

## Components and Assemblies Catalog

High Voltage Diodes  
High Voltage and  
High Current Rectifier Assemblies  
High Voltage Ceramic Capacitors  
Bridge Rectifiers and Bridge Assemblies  
MOVs  
Silicon Carbide Surge Suppressors  
Selenium Surge Suppressors



## About Us



Dean Technology, Inc. has a long and exceptional history providing world-class products, design, and

solutions for high voltage and high power markets and applications. Grown through the consolidation of many complimentary brands, the full product offering can supply everything from components through complete systems. Headquartered in Dallas Texas, with production facilities in the United States and China, as well as sales offices throughout the world, DTI is a truly modern multi national company. Our broad range of locations and capabilities with all activities directed through a close-knit team of experienced executives, allows us to be exceptionally price competitive and flexible, while ensuring the quality and technical know how expected of a US manufacturer.

Dean Technology brings a distinctive approach to the manufacture and sale of electronics. While most manufacturers prefer the path of least resistance, seeking only new cost reducing methods and increased margins, we remain focused on providing the correct product and solution to meet each individual design. All of the engineers on our staff work directly with our customers, helping to ensure we are providing the correct technical solution, and offering lower cost items whenever appropriate. We firmly believe that through this honest, involved, and direct approach we are best able to meet our customers' needs. We know that content and successful customers are what ensure our own success.

It is this unique thinking about how to work with our customers that allows DTI to bring together the most current back office technology, modern business practices, cutting edge design and proven manufacturing techniques to offer the best and newest products while maintaining support for more traditional and legacy items. We aim to discontinue only those products for which we can immediately offer a form fit and function replacement that is equal to or better than the performance, quality and reliability of its predecessor. Where other manufacturers abandon products and markets that don't show year over year quantity growth, we see and are committed to the long-term value of everything we sell. Designing with Dean Technology product ensures you will have continued support well into the future.

Dean Technology, Inc. is focused completely on providing our customers with the very best we have to offer, in every way possible. We revel in the specific details of each and every customer's needs, and given the opportunity, will work tirelessly for their success.



Farmingdale, NJ facility



Lucernemines, PA facilities



Indiana, PA facility



Carrollton, TX facility



Anshan, Liaoning  
China facility

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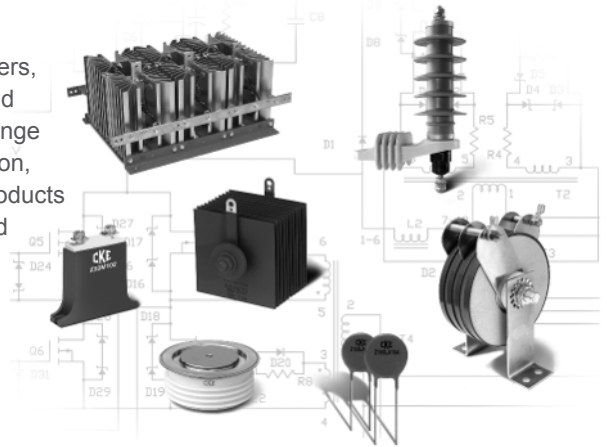
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## Product Line Descriptions



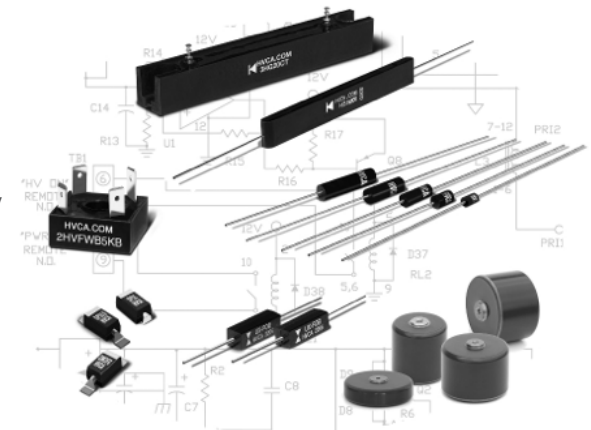
### CKE

CKE is a line of high voltage and high power silicon rectifiers, MOVs, selenium suppressors, silicon carbide varistors, and assemblies. These products are appropriate for a wide range of applications, and find a special fit in the power generation, resistance welding and RF power systems markets. All products can be customized to meet specific needs, and are offered with a wide variety of packaging, and connection options.



### HVCA

The HVCA product line centers on high voltage diodes, ceramic capacitors, bridge rectifiers and assemblies. Advanced diffusion and manufacturing techniques allow us to produce a wide range of diodes, and rectifier products. Tight control of these designs and processes allow for custom versions of any product within this line, and delivery on short lead times. Dean Technology has extensive expertise in high voltage assembly and encapsulation allowing replication of most any competitive or discontinued part.



### HVPSI

The HVPSI line of products includes standard, modified standard, build to print, and custom multipliers, power supplies and test equipment. The HVPSI line is our most complex, and represents all of the best we have to offer. This product line is not represented in this publication, but many of the products listed are used in the production of the HVPSI line. We believe so strongly in our own products that we are one of our own biggest customers for our own components.

High voltage power supplies and multipliers are complex and delicate designs, which require many specific features depending on the exact application. Whether for electrostatic, x-ray, imaging, or any other high voltage application, the HVPSI line and exceptional design support of Dean Technology is perfectly suited. DTI is highly dedicated to this product line, and is investing heavily in developing new techniques and products that will allow us to significantly reduce the design time on custom power supplies. This is all simply a continuation of the dedication we carry through to our customers' needs on all of our offerings.



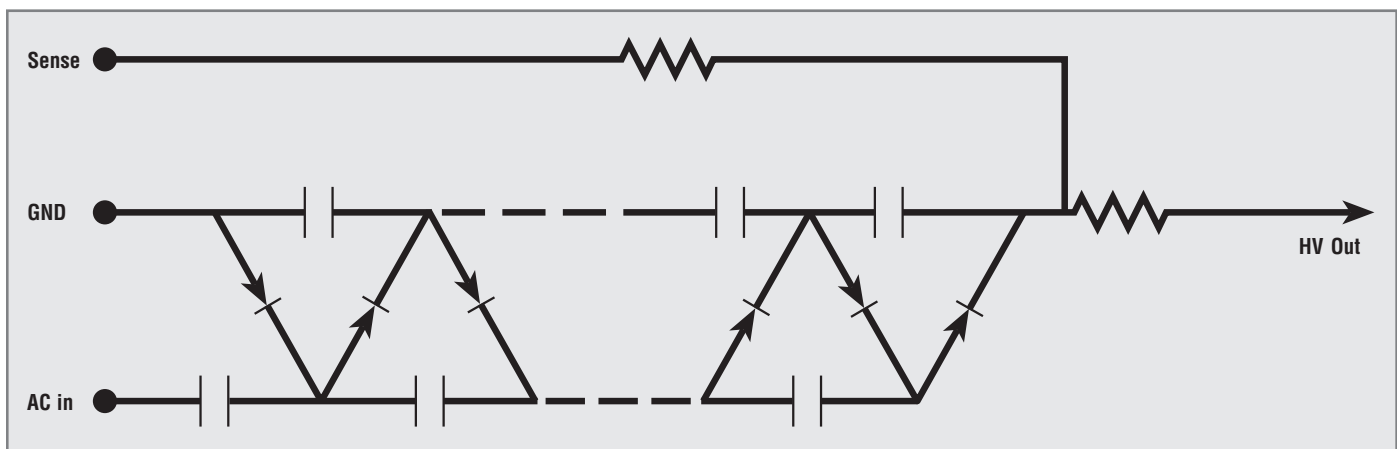
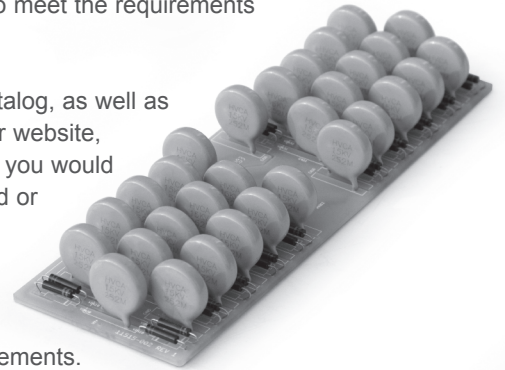
Dean Technology is very aware of all the special requirements of high voltage applications. Although we offer a vast selection of products, and try to cover all possible needs, we are acutely



aware that in high voltage, one size does not fit all. In support of this, every single thing we offer can be customized. When doing electronics design nothing can offer the performance and effectiveness of a custom solution. DTI can produce these custom solutions, in most cases, without the premium cost that most manufacturers require.

By maintaining full control over the design and build of everything we sell, we can offer everything as custom, from the lowest level component, through the full system. Our engineers are involved in every product recommendation we make. When we don't have a perfect offering, they are already primed and ready to help design something new. We also have all of the necessary testing facilities to aid in the development and design process, ensuring that everything we ship has been tested to meet the requirements it was designed for.

Consider this entire catalog, as well as everything listed on our website, as a capacity guide. If you would like something changed or something completely new, just ask, we'll be more than happy to work with you to meet your exact requirements.



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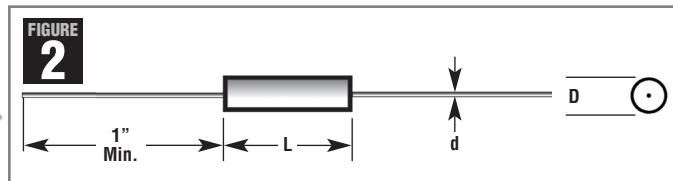
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# HIGH VOLTAGE LOW CURRENT DIODES - NV, G, HVEF, HL, HVRT AND HVRL SERIES



Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ V	Avg. Forward Current Max. $I_{FAVM@55^{\circ}C}$ mA	Max. Forward Voltage Drop $V_F@I_F$ V	Max. Reverse Current $I_R@V_{RRM@25^{\circ}C}$ $\mu$ A	Max. Surge Current $I_{FSM}^3$ A	Junction Capacitance Typ $C_J^2$ pF	Max. Reverse Recovery Time $T_{RR}^1$ nS	Body Length L	Body Diameter D	Lead Diameter d
<b>NV Series - Subminiature High Voltage Diodes <math>T_{RR}</math> 80nS</b>										Figure 2
NV20FP	2000	20	10	0.02	3	0.85	80	0.120	0.080	0.020
NV30FP	3000	20	10	0.02	3	0.85	80	0.120	0.080	0.020
NV40FP	4000	20	10	0.02	3	0.85	80	0.120	0.080	0.020
NV50FP	5000	20	10	0.02	3	0.85	80	0.120	0.080	0.020
<b>G Series - Subminiature High Voltage Diodes <math>T_{RR}</math> 75nS</b>										Figure 2
G2FSA	2000	25	12	0.20	3	0.50	75	0.195	0.080	0.020
G3FSA	3000	25	12	0.20	3	0.50	75	0.195	0.080	0.020
G4FSA	4000	25	12	0.20	3	0.50	75	0.195	0.080	0.020
G5FSA	5000	25	12	0.20	3	0.50	75	0.195	0.080	0.020
<b>G Series - Miniature High Voltage Diodes <math>T_{RR}</math> 100nS</b>										Figure 2
G6FS	6000	25	18	0.20	3	0.38	100	0.320	0.120	0.020
G7FS	7000	25	18	0.20	3	0.38	100	0.320	0.120	0.020
G8FS	8000	25	23	0.20	3	0.65	100	0.320	0.120	0.024
G10FS	10000	25	23	0.20	3	0.65	100	0.320	0.120	0.024
G12FS	12000	25	25	0.20	3	0.26	100	0.400	0.120	0.024
G15FS	15000	25	25	0.20	3	0.26	100	0.400	0.120	0.024
G20FS	20000	25	35	0.20	3	0.25	100	0.470	0.120	0.024
G25FS	25000	25	42	0.20	3	0.20	100	0.470	0.120	0.024
G30FS	30000	25	48	0.20	3	0.26	100	0.470	0.120	0.024
<b>DV Series - Subminiature High Voltage Rectifier <math>T_{RR}</math> 75nS</b>										Figure 2
DV6P	6000	90	8	0.02	3	1.3	75	0.195	0.080	0.020
DV8P	8000	70	11	0.02	3	0.9	75	0.195	0.080	0.020
DV10P	10000	55	16	0.04	3	0.65	75	0.195	0.080	0.020
<b>HVEF Series - Miniature High Voltage Diodes <math>T_{RR}</math> 20nS</b>										Figure 2
HVEF8P	8000	25	20	0.20	3	0.33	20	0.260	0.100	0.021
HVEF10P	10000	20	23	0.20	3	0.30	20	0.400	0.100	0.021
HVEF12P	12000	20	27	0.20	3	0.25	20	0.400	0.100	0.021
<b>HVRL Series - Miniature High Voltage Diodes <math>T_{RR}</math> 100nS</b>										Figure 2
HVRL150	15000	30	30	1.00	3	0.5	100	0.60	0.17	0.032
HVRL200	20000	30	35	1.00	3	1.0	100	0.60	0.17	0.032
HVRL250	25000	30	40	1.00	3	0.9	100	0.60	0.17	0.032
HVRL300	30000	30	45	1.00	3	0.8	100	0.60	0.17	0.032
HVRL400	40000	30	50	1.00	3	0.6	100	0.60	0.17	0.032
<b>HL Series - Miniature High Voltage Diodes <math>T_{RR}</math> 100nS</b>										Figure 2
HL300	3000	40	26	1.00	3	0.3	100	0.4	0.12	0.025
HL500	5000	40	26	1.00	3	0.3	100	0.4	0.12	0.025
HL800	8000	40	26	1.00	3	0.3	100	0.4	0.12	0.025
HL1000	10000	40	26	1.00	3	0.3	100	0.4	0.12	0.025
HL1200	12000	40	26	1.00	3	0.3	100	0.4	0.12	0.025
<b>HVRT Series - Miniature High Voltage Diodes <math>T_{RR}</math> 100nS</b>										Figure 2
HVRT080	8000	30	20	1.00	0.5	0.8	100	0.32	0.12	0.025
HVRT100	10000	30	23	1.00	0.5	0.7	100	0.4	0.12	0.025
HVRT120	12000	30	25	1.00	0.5	0.6	100	0.4	0.12	0.025
HVRT150	15000	55	35	1.00	3	0.5	100	0.47	0.12	0.025
HVRT200	20000	55	35	1.00	3	1.0	100	0.47	0.12	0.025
HVRT250	25000	55	35	1.00	3	0.9	100	0.47	0.12	0.025
HVRT300	30000	55	48	1.00	3	0.8	100	0.47	0.12	0.025

**Notes:**

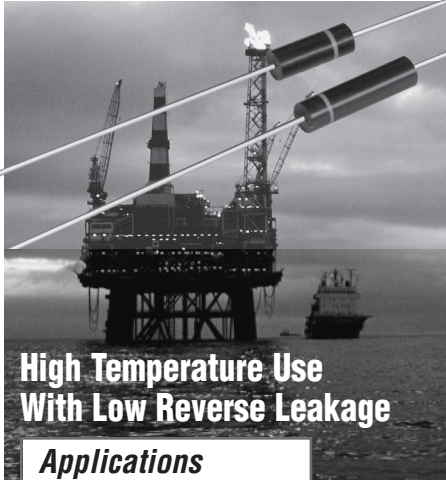
<sup>1</sup> See page 23, Fig 141 for data related to  $T_{RR}$  measurements.

<sup>2</sup> Diode Junction Capacitance is measured at 1 MHz,  $V_R = 0$  and  $T_A = 25^{\circ}C$

<sup>3</sup> 1/2 Sine(60Hz) @ 25°C

All devices listed are RoHS compliant.

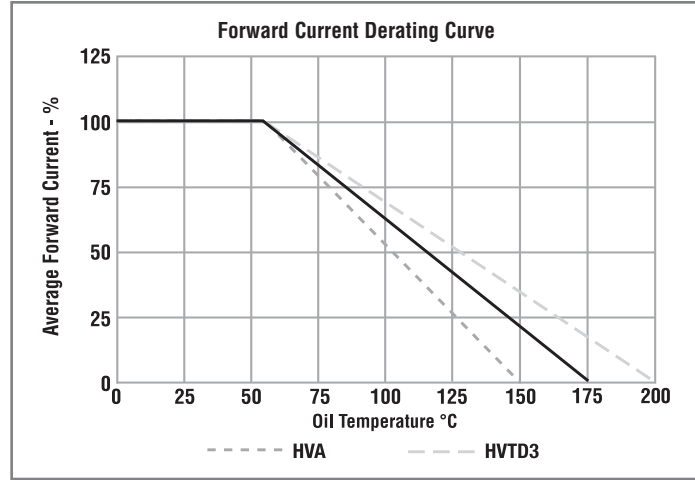
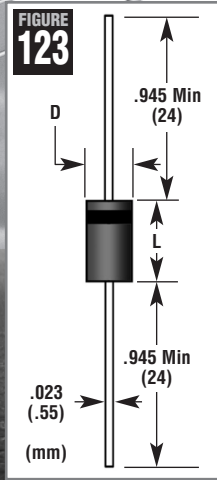
Direct replacements for the discontinued CS4200 and CS4300 series diodes may be found on this page. Contact factory.



**High Temperature Use  
With Low Reverse Leakage**

**Applications**

- Downhole Use
- Oil Well Drilling
- Automotive



Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ V	Average Forward Current Max. $I_{FAVM@55°C}$ mA	Average Forward Current Max. $I_{FAVM@175°C}$ mA	Maximum Forward Voltage Drop $V_F@I_{FAVM@25°C}$ V	Maximum Reverse Current $I_{RRM@25°C}$ $\mu A$	Maximum Reverse Current $I_{RRM@175°C}$ $\mu A$	Maximum Forward Surge Current $I_{FSM}^1$ A	Typical Reverse Recovery Time $T_{RR}^2$ nS	Body Length L Inches	Body Diameter D Inches
<b>HVTD Series - High Temperature Diodes</b>										
Ambient Operating Temperature Range -55°C to +175°C										Figure 123
HVTD5	5000	50	5	15.0	0.5	15	3	-	0.32	0.12
HVTD5L	5000	35	5	25.0	0.5	5	3	-	0.40	0.10
HVTD6	6000	35	5	25.0	0.5	7.5	3	-	0.40	0.10
HVTD7	7000	35	5	25.0	0.5	7.5	3	-	0.40	0.10
<b>HVTDR Series - High Temperature Fast Recovery Diodes</b>										
Ambient Operating Temperature Range -55°C to +175°C										Figure 123
HVTDR3	3000	25	1	25.0	0.20	14.0	3	300@175°C	0.26	0.10
HVTDR4	4000	25	1	25.0	0.20	15.0	3	300@175°C	0.26	0.10
HVTDR5	5000	25	1	25.0	0.20	16.0	3	300@175°C	0.26	0.10
HVTDR6	6000	25	1	25.0	0.20	18.0	3	300@175°C	0.26	0.10
HVTDR7	7000	25	1	25.0	0.20	20.0	3	300@175°C	0.26	0.10

Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ V	Average Forward Current Max. $I_{FAVM@55°C}$ mA	Average Forward Current Max. $I_{FAVM@200°C}$ mA	Maximum Forward Voltage Drop $V_F@I_{FAVM@25°C}$ V	Maximum Reverse Current $I_{RRM@25°C}$ $\mu A$	Maximum Reverse Current $I_{RRM@200°C}$ $\mu A$	Maximum Forward Surge Current $I_{FSM}^1$ A	Typical Reverse Recovery Time $T_{RR}$ nS	Body Length L Inches	Body Diameter D Inches
<b>HVTD Series - Very High Temperature Diodes</b>										
Ambient Operating Temperature Range -55°C to +200°C										Figure 123
HVTD3	3000	50	1	25	0.5	18.0 Typ	3	-	0.40	0.10

Part Number	Max. Reverse Voltage $V_{T_A=25°C}$ V	Reverse Avalanche Voltage $V_Z$ $I_R=100\mu A@25°C$ V	Average Forward Current Max. $T_A=55°C$ mA	Max. Forward Voltage Drop $I_F=1mA@25°C$ V	Max. Reverse Current $V_{RRM@25°C}$ $I_R$ $\mu A$	Max. Reverse Current $V_{RRM@150°C}$ $I_R$ $\mu A$	Max. Forward Surge Current $I_{FSM}^1$ A	Max. Junction Temperature $T_{JMAX}$ °C	Body Length L Inches	Body Diameter D Inches
<b>HVA Series Automotive Diodes<sup>3</sup></b>										
Ambient Operating Temperature Range -55°C to +150°C										Figure 123
HVA8J	4000	3200 - 6000	150	8.0	2.0	10	3.0	150	.32	.12

Notes:

<sup>1</sup> 1/2 Sine(60Hz) @ 25°C

<sup>2</sup>  $T_{RR}$  100nS@25°C

<sup>3</sup> The HVA8J is used in many automotive applications but has not been subjected to the full AEC Q101 testing regime.

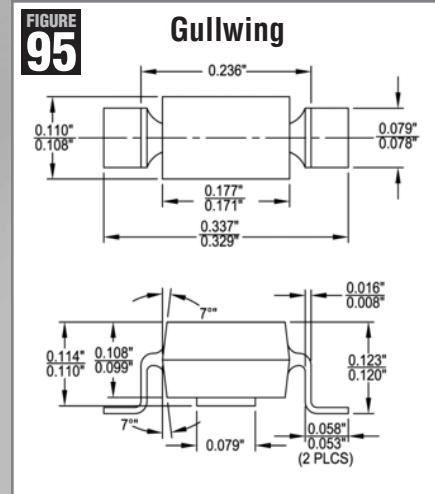
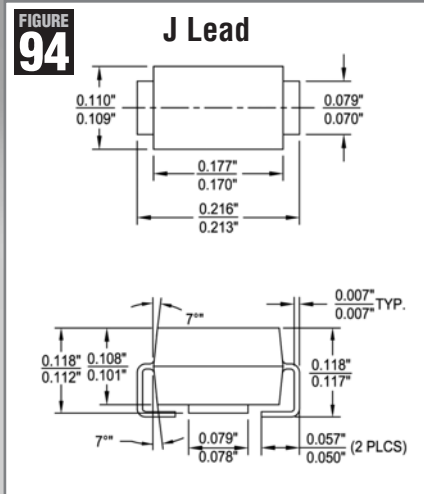
Operating & Storage Temperature -55°C to 150°C unless otherwise noted.

$C_J$  Data is not available for standard recovery devices except by special request

$I_R$  is measured in oil after voltage has been applied for 3 minutes on all HVTD series diodes.

HVTDR3 – HVTDR7 have the same  $C_J = 0.36pF$  measured at  $F = 1$  mHz,  $V_R = 0$ ,  $T_A = 25°C$

All devices listed are RoHS compliant.



**SMA Package Voltages up to 8kV**

**Currents up to 900mA**

Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ V	Average Forward Current Max. $I_{FAVM}@T_L=55^{\circ}C$ mA	Average Forward Current Max. $I_{FAVM}@T_L=100^{\circ}C$ mA	Maximum Forward Voltage Drop $V_F@100mA$ V	Typical Junction Capacitance $C_J@V_R=0\ VDC^1$ (pF)	Maximum Reverse Current $I_{RR}@25^{\circ}C$ $\mu A$	Maximum Reverse Recovery Time $T_{RR}@25^{\circ}C$ nS	Maximum Surge Current $I_{FSM}^2$ A	Typical Thermal Resistance $R_{\theta JL}$ ( $^{\circ}C/W$ ) <sup>3</sup>	
<b>SM &amp; SP Series - High Voltage Surface Mount Diodes</b>					<b>J Lead Devices</b>					<b>Figure 94</b>
SM3F	3000	900	350	3.7	6.0	0.5	65	10	27	
SP3A	3000	750	200	3.2	15.0	0.5	100	15	30	
SP3L	3000	450	110	3.6	9.0	0.5	75	10	17	
SP3S	3000	120	50	3.9	2.5	0.5	75	3	40	
SP5L	5000	270	140	8.5	4.5	0.5	75	10	32	
SP5LF	5000	270	140	7.6	6.8	0.5	50	10	32	
SP5S	5000	40	20	14.0	1.0	0.5	60	3	55	
<b>SM &amp; SP Series - High Voltage Surface Mount Diodes</b>					<b>Gullwing Devices</b>					<b>Figure 95</b>
SM3FG	3000	900	350	3.7	6.0	0.5	65	10	27	
SP3AG	3000	750	200	3.2	15.0	0.5	100	15	30	
SP3LG	3000	450	110	3.6	9.0	0.5	75	10	17	
SP3SG	3000	120	50	3.9	2.5	0.5	75	3	40	
SP5LG	5000	270	140	8.5	4.5	0.5	75	10	32	
SP5LFG	5000	270	140	7.6	7.2	0.5	50	10	32	
SP5SG	5000	40	20	14.0	1.0	0.5	60	3	55	
SP8LG <sup>4</sup>	8000	100	40	18.0	3.3	0.5	75	10	15	
SP8SG <sup>4</sup>	8000	40	20	18.0	0.8	0.5	75	3	45	

**Notes:**

<sup>1</sup> Diode Junction Capacitance is measured at 1 MHz,  $V_R=0$  and  $T_A=25^{\circ}C$

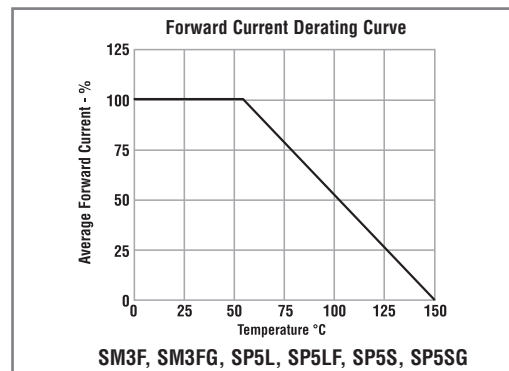
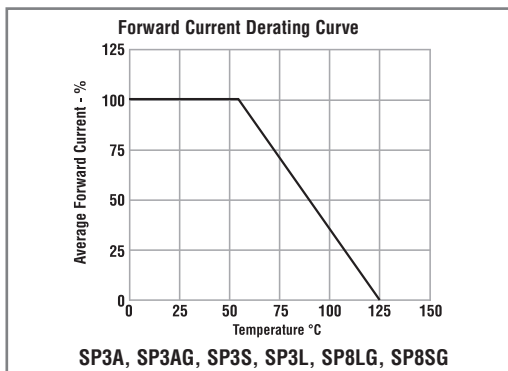
<sup>2</sup> 1/2 Sine(60Hz) @ 25°C

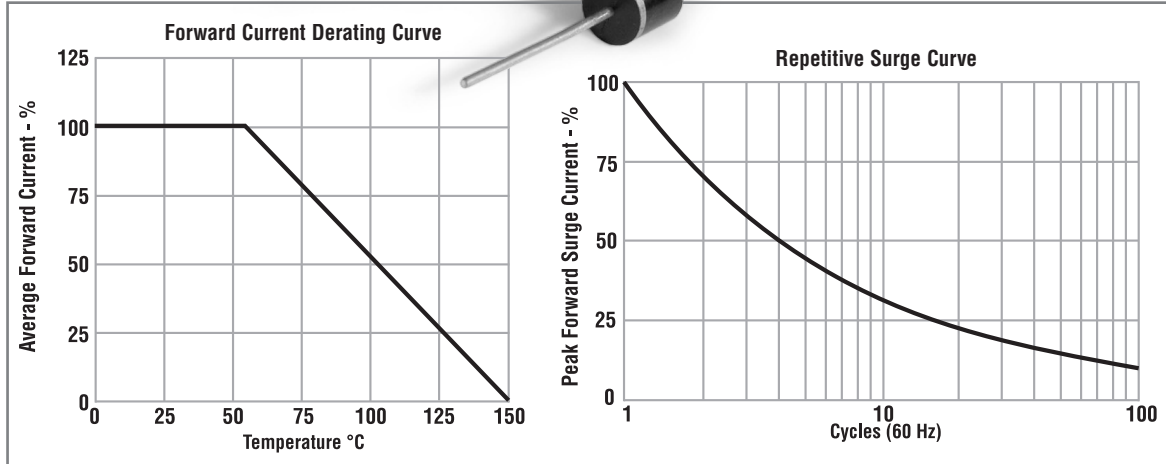
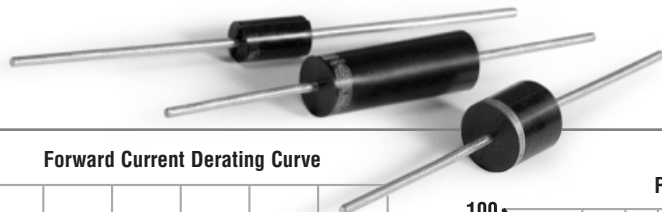
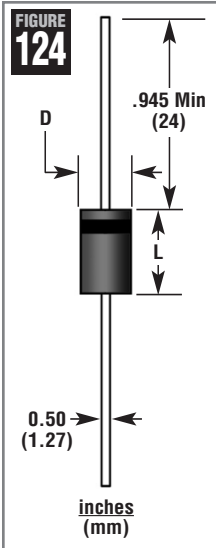
<sup>3</sup> P.C.B. mounted on 0.2" x 0.2" (5.0mm x 5.0mm) copper solder pads

<sup>4</sup> SP8LG & SP8SG should not be operated at voltages above 5kV in air.

See page 23 for notes on max package operating voltage -  $V_{RRM}$  vs package applicability  
All devices listed are RoHS compliant.

**Derating Curves**





Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ V	Avg. Forward Current Max $I_{FAVM@55^{\circ}C}$ A	Avg. Forward Voltage Drop $V_F@I_{FAVM}$ V	Max. Reverse Current $I_R@V_{RRM}@25^{\circ}C$ $\mu A$	Max. Surge Current $I_{FSM}$ (8.3ms) A	Typical Junction Capacitance <sup>1</sup> pF	Max. Reverse Recovery Time $T_{RR}$ <sup>2</sup> nS	Body Length L Inches	Body Diameter D Inches
<b>BR Series - High Voltage Medium and High Current Diodes</b> <span style="float: right;">Figure 124</span>									
BR2	2000	1.00	2.4	5.0	40	-	-	0.354	0.197
BR4	4000	0.85	4.4	5.0	20	-	-	0.354	0.197
BR2F	2000	0.9	3.8	5.0	40	35	100	0.354	0.197
BR4F	4000	0.6	7.0	5.0	20	36	100	0.354	0.197
BR5F	5000	0.6	8.8	5.0	20	20	100	0.354	0.197
BR6F	6000	0.5	10.5	5.0	20	19	100	0.354	0.197
BR10F	10000	0.25	14.0	5.0	20	10	100	0.354	0.197
BRU10SF	10000	0.25	17.0	5.0	20	7	75	0.354	0.197
<b>HVW HVRW Series - High Voltage High Current Diodes</b> <span style="float: right;">Figure 124</span>									
HVW3	3000	2.0	3.0	5.0	300	-	-	0.36	0.36
HVRW1	1000	2.5	2.0	10.0	200	105.0	150	0.38	0.32
HVRW2	2000	1.5	4.0	10.0	200	52.0	150	0.38	0.32
HVRW3	3000	1.5	5.0	10.0	200	35.0	150	0.38	0.32
HVRW4	4000	1.0	6.0	10.0	200	27.0	150	0.38	0.32
<b>CL03 Series - High Voltage Medium Current Fast Recovery Diodes</b> <span style="float: right;">Figure 124</span>									
CL03-8	8000	0.40	20.0	2.0	20	6.2	100	0.87	0.3
CL03-10	10000	0.30	25.0	2.0	20	5.3	100	0.87	0.3
CL03-12	12000	0.25	30.0	2.0	20	4.4	100	0.87	0.3
CL03-15	15000	0.20	35.0	2.0	20	3.5	100	0.87	0.3
CL03-20	20000	0.12	38.0	2.0	20	2.8	100	0.87	0.3
<b>2CL100 Series - High Voltage Medium Current Standard Recovery Diodes</b> <span style="float: right;">Figure 124</span>									
2CL105	9000	0.45	10.0	2.0	30	-	-	0.84	0.3
2CL106	12000	0.45	12.0	2.0	30	-	-	0.84	0.3
<b>HV550 Series - High Voltage Medium Current Standard Recovery Diodes</b> <span style="float: right;">Figure 124</span>									
HV550S08	8000	0.55	8.0	5.0	30	-	-	0.87	0.3
HV550S10	10000	0.45	9.0	5.0	30	-	-	0.87	0.3
HV550S12	12000	0.40	12.0	30.0	30	-	-	0.87	0.3
HV550S15	15000	0.35	14.0	30.0	30	-	-	0.87	0.3
HV550S20	20000	0.25	17.0	30.0	30	-	-	0.87	0.3
HV550S25	25000	0.20	21.0	30.0	30	-	-	0.87	0.3
HV550S30	30000	0.20	25.0	30.0	30	-	-	0.87	0.3

Notes:

<sup>1</sup> Diode Junction Capacitance is measured at 1 MHz,  $V_R=0$  and  $T_A=25^{\circ}C$

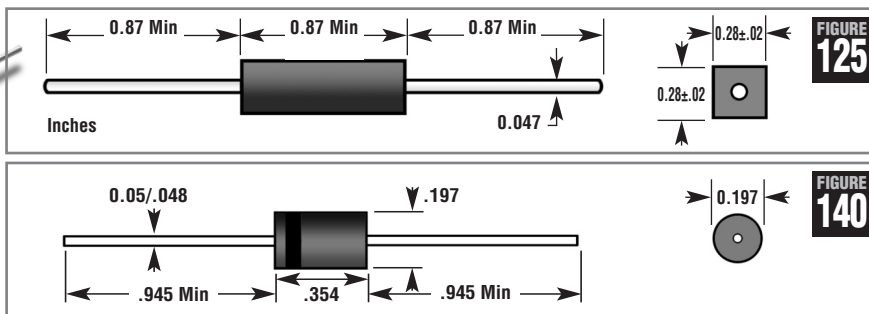
<sup>2</sup> A “-” indicates the component is a standard recovery device and no  $T_{RR}$  data is taken. See page 23 for info.

DTI suggests that a proper heatsink is used on the leads of this device to prevent damage from heating and to achieve maximum current capability. All devices listed are RoHS compliant.



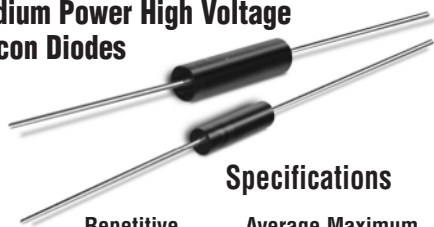


## High Voltage Power Diodes Ultra-Fast Recovery

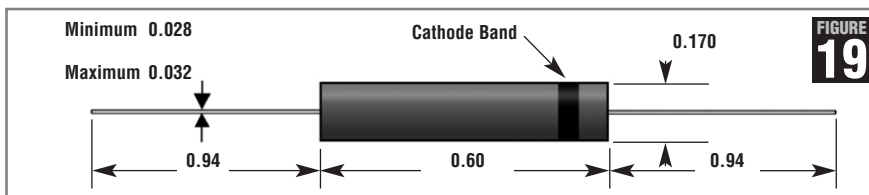


Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ V	Average Maximum Forward Current $I_{FAVM}@$		Maximum Forward Voltage Drop $V_F@I_F^3$ V	Maximum Surge Current $I_{FSM}^2$ A	Maximum Reverse Current $I_R@V_{RRM}@25^\circ C$ $\mu A$	Typical Junction Cap $C_j^1$ pF	Maximum Reverse Recovery Time $T_{RR}$ nS	Figure
		$T_A=55^\circ C$ mA	$T_{OL}=55^\circ C$ mA						
<b>UX Series - Ultra Fast Recovery High Current Diodes</b>									
UX-FOB	8000	500	600	12	20	0.5	7.5	40	125
UX-FBR8	8000	420	500	12	20	0.5	7.5	40	140
UX-F15B	15000	200	320	16	20	0.5	3.5	50	125
UX-F2CL15	15000	150	250	16	20	0.5	3.5	50	19
<b>HV200UF Series - Ultra Fast Recovery High Current Diodes</b>									
HV200UF3	3000	200	375	15	8	1.0	12	50	140
HV200UF4	4000	200	375	15	8	1.0	12	50	140
HV200UF5	5000	200	375	15	8	1.0	12	50	140

## Medium Power High Voltage Silicon Diodes



### Specifications



Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ V	Average Maximum Forward Current $I_{FAVM}$		Maximum Forward Voltage Drop $V_F@I_F^3$ V	Maximum Surge Current $I_{FSM}^2$ A	Maximum Reverse Current $I_R@V_{RRM}$		Typical Junction Cap $C_j^1$ pF	Maximum Reverse Recovery Time $T_{RR}$ nS	Figure
		$@T_A=40^\circ C$ mA	$@T_{OL}=55^\circ C$ mA			$T_A=25^\circ C$ $\mu A$	$T_A=100^\circ C$ $\mu A$			
<b>2CL Series - Medium Current Diodes</b>										
2CL2F	8000	100	220	10	20	2.0	40	-	-	19
2CL2G	10000	100	220	12	20	2.0	40	-	-	19
2CL2H	12000	100	220	13	20	2.0	40	-	-	19
2CL2J	15000	100	220	16	20	2.0	40	-	-	19
2CL2FF	8000	60	120	16	10	2.0	50	4.1	150	19
2CL2FG	10000	60	120	18	10	2.0	50	3.3	150	19
2CL2FH	12000	60	120	20	10	2.0	50	2.3	150	19
2CL2FJ	15000	60	120	24	10	2.0	50	1.8	150	19
2CL2FK	10000	140	240	22	10	2.0	50	2.7	100	19
2CL2FL	15000	120	200	26	10	2.0	50	2.5	100	19
2CL2FM	20000	100	170	35	10	2.0	50	1.9	100	19
2CL2FP	30000	80	140	46	10	2.0	50	1.1	100	19
2CL2FR	35000	60	100	52	10	2.0	50	0.9	100	19
<b>HV Series - High Current Diodes</b>										
HV37-08	8000	210	410	12	15	2.0	10	7.4	150	19
HV37-10	10000	190	365	13	15	2.0	10	6.0	150	19
HV37-10F	10000	190	365	14	15	2.0	10	5.0	120	19
HV07-12B	12000	225	500	11	30	2.0	10	-	-	19

Notes:

<sup>1</sup> Diode Junction Capacitance is measured at 1 MHz,  $V_R=0$  and  $T_A=25^\circ C$

<sup>2</sup> 1/2 Sine(60Hz) @ 25°C

<sup>3</sup>  $V_F$  measured at 100mA & 25°C

See page 23 for notes on max package operating voltage -  $V_{RRM}$  vs package applicability  
All devices listed are RoHS compliant.



Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ V	Avg. Forward Current Max. $I_{FAVM@55^{\circ}C}$ mA	Max. Forward Voltage Drop $V_f@I_f$ Per Leg V	Max. Reverse Current $I_R@V_{RRM@25^{\circ}C}$ $\mu A$	Max. Surge Current $I_{FSM}$ (8.3ms) A	Max. Reverse Recovery Time $T_{RR}$ nS	Figure 20 Board Size
<b>HVB, XRB Series - High Voltage Rectifiers</b>							
HVSB100	100000	220	140	2	20	-	A
HVSB150	150000	220	182	2	20	-	A
HVSB200	200000	220	224	2	20	-	A
HVSBF100	100000	220	308	2	10	100	A
HVSBF150	150000	220	364	2	10	100	A
HVSBF200	200000	220	364	2	10	100	A
XRB100	100000	220	160	2	20	-	B
XRB125	125000	220	192	2	20	-	B
XRB150	150000	220	208	2	20	-	B
XRB175	175000	220	256	2	20	-	B
XRB200	200000	220	256	2	20	-	B
XRBF100	100000	220	352	2	10	100	B
XRBF125	125000	220	352	2	10	100	B
XRBF150	150000	220	416	2	10	100	B
XRBF175	175000	220	416	2	10	100	B
XRBF200	200000	220	416	2	10	100	B
XRBF250	250000	220	560	2	10	100	B
XRLB100	100000	220	170	2	20	-	C
XRLB125	125000	220	204	2	20	-	C
XRLB150	150000	220	221	2	20	-	C
XRLB175	175000	220	221	2	20	-	C
XRLB200	200000	220	272	2	20	-	C
XRLBF100	100000	220	374	2	10	100	C
XRLBF125	125000	220	374	2	10	100	C
XRLBF150	150000	220	442	2	10	100	C
XRLBF175	175000	220	442	2	10	100	C
XRLBF200	200000	220	442	2	10	100	C
XRLBF250	250000	220	595	2	10	100	C
HVMB175	175000	220	230	2	20	-	D
HVMB225	225000	220	276	2	20	-	D
HVMB275	275000	220	299	2	20	-	D
HVMB325	325000	220	368	2	20	-	D
HVMBF225	225000	220	506	2	10	100	D
HVMBF325	325000	220	598	2	10	100	D
HVMBF450	450000	220	805	2	10	100	D
HVB200	200000	220	300	2	20	-	E
HVB250	250000	220	360	2	20	-	E
HVB300	300000	220	360	2	20	-	E
HVB350	350000	220	390	2	20	-	E
HVB450	450000	220	480	2	20	-	E
HVBF200	200000	220	660	2	10	100	E
HVBF250	250000	220	660	2	10	100	E
HVBF300	300000	220	660	2	10	100	E
HVBF350	350000	220	780	2	10	100	E
HVBF450	450000	220	780	2	10	100	E
HVBF600	600000	220	1050	2	10	100	E
<b>HVB•, HVBF• - High Voltage Board Center Tap and Doubler (Voltage is Per Leg, Double the Voltage for the Whole Board)</b>							
HVB•75	75000	220	110	2	20	-	F
HVB•100	100000	220	132	2	20	-	F
HVB•125	125000	220	143	2	20	-	F
HVB•150	150000	220	176	2	20	-	F
HVBF•100	100000	220	242	2	10	100	F
HVBF•150	150000	220	286	2	10	100	F
HVBF•200	200000	220	385	2	10	100	F

Notes:  
Where • appears in part number P, N or D should be inserted as appropriate. See explanation at right.

**P=Positive Center Tap**  
**N=Negative Center Cap**  
**D=Doubler**

**Positive Center Tap (P)**



Positive Center Tap 220mA, 75000V/LEG HVBP75

**Negative Center Tap (N)**



Negative Center Tap 220mA, 75000V/LEG HVBN75

**Doubler (D)**



( $I_{FAVM}$  of Doubler is  $I_{FAVM} \times 0.5$ )

Fast Recovery Doubler 220mA, 75000V/LEG HVBD75

To achieve rated current and voltage, diodes must be submerged in Shell Diala AX electrical insulating oil or equivalent.

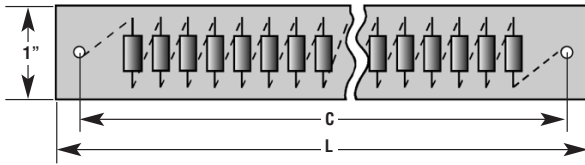
Boards over 200kV are only forward voltage tested after assembly, all individual diodes are reverse tested at full rated voltage before assembly.

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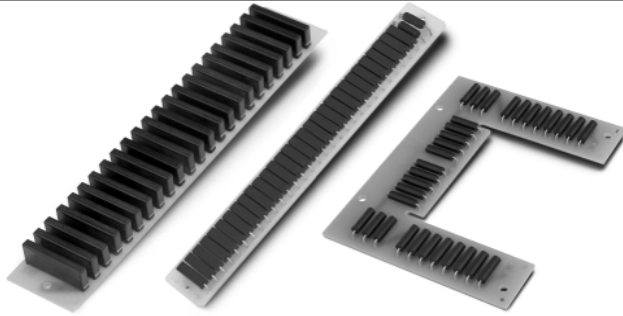
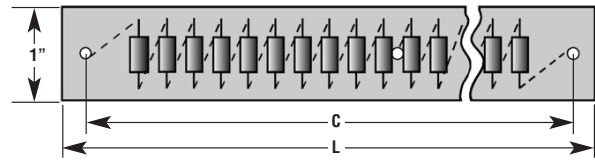


FIGURE 20

High Voltage Board Rectifier Assembly (A-E)



High Voltage Board Rectifier Assembly (F)



Board Size	Dimension L	Dimension C	Hole Diameter
A	4.17	3.85	0.16
B	6	5.6	0.15
C	6.75	6.5	0.16
D	8.6	8.3	0.16
E	10.5	10	0.15
F	6.5	6.17*	0.14

\*This is the end hole center to center dimension, middle hole is offset 3" & 3.17"

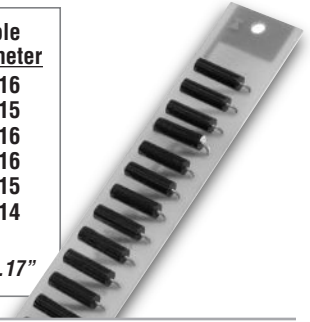


FIGURE 146

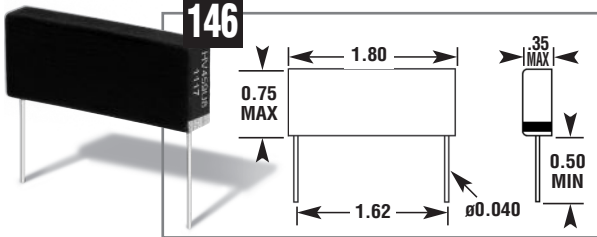
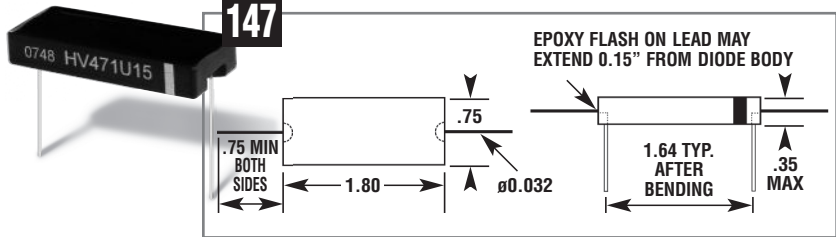


FIGURE 147



Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ V	Average Forward Current Maximum $I_{FAVM}@$ $T_A=25^\circ\text{C}$ mA $T_{OH}=55^\circ\text{C}$ mA	Maximum Forward Voltage Drop $V_F@I_F^3$ V	Maximum Reverse Current $I_R@V_{RRM}@25^\circ\text{C}$ $\mu\text{A}$	Typical Junction Capacitance $C_j^1$ pF	Maximum Reverse Recovery Time $T_{RR}$ nS	Maximum Surge Current $I_{FSM}$ (8.3ms) <sup>2</sup> A	Figure
<b>HV459S Series - High Current Rectifiers Standard Recovery</b>								
HV459S8	8000	1100	2000	10.0	-	-	80	146
HV459S10	10000	970	2000	12.5	-	-	80	146
HV459S12	12000	850	2000	15.0	-	-	80	146
<b>HV459U Series - High Current Rectifiers Ultra Fast Recovery</b>								
HV459U8	8000	850	1500	10.7	8.3	75	45	146
HV459U10	10000	750	1500	13.4	6.6	75	45	146
HV459U12	12000	650	1500	16.1	5.5	75	45	146
<b>HV458S Series - Medium Current Rectifiers Standard Recovery</b>								
HV458S8	8000	650	1200	8.0	-	-	50	146
HV458S10	10000	550	1000	10.0	-	-	50	146
HV458S12	12000	475	870	12.0	-	-	50	146
HV458S15	15000	425	780	15.0	-	-	50	146
<b>HV458U Series - Medium Current Rectifiers Ultra Fast Recover</b>								
HV458U8	8000	425	750	20.0	4.7	75	30	146
HV458U10	10000	375	660	25.0	3.8	75	30	146
HV458U12	12000	325	570	30.0	3.2	75	30	146
HV458U15	15000	275	480	37.5	2.5	75	30	146
<b>HV471U Series - Medium Current Rectifiers Ultra Fast Recovery</b>								
HV471U8	8000	425	750	20.0	4.7	75	30	147
HV471U10	10000	375	660	25.0	3.8	75	30	147
HV471U12	12000	325	570	30.0	3.2	75	30	147
HV471U15	15000	275	480	37.5	2.5	75	30	147

<sup>1</sup> Diode Junction Capacitance is measured at 1 Mhz,  $V_R=0$  and  $T_A=25^\circ\text{C}$

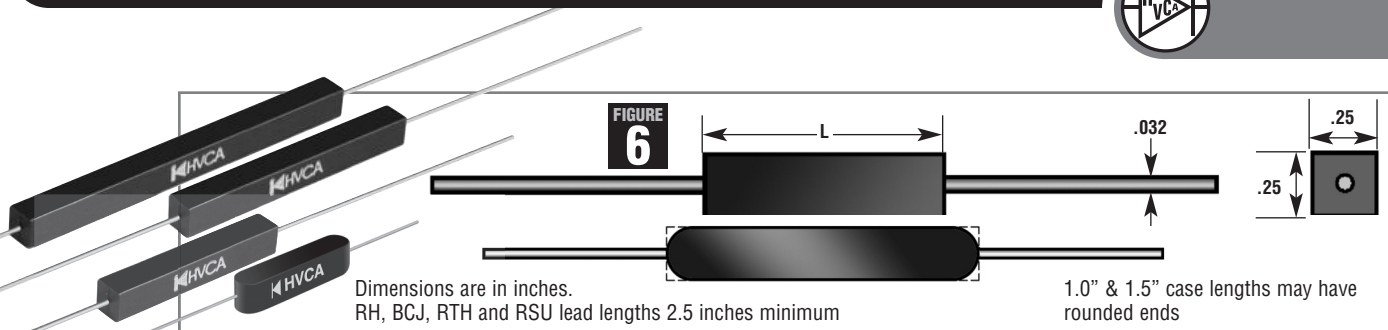
<sup>2</sup> 1/2 Sine(60Hz) @  $25^\circ\text{C}$

<sup>3</sup>  $V_F$  measured at 100mA &  $25^\circ\text{C}$

A "-" indicates the component is a standard recovery device and no  $T_{RR}$  data is taken. See page 23 for info.

Storage & Operating Temperatures  $-55^\circ\text{C}$  to  $150^\circ\text{C}$

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Dimensions are in inches.  
RH, BCJ, RTH and RSU lead lengths 2.5 inches minimum

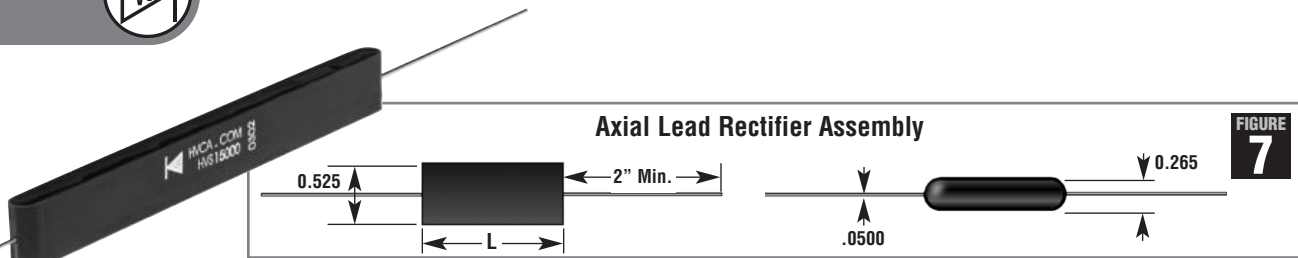
1.0" & 1.5" case lengths may have rounded ends

Part Number	Peak Reverse Voltage $V_{RRM}$ V	Avg. Forward Current Max. $I_{FAVM@55^{\circ}C}$ mA	Max. Forward Voltage Drop $V_f@I_{FAVM}$ V	Max. Reverse Current@25°C $I_R@V_{RRM}$ $\mu A$	Max. Surge Current $I_{FSM}(8.3ms)$ A	Max. Reverse Recovery Time $T_{RR}$ nS	Case L Inches
<b>RHV Series - Ultra High Voltage Low Current Fast Recovery Rectifiers</b>							Figure 6
RHV15	15000	25	35	1	3	100	2.0
RHV20	20000	25	55	1	3	100	2.0
RHV25	25000	25	55	1	3	100	2.0
RHV30	30000	25	70	1	3	100	3.0
RHV40	40000	25	110	1	3	100	3.0
RHV50	50000	25	110	1	3	100	3.0
RHV60	60000	25	110	1	3	100	3.0
RHV90	90000	25	165	1	3	100	3.0
RHV120	120000	25	220	1	3	100	3.0
RHV150	150000	25	275	1	3	100	3.0
<b>BCHV Series - Very High Voltage Medium Current Standard Recovery Rectifiers</b>							Figure 6
BCHV08	8000	100	10	2	20	-	1.0
BCHV10	10000	100	12	2	20	-	1.0
BCHV12	12000	100	13	2	20	-	1.0
BCHV15	15000	100	16	2	20	-	1.5
BCHV20	20000	100	24	2	20	-	2.0
BCHV25	25000	100	32	2	20	-	2.5
BCHV30	30000	100	32	2	20	-	3.0
BCHV35	35000	100	39	2	20	-	3.0
BCHV40	40000	100	48	2	20	-	3.0
BCHV50	50000	100	64	2	20	-	3.0
BCHV60	60000	100	64	2	20	-	3.0
<b>RTHV Series - Very High Voltage Medium Current Fast Recovery Rectifiers</b>							Figure 6
RTHV08	8000	100	22	2	10	100	1.0
RTHV10	10000	100	22	2	10	100	1.0
RTHV15	15000	100	26	2	10	100	1.5
RTHV20	20000	100	44	2	10	100	2.0
RTHV25	25000	100	52	2	10	100	2.5
RTHV30	30000	100	52	2	10	100	3.0
RTHV40	40000	100	78	2	10	100	3.0
RTHV45	45000	100	78	2	10	100	3.0
RTHV50	50000	100	105	2	10	100	3.0
RTHV60	60000	100	105	2	10	100	3.0
RTHV80	80000	100	140	2	10	100	3.0
<b>RSUF Series - High Current Ultra Fast Recovery Rectifiers</b>							Figure 6
RSUF2	2000	650	2.6	5	10	35	1.0
RSUF3	3000	650	3.9	5	10	35	1.5
RSUF5	5000	550	6.5	5	10	35	2.0
RSUF7	7000	500	9.1	5	10	35	3.0
<b>RSUFH Series - High Current Ultra Fast Recovery Rectifiers</b>							Figure 6
RSUFH12	1200	1500	3.6	10	50	35	1.0
RSUFH18	1800	1500	5.4	10	50	35	1.5
RSUFH24	2400	1250	7.2	10	50	35	2.0
RSUFH36	3600	1250	10.8	10	50	35	2.5
RSUFH42	4200	1250	12.6	10	50	35	3.0
<b>G•PE High Voltage Rectifiers - Poured Epoxy Overmolded Fast Rectifier</b>							Figure 6
G20PE	20000	15	35	0.2	3	100	1
G25PE	25000	15	42	0.2	3	100	1
G30PE	30000	15	48	0.2	3	100	1

G•PE Series lead lengths => 0.75 inches. Lead diameter 0.032 inches

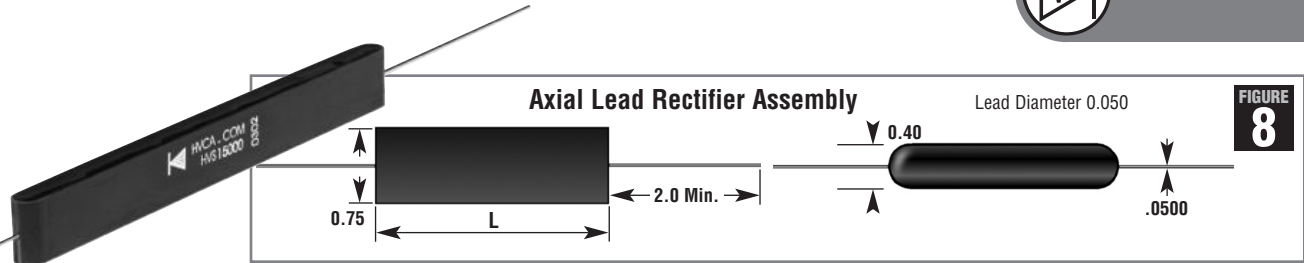
See page 23 for notes on maximum package operating voltages -  $V_{RRM}$  vs package

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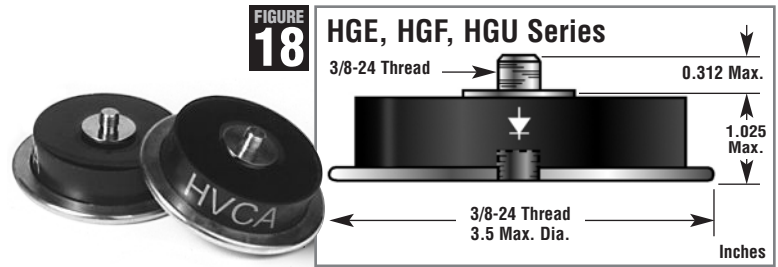
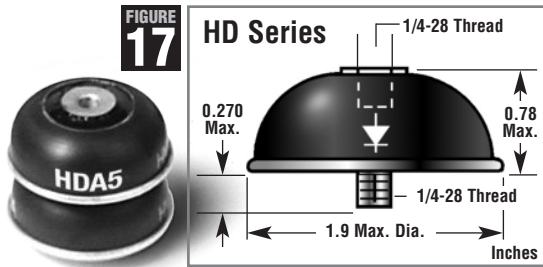
Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ V	Avg. Forward Current Max. $I_{FAVM@55^{\circ}C}$ A	Max. Forward Voltage Drop $V_F@I_{FAVM}$ V	Max. Reverse Current $I_R@V_{RRM}@25^{\circ}C$ $\mu A$	Max. Surge Current $I_{FSM}(8.3ms)$ A	Max. Reverse Recovery Time $T_{RR}$ nS	Case L Inches
<b>HV Series - Standard Recovery Axial Lead 1.0 Amp Glass Passivated Rectifier</b>							<b>Figure 7</b>
HV5000	5000	0.6	4.5	0.5	50	-	1.125
HV7500	7500	0.6	7.2	0.5	50	-	1.625
HV10000	10000	0.6	9.0	0.5	50	-	2.000
HV15000	15000	0.6	14.0	0.5	50	-	2.750
HV20000	20000	0.6	18.0	0.5	50	-	3.500
HV25000	25000	0.6	22.0	0.5	50	-	4.250
HV30000	30000	0.6	28.0	0.5	50	-	4.250
<b>HVF Series - Fast Recovery Axial Lead 1.0 Amp Glass Passivated Rectifier <math>T_{RR}</math> 150 nS</b>							<b>Figure 7</b>
HVF2500	2500	0.5	6.0	1.0	50	150	1.125
HVF5000	5000	0.5	9.0	1.0	50	150	2.000
HVF7500	7500	0.5	12.0	1.0	50	150	2.750
HVF10000	10000	0.5	15.0	1.0	50	150	3.500
HVF12500	12500	0.5	20.0	1.0	50	150	4.250
HVF15000	15000	0.5	24.0	1.0	50	150	4.250
HVF20000	20000	0.5	30.0	1.0	50	150	4.250
<b>HVUF Series - Ultra Fast Recovery Axial Lead 1.0 Amp Rectifier <math>T_{RR}</math> 75 nS</b>							<b>Figure 7</b>
HVUF2500	2500	0.5	3.3	1.0	35	75	1.125
HVUF5000	5000	0.5	5.5	1.0	35	75	1.125
HVUF7500	7500	0.5	8.8	1.0	35	75	1.625
HVUF10000	10000	0.5	11.0	1.0	35	75	2.000
HVUF12500	12500	0.5	15.0	1.0	35	75	2.750
HVUF15000	15000	0.5	17.0	1.0	35	75	2.750
HVUF20000	20000	0.5	22.0	1.0	35	75	3.500
HVUF25000	25000	0.5	28.0	1.0	35	75	4.250
<b>HVFE Series - Ultra Super Fast Recovery Axial Lead 1.0 Amp Rectifier <math>T_{RR}</math> 35nS</b>							<b>Figure 7</b>
HVFE2500	2500	0.6	13.0	1.0	50	35	2.750
HVFE5000	5000	0.6	24.0	1.0	50	35	4.250
<b>HVUSF Series - Ultra Super Fast Recovery Axial Lead 1.0 Amp Rectifier <math>T_{RR}</math> 35 nS</b>							<b>Figure 7</b>
HVUSF2500	2500	0.5	4.2	1.0	10	35	1.125
HVUSF5000	5000	0.5	7.0	1.0	10	35	2.000
HVUSF7500	7500	0.5	11.2	1.0	10	35	2.750
HVUSF10000	10000	0.5	14.0	1.0	10	35	3.500
HVUSF12500	12500	0.5	18.2	1.0	10	35	4.250
HVUSF15000	15000	0.5	21.0	1.0	10	35	4.250
HVUSF20000	20000	0.5	28.0	1.0	10	35	4.250

See page 23 for notes on max package operating voltage -  $V_{RRM}$  vs package applicability  
 All listed products shipped on December 31, 2013 or later will be RoHS Compliant. Available earlier by special request, contact factory or sales rep for availability.



Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ V	Avg. Forward Current Max. $I_{FAVM@55^{\circ}C}$ A	Max. Forward Voltage Drop $V_F@I_{FAVM}$ V	Max. Reverse Current $I_R@V_{RRM}@25^{\circ}C$ $\mu A$	Max. Surge Current $I_{FSM}(8.3ms)$ A	Max. Reverse Recovery Time $T_{RR}$ nS	Case L Inches
<b>HVS Series - Standard Recovery Axial Lead 3.0 Amp Glass Passivated Rectifier Assembly</b>							<b>Figure 8</b>
HVS2500	2500	1.1	2.4	0.5	150	-	1.5
HVS5000	5000	1.1	4.5	0.5	150	-	2.5
HVS7500	7500	1.1	7.2	0.5	150	-	3.5
HVS10000	10000	1.1	9.0	0.5	150	-	4.5
HVS12500	12500	1.1	11.0	0.5	150	-	5.5
HVS15000	15000	1.1	14.0	0.5	150	-	6.5
HVS20000	20000	1.1	18.0	0.5	150	-	6.5
HVS25000	25000	1.1	22.0	0.5	150	-	6.5
HVS30000	30000	1.1	28.0	0.5	150	-	6.5
<b>HVFS Series - Fast Recovery Axial Lead 3.0 Amp Glass Passivated Rectifier Assembly <math>T_{RR}</math> 250 nS</b>							<b>Figure 8</b>
HVFS2500	2500	0.75	4.0	0.5	100	250	1.5
HVFS5000	5000	0.75	7.0	0.5	100	250	2.5
HVFS7500	7500	0.75	11.0	0.5	100	250	3.5
HVFS10000	10000	0.75	13.0	0.5	100	250	4.5
HVFS12500	12500	0.75	17.0	0.5	100	250	5.5
HVFS15000	15000	0.75	22.0	0.5	100	250	6.5
HVFS20000	20000	0.75	26.0	0.5	100	250	6.5
HVFS25000	25000	0.75	34.0	0.5	100	250	6.5
HVFS30000	30000	0.75	44.0	0.5	100	250	6.5
<b>HVFES Series - Ultra Super Fast Recovery Axial Lead 3.0 Amp Fast Efficient Glass Passivated Rectifier Assembly <math>T_{RR}</math> 35 nS</b>							<b>Figure 8</b>
HVFES2500	2500	1.3	13.0	5.0	50	35	3.5
HVFES5000	5000	1.3	24.0	5.0	50	35	6.5
<b>HVUFS Series - Ultra Fast Recovery Axial Lead 3.0 Amp Rectifier Assembly <math>T_{RR}</math> 75 nS</b>							<b>Figure 8</b>
HVUFS2000	2500	2.0	4.2	5.0	150	75	1.5
HVUFS5000	5000	2.0	7.0	5.0	150	75	2.5
HVUFS7500	7500	2.0	11.2	5.0	150	75	3.5
HVUFS10000	10000	1.75	14.0	5.0	150	75	4.5
HVUFS12500	12500	1.75	18.2	5.0	150	75	5.5
HVUFS15000	15000	1.75	21.0	5.0	150	75	6.5
HVUFS20000	20000	1.75	28.0	5.0	150	75	6.5
HVUFS25000	25000	1.75	35.0	5.0	150	75	6.5
<b>HVUSFS Series - Ultra Super Fast Recovery Axial Lead 2.0 Amp Rectifier Assembly <math>T_{RR}</math> 40 nS</b>							<b>Figure 8</b>
HVUSFS2000	2500	1.25	6.0	5.0	60	40	1.5
HVUSFS5000	5000	1.25	10.0	5.0	60	40	2.5
HVUSFS7500	7500	1.25	16.0	5.0	60	40	3.5
HVUSFS10000	10000	1.25	20.0	5.0	60	40	4.5
HVUSFS12500	12500	1.0	26.0	5.0	60	40	5.5
HVUSFS15000	15000	1.0	30.0	5.0	60	40	6.5
HVUSFS20000	20000	1.0	40.0	5.0	60	40	6.5

See page 23 for notes on max package operating voltage -  $V_{RRM}$  vs package applicability  
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Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ V	Avg. Forward Current Max. $I_{FAVM}@T_C 75^\circ C$ A	Max. Forward Voltage Drop $V_F@I_F$ V	Max. Reverse Current $I_R@V_{RRM}@25^\circ C$ $\mu A$	Max. Surge Current $I_{FSM}(8.3ms)$ A	Max. Reverse Recovery Time $T_{RR}$ nS	Figure
<b>HD Series - Standard Recovery Hi-Bel 1.0 and 3.0 Amp Glass Passivated Rectifier Assembly</b>							
HDB2.5	2500	3.0	2.2	0.5	150	-	17
HDB5	5000	2.0	4.4	0.5	150	-	17
HDA5	5000	1.7	4.5	0.5	150	-	17
HDB7.5	7500	1.4	6.6	0.5	150	-	17
HDA7.5	7500	1.3	6.6	0.5	150	-	17
HDB10	10000	1.2	9.0	0.5	150	-	17
HDA10	10000	1.0	9.0	0.5	150	-	17
HDA15	15000	0.7	12.0	0.5	50	-	17
HDA20	20000	0.6	17.0	0.5	50	-	17
<b>HD Series - Standard Recovery Hi-Bel 6.0 Amp Rectifier Assembly</b>							
HDE2.5	2500	4.0	3.0	5.0	400	-	17
HDE5	5000	4.0	5.0	5.0	400	-	17
<b>HD Series - Fast Recovery Hi-Bel 1.0 and 3.0 Amp Glass Passivated Rectifier Assembly</b>							
HDD2.5	2500	2.3	4.0	0.5	100	250	17
HDD5	5000	1.5	7.0	0.5	100	250	17
HDC5	5000	1.2	7.0	0.5	100	250	17
HDD7.5	7500	1.0	11.0	0.5	100	250	17
HDC7.5	7500	0.9	11.0	0.5	100	250	17
HDC10	10000	0.8	13.0	0.5	50	150	17
HDC15	15000	0.6	22.0	0.5	50	150	17
<b>HD Series - Fast Recovery Hi-Bel 6.0 Amp Rectifier Assembly</b>							
HGEF2.5	2500	3.0	3.6	5.0	200	350	17
HGEF5	5000	3.0	6.0	5.0	200	350	17
<b>HD Series - Ultra Fast Recovery Hi-Bel Rectifier Assembly</b>							
HDU1.5	1500	1.0	8.0	1.0	50	35	17
HDU2	2000	0.9	10.0	1.0	50	35	17
HDU3	3000	0.7	15.0	1.0	50	35	17
HDV1.5	1500	1.4	8.0	5.0	125	35	17
HDV2	2000	1.3	10.0	5.0	125	35	17
HDT1	1000	2.5	2.0	10.0	250	50	17
HDT1.5	1500	2.0	3.0	10.0	250	50	17
<b>HD Series - Ultra Fast Recovery Hi-Bel 1.0 and 3.0 Amp Rectifier Assembly</b>							
HDAUF5	5000	0.8	5.5	1.0	35	75	17
HDBUF5.0	5000	2.25	7.0	5.0	150	75	17
HDAUF7.5	7500	0.8	8.8	1.0	35	75	17
HDBUF7.5	7500	2.25	11.2	5.0	150	75	17
HDAUF10	10000	0.8	11.0	1.0	35	75	17
HDAUF15	15000	0.8	17.0	1.0	35	75	17
<b>HD Series - Ultra Super Fast Recovery 1.0 and 2.0 Amp Rectifier Assembly</b>							
HDAUSF5	5000	0.65	7.0	1.0	10	35	17
HDBUSF5	5000	1.75	10.0	5.0	60	40	17
HDAUSF7.5	7500	0.65	11.2	1.0	10	35	17
HDAUSF10	10000	0.65	14.0	5.0	10	35	17
<b>HGE Series - Standard Recovery Hi-Bel Glass Passivated Rectifier Assembly</b>							
HGE2.5	2500	8	3.3	10	200	-	18
HGE5	5000	8	5.5	10	200	-	18
<b>HGF Series - Fast Recovery Hi-Bel Glass Passivated Rectifier Assembly</b>							
HGF2.5	2500	8	5.2	10	150	150	18
HGF5	5000	8	9.0	10	150	150	18
<b>HGU Series - Ultra Fast Recovery Hi-Bel Glass Passivated Rectifier Assembly</b>							
HGU2	2000	10	6.0	10	250	50	18

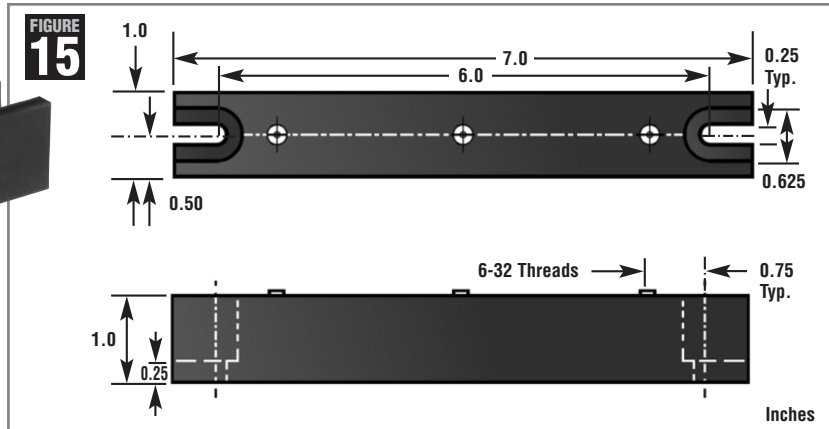
Please Note: These parts are replacements for Unitrode. Custom parts available, please consult factory.  
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## HG, 3HG, 6HG, Rectifier Blocks High Voltage, Mounting Slots



**Please Note:**  
For Halfwave Assemblies, omit center terminal



Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ Per Leg V	Avg. Forward Current Max. $I_{FAVM}@55^{\circ}\text{C}$ Per Leg A	Max. Forward Voltage Drop $V_F@I_{FAVM}$ Per Leg V	Max. Reverse Current $I_R@V_{RRM}@25^{\circ}\text{C}$ $\mu\text{A}$	Max. Surge Current $I_{FSM}(8.3\text{ms})$ A	Max. Reverse Recovery Time $T_{RR}$ nS	Figure
<b>HG - 1.0 Amp Glass Passivated Rectifier Assembly</b>							
HG10	10000	1.00	9.0	0.5	50	-	15
HG15	15000	1.00	14.0	0.5	50	-	15
HG20	20000	1.00	18.0	0.5	50	-	15
HG25	25000	0.80	22.0	0.5	50	-	15
HG30	30000	0.80	28.0	0.5	50	-	15
HG40	40000	0.80	36.0	0.5	50	-	15
HG50	50000	0.80	44.0	0.5	50	-	15
<b>HG• - 1.0 Amp Glass Passivated Center Tap and Doubler Assembly</b>							
HG•5	5000	2.00	4.5	0.5	50	-	15
HG•10	10000	2.00	9.0	0.5	50	-	15
HG•15	15000	1.60	14.0	0.5	50	-	15
HG•20	20000	1.60	18.0	0.5	50	-	15
HG•25	25000	1.60	22.0	0.5	50	-	15
<b>3HG - 3.0 Amp Glass Passivated Rectifier Assembly</b>							
3HG10	10000	2.50	9.0	0.5	150	-	15
3HG15	15000	2.25	14.0	0.5	150	-	15
3HG20	20000	2.25	18.0	0.5	150	-	15
3HG25	25000	2.00	22.0	0.5	150	-	15
3HG30	30000	2.00	28.0	0.5	150	-	15
<b>3HG• - 3.0 Amp Glass Passivated Center Tap and Doubler Assembly</b>							
3HG•5	5000	2.50	4.8	0.5	150	-	15
3HG•10	10000	2.25	9.0	0.5	150	-	15
3HG•15	15000	2.00	14.0	0.5	150	-	15
<b>3HG•RC - Resistor-Capacitor Compensated 3.0 Amp Glass Passivated Rectifier Assembly</b>							
3HG10RC	10000	3.00	9.0	500	150	-	15
3HG15RC	15000	2.75	14.0	500	150	-	15
3HG20RC	20000	2.50	18.0	500	150	-	15
<b>6HG - 6.0 Amp Rectifier Assembly</b>							
6HG10	10000	3.00	10.0	5.0	400	-	15
6HG15	15000	2.75	15.0	5.0	400	-	15
6HG20	20000	2.50	20.0	5.0	400	-	15
<b>6HG•RC - Resistor-Capacitor Compensated 6.0 Amp Rectifier Assembly</b>							
6HG10RC	10000	3.60	10.0	500	400	-	15
6HG15RC	15000	3.30	15.0	500	400	-	15
6HG18RC	18000	3.00	18.0	500	400	-	15

Available with resistor and capacitor or capacitor only compensation.

Add "T" for turret at end of part number.  
Example: 3HG20T

All listed products shipped on December 31, 2013 or later will be RoHS Compliant. Available earlier by special request, contact factory or sales rep for availability.

Where • appears in the part number, substitute the letter N, P or D for the appropriate assembly configuration. i.e. 3HGD5 is a 5kV, 2.5A doubler

**Please Note:**  
Different circuit arrangements are identified by using a **Circuit Code Letter.**  
P=Positive Center Tap  
N=Negative Center Tap  
D=Doubler

**Positive Center Tap (HGP)**

Positive Center Tap 2.0A, 10000V/LEG HGP10

**Negative Center Tap (HGN)**

Negative Center Tap 1.6A, 25000V/LEG HGN25

**Doubler (3HGD)**

( $I_{FAVM}$  of Doubler is  $I_{FAVM} \times 0.5$ )  
Doubler 2.0A, 15000V/LEG 3HGD15





Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ Per Leg V	Avg. Forward Current Max. $I_{FAVM}@55^{\circ}C$ Per Leg A	Max. Forward Voltage Drop $V_F@I_F$ Per Leg V	Max. Reverse Current $I_R@V_{RRM}@25^{\circ}C$ $\mu A$	Max. Surge Current $I_{FSM}$ (8.3ms) A	Max. Reverse Recovery Time $T_{RR}$ nS	Figure
<b>HGUF Series - Ultra Fast Recovery 1.0 Amp Rectifier Assembly <math>T_{RR}</math> 75nS</b>							
HGUF10	10000	0.9	11.0	1.0	35	75	15
HGUF15	15000	0.9	17.0	1.0	35	75	15
HGUF20	20000	0.7	22.0	1.0	35	75	15
HGUF25	25000	0.7	28.0	1.0	35	75	15
HGUF30	30000	0.7	34.0	1.0	35	75	15
HGUF40	40000	0.7	44.0	1.0	35	75	15
HGUF50	50000	0.7	56.0	1.0	35	75	15
<b>HGUSF Series - Ultra Super Fast Recovery 1.0 Amp Rectifier Assembly <math>T_{RR}</math> 35nS</b>							
HGUSF10	10000	0.65	14.0	1.0	10	35	15
HGUSF15	15000	0.65	21.0	1.0	10	35	15
HGUSF20	20000	0.5	28.0	1.0	10	35	15
HGUSF25	25000	0.5	35.0	1.0	10	35	15
HGUSF30	30000	0.5	42.0	1.0	10	35	15
HGUSF40	40000	0.4	56.0	1.0	10	35	15
HGUSF50	50000	0.4	70.0	1.0	10	35	15
<b>2HGUSF Series - Ultra Super Fast Recovery 2.0 Amp Rectifier Assembly <math>T_{RR}</math> 40nS</b>							
2HGUSF10	10000	1.75	20.0	5.0	60	40	15
2HGUSF15	15000	1.5	30.0	5.0	60	40	15
2HGUSF20	20000	1.5	40.0	5.0	60	40	15
<b>3HGUF Series - Ultra Fast Recovery 3.0 Amp Rectifier Assembly <math>T_{RR}</math> 75nS</b>							
3HGUF10	10000	2.25	14.0	5.0	150	75	15
3HGUF15	15000	2.25	21.0	5.0	150	75	15
3HGUF20	20000	2.25	28.0	5.0	150	75	15
3HGUF25	25000	1.75	35.0	5.0	150	75	15
3HGUF30	30000	1.75	42.0	5.0	150	75	15
<b>3HGUF Series - Ultra Fast Recovery 3.0 Amp Center Tap and Doubler Assembly <math>T_{RR}</math> 75nS</b>							
3HGUF•5	5000	2.25	7.0	5.0	150	75	15
3HGUF•10	10000	2.25	14.0	5.0	150	75	15
3HGUF•15	15000	1.75	21.0	5.0	150	75	15
<b>HGUF Series - Ultra Fast Recovery 1.0 Amp Center Tap and Doubler Assembly <math>T_{RR}</math> 75nS</b>							
HGUF•5	5000	0.9	5.5	1.0	35	75	15
HGUF•10	10000	0.7	11.0	1.0	35	75	15
HGUF•15	15000	0.7	17.0	1.0	35	75	15
HGUF•20	20000	0.7	22.0	1.0	35	75	15
HGUF•25	25000	0.7	28.0	1.0	35	75	15
<b>6HGF Series - Fast Recovery 6.0 Amp Rectifier Assembly <math>T_{RR}</math> 350nS</b>							
6HGF10	10000	2.5	12.0	5.0	200	350	15
6HGF15	15000	2.5	18.0	5.0	200	350	15
6HGF20	20000	2.25	24.0	5.0	200	350	15
<b>HGUSF Series - Ultra Super Fast Recovery 1.0 Amp Center Tap and Doubler Assembly <math>T_{RR}</math> 35nS</b>							
HGUSF•5	5000	0.65	7.0	1.0	10	35	15
HGUSF•10	10000	0.5	14.0	1.0	10	35	15
HGUSF•15	15000	0.5	21.0	1.0	10	35	15
<b>2HGUSF Series - Ultra Super Fast Recovery 2.0 Amp Center Tap and Doubler Assembly <math>T_{RR}</math> 40nS</b>							
2HGUSF•5	5000	1.75	10.0	5.0	60	40	15
2HGUSF•10	10000	1.5	20.0	5.0	60	40	15

Available with resistor and capacitor or capacitor only compensation.

Add "T" for turret at end of part number.  
Example: 6HGF10T

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**Please note:**

Different circuit arrangements are identified by using a **Circuit Code Letter**.  
P=Positive Center Tap  
N=Negative Center Cap  
D=Doubler

**Positive Center Tap (HGP)**

Positive Center Tap 2.0A, 10000V/LEG HGUPF5

**Negative Center Tap (HGN)**

Negative Center Tap 1.6A, 25000V/LEG HGUFN5

**Doubler (3HGD)**

( $I_{FAVM}$  of Doubler is  $I_{FAVM} \times 0.5$ )  
Doubler 2.0A, 15000V/LEG HGUFD5

Where • appears in the part number, substitute the letter N, P or D for the appropriate assembly configuration. i.e. 3HGD5 is a 5kV, 2.5A doubler

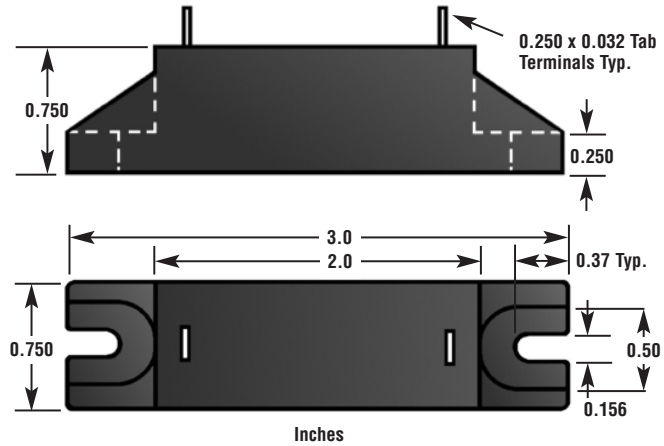


**HC, 3HC, 3HCF, HCUF Rectifier Blocks High Voltage, Mounting Slots**

**FIGURE 14**



**Please Note:**  
For Solder Turrets Add Suffix "T"



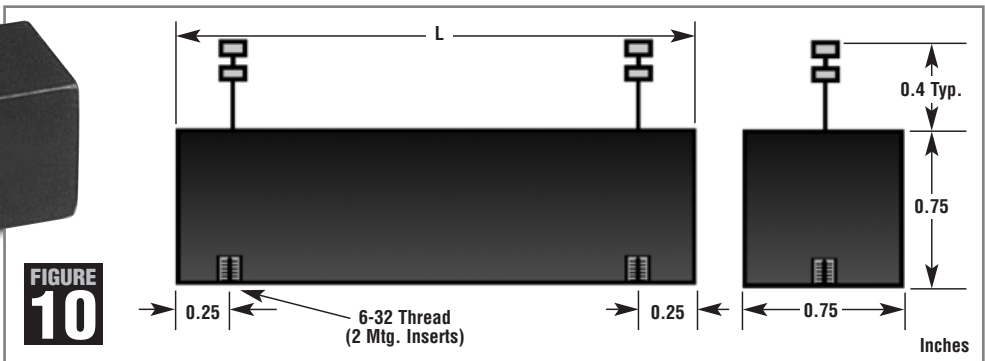
Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ V	Avg. Forward Current Max. $I_{FAVM@55^{\circ}C}$ A	Max. Forward Voltage Drop $V_F@I_{FAVM}$ V	Max. Reverse Current $I_R@V_{RRM@25^{\circ}C}$ $\mu A$	Max. Surge Current $I_{FSM}(8.3ms)$ A	Max. Reverse Recovery Time $T_{RR}$ nS	Figure
<b>HC Series - Standard Recovery 1.0 Amp Glass Passivated Rectifier Assembly</b>							
HC5	5000	1.0	4.5	0.5	50	-	14
HC8	8000	1.0	7.2	0.5	50	-	14
HC10	10000	1.0	9.0	0.5	50	-	14
HC12	12000	0.8	10.5	0.5	50	-	14
HC15	15000	0.7	14.0	0.5	50	-	14
HC20	20000	0.6	21.0	0.5	50	-	14
<b>3HC Series - Standard Recovery 3.0 Amp Glass Passivated Rectifier Assembly</b>							
3HC5	5000	2.5	4.8	0.5	150	-	14
3HC10	10000	2.0	9.0	0.5	150	-	14
3HC12	12000	1.75	10.5	0.5	150	-	14
3HC15	15000	1.5	13.2	0.5	150	-	14
<b>HCF Series - Fast Recovery 1.0 Amp Glass Passivated Rectifier Assembly <math>T_{RR}</math> 150nS</b>							
HCF5	5000	1.0	8.0	1.0	50	150	14
HCF8	8000	1.0	12.0	1.0	50	150	14
HCF10	10000	0.8	15.0	1.0	50	150	14
HCF12	12000	0.7	18.0	1.0	50	150	14
<b>3HCF Series - Fast Recovery 3.0 Amp Glass Passivated Rectifier Assembly <math>T_{RR}</math> 250nS</b>							
3HCF5	5000	2.0	7.0	0.5	100	250	14
3HCF10	10000	1.5	13.0	0.5	100	250	14
<b>HCUF Series - Ultra Fast Recovery 1.0 Amp Rectifier Assembly <math>T_{RR}</math> 75nS</b>							
HCUF5	5000	1.0	5.5	1.0	35	75	14
HCUF8	8000	1.0	8.8	1.0	35	75	14
HCUF10	10000	0.8	11.0	1.0	35	75	14
HCUF12	12000	0.7	13.2	1.0	35	75	14
HCUF15	15000	0.6	17.0	1.0	35	75	14
<b>HCUSF Series - Ultra Super Fast Recovery 1.0 Amp Rectifier Assembly <math>T_{RR}</math> 35nS</b>							
HCUSF5	5000	0.65	7.0	1.0	10	35	14
HCUSF8	8000	0.65	11.2	1.0	10	35	14
HCUSF10	10000	0.5	14.0	1.0	10	35	14
HCUSF12	12000	0.5	16.8	1.0	10	35	14
HCUSF15	15000	0.5	21.0	1.0	10	35	14
<b>2HCUSF Series - Ultra Super Fast Recovery 2.0 Amp Rectifier Assembly <math>T_{RR}</math> 40nS</b>							
2HCUSF3	3000	1.75	6.0	5.0	60	40	14
2HCUSF5	5000	1.75	10.0	5.0	60	40	14
2HCUSF8	8000	1.5	16.0	5.0	60	40	14
<b>3HCUF Series - Fast Recovery 3.0 Amp Rectifier Assembly <math>T_{RR}</math> 75nS</b>							
3HCUF5	5000	2.25	7.0	5.0	150	75	14
3HCUF8	8000	2.0	11.2	5.0	150	75	14
3HCUF10	10000	2.0	14.0	5.0	150	75	14

See page 23 for notes on max package operating voltage -  $V_{RRM}$  vs package applicability

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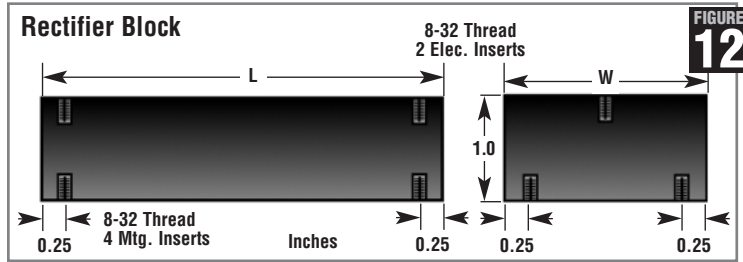
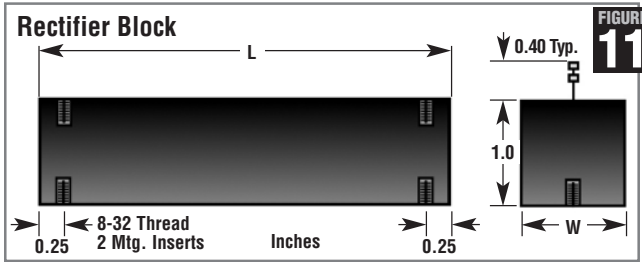
Rectifier Block



**FIGURE 10**

Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ V	Avg. Forward Current Max. $I_{FAVM@55^{\circ}C}$ A	Max. Forward Voltage Drop $V_F@I_{FAVM}$ V	Max. Reverse Current $I_R@V_{RRM@25^{\circ}C}$ $\mu A$	Max. Surge Current $I_{FSM}(8.3ms)$ A	Max. Reverse Recovery Time $T_{RR}$ nS	Case L Inches
<b>1HVK Series - Standard Recovery Block 1.0 Amp Glass Passivated Rectifier Assembly</b> Figure 10							
1HV5K	5000	1.0	4.5	1.0	50	-	2.5
1HV8K	8000	1.0	7.2	1.0	50	-	3.5
1HV10K	10000	1.0	9.0	1.0	50	-	3.5
1HV15K	15000	1.0	14.0	1.0	50	-	5.0
1HV20K	20000	1.0	18.0	1.0	50	-	5.0
1HV25K	25000	0.75	22.0	1.0	50	-	6.0
1HV30K	30000	0.75	28.0	1.0	50	-	6.0
1HV40K	40000	0.75	36.0	1.0	50	-	7.0
1HV50K	50000	0.75	44.0	1.0	50	-	7.0
1HV60K	60000	0.75	56.0	1.0	50	-	7.0
<b>1HVF Series - Fast Recovery Block 1.0 Amp Glass Passivated Rectifier Assembly <math>T_{RR}</math> 150nS</b> Figure 10							
1HVF5K	5000	0.9	8.0	0.5	50	150	2.5
1HVF8K	8000	0.9	12.0	0.5	50	150	3.5
1HVF10K	10000	0.9	15.0	0.5	50	150	3.5
1HVF15K	15000	0.9	24.0	0.5	50	150	5.0
1HVF20K	20000	0.7	30.0	0.5	50	150	5.0
1HVF25K	25000	0.7	40.0	0.5	50	150	6.0
1HVF30K	30000	0.7	48.0	0.5	50	150	6.0
1HVF40K	40000	0.7	60.0	0.5	50	150	7.0
1HVF50K	50000	0.7	78.0	0.5	50	150	7.0
<b>1HVUF Series - Ultra Fast Recovery Block 1.0 Amp Rectifier Assembly <math>T_{RR}</math> 75nS</b> Figure 10							
1HVUF5K	5000	0.9	5.5	1.0	35	75	2.5
1HVUF8K	8000	0.9	8.8	1.0	35	75	3.5
1HVUF10K	10000	0.9	11.0	1.0	35	75	3.5
1HVUF15K	15000	0.9	17.0	1.0	35	75	5.0
1HVUF20K	20000	0.7	22.0	1.0	35	75	5.0
1HVUF25K	25000	0.7	28.0	1.0	35	75	6.0
1HVUF30K	30000	0.7	34.0	1.0	35	75	6.0
1HVUF40K	40000	0.7	44.0	1.0	35	75	7.0
1HVUF50K	50000	0.7	56.0	1.0	35	75	7.0
<b>1HVFEK Series - Ultra Super Fast Recovery Block 1.0 Amp Fast Efficient Glass Passivated Rectifier Assembly <math>T_{RR}</math> 35nS</b> Figure 10							
1HVFE3K	3000	1.0	15.0	1.0	50	35	5.0
1HVFE5K	5000	0.75	24.0	1.0	50	35	6.0
1HVFE10K	10000	0.75	48.0	1.0	50	35	7.0
<b>1HVUSFK Series - Ultra Super Fast Recovery Block 1.0 Amp Rectifier Assembly <math>T_{RR}</math> 35nS</b> Figure 10							
1HVUSF5K	5000	0.65	7.0	1.0	10	35	2.5
1HVUSF8K	8000	0.65	11.2	1.0	10	35	3.5
1HVUSF10K	10000	0.65	14.0	1.0	10	35	3.5
1HVUSF15K	15000	0.65	21.0	1.0	10	35	5.0
1HVUSF20K	20000	0.5	28.0	1.0	10	35	5.0
1HVUSF25K	25000	0.5	35.0	1.0	10	35	6.0
1HVUSF30K	30000	0.5	42.0	1.0	10	35	6.0
1HVUSF40K	40000	0.5	56.0	1.0	10	35	7.0
1HVUSF50K	50000	0.5	70.0	1.0	10	35	7.0

Available with resistor and capacitor or capacitor only compensation.  
 All listed products shipped on December 31, 2013 or later will be RoHS Compliant. Available earlier by special request, contact factory or sales rep for availability.



Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ V	Avg. Forward Current Max. $I_{FAVM@55^{\circ}C}$ A	Max. Forward Voltage Drop $V_f@I_{FAVM}$ V	Max. Reverse Current $I_{R@V_{RRM}@25^{\circ}C}$ $\mu A$	Max. Surge Current $I_{FSM}(8.3ms)$ A	Max. Reverse Recovery Time $T_{RR}$ nS	Case Dimension LxW Inches	Figure
<b>2HUSF K Series - Ultra Super Fast Recovery Block 2.0 Amp Rectifier Assembly <math>T_{RR}</math> 40nS</b>								
2HUSF5K	5000	2.0	10.0	5.0	60	40	4.0x1.0	11
2HUSF8K	8000	1.75	16.0	5.0	60	40	6.0x1.0	11
2HUSF10K	10000	1.5	20.0	5.0	60	40	7.0x1.0	11
2HUSF15K	15000	1.5	30.0	5.0	60	40	4.0x2.0	12
2HUSF20K	20000	1.25	40.0	5.0	60	40	6.0x2.0	12
2HUSF25K	25000	1.25	50.0	5.0	60	40	8.0x2.0	12
2HUSF30K	30000	1.25	60.0	5.0	60	40	4.0x3.0	12
2HUSF40K	40000	1.25	80.0	5.0	60	40	8.0x3.0	12
2HUSF50K	50000	1.25	100.0	5.0	60	40	6.0x4.0	12
<b>3HV K Series - Standard Recovery Block 3.0 Amp Glass Passivated Rectifier Assembly</b>								
3HV5K	5000	3.0	4.8	0.5	150	-	4.0x1.0	11
3HV8K	8000	2.75	7.5	0.5	150	-	6.0x1.0	11
3HV10K	10000	2.5	9.0	0.5	150	-	7.0x1.0	11
3HV15K	15000	2.5	14.0	0.5	150	-	4.0x2.0	12
3HV20K	20000	2.25	18.0	0.5	150	-	6.0x2.0	12
3HV25K	25000	2.25	22.0	0.5	150	-	8.0x2.0	12
3HV30K	30000	2.25	28.0	0.5	150	-	4.0x3.0	12
3HV40K	40000	2.25	36.0	0.5	150	-	8.0x3.0	12
3HV50K	50000	2.25	44.0	0.5	150	-	6.0x4.0	12
<b>3HVF K Series - Fast Recovery Block 3.0 Amp Glass Passivated Rectifier Assembly <math>T_{RR}</math> 250nS</b>								
3HVF5K	5000	2.5	7.0	0.5	100	250	4.0x1.0	11
3HVF8K	8000	2.5	11.0	0.5	100	250	6.0x1.0	11
3HVF10K	10000	2.5	13.0	0.5	100	250	7.0x1.0	11
3HVF15K	15000	2.25	22.0	0.5	100	250	4.0x2.0	12
3HVF20K	20000	2.25	26.0	0.5	100	250	6.0x2.0	12
3HVF25K	25000	2.25	34.0	0.5	100	250	8.0x2.0	12
3HVF30K	30000	2.25	40.0	0.5	100	250	4.0x3.0	12
3HVF40K	40000	2.25	52.0	0.5	100	250	8.0x3.0	12
3HVF50K	50000	2.25	68.0	0.5	100	250	6.0x4.0	12
<b>3HUF K Series - Ultra Fast Recovery Block 3.0 Amp Rectifier Assembly <math>T_{RR}</math> 75nS</b>								
3HUF5K	5000	3.0	7.0	5.0	150	75	4.0x1.0	11
3HUF8K	8000	2.75	11.0	5.0	150	75	6.0x1.0	11
3HUF10K	10000	2.5	14.0	5.0	150	75	7.0x1.0	11
3HUF15K	15000	2.5	21.0	5.0	150	75	4.0x2.0	12
3HUF20K	20000	2.25	28.0	5.0	150	75	6.0x2.0	12
3HUF25K	25000	2.25	35.0	5.0	150	75	8.0x2.0	12
3HUF30K	30000	2.25	42.0	5.0	150	75	4.0x3.0	12
3HUF40K	40000	2.25	56.0	5.0	150	75	8.0x3.0	12
3HUF50K	50000	2.25	70.0	5.0	150	75	6.0x4.0	12
<b>6HV K Series - Standard Recovery Block 6.0 Amp Rectifier Assembly</b>								
6HV5K	5000	3.5	5.0	5.0	400	-	4.0x1.0	11
6HV8K	8000	3.25	8.0	5.0	400	-	6.0x1.0	11
6HV10K	10000	3.0	10.0	5.0	400	-	7.0x1.0	11
6HV15K	15000	3.0	15.0	5.0	400	-	4.0x2.0	12
6HV20K	20000	2.75	20.0	5.0	400	-	6.0x2.0	12
6HV25K	25000	2.5	25.0	5.0	400	-	8.0x2.0	12
6HV30K	30000	2.5	30.0	5.0	400	-	4.0x3.0	12
6HV40K	40000	2.5	40.0	5.0	400	-	8.0x3.0	12
6HV50K	50000	2.5	50.0	5.0	400	-	6.0x4.0	12
<b>6HVF K Series - Fast Recovery Block 6.0 Amp Rectifier Block <math>T_{RR}</math> 350nS</b>								
6HVF5K	5000	3.0	6.0	5.0	200	350	4.0x1.0	11
6HVF8K	8000	2.75	9.6	5.0	200	350	6.0x1.0	11
6HVF10K	10000	2.5	12.0	5.0	200	350	7.0x1.0	11
6HVF15K	15000	2.5	18.0	5.0	200	350	4.0x2.0	12
6HVF20K	20000	2.25	24.0	5.0	200	350	6.0x2.0	12
6HVF25K	25000	2.0	30.0	5.0	200	350	8.0x2.0	12
6HVF30K	30000	2.0	36.0	5.0	200	350	4.0x3.0	12
6HVF40K	40000	2.0	48.0	5.0	200	350	8.0x3.0	12
6HVF50K	50000	2.0	60.0	5.0	200	350	6.0x4.0	12

8-32 female inserts standard. Add "T" to end of part number for solder terminals. Available with resistor and capacitor or capacitor only compensation. All listed products shipped on December 31, 2013 or later will be RoHS Compliant. Available earlier by special request, contact factory or sales rep for availability.



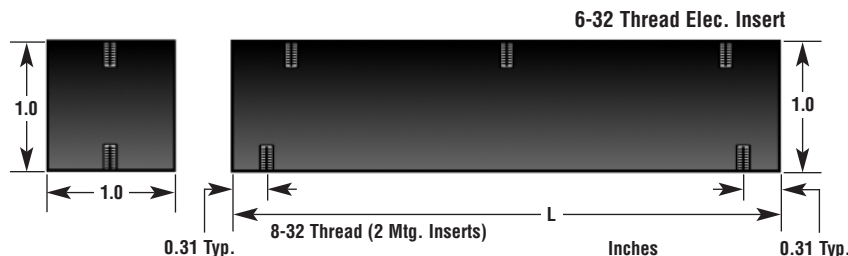
Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ Per Leg V	Average Forward Current Max. $I_{FAVM}@55^{\circ}C$ A	Maximum Forward Voltage Drop $V_F@I_F$ Per Leg V	Maximum Reverse Current $I_R@V_{RRM}@25^{\circ}C$ $\mu A$	Maximum Surge Current $I_{FSM}$ (8.3ms) A	Case Length L Inches
<b>3HV RC Series - Resistor-Capacitor Compensated 3.0 Amp Glass Passivated Rectifier Assembly</b>						<b>Figure 16</b>
3HV3RC	3000	1.75	2.4	500	150	2.38
3HV5RC	5000	1.75	4.8	500	150	2.38
3HV8RC	8000	1.75	7.5	500	150	2.38
3HV10RC	10000	1.75	9.0	500	150	4.50
3HV12RC	12000	1.75	10.8	500	150	4.50
3HV15RC	15000	1.75	14.0	500	150	5.50
3HV20RC	20000	1.75	18.0	500	150	7.00
3HV25RC	25000	1.75	22.0	500	150	8.25
3HV30RC	30000	1.75	28.0	500	150	10.25
3HV40RC	40000	1.75	36.0	500	150	13.25
3HV50RC	50000	1.75	44.0	500	150	16.25
3HV75RC	75000	1.75	69.0	500	150	25.00
<b>6HV RC Series - Resistor-Capacitor Compensated 6.0 Amp Rectifier Assembly</b>						<b>Figure 16</b>
6HV3RC	3000	2.0	3.0	500	400	3.25
6HV5RC	5000	2.0	5.0	500	400	3.25
6HV8RC	8000	2.0	8.0	500	400	3.25
6HV10RC	10000	2.0	10.0	500	400	5.50
6HV12RC	12000	2.0	12.0	500	400	5.50
6HV15RC	15000	2.0	15.0	500	400	7.00
6HV20RC	20000	2.0	20.0	500	400	10.25
6HV25RC	25000	2.0	25.0	500	400	13.25
6HV30RC	30000	2.0	30.0	500	400	16.25
6HV40RC	40000	2.0	40.0	500	400	25.00
6HV50RC	50000	2.0	50.0	500	400	25.00
<b>3HV•RC Series - Resistor-Capacitor Compensated 3.0 Amp Glass Passivated Rectifier Center Tap and Doubler Assembly</b>						<b>Figure 16</b>
3HV•5RC	5000	3.5	4.8	500	150	4.50
3HV•8RC	8000	3.5	7.5	500	150	5.50
3HV•10RC	10000	3.5	9.0	500	150	7.00
3HV•12RC	12000	3.5	10.8	500	150	8.25
3HV•15RC	15000	3.5	14.0	500	150	10.25
3HV•20RC	20000	3.5	18.0	500	150	13.25
3HV•25RC	25000	3.5	23.0	500	150	16.25
<b>6HV•RC Series - Resistor-Capacitor Compensated 6.0 Amp Rectifier Center Tap and Doubler Assembly</b>						<b>Figure 16</b>
6HV•5RC	5000	4.0	5.0	500	400	5.5
6HV•8RC	8000	4.0	8.0	500	400	8.25
6HV•10RC	10000	4.0	10.0	500	400	10.25
6HV•12RC	12000	4.0	12.0	500	400	13.25
6HV•15RC	15000	4.0	15.0	500	400	13.25
6HV•20RC	20000	4.0	20.0	500	400	25.00
6HV•25RC	25000	4.0	25.0	500	400	25.00

**FIGURE 16**

### Resistor-Capacitor Compensated High Voltage Rectifier Block

Please Note: For Solder Turrets Add Suffix "T" For Mounting Studs Add Suffix "S"

3 HV•RC and 6HV•RC Center Tap and Doubler Assemblies



Where • appears in the part number, substitute the letter N, P or D for the appropriate assembly configuration. i.e. 3HGD5 is a 5kV, 2.5A doubler

**Please Note:**

Different circuit arrangements are identified by using a Circuit Code Letter.

- P=Positive Center Tap
- N=Negative Center Cap
- D=Doubler

**Positive Center Tap (HGP)**

Positive Center Tap 2.0A, 10000V/LE 3HVP5RC

**Negative Center Tap (HGN)**

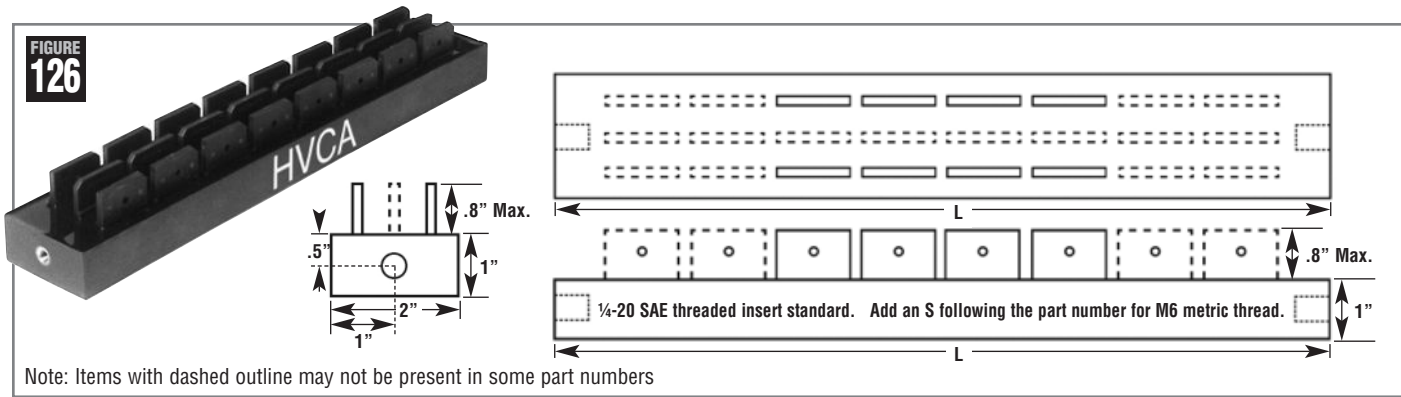
Negative Center Tap 1.6A, 25000V/LE 3HVN5RC

**Doubler (3HGD)**

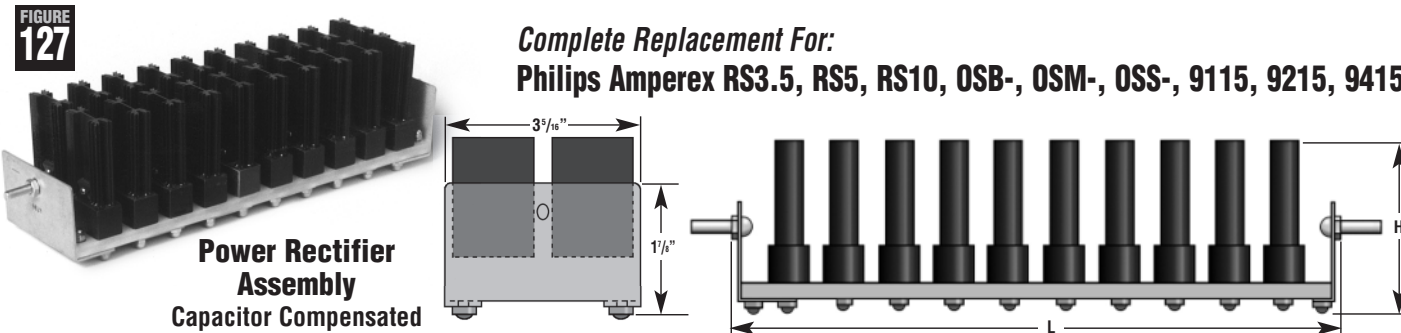
( $I_{FAVM}$  of Doubler is  $I_{FAVM} \times 0.5$ )  
Doubler 2.0A, 15000V/LE 3HV05RC

Available with capacitor only compensation or no compensation.

All listed products shipped on December 31, 2013 or later will be RoHS Compliant. Available earlier by special request, contact factory or sales rep for availability.



Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ V	Avg. Maximum Forward Current Still Air $@T_A=35^\circ\text{C}$ A	Avg. Maximum Forward Current Still Air $@T_A=55^\circ\text{C}$ A	Avg. Maximum Forward Current Forced Air $@T_A=35^\circ\text{C}^1$ A	Avg. Maximum Forward Current Forced Air $@T_A=55^\circ\text{C}^1$ A	Max. Forward Voltage Drop@25°C $V_F@I_F=12\text{A}$ V	Max. Surge Current $I_{FSM}(8.3\text{ms})$ A	Max. Reverse Current $I_R@V_{RRM}25^\circ\text{C}/100^\circ\text{C}$ nS	Package Length L Inches	Figure
<b>HVHP Series - High Current Diode</b>		<b>Standard Recovery</b>								
HVHP7K	7200	4.2	3.5	12	10	12	600	400/600	6.5	126
HVHP10K	10800	3.2	2.6	12	10	18	600	400/600	6.5	126
HVHP19K	19200	2.6	2.0	10	8.4	32	600	400/600	12.5	126
HVHP29K	29000	2	1.4	9	7.5	48	600	400/600	12.5	126



Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ V	Avg. Maximum Forward Current $50^\circ\text{C } I_{FAVM}^2$ A	Avg. Maximum Forward Current $50^\circ\text{C } I_{FAVM}^3$ A	Max. Forward Voltage Drop@25°C $V_F@I_F=5.0\text{A}$ V	Max. Surge Current $I_{FSM}@10\text{ms}$ A	Max. Reverse Current $I_R@V_{RRM}@25^\circ\text{C}$ $\mu\text{A}$	Package Length L Inches	Figure
<b>HRS5 Series - Power Rectifier</b>		<b>Standard Recovery</b>		<b>H = 3.25 Inches</b>				
HRS5-6	9600	5	15	6	400	100	4.8	127
HRS5-9	16000	5	15	10	400	100	7.0	127
HRS5-12	19200	5	15	12	400	100	8.15	127
HRS5-15	25600	5	15	16	400	100	10.4	127
HRS5-18	28800	5	15	18	400	100	11.5	127
HRS5-21	32000	5	15	20	400	100	12.62	127
HRS5-24	38400	5	15	24	400	100	14.85	127
HRS5-27	41600	5	15	26	400	100	16	127
HRS5-30	48000	5	15	30	400	100	18.2	127
<b>HRS10 Series - Power Rectifier</b>		<b>Standard Recovery</b>		<b>H = 3.75 Inches</b>				
HRS10-6	9600	10	25	6	950	100	4.8	127
HRS10-9	16000	10	25	10	950	100	7.0	127
HRS10-12	19200	10	25	12	950	100	8.15	127
HRS10-15	25600	10	25	16	950	100	10.4	127
HRS10-18	28800	10	25	18	950	100	11.5	127
HRS10-21	32000	10	25	20	950	100	12.62	127
HRS10-24	38400	10	25	24	950	100	14.85	127
HRS10-27	41600	10	25	26	950	100	16	127
HRS10-30	48000	10	25	30	950	100	18.2	127

For HRS series, add an S after the part number for M6-35 Studs instead of 1/4-28 - 1" studs which are standard. Fast recovery available.

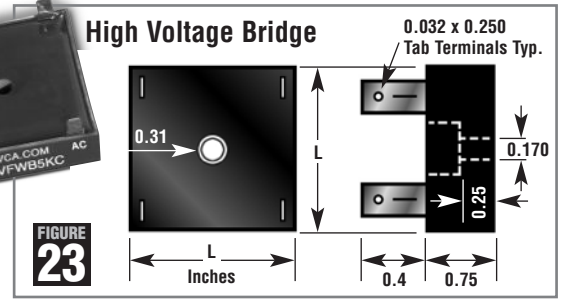
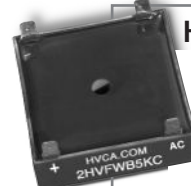
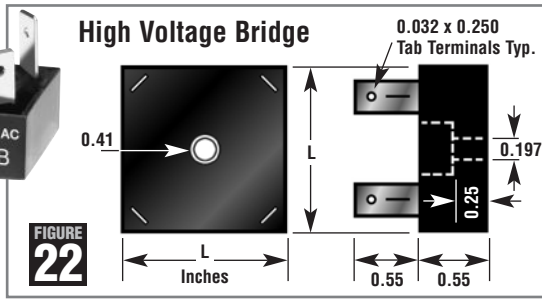
<sup>1</sup> Ratings valid with 700 lfm of air at 35°C to 55°C with the case mounted to a proper heatsink and the air flow directed on the device.

<sup>2</sup> The current ratings in this column are for devices operated with convective cooling only. Ambient air temperature of 50°C or below.

<sup>3</sup> The current ratings in this column are for devices operated with forced air cooling. Air flow must equal or exceed 300 linear feet per minute flow with an ambient air temperature of 50°C or below.

Maximum operating and storage temperature -55°C to 125°C

All listed products shipped on December 31, 2013 or later will be RoHS Compliant. Available earlier by special request, contact factory or sales rep for availability.



Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ Per Leg V	Avg. Forward Current Max. $I_{FAVM}$ @ $T_C = 55^\circ C$ A	Max. Forward Voltage Drop $V_F @ 0.5 I_{FAVM}$ Per Leg V	Max. Reverse Current $I_R$ @ $V_{RRM} @ 25^\circ C$ $\mu A$	Max. Surge Current $I_{FSM}$ (8.3ms) A	Max. Reverse Recovery Time $T_{RR}$ nS	Case Length L Inches	Figure
<b>HVFWB - Standard Recovery 1.0 and 3.0 Amp Glass Passivated Rectifiers</b>								
2HVFWB5KB	5000	2.0	4.8	0.5	50	-	1.25	22
2HVFWB8KB	8000	2.0	7.2	0.5	50	-	1.25	22
2HVFWB5KC	5000	2.0	4.8	0.5	50	-	1.5	23
2HVFWB10KC	10000	2.0	8.4	0.5	50	-	1.5	23
2HVFWB10KD	10000	2.0	8.4	0.5	50	-	2.0	23
2HVFWB15KD	15000	2.0	12.0	0.5	50	-	2.0	23
2HVFWB15KE	15000	2.0	12.0	0.5	50	-	2.5	23
2HVFWB20KE	20000	2.0	18.0	0.5	50	-	2.5	23
5HVFWB5KC	5000	5.0	5.2	0.5	150	-	1.5	23
5HVFWB7.5KD	7500	5.0	6.5	0.5	150	-	2.0	23
5HVFWB5KE	5000	5.0	5.2	0.5	150	-	2.5	23
5HVFWB10KE	10000	5.0	10.4	0.5	150	-	2.5	23
5HVFWB15KE	15000	5.0	13.0	0.5	150	-	2.5	23
<b>HVFWB F - Fast Recovery 1.0 and 3.0 Amp Glass Passivated Rectifiers</b>								
1HVFWB5KBF	5000	1.0	7.2	0.3	20	250	1.25	22
1HVFWB10KBF	10000	1.0	14.4	0.3	20	250	1.25	22
1HVFWB5KCF	5000	1.0	7.2	0.3	20	250	1.5	23
1HVFWB10KCF	10000	1.0	14.4	0.3	20	250	1.5	23
2HVFWB5KDF	5000	2.0	6.5	1.0	50	150	2.0	23
2HVFWB10KDF	10000	2.0	13.0	1.0	50	150	2.0	23
2HVFWB10KEF	10000	2.0	13.0	1.0	50	150	2.5	23
2HVFWB15KEF	15000	2.0	20.0	1.0	50	150	2.5	23
4HVFWB5KCF	5000	4.0	7.0	0.5	100	250	1.5	23
4HVFWB5KDF	5000	4.0	7.0	0.5	100	250	2.0	23
5HVFWB5KEF	5000	5.0	7.5	0.5	100	250	2.5	23
4HVFWB10KEF	10000	4.0	14.0	0.5	100	250	2.5	23
<b>HVFWB UF - Ultra Fast Recovery <math>T_{RR}</math> 75 nS 1.0 and 3.0 Amp Rectifiers</b>								
2HVFWB5KBUF	5000	2.0	8.0	1.0	35	75	1.25	22
2HVFWB8KBUF	8000	2.0	13.0	1.0	35	75	1.25	22
2HVFWB5KCUF	5000	2.0	8.0	1.0	35	75	1.5	23
2HVFWB10KCUF	10000	2.0	16.0	1.0	35	75	1.5	23
2HVFWB10KDUF	10000	2.0	16.0	1.0	35	75	2.0	23
2HVFWB15KDUF	15000	2.0	24.0	1.0	35	75	2.0	23
2HVFWB15KEUF	15000	2.0	24.0	1.0	35	75	2.5	23
2HVFWB20KEUF	20000	2.0	32.0	1.0	35	75	2.5	23
4HVFWB5KCUF	5000	4.0	7.0	5.0	150	75	1.5	23
4HVFWB5KDUF	5000	4.25	7.0	5.0	150	75	2.0	23
4HVFWB8KDUF	8000	4.0	11.2	5.0	150	75	2.0	23
4HVFWB10KEUF	10000	4.25	14.0	5.0	150	75	2.5	23
4HVFWB15KEUF	15000	4.0	21.0	5.0	150	75	2.5	23
<b>HVFWB USF - Ultra Super Fast Recovery <math>T_{RR}</math> 35 nS 1.0 Amp Rectifiers</b>								
1HVFWB5KBUSF	5000	1.0	7.0	1.0	10	35	1.25	22
1HVFWB5KCUSF	5000	1.0	7.0	1.0	10	35	1.5	23
1HVFWB8KCUSF	8000	1.0	11.2	1.0	10	35	1.5	23
1HVFWB10KDUFSF	10000	1.0	14.0	1.0	10	35	2.0	23
1HVFWB15KDUFSF	15000	0.9	21.0	1.0	10	35	2.0	23
1HVFWB15KEUSF	15000	1.0	21.0	1.0	10	35	2.5	23
1HVFWB20KEUSF	20000	0.9	28.0	1.0	10	35	2.5	23
<b>HVFWB USF - Ultra Super Fast Recovery <math>T_{RR}</math> 40 nS 2.0 Amp Rectifiers</b>								
3HVFWB5KCUFSF	5000	3.0	10.0	5.0	60	40	1.5	23
3HVFWB5KDUFSF	5000	3.0	10.0	5.0	60	40	2.0	23
3HVFWB10KDUFSF	10000	2.75	20.0	5.0	60	40	2.0	23
3HVFWB10KEUSF	10000	3.0	20.0	5.0	60	40	2.5	23
3HVFWB15KEUSF	15000	2.75	30.0	5.0	60	40	2.5	23

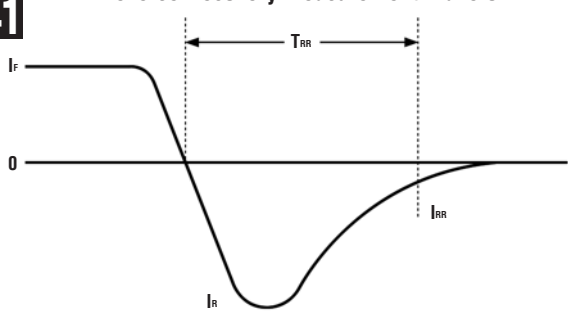
Note: All current ratings require assembly on suitably engineered heat sink, using a quality heat coupling compound. For Solder Turrets Add Suffix "T" For Wire Leads Add Suffix "W". All listed products shipped on December 31, 2013 or later will be RoHS Compliant. Available earlier by special request, contact factory or sales rep for availability.



These curves apply to most diodes in this catalog.  
For further information, please contact the factory.

FIGURE 141

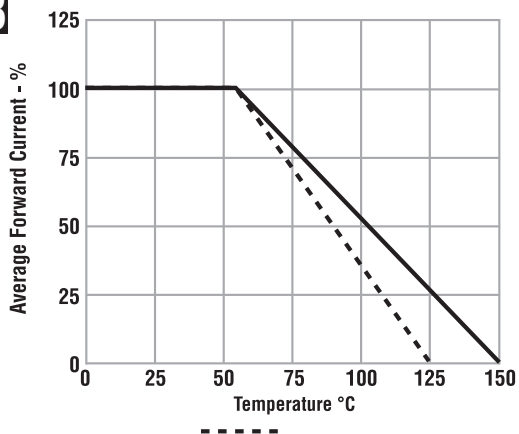
Reverse Recovery Measurement Waveform



Typical data capture points:  $I_F = 0.5I_R$ ,  $I_R, I_{RR} = 0.25I_R$   
 $I_R$  is typically the rated average forward current maximum ( $I_{FAVM}$ ) of the D.U.T.

FIGURE 143

Forward Current Derating Curve



This applies to most diodes in our catalog that show average current rating at 55°C unless otherwise specified.  
Max operating temperature is 150°C unless otherwise specified.

**On Forward Pulse Current Durations Much Shorter Than 8.3mS**

A general guideline relationship for expressing the forward pulse current withstand of a rectifier for a given pulse duration is the following:

$$(I_{pulse}^2) * (t_{pulse}) = (I_{FSM}^2) * (t_{surge}) \quad T_{ambient} = 25^{\circ}C$$

Where  $I_{FSM}$  is the rated forward surge current of the rectifier at 25°C and  $t_{surge}$  is 8.3msec.

Note that the above relationship is only to be used as a guideline. The ability of a rectifier to handle short term pulse currents is governed by several factors, so hands-on analysis by the circuit designer is essential to verify acceptable pulse withstand performance.

**Package Applicability at Specified Max Voltage Rating  $V_{RRM}$**

It should be noted that the data provided in the component tables of this catalog are electrical data related to the internal function of the device. The voltage rating in the table may exceed the electrical rating of the package in some environments. It is the responsibility of the user to assure that proper engineering consideration is given to the applicability of the package (creepage distance) at the voltage rating and in the environment of intended use. Please contact us if you have questions or concerns about applicability.

FIGURE 142

Typical  $T_{RR}$  Setup for Higher Current Diodes

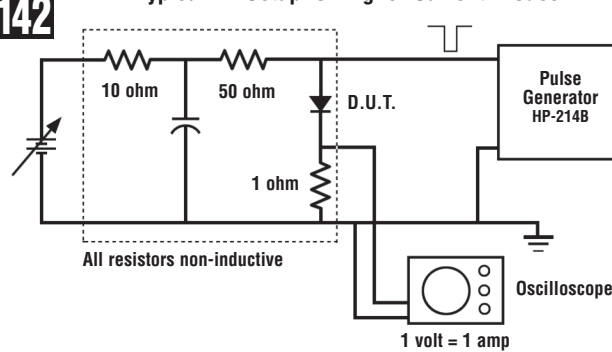


FIGURE 145

Typical  $T_{RR}$  Setup for Lower Current Diodes

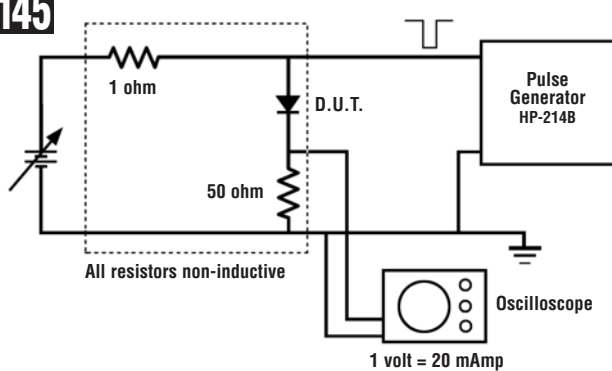
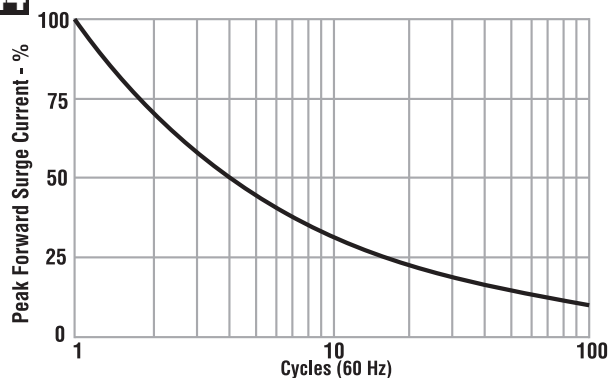


FIGURE 144

Repetitive Surge Current Derating Curve



This curve represents the percentage of published maximum surge rating as a function of surge repetition.

**Cleanliness and high voltage**

In applications where high voltage devices will be encapsulated, it is highly recommended that high voltage components or assemblies be washed in a clean, high pressure washer and then baked at 110°C for 2 hours. The cleaned, dried devices or assemblies should then be placed in heat sealed bags to prevent the accumulation of dirt or moisture prior to encapsulation.

**Humidity and high voltage**

Moisture can wreak havoc in high voltage systems. Therefore, it is highly recommended that devices that have been open to the environment be baked at 110°C for 2 hours prior to any application of high voltage.



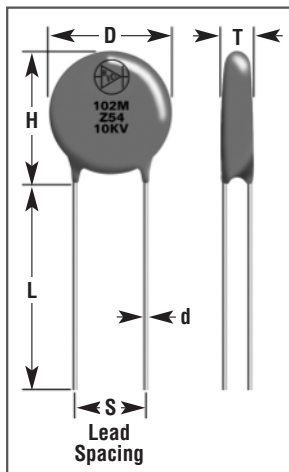


## Introduction

The NY2 series Class II high voltage capacitor line from Dean Technology uses high dielectric constant ferroelectric materials based on Barium or Strontium Titanate.<sup>1</sup> Some key features of this capacitor series include stable temperature characteristics, excellent voltage coefficient behavior, reliable voltage and frequency performance with predictable change of capacitance over time. Many different dielectric materials are available and include Y5P, Y5R, Y5T, Y5U, Y5V, Z5P, Z5U, T3M and BXN.<sup>1</sup>

The CK1 series, Class I stable high voltage capacitor line incorporates the features well known to this class of capacitor. Excellent temperature stability, superb voltage vs capacitance performance with low dissipation factor, high Q and low ESR.

Catalog listings are limited to radial lead style components with standard leads but these capacitors are available in many case and lead styles including axial, axial egress and other formats. Contact Dean Technology sales for more information.



## Specifications

### Capacitance and Dissipation Factor Measurement Methods:

Capacitance and Dissipation Factor are measured at a standard frequency of 1 KHz. A temperature of 25°C is used with an applied test voltage of less than 2 Volts AC. The allowable dissipation factor will be no greater than 2.5%.

### Voltage Ratings:

Rated Voltages are available for standard product from 1kV to 15kV. Higher voltages available by special request.

### Capacitance Tolerances Available:

Tolerance	Code Letter
±5%	J
±10%	K
±20%	M
+80, -20%	Z
+100, -0%	P

### Dielectric Withstand Voltage:

Capacitors must meet the original manufacturer's specifications following application of 1.5 times the rated D.C. voltage for 5±1 seconds.

### Insulation Resistance:

Insulation resistance shall be 10,000 megohms or greater with a test temperature of 25°C. Measurements are made between component terminals following a 2 minute charge at 100 Volts DC. Charging currents will be limited to no more than 50 milliamperes.

### Temperature Characteristics Available:

The temperature characteristics table follows the EIA Standard RS-198-C.

1st Letter	Number	Last Letter
Y= -30°C	5= +85°C	P= ±10%
Z= +10°C		R= ±15%
		T= +22%/-33%
		U= +22%/-56%
		V= +22%/-82%

<sup>1</sup> The BxN in the part numbers listed in this section is not an EIA standard temperature characteristic. It is a dielectric material, proprietary to Dean Technology, which responds much like standard Y5P material but with a broader and more stable temperature curve.

## Life Testing Method:

These capacitors are designed to withstand voltages of at least 1.5 times the rated DC voltage for at least 1000 hours at 85°C. A change of capacitance of no more than 10% is acceptable when tested 24 hours later. Dissipation Factor changes are limited to 5% with Insulation Resistance values of no less than 1000 megohms.

## Temperature Ratings:

Class I and Class II and intended to operate within the temperature limits set forth in EIA RS-198-C but may be stored at temperatures ranging from -55°C to +125°C without harm.

## Humidity Resistance:

Capacitors must have a minimum insulation resistance of 1000 megohms and a maximum Dissipation Factor of 5% following exposure to a relative humidity of 95% for 100 hours at 40°C.

## Construction

### Coating Materials:

All capacitors with 1kVDC ratings are coated with a flame retardant, baked-on phenolic coating applied using the wet-dip method. Those rated 2 KV and above, are coated with a flame retardant, dry process fluid-bed epoxy. Diameter and thickness dimensions shown in the tables apply to epoxy as well as phenolic-coated units.

### Lead Coatings:

On straight leads, the coatings shall not extend beyond 1/8 inch below the bottom of the capacitor disc. On bent or formed leads, the coating will not be allowed beyond the kink which is the seating plane of the capacitor.

### Lead Wire Material and Configurations:

Lead wire material is tin-plated copper wire of 22 or 20 AWG. Capacitors with diameters of 12 mm or less, or voltage values less than 8 KV will be of the smaller gauge. Standard lead configurations are straight and at least 1 inch long, and formed or cut leads are available on special order (drawings required on special configurations).

## Component Marking:

Both inking and laser equipment are used to mark these components. Each capacitor, where space is available, shall bear the letters "HVCA" across the top, followed by the capacitance, tolerance, temperature code and voltage where space permits. When space is limited, the temperature characteristic code may be omitted.

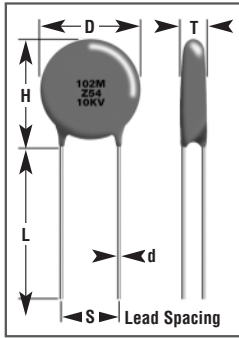
## Ordering Information:

Component part numbers, capacitances, dielectrics and rated voltage represent the values presently stocked by Dean Technology, Inc. and typically available for immediate shipment. Many other values, voltages and styles are available by special request. For requirements not shown in the following pages, please contact your sales representative for datasheets, prices and lead times.

NY2 Manufacturer's Code	Y5P Temperature Characteristics Code	102 Capacitor Value (pf)	M Capacitance Tolerance Code	10KV DC Voltage Rating
CK1 or NY2 for Class II Capacitors	From Temperature Characteristics Table to the Left	3 Digits Total 1st two are Significant Third is Multiplier 0=X1 1=X10 2=X100 3=X1000 9=X10000	K=±10% M=±20% Z=+80, -20% P=+100, -0%	As Required

Example: CK1Z5U471K5KV

This is a capacitor with Z5U temperature characteristics, a capacitance of 470 pf, a capacitance tolerance of ±10% with a rated DC voltage of 5 KV.

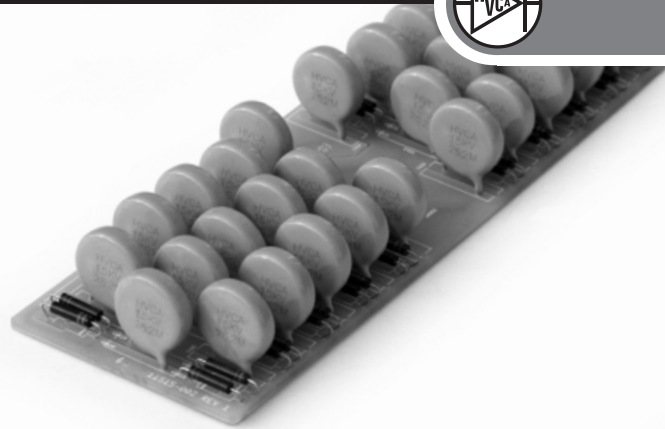


### Key Features:

- Low Loss
- High Stability
- RoHS Compliant

### Applications

- High Voltage Multipliers
- High Voltage Noise filters
- High Voltage Power Supplies
- RF Coupling
- RF Bypass



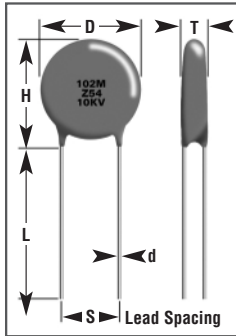
Part Number	Capacitance Value	Dielectric Material	Rated Voltage	Dielectric Withstand Voltage	Capacitor Dimensions				
	pF				V	V	Dia mm	Height mm	Thickness mm
<b>NY2 Series - Y5P Dielectric</b>					<b>Radial Lead Style<sup>1</sup></b>				
NY2Y5P101M3KV	100	Y5P	3000	4500	7.5	10.0	4.0	7.5	0.6
NY2Y5P221M3KV	220	Y5P	3000	4500	7.0	8.0	4.0	7.5	0.6
NY2Y5P331M3KV	330	Y5P	3000	4500	7.0	9.0	4.0	7.5	0.6
NY2Y5P471M3KV	470	Y5P	3000	4500	8.0	9.0	4.0	7.5	0.6
NY2Y5P561M3KV	560	Y5P	3000	4500	8.0	9.0	4.0	7.5	0.6
NY2Y5P102M3KV	1000	Y5P	3000	4500	9.0	11.0	4.0	7.5	0.6
NY2Y5P152M3KV	1500	Y5P	3000	4500	11.0	12.0	4.0	7.5	0.6
NY2Y5P242M3KV	2400	Y5P	3000	4500	16.0	19.0	4.0	7.5	0.7
NY2Y5P101M6KV	100	Y5P	6000	9000	8.0	11.0	7.0	7.5	0.6
NY2Y5P221M6KV	220	Y5P	6000	9000	8.0	11.0	7.0	10.0	0.6
NY2Y5P331M6KV	330	Y5P	6000	9000	9.0	10.0	7.0	10.0	0.6
NY2Y5P471M6KV	470	Y5P	6000	9000	10.0	11.0	7.0	10.0	0.6
NY2Y5P561M6KV	560	Y5P	6000	9000	9.0	11.0	7.0	10.0	0.6
NY2Y5P102M6KV	1000	Y5P	6000	9000	12.0	14.0	7.0	10.0	0.7
NY2Y5P152M6KV	1500	Y5P	6000	9000	14.0	16.0	7.0	10.0	0.7
NY2Y5P242M6KV	2400	Y5P	6000	9000	18.0	19.0	7.0	10.0	0.7
NY2Y5P101M10KV	100	Y5P	10000	15000	8.0	10.0	8.0	10.0	0.7
NY2Y5P221M10KV	220	Y5P	10000	15000	10.0	11.0	8.0	10.0	0.7
NY2Y5P331M10KV	330	Y5P	10000	15000	11.0	13.0	8.0	10.0	0.7
NY2Y5P471M10KV	470	Y5P	10000	15000	12.0	14.0	8.0	10.0	0.7
NY2Y5P561M10KV	560	Y5P	10000	15000	12.5	15.0	8.0	10.0	0.7
NY2Y5P102M10KV	1000	Y5P	10000	15000	17.0	20.0	8.0	10.0	0.7
NY2Y5P152M10KV	1500	Y5P	10000	15000	18.0	21.0	8.0	10.0	0.7
NY2Y5P101M15KV	100	Y5P	15000	22500	9.0	12.0	9.0	10.0	0.7
NY2Y5P221M15KV	220	Y5P	15000	22500	10.0	13.0	9.0	10.0	0.7
NY2Y5P331M15KV	330	Y5P	15000	22500	13.0	15.0	9.0	12.5	0.7
NY2Y5P561M15KV	560	Y5P	15000	22500	15.0	17.0	9.0	12.5	0.7
NY2Y5P102M15KV	1000	Y5P	15000	22500	18.5	21.5	9.0	12.5	0.7
NY2Y5P152M15KV	1500	Y5P	15000	22500	22.0	25.0	9.0	12.5	0.7
NY2Y5P242M15KV	2400	Y5P	15000	22500	24.0	26.0	9.0	12.5	0.7
<b>NY2 Series - Y5T Dielectric</b>					<b>Radial Lead Style<sup>1</sup></b>				
NY2Y5T102M3KV	1000	Y5T	3000	4500	7.0	8.0	4.0	7.5	0.6
NY2Y5T152M3KV	1500	Y5T	3000	4500	8.0	10.0	4.0	7.5	0.6
NY2Y5T222M3KV	2200	Y5T	3000	4500	11.0	13.0	4.0	7.5	0.6
NY2Y5T332M3KV	3300	Y5T	3000	4500	14.0	16.0	4.0	7.5	0.6
NY2Y5T472M3KV	4700	Y5T	3000	4500	14.5	16.0	4.0	7.5	0.6
NY2Y5T561M6KV	560	Y5T	6000	9000	9.0	11.0	5.0	10.0	0.6
NY2Y5T102M6KV	1000	Y5T	6000	9000	10.0	12.0	5.0	10.0	0.6
NY2Y5T152M6KV	1500	Y5T	6000	9000	13.0	14.0	5.0	10.0	0.7
NY2Y5T222M6KV	2200	Y5T	6000	9000	13.0	16.0	5.0	10.0	0.7
NY2Y5T561M10KV	560	Y5T	10000	15000	10.5	13.0	8.0	10.0	0.7
NY2Y5T102M10KV	1000	Y5T	10000	15000	14.0	16.0	8.0	10.0	0.7
NY2Y5T331M15KV	330	Y5T	15000	22500	10.0	12.0	9.0	12.5	0.7
NY2Y5T471M15KV	470	Y5T	15000	22500	11.0	13.0	9.0	12.5	0.7
NY2Y5T561M15KV	560	Y5T	15000	22500	11.0	14.0	9.0	12.5	0.7

**Notes:**

Standard lead length – 25mm typical

See page 23 for notes regarding package applicability at specified voltage rating.

All devices listed are RoHS compliant. Performance curves for products listed here can be found on page 29.



### Key Features:

- Low Loss
- High Stability
- RoHS Compliant

### Applications

- High Voltage Multipliers
- High Voltage Noise filters
- High Voltage Power Supplies
- RF Coupling
- RF Bypass

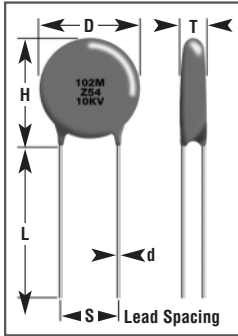


Part Number	Capacitance Value pF	Dielectric Material	Rated Voltage V	Dielectric Withstand Voltage V	Capacitor Dimensions				
					Dia mm	Height mm	Thickness mm	Lead Spacing mm	Lead Dia mm±10%
<b>NY2 Series - BxN Dielectric</b>					<b>Radial Lead Style<sup>1</sup></b>				
NY2BxN331M3KV	330	BxN	3000	4500	7.0	9.0	4.0	7.5	0.6
NY2BxN471M3KV	470	BxN	3000	4500	8.0	9.0	4.0	7.5	0.6
NY2BxN561M3KV	560	BxN	3000	4500	8.0	9.0	4.0	7.5	0.6
NY2BxN102M3KV	1000	BxN	3000	4500	9.0	11.0	4.0	7.5	0.6
NY2BxN152M3KV	1500	BxN	3000	4500	11.0	12.0	4.0	7.5	0.6
NY2BxN242M3KV	2400	BxN	3000	4500	16.0	19.0	4.0	7.5	0.7
NY2BxN331M6KV	330	BxN	6000	9000	9.0	10.0	7.0	10.0	0.6
NY2BxN471M6KV	470	BxN	6000	9000	10.0	11.0	7.0	10.0	0.6
NY2BxN561M6KV	560	BxN	6000	9000	9.0	11.0	7.0	10.0	0.6
NY2BxN102M6KV	1000	BxN	6000	9000	12.0	14.0	7.0	10.0	0.7
NY2BxN152M6KV	1500	BxN	6000	9000	14.0	16.0	7.0	10.0	0.7
NY2BxN242M6KV	2400	BxN	6000	9000	18.0	19.0	7.0	10.0	0.7
NY2BxN331M10KV	330	BxN	10000	15000	11.0	13.0	8.0	10.0	0.7
NY2BxN471M10KV	470	BxN	10000	15000	12.0	14.0	8.0	10.0	0.7
NY2BxN561M10KV	560	BxN	10000	15000	12.5	15.0	8.0	10.0	0.7
NY2BxN102M10KV	1000	BxN	10000	15000	17.0	20.0	8.0	10.0	0.7
NY2BxN152M10KV	1500	BxN	10000	15000	18.0	21.0	8.0	10.0	0.7
NY2BxN221M15KV	220	BxN	15000	22500	10.0	13.0	9.0	10.0	0.7
NY2BxN331M15KV	330	BxN	15000	22500	13.0	15.0	9.0	10.0	0.7
NY2BxN561M15KV	560	BxN	15000	22500	15.0	17.0	9.0	12.5	0.7
NY2BxN102M15KV	1000	BxN	15000	22500	18.5	21.5	9.0	12.5	0.7
NY2BxN152M15KV	1500	BxN	15000	22500	22.0	25.0	9.0	12.5	0.7
<b>NY2 Series - Z5U Dielectric</b>					<b>Radial Lead Style<sup>1</sup></b>				
NY2Z5U102M3KV	1000	Z5U	3000	4500	6.0	9.0	4.0	5.0	0.6
NY2Z5U152M3KV	1500	Z5U	3000	4500	8.0	10.0	4.0	7.5	0.6
NY2Z5U222M3KV	2200	Z5U	3000	4500	10.0	11.0	4.0	7.5	0.6
NY2Z5U332M3KV	3300	Z5U	3000	4500	10.0	11.0	4.0	7.5	0.6
NY2Z5U472M3KV	4700	Z5U	3000	4500	12.0	13.0	4.0	7.5	0.7
NY2Z5U562M3KV	5600	Z5U	3000	4500	14.0	15.0	4.0	7.5	0.7
NY2Z5U471M6KV	470	Z5U	6000	9000	8.0	10.0	6.0	7.5	0.6
NY2Z5U561M6KV	560	Z5U	6000	9000	8.0	10.0	6.0	7.5	0.6
NY2Z5U102M6KV	1000	Z5U	6000	9000	9.0	11.0	6.0	10.0	0.6
NY2Z5U152M6KV	1500	Z5U	6000	9000	10.0	12.0	6.0	10.0	0.6
NY2Z5U222M6KV	2200	Z5U	6000	9000	11.5	13.0	6.0	10.0	0.7
NY2Z5U332M6KV	3300	Z5U	6000	9000	14.0	16.0	6.0	10.0	0.7
NY2Z5U471M10KV	470	Z5U	10000	15000	9.5	12.0	7.0	10.0	0.7
NY2Z5U561M10KV	560	Z5U	10000	15000	9.0	12.0	7.0	10.0	0.7
NY2Z5U102M10KV	1000	Z5U	10000	15000	11.0	13.0	8.0	10.0	0.7
NY2Z5U152M10KV	1500	Z5U	10000	15000	13.0	16.0	8.0	10.0	0.7
NY2Z5U222M10KV	2200	Z5U	10000	15000	16.0	18.0	8.0	10.0	0.7
NY2Z5U332M10KV	3300	Z5U	10000	15000	17.5	20.0	8.0	10.0	0.7
NY2Z5U471M15KV	470	Z5U	15000	22500	11.0	12.0	10.0	12.5	0.7
NY2Z5U561M15KV	560	Z5U	15000	22500	12.0	14.0	10.0	12.5	0.7
NY2Z5U102M15KV	1000	Z5U	15000	22500	12.0	15.0	10.0	12.5	0.7
NY2Z5U152M15KV	1500	Z5U	15000	22500	15.0	17.0	10.0	12.5	0.7
NY2Z5U202M15KV	2000	Z5U	15000	22500	17.0	20.5	10.0	12.5	0.7

### Notes:

Standard lead length – 25mm typical. See page 23 for notes regarding package applicability at specified voltage rating.

All devices listed are RoHS compliant. BxN is a dielectric material proprietary to DTI. This material is similar to Y5P but has a better temperature range which makes it an ideal replacement for X5R and X7R materials in many applications. Capacitor datasheets available upon request.



### Key Features:

- Very Low Loss
- Extremely High Stability
- RoHS Compliant

### Applications

- RF Resonant Circuits
- Resonant Filters
- RF Phase Control
- RF Coupling
- High Efficiency Voltage Multipliers



Part Number	Capacitance Value	Dielectric Material	Rated Voltage	Dielectric Withstand Voltage	Capacitor Dimensions				
	pF				V	V	Dia mm	Height mm	Thickness mm
<b>CK1 Series - NPO Dielectric</b>					<b>Radial Lead Style<sup>1</sup></b>				
CK1NP02R0K3KV	2	NPO	3000	6000	6	9	4	5	0.6
CK1NP03R3K3KV	3.3	NPO	3000	6000	6	9	4	5	0.6
CK1NP05R0K3KV	5	NPO	3000	6000	6	9	4	5	0.6
CK1NP06R8K3KV	6.8	NPO	3000	6000	6	9	4	5	0.6
CK1NP0100K3KV	10	NPO	3000	6000	7	10	4	5	0.6
CK1NP0150K3KV	15	NPO	3000	6000	7	10	4	5	0.6
CK1NP0330K3KV	33	NPO	3000	6000	8	11	4	7.5	0.6
CK1NP0510K3KV	51	NPO	3000	6000	9	12	4	7.5	0.6
CK1NP0680K3KV	68	NPO	3000	6000	10	13	4	7.5	0.6
CK1NP0910K3KV	91	NPO	3000	6000	12	15	4	7.5	0.7
CK1NP0151K3KV	150	NPO	3000	6000	15	18	4	10	0.7
CK1NP02R0K6KV	2	NPO	6000	12000	6	9	5	10	0.6
CK1NP03R3K6KV	3.3	NPO	6000	12000	6	9	5	10	0.6
CK1NP05R0K6KV	5	NPO	6000	12000	7	10	5	10	0.6
CK1NP06R8K6KV	6.8	NPO	6000	12000	7	10	5	10	0.6
CK1NP0100K6KV	10	NPO	6000	12000	7	10	5	10	0.6
CK1NP0150K6KV	15	NPO	6000	12000	7	10	5	10	0.6
CK1NP0330K6KV	33	NPO	6000	12000	9	12	5	10	0.6
CK1NP0390K6KV	39	NPO	6000	12000	10	13	5	10	0.6
CK1NP0680K6KV	68	NPO	6000	12000	12	15	5	10	0.7
CK1NP0910K6KV	91	NPO	6000	12000	14	17	5	10	0.7
CK1NP0151K6KV	150	NPO	6000	12000	17	20	5	10	0.7
<b>CK1 Series - SL Dielectric</b>					<b>Radial Lead Style<sup>1</sup></b>				
CK1SL100K3KV	10	SL	3000	6000	6	9	4	5	0.6
CK1SL150K3KV	15	SL	3000	6000	6	9	4	5	0.6
CK1SL220K3KV	22	SL	3000	6000	6	9	4	5	0.6
CK1SL510K3KV	51	SL	3000	6000	8	11	4	5	0.6
CK1SL680K3KV	68	SL	3000	6000	8	11	4	5	0.6
CK1SL910K3KV	91	SL	3000	6000	9	12	4	5	0.6
CK1SL151K3KV	150	SL	3000	6000	11	14	4	7.5	0.6
CK1SL161K3KV	160	SL	3000	6000	11	14	4	7.5	0.6
CK1SL221K3KV	220	SL	3000	6000	13	16	4	10	0.7
CK1SL241K3KV	240	SL	3000	6000	13	16	4	10	0.7
CK1SL301K3KV	300	SL	3000	6000	14	17	4	10	0.7
CK1SL100K6KV	10	SL	6000	12000	6	9	5	10	0.6
CK1SL150K6KV	15	SL	6000	12000	6	9	5	10	0.6
CK1SL330K6KV	33	SL	6000	12000	7	10	5	10	0.6
CK1SL390K6KV	39	SL	6000	12000	8	11	5	10	0.6
CK1SL510K6KV	51	SL	6000	12000	9	12	5	10	0.6
CK1SL680K6KV	68	SL	6000	12000	10	13	5	10	0.6
CK1SL910K6KV	91	SL	6000	12000	10	13	5	10	0.6
CK1SL151K6KV	150	SL	6000	12000	12	15	5	10	0.7
CK1SL181K6KV	180	SL	6000	12000	14	17	5	10	0.7
CK1SL201K6KV	200	SL	6000	12000	14	17	5	10	0.7
CK1SL271K6KV	270	SL	6000	12000	16	19	5	10	0.7
CK1SL301K6KV	300	SL	6000	12000	17	20	5	10	0.7

### Notes:

Standard lead length - 25mm typical. See page 23 for notes regarding package applicability at specified voltage rating.

All devices listed are RoHS compliant. Performance curves for products listed here can be found on page 29.

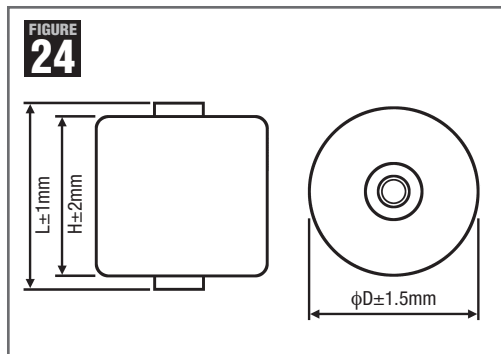


## FEATURES

- Compact size with low dissipation factor
- Low voltage coefficient
- Epoxy encapsulated internal screw thread design
- Up to 50kV DC working voltage

## APPLICATIONS

- Lasers
- HV power supplies
- Electrostatic coating and spray equipment
- Lightning arresters, voltage distribution systems
- Electron Microscopes and synchroscopes



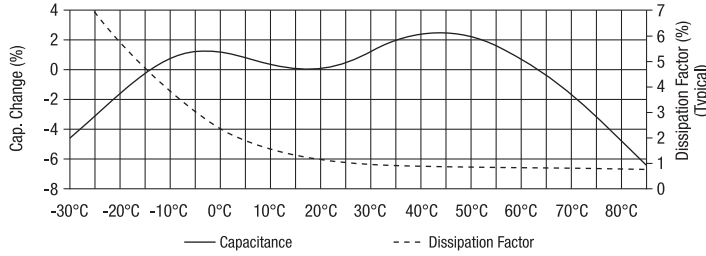
Part Number	Capacitance Value pF	Capacitance Tolerance %	Dielectric Material	Rated Voltage V	Dielectric Withstand Voltage V	Capacitor Dimensions			Terminal Dimensions mm
						D mm	L mm	H mm	
<b>NX5 Series - T3M/N4700 Class I Dielectric</b>						<b>Figure 24</b>			
NX5T3M561K10KV	560	±10	T3M/N4700	10000	15000	20	16	12	M4×4
NX5T3M122K10KV	1200	±10	T3M/N4700	10000	15000	24	16	12	M4×4
NX5T3M282K10KV	2800	±10	T3M/N4700	10000	15000	38	16	12	M4×4
NX5T3M502K10KV	5000	±10	T3M/N4700	10000	15000	52	16	12	M5×4
NX5T3M802K10KV	8000	±10	T3M/N4700	10000	15000	58	16	12	M5×4
NX5T3M371K15KV	370	±10	T3M/N4700	15000	22500	20	18	14	M4×4
NX5T3M112K15KV	1100	±10	T3M/N4700	15000	22500	30	18	14	M4×4
NX5T3M192K15KV	1900	±10	T3M/N4700	15000	22500	38	18	14	M4×4
NX5T3M342K15KV	3400	±10	T3M/N4700	15000	22500	52	18	14	M5×4
NX5T3M532K15KV	5300	±10	T3M/N4700	15000	22500	58	18	14	M5×4
NX5T3M281K20KV	280	±10	T3M/N4700	20000	30000	20	24	20	M4×5
NX5T3M881K20KV	880	±10	T3M/N4700	20000	30000	30	24	20	M4×5
NX5T3M142K20KV	1400	±10	T3M/N4700	20000	30000	38	24	20	M4×5
NX5T3M252K20KV	2500	±10	T3M/N4700	20000	30000	52	24	20	M5×5
NX5T3M402K20KV	4000	±10	T3M/N4700	20000	30000	58	24	20	M5×5
NX5T3M191K30KV	190	±10	T3M/N4700	30000	45000	20	28	24	M4×5
NX5T3M591K30KV	590	±10	T3M/N4700	30000	45000	30	28	24	M4×5
NX5T3M941K30KV	940	±10	T3M/N4700	30000	45000	38	28	24	M4×5
NX5T3M172K30KV	1700	±10	T3M/N4700	30000	45000	52	28	24	M5×5
NX5T3M272K30KV	2700	±10	T3M/N4700	30000	45000	58	28	24	M5×5
NX5T3M141K40KV	140	±10	T3M/N4700	40000	60000	20	36	32	M4×6
NX5T3M441K40KV	440	±10	T3M/N4700	40000	60000	30	36	32	M4×6
NX5T3M701K40KV	700	±10	T3M/N4700	40000	60000	38	36	32	M4×6
NX5T3M132K40KV	1300	±10	T3M/N4700	40000	60000	52	36	32	M5×6
NX5T3M202K40KV	2000	±10	T3M/N4700	40000	60000	58	36	32	M5×6
NX5T3M101K50KV	100	±10	T3M/N4700	50000	75000	20	39	35	M4×6
NX5T3M201K50KV	200	±10	T3M/N4700	50000	75000	24	39	35	M4×6
NX5T3M401K50KV	400	±10	T3M/N4700	50000	75000	30	39	35	M4×6
NX5T3M561K50KV	560	±10	T3M/N4700	50000	75000	38	39	35	M4×6
NX5T3M112K50KV	1100	±10	T3M/N4700	50000	75000	52	39	35	M5×6
NX5T3M172K50KV	1700	±10	T3M/N4700	50000	75000	58	39	35	M5×6
<b>NX5 Series - Y5P Class II Dielectric</b>						<b>Figure 24</b>			
NX5Y5P251K15KV	250	±10	Y5P	15000	22500	20	19	15	M4×4
NX5Y5P501K15KV	500	±10	Y5P	15000	22500	24	19	15	M4×4
NX5Y5P102K15KV	1000	±10	Y5P	15000	22500	36	19	15	M4×4
NX5Y5P251K20KV	250	±10	Y5P	20000	30000	24	22	18	M4×4
NX5Y5P501K20KV	500	±10	Y5P	20000	30000	30	22	18	M4×4
NX5Y5P102K20KV	1000	±10	Y5P	20000	30000	40	22	18	M4×4
NX5Y5P251K30KV	250	±10	Y5P	30000	45000	24	26	22	M4×4
NX5Y5P501K30KV	500	±10	Y5P	30000	45000	36	26	22	M4×4
NX5Y5P251K40KV	250	±10	Y5P	40000	60000	30	32	28	M4×4
NX5Y5P501K40KV	500	±10	Y5P	40000	60000	40	32	28	M4×4
NX5Y5P251K50KV	250	±10	Y5P	50000	75000	34	39	35	M4×5
NX5Y5P501K50KV	500	±10	Y5P	50000	75000	52	39	35	M5×5

All devices listed are RoHS compliant.

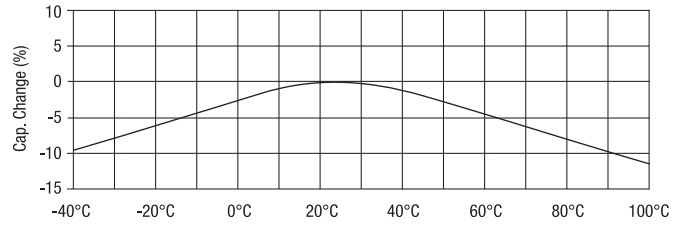
Performance curves for products listed here can be found on page 29.



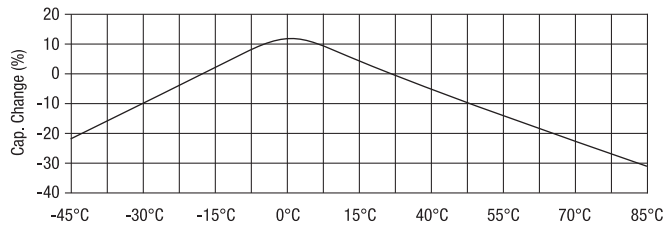
**BXN Typical Temperature Characteristics Curve**



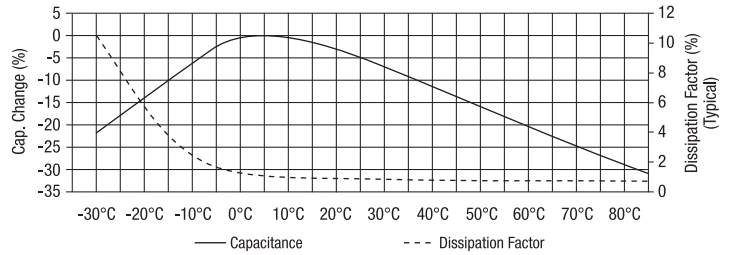
**Y5P Typical Temperature Characteristics Curve**



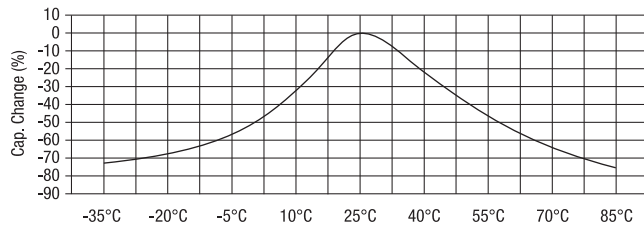
**Y5T Typical Temperature Characteristics Curve**



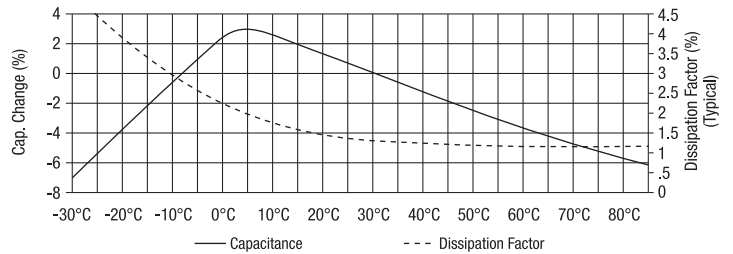
**Z5U Typical Temperature Characteristics Curve**



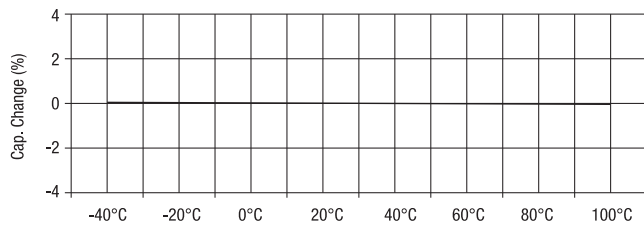
**Y5V Typical Temperature Characteristics Curve**



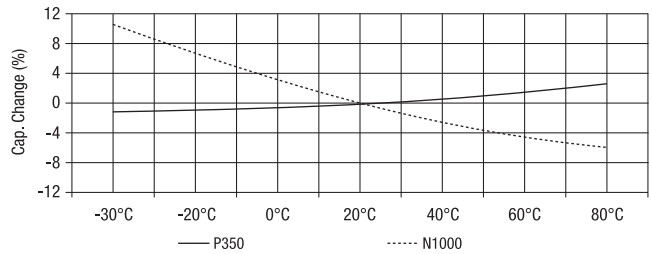
**Z5P Typical Temperature Characteristics Curve**



**NPO Typical Temperature Characteristics Curve**

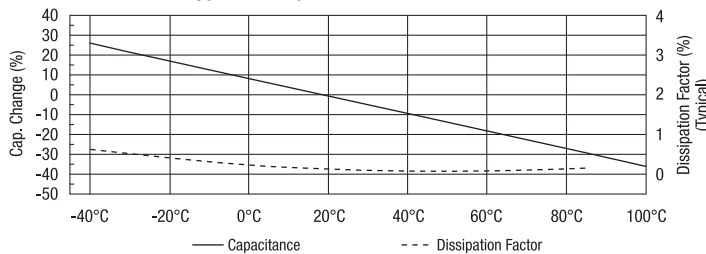


**SL Typical Temperature Characteristics Curve**

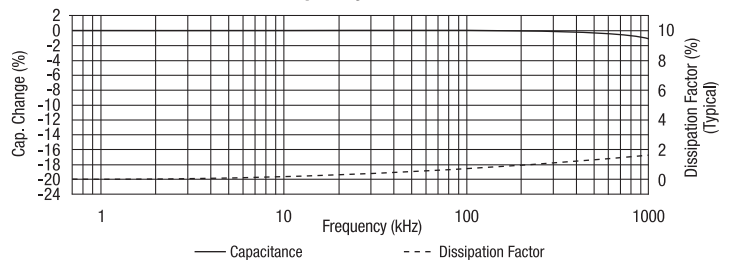


## Door Knob Capacitor Characteristic Curves

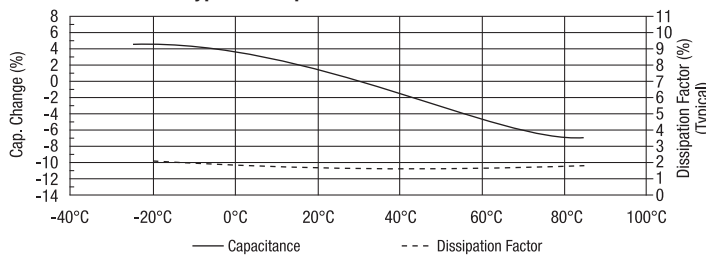
**T3M Typical Temperature Characteristics Curve**



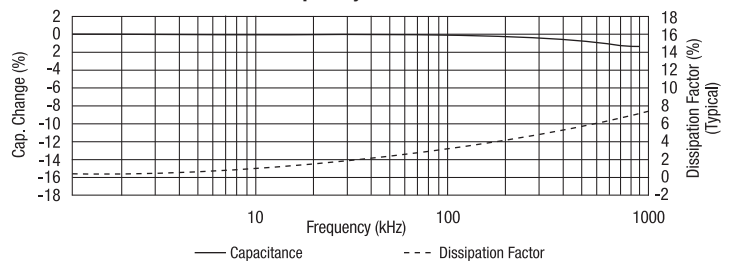
**T3M Frequency Characteristic**



**Y5P Typical Temperature Characteristics Curve**



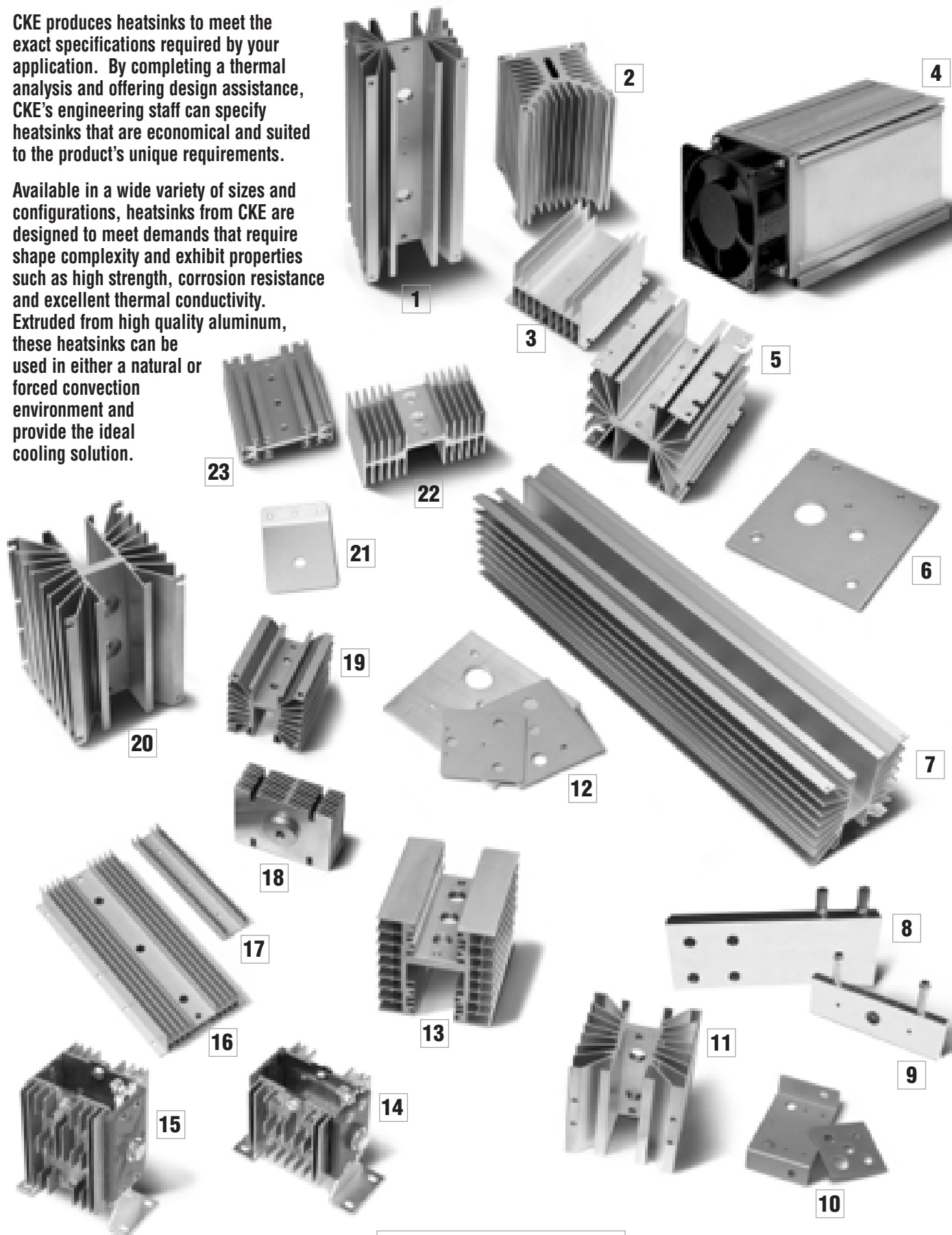
**Y5P Frequency Characteristic**



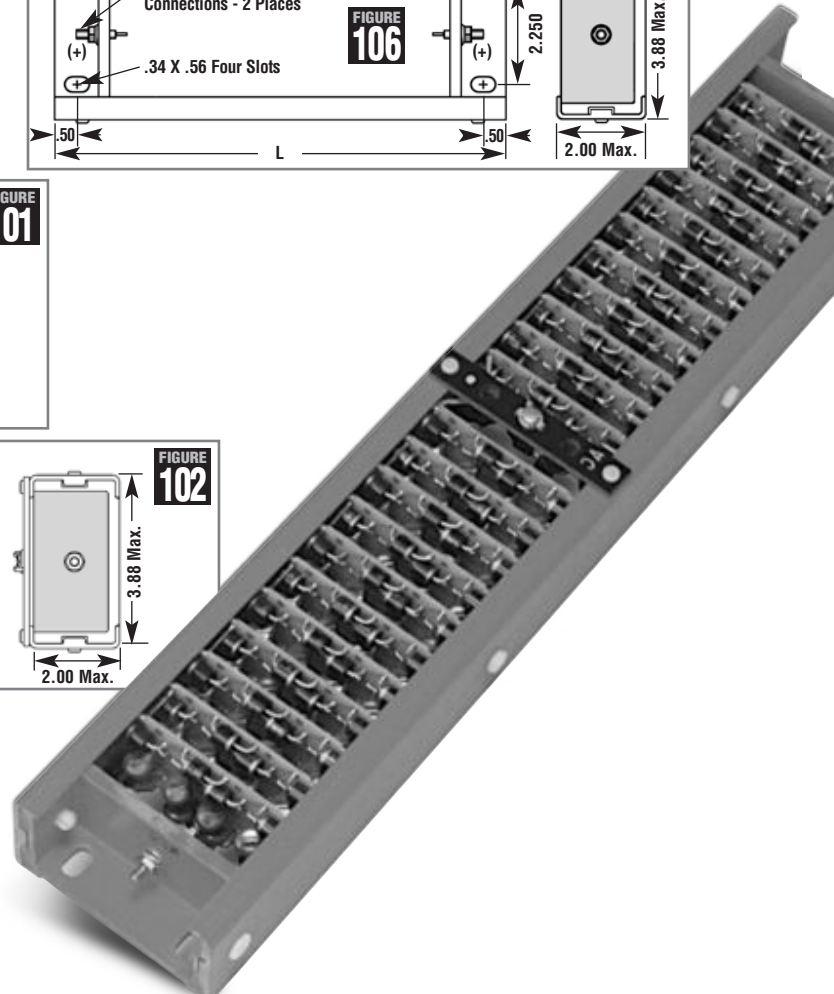
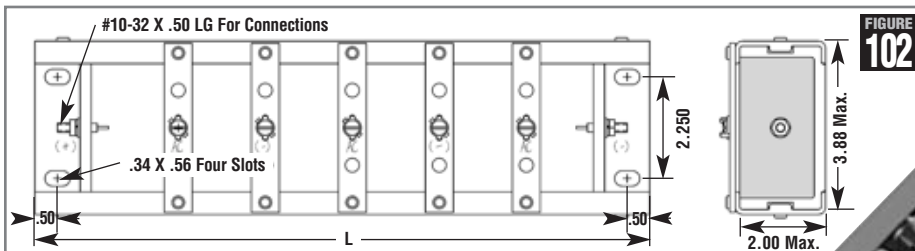
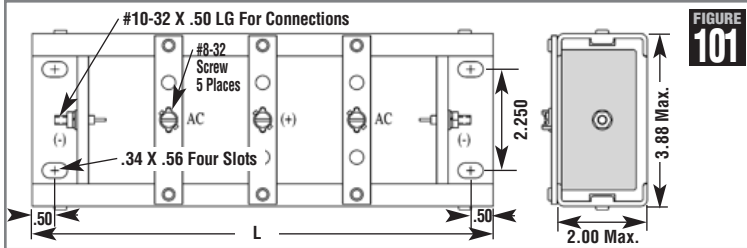
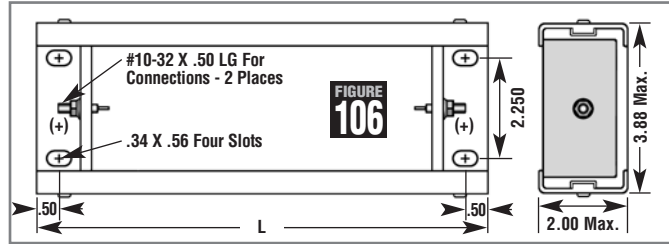
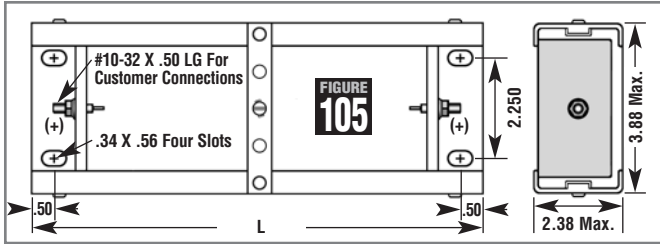


CKE produces heatsinks to meet the exact specifications required by your application. By completing a thermal analysis and offering design assistance, CKE's engineering staff can specify heatsinks that are economical and suited to the product's unique requirements.

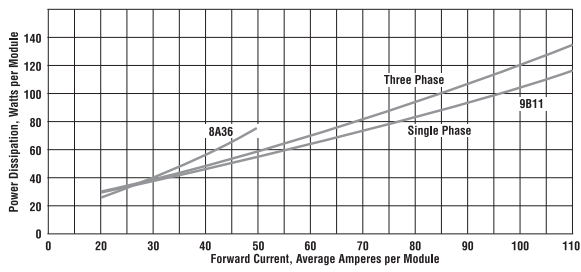
Available in a wide variety of sizes and configurations, heatsinks from CKE are designed to meet demands that require shape complexity and exhibit properties such as high strength, corrosion resistance and excellent thermal conductivity. Extruded from high quality aluminum, these heatsinks can be used in either a natural or forced convection environment and provide the ideal cooling solution.



Numbers are for reference only



### Electrical Characteristics Average Power Dissipation per Module



Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ Per Leg <sup>1</sup> kV	Max Applied Voltage $V_{MA}$ kV	Avg. Forward Current Maximum@ 40°C Air A	70°C Oil A	Max. Forward Voltage Drop $V_F@I_F$ Per Leg V	Max. Forward Current $I_R@V_{MA}$ $\mu$ A	Max. Reverse Current $I_{FSM}$ A	Max. Surge Overall Length (L) Inches	Figure
<b>S Series - High Voltage Channel Stack Rectifiers</b>									
SD17A12Z0817S	8	4	12	11	8.8	100	370	16.25	105
SD15A09Z0817S	32	16	2.4	4	36	100	370	16.25	105
SD16A14Z0625S	24	12	4	7	24	100	1050	22.25	105
SH13A03Z0508S	56	28	1	1.5	88	100	150	9.5	106
SH13A03Z1320S	145	72.5	1	1.5	208	100	150	18.5	106
SH16A14Z0612S	24	12	4	7	24	100	1050	12.5	106
SH15A09Z2020S	80	80	2.4	4	88	100	370	18.5	106
SH18A36Z3434S	34	17	15	26	38	100	1050	29	106
SH19B11Z1633S	16	8	33	70	24	100	3000	28.25	106
SB53A03Z0111S	11	5.5	1	1.5	16	100	150	11.75	101
SB56A14Z0111S	4	2	4	7	4.4	100	1050	11.75	101
SE53A03Z0223S	22	11	1	1.5	32	100	150	20.75	102
SE55A09Z0111S	4	2	2.4	4	4.4	100	370	11.75	102
SE58A36Z0323S	3	1.5	15	26	3.3	100	1050	20.75	102

<sup>1</sup>The true  $V_{RRM}$  of an MOV compensated unit is 2 times the max applied voltage. In this case the Max Applied Voltage of the assembly is limited by the Max Operating Voltage of the MOV used. Max Applied Voltage is the max safe peak voltage that can be repeatedly applied to the rectifier.

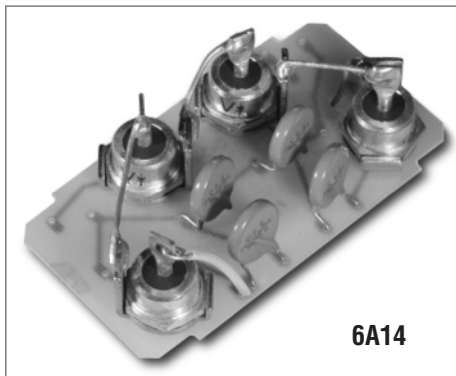
Maximum operating and storage temperature -40°C to 125°C

Each diode is rated @ 1000 Volts Peak and MOV compensated which gives an avalanche rating of 90 Joules maximum (8 x 20  $\mu$ S) and a nominal voltage of 680 volts.

For R-C compensation, drop the S suffix.

Product is available in RoHS compliant form. Unless RoHS compliance is requested, existing stocks of non-compliant materials are being shipped.





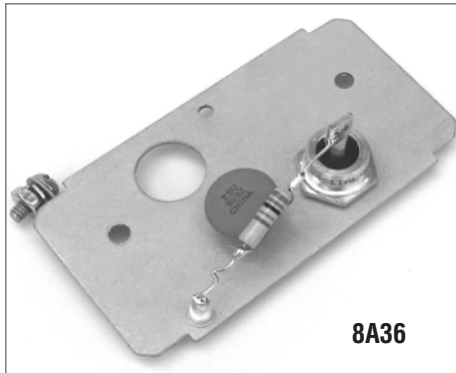
6A14



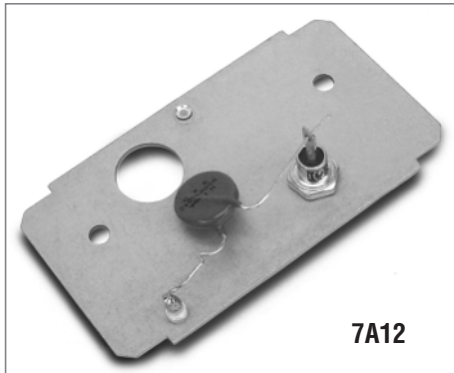
3A03



5A09



8A36



7A12



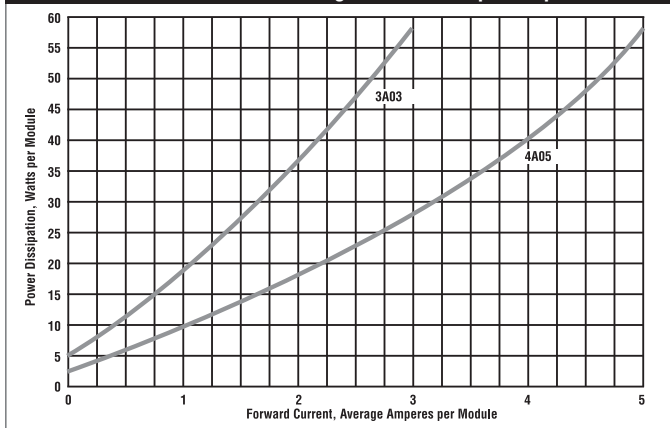
4A05

**Product Description Number**

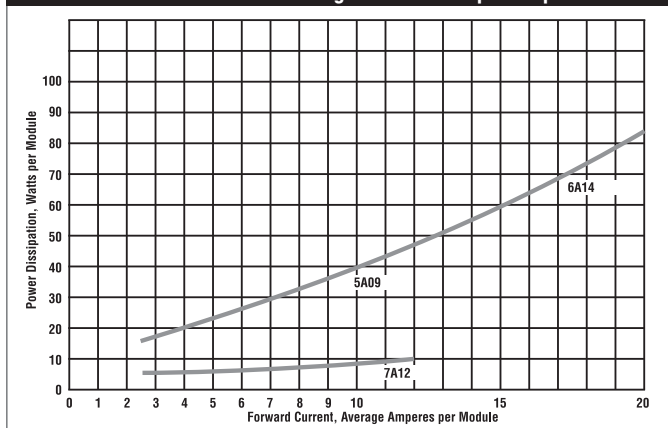
Circuit	Termination	Module (see above)	Modules (per Leg)	Channel No.
<b>S *</b>	<b>1</b>	<b>7 A 1 2 Z</b>	<b>1 5</b>	<b>3 1</b>
SH = Half Wave SD = Doubler SB = 1φ Bridge SE = 3φ Bridge	Please consult factory for other ends			To determine channel length in inches L=(3.5+channel number x .75 inches)

Module Type	Volts/ Board	Avg. Forward Current Max. $I_{FAVM}@T_c 40^\circ C$ A (Amps)	Max. Surge Current $I_{FSM}(8.3ms)$ A (Amps)
6A14	4kv	4.0	1050
3A03	16kv	1.2	150
5A09	4kv	2.4	370
8A36	1kv	15	1050
7A12	1kv	12	370
4A05	8kv	3.0	150

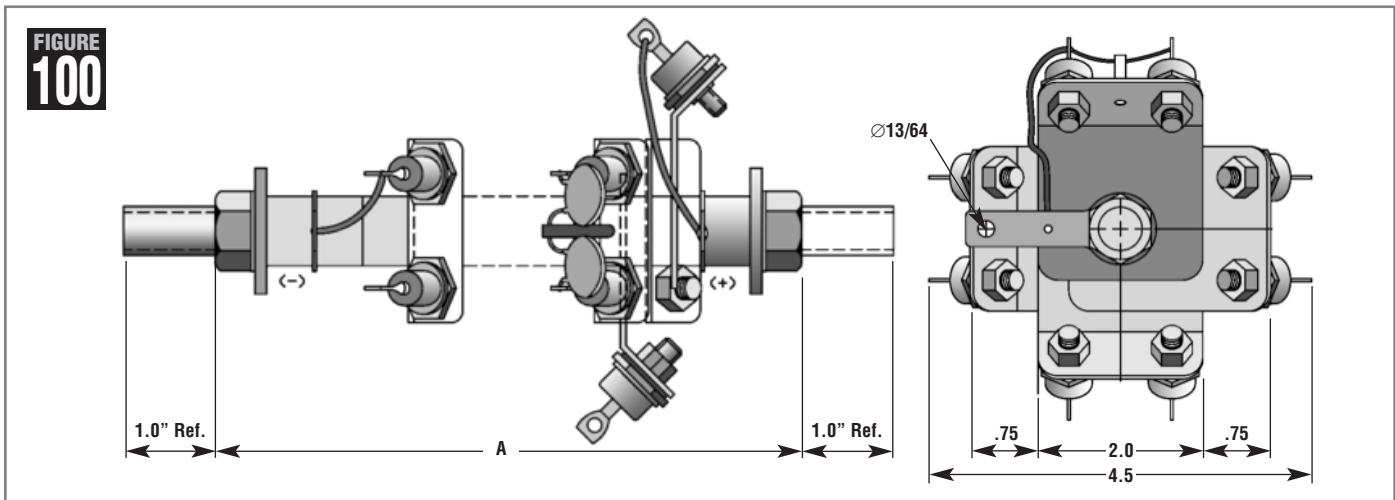
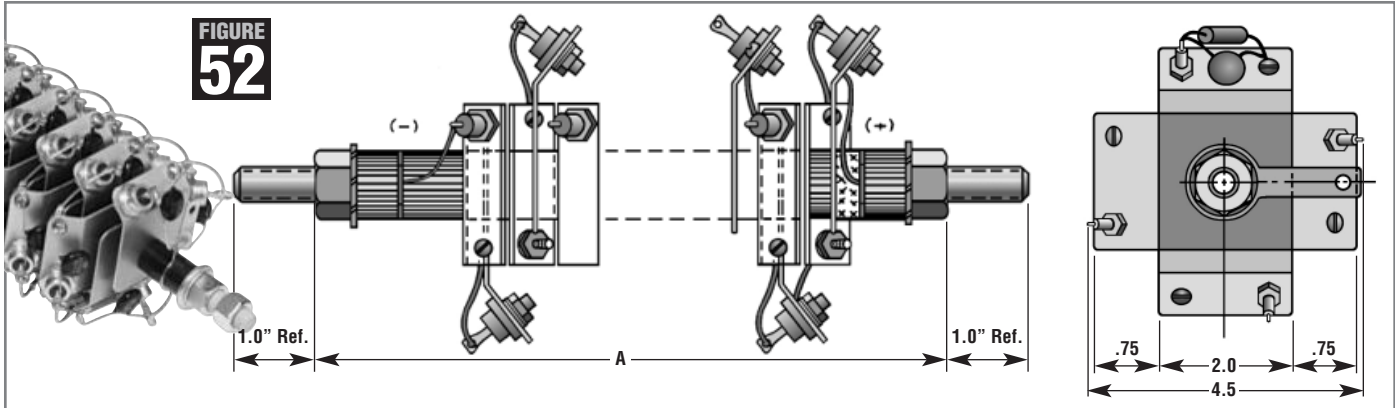
**Electrical Characteristics Average Power Dissipation per Module**



**Electrical Characteristics Average Power Dissipation per Module**



Product is available in RoHS compliant form. Unless RoHS compliance is requested, existing stocks of non-compliant materials are being shipped.



Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ kV	Max. Applied Voltage <sup>1</sup> kV	Maximum Forward Current@50°C $I_{FAVM}^2$ A	Maximum Forward Current@50°C $I_{FAVM}^3$ A	Forward Voltage@25°C $V_f^4$ V	Max. Surge Current $I_{FSM}$ A	Max Reverse Current $I_R$ @M.O.V. $T_J@25°C$ $\mu A$	Dim A Inches	Figure
<b>CJ Series - Spiral Rectifier Stack</b>									
CJ2V04H•S	8kV - 56kV	4kV - 28kV	3.25	6.25	16 - 48	370	<100	4 - 10.75	100
CJ2V06H•S	8kV - 56kV	4kV - 28kV	6	12	16 - 48	1500	<100	4 - 10.75	100
CJV04H•S	8kV - 56kV	4kV - 28kV	6.5	12.5	16 - 48	370	<100	5.125 - 17.5	52
CJV05H•S	8kV - 56kV	4kV - 28kV	10	22	16 - 48	800	<100	5.125 - 17.5	52
CJV06H•S	8kV - 56kV	4kV - 28kV	12	24	16 - 48	1500	<100	5.125 - 17.5	52

See datasheet for more item specific detail

- Peak inverse voltage ratings of 16kV to 48kV available. Replace the dot with the required voltage. i.e. CJV04H16S for 16kV MOV compensated or CJ206H44 for 44kV RC compensated.

<sup>1</sup> The true  $V_{RRM}$  of an MOV compensated unit is 2 times the max operating voltage. In this case the Max Applied Voltage of the assembly is limited by the Max Operating Voltage of the MOV used. Max Applied Voltage is the max safe peak voltage that can be repeatedly applied to the rectifier.

<sup>2</sup> Average current based on ambient air temperature of 50°C or below with convective cooling and free air movement around assembly.

<sup>3</sup> Average current based on ambient air temperature of 50°C or below with at least 300  $I_{FPM}$  airflow around the assembly.

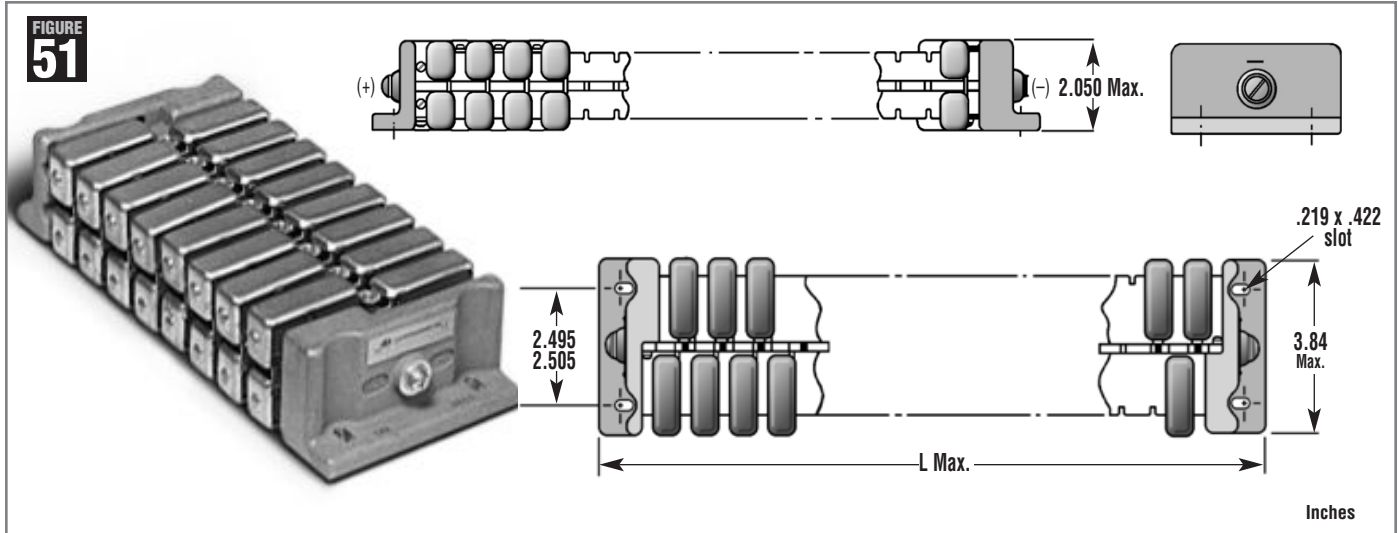
<sup>4</sup> Forward voltage  $V_f$  is approximately equal to the repetitive peak reverse voltage rating/1000. It is directly related to the number diodes in the string, each having a  $V_f$  of approximately 1.0 volts at rated current.

Each diode in the string is rated @ 1000V Peak and MOV compensated which gives an avalanche rating of 90 Joules maximum (8 x 20  $\mu S$ ) and a  $V_{NOM}$  of 680 volts. For R-C compensation, drop the S suffix.

Maximum operating and storage temperature -40°C to 125°C

Higher voltages, higher currents and fast recovery assemblies are available. Doublers and special configurations including special lengths are available. Contact the factory. UNLESS THE 'S' SUFFIX IS OMITTED THESE ASSEMBLIES WILL BE MOV COMPENSATED

All listed products shipped on December 31, 2013 or later will be RoHS Compliant. Available earlier by special request, contact factory or sales rep for availability.



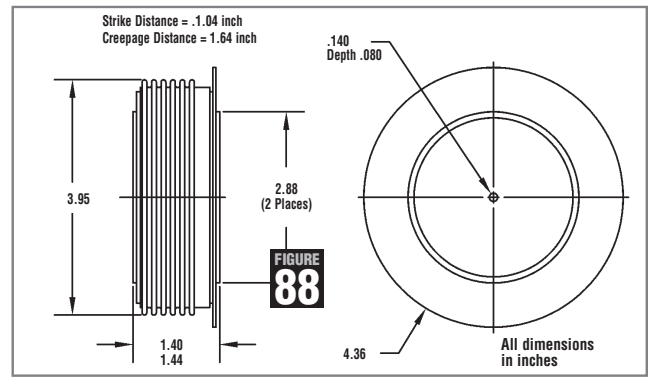
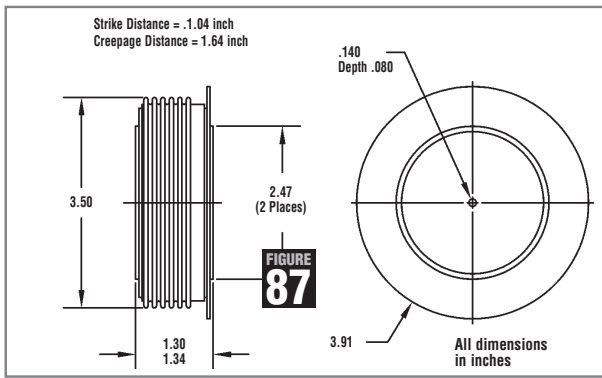
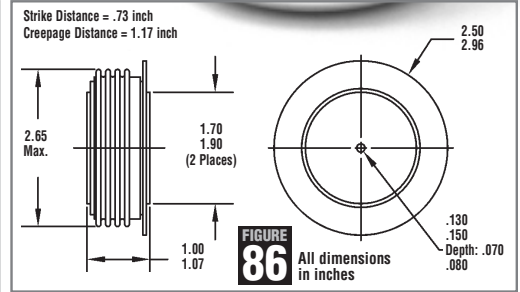
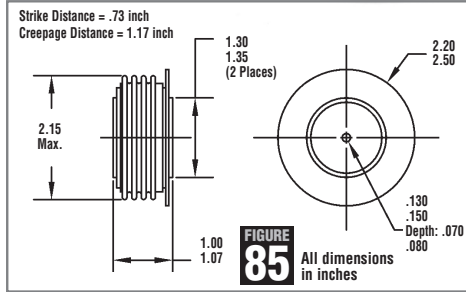
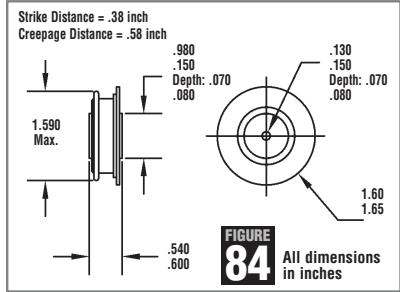
Part Number	Rep. PIV $V_{RRM}$ kV	Avg. Forward Current@		Max. Forward Voltage Drop $V_F@I_F$ Per Leg V	Max. Reverse Current $I_R@V_{RRM}@25^\circ C$ mA	Max. Surge Current $I_{SM}$ A	Overall Length Inches L Max
		40°C A	70°C Oil A				
<b>1HV12 Series - High Voltage Medium Current Column Rectifier</b>							<b>Figure 51</b>
1HV12R10A	24	3.0	12.0	20	1.5	370	5.54
1HV12R20A	48	3.0	12.0	40	1.5	370	8.67
1HV12R30A	72	3.0	12.0	60	1.5	370	11.8
1HV12R40A	96	3.0	12.0	80	1.5	370	14.93
1HV12R50A	120	3.0	12.0	100	1.5	370	18.06
1HV12R60A	144	3.0	12.0	120	1.5	370	21.19
1HV12R70A	168	3.0	12.0	140	1.5	370	24.32
1HV12R80A	192	3.0	12.0	160	1.5	370	27.45
1HV12R90A	216	3.0	12.0	180	1.5	370	30.58
1HV12R100A	240	3.0	12.0	200	1.5	370	33.71
<b>2HV12 Series - High Voltage Medium Current Column Rectifier</b>							<b>Figure 51</b>
2HV12R10A	24	4.0	12.5	20	1.5	370	6.73
2HV12R20A	48	4.0	12.5	40	1.5	370	10.8
2HV12R30A	72	4.0	12.5	60	1.5	370	14.87
2HV12R40A	96	4.0	12.5	80	1.5	370	18.94
2HV12R50A	120	4.0	12.5	100	1.5	370	23.01
2HV12R60A	144	4.0	12.5	120	1.5	370	27.08
2HV12R70A	168	4.0	12.5	140	1.5	370	31.15
<b>3HV•P Series - High Voltage High Current Column Rectifier</b>							<b>Figure 51</b>
3HV12P10A	24	7.0	33.0	20	4	1050	10.22
3HV12P20A	48	7.0	33.0	40	4	1050	18.03
3HV12P30A	72	7.0	33.0	60	4	1050	25.84
3HV12P40A	96	7.0	33.0	80	4	1050	33.65
3HV16P10A	32	7.0	33.0	20	5.3	1050	10.22
3HV16P20A	64	7.0	33.0	40	5.3	1050	18.03
3HV16P30A	96	7.0	33.0	60	5.3	1050	25.84
3HV16P40A	128	7.0	33.0	80	5.3	1050	33.65
<b>3HV•M Series - High Voltage High Current Column Rectifier</b>							<b>Figure 51</b>
3HV12M10A	24	8.0	36.0	20	4	1500	10.22
3HV12M20A	48	8.0	36.0	40	4	1500	18.03
3HV12M30A	72	8.0	36.0	60	4	1500	25.84
3HV12M40A	96	8.0	36.0	80	4	1500	33.65
3HV16M10A	32	8.0	36.0	20	5.3	1500	10.22
3HV16M20A	64	8.0	36.0	40	5.3	1500	18.03
3HV16M30A	96	8.0	36.0	60	5.3	1500	25.64
3HV16M40A	128	8.0	36.0	80	5.3	1500	33.65

Many circuit arrangements are available. Doublers, quadruplers, single and three phase bridges, standard or fast recovery devices available on request. Standard assemblies are RC compensated but MOV compensation is available on request. Custom configurations are available. Contact your sales representative. Custom parts available, please consult factory.

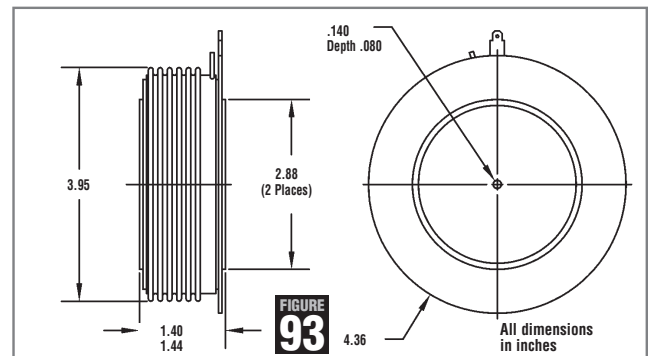
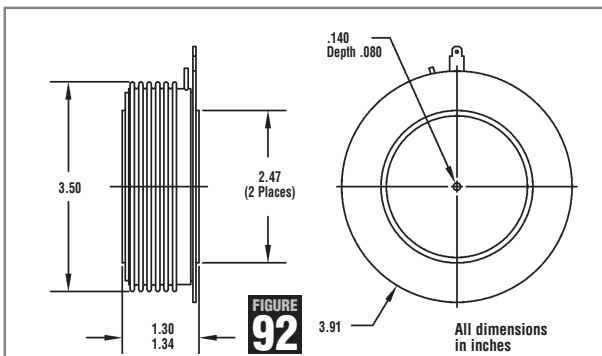
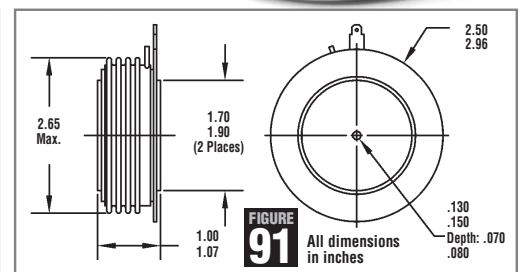
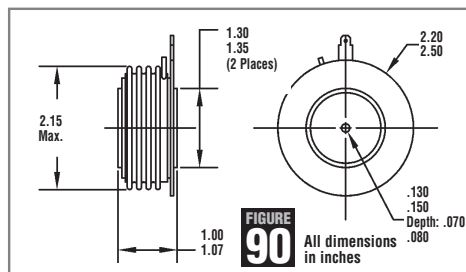
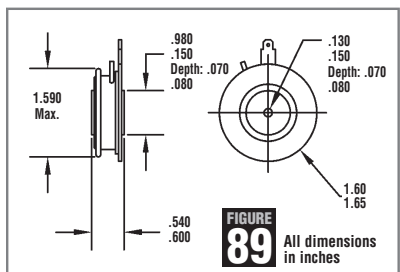
Product is available in RoHS compliant form. Unless RoHS compliance is requested, existing stocks of non-compliant materials are being shipped. Fast recovery devices and special configuration assemblies available by special request.



Diode Capsules



SCR Capsules





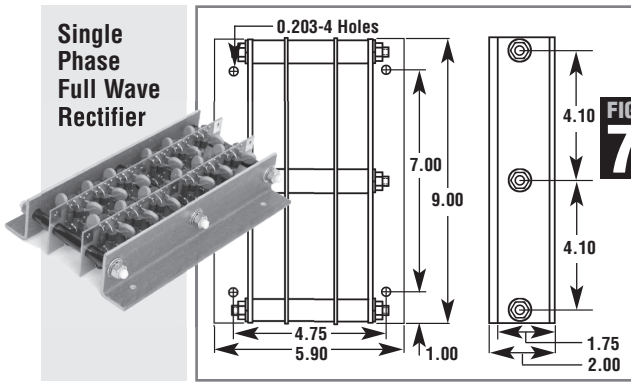


FIGURE 76

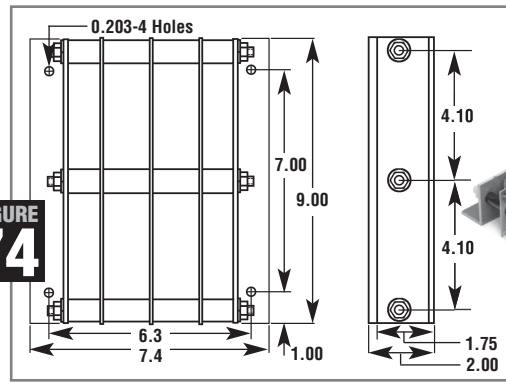
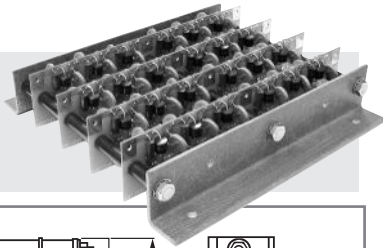


FIGURE 74

Three Phase Full Wave Rectifier

Single Phase Full Wave Rectifier



Three Phase Full Wave Rectifier

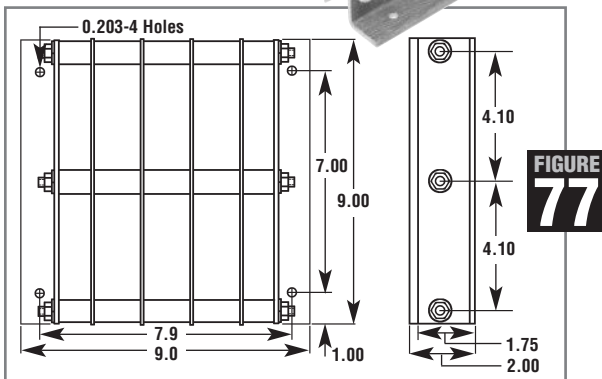
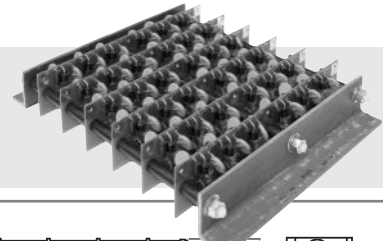


FIGURE 77

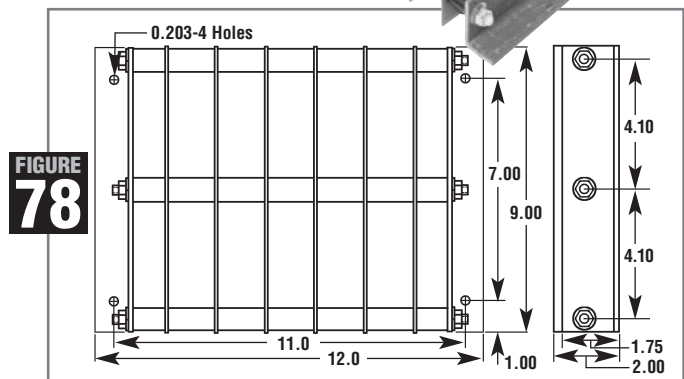


FIGURE 78

Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ V	Max. Bridge Output Voltage $V_{BO}^2$ V	Max. Average Output Current $I_{FAVM}@25^{\circ}C$ A	Max. Forward Voltage Drop (leg) $V_f@55^{\circ}C$ V	Max. Reverse Current $I_R@V_{RRM}@25^{\circ}C$ $\mu A$	Max. Surge Current (leg) $I_{FSM}^1$ A	Max. Reverse Recovery Time $T_{RR}^3$ nS	Figure
<b>51000 Series - Single Phase Fullwave Bridge Rectifier Assembly - Convective Air Cooling</b>								
51012	12000	6000	6	6	6.5	400	-	76
51014	24000	12000	6	12	6.5	400	-	77
<b>51000 Series - Three Phase Fullwave Bridge Rectifier Assembly - Convective Air Cooling</b>								
51013	12000	6000	9	6	6.5	400	-	74
51016	24000	12000	9	9	6.5	400	-	78
<b>52000 Series - Single &amp; Three Phase Rectifier Assembly - Oil Dielectric Use Only<sup>4</sup></b>								
52014	48000 <sup>2</sup>	24000	4	9	5.0	400	-	77
52016	48000 <sup>2</sup>	24000	6	9	5.0	400	-	78

<sup>1</sup> The true  $V_{RRM}$  of diodes used in an MOV compensated assembly is twice the Max Operating Voltage. Max Applied Voltage is limited, not by  $V_{RRM}$  but by the maximum voltage rating of the MOV. Each individual diode is rated at 1000V peak and MOV compensated to give an avalanche rating of 90 Joules max (8 x 20uS) and a  $V_{NOM}$  of 680V.

<sup>2</sup> Average current is based on ambient air temp of 50°C or below with convective cooling and free air movement around assy.

<sup>3</sup> Average current based on ambient air temp of 50°C and below with at least 300 lfm airflow around assy.

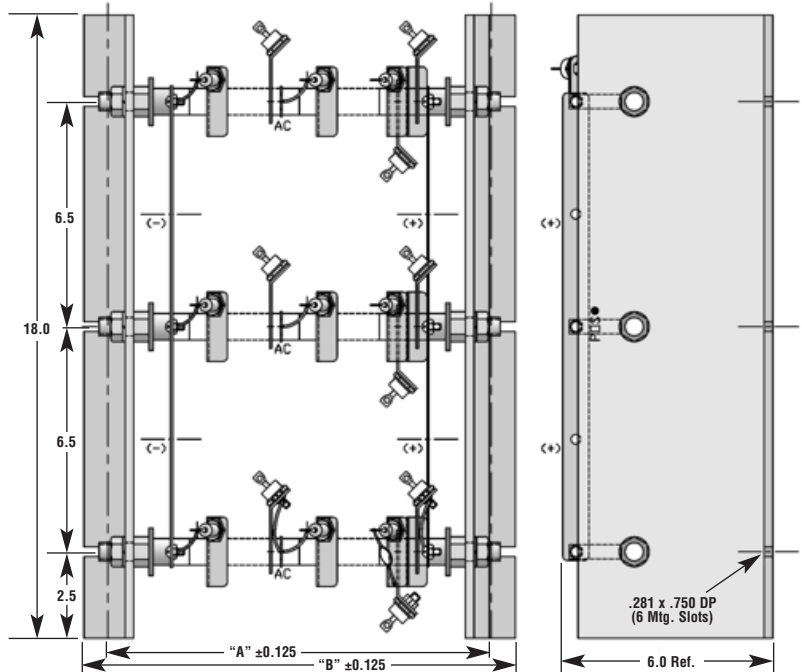
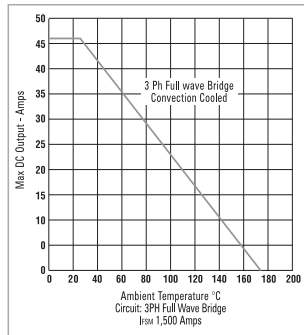
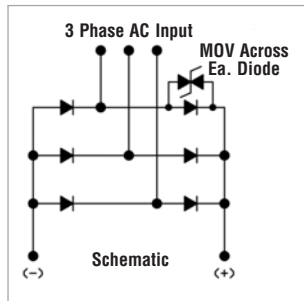
<sup>4</sup> The voltage and current rating for the 52000 series parts can be achieved only by complete emersion in dielectric oil such as Shell Diala or equivalent. Contact factory when other dielectric use is intended.

Max storage and operating temperature is -40°C to 125°C. Higher voltage, currents and fast recovery assemblies are available.

Doublers and special configurations, including special lengths, are available on special request. Contact the factory.

Much higher current ratings for 51000 series assemblies are possible when immersed in Shell Diala dielectric or equivalent. Contact Factory.

Product is available in RoHS compliant form. Unless RoHS compliance is requested, existing stocks of non-compliant materials are being shipped.

**FIGURE 128**


Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ Per Leg <sup>1</sup> V	Max. Applied Voltage <sup>1</sup> V	Avg. Forward Current Max. $I_{FAVM}@40^{\circ}C$ A	Max. Forward Voltage Drop $V_F@I_F$ Per Leg <sup>1</sup> V	Max. Reverse Current $I_R@V_{RRM}@25^{\circ}C^5$ $\mu A$	Max. Surge Current $I_{FSM}^2$ A	Max. Reverse Recovery Time $T_{RR}$ nS	Package Dimension A (Inches)	Package Dimension B (Inches)
<b>3PH Series - High Current Full Wave Bridge</b>									
3PHFWB40A4KV	4000	2000	40	4	<100	1500	-	8.161	9.38
3PHFWB40A8KV	8000	4000	40	8	<100	1500	-	10.411	11.63
3PHFWB40A12KV	12000	6000	40	12	<100	1500	-	12.661	13.88
3PHFWB40A16KV	16000	8000	40	16	<100	1500	-	14.911	16.13
3PHFWB40A20KV	20000	10000	40	20	<100	1500	-	17.161	18.38
3PHFWB40A24KV	24000	12000	40	24	<100	1500	-	19.411	20.63
3PHFWB40A28KV	28000	14000	40	28	<100	1500	-	21.661	22.88
3PHFWB40A32KV	32000	16000	40	32	<100	1500	-	23.911	25.13
3PHFWB40A36KV	36000	18000	40	36	<100	1500	-	26.161	27.38

 Maximum junction operating temperature  $T_J = 180^{\circ}C$ 

Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ Per Leg <sup>1</sup> V	Max. Applied Voltage <sup>1</sup> V	Avg. Forward Current Max. $I_{FAVM}@40^{\circ}C$ A	Max. Forward Voltage Drop $V_F@I_F$ Per Leg <sup>2</sup> V	Max. Reverse Current $I_R@V_{RRM}@25^{\circ}C^5$ $\mu A$	Max. Surge Current $I_{FSM}^3$ A	Max. Reverse Recovery Time $T_{RR}$ nS	Package Dimension A (Inches)	Package Dimension B (Inches)
<b>3PH Series - Medium Current Full Wave Bridge</b>									
3PHFWB18A8KV	8000	4000	18	8	<100	1050	-	8.161	9.38
3PHFWB18A16KV	16000	8000	18	16	<100	1050	-	10.411	11.63
3PHFWB18A24KV	24000	12000	18	24	<100	1050	-	12.661	13.88
3PHFWB18A32KV	32000	16000	18	32	<100	1050	-	14.911	16.13
3PHFWB18A40KV	40000	20000	18	40	<100	1050	-	17.161	18.38
3PHFWB18A48KV	48000	24000	18	48	<100	1050	-	19.411	20.63

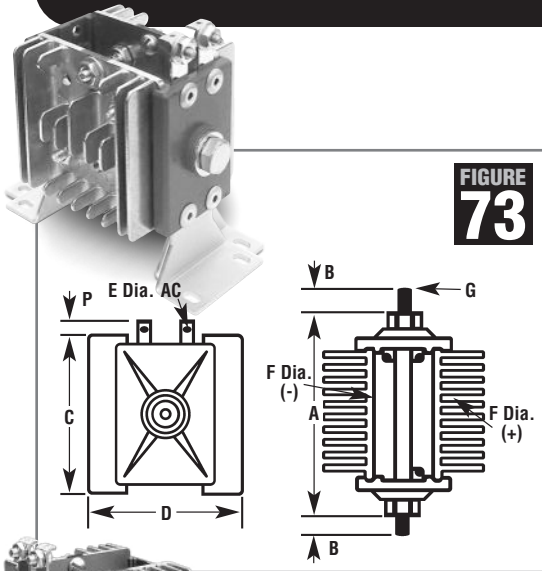
 Maximum junction operating temperature  $T_J = 150^{\circ}$ 
<sup>1</sup>  $V_F$  measured at 14 Amperes Forward Current

<sup>2</sup>  $V_F$  measured at 6 Amperes Forward Current

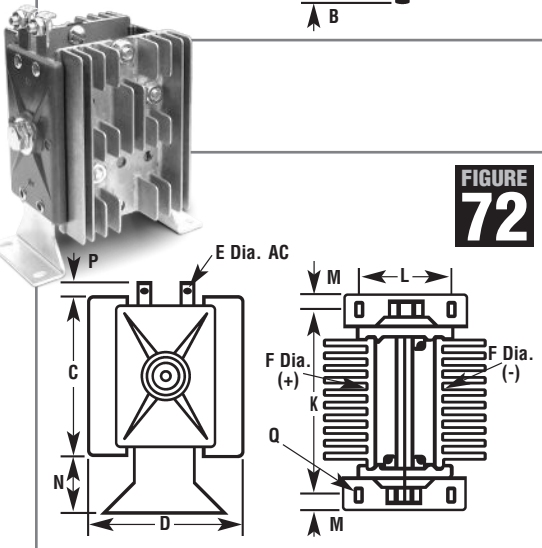
<sup>3</sup> 1/2 Sine(60Hz) @  $T_J=150^{\circ}C$ 
<sup>4</sup> Individual diodes used in these assemblies are protected with MOVs. The clamp voltage of the MOVs is set considerably below the diode avalanche voltage. For this reason, the maximum safe input voltage applied to the bridge should not exceed 50% of the rated  $V_{RRM}$ .

<sup>5</sup> Leakage current values include both MOV and diode leakage measured at 50% of  $V_{RRM}$  See note 4.

All listed products shipped on December 31, 2013 or later will be RoHS Compliant. Available earlier by special request, contact factory or sales rep for availability.



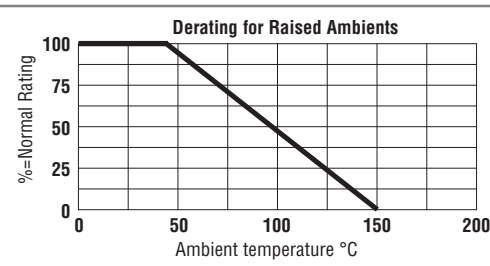
**FIGURE 73**



**FIGURE 72**

**Dimensions**

	X Type		Y Type	
	Inches	Millimeters	Inches	Millimeters
A	4.31	109.4	4.0	101.6
B	.625	15.87	0.5	12.7
C	4.0	101.6	2.5	63.5
D	3.12	79.2	2.56	65.0
E	.201	5.10	.177	4.495
F	.265	6.731	.198	5.029
G	3/8 - 16UNC - 3A		5/16 - 16UNC - 3A	
K	3.93	15.87	3.75	95.2
L	1.5	101.6	1.25	31.7
M	.281	79.2	.281	7.137
N	.875	5.10	.937	23.79
P	.625	6.731	.625	15.87
Q	3/16x5/16		3/16x5/16	



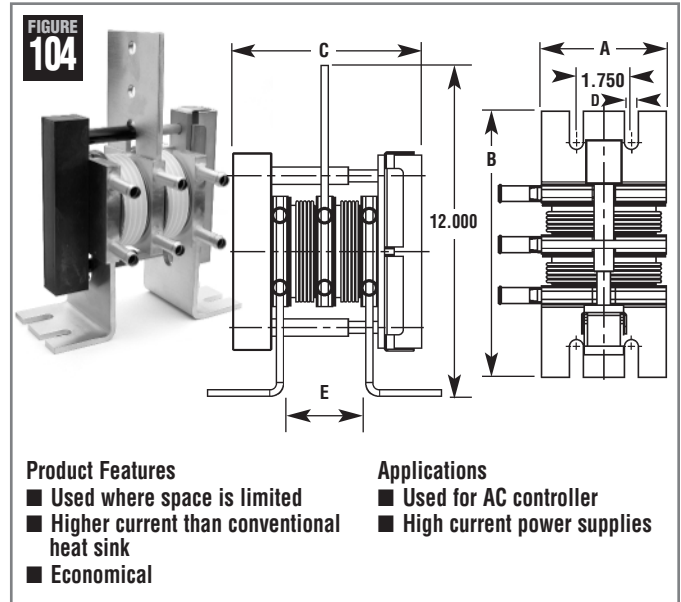
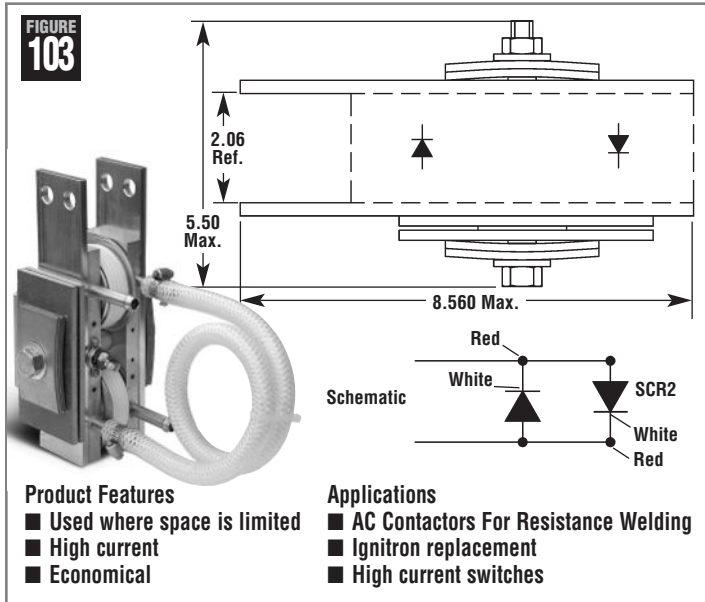
Please Note: Other circuit arrangements available, doubler, quadrupler, single phase and three phase bridges. Fast recovery and MOV compensation can be requested.

\*Available with bracket (B) or stud (N) mounting. Fast recovery and MOV compensation available on request. All listed products shipped on December 31, 2013 or later will be RoHS Compliant. Available earlier by special request, contact factory or sales rep for availability.

Part Number	Rep. Peak Reverse Voltage V <sub>RRM</sub>	Avg. Forward Current		Max. Forward Voltage Drop V <sub>F@I<sub>F</sub></sub>	Max. Reverse Current I <sub>R@V<sub>RRM@25°C</sub></sub>	Max. Surge Current I <sub>FSM</sub> <sup>2</sup>	Figure
	V	40°C A	40°C <sup>1</sup> A	V	mA	A	
<b>Single Phase Bridges</b>							
Y2120B1*1	200	14	26	1.2	5	370	73
Y2140B1*1	400	14	26	1.2	5	370	73
Y2160B1*1	600	14	26	1.2	5	370	73
Y2180B1*1	800	14	26	1.2	5	370	73
Y21100B1*1	1000	14	26	1.2	5	370	73
Y21120B1*1	1200	14	26	1.2	5	370	73
Y21140B1*1	1400	14	26	1.2	5	370	73
Y21160B1*1	1600	14	26	1.2	5	370	73
X2120B1*1	200	22	40	1.2	5	370	72
X2140B1*1	400	22	40	1.2	5	370	72
X2160B1*1	600	22	40	1.2	5	370	72
X2180B1*1	800	22	40	1.2	5	370	72
X21100B1*1	1000	22	40	1.2	5	370	72
X21120B1*1	1200	22	40	1.2	5	370	72
X21140B1*1	1400	22	40	1.2	5	370	72
X21160B1*1	1600	22	40	1.2	5	370	72
X3420B1*1	200	35	68	1.2	5	1050	72
X3440B1*1	400	35	68	1.2	5	1050	72
X3460B1*1	600	35	68	1.2	5	1050	72
X3480B1*1	800	35	68	1.2	5	1050	72
X34100B1*1	1000	35	68	1.2	5	1050	72
X34120B1*1	1200	35	68	1.2	5	1050	72
X34140B1*1	1400	35	68	1.2	5	1050	72
X34160B1*1	1600	35	68	1.2	5	1050	72
X3720B1*1	200	43	80	1.2	5	1500	72
X3740B1*1	400	43	80	1.2	5	1500	72
X3760B1*1	600	43	80	1.2	5	1500	72
X3780B1*1	800	43	80	1.2	5	1500	72
X37100B1*1	1000	43	80	1.2	5	1500	72
X37120B1*1	1200	43	80	1.2	5	1500	72
X37140B1*1	1400	43	80	1.2	5	1500	72
X37160B1*1	1600	43	80	1.2	5	1500	72
<b>Three Phase Bridges</b>							
Y2120Z1*1	200	22	42	1.2	5	370	73
Y2140Z1*1	400	22	42	1.2	5	370	73
Y2160Z1*1	600	22	42	1.2	5	370	73
Y2180Z1*1	800	22	42	1.2	5	370	73
Y21100Z1*1	1000	22	42	1.2	5	370	73
Y21120Z1*1	1200	22	42	1.2	5	370	73
Y21140Z1*1	1400	22	42	1.2	5	370	73
Y21160Z1*1	1600	22	42	1.2	5	370	73
X2120Z1*1	200	26	55	1.2	5	370	72
X2140Z1*1	400	26	55	1.2	5	370	72
X2160Z1*1	600	26	55	1.2	5	370	72
X2180Z1*1	800	26	55	1.2	5	370	72
X21100Z1*1	1000	26	55	1.2	5	370	72
X21120Z1*1	1200	26	55	1.2	5	370	72
X21140Z1*1	1400	26	55	1.2	5	370	72
X21160Z1*1	1600	26	55	1.2	5	370	72
X3420Z1*1	200	55	100	1.2	5	1050	72
X3440Z1*1	400	55	100	1.2	5	1050	72
X3460Z1*1	600	55	100	1.2	5	1050	72
X3480Z1*1	800	55	100	1.2	5	1050	72
X34100Z1*1	1000	55	100	1.2	5	1050	72
X34120Z1*1	1200	55	100	1.2	5	1050	72
X34140Z1*1	1400	55	100	1.2	5	1050	72
X34160Z1*1	1600	55	100	1.2	5	1050	72
X3720Z1*1	200	65	120	1.2	5	1500	72
X3740Z1*1	400	65	120	1.2	5	1500	72
X3760Z1*1	600	65	120	1.2	5	1500	72
X3780Z1*1	800	65	120	1.2	5	1500	72
X37100Z1*1	1000	65	120	1.2	5	1500	72
X37120Z1*1	1200	65	120	1.2	5	1500	72
X37140Z1*1	1400	65	120	1.2	5	1500	72
X37160Z1*1	1600	65	120	1.2	5	1500	72

<sup>1</sup> Current rating based on cooling airflow of 800LFM  
<sup>2</sup> 1/2 Sine(60Hz) @ 25°C





Part Number <sup>1</sup>	Max. Welding Current @50% Duty Cycle Amps <sub>RMS</sub> A	Max. Welding Current @100% Duty Cycle Amps <sub>RMS</sub> A	Peak Inverse Voltage V <sub>RRM</sub> V	SCR Voltage Rating V <sub>RRM</sub> V	Surge Rating 8.3mS I <sub>FSM</sub> A	Figure
<b>RW Series - AC Contactors</b>						
RW700AC1000	1350	700	1000-2000	1000	7500	103
RW700AC1200	1350	700	1000-2000	1200	7500	103
RW700AC1400	1350	700	1000-2000	1400	7500	103

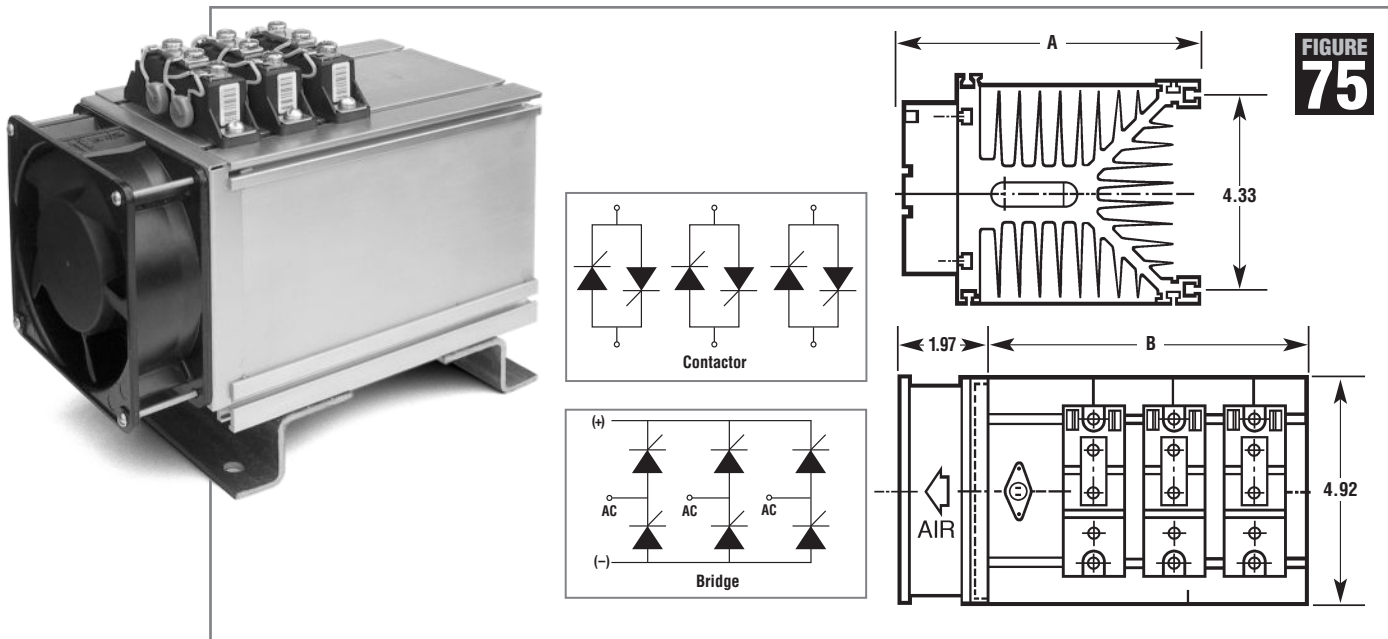
Part Number <sup>1</sup>	1/2 Wave Current Rating I <sub>AVG</sub> per leg A	Single Phase Current Rating I <sub>DC</sub> <sup>2</sup> A	Peak Inverse Voltage Rating V <sub>RRM</sub> V	Dimensions in Inches					Figure
				A	B	C	D	E	
<b>WC Series - Watercooled High Current Diodes</b>									
WC38D1500A•V	1500	2900	1500-2600	3	8.537	6.958	0.406	3.097	104
WC52D2100A•V	2100	4100	1400-2000	3	8.537	6.958	0.406	3.097	104
WC77D3600A•V	3600	6800	1800-2600	4	9.307	7.668	0.531	3.807	104

Part Number <sup>1</sup>	1/2 Wave Current Rating I <sub>AVG</sub> per leg A	Single Phase Current Rating I <sub>DC</sub> <sup>2</sup> A	Peak Inverse Voltage Rating V <sub>RRM</sub> V	Dimensions in Inches					Figure
				A	B	C	D	E	
<b>WC Series - Watercooled High Current SCR</b>									
WC38T750A•V	750	1450	500-1600	3	8.537	6.958	0.406	3.097	104
WC52T1250A•V	1250	2450	500-1400	3	8.537	6.958	0.406	3.097	104
WC65T1750A•V	1750	3350	600-2000	4	9.107	7.468	0.531	3.607	104
WC77T1950A•V	1950	3700	1200-2100	4	9.307	7.668	0.531	3.807	104

<sup>1</sup> Replace the • in the above part number with the required peak reverse voltage (PIV). Part number WC38T750A500V is a 750 amp, 500 volt assembly.

<sup>2</sup> Devices shown are half bridges and two units are required for full bridge operation.

All listed products shipped on December 31, 2013 or later will be RoHS Compliant.



Part Number	Repetitive Peak Reverse Voltage $V_{RRM}$ Per Leg V	Maximum Forward Voltage Drop $V_f @ I_f$ Per Leg V	Output Current Convection $A_{RMS}$	Output Current Forced Air <sup>2</sup> $A_{RMS}$	Max. Reverse Leakage $T_c @ 125^\circ C$ mA	Surge Current $I_{FSM}^1$ A	Dimensions	
							A mm	B mm
<b>SCR47TC Series - Modular 3 Phase SCR Contactors</b>							<b>Figure 75</b>	
SCR47TC●	400-1200	1.95	47	60	15	420	6.85	7.08
SCR60TC●	400-1200	1.81	60	85	15	890	6.85	7.08
SCR75TC●	400-1200	1.54	75	100	15	1370	6.85	7.08
SCR95TC●	400-1200	1.58	95	135	15	1870	6.85	7.08
SCR135TC●	400-1200	1.57	135	160	50	3360	7.87	8.66
SCR160TC●	400-1200	1.54	160	185	50	5100	7.87	8.66
<b>SCR47TB Series - Modular 3 Phase SCR Contactors</b>							<b>Figure 75</b>	
SCR47TB●	400-1200	1.95	47	77	15	420	6.85	7.08
SCR60TB●	400-1200	1.81	60	110	15	890	6.85	7.08
SCR70TB●	400-1200	1.54	70	130	15	1370	6.85	7.08
SCR85TB●	400-1200	1.58	85	175	15	1870	6.85	7.08
SCR105TB●	400-1200	1.49	105	235	50	7850	7.87	8.66

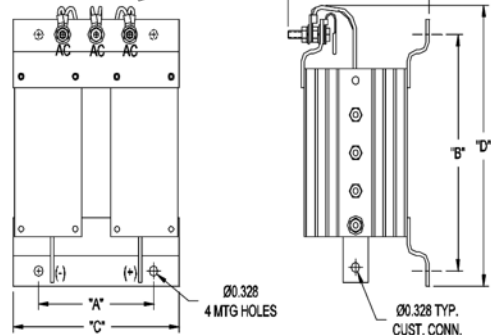
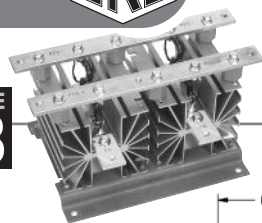
- Replace the dot with the required voltage. i.e. SCR47TC40 for 400V, 60 for 600V, 80 for 800V, 100 for 1000V and 120 for 1200V

Add "D" to the end of the part number for a free wheeling diode option  
 Add "F" to the end of the part number for Fan option

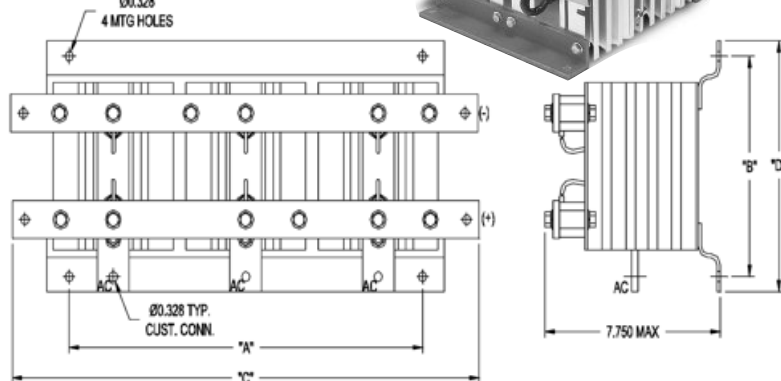
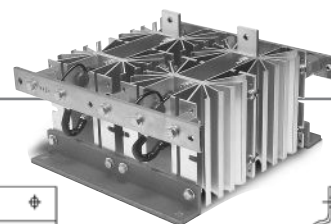
Notes:  
<sup>1</sup> ½ Sine(60Hz) @ 25°C  
<sup>2</sup> Required air flow, 100CFM  
 Operating & Storage Temperature -55°C to 125°C  
 All devices RoHS compliant per exemption. All units are MOV compensated. Other circuit arrangements available, doublers, quaduplers and single phase bridges.  
 All listed products shipped on December 31, 2013 or later will be RoHS Compliant.  
 Available earlier by special request, contact factory or sales rep for availability.



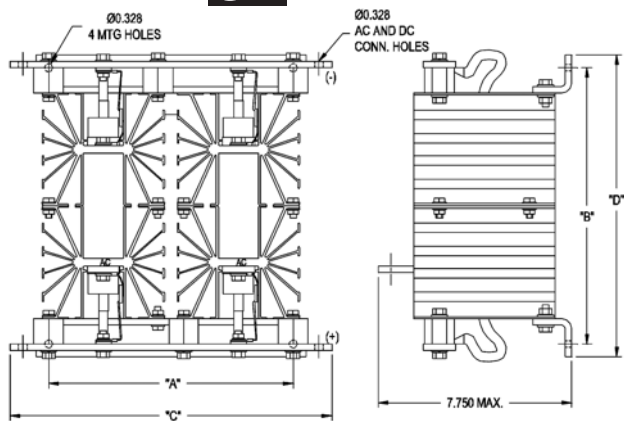
**FIGURE 53**



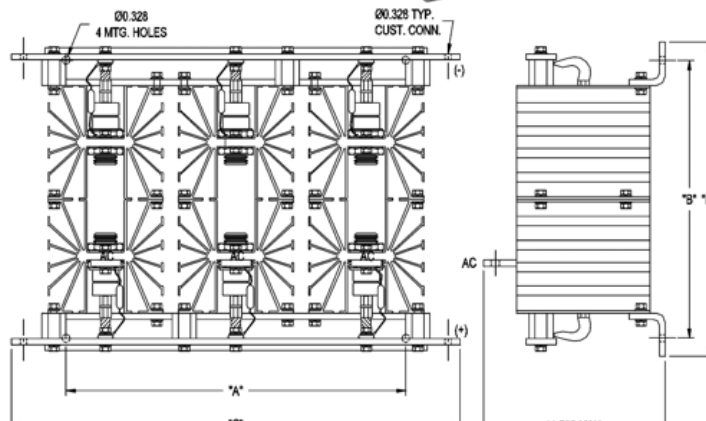
**FIGURE 55**



**FIGURE 54**



**FIGURE 56**



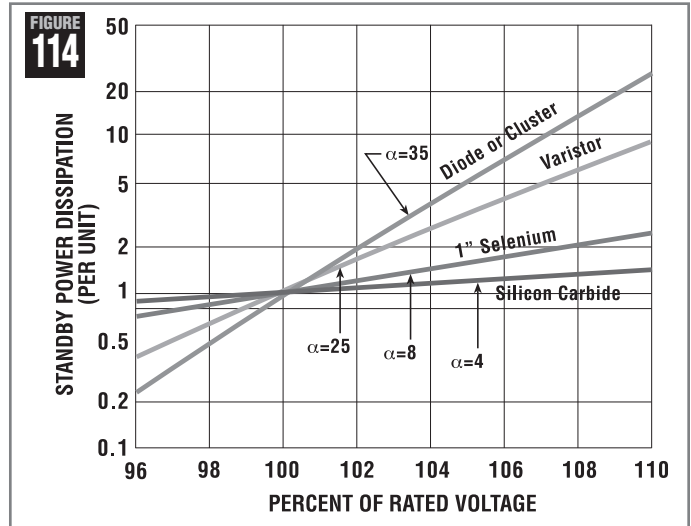
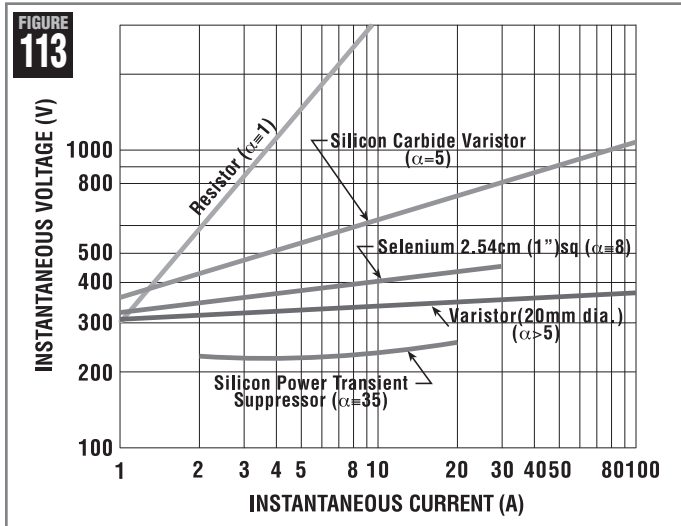
Part Number	Peak Repetitive Reverse Voltage V <sub>RRM</sub> Per Leg Volts	Maximum Average Forward Current I <sub>FAVM</sub> @50°C Amps	Maximum Forward Voltage Drop V <sub>F</sub> @I <sub>F</sub> Per Leg Volts	Maximum Reverse Current I <sub>R</sub> @V <sub>RRM</sub> @25°C MilliAmps	Maximum Surge Current I <sub>FSM</sub> (8.3ms) Amps	Fig.	DIM "A"	DIM "B"	DIM "C"	DIM "D"
<b>CB Series - Single Phase Full Wave Bridge Configuration</b>										
CB70H2AA●	400-1200	70	1.50	1.0	500	53	4.50	7.75	6.50	9.50
CB100H2AA●	400-1200	100	1.50	1.0	1200	53	4.50	7.75	6.50	9.50
CB200K2AA●	400-1200	200	1.50	1.0	3000	55	9.50	7.25	12.50	8.25
CB250K4AA●	400-2000	250	1.50	1.0	3600	54	9.50	11.00	12.50	12.00
CB300K4AA●	400-1600	300	1.50	1.0	6850	54	9.50	11.00	12.50	12.00
<b>CT Series - Three Phase Full Wave Bridge Configuration</b>										
CT50G2AA●	400-1200	50	1.50	1.0	500	53	4.50	7.75	6.50	9.50
CT150K3AA●	400-1200	150	1.50	1.0	1200	55	14.00	7.25	18.50	8.25
CT300K3AA●	400-1200	300	1.50	1.0	3600	55	14.00	7.25	18.50	8.25
CT400K6AA●	400-2500	400	1.50	1.0	3600	55	14.00	11.00	18.50	12.50
CT500K6AA●	400-1600	500	1.50	1.0	6850	56	14.00	11.00	18.50	12.50
CT700U6AA●	400-1600	700	1.50	1.0	6850	56	18.50	14.50	24.00	15.50
CT1000V6AA●	400-1600	1000	1.50	1.0	10960	56	18.50	14.50	24.00	15.50

P/N CT50G2AA400 represents a 50 Ampere , 400 Volt VRRM Three Phase Full Wave Bridge Rectifier

Were the ● appears, the desired PIV rating should be inserted instead. Voltage ratings are available in increments of 200V from 400 to 1200 or 400 to 1600 as appropriate. All listed products shipped on December 31, 2013 or later will be RoHS Compliant. Available earlier by special request, contact factory or sales rep for availability.



Product Features	Applications
<p><b>MOV:</b></p> <ul style="list-style-type: none"> <li>■ High surge rating on short pulses</li> <li>■ Fast response time pico-second range</li> <li>■ Low standby (leakage) current</li> <li>■ Cost effective for low average power applications</li> <li>■ High clamping ratio</li> <li>■ Board mountable, (Larger devices available)</li> </ul>	<ul style="list-style-type: none"> <li>■ Appliances</li> <li>■ Power supplies</li> <li>■ Computers</li> <li>■ Motor controls</li> <li>■ Microelectronics</li> <li>■ Telecommunications</li> </ul>
<p><b>Arrester Disc:</b></p> <ul style="list-style-type: none"> <li>■ High surge capability, and capacity</li> <li>■ Available in several standard voltages</li> <li>■ Can be put in series to attain required voltage</li> <li>■ Meets IEC standard IEC60099-4</li> </ul>	<ul style="list-style-type: none"> <li>■ AC transmission or transformation equipment</li> <li>■ Can be enclosed in either porcelain or silicon rubber housing</li> </ul>
<p><b>Silicon Carbide Varistor:</b></p> <ul style="list-style-type: none"> <li>■ Capable of handling long pulses, 100-400 milliseconds</li> <li>■ Fast response time 5-10 nanoseconds</li> <li>■ High body temperature operation, continuous 110°C</li> <li>■ Large mass device and consequently high energy</li> </ul>	<ul style="list-style-type: none"> <li>■ Discharging lifting magnets</li> <li>■ Exciter field protection</li> <li>■ Insulation protection</li> </ul>
<p><b>Selenium Suppressor:</b></p> <ul style="list-style-type: none"> <li>■ Multi-crystalline structure that enables a “self healing” characteristic</li> <li>■ Fast response time &lt; 1microsecond</li> <li>■ Inherent heatsink design, subsequently high energy device</li> </ul>	<ul style="list-style-type: none"> <li>■ Inductive load protection</li> <li>■ Synch motors protection</li> <li>■ Diode/SCR protection</li> </ul>
<p><b>Arrestors–Secondary:</b></p> <ul style="list-style-type: none"> <li>■ MOV Based, UL - OWHX-rated</li> <li>■ 13,000 and 25,000 amp rated arrestors</li> <li>■ Category C device for main service</li> </ul>	<ul style="list-style-type: none"> <li>■ Residential</li> <li>■ Industrial</li> <li>■ Commercial</li> <li>■ Agricultural</li> </ul>
<p><b>Arrestors–Distribution &amp; Intermediate:</b></p> <ul style="list-style-type: none"> <li>■ MOV Based</li> <li>■ Distribution rated to 42kV</li> <li>■ Intermediate rated to 138kV</li> <li>■ Polymer Design</li> </ul>	<ul style="list-style-type: none"> <li>■ Space &amp; weight saving</li> <li>■ Increased equipment and personnel safety</li> </ul>



Curves used with permission from Littelfuse

### Comparison Synopsis

Figures 113 & 114 show the characteristics of transient suppressors and compare their abilities to suppress transients and also handle elevated "swell voltages."

Figure 113 demonstrates the device's ability to clamp transients. The resistor curve, the first element shown, indicates that the current draw is in direct correlation to the voltage applied. The term Alpha ( $\alpha$ ) indicates the degree of component non-linearity and in this case is shown to be  $\alpha = 1$ . When a resistor is applied, any change in current will produce an equal change in voltage.

As the transient suppressor's  $\alpha$  value increases, so does the degree of non-linearity of the device. In this case, a large change in current produces a smaller change in voltage. Since these active suppressors are voltage-dependent devices, when the voltage across the poles increases, the resistance or impedance of the device decreases exponentially as a factor of  $\alpha$ . This is the basic concept of transient suppressors. As a transient voltage spikes upward, the suppressor reduces its impedance drastically and becomes a virtual short circuit to the transient energy. In doing so, the suppressor device clamps the transient spike to a safe level for the system being protected.

Figure 114 represents how the suppressor handles over-voltage events. The higher the  $\alpha$ , the higher the current draw in relation to a given voltage input. This condition produces higher device dissipation. While this is the way they are designed to perform for very short transient voltage spikes, continued operation in the over-voltage region will produce excessive heating in devices that have low average power ratings. For this reason, most surge suppression devices are not suitable for long pulse or continuous over-voltage conditions (Swell Voltage).

### Summary

Each device type has its own unique advantages and disadvantages. It is very important that the user understands the strengths and weaknesses of the selected suppressor in order to properly apply it to the target system needing protection. Characteristics such as response time, clamping voltage, maximum energy absorption or VI characteristics must be considered. Often, different suppressor types used together can produce the best result.

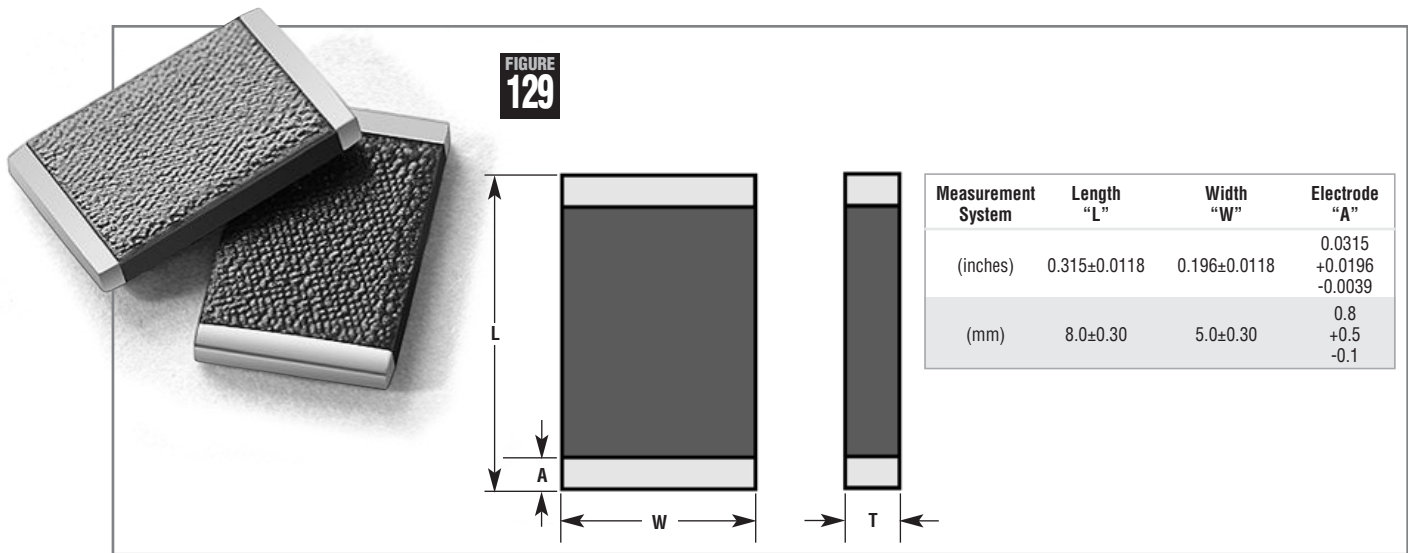
### Examples

The first application presents an inductive load which produces a back EMF pulse of approximately 400 mS at a peak current of 50 to 100 amps. In such an application, options such as several large body MOVs, two or more Selenium suppressors or a single Silicon Carbide (SiCV) assembly can be utilized successfully.

In a second example, an op-amp feeding a capacitive load could use a through-hole or surface mount MOV to protect the op-amp but a TVSS device might be more economical and better suited to the task.

These are but a couple of many examples of where the proper knowledge of all the different surge suppression technologies offered by DTI will enable the designer to enhance the performance of protected systems.

See website [www.deantechnology.com](http://www.deantechnology.com) or contact factory for additional information on characteristic curves

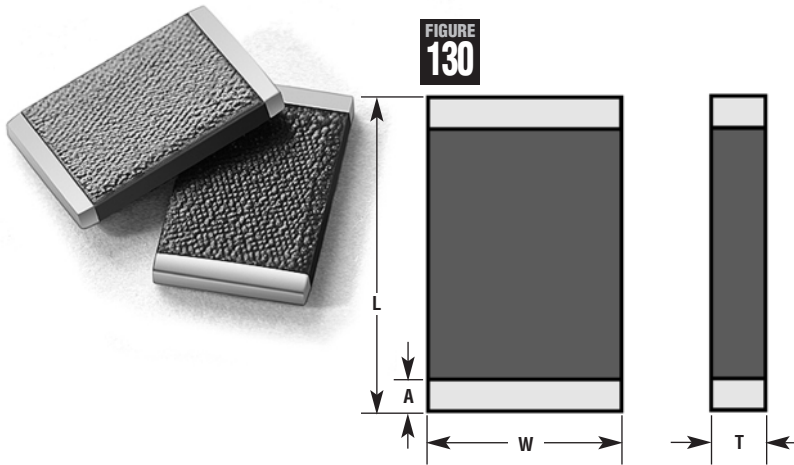


Part Number	Maximum Allowable Voltage		Varistor Voltage @1mA DC V	Energy Absorption (10/1000µS) J	Maximum Clamping Voltage		Peak Surge Current 8/20µS A	Typical Capacitance @1kHz pF	Thickness	
	V <sub>RMS</sub>	DC V			A	V			inches	mm
<b>08CH Series - Surface Mount MOVs</b>										
<b>Figure 129</b>										
08CH180K	11	14	18(16-20)	0.8	5	40	250	3300	0.0591	1.5
08CH220K	14	18	22(20-24)	1	5	46	250	1750	0.0591	1.5
08CH270K	17	22	27(24-30)	1	5	56	250	1500	0.0591	1.5
08CH330K	20	26	33(30-36)	1.2	5	67	250	1200	0.0591	1.5
08CH390K	25	31	39(35-43)	1.5	5	76	250	820	0.0591	1.5
08CH470K	30	38	47(42-52)	1.8	5	90	250	660	0.0591	1.5
08CH560K	35	45	56(50-62)	2.3	5	106	250	530	0.0787	2.0
08CH680K	40	56	68(62-74)	3	5	124	250	360	0.0787	2.0
08CH820K	50	65	82(74-90)	4	10	135	500	250	0.0591	1.5
08CH101K	65	85	100(90-110)	5	10	165	500	225	0.0591	1.5
08CH121K	75	102	120(108-132)	6	10	198	500	200	0.0591	1.5
08CH151K	95	127	150(135-165)	8	10	248	500	150	0.0591	1.5
08CH181K	115	153	180(162-198)	10	10	292	500	110	0.0591	1.5
08CH201K	130	175	200(180-220)	11	10	340	500	100	0.0591	1.5
08CH221K	140	180	220(198-242)	12	10	356	500	94	0.0591	1.5
08CH241K	150	200	240(216-264)	13	10	390	500	86	0.0591	1.5
08CH271K	175	225	270(243-297)	14	10	450	500	76	0.0591	1.5
08CH301K	190	250	300(270-330)	15	10	495	500	64	0.0591	1.5
08CH331K	210	275	330(297-363)	16	10	545	500	52	0.0591	1.5
08CH361K	230	300	360(324-396)	20	10	593	500	45	0.0787	2.0
08CH391K	250	330	390(351-429)	21	10	647	500	42	0.0787	2.0
08CH431K	275	369	430(387-473)	23	10	705	500	39	0.0984	2.5
08CH471K	300	385	470(423-517)	25	10	775	500	35	0.0984	2.5

Notes:  
 Device data taken at 25°C  
 Operating and storage temperature range is -55°C to +125°C  
 All devices listed are RoHS compliant.  
 Parts available on tape and reel in quantities of 1000 pcs per reel  
 Consult Factory for minimum order quantity.



**FIGURE 130**



Z1206MLA Series				
Measurement System	Length "L"	Width "W"	Electrode "A"	Thickness "T"
(inches)	0.126 ±0.0079	0.063 ±0.0059	0.0197 +0.0079 -0.0079	0.059 max.
(mm)	3.200 ±0.200	1.600 ±0.150	0.500 +0.200 -0.200	1.500 max.

Z1210MLA Series				
Measurement System	Length "L"	Width "W"	Electrode "A"	Thickness "T"
(inches)	0.126 ±0.0079	0.098 ±0.0079	0.0200 +0.0079 -0.0079	0.059 max.
(mm)	3.200 ±0.200	2.500 ±0.200	0.500 +0.200 -0.200	1.500 max.

Z2220MLA Series				
Measurement System	Length "L"	Width "W"	Electrode "A"	Thickness "T"
(inches)	0.2244 ±0.0079	0.1969 ±0.0079	0.0197 +0.0118 -0.0039	0.098 max.
(mm)	5.700 ±0.200	5.000 ±0.200	0.500 +0.300 -0.100	2.500 max.

Z1812MLA Series				
Measurement System	Length "L"	Width "W"	Electrode "A"	Thickness "T"
(inches)	0.177 ±0.0079	0.126 ±0.0079	0.0197 +0.0118 -0.0039	0.079 max.
(mm)	4.500 ±0.200	3.200 ±0.200	0.500 +0.300 -0.100	2.000 max.

Part Number	Maximum Allowable Voltage		Varistor Voltage @1mA DC V	Energy Absorption (10/1000µs) J	Maximum Clamping Voltage		Peak Surge Current 8/20µs A	Typical Capacitance @1kHz pF	
	AC V <sub>RMS</sub>	DC V			A	V			
<b>Z Series Surface - Mount MOVs</b>									
Z1206MLA150H	8	11	15(12.75-17.25)	0.4	1	28	200	1700	
Z1206MLA180H	11	14	18(15.3-20.7)	0.5	1	30	200	1500	
Z1206MLA220H	12	16.5	22(19.8-24.2)	0.5	1	36	200	1280	
Z1206MLA240H	14	18	24(21.6-27)	0.5	1	39	200	1160	
Z1206MLA270H	17	22	27(24.3-29.8)	0.6	1	44	200	1080	
Z1206MLA330H	20	26	33(29.7-36.3)	0.7	1	54	200	680	
Z1206MLA390H	25	30	39(35.1-42.9)	1	1	65	200	620	
Z1206MLA470H	30	38	47(42.3-51.7)	1.1	1	77	200	550	
Z1206MLA560H	35	45	56(50.4-61.6)	0.8	1	90	200	400	
Z1210MLA150H	8	11	15(12.75-17.25)	1.0	2.5	28	400	4050	
Z1210MLA180H	11	14	18(15.3-20.7)	1.2	2.5	30	400	3860	
Z1210MLA220H	12	16.5	22(19.8-24.2)	1.4	2.5	36	400	2600	
Z1210MLA240H	14	18	24(21.6-27)	1.4	2.5	39	400	2380	
Z1210MLA270H	17	22	27(24.3-29.8)	1.7	2.5	44	400	2100	
Z1210MLA330H	20	26	33(29.7-36.3)	1.9	2.5	54	400	1400	
Z1210MLA390H	25	30	39(35.1-42.9)	1.7	2.5	65	400	1180	
Z1210MLA470H	30	38	47(42.3-51.7)	2.0	2.5	77	400	1000	
Z1210MLA560H	35	45	56(50.4-61.6)	2.0	2.5	90	400	660	
Z1812MLA150H	8	11	15(12.75-17.25)	1.8	5	28	800	8450	
Z1812MLA180H	11	14	18(15.3-20.7)	1.9	5	30	800	7030	
Z1812MLA220H	12	16.5	22(19.8-24.2)	2.3	5	36	800	5080	
Z1812MLA240H	14	18	24(21.6-27)	2.3	5	39	800	4650	
Z1812MLA270H	17	22	27(24.3-29.8)	2.7	5	44	800	4150	
Z1812MLA330H	20	26	33(29.7-36.3)	3.0	5	54	800	3400	
Z1812MLA390H	25	30	39(35.1-42.9)	3.7	5	65	800	2950	
Z1812MLA470H	30	38	47(42.3-51.7)	4.2	5	77	800	2550	
Z1812MLA560H	35	45	56(50.4-61.6)	4.2	5	90	800	2400	
Z2220MLA150H	8	11	15(12.75-17.25)	4.2	10	28	1200	21200	
Z2220MLA180H	11	14	18(15.3-20.7)	5.4	10	30	1200	17700	
Z2220MLA220H	12	16.5	22(19.8-24.2)	5.8	10	36	1200	14500	
Z2220MLA240H	14	18	24(21.6-27)	5.8	10	39	1200	13600	
Z2220MLA270H	17	22	27(24.3-29.8)	7.2	10	44	1200	12000	
Z2220MLA330H	20	26	33(29.7-36.3)	7.8	10	54	1200	10500	
Z2220MLA390H	25	30	39(35.1-42.9)	9.6	10	65	1200	8900	
Z2220MLA470H	30	38	47(42.3-51.7)	12.0	10	77	1200	5700	
Z2220MLA560H	35	45	56(50.4-61.6)	7.7	10	90	1200	4800	

Parts are available on tape and reel.

Z1206 – 3000 pcs/reel      Z1812 – 1000 pcs/reel  
 Z1210 – 2000 pcs/reel      Z2222 – 1000 pcs/reel

Consult Factory for minimum order quantity.

All devices listed are RoHS compliant.

See page 57 for explanation of UL Surge Suppression Device Type Designations.







Part Number	Agency Mark	Device Marking	Maximum Applied Voltage		Varistor Voltage @1mA DC V	Energy J	Maximum Clamping Voltage 8/20 $\mu$ S		Peak Current A	Typical Capacitance $\mu$ F	Dimensions(mm) $\pm$ 1mm Figure 64			
			AC RMS	DC			V	A			D-Max	T	W	d
<b>Line Voltage Series - Radial Lead MOVs</b>														
Z130LA2		1302	130	170	205(185-225)	11	340	10	1200	250	9.0	4.2	5.0	0.6
Z130LA5		1305	130	170	205(185-225)	20	340	25	2500	500	13.5	4.6	7.5	0.8
Z130LA10A		Z130LA10A	130	170	205(185-225)	38	340	50	4500	1000	17.0	4.6	7.5	0.8
Z130LA20A		Z130LA20A	130	170	205(185-225)	70	340	100	6500	2000	23.0	5.0	10.0	1.0
Z140LA2		1402	140	180	220(198-242)	12	360	10	1200	250	9.0	4.3	5.0	0.6
Z140LA5		1405	140	180	220(198-242)	23	360	25	2500	450	13.5	4.7	7.5	0.8
Z140LA10A		Z140LA10A	140	180	220(198-242)	42	360	50	4500	1000	17.0	4.7	7.5	0.8
Z140LA20A		Z140LA20A	140	180	220(198-242)	75	360	100	6500	2000	23.0	5.2	10.0	1.0
Z150LA2		1502	150	200	240(216-264)	13	395	10	1200	200	9.0	4.4	5.0	0.6
Z150LA5		1505	150	200	240(216-264)	25	395	25	2500	400	13.5	4.8	7.5	0.8
Z150LA10A		Z150LA10A	150	200	240(216-264)	45	395	50	4500	900	17.0	4.8	7.5	0.8
Z150LA20A		Z150LA20A	150	200	240(216-264)	80	395	100	6500	1800	23.0	5.3	10.0	1.0
Z175LA2		1752	175	225	270(247-303)	15	455	10	1200	170	9.0	4.6	5.0	0.6
Z175LA5		1755	175	225	270(247-303)	30	455	25	2500	350	13.5	5.0	7.5	0.8
Z175LA10A		Z175LA10A	175	225	270(247-303)	55	455	50	4500	750	17.0	5.1	7.5	0.8
Z175LA20A		Z175LA20A	175	225	270(247-303)	90	455	100	6500	1600	23.0	5.4	10.0	1.0
Z210LA4		2104	210	275	330(297-363)	15	550	10	1200	140	9.0	4.8	5.0	0.6
Z210LA10		210L	210	275	330(297-363)	32	550	25	2500	300	13.5	5.2	7.5	0.8
Z210LA20A		Z210LA20A	210	275	330(297-363)	60	550	50	4500	650	17.0	5.3	7.5	0.8
Z210LA40A		Z210LA40A	210	275	330(297-363)	105	550	100	6500	1400	23.0	5.5	10.0	1.0
Z230LA4		2304	230	300	360(324-396)	15	595	10	1200	130	9.0	5.2	5.0	0.6
Z230LA10		230L	230	300	360(324-396)	35	595	25	2500	300	14.0	5.7	7.5	0.8
Z230LA20A		Z230LA20A	230	300	360(324-396)	65	595	50	4500	550	17.5	5.7	7.5	0.8
Z230LA40A		Z230LA40A	230	300	360(324-396)	120	595	100	6500	1200	24.0	6.1	10.0	1.0
Z250LA4		2504	250	330	390(351-429)	21	650	10	1200	130	9.0	5.4	5.0	0.6
Z250LA10		250L	250	330	390(351-429)	40	650	25	2500	270	14.0	5.8	7.5	0.8
Z250LA20A		Z250LA20A	250	330	390(351-429)	72	650	50	4500	500	17.5	5.8	7.5	0.8
Z250LA40A		Z250LA40A	250	330	390(351-429)	130	650	100	6500	1000	24.0	6.4	10.0	1.0
Z275LA4		2754	275	350	430(387-473)	23	710	10	1200	110	9.0	5.7	5.0	0.6
Z275LA10		275L	275	350	430(387-473)	45	710	25	2500	250	14.0	6.2	7.5	0.8
Z275LA20A		Z275LA20A	275	350	430(387-473)	75	710	50	4500	450	17.5	6.2	7.5	0.8
Z275LA40A		Z275LA40A	275	350	430(387-473)	140	710	100	6500	900	24.0	6.7	10.0	1.0
Z300LA4		3004	300	385	470(423-517)	25	775	10	1200	100	9.0	6.0	5.0	0.6
Z300LA10		300L	300	385	470(423-517)	45	775	25	2500	230	14.0	6.2	7.5	0.8
Z300LA20A		Z300LA20A	300	385	470(423-517)	80	775	50	4500	440	17.5	6.2	7.5	0.8
Z300LA40A		Z300LA40A	300	385	470(423-517)	150	775	100	6500	900	24.0	6.7	10.0	1.0
Z350LA10		350L	350	455	560(504-616)	45	925	25	2500	180	14.0	6.1	7.5	0.8
Z350LA20A		Z350LA20A	350	455	560(504-616)	80	925	50	4500	350	17.5	6.3	7.5	0.8
Z350LA40A		Z350LA40A	350	455	560(504-616)	150	925	100	6500	700	24.0	6.8	10.0	1.0
Z385LA10		385L	385	505	620(558-682)	45	1025	25	2500	130	14.0	6.2	7.5	0.8
Z385LA20A		Z385LA20A	385	505	620(558-682)	85	1025	50	4500	250	17.5	6.5	7.5	0.8
Z385LA40A		Z385LA40A	385	505	620(558-682)	150	1025	100	6500	500	24.0	6.9	10.0	1.0
Z420LA10		420L	420	560	680(612-748)	45	1120	25	2500	130	14.0	6.5	7.5	0.8
Z420LA20A		Z420LA20A	420	560	680(612-748)	90	1120	50	4500	250	17.5	6.5	7.5	0.8
Z420LA40A		Z420LA40A	420	560	680(612-748)	160	1120	100	6500	460	24.0	6.9	10.0	1.0
Z460LA10		460L	460	615	750(675-825)	50	1240	25	2500	120	14.0	6.8	7.5	0.8
Z460LA20A		Z460LA20A	460	615	750(675-825)	100	1240	50	4500	230	17.5	6.8	7.5	0.8
Z460LA40A		Z460LA40A	460	615	750(675-825)	175	1240	100	6500	420	24.0	7.3	10.0	1.0
Z480LA20		480L	480	640	780(702-858)	50	1290	25	2500	120	14.0	6.9	7.5	0.8
Z480LA40A		Z480LA40A	480	640	780(702-858)	105	1290	50	4500	230	17.5	6.9	7.5	0.8
Z480LA80A		Z480LA80A	480	640	780(702-858)	180	1290	100	6500	420	24.0	7.4	10.0	1.0
Z510LA20		510L	510	670	820(738-902)	55	1355	25	2500	105	14.0	7.1	7.5	0.8
Z510LA40A		Z510LA40A	510	670	820(738-902)	110	1355	50	4500	200	17.5	7.1	7.5	0.8
Z510LA80A		Z510LA80A	510	670	820(738-902)	190	1355	100	6500	400	24.0	7.6	10.0	1.0
Z550LA20		550L	550	700	910(819-1000)	60	1500	25	2500	95	14.0	7.6	7.5	0.8
Z550LA40A		Z550LA40A	550	700	910(819-1000)	120	1500	50	4500	180	17.5	7.6	7.5	0.8
Z550LA80A		Z550LA80A	550	700	910(819-1000)	220	1500	100	6500	350	24.0	8.1	10.0	1.0
Z575LA20		575L	575	745	920(819-1000)	60	1500	25	2500	95	14.0	7.6	7.5	0.8
Z575LA40A		Z575LA40A	575	745	920(819-1000)	120	1500	50	4500	180	17.5	7.6	7.5	0.8
Z575LA80A		Z575LA80A	575	745	920(819-1000)	220	1500	100	6500	350	24.0	8.1	10.0	1.0
Z600LA20		625L	625	825	1000(900-1100)	65	1650	25	2500	80	14.0	8.0	7.5	0.8
Z600LA50A		Z600LA50A	625	825	1000(900-1100)	130	1650	50	4500	150	17.5	8.0	7.5	0.8
Z600LA100A		Z600LA100A	625	825	1000(900-1100)	230	1650	100	6500	320	24.0	8.5	10.0	1.0
Z660LA20		660L	680	895	1100(990-1210)	70	1815	25	2500	80	14.0	8.5	7.5	0.8
Z660LA50A		Z660LA50A	680	895	1100(990-1210)	140	1815	50	4500	150	17.5	8.5	7.5	0.8
Z660LA100A		Z660LA100A	680	895	1100(990-1210)	250	1815	100	6500	300	24.0	9.0	10.0	1.0
Z1000LA80A		Z1000LA80A	1000	1465	1800(1620-1980)	240	2970	50	4500	100	17.5	12.0	15.0	0.8
Z1000LA160A		Z1000LA160A	1000	1465	1800(1620-1980)	400	2970	100	6500	200	25.0	12.0	15.0	1.0

Radial leaded MOVs having the Underwriters Laboratory Recognized Component Mark, conform to UL 1414, UL1449 edition 3, as listed on DTI UL file number E319342.

Maximum Power Dissipation: 5 mm-0.1 watt; 7 mm-0.25 watt; 10 mm-0.4 watt; 14 mm-0.6 watt, 20 mm-1 watt.

Typical response time is less than 15 nanoseconds.

See page 57 for explanation of UL Surge Suppression Device Type Designations.

All devices listed are RoHS compliant.



Part Number	Agency Mark	Device Marking	Maximum Applied Voltage		Varistor Voltage @1mA DC V	Energy 2mS J	Maximum Clamping Voltage 8/20 $\mu$ S		Peak Current A	Typical Capacitance pF	Dimensions(mm) $\pm$ 1mm			
			AC RMS	DC			V	A			D-Max	T	W	d
<b>High Energy Series - Radial Lead MOVs</b>											<b>Figure 64</b>			
Z5L180H		H180	11	14	18 (14.4-21.6)	0.6	40	1	250	1600	7.5	4.4	5.0	0.6
Z5L220H		H220	14	18	22 (17.6-26.4)	0.7	48	1	250	1500	7.5	4.5	5.0	0.6
Z5L270H		H270	17	22	27 (24-30)	0.9	60	1	250	1450	7.5	4.6	5.0	0.6
Z5L330H		H330	20	26	33 (30-36)	1.1	73	1	250	1400	7.5	4.8	5.0	0.6
Z5L390H		H390	25	31	39 (35-43)	1.2	86	1	250	700	7.5	5.0	5.0	0.6
Z5L470H		H470	30	38	47 (42-52)	1.5	104	1	250	650	7.5	5.2	5.0	0.6
Z5L560H		H560	35	45	56 (50-62)	1.8	123	1	250	600	7.5	5.4	5.0	0.6
Z5L680H		H680	40	56	68 (61-75)	2.2	150	1	250	580	7.5	5.7	5.0	0.6
Z5L820H	<b>RL4</b>	H820	50	65	82 (74-90)	4.0	145	5	800	310	7.5	4.0	5.0	0.6
Z5L101H	<b>RL4</b>	H101	60	85	100 (90-110)	4.1	175	5	800	290	7.5	4.4	5.0	0.6
Z5L121H	<b>RL4</b>	H121	75	100	120 (108-132)	4.9	210	5	800	270	7.5	4.5	5.0	0.6
Z5L151H	<b>RL4</b>	H151	95	125	150 (135-165)	6.5	260	5	800	240	7.5	4.5	5.0	0.6
Z5L181H	<b>RL4</b>	H181	115	150	180 (162-198)	7.5	325	5	800	140	7.5	4.6	5.0	0.6
Z5L201H	<b>RL4</b>	H201	130	170	205 (185-225)	8.5	355	5	800	120	7.5	4.7	5.0	0.6
Z5L221H	<b>RL4</b>	H221	140	180	220 (198-242)	9.0	380	5	800	110	7.5	4.7	5.0	0.6
Z5L241H	<b>RL4</b>	H241	150	200	240 (216-264)	10.5	415	5	800	110	7.5	4.7	5.0	0.6
Z5L271H	<b>RL4</b>	H271	175	225	270 (247-303)	11.0	475	5	800	100	7.5	4.8	5.0	0.6
Z5L301H	<b>RL4</b>	H301	195	250	300 (270-330)	12.0	505	5	800	100	7.5	4.8	5.0	0.6
Z5L331H	<b>RL4</b>	H331	210	275	330 (297-363)	13.0	600	5	800	90	7.5	4.9	5.0	0.6
Z5L361H	<b>RL4</b>	H361	230	300	360 (324-396)	16.0	620	5	800	80	7.5	4.9	5.0	0.6
Z5L391H	<b>RL4</b>	H391	250	320	390 (351-429)	17.0	675	5	800	80	7.5	5.1	5.0	0.6
Z5L431H	<b>RL4</b>	H431	275	350	430 (387-473)	20.0	745	5	800	70	7.5	5.3	5.0	0.6
Z5L471H	<b>RL4</b>	H471	300	385	470 (423-517)	21.0	810	5	800	70	7.5	5.5	5.0	0.6
Z7L180H		7H180	11	14	18 (14.4-21.6)	1.3	36	2.5	500	3800	9.0	4.4	5.0	0.6
Z7L220H		7H220	14	18	22 (17.6-26.4)	2.1	43	2.5	500	3600	9.0	4.5	5.0	0.6
Z7L270H		7H270	17	22	27 (24-30)	2.5	53	2.5	500	3400	9.0	4.6	5.0	0.6
Z7L330H		7H330	20	26	33 (30-36)	3.0	65	2.5	500	2900	9.0	4.8	5.0	0.6
Z7L390H		7H390	25	31	39 (35-43)	4.0	77	2.5	500	1600	9.0	5.0	5.0	0.6
Z7L470H		7H470	30	38	47 (42-52)	5.0	93	2.5	500	1550	9.0	5.2	5.0	0.6
Z7L560H		7H560	35	45	56 (50-62)	5.4	110	2.5	500	1500	9.0	5.4	5.0	0.6
Z7L680H		7H680	40	56	68 (61-75)	6.1	135	2.5	500	1200	9.0	5.7	5.0	0.6
Z7L820H	<b>RL4</b>	7H820	50	65	82 (74-90)	7.0	135	10	1750	860	9.0	4.0	5.0	0.6
Z7L101H	<b>RL4</b>	7H101	60	85	100 (90-110)	7.5	165	10	1750	750	9.0	4.4	5.0	0.6
Z7L121H	<b>RL4</b>	7H121	75	100	120 (108-132)	9.0	200	10	1750	510	9.0	4.5	5.0	0.6
Z7L151H	<b>RL4</b>	7H151	95	125	150 (135-165)	11.0	250	10	1750	410	9.0	4.5	5.0	0.6
Z7L181H	<b>RL4</b>	7H181	115	150	180 (162-198)	13.0	300	10	1750	300	9.0	4.6	5.0	0.6
Z10L180H		10H180	11	14	18 (14.4-21.6)	3.0	36	5	1000	16000	14.0	4.8	7.5	0.8
Z10L220H		10H220	14	18	22 (17.6-26.4)	5.0	43	5	1000	11000	14.0	4.9	7.5	0.8
Z10L270H		10H270	17	22	27 (24-30)	6.0	53	5	1000	8000	14.0	5.0	7.5	0.8
Z10L330H		10H330	20	26	33 (30-36)	7.0	65	5	1000	6300	14.0	5.2	7.5	0.8
Z10L390H		10H390	25	31	39 (35-43)	9.0	77	5	1000	5200	14.0	5.4	7.5	0.8
Z10L470H		10H470	30	38	47 (42-52)	11.0	93	5	1000	4600	14.0	5.6	7.5	0.8
Z10L560H		10H560	35	45	56 (50-62)	13.0	110	5	1000	3750	14.0	5.8	7.5	0.8
Z10L680H		10H680	40	56	68 (61-75)	15.0	135	5	1000	2800	14.0	6.1	7.5	0.8
Z10L820H	<b>RL4</b>	10H820	50	65	82 (74-90)	17.0	135	25	3500	1920	14.0	4.4	7.5	0.8
Z10L101H	<b>RL4</b>	10H101	60	85	100 (90-110)	18.0	165	25	3500	1800	14.0	4.8	7.5	0.8
Z10L121H	<b>RL4</b>	10H121	75	100	120 (108-132)	21.0	200	25	3500	1500	14.0	4.9	7.5	0.8
Z10L151H	<b>RL4</b>	10H151	95	125	150 (135-165)	25.0	250	25	3500	1200	14.0	4.9	7.5	0.8
Z10L181H	<b>RL4</b>	10H181	115	150	180 (162-198)	30.0	300	25	3500	620	14.0	5.0	7.5	0.8
Z15L180H		15H180	11	14	18 (14.4-21.6)	7.0	36	10	2000	25000	17.5	4.8	7.5	0.8
Z15L220H		15H220	14	18	22 (17.6-26.4)	9.0	43	10	2000	20000	17.5	4.9	7.5	0.8
Z15L270H		15H270	17	22	27 (24-30)	11.0	53	10	2000	16000	17.5	5.0	7.5	0.8
Z15L330H		15H330	20	26	33 (30-36)	13.0	65	10	2000	12200	17.5	5.2	7.5	0.8
Z15L390H		15H390	25	31	39 (35-43)	15.0	77	10	2000	7000	17.5	5.4	7.5	0.8
Z15L470H		15H470	30	38	47 (42-52)	19.0	93	10	2000	6750	17.5	5.6	7.5	0.8
Z15L560H		15H560	35	45	56 (50-62)	22.0	110	10	2000	6500	17.5	5.8	7.5	0.8
Z15L680H		15H680	40	56	68 (61-75)	27.0	135	10	2000	5500	17.5	6.1	7.5	0.8
Z15L820H	<b>RL4</b>	15H820	50	65	82 (74-90)	31.0	135	50	6000	4300	17.5	4.4	7.5	0.8
Z15L101H	<b>RL4</b>	15H101	60	85	100 (90-110)	38.0	165	50	6000	3500	17.5	4.8	7.5	0.8
Z15L121H	<b>RL4</b>	15H121	75	100	120 (108-132)	47.0	200	50	6000	2500	17.5	4.9	7.5	0.8
Z15L151H	<b>RL4</b>	15H151	95	125	150 (135-165)	58.0	250	50	6000	2100	17.5	4.9	7.5	0.8
Z15L181H	<b>RL4</b>	15H181	115	150	180 (162-198)	71.0	300	50	6000	1250	17.5	5.0	7.5	0.8
Z21L180H		21H180	11	14	18 (14.4-21.6)	13.0	36	20	3000	40000	25.0	5.2	10.0	1.0
Z21L220H		21H220	14	18	22 (17.6-26.4)	16.0	43	20	3000	30000	25.0	5.3	10.0	1.0
Z21L270H		21H270	17	22	27 (24-30)	19.0	53	20	3000	24500	25.0	5.4	10.0	1.0
Z21L330H		21H330	20	26	33 (30-36)	24.0	65	20	3000	20000	25.0	5.6	10.0	1.0
Z21L390H		21H390	25	31	39 (35-43)	28.0	77	20	3000	13800	25.0	5.8	10.0	1.0
Z21L470H		21H470	30	38	47 (42-52)	34.0	93	20	3000	13500	25.0	6.0	10.0	1.0
Z21L560H		21H560	35	45	56 (50-62)	41.0	110	20	3000	12200	25.0	6.2	10.0	1.0
Z21L680H		21H680	40	56	68 (61-75)	49.0	135	20	3000	11500	25.0	6.5	10.0	1.0
Z21L820H	<b>RL4</b>	21H820	50	65	82 (74-90)	56.0	135	100	10000	8200	25.0	4.8	10.0	1.0
Z21L101H	<b>RL4</b>	21H101	60	85	100 (90-110)	70.0	165	100	10000	8000	25.0	5.2	10.0	1.0
Z21L121H	<b>RL4</b>	21H121	75	100	120 (108-132)	85.0	200	100	10000	5500	25.0	5.3	10.0	1.0
Z21L151H	<b>RL4</b>	21H151	95	125	150 (135-165)	106.0	250	100	10000	4200	25.0	5.3	10.0	1.0
Z21L181H	<b>RL4</b>	21H181	115	150	180 (162-198)	130.0	300	100	10000	2500	25.0	5.4	10.0	1.0

Radial leaded MOVs having the Underwriters Laboratory Recognized Component Mark, conform to UL 1414, UL1449 edition 3, as listed on DTI UL file number E319342. Maximum Power Dissipation: 5 mm-0.1 watt; 7 mm-0.25 watt; 10 mm-0.4 watt; 14 mm-0.6 watt, 20 mm-1 watt.

Typical response time is less than 15 nanoseconds. See page 57 for explanation of UL Surge Suppression Device Type Designations.

All devices listed are RoHS compliant.



# RADIAL LEAD METAL OXIDE VARISTORS - HIGH ENERGY SERIES

Part Number	Agency Mark	Device Marking	Maximum Applied Voltage		Varistor Voltage @1mA DC V	Energy 2mS J	Maximum Clamping Voltage 8/20 $\mu$ S		Peak Current A	Typical Capacitance pF	Dimensions(mm) $\pm$ 1mm			
			AC RMS	DC			V	A			D-Max	T	W	d
<b>High Energy Series - Radial Lead MOVs</b>											<b>Figure 64</b>			
Z130LA2H	V4	1302H	130	170	205 (185-225)	17.0	340	10	1750	250	9.0	4.7	5.0	0.6
Z130LA5H	V4	1305H	130	170	205 (185-225)	35.0	340	25	3500	570	14.0	5.1	7.5	0.8
Z130LA10AH	V4	130H10A	130	170	205 (185-225)	69.0	340	50	6000	1150	17.5	5.1	7.5	0.8
Z130LA20AH	V4	130H20A	130	170	205 (185-225)	140.0	340	100	10000	2300	25.0	5.5	10.0	1.0
Z130LA20BH	V3	130H20B	130	170	200 (185-210)	140.0	325	100	10000	2300	25.0	5.5	10.0	1.0
Z140LA2H	V4	1402H	140	180	220 (198-242)	19.0	360	10	1750	250	9.0	4.7	5.0	0.6
Z140LA5H	V4	1405H	140	180	220 (198-242)	39.0	360	25	3500	560	14.0	5.1	7.5	0.8
Z140LA10AH	V4	140H10A	140	180	220 (198-242)	77.0	360	50	6000	1100	17.5	5.1	7.5	0.8
Z140LA20AH	V4	140H20A	140	180	220 (198-242)	155.0	360	100	10000	2200	25.0	5.5	10.0	1.0
Z140LA20BH	V3	140H20B	140	180	220 (198-230)	155.0	345	100	10000	2200	25.0	5.5	10.0	1.0
Z150LA2H	V4	1502H	150	200	240 (216-264)	21.0	395	10	1750	240	9.0	4.7	5.0	0.6
Z150LA5H	V4	1505H	150	200	240 (216-264)	42.0	395	25	3500	550	14.0	5.1	7.5	0.8
Z150LA10AH	V4	150H10A	150	200	240 (216-264)	83.0	395	50	6000	1050	17.5	5.1	7.5	0.8
Z150LA20AH	V3	150H20A	150	200	240 (216-264)	168.0	395	100	10000	2200	25.0	5.5	10.0	1.0
Z150LA20BH	V3	150H20B	150	200	240 (216-252)	168.0	375	100	10000	2200	25.0	5.5	10.0	1.0
Z175LA2H	V4	1752H	175	225	270 (247-303)	24.0	455	10	1750	220	9.0	4.8	5.0	0.6
Z175LA5H	V4	1755H	175	225	270 (247-303)	49.0	455	25	3500	530	14.0	5.2	7.5	0.8
Z175LA10AH	V4	175H10A	175	225	270 (247-303)	94.0	455	50	6000	1000	17.5	5.2	7.5	0.8
Z175LA20AH	V3	175H20A	175	225	270 (247-303)	190.0	455	100	10000	2100	25.0	5.6	10.0	1.0
Z175LA20BH	V3	175H20B	175	225	270 (247-284)	190.0	435	100	10000	2100	25.0	5.6	10.0	1.0
Z200LA2H	V4	2002H	195	250	300 (270-330)	26.0	500	10	1750	190	9.0	4.8	5.0	0.6
Z200LA5H	V4	2005H	195	250	300 (270-330)	54.0	500	25	3500	500	14.0	5.2	7.5	0.8
Z200LA10AH	V4	200H10A	195	250	300 (270-330)	103.0	500	50	6000	900	17.5	5.2	7.5	0.8
Z200LA20AH	V3	200H20A	195	250	300 (270-330)	210.0	500	100	10000	1800	25.0	5.6	10.0	1.0
Z200LA20BH	V3	200H20B	195	250	300 (270-315)	210.0	475	100	10000	1800	25.0	5.6	10.0	1.0
Z210LA4H	V4	2104H	210	275	330 (297-363)	28.0	550	10	1750	170	9.0	4.9	5.0	0.6
Z210LA10H	V4	210LH	210	275	330 (297-363)	58.0	550	25	3500	450	14.0	5.3	7.5	0.8
Z210LA20AH	V4	210H20A	210	275	330 (297-363)	112.0	550	50	6000	850	17.5	5.3	7.5	0.8
Z210LA40AH	V3	210H40A	210	275	330 (297-363)	228.0	550	100	10000	1750	25.0	5.7	10.0	1.0
Z210LA40BH	V3	210H40B	210	275	330 (297-345)	228.0	525	100	10000	1750	25.0	5.7	10.0	1.0
Z230LA4H	V4	2304H	230	300	360 (324-396)	32.0	595	10	1750	180	9.0	4.9	5.0	0.6
Z230LA10H	V4	230H	230	300	360 (324-396)	65.0	595	25	3500	450	14.0	5.3	7.5	0.8
Z230LA20AH	V4	230H20A	230	300	360 (324-386)	125.0	595	50	6000	850	17.5	5.3	7.5	0.8
Z230LA40AH	V3	230H40A	230	300	360 (324-396)	255.0	595	100	10000	1700	25.0	5.7	10.0	1.0
Z230LA40BH	V3	230H40B	230	300	360 (324-380)	255.0	565	100	10000	1700	25.0	5.7	10.0	1.0
Z250LA4H	V4	2504H	250	320	390 (351-429)	35.0	650	10	1750	160	9.0	5.1	5.0	0.6
Z250LA10H	V4	250H	250	320	390 (351-429)	70.0	650	25	3500	430	14.0	5.5	7.5	0.8
Z250LA20AH	V4	250H20A	250	320	390 (351-429)	135.0	650	50	6000	800	17.5	5.5	7.5	0.8
Z250LA40AH	V3	250H40A	250	320	390 (351-429)	275.0	650	100	10000	1400	25.0	5.9	10.0	1.0
Z250LA40BH	V3	250H40B	250	320	390 (351-410)	275.0	620	100	10000	1400	25.0	5.9	10.0	1.0
Z275LA4H	V4	2754H	275	350	430 (387-473)	40.0	710	10	1750	150	9.0	5.3	5.0	0.6
Z275LA10H	V4	275H	275	350	430 (387-473)	80.0	710	25	3500	400	14.0	5.7	7.5	0.8
Z275LA20AH	V4	275H20A	275	350	430 (387-473)	150.0	710	50	6000	650	17.5	5.7	7.5	0.8
Z275LA40AH	V3	275H40A	275	350	430 (387-473)	305.0	710	100	10000	1350	25.0	6.1	10.0	1.0
Z275LA40BH	V3	275H40B	275	350	430 (387-450)	305.0	675	100	10000	1350	25.0	6.1	10.0	1.0
Z300LA4H	V4	3004H	300	385	470 (423-517)	42.0	775	10	1750	130	9.0	5.5	5.0	0.6
Z300LA10H	V4	300H	300	385	470 (423-517)	85.0	775	25	3500	300	14.0	5.9	7.5	0.8
Z300LA20AH	V4	300H20A	300	385	470 (423-517)	172.0	775	50	6000	550	17.5	5.9	7.5	0.8
Z300LA40AH	V3	300H40A	300	385	470 (423-517)	350.0	775	100	10000	1200	25.0	6.3	10.0	1.0
Z300LA40BH	V3	300H40B	300	385	470 (423-494)	350.0	735	100	10000	1200	25.0	6.3	10.0	1.0

Radial leaded MOVs having the Underwriters Laboratory Recognized Component Mark, conform to UL 1414, UL1449 edition 3, as listed on DTI UL file number E319342. Maximum Power Dissipation: 5 mm-0.1 watt; 7 mm-0.25 watt; 10 mm-0.4 watt; 14 mm-0.6 watt, 20 mm-1 watt.

Typical response time is less than 15 nanoseconds.

See page 57 for explanation of UL Surge Suppression Device Type Designations.

All devices listed are RoHS compliant.



Part Number	Agency Mark	Device Marking	Maximum Applied Voltage		Varistor Voltage @1mA DC V	Energy 2mS J	Maximum Clamping Voltage 8/20 μS		Peak Current A	Typical Capacitance pF	Dimensions(mm) ±1mm			
			AC <sub>RMS</sub>	DC			V	A			D-Max	T	W	d
<b>High Energy Series - Radial Lead MOVs</b>													<b>Figure 64</b>	
Z320LA4H	UL4	3204H	320	410	510 (459-561)	32	845	10	1750	120	9.0	5.7	5.0	0.6
Z320LA10H	UL4	320H	320	410	510 (459-561)	67	845	25	3500	260	14.0	6.1	7.5	0.8
Z320LA20AH	UL4	320H20A	320	410	510 (459-561)	136	845	50	6000	450	17.5	6.1	7.5	0.8
Z320LA40AH	UL3	320H40A	320	410	510 (459-561)	273	845	100	10000	1050	25.0	6.5	10.0	1.0
Z320LA40BH	UL3	320H40B	320	410	510 (459-535)	273	805	100	10000	1050	25.0	6.5	10.0	1.0
Z350LA4H	UL4	3504H	350	460	560 (504-616)	32	915	10	1750	120	9.0	6.0	5.0	0.6
Z350LA10H	UL4	350H	350	460	560 (504-616)	67	915	25	3500	200	14.0	6.0	7.5	0.8
Z350LA20AH	UL4	350H20A	350	460	560 (504-616)	136	915	50	6000	400	14.0	6.4	7.5	0.8
Z350LA40AH	UL3	350H40A	350	460	560 (504-616)	273	915	100	10000	850	25.0	6.8	10.0	1.0
Z350LA40BH	UL3	350H40B	350	460	560 (504-590)	273	870	100	10000	850	25.0	6.8	10.0	1.0
Z385LA4H	UL4	3854H	385	505	620 (558-682)	32	1025	10	1750	120	9.0	6.3	5.0	0.6
Z385LA10H	UL4	385H	385	505	620 (558-682)	67	1025	25	3500	170	14.0	6.7	7.5	0.8
Z385LA20AH	UL4	385H20A	385	505	620 (558-682)	136	1025	50	6000	350	17.5	6.7	7.5	0.8
Z385LA40AH	UL3	385H40A	385	505	620 (558-682)	273	1025	100	10000	570	25.0	7.1	10.0	1.0
Z385LA40BH	UL3	385H40B	385	505	620 (558-650)	273	975	100	10000	570	25.0	7.1	10.0	1.0
Z420LA10H	UL4	420H	420	560	680 (612-748)	67	1120	25	3500	160	14.0	7.0	7.5	0.8
Z420LA20AH	UL4	420H20A	420	560	680 (612-748)	136	1120	50	6000	350	17.5	7.0	7.5	0.8
Z420LA40AH	UL3	420H40A	420	560	680 (612-748)	273	1120	100	10000	550	25.0	7.4	10.0	1.0
Z420LA40BH	UL3	420H40B	420	560	680 (612-715)	273	1065	100	10000	550	25.0	7.4	10.0	1.0
Z460LA10H	UL4	460H	460	615	750 (675-825)	70	1240	25	3500	150	14.0	7.4	7.5	0.8
Z460LA20AH	UL4	460H20A	460	615	750 (675-825)	150	1240	50	6000	330	17.5	7.4	7.5	0.8
Z460LA40AH	UL3	460H40A	460	615	750 (675-825)	300	1240	100	10000	530	25.0	7.8	10.0	1.0
Z460LA40BH	UL3	460H40B	460	615	750 (675-790)	300	1180	100	10000	530	25.0	7.8	10.0	1.0
Z480LA20H	UL4	480H	485	640	780 (702-858)	75	1290	25	3500	150	14.0	7.4	7.5	0.8
Z480LA40AH	UL4	480H40A	485	640	780 (702-858)	160	1290	50	6000	330	17.5	7.4	7.5	0.8
Z480LA80AH	UL3	480H80A	485	640	780 (702-858)	315	1290	100	10000	530	25.0	7.8	10.0	1.0
Z480LA80BH	UL3	480H80B	485	640	780 (702-820)	315	1225	100	10000	530	25.0	7.8	10.0	1.0
Z510LA20H	UL4	510H	510	670	820 (738-902)	80	1355	25	3500	150	14.0	7.8	7.5	0.8
Z510LA40AH	UL4	510H40A	510	670	820 (738-902)	165	1355	50	6000	330	17.5	7.8	7.5	0.8
Z510LA80AH	UL3	510H80A	510	670	820 (738-902)	325	1355	100	10000	530	25.0	8.2	10.0	1.0
Z510LA80BH	UL3	510H80B	510	670	820 (738-860)	325	1290	100	10000	530	25.0	8.2	10.0	1.0
Z550LA20H	UL4	550H	550	745	910 (819-1001)	90	1500	25	3500	140	14.0	8.2	7.5	0.8
Z550LA40AH	UL4	550H40A	550	745	910 (819-1001)	180	1500	50	6000	300	17.5	8.2	7.5	0.8
Z550LA80AH	UL3	550H80A	550	745	910 (819-1001)	360	1500	100	10000	480	25.0	8.6	10.0	1.0
Z550LA80BH	UL3	550H80B	550	745	910 (819-955)	360	1425	100	10000	480	25.0	8.6	10.0	1.0
Z600LA20H	UL4	625H	625	825	1000 (900-1100)	100	1650	25	3500	140	14.0	8.7	7.5	0.8
Z600LA50AH	UL4	600H50A	625	825	1000 (900-1100)	200	1650	50	6000	300	17.5	8.7	7.5	0.8
Z600LA100AH	UL3	600H100A	625	825	1000 (900-1100)	400	1650	100	10000	480	25.0	9.1	10.0	1.0
Z600LA100BH	UL3	600H100B	625	825	1000 (900-1050)	400	1570	100	10000	480	25.0	9.1	10.0	1.0
Z660LA20H	UL4	660H	680	895	1100 (990-1210)	110	1815	25	3500	130	14.0	9.2	7.5	0.8
Z660LA50AH	UL4	660H50A	680	895	1100 (990-1210)	220	1815	50	6000	200	17.5	9.2	7.5	0.8
Z660LA100AH	UL3	660H100A	680	895	1100 (990-1210)	440	1815	100	10000	400	25.0	9.6	10.0	1.0
Z660LA100BH	UL3	660H100B	680	895	1100 (990-1155)	440	1725	100	10000	400	25.0	9.6	10.0	1.0
Z1000LA20H	UL4	1000H	1000	1465	1800 (1620-1980)	183	2970	25	3500	70	14.0	9.2	7.5	0.8
Z1000LA80AH	UL4	1000H80A	1000	1465	1800 (1620-1980)	360	2970	50	6000	150	17.5	13.9	7.5	0.8
Z1000LA160AH	UL3	1000H160A	1000	1465	1800 (1620-1980)	720	2970	100	10000	250	25.0	14.3	10.0	1.0
Z1000LA160BH	UL3	1000H160B	1000	1465	1800(1620-1890)	720	2820	100	1000	250	25.0	14.3	10.0	1.0

Radial leaded MOVs having the Underwriters Laboratory Recognized Component Mark, conform to UL 1414, UL1449 edition 3, as listed on DTI UL file number E319342. Maximum Power Dissipation: 5 mm-0.1 watt; 7 mm-0.25 watt; 10 mm-0.4 watt; 14 mm-0.6 watt, 20 mm-1 watt. Typical response time is less than 15 nanoseconds. See page 57 for explanation of UL Surge Suppression Device Type Designations.

All devices listed are RoHS compliant.

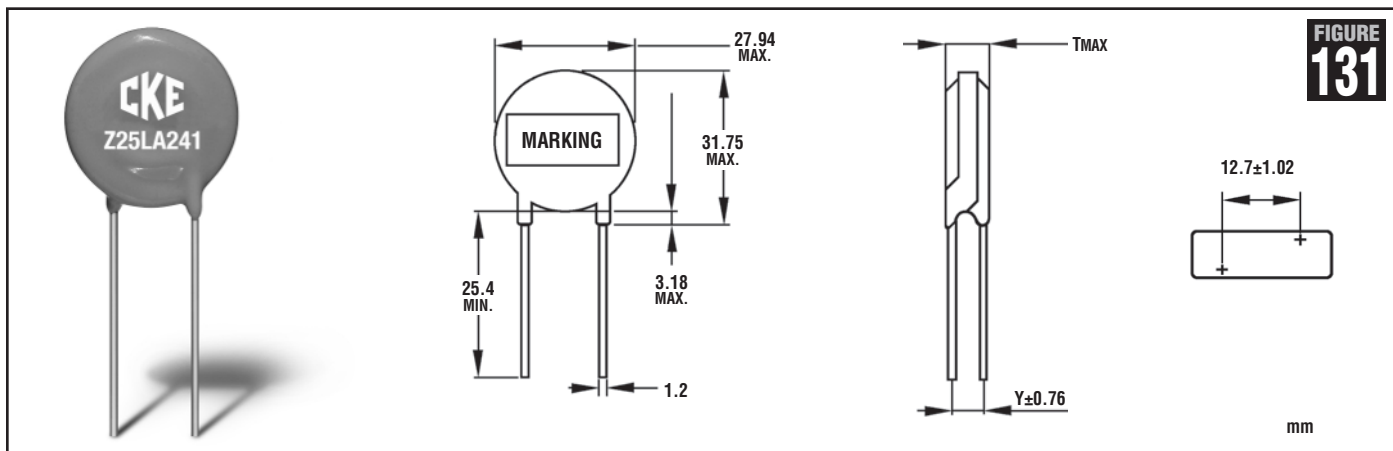


FIGURE 131

Part Number	Agency Mark	Maximum Applied Voltage		Varistor Voltage @ 1mA DC V	Maximum Energy Joules 2mS	Maximum Clamping Voltage 8/20uS		Peak Current I <sub>P</sub>		Typical Capacitance @1kHz pf	Dimensions in mm		
		AC <sub>RMS</sub> V	DC V			VC V	IP A	1 Time A	2 Times A		T	Y	Figure
<b>Z25LA Series - MOVs</b>													
Z25LA201	UL2	130	170	205(185-225)	140	340	150	20000	15000	3700	8.2	3.7	131
Z25LA221	UL2	140	180	220(198-242)	150	360	150	20000	15000	3400	8.2	3.7	131
Z25LA241	UL2	150	200	240(216-264)	160	395	150	20000	15000	3100	8.4	3.9	131
Z25LA271	UL2	175	225	270(243-297)	180	455	150	20000	15000	2600	8.5	4.2	131
Z25LA301	UL2	190	250	300(270-330)	200	500	150	20000	15000	2100	8.6	4.2	131
Z25LA331	UL2	210	275	330(297-363)	220	550	150	20000	15000	2200	8.7	4.3	131
Z25LA361	UL2	230	300	360(324-396)	240	595	150	20000	15000	2100	8.9	4.5	131
Z25LA391	UL2	250	320	390(351-429)	260	650	150	20000	15000	1900	9.1	4.7	131
Z25LA431	UL2	275	350	430(387-473)	280	710	150	20000	15000	1800	9.3	5	131
Z25LA471	UL2	300	385	470(423-517)	300	775	150	20000	15000	1600	9.5	5.2	131
Z25LA511	UL2	320	415	510(459-561)	300	845	150	20000	15000	1500	9.8	5.5	131
Z25LA561	UL2	350	460	560(504-616)	300	925	150	20000	15000	1300	10.1	5.8	131
Z25LA621	UL2	385	505	620(558-682)	300	1025	150	20000	15000	1200	10.4	6.2	131
Z25LA681	UL2	420	560	680(612-748)	320	1120	150	20000	15000	1100	10.8	6.6	131
Z25LA751	UL2	460	615	750(675-825)	350	1240	150	20000	15000	1000	11.2	6.8	131
Z25LA781	UL2	485	640	780(702-858)	360	1290	150	20000	15000	990	11.4	7	131
Z25LA821	UL2	510	670	820(738-902)	380	1355	150	20000	15000	930	11.6	7.6	131
Z25LA911	UL2	550	745	910(819-1001)	430	1500	150	20000	15000	860	12.1	7.8	131
Z25LA102	UL2	625	825	1000(900-1100)	460	1650	150	20000	15000	760	12.6	8.7	131
Z25LA112	UL2	680	895	1100(990-1210)	500	1815	150	20000	15000	690	13.1	9.3	131
Z25LA122	UL2	750	970	1200(1080-1320)	580	2000	150	20000	15000	620	14.2	10.4	131
Z25LA142	UL2	880	1150	1400(1260-1540)	645	2290	150	20000	15000	540	15.2	11.6	131
Z25LA162	UL2	900	1200	1600(1440-1760)	725	2550	150	20000	15000	470	16.3	12.8	131

Radial leaded MOVs having the Underwriters Laboratory Recognized Component Mark, conform to UL 1414, UL1449 edition 3, as listed on DT1 UL file number E319342.

Maximum Power Dissipation: 1 watt.

Typical response time is less than 15 nanoseconds.

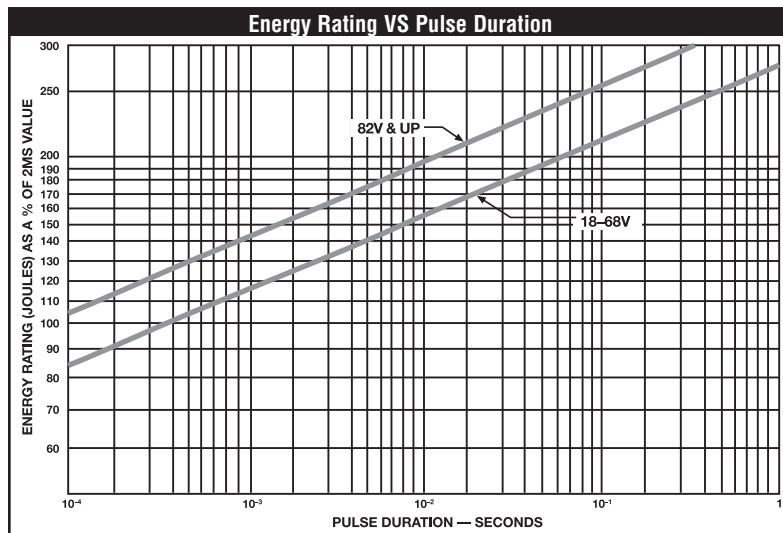
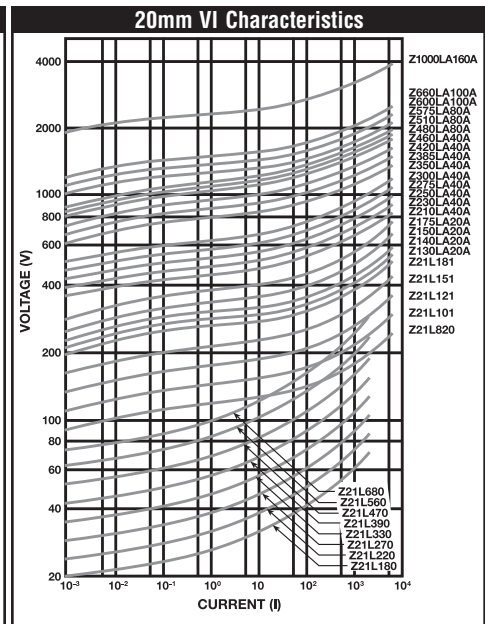
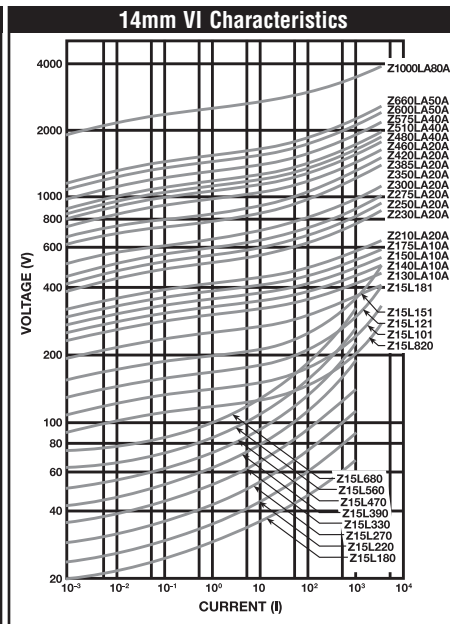
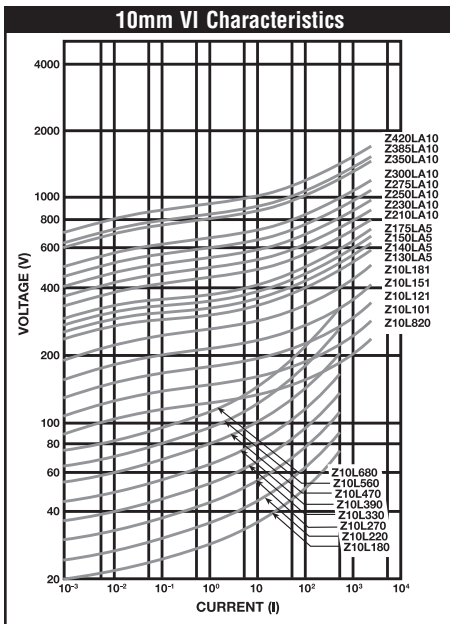
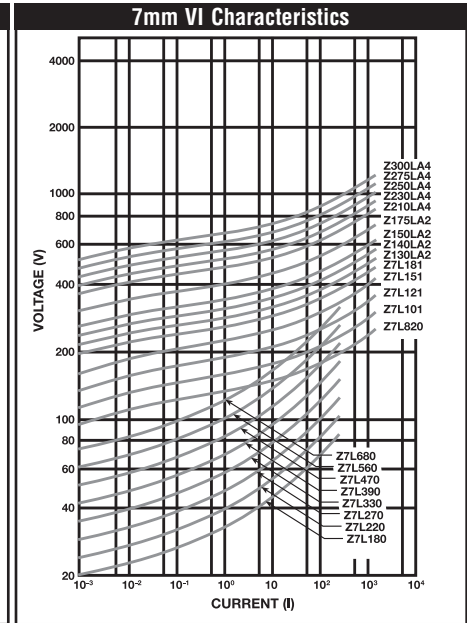
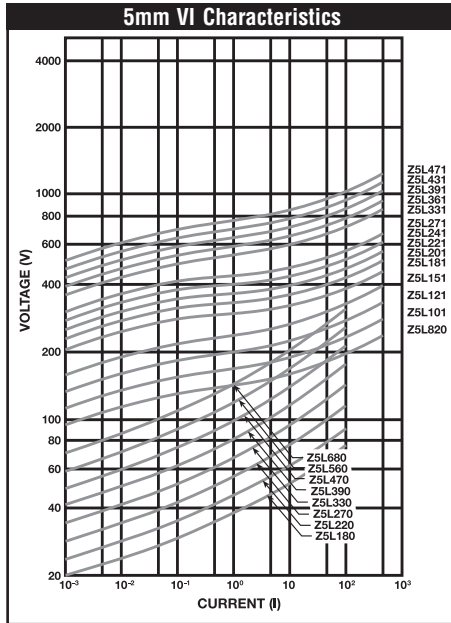
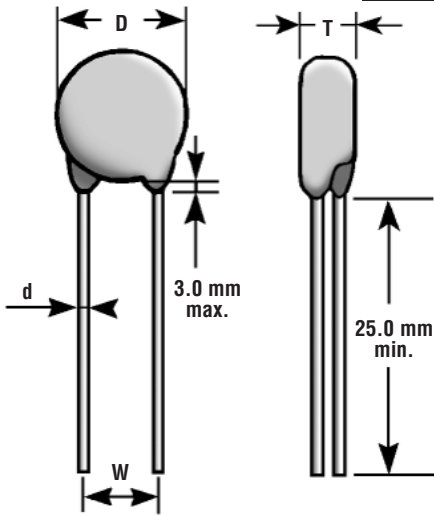
See page 57 for explanation of UL Surge Suppression Device Type Designations.

All devices listed are RoHS compliant.

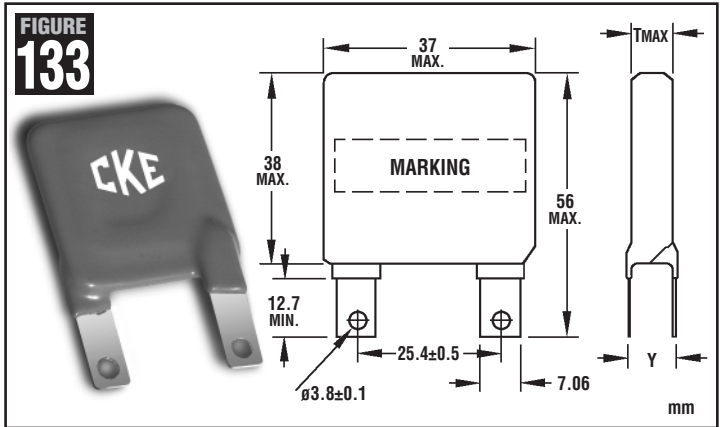
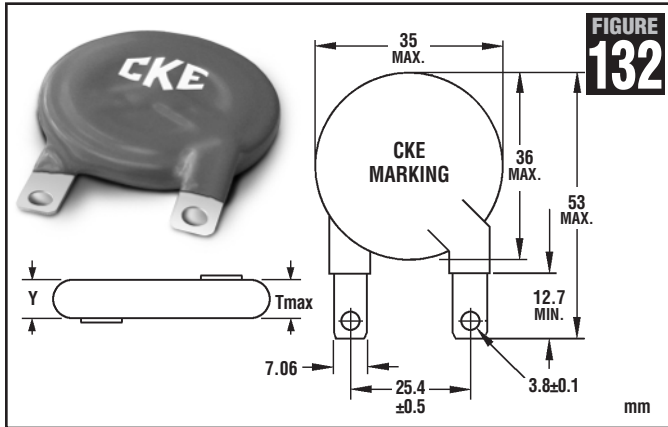


Radial Lead Series

FIGURE 64

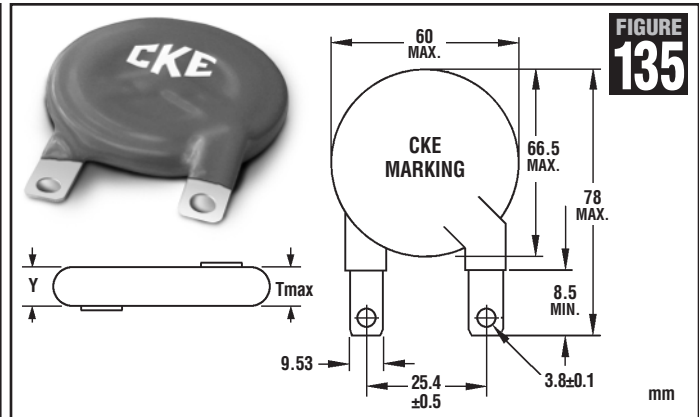
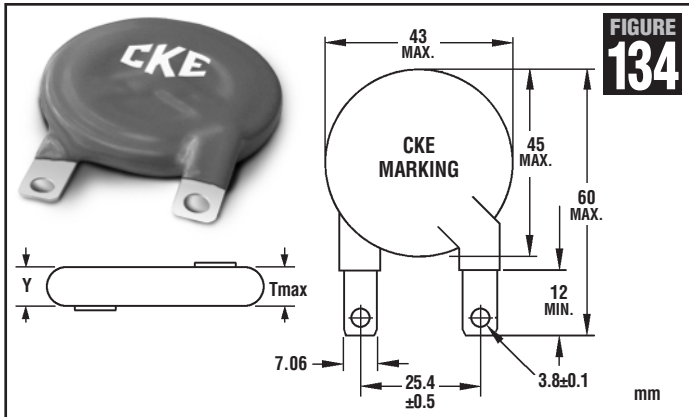


See website [www.deantechnology.com](http://www.deantechnology.com) or contact factory for additional information on characteristic curves



Part Number	Agency Mark	Maximum Applied Voltage		Varistor Voltage @1mADC V	Maximum Energy 2mS J	Maximum Clamping Voltage 8/20µS		Peak Current 8/20µS		Typical Capacitance 1 kHz pF	Dimensions		
		AC <sub>RMS</sub> V	DC V			V <sub>c</sub> V	I <sub>p</sub> A	1 Time A	2 Times A		T mm	Y mm	
<b>Z32RD Round Series - MOVs</b>													
												<b>Figure 132</b>	
Z32RD201	RU2	130	170	205(185-225)	210	340	200	25000	20000	4100	6.8	4.9	
Z32RD241	RU2	150	200	240(216-264)	240	395	200	25000	20000	3400	7.0	5.1	
Z32RD271	RU2	175	225	270(243-297)	255	455	200	25000	20000	2900	7.1	5.2	
Z32RD331	RU2	210	275	330(297-363)	300	550	200	25000	20000	2600	7.3	5.4	
Z32RD361	RU2	230	300	360(324-396)	315	595	200	25000	20000	2300	7.5	5.6	
Z32RD391	RU2	250	320	390(351-429)	330	650	200	25000	20000	2100	7.7	5.8	
Z32RD431	RU2	275	350	430(387-473)	360	710	200	25000	20000	2000	7.9	6.0	
Z32RD471	RU2	300	385	470(423-517)	380	775	200	25000	20000	1700	8.1	6.2	
Z32RD511	RU2	320	415	510(459-561)	430	845	200	25000	20000	1600	8.4	6.5	
Z32RD621	RU2	385	505	620(558-682)	470	1025	200	25000	20000	1300	9.0	7.1	
Z32RD681	RU2	420	560	680(612-748)	495	1120	200	25000	20000	1300	9.4	7.5	
Z32RD751	RU2	460	615	750(675-825)	520	1240	200	25000	20000	1100	9.8	7.9	
Z32RD781	RU2	485	640	780(702-858)	550	1290	200	25000	20000	1100	10.0	8.0	
Z32RD821	RU2	510	670	820(738-902)	580	1355	200	25000	20000	1000	10.2	8.3	
Z32RD911	RU2	550	745	910(819-1001)	620	1500	200	25000	20000	950	10.7	8.8	
Z32RD951	RU2	575	765	950(855-1045)	650	1570	200	25000	20000	900	11.0	9.0	
Z32RD102	RU2	625	825	1000(900-1100)	685	1650	200	25000	20000	840	11.2	9.3	
Z32RD112	RU2	680	895	1100(990-1210)	750	1815	200	25000	20000	770	11.7	9.8	
Z32RD122	RU2	750	970	1200(1062-1300)	800	2100	200	25000	20000	690	12.8	10.9	
Z32RD142	RU2	880	1150	1400(1245-1520)	850	2290	200	25000	20000	590	13.8	11.9	
Z32RD162	RU2	1000	1200	1600(1414-1728)	900	2700	200	25000	20000	520	14.9	13.0	
<b>Z34SQ Square Series - MOVs</b>													
												<b>Figure 133</b>	
Z34SQ201	RU1	130	170	205(185-225)	310	340	300	40000	25000	7900	6.8	4.9	
Z34SQ221	RU1	140	180	220(198-242)	330	360	300	40000	25000	7200	6.9	5	
Z34SQ241	RU1	150	200	240(216-264)	360	395	300	40000	25000	6600	7	5.1	
Z34SQ271	RU1	175	225	270(243-297)	390	455	300	40000	25000	5600	7.1	5.2	
Z34SQ331	RU1	210	275	330(297-363)	460	550	300	40000	25000	5000	7.3	5.4	
Z34SQ361	RU1	230	300	360(324-396)	475	595	300	40000	25000	4400	7.5	5.6	
Z34SQ391	RU1	250	320	390(351-429)	490	650	300	40000	25000	4100	7.7	5.8	
Z34SQ431	RU1	275	350	430(387-473)	550	710	300	40000	25000	3800	7.9	6.0	
Z34SQ471	RU1	300	385	470(423-517)	600	775	300	40000	25000	3400	8.1	6.2	
Z34SQ511	RU1	320	415	510(459-561)	640	845	300	40000	25000	3200	8.4	6.5	
Z34SQ561	RU1	350	460	560(504-616)	710	920	300	40000	25000	2900	8.5	6.8	
Z34SQ621	RU1	385	505	620(558-682)	720	1025	300	40000	25000	2600	9	7.1	
Z34SQ681	RU1	420	560	680(612-748)	750	1120	300	40000	25000	2400	9.4	7.5	
Z34SQ751	RU1	460	615	750(675-825)	780	1240	300	40000	25000	2200	9.8	7.9	
Z34SQ781	RU1	485	640	780(702-858)	820	1290	300	40000	25000	2100	10	8.0	
Z34SQ821	RU1	510	670	820(738-902)	900	1355	300	40000	25000	2000	10.2	8.3	
Z34SQ911	RU1	550	745	910(819-1001)	960	1500	300	40000	25000	1800	10.7	8.8	
Z34SQ951	RU1	575	765	950(855-1045)	1000	1570	300	40000	25000	1700	11	9.0	
Z34SQ102	RU1	625	825	1000(900-1100)	1055	1650	300	40000	25000	1600	11.2	9.3	
Z34SQ112	RU1	680	895	1100(990-1210)	1155	1815	300	40000	25000	1500	11.7	9.8	
Z34SQ122	RU1	750	970	1200(1062-1300)	1200	2100	300	40000	25000	1300	12.8	10.9	
Z34SQ142	RU1	880	1150	1400(1245-1520)	1300	2290	300	40000	25000	1100	13.8	11.9	
Z34SQ162	RU1	1000	1200	1600(1414-1728)	1400	2700	300	40000	25000	1000	14.9	13.0	

Radial leaded MOVs having the Underwriters Laboratory Recognized Component Mark, conform to UL 1414, UL1449 edition 3, as listed on DTI UL file number E319342. Maximum Power Dissipation: 5 mm-0.1 watt; 7 mm-0.25 watt; 10 mm-0.4 watt; 14 mm-0.6 watt, 20 mm-1 watt. Typical response time is less than 15 nanoseconds. See page 57 for explanation of UL Surge Suppression Device Type Designations. All devices listed are RoHS compliant.



Part Number	Agency Mark	Maximum Applied Voltage		Varistor Voltage @ 1mA DC	Maximum Energy 2mS	Maximum Clamping Voltage 8/20µS		Peak Current 8/20µS		Typical Capacitance 1 kHz	Dimensions		
		AC <sub>RMS</sub> V	DC V			V <sub>c</sub> V	I <sub>p</sub> A	1 Time A	2 Times A		T mm	Y mm	
<b>Z40RD Series - MOVs</b>												<b>Figure 134</b>	
Z40RD201		130	170	205(185-225)	310	340	300	40000	25000	8600	6.8	4.9	
Z40RD241		150	200	240(216-264)	360	395	300	40000	25000	7200	7.0	5.1	
Z40RD271		175	225	270(243-297)	390	455	300	40000	25000	6000	7.1	5.2	
Z40RD331		210	275	330(297-363)	460	550	300	40000	25000	5400	7.3	5.4	
Z40RD361		230	300	360(324-396)	475	595	300	40000	25000	4800	7.5	5.6	
Z40RD391		250	320	390(351-429)	490	650	300	40000	25000	4400	7.7	5.8	
Z40RD431		275	350	430(387-473)	550	710	300	40000	25000	4100	7.9	6.0	
Z40RD471		300	385	470(423-517)	600	775	300	40000	25000	3600	8.1	6.2	
Z40RD511		320	415	510(459-561)	640	845	300	40000	25000	3400	8.4	6.5	
Z40RD621		385	505	620(558-682)	720	1025	300	40000	25000	2800	9.0	7.1	
Z40RD681		420	560	680(612-748)	750	1120	300	40000	25000	2600	9.4	7.5	
Z40RD751		460	615	750(675-825)	780	1240	300	40000	25000	2400	9.8	7.9	
Z40RD781		485	640	780(702-858)	820	1290	300	40000	25000	2270	10.0	8.0	
Z40RD821		510	670	820(738-902)	900	1355	300	40000	25000	2160	10.2	8.3	
Z40RD911		550	745	910(819-1001)	960	1500	300	40000	25000	1940	10.7	8.8	
Z40RD951		575	765	950(855-1045)	1000	1570	300	40000	25000	1800	11.0	9.0	
Z40RD102		625	825	1000(900-1100)	1055	1650	300	40000	25000	1730	11.2	9.3	
Z40RD112		680	895	1100(990-1210)	1155	1815	300	40000	25000	1620	11.7	9.8	
Z40RD122		750	970	1200(1062-1300)	1200	2100	300	40000	25000	1400	12.8	10.9	
Z40RD142		880	1150	1400(1245-1520)	1300	2290	300	40000	25000	1200	13.8	11.9	
Z40RD162		1000	1200	1600(1414-1728)	1400	2700	300	40000	25000	1080	14.9	13.0	
<b>Z53RD Series - MOVs</b>												<b>Figure 135</b>	
Z53RD201	UL	130	170	205(185-225)	490	340	500	70000	50000	14000	6.8	4.9	
Z53RD241	UL	150	200	240(216-264)	570	395	500	70000	50000	11000	7.0	5.1	
Z53RD271	UL	175	225	270(243-297)	630	455	500	70000	50000	10000	7.1	5.2	
Z53RD331	UL	210	275	330(297-363)	680	550	500	70000	50000	8500	7.3	5.4	
Z53RD361	UL	230	300	360(324-396)	730	595	500	70000	50000	7700	7.5	5.6	
Z53RD391	UL	250	320	390(351-429)	880	650	500	70000	50000	7100	7.7	5.8	
Z53RD431	UL	275	350	430(387-473)	950	710	500	70000	50000	6600	7.9	6.0	
Z53RD471	UL	300	385	470(423-517)	1000	775	500	70000	50000	5900	8.1	6.2	
Z53RD511	UL	320	415	510(459-561)	1100	845	500	70000	50000	5700	8.4	6.5	
Z53RD561	UL	350	460	560(504-616)	1200	875	500	70000	50000	5000	8.7	6.8	
Z53RD621	UL	385	505	620(558-682)	1300	1025	500	70000	50000	4600	9.0	7.1	
Z53RD681	UL	420	560	680(612-748)	1500	1120	500	70000	50000	4400	9.4	7.5	
Z53RD751	UL	460	615	750(675-825)	1600	1240	500	70000	50000	3900	9.8	7.9	
Z53RD781	UL	485	640	780(702-858)	1650	1290	500	70000	50000	3800	10.0	8.0	
Z53RD821	UL	510	670	820(738-902)	1800	1355	500	70000	50000	3500	10.2	8.3	
Z53RD911	UL	550	745	910(819-1001)	2000	1500	500	70000	50000	3300	10.7	8.8	
Z53RD951	UL	575	765	950(855-1045)	2100	1570	500	70000	50000	3100	11.0	9.0	
Z53RD102	UL	625	825	1000(900-1100)	2200	1650	500	70000	50000	2900	11.2	9.3	
Z53RD112	UL	680	895	1100(990-1210)	2500	1815	500	70000	50000	2700	11.7	9.8	
Z53RD122	UL	750	970	1200(1062-1300)	2600	2100	500	70000	50000	2400	12.8	10.9	
Z53RD142	UL	880	1150	1400(1245-1520)	3200	2290	500	70000	50000	2100	13.8	11.9	
Z53RD162	UL	1000	1200	1600(1414-1728)	3500	2700	500	70000	50000	1800	14.9	13.0	

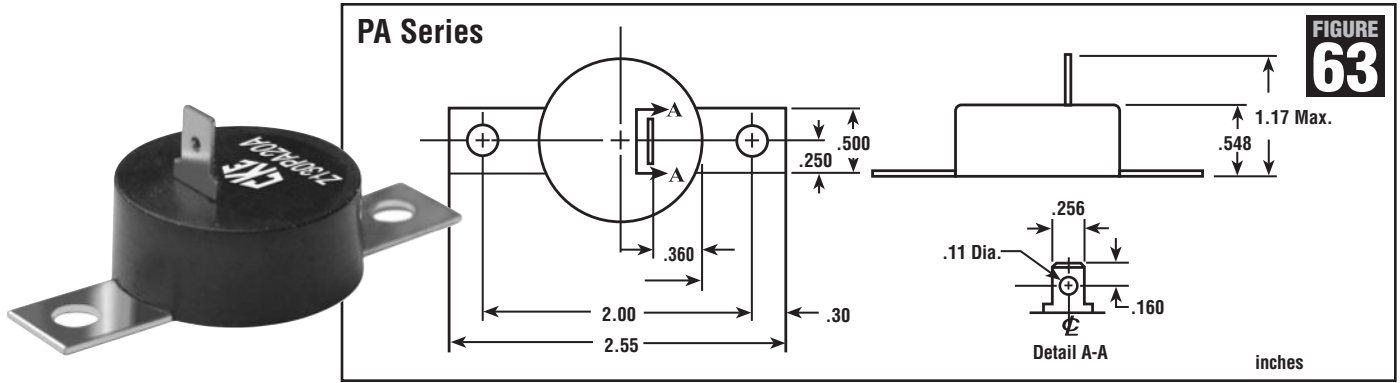
Radial leaded MOVs having the Underwriters Laboratory Recognized Component Mark, conform to UL 1414, UL1449 edition 3, as listed on DTI UL file number E319342. Maximum Power Dissipation: 5 mm-0.1 watt; 7 mm-0.25 watt; 10 mm-0.4 watt; 14 mm-0.6 watt, 20 mm-1 watt.

Typical response time is less than 15 nanoseconds.

See page 57 for explanation of UL Surge Suppression Device Type Designations.

All devices listed are RoHS compliant.





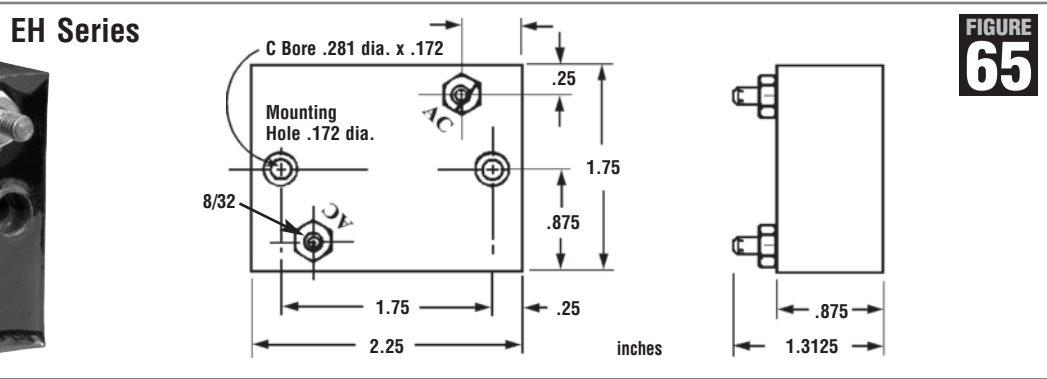
Part Number	Agency Mark	Maximum Applied Voltage		Varistor Voltage @1mA DC	Maximum Energy 2mS	Maximum Clamping Voltage 8/20µS		Peak Current 8/20µS	Typical Capacitance 1 kHz	Figure
		AC <sub>RMS</sub> V	DC V			V <sub>c</sub> V	I <sub>p</sub> A			
<b>PA Series - MOVs</b>										
Z130PA20A	UL3	130	175	205(184-243)	100	340	100	10000	2300	63
Z130PA20C	UL3	130	175	205(184-220)	100	325	100	10000	2300	63
Z140PA20A	UL3	140	180	220(198-242)	100	360	100	10000	2200	63
Z140PA20C	UL3	140	180	220(198-231)	100	345	100	10000	2200	63
Z150PA20A	UL3	150	200	240(212-284)	100	420	100	10000	2200	63
Z150PA20C	UL3	150	200	240(212-243)	100	360	100	10000	2200	63
Z175PA20A	UL3	175	225	270(243-297)	100	455	100	10000	2100	63
Z175PA20C	UL3	175	225	270(243-284)	100	435	100	10000	2100	63
Z200PA20A	UL3	195	250	300(270-330)	110	550	100	10000	1800	63
Z200PA20C	UL3	195	250	300(270-315)	110	500	100	10000	1800	63
Z210PA40A	UL3	210	275	330(297-363)	110	550	100	10000	1750	63
Z210PA40C	UL3	210	275	330(297-347)	110	525	100	10000	1750	63
Z230PA40A	UL3	230	300	360(324-396)	120	595	100	10000	1700	63
Z230PA40C	UL3	230	300	360(324-378)	120	565	100	10000	1700	63
Z250PA40A	UL3	250	330	390(354-453)	130	675	100	10000	1400	63
Z250PA40C	UL3	250	330	390(354-413)	130	620	100	10000	1400	63
Z275PA40A	UL3	275	369	430(389-494)	140	740	100	10000	1350	63
Z275PA40C	UL3	275	369	430(389-453)	140	680	100	10000	1350	63
Z300PA40A	UL3	300	385	470(423-517)	150	775	100	10000	1200	63
Z300PA40C	UL3	300	385	470(423-494)	150	735	100	10000	1200	63
Z320PA40A	UL3	320	420	515(462-565)	160	850	100	10000	1050	63
Z320PA40C	UL3	320	420	510(462-539)	160	800	100	10000	1050	63
Z350PA40A	UL3	350	460	560(504-616)	150	915	100	10000	850	63
Z350PA40C	UL3	350	460	560(504-588)	150	870	100	10000	850	63
Z385PA40A	UL3	385	505	620(558-682)	150	1025	100	10000	570	63
Z385PA40C	UL3	385	505	620(588-651)	150	975	100	10000	570	63
Z420PA40A	UL3	420	560	680(610-790)	160	1160	100	10000	550	63
Z420PA40C	UL3	420	560	680(610-690)	160	1050	100	10000	550	63
Z460PA40A	UL3	460	615	750(675-825)	180	1240	100	10000	530	63
Z460PA40C	UL3	460	615	750(675-788)	180	1180	100	10000	530	63
Z480PA80A	UL3	480	640	780(670-860)	180	1280	100	10000	530	63
Z480PA80C	UL3	480	640	780(670-790)	180	1160	100	10000	530	63
Z510PA80A	UL3	510	675	820(735-963)	190	1410	100	10000	530	63
Z510PA80C	UL3	510	675	820(735-860)	190	1280	100	10000	530	63
Z550PA80A	UL3	550	700	910(775-1000)	200	1500	100	10000	480	63
Z550PA80C	UL3	550	700	910(775-960)	200	1400	100	10000	480	63
Z575PA80A	UL3	575	730	950(805-1050)	220	1560	100	10000	480	63
Z575PA80C	UL3	575	730	950(805-960)	220	1410	100	10000	480	63
Z600PA100A	UL3	625	825	1000(900-1100)	240	1650	100	10000	480	63
Z600PA100C	UL3	625	825	1000(900-1050)	240	1570	100	10000	480	63
Z625PA80A	UL3	625	825	1000(900-1100)	230	1650	100	10000	480	63
Z660PA100A	UL3	660	850	1100(940-1210)	250	1820	100	10000	400	63
Z660PA100C	UL3	660	850	1100(940-1100)	250	1650	100	10000	400	63
Z1000PA100A	UL3	1000	1350	1800(1460-1880)	380	2800	100	10000	250	63
Z1000PA100C	UL3	1000	1350	1800(1460-1720)	380	2580	100	10000	250	63

Radial leaded MOVs having the Underwriters Laboratory Recognized Component Mark, conform to UL 1414, UL1449 edition 3, as listed on DTI UL file number E319342. Maximum Power Dissipation: 5 mm-0.1 watt; 7 mm-0.25 watt; 10 mm-0.4 watt; 14 mm-0.6 watt, 20 mm-1 watt.

Typical response time is less than 15 nanoseconds.

See page 57 for explanation of UL Surge Suppression Device Type Designations.

All devices listed are RoHS compliant.



Part Number	Maximum Applied Voltage		Varistor Voltage @1mADC V	Maximum Energy 2mS J	Maximum Clamping Voltage 8/20µS		Peak Current 8/20µS A	Typical Capacitance 1 kHz pF
	AC <sub>RMS</sub> V	DC V			V <sub>c</sub> V	I <sub>p</sub> A		
<b>EH Series - MOVs</b>								
Z130EH6	130	175	200(184-228)	370	320	200	40000	10200
Z150EH6	150	200	240(212-268)	400	375	200	40000	10200
Z250EH6	250	330	390(354-429)	650	620	200	40000	6000
Z275EH6	275	369	430(389-473)	700	685	200	40000	5700
Z320EH6	320	420	510(462-539)	750	810	200	40000	5400
Z420EH6	420	560	680(610-748)	850	1000	200	40000	3780
Z480EH6	480	640	750(670-824)	900	1120	200	40000	3480
Z510EH6	510	675	820(735-910)	950	1250	200	40000	3480
Z575EH6	575	730	910(805-1005)	1050	1480	200	40000	3480
Z600EH6	600	810	1000(900-1100)	1100	1620	200	40000	1980
Z660EH6	660	850	1050(940-1160)	1250	1740	200	40000	1980

Radial leaded MOVs having the Underwriters Laboratory Recognized Component Mark, conform to UL 1414, UL1449 edition 3, as listed on DTI UL file number E319342. Maximum Power Dissipation is 1 watt.

Typical response time is less than 15 nanoseconds.

All devices listed are RoHS compliant.

**UL Surge Suppression Device Type Designations**

Present Type Designations (Type 5 and Types 1, 2, 3 and 4 Component Assemblies)

Type 5 SPDs and types 1, 2, 3 and 4 component assemblies are intended only for factory installation within another component, device or product.

Type 5 SPDs are discrete component surge suppressors, such as MOVs that may be mounted on a printed wiring board, connected by its leads or provided within an enclosure with mounting means and wiring terminations.

Type 4 component assemblies are assemblies consisting of one or more type 5 SPDs together with a disconnect (integral or external) or a means of complying with the limited current tests in ANSI/UL 1449.

Type 5 SPD discrete components and type 4 component assemblies are rated in nominal discharge current (I<sub>n</sub>), measured limiting voltage (MLV), normal operating voltage and maximum continuous operating voltage (MCOV)

Types 1, 2 and 3 component assemblies consist of a type 4 component assembly with internal or external short-circuit protection. These types are tested and rated based on the intended application as either type 1, 2 or 3 SPDs.

See UL 1449 Edition 3 for further details about type designations and the appropriateness of component use.



Z33M & Z40M Series

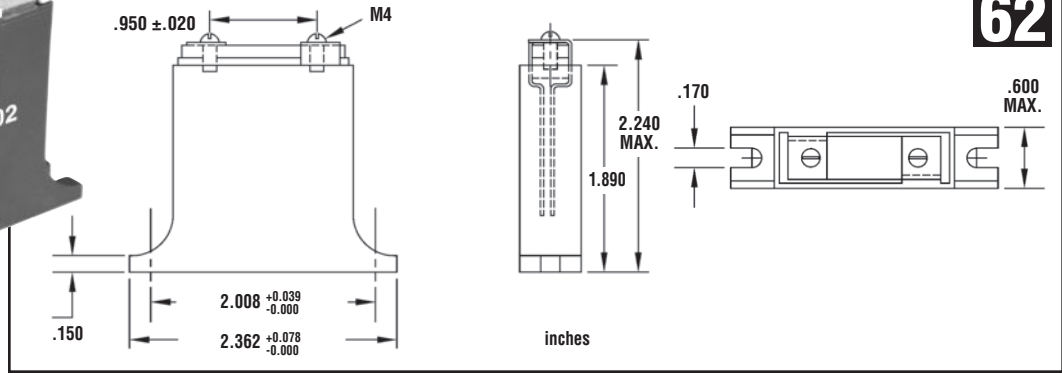


FIGURE 62

Part Number	Agency Mark	Maximum Applied Voltage		Varistor Voltage @ 1mA DC V	Maximum Energy 2mS J	Maximum Clamping Voltage		Peak Current 8/20µS A	Typical Capacitance 1 kHz pF	Figure
		AC <sub>RMS</sub> V	DC V			V <sub>c</sub> V	I <sub>p</sub> A			
<b>Z33M Series - MOVs</b>										
Z33M201	UL 2	130	170	205(180-220)	210	340	200	25000	4100	62
Z33M241	UL 2	150	200	240(216-264)	240	395	200	25000	3400	62
Z33M271	UL 2	175	225	270(243-303)	255	455	200	25000	2900	62
Z33M331	UL 2	210	275	330(297-363)	320	550	200	25000	2600	62
Z33M361	UL 2	230	300	360(324-396)	325	595	200	25000	2300	62
Z33M391	UL 2	250	320	390(351-429)	350	650	200	25000	2100	62
Z33M431	UL 2	275	350	430(387-473)	400	710	200	25000	2000	62
Z33M471	UL 2	300	385	470(423-517)	405	775	200	25000	1700	62
Z33M511	UL 2	320	415	510(459-561)	415	845	200	25000	1600	62
Z33M621	UL 2	385	505	620(558-682)	425	1025	200	25000	1300	62
Z33M681	UL 2	420	560	680(612-748)	450	1120	200	25000	1300	62
Z33M751	UL 2	460	615	750(675-825)	500	1240	200	25000	1100	62
Z33M781	UL 2	485	640	780(702-858)	520	1290	200	25000	1100	62
Z33M821	UL 2	510	670	820(738-902)	545	1355	200	25000	1000	62
Z33M911	UL 2	550	745	910(819-1001)	600	1500	200	25000	950	62
Z33M951	UL 2	580	760	950(855-1045)	600	1500	200	25000	900	62
Z33M102	UL 2	625	825	1000(900-1100)	655	1650	200	25000	840	62
Z33M112	UL 2	680	895	1100(990-1210)	725	1815	200	25000	770	62
Z33M122	UL 2	750	970	1200(1080-1320)	800	2000	200	25000	690	62
Z33M142	UL 2	880	1150	1400(1260-1540)	850	2290	200	25000	590	62
Z33M162	UL 2	1000	1200	1600(1440-1760)	900	2550	200	25000	520	62
<b>Z40M Series - MOVs</b>										
Z40M201	UL 1	130	170	205(180-220)	310	340	300	40000	7900	62
Z40M241	UL 1	150	200	240(216-264)	360	395	300	40000	6600	62
Z40M271	UL 1	175	225	270(243-303)	380	455	300	40000	5600	62
Z40M331	UL 1	215	275	330(297-363)	430	545	300	40000	5000	62
Z40M361	UL 1	230	300	360(324-396)	460	595	300	40000	4400	62
Z40M391	UL 1	250	320	390(351-429)	490	650	300	40000	4100	62
Z40M431	UL 1	275	350	430(387-473)	550	710	300	40000	3800	62
Z40M471	UL 1	300	385	470(423-517)	590	775	300	40000	3400	62
Z40M511	UL 1	320	415	510(459-561)	640	845	300	40000	3200	62
Z40M621	UL 1	385	505	620(558-682)	800	1025	300	40000	2600	62
Z40M681	UL 1	420	560	680(612-748)	830	1120	300	40000	2400	62
Z40M751	UL 1	460	615	750(675-825)	850	1240	300	40000	2200	62
Z40M781	UL 1	485	640	780(702-858)	890	1290	300	40000	2100	62
Z40M821	UL 1	510	670	820(738-902)	920	1355	300	40000	2000	62
Z40M911	UL 1	550	745	910(819-1001)	960	1500	300	40000	1800	62
Z40M951	UL 1	580	760	950(855-1045)	1000	1500	300	40000	1700	62
Z40M102	UL 1	625	825	1000(900-1100)	1020	1650	300	40000	1600	62
Z40M112	UL 1	680	895	1100(990-1210)	1100	1815	300	40000	1500	62
Z40M122	UL 1	750	970	1200(1080-1320)	1200	2000	300	40000	1300	62
Z40M142	UL 1	880	1150	1400(1260-1540)	1300	2290	300	40000	1100	62
Z40M162	UL 1	1000	1200	1600(1440-1760)	1400	2550	300	40000	1000	62

Radial leaded MOVs having the Underwriters Laboratory Recognized Component Mark, conform to UL 1414, UL1449 edition 3, as listed on DT1 UL file number E319342. Maximum Power Dissipation is 2 watts.

Typical response time is less than 15 nanoseconds.

See page 57 for explanation of UL Surge Suppression Device Type Designations.

All devices listed are RoHS compliant.



Z60M Series

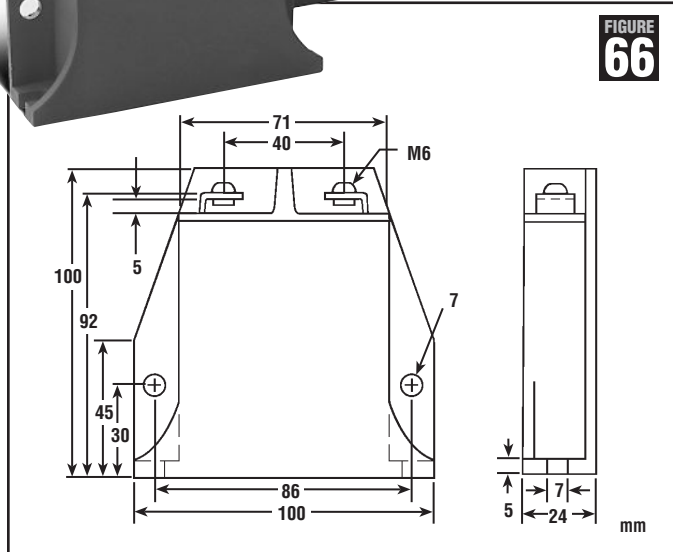


FIGURE 66

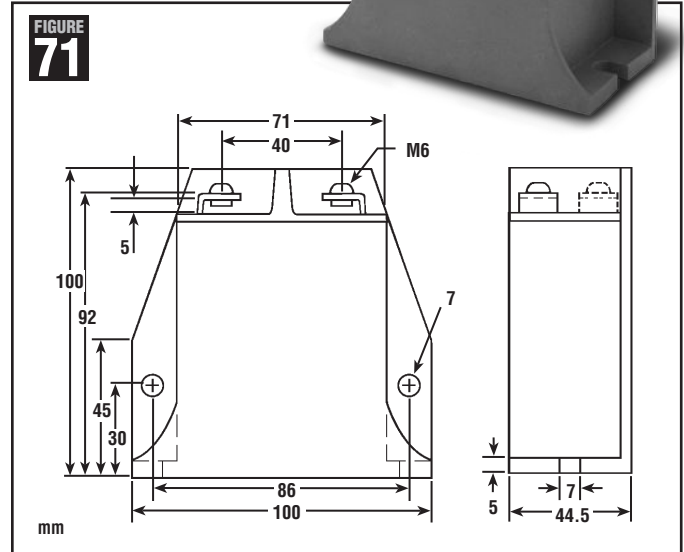
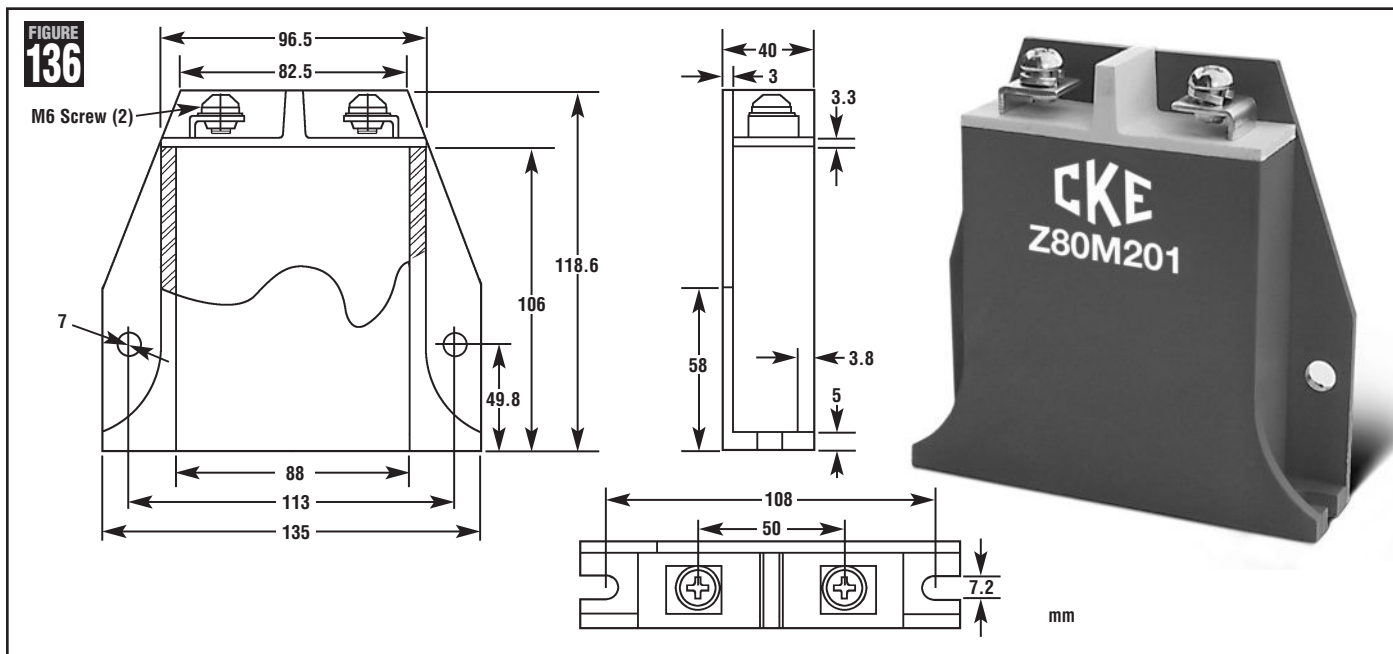


FIGURE 71

Part Number	Agency Mark	Maximum Applied Voltage		Varistor Voltage @ 1mA <sub>DC</sub>	Maximum Energy 2mS J	Maximum Clamping Voltage		Peak Current 8/20μS A	Typical Capacitance 1 kHz pF	Figure
		AC <sub>RMS</sub> V	DC V			V <sub>c</sub> V	I <sub>p</sub> A			
<b>Z60M Series - MOVs</b>										
Z60M201	UL1	130	175	200(180-220)	490	340	500	70000	14000	66
Z60M241	UL1	150	200	240(216-264)	570	400	500	70000	10000	66
Z60M271	UL1	175	225	270(243-297)	630	455	500	70000	10000	66
Z60M331	UL1	210	275	330(297-363)	680	550	500	70000	8500	66
Z60M361	UL1	230	300	360(324-396)	730	595	500	70000	7700	66
Z60M391	UL1	250	330	390(351-429)	880	620	500	70000	7100	66
Z60M431	UL1	275	369	430(387-473)	950	680	500	70000	6600	66
Z60M471	UL1	300	385	470(423-517)	1000	775	500	70000	5900	66
Z60M511	UL1	320	420	510(459-561)	1100	760	500	70000	5700	66
Z60M621	UL1	385	505	620(558-682)	1300	1025	500	70000	4600	66
Z60M681	UL1	420	560	680(612-748)	1500	1060	500	70000	4400	66
Z60M751	UL1	480	640	750(675-825)	1600	1160	500	70000	3900	66
Z60M781	UL1	485	640	780(702-858)	1650	1290	500	70000	3800	66
Z60M821	UL1	510	675	820(738-902)	1800	1300	500	70000	3500	66
Z60M911	UL1	575	730	910(819-1001)	2100	1420	500	70000	3300	66
Z60M951	UL1	580	760	950(855-1045)	2100	1500	500	70000	3100	66
Z60M102	UL1	660	850	1000(900-1100)	2300	1640	500	70000	2900	66
Z60M112	UL1	680	895	1100(990-1210)	2300	1640	500	70000	2700	66
Z60M122	UL1	750	970	1200(1080-1320)	2600	1880	500	70000	2400	66
Z60M142	UL1	880	1150	1400(1260-1540)	3200	2290	500	70000	2100	66
Z60M162	UL1	900	1200	1600(1440-1760)	3300	2700	500	70000	1800	66
Z60M182	UL4	1100	1400	1800(1620-1980)	3800	2940	500	70000	2200	66
Z60M222	UL4	1400	1750	2200(1980-2420)	5000	3600	500	70000	1800	71
Z60M272	UL4	1700	2150	2700(2430-2970)	6000	4300	500	70000	1500	71
Z60M332	UL4	2000	2500	3300(2970-3630)	7500	5200	500	70000	1200	71
Z60M392	UL4	2400	3000	3900(3510-4290)	8600	6200	500	70000	1000	71
Z60M472	UL4	2800	3500	4700(4230-5170)	10000	7400	500	70000	800	71

Radial leaded MOVs having the Underwriters Laboratory Recognized Component Mark, conform to UL 1414, UL1449 edition 3, as listed on DTI UL file number E319342. Maximum Power Dissipation is 2.5 watts. Typical response time is less than 15 nanoseconds. See page 57 for explanation of UL Surge Suppression Device Type Designations. All devices listed are RoHS compliant.

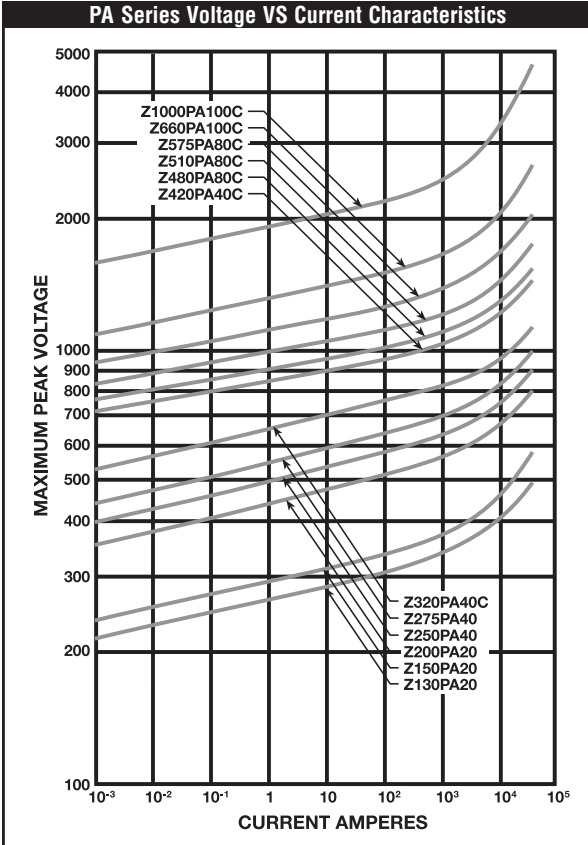


Part Number	Maximum Applied Voltage		Varistor Voltage @ 1mA <sub>DC</sub>	Maximum Energy 2mS J	Maximum Clamping Voltage		Peak Current 8/20µS		Typical Capacitance 1 kHz pF	Figure
	AC <sub>RMS</sub> V	DC V			V <sub>c</sub> V	I <sub>p</sub> A	1 Time A	2 Times A		
<b>Z80M Series - MOVs</b>										
Z80M201	130	170	205(185-225)	660	340	800	100000	80000	28000	136
Z80M241	150	200	240(216-264)	800	395	800	100000	80000	23000	136
Z80M271	175	225	270(243-297)	900	455	800	100000	80000	20000	136
Z80M331	210	275	330(297-363)	1000	550	800	100000	80000	18000	136
Z80M361	230	300	360(324-396)	1200	595	800	100000	80000	16000	136
Z80M391	250	320	390(351-429)	1300	650	800	100000	80000	14000	136
Z80M431	275	350	430(387-473)	1400	710	800	100000	80000	13000	136
Z80M471	300	385	470(423-517)	1500	775	800	100000	80000	12000	136
Z80M511	320	415	510(459-561)	1600	845	800	100000	80000	11000	136
Z80M621	385	505	620(558-682)	2000	1025	800	100000	80000	9000	136
Z80M681	420	560	680(612-748)	2200	1120	800	100000	80000	8500	136
Z80M751	460	615	750(675-825)	2500	1240	800	100000	80000	7700	136
Z80M781	485	640	780(702-858)	2600	1290	800	100000	80000	7200	136
Z80M821	510	670	820(738-902)	2800	1355	800	100000	80000	6900	136
Z80M911	550	745	910(819-1001)	3100	1500	800	100000	80000	6500	136
Z80M951	575	765	950(855-1045)	3300	1570	800	100000	80000	6200	136
Z80M102	625	825	1000(900-1100)	3400	1650	800	100000	80000	5800	136
Z80M112	680	895	1100(990-1210)	3600	1815	800	100000	80000	5200	136
Z80M122	750	970	1200(1062-1300)	4000	2100	800	100000	80000	4800	136
Z80M142	880	1150	1400(1245-1520)	5000	2290	800	100000	80000	4000	136
Z80M162	1000	1200	1600(1414-1728)	6000	2700	800	100000	80000	3200	136
Z80M182	1100	1400	1800(1620-2060)	7000	3030	800	100000	80000	2900	136

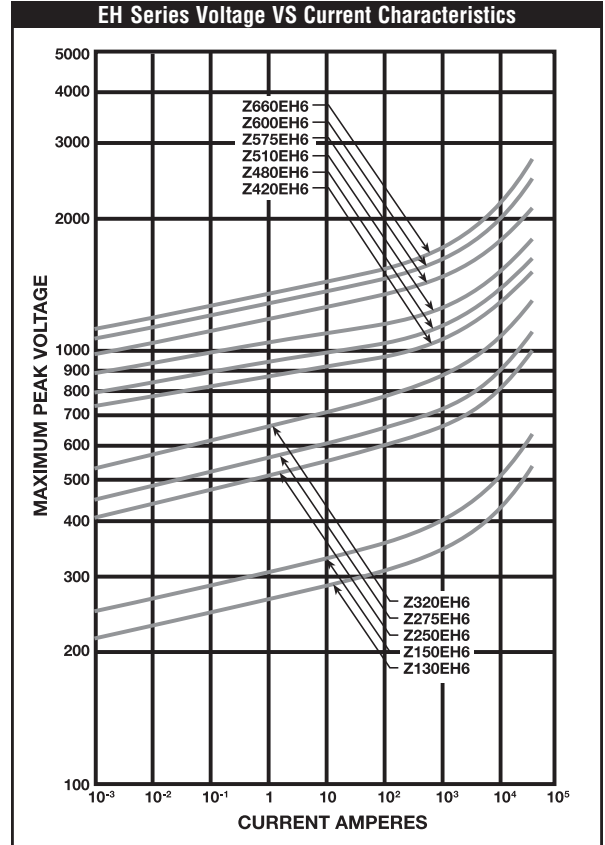
Maximum Power Dissipation: Z80M is watts  
 Typical response time is less than 15 nanoseconds.  
 All devices listed are RoHS compliant.



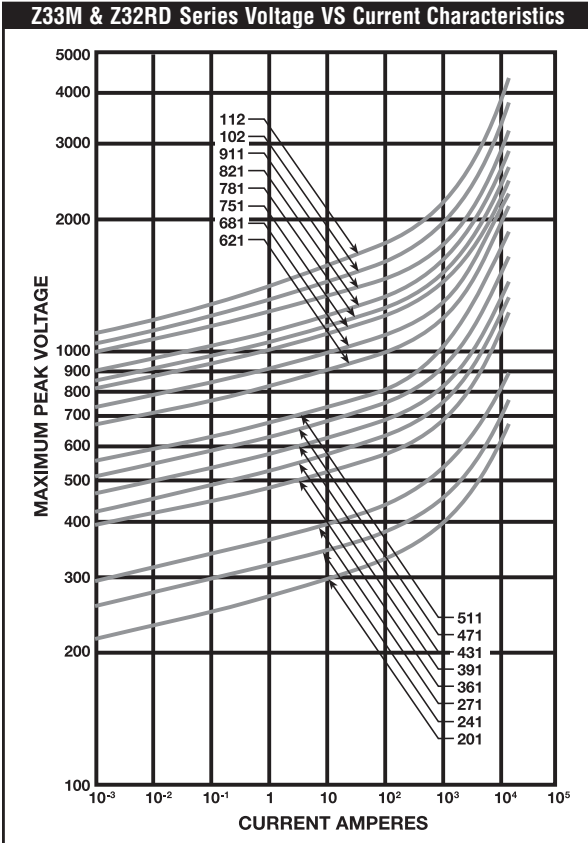
PA Series Voltage VS Current Characteristics



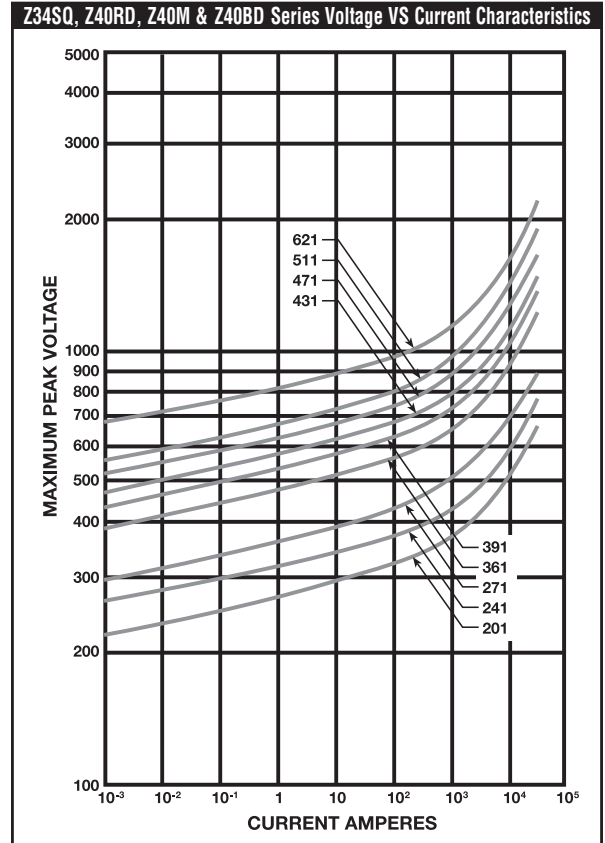
EH Series Voltage VS Current Characteristics



Z33M & Z32RD Series Voltage VS Current Characteristics



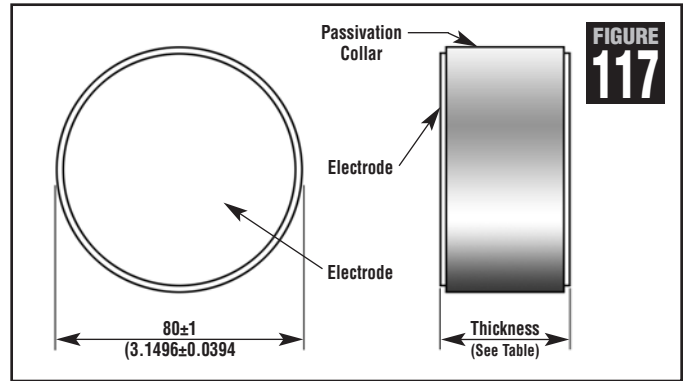
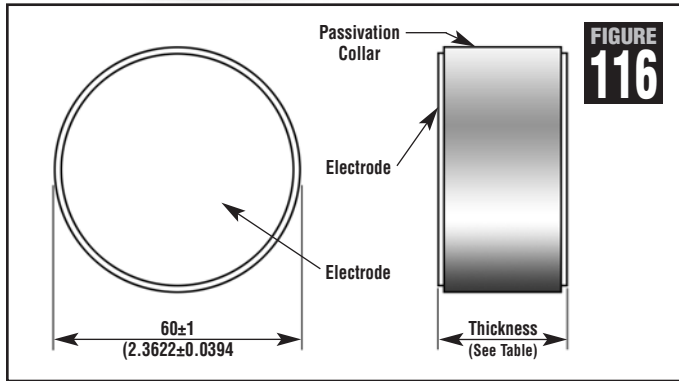
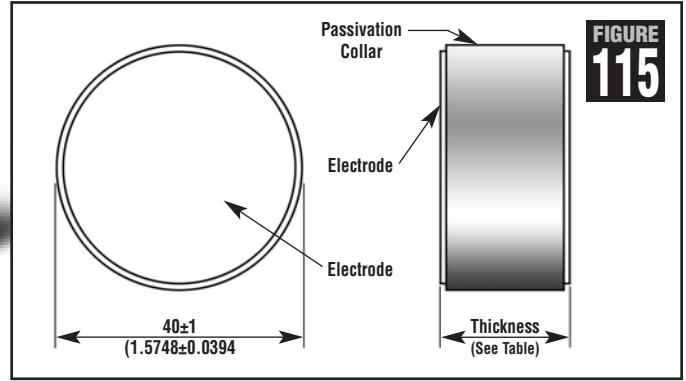
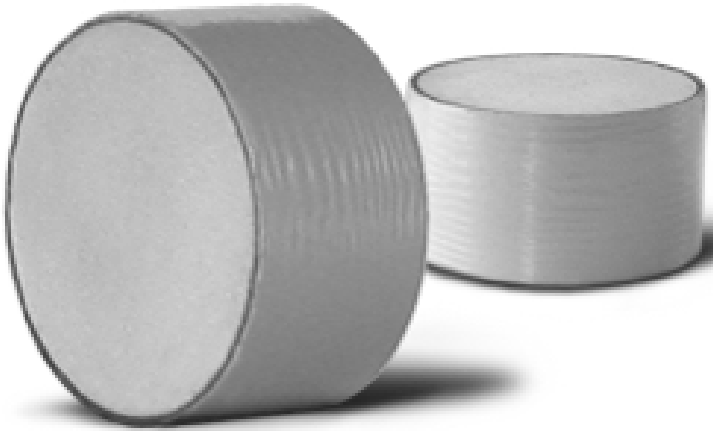
Z34SQ, Z40RD, Z40M & Z40BD Series Voltage VS Current Characteristics



See website [www.deantechnology.com](http://www.deantechnology.com) or contact factory for additional information on characteristic curves



METAL OXIDE VARISTOR DISCS



Part Number	Maximum Applied Voltage		Varistor Voltage @ 1mA <sub>DC</sub> V	Maximum Energy 2mS J	Maximum Clamping Voltage		Peak Current 8/20µS A	Typical Capacitance 1 kHz pF	Max. Thickness	
	AC <sub>RMS</sub> V	DC V			V <sub>c</sub> V	I <sub>p</sub> A			Inches	mm
<b>Z40BD Series - Bare Disc MOVs</b>										
Z40BD201	130	170	205 (185-225)	310	40000	340	300	8400	0.0449	1.14
Z40BD241	150	200	240 (216-264)	360	40000	395	300	8000	0.0539	1.37
Z40BD271	175	225	270 (243-297)	390	40000	455	300	7600	0.0606	1.54
Z40BD331	210	275	330 (297-363)	460	40000	550	300	6700	0.0744	1.89
Z40BD361	230	300	360 (324-396)	475	40000	595	300	6200	0.0811	2.06
Z40BD391	250	320	390 (351-429)	490	40000	650	300	5100	0.0878	2.23
Z40BD431	275	350	430 (387-473)	550	40000	710	300	4900	0.0969	2.46
Z40BD471	300	385	470 (423-517)	600	40000	775	300	4300	0.1059	2.69
Z40BD511	320	415	510 (459-561)	640	40000	845	300	4200	0.1146	2.91
Z40BD621	385	505	620 (558-682)	720	40000	1025	300	3800	0.1394	3.54
Z40BD681	420	560	680 (612-748)	750	40000	1120	300	3500	0.1531	3.89
Z40BD751	460	615	750 (675-825)	780	40000	1240	300	3200	0.1689	4.29
Z40BD781	485	640	780 (702-858)	820	40000	1290	300	3000	0.1756	4.46
Z40BD821	510	670	820 (738-902)	900	40000	1355	300	2900	0.1846	4.69
Z40BD911	550	745	910 (819-1001)	960	40000	1500	300	2200	0.2047	5.20
Z40BD951	575	765	950 (855-1045)	1000	40000	1570	300	2000	0.2138	5.43
Z40BD102	625	825	1000 (900-1100)	1055	40000	1650	300	1800	0.2248	5.71
Z40BD112	680	895	1100 (990-1210)	1155	40000	1815	300	1600	0.2476	6.29
Z40BD122	750	970	1200 (1062-1300)	1200	40000	2100	300	1500	0.2701	6.86
Z40BD142	880	1150	1400 (1245-1520)	1300	40000	2290	300	1400	0.3150	8.00
Z40BD162	1000	1200	1600 (1414-1728)	1400	40000	2700	300	1300	0.3598	9.14

All devices listed are RoHS compliant.



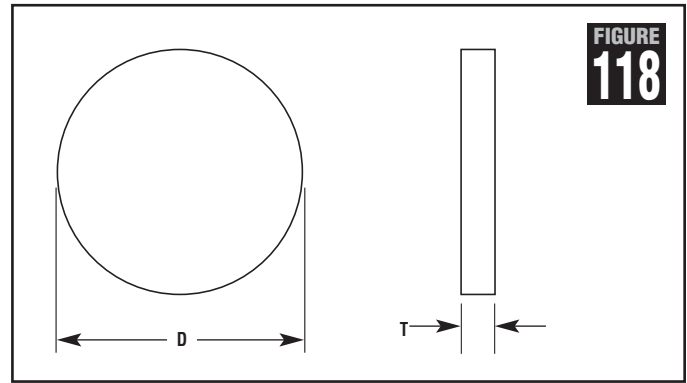
Part Number	Maximum Applied Voltage		Varistor Voltage @ 1mA DC V	Maximum Energy 2mS J	Maximum Clamping Voltage		Peak Current 8/20µS A	Typical Capacitance 1 kHz pF	Maximum Thickness	
	AC <sub>RMS</sub> V	DC V			V <sub>c</sub> V	I <sub>p</sub> A			T±0.0394 Inches	T±1 mm
<b>Z60BD Series - Bare Disc MOVs</b>										
										<b>Figure 116</b>
Z60BD391	250	320	390(351-429)	880	650	500	70000	9000	0.1142	2.9
Z60BD431	275	350	430(387-473)	950	710	500	70000	8500	0.1260	3.2
Z60BD471	300	350	470(423-517)	1000	775	500	70000	7600	0.1339	3.4
Z60BD511	320	415	510(459-561)	1100	845	500	70000	7000	0.1496	3.8
Z60BD621	385	505	620(558-682)	1200	1025	500	70000	6600	0.1811	4.6
Z60BD681	420	560	680(612-748)	1500	1120	500	70000	6200	0.1969	5.0
Z60BD751	460	615	750(675-825)	1650	1240	500	70000	5800	0.2047	5.2
Z60BD781	485	640	780(702-858)	1700	1290	500	70000	5500	0.2165	5.5
Z60BD821	510	670	820(738-902)	1800	1355	500	70000	5000	0.2402	6.1
Z60BD911	550	745	910(819-1001)	1900	1500	500	70000	4500	0.2520	6.4
Z60BD951	575	765	950(855-1045)	2100	1570	500	70000	4200	0.2638	6.7
Z60BD102	625	825	1000(900-1100)	2200	1650	500	70000	4000	0.2913	7.4
Z60BD112	680	895	1100(990-1210)	2300	1815	500	70000	3800	0.3150	8.0
Z60BD122	750	970	1200(1062-1300)	2600	2100	500	70000	3500	0.3701	9.4
Z60BD142	880	1150	1400(1245-1520)	3200	2290	500	70000	3000	0.4213	10.7
Z60BD162	1000	1200	1600(1414-1728)	3200	2700	500	70000	2500	0.4724	12.0
Z60BD182	1100	1400	1800(1620-2060)	3200	3030	500	70000	2200	0.5039	12.8
Z60BD222	1400	1750	2200(2020-2200)	5000	3580	500	70000	1800	0.6299	16.0
Z60BD272	1700	2150	2700(2500-3030)	6000	4400	500	70000	1500	0.7559	19.2
Z60BD332	2000	2500	3300(2970-3300)	7500	5375	500	70000	1200	0.9449	24.0
Z60BD392	2400	3000	3900(3510-4290)	8600	6360	500	70000	1000	1.1220	28.5
Z60BD472	2800	3500	4700(4230-5170)	10000	7665	500	70000	800	1.3465	34.2
<b>Z80BD Series - Bare Disc MOVs</b>										
										<b>Figure 117</b>
Z80BD431	275	350	430(387-473)	1400	710	800	100000	13000	0.1260	3.2
Z80BD471	300	385	470(423-517)	1500	775	800	100000	12000	0.1339	3.4
Z80BD511	320	415	510(459-561)	1600	845	800	100000	11000	0.1496	3.8
Z80BD621	385	505	620(558-682)	2000	1025	800	100000	9000	0.1811	4.6
Z80BD681	420	560	680(612-748)	2200	1120	800	100000	8500	0.1969	5
Z80BD751	460	615	750(675-825)	2500	1240	800	100000	7700	0.2047	5.2
Z80BD781	485	640	780(702-858)	2600	1290	800	100000	7200	0.2165	5.5
Z80BD821	510	670	820(738-902)	2800	1355	800	100000	6900	0.2402	6.1
Z80BD911	550	745	910(819-1001)	3100	1500	800	100000	6500	0.2520	6.4
Z80BD951	575	765	950(855-1045)	3300	1570	800	100000	6200	0.2638	6.7
Z80BD102	625	825	1000(900-1100)	3400	1650	800	100000	5800	0.2913	7.4
Z80BD112	680	895	1100(990-1210)	3600	1815	800	100000	5200	0.3150	8
Z80BD122	750	970	1200(1062-1300)	4000	2100	800	100000	4800	0.3701	9.4
Z80BD142	880	1150	1400(1245-1520)	5000	2290	800	100000	4000	0.4213	10.7
Z80BD162	1000	1200	1600(1414-1728)	6000	2700	800	100000	3200	0.4724	12
Z80BD182	1100	1400	1800(1620-2060)	7000	3030	800	100000	2900	0.5039	12.8

All devices listed are RoHS compliant.





SURGE ARRESTOR DISCS



**Product Features**

- Available in several standard voltages
- Can be put in series to attain required voltage
- Meets IEC standard IEC60099-4
- High surge capability and capacity

**Applications**

- AC transmission or transformation equipment
- Can be enclosed in either porcelain or silicon rubber housing

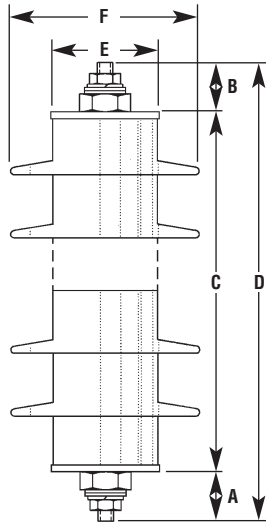
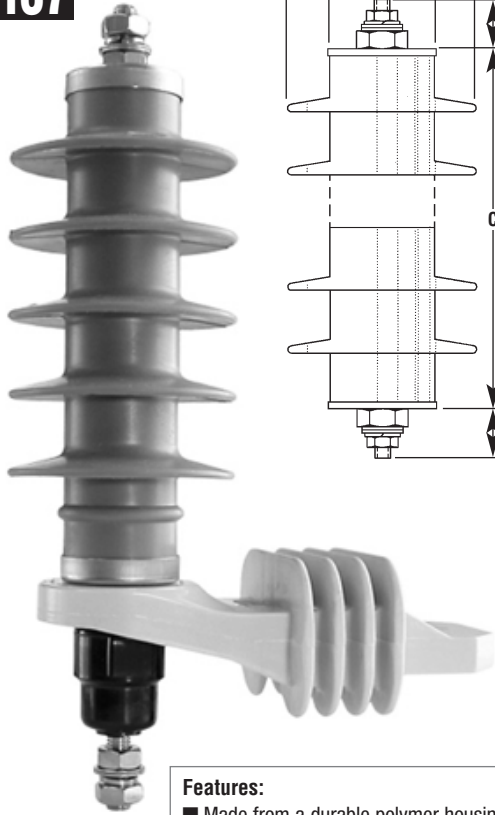
Part Number	Rated Voltage kV	DC Reference Voltage $U_R$ @ 1mA kV	Maximum Residual Voltage Ratio 8/20 $\mu$ S	Current Impulse Withstand Capacity		MCOV kV	$I_R$ $\mu$ A	Dimensions	
				4/10 $\mu$ S kA	2mS A			D mm	T mm
<b>ARD Series - Bare Disc Surge Arrestors</b>									
<b>Figure 118</b>									
ARD32x3	0.28	0.6 - 0.8	1.88 (@5kA)	40	100	0.48	150	32 $\pm$ 1	3 $\pm$ 0.5
ARD32x6	0.50	1.2 - 1.6	1.88 (@5kA)	40	100	0.96	150	32 $\pm$ 1	6 $\pm$ 0.5
ARD32x21	3.00	4.0 - 4.8	1.88 (@5kA)	40	100	3.20	150	31 $\pm$ 1	21 $\pm$ 1
ARD32x31	4.50	6.2 - 7.0	1.88 (@5kA)	40	100	4.96	150	32 $\pm$ 1	31 $\pm$ 1
ARD32x42	6.00	8.4 - 9.2	1.88 (@5kA)	40	100	6.72	150	32 $\pm$ 1	42 $\pm$ 1
ARD35x3	0.28	0.6 - 0.8	1.85 (@5kA)	65	100	0.48	150	35 $\pm$ 1	3 $\pm$ 0.5
ARD35x6	0.50	1.2 - 1.6	1.85 (@5kA)	65	100	0.96	150	35 $\pm$ 1	6 $\pm$ 0.5
ARD35x21	3.00	4.0 - 4.8	1.85 (@5kA)	65	100	3.20	150	35 $\pm$ 1	21 $\pm$ 1
ARD35x31	4.50	6.2 - 7.0	1.85 (@5kA)	65	100	4.96	150	35 $\pm$ 1	31 $\pm$ 1
ARD35x42	6.00	8.4 - 9.2	1.85 (@5kA)	65	100	6.72	150	35 $\pm$ 1	42 $\pm$ 1
ARD40x21	3.00	4.0 - 4.8	1.80@5kA/1.89@10kA	100	200	3.20	160	40.5 $\pm$ 1	21 $\pm$ 1
ARD40x31	4.50	6.2 - 7.0	1.80@5kA/1.89@10kA	100	200	4.96	160	40.5 $\pm$ 1	31 $\pm$ 1
ARD45x21	3.00	4.0 - 4.8	1.75@5kA/1.84@10kA	100	300	3.20	170	45 $\pm$ 1	21 $\pm$ 1
ARD45x31	4.50	6.2 - 7.0	1.75@5kA/1.84@10kA	100	300	4.96	170	45 $\pm$ 1	31 $\pm$ 1
ARD52x21	3.00	4.0 - 4.8	1.72@5kA/1.81@10kA	100	400	6.72	180	52.5 $\pm$ 1	21 $\pm$ 1
ARD52x31	4.50	6.2 - 7.0	1.72@5kA/1.81@10kA	100	400	4.96	180	52.1 $\pm$ 1	31 $\pm$ 1
ARD62x21	3.00	4.0 - 4.8	1.69@5kA/1.78@10kA	100	600	3.20	200	62.5 $\pm$ 1	21 $\pm$ 1
ARD62x31	4.50	6.2 - 7.0	1.69@5kA/1.78@10kA	100	600	4.96	200	62.5 $\pm$ 1	31 $\pm$ 1

Notes:

Metal oxide discs may be used in porcelain or silicon rubber housing to assemble various surge arrestors. Medium may be air, SF6 or equivalent. Metal oxide discs meet all technical requirements of IEC standard IEC600 99-4. All devices listed are RoHS compliant.

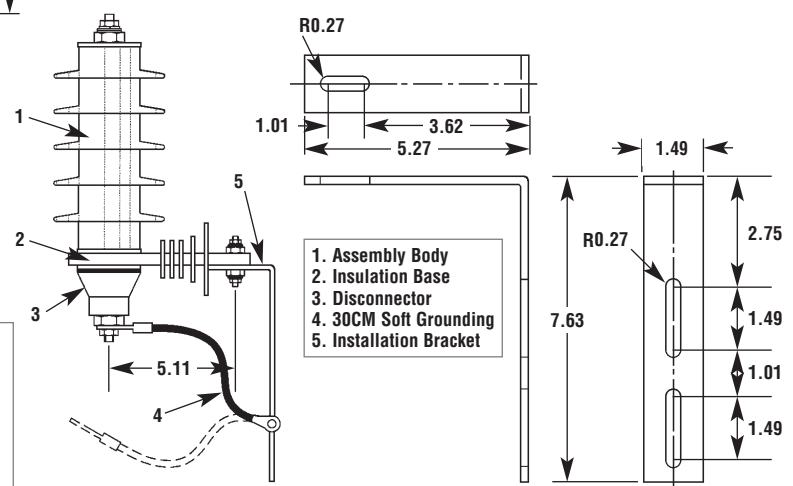


**FIGURE 137**

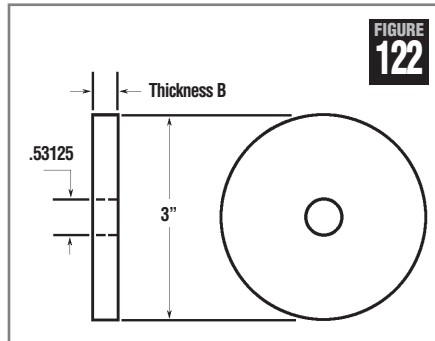
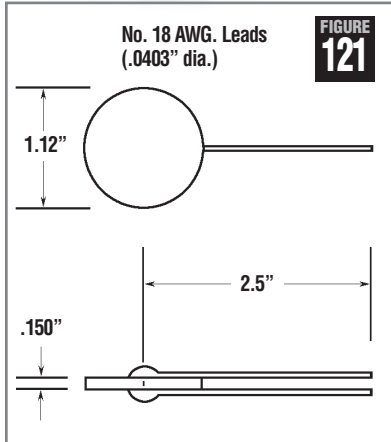
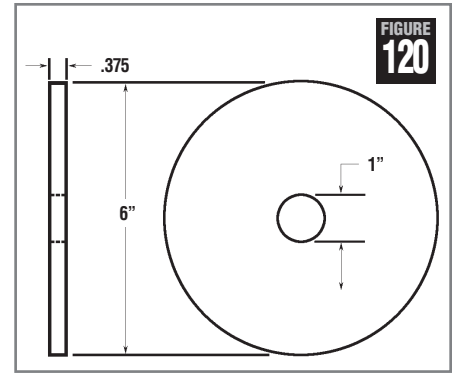
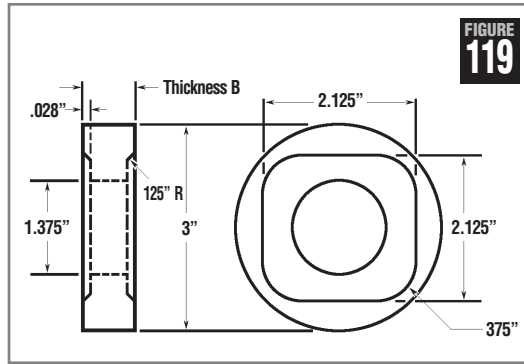


CKE Part Number	Typical Dimensions (in)					
	'A'	'B'	'C'	'D'	'E'	'F'
CKE10W-3/8.5	1.38	1.38	3.15	5.91	2.24	4.06
CKE10W-6/17	1.38	1.38	4.33	7.09	2.24	4.06
CKE10W-9/29	1.38	1.38	5.51	8.27	2.24	4.06
CKE10W-10/33	1.38	1.38	5.51	8.27	2.24	4.06
CKE10W-12/34	1.38	1.38	5.51	8.27	2.24	4.06
CKE10W-15/42.5	1.38	1.38	6.69	9.45	2.24	4.06
CKE10W-18/51	1.38	1.38	7.87	10.63	2.24	4.06
CKE10W-21/59.5	1.38	1.38	9.06	11.81	2.24	4.06
CKE10W-24/68	1.38	1.38	10.24	12.99	2.24	4.06
CKE10W-27/76.5	1.38	1.38	10.24	12.99	2.24	4.06
CKE10W-30/85	1.38	1.38	12.60	15.35	2.24	4.06
CKE10W-33/93.5	1.38	1.38	12.60	15.35	2.24	4.06
CKE10W-36/102	1.38	1.38	13.78	16.54	2.24	4.06

- Features:**
- Made from a durable polymer housing
  - Meets IEC 60099-4 and IEEE C 62.11 standards
  - Available with mounting hardware
  - Most typical voltages are available



Part Number	Maximum Continuous operating $V_{MCOV}$ , kV <sub>RMS</sub>	Rated voltage, VR, kV <sub>RMS</sub>	Rated discharge current kA peak value	Maximum DC reference voltage $V_{1mA}$ , kV	Maximum residual voltage at steep impulse 1/10us, kV	Maximum residual voltage at lightning impulse 8/20us, kV	Maximum residual voltage at switching impulse 30/60us, kV	Withstand capability at current impulse 4/10us, kV	Housing insulation level at lightning impulse, kV	Housing insulation level at power frequency in wet 1 min., kV	Mechanical strength, torsional/cantilever (N.m/N)	Creepage distance, mm
<b>CK10W Series</b>												
CK10W-3/8.5	2.4	3	10	4.3	9.8	8.5	7.2	100	35	15	60/250	160
CK10W-6/17	4.8	6	10	8.6	19.5	17	14.4	100	45	20	60/250	220
CK10W-9/29	7.7	9	10	14.8	33.5	29	25	100	75	30	60/250	290
CK10W-10/33	8.5	10	10	16.4	38	33	28	100	75	30	60/250	290
CK10W-12/34	9.6	12	10	17.2	39.1	34	28.9	100	75	30	60/250	290
CK10W-15/42.5	12	15	10	21.5	48.9	42.5	36	100	75	30	60/250	355
CK10W-18/51	14.4	18	10	25.8	58.5	51	43.3	100	90	40	60/250	420
CK10W-21/59.5	16.8	21	10	30.1	68.3	59.5	50.5	100	105	45	60/250	485
CK10W-24/68	19.2	24	10	34.4	78.2	68	57.8	100	125	50	60/250	545
CK10W-27/76.5	21.6	27	10	38.7	87.8	76.5	65	100	125	50	60/250	550
CK10W-30/85	24	30	10	43	97.8	85	72.2	100	145	60	60/250	675
CK10W-33/93.5	26.4	33	10	47.3	107.5	93.5	79.5	100	145	60	60/250	675
CK10W-36/102	28.8	36	10	51.6	117.3	102	86.7	100	170	70	60/250	740



**Product Features**

**Silicon Carbide Varistor:**

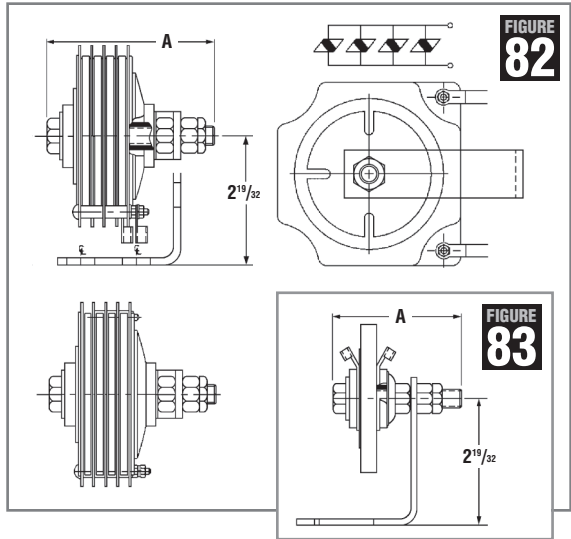
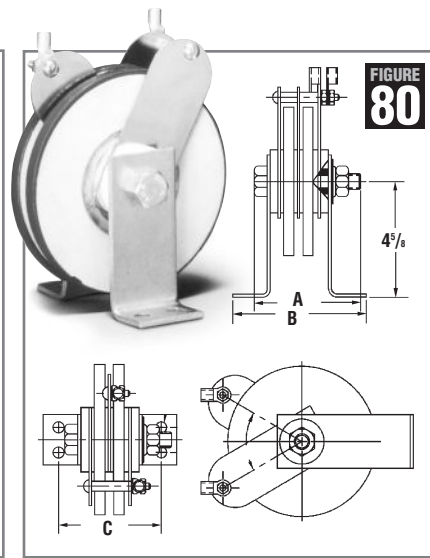
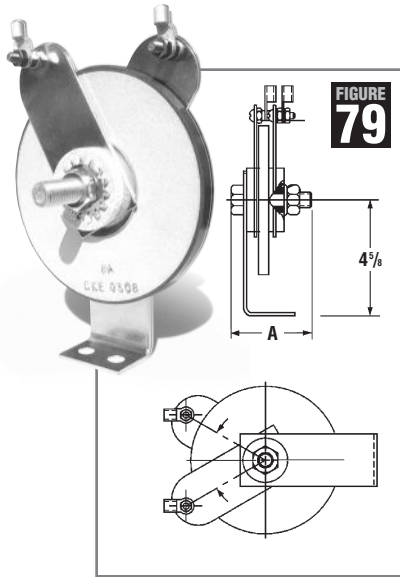
- Capable of handling long pulses, 100-400 milliseconds
- Fast response time 5-10 nanoseconds
- High body temperature operation, continuous 110°C
- Large mass device and consequently high energy

**Applications**

- Discharging lifting magnets
- Exciter field protection
- Insulation protection

Part Number	Maximum Continuous Operating Voltage		Maximum Continuous Power Rating W	Maximum Discharge Capacity J	Maximum Clamping Voltage $V_c @ I_p$		Varistor Voltage DC Test Conditions $V_{MIN} \leq V \leq V_{MAX} @ A$			Figure
	DC V	AC V			$V_c$ V	$I_p$ A	Minimum V	Maximum V	@ Current A	
<b>Silicon Carbide Bare Disc Surge Suppressors</b>										
69W60100	275	250	10.0	22,500	1,200	10	440	660	0.5000	120
68W60200	200	180	10.0	22,500	990	12.5	320	480	0.5000	120
68W60100	150	135	10.0	22,500	780	15	240	360	0.5000	120
71W30100	1500	1350	3.5	9,250	7500	10	1440	2160	0.0025	122
69W30100	300	270	3.0	5,100	1350	1.5	416	624	0.0500	122
68W30100	150	135	3.0	1,700	800	2.5	184	276	0.0500	122
71D10000	300	270	1.5	275	1000	0.25	280	420	0.0050	121
68D10000	150	135	1.5	275	575	0.5	140	210	0.0100	121

All devices listed are RoHS compliant.



Part Number	Max. Continuous DC Operating Voltage <sup>1</sup> V	Maximum Continuous Power Rating W	Maximum Discharge Capacity <sup>2</sup> J	Max. Clamping Voltage V <sub>c</sub> @ I <sub>p</sub>		Number of Discs in Assembly	Dimensions in Inches			Approx. Net Weight lbs	Approx. Shipping Weight lbs	Figure
				V <sub>c</sub> V	I <sub>p</sub> A		A	B	C			
<b>9RV Series - Silicon Carbide Surge Suppressor Assemblies</b>												
9RV3A1	6	3	1,100	10	40	1	2.00	-	-	.75	1.25	83
9RV3A2	6	6	2,200	20	40	2	2.25	-	-	1.50	2.00	82
9RV3A3	6	12	4,400	40	40	4	2.50	-	-	1.50	2.00	82
9RV3A4	12	3	1,350	10	80	1	2.00	-	-	.75	1.50	83
9RV3A5	12	6	2,700	20	80	2	2.25	-	-	1.50	2.00	82
9RV3A6	12	12	5,400	40	80	4	2.50	-	-	1.50	2.00	82
9RV3A7	25	6	2,700	10	160	2	2.25	-	-	.75	1.50	83
9RV3A8	50	3	1,700	5	200	1	2.25	-	-	.75	1.25	83
9RV3A9	50	6	3,400	10	200	2	2.25	-	-	1.50	2.00	82
9RV3A10	50	12	6,800	20	200	4	2.50	-	-	1.50	2.00	82
9RV3A11	100	6	3,400	5	400	2	2.25	-	-	.75	1.50	83
9RV3A12	150	3	5,100	2.5	775	1	2.25	-	-	.75	1.50	83
9RV3A14	300	3	5,100	1.5	1,350	1	2.75	-	-	.75	1.50	83
9RV3A15	600	6	10,200	0.5	2,300	2	3.25	-	-	1.00	1.50	83
9RV3B3	12	6	2,200	10	80	2	2.25	-	-	.75	1.50	83
9RV3B4	15	3	1,350	10	100	1	2.00	-	-	.75	1.50	83
9RV3B5	15	6	2,700	20	100	2	2.25	-	-	1.50	2.00	82
9RV3B6	30	3	1,700	5	150	1	2.25	-	-	.75	1.25	83
9RV3B7	30	6	3,400	10	150	2	1.25	-	-	1.50	2.00	82
9RV3B8	60	3	1,700	5	250	1	2.25	-	-	.75	1.25	83
9RV3B9	60	6	3,400	10	250	2	2.25	-	-	1.50	2.00	82
9RV3B10	60	12	6,800	20	250	4	2.50	-	-	1.50	2.00	82
9RV3B11	100	6	3,400	5	400	2	2.25	-	-	.75	1.50	83
9RV6A1	150	10	22,500	15	780	1	3.44	-	-	2.75	5.25	79
9RV6A2	150	20	45,000	30	780	2	3.94	5.00	3.781	4.50	7.00	80
9RV6A3	150	30	67,500	45	780	3	4.94	5.63	4.407	5.75	8.50	80
9RV6A4	150	40	90,000	60	780	4	5.44	6.25	5.031	7.00	9.50	80
9RV6A5	300	20	45,000	10	1,440	2	4.69	5.75	4.470	4.50	7.00	80
9RV6A6	275	10	22,500	10	1,200	1	3.44	-	-	2.75	5.25	79
9RV6A7	275	20	45,000	20	1,200	2	3.94	5.00	3.781	4.50	7.00	80
9RV6A8	275	30	67,500	30	1,200	3	4.94	5.63	4.410	5.75	8.50	80
9RV6A9	275	40	90,000	40	1,200	4	5.44	6.25	5.031	7.00	9.50	80
9RV6A10	550	20	45,000	5	2,160	2	4.69	5.75	4.470	4.50	7.00	80

**Maximum ratings:**

Continuous body temperature limited to 110°C. Short-term body temperature can reach 150°C.

Notes:

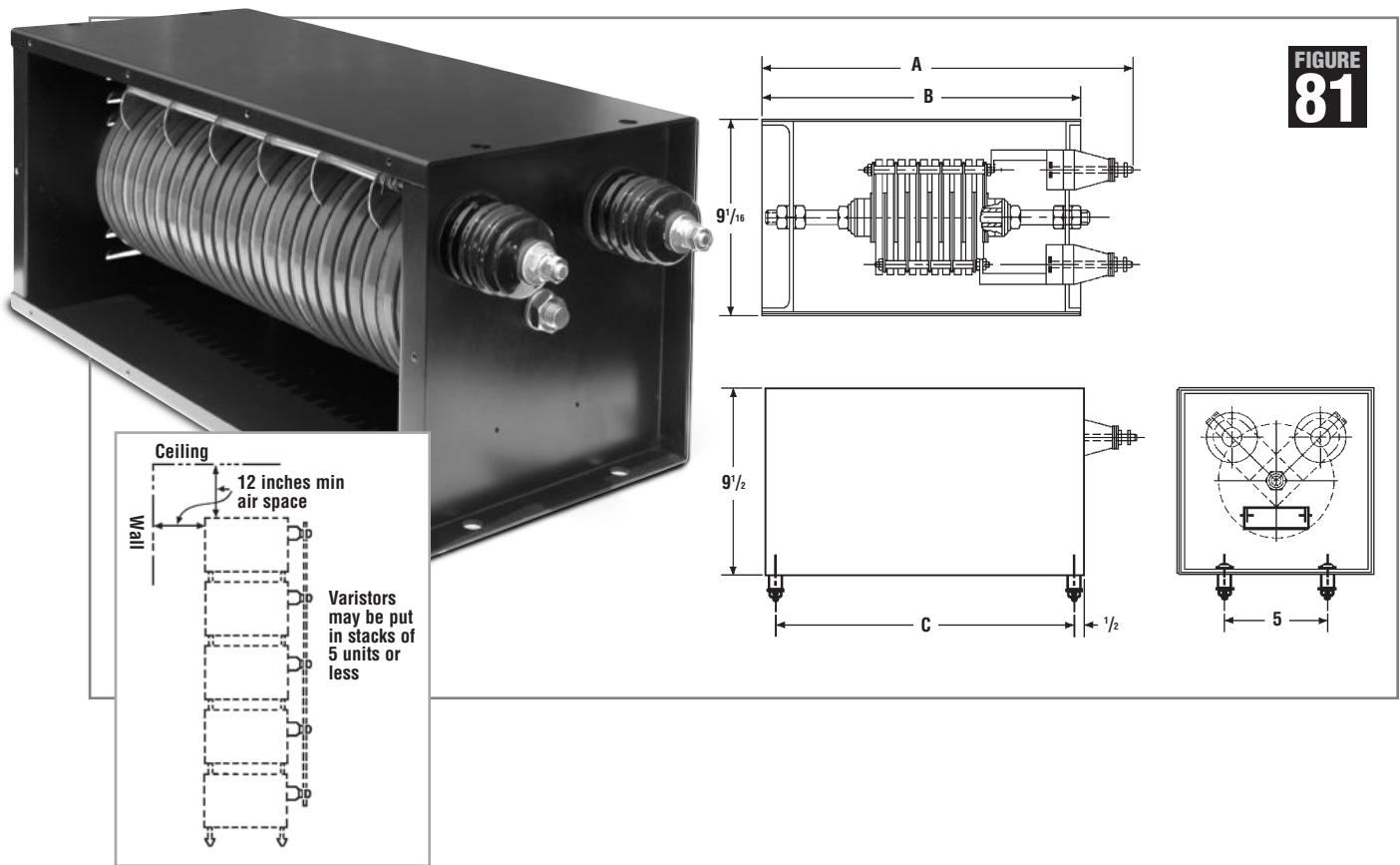
<sup>1</sup> AC voltage rating of approximately 90% of the DC voltage rating may be used.

<sup>2</sup> The Discharge Capacity value should not be exceeded by the energy stored in the magnetic or inductive field (W=1/2LI<sup>2</sup>). A discharge of energy equal to the Discharge Capacity value will result in a temperature rise of approximately 80°C.

Most bracket mounted assemblies are also available for stud mounting. Substitute "C" for "A" in catalog number. All varistors are moisture protected with silicone impregnation. See factory for possible variations. All devices are RoHS Compliant



**FIGURE 81**



Part Number	Max. Continuous DC Operating Voltage V <sup>1</sup>	Maximum Continuous Power Rating W	Maximum Discharge Capacity <sup>2</sup> J	Max. Clamping Voltage V <sub>c</sub> @ I <sub>p</sub>		Number of Discs in Assembly	Dimensions in Inches			Approx. Weight		Figure
				V <sub>c</sub> V	I <sub>p</sub> A		A	B	C	Net lbs	Shipping lbs	
<b>9RV6A Series - Silicon Carbide Surge Suppressor Assemblies</b>												
9RV6A50	150	200	450,000	300	780	20	23.50	21.50	20.50	52	59	81
9RV6A51	200	200	450,000	250	990	20	23.88	21.50	20.50	52	59	81
9RV6A52	275	200	450,000	200	1,200	20	23.88	21.50	20.50	52	59	81
9RV6A53	300	240	540,000	170	1,550	24	23.88	21.50	20.50	57	64	81
9RV6A54	400	240	540,000	140	1,900	24	23.88	21.50	20.50	57	64	81
9RV6A55	550	240	540,000	60	2,160	24	23.88	21.50	20.50	57	64	81
9RV6A60	150	100	225,000	150	780	10	17.75	15.75	14.75	33	40	81
9RV6A61	200	100	225,000	125	990	10	17.75	15.75	14.75	33	40	81
9RV6A62	275	100	225,000	100	1,200	10	17.75	15.75	14.75	33	40	81
9RV6A63	300	120	270,000	135	1,550	12	17.75	15.75	14.75	35	42	81
9RV6A64	400	120	270,000	70	1,900	12	17.75	15.75	14.75	35	42	81
9RV6A65	550	120	270,000	30	2,160	12	17.75	15.75	14.75	35	42	81

**Maximum Ratings:**

Continuous body temperature limited to 110°C. Short-term body temperature can reach 150°C.

**Notes:**

<sup>1</sup> AC voltage rating of approximately 90% of the DC voltage rating may be used.

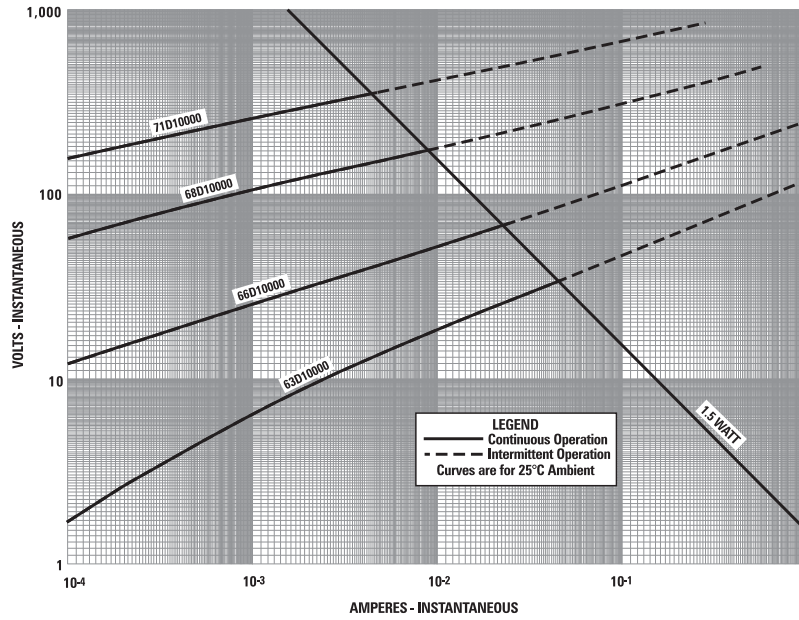
<sup>2</sup> The Discharge Capacity value should not be exceeded by the energy stored in the magnetic or inductive field (W=1/2LI<sup>2</sup>). A discharge of energy equal to the Discharge Capacity value will result in a temperature rise of approximately 80°C.

Most bracket mounted assemblies are also available for stud mounting. Substitute "C" for "A" in catalog number. All varistors are moisture protected with silicone impregnation. See factory for possible variations.

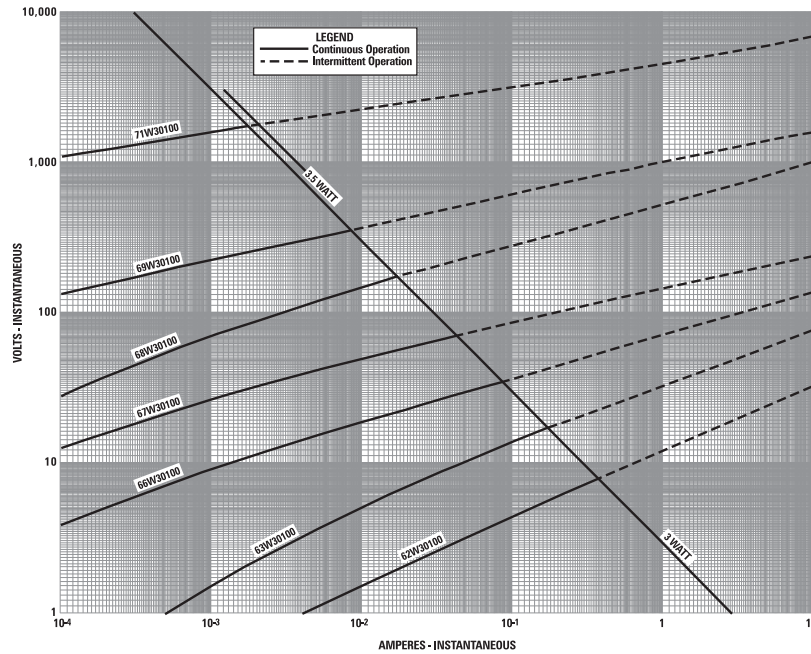
All devices are RoHS Compliant



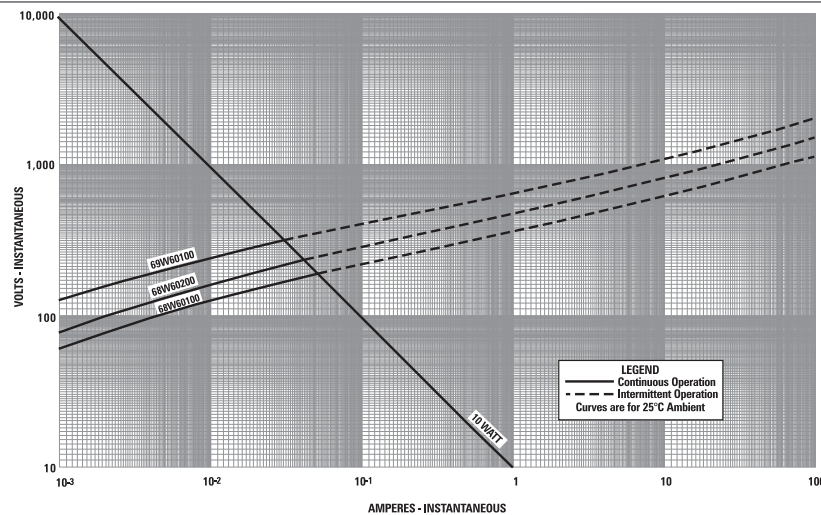
1.12" Varistor Nominal Volt-Ampere Characteristics

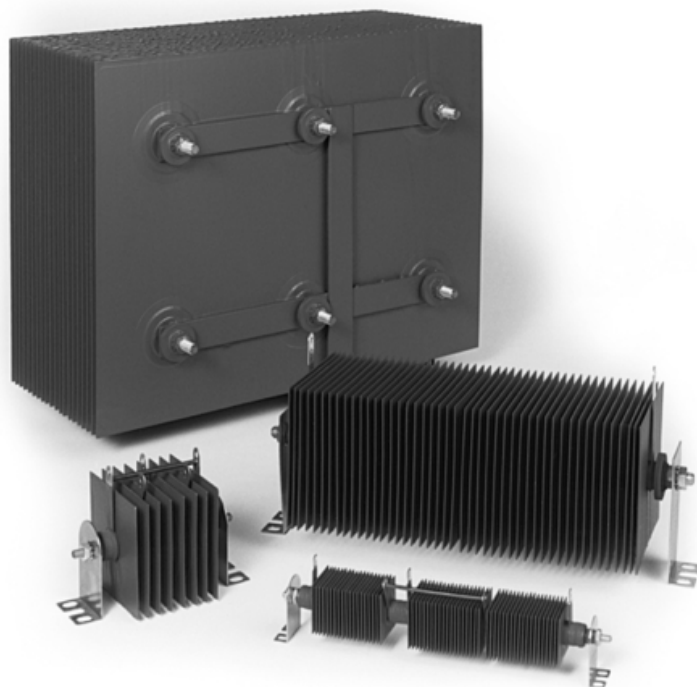


3" Varistor Nominal Volt-Ampere Characteristics



6" Varistor Nominal Volt-Ampere Characteristics





Part Number	Maximum DC Voltage	Maximum Clamping Voltage	Fig.	Dim. A (inches)	Thread size
<b>Series A – 1" x 1"</b>					
SD1543-4	90	240	67	1.0625	8-32
SD1543-5	112	300	67	1.1875	8-32
SD1543-6	135	360	67	1.3125	8-32
SD1543-7	157	420	67	1.3750	8-32
SD1543-8	180	480	67	1.5000	8-32
SD1543-9	202	540	67	1.5625	8-32
SD1543-10	225	600	67	1.6875	8-32
SD1543-11	247	660	67	1.8125	8-32
SD1543-12	270	720	67	1.8750	8-32
SD1543-13	292	780	67	2.0000	8-32
SD1543-14	315	840	67	2.0625	8-32
SD1543-15	337	900	67	2.1875	8-32
SD1543-16	360	960	67	2.3125	8-32
SD1551-17	382	1020	68	2.6250	8-32
SD1551-18	405	1080	68	2.7500	8-32
SD1551-19	427	1140	68	2.8750	8-32
SD1551-20	450	1200	68	2.9375	8-32
SD1551-21	472	1260	68	3.0625	8-32
SD1551-22	495	1320	68	3.1875	8-32
SD1551-23	517	1380	68	3.3125	8-32
SD1551-24	540	1440	68	3.3750	8-32
SD1551-25	562	1500	68	3.5000	8-32
SD1551-26	585	1560	68	3.5625	8-32
SD1551-27	607	1620	68	3.6875	8-32
SD1551-28	630	1680	68	3.8125	8-32
SD1551-29	652	1720	68	3.8750	8-32
SD1551-30	675	1800	68	4.0000	8-32

Peak discharge current - 3 Amps



Part Number	Maximum DC Voltage	Maximum Clamping Voltage	Fig.	Dim. A (inches)	Thread size
<b>Series C – 1 1/2" x 1 1/2"</b>					
SD3066-4	90	240	67	1.0625	8-32
SD3066-5	112	300	67	1.1875	8-32
SD3066-6	135	360	67	1.3125	8-32
SD3066-7	157	420	67	1.3750	8-32
SD3066-8	180	480	67	1.5000	8-32
SD3066-9	202	540	67	1.5625	8-32
SD3066-10	225	600	67	1.6875	8-32
SD3066-11	247	660	67	1.8125	8-32
SD3066-12	270	720	67	1.8750	8-32
SD3066-13	292	780	67	2.0000	8-32
SD3066-14	315	840	67	2.0625	8-32
SD3066-15	337	900	67	2.1875	8-32
SD3066-16	360	960	67	2.3125	8-32
SD3066-17	382	1020	68	2.6250	8-32
SD3066-18	405	1080	68	2.7500	8-32
SD3066-19	427	1140	68	2.8750	8-32
SD3066-20	450	1200	68	2.9375	8-32
SD3066-21	472	1260	68	3.0625	8-32
SD3066-22	495	1320	68	3.1875	8-32
SD3066-23	517	1380	68	3.3125	8-32
SD3066-24	540	1440	68	3.3750	8-32
SD3066-25	562	1500	68	3.5000	8-32
SD3066-26	585	1560	68	3.5625	8-32
SD3066-27	607	1620	68	3.6875	8-32
SD3066-28	630	1680	68	3.8125	8-32
SD3066-29	652	1720	68	3.8750	8-32
SD3066-30	675	1800	68	4.0000	8-32

Peak discharge current - 9 Amps



Part Number	Maximum DC Voltage	Maximum Clamping Voltage	Fig.	Dim. A (inches)	Thread size
<b>Series E – 2" x 2"</b>					
SD2619-4	90	240	67	1.8750	1/4-20
SD2619-5	112	300	67	2.1250	1/4-20
SD2619-6	135	360	67	2.3750	1/4-20
SD2619-7	157	420	67	2.6250	1/4-20
SD2619-8	180	480	67	2.8750	1/4-20
SD2107-9	202	540	68	3.0000	1/4-20
SD2107-10	225	600	68	3.2500	1/4-20
SD2107-11	247	660	68	3.5000	1/4-20
SD2107-12	270	720	68	3.6875	1/4-20
SD2107-13	292	780	68	3.8750	1/4-20
SD2107-14	315	840	68	4.1250	1/4-20
SD2107-15	337	900	68	4.3750	1/4-20
SD2107-16	360	960	68	4.5625	1/4-20
SD2107-17	382	1020	68	4.8125	1/4-20
SD2107-18	405	1080	68	5.0000	1/4-20
SD2107-19	427	1140	68	5.2500	1/4-20
SD2107-20	450	1200	68	5.5625	1/4-20
SD2107-21	472	1260	68	5.7500	1/4-20
SD2107-22	495	1320	68	6.0000	1/4-20
SD2107-23	517	1380	68	6.1875	1/4-20
SD2107-24	540	1440	68	6.3750	1/4-20
SD2107-25	562	1500	68	6.6250	1/4-20
SD2107-26	585	1560	68	6.8750	1/4-20
SD2107-27	607	1620	68	7.0625	1/4-20
SD2107-28	630	1680	68	7.2500	1/4-20
SD2107-29	652	1720	68	7.5000	1/4-20
SD2107-30	675	1800	68	7.7500	1/4-20

Peak discharge current - 15 Amps



**Nonpolarized versions available. Please consult factory.**

Replacement Selenium Rectifiers are available on special order. Consult factory [www.deantechnology.com](http://www.deantechnology.com)  
Available earlier by special request, contact factory or sales rep for availability.



Part Number	Maximum DC Voltage	Maximum Clamping Voltage	Fig.	Dim. A (inches)	Thread size
<b>Series K – 3" x 3"</b>					
SD1622-4	90	240	67	2.5000	3/8-16
SD1623-5	112	300	68	2.8750	3/8-16
SD1623-6	135	360	68	3.2500	3/8-16
SD1623-7	157	420	68	3.5000	3/8-16
SD1623-8	180	480	68	3.9375	3/8-16
SD1623-9	202	540	68	4.2500	3/8-16
SD1623-10	225	600	68	4.6250	3/8-16
SD1623-11	247	660	68	5.0000	3/8-16
SD1623-12	270	720	68	5.3125	3/8-16
SD1623-13	292	780	68	5.6875	3/8-16
SD1623-14	315	840	68	6.0000	3/8-16
SD1623-15	337	900	68	6.3750	3/8-16
SD1623-16	360	960	68	6.6875	3/8-16
SD1623-17	382	1020	68	7.0000	3/8-16
SD1623-18	405	1080	68	7.3750	3/8-16
SD1623-19	427	1140	68	7.7500	3/8-16
SD1623-20	450	1200	68	8.0625	3/8-16
SD1623-21	472	1260	68	8.4375	3/8-16
SD1623-22	495	1320	68	8.7500	3/8-16
SD1623-23	517	1380	68	9.1250	3/8-16
SD1623-24	540	1440	68	9.5000	3/8-16
SD1623-25	562	1500	68	9.8750	3/8-16
SD1623-26	585	1560	68	10.1875	3/8-16
SD1623-27	607	1620	68	10.5000	3/8-16
SD1623-28	630	1680	68	10.8750	3/8-16
SD1623-29	652	1720	68	11.2500	3/8-16
SD1623-30	675	1800	68	11.6250	3/8-16

Peak discharge current - 37 Amps



Part Number	Maximum DC Voltage	Maximum Clamping Voltage	Fig.	Dim. A (inches)	Thread size
<b>Series S – 5" x 6"</b>					
SD1772-4	90	240	67	2.8750	3/8-16
SD1772-5	112	300	68	3.2500	3/8-16
SD1772-6	135	360	68	3.6250	3/8-16
SD1772-7	157	420	68	4.1250	3/8-16
SD1772-8	180	480	68	4.5000	3/8-16
SD1772-9	202	540	68	4.8750	3/8-16
SD1772-10	225	600	68	5.3750	3/8-16
SD1772-11	247	660	68	5.7500	3/8-16
SD1772-12	270	720	68	6.1250	3/8-16
SD1772-13	292	780	68	6.6250	3/8-16
SD1772-14	315	840	68	7.0000	3/8-16
SD1772-15	337	900	68	7.3750	3/8-16
SD1772-16	360	960	68	7.7500	3/8-16
SD1772-17	382	1020	68	8.2500	3/8-16
SD1772-18	405	1080	68	8.6250	3/8-16
SD1772-19	427	1140	68	9.0000	3/8-16
SD1772-20	450	1200	68	9.5000	3/8-16
SD1772-21	472	1260	68	9.8750	3/8-16
SD1772-22	495	1320	68	10.2500	3/8-16
SD1772-23	517	1380	68	10.6250	3/8-16
SD1772-24	540	1440	68	11.0000	3/8-16
SD1772-25	562	1500	68	11.5000	3/8-16
SD1772-26	585	1560	68	11.8750	3/8-16
SD1772-27	607	1620	68	12.2500	3/8-16
SD1772-28	630	1680	68	12.7500	3/8-16
SD1772-29	652	1720	68	13.1250	3/8-16
SD1772-30	675	1800	68	13.5000	3/8-16

Peak discharge current - amperes 130



Part Number	Maximum DC Voltage	Maximum Clamping Voltage	Fig.	Dim. A (inches)	Thread size
<b>Series M – 4" x 4"</b>					
SD1598-4	90	240	67	2.6875	3/8-16
SD1599-5	112	300	68	3.1875	3/8-16
SD1599-6	135	360	68	3.5625	3/8-16
SD1599-7	157	420	68	4.0000	3/8-16
SD1599-8	180	480	68	4.3750	3/8-16
SD1599-9	202	540	68	4.8125	3/8-16
SD1599-10	225	600	68	5.2500	3/8-16
SD1599-11	247	660	68	5.6250	3/8-16
SD1599-12	270	720	68	6.0625	3/8-16
SD1599-13	292	780	68	6.5000	3/8-16
SD1599-14	315	840	68	6.9375	3/8-16
SD1599-15	337	900	68	7.3750	3/8-16
SD1599-16	360	960	68	7.8125	3/8-16
SD1599-17	382	1020	68	8.2500	3/8-16
SD1599-18	405	1080	68	8.6250	3/8-16
SD1599-19	427	1140	68	9.0625	3/8-16
SD1599-20	450	1200	68	9.4375	3/8-16
SD1599-21	472	1260	68	9.8750	3/8-16
SD1599-22	495	1320	68	10.3125	3/8-16
SD1599-23	517	1380	68	10.6250	3/8-16
SD1599-24	540	1440	68	11.0000	3/8-16
SD1599-25	562	1500	68	11.4375	3/8-16
SD1599-26	585	1560	68	11.8750	3/8-16
SD1599-27	607	1620	68	12.2500	3/8-16
SD1599-28	630	1680	68	12.6250	3/8-16
SD1599-29	652	1720	68	13.0625	3/8-16
SD1599-30	675	1800	68	13.5000	3/8-16

Peak discharge current - 70 Amps



Part Number	Maximum DC Voltage	Maximum Clamping Voltage	Fig.	Dim. A (inches)	Thread size
<b>Series N – 6" x 7 1/4"</b>					
SD2482-4	90	240	67	2.8750	3/8-16
SD2482-5	112	300	68	3.2500	3/8-16
SD2482-6	135	360	68	3.6250	3/8-16
SD2482-7	157	420	68	4.1250	3/8-16
SD2482-8	180	480	68	4.5000	3/8-16
SD2482-9	202	540	68	4.8750	3/8-16
SD2482-10	225	600	68	5.3750	3/8-16
SD2482-11	247	660	68	5.7500	3/8-16
SD2482-12	270	720	68	6.1250	3/8-16
SD2482-13	292	780	68	6.6250	3/8-16
SD2482-14	315	840	68	7.0000	3/8-16
SD2482-15	337	900	68	7.3750	3/8-16
SD2482-16	360	960	68	7.7500	3/8-16
SD2482-17	382	1020	68	8.2500	3/8-16
SD2482-18	405	1080	68	8.6250	3/8-16
SD2482-19	427	1140	68	9.0000	3/8-16
SD2482-20	450	1200	68	9.5000	3/8-16
SD2482-21	472	1260	68	9.8750	3/8-16
SD2482-22	495	1320	68	10.2500	3/8-16
SD2482-23	517	1380	68	10.6250	3/8-16
SD2482-24	540	1440	68	11.0000	3/8-16
SD2482-25	562	1500	68	11.5000	3/8-16
SD2482-26	585	1560	68	11.8750	3/8-16
SD2482-27	607	1620	68	12.2500	3/8-16
SD2482-28	630	1680	68	12.7500	3/8-16
SD2482-29	652	1720	68	13.1250	3/8-16
SD2482-30	675	1800	68	13.5000	3/8-16

Peak discharge current - 200 Amps



Nonpolarized versions available. Please consult factory.

Replacement Selenium Rectifiers are available on special order. Consult factory [www.deantechnology.com](http://www.deantechnology.com)  
Available earlier by special request, contact factory or sales rep for availability.



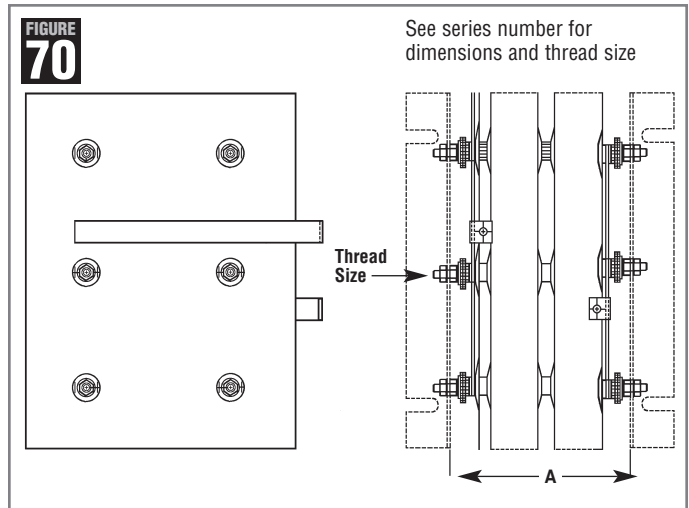
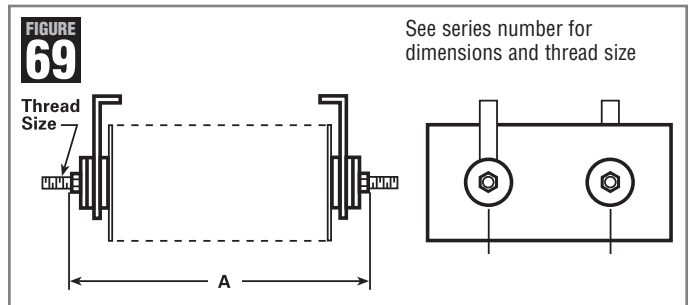
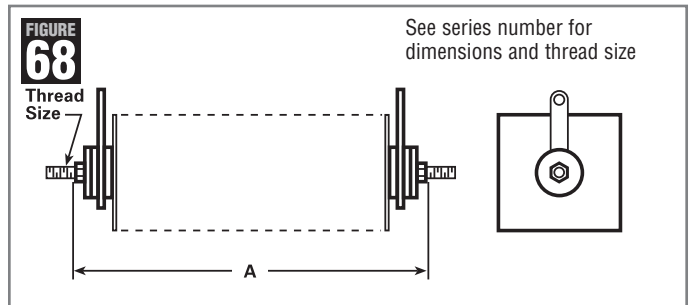
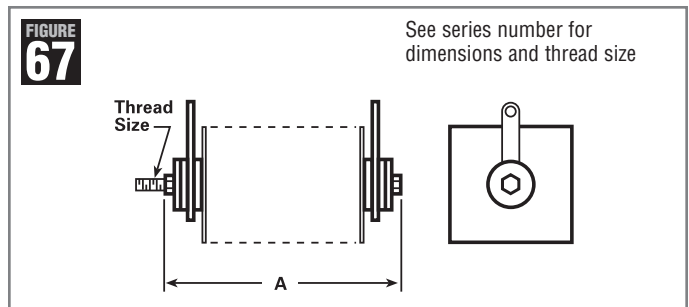


Part Number	Maximum DC Voltage	Maximum Clamping Voltage	Fig.	Dim. A (inches)	Thread size
<b>Series V – 6" x 10"</b>					
SD2399-4	90	240	69	2.8750	3/8-16
SD2399-5	112	300	69	3.2500	3/8-16
SD2399-6	135	360	69	3.6250	3/8-16
SD2399-7	157	420	69	4.1250	3/8-16
SD2399-8	180	480	69	4.5000	3/8-16
SD2399-9	202	540	69	4.8750	3/8-16
SD2399-10	225	600	69	5.3750	3/8-16
SD2399-11	247	660	69	5.7500	3/8-16
SD2399-12	270	720	69	6.1250	3/8-16
SD2399-13	292	780	69	6.6250	3/8-16
SD2399-14	315	840	69	7.0000	3/8-16
SD2399-15	337	900	69	7.3750	3/8-16
SD2399-16	360	960	69	7.7500	3/8-16
SD2399-17	382	1020	69	8.2500	3/8-16
SD2399-18	405	1080	69	8.6250	3/8-16
SD2399-19	427	1140	69	9.0000	3/8-16
SD2399-20	450	1200	69	9.5000	3/8-16
SD2399-21	472	1260	69	9.8750	3/8-16
SD2399-22	495	1320	69	10.2500	3/8-16
SD2399-23	517	1380	69	10.6250	3/8-16
SD2399-24	540	1440	69	11.0000	3/8-16
SD2399-25	562	1500	69	11.5000	3/8-16
SD2399-26	585	1560	69	11.8750	3/8-16
SD2399-27	607	1620	69	12.2500	3/8-16
SD2399-28	630	1680	69	12.7500	3/8-16
SD2399-29	652	1720	69	13.1250	3/8-16
SD2399-30	675	1800	69	13.5000	3/8-16

Peak discharge current - 270 Amps

<b>Series X – 12" x 16"</b>					
SD4359-4	90	240	70	3.0000	3/8-16
SD4359-5	112	300	70	3.3750	3/8-16
SD4359-6	135	360	70	3.7500	3/8-16
SD4359-7	157	420	70	4.0000	3/8-16
SD4359-8	180	480	70	4.3750	3/8-16
SD4359-9	202	540	70	4.7500	3/8-16
SD4359-10	225	600	70	5.1250	3/8-16
SD4359-11	247	660	70	5.5000	3/8-16
SD4359-12	270	720	70	5.7500	3/8-16
SD4359-13	292	780	70	6.1250	3/8-16
SD4359-14	315	840	70	6.5000	3/8-16
SD4359-15	337	900	70	6.8750	3/8-16
SD4359-16	360	960	70	7.2500	3/8-16
SD4359-17	382	1020	70	7.6250	3/8-16
SD4359-18	405	1080	70	8.0000	3/8-16
SD4359-19	427	1140	70	8.2500	3/8-16
SD4359-20	450	1200	70	8.6250	3/8-16
SD4359-21	472	1260	70	9.0000	3/8-16
SD4359-22	495	1320	70	9.3750	3/8-16
SD4359-23	517	1380	70	9.7500	3/8-16
SD4359-24	540	1440	70	10.0000	3/8-16
SD4359-25	562	1500	69	10.3750	3/8-16
SD4359-26	585	1560	69	10.7500	3/8-16
SD4359-27	607	1620	69	12.0000	3/8-16
SD4359-28	630	1680	69	12.3750	3/8-16
SD4359-29	652	1740	69	12.7500	3/8-16
SD4359-30	675	1800	69	13.8750	3/8-16

Peak discharge current - amperes 904



Nonpolarized versions available. Please consult factory.

Replacement Selenium Rectifiers are available on special order. Consult factory [www.deantechnology.com](http://www.deantechnology.com)  
 Available earlier by special request, contact factory or sales rep for availability.



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**For additional information or questions regarding the products in this catalog,  
please contact Dean Technology, Inc. at phone 972.248.7691 or fax 972.381.9998**

*Dean Technology, Inc. (DTI) reserves the right to change these specifications at any time and without notice in order to supply the best product possible.*



# Selenium Suppressors Outperform MOV Cousins

By Rajendranath K. Maharaj, CKE, Lucernemines, PA

Used as semiconductor in rectifiers and suppressors for many years, selenium occurs naturally on the earth. Its popularity as a rectifier is fading in favor of its silicon equivalent. However, demand for selenium suppressors continues.

Depositing the elements on a metal substrate's surface produces selenium cells. This provides the cells with good thermal mass and energy dissipation as well as "self-healing" characteristics, allowing the device to survive energy discharges in excess of the rated value. Selenium's crystalline structure gives it the ability to continue functioning after a burst of energy in excess of its short pulse width rating. Its suppressor operation is comparable to a pressure relief valve—when the pressure rises, the relief valve opens, releases the pressure, and then resets itself.

Because of its unique properties, the selenium suppressor remains viable in many applications. Special clamping capabilities enable the selenium suppressor to find its own niche as transient voltage suppressor. Because of its ability to continuously dissipate power and handle long surges, it's better than MOVs or silicon suppressors for some applications.

The selenium suppressor can absorb energy levels in excess of its rated capability while maintaining its clamping characteristics on the next cycle. The layering of the suppressor onto the aluminum plate allows the suppressor's energy capabilities to follow that of a heat sink curve. This heat sink capability allows steady-state power dissipation up to 40 times that of an MOV. For a 130V suppressor, the selenium product allows steady-state dissipation of 2.5W to 80W, compared with an MOV that allows only 0.1W to 2.5W. The photo shows several selenium cells.

Manufacturers produce selenium suppressor cell plates in sizes varying from 1 in. x 1 in. to 12 in. x 16 in. that can function at a temperature of 0°C to 55°C ambient without any derating. The voltage of a selenium suppressor cell starts at 26V<sub>rms</sub> or 22.5Vdc per cell plate. Users must keep the suppressor to 75V maximum due to the dielectric ceiling of the cell. The capacitive nature of the plate allows placement in series to attain higher voltage levels.

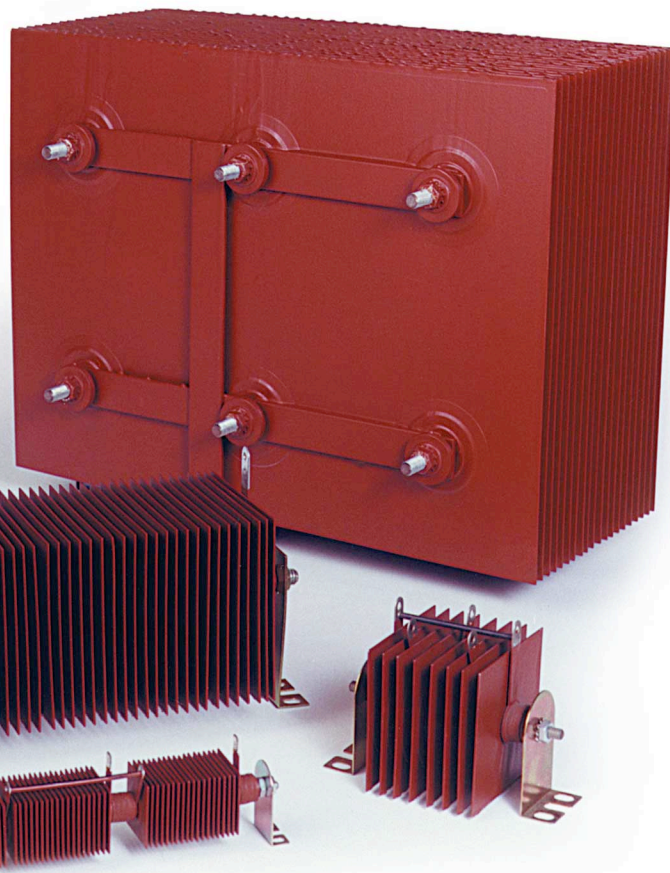
Other suppressors can handle high current, short pulse widths in the microsecond range, but the selenium suppressor can handle milli-second pulse width currents, making it a more robust suppressor than silicon devices. It has a typical response time of less than 1 ms and is capable of handling pulses with long decay times as seen in large DC motors or any inductive loads with L/R ratios in the 100 ms range.

Power conditioning systems, generators, and AC controllers are typical selenium suppressor applications. Suppressor applications are specifically used on the DC side of a rectified generator output, across SCRs on large controllers, across DC motors, and on transformers for line-to-line transient suppression.

Typical applications for selenium suppressors include:

- On the DC side of a rectified generator output.
- Across the SCRs on large controllers.
- Across DC motors.
- On transformers (for line-to-line suppression)
- Power conditioning (i.e. from power strips to service entrance).

For some devices, an MOV or a TVSS is better suited, and for others, a combination of suppressors is best. However, to the surprise of many electrical engineers, the capabilities unique to the selenium suppressor have enabled it to retain a firm place in today's market.



**For more information on the full line of CKE polarized and non-polarized selenium suppressors from 1" x 1" through 12" x 16", visit our web site at [www.deantechnology.com](http://www.deantechnology.com)**

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