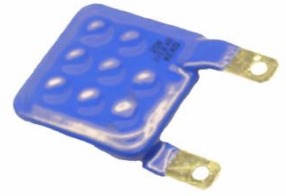


## Description:

ZOV Series of varistors are square shaped components that feature a wide range of surge current and energy absorption capabilities over an operating voltage range from 60 to 680 Vrms. There are two versions of these varistors.

The standard version is available in 5 model sizes from 23 mm to 60 mm, with single-pulse (8/20 us) surge capabilities ranging from 15 kA to 80 kA. Offered in both block format and rigid leaded construction, these varistors provide excellent protection against high-energy transients such as inductively coupled lightning strikes, line switching load surges, and other transient events where large amounts on current are present.



The second version features a broad range of custom parameters to meet specific over-voltage protection requirements. Customers are given the opportunity to design the optimum varistor with minimum dimensions to satisfy a custom TVS application. Available customized parameters are: non-standard AC / DC operating voltages, maximum surge current, maximum dissipation power and the varistors shape, the dimensions being a function of required electrical parameters and vice-versa.

Both groups are offered in two versions: epoxy coated with rigid terminals and metalized varistor blocks. The first version is designed to provide secondary surge protection in outdoor and service entrance environments (distribution panels), in computers and in industrial applications for motor controls and power supplies for equipment in oil-drilling, mining and transportation. The second version is intended for applications with special contact or installation requirements. The electrode finish of these devices is solderable and can also be used with pressure contacts for stacking applications.

## Features:

### Standard Varistor Types

- AC operating voltage (Vrms) from 60 V to 680 V
- DC operating voltage (Vdc) from 85 V to 895 V
- Available either as epoxy coated varistors with rigid terminals or as metalized varistor blocks
- Broad range of current and energy handling capabilities
- Low limiting voltage @ Ip/2
- + 85°C continuous operating temperature
- 5 model sizes available 23, 25, 32, 40 and 60 mm
- In-house testing according to VDE 0675
- UL1449, 3<sup>rd</sup> Ed. and CSA C22.2 certified
- RoHS compliant, lead-free and halogen-free

### Full Custom Parameter Design Varistors

- AC operating voltage range (Vrms) from 60 V to 680 V
- DC operating voltage (Vdc) from 85 V to 895 V
- Indefinite number of sizes of both square and rectangular shape, the maximum one being 45 x 90mm
- Broad range of current and energy handling capabilities
- +85 °C continuous operating temperature
- Available customized parameters are AC / DC operating voltage, leakage current, clamping voltage, maximum surge current, energy absorption level, maximum dissipation power and threshold voltage temperature coefficient
- Available either as epoxy coated varistors with rigid terminals or as metalized varistor blocks

## General Technical Data

Item	Standard Values	Custom Designed Values
Climatic Category	40 / 85 / 56	40 / 85 / 56
Operating Temperature	-40°C to +85°C	-40°C to +85°C
Storage Temperature Range	-40°C to +125°C	-40°C to +125°C
Threshold Voltage Temperature	< +0.05% / °C	< +0.05% / °C
Isolation Voltage Capability	> 2.5kV	> 2.5kV
Response Time	< 25 nS	< 25 nS
Insulation Resistance	> 1 Gohm	> 1 Gohm

## Mechanical Specifications



Metallised Varistor Block				Epoxy Coated Varistor Block				
Size	L <sub>MAX</sub>	Le <sub>MAX</sub>	Unit	Size	D <sub>MAX</sub>	R	H <sub>MAX</sub>	Unit
23	23.00	18.00	mm	23	25.00	18.50 ± 1.00	43.00	mm
25	23.00	20.00	mm	25	25.00	18.50 ± 1.00	43.00	mm
32	30.00	28.00	mm	32	35.00	25.40 ± 1.00	53.00	mm
40	34.00	31.00	mm	40	36.50	25.40 ± 1.00	56.00	mm
60	43.00	39.00	mm	60	48.00	25.40 ± 1.00	66.00	mm

## Standard Packaging Options

Series	Voltage Range	Varistor Sizes	Varistor Configuration Options (Available on All Sizes)
ZOV	60 - 680	23	Epoxy coated with rigid terminals Metalized varistor blocks
	60 - 680	25	
	60 - 680	32	
	60 - 680	40	
	130 - 680	60	

ZOVs will be packaged in resilient polystyrene plastic containers. The quantity per container will depend upon voltage, size and configuration. Quantities generally range between 50 and 100 pieces per box, contact Stackpole for exact count.

## Device Ratings and Dimensions

Part Number	V <sub>RMS</sub> (volts)	V <sub>DC</sub> (volts)	V <sub>N</sub> (@ 1 Ma) (volts)	V <sub>C</sub> (@ IC) (volts)	I <sub>C</sub> (8/20 uSec) (amps)	W <sub>MAX</sub> (10/1000 μs) (joules)	P <sub>MAX</sub> (watts)	I <sub>MAX</sub> (8/20 uSec) (amps)	C (@ 1 kHz) (pF)	t <sub>MAX</sub> (mm)	T <sub>MAX</sub> (mm)
ZOV60K23	60	85	100	165	100	90	1.0	18000	3850	1.0	7.7
ZOV60K25	60	85	100	165	150	125	1.0	20000	4850	1.0	7.7
ZOV60K32	60	85	100	165	200	250	1.2	30000	9700	1.0	7.7
ZOV60K40	60	85	100	165	300	300	1.4	45000	12000	1.0	7.7
ZOV75K23	75	100	120	200	100	100	1.0	18000	3500	1.1	7.9
ZOV75K25	75	100	120	200	150	145	1.0	20000	4500	1.1	7.9
ZOV75K32	75	100	120	200	200	280	1.2	30000	8900	1.1	7.9
ZOV75K40	75	100	120	200	300	340	1.4	45000	11000	1.1	7.9
ZOV95K23	95	125	150	250	100	135	1.0	18000	2950	1.3	8.1
ZOV95K25	95	125	150	250	150	190	1.0	20000	3680	1.3	8.1
ZOV95K32	95	125	150	250	200	380	1.2	30000	7470	1.3	8.1
ZOV95K40	95	125	150	250	300	450	1.4	45000	9200	1.3	8.1
ZOV130K23	130	170	205	340	100	180	1.0	18000	2310	1.5	8.1
ZOV130K25	130	170	205	340	150	250	1.0	20000	2900	1.5	8.1
ZOV130K32	130	170	205	340	200	500	1.2	30000	5780	1.5	8.1
ZOV130K40	130	170	205	340	300	600	1.4	45000	7200	1.5	8.1
ZOV130K60	130	170	205	340	500	960	1.6	80000	11520	1.5	8.1

**Device Ratings and Dimensions (cont.)**

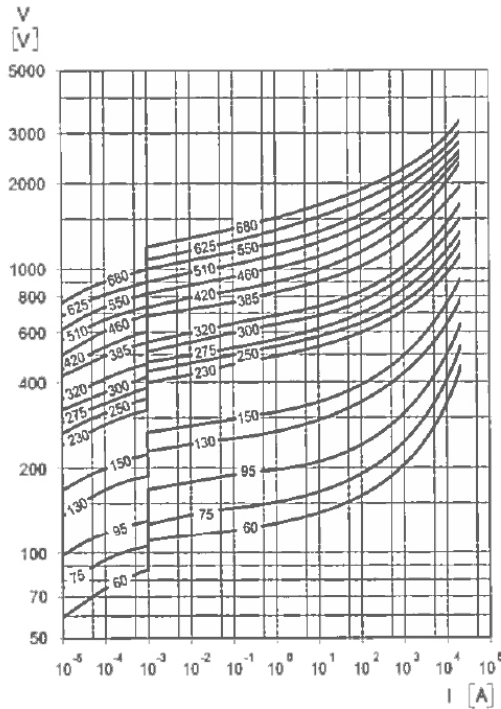
Part Number	V <sub>RMS</sub> (volts)	V <sub>DC</sub> (volts)	V <sub>N</sub> (@ 1 Ma) (volts)	V <sub>C</sub> (@ I <sub>C</sub> ) (volts)	I <sub>C</sub> (8/20 uSec) (amps)	W <sub>MAX</sub> (10/1000 μs) (joules)	P <sub>MAX</sub> (watts)	I <sub>MAX</sub> (8/20 uSec) (amps)	C (@ 1 kHz) (pF)	t <sub>MAX</sub> (mm)	T <sub>MAX</sub> (mm)
ZOV150K23	150	200	240	395	100	215	1.0	18000	1990	1.7	8.3
ZOV150K25	150	200	240	395	150	300	1.0	20000	2480	1.7	8.3
ZOV150K32	150	200	240	395	200	600	1.2	30000	4960	1.7	8.3
ZOV150K40	150	200	240	395	300	720	1.4	45000	6100	1.7	8.3
ZOV150K60	150	200	240	395	500	1150	1.6	80000	9760	1.7	8.3
ZOV230K23	230	300	360	595	100	320	1.0	18000	1320	2.4	9.0
ZOV230K25	230	300	360	595	150	450	1.0	20000	1650	2.4	9.0
ZOV230K32	230	300	360	595	200	900	1.2	30000	3300	2.4	9.0
ZOV230K40	230	300	360	595	300	1080	1.4	45000	4060	2.4	9.0
ZOV230K60	230	300	360	595	500	1730	1.6	80000	6490	2.4	9.0
ZOV250K23	250	320	390	650	100	350	1.0	18000	1220	2.6	9.2
ZOV250K25	250	320	390	650	150	490	1.0	20000	1530	2.6	9.2
ZOV250K32	250	320	390	650	200	970	1.2	30000	3050	2.6	9.2
ZOV250K40	250	320	390	650	300	1160	1.4	45000	3760	2.6	9.2
ZOV250K60	250	320	390	650	500	1860	1.6	80000	6050	2.6	9.2
ZOV275K23	275	350	430	710	100	380	1.0	18000	1100	2.8	9.4
ZOV275K25	275	350	430	710	150	530	1.0	20000	1380	2.8	9.4
ZOV275K32	275	350	430	710	200	1060	1.2	30000	2770	2.8	9.4
ZOV275K40	275	350	430	710	300	1280	1.4	45000	3400	2.8	9.4
ZOV275K60	275	350	430	710	500	2050	1.6	80000	5440	2.8	9.4
ZOV300K23	300	385	470	775	100	440	1.0	18000	1010	3.1	9.7
ZOV300K25	300	385	470	775	150	615	1.0	20000	1270	3.1	9.7
ZOV300K32	300	385	470	775	200	1225	1.2	30000	2540	3.1	9.7
ZOV300K40	300	385	470	775	300	1470	1.4	45000	3130	3.1	9.7
ZOV300K60	300	385	470	775	500	2350	1.6	80000	5000	3.1	9.7
ZOV320K23	320	420	510	840	100	480	1.0	18000	990	3.2	9.9
ZOV320K25	320	420	510	840	150	680	1.0	20000	1240	3.2	9.9
ZOV320K32	320	420	510	840	200	1350	1.2	30000	2470	3.2	9.9
ZOV320K40	320	420	510	840	300	1620	1.4	45000	3050	3.2	9.9
ZOV320K60	320	420	510	840	500	2600	1.6	80000	4880	3.2	9.9
ZOV385K23	385	505	620	1025	100	500	1.0	18000	810	3.8	10.6
ZOV385K25	385	505	620	1025	150	690	1.0	20000	1020	3.8	10.6
ZOV385K32	385	505	620	1025	200	1390	1.2	30000	2040	3.8	10.6
ZOV385K40	385	505	620	1025	300	1660	1.4	45000	2500	3.8	10.6
ZOV385K60	385	505	620	1025	500	2660	1.6	80000	4000	3.8	10.6
ZOV420K23	420	560	680	1120	100	530	1.0	18000	740	4.4	10.9
ZOV420K25	420	560	680	1120	150	740	1.0	20000	930	4.4	10.9
ZOV420K32	420	560	680	1120	200	1480	1.2	30000	1850	4.4	10.9
ZOV420K40	420	560	680	1120	300	1780	1.4	45000	2280	4.4	10.9
ZOV420K60	420	560	680	1120	500	2850	1.6	80000	3650	4.4	10.9
ZOV460K23	460	615	750	1240	100	580	1.0	18000	670	4.8	11.4
ZOV460K25	460	615	750	1240	150	810	1.0	20000	840	4.8	11.4
ZOV460K32	460	615	750	1240	200	1610	1.2	30000	1680	4.8	11.4
ZOV460K40	460	615	750	1240	300	1930	1.4	45000	2060	4.8	11.4
ZOV460K60	460	615	750	1240	500	3090	1.6	80000	3300	4.8	11.4
ZOV510K23	510	670	820	1355	100	600	1.0	18000	610	5.2	11.8
ZOV510K25	510	670	820	1355	150	840	1.0	20000	770	5.2	11.8
ZOV510K32	510	670	820	1355	200	1680	1.2	30000	1530	5.2	11.8
ZOV510K40	510	670	820	1355	300	2010	1.4	45000	1900	5.2	11.8
ZOV510K60	510	670	820	1355	500	3220	1.6	80000	3040	5.2	11.8

### Device Ratings and Dimensions (cont.)

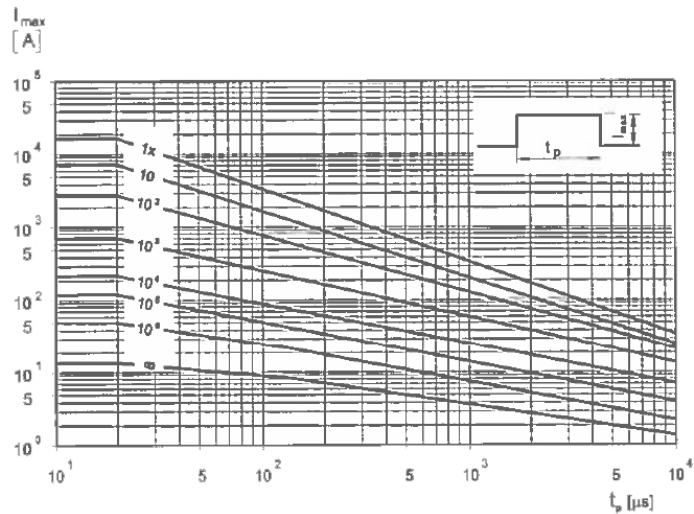
Part Number	V <sub>RMS</sub> (volts)	V <sub>DC</sub> (volts)	V <sub>N</sub> (@ 1 Ma) (volts)	V <sub>C</sub> (@ I <sub>C</sub> ) (volts)	I <sub>C</sub> (8/20 uSec) (amps)	W <sub>MAX</sub> (10/1000 μs) (joules)	P <sub>MAX</sub> (watts)	I <sub>MAX</sub> (8/20 uSec) (amps)	C (@ 1 kHz) (pF)	t <sub>MAX</sub> (mm)	T <sub>MAX</sub> (mm)
ZOV550K23	550	745	910	1500	100	650	1.0	18000	550	5.9	12.5
ZOV550K25	550	745	910	1500	150	900	1.0	20000	690	5.9	12.5
ZOV550K32	550	745	910	1500	200	1810	1.2	30000	1380	5.9	12.5
ZOV550K40	550	745	910	1500	300	2170	1.4	45000	1700	5.9	12.5
ZOV550K60	550	745	910	1500	500	3470	1.6	80000	2720	5.9	12.5
ZOV680K23	680	895	1100	1815	100	770	1.0	18000	460	6.9	13.5
ZOV680K25	680	895	1100	1815	150	1080	1.0	20000	570	6.9	13.5
ZOV680K32	680	895	1100	1815	200	2160	1.2	30000	1150	6.9	13.5
ZOV680K40	680	895	1100	1815	300	2590	1.4	45000	1400	6.9	13.5
ZOV680K60	680	895	1100	1815	500	4140	1.6	80000	2240	6.9	13.5

### Protection Level

With the worst-case condition in the tolerance region.



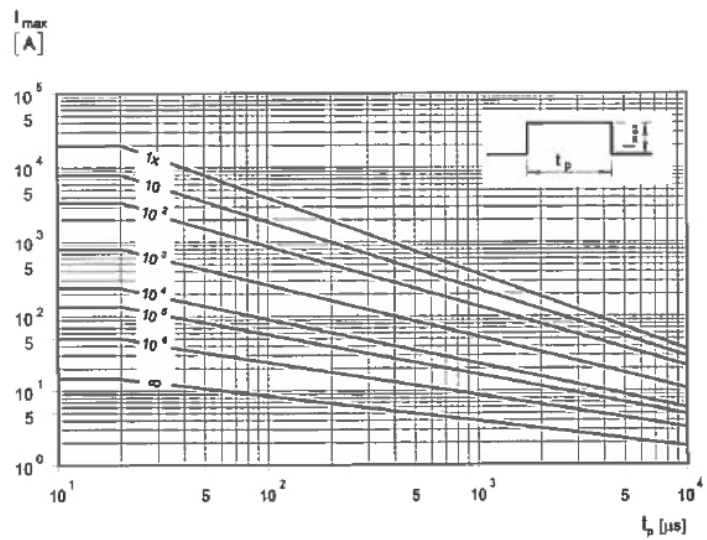
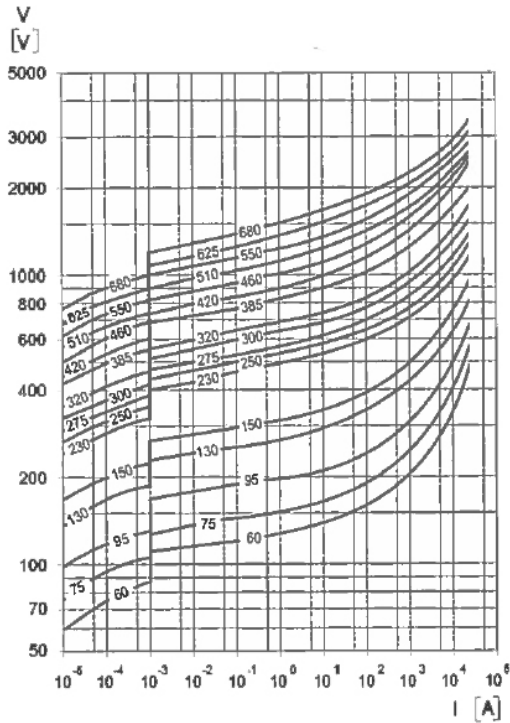
Model Size 23  
ZOV60...680



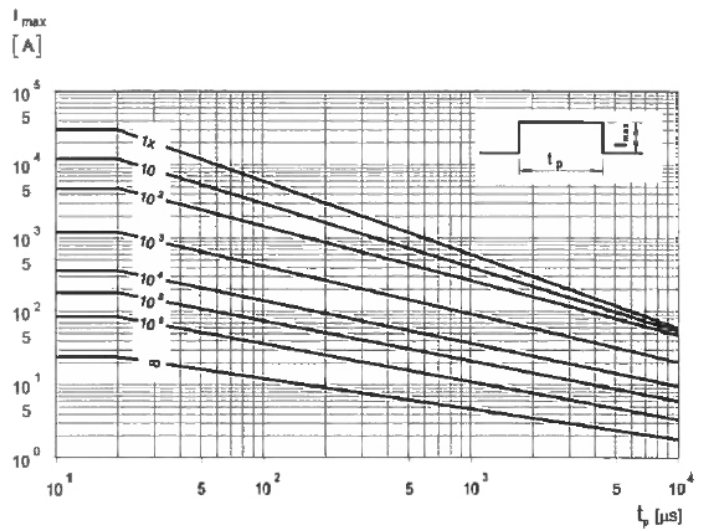
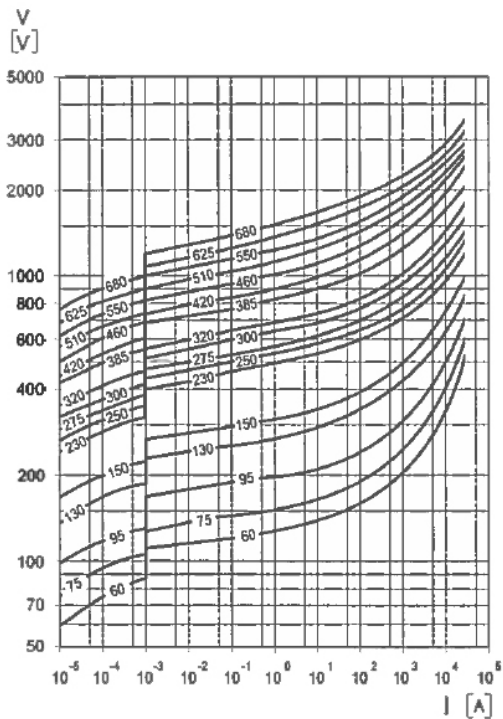
Protection Level

With the worst-case condition in the tolerance region.

Model Size 25  
ZOV60...680

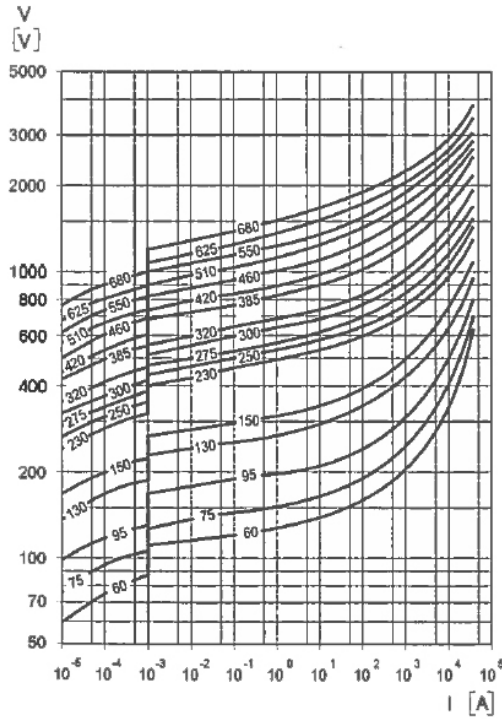


Model Size 32  
ZOV60...680

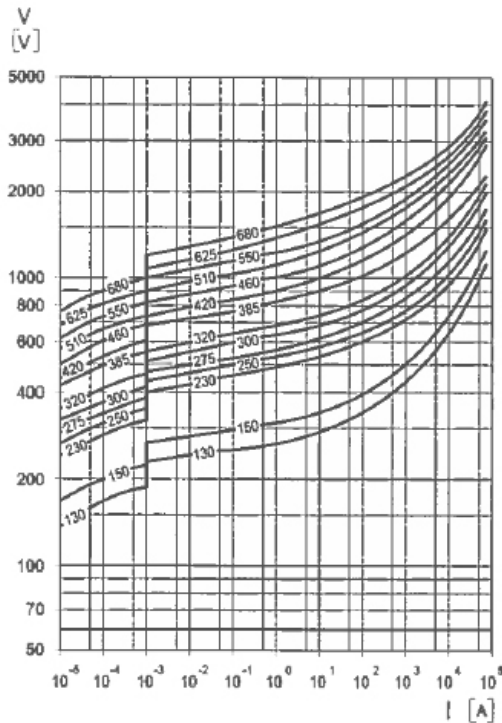
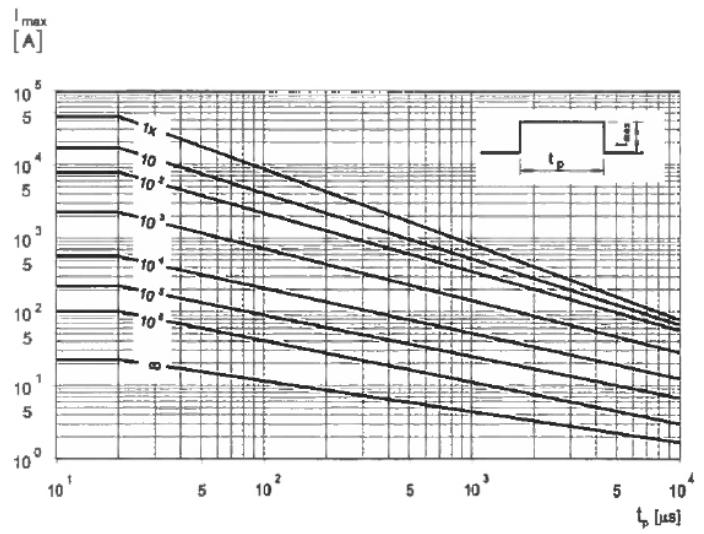


**Protection Level**

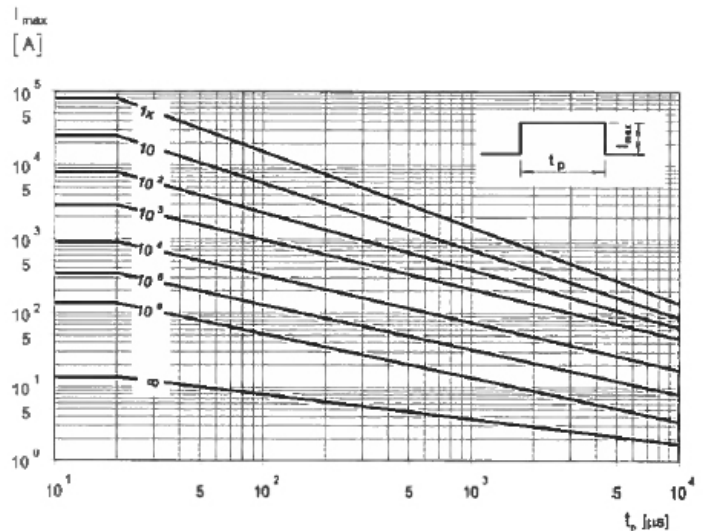
With the worst-case condition in the tolerance region.



Model Size 40  
ZOV60...680



Model Size 60  
ZOV60...680



## RoHS Compliance

Stackpole Electronics has joined the worldwide effort to reduce the amount of lead in electronic components and to meet the various regulatory requirements now prevalent, such as the European Union's directive regarding "Restrictions on Hazardous Substances" (RoHS 3). As part of this ongoing program, we periodically update this document with the status regarding the availability of our compliant components. All our standard part numbers are compliant to EU Directive 2011/65/EU of the European Parliament as amended by Directive (EU) 2015/863/EU as regards the list of restricted substances.

RoHS Compliance Status						
Standard Product Series	Description	Package / Termination Type	Standard Series RoHS Compliant	Lead-Free Termination Composition	Lead-Free Mfg. Effective Date (Std Product Series)	Lead-Free Effective Date Code (YY/WW)
ZOV	High Energy Varistor	Special	YES	100% Matte Sn	Always	Always

## "Conflict Metals" Commitment

Stackpole Electronics has joined the worldwide effort to reduce the amount of lead in electronic components and to meet the various regulatory requirements now prevalent, such as the European Union's directive regarding "Restrictions on Hazardous Substances" (RoHS 3). As part of this ongoing program, we periodically update this document with the status regarding the availability of our compliant components. All our standard part numbers are compliant to EU Directive 2011/65/EU of the European Parliament as amended by Directive (EU) 2015/863/EU as regards the list of restricted substances.

## Compliance to "REACH"

We certify that all passive components supplied by Stackpole Electronics, Inc. are SVHC (Substances of Very High Concern) free and compliant with the requirements of EU Directive 1907/2006/EC, "The Registration, Evaluation, Authorization and Restriction of Chemicals", otherwise referred to as REACH. Contact us for complete list of REACH Substance Candidate List.

## Environmental Policy

It is the policy of Stackpole Electronics, Inc. (SEI) to protect the environment in all localities in which we operate. We continually strive to improve our effect on the environment. We observe all applicable laws and regulations regarding the protection of our environment and all requests related to the environment to which we have agreed. We are committed to the prevention of all forms of pollution.

## How to Order

