

### Description:

The ZVL Series of low voltage leaded multilayer varistors (MLVs) is designed to protect sensitive electronic devices operating in the low voltage region against high voltage/current surges. They offer excellent transient energy absorption due to improved energy volume distribution and power dissipation. Low voltage MLVs cover a wide DC operating voltage range from 14V to 56V.



### Features:

- AC operating voltage (Vrms) from 11V to 40V
- DC operating voltage (Vdc) from 14V to 56V
- 5 model sizes available 5, 7, 10, 14, 20
- Available with straight or crimped leads
- Broad range of current and energy handling capabilities
- +125°C continuous operating temperature (+150°C for ZVYL)
- Dimensional and weight savings on PC board
- Bi-directional, lower clamping voltages than disc type varistors
- ZVYL high temperature product will have performance characteristics different from the ZVL. Contact Stackpole for specific details.
- 100% RoHS compliant and lead free without exemption
- Halogen free
- REACH compliant
- AEC-Q200 qualified Grade 3

### Applications:

- Suppression of inductive switching or other transient events at the circuit board level
- Provides on-board transient voltage protection for ICs and transistors
- Used to help achieve electromagnetic compliance of end products
- Replace larger TVS Zener diodes in many applications

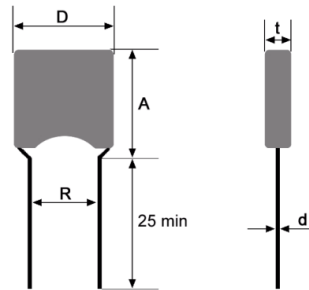
### General Technical Data

|                                           |                 |
|-------------------------------------------|-----------------|
| Operating Temperature - ZVL               | -55°C to +125°C |
| Operating Temperature - ZVYL              | -55°C to +150°C |
| Storage Temperature Range                 | -55°C to +150°C |
| Threshold Voltage Temperature Coefficient | < -0.05% /°C    |
| Insulation Resistance                     | > 1Gohm         |
| Isolation Voltage Capability              | >1.25kV         |
| Response Time                             | < 25nS          |

### Standard Packaging Options / Quantities

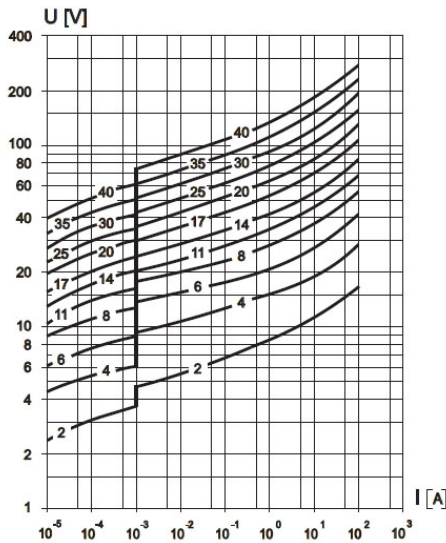
| Series    | Voltage Range (Vrms) | Model Size | Packaging options 7 mm, 10 mm, 14 mm, 20 mm and 23 mm |                   |
|-----------|----------------------|------------|-------------------------------------------------------|-------------------|
|           |                      |            | B (Bulk)                                              | T (Tape and Reel) |
| ZVL, ZVYL | 11 - 40              | 05         | 1500                                                  | 1500              |
|           | 11 - 40              | 07         | 1500                                                  | 1500              |
|           | 11 - 40              | 10         | 1500                                                  | 1500              |
|           | 11 - 40              | 14         | 1000                                                  | 1500              |
|           | 11 - 40              | 20         | 1000                                                  | 1500              |

### Device Ratings and Dimensions

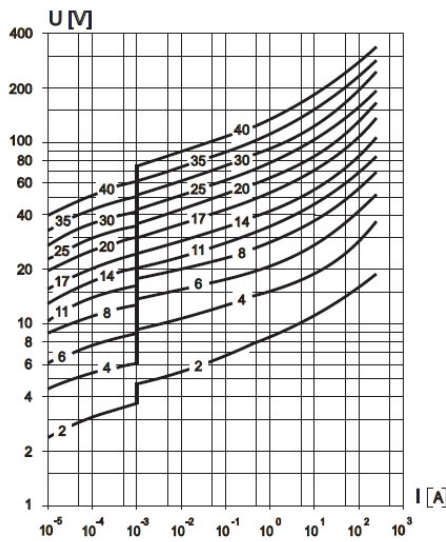
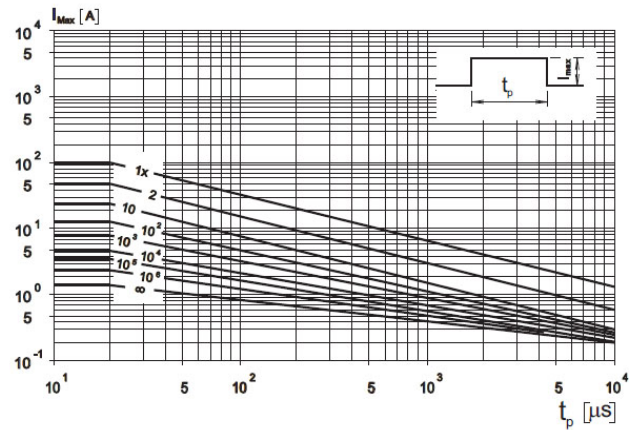


| Part Number | V <sub>RMS</sub><br>(volts) | V <sub>DC</sub><br>(volts) | V <sub>N</sub><br>(1 mA)<br>(volts) | V <sub>C</sub><br>(volts) | I <sub>C</sub><br>(8/20 uSec)<br>(amps) | W <sub>MAX</sub><br>(10/1000 uSec)<br>(joules) | P <sub>MAX</sub><br>(watts) | I <sub>MAX</sub><br>(8/20 uSec)<br>(amps) | C <sub>TYP</sub><br>(@ 1 kHz)<br>(pF) | D <sub>MAX</sub><br>(mm) | t <sub>MAX</sub><br>(mm) | R<br>(mm) | d<br>(mm) | h/A <sub>MAX</sub><br>(mm) |
|-------------|-----------------------------|----------------------------|-------------------------------------|---------------------------|-----------------------------------------|------------------------------------------------|-----------------------------|-------------------------------------------|---------------------------------------|--------------------------|--------------------------|-----------|-----------|----------------------------|
| ZVL11K05    | 11                          | 14                         | 18                                  | 33                        | 1                                       | 0.30                                           | 0.005                       | 100                                       | 480                                   | 6.00                     | 3.50                     | 5.00      | 0.60      | 7.00                       |
| ZVL11K07    | 11                          | 14                         | 18                                  | 33                        | 2.5                                     | 0.80                                           | 0.008                       | 250                                       | 1,400                                 | 7.00                     | 3.50                     | 5.00      | 0.60      | 8.00                       |
| ZVL11K10    | 11                          | 14                         | 18                                  | 33                        | 5                                       | 1.70                                           | 0.010                       | 500                                       | 2,420                                 | 7.00                     | 3.50                     | 5.00      | 0.60      | 9.00                       |
| ZVL11K14    | 11                          | 14                         | 18                                  | 33                        | 10                                      | 3.30                                           | 0.015                       | 1,000                                     | 5,000                                 | 8.00                     | 3.50                     | 5.00      | 0.60      | 12.00                      |
| ZVL11K20    | 11                          | 14                         | 18                                  | 33                        | 20                                      | 10.50                                          | 0.020                       | 2,000                                     | 9,270                                 | 9.00                     | 3.50                     | 5.00      | 0.60      | 12.00                      |
| ZVL14K05    | 14                          | 18                         | 22                                  | 38                        | 1                                       | 0.40                                           | 0.005                       | 100                                       | 377                                   | 6.00                     | 3.50                     | 5.00      | 0.60      | 7.00                       |
| ZVL14K07    | 14                          | 18                         | 22                                  | 38                        | 2.5                                     | 0.90                                           | 0.008                       | 250                                       | 1,050                                 | 7.00                     | 3.50                     | 5.00      | 0.60      | 8.00                       |
| ZVL14K10    | 14                          | 18                         | 22                                  | 38                        | 5                                       | 2.20                                           | 0.010                       | 500                                       | 1,770                                 | 7.00                     | 3.50                     | 5.00      | 0.60      | 9.00                       |
| ZVL14K14    | 14                          | 18                         | 22                                  | 38                        | 10                                      | 4.20                                           | 0.015                       | 1,000                                     | 3,850                                 | 8.00                     | 3.50                     | 5.00      | 0.60      | 12.00                      |
| ZVL14K20    | 14                          | 18                         | 22                                  | 38                        | 20                                      | 12.00                                          | 0.020                       | 2,000                                     | 7,670                                 | 9.00                     | 3.50                     | 5.00      | 0.60      | 12.00                      |
| ZVL17K05    | 17                          | 22                         | 27                                  | 44                        | 1                                       | 0.50                                           | 0.005                       | 100                                       | 335                                   | 6.00                     | 3.50                     | 5.00      | 0.60      | 7.00                       |
| ZVL17K07    | 17                          | 22                         | 27                                  | 44                        | 2.5                                     | 1.20                                           | 0.008                       | 250                                       | 850                                   | 7.00                     | 3.50                     | 5.00      | 0.60      | 8.00                       |
| ZVL17K10    | 17                          | 22                         | 27                                  | 44                        | 5                                       | 2.60                                           | 0.010                       | 500                                       | 1,370                                 | 7.00                     | 3.50                     | 5.00      | 0.60      | 9.00                       |
| ZVL17K14    | 17                          | 22                         | 27                                  | 44                        | 10                                      | 5.20                                           | 0.015                       | 1,000                                     | 3,050                                 | 8.00                     | 3.50                     | 5.00      | 0.60      | 12.00                      |
| ZVL17K20    | 17                          | 22                         | 27                                  | 44                        | 20                                      | 14.20                                          | 0.020                       | 2,000                                     | 6,600                                 | 9.00                     | 3.50                     | 5.00      | 0.60      | 12.00                      |
| ZVL20K05    | 20                          | 26                         | 33                                  | 54                        | 1                                       | 0.60                                           | 0.005                       | 100                                       | 325                                   | 6.00                     | 4.50                     | 5.00      | 0.60      | 7.00                       |
| ZVL20K07    | 20                          | 26                         | 33                                  | 54                        | 2.5                                     | 1.40                                           | 0.008                       | 250                                       | 790                                   | 7.00                     | 4.50                     | 5.00      | 0.60      | 8.00                       |
| ZVL20K10    | 20                          | 26                         | 33                                  | 54                        | 5                                       | 3.20                                           | 0.010                       | 500                                       | 1,090                                 | 7.00                     | 4.50                     | 5.00      | 0.60      | 9.00                       |
| ZVL20K14    | 20                          | 26                         | 33                                  | 54                        | 10                                      | 6.40                                           | 0.015                       | 1,000                                     | 2,490                                 | 8.00                     | 4.50                     | 5.00      | 0.60      | 12.00                      |
| ZVL20K20    | 20                          | 26                         | 33                                  | 54                        | 20                                      | 18.20                                          | 0.020                       | 2,000                                     | 5,670                                 | 9.00                     | 4.50                     | 5.00      | 0.60      | 12.00                      |
| ZVL25K05    | 25                          | 31                         | 39                                  | 65                        | 1                                       | 0.70                                           | 0.005                       | 100                                       | 315                                   | 6.00                     | 4.50                     | 5.00      | 0.60      | 7.00                       |
| ZVL25K07    | 25                          | 31                         | 39                                  | 65                        | 2.5                                     | 1.60                                           | 0.008                       | 250                                       | 790                                   | 7.00                     | 4.50                     | 5.00      | 0.60      | 8.00                       |
| ZVL25K10    | 25                          | 31                         | 39                                  | 65                        | 5                                       | 3.80                                           | 0.010                       | 500                                       | 870                                   | 7.00                     | 4.50                     | 5.00      | 0.60      | 9.00                       |
| ZVL25K14    | 25                          | 31                         | 39                                  | 65                        | 10                                      | 7.20                                           | 0.015                       | 1,000                                     | 1,890                                 | 8.00                     | 4.50                     | 5.00      | 0.60      | 12.00                      |
| ZVL25K20    | 25                          | 31                         | 39                                  | 65                        | 20                                      | 22.40                                          | 0.020                       | 2,000                                     | 4,670                                 | 9.00                     | 4.50                     | 5.00      | 0.60      | 12.00                      |
| ZVL30K05    | 30                          | 38                         | 47                                  | 77                        | 1                                       | 0.90                                           | 0.005                       | 100                                       | 315                                   | 6.00                     | 4.50                     | 5.00      | 0.60      | 7.00                       |
| ZVL30K07    | 30                          | 38                         | 47                                  | 77                        | 2.5                                     | 2.20                                           | 0.008                       | 250                                       | 790                                   | 7.00                     | 4.50                     | 5.00      | 0.60      | 8.00                       |
| ZVL30K10    | 30                          | 38                         | 47                                  | 77                        | 5                                       | 4.40                                           | 0.010                       | 500                                       | 770                                   | 7.00                     | 4.50                     | 5.00      | 0.60      | 9.00                       |
| ZVL30K14    | 30                          | 38                         | 47                                  | 77                        | 10                                      | 9.40                                           | 0.015                       | 1,000                                     | 1,530                                 | 8.00                     | 4.50                     | 5.00      | 0.60      | 12.00                      |
| ZVL30K20    | 30                          | 38                         | 47                                  | 77                        | 20                                      | 25.80                                          | 0.020                       | 2,000                                     | 3,870                                 | 9.00                     | 4.50                     | 5.00      | 0.60      | 12.00                      |
| ZVL35K05    | 35                          | 45                         | 56                                  | 90                        | 1                                       | 1.20                                           | 0.005                       | 100                                       | 315                                   | 6.00                     | 4.50                     | 5.00      | 0.60      | 7.00                       |
| ZVL35K07    | 35                          | 45                         | 56                                  | 90                        | 2.5                                     | 2.60                                           | 0.008                       | 250                                       | 790                                   | 7.00                     | 4.50                     | 5.00      | 0.60      | 8.00                       |
| ZVL35K10    | 35                          | 45                         | 56                                  | 90                        | 5                                       | 5.40                                           | 0.010                       | 500                                       | 680                                   | 7.00                     | 4.50                     | 5.00      | 0.60      | 9.00                       |
| ZVL35K14    | 35                          | 45                         | 56                                  | 90                        | 10                                      | 10.20                                          | 0.015                       | 1,000                                     | 1,260                                 | 8.00                     | 4.50                     | 5.00      | 0.60      | 12.00                      |
| ZVL35K20    | 35                          | 45                         | 56                                  | 90                        | 20                                      | 33.40                                          | 0.020                       | 2,000                                     | 3,470                                 | 9.00                     | 4.50                     | 5.00      | 0.60      | 12.00                      |
| ZVL40K05    | 40                          | 56                         | 68                                  | 110                       | 1                                       | 1.40                                           | 0.005                       | 100                                       | 315                                   | 6.00                     | 4.50                     | 5.00      | 0.60      | 7.00                       |
| ZVL40K07    | 40                          | 56                         | 68                                  | 110                       | 2.5                                     | 3.20                                           | 0.008                       | 250                                       | 790                                   | 7.00                     | 4.50                     | 5.00      | 0.60      | 8.00                       |
| ZVL40K10    | 40                          | 56                         | 68                                  | 110                       | 5                                       | 6.40                                           | 0.010                       | 500                                       | 660                                   | 7.00                     | 4.50                     | 5.00      | 0.60      | 9.00                       |
| ZVL40K14    | 40                          | 56                         | 68                                  | 110                       | 10                                      | 13.40                                          | 0.015                       | 1,000                                     | 1,070                                 | 8.00                     | 4.50                     | 5.00      | 0.60      | 12.00                      |
| ZVL40K20    | 40                          | 56                         | 68                                  | 110                       | 20                                      | 37.80                                          | 0.020                       | 2,000                                     | 3,130                                 | 9.00                     | 4.50                     | 5.00      | 0.60      | 12.00                      |

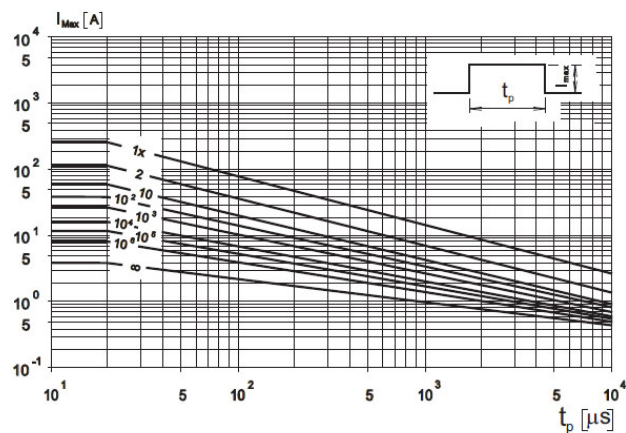
## Protection Level



Disc Diameter 5  
ZVL11...40

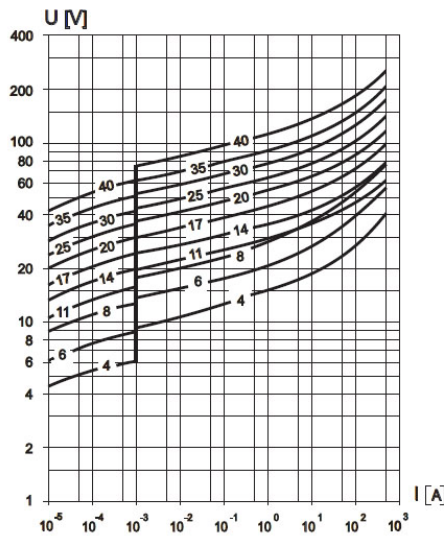


Disc Diameter 7  
ZVL11...40

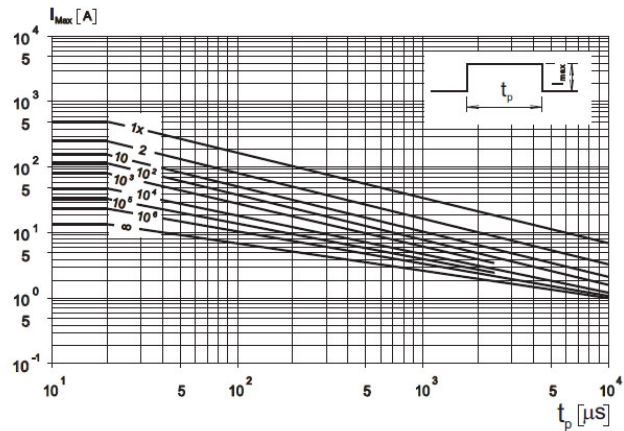


(With the worst-case condition in the tolerance region)

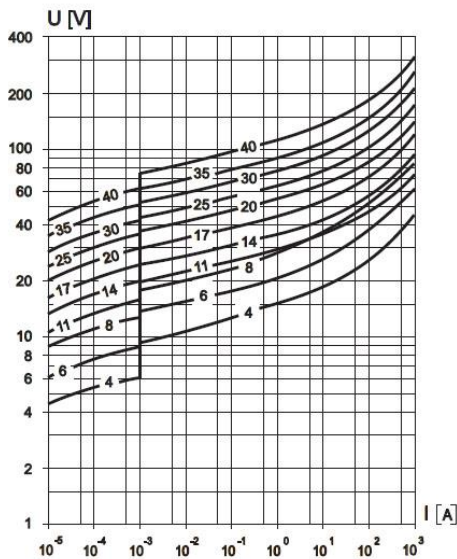
## Protection Level



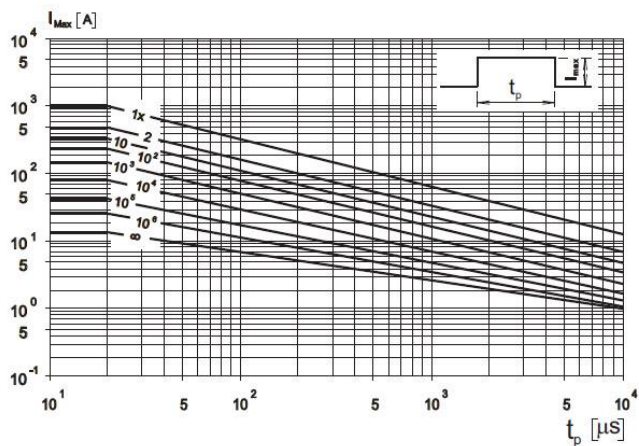
Disc Diameter 10  
ZVL11...40



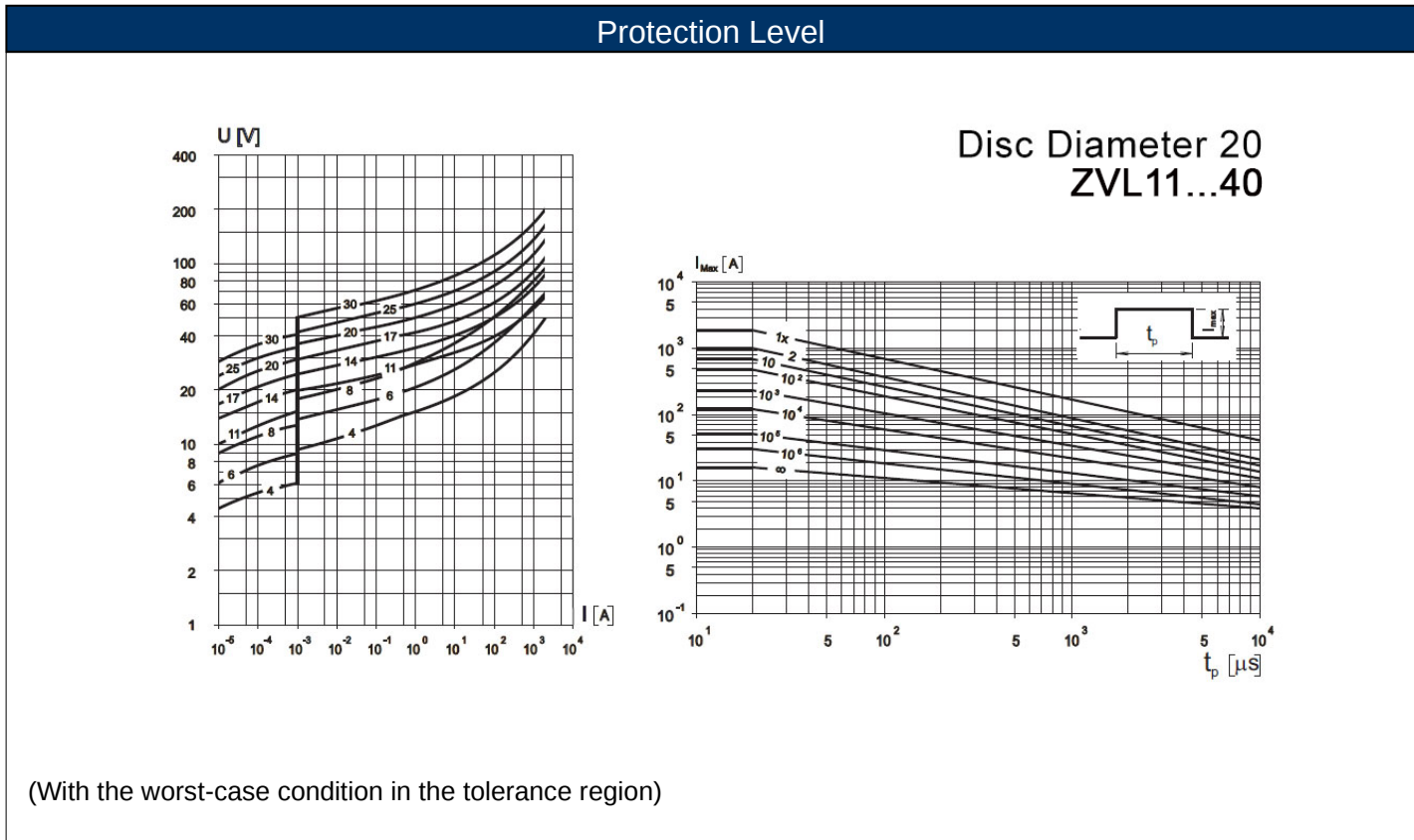
(With the worst-case condition in the tolerance region)



Disc Diameter 14  
ZVL11...40



(With the worst-case condition in the tolerance region)



## 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) |
| ZVL                     | Low Voltage Radial Leaded MLV Varistor | Leaded                     | YES                            | 100% Matte Sn                     | Jul-05                                             | 05/27                                 |

## "Conflict Metals" Commitment

We at Stackpole Electronics, Inc. are joined with our industry in opposing the use of metals mined in the "conflict region" of the eastern Democratic Republic of the Congo (DRC) in our products. Recognizing that the supply chain for metals used in the electronics industry is very complex, we work closely with our own suppliers to verify to the extent possible that the materials and products we supply do not contain metals sourced from this conflict region. As such, we are in compliance with the requirements of Dodd-Frank Act regarding Conflict Minerals.

## 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

