

# No. HVR250



**Devices are not intended for continuous use at 250 V!**

Dimensions (mm)

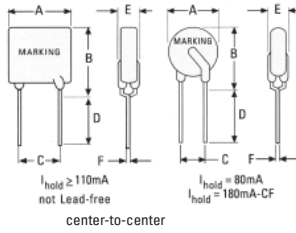


Figure 1

Figure 2

## High Voltage PTC Device, 60 V / 250 V

**Standard**  
UL 1434 1<sup>st</sup> Edition  
CSA C22.2 No. 0 CSA TIL No. CA-3A

**Approvals**  
cULus Recognition  
TÜV

### Features

This product line is designed to provide protection against induced AC power current, direct power contact and the natural lightning strike. The HVR250 product line is widely used in the field of telecommunications and networking, ISDN and XSDN equipment. It also helps equipment manufacturers pass ITU K20, K21 and telcordia requirements.

## Specifications

### Packaging

A: bulk  
F: tape and ammo

### Materials

Insulating Material: Yellow Epoxy Polymer, UL 94 V-0

Round Pins: Copper alloy, tin plated

**Max. Device Surface Temperature in Tripped State**  
125 °C

### Operating / Storage Temperature

-40 °C to +85 °C (consider de-rating)

### Humidity Ageing

+85 °C, 85 % R.H., 1000 hours, ± 5 % typical resistance change

### Soldering Characteristics

Solderability per MIL-STD-202, Method 208E

### Thermal Shock

MIL-STD-202F, Method 107G

+125 °C to -40 °C 10 times,  
±10 % typical resistance change

### Solvent Resistance

MIL-STD-202, Method 215F, no change

### Marking

"P", voltage, amperage rating, lot number



| Dimensions (mm) |      |       |       |       |       |       |               |                          |                        |      |
|-----------------|------|-------|-------|-------|-------|-------|---------------|--------------------------|------------------------|------|
| Model           | Fig. | A Max | B Max | C typ | D Min | E Max | Physical Lead | Characteristics Material | packaging quantity bag | ammo |
| HVR250P080C     | 1    | 5,8   | 10,9  | 5,5   | 4,7   | 5,1   | 0.65 dia      | Sn/Cu                    | 500                    | 1500 |
| HVR250P080U     | 1    | 5,0   | 9,0   | 3,8   | 4,7   | 5,1   | 0.65 dia      | Sn/Cu                    | 500                    | 1500 |
| HVR250P080CF    | 1    | 5,8   | 10,9  | 5,5   | 4,7   | 5,1   | 0.65 dia      | Sn/Cu                    | 500                    | 1500 |
| HVR250P110U     | 1    | 5,3   | 9,4   | 3,8   | 4,7   | 5,1   | 0.65 dia      | Sn/Cu                    | 500                    | 1500 |
| HVR250P120C     | 2    | 6,8   | 12,5  | 5,5   | 4,7   | 5,1   | 0.65 dia      | Sn/Cu                    | 500                    | 1200 |
| HVR250P120U     | 2    | 6,0   | 10,0  | 3,8   | 4,7   | 5,1   | 0.65 dia      | Sn/Cu                    | 500                    | 1200 |
| HVR250P120C-RA  | 2    | 6,8   | 12,5  | 5,5   | 4,7   | 5,1   | 0.65 dia      | Sn/Cu                    | 500                    | 1200 |
| HVR250P120C-RC  | 2    | 6,8   | 12,5  | 5,5   | 4,7   | 5,1   | 0.65 dia      | Sn/Cu                    | 500                    | 1200 |
| HVR250P120C-RF  | 2    | 6,8   | 12,5  | 5,5   | 4,7   | 5,1   | 0.65 dia      | Sn/Cu                    | 500                    | 1200 |
| HVR250P120C-R1  | 2    | 6,8   | 12,5  | 5,5   | 4,7   | 5,1   | 0.65 dia      | Sn/Cu                    | 500                    | 1200 |
| HVR250P120C-R2  | 2    | 6,8   | 12,5  | 5,5   | 4,7   | 5,1   | 0.65 dia      | Sn/Cu                    | 500                    | 1200 |
| HVR250P120C-R3  | 2    | 6,8   | 12,5  | 5,5   | 4,7   | 5,1   | 0.65 dia      | Sn/Cu                    | 500                    | 1200 |
| HVR250P120CT    | 2    | 6,8   | 12,5  | 5,5   | 4,7   | 5,1   | 0.65 dia      | Sn/Cu                    | 500                    | 1200 |
| HVR250P145C     | 2    | 6,8   | 12,5  | 5,5   | 4,7   | 5,1   | 0.65 dia      | Sn/Cu                    | 500                    | 1200 |
| HVR250P145U     | 2    | 6,0   | 10,0  | 3,8   | 4,7   | 5,1   | 0.65 dia      | Sn/Cu                    | 500                    | 1200 |
| HVR250P145C-RA  | 2    | 6,8   | 12,5  | 5,5   | 4,7   | 5,1   | 0.65 dia      | Sn/Cu                    | 500                    | 1200 |
| HVR250P145C-RB  | 2    | 6,8   | 12,5  | 5,5   | 4,7   | 5,1   | 0.65 dia      | Sn/Cu                    | 500                    | 1200 |
| HVR250P145CT    | 2    | 6,8   | 12,5  | 5,5   | 4,7   | 5,1   | 0.65 dia      | Sn/Cu                    | 500                    | 1200 |
| HVR250P180C     | 2    | 12,5  | 12,9  | 5,5   | 4,7   | 5,1   | 0.65 dia      | Sn/Cu                    | 200                    | 1000 |
| HVR250P180U     | 2    | 10,4  | 12,6  | 3,8   | 4,7   | 5,1   | 0.65 dia      | Sn/Cu                    | 200                    | 1000 |
| HVR250P180CF    | 1    | 12,0  | 13,2  | 5,5   | 4,7   | 5,1   | 0.65 dia      | Sn/Cu                    | 200                    | 1000 |

Permissible continuous operating current is ≤ 100 % at ambient temperature of 20 °C (68 °F).

| Model          | I <sub>hold</sub> | I <sub>trip</sub> | V <sub>max. ac</sub> | I <sub>max.</sub> | max. time to trip | P <sub>d max.</sub> | Resistance            |                       |                         | Approvals |     |
|----------------|-------------------|-------------------|----------------------|-------------------|-------------------|---------------------|-----------------------|-----------------------|-------------------------|-----------|-----|
|                |                   |                   |                      |                   |                   |                     | R <sub>min.</sub> (Ω) | R <sub>max.</sub> (Ω) | R <sub>1 max.</sub> (Ω) | cULus     | TÜV |
| HVR250P080C    | 0.080             | 0.16              | 250/60               | 3                 | 3.00 @ 0.35**     | 1.00                | 14.0                  | 22.0                  | 33                      | •         | •   |
| HVR250P080U    | 0.080             | 0.16              | 250/60               | 3                 | 3.00 @ 0.35**     | 1.00                | 15.0                  | 22.0                  | 33                      | •         | •   |
| HVR250P080CFT  | 0.080             | 0.16              | 250/60               | 3                 | 3.00 @ 0.35**     | 1.00                | 14.0                  | 22.0                  | 33                      | p         | •   |
| HVR250P110U    | 0.110             | 0.22              | 250/60               | 3                 | 0.75 @ 1.00       | 1.00                | 5.0                   | 9.0                   | 16                      | p         | p   |
| HVR250P120C    | 0.120             | 0.24              | 250/60               | 3                 | 1.50 @ 1.00       | 1.00                | 4.0                   | 8.0                   | 16                      | •         | •   |
| HVR250P120U    | 0.120             | 0.24              | 250/60               | 3                 | 1.00 @ 1.00       | 1.00                | 6.0                   | 10.0                  | 16                      | •         | •   |
| HVR250P120C-RA | 0.120             | 0.24              | 250/60               | 3                 | 0.90 @ 1.00       | 1.00                | 7.0                   | 9.0                   | 16                      | •         | •   |
| HVR250P120C-RC | 0.120             | 0.24              | 250/60               | 3                 | 0.85 @ 1.00       | 1.00                | 5.4                   | 7.5                   | 14                      | •         | •   |
| HVR250P120C-RF | 0.120             | 0.24              | 250/60               | 3                 | 0.70 @ 1.00       | 1.00                | 6.0                   | 10.5                  | 16                      | •         | •   |
| HVR250P120C-R1 | 0.120             | 0.24              | 250/60               | 3                 | 0.80 @ 1.00       | 1.00                | 6.0                   | 9.0                   | 16                      | •         | •   |
| HVR250P120C-R2 | 0.120             | 0.24              | 250/60               | 3                 | 0.70 @ 1.00       | 1.00                | 8.0                   | 10.5                  | 16                      | •         | •   |
| HVR250P120C-R3 | 0.120             | 0.24              | 250/60               | 3                 | 1.00 @ 1.00       | 1.00                | 8.0                   | 10.0                  | 16                      | •         | •   |
| HVR250P120CT   | 0.120             | 0.24              | 250/60               | 3                 | 0.70 @ 1.00       | 1.00                | 7.0                   | 12.0                  | 16                      | •         | •   |
| HVR250P145C    | 0.145             | 0.29              | 250/60               | 3                 | 2.50 @ 1.00       | 1.00                | 3.0                   | 6.0                   | 14                      | •         | •   |
| HVR250P145U    | 0.145             | 0.29              | 250/60               | 3                 | 2.00 @ 1.00       | 1.00                | 3.5                   | 6.5                   | 14                      | •         | •   |
| HVR250P145C-RA | 0.145             | 0.29              | 250/60               | 3                 | 2.50 @ 1.00       | 1.00                | 3.0                   | 5.5                   | 12                      | •         | •   |
| HVR250P145C-RB | 0.145             | 0.29              | 250/60               | 3                 | 2.00 @ 1.00       | 1.00                | 4.5                   | 6.0                   | 14                      | •         | •   |
| HVR250P145CT   | 0.145             | 0.29              | 250/60               | 3                 | 2.00 @ 1.00       | 1.00                | 5.4                   | 7.5                   | 14                      | •         | •   |
| HVR250P180C    | 0.180             | 0.65              | 250/60               | 3                 | 21.00 @ 1.00      | 1.80                | 0.8                   | 2.0                   | 4                       | •         | •   |
| HVR250P180U    | 0.180             | 0.65              | 250/60               | 10                | 15.00 @ 1.00      | 1.80                | 0.8                   | 2.0                   | 4                       | •         | •   |
| HVR250P180CF   | 0.180             | 0.65              | 250/60               | 3                 | 21.00 @ 1.00      | 1.80                | 0.8                   | 2.2                   | 4                       | p         | •   |

\* V<sub>int.</sub>: Interrupt Voltage V<sub>op.</sub>: Operating Voltage(Vcd)  
\*\* typical value

NOTE:  
I<sub>hold</sub> = Hold current: maximum current device will pass without tripping in 20 °C still air.  
I<sub>trip</sub> = Trip current: minimum current at which the device will trip in 20 °C still air.  
I<sub>max.</sub> = Maximum fault current device can withstand without damage at rated voltage (V<sub>max.</sub>)

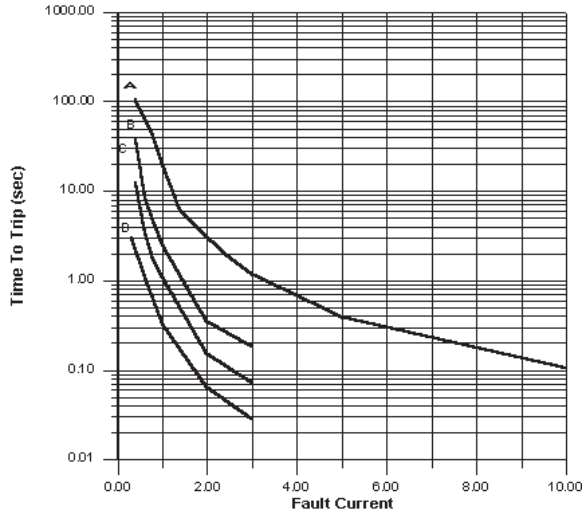
P<sub>d</sub> = Power dissipated from device when in the tripped state at 20 °C still air.  
R<sub>min.</sub> = Minimum resistance of device in initial (un-soldered) state.  
R<sub>1 max.</sub> = Maximum resistance of device at 20 °C measured one hour after tripping for 20 s.  
Caution: Operation beyond the specified rating may result in damage and possible arcing and flame.

|                   |      |              |       |           |
|-------------------|------|--------------|-------|-----------|
| Order Information | Qty. | Order-Number | Model | Packaging |
|-------------------|------|--------------|-------|-----------|

Specifications are subject to change without notice.

## No. HVR250

### Average time-current curve



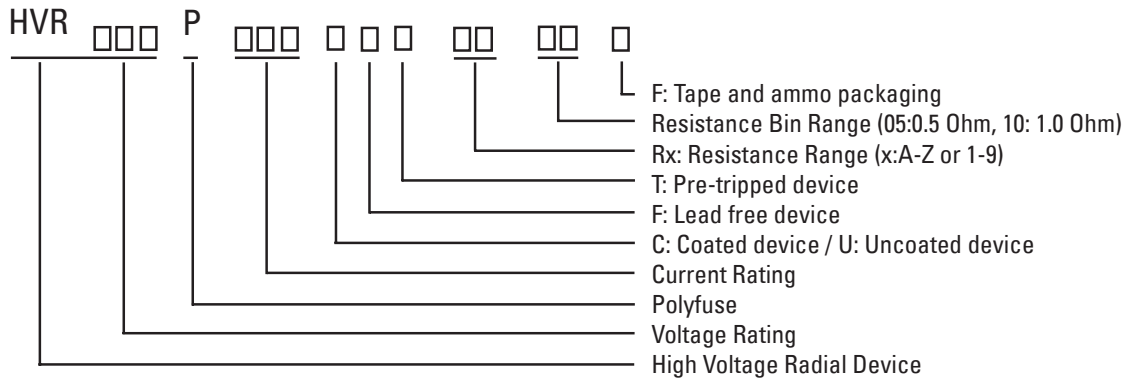
- A : HVR250P180C / HVR250P180F
- B : HVR250P145C
- C : HVR250P120C
- D : HVR250P080F

### Agency Specification

| Product     | Lightning                                 | Power Cross                             |
|-------------|---|---|
| HVR250P080F | ITU K.20/21/45 - 1.5 kV 10/700 $\mu$ s    | ITU K.20/21/45 - 230 V ac, 10 $\Omega$  |
| HVR250P120C | ITU K.20/21/45 - 4 kV 10/700 $\mu$ s      | ITU K.20/21/45 - 600 V ac, 600 $\Omega$ |
| HVR250P145C | ITU K.20/21/45 - 4 kV 10/700 $\mu$ s      | ITU K.20/21/45 - 600 V ac, 600 $\Omega$ |
| HVR250P180C | ITU K.20/21/45 - 1.5 kV 10/700 $\mu$ s    | ITU K.20/21/45 - 230 V ac, 10 $\Omega$  |
| HVR250P180F | ITU K.20/21/45 - 4 kV 10/700 $\mu$ s      | ITU K.20/21/45 - 600 V ac, 600 $\Omega$ |
|             | Telcordia GR-974 - 1.0 kV 10/1000 $\mu$ s | Telcordia GR-974 - 283 V ac, 10 A       |

select a specific part number for each application based on the agency request

### Part-numbering system



### Thermal Derating Chart

| Model         | Ambient Operation Temperature - $I_{hold}$ (A) |        |      |       |       |       |       |       |       |  |
|---------------|--|--------|------|-------|-------|-------|-------|-------|-------|--|
|               | -40 °C   | -20 °C | 0 °C | 23 °C | 40 °C | 50 °C | 60 °C | 70 °C | 85 °C |  |
| HVR250P080C/U | 0.12   | 0.11   | 0.09 | 0.08  | 0.06  | 0.05  | 0.05  | 0.04  | 0.03  |  |
| HVR250P080CF  | 0.12   | 0.11   | 0.09 | 0.08  | 0.06  | 0.05  | 0.05  | 0.04  | 0.03  |  |
| HVR250P110U   | 0.17   | 0.15   | 0.13 | 0.11  | 0.09  | 0.08  | 0.07  | 0.05  | 0.04  |  |
| HVR250P120C/U | 0.18   | 0.16   | 0.14 | 0.12  | 0.10  | 0.09  | 0.08  | 0.06  | 0.05  |  |
| HVR250P145C/U | 0.26   | 0.20   | 0.17 | 0.145 | 0.12  | 0.11  | 0.09  | 0.08  | 0.06  |  |
| HVR250P180C/U | 0.27   | 0.23   | 0.21 | 0.18  | 0.15  | 0.13  | 0.19  | 0.11  | 0.083 |  |
| HVR250P180CF  | 0.28   | 0.23   | 0.21 | 0.18  | 0.16  | 0.13  | 0.10  | 0.11  | 0.083 |  |