

## Surface Mount Transient Voltage Suppressors

### U3K Series

#### Description

U3K series TVS is designed for DC power supply equipment in outdoor exposure environment. It is used to replace the traditional PTC, GDT and TVS combination solution, which is widely used to DC12V to 76V

Working Voltage: 12 to 76 V

#### Features

- ◆ Glass passivated junction
- ◆ Bi-directional
- ◆ Excellent clamping capability
- ◆ Low slope resistance
- ◆ 3000A Peak Pulse power capability at 8/20us waveform
- ◆ Fast response time: typically less than 1.0ps from 0V to  $V_{BR}$  min
- ◆ High temperature soldering: 260°C/10s at terminals.
- ◆ ROHS Compliant



#### Functional Diagram



#### Applications

TVS devices are ideal for the protection of I/O interfaces,  $V_{CC}$  bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

#### Maximum Ratings and Thermal Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise noted)

| Parameter                                 | Symbol    | Value        | Units            |
|-------------------------------------------|-----------|--------------|------------------|
| Operating junction temperature range      | $T_J$     | - 55 to +125 | $^\circ\text{C}$ |
| Peak pulse current with a 8/20us waveform | $I_{PP}$  | 3000         | A                |
| Storage temperature range                 | $T_{STG}$ | - 55 to +150 | $^\circ\text{C}$ |

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#### Electrical Characteristics (@ 25°C Unless Otherwise Specified )

| Part Number | Stand-Off Voltage<br>$V_{MW}$<br>(V) | Breakdown Voltage<br>$V_{BR}$ (V) |       | Test Current<br>$I_T$<br>( $\mu A$ ) | Maximum Reverse Leakage<br>$I_R$<br>@ $V_{RWM}$ ( $\mu A$ ) | Maximum Reverse Surge Current<br>$I_{PP}$ (A) <sup>(1)</sup> | Maximum Clamping Voltage<br>$V_C$ @ $I_{PP}$ (V) |
|-------------|--------------------------------------|-----------------------------------|-------|--------------------------------------|-------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------|
|             |                                      | MIN.                              | MAX.  |                                      |                                                             |                                                              |                                                  |
| U3K-12C     | 12                                   | 13.00                             | 15.00 | 10                                   | 20                                                          | 3000                                                         | 22.0                                             |
| U3K-15C     | 15                                   | 16.00                             | 19.00 | 10                                   | 20                                                          | 3000                                                         | 28.0                                             |
| U3K-20C     | 20                                   | 22.00                             | 26.00 | 10                                   | 20                                                          | 3000                                                         | 36.0                                             |
| U3K-25C     | 25                                   | 27.00                             | 30.00 | 10                                   | 20                                                          | 3000                                                         | 45.0                                             |
| U3K-30C     | 30                                   | 32.00                             | 37.00 | 10                                   | 20                                                          | 3000                                                         | 90.0                                             |
| U3K-36C     | 36                                   | 39.00                             | 45.00 | 10                                   | 20                                                          | 3000                                                         | 98.0                                             |
| U3K-58C     | 58                                   | 64.00                             | 70.00 | 10                                   | 20                                                          | 3000                                                         | 110.0                                            |
| U3K-66C     | 66                                   | 72.00                             | 80.00 | 10                                   | 20                                                          | 3000                                                         | 120.0                                            |
| U3K-76C     | 76                                   | 85.00                             | 95.00 | 10                                   | 20                                                          | 3000                                                         | 140.0                                            |

NOTE1: Surge waveform: 8/20  $\mu s$

$V_R$  : Stand-off Voltage -- Maximum voltage that can be applied

$V_{BR}$ : Breakdown Voltage

$V_C$ : Clamping Voltage -- Peak voltage measured across the suppressor at a specified  $I_{PP}$

$I_R$ : Reverse Leakage Current

#### Ratings and Characteristics Curves ( $T_A=25^\circ C$ unless otherwise noted)

Figure 1 - Pulse Waveform

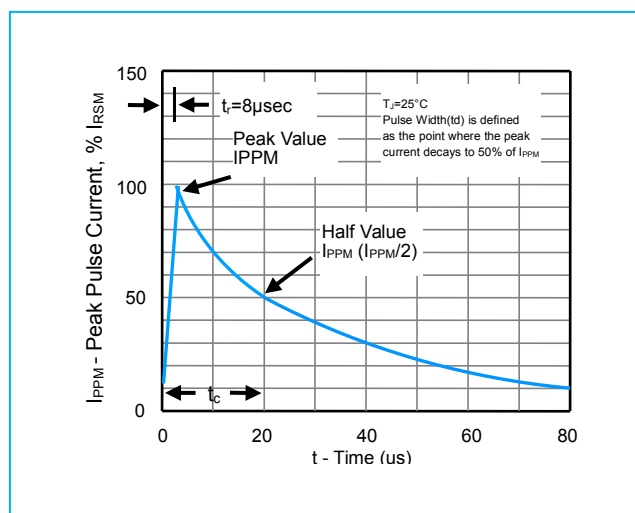
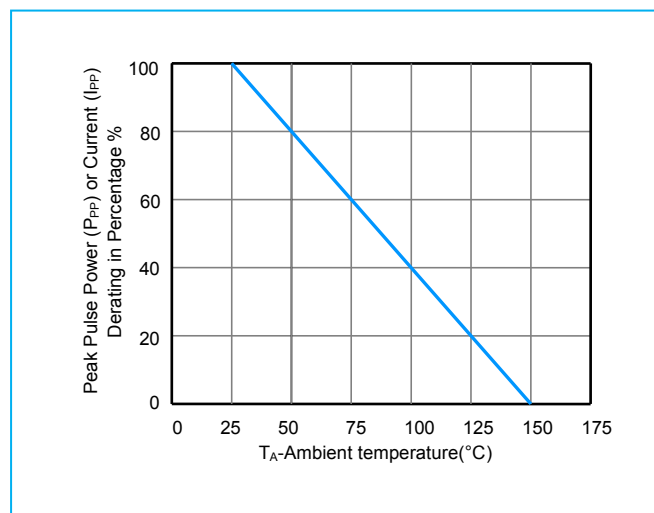


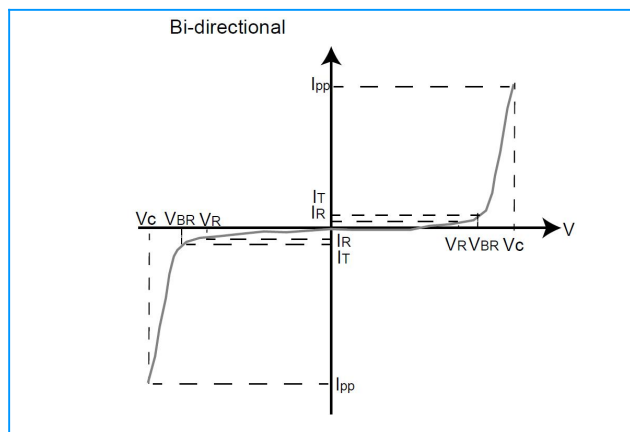
Figure 2 - Pulse Derating Curve



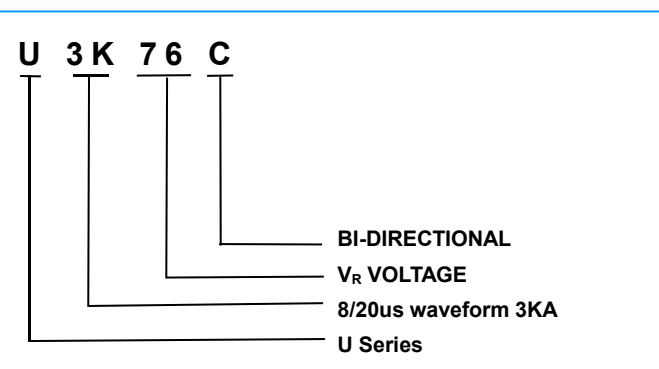
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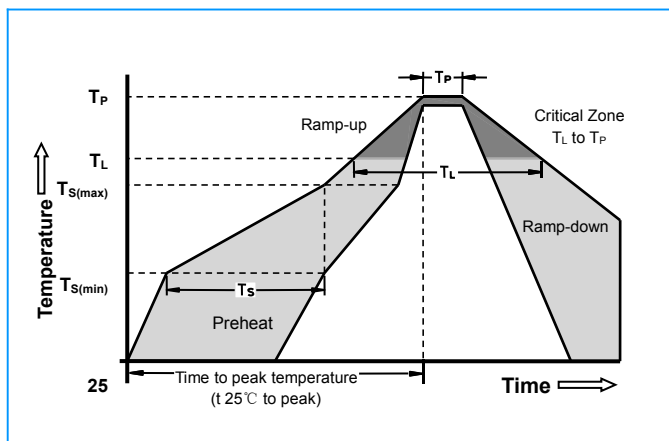
#### I-V Curve Characteristics



#### Part Numbering



#### Soldering Parameters

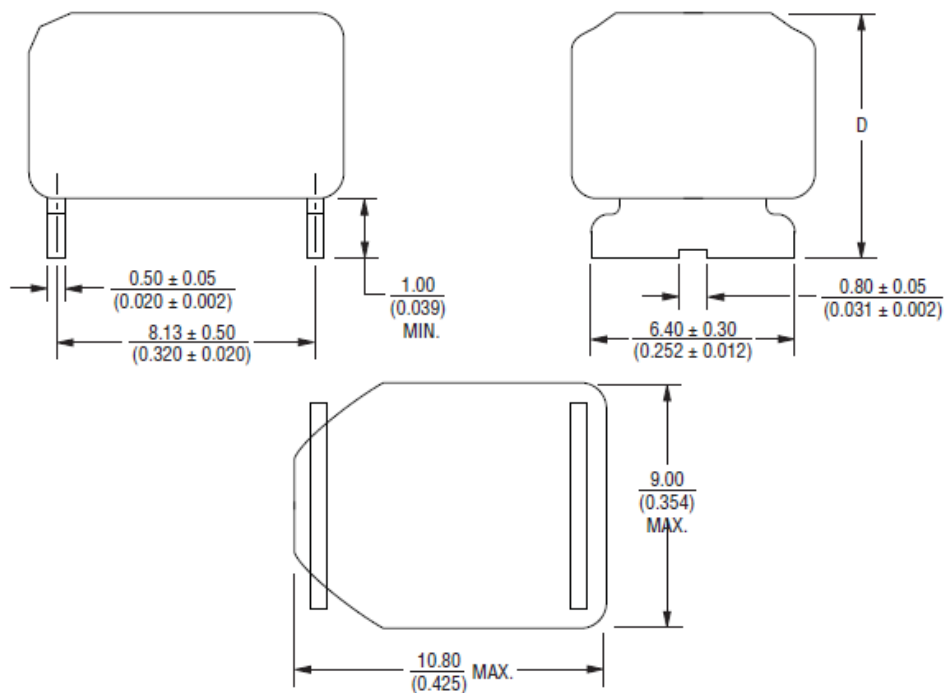


| Reflow Condition                                     |                                    | Lead-free assembly |
|------------------------------------------------------|------------------------------------|--------------------|
| Pre Heat                                             | -Temperature Min ( $T_{S(min)}$ )  | 150°C              |
|                                                      | -Temperature Max ( $T_{S(max)}$ )  | 200°C              |
|                                                      | - Time (min to max) ( $t_s$ )      | 60 -180 Seconds    |
| Average ramp up rate ( Liquidus Temp $T_L$ ) to peak |                                    | 3°C/second max     |
| $T_{S(max)}$ to $T_L$ - Ramp-up Rate                 |                                    | 3°C/second max     |
| Reflow                                               | - Temperature ( $T_L$ ) (Liquidus) | 217°C              |
|                                                      | - Time (min to max) ( $t_s$ )      | 60 -150 Seconds    |
| Peak Temperature ( $T_P$ )                           |                                    | 260 +0/-5°C        |
| Time within 5°C of actual peak Temperature ( $t_p$ ) |                                    | 30 Seconds         |
| Ramp-down Rate                                       |                                    | 6°C/second max     |
| Time 25°C to peak Temperature ( $T_P$ )              |                                    | 8 minutes Max      |
| Do not exceed                                        |                                    | 260°C              |

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#### Packaging



| Part Number | Dimension D       | Dimension:   |
|-------------|-------------------|--------------|
| U3K-12C     | $6.00 \pm 0.50$   | MM<br>INCHES |
| U3K-15C     | $0.311 \pm 0.020$ |              |
| U3K-20C     |                   |              |
| U3K-25C     | $7.00 \pm 0.50$   |              |
| U3K-30C     | $0.311 \pm 0.020$ |              |
| U3K-36C     |                   |              |
| U3K-58C     | $7.90 \pm 0.50$   |              |
| U3K-66C     | $0.311 \pm 0.020$ |              |
| U3K-76C     |                   |              |

| Part Number    | Case Type | Quantity | Packing Option |
|----------------|-----------|----------|----------------|
| U3K-XXC Series | TPS       | 126      | Box            |