

## Features

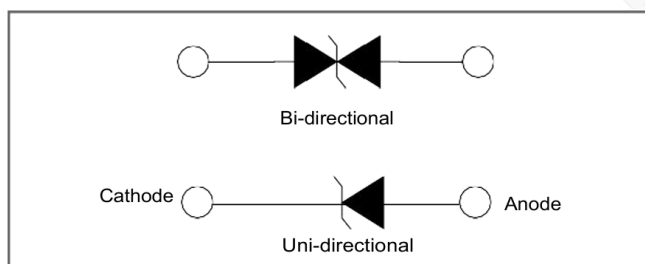
- ◆ 5000W peak pulse power capability at 10/1000  $\mu$  s waveform, repetition rate (duty cycles):0.01%
- ◆ Excellent clamping capability
- ◆ Typical failure mode is a short circuit condition for current events exceeding component rating
- ◆ Plastic package is flammability rated V-0 per UL-94
- ◆ Meet MSL level1, per J-STD-020, lead-frame maximum peak of 260°C



## Applications

TVS devices are ideal for the transient voltage clamp protection of I/O Interfaces, DC power line bus and other circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

## Function Diagram



| Maximum Ratings and Thermal Characteristics (TA=25°C unless otherwise noted) |                  |            |      |
|------------------------------------------------------------------------------|------------------|------------|------|
| Parameter                                                                    | Symbol           | Value      | Unit |
| Peak Pulse Power Dissipation at TA=25°C by 10/1000 $\mu$ s Waveform(Fig.3)   | P <sub>PPM</sub> | 5000       | W    |
| Power Dissipation on Infinite Heat Sink at T <sub>L</sub> =50°C              | P <sub>D</sub>   | 6.5        | W    |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 1)             | I <sub>FSM</sub> | 300        | A    |
| Maximum Instantaneous Forward Voltage at 100A for Unidirectional Only        | V <sub>F</sub>   | 5          | V    |
| Operating Temperature Range                                                  | T <sub>J</sub>   | -55 to 150 | °C   |
| Storage Temperature Range                                                    | T <sub>STG</sub> | -55 to 150 | °C   |

Notes:

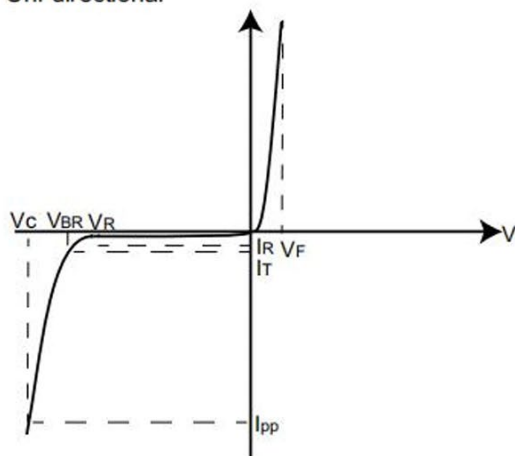
1. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum.

## Characteristics (T =25°C unless otherwise noted)

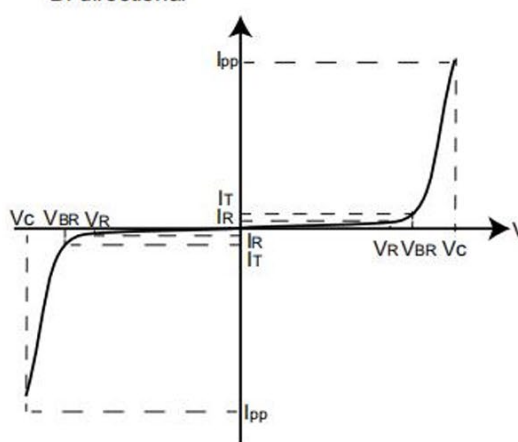
| Part Number<br>(Uni) | Part Number<br>(Bi) | Key Marking |       | Reverse<br>Stand<br>off<br>Voltage<br>V <sub>R</sub><br>(Volts) | Breakdown<br>Voltage V <sub>BR</sub><br>(Volts) @ I <sub>T</sub> |       | Test<br>Current<br>I <sub>T</sub><br>(mA) | Maximum<br>Clampin<br>g Voltage<br>V <sub>C</sub><br>@ I <sub>pp</sub> (V) | Maximum<br>Peak Pulse<br>Current I <sub>pp</sub><br>(A)<br>10/1000uS | Maximum<br>Reverse<br>Leakage<br>I <sub>R</sub> @ V <sub>R</sub><br>(μA) |
|----------------------|---------------------|-------------|-------|-----------------------------------------------------------------|------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------|--------------------------------------------------------------------------|
|                      |                     | UNI         | BI    |                                                                 | MIN                                                              | MAX   |                                           |                                                                            |                                                                      |                                                                          |
| 5.0SMDJ5.0A          | 5.0SMDJ5.0CA        | 5D005       | 5D005 | 5.0                                                             | 6.40                                                             | 7.00  | 10                                        | 9.2                                                                        | 543.5                                                                | 800                                                                      |
| 5.0SMDJ6.0A          | 5.0SMDJ6.0CA        | 5D006       | 5D006 | 6.0                                                             | 6.67                                                             | 7.37  | 10                                        | 10.3                                                                       | 485.5                                                                | 500                                                                      |
| 5.0SMDJ6.5A          | 5.0SMDJ6.5CA        | 5D06F       | 5D06F | 6.5                                                             | 7.22                                                             | 7.98  | 10                                        | 11.2                                                                       | 446.5                                                                | 400                                                                      |
| 5.0SMDJ7.0A          | 5.0SMDJ7.0CA        | 5D007       | 5D007 | 7.0                                                             | 7.78                                                             | 8.60  | 10                                        | 12.0                                                                       | 416.7                                                                | 300                                                                      |
| 5.0SMDJ7.5A          | 5.0SMDJ7.5CA        | 5D07F       | 5D07F | 7.5                                                             | 8.33                                                             | 9.21  | 1                                         | 12.9                                                                       | 387.7                                                                | 200                                                                      |
| 5.0SMDJ8.0A          | 5.0SMDJ8.0CA        | 5D008       | 5D008 | 8.0                                                             | 8.89                                                             | 9.83  | 1                                         | 13.6                                                                       | 367.7                                                                | 200                                                                      |
| 5.0SMDJ8.5A          | 5.0SMDJ8.5CA        | 5D08F       | 5D08F | 8.5                                                             | 9.44                                                             | 10.4  | 1                                         | 14.4                                                                       | 347.2                                                                | 100                                                                      |
| 5.0SMDJ9.0A          | 5.0SMDJ9.0CA        | 5D009       | 5D009 | 9.0                                                             | 10.0                                                             | 11.1  | 1                                         | 15.4                                                                       | 324.7                                                                | 100                                                                      |
| 5.0SMDJ10A           | 5.0SMDJ10CA         | 5D010       | 5D010 | 10.0                                                            | 11.1                                                             | 12.3  | 1                                         | 17.0                                                                       | 294.2                                                                | 50                                                                       |
| 5.0SMDJ11A           | 5.0SMDJ11CA         | 5D011       | 5D011 | 11.0                                                            | 12.2                                                             | 13.5  | 1                                         | 18.2                                                                       | 274.7                                                                | 30                                                                       |
| 5.0SMDJ12A           | 5.0SMDJ12CA         | 5D012       | 5D012 | 12.0                                                            | 13.3                                                             | 14.7  | 10                                        | 19.9                                                                       | 252.0                                                                | 20                                                                       |
| 5.0SMDJ13A           | 5.0SMDJ13CA         | 5D013       | 5D013 | 13.0                                                            | 14.4                                                             | 15.9  | 10                                        | 21.5                                                                       | 233.0                                                                | 10                                                                       |
| 5.0SMDJ14A           | 5.0SMDJ14CA         | 5D014       | 5D014 | 14.0                                                            | 15.6                                                             | 17.2  | 10                                        | 23.2                                                                       | 216.0                                                                | 10                                                                       |
| 5.0SMDJ15A           | 5.0SMDJ15CA         | 5D015       | 5D015 | 15.0                                                            | 16.7                                                             | 18.5  | 1                                         | 24.4                                                                       | 205.0                                                                | 5                                                                        |
| 5.0SMDJ16A           | 5.0SMDJ16CA         | 5D016       | 5D016 | 16.0                                                            | 17.8                                                             | 19.7  | 1                                         | 26.0                                                                       | 193.0                                                                | 5                                                                        |
| 5.0SMDJ17A           | 5.0SMDJ17CA         | 5D017       | 5D017 | 17.0                                                            | 18.9                                                             | 20.9  | 1                                         | 27.6                                                                       | 181.0                                                                | 5                                                                        |
| 5.0SMDJ18A           | 5.0SMDJ18CA         | 5D018       | 5D018 | 18.0                                                            | 20.0                                                             | 22.1  | 1                                         | 29.2                                                                       | 172.0                                                                | 5                                                                        |
| 5.0SMDJ20A           | 5.0SMDJ20CA         | 5D020       | 5D020 | 20.0                                                            | 22.2                                                             | 24.5  | 1                                         | 32.4                                                                       | 155.0                                                                | 5                                                                        |
| 5.0SMDJ22A           | 5.0SMDJ22CA         | 5D022       | 5D022 | 22.0                                                            | 24.4                                                             | 26.9  | 1                                         | 35.5                                                                       | 141.0                                                                | 5                                                                        |
| 5.0SMDJ24A           | 5.0SMDJ24CA         | 5D024       | 5D024 | 24.0                                                            | 26.7                                                             | 29.5  | 1                                         | 38.9                                                                       | 129.0                                                                | 5                                                                        |
| 5.0SMDJ26A           | 5.0SMDJ26CA         | 5D026       | 5D026 | 26.0                                                            | 28.9                                                             | 31.9  | 1                                         | 42.1                                                                       | 119.0                                                                | 5                                                                        |
| 5.0SMDJ28A           | 5.0SMDJ28CA         | 5D028       | 5D028 | 28.0                                                            | 31.1                                                             | 34.4  | 1                                         | 45.4                                                                       | 110.0                                                                | 5                                                                        |
| 5.0SMDJ30A           | 5.0SMDJ30CA         | 5D030       | 5D030 | 30.0                                                            | 33.3                                                             | 36.8  | 1                                         | 48.4                                                                       | 103.0                                                                | 5                                                                        |
| 5.0SMDJ33A           | 5.0SMDJ33CA         | 5D033       | 5D033 | 33.0                                                            | 36.7                                                             | 40.6  | 1                                         | 53.3                                                                       | 93.9                                                                 | 5                                                                        |
| 5.0SMDJ36A           | 5.0SMDJ36CA         | 5D036       | 5D036 | 36.0                                                            | 40.0                                                             | 44.2  | 1                                         | 58.1                                                                       | 86.1                                                                 | 5                                                                        |
| 5.0SMDJ40A           | 5.0SMDJ40CA         | 5D040       | 5D040 | 40.0                                                            | 44.4                                                             | 49.1  | 1                                         | 64.5                                                                       | 77.6                                                                 | 5                                                                        |
| 5.0SMDJ43A           | 5.0SMDJ43CA         | 5D043       | 5D043 | 43.0                                                            | 47.8                                                             | 52.8  | 1                                         | 69.4                                                                       | 72.1                                                                 | 5                                                                        |
| 5.0SMDJ45A           | 5.0SMDJ45CA         | 5D045       | 5D045 | 45.0                                                            | 50.0                                                             | 55.3  | 1                                         | 72.7                                                                       | 68.8                                                                 | 5                                                                        |
| 5.0SMDJ48A           | 5.0SMDJ48CA         | 5D048       | 5D048 | 48.0                                                            | 53.3                                                             | 58.9  | 1                                         | 77.4                                                                       | 64.7                                                                 | 5                                                                        |
| 5.0SMDJ51A           | 5.0SMDJ51CA         | 5D051       | 5D051 | 51.0                                                            | 56.7                                                             | 62.7  | 1                                         | 82.4                                                                       | 60.7                                                                 | 5                                                                        |
| 5.0SMDJ54A           | 5.0SMDJ54CA         | 5D054       | 5D054 | 54.0                                                            | 60.0                                                             | 66.3  | 1                                         | 87.1                                                                       | 57.5                                                                 | 5                                                                        |
| 5.0SMDJ58A           | 5.0SMDJ58CA         | 5D058       | 5D058 | 58.0                                                            | 64.4                                                             | 71.2  | 1                                         | 93.6                                                                       | 53.5                                                                 | 5                                                                        |
| 5.0SMDJ60A           | 5.0SMDJ60CA         | 5D060       | 5D060 | 60.0                                                            | 66.7                                                             | 73.7  | 1                                         | 96.8                                                                       | 51.7                                                                 | 5                                                                        |
| 5.0SMDJ64A           | 5.0SMDJ64CA         | 5D064       | 5D064 | 64.0                                                            | 71.1                                                             | 78.6  | 1                                         | 103.0                                                                      | 48.6                                                                 | 5                                                                        |
| 5.0SMDJ70A           | 5.0SMDJ70CA         | 5D070       | 5D070 | 70.0                                                            | 77.8                                                             | 86.0  | 1                                         | 113.0                                                                      | 44.3                                                                 | 5                                                                        |
| 5.0SMDJ75A           | 5.0SMDJ75CA         | 5D075       | 5D075 | 75.0                                                            | 83.3                                                             | 92.1  | 1                                         | 121.0                                                                      | 41.4                                                                 | 5                                                                        |
| 5.0SMDJ78A*          | 5.0SMDJ78CA*        | 5D078       | 5D078 | 78.0                                                            | 86.7                                                             | 95.8  | 1                                         | 126.0                                                                      | 39.7                                                                 | 5                                                                        |
| 5.0SMDJ85A*          | 5.0SMDJ85CA*        | 5D085       | 5D085 | 85.0                                                            | 94.4                                                             | 104.0 | 1                                         | 137.0                                                                      | 36.5                                                                 | 5                                                                        |
| 5.0SMDJ90A*          | 5.0SMDJ90CA*        | 5D090       | 5D090 | 90.0                                                            | 100.0                                                            | 111.0 | 1                                         | 146.0                                                                      | 34.3                                                                 | 5                                                                        |
| 5.0SMDJ100A          | 5.0SMDJ100CA        | 5D100       | 5D100 | 100.0                                                           | 111.0                                                            | 123.0 | 1                                         | 162.0                                                                      | 30.9                                                                 | 5                                                                        |
| 5.0SMDJ110A*         | 5.0SMDJ110CA*       | 5D110       | 5D110 | 110.0                                                           | 122.0                                                            | 135.0 | 1                                         | 177.0                                                                      | 28.3                                                                 | 5                                                                        |
| 5.0SMDJ120A*         | 5.0SMDJ120CA*       | 5D120       | 5D120 | 120.0                                                           | 133.0                                                            | 147.0 | 1                                         | 193.0                                                                      | 26.0                                                                 | 5                                                                        |
| 5.0SMDJ130A*         | 5.0SMDJ130CA*       | 5D130       | 5D130 | 130.0                                                           | 144.0                                                            | 159.0 | 1                                         | 209.0                                                                      | 24.0                                                                 | 5                                                                        |
| 5.0SMDJ140A*         | 5.0SMDJ140CA*       | 5D140       | 5D140 | 140.0                                                           | 156.0                                                            | 172.0 | 1                                         | 226.1                                                                      | 22.2                                                                 | 5                                                                        |
| 5.0SMDJ150A*         | 5.0SMDJ150CA*       | 5D150       | 5D150 | 150.0                                                           | 167.0                                                            | 185.0 | 1                                         | 243.0                                                                      | 20.6                                                                 | 5                                                                        |
| 5.0SMDJ160A*         | 5.0SMDJ160CA*       | 5D160       | 5D160 | 160.0                                                           | 178.0                                                            | 197.0 | 1                                         | 259.0                                                                      | 19.3                                                                 | 5                                                                        |
| 5.0SMDJ170A*         | 5.0SMDJ170CA*       | 5D170       | 5D170 | 170.0                                                           | 189.0                                                            | 209.0 | 1                                         | 275.0                                                                      | 18.2                                                                 | 5                                                                        |

## I-V Curve Characteristics

Uni-directional



Bi-directional



$P_{PPM}$  Peak Pulse Power Dissipation -- Max power dissipation

$V_R$  Stand-off Voltage -- Maximum voltage that can be applied to the TVS without operation

$V_{BR}$  Breakdown Voltage -- Maximum voltage that flows through the TVS at a specified test current ( $I_T$ )

$V_C$  Clamping Voltage -- Peak voltage measured across the TVS at a specified  $I_{PPM}$  (peak impulse current)

$I_R$  Reverse Leakage Current -- Current measured at  $V_R$

$V_{BR}$  Forward Voltage Drop for Uni-directional

## Ratings and Characteristic Curves (T = 25°C unless otherwise noted)

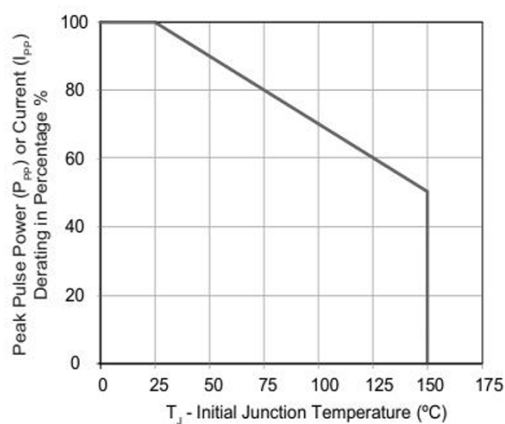


Figure 1. Peak pulse power derating curve

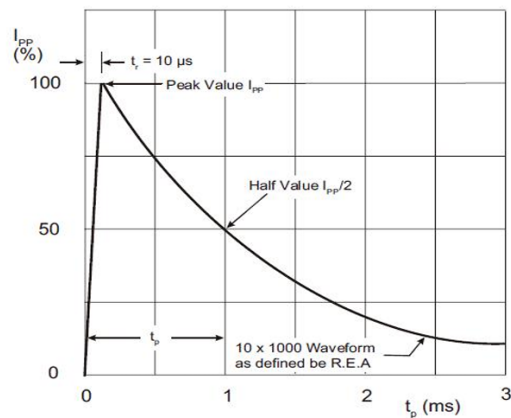


Figure 2. Pulse waveform

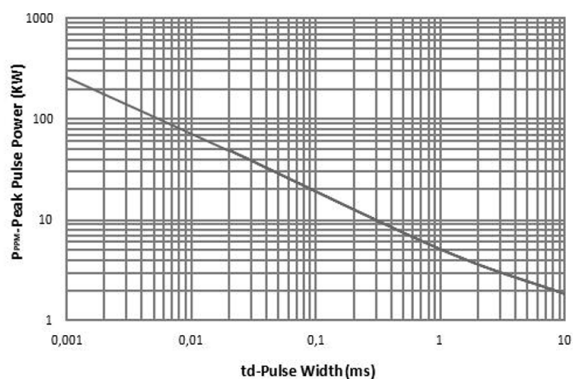


Figure 3. Peak pulse power rating curve

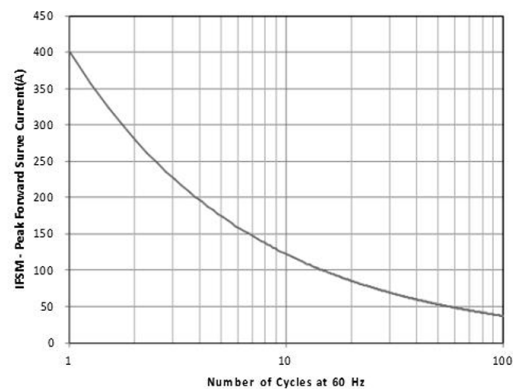
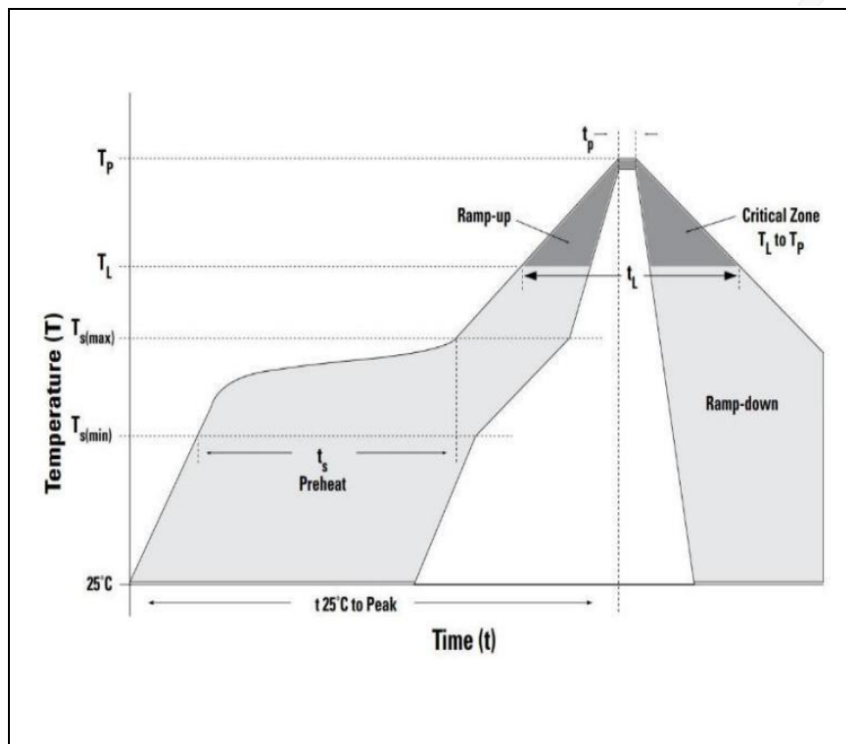


Figure 4. Maximum non-repetitive surge current

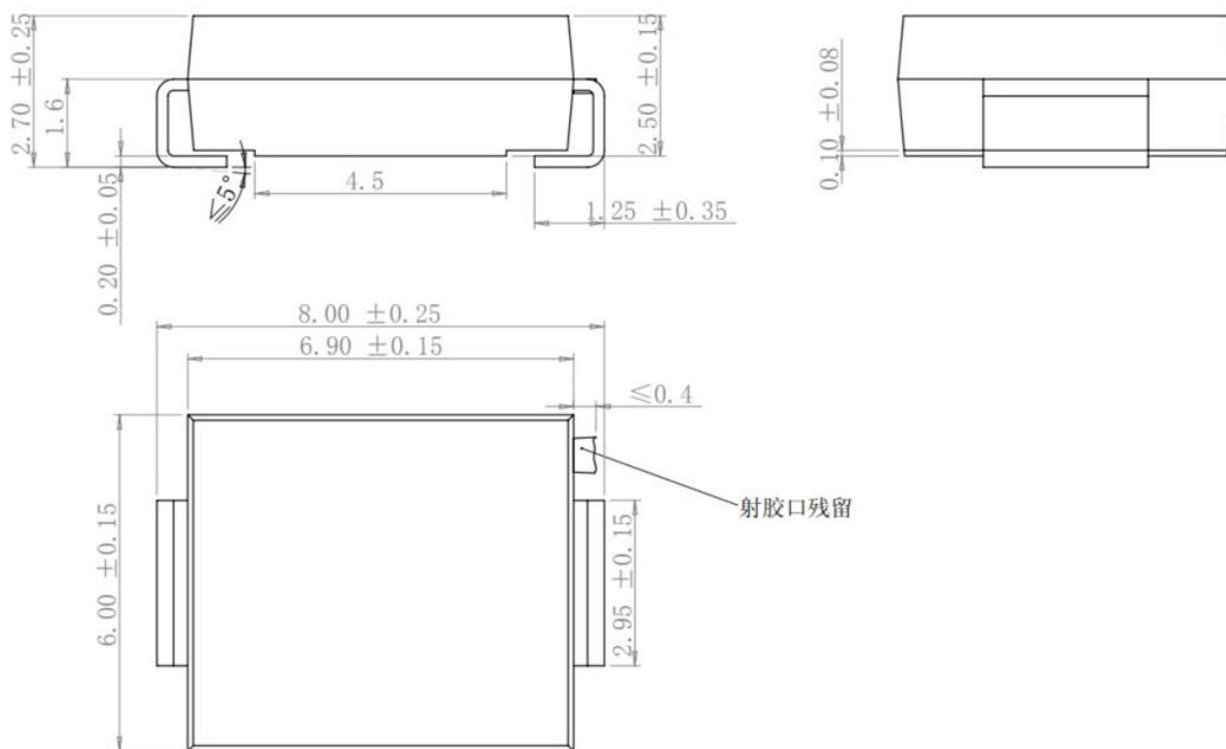
## Soldering Parameters

| 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 – 120 secs      |
| Average ramp up rate (Liquidus Temp ( $T_A$ ) to peak |                                    | 3°C/second max     |
| $T_{s(max)}$ to $T_A$ - Ramp-up Rate                  |                                    | 3°C/second max     |
| Reflow                                                | - Temperature ( $T_A$ ) (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 ( $t_p$ )  |                                    | 20 – 40 seconds    |
| Ramp-down Rate                                        |                                    | 6°C/second max     |
| Time 25°C to peak Temperature ( $T_P$ )               |                                    | 8 minutes Max.     |
| Do not exceed                                         |                                    | 260°C              |

## Soldering profile



## Dimensions



## Part Numbering

5.0SMDJ XX XX

A: Uni-directional  
CA: Bi-directional

Reverse Standard off Voltage  $V_R$

Product series

Product Type Marking Code

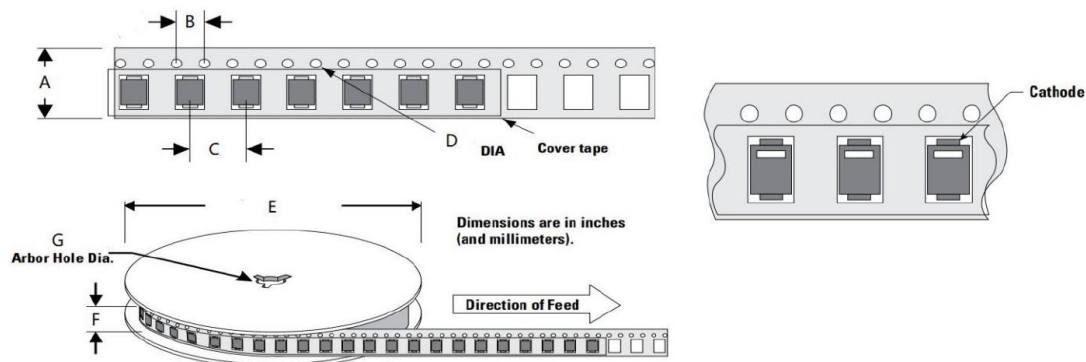


Cathode band  
(for uni-directional products only)

## Packing

| Part number | Package name | Small packing quantity | Packing method |
|-------------|--------------|------------------------|----------------|
| 5.0SMDJXXXX | DO-214AB     | 3000                   | Tape & Reel    |

## Tape and Reel Specification



| Symbol | Millimeter        |
|--------|-------------------|
| A      | $16.00 \pm 0.10$  |
| B      | $4.00 \pm 0.10$   |
| C      | $8.00 \pm 0.10$   |
| D      | $1.55 \pm 0.05$   |
| E      | $330.20 \pm 2.00$ |
| F      | $19.70 \pm 2.00$  |
| G      | $13.30 \pm 0.30$  |

## Revision history of Specification

| Version | Change Items    | Effective Date |
|---------|-----------------|----------------|
| 1.0     | Initial Release | 8-1-2022       |