

Features

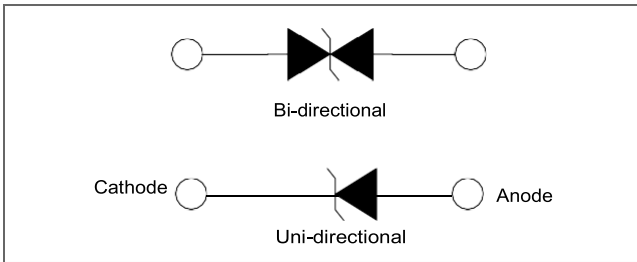
- 3000W peak pulse power capability at 10/1000µs waveform, repetition rate (duty cycles):0.01%
- Excellent clamping capability
- Typical failure mode is a short circuit condition for current events exceeding component rating
- Plastic package is flammability rated V-0 per UL-94
- Meet MSL level1, per J-STD-020, lead-frame maximum peak of 260°C
- High reliability application and automotive grade AEC-Q101 qualified



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 (T _A =25°C unless otherwise noted) | | | |
|---|------------------|------------|------|
| Parameter | Symbol | Value | Unit |
| Peak Pulse Power Dissipation at T _A =25°C by 10/1000µs Waveform (Fig.3) | P _{PPM} | 3000 | W |
| Power Dissipation on Infinite Heat Sink at T _L =50°C | P _D | 6.5 | W |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 1) | I _{FSM} | 300 | A |
| Maximum Instantaneous Forward Voltage at 50A for Unidirectional Only(Note 2) | V _F | 3.5/5 | V |
| Operating Temperature Range | T _J | -55 to 150 | °C |
| Storage Temperature Range | T _{STG} | -55 to 150 | °C |

| AGENCY | AGENCY FILE NUMBER |
|--------|--------------------|
| | Pending |

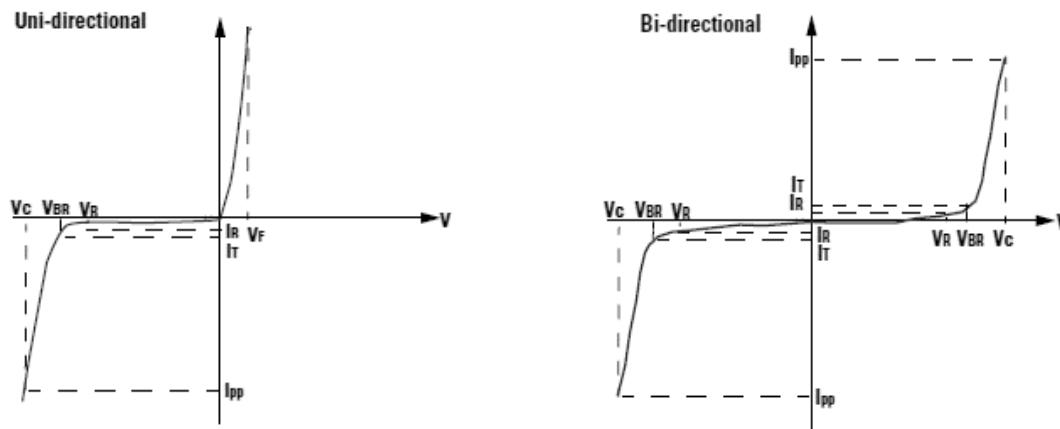
Notes:

1. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum.
2. V_F < 3.5V for single die parts and V_F < 5V for stacked-die parts.

Characteristics (T = 25°C unless otherwise noted)

| Part Number (Uni) | Part Number (Bi) | Key Marking | | Reverse Stand off Voltage V _R (Volts) | Breakdown Voltage V _{BR} (Volts) @ I _T | | Test Current I _T (mA) | Maximum Clamping Voltage V _C @ I _{nn} (V) | Maximum Peak Pulse Current I _{pp} (A) | Maximum Reverse Leakag I _R @ V _R (μA) | Agency Approval  |
|----------------------|---------------------|-------------|-------|---|---|--------|--|---|--|--|---|
| | | UNI | BI | | MIN | MAX | | | | | |
| TPSMD10A | TPSMD10CA | AD010 | AD010 | 10.0 | 11.10 | 12.30 | 1 | 17.0 | 176.5 | 5 | |
| TPSMD11A | TPSMD11CA | AD011 | AD011 | 11.0 | 12.20 | 13.50 | 1 | 18.2 | 164.8 | 2 | |
| TPSMD12A | TPSMD12CA | AD012 | AD012 | 12.0 | 13.30 | 14.70 | 1 | 19.9 | 150.8 | 2 | |
| TPSMD13A | TPSMD13CA | AD013 | AD013 | 13.0 | 14.40 | 15.90 | 1 | 21.5 | 139.5 | 2 | |
| TPSMD14A | TPSMD14CA | AD014 | AD014 | 14.0 | 15.60 | 17.20 | 1 | 23.2 | 129.3 | 2 | |
| TPSMD15A | TPSMD15CA | AD015 | AD015 | 15.0 | 16.70 | 18.50 | 1 | 24.4 | 123.0 | 2 | |
| TPSMD16A | TPSMD16CA | AD016 | AD016 | 16.0 | 17.80 | 19.70 | 1 | 26.0 | 115.4 | 2 | |
| TPSMD17A | TPSMD17CA | AD017 | AD017 | 17.0 | 18.90 | 20.90 | 1 | 27.6 | 108.7 | 2 | |
| TPSMD18A | TPSMD18CA | AD018 | AD018 | 18.0 | 20.00 | 22.10 | 1 | 29.2 | 102.7 | 2 | |
| TPSMD20A | TPSMD20CA | AD020 | AD020 | 20.0 | 22.20 | 24.50 | 1 | 32.4 | 92.6 | 2 | |
| TPSMD22A | TPSMD22CA | AD022 | AD022 | 22.0 | 24.40 | 26.90 | 1 | 35.5 | 84.5 | 2 | |
| TPSMD24A | TPSMD24CA | AD024 | AD024 | 24.0 | 26.70 | 29.50 | 1 | 38.9 | 77.1 | 2 | |
| TPSMD26A | TPSMD26CA | AD026 | AD026 | 26.0 | 28.90 | 31.90 | 1 | 42.1 | 71.3 | 2 | |
| TPSMD28A | TPSMD28CA | AD028 | AD028 | 28.0 | 31.10 | 34.40 | 1 | 45.4 | 66.1 | 2 | |
| TPSMD30A | TPSMD30CA | AD030 | AD030 | 30.0 | 33.30 | 36.80 | 1 | 48.4 | 62.0 | 2 | |
| TPSMD33A | TPSMD33CA | AD033 | AD033 | 33.0 | 36.70 | 40.60 | 1 | 53.3 | 56.3 | 2 | |
| TPSMD36A | TPSMD36CA | AD036 | AD036 | 36.0 | 40.00 | 44.20 | 1 | 58.1 | 51.6 | 2 | |
| TPSMD40A | TPSMD40CA | AD040 | AD040 | 40.0 | 44.40 | 49.10 | 1 | 64.5 | 46.5 | 2 | |
| TPSMD43A | TPSMD43CA | AD043 | AD043 | 43.0 | 47.80 | 52.80 | 1 | 69.4 | 43.2 | 2 | |
| TPSMD45A | TPSMD45CA | AD045 | AD045 | 45.0 | 50.00 | 55.30 | 1 | 72.7 | 41.3 | 2 | |
| TPSMD48A | TPSMD48CA | AD048 | AD048 | 48.0 | 53.30 | 58.90 | 1 | 77.4 | 38.8 | 2 | |
| TPSMD51A | TPSMD51CA | AD051 | AD051 | 51.0 | 56.70 | 62.70 | 1 | 82.4 | 36.4 | 2 | |
| TPSMD54A | TPSMD54CA | AD054 | AD054 | 54.0 | 60.00 | 66.30 | 1 | 87.1 | 34.4 | 2 | |
| TPSMD58A | TPSMD58CA | AD058 | AD058 | 58.0 | 64.40 | 71.20 | 1 | 93.6 | 32.1 | 2 | |
| TPSMD60A | TPSMD60CA | AD060 | AD060 | 60.0 | 66.70 | 73.70 | 1 | 96.8 | 31.0 | 2 | |
| TPSMD64A | TPSMD64CA | AD064 | AD064 | 64.0 | 71.10 | 78.60 | 1 | 103.0 | 29.1 | 2 | |
| TPSMD70A | TPSMD70CA | AD070 | AD070 | 70.0 | 77.80 | 86.00 | 1 | 113.0 | 26.5 | 2 | |
| TPSMD75A | TPSMD75CA | AD075 | AD075 | 75.0 | 83.30 | 92.10 | 1 | 121.0 | 24.8 | 2 | |
| TPSMD78A | TPSMD78CA | AD078 | AD078 | 78.0 | 86.70 | 95.80 | 1 | 126.0 | 23.8 | 2 | |
| TPSMD85A | TPSMD85CA | AD085 | AD085 | 85.0 | 94.40 | 104.00 | 1 | 137.0 | 21.9 | 2 | |

I-V Curve Characteristics



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

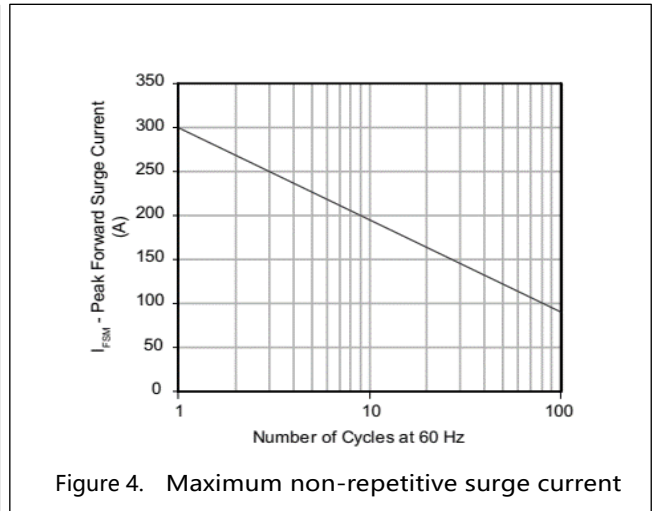
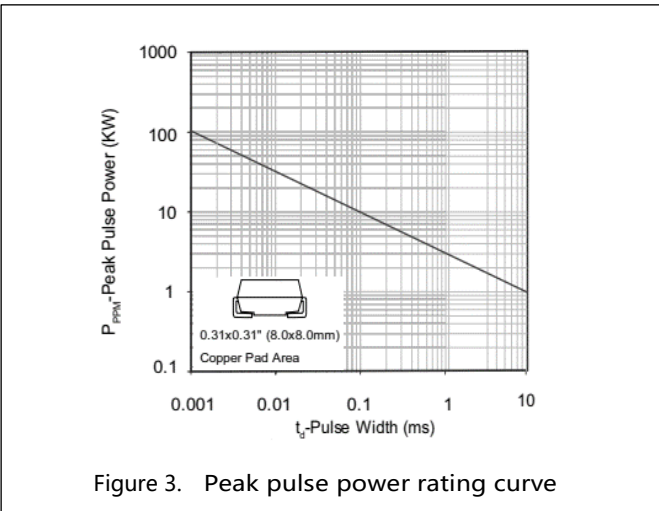
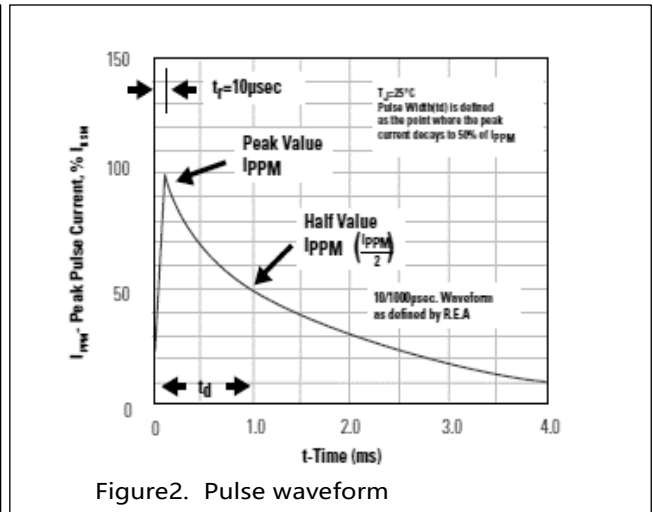
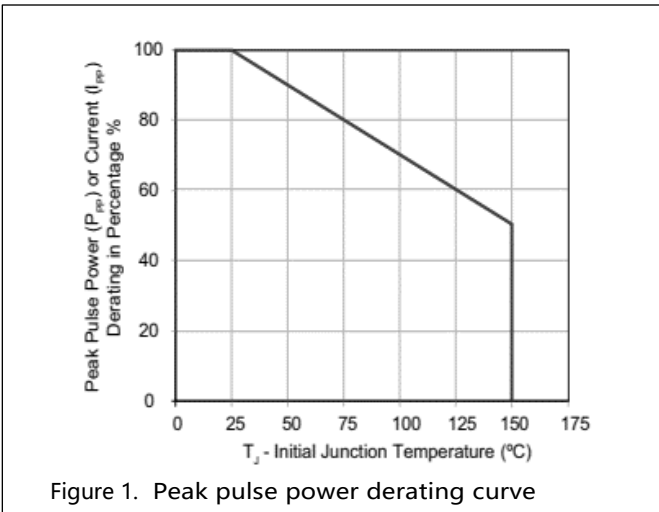
V_{BR} Breakdown Voltage -- Maximum voltage that flows through the TVS at a specified test current (I_T)

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_F Forward Voltage Drop for Uni-directional

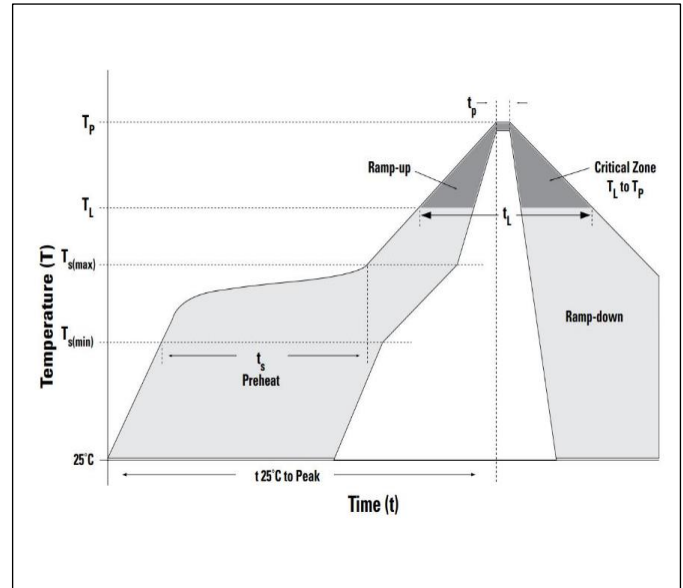
Ratings and Characteristic Curves (T = 25°C unless otherwise noted)



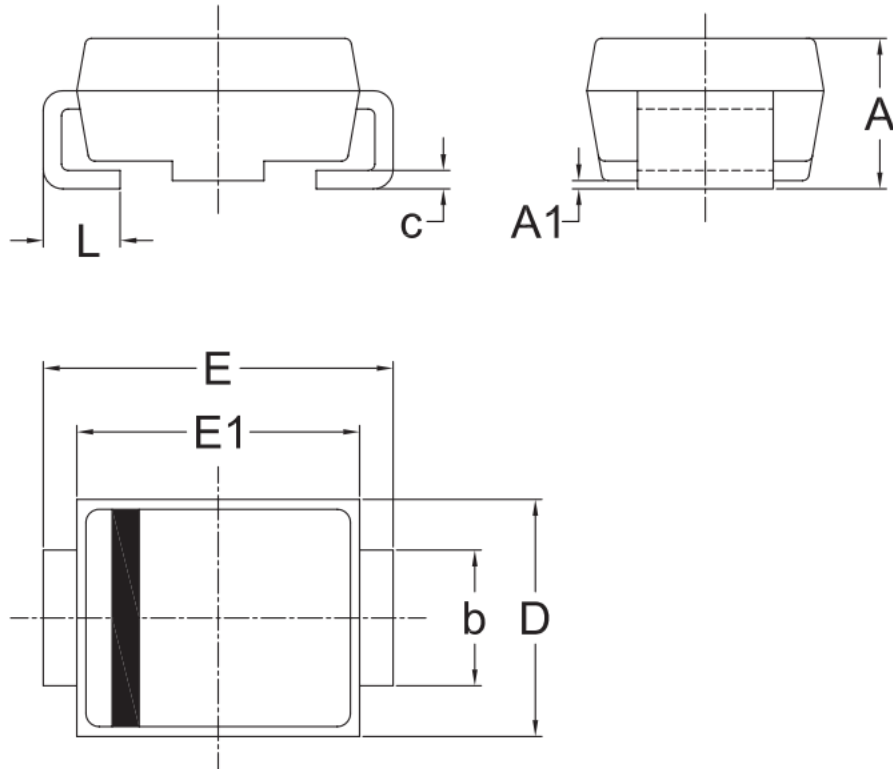
Soldering Parameters

| | | |
|--|------------------------------------|-------------------------|
| 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



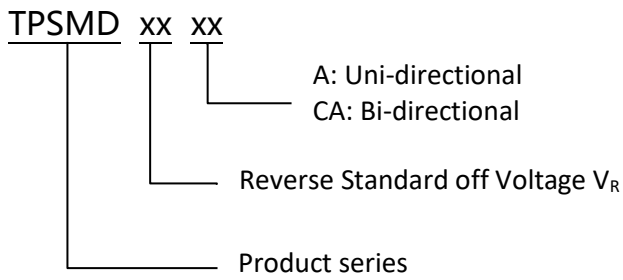
Dimensions



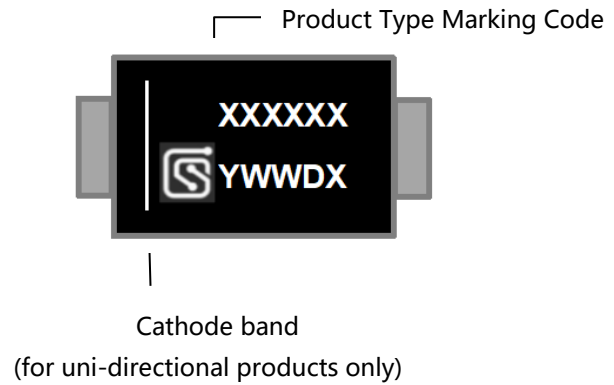
| UNIT | A | A1 | b | c | D | E | E1 | L | |
|------|-----|------|------|------|------|------|------|------|------|
| mm | Max | 2.83 | 0.30 | 3.10 | 0.25 | 6.15 | 8.15 | 7.05 | 1.60 |
| | Min | 2.33 | 0.00 | 2.80 | 0.15 | 5.85 | 7.65 | 6.75 | 0.90 |

Remark: Dimensions D and E1 do not include mold flash & gate remain.

Part Numbering



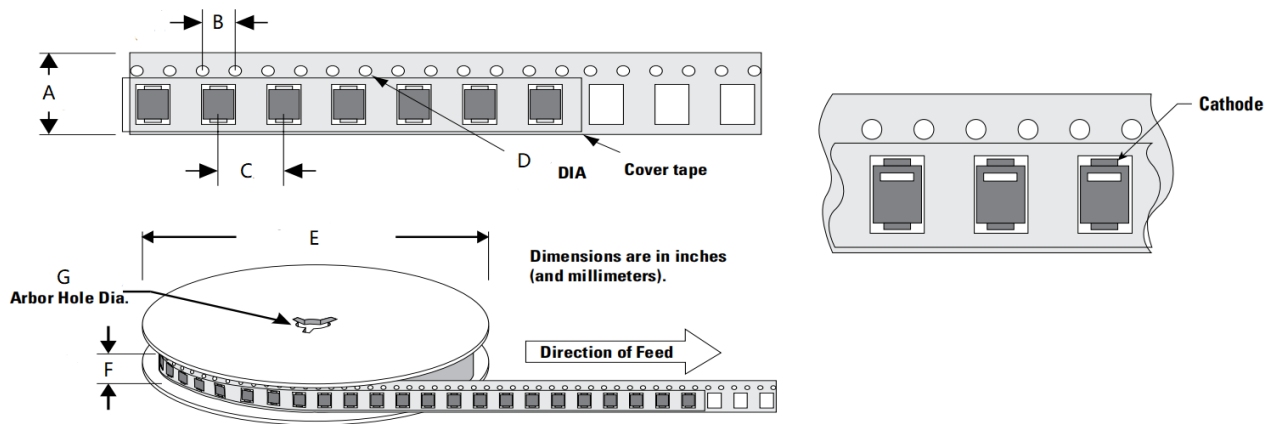
Part Marking



Packing

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

Tape and Reel Specification



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

Revision history of Specification

| Version | Change Items | Effective Date |
|---------|-----------------|----------------|
| 1.0 | Initial Release | 13-Aug-2021 |

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