

Features

- 400W 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

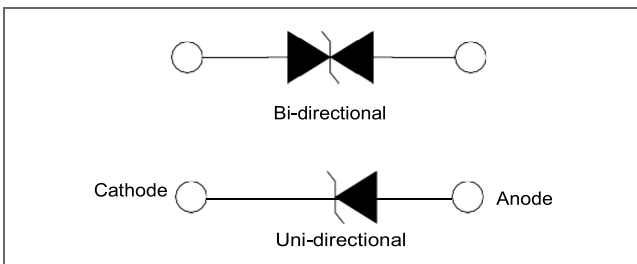
RoHS
Compliant



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} | 400 | W |
| Power Dissipation on Infinite Heat Sink at T _L =50°C | P _D | 3.3 | W |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 1) | I _{FSM} | 60 | A |
| Maximum Instantaneous Forward Voltage at 50A for Unidirectional Only(Note 2) | V _F | 3.5 | 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 _{DD} (V) | Maximum Peak Pulse Current I _{PP} (A) | Maximum Reverse Leakage I _R @ V _R (μA) | Agency Approval  |
|----------------------|---------------------|-------------|------|---|--|-------|--|---|--|--|---|
| | | UNI | BI | | MIN | MAX | | | | | |
| \ | SMAJ5.0CA | \ | 005C | 5.0 | 6.40 | 7.00 | 10 | 9.2 | 43.5 | 400 | |
| SMAJ5.0A | \ | 005A | \ | 5.0 | 6.40 | 7.00 | 10 | 9.2 | 43.5 | 100 | |
| \ | SMAJ6.0CA | \ | 006C | 6.0 | 6.67 | 7.37 | 10 | 10.3 | 38.8 | 400 | |
| SMAJ6.0A | \ | 006A | \ | 6.0 | 6.67 | 7.37 | 10 | 10.3 | 38.8 | 100 | |
| \ | SMAJ6.5CA | \ | 06FC | 6.5 | 7.22 | 7.98 | 10 | 11.2 | 35.7 | 150 | |
| SMAJ6.5A | \ | 06FA | \ | 6.5 | 7.22 | 7.98 | 10 | 11.2 | 35.7 | 80 | |
| SMAJ7.0A | SMAJ7.0CA | 007A | 007C | 7.0 | 7.78 | 8.60 | 10 | 12.0 | 33.3 | 60 | |
| SMAJ7.5A | SMAJ7.5CA | 07FA | 07FC | 7.5 | 8.33 | 9.21 | 1 | 12.9 | 31.0 | 50 | |
| SMAJ8.0A | SMAJ8.0CA | 008A | 008C | 8.0 | 8.89 | 9.83 | 1 | 13.6 | 29.4 | 30 | |
| SMAJ8.5A | SMAJ8.5CA | 08FA | 08FC | 8.5 | 9.44 | 10.40 | 1 | 14.4 | 27.8 | 20 | |
| SMAJ9.0A | SMAJ9.0CA | 009A | 009C | 9.0 | 10.00 | 11.10 | 1 | 15.4 | 26.0 | 10 | |
| SMAJ10A | SMAJ10CA | 010A | 010C | 10.0 | 11.10 | 12.30 | 1 | 17.0 | 23.5 | 5 | |
| SMAJ11A | SMAJ11CA | 011A | 011C | 11.0 | 12.20 | 13.50 | 1 | 18.2 | 22.0 | 1 | |
| SMAJ12A | SMAJ12CA | 012A | 012C | 12.0 | 13.30 | 14.70 | 1 | 19.9 | 20.1 | 1 | |
| SMAJ13A | SMAJ13CA | 013A | 013C | 13.0 | 14.40 | 15.90 | 1 | 21.5 | 18.6 | 1 | |
| SMAJ14A | SMAJ14CA | 014A | 014C | 14.0 | 15.60 | 17.20 | 1 | 23.2 | 17.3 | 1 | |
| SMAJ15A | SMAJ15CA | 015A | 015C | 15.0 | 16.70 | 18.50 | 1 | 24.4 | 16.4 | 1 | |
| SMAJ16A | SMAJ16CA | 016A | 016C | 16.0 | 17.80 | 19.70 | 1 | 26.0 | 15.4 | 1 | |
| SMAJ17A | SMAJ17CA | 017A | 017C | 17.0 | 18.90 | 20.90 | 1 | 27.6 | 14.5 | 1 | |
| SMAJ18A | SMAJ18CA | 018A | 018C | 18.0 | 20.00 | 22.10 | 1 | 29.2 | 13.7 | 1 | |
| SMAJ20A | SMAJ20CA | 020A | 020C | 20.0 | 22.20 | 24.50 | 1 | 32.4 | 12.4 | 1 | |
| SMAJ22A | SMAJ22CA | 022A | 022C | 22.0 | 24.40 | 26.90 | 1 | 35.5 | 11.3 | 1 | |
| SMAJ24A | SMAJ24CA | 024A | 024C | 24.0 | 26.70 | 29.50 | 1 | 38.9 | 10.3 | 1 | |
| SMAJ26A | SMAJ26CA | 026A | 026C | 26.0 | 28.90 | 31.90 | 1 | 42.1 | 9.5 | 1 | |
| SMAJ28A | SMAJ28CA | 028A | 028C | 28.0 | 31.10 | 34.40 | 1 | 45.4 | 8.8 | 1 | |
| SMAJ30A | SMAJ30CA | 030A | 030C | 30.0 | 33.30 | 36.80 | 1 | 48.4 | 8.3 | 1 | |
| SMAJ33A | SMAJ33CA | 033A | 033C | 33.0 | 36.70 | 40.60 | 1 | 53.3 | 7.5 | 1 | |
| SMAJ36A | SMAJ36CA | 036A | 036C | 36.0 | 40.00 | 44.20 | 1 | 58.1 | 6.9 | 1 | |
| SMAJ40A | SMAJ40CA | 040A | 040C | 40.0 | 44.40 | 49.10 | 1 | 64.5 | 6.2 | 1 | |
| SMAJ43A | SMAJ43CA | 043A | 043C | 43.0 | 47.80 | 52.80 | 1 | 69.4 | 5.8 | 1 | |
| SMAJ45A | SMAJ45CA | 045A | 045C | 45.0 | 50.00 | 55.30 | 1 | 72.7 | 5.5 | 1 | |
| SMAJ48A | SMAJ48CA | 048A | 048C | 48.0 | 53.30 | 58.90 | 1 | 77.4 | 5.2 | 1 | |
| SMAJ51A | SMAJ51CA | 051A | 051C | 51.0 | 56.70 | 62.70 | 1 | 82.4 | 4.9 | 1 | |
| SMAJ54A | SMAJ54CA | 054A | 054C | 54.0 | 60.00 | 66.30 | 1 | 87.1 | 4.6 | 1 | |
| SMAJ58A | SMAJ58CA | 058A | 058C | 58.0 | 64.40 | 71.20 | 1 | 93.6 | 4.3 | 1 | |
| SMAJ60A | SMAJ60CA | 060A | 060C | 60.0 | 66.70 | 73.70 | 1 | 96.8 | 4.1 | 1 | |
| SMAJ64A | SMAJ64CA | 064A | 064C | 64.0 | 71.10 | 78.60 | 1 | 103.0 | 3.9 | 1 | |
| SMAJ70A | SMAJ70CA | 070A | 070C | 70.0 | 77.80 | 86.00 | 1 | 113.0 | 3.6 | 1 | |
| SMAJ75A | SMAJ75CA | 075A | 075C | 75.0 | 83.30 | 92.10 | 1 | 121.0 | 3.3 | 1 | |
| SMAJ78A | SMAJ78CA | 078A | 078C | 78.0 | 86.70 | 95.80 | 1 | 126.0 | 3.2 | 1 | |
| SMAJ85A | SMAJ85CA | 085A | 085C | 85.0 | 94.40 | 104.0 | 1 | 137.0 | 2.9 | 1 | |



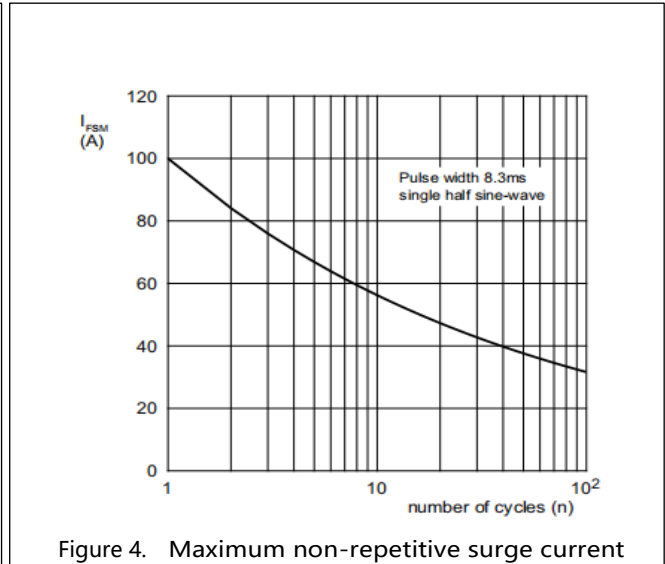
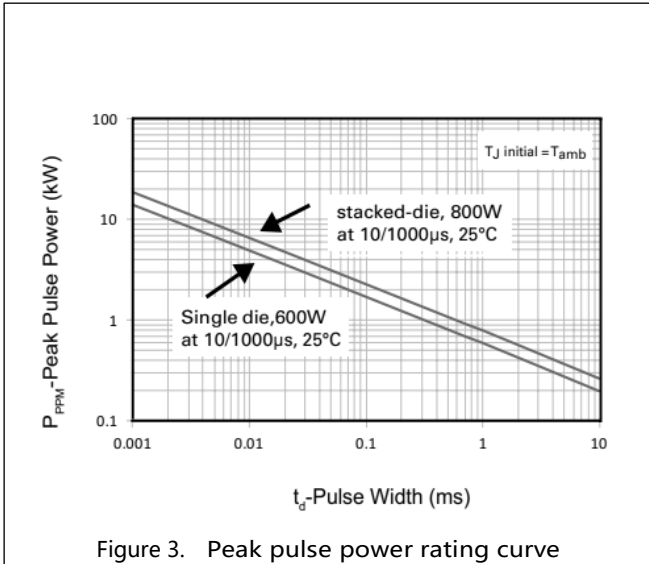
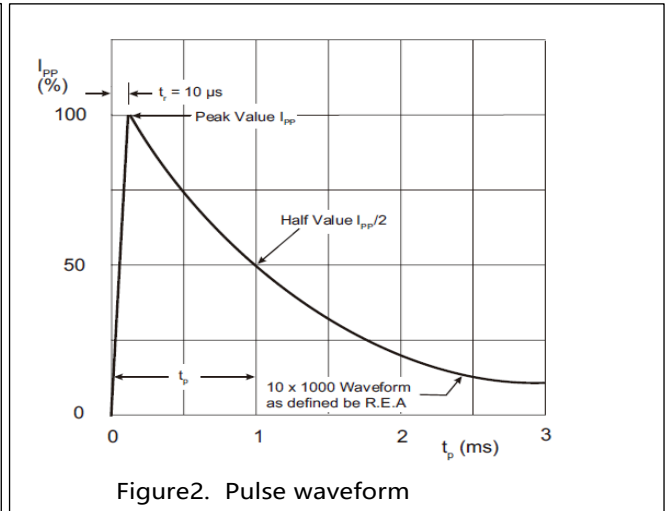
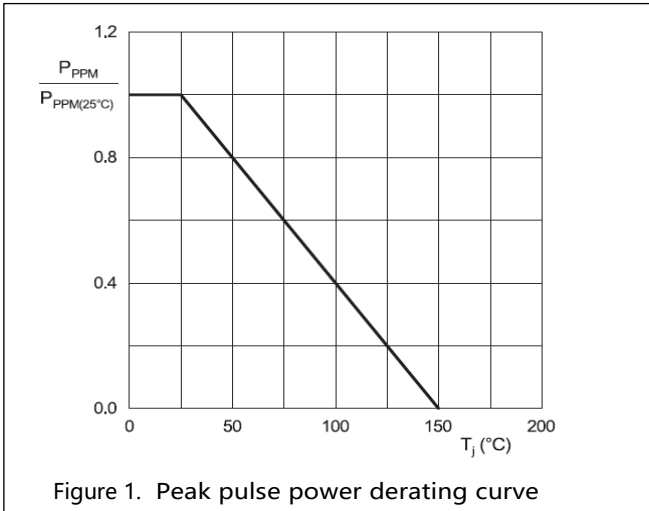
| Part Number (Uni) | Part Number (Bi) | Key Marking | | Reverse Stand off Voltage V_R (Volts) | Breakdown Voltage V_{BR} (Volts) @ I_T | | Test Current I_T (mA) | Maximum Clamping Voltage V_C @ I_{PP} (V) | Maximum Peak Pulse Current I_{pp} (A) | Maximum Reverse Leakage I_R @ V_R (μ A) | Agency Approval  |
|----------------------|---------------------|-------------|------|--|--|-------|----------------------------------|---|---|--|---|
| | | UNI | BI | | MIN | MAX | | | | | |
| SMAJ90A | SMAJ90CA | 090A | 090C | 90.0 | 100.0 | 111.0 | 1 | 146.0 | 2.8 | 1 | |
| SMAJ100A | SMAJ100CA | 100A | 100C | 100.0 | 111.0 | 123.0 | 1 | 162.0 | 2.5 | 1 | |
| SMAJ110A | SMAJ110CA | 110A | 110C | 110.0 | 122.0 | 135.0 | 1 | 177.0 | 2.3 | 1 | |
| SMAJ120A | SMAJ120CA | 120A | 120C | 120.0 | 133.0 | 147.0 | 1 | 193.0 | 2.1 | 1 | |
| SMAJ130A | SMAJ130CA | 130A | 130C | 130.0 | 144.0 | 159.0 | 1 | 209.0 | 1.9 | 1 | |
| SMAJ150A | SMAJ150CA | 150A | 150C | 150.0 | 167.0 | 185.0 | 1 | 243.0 | 1.7 | 1 | |
| SMAJ160A | SMAJ160CA | 160A | 160C | 160.0 | 178.0 | 197.0 | 1 | 259.0 | 1.6 | 1 | |
| SMAJ170A | SMAJ170CA | 170A | 170C | 170.0 | 189.0 | 209.0 | 1 | 275.0 | 1.5 | 1 | |
| SMAJ180A | SMAJ180CA | 180A | 180C | 180.0 | 201.0 | 222.0 | 1 | 292.0 | 1.4 | 1 | |
| SMAJ200A | SMAJ200CA | 200A | 200C | 200.0 | 224.0 | 247.0 | 1 | 324.0 | 1.3 | 1 | |
| SMAJ220A | SMAJ220CA | 220A | 220C | 220.0 | 246.0 | 272.0 | 1 | 356.0 | 1.1 | 1 | |
| SMAJ250A | SMAJ250CA | 250A | 250C | 250.0 | 279.0 | 309.0 | 1 | 405.0 | 1.0 | 1 | |
| SMAJ300A | SMAJ300CA | 300A | 300C | 300.0 | 335.0 | 371.0 | 1 | 486.0 | 0.8 | 1 | |
| SMAJ350A | SMAJ350CA | 350A | 350C | 350.0 | 391.0 | 432.0 | 1 | 567.0 | 0.7 | 1 | |
| SMAJ400A | SMAJ400CA | 400A | 400C | 400.0 | 447.0 | 494.0 | 1 | 648.0 | 0.6 | 1 | |
| SMAJ440A | SMAJ440CA | 440A | 440C | 440.0 | 492.0 | 543.0 | 1 | 713.0 | 0.6 | 1 | |

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)



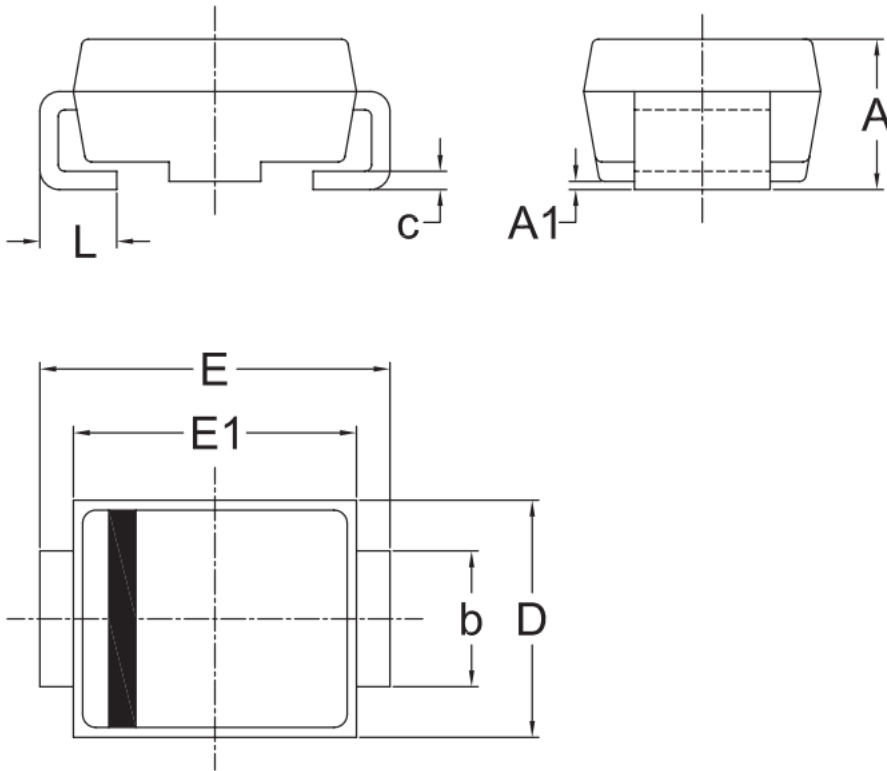
Soldering Parameters

| | | |
|--|------------------------------------|-------------------------|
| 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 – 180 secs |
| Average ramp up rate (Liquidus Temp (T_L) 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



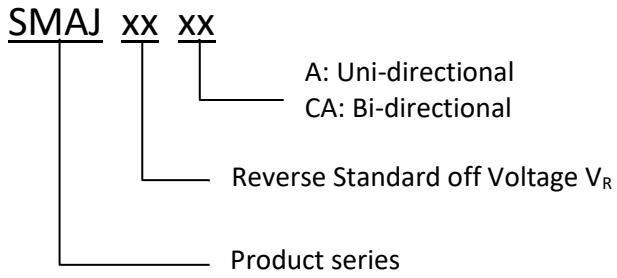
Dimensions



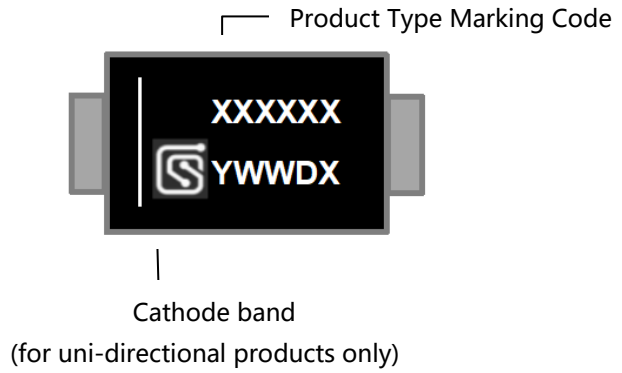
| UNIT | A | A1 | b | c | D | E | E1 | L | |
|------|-----|------|------|------|------|------|------|------|------|
| mm | Max | 2.50 | 0.30 | 2.15 | 0.25 | 3.75 | 5.54 | 4.65 | 1.50 |
| | Min | 2.00 | 0.00 | 1.85 | 0.15 | 3.45 | 5.04 | 4.35 | 0.80 |

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

Part Numbering



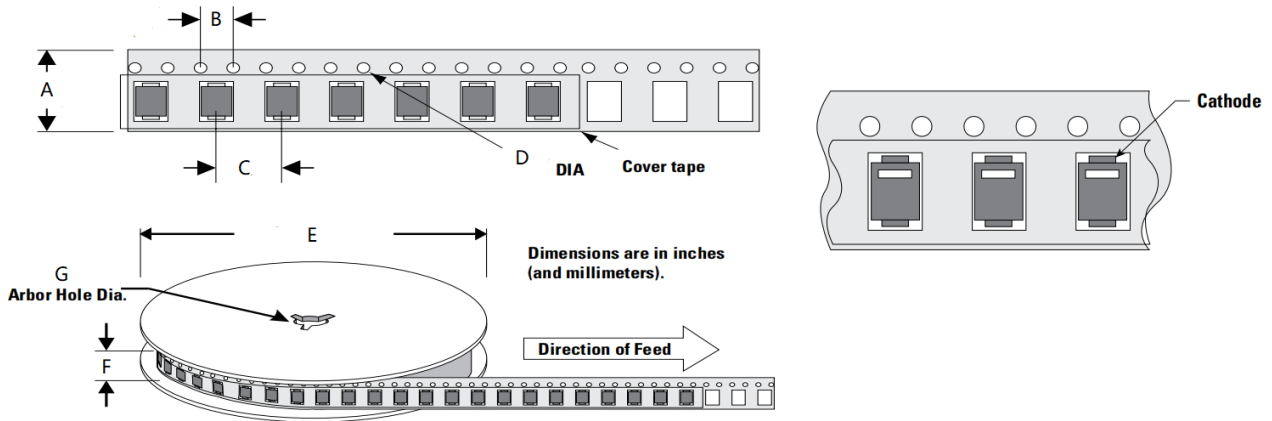
Part Marking



Packing

| Part number | Package name | Small packing quantity | Packing method |
|-------------|--------------|------------------------|----------------|
| SMAJXXXX | DO-214AC | 5000 | Tape & Reel |

Tape and Reel Specification



| Symbol | Millimeter |
|--------|-------------|
| A | 12.00±0.10 |
| B | 4.00±0.10 |
| C | 8.00±0.10 |
| D | 1.55±0.05 |
| E | 330.20±2.00 |
| F | 15.70±2.00 |
| G | 13.30±0.30 |

Revision history of Specification

| Version | Change Items | Effective Date |
|---------|--------------------------------------|----------------|
| 1.0 | Initial Release | 13-July-2021 |
| 1.1 | Modified Temperature Range & Details | 16-August-2021 |

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