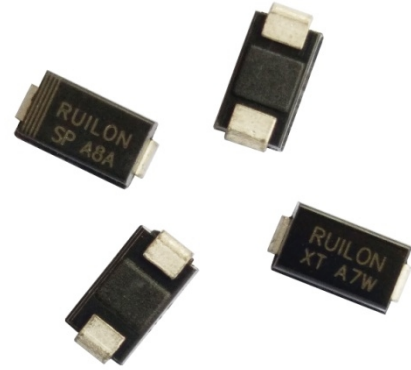


Mechanical Data

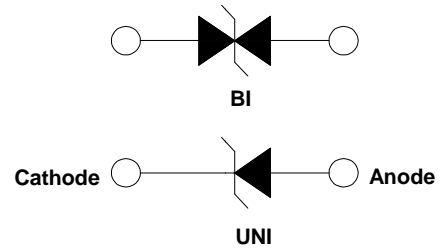
- I Case: Molded plastic
- I Epoxy: UL 94V-0 rate flame retardant
- I Lead: Solderable per MIL-STD-750, method 2026
- I Polarity: Color band denotes cathode end except Bipolar
- I Mounting position: Any

Features

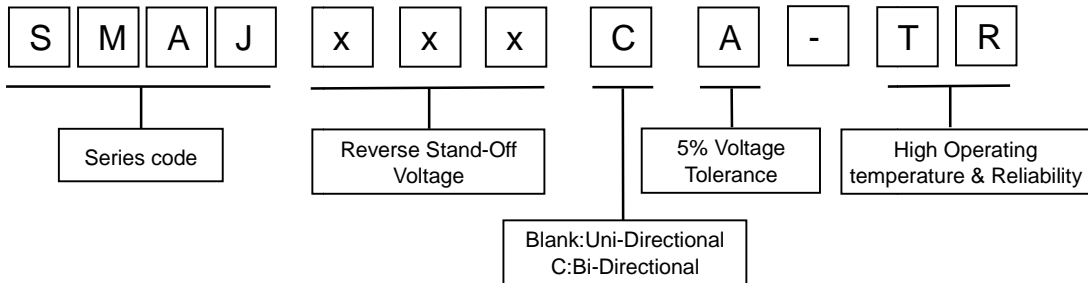
- I Glass passivated chip
- I 400 W peak pulse power capability with a 10/1000 μ s waveform, repetitive rate (duty cycle):0.01 %
- I High reliability application and automotive grade
- I AEC Q101 qualified
- I Low leakage
- I Uni and Bidirectional unit
- I Excellent clamping capability
- I Very fast response time
- I RoHS compliant



Electrical symbol



Part Number Code



Mechanical Characteristics

| Rating | Symbol | Value | Units |
|--|-----------------------------------|------------|-------|
| Peak power dissipation with a 10/1000 μ s waveform (Fig.4)(Note 1) | P _{PP} | 400 | W |
| Power Dissipation on Infinite Heat Sink at T _L =75°C(Fig.3) | P _D | 1.0 | W |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 2) | I _{FSM} | 40 | A |
| Maximum instantaneous forward voltage at 50 A for unidirectional only ⁽²⁾ | V _F | 3.5/5.0 | V |
| Operating Temperature Range Storage Temperature Range | T _J , T _{STG} | -55 to 150 | °C |

Notes:

1. Non-repetitive current pulse, per Fig.2 and derated above T_A=25° C per Fig. 1.
2. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum.

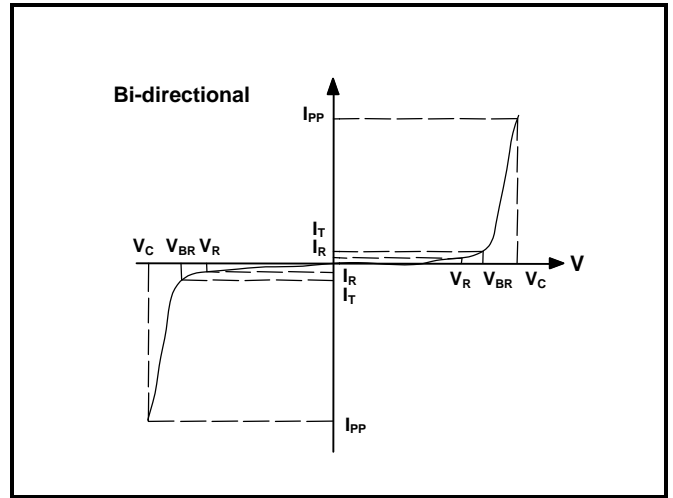
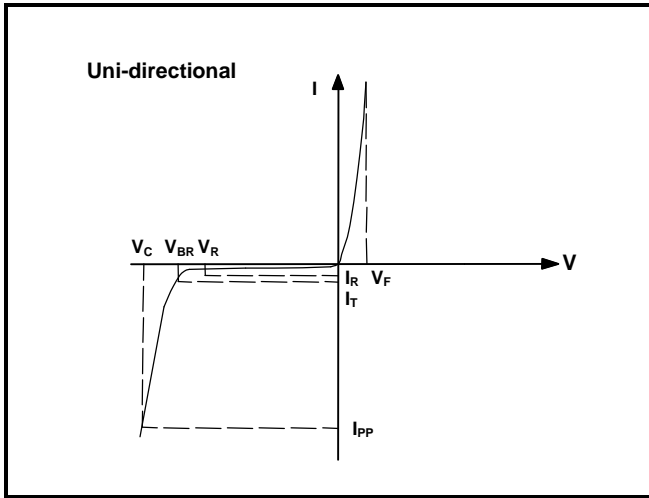


Electrical Characteristics

| Type Number | | Marking | | Reverse Stand-Off Voltage | Breakdown Voltage | | Test Current | Max. Clamping Voltage 10/1000µs | Max. Peak Pulse Current 10/1000µs | Reverse Leakage | | | | |
|-------------|-------------|---------|-----|---------------------------|---------------------------------|-------|--------------|------------------------------------|--------------------------------------|-----------------|----------------|---------------------------------|-----------------|----------------------------------|
| | | | | | V _{BR} @I _T | | | | | | I _r | V _C @I _{PP} | I _{PP} | I _r @V _{RWM} |
| | | | | | Min | Max | | | | | | | | |
| UNI | BI | UNI | BI | V | V | V | mA | V | A | µA | | | | |
| SMAJ10A-TR | SMAJ10CA-TR | AXA | WXA | 10.0 | 11.1 | 12.3 | 1 | 17.0 | 23.53 | 1 | | | | |
| SMAJ11A-TR | SMAJ11CA-TR | AZA | WZA | 11.0 | 12.2 | 13.5 | 1 | 18.2 | 21.98 | 1 | | | | |
| SMAJ12A-TR | SMAJ12CA-TR | BEA | XEA | 12.0 | 13.3 | 14.7 | 1 | 19.9 | 20.10 | 1 | | | | |
| SMAJ13A-TR | SMAJ13CA-TR | BGA | XGA | 13.0 | 14.4 | 15.9 | 1 | 21.5 | 18.60 | 1 | | | | |
| SMAJ14A-TR | SMAJ14CA-TR | BKA | XKA | 14.0 | 15.6 | 17.2 | 1 | 23.2 | 17.24 | 1 | | | | |
| SMAJ15A-TR | SMAJ15CA-TR | BMA | XMA | 15.0 | 16.7 | 18.5 | 1 | 24.4 | 16.39 | 1 | | | | |
| SMAJ16A-TR | SMAJ16CA-TR | BPA | XPA | 16.0 | 17.8 | 19.7 | 1 | 26.0 | 15.38 | 1 | | | | |
| SMAJ17A-TR | SMAJ17CA-TR | BRA | XRA | 17.0 | 18.9 | 20.9 | 1 | 27.6 | 14.49 | 1 | | | | |
| SMAJ18A-TR | SMAJ18CA-TR | BTA | XTA | 18.0 | 20.0 | 22.1 | 1 | 29.2 | 13.70 | 1 | | | | |
| SMAJ19A-TR | SMAJ19CA-TR | BBA | XBA | 19.0 | 21.1 | 23.3 | 1 | 30.8 | 13.00 | 1 | | | | |
| SMAJ20A-TR | SMAJ20CA-TR | BVA | XVA | 20.0 | 22.2 | 24.5 | 1 | 32.4 | 12.35 | 1 | | | | |
| SMAJ22A-TR | SMAJ22CA-TR | BXA | XXA | 22.0 | 24.4 | 26.9 | 1 | 35.5 | 11.27 | 1 | | | | |
| SMAJ24A-TR | SMAJ24CA-TR | BZA | XZA | 24.0 | 26.7 | 29.5 | 1 | 38.9 | 10.28 | 1 | | | | |
| SMAJ26A-TR | SMAJ26CA-TR | CEA | YEA | 26.0 | 28.9 | 31.9 | 1 | 42.1 | 9.50 | 1 | | | | |
| SMAJ28A-TR | SMAJ28CA-TR | CGA | YGA | 28.0 | 31.1 | 34.4 | 1 | 45.4 | 8.81 | 1 | | | | |
| SMAJ30A-TR | SMAJ30CA-TR | CKA | YKA | 30.0 | 33.3 | 36.8 | 1 | 48.4 | 8.26 | 1 | | | | |
| SMAJ33A-TR | SMAJ33CA-TR | CMA | YMA | 33.0 | 36.7 | 40.6 | 1 | 53.3 | 7.50 | 1 | | | | |
| SMAJ36A-TR | SMAJ36CA-TR | CPA | YPA | 36.0 | 40.0 | 44.2 | 1 | 58.1 | 6.88 | 1 | | | | |
| SMAJ40A-TR | SMAJ40CA-TR | CRA | YRA | 40.0 | 44.4 | 49.1 | 1 | 64.5 | 6.20 | 1 | | | | |
| SMAJ43A-TR | SMAJ43CA-TR | CTA | YTA | 43.0 | 47.8 | 52.8 | 1 | 69.4 | 5.76 | 1 | | | | |
| SMAJ45A-TR | SMAJ45CA-TR | CVA | YVA | 45.0 | 50.0 | 55.3 | 1 | 72.7 | 5.50 | 1 | | | | |
| SMAJ48A-TR | SMAJ48CA-TR | CXA | YXA | 48.0 | 53.3 | 58.9 | 1 | 77.4 | 5.17 | 1 | | | | |
| SMAJ51A-TR | SMAJ51CA-TR | CZA | YZA | 51.0 | 56.7 | 62.7 | 1 | 82.4 | 4.85 | 1 | | | | |
| SMAJ54A-TR | SMAJ54CA-TR | REA | ZEA | 54.0 | 60.0 | 66.3 | 1 | 87.1 | 4.59 | 1 | | | | |
| SMAJ58A-TR | SMAJ58CA-TR | RGA | ZGA | 58.0 | 64.4 | 71.2 | 1 | 93.6 | 4.27 | 1 | | | | |
| SMAJ60A-TR | SMAJ60CA-TR | RKA | ZKA | 60.0 | 66.7 | 73.7 | 1 | 96.8 | 4.13 | 1 | | | | |
| SMAJ64A-TR | SMAJ64CA-TR | RMA | ZMA | 64.0 | 71.1 | 78.6 | 1 | 103.0 | 3.88 | 1 | | | | |
| SMAJ70A-TR | SMAJ70CA-TR | RPA | ZPA | 70.0 | 77.8 | 86.0 | 1 | 113.0 | 3.54 | 1 | | | | |
| SMAJ75A-TR | SMAJ75CA-TR | RRA | ZRA | 75.0 | 83.3 | 92.1 | 1 | 121.0 | 3.31 | 1 | | | | |
| SMAJ78A-TR | SMAJ78CA-TR | RTA | ZTA | 78.0 | 86.7 | 95.8 | 1 | 126.0 | 3.17 | 1 | | | | |
| SMAJ80A-TR | SMAJ80CA-TR | RBA | ZBA | 80.0 | 88.8 | 97.6 | 1 | 129.6 | 3.09 | 1 | | | | |
| SMAJ85A-TR | SMAJ85CA-TR | RVA | ZVA | 85.0 | 94.4 | 104.0 | 1 | 137.0 | 2.92 | 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 ($T_A=25^\circ\text{C}$ unless otherwise noted)

Figure 1 - Pulse Derating Curve

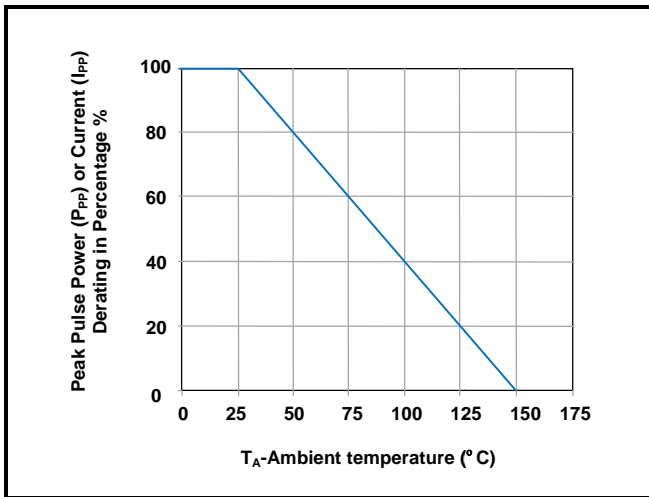


Figure 2 - Pulse Waveform

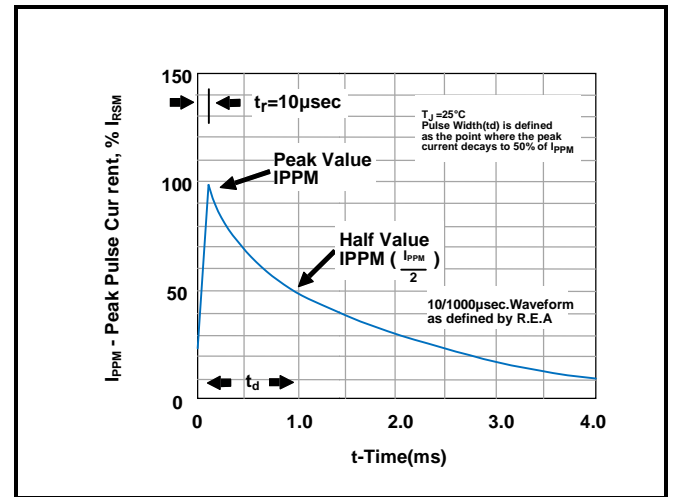


Figure 3 - Steady State Power Derating Curve

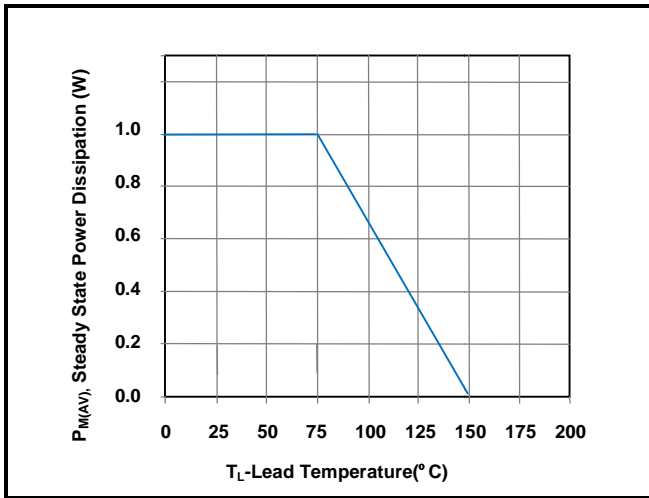


Figure 4 - Peak Pulse Power Rating Curve

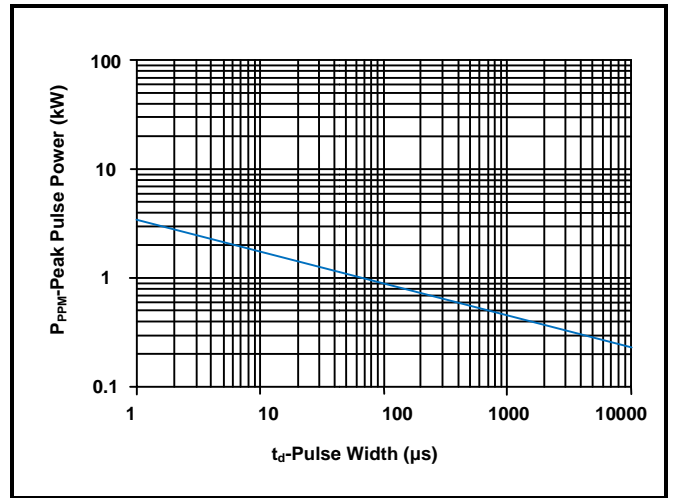


Figure 5 - Maximum Non-Repetitive Surge Current

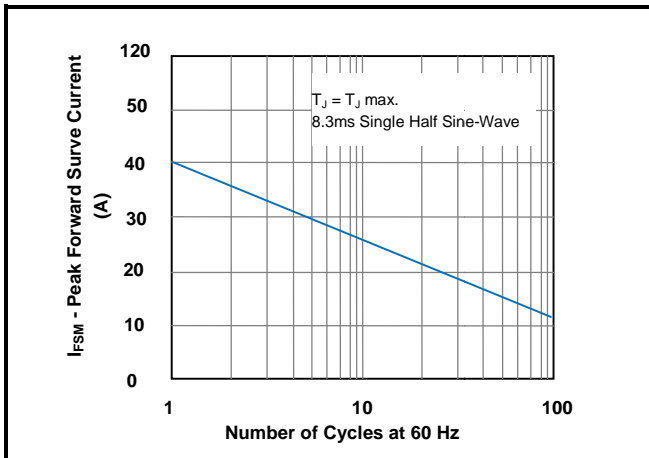
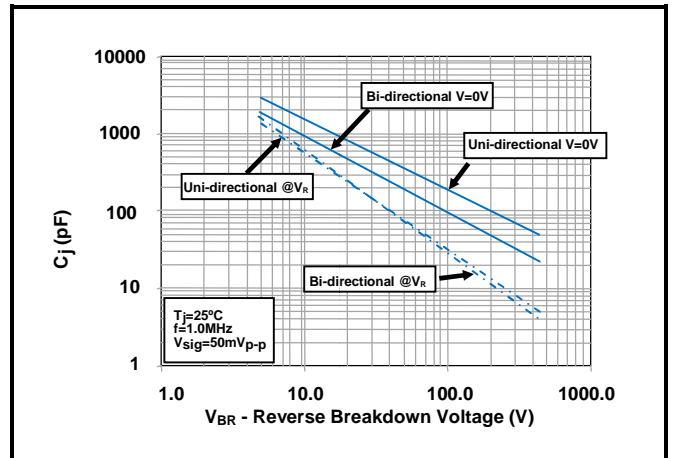
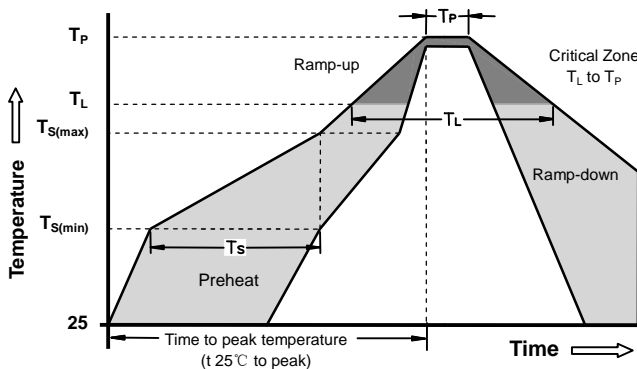


Figure 6 - Typical Junction Capacitance



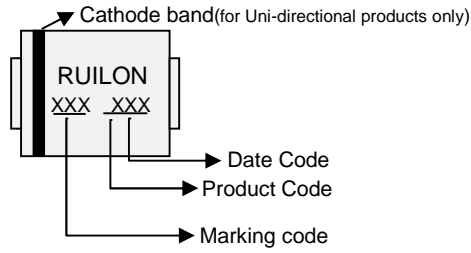
Soldering Parameters - Reflow Soldering (Surface Mount Devices)



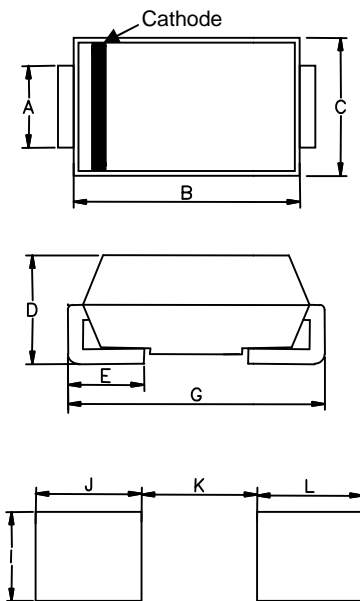
| Reflow Condition | | Pb - Free assembly |
|--|-----------------------------------|--------------------|
| Pre Heat | -Temperature Min ($T_{S(min)}$) | 150°C |
| | -Temperature Max ($T_{S(max)}$) | 200°C |
| | - Time (min to max) (t_s) | 60 -180 Seconds |
| Average ramp up rate (Liquids Temp T_L to peak | | 3°C/second max |
| $T_{S(max)}$ to T_L - Ramp-up Rate | | 3°C/second max |
| Reflow | - Temperature (T_L) (Liquids) | 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 |



Part Marking System



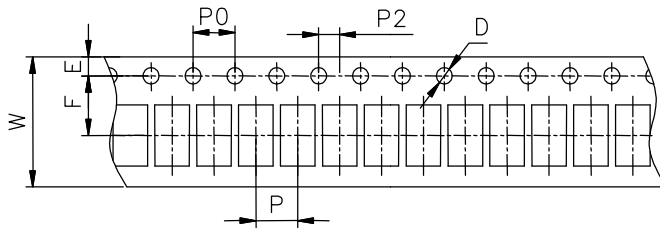
Dimensions



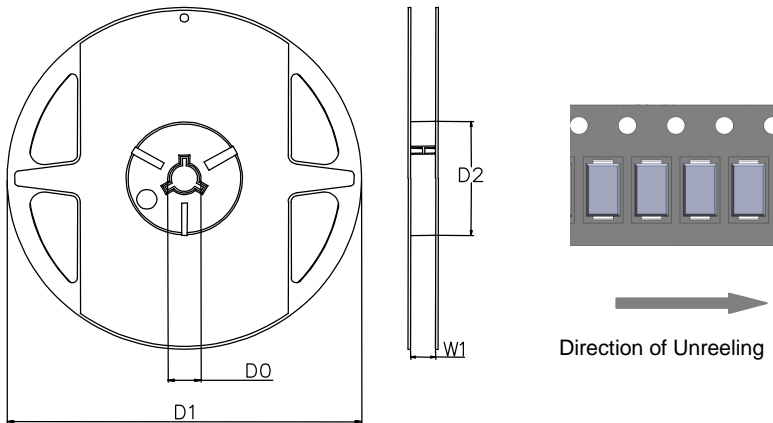
| DIM | Millimeters | | Inches | |
|-----|-------------|-------|--------|-------|
| | Min | Max | Min | Max |
| A | 1.23 | 1.63 | 0.049 | 0.064 |
| B | 4.10 | 4.55 | 0.162 | 0.179 |
| C | 2.51 | 2.76 | 0.099 | 0.109 |
| D | 1.96 | 2.26 | 0.077 | 0.089 |
| E | 0.75 | 1.51 | 0.030 | 0.060 |
| G | 4.87 | 5.22 | 0.192 | 0.206 |
| I | 1.800 | - | 0.070 | - |
| J | 2.100 | - | 0.082 | - |
| K | - | 2.300 | - | 0.090 |
| L | 2.100 | - | 0.082 | - |



Taping and Reel Specifications



| Symbol | Millimeters | Inches |
|--------|--------------|--------------------|
| W | 12±0.3 | 0.472±0.012 |
| P | 4±0.1 | 0.157±0.004 |
| F | 5.5±0.1 | 0.217±0.004 |
| E | 1.75±0.1 | 0.069±0.004 |
| D | 1.5+0.1/-0.0 | 0.059+0.004/-0.0 |
| P0 | 4±0.1 | 0.157±0.004 |
| P2 | 2±0.1 | 0.079±0.004 |
| D0 | 16.7±0.15 | 0.657±0.006 |
| D1 | 178±2 | 7.007±0.079 |
| D2 | 59.6+1/-2 | 2.346+0.039/-0.079 |
| W1 | 12.64±0.4 | 0.498±0.016 |



| Part Number | Component package | Quantity | Packaging option | Packaging specification |
|----------------|-------------------|----------|-----------------------|-------------------------|
| SMAJXXXA/CA-TR | DO-214AC(SMA) | 2000 | Tape&Reel-12mm/7"tape | EIA STD RS-481 |