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SPECIFICATION FOR APPROVAL

| | |
|----------------------|-------------------|
| CUSTOMER | 立創電子 |
| CERTIFIED MODEL/TYPE | SMAJ48 |
| PART NO. | SMAJ48A (RoHS+HF) |
| APPLICATION | |
| CUSTOMER P/N | |
| ISSUE DATE | Dec.07,2020 |
| REV. NO. | |
| REV. DATE | |

| FOR CUSTOMER APPROVAL | CHECKED BY |
|-----------------------|-----------------------|
| | <i>Dan Zhang</i> |
| | APPROVED BY |
| | <i>Huaifang Zhang</i> |





REVISED RECORD SHEET

| REV. NO | REV. DATE | REVISED CONTENT |
|---------|-----------|-----------------|
| | | |



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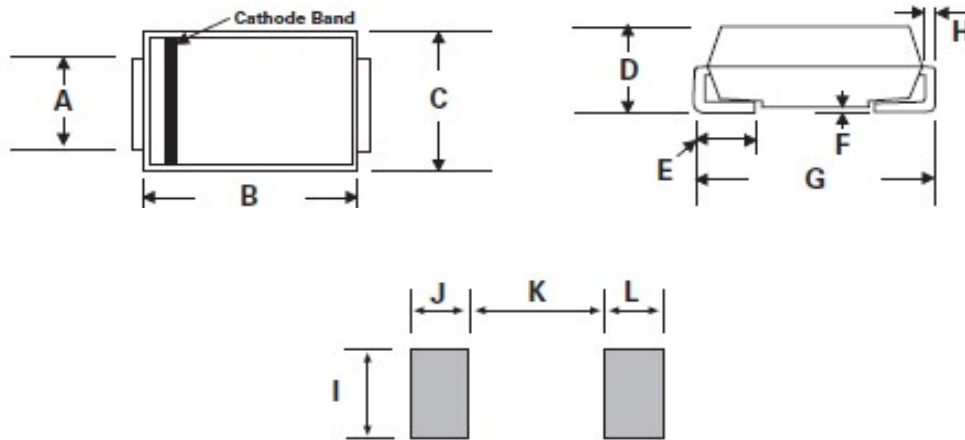
Part Number Code

Example :

SMAJ **48** **A**
 (1) (2) (3)

| No. | Item | Digit | Specification |
|-----|---|-------|---|
| (1) | Product Type | SMAJ | Thinking Power TVS SMD Type |
| (2) | Reverse Stand off Voltage (V_{RWM}) | 48 | 48=48 V_{RWM} |
| (3) | Type Code | A | Uni-directional 5% VBR Voltage Tolerance |

Structure and Dimensions



* The Cathode bend for Uni-directional product only.

| Item | Millimeters | | Inches | |
|------|-------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 1.25 | 1.65 | 0.049 | 0.065 |
| B | 3.99 | 4.6 | 0.157 | 0.181 |
| C | 2.4 | 2.8 | 0.094 | 0.11 |
| D | 1.9 | 2.3 | 0.074 | 0.09 |
| E | 0.76 | 1.52 | 0.03 | 0.06 |
| F | - | 0.203 | - | 0.008 |
| G | 4.8 | 5.28 | 0.188 | 0.208 |
| H | 0.152 | 0.305 | 0.006 | 0.012 |
| I | 1.8 | - | 0.07 | - |
| J/L | 2.1 | - | 0.082 | - |
| K | - | 2.3 | - | 0.09 |

Electrical Characteristics

Peak power dissipation with a 10/1000 μ s waveform : 400W

Operating junction and storage temperature range : -55~+150 °C

| Part No. (Uni) | Part No. (Bi) | Reverse Stand off Voltage | Breakage Voltage VBR @ IT | | Test Current | Maximum Clamping Voltage VC @ Ipp | Maximum Peak Pulse Current | Maximum Reverse Leakage IR @VRWM | Marking Code | |
|-------------------|------------------|---------------------------------|---------------------------------|----------|-----------------|--|----------------------------------|--|-----------------|----------|
| | | | VRWM (V) | Min(V) | | | | | Max(V) | IT(mA) |
| SMAJ5.0A | SMAJ5.0CA | 5 | 6.4 | 7 | 10 | 9.2 | 43.5 | 800 | AE. | WE. |
| SMAJ6.0A | SMAJ6.0CA | 6 | 6.67 | 7.37 | 10 | 10.3 | 38.8 | 800 | AG. | WG. |
| SMAJ6.5A | SMAJ6.5CA | 6.5 | 7.22 | 7.98 | 10 | 11.2 | 35.7 | 500 | AK. | WK. |
| SMAJ7.0A | SMAJ7.0CA | 7 | 7.78 | 8.6 | 10 | 12 | 33.3 | 200 | AM. | WM. |
| SMAJ7.5A | SMAJ7.5CA | 7.5 | 8.33 | 9.21 | 1 | 12.9 | 31 | 100 | AP. | WP. |
| SMAJ8.0A | SMAJ8.0CA | 8 | 8.89 | 9.83 | 1 | 13.6 | 29.4 | 50 | AR. | WR. |
| SMAJ8.5A | SMAJ8.5CA | 8.5 | 9.44 | 10.4 | 1 | 14.4 | 27.8 | 20 | AT. | WT. |
| SMAJ9.0A | SMAJ9.0CA | 9 | 10 | 11.1 | 1 | 15.4 | 26 | 10 | AV. | WV. |
| SMAJ10A | SMAJ10CA | 10 | 11.1 | 12.3 | 1 | 17 | 23.5 | 5 | AX. | WX. |
| SMAJ11A | SMAJ11CA | 11 | 12.2 | 13.5 | 1 | 18.2 | 22 | 1 | AZ. | WZ. |
| SMAJ12A | SMAJ12CA | 12 | 13.3 | 14.7 | 1 | 19.9 | 20.1 | 1 | BE. | XE. |
| SMAJ13A | SMAJ13CA | 13 | 14.4 | 15.9 | 1 | 21.5 | 18.6 | 1 | BG. | XG. |
| SMAJ14A | SMAJ14CA | 14 | 15.6 | 17.2 | 1 | 23.2 | 17.2 | 1 | BK. | XK. |
| SMAJ15A | SMAJ15CA | 15 | 16.7 | 18.5 | 1 | 24.4 | 16.4 | 1 | BM. | XM. |
| SMAJ16A | SMAJ16CA | 16 | 17.8 | 19.7 | 1 | 26 | 15.4 | 1 | BP. | XP. |
| SMAJ17A | SMAJ17CA | 17 | 18.9 | 20.9 | 1 | 27.6 | 14.5 | 1 | BR. | XR. |
| SMAJ18A | SMAJ18CA | 18 | 20 | 22.1 | 1 | 29.2 | 13.7 | 1 | BT. | XT. |
| SMAJ20A | SMAJ20CA | 20 | 22.2 | 24.5 | 1 | 32.4 | 12.3 | 1 | BV. | XV. |
| SMAJ22A | SMAJ22CA | 22 | 24.4 | 26.9 | 1 | 35.5 | 11.3 | 1 | BX. | XX. |
| SMAJ24A | SMAJ24CA | 24 | 26.7 | 29.5 | 1 | 38.9 | 10.3 | 1 | BZ. | XZ. |
| SMAJ26A | SMAJ26CA | 26 | 28.9 | 31.9 | 1 | 42.1 | 9.5 | 1 | CE. | YE. |
| SMAJ28A | SMAJ28CA | 28 | 31.1 | 34.4 | 1 | 45.4 | 8.8 | 1 | CG. | YG. |
| SMAJ30A | SMAJ30CA | 30 | 33.3 | 36.8 | 1 | 48.4 | 8.3 | 1 | CK. | YK. |
| SMAJ33A | SMAJ33CA | 33 | 36.7 | 40.6 | 1 | 53.3 | 7.5 | 1 | CM. | YM. |
| SMAJ36A | SMAJ36CA | 36 | 40 | 44.2 | 1 | 58.1 | 6.9 | 1 | CP. | YP. |
| SMAJ40A | SMAJ40CA | 40 | 44.4 | 49.1 | 1 | 64.5 | 6.2 | 1 | CR. | YR. |
| SMAJ43A | SMAJ43CA | 43 | 47.8 | 52.8 | 1 | 69.4 | 5.8 | 1 | CT. | YT. |
| SMAJ45A | SMAJ45CA | 45 | 50 | 55.3 | 1 | 72.7 | 5.5 | 1 | CV. | YV. |
| SMAJ48A | SMAJ48CA | 48 | 53.3 | 58.9 | 1 | 77.4 | 5.2 | 1 | CX. | YX. |
| SMAJ51A | SMAJ51CA | 51 | 56.7 | 62.7 | 1 | 82.4 | 4.9 | 1 | CZ. | YZ. |
| SMAJ54A | SMAJ54CA | 54 | 60 | 66.3 | 1 | 87.1 | 4.6 | 1 | RE. | ZE. |
| SMAJ58A | SMAJ58CA | 58 | 64.4 | 71.2 | 1 | 93.6 | 4.3 | 1 | RG. | ZG. |
| SMAJ60A | SMAJ60CA | 60 | 66.7 | 73.7 | 1 | 96.8 | 4.1 | 1 | RK. | ZK. |

Electrical CharacteristicsPeak power dissipation with a 10/1000 μ s waveform : 400W

Operating junction and storage temperature range : -55~+150 °C

| Part No. (Uni) | Part No. (Bi) | Reverse Stand off Voltage | Breakage Voltage VBR @ IT | | Test Current | Maximum Clamping Voltage VC @ Ipp | Maximum Peak Pulse Current | Maximum Reverse Leakage IR @VRWM | Marking Code | |
|-------------------|------------------|---------------------------------|---------------------------------|----------|-----------------|--|----------------------------------|--|-----------------|----------|
| | | | VRWM (V) | Min(V) | | | | | Max(V) | IT(mA) |
| SMAJ64A | SMAJ64CA | 64 | 71.1 | 78.6 | 1 | 103 | 3.9 | 1 | RM. | ZM. |
| SMAJ70A | SMAJ70CA | 70 | 77.8 | 86 | 1 | 113 | 3.5 | 1 | RP. | ZP. |
| SMAJ75A | SMAJ75CA | 75 | 83.3 | 92.1 | 1 | 121 | 3.3 | 1 | RR. | ZR. |
| SMAJ78A | SMAJ78CA | 78 | 86.7 | 95.8 | 1 | 126 | 3.2 | 1 | RT. | ZT. |
| SMAJ85A | SMAJ85CA | 85 | 94.4 | 104 | 1 | 137 | 2.9 | 1 | RV. | ZV. |
| SMAJ90A | SMAJ90CA | 90 | 100 | 111 | 1 | 146 | 2.7 | 1 | RX. | ZX. |
| SMAJ100A | SMAJ100CA | 100 | 111 | 123 | 1 | 162 | 2.5 | 1 | RZ. | ZZ. |
| SMAJ110A | SMAJ110CA | 110 | 122 | 135 | 1 | 177 | 2.3 | 1 | SE. | VE. |
| SMAJ120A | SMAJ120CA | 120 | 133 | 147 | 1 | 193 | 2.1 | 1 | SG. | VG. |
| SMAJ130A | SMAJ130CA | 130 | 144 | 159 | 1 | 209 | 1.9 | 1 | SK. | VK. |
| SMAJ150A | SMAJ150CA | 150 | 167 | 185 | 1 | 243 | 1.6 | 1 | SM. | VM. |
| SMAJ160A | SMAJ160CA | 160 | 178 | 197 | 1 | 259 | 1.5 | 1 | SP. | VP. |
| SMAJ170A | SMAJ170CA | 170 | 189 | 209 | 1 | 275 | 1.5 | 1 | SR. | VR. |
| SMAJ180A | SMAJ180CA | 180 | 201 | 222 | 1 | 292 | 1.4 | 1 | ST. | VT. |
| SMAJ190A | SMAJ190CA | 190 | 209 | 243 | 1 | 308 | 1.3 | 1 | SV. | VV. |
| SMAJ200A | SMAJ200CA | 200 | 224 | 247 | 1 | 324 | 1.2 | 1 | SW. | VW. |
| SMAJ220A | SMAJ220CA | 220 | 246 | 272 | 1 | 356 | 1.1 | 1 | SX. | VX. |
| SMAJ250A | SMAJ250CA | 250 | 279 | 309 | 1 | 405 | 1 | 1 | SZ. | VZ. |
| SMAJ300A | SMAJ300CA | 300 | 335 | 371 | 1 | 486 | 0.8 | 1 | DE. | HE. |
| SMAJ350A | SMAJ350CA | 350 | 391 | 432 | 1 | 567 | 0.7 | 1 | DG. | HG. |
| SMAJ400A | SMAJ400CA | 400 | 447 | 494 | 1 | 648 | 0.6 | 1 | DK. | HK. |
| SMAJ440A | SMAJ440CA | 440 | 492 | 543 | 1 | 713 | 0.6 | 1 | DM. | HM. |

Reliability

| Item | Standard | Test conditions / Methods | Specifications |
|--|---|---|---|
| HTRB (High Temp. Reverse Bias Test) | MIL-STD-750D METHOD 1038.3 Method 103 | Test Temp. : 150°C Duration 168 hrs with rated VRWM | Electrical properties meet Specifications |
| PCT (Pressure Cooker Test) | MIL-STD-19500 EAPPENDIX C | Test Temp. : 121 °C Pressure:1.2Kg Duration: 96 hrs | Electrical properties meet Specifications |
| TCT | MIL-STD-750D METHOD 1051.5 | Test Temp. : -55°C ~+150°C 20 cycles | Electrical properties meet Specifications |
| Forward Surge | MIL-STD-750D METHOD 4066.3 | Sine half wave 8.3mS 1 shot IFSM:20A forSMF 40A for SMA/ P4SMA & SMAF 100A for SMB/P6SMB 200A for SMC/1.5SMC For Uni-directional product only. | Electrical properties meet Specifications |
| Soldering Heat | MIL-STD-750D METHOD 2031.2 | Test Temp. : 260°C Duration:10 sec 1cycle | Electrical properties meet Specifications |

Soldering Recommendation

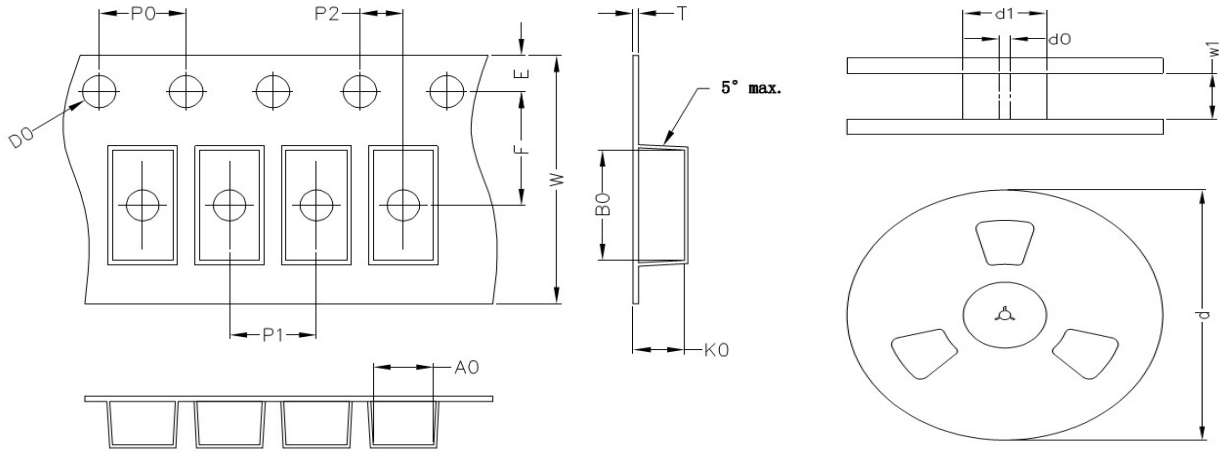
■ IR-reflow soldering profile



| Reflow Condition | Lead-free assembly |
|---|------------------------------------|
| Preheat -Temperature Min(Ts min) -Temperature Min(Ts max) -Time (min to max) (ts) | 150°C 200°C 60 – 180 seconds |
| Average ramp up rate -Temperature Liquidus (TL) to peak | 3°C/second max |
| Ts(max) to TL -Ramp-up Rate | 3°C/second max. |
| Reflow -Temperature Liquidus (TL) -Time (tl) | 217°C 60 – 150 seconds |
| Peak Temperature (TP) | 260°C |
| Time within 5°C of actual peak Temperature(tp) | 20 – 40 seconds |
| Ramp-down Rate | 6°C/second max. |
| Time 25°C to peak Temperature(TP) | 8 minutes max. |
| Do not exceed | 260°C |

Packaging

■ Taping Specification



(Unit : mm)

| Index | A0 | B0 | K0 | D0 | E | F | P0 | P1 | P2 | T | W | d(13'') | d1 | d0 | w1 |
|-------|-----|------|------|------|------|-----|----|----|----|-----------|----|---------|----|------|------|
| SMAJ | 2.8 | 5.33 | 2.36 | 1.55 | 1.75 | 5.5 | 4 | 4 | 2 | 0.22±0.05 | 12 | 330 | 75 | 13.5 | 13.5 |

Notes: The tolerance of carrier tape and top cover is ±0.1mm, the tolerance of reel is ±2mm

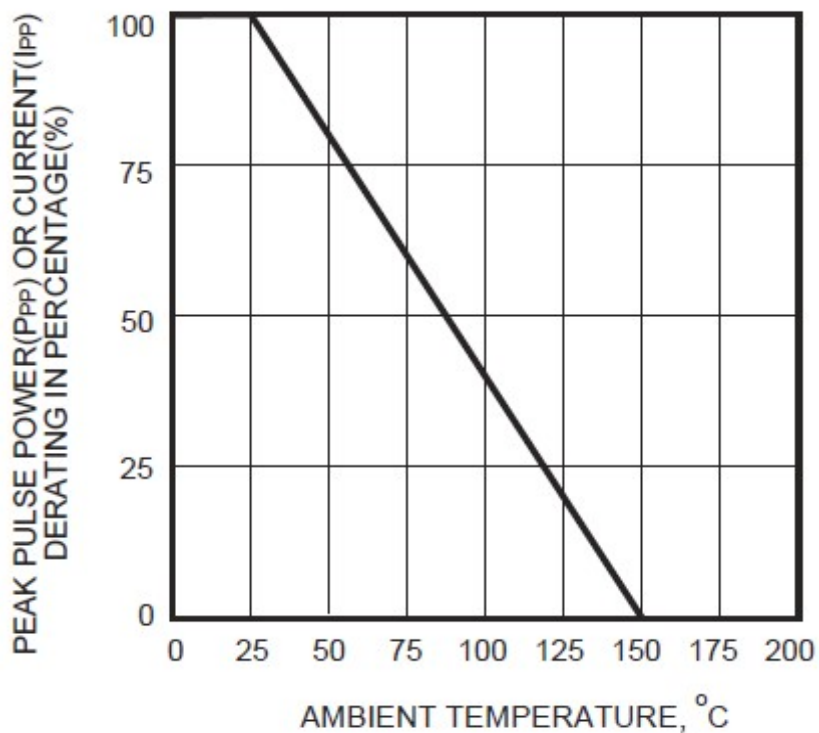
■ Quantity

| Series Type | Reel size | Quantity (pcs/reel) |
|-------------|-----------|---------------------|
| SMAJ | 13" | 5,000 |

Pulse Waveform



Pulse Derating Curve



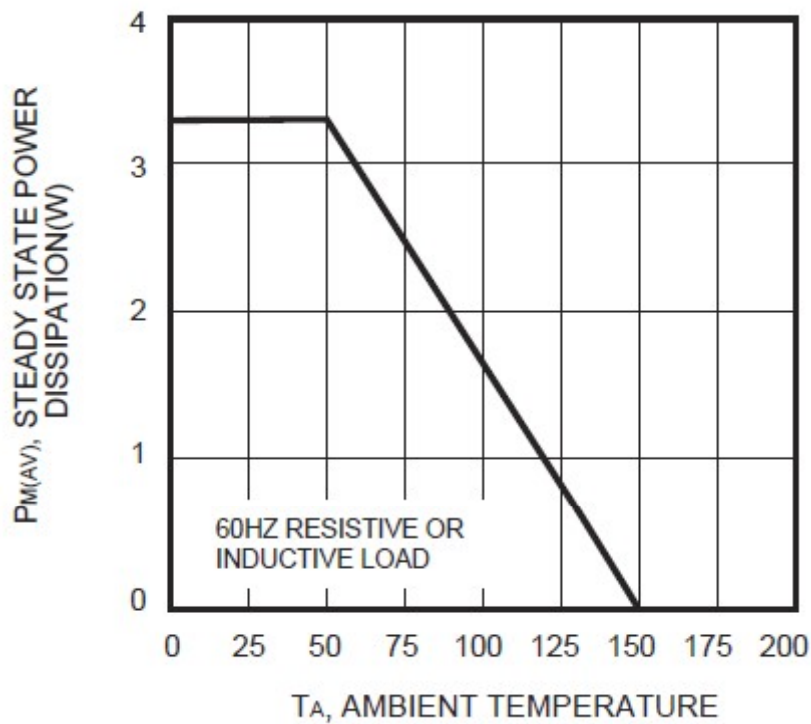
Peak Pulse Power Rating Curve

SMAJ series



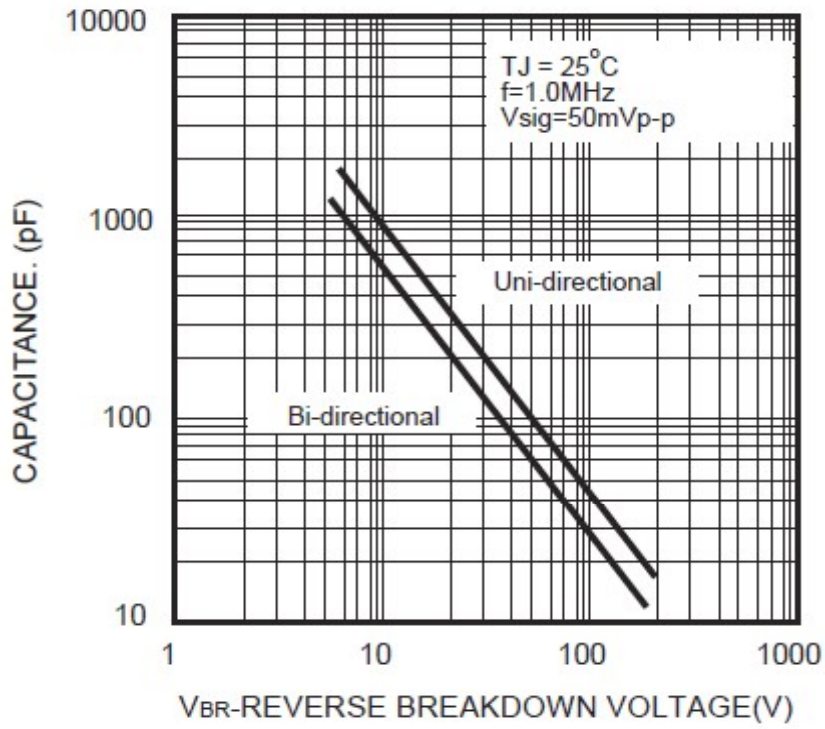
Steady State Power Derating Curve

SMAJ series



Typical Junction Capacitance

SMAJ series



RoHS Compliant Declaration

We hereby declare that the components delivered to your company are compliant with RoHS directive 2015/863/EU.

Warehouse Storage Conditions of Products

(I) Storage Conditions :

- 1.Storage Temperature : $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$
- 2.Relative Humidity : $\leq 75\%RH$
- 3.Keep away from corrosive atmosphere and sunlight.

(II) Period of Storage : 1 year

Safety Approvals



* UL 497B recognized (File # E229991)

Certificates

- (1) IATF 16949 certificate
- (2) ISO 9001 certificate

Test Report

- (1) RoHS test report
- (2) Halogen-free test report

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