

P6SMB SERIES

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tai rong smc

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600W SURFACE MOUNT TRANSIENT VOLTAGE SUPPRESSORS

Transient Voltage Suppressors (TVS) Data Sheet

● Description

The P6SMB series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events

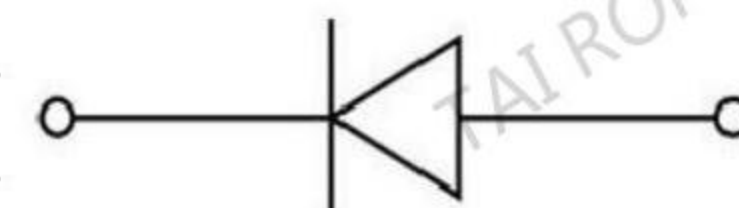
Breakdown Voltage

6.8 to 600V

Peak Pulse Power

600W

DO-214AA(SMB)



● Features

- For surface mounted applications in order to optimize board space
- Low leakage
- Glass passivated junction
- Low inductance
- Excellent clamping capability
- 600W peak pulse power capability at 10/1000μs waveform
- Fast response time
- Typical IR less than 5μA above 12.8V
- High Temperature soldering: 260°C/40 seconds at terminals
- Typical maximum temperature coefficient $\Delta VBR=0.1\% \times VBR@25^{\circ}C \times \Delta T$
- Plastic package has Underwriters Laboratory Flammability 94V-0
- Matte tin lead-free Plated
- Halogen free and RoHS compliant
- Typical failure mode is short from over-specified voltage or current
- Whisker test is conducted based on JEDEC JESD201A per itstable 4a and 4c
- IEC61000-4-2 ESD 30KV(Air), 30KV(contact)

● Applications

TVS devices are ideal for the protection of I/O interfaces, VCC bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications

● Maximum Ratings (Ta=25°C Unless otherwise specified)

| PARAMETER | SYMBOL | VALUE | SYMBOL |
|---|---------|----------------|--------|
| Peak Pulse Power Dissipation with a 10/1000 μs waveform (Fig. 1) (Note 1), (Note 2) | PppM | 600 | W |
| Peak Pulse Current with a 10/1000 μs waveform. (Note 1, Fig. 3) | IppP | See Next Table | A |
| Power Dissipation on Infinite Heat Sink at T[=75° C | PMAV | 5.0 | W |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3) | IrsM | 100 | A |
| Maximum Instantaneous Forward Voltage at 25A for Unidirectional Only (Note 4) | VF | 3.5/5.0 | V |
| Operating junction and Storage Temperature Range | T, TsTG | -55 to +150 | °C |
| Typical thermal resistance junction to lead | RaH | 20 | °C/W |
| Typical thermal resistance junction to ambient | ReJA | 100 | °C/W |

Note:

(1) Non-repetitive current pulse, per Fig. 3 and derated above Ta=25°C per Fig. 2.

(2) Mounted on 5.0mm x 5.0mm (0.03mm thick) Copper Pads to each terminal.

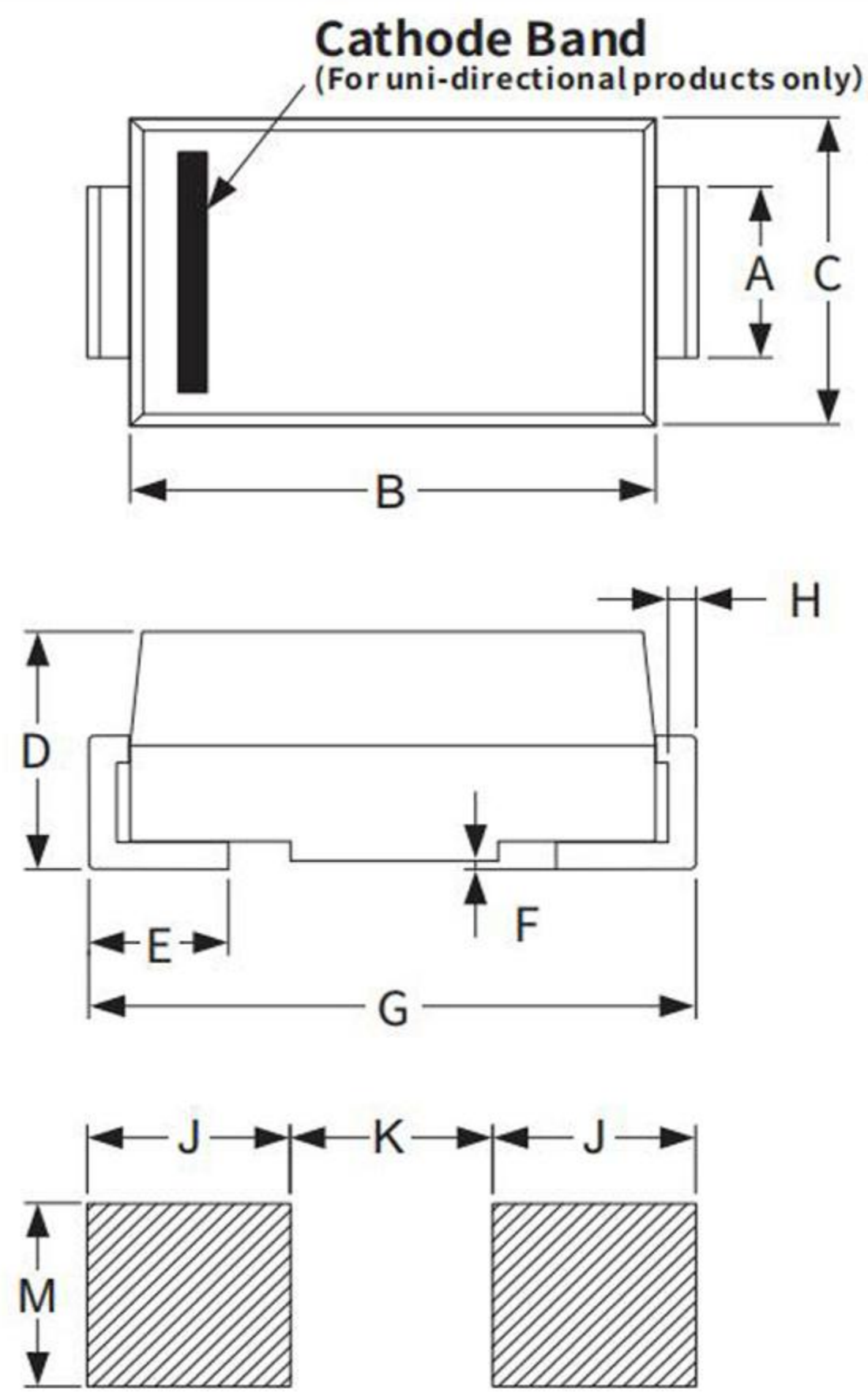
(3) 8.3ms single half sine-wave, or equivalent square wave, Duty cycle=4 pulses per minutes maximum.

(4) VF<3.5V for VBR<200V and Vp<6.5V for VBR>201V.

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● Package Outline Dimensions (SMB/DO-214AA)



| Symbol | Dimensions | | | |
|--------|-------------|-------|--------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 1.85 | 2.21 | 0.073 | 0.087 |
| B | 4.25 | 4.85 | 0.167 | 0.191 |
| C | 3.30 | 3.94 | 0.130 | 0.155 |
| D | 2.15 | 2.65 | 0.085 | 0.104 |
| E | 0.75 | 1.52 | 0.030 | 0.060 |
| F | - | 0.203 | | 0.008 |
| G | 5.08 | 5.59 | 0.200 | 0.220 |
| H | 0.15 | 0.31 | 0.006 | 0.012 |
| M | 2.26 | | 0.089 | |
| J | 2.10 | | 0.085 | |
| K | | 2.74 | | 0.107 |

● Electrical Characteristics (Ta=25°C Unless otherwise specified)

| Part Number | | Marking | | Reverse Stand-Off Voltage | Breakdown Voltage VBR (V) @I | | Test Current | Maximum Clamping Voltage@Ipp | Peak Pulse Current | Reverse Leakage @VRWM |
|-------------|------------|---------|------|---------------------------|------------------------------|-------|---------------------|------------------------------|--------------------|-----------------------|
| Uni | Bi | Uni | Bi | VRwm (V) | Min. | Max. | I _T (mA) | Ve (V) | Ipp (A) | IR (μA) |
| P6SMB6.8A | P6SMB6.8CA | 6V8A | 6V8C | 5.8 | 6.46 | 7.14 | 10 | 10.5 | 57.1 | 1000 |
| P6SMB7.5A | P6SMB7.5CA | 7V5A | 7V5C | 6.4 | 7.13 | 7.88 | 10 | 11.3 | 53.1 | 500 |
| P6SMB8.2A | P6SMB8.2CA | 8V2A | 8V2C | 7.0 | 7.79 | 8.61 | 10 | 12.1 | 49.6 | 200 |
| P6SMB9.1A | P6SMB9.1CA | 9V1A | 9V1C | 7.8 | 8.65 | 9.56 | 1 | 13.4 | 44.7 | 50 |
| P6SMB10A | P6SMB10CA | 10A | 10C | 8.6 | 9.5 | 10.5 | 1 | 14.5 | 41.3 | 10 |
| P6SMB11A | P6SMB11CA | 11A | 11C | 9.4 | 10.45 | 11.55 | 1 | 15.6 | 38.4 | 5 |
| P6SMB12A | P6SMB12CA | 12A | 12C | 10.2 | 11.4 | 12.6 | 1 | 16.7 | 35.9 | 5 |
| P6SMB13A | P6SMB13CA | 13A | 13C | 11.1 | 12.35 | 13.65 | 1 | 18.2 | 32.9 | 5 |
| P6SMB15A | P6SMB15CA | 15A | 15C | 12.8 | 14.25 | 15.75 | 1 | 21.2 | 28.3 | 5 |
| P6SMB16A | P6SMB16CA | 16A | 16C | 13.6 | 15.2 | 16.8 | 1 | 22.5 | 26.6 | 5 |
| P6SMB18A | P6SMB18CA | 18A | 18C | 15.3 | 17.1 | 18.9 | 1 | 25.2 | 23.8 | 5 |
| P6SMB20A | P6SMB20CA | 20A | 20C | 17.1 | 19 | 21 | 1 | 27.7 | 21.6 | 5 |
| P6SMB22A | P6SMB22CA | 22A | 22C | 18.8 | 20.9 | 23.1 | 1 | 30.6 | 19.6 | 5 |
| P6SMB24A | P6SMB24CA | 24A | 24C | 20.5 | 22.8 | 25.2 | 1 | 33.2 | 18.1 | 5 |
| P6SMB27A | P6SMB27CA | 27A | 27C | 23.1 | 25.65 | 28.35 | 1 | 37.5 | 16 | 5 |
| P6SMB30A | P6SMB30CA | 30A | 30C | 25.6 | 28.5 | 31.5 | 1 | 41.4 | 14.5 | 5 |
| P6SMB33A | P6SMB33CA | 33A | 33C | 28.2 | 31.35 | 34.65 | 1 | 45.7 | 13.1 | 5 |
| P6SMB36A | P6SMB36CA | 36A | 36C | 30.8 | 34.2 | 37.8 | 1 | 49.9 | 12 | 5 |
| P6SMB39A | P6SMB39CA | 39A | 39C | 33.3 | 37.05 | 40.95 | 1 | 53.9 | 11.1 | 5 |
| P6SMB43A | P6SMB43CA | 43A | 43C | 36.8 | 40.85 | 45.15 | 1 | 59.3 | 10.1 | 5 |
| P6SMB47A | P6SMB47CA | 47A | 47C | 40.2 | 44.65 | 49.35 | 1 | 64.8 | 9.2 | 5 |
| P6SMB51A | P6SMB51CA | 51A | 51C | 43.6 | 48.45 | 53.55 | 1 | 70.1 | 8.5 | 5 |
| P6SMB56A | P6SMB56CA | 56A | 56C | 47.8 | 53.2 | 58.8 | 1 | 77 | 7.8 | 5 |

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● Electrical Characteristics (Ta=25°C Unless otherwise specified)

| Part Number | | Marking | | Reverse Stand-Off Voltage | Breakdown Voltage VBR (V) @I | | Test Current | Maximum Clamping Voltage@Ipp | Peak Pulse Current | Reverse Leakage @VRwM |
|-------------|------------|---------|------|---------------------------|------------------------------|-------|--------------|------------------------------|--------------------|-----------------------|
| Uni | Bi | Uni | Bi | VRwM(V) | Min. | Max. | I- (mA) | Vc (V) | Ipp (A) | IR (μA) |
| P6SMB62A | P6SMB62CA | 62A | 62C | 53 | 58.9 | 65.1 | 1 | 85 | 7.0 | 5 |
| P6SMB68A | P6SMB68CA | 68A | 68C | 58.1 | 64.6 | 71.4 | 1 | 92 | 6.5 | 5 |
| P6SMB75A | P6SMB75CA | 75A | 75C | 64.1 | 71.25 | 78.75 | 1 | 103 | 5.8 | 5 |
| P6SMB82A | P6SMB82CA | 82A | 82C | 70.1 | 77.9 | 86.1 | 1 | 113 | 5.3 | 5 |
| P6SMB91A | P6SMB91CA | 91A | 91C | 77.8 | 86.45 | 95.35 | 1 | 125 | 4.8 | 5 |
| P6SMB100A | P6SMB100CA | 100A | 100C | 85.5 | 95 | 105 | 1 | 137 | 4.3 | 5 |
| P6SMB110A | P6SMB110CA | 110A | 110C | 94 | 104.5 | 115.5 | 1 | 152 | 3.9 | 5 |
| P6SMB120A | P6SMB120CA | 120A | 120C | 102 | 114 | 126 | 1 | 165 | 3.6 | 5 |
| P6SMB130A | P6SMB130CA | 130A | 130C | 111 | 123.5 | 136.5 | 1 | 179 | 3.3 | 5 |
| P6SMB150A | P6SMB150CA | 150A | 150C | 128 | 142.5 | 157.5 | 1 | 207 | 2.9 | 5 |
| P6SMB160A | P6SMB160CA | 160A | 160C | 136 | 152 | 168 | 1 | 219 | 2.7 | 5 |
| P6SMB170A | P6SMB170CA | 170A | 170C | 145 | 161.5 | 178.5 | 1 | 234 | 2.5 | 5 |
| P6SMB180A | P6SMB180CA | 180A | 180C | 154 | 171 | 189 | 1 | 246 | 2.4 | 5 |
| P6SMB200A | P6SMB200CA | 200A | 200C | 171 | 190 | 210 | 1 | 274 | 2.2 | 5 |
| P6SMB220A | P6SMB220CA | 220A | 220C | 185 | 209 | 231 | 1 | 328 | 1.8 | 5 |
| P6SMB250A | P6SMB250CA | 250A | 250C | 214 | 237.5 | 262.5 | 1 | 344 | 1.7 | 5 |
| P6SMB300A | P6SMB300CA | 300A | 300C | 256 | 285 | 315 | 1 | 414 | 1.4 | 5 |
| P6SMB350A | P6SMB350CA | 350A | 350C | 299.3 | 332.5 | 367.5 | 1 | 482 | 1.2 | 5 |
| P6SMB380A | P6SMB380CA | 380A | 380C | 324.9 | 361 | 399 | 1 | 524.4 | 1.1 | 5 |
| P6SMB400A | P6SMB400CA | 400A | 400C | 342 | 380 | 420 | 1 | 548 | 1.1 | 5 |
| P6SMB440A | P6SMB440CA | 440A | 440C | 376.2 | 418 | 462 | 1 | 607.2 | 1.0 | 5 |
| P6SMB500A | P6SMB500CA | 500A | 500C | 427.5 | 475 | 525 | 1 | 690 | 0.8 | 5 |
| P6SMB520A | P6SMB520CA | 520A | 520C | 444.6 | 494 | 546 | 1 | 717.6 | 0.8 | 5 |
| P6SMB550A | P6SMB550CA | 550A | 550C | 470.3 | 522.5 | 577.5 | 1 | 759 | 0.8 | 5 |
| P6SMB600A | P6SMB600CA | 600A | 600C | 513 | 570 | 630 | 1 | 828 | 0.7 | 5 |

Note:

(1) Suffix 'A' denotes 5% tolerance device.

(2) Add suffix 'CA' after part number to specify Bi-directional devices.

(3) For Bi-Directional devices having VR of 10 volts and under, the IRLimit is double.

•Ratings And Characteristics Curves (Ta=25°C Unless otherwise specified)

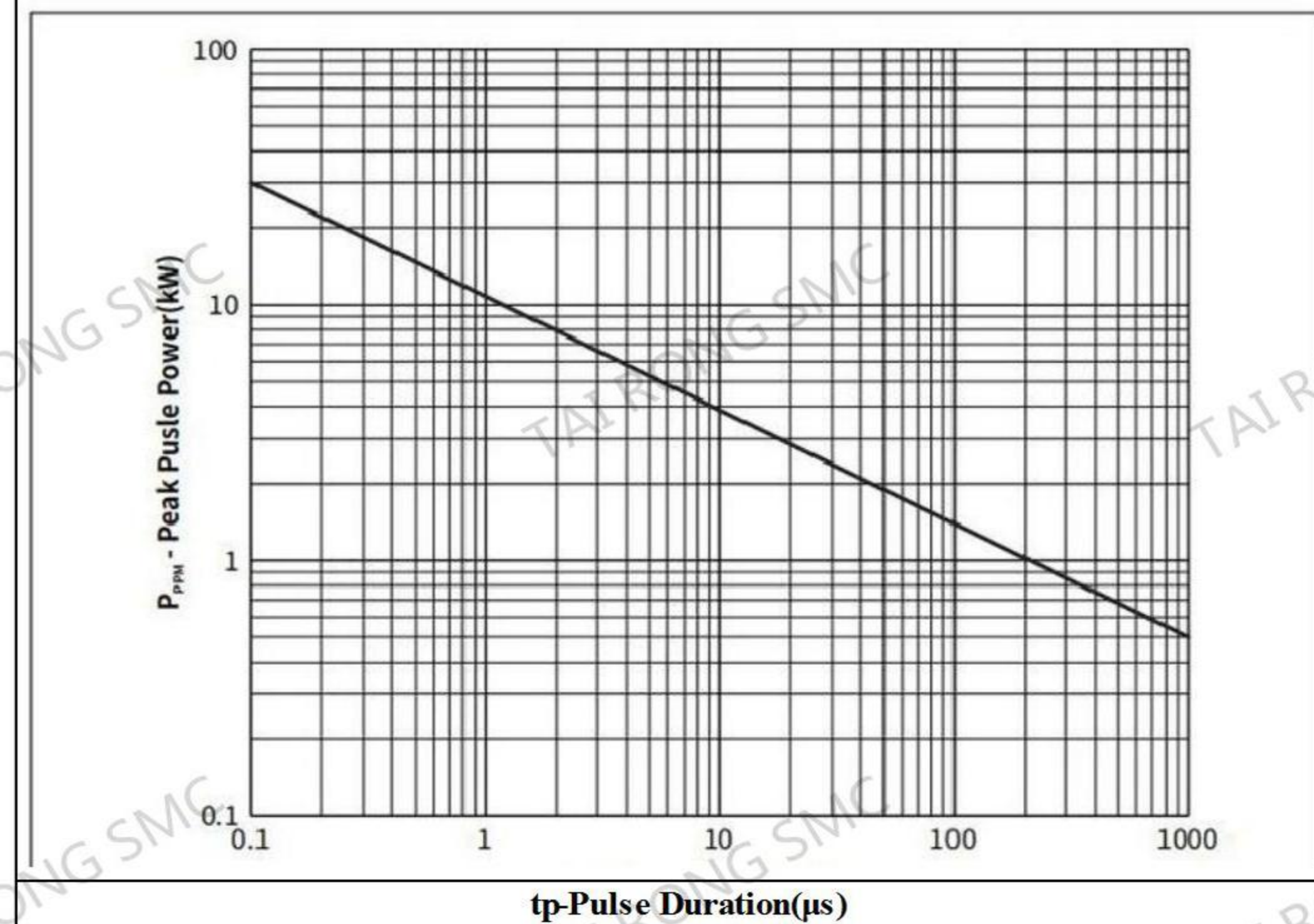


Fig.1 Peak Pulse Power Rating Curve

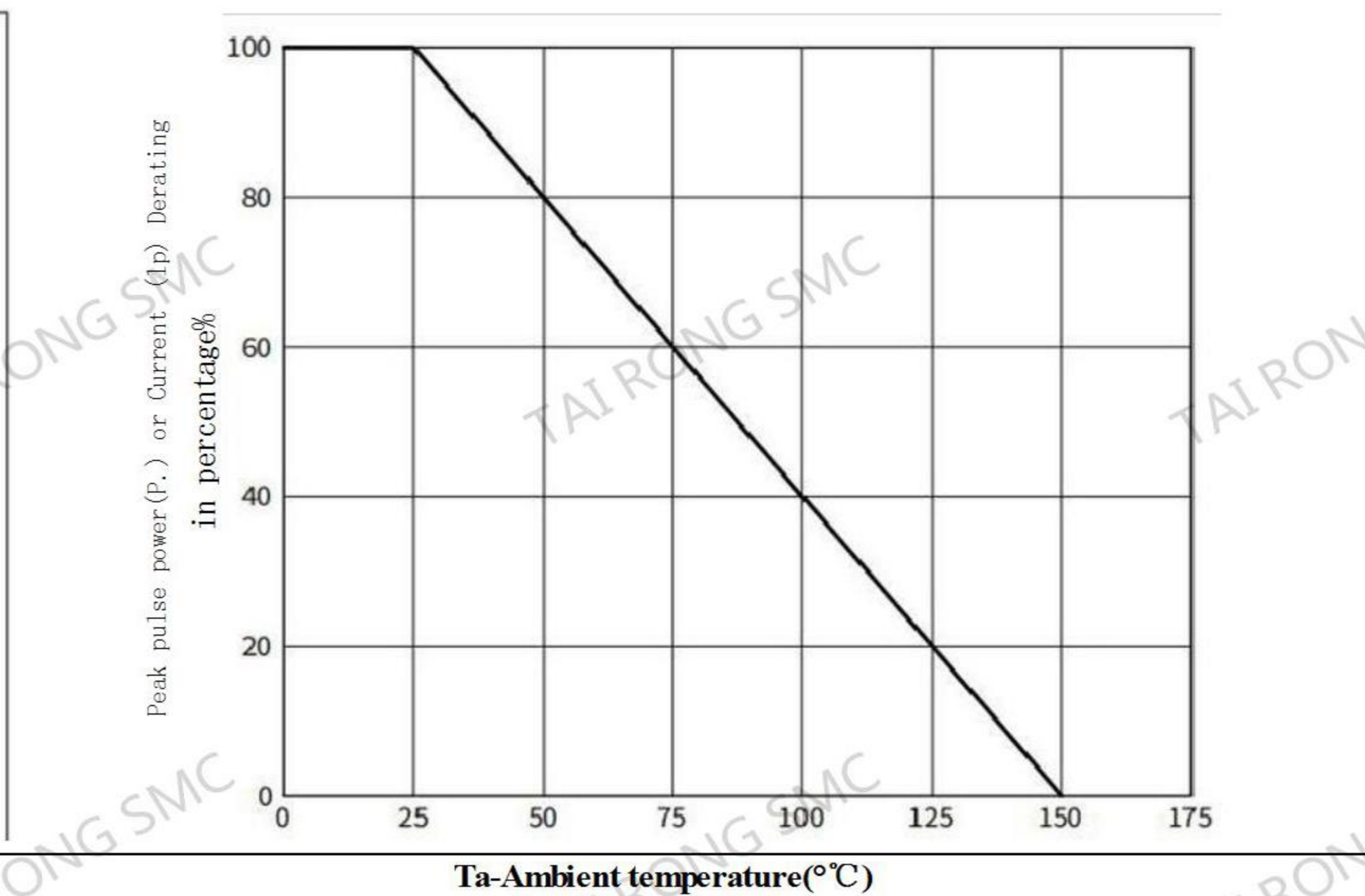


Fig.2 Pulse Derating Curve

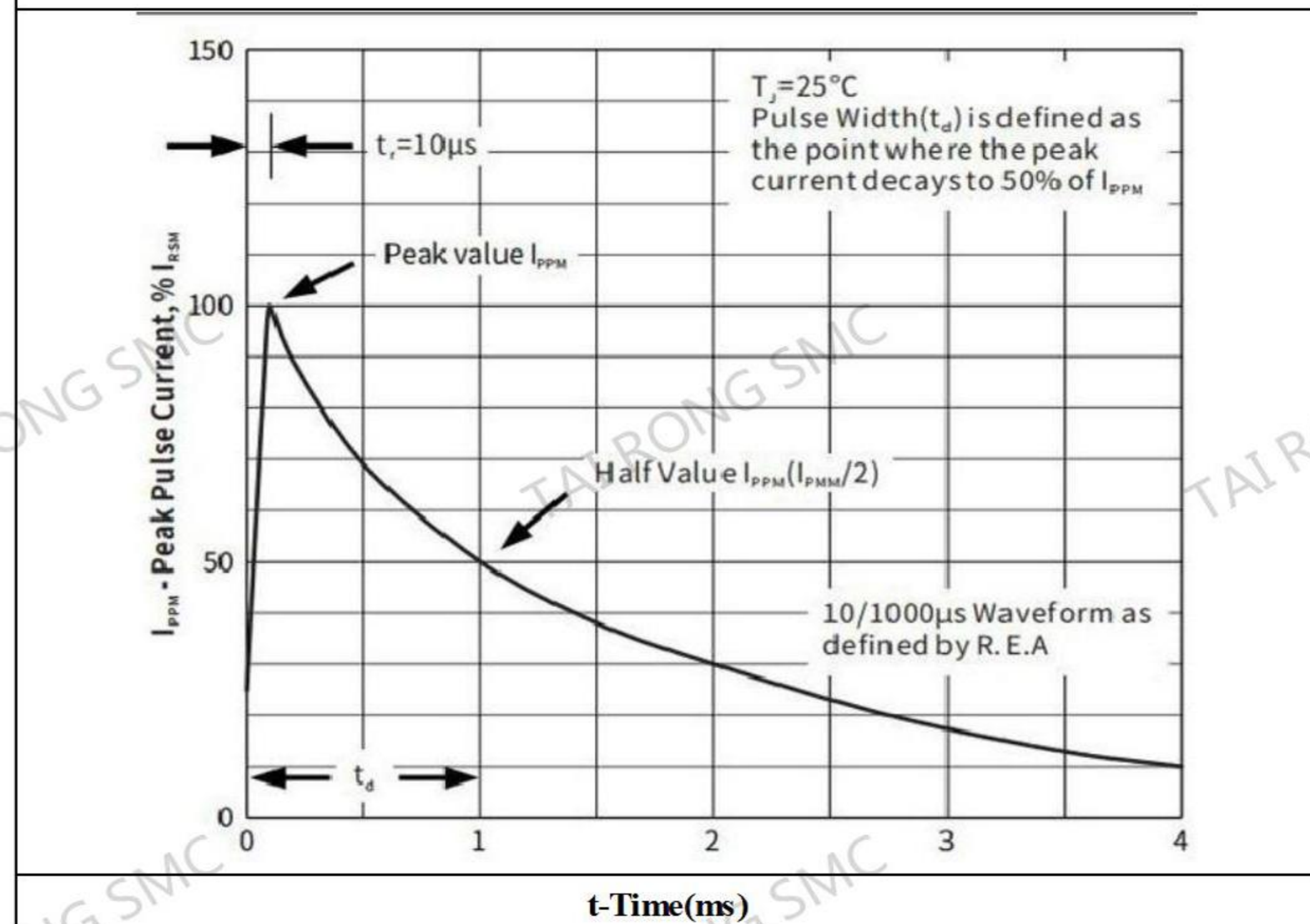


Fig.3 Pulse Waveform

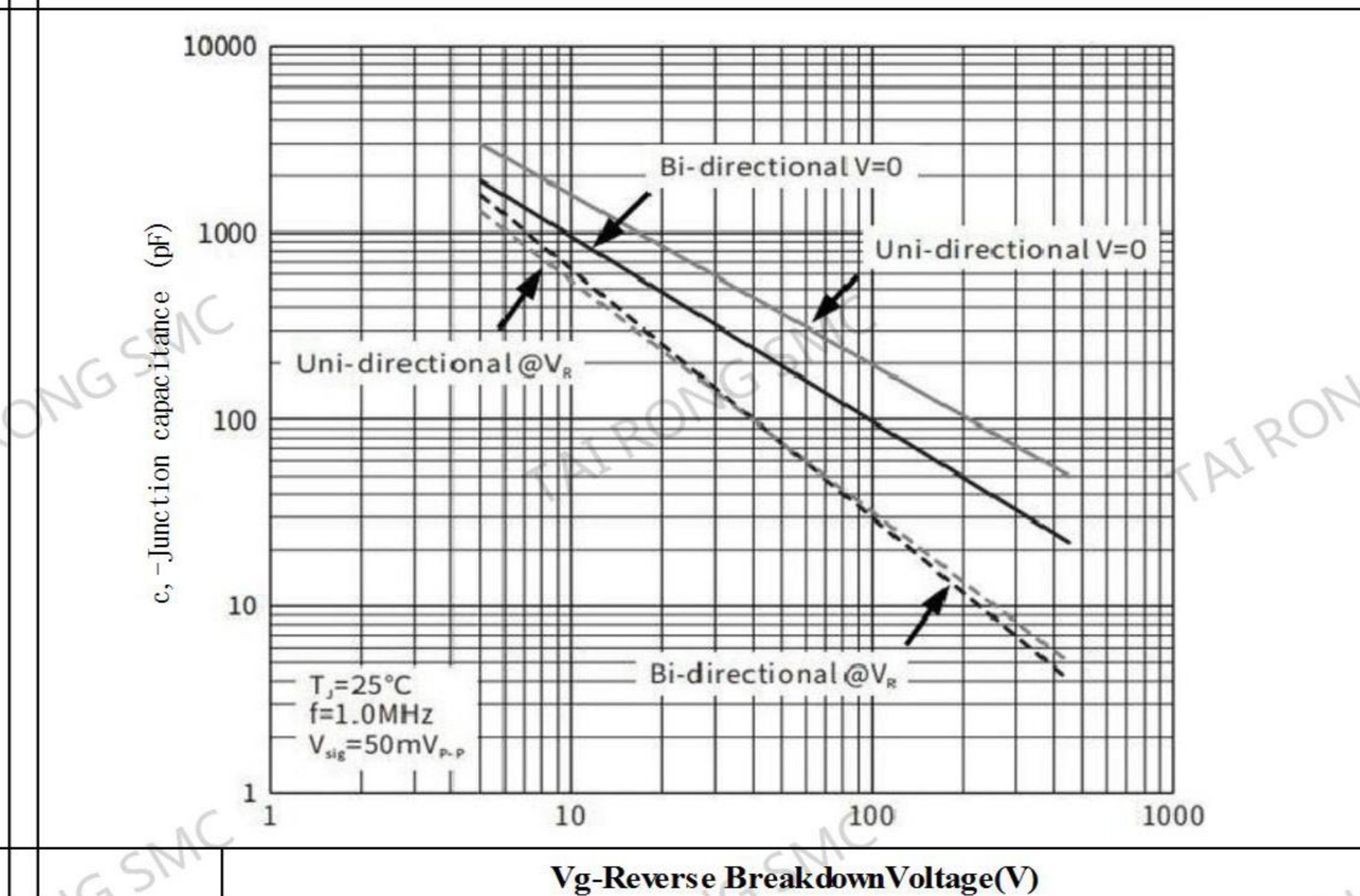


Fig.4 Typical Junction Capacitance

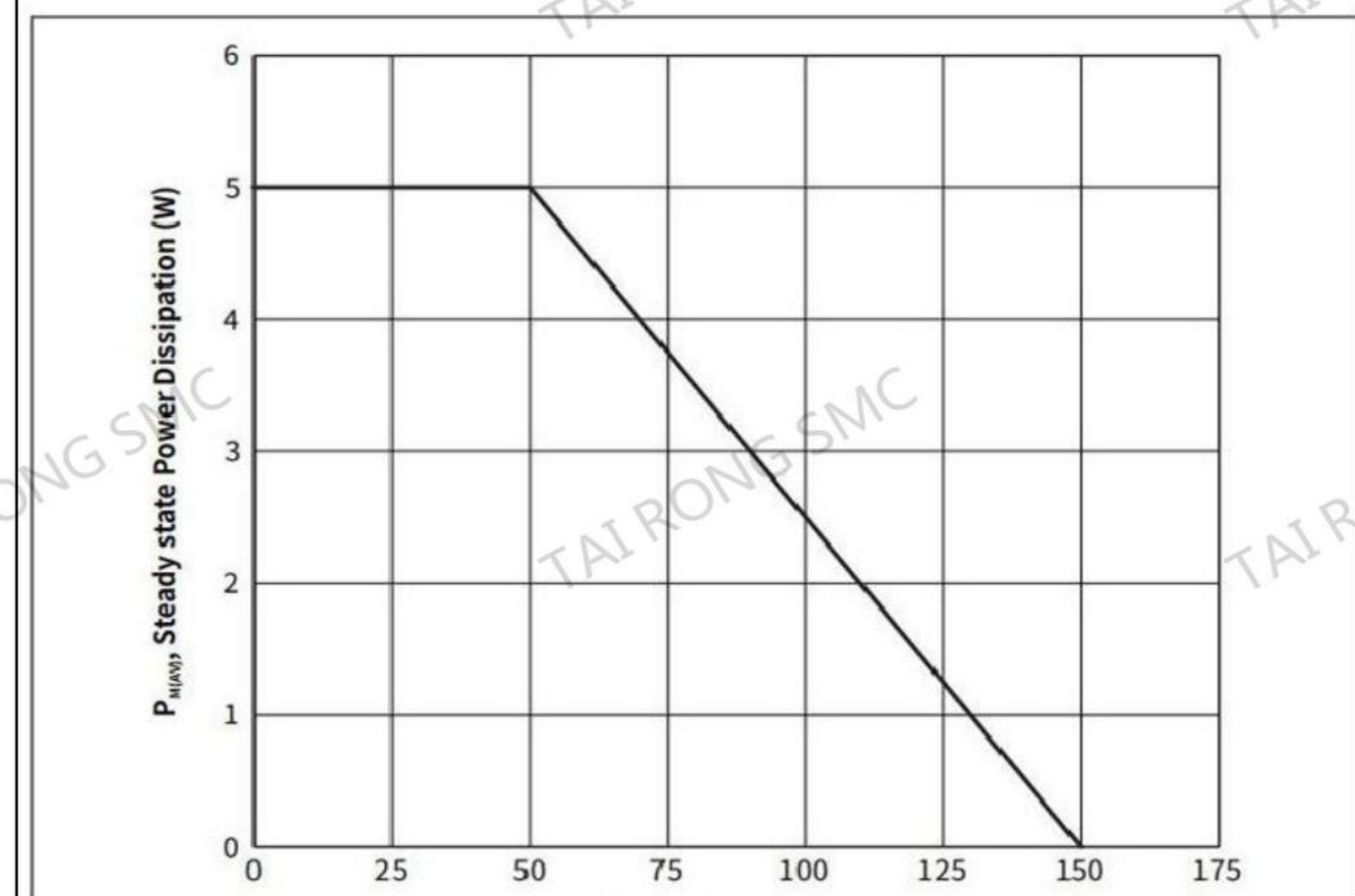


Fig.5 Steady State Power Dissipation Derating Curve

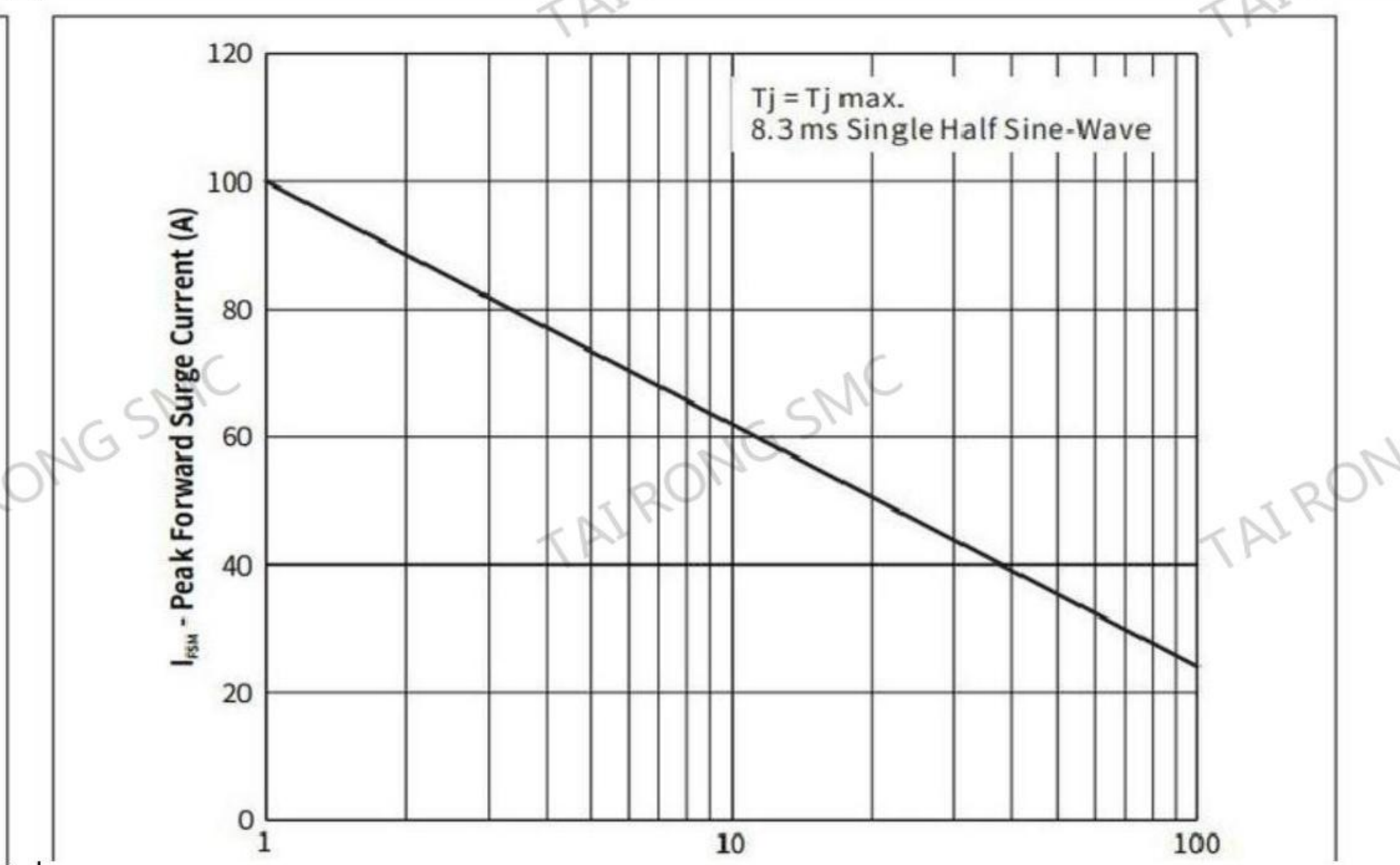


Fig.6 Maximum Non-Repetitive Forward Surge Current Uni-Directional Only

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● Ordering Information

| PACKAGE | PACKAGE CODE | UNIT WEIGHT (g) | REEL (pcs) | BOX (pcs) | CARTON (pcs) | DELIVERY MODE |
|---------|--------------|-----------------|------------|-----------|--------------|---------------|
| SMB | R1 | 0.098 | 500 | 2000 | 16000 | 7" |
| SMB | R3 | 0.098 | 3000 | 6000 | 48000 | 13" |

● Part Numbering

| P6SMB XXX C A | |
|--------------------------|--|
| — 5%VgRVoltage Tolerance | |
| — Bidirectional | |
| — Vew m Voltage | |
| — Series Code | |

● Soldering Parameters

| Profile Feature | | Pb-Free Assembly |
|---|-----------------------------|------------------|
| Pre-heat | Temperature Min(Ts(min)) | +150°C |
| | Temperature Max(Ts(max)) | +200°C |
| | Time(Min to Max)(ts) | 60-180 secs. |
| Average ramp up rate(Liquid us Temp(T) to peak) | | 3°C/sec.Max |
| Ts(max) to T-Ramp-up Rate | | 3°C/sec.Max |
| Reflow | Temperature(TL) (Liquid us) | +217°C |
| | Temperature(tL) | 60-150 secs. |
| PeakTemp(Tp) | | +260(+0/-5)°C |
| Time within 5°Cof actual Peak Temp(tp) | | 30 secs.Max |
| Ramp-down Rate | | 6°C/sec.Max |
| Time 25°Cto Peak Temp(Tp) | | 8 min.Max |
| Do not exceed | | +260°C |

● Packaging (SMB/DO-214AA)

| Symbol | Dimension (mm) |
|--------|----------------|
| W | 12.00±0.20 |
| P0 | 4.00±0.10 |
| P1 | 8.00±0.10 |
| P2 | 2.00±0.10 |
| D0 | φ1.55±0.10 |
| D1 | φ1.5±0.10 |
| E | 1.75±0.10 |
| F | 5.50±0.05 |
| A0 | 3.86±0.10 |
| B0 | 5.65±0.10 |
| K0 | 2.75±0.15 |
| T | 0.25±0.05 |