

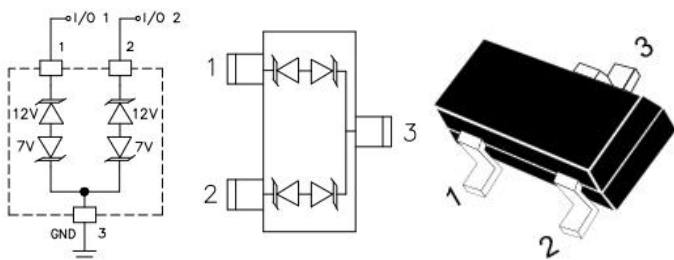
Description

The SM712 is designed for asymmetrical (12V to -7V) protection in multi-point data transmission application, The SM712 replace four discrete components by integrating two 12V and two 7V TVS diodes in a single package. The SM712 complies with the IEC 61000-4-2 (ESD) standard with $\pm 30\text{kV}$ air and $\pm 30\text{kV}$ contact discharge. It is assembled into a lead-free SOT-23 package. It is designed to protect components which are connected to data and transmission lines from voltage surges.

Features

- 325W peak pulse power (8/20 μs)
- Ultra low leakage: nA level
- Operating voltage: 7V or 12V
- Low clamping voltage
- Complies with following standards:
 - IEC 61000-4-2 (ESD) immunity test
 - Air discharge: $\pm 30\text{kV}$
 - Contact discharge: $\pm 30\text{kV}$
- – IEC61000-4-5 (Lightning)
36A for 12V & 7V (8/20 μs)
- RoHS Compliant

Dimensions & Symbol (Unit: mm Max)



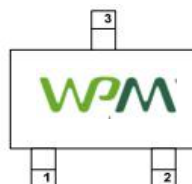
Mechanical Characteristics

- Package: SOT-23
- Lead Finish: Matte Tin
- Case Material: “Green” Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Connections: See Diagram Below
- Marking Information: See Below

Applications

- Wireless System
- Networks
- Portable Instrumentation
- RS485 Ports

Marking information



Details marking code reference customer approval list

Ordering Information

| Part Number | Packaging | Reel Size |
|-------------|------------------|-----------|
| SM712 | 3000/Tape & Reel | 7 inch |

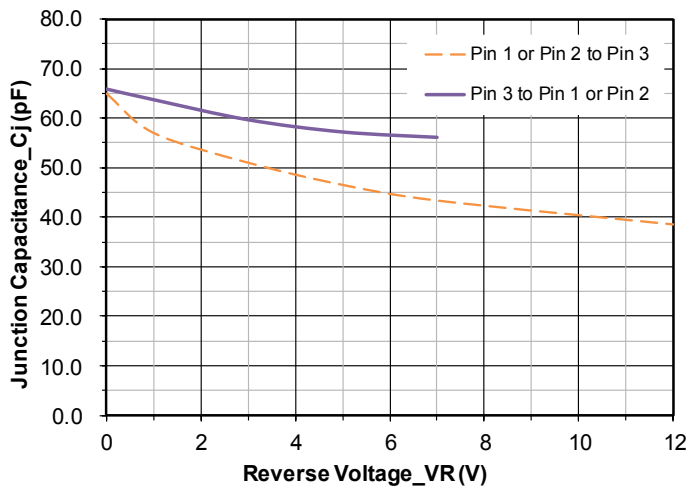
Absolute Maximum Ratings (T_A=25°C unless otherwise specified)

| Parameter | Symbol | Value | Unit |
|---|--------|-------------|------|
| Peak Pulse Power (8/20μs) | Ppk | 600-1000 | W |
| Peak Pulse Current (tp = 8/20μs), Pin 1 or 2 to Pin 3 | Ipp | 36 | A |
| Peak Pulse Current (tp = 8/20μs), Pin 3 to Pin 1 or 2 | | 36 | |
| ESD per IEC 61000-4-2 (Air) | VESD | ±30 | kV |
| ESD per IEC 61000-4-2 (Contact) | | ±30 | |
| Operating Temperature Range | TJ | -55 to +125 | °C |
| Storage Temperature Range | Tstg | -55 to +150 | °C |

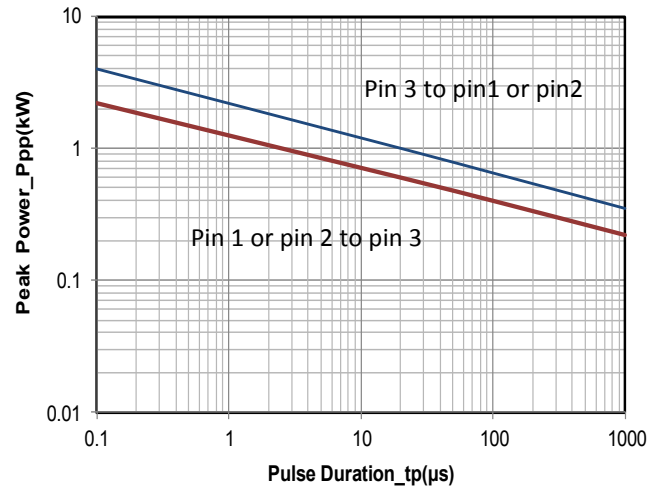
Electrical Characteristics (T_A=25°C unless otherwise specified)

| Parameter | Symbol | Pin 1 to 3 and 2 to 3 (12V TVS) | | | Pin 3 to 1 and 3 to 2 (7V TVS) | | | Unit | Test Condition |
|-------------------------|--------|---------------------------------------|-----|-----|--------------------------------------|-----|-----|------|--|
| | | Min | Typ | Max | Min | Typ | Max | | |
| Reverse Working Voltage | VRWM | | | 12 | | | 7 | V | |
| Breakdown Voltage | VBR | 13.3 | | | 7.5 | | | V | IT = 1mA |
| Reverse Leakage Current | IR | | | 0.1 | | | 0.1 | μA | VR = VRWM |
| Clamping Voltage | VC | | | 19 | | | 10 | V | I _{PP} = 1A (8 x 20μs pulse) |
| Clamping Voltage | VC | | | 25 | | | 15 | V | I _{PP} = 25A (8 x 20μs pulse) |
| Clamping Voltage | VC | | | 28 | | | 17 | V | I _{PP} = 36A (8 x 20μs pulse) |
| Junction Capacitance | CJ | | | 75 | | | 75 | pF | VR = 0V, f = 1MHz |
| Junction Capacitance | CJ | | | 50 | | | 60 | pF | VR = VRWM, f = 1MHz |

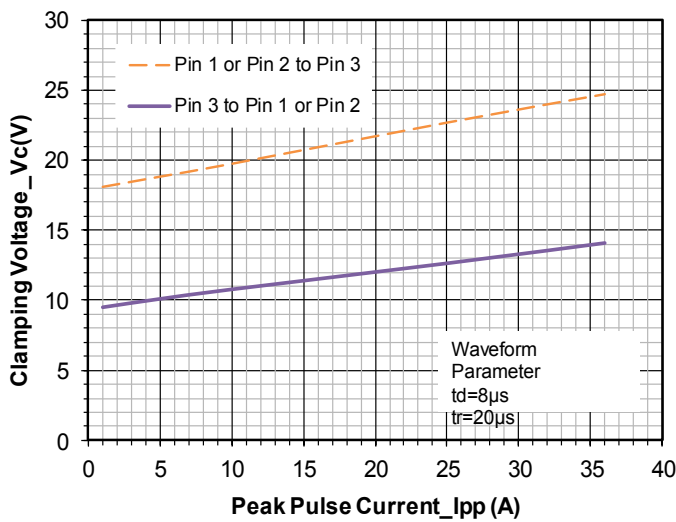
Typical Performance Characteristics (T_A=25°C unless otherwise Specified)



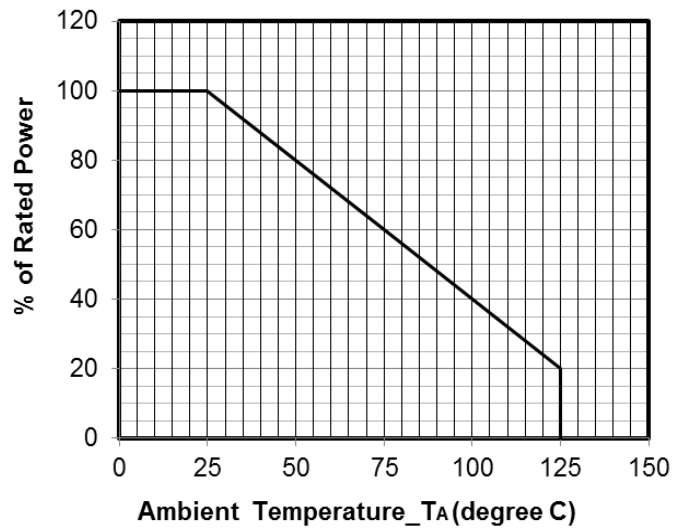
Junction Capacitance vs. Reverse Voltage



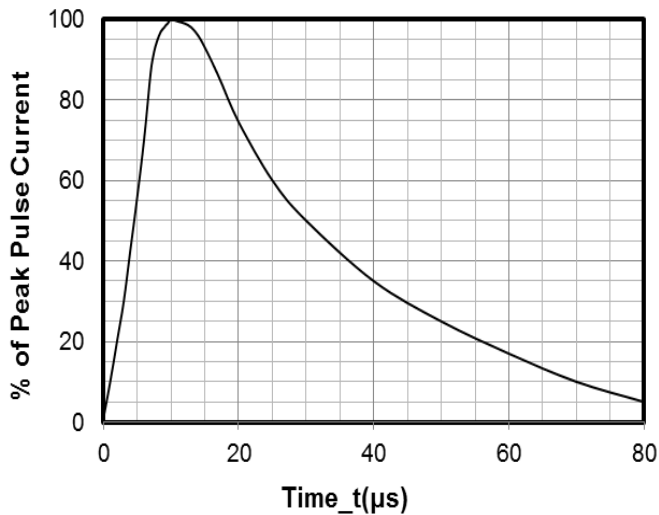
Peak Pulse Power vs. Pulse Time



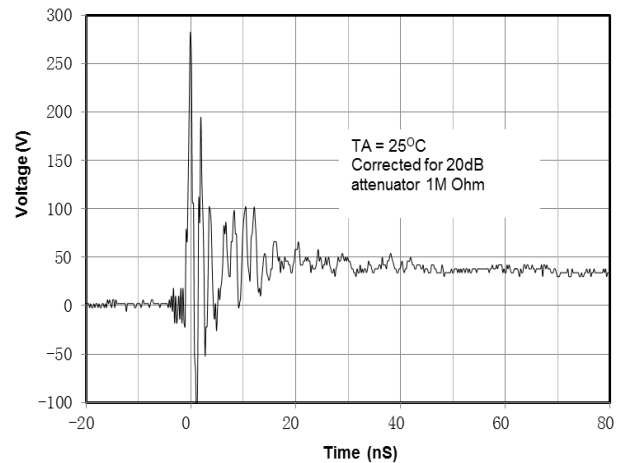
Clamping Voltage vs. Peak Pulse Current



Power Derating Curve



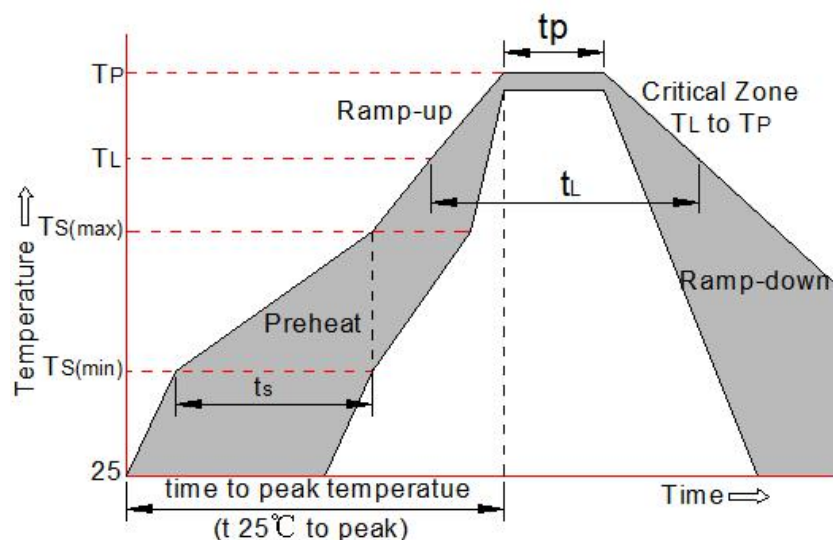
8 X 20μs Pulse Waveform



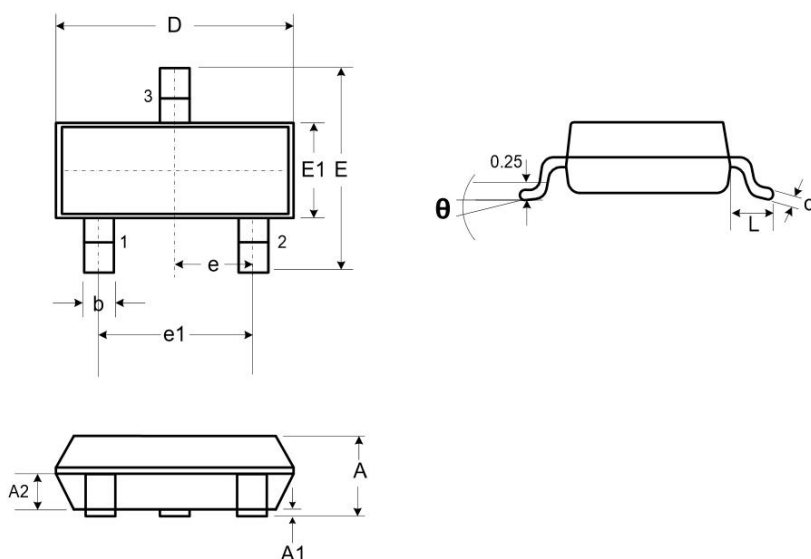
**ESD Clamping Voltage
8 kV Contact per IEC61000-4-2**

Soldering parameters

| | | |
|---|-----------------------------------|---------------------------------|
| Reflow Condition | | Pb-Free assembly (see FIG.2) |
| 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 (Liquid us Temp (T_L) to peak) | | 3°C/sec. Max |
| $T_{s(max)}$ to T_L - Ramp-up Rate | | 3°C/sec. Max |
| Reflow | -Temperature(T_L) (Liquid us) | +217°C |
| | -Temperature(t_L) | 60-150 secs. |
| Peak Temp (T_p) | | +260(+0/-5)°C |
| Time within 5°C of actual Peak Temp (t_p) | | 30 secs. Max |
| Ramp-down Rate | | 6°C/sec. Max |
| Time 25°C to Peak Temp (T_p) | | 8 min. Max |
| Do not exceed | | +260°C |

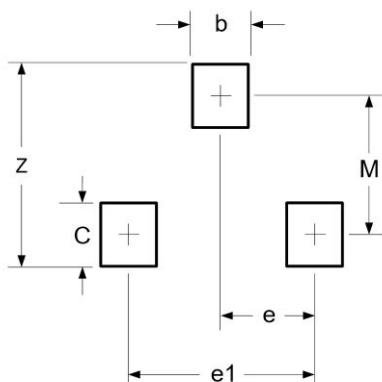


Package mechanical data



| DIMENSIONS | | | | |
|------------|------------|------|------------|--------|
| SYMBOL | MILLIMETER | | INCHES | |
| | MIN | MAX | MIN | MAX |
| A | 0.90 | 1.15 | 0.035 | 0.045 |
| A1 | 0.00 | 0.10 | 0.000 | 0.004 |
| A2 | 0.60 | 0.70 | 0.0236 | 0.0275 |
| b | 0.30 | 0.50 | 0.012 | 0.020 |
| c | 0.08 | 0.15 | 0.003 | 0.006 |
| D | 2.80 | 3.00 | 0.110 | 0.118 |
| E | 2.25 | 2.55 | 0.089 | 0.100 |
| E1 | 1.20 | 1.40 | 0.047 | 0.055 |
| e | 0.95 BSC | | 0.0374 BSC | |
| e1 | 1.80 | 2.00 | 0.071 | 0.079 |
| L | 0.30 | 0.50 | 0.012 | 0.020 |
| θ | 0 | 8° | 0 | 8° |

Suggested Land Pattern



| DIMENSIONS | | |
|------------|-----------|-------------|
| DIM | INCHES | MILLIMETERS |
| M | 0.0795 | 2.02 |
| C | 0.0315 | 0.80 |
| Z | 0.111 | 2.82 |
| e | 0.037 BSC | 0.95 BSC |
| e1 | 0.075 BSC | 1.9 BSC |
| b | 0.0315 | 0.80 |

Contact information

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