

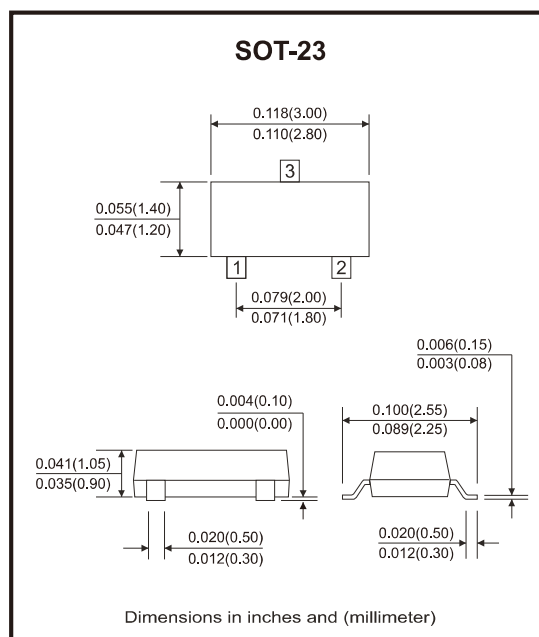
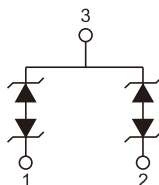
## Features

- Low clamping voltage.
- Low leakage
- Operating voltage: 7V or 12V .

## Mechanical data

- Case: SOT-23, molded plastic.
- Mounting position: Any.

## Circuit Diagram



## Maximum Rating (at TA=25°C unless otherwise noted)

| Parameter                          | Symbol           | Value      | Unit |
|------------------------------------|------------------|------------|------|
| IEC 61000-4-2(ESD)air (Note 1)     | V <sub>ESD</sub> | ±30        | kV   |
| IEC 61000-4-2(ESD)contact (Note 1) | V <sub>ESD</sub> | ±30        | kV   |
| Peak pulse power (Note 2)          | P <sub>PP</sub>  | 325        | W    |
| Peak pulse current (Note 2)        | I <sub>PP</sub>  | 13         | A    |
| Operating temperature range        | T <sub>J</sub>   | -55 ~ +125 | °C   |
| Storage temperature range          | T <sub>STG</sub> | -55 ~ +150 | °C   |

Notes : 1. Device stressed with ten non-repetitive ESD pulses.

2. Non-repetitive current pulse 8/20μs exponential decay waveform according to IEC 61000-4-5.

**Electrical Characteristics** (at  $T_A=25^{\circ}\text{C}$  unless otherwise noted)

| Parameter                            | Conditions                    |                                       | Symbol     | Min  | Typ | Max | Unit          |
|--------------------------------------|-------------------------------|---------------------------------------|------------|------|-----|-----|---------------|
| Reverse standoff voltage<br>(Note 1) | Pin1 to Pin3 and Pin2 to Pin3 |                                       | $V_{RWM}$  |      |     | 12  | V             |
|                                      | Pin3 to Pin1 and Pin3 to Pin2 |                                       | $V_{RWM}$  |      |     | 7   | V             |
| Reverse leakage current              | Pin1 to Pin3 and Pin2 to Pin3 | $V_R = V_{RWM}$                       | $I_R$      |      |     | 0.5 | $\mu\text{A}$ |
|                                      | Pin3 to Pin1 and Pin3 to Pin2 | $V_R = V_{RWM}$                       | $I_R$      |      |     | 0.5 | $\mu\text{A}$ |
| Breakdown voltage                    | Pin1 to Pin3 and Pin2 to Pin3 | $I_T = 1\text{mA}$                    | $V_{(BR)}$ | 13.3 |     |     | V             |
|                                      | Pin3 to Pin1 and Pin3 to Pin2 | $I_T = 1\text{mA}$                    | $V_{(BR)}$ | 7.5  |     |     | V             |
| Clamping voltage (Note 2)            | Pin1 to Pin3 and Pin2 to Pin3 | $I_{PP} = 5\text{A}$                  | $V_C$      |      |     | 20  | V             |
|                                      | Pin3 to Pin1 and Pin3 to Pin2 | $I_{PP} = 5\text{A}$                  | $V_C$      |      |     | 14  | V             |
| Clamping voltage (Note 2)            | Pin1 to Pin3 and Pin2 to Pin3 | $I_{PP} = 13\text{A}$                 | $V_C$      |      |     | 25  | V             |
|                                      | Pin3 to Pin1 and Pin3 to Pin2 | $I_{PP} = 13\text{A}$                 | $V_C$      |      |     | 16  | V             |
| Junction capacitance                 | Pin1 to Pin3 and Pin2 to Pin3 | $V_R = 0\text{V}$ , $f = 1\text{MHz}$ | $C_J$      |      | 40  |     | pF            |
|                                      | Pin3 to Pin1 and Pin3 to Pin2 | $V_R = 0\text{V}$ , $f = 1\text{MHz}$ | $C_J$      |      | 40  |     | pF            |
| Junction capacitance                 | Pin1 to Pin3 and Pin2 to Pin3 | $V_R = V_{RWM}$ , $f = 1\text{MHz}$   | $C_J$      |      | 30  |     | pF            |
|                                      | Pin3 to Pin1 and Pin3 to Pin2 | $V_R = V_{RWM}$ , $f = 1\text{MHz}$   | $C_J$      |      | 30  |     | pF            |

Notes : 1. Other voltage available upon request.

2. Non-repetitive current pulse 8/20 $\mu\text{s}$  exponential decay waveform according to IEC 61000-4-5.

## Typical Rating and Characteristic Curves

Fig.1 - Junction Capacitance vs. Reverse Voltage

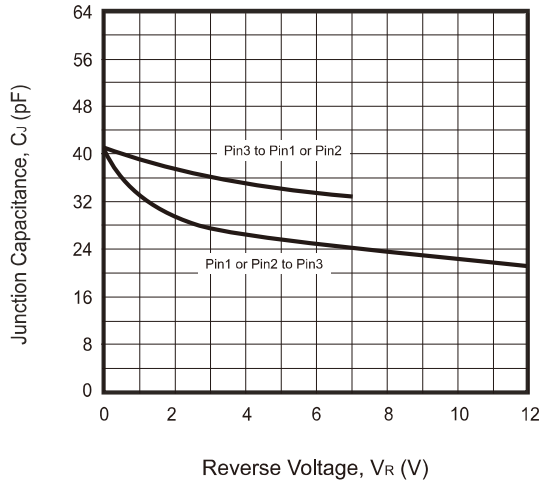


Fig.2 - Peak Pulse Power vs. Pulse Time

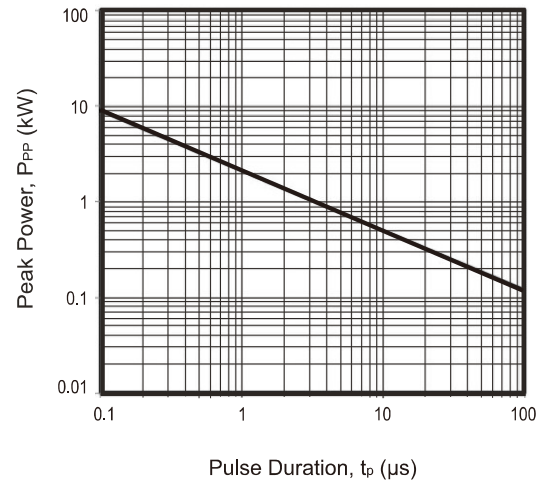


Fig.3 - Clamping Voltage vs. Peak Pulse Current

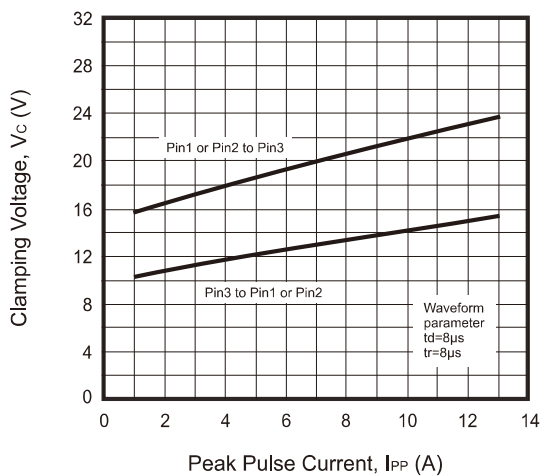


Fig.4 - Power Derating Curve

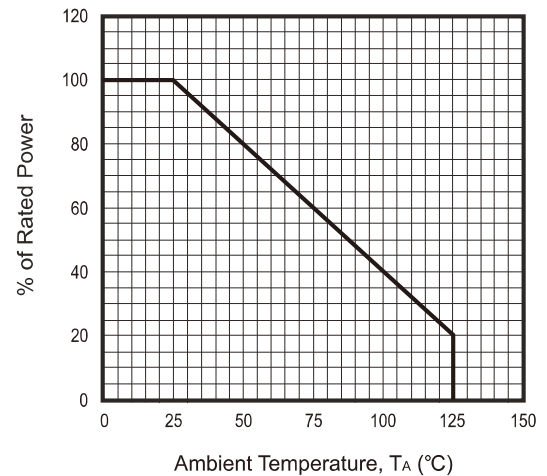


Fig.5 - 8 x 20 $\mu$ s Pulse Waveform

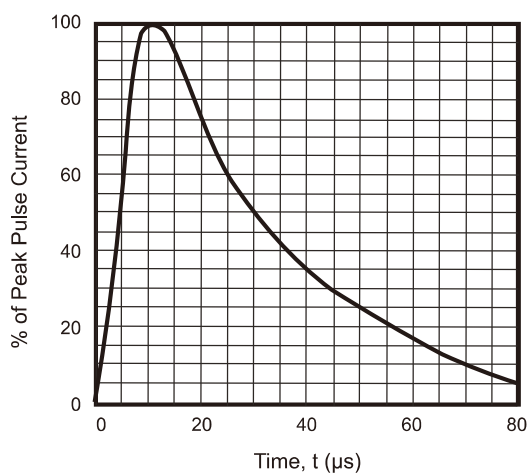
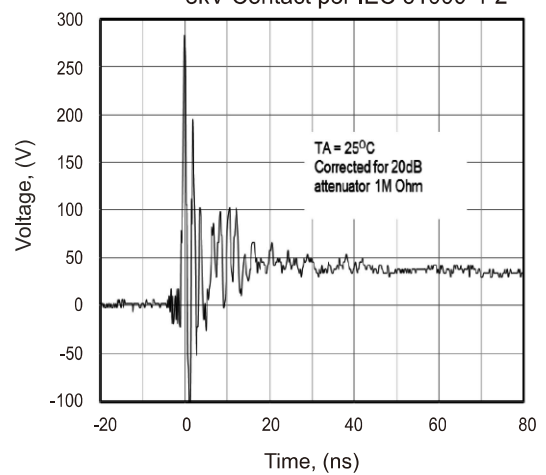
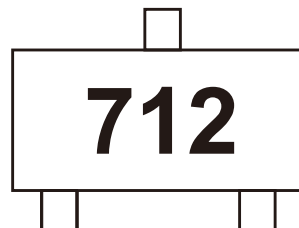


Fig.6 - ESD Clamping Voltage  
8kV Contact per IEC 61000-4-2



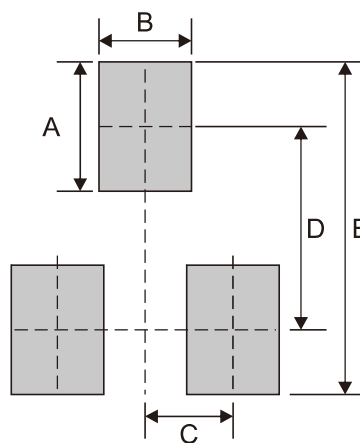
## Marking Code

| Part Number  | Marking Code |
|--------------|--------------|
| <b>SM712</b> | <b>712</b>   |



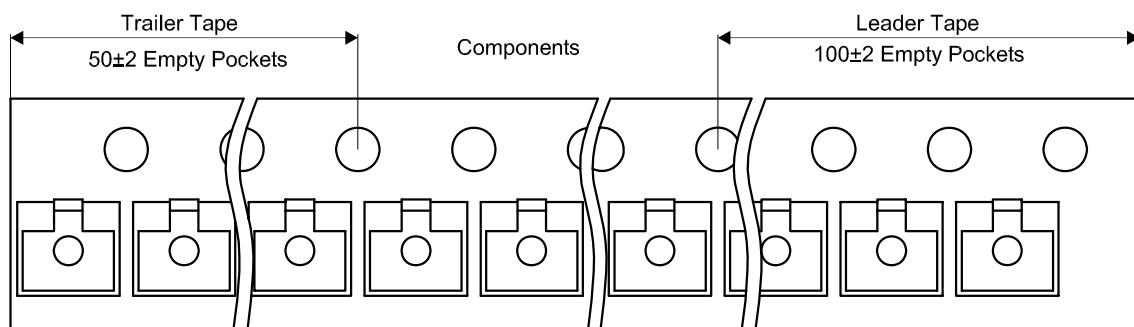
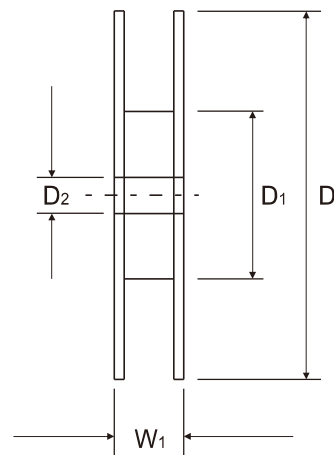
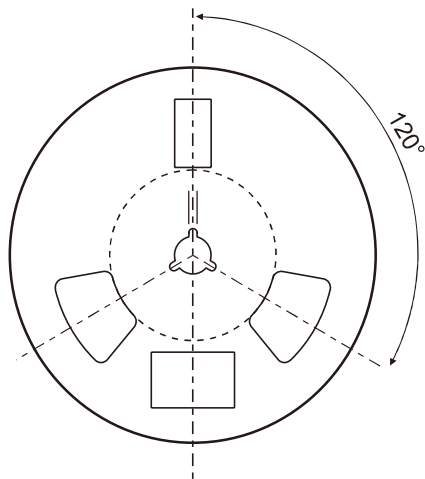
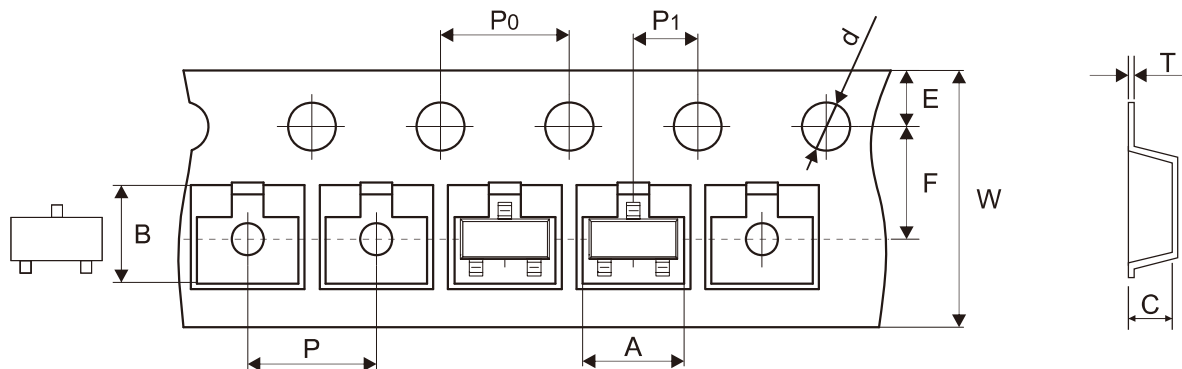
## Suggested P.C.B. PAD Layout

| SIZE     | SOT-23      |              |
|----------|-------------|--------------|
|          | (mm)        | (inch)       |
| <b>A</b> | <b>1.40</b> | <b>0.055</b> |
| <b>B</b> | <b>1.00</b> | <b>0.039</b> |
| <b>C</b> | <b>0.95</b> | <b>0.037</b> |
| <b>D</b> | <b>2.20</b> | <b>0.087</b> |
| <b>E</b> | <b>3.60</b> | <b>0.142</b> |



## Standard Packaging

| Case Type     | REEL PACK     |                     |
|---------------|---------------|---------------------|
|               | REEL<br>(pcs) | Reel Size<br>(inch) |
| <b>SOT-23</b> | <b>3,000</b>  | <b>7</b>            |



| SOT-23 | SYMBOL | A                 | B                 | C                 | d                       | D                 | D1                | D2                |
|--------|--------|-------------------|-------------------|-------------------|-------------------------|-------------------|-------------------|-------------------|
|        | (mm)   | $3.15 \pm 0.10$   | $2.77 \pm 0.10$   | $1.22 \pm 0.10$   | $1.50 + 0.10 - 0.00$    | $178.00 \pm 2.00$ | $54.40 \pm 1.00$  | $13.00 \pm 1.00$  |
|        | (inch) | $0.124 \pm 0.004$ | $0.109 \pm 0.004$ | $0.048 \pm 0.004$ | $0.059 + 0.004 - 0.000$ | $7.008 \pm 0.079$ | $2.142 \pm 0.039$ | $0.512 \pm 0.039$ |

| SOT-23 | SYMBOL | E                 | F                 | P                 | P0                | P1                | T                 | W                       | W1                |
|--------|--------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------------|-------------------|
|        | (mm)   | $1.75 \pm 0.10$   | $3.50 \pm 0.05$   | $4.00 \pm 0.10$   | $4.00 \pm 0.10$   | $2.00 \pm 0.05$   | $0.20 \pm 0.02$   | $8.00 + 0.30 - 0.10$    | $12.30 \pm 1.00$  |
|        | (inch) | $0.069 \pm 0.004$ | $0.138 \pm 0.002$ | $0.157 \pm 0.004$ | $0.157 \pm 0.004$ | $0.079 \pm 0.002$ | $0.008 \pm 0.001$ | $0.315 + 0.012 - 0.004$ | $0.484 \pm 0.039$ |