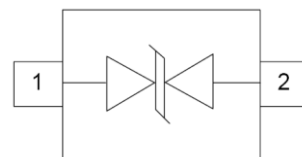


### Features

- 350 Watts peak pulse power ( $t_p = 8/20\mu s$ )
- Low clamping voltage
- Working voltage:  $V_{RWM} = 3.3V, 5V, 8V, 12V, 15V, 18V, 24V, 36V$
- Low reverse clamping voltage
- RoHS compliant with Halogen-free
- Qualified to AEC-Q101 Standards

HF

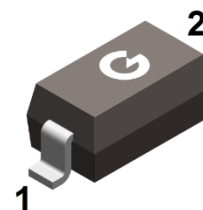


### Typical Applications

- Cell Phone Handsets and Accessories
- Microprocessor based equipment
- Portable instrumentation

### Mechanical Data

- Case: SOD-123
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



SOD-123

### Ordering Information

| Part Number | Package | Shipping Quantity     | Marking Code |
|-------------|---------|-----------------------|--------------|
| TSD03CW     | SOD-123 | 3000pcs / Tape & Reel | 03C          |
| TSD05CW     | SOD-123 | 3000pcs / Tape & Reel | 05C          |
| TSD08CW     | SOD-123 | 3000pcs / Tape & Reel | 9/9          |
| TSD12CW     | SOD-123 | 3000pcs / Tape & Reel | 6/6          |
| TSD15CW     | SOD-123 | 3000pcs / Tape & Reel | 7/7          |
| TSD18CW     | SOD-123 | 3000pcs / Tape & Reel | 18C          |
| TSD24CW     | SOD-123 | 3000pcs / Tape & Reel | 8/8          |
| TSD36CW     | SOD-123 | 3000pcs / Tape & Reel | 36           |

### Maximum Ratings (@ $T_A = 25^\circ C$ unless otherwise specified)

| Parameter                              | Symbol      | Value    | Unit |
|----------------------------------------|-------------|----------|------|
| IEC 61000-4-2; ESD (Air)               | $V_{ESD-A}$ | $\pm 30$ | kV   |
| IEC 61000-4-2; ESD (Contact)           | $V_{ESD-C}$ | $\pm 30$ | kV   |
| Peak Pulse Power ( $t_p = 8/20\mu s$ ) | $P_{PP}$    | 350      | W    |

### Thermal Characteristics

| Parameter                                     | Symbol    | Value       | Unit |
|-----------------------------------------------|-----------|-------------|------|
| Lead Solder Temperature (10 Seconds Duration) | $T_L$     | 260         | °C   |
| Junction Temperature                          | $T_J$     | -55 to +125 | °C   |
| Storage Temperature Range                     | $T_{STG}$ | -55 to +150 | °C   |

### Electrical Characteristics (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

| Parameter                         | Symbol     | Test Condition                                  | Min. | Typ. | Max. | Unit          |
|-----------------------------------|------------|-------------------------------------------------|------|------|------|---------------|
| <b>TSD03CW TVS for 3.3V Lines</b> |            |                                                 |      |      |      |               |
| Reverse Stand-off Voltage         | $V_{RWM}$  |                                                 | -    | -    | 3.3  | V             |
| Reverse Breakdown Voltage         | $V_{(BR)}$ | $I_T = 1\text{mA}$                              | 4    | -    | 6.5  | V             |
| Reverse Leakage Current           | $I_R$      | $V_{RWM} = 3.3\text{V}$                         | -    | -    | 1    | $\mu\text{A}$ |
| Clamping Voltage                  | $V_C$      | $I_{PP} = 1\text{A}$ , $t_p = 8/20\mu\text{s}$  | -    | -    | 7    | V             |
|                                   |            | $I_{PP} = 25\text{A}$ , $t_p = 8/20\mu\text{s}$ | -    | -    | 14   | V             |
| Junction Capacitance              | $C_J$      | $V_R = 0\text{V}$ , $f = 1\text{MHz}$           | -    | -    | 250  | pF            |
| <b>TSD05CW TVS for 5V Lines</b>   |            |                                                 |      |      |      |               |
| Reverse Stand-off Voltage         | $V_{RWM}$  |                                                 | -    | -    | 5    | V             |
| Reverse Breakdown Voltage         | $V_{(BR)}$ | $I_T = 1\text{mA}$                              | 6    | -    | 8    | V             |
| Reverse Leakage Current           | $I_R$      | $V_{RWM} = 5\text{V}$                           | -    | -    | 1    | $\mu\text{A}$ |
| Clamping Voltage                  | $V_C$      | $I_{PP} = 5\text{A}$ , $t_p = 8/20\mu\text{s}$  | -    | -    | 9.8  | V             |
|                                   |            | $I_{PP} = 24\text{A}$ , $t_p = 8/20\mu\text{s}$ | -    | -    | 14.5 | V             |
| Junction Capacitance              | $C_J$      | $V_R = 0\text{V}$ , $f = 1\text{MHz}$           | -    | -    | 200  | pF            |
| <b>TSD08CW TVS for 8V Lines</b>   |            |                                                 |      |      |      |               |
| Reverse Stand-off Voltage         | $V_{RWM}$  |                                                 | -    | -    | 8    | V             |
| Reverse Breakdown Voltage         | $V_{(BR)}$ | $I_T = 1\text{mA}$                              | 9    | -    | -    | V             |
| Reverse Leakage Current           | $I_R$      | $V_{RWM} = 8\text{V}$                           | -    | -    | 1    | $\mu\text{A}$ |
| Clamping Voltage                  | $V_C$      | $I_{PP} = 1\text{A}$ , $t_p = 8/20\mu\text{s}$  | -    | -    | 13   | V             |
|                                   |            | $I_{PP} = 20\text{A}$ , $t_p = 8/20\mu\text{s}$ | -    | -    | 20   | V             |
| Junction Capacitance              | $C_J$      | $V_R = 0\text{V}$ , $f = 1\text{MHz}$           | -    | -    | 150  | pF            |
| <b>TSD12CW TVS for 12V Lines</b>  |            |                                                 |      |      |      |               |
| Reverse Stand-off Voltage         | $V_{RWM}$  |                                                 | -    | -    | 12   | V             |
| Reverse Breakdown Voltage         | $V_{(BR)}$ | $I_T = 1\text{mA}$                              | 13.3 | -    | 16   | V             |
| Reverse Leakage Current           | $I_R$      | $V_{RWM} = 12\text{V}$                          | -    | -    | 1    | $\mu\text{A}$ |
| Clamping Voltage                  | $V_C$      | $I_{PP} = 5\text{A}$ , $t_p = 8/20\mu\text{s}$  | -    | -    | 19   | V             |
|                                   |            | $I_{PP} = 15\text{A}$ , $t_p = 8/20\mu\text{s}$ | -    | -    | 24   | V             |
| Junction Capacitance              | $C_J$      | $V_R = 0\text{V}$ , $f = 1\text{MHz}$           | -    | -    | 100  | pF            |

| TSD15CW TVS for 15V Lines |            |                                 |      |   |    |         |
|---------------------------|------------|---------------------------------|------|---|----|---------|
| Reverse Stand-off Voltage | $V_{RWM}$  |                                 | -    | - | 15 | V       |
| Reverse Breakdown Voltage | $V_{(BR)}$ | $I_T = 1mA$                     | 16.7 | - | 20 | V       |
| Reverse Leakage Current   | $I_R$      | $V_{RWM} = 15V$                 | -    | - | 1  | $\mu A$ |
| Clamping Voltage          | $V_C$      | $I_{PP} = 5A, t_p = 8/20\mu s$  | -    | - | 27 | V       |
|                           |            | $I_{PP} = 10A, t_p = 8/20\mu s$ | -    | - | 40 | V       |
| Junction Capacitance      | $C_J$      | $V_R = 0V, f = 1MHz$            | -    | - | 75 | pF      |
| TSD18CW TVS for 18V Lines |            |                                 |      |   |    |         |
| Reverse Stand-off Voltage | $V_{RWM}$  |                                 | -    | - | 18 | V       |
| Reverse Breakdown Voltage | $V_{(BR)}$ | $I_T = 1mA$                     | 20   | - | -  | V       |
| Reverse Leakage Current   | $I_R$      | $V_{RWM} = 18V$                 | -    | - | 1  | $\mu A$ |
| Clamping Voltage          | $V_C$      | $I_{PP} = 1A, t_p = 8/20\mu s$  | -    | - | 28 | V       |
|                           |            | $I_{PP} = 8A, t_p = 8/20\mu s$  | -    | - | 35 | V       |
| Junction Capacitance      | $C_J$      | $V_R = 0V, f = 1MHz$            | -    | - | 70 | pF      |
| TSD24CW TVS for 24V Lines |            |                                 |      |   |    |         |
| Reverse Stand-off Voltage | $V_{RWM}$  |                                 | -    | - | 24 | V       |
| Reverse Breakdown Voltage | $V_{(BR)}$ | $I_T = 1mA$                     | 26.7 | - | 33 | V       |
| Reverse Leakage Current   | $I_R$      | $V_{RWM} = 24V$                 | -    | - | 1  | $\mu A$ |
| Clamping Voltage          | $V_C$      | $I_{PP} = 5A, t_p = 8/20\mu s$  | -    | - | 46 | V       |
|                           |            | $I_{PP} = 8A, t_p = 8/20\mu s$  | -    | - | 54 | V       |
| Junction Capacitance      | $C_J$      | $V_R = 0V, f = 1MHz$            | -    | - | 70 | pF      |
| TSD36CW TVS for 36V Lines |            |                                 |      |   |    |         |
| Reverse Stand-off Voltage | $V_{RWM}$  |                                 | -    | - | 36 | V       |
| Reverse Breakdown Voltage | $V_{(BR)}$ | $I_T = 1mA$                     | 39.6 | - | 48 | V       |
| Reverse Leakage Current   | $I_R$      | $V_{RWM} = 36V$                 | -    | - | 1  | $\mu A$ |
| Clamping Voltage          | $V_C$      | $I_{PP} = 1A, t_p = 8/20\mu s$  | -    | - | 50 | V       |
|                           |            | $I_{PP} = 5A, t_p = 8/20\mu s$  | -    | - | 70 | V       |
| Junction Capacitance      | $C_J$      | $V_R = 0V, f = 1MHz$            | -    | - | 40 | pF      |

**Ratings and Characteristic Curves** (@  $T_A = 25^\circ\text{C}$  unless otherwise specified)

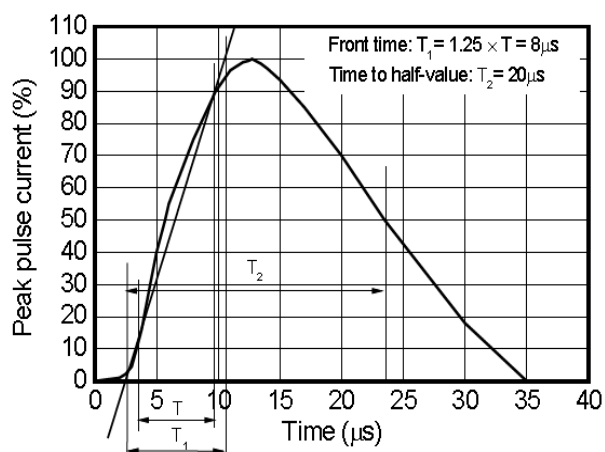


**Fig 1** 8/20  $\mu\text{s}$  waveform per IEC61000-4-5

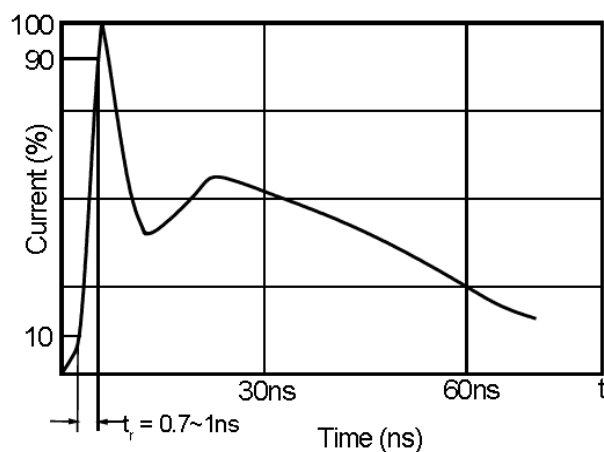


**Fig 2** ESD pulse waveform according to IEC61000-4-2

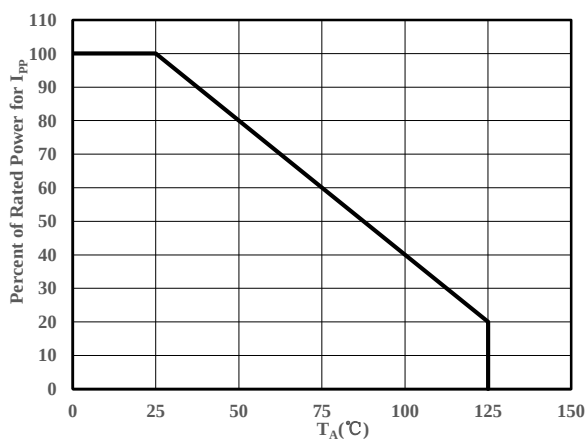
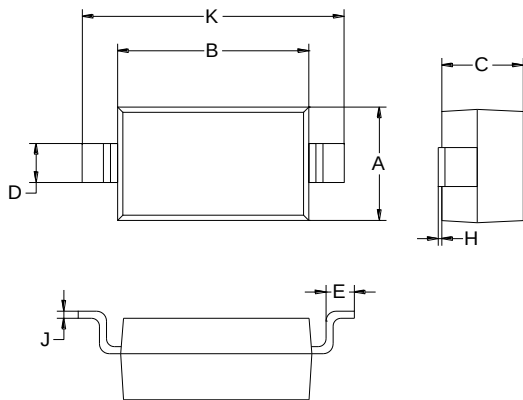


**Fig 3** Power Derating Curve

Package Outline Dimensions (Unit: mm)



| SOD-123   |      |      |
|-----------|------|------|
| Dimension | Min. | Max. |
| A         | 1.45 | 1.75 |
| B         | 2.55 | 2.85 |
| C         | 1.00 | 1.30 |
| D         | 0.50 | 0.60 |
| E         | 0.25 | 0.45 |
| H         | 0.02 | 0.10 |
| J         | 0.05 | 0.15 |
| K         | 3.55 | 3.85 |

Package Outline Dimensions (Unit: mm)

SOD-123

