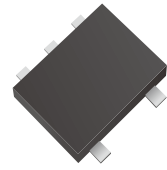
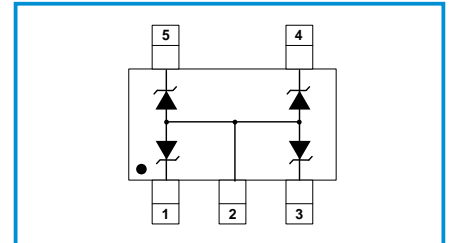


## Quad-direction ESD Protection Diode

### Features

- Uni-directional ESD protection of four lines
- Low capacitance: 10pF(Typ)
- Low reverse stand-off voltage: 5V
- Low reverse clamping voltage
- Low leakage current
- Excellent package: 1.6mm×1.2mm×0.6mm
- Fast response time
- JESD22-A114-B ESD Rating of class 3B per human body model
- IEC 61000-4-2 Level 3 ESD protection
- Marking: 5H


**Functional Diagram**


### Applications

- Computers and peripherals
- Audio and video equipment
- Subscriber Identity Module (SIM) card protection
- Cellular handsets and accessories
- Portable electronics
- Other electronics equipments communication systems

### Absolute Maximum Ratings (T<sub>amb</sub>=25°C unless otherwise specified)

| Parameter  | Symbol                          | Limit                | Unit |
|--|---------------------------------|----------------------|------|
| IEC 61000-4-2 ESD Voltage                              | V <sub>ESD</sub> <sup>(1)</sup> | Air Model            | ±10  |
|  |                                 | Contact Model        | ±10  |
|  |                                 | Per Human Body Model | ±15  |
|  |                                 | Machine Model        | ±0.4 |
| ESD Voltage  |                                 |                      | kV   |
| Peak Pulse Power                                       | P <sub>PP</sub> <sup>(2)</sup>  | 28                   | W    |
| Peak Pulse Current                                     | I <sub>PP</sub> <sup>(2)</sup>  | 2.5                  | A    |
| Lead Solder Temperature – Maximum (10 Second Duration) | T <sub>L</sub>                  | 260                  | °C   |
| Junction Temperature                                   | T <sub>j</sub>                  | 150                  | °C   |
| Storage Temperature Range                              | T <sub>stg</sub>                | -55 ~ +150           | °C   |

(1). Device stressed with ten non-repetitive ESD pulses, Per channel(I/O to GND).

(2). Non-repetitive current pulse 8/20μs exponential decay waveform according to IEC61000-4-5.

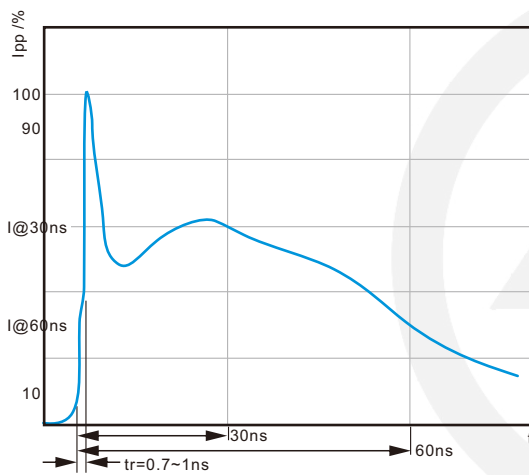
## ESD standards compliance

### IEC61000-4-2 Standard

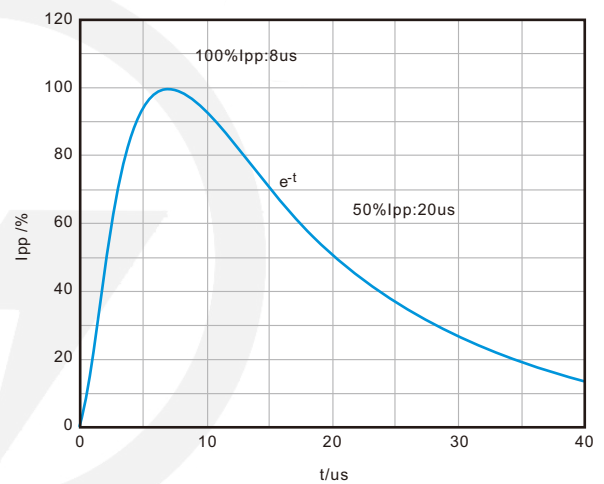
| Contact Discharge |                 | Air Discharge |                 |
|-------------------|-----------------|---------------|-----------------|
| Level             | Test Voltage kV | Level         | Test Voltage kV |
| 1                 | 2               | 1             | 2               |
| 2                 | 4               | 2             | 4               |
| 3                 | 6               | 3             | 8               |
| 4                 | 8               | 4             | 15              |

### JESD22-A114-B Standard

| ESD Class | Human Body Discharge V |
|-----------|------------------------|
| 0         | 0~249                  |
| 1A        | 250~499                |
| 1B        | 500~999                |
| 1C        | 1000~1999              |
| 2         | 2000~3999              |
| 3A        | 4000~7999              |
| 3B        | 8000~15999             |



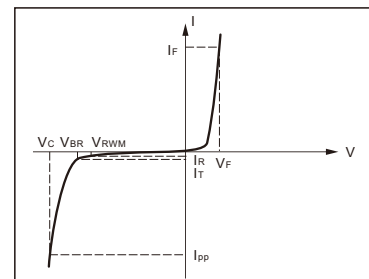
ESD pulse waveform according to IEC61000-4-2



8/20µs pulse waveform according to IEC 61000-4-5

## Electrical Parameter

| Symbol    | Parameter                           |
|-----------|-------------------------------------|
| $V_C$     | Clamping Voltage @ $I_{PP}$         |
| $I_{PP}$  | Peak Pulse Current                  |
| $V_{BR}$  | Breakdown Voltage @ $I_T$           |
| $I_T$     | Test Current                        |
| $I_R$     | Reverse Leakage Current @ $V_{RWM}$ |
| $V_{RWM}$ | Reverse Standoff Voltage            |
| $V_F$     | Forward Voltage @ $I_F$             |
| $I_F$     | Forward Current                     |



V-I characteristics for a uni-directional TVS

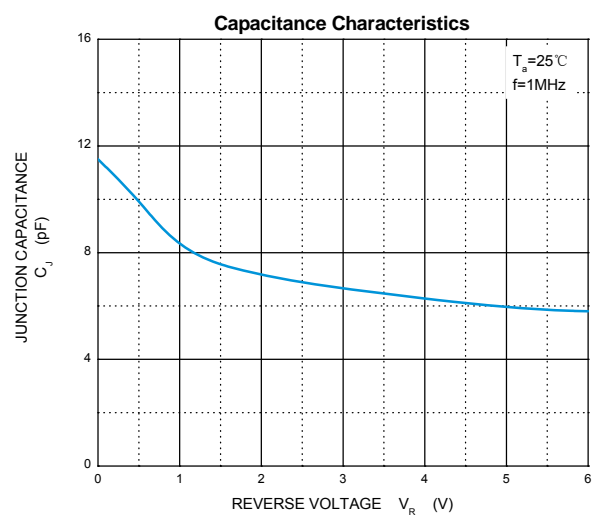
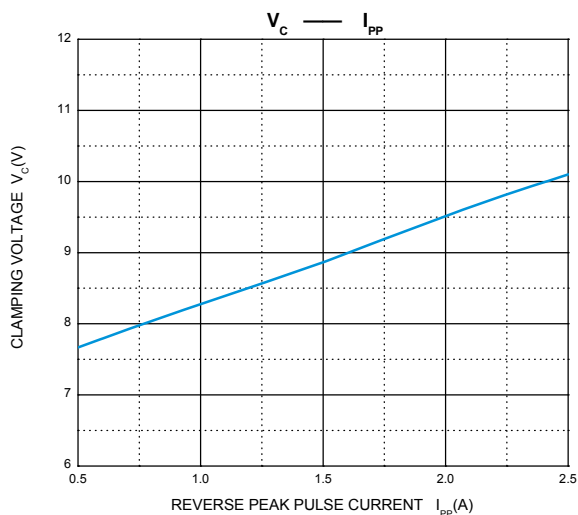
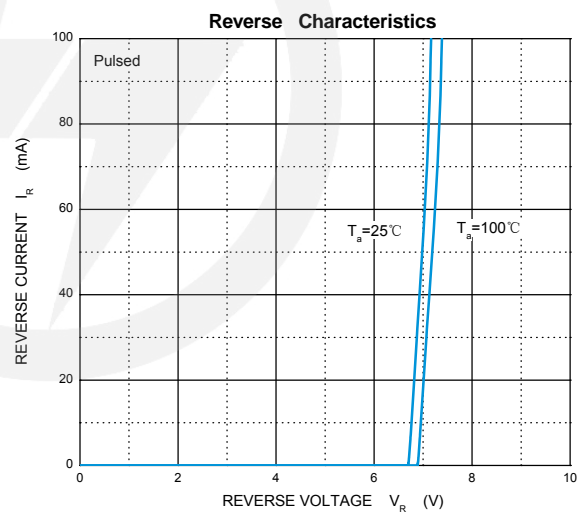
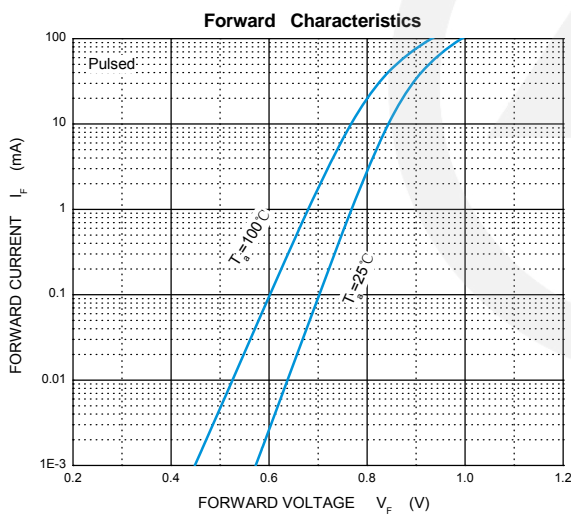
## Electrical Characteristics (TA=25°C unless otherwise specified)

| Parameter                 | Symbol          | Test conditions  | Min | Typ | Max | Unit    |
|---------------------------|-----------------|------------------|-----|-----|-----|---------|
| Per Diode                 |                 |                  |     |     |     |         |
| Reverse stand off voltage | $V_{RWM}^{(1)}$ |                  |     |     | 5   | V       |
| Breakdown voltage         | $V_{(BR)}$      | $I_T=1mA$        | 6.0 |     | 7.2 | V       |
| Reverse leakage current   | $I_R$           | $V_{RWM}=5V$     |     |     | 1.0 | $\mu A$ |
| Forward voltage           | $V_F$           | $I_F=10mA$       |     |     | 0.9 | V       |
| Clamping voltage          | $V_C^{(2)}$     | $I_{PP}=2.5A$    |     |     | 11  | V       |
| Junction capacitance      | $C_J$           | $V_R=0V, f=1MHz$ |     | 10  |     | pF      |

(1). Other voltages available upon request.

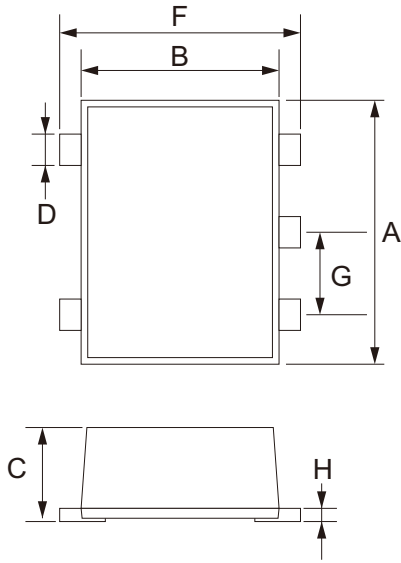
(2). Non-repetitive current pulse 8/20 $\mu s$  exponential decay waveform according to IEC61000-4-5

## Characteristic Curves

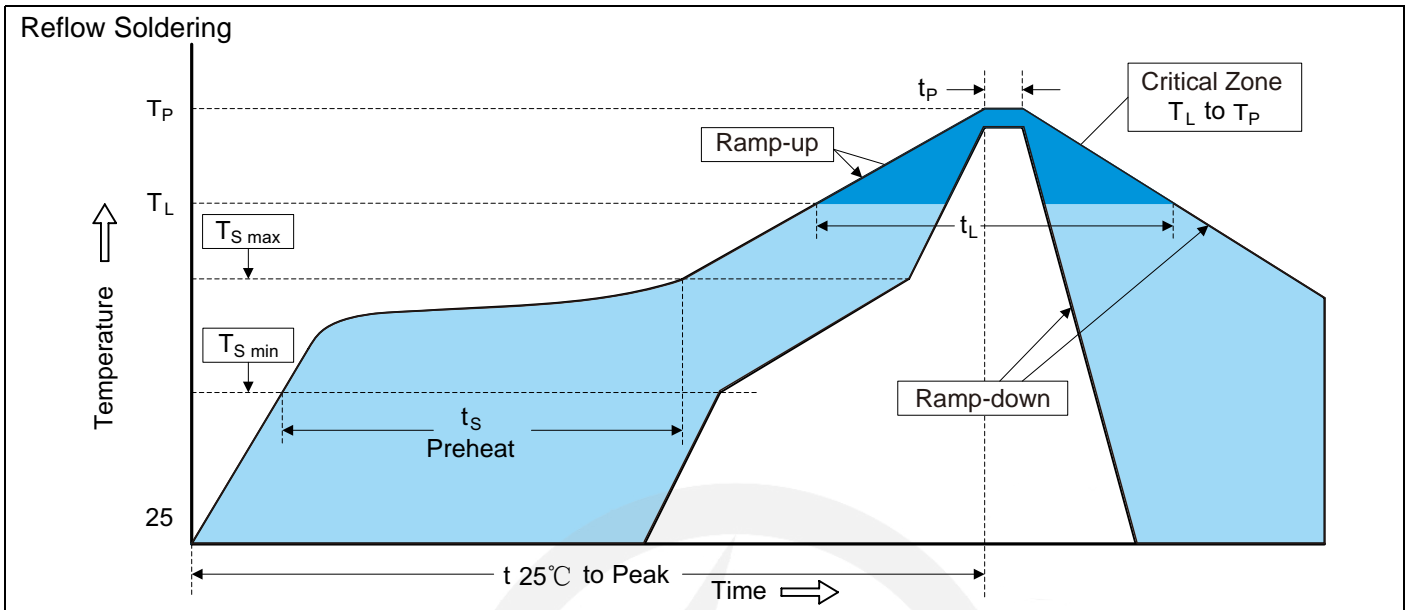


SOT-553 Package Outline

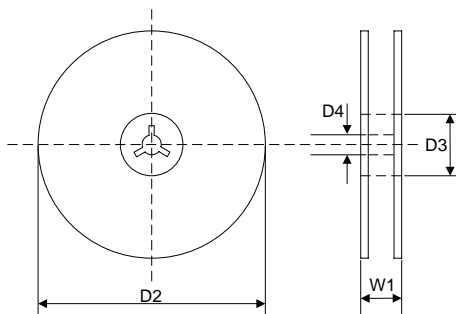
Unit: mm



| SYMBOL | DIMENSIONS |      |
|--------|------------|------|
|        | MIN.       | MAX. |
| A      | 1.50       | 1.70 |
| B      | 1.10       | 1.30 |
| C      | 0.50       | 0.60 |
| D      | 0.17       | 0.27 |
| F      | 1.50       | 1.70 |
| G      | 0.50 TYP.  |      |
| H      | 0.08       | 0.18 |

**Recommended Soldering Conditions**

**Recommended Conditions**

| Profile Feature   | Pb-Free Assembly                 |
|---|----------------------------------|
| Average ramp-up rate ( $T_L$ to $T_P$ )   | 3°C/second max.                  |
| Preheat<br>-Temperature Min ( $T_{S\ min}$ )<br>-Temperature Max ( $T_{S\ max}$ )<br>-Time (min to max) ( $t_s$ ) | 150°C<br>200°C<br>60-180 seconds |
| $T_{S\ max}$ to $T_L$<br>-Ramp-up Rate  | 3°C/second max.                  |
| Time maintained above:<br>-Temperature ( $T_L$ )<br>-Time ( $t_L$ )   | 217°C<br>60-150 seconds          |
| Peak Temperature ( $T_P$ )  | 260°C                            |
| Time within 5°C of actual Peak Temperature ( $t_P$ )  | 20-40 seconds                    |
| Ramp-down Rate  | 6°C/second max.                  |
| Time 25°C to Peak Temperature   | 8 minutes max.                   |

**7" Reel**


|    |                      |
|----|----------------------|
| D2 | $\Phi 178.0 \pm 2.0$ |
|----|----------------------|

|    |                          |
|----|--------------------------|
| D3 | $\Phi 50.0 \text{ Min.}$ |
|----|--------------------------|

|    |                     |
|----|---------------------|
| D4 | $\Phi 13.0 \pm 0.5$ |
|----|---------------------|

|    |                |
|----|----------------|
| W1 | $16.0 \pm 2.0$ |
|----|----------------|

Quantity: 3000PCS