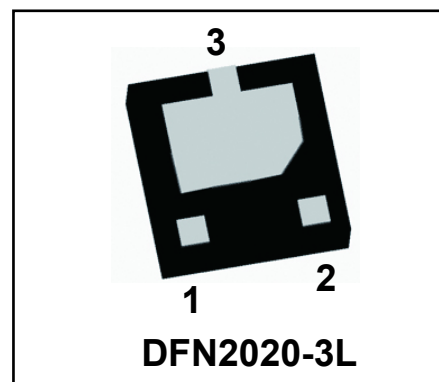


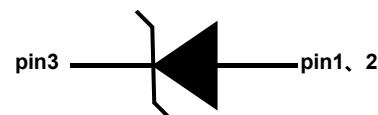
## Desicription

- ◆ This a high power TVS, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting voltage sensitive lines. It is assembled into a 3-pin DFN2020-3 lead-free package. The combination of small size, and high surge capability makes them ideal for use in applications such as cellular



## Features

- ◆ IEC61000-4-2(ESD):30KV Max Air  
30KV Max Contact
- ◆ IEC61000-4-5(Surge): 180A (8/20us)
- ◆ Very low reverse current: $I_R < 1\mu A$ (typical)
- ◆ Halogen free ,Lead free and RoHs



**Circuit Diagram**

## Application

- ◆ Cellular phones
- ◆ Power Management
- ◆ Industrial Application
- ◆ Power Supply Protection
- ◆ Portable devices
- ◆ Smart home
- ◆ Robot

## Order information

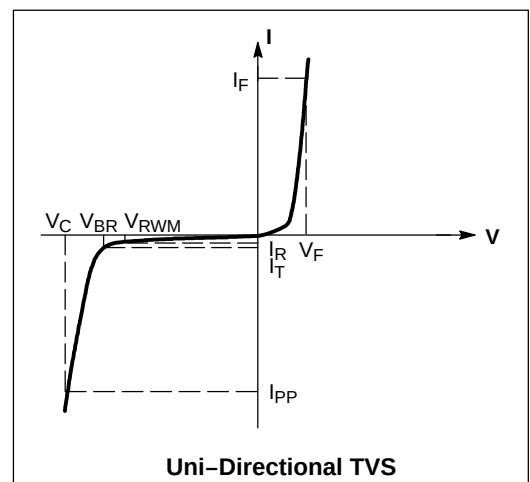
| Model        | Marking | Package    | shipping       |
|--------------|---------|------------|----------------|
| ESD12J551TRP | T12     | DFN2020-3L | 3000/Tape&Reel |

**Electrical characteristic(T=25°C, unless otherwise specified)**

| Parameter                 | Symbol                  | Conditions                             | Min. | TYP. | Max.       | Units         |
|---------------------------|-------------------------|----------------------------------------|------|------|------------|---------------|
| Reverse stand-off voltage | $V_{RWM}$               |                                        |      |      | $\pm 12.0$ | V             |
| Reverse leakage current   | $I_R$                   | $V_{RWM}=12\text{ V}$                  |      |      | 1.0        | $\mu\text{A}$ |
| Reveres breakdown voltage | $V_{BR}$<br>Pin3~Pin1/2 | $I_T=1\text{ mA}$                      | 13.0 | 14.5 |            | V             |
| Clamping voltage          | $V_C$<br>Pin3~Pin1/2    | $I_{PP}=20\text{ A}(8/20\mu\text{s})$  |      |      | 18.0       | V             |
|                           |                         | $I_{pp}=180\text{ A}(8/20\mu\text{s})$ |      |      | 30.0       | V             |

**Electrical characteristic(T=25°C, unless otherwise specified)**

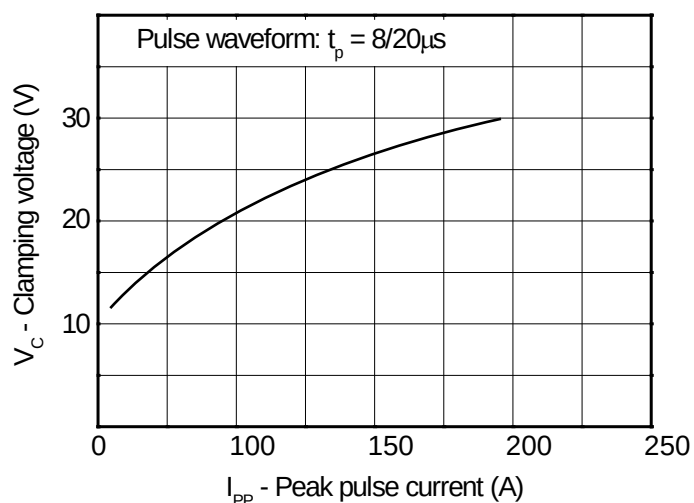
| Symbol    | Parameter                           |
|-----------|-------------------------------------|
| $V_{RWM}$ | Peak Reverse Working Voltage        |
| $I_R$     | Reverse Leakage Current @ $V_{RWM}$ |
| $V_{BR}$  | Breakdown Voltage @ $I_T$           |
| $I_T$     | Test Current                        |
| $I_{PP}$  | Maximum Reverse Peak Pulse Current  |
| $V_C$     | Clamping Voltage @ $I_{PP}$         |
| $P_{PP}$  | Peak Pulse Power                    |
| $C_J$     | Junction Capacitance                |
| $I_F$     | Forward Current                     |
| $V_F$     | Forward Voltage @ $I_F$             |



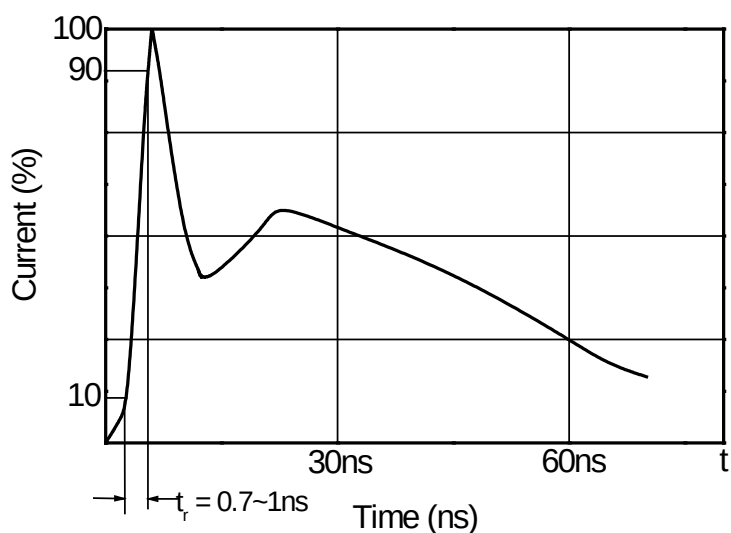
## Maximum Rating

| Rating                                | symbol    | value    | Units       |
|---------------------------------------|-----------|----------|-------------|
| Peak Pulse Current( $t_p=8/20\mu s$ ) | $I_{pp}$  | 180      | A           |
| ESD per IEC61000-4-2(Contact)         | $V_{ESD}$ | $\pm 30$ | KV          |
| ESD per IEC61000-4-2(Air)             |           | $\pm 30$ |             |
| Operating Temperature                 | $T_J$     | -55~125  | $^{\circ}C$ |
| Storage Temperature                   | $T_{STG}$ | -55~155  | $^{\circ}C$ |

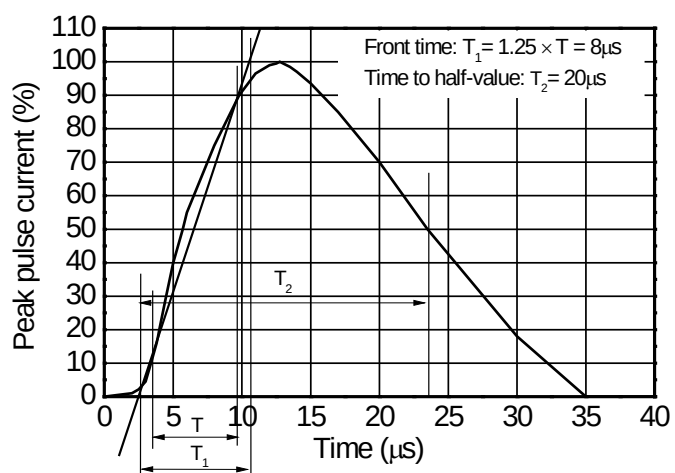
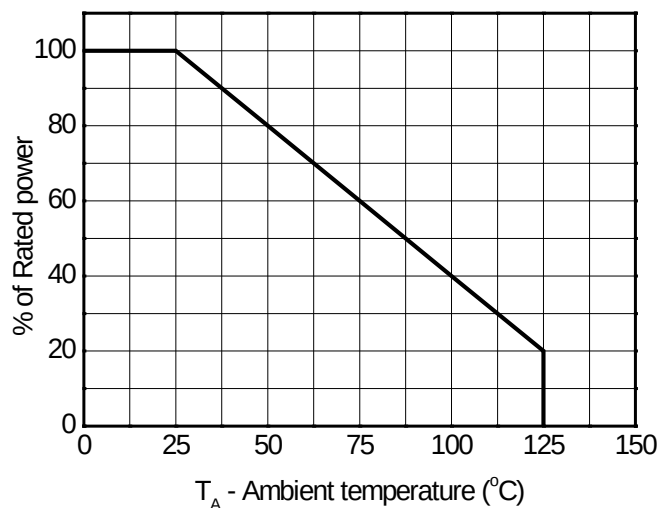
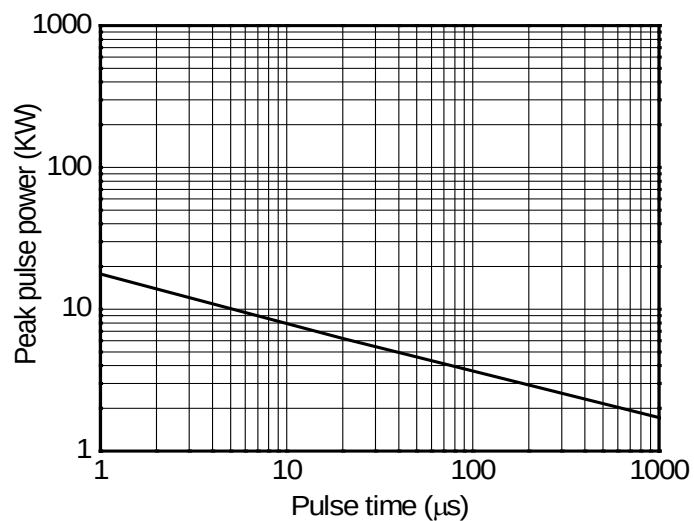
## Typical characteristic



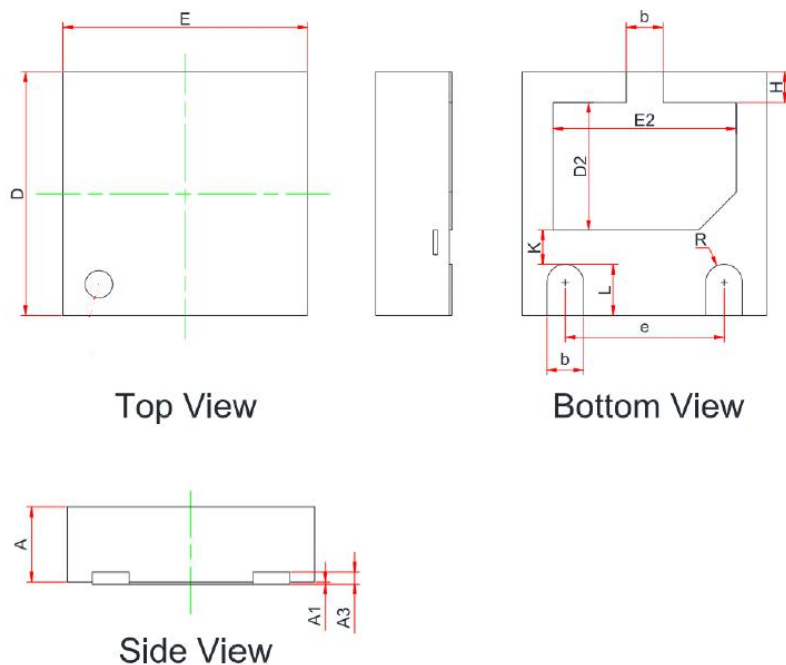
Clamping voltage vs. Peak pulse current



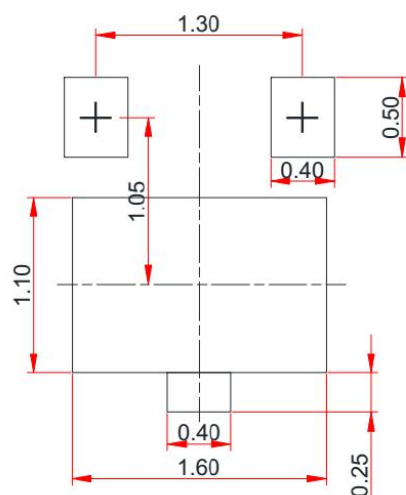
Contact discharge current waveform per IEC61000-4-2


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

**Power derating vs. Ambient temperature**

**Non-repetitive peak pulse power vs. Pulse time**

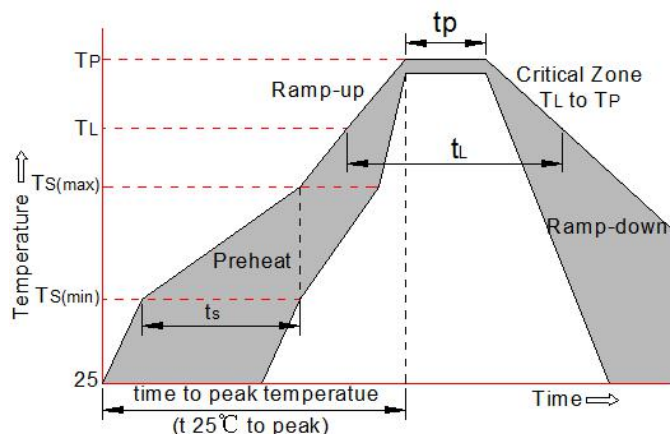
**Dimension outline**    Unit:mm

**DFN2020-3L**


| SYM | DIMENSIONS  |      |      |
|-----|-------------|------|------|
|     | MILLIMETERS |      |      |
|     | MIN         | NOM  | MAX  |
| A   | 0.55        | 0.60 | 0.65 |
| A1  | 0.00        | 0.02 | 0.05 |
| A3  | 0.10REF     |      |      |
| b   | 0.25        | --   | 0.35 |
| D   | 1.90        | --   | 2.10 |
| E   | 1.90        | --   | 2.10 |
| D2  | 0.95        | --   | 1.15 |
| E2  | 1.40        | --   | 1.60 |
| e   | 1.20        |      | 1.40 |
| H   | 0.20        | --   | 0.30 |
| K   | 0.20        |      | 0.40 |
| L   | 0.35        | --   | 0.45 |
| R   | 0.13        | --   | --   |

**Recommended Mounting Pad Layout**    Unit:mm


## Soldering Parameters



| Reflow Condition                                        |                                   | Pb-Free assembly (see as bellow) |
|---------------------------------------------------------|-----------------------------------|----------------------------------|
| Pre Heat                                                | -Temperature Min ( $T_{s(min)}$ ) | +150°C                           |
|                                                         | -Temperature Max( $T_{s(max)}$ )  | +200°C                           |
|                                                         | -Time (Min to Max) (ts)           | 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                           |