

## Features

- Solid-state silicon technology
- Ultra-low Capacitance
- Ultra Low Leakage Current
- Low Clamping Voltage
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free. "Green" Device (Note 1)
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

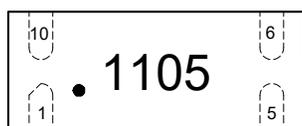
## Maximum Ratings

|                                      |                  |                 |
|--------------------------------------|------------------|-----------------|
| IEC61000-4-2(ESD)                    | Air              | ±20KV           |
|                                      | Contact          | ±20KV           |
| Peak Pulse Power (8/20µs)            | PPK              | 54W             |
| Peak Pulse Current (8/20µs)(Note 2)  | I <sub>PP</sub>  | 4.5A            |
| Operating Junction Temperature Range | T <sub>J</sub>   | -40°C to +125°C |
| Storage Temperature Range            | T <sub>STG</sub> | -55°C to +150°C |

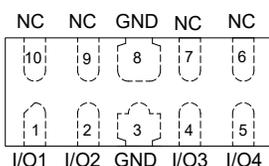
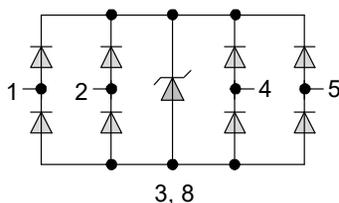
Note:

1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. Non-repetitive current pulse 8/20 µs exponential decay waveform according to IEC61000-4-5.

## Marking Information



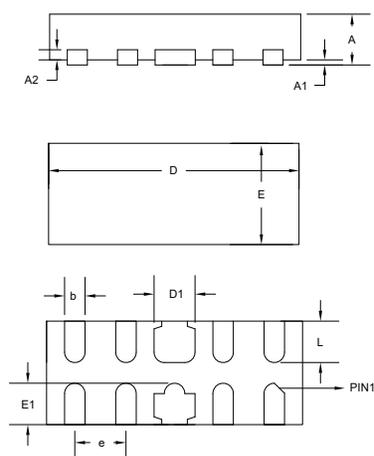
## Internal Structure



## Transparent top view

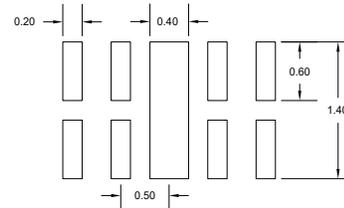
# ESD Protection Device

## DFN2510-10

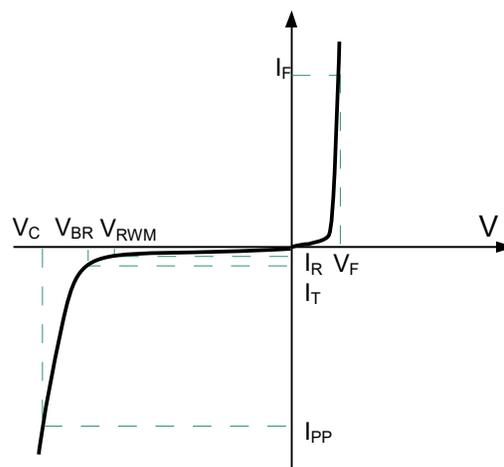


| DIM | INCH       |       | MM        |      | NOTE |
|-----|------------|-------|-----------|------|------|
|     | MIN        | MAX   | MIN       | MAX  |      |
| D   | 0.094      | 0.102 | 2.40      | 2.60 |      |
| E   | 0.035      | 0.043 | 0.90      | 1.10 |      |
| A   | 0.020      | 0.025 | 0.50      | 0.65 |      |
| A1  | 0.000      | 0.020 | 0.00      | 0.05 |      |
| A2  | 0.006 Ref. |       | 0.15 Ref. |      | TYP  |
| D1  | 0.012      | 0.020 | 0.30      | 0.50 |      |
| E1  | 0.012      | 0.024 | 0.30      | 0.61 |      |
| b   | 0.005      | 0.010 | 0.13      | 0.25 |      |
| e   | 0.020 BSC  |       | 0.50 BSC  |      | TYP  |
| L   | 0.011      | 0.020 | 0.28      | 0.50 |      |

## SUGGESTED SOLDER PAD LAYOUT (mm)



| Symbol | Parameter                          |
|--------|------------------------------------|
| VRWM   | Peak Reverse Working Voltage       |
| IR     | Reverse Leakage Current @ VRWM     |
| VBR    | Breakdown Voltage @ IT             |
| IT     | Test Current                       |
| IPP    | Maximum Reverse Peak Pulse Current |
| VC     | Clamping Voltage @ IPP             |
| PPP    | Peak Pulse Power                   |
| CJ     | Junction Capacitance               |
| IF     | Forward Current                    |
| VF     | Forward Voltage @ IF               |



**Electrical Characteristics @ 25°C (Unless Otherwise Specified)**

| Parameter                              | Symbol    | Conditions                                | Min. | Typ. | Max. | Units    |
|--|-----------|---|------|------|------|----------|
| Reverse Working Voltage                | $V_{RWM}$ |   |      |      | 5    | V        |
| Reverse Breakdown Voltage              | $V_{BR}$  | $I_T=1mA$                                 | 7    |      |      | V        |
| Reverse Leakage Current                | $I_R$     | $V_{RWM}=5V$                              |      |      | 100  | nA       |
| Forward Voltage                        | $V_F$     | $I_T = 10mA$                              | 0.6  | 0.9  | 1.2  | V        |
| Clamping Voltage <sup>(Note 1)</sup>   | $V_C$     | $I_{PP}=16A, t_p=100ns$                   |      | 14   |      | V        |
| Dynamic Resistance <sup>(Note 1)</sup> | $R_{DYN}$ | $t_p=100ns$                               |      | 0.33 |      | $\Omega$ |
| Clamping Voltage <sup>(Note 2)</sup>   | $V_C$     | $V_{ESD}=+8KV$                            |      | 14   |      | V        |
| Clamping Voltage <sup>(Note 3)</sup>   | $V_C$     | $I_{PP}=1A, t_p=8/20\mu s$                |      | 8    | 9.5  | V        |
| Clamping Voltage <sup>(Note 3)</sup>   | $V_C$     | $I_{PP}=4.5A, t_p=8/20\mu s$              |      | 10.5 | 12   | V        |
| Junction Capacitance                   | $C_J$     | $V_R=0V, f=1MHz,$<br>Any I/O pin to GND   |      | 0.45 | 0.6  | pF       |
| Junction Capacitance                   | $C_J$     | $V_R=0V, f=1MHz,$<br>Between any I/O pins |      | 0.25 | 0.4  | pF       |

Notes:

- 1) TLP parameter:  $Z_0 = 50\Omega, t_p = 100ns, t_r = 2ns$ , averaging window from 60ns to 80ns.  $R_{DYN}$  is calculated from 4A to 16A.
- 2) Contact discharge mode, according to IEC61000-4-2.
- 3) Non-repetitive current pulse 8/20 $\mu s$  exponential decay waveform according to IEC61000-4-5.

## Curve Characteristics

Fig. 1 - 8 X 20µs Pulse Waveform

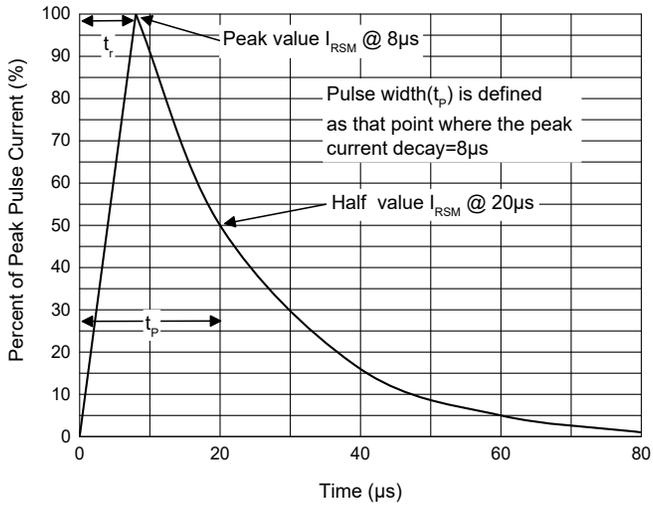


Fig. 2 - Non-Repetitive Peak Pulse Power

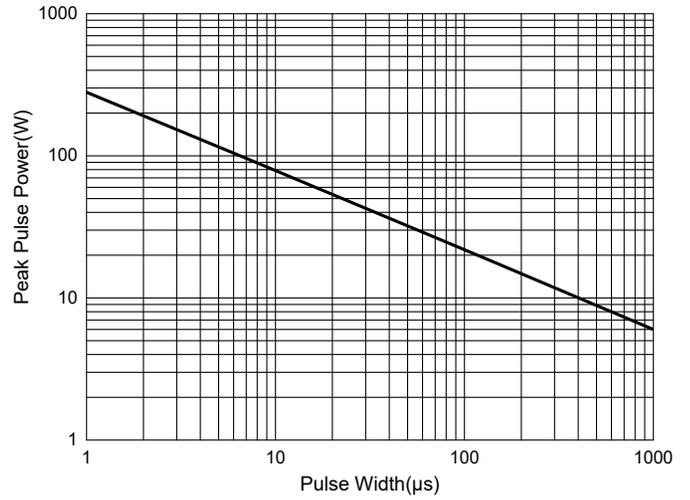


Fig. 3 - Capacitance Characteristics

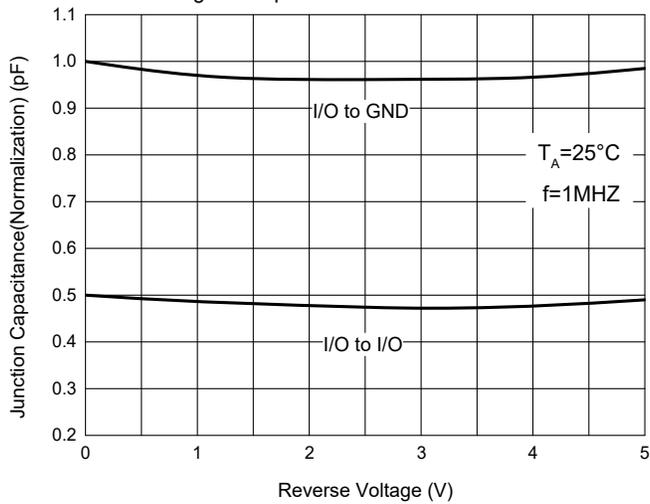


Fig. 4 - Clamping Voltage Characteristics

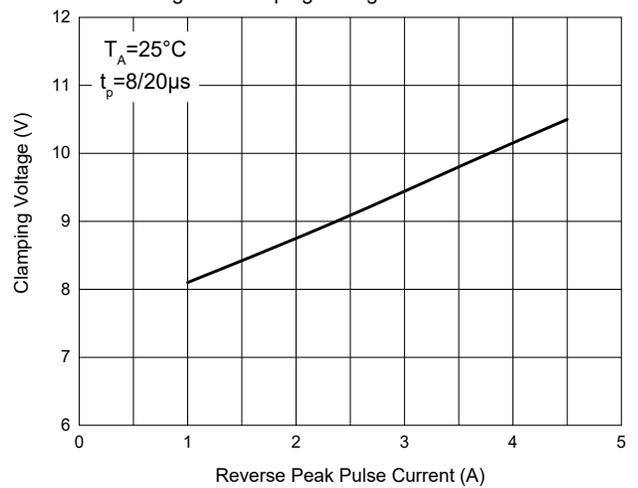


Fig. 5 - TLP Measurement

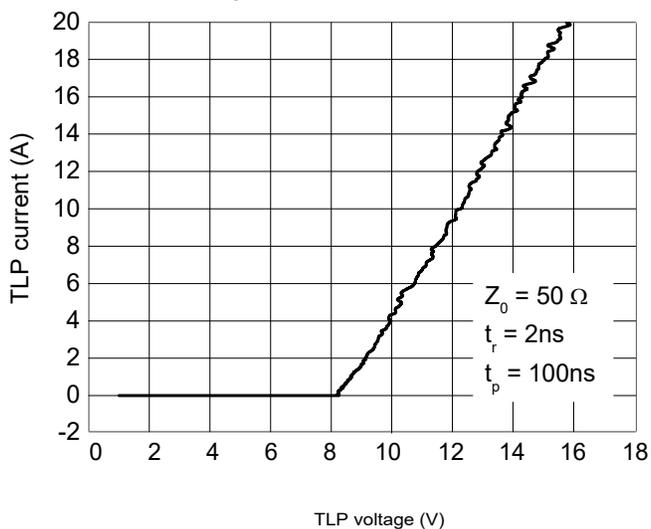
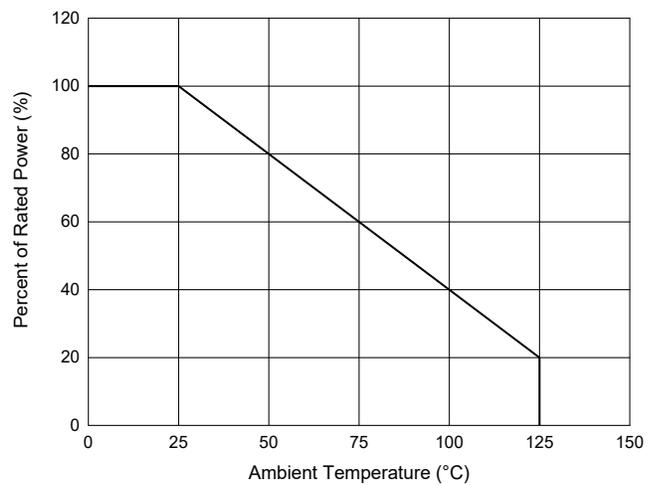


Fig. 6 - Pulse Derating Curve



## Ordering Information

| Device         | Packing               |
|----------------|-----------------------|
| Part Number-TP | Tape&Reel: 3Kpcs/Reel |

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