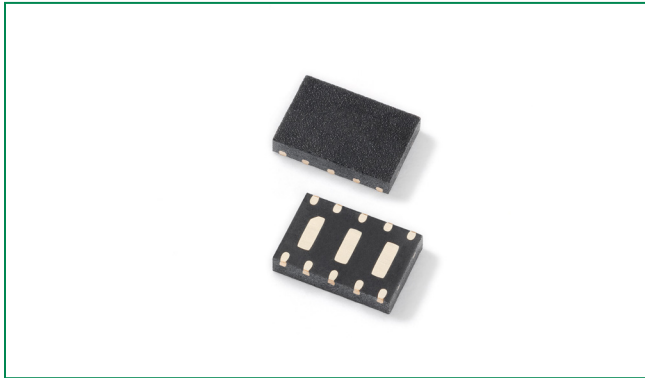


SP2525NUTG, 2.5V, 30A Diode Array

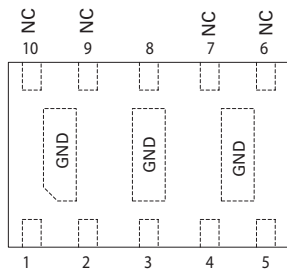


Description

The SP2525NUTG is a low-capacitance, TVS Diode Array designed to provide protection against ESD (electrostatic discharge), CDE (cable discharge events), EFT (electrical fast transients), and lightning induced surges for highspeed, differential data lines. It's packaged in a μDFN package (3.0 x 2.0mm) and each device can protect up to 4 channels up to 30A (IEC 61000-4- 5 2nd edition,) and up to ±30kV ESD (IEC 61000-4-2).

The SP2525NUTG with its low capacitance and low clamping voltage makes it ideal for high-speed data interfaces such as 1GbE applications found in notebooks, switches, etc.

Pinout



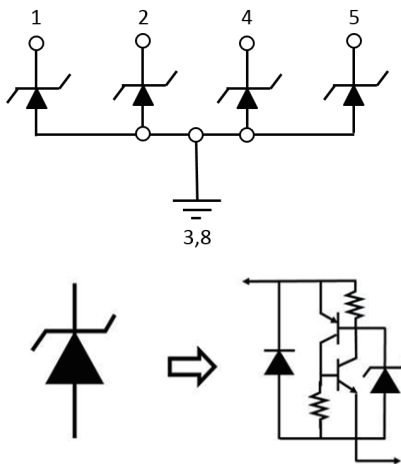
Note: PIN3 and PIN8 are same potential with GND

Top View

Features

- ESD, IEC 61000-4-2, ±30kV contact, ±30kV air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, IEC 61000-4-5 2nd edition, 30A (t_p=8/20μs)
- Low capacitance of 1.7pF@0V (TYP)
- Low leakage current of 1nA (TYP) at 2.5V
- Low operating and clamping voltage
- μDFN-10 package is optimized for high-speed data line routing
- Provides protection for two differential data pairs (4 channels) up to 30A
- Halogen free, Lead free and RoHS compliant
- Moisture Sensitivity Level (MSL -1)

Functional Block Diagram



Applications

- 10/100/1000 Ethernet
- WAN/LAN Equipment
- Desktops, Servers and Notebooks
- LVDS Interfaces
- Integrated Magnetics
- Smart TV
- 2.5G/5G/10G Ethernet

Life Support Note:

Not Intended for Use in Life Support or Life Saving Applications

The products shown herein are not designed for use in life sustaining or life saving applications unless otherwise expressly indicated.

Absolute Maximum Ratings

| Symbol | Parameter | Value | Units |
|------------|----------------------------------|------------|-------|
| I_{PP} | Peak Current ($t_p=8/20\mu s$) | 30 | A |
| T_{OP} | Operating Temperature | -40 to 125 | °C |
| T_{STOR} | Storage Temperature | -55 to 150 | °C |

Notes:

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the component. This is a stress only rating and operation of the component at these or any other conditions above those indicated in the operational sections of this specification is not implied.

Electrical Characteristics ($T_{OP}=25^\circ C$)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Units |
|--------------------------------------|---------------|-----------------------------------|----------|------|-----|----------|
| Reverse Standoff Voltage | V_{RWM} | $I_R = 1\mu A$ | | | 2.5 | V |
| Breakdown Voltage | V_{BR} | $I_R = 1mA$ | 5.5 | 7.0 | | V |
| Reverse Leakage Current | I_{LEAK} | $V_R=2.5V$ | | 1 | 100 | nA |
| Holding Voltage | V_{HOLD} | I/O to GND | | 1.6 | | V |
| Clamp Voltage ¹ | V_C | $I_{PP}=30A, t_p=8/20\mu s$ | | 9 | 11 | V |
| Dynamic Resistance ² | R_{DYN} | TLP, $t_p=100ns$ | | 0.14 | | Ω |
| ESD Withstand Voltage ^{1,3} | V_{ESD} | IEC 61000-4-2 (Contact Discharge) | ± 30 | | | kV |
| | | IEC 61000-4-2 (Air Discharge) | ± 30 | | | kV |
| Diode Capacitance ¹ | $C_{I/O-GND}$ | Reverse Bias=0V, f=1MHz | | 1.7 | 2.5 | pF |

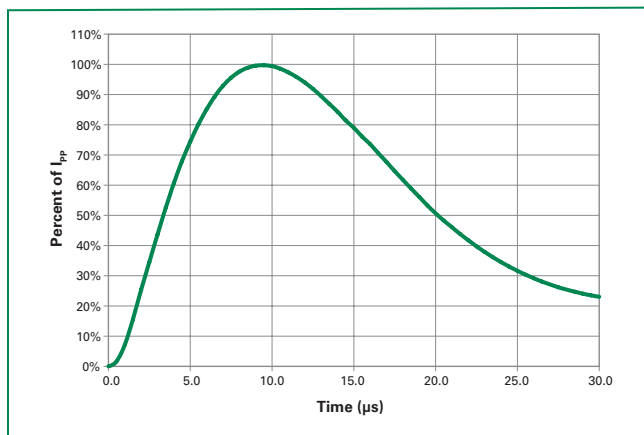
Notes:

1Parameter is guaranteed by design and/or component characterization.

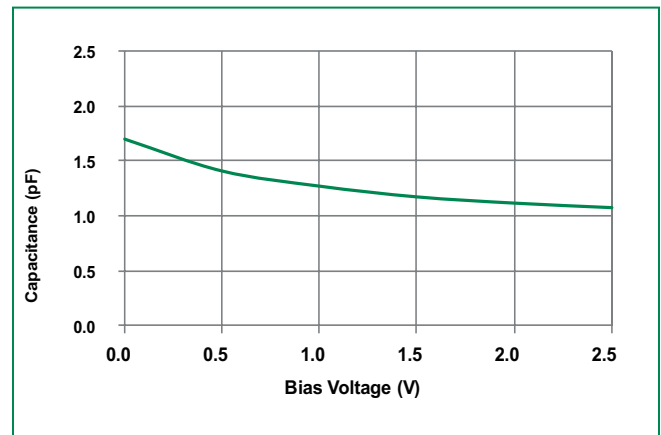
2 Transmission Line Pulse (TLP) test setting : Std. TDR(50 Ω), $t_p=100ns$, $t_r=0.2ns$ ITLP and VTLP averaging window: start $t_1=70ns$ to end $t_2=90ns$

3. Device stressed with ten non-repetitive ESD pulses.

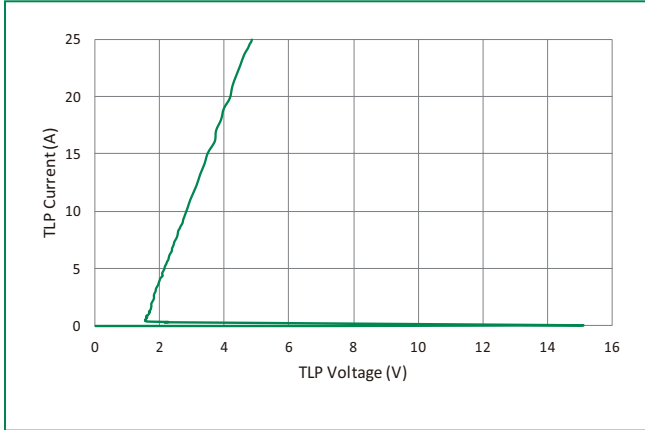
8/20 μs Pulse Waveform



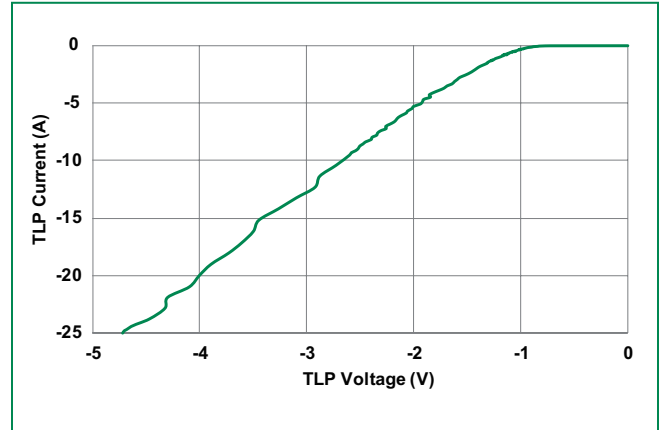
Capacitance vs. Reverse Bias



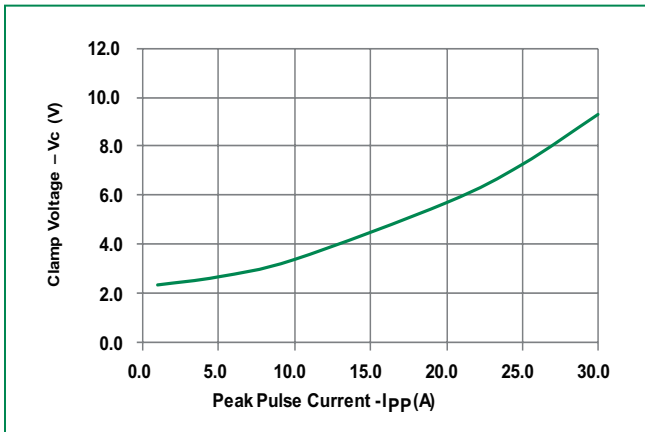
Positive Transmission Line Pulsing (TLP) Plot



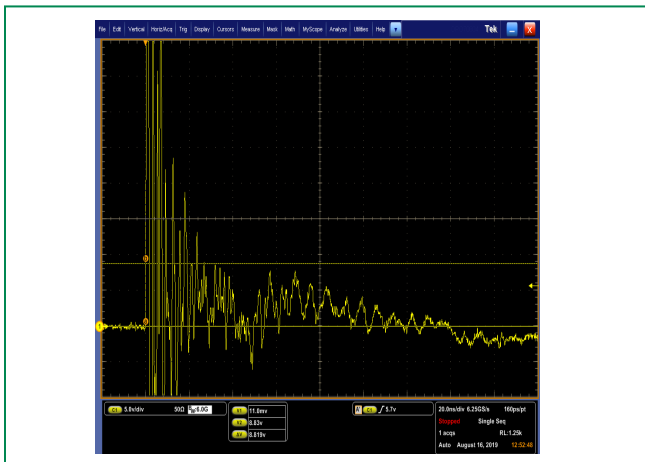
Negative Transmission Line Pulsing (TLP) Plot



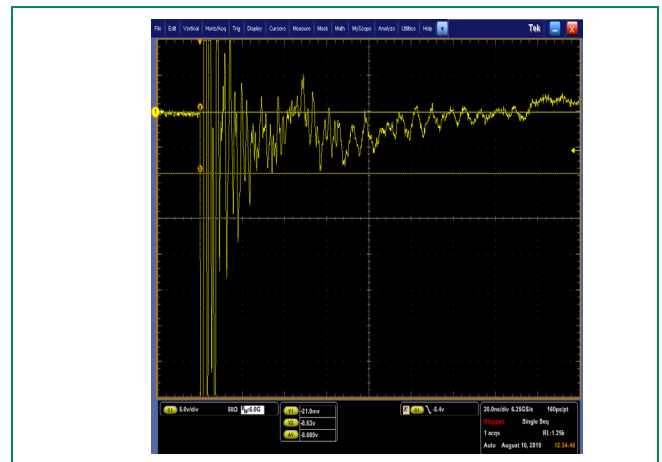
Clamping Voltage vs. Peak Pulse Current



IEC 61000-4-2 +8 kV Contact ESD Clamping Voltage

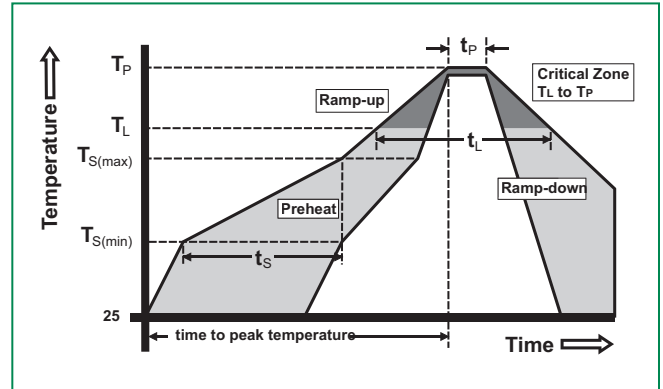


IEC 61000-4-2 -8 kV Contact ESD Clamping Voltage



Soldering Parameters

| | | |
|--|------------------------------------|-------------------------|
| Reflow Condition | | Pb – Free assembly |
| Pre Heat | - Temperature Min ($T_{s(min)}$) | 150°C |
| | - Temperature Max ($T_{s(max)}$) | 200°C |
| | - Time (min to max) (t_s) | 60 – 180 secs |
| Average ramp up rate (Liquidus) Temp (T_L) to peak | | 3°C/second max |
| $T_{s(max)}$ to T_L - Ramp-up Rate | | 3°C/second max |
| Reflow | - Temperature (T_L) (Liquidus) | 217°C |
| | - Temperature (t_L) | 60 – 150 seconds |
| Peak Temperature (T_p) | | 260 ^{+0/-5} °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 (T_p) | | 8 minutes Max. |
| Do not exceed | | 260°C |



Ordering Information

| Part Number | Package | Min. Order Qty. |
|-------------|---------------------|-----------------|
| SP2525NUTG | μDFN-10 (3.0x2.0mm) | 3000 |

Product Characteristics

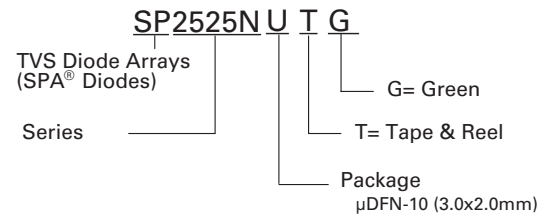
| | |
|---------------------------|--|
| Lead Plating | PPF |
| Lead Material | Copper Alloy |
| Substrate Material | Silicon |
| Body Material | Molded Compound |
| Flammability | UL Recognized compound meeting flammability rating V-0 |

Part Marking System

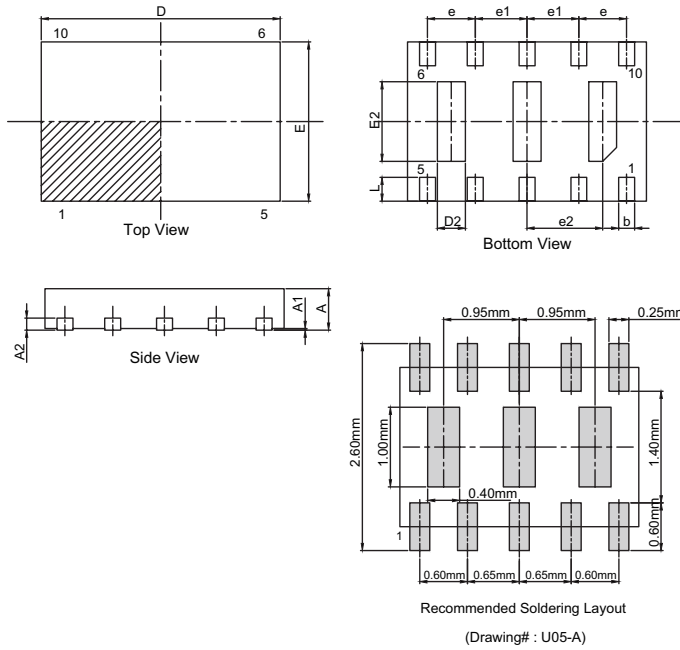


First row = Part name = SP2525NUTG
 Second row = Assembly code + Date Code

Part Numbering System

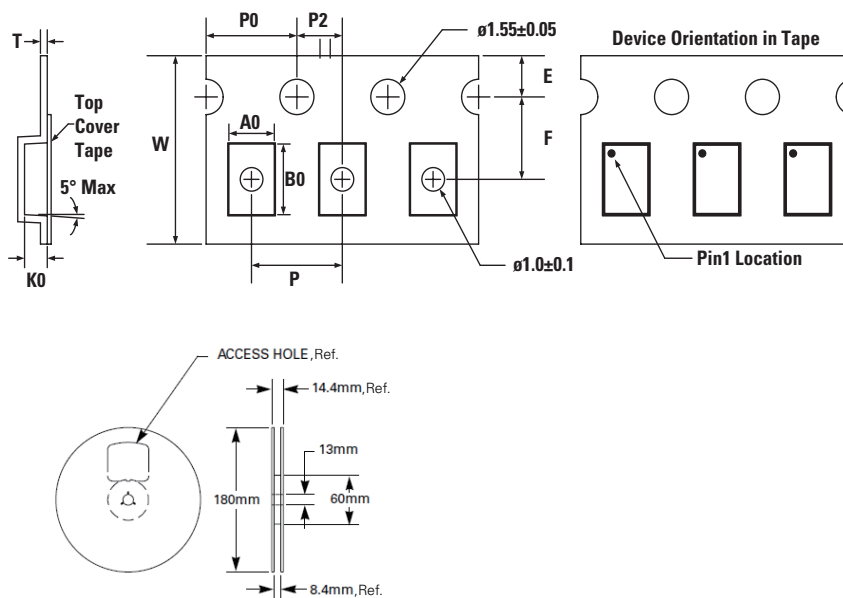


Package Dimensions - μ DFN-10 (3.0x2.0mm)



| Symbol | Millimeters | | | Inches | | |
|-----------|-------------|------|------|-----------|-------|-------|
| | Min | Nom | Max | Min | Nom | Max |
| A | 0.50 | 0.55 | 0.60 | 0.020 | 0.022 | 0.024 |
| A1 | 0.00 | 0.02 | 0.05 | 0.000 | 0.001 | 0.002 |
| A2 | 0.15 Ref | | | 0.006 Ref | | |
| b | 0.15 | 0.20 | 0.25 | 0.006 | 0.008 | 0.010 |
| D | 2.90 | 3.00 | 3.10 | 0.114 | 0.118 | 0.122 |
| E | 1.90 | 2.00 | 2.10 | 0.075 | 0.079 | 0.083 |
| D2 | 0.25 | 0.35 | 0.45 | 0.010 | 0.014 | 0.018 |
| E2 | 0.90 | 1.00 | 1.10 | 0.035 | 0.039 | 0.043 |
| L | 0.20 | 0.30 | 0.40 | 0.008 | 0.012 | 0.016 |
| e | 0.60 BSC | | | 0.024 BSC | | |
| e1 | 0.65 BSC | | | 0.026 BSC | | |
| e2 | 0.95 BSC | | | 0.037 BSC | | |

Tape & Reel Specification — μ DFN-10 (3.0x2.0mm)



| Package | μ DFN-10 (3.0x2.0mm) |
|-----------|--------------------------|
| Symbol | Millimeters |
| A0 | 2.30 +/- 0.10 |
| B0 | 3.20 +/- 0.10 |
| E | 1.75 +/- 0.10 |
| F | 3.50 +/- 0.05 |
| K0 | 1.0 +/- 0.10 |
| P | 4.00 +/- 0.10 |
| P0 | 4.00 +/- 0.10 |
| P2 | 2.00 +/- 0.10 |
| T | 0.3 +/- 0.05 |
| W | 8.00 +0.30/- 0.10 |

8mm TAPE AND REEL

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