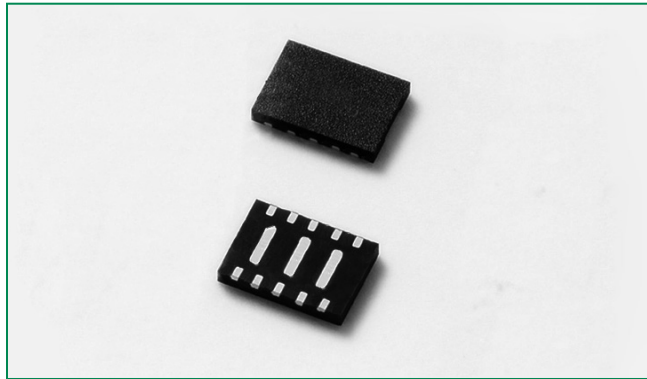
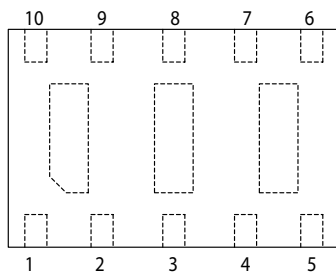


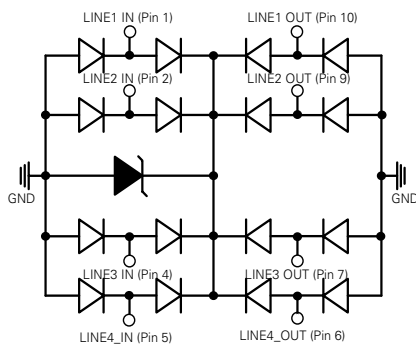
## SP2574NUTG 2.5V 40A Diode Array



### Pinout



### Functional Block Diagram



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.

### Description

The SP2574NUTG 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 high-speed, differential data lines. It's packaged in a μDFN package (3.0 x 2.0mm) and each device can protect up to 4 channels or 2 differential pairs, up to 40A (IEC 61000-4-5, 2nd edition) and up to 30kV ESD (IEC 61000-4-2). The "flow-through" design minimizes signal distortion, reduces voltage overshoot, and provides a simplified PCB design.

The SP2574NUTG 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.

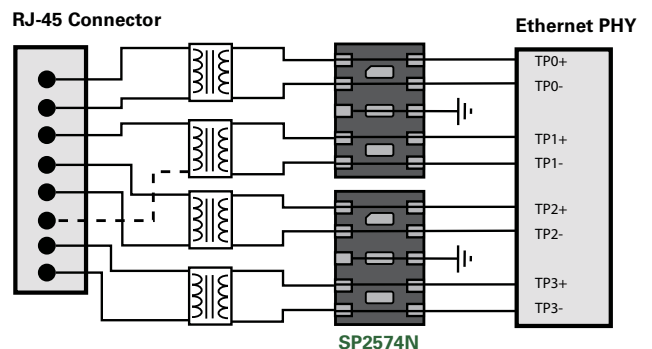
### Features

- ESD, IEC 61000-4-2, ±30kV contact, ±30kV air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, IEC 61000-4-5, 2nd edition 40A ( $t_p=8/20\mu s$ )
- Low capacitance of 3.8pF@0V (TYP) per I/O
- Low leakage current of 0.1μA (TYP) at 2.5V
- μDFN-10 package is optimized for high-speed data line routing
- Provides protection for two differential data pairs (4 channels) up to 40A
- Low operating and clamping voltage
- AEC-Q101 qualified
- RoHS compliant and lead-free

### Applications

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

### Application Example



### Absolute Maximum Ratings

Symbol	Parameter	Value	Units
$I_{PP}$	Peak Current ( $t_p=8/20\mu s$ )	40 <sup>1</sup>	A
$P_{PK}$	Peak Pulse Power ( $t_p=8/20\mu s$ )	1000	W
$T_{OP}$	Operating Temperature	-40 to 125	°C
$T_{STOR}$	Storage Temperature	-55 to 150	°C

Notes: 1. Rating with 2 pins connected together per suggested diagram ( For example, pin1 is connected to pin 10, pin 2 is connected to Pin 9, Pin 4 is connected to pin 7 and pin 5 is connected to pin 6)

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

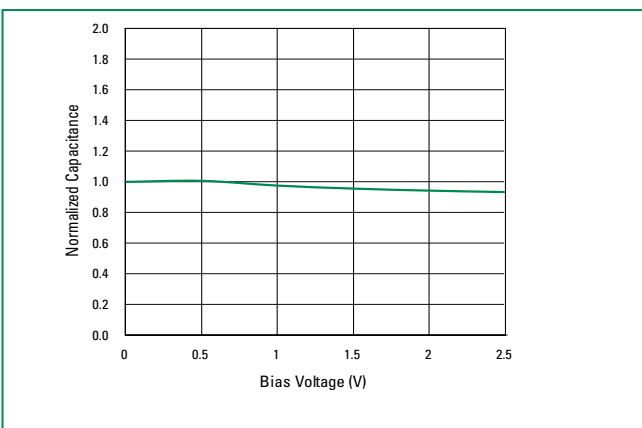
### Electrical Characteristics ( $T_{OP}=25^\circ C$ )

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	$V_{RWM}$	$I_R \leq 1\mu A$			2.5	V
Reverse Leakage Current	$I_R$	$V_{RWM} = 2.5V, T = 25^\circ C$		0.1	0.5	$\mu A$
Breakdown Voltage	$V_{BR}$	$I_{t1} = 1\mu A$	3.0	3.7	4.5	V
Snap Back Voltage	$V_{SB}$	$I_H = 1mA$	3.0			V
Clamp Voltage	$V_C$	$I_{PP} = 1A, t_p = 8/20\mu s$ Any I/O to Ground			4.5	V
		$I_{PP} = 10A, t_p = 8/20\mu s$ Any I/O to Ground			7.5	
		$I_{PP} = 25A, t_p = 8/20\mu s$ Any I/O to Ground			12.0	
		$I_{PP} = 40A, t_p = 8/20\mu s$ Line-to-Line <sup>1</sup> , two I/O Pins connected together on each line			20.0	
Dynamic Resistance <sup>2</sup>	$R_{DYN}$	TLP, $t_p=100ns$ , Any I/O to Ground		0.13		$\Omega$
ESD Withstand Voltage	$V_{ESD}$	IEC61000-4-2 (Contact)	$\pm 30$			kV
		IEC61000-4-2 (Air)	$\pm 30$			kV
Diode Capacitance	$C_{I/O \text{ to GND}}$	Between I/O Pins and Ground $V_R = 0V, f = 1MHz$		3.8	5.0	pF
	$C_{I/O \text{ to I/O}}$	Between I/O Pins $V_R = 0V, f = 1MHz$		1.7		pF

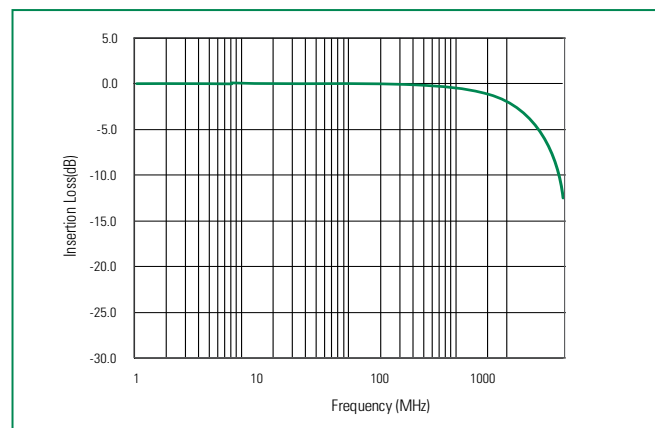
Notes:

- Rating with 2 pins connected together per suggested diagram ( For example, pin1 is connected to pin 10, pin 2 is connected to Pin 9, Pin 4 is connected to pin 7 and pin 5 is connected to pin 6)
- Transmission Line Pulse (TLP) with 100ns width and 200ps rise time.

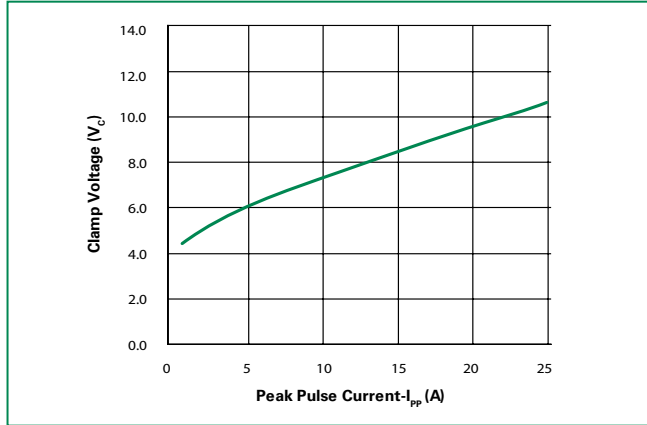
### Normalized Capacitance vs. Voltage



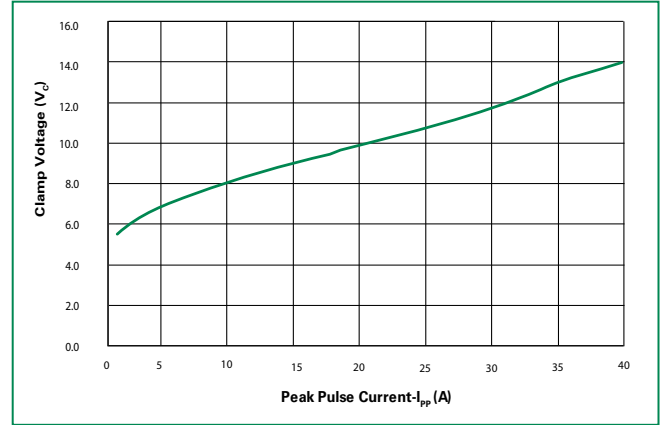
### Insertion Loss (S21)



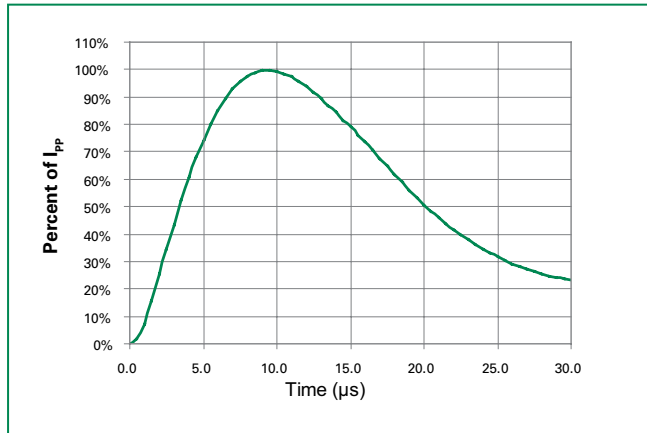
**Clamping Voltage vs.  $I_{pp}$  (I/O to GND)**



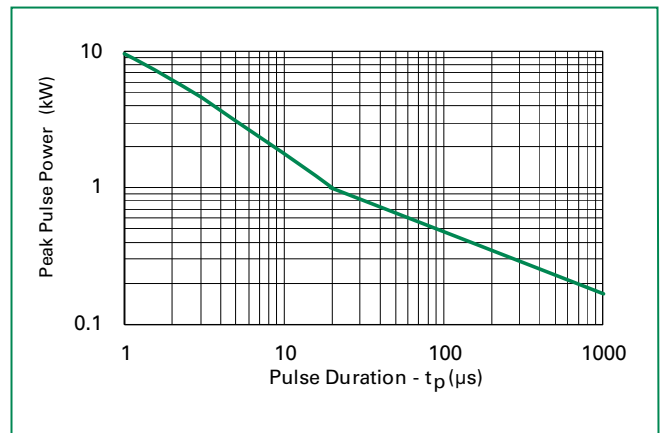
**Clamping Voltage vs.  $I_{pp}$  (Line-to-Line, Two I/O Pins Connected Together)**



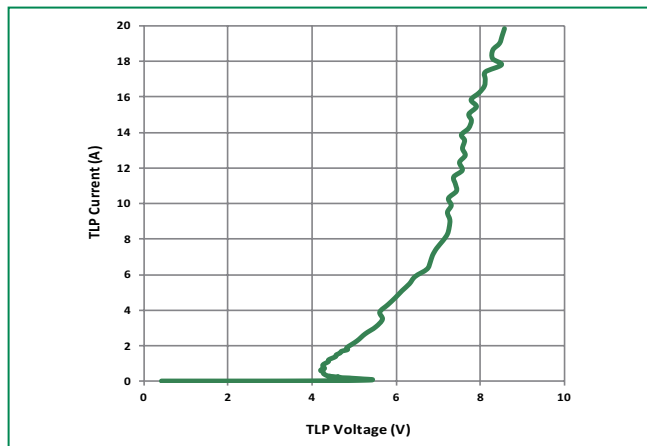
**Pulse Waveform**



**Non-Repetitive Peak Pulse Power vs. Pulse Time**



**Transmission Line Pulse (TLP)**



**Additional Information**



[Datasheet](#)



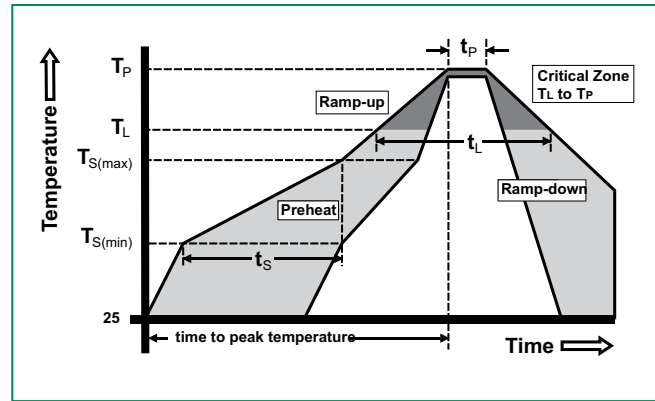
[Resources](#)



[Samples](#)

**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 <sup>+0/-5</sup> °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



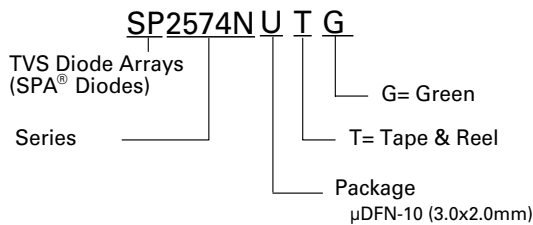
**Product Characteristics**

<b>Lead Plating</b>	Pre-Plated Frame
<b>Lead Material</b>	Copper Alloy
<b>Lead Coplanarity</b>	0.0004 inches (0.102mm)
<b>Substrate material</b>	Silicon
<b>Body Material</b>	Molded Epoxy
<b>Flammability</b>	UL 94 V-0

**Ordering Information**

Part Number	Package	Marking	Min. Order Qty.
SP2574NUTG	μDFN-10 (3.0x2.0mm)	ABR4	3000

**Part Numbering System**



**Part Marking System**

