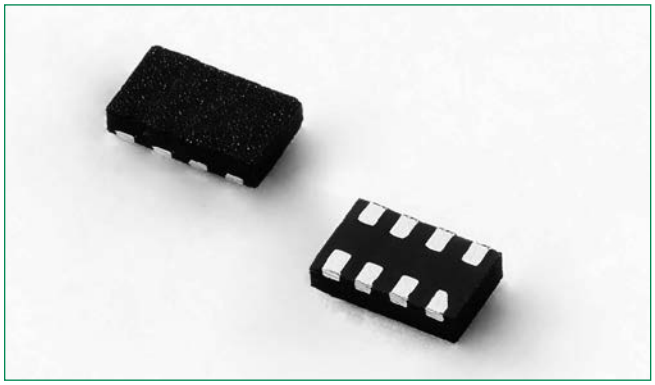
SP3312T Series 3.3V 15A Diode Array

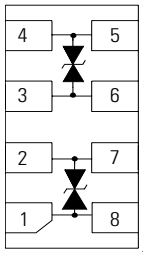
RoHS Pb GREEN



Description

The SP3312T integrates 4 channels (2 differential pair) of low capacitance diodes to protect sensitive I/O pins against lightning induced surge events and ESD. This robust component can safely absorb up to 15A per IEC 61000-4-5 (t_p=8/20µs)without performance degradation and a minimum ±30kV ESD per IEC 61000-4-2 international standard. The low loading capacitance makes the SP3312T ideal for protecting high-speed signal pins.

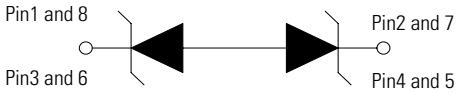
Pinout



Features

- ESD, IEC 61000-4-2, ±30kV contact, ±30kV air
- EFT, IEC 61000-4-4, 40A (t_P=5/50ns)
- Lightning, IEC 61000-4-5 2nd edition, 15A (t_P=8/20µs)
- Low capacitance of 1.3pF (TYP) per I/O
- Low leakage current of 0.01µA (TYP) at 3.3V
- Low variation in capacitance vs. bias voltage: 0.3pF Typical(V_R=0 to 2.5V)
- AEC-Q101 qualified
- Moisture Sensitivity Level (MSL-1)

Functional Block Diagram



Applications

- 10/100/1000 Ethernet
- Integrated magnetics/ RJ45 connectors
- LAN/WAN Equipment
- Security Cameras
- Industrial Controls
- Notebook & Desktop Computers

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.

Revised: 09/24/19

TVS Diode Array (SPA® Diodes)

Lightning Surge Protection- SP3312T Series

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I_{PP}	Peak Current (t_p=8/20µs)	15.0	A
P_{PK}	Peak Pulse Power (t_p=8/20µs)	250	W
T_{OP}	Operating Temperature	-40 to 125	°C
T_{STOR}	Storage Temperature	-55 to 150	°C

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.

Thermal Information

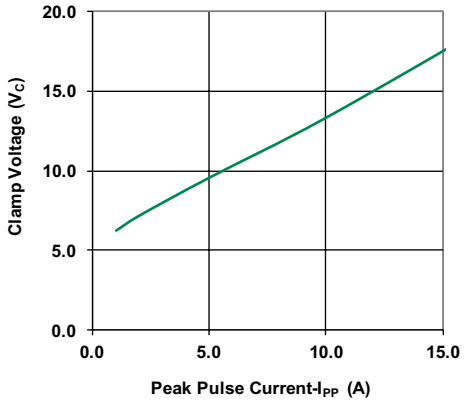
Parameter	Rating	Units
Storage Temperature Range	-55 to 150	°C
Maximum Junction Temperature	150	°C
Maximum Lead Temperature (Soldering 20-40s)	260	°C

Electrical Characteristics (T_{OP}=25°C)

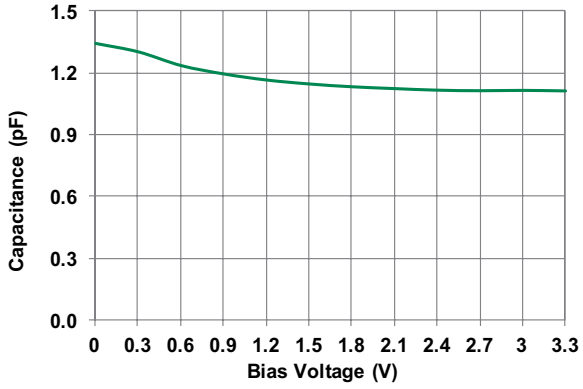
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}				3.3	V
Snap Back Voltage	V_{SB}	I_{SB}=50mA	2.8			V
Reverse Leakage Current	I_{LEAK}	V_R=3.3V, I/O to GND		0.01	0.05	µA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs, Fwd		6.0		V
		I_{PP}=2A, t_p=8/20µs, Fwd		7.0		V
		I_{PP}=10A, t_p=8/20µs, Fwd		13.0		V
Dynamic Resistance[2]	R_{DYN}	TLP, t_p=100ns, I/O to GND		0.40		Ω
ESD Withstand Voltage[1]	V_{ESD}	IEC 61000-4-2 (Contact)	±30			kV
		IEC 61000-4-2 (Air)	±30			kV
Variation in Capacitance with Reverse Bias [1]		Pins 1, 8 to 2, 7 and pins 3, 6 to 4, 5 V_R= 0 to 2.5V, f= 1MHz		0.3	2.0	pF
Diode Capacitance[1]	$C_{I/O-GND}$	Reverse Bias=0V		1.3	4.0	pF

Note:
1. Parameter is guaranteed by design and/or component characterization.
2. Transmission Line Pulse (TLP) with 100ns width, 2ns rise time, and average window t1=70ns to t2= 90ns

Clamping Voltage vs I_{PP}



Capacitance vs. Reverse Bias



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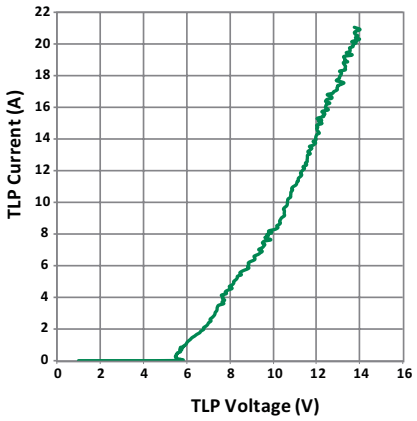
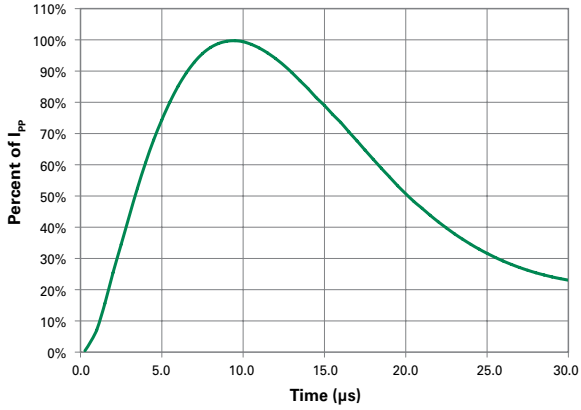
TVS Diode Array (SPA® Diodes)

Lightning Surge Protection- SP3312T Series

Transmission Line Pulsing (TLP) Plot

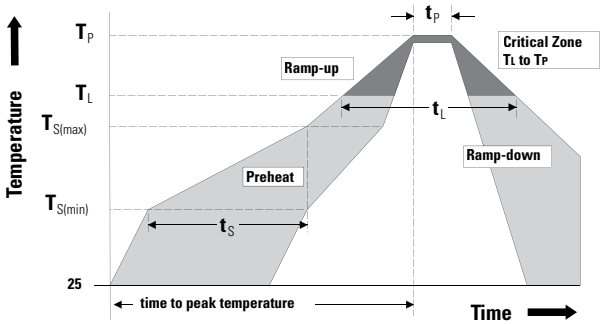


8/20µs Pulse Waveform



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



Product Characteristics

Lead Plating	Pre-Plated Frame
Lead Material	Copper Alloy
Lead Coplanarity	0.004 inches(0.102mm)
Substrate material	Silicon
Body Material	Molded Compound
Flammability	UL Recognized compound meeting flammability rating V-0

Notes :
1. All dimensions are in millimeters
2. Dimensions include solder plating.
3. Dimensions are exclusive of mold flash & metal burr.

Ordering Information

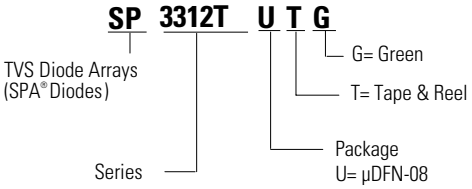
Part Number	Package	Marking	Min. Order Qty.
SP3312TUTG	µDFN-08	33H	3000

Revised: 09/24/19

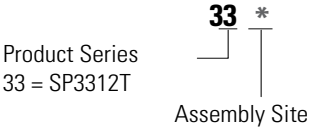
TVS Diode Array (SPA® Diodes)

Lightning Surge Protection- SP3312T Series

Part Numbering System

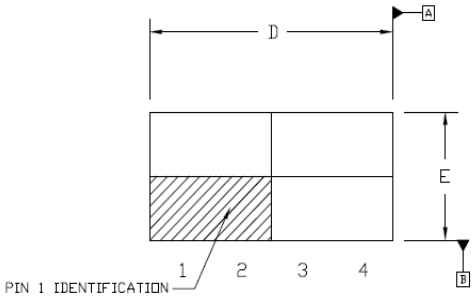


Part Marking System

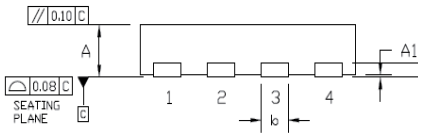


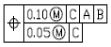
Package Dimensions — µDFN-08

Top View

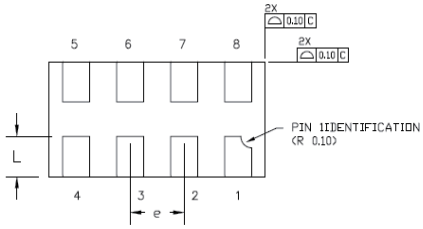


Side View



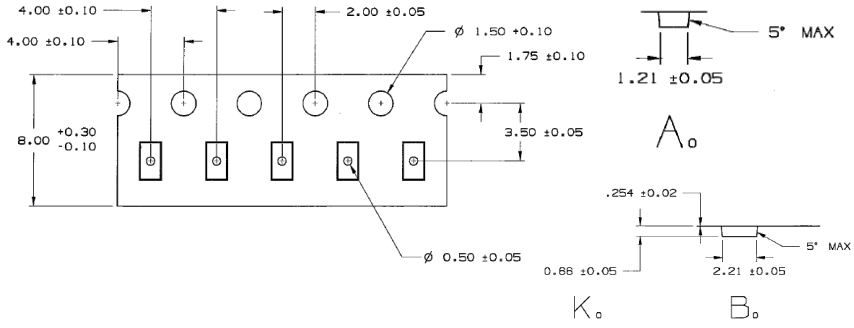


Bottom View



Package	µDFN-08 (2.0x1.0mm)			
JEDEC	MO-229			
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.45	0.55	0.018	0.022
A1	0	0.05	0	0.002
b	0.20	0.30	0.008	0.012
D	1.90	2.10	0.075	0.083
E	0.90	1.10	0.035	0.043
R	0.10 BSC		0.004 BSC	
e	0.50 BSC		0.020 BSC	
L	0.30	0.40	0.012	0.016

Embossed Carrier Tape & Reel Specification — µDFN-08



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