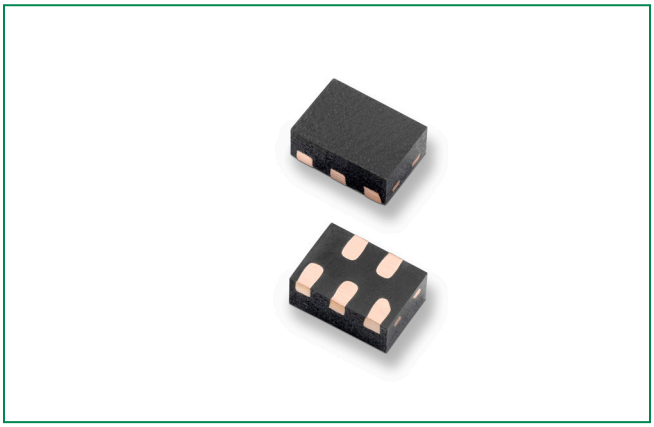
SP3422 0.2pF 22kV Diode Array

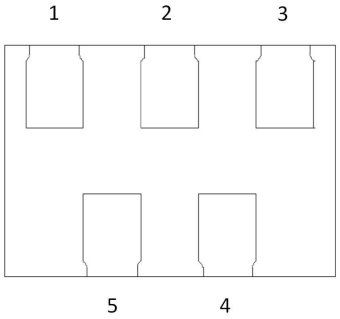
HF RoHS Pb GREEN



Description

The SP3422 integrates 4 channels of ultra low capacitance rail-to-rail diodes and an additional zener diode to provide protection for electronic equipment that may experience destructive electrostatic discharges (ESD). This robust component can safely absorb repetitive ESD strikes above the maximum level specified in the IEC 61000-4-2 international standard (±8kV contact discharge) without performance degradation. The extremely low loading capacitance also makes it ideal for protecting high speed signal pins such as V-by-One®, USB3.0, USB2.0, and IEEE 1394.

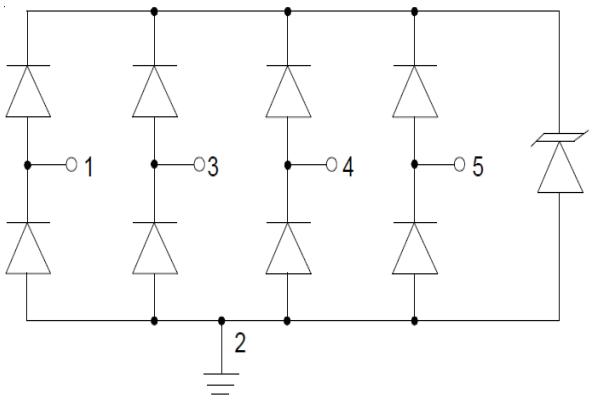
Pinout



Features

- ESD, IEC 61000-4-2, +22/-10kV contact, +22/-10kV air
- EFT, IEC 61000-4-4, 40A (t_P=5/50ns)
- Lightning, IEC 61000-4-5 2nd edition, 2A (t_P=8/20µs)
- Low capacitance of 0.2pF (TYP) at 3GHz
- Low leakage current of 20nA (TYP) at 5V
- Halogen free, Lead free and RoHS compliant
- Moisture Sensitivity Level(MSL -1)

Functional Block Diagram



Applications

- V-by-One®
- Embedded DisplayPort
- USB 2.0/3.0 Ports
- MIPI Camera and Display
- Serial bus interfaces such as IEEE 1394
- Flat Panel Displays
- LCD/LED TVs
- Smartphones
- Mobile Computing

Revision: 08/04/17

TVS Diode Arrays (SPA® Diodes)

Low Capacitance ESD Protection - SP3422

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I_{PP}	Peak Current (t_p=8/20µs)	2.0	A
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.

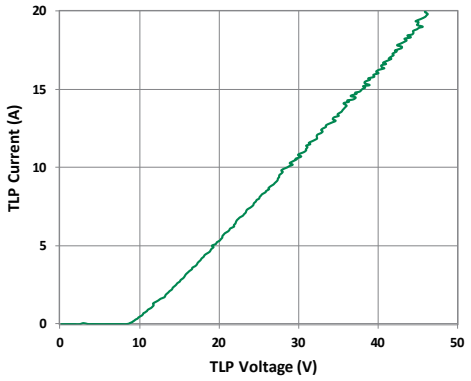
Electrical Characteristics (T_{OP}=25°C)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	$I_R \leq 1\mu A$			5.0	V
Reverse Leakage Current	I_{LEAK}	V_R=5V, Any I/O to GND		0.02	1.00	µA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs, Fwd		12.9		V
		I_{PP}=2A, t_p=8/20µs, Fwd		16.7		V
Dynamic Resistance[2]	R_{DYN}	TLP, t_p=100ns, I/O to GND		1.8		Ω
ESD Withstand Voltage[1]	V_{ESD}	IEC 61000-4-2 (Contact)	+22/-10			kV
		IEC 61000-4-2 (Air)	+22/-10			kV
Diode Capacitance[1]	$C_{I/O-GND}$	Reverse Bias=0V, f=3 GHz		0.2		pF

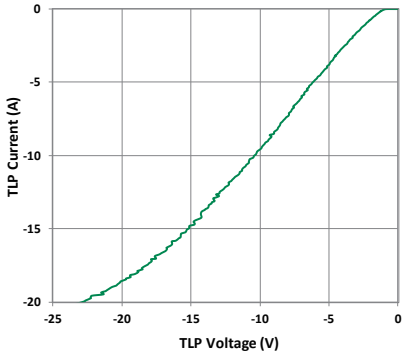
Note: [1] Parameter is guaranteed by design and/or component characterization.

[2] Transmission Line Pulse (TLP) with 100ns width, 2ns rise time, and average window t1=70ns to t2= 90ns

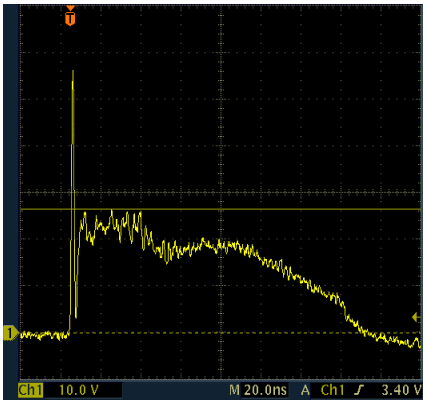
Positive Transmission Line Pulsing (TLP) Plot



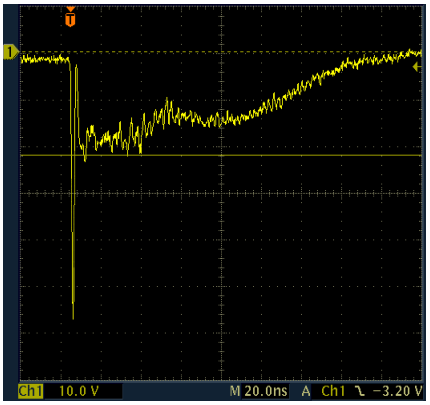
Negative Transmission Line Pulsing (TLP) Plot



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



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



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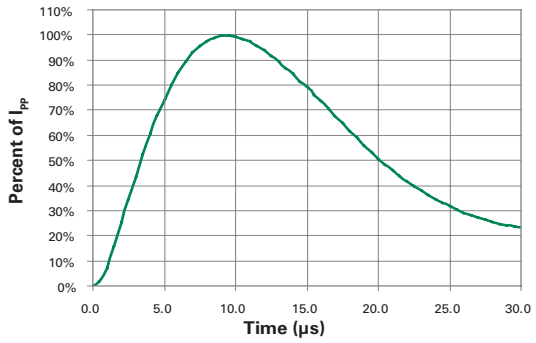
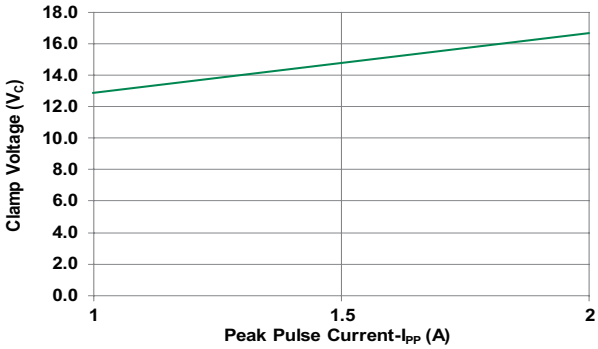
TVS Diode Arrays (SPA® Diodes)

Low Capacitance ESD Protection - SP3422

8/20µs Pulse Waveform

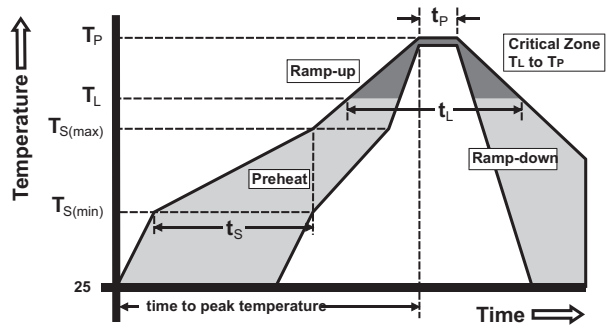


Clamping Voltage vs I_{PP}



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



Part Numbering System

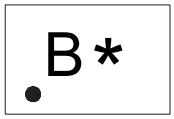
SP 3422 - 04 U T G

- SP: TVS Diode Arrays (SPA® Diodes)
- 3422: Series
- 04: Number of Channels
- U: Package — U=DFN-5 (1.0x0.6mm)
- T: T= Tape & Reel
- G: G= Green

Ordering Information

Part Number	Package	Marking	Min. Order Qty.
SP3422-04UTG	µDFN-5	B*	3000

Part Marking System



B = Part code = SP3422-04UTG
*= Date code

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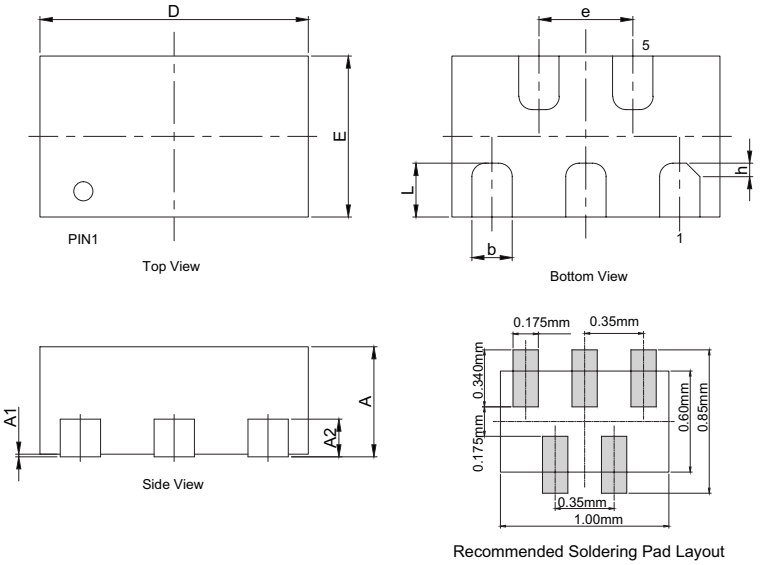
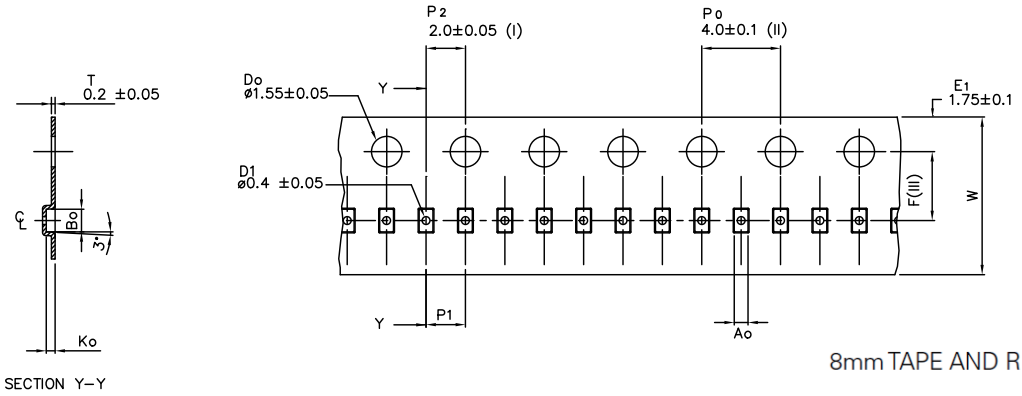
Package Dimensions

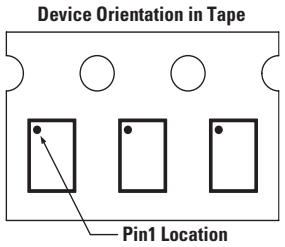


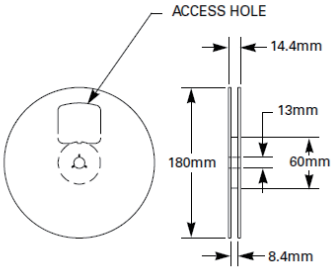
Symbol	1.0x0.6mm DFN		
	Millimeters		
	Min	Nor	Max
A	0.40	0.45	0.50
A1	0.00	0.02	0.05
A2		0.127 REF	
b	0.10	0.15	0.20
D	0.90	1.00	1.10
E	0.50	0.60	0.70
e		0.35 BSC	
L	0.125	0.225	0.325
h		0.05 (x 45°)	

Embossed Carrier Tape & Reel Specification



Symbol	Millimeters
A0	0.70 +/- 0.05
B0	1.15 +/- 0.05
K0	0.47 +/- 0.05
F	3.50 +/- 0.05
P1	2.00 +/- 0.10
W	8.00 +/- 0.10





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