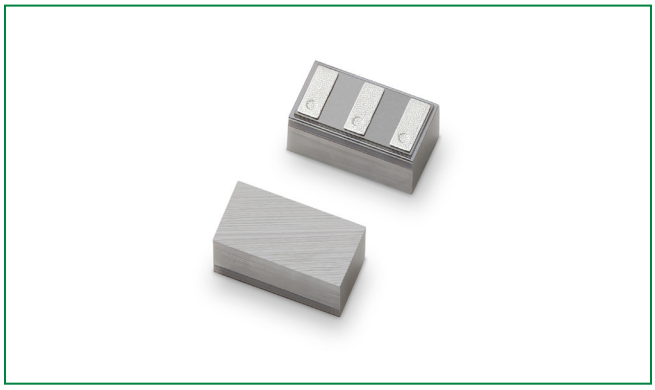
SP4339-02WTG

5 V, 0.25 pF, 15 kV, 2 CH Bidirectional TVS, Ultra Low Capacitance ESD Protection

HF RoHS Pb

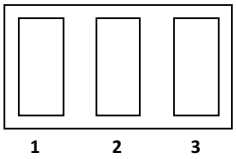


Description

The SP4339-02WTG provides ultra-low capacitance, bidirectional and a high level of protection for 2 channel electronic equipment that may experience destructive electrostatic discharges (ESD). The typical capacitance of 0.25 pF helps ensure excellent signal integrity on the most challenging consumer electronics interfaces, such as DisplayPort interfaces, Thunderbolt and high speed USB.

It can safely absorb repetitive ESD strikes at ±15 kV (contact discharge, IEC 61000-4-2) without performance degradation and safely dissipate 8 A of 8/20 µs surge current (IEC 61000-4-5 2nd edition).

Pinout

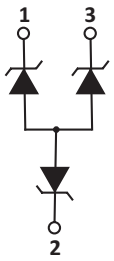


Bottom View

Features

- ESD, IEC 61000-4-2, ±15 kV contact, ±18 kV air
- EFT, IEC 61000-4-4, 40 A (5/50 ns)
- Maximum surge tolerance, IEC 61000-4-5, 2nd edition, 8 A (8/20 µs)
- Low leakage current of 50 nA (Typ) at 5 V
- Ultra low capacitance of 0.25 pF (Typ @ V_R = 0 V)
- Space efficient 0201
- Halogen-free, lead-free and RoHS compliant

Functional Block Diagram



Applications

- USB 2.0 to 4.0
- Computing
- MIPI
- DisplayPort
- Thunderbolt
- S-ATA
- Cell phone

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.

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Revised: F.W.05/28/26

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Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I_{PP}	Peak Current (t_p = 8/20 µs)	8.0	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.

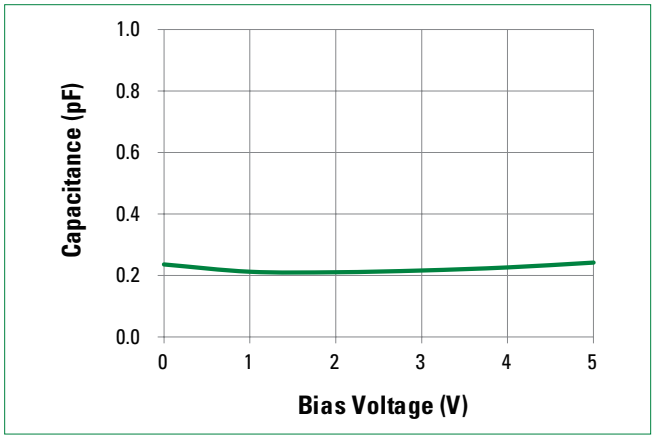
Electrical Characteristics (T_{OP} = 25 °C)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}				5	V
Breakdown Voltage	V_{BR}	I_R = 1 mA	5.5		7.5	V
Reverse Leakage Current	I_{LEAK}	V_R = 5 V		50	200	nA
Trigger Voltage	V_t			8		V
Clamp Voltage[1]	V_C	I_{PP} = 16 A, t_P = 0.2/100 ns(TLP)		6.5		V
		I_{PP} = 1 A, t_p = 8/20 µs		3.5		V
		I_{PP} = 8 A, t_p= 8/20 µs		6.0		V
Dynamic Resistance[2]	R_{DYN}	TLP, t_P = 100 ns		0.25		Ω
ESD Withstand Voltage[1,3]	V_{ESD}	IEC 61000-4-2 (Contct Discharge)	±15			kV
		IEC 61000-4-2 (Air Discharge)	±18			kV
Diode Capacitance[1]	$C_{IO-I/O}$	Reverse Bias = 0 V, f = 1 MHz		0.25	0.35	pF

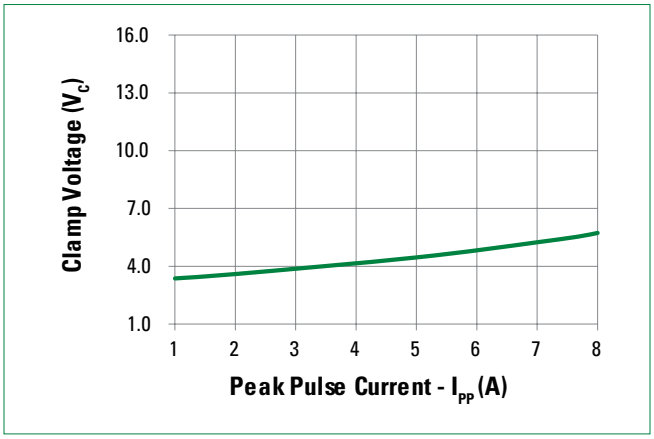
Note:

1. Parameter is guaranteed by design and/or component characterization.
2. Transmission Line Pulse (TLP) with 100ns width, 0.2 ns rise time, and average window t1 = 70 ns to t2 = 90 ns
3. Device stressed with ten non-repetitive ESD pulses.

Capacitance vs. Reverse Bias



Clamping Voltage vs I_{PP}



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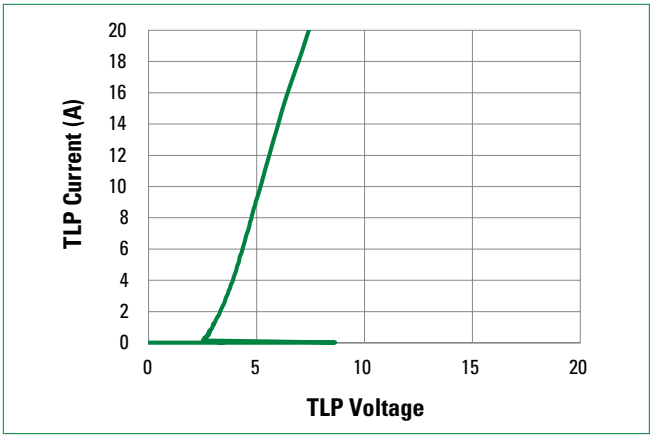
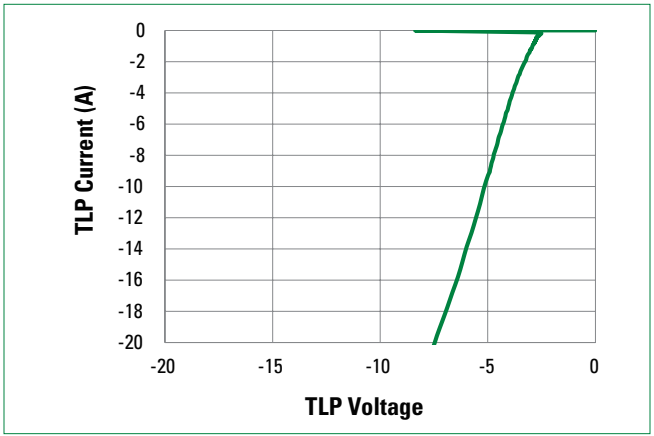
Positive Transmission Line Pulsing (TLP) Plot

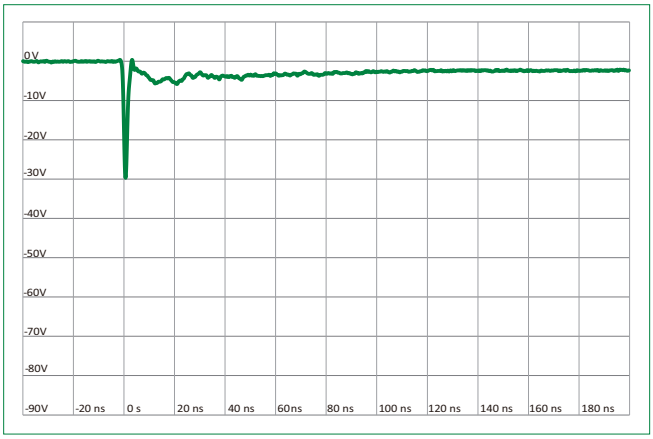


Negative Transmission Line Pulsing (TLP) Plot



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

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



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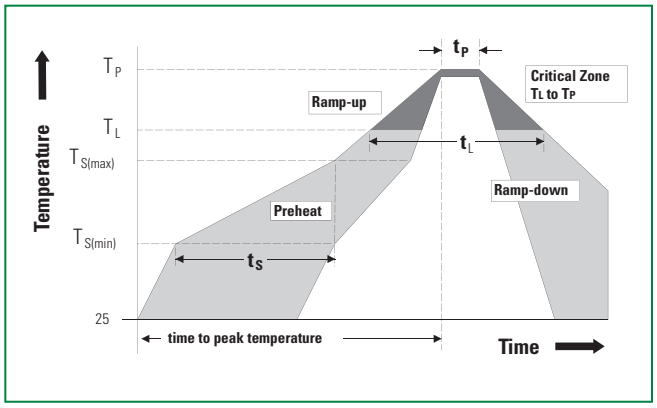
Soldering Parameters

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 – 120 seconds
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)		30 seconds max
Ramp-down Rate		6 °C/second max
Time 25 °C to Peak Temperature (T_P)		8 minutes max
Do Not Exceed		260 °C



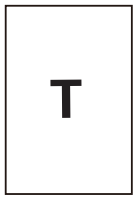
Ordering Information

Part Number	Package	Min. Order Qty.
SP4339-02WTG	Flipchip	10000

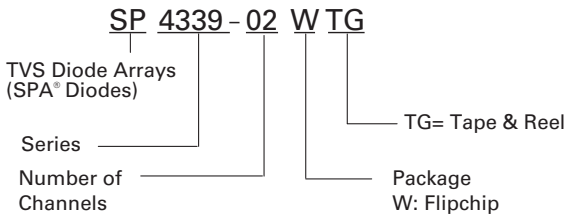
Product Characteristics

Lead Plating	Matte tin plating
Lead Material	Copper bump
Flammability	UL recognized compound meeting flammability rating V-0

Part Marking System



Part Numbering System



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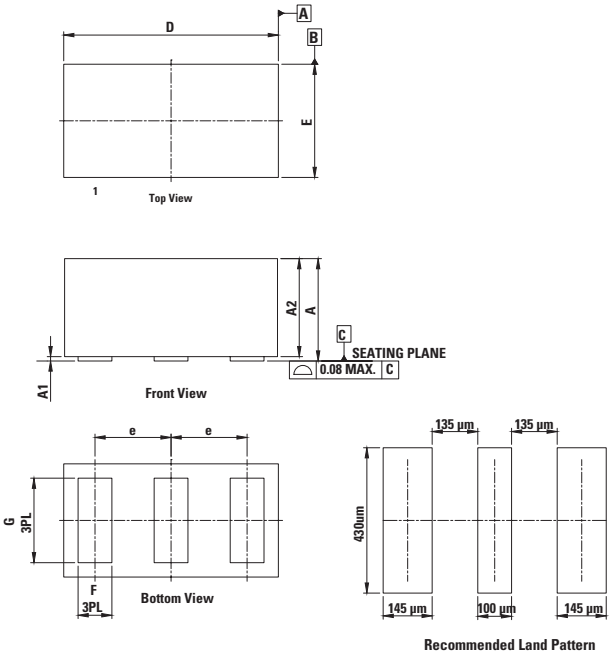
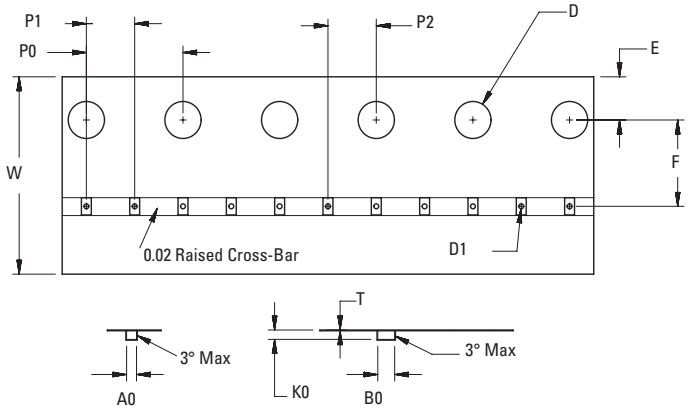
Package Dimensions — Flipchip

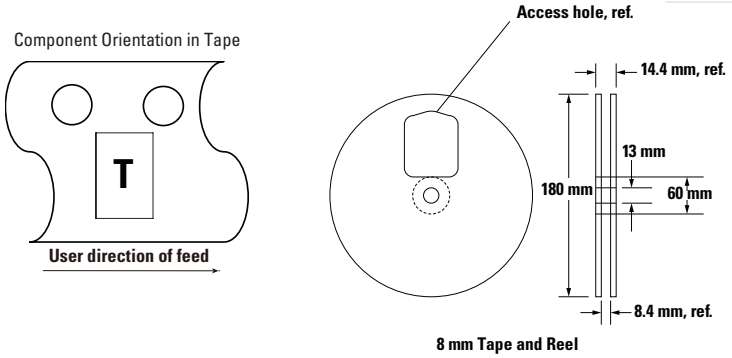


Symbol	Millimeters			Inches		
	Min	Nom	Max	Min	Nom	Max
A	0.134	0.150	0.166	0.0053	0.0059	0.0065
A1	0.008	0.011	0.014	0.0003	0.0004	0.0006
A2	0.126	0.139	0.152	0.0050	0.0055	0.0060
e	0.225 BSC			0.0089 BSC		
D	0.605	0.620	0.635	0.0238	0.0244	0.0250
E	0.305	0.320	0.335	0.0120	0.0126	0.0132
F	0.094	0.100	0.106	0.0037	0.0039	0.0042
G	0.244	0.250	0.256	0.0096	0.0098	0.0101

Embossed Carrier Tape & Reel Specification — Flipchip



Symbol	Millimeters
A0	0.39 +0.03/-0.04
B0	0.69 +0.03/-0.04
D	Ø2.00 +0.05/-0.60
D1	Ø0.20 +0.05/-0.10
E	1.75 +/-0.10
F	3.50 +/-0.05
K0	0.23 +/-0.03
P0	4.00 +/-0.10
P1	2.00 +/-0.05
P2	2.00 +/-0.05
W	8.00 +0.30/-0.10
T	0.20 +/-0.02



8 mm Tape and Reel

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