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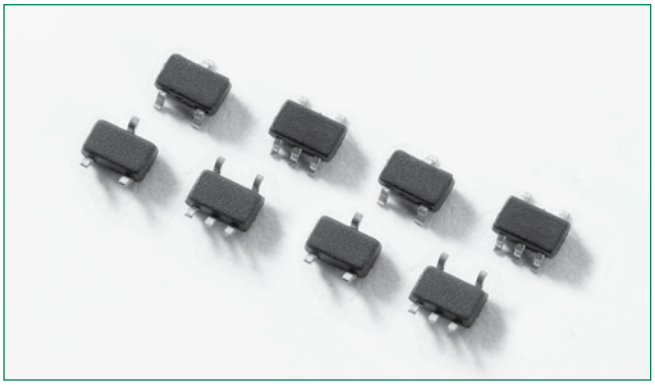
TVS Diode Array

General Purpose ESD Protection - SP1002 Series

SP1002 Series 5pF 8kV Bidirectional TVS Array

RoHS Pb GREEN

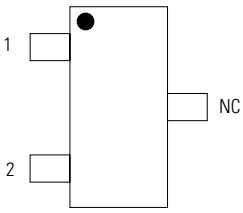


Description

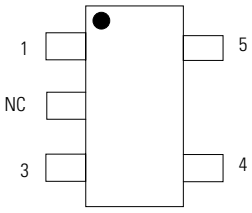
Back-to-Back Zener diodes fabricated in a proprietary silicon avalanche technology protect each I/O pin to provide a high level of protection for electronic equipment that may experience destructive electrostatic discharges (ESD). These robust diodes can safely absorb repetitive ESD strikes at the maximum level specified in the IEC 61000-4-2 international standard (Level 4, ±8kV contact discharge) without performance degradation. Their very low loading capacitance also makes them ideal for protecting high-speed signal pins.

Pinout

SP1002-01JTG
(SC70-3)



SP1002-02JTG
(SC70-5)

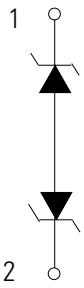


Features

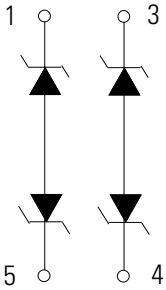
- Low capacitance of 5pF (TYP) I/O to I/O
- ESD protection of ±8kV contact discharge, ±15kV air discharge, (Level 4, IEC 61000-4-2)
- EFT protection, IEC 61000-4-4, 40A (5/50ns)
- Low leakage current of 0.5µA (MAX) at 5V
- Small package saves board space
- Lightning Protection, IEC 61000-4-5, 2nd edition 2A (8/20µs)
- RoHS compliant and lead free
- AEC-Q101 qualified

Functional Block Diagram

SP1002-01JTG



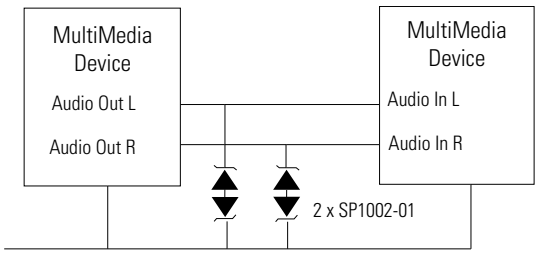
SP1002-02JTG



Applications

- Computer Peripherals
- Mobile Phones
- Digital Cameras
- Desktops/Notebooks
- LCD/PDP TVs
- Set Top Boxes
- DVD Players
- MP3/PMP

Application Example



SCART MultiMedia Application of SP1002-01

Additional Information

Datasheet | **Resources** | **Samples**

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: 09/06/19

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Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I_{PP}	Peak Current (t_p=8/20µs)	2	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 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.

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

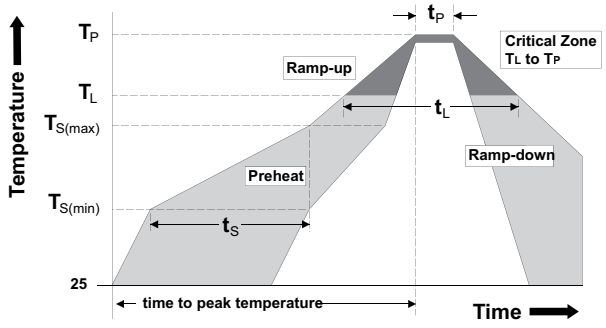
Electrical Characteristics (T_{OP} = 25°C)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Voltage Drop	V_D	I_R=1mA	6.0		9.5	V
Reverse Standoff Voltage	V_{RWM}	I_R≤1µA with 1 I/O at GND			6.0	V
Leakage Current	I_{LEAK}	V_R=5V with I/O at GND			0.5	µA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs, Fwd		9.2	13.0	V
		I_{PP}=2A, t_p=8/20µs, Fwd		11.2	16.0	V
Dynamic Resistance	R_{DYN}	$(V_{C2} - V_{C1}) / (I_{PP2} - I_{PP1})$		2.0		Ω
ESD Withstand Voltage[1,2]	V_{ESD}	IEC61000-4-2 (Contact)	±8			kV
		IEC61000-4-2 (Air)	±15			kV
Diode Capacitance[1]	C_D	Reverse Bias=0V		6		pF
		Reverse Bias=2.5V		5		pF
		Reverse Bias=5V		5		pF

Notes:
[1] Parameter is guaranteed by device characterization
[2] A minimum of 1,000 ESD pulses are applied at 1s intervals

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



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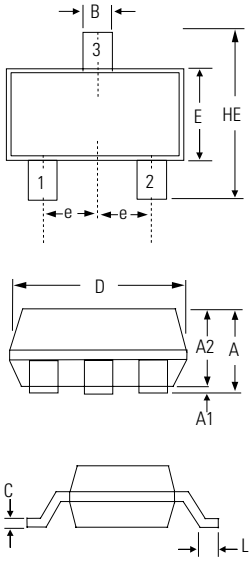
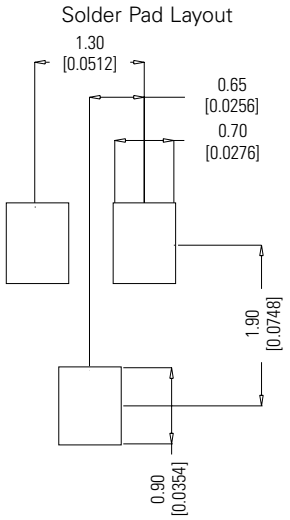
TVS Diode Array

General Purpose ESD Protection - SP1002 Series

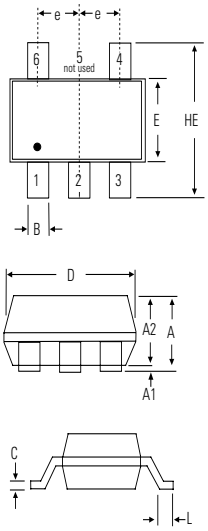
Package Dimensions — SC70-3

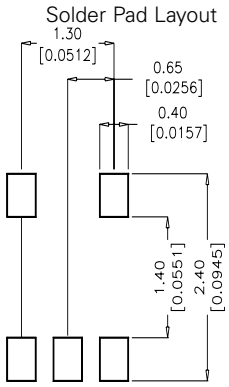




Package	SC70-3			
Pins	3			
JEDEC	MO-203			
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.80	1.10	0.031	0.043
A1	0.00	0.10	0.000	0.004
A2	0.70	1.00	0.028	0.039
B	0.15	0.30	0.006	0.012
c	0.08	0.25	0.003	0.010
D	1.85	2.25	0.073	0.089
E	1.15	1.35	0.045	0.053
e	0.66 BSC		0.026 BSC	
HE	2.00	2.40	0.079	0.094
L	0.26	0.46	0.010	0.018

Package Dimensions — SC70-5





Package	SC70-5			
Pins	5			
JEDEC	MO-203			
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.80	1.10	0.031	0.043
A1	0.00	0.10	0.000	0.004
A2	0.70	1.00	0.028	0.039
B	0.15	0.30	0.006	0.012
c	0.08	0.25	0.003	0.010
D	1.85	2.25	0.073	0.089
E	1.15	1.35	0.045	0.053
e	0.65 BSC		0.026 BSC	
HE	2.00	2.40	0.079	0.094
L	0.26	0.46	0.010	0.018

Product Characteristics

Lead Plating	Matte Tin
Lead Material	Copper Alloy
Lead Coplanarity	0.0004 inches (0.102mm)
Substitute Material	Silicon
Body Material	Molded Epoxy
Flammability	UL 94 V-0

Notes :
1. All dimensions are in millimeters
2. Dimensions include solder plating.
3. Dimensions are exclusive of mold flash & metal burr.
4. Blo is facing up for mold and facing down for trim/form, i.e. reverse trim/form.
5. Package surface matte finish VDI 11-13.

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Part Numbering System

SP 1002 - ** J T G

- TVS Diode Arrays (SPA® Diodes)
- Series
- Number of Channels
  - -01 = 1 Channel
  - -02 = 2 Channel
- Package
  - J = SC70-3
  - SC70-5
- T= Tape & Reel
- G= Green

Part Marking System

B**

Product Series
B = SP1002 Series

B * *

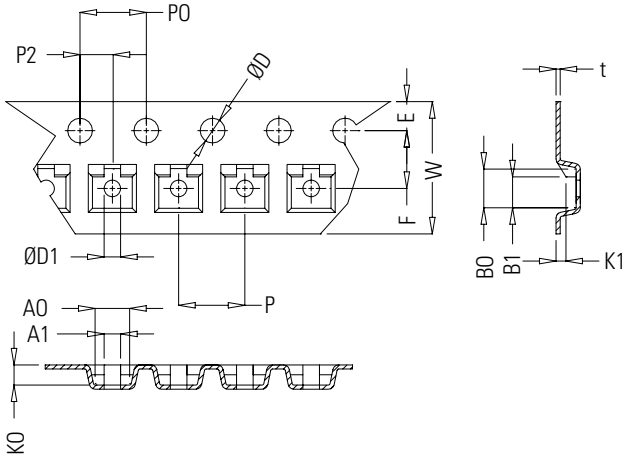
Number of Channels
(varies)

Assembly Site
(varies)

Ordering Information

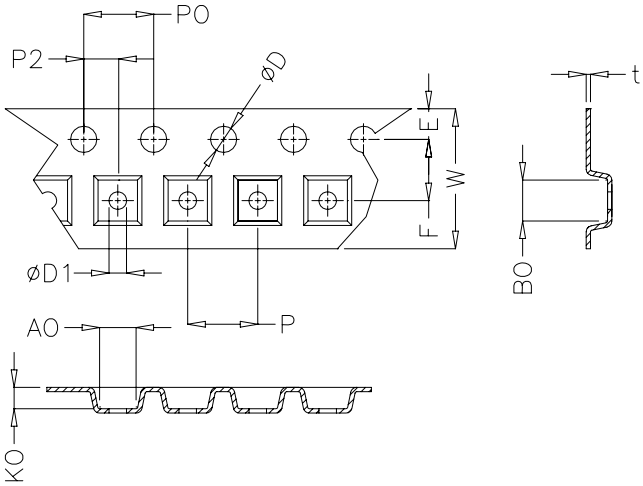
Part Number	Package	Marking	Min. Order Qty.
SP1002-01JTG	SC70-3	B*1	3000
SP1002-02JTG	SC70-5	B*2	3000

Embossed Carrier Tape & Reel Specification — SC70-3



Symbol	Millimetres		Inches	
	Min	Max	Min	Max
E	1.65	1.85	0.065	0.073
F	3.45	3.55	0.135	0.139
P2	1.95	2.05	0.077	0.081
D	1.40	1.60	0.055	0.063
D1	1.00	1.25	0.039	0.049
P0	3.90	4.10	0.154	0.161
10P0	40.0 ± 0.20		1.574 ± 0.008	
W	7.70	8.10	0.303	0.318
P	3.90	4.10	0.153	0.161
A0	2.30	2.50	0.090	0.098
A1	1.00 Ref		0.039 Ref	
B0	2.30	2.50	0.090	0.098
B1	1.90 Ref		0.074	
K0	1.10	1.30	0.043	0.051
K1	0.60 Ref		0.023 Ref	
t	0.27 max		0.010	

Embossed Carrier Tape & Reel Specification — SC70-5 and SC70-6



Symbol	Millimetres		Inches	
	Min	Max	Min	Max
E	1.65	1.85	0.065	0.073
F	3.45	3.55	0.135	0.139
P2	1.95	2.05	0.077	0.081
D	1.40	1.60	0.055	0.063
D1	1.00	1.25	0.039	0.049
P0	3.90	4.10	0.154	0.161
10P0	40.0 ± 0.20		1.574 ± 0.008	
W	7.70	8.10	0.303	0.318
P	3.90	4.10	0.153	0.161
A0	2.14	2.34	0.084	0.092
B0	2.24	2.44	0.088	0.096
K0	1.12	1.32	0.044	0.052
t	0.27 max		0.010 max	

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