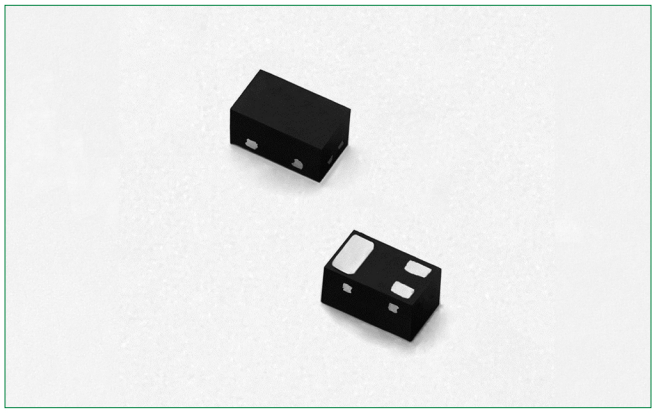
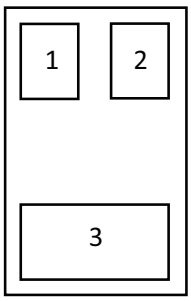
SC3402-02ETG

5 V, 0.4 pF, 15 kV, SOD883, Ultra Low Capacitance ESD protection

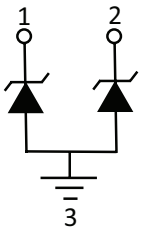
HF RoHS Pb



Pinout



Functional Block Diagram



Description

The SC3402-02ETG provides ultra-low capacitance, unidirectional and a high level of protection for 2-channel electronic equipment that may experience destructive electrostatic discharges (ESD). The typical capacitance of 0.4 pF helps ensure excellent signal integrity on the most challenging consumer electronics interfaces, such as High-Definition Multimedia Interface (HDMI) and DisplayPort interfaces, and USB 3.0/3.1 Gen 1.

It can safely absorb repetitive ESD strikes at ±15 kV (contact discharge, IEC 61000-4-2) without performance degradation and safely dissipate 7 A of 8/20 µs surge current (IEC 61000-4-5 2nd edition).

Features

- ESD, IEC 61000-4-2, ±15 kV contact, ±20 kV air
- EFT, IEC 61000-4-4, 40 A (5/50 ns)
- Maximum surge tolerance, IEC 61000- 4-5 2nd edition, 7 A (8/20 µs)
- Low leakage current of 100 nA (Max) at 5 V
- Ultra low capacitance of 0.4 pF (Typ @ V_R = 0 V)
- Tiny SOD883 package saves board space
- Halogen free, lead free and RoHS compliant
- Moisture sensitivity level (MSL-1)

Applications

- USB 2.0/3.0
- USB 3.1 Gen 1
- HDMI
- DisplayPort interfaces

Revised: FW.01/22/26

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Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I_{PP}	Peak Current (t_p = 8/20 µs)	7	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.

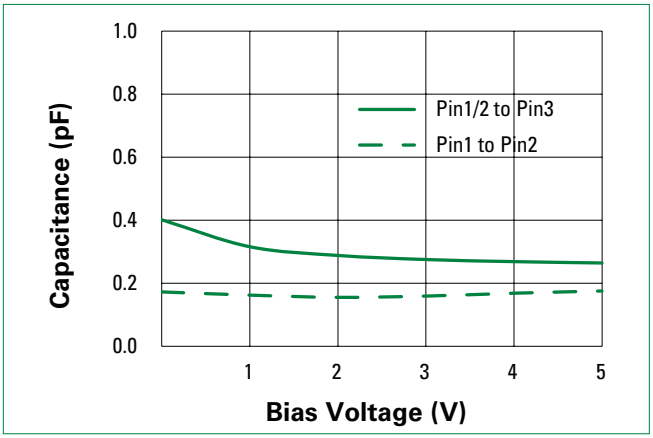
Electrical Characteristics (T_{OP}=25°C)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}				5	V
Breakdown Voltage	V_{BR}	I_R = 1 mA	6.5		9.4	V
Reverse Leakage Current	I_{LEAK}	V_R = 5 V		1	100	nA
Clamp Voltage[1]	V_C	I_{PP} = 16 A, t_P = 0.2/100 ns(TLP), Pin1/2 to Pin3		4.5		V
		I_{PP} = 1 A, t_P = 8/20 µs, Pin1/2 to Pin3		2.5		V
		I_{PP} = 7 A., t_P = 8/20 µs, Pin1/2 to Pin3		4.0		V
Dynamic Resistance[2]	R_{DYN}	TLP, t_P = 100 ns, Pin1/2 to Pin3		0.17		Ω
ESD Withstand Voltage[1,3]	V_{ESD}	IEC 61000-4-2 (Contact Discharge)	±15			kV
		IEC 61000-4-2 (Air Discharge)	±20			kV
Diode Capacitance[1]	C_{IO-GND}	Reverse Bias = 0 V , f = 1 MHz, Pin1/2 to Pin3		0.40		pF
	C_{IO-IO}	Reverse Bias= 0 V, f=1MHz, Pin1 to Pin2		0.16		pF

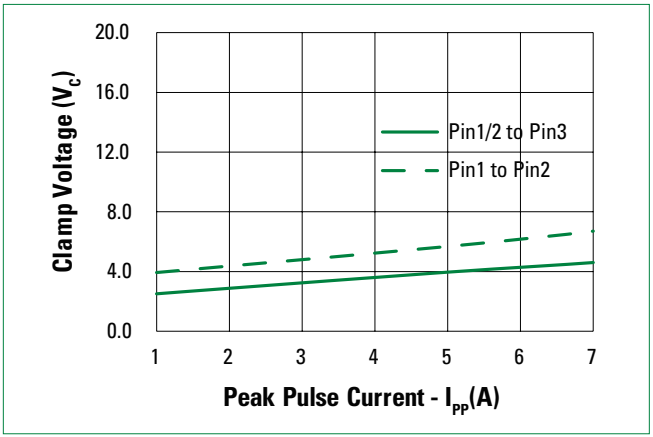
Note:

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 according to IEC61000-4-2 (R = 330 Ω, C = 150 pF).

Capacitance vs. Reverse Bias



Clamping Voltage vs I_{PP}



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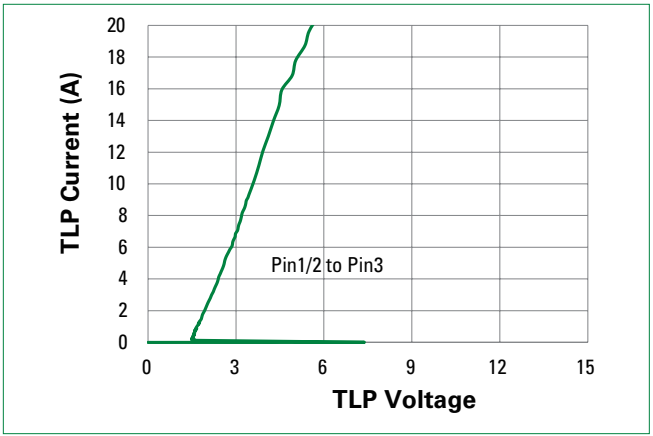
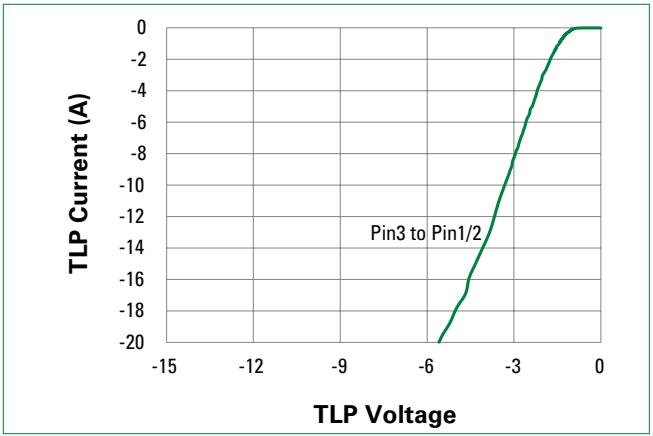
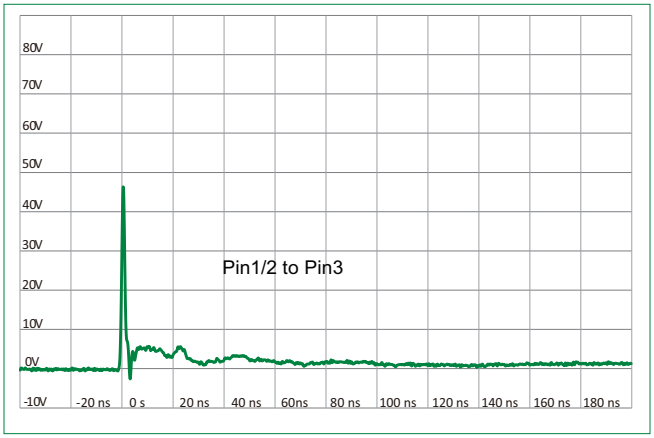
Positive Transmission Line Pulsing (TLP) Plot



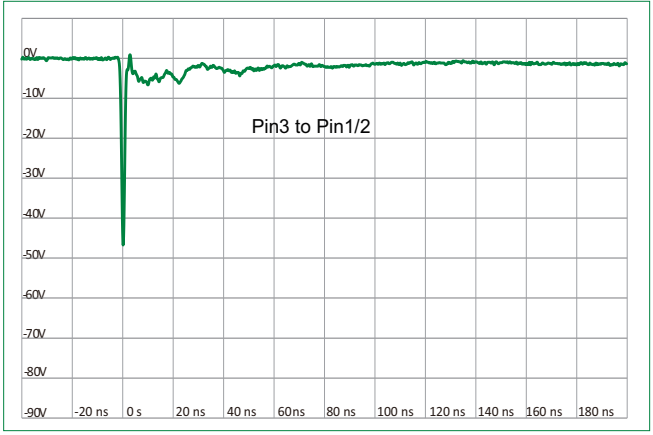
Negative Transmission Line Pulsing (TLP) Plot



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



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



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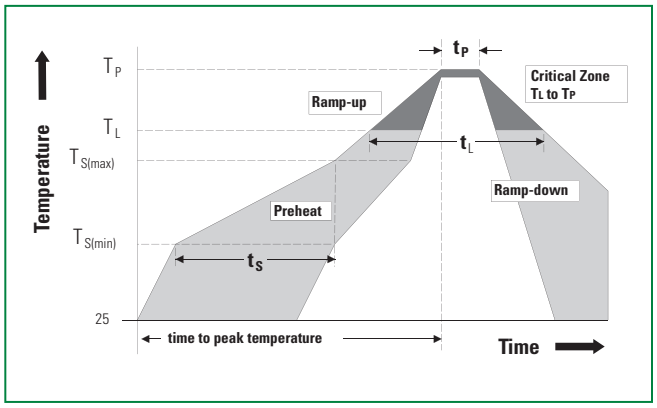
Soldering Parameters

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



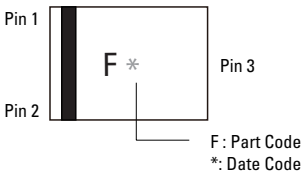
Ordering Information

Part Number	Package	Min. Order Qty.
SC3402-02ETG	SOD883	10000

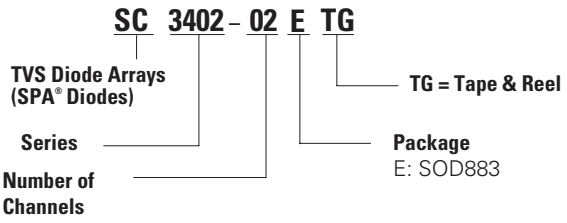
Product Characteristics

Lead Plating	Pre-plated frame
Lead Material	Copper alloy
Body Material	Molded compound
Flammability	UL recognized compound meeting flammability rating V-0

Part Marking System



Part Numbering System



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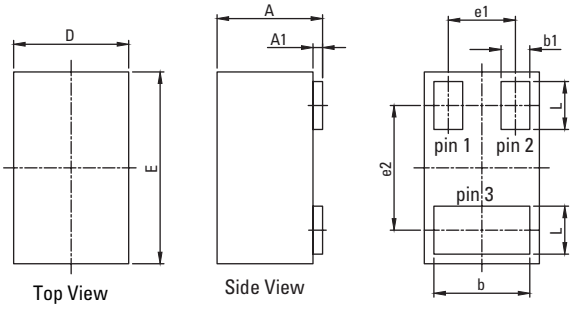
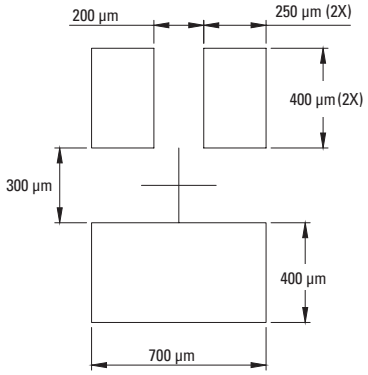
Package Dimensions — SOD883

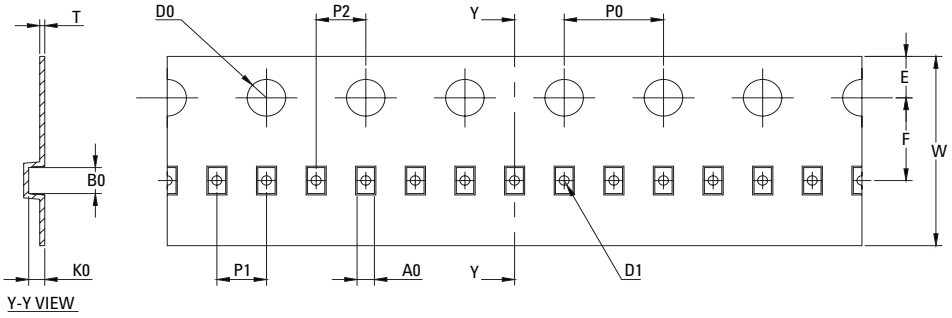


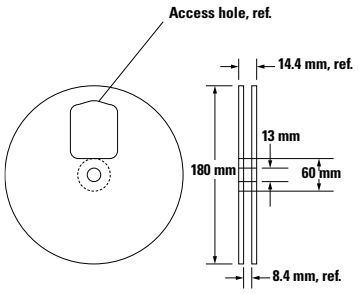
Symbol	Millimeters		
	Min	Nom	Max
A	0.45	0.50	0.55
A1	-	0.02	0.05
D	0.55	0.60	0.65
E	0.95	1.00	1.05
b	0.45	0.50	0.55
b1	0.10	0.15	0.20
L	0.20	0.25	0.30
e1	0.35 BSC		
e2	0.65 BSC		

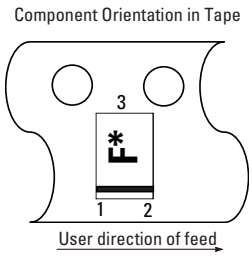


Recommended Soldering pad layout

Embossed Carrier Tape & Reel Specification — SOD883







Symbol	Millimeters		
	Min	Nom	Max
A0	0.63	0.70	0.77
B0	1.06	1.12	1.18
D0	1.50	1.55	1.60
D1	0.30	0.45	0.60
E	1.65	1.75	1.85
F	3.40	3.50	3.60
K0	0.54	0.60	0.66
P0	3.90	4.00	4.10
P1	1.90	2.00	2.10
P2	1.95	2.00	2.05
T	0.15	0.20	0.25
W	7.80	8.00	8.30

Revised: FW.01/22/26