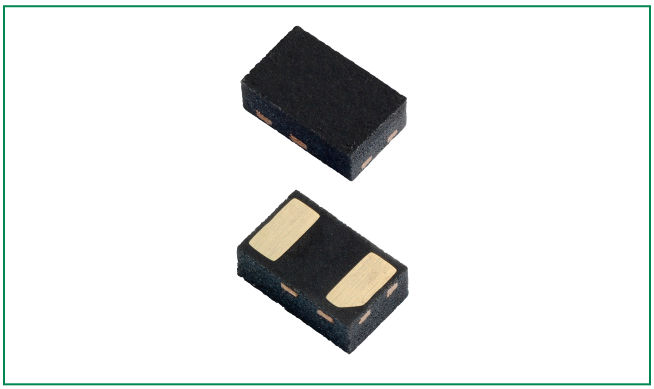
SC11xx Series Discrete Unidirectional TVS Diode

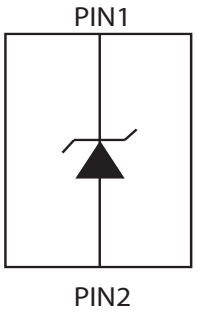
RoHS Pb GREEN



Description

Avalanche breakdown 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 ±30kV (contact and air discharge, IEC 61000-4-2) without performance degradation. Additionally, each diode can safely dissipate 80A (SC1105) of 8/20µs surge current (IEC 61000-4-5 2nd edition) with very low clamping voltages.

Pinout and Functional Block Diagram



Features

- ESD, IEC 61000-4-2, ±30kV contact, ±30kV air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, IEC 61000-4-5 2nd edition, 80A (t_P=8/20µs, SC1105)
- Low clamping voltage
- Low leakage current
- Moisture Sensitivity Level(MSL -1)
- Lead free and RoHS compliant

Applications

- Switches / Buttons
- Test Equipment / Instrumentation
- Point-of-Sale Terminals
- Medical Equipment
- Notebooks / Desktops / Servers
- Computer Peripherals

Revision: 10/16/20

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
T_{OP}	Operating Temperature	-40 to 125	°C
T_{STOR}	Storage Temperature	-55 to 150	°C

Notes:
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.

SC1105 Electrical Characteristics (T_{OP}=25°C)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	I_R=1µA			5.0	V
Breakdown Voltage	V_{BR}	I_R=1mA	6.0		7.5	V
Reverse Leakage Current	I_{LEAK}	V_R=5V			1.0	µA
Clamp Voltage[1]	V_C	I_{PP}=40A, t_p=8/20µs, Fwd		9.3		V
		I_{PP}=80A, t_p=8/20µs, Fwd		11.8		V
Dynamic Resistance[2]	R_{DYN}	TLP, t_p=100ns, I/O to GND		0.04		Ω
Peak Pulse Current	I_{pp}	t_p=8/20µs			80	A
ESD Withstand Voltage[1]	V_{ESD}	IEC 61000-4-2 (Contact Discharge)	±30			kV
		IEC 61000-4-2 (Air Discharge)	±30			kV
Diode Capacitance[1]	$C_{I/O-GND}$	Reverse Bias=0V, f=1MHz		660		pF

SC1115 Electrical Characteristics (T_{OP}=25°C)

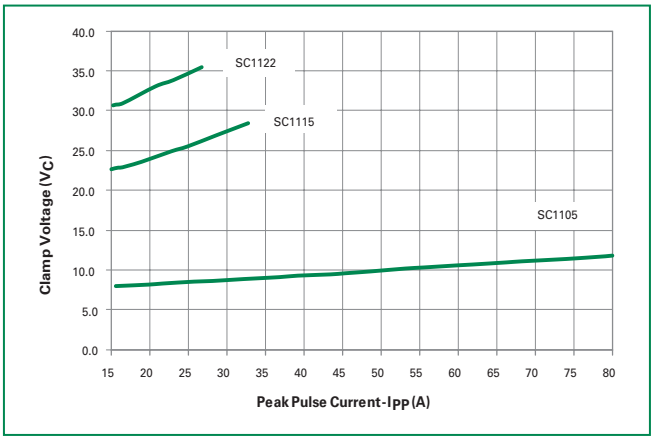
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	I_R=1µA			15.0	V
Breakdown Voltage	V_{BR}	I_R=1mA	16.7			V
Reverse Leakage Current	I_{LEAK}	V_R=15V			1.0	µA
Clamp Voltage[1]	V_C	I_{PP}=30A, t_p=8/20µs, Fwd		27.4		V
Dynamic Resistance[2]	R_{DYN}	TLP, t_p=100ns, I/O to GND		0.09		Ω
Peak Pulse Current	I_{pp}	t_p=8/20µs			30.0	A
ESD Withstand Voltage[1]	V_{ESD}	IEC 61000-4-2 (Contact Discharge)	±30			kV
		IEC 61000-4-2 (Air Discharge)	±30			kV
Diode Capacitance[1]	$C_{I/O-GND}$	Reverse Bias=0V, f=1MHz		180		pF

SC1122 Electrical Characteristics (T_{OP}=25°C)

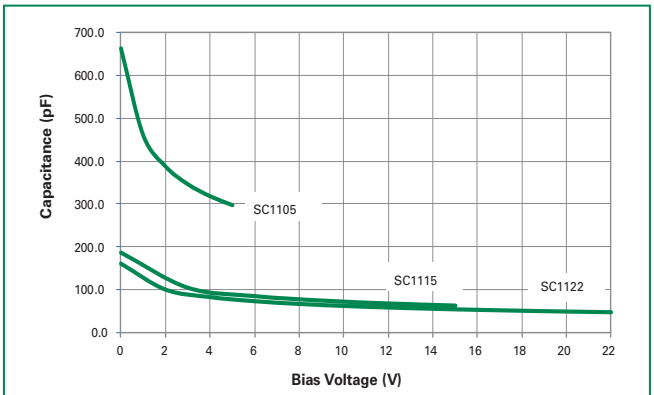
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	I_R=1µA			22.0	V
Breakdown Voltage	V_{BR}	I_R=1mA	23.0			V
Reverse Leakage Current	I_{LEAK}	V_R=22V			1.0	µA
Clamp Voltage[1]	V_C	I_{PP}=27A, t_p=8/20µs, Fwd		35.5		V
Dynamic Resistance[2]	R_{DYN}	TLP, t_P=100ns, I/O to GND		0.13		Ω
Peak Pulse Current	I_{pp}	t_p=8/20µs			27.0	A
ESD Withstand Voltage[1]	V_{ESD}	IEC 61000-4-2 (Contact Discharge)	±30			kV
		IEC 61000-4-2 (Air Discharge)	±30			kV
Diode Capacitance[1]	$C_{I/O-GND}$	Reverse Bias=0V, f=1MHz		160		pF

Note:
1. Parameter is guaranteed by design and/or component characterization.
2.Transmission Line Pulse (TLP) with 100ns width, 0.2ns rise time, and average window t1=70ns to t2= 90ns

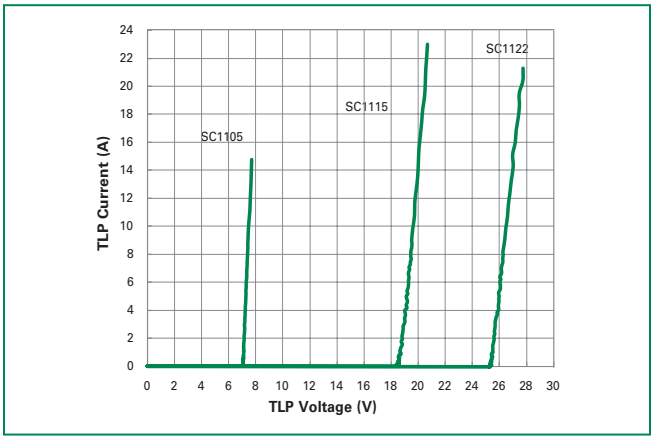
Clamping voltage vs. I_{PP} for 8/20µs waveshape



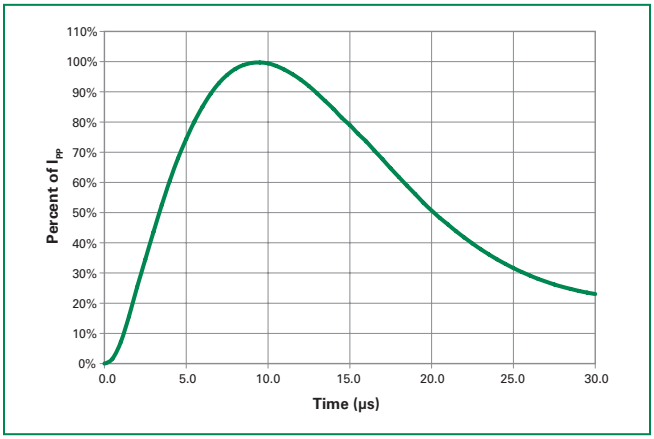
Capacitance vs. Bias



Transmission Line Pulsing (TLP) Plot



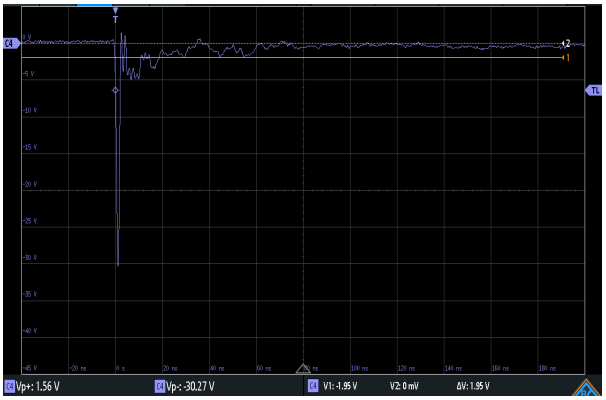
8/20µs Pulse Waveform



Revision: 10/16/20

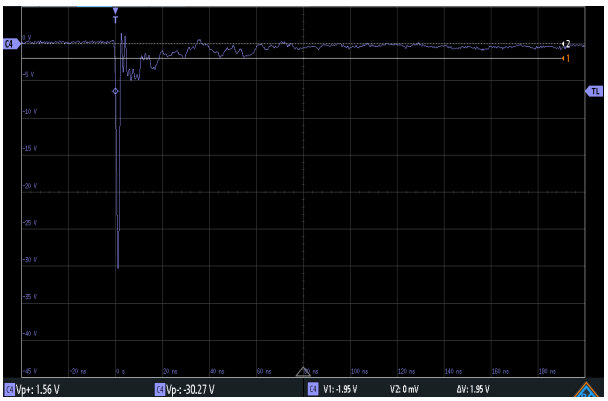
SC1105 IEC 61000 -4-2 +8 kV Contact ESD Clamping Voltage

SC1105 IEC 61000 -4-2 -8 kV Contact ESD Clamping Voltage

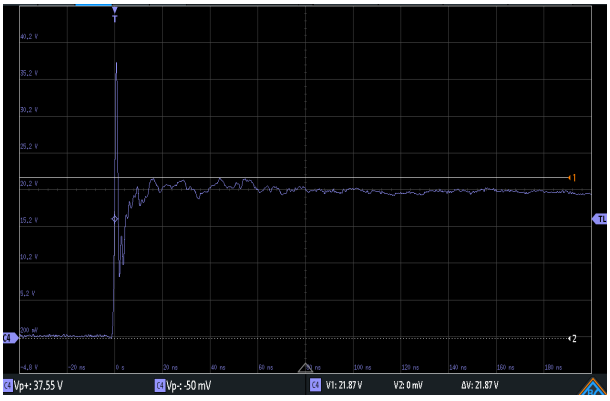


SC1115 IEC 61000 -4-2 +8 kV Contact ESD Clamping Voltage

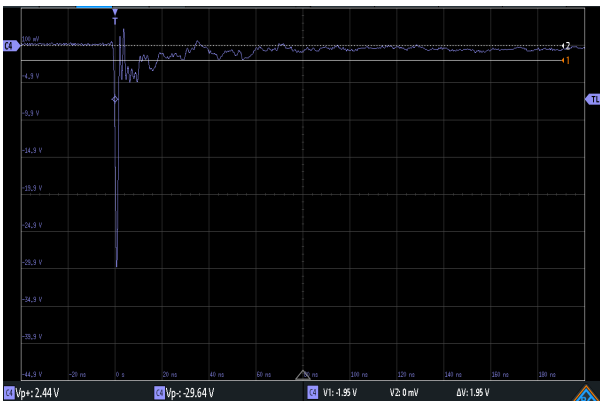
SC1115 IEC 61000 -4-2 -8 kV Contact ESD Clamping Voltage



SC1122 IEC 61000 -4-2 +8 kV Contact ESD Clamping Voltage



SC1122 IEC 61000 -4-2 -8 kV Contact ESD Clamping Voltage



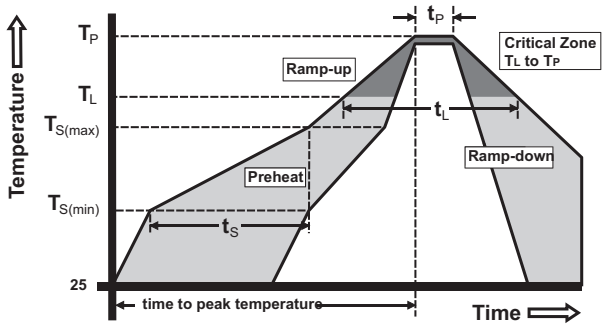
Revision: 12/16/20

TVS Diode Arrays (SPA® Diodes)

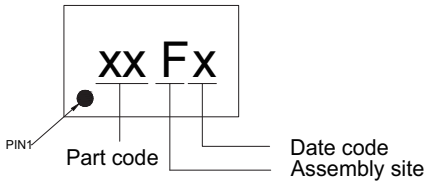
General Purpose Surge Protection - SC11xx Series

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

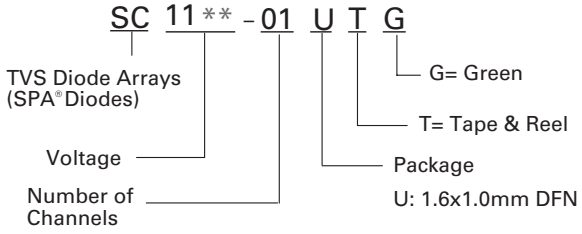


Part Marking System



Part code :
AP = SC1105-01UTG
AQ = SC1115-01UTG
AO = SC1122-01UTG

Part Numbering System



Ordering Information

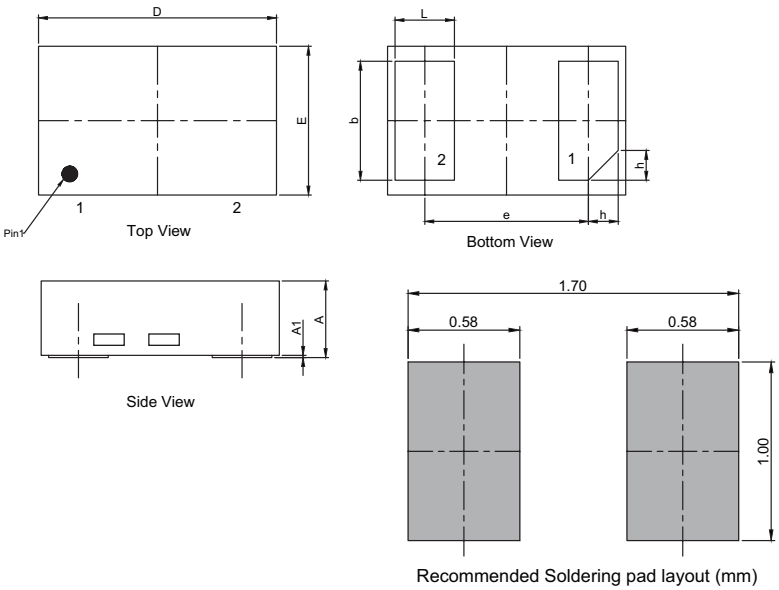
Part Number	Package	Marking	Min. Order Qty.
SC1105-01UTG	1.6x1.0mm DFN	APFx	3000
SC1115-01UTG	1.6x1.0mm DFN	AQFx	3000
SC1122-01UTG	1.6x1.0mm DFN	AOFx	3000

Revision: 10/16/20

TVS Diode Arrays (SPA® Diodes)

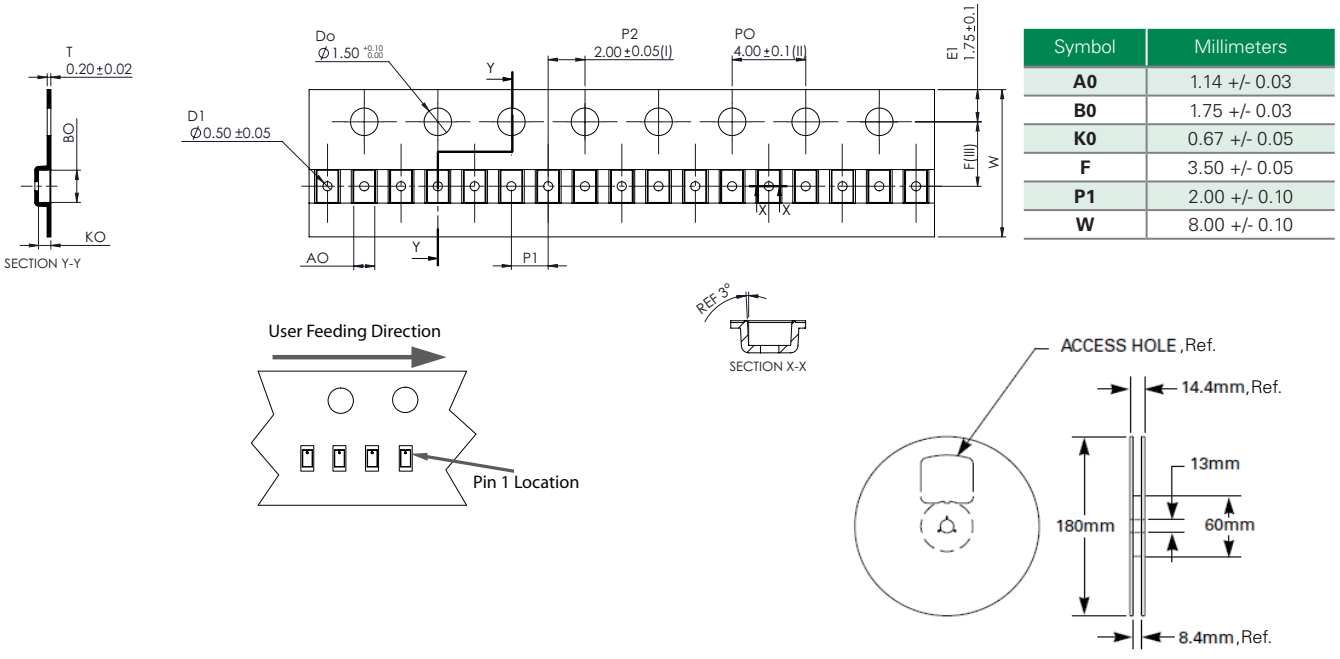
General Purpose Surge Protection - SC11xx Series

Package Dimensions



Symbol	1.6x1.0mm DFN Millimeters		
	Min	Nor	Max
A	0.45	0.50	0.55
A1	-	0.02	0.05
D	1.55	1.60	1.65
E	0.95	1.00	1.05
b	0.75	0.80	0.85
L	0.35	0.40	0.45
e	1.10 BSC		
h	0.15	0.20	0.25

Embossed Carrier Tape & Reel Specification



Symbol	Millimeters
A0	1.14 +/- 0.03
B0	1.75 +/- 0.03
K0	0.67 +/- 0.05
F	3.50 +/- 0.05
P1	2.00 +/- 0.10
W	8.00 +/- 0.10

Revision: 10/16/20