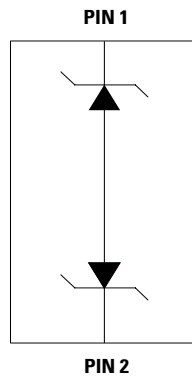


**SP1103C****80A Discrete Bidirectional TVS Diode****Pinout and Functional Block Diagram****Description**

The SP1103C includes TVS 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  $\pm 30\text{kV}$  (contact discharge, IEC 61000-4-2) without performance degradation. Additionally, each diode can safely dissipate 80A of 8/20 $\mu\text{s}$  surge current (IEC 61000-4-5, 2nd edition) with very low clamping voltages.

**Features and Benefits**

- ESD, IEC 61000-4-2,  $\pm 30\text{kV}$  contact,  $\pm 30\text{kV}$  air
- EFT, IEC 61000-4-4, 40A (5/50ns)
- Lightning, IEC 61000-4-5 2nd edition, 80A ( $t_P=8/20\mu\text{s}$ )
- Low clamping voltage
- Low leakage current
- AEC-Q101 qualified
- Moisture Sensitivity Level (MSL -1)
- Halogen free, Lead free and RoHS compliant

**Applications**

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

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.

**SP1103C****80A Discrete Bidirectional TVS Diode****Absolute Maximum Ratings**

Symbol	Parameter	Value	Units
$P_{pk}$	Peak Pulse Power ( $t_p=8/20\mu s$ )	720	W
$T_{OP}$	Operating Temperature	-40 to 125	$^{\circ}C$
$T_{STOR}$	Storage Temperature	-55 to 150	$^{\circ}C$

**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.

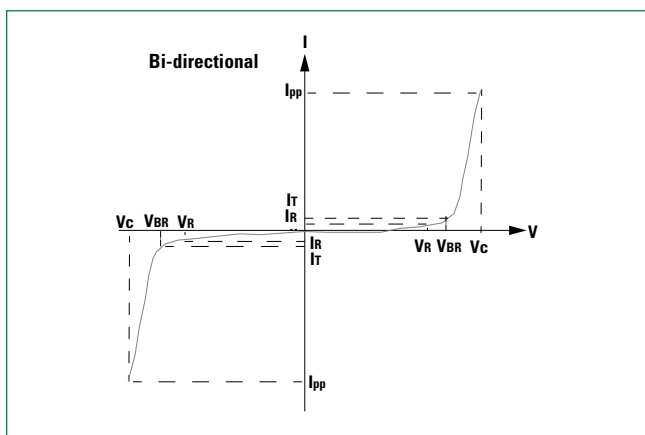
**SP1103C Electrical Characteristics ( $T_{OP}=25^{\circ}C$ )**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	$V_{RWM}$	-	-	-	3.3	V
Breakdown Voltage	$V_{BR}$	$I_R=1mA$	3.4	3.8	5.0	V
Reverse Leakage Current	$I_{LEAK}$	$V_R=3.3V$	-	-	1.0	$\mu A$
Clamp Voltage <sup>1</sup>	$V_C$	$I_{pp}=40A, t_p=8/20\mu s, Fwd$	-	6	-	V
		$I_{pp}=80A, t_p=8/20\mu s, Fwd$	-	9	-	V
Dynamic Resistance <sup>2</sup>	$R_{DYN}$	TLP, $t_p=100ns, I/O$ to GND	-	0.01	-	$\Omega$
Peak Pulse Current	$I_{pp}$	$t_p=8/20\mu s$	-	-	80	A
ESD Withstand Voltage <sup>1</sup>	$V_{ESD}$	IEC 61000-4-2 (Contact Discharge)	$\pm 30$	-	-	kV
		IEC 61000-4-2 (Air Discharge)	$\pm 30$	-	-	kV
Diode Capacitance <sup>1</sup>	$C_D$	Reverse Bias=0V, $f=1MHz$	-	130	-	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  $t2=90ns$

**I-V Curve Characteristics**

**$V_R$  Stand-off Voltage** – Maximum voltage that can be applied to the TVS without operation

**$V_{BR}$  Breakdown Voltage** – Maximum voltage that flows through the TVS at a specified test current ( $I_R$ )

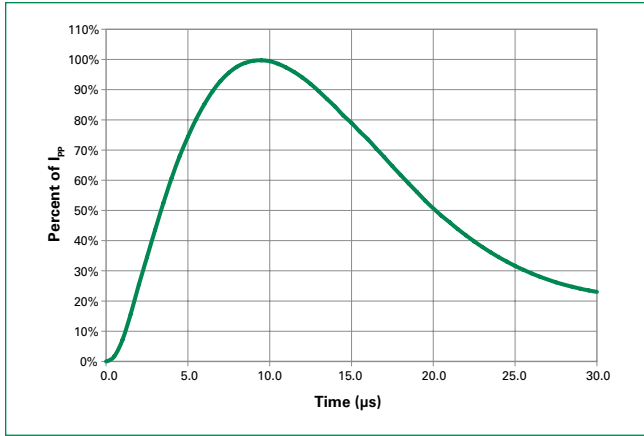
**$V_C$  Clamping Voltage** – Peak voltage measured across the TVS at a specified  $I_{ppm}$  (peak impulse current)

**$I_R$  Reverse Leakage Current** – Current measured at  $V_R$

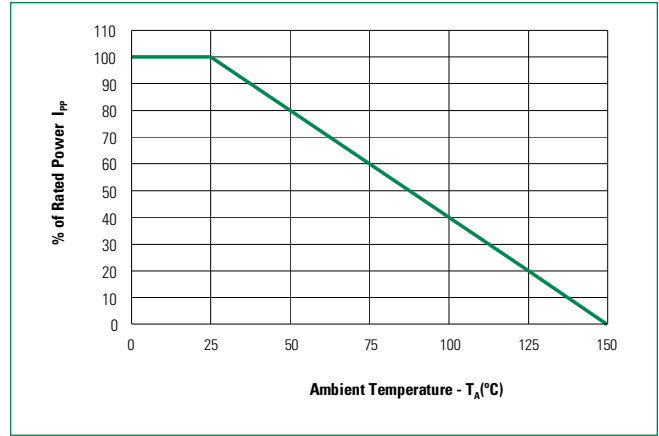
# SP1103C

## 80A Discrete Bidirectional TVS Diode

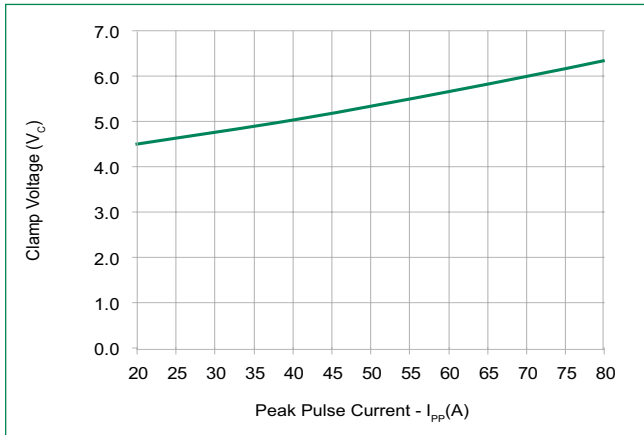
**8/20µs Pulse Waveform**



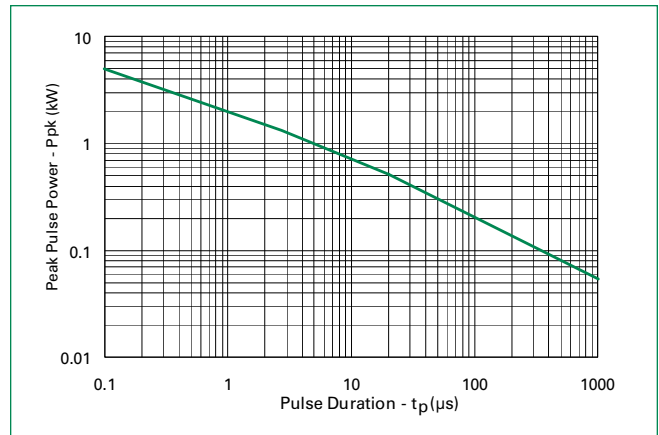
**Power Derating Curve**



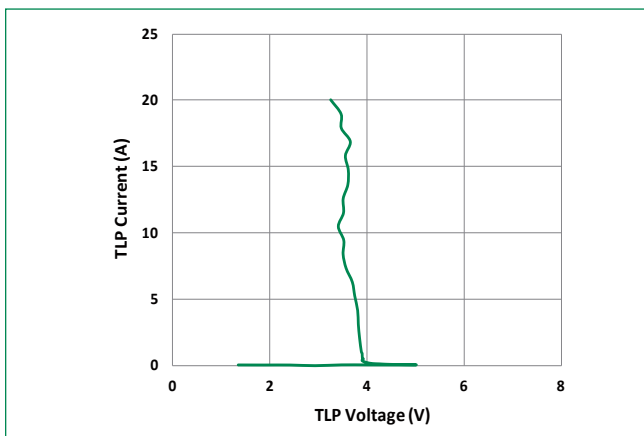
**Clamping Voltage vs IPP**



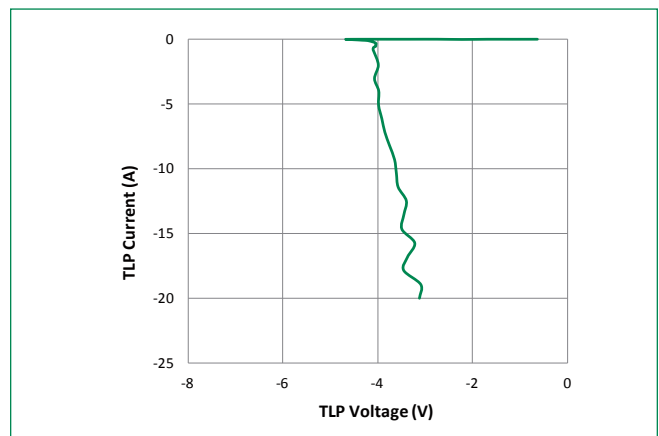
**Non-Repetitive Peak Pulse Power vs. Pulse Time**



**Positive Transmission Line Pulsing (TLP) Plot**



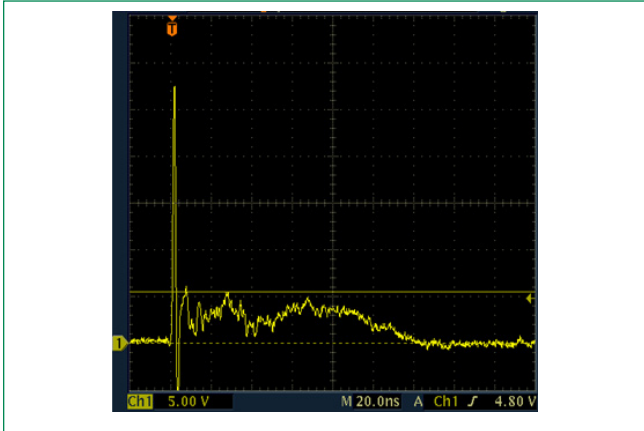
**Negative Transmission Line Pulsing (TLP) Plot**



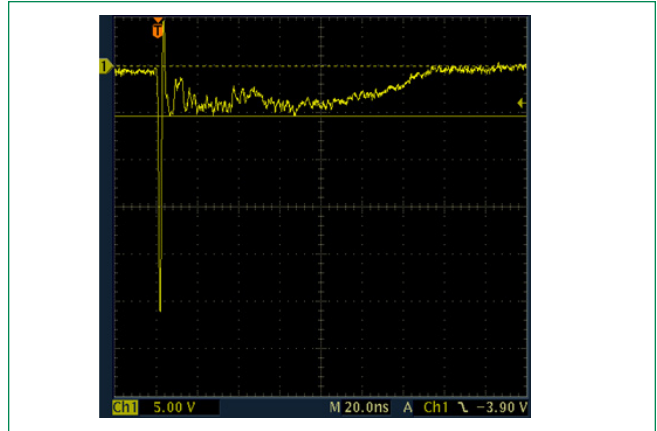
# SP1103C

## 80A Discrete Bidirectional TVS Diode

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

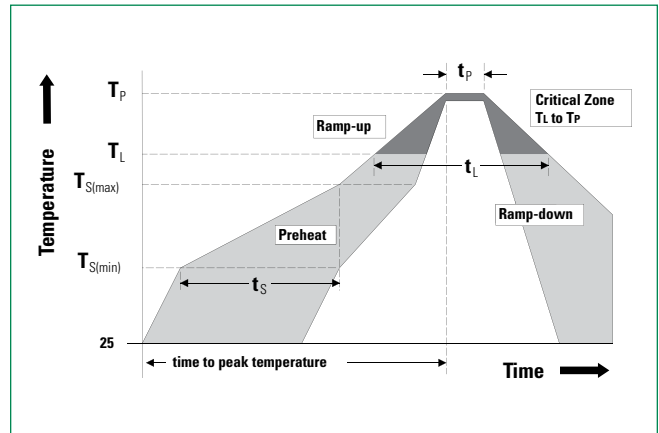


IEC 61000-4-2 -8 kV Contact ESD Clamping Voltage

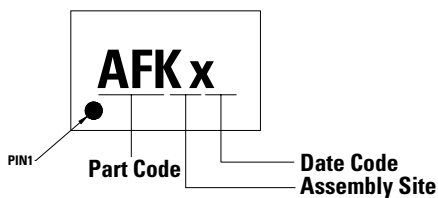


### Soldering Parameters

<b>Reflow Condition</b>		Pb – Free assembly
<b>Pre Heat</b>	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (min to max) ( $t_s$ )	60 – 120 secs
<b>Average ramp up rate (Liquidus) Temp (<math>T_L</math>) to peak</b>		3°C/second max
<b><math>T_{s(max)}</math> to <math>T_L</math> - Ramp-up Rate</b>		3°C/second max
<b>Reflow</b>	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Temperature ( $t_L$ )	60 – 150 seconds
<b>Peak Temperature (<math>T_p</math>)</b>		260 <sup>+0/-5</sup> °C
<b>Time within 5°C of actual peak Temperature (<math>t_p</math>)</b>		30 seconds
<b>Ramp-down Rate</b>		6°C/second max
<b>Time 25°C to peak Temperature (<math>T_p</math>)</b>		8 minutes Max.
<b>Do not exceed</b>		260°C



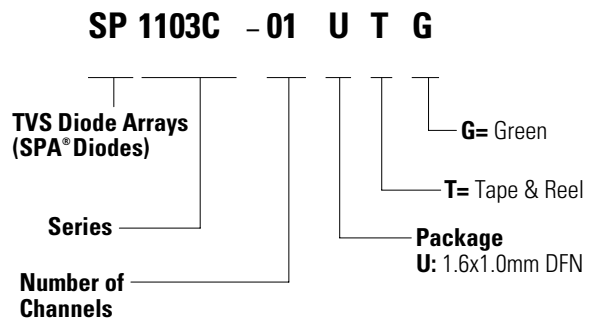
### Part Marking System

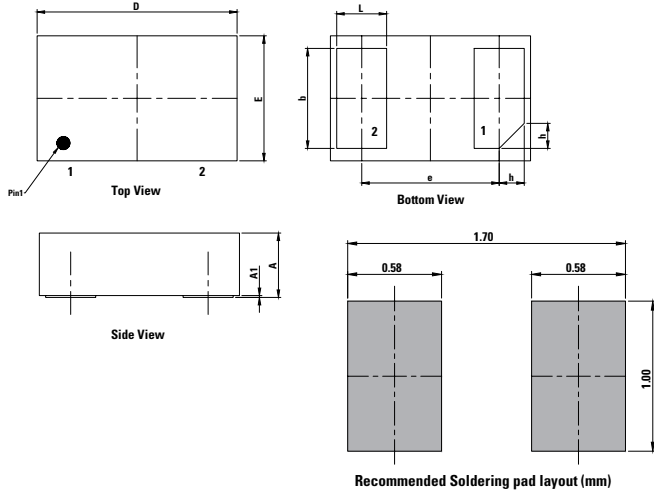


### Ordering Information

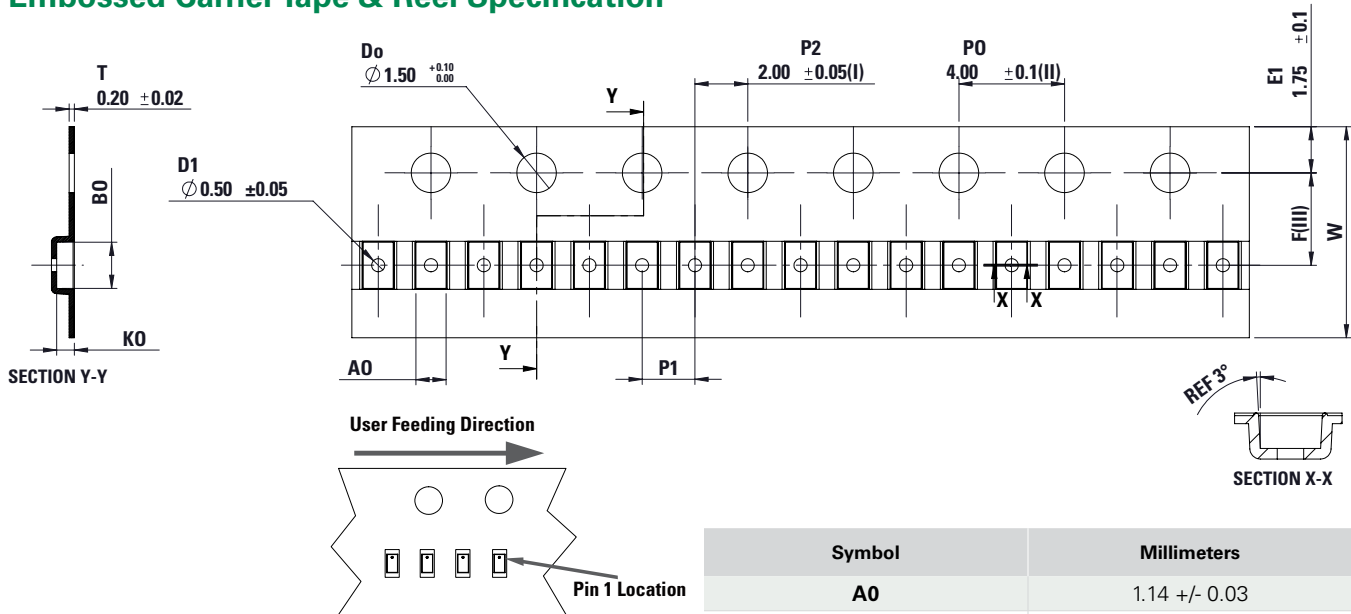
Part Number	Package	Marking	Min. Order Qty.
SP1103C-01UTG	1.6x1.0mm DFN	AFKx	3000

### Part Numbering System



**SP1103C****80A Discrete Bidirectional TVS Diode****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

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