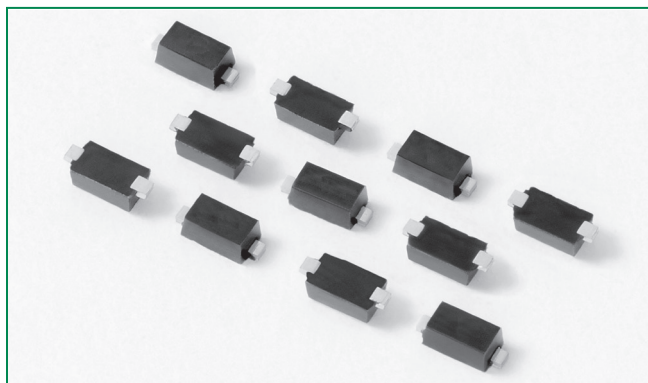
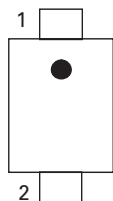


**SP1003 Series - 30pF 30kV Unidirectional Discrete TVS**



**Pinout**



**Functional Block Diagram**



**Description**

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 ±30kV (contact discharge, IEC 61000-4-2) without performance degradation. Additionally, each diode can safely dissipate 7A of 8/20µs surge current (IEC61000-4-5) with very low clamping voltages.

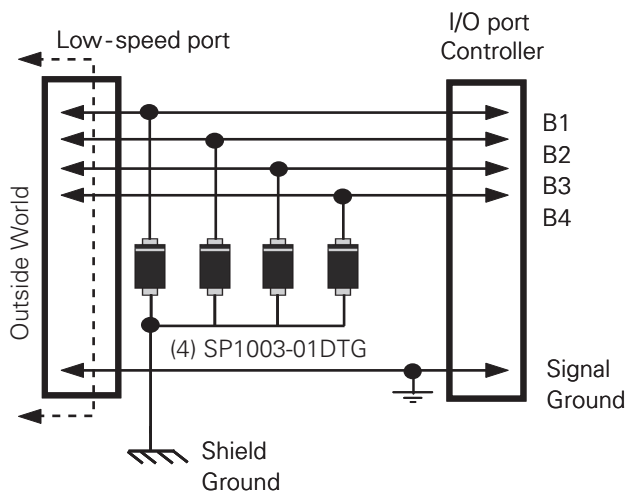
**Features**

- ESD, IEC61000-4-2, ±30kV contact, ±30kV air
- EFT, IEC61000-4-4, 40A (5/50ns)
- Lightning, IEC61000-4-5, 7A (8/20µs)
- Low leakage current of 100nA (MAX) at 5V
- Tiny SOD723 package saves board space
- Fits solder footprint of industry standard 0402 (1005) devices

**Applications**

- Mobile phones
- Smart phones
- PDAs
- Portable navigation devices
- Digital cameras
- Portable medical devices

**Application Example**



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.

**Absolute Maximum Ratings**

Symbol	Parameter	Value	Units
$I_{PP}$	Peak Pulse Current ( $t_p=8/20\mu s$ )	7.0	A
$T_{OP}$	Operating Temperature	-40 to 85	°C
$T_{STOR}$	Storage Temperature	-60 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**

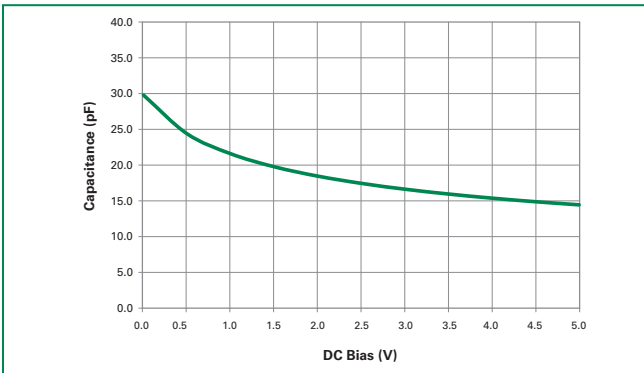
Parameter	Rating	Units
Storage Temperature Range	-65 to 150	°C
Maximum Junction Temperature	150	°C
Maximum Lead Temperature (Soldering 10s)	260	°C

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

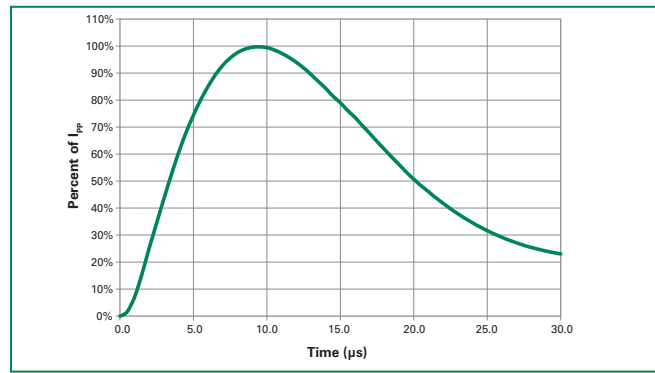
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Forward Voltage Drop	$V_F$	$I_F = 10mA$		0.8	1.2	V
Reverse Voltage Drop	$V_R$	$I_R = 1mA$	7.0	7.8	8.5	V
Reverse Standoff Voltage	$V_{RWM}$	$I_R \leq 1\mu A$			5.0	V
Reverse Leakage Current	$I_{LEAK}$	$V_R = 5V$			100	nA
Clamp Voltage <sup>1</sup>	$V_C$	$I_{PP} = 6A$ $t_p = 8/20\mu s$		11.4		V
		$I_{PP} = 7A$ $t_p = 8/20\mu s$		12.0		V
Dynamic Resistance	$R_{DYN}$	$(V_{C2} - V_{C1}) / (I_{PP2} - I_{PP1})$		0.6		$\Omega$
ESD Withstand Voltage <sup>1</sup>	$V_{ESD}$	IEC61000-4-2 (Contact Discharge)	$\pm 30$			kV
		IEC61000-4-2 (Air Discharge)	$\pm 30$			kV
Diode Capacitance <sup>1</sup>	$C_D$	Reverse Bias=0V		30		pF

Note: <sup>1</sup> Parameter is guaranteed by design and/or device characterization.

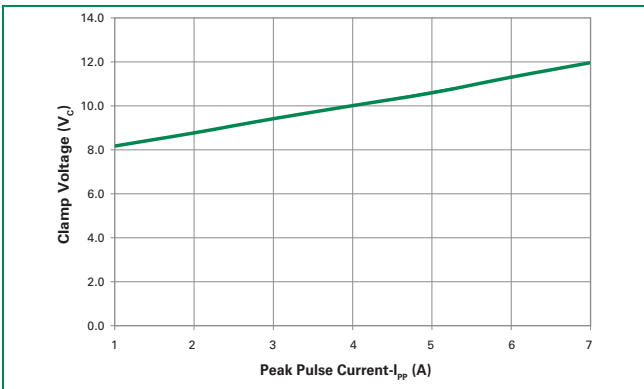
**Capacitance vs. Reverse Bias**



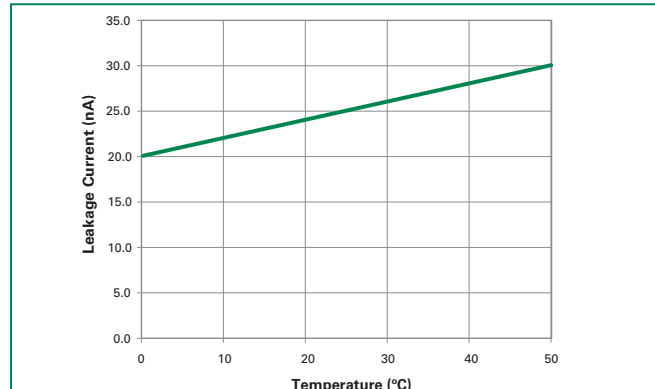
**Pulse Waveform**



**Clamping Voltage vs.  $I_{PP}$**

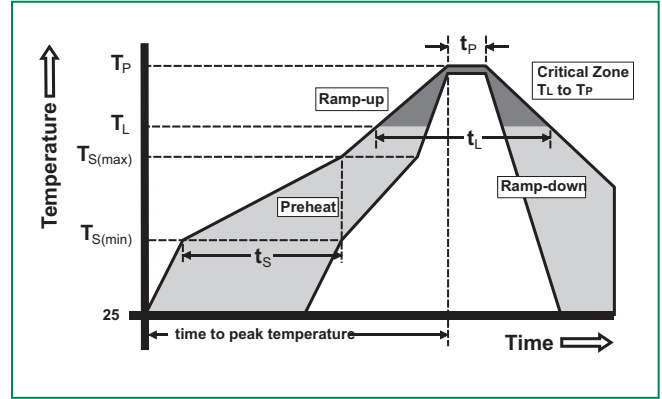


**Leakage vs. Temperature**



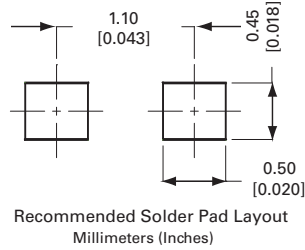
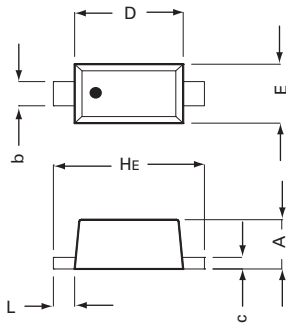
**Soldering Parameters**

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 ( $T_p$ )		250 <sup>+0/-5</sup> °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



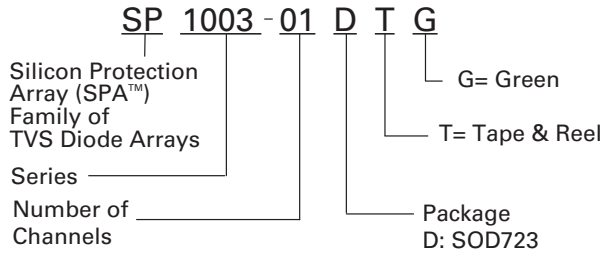
SP1003

**Package Dimensions – SOD723**

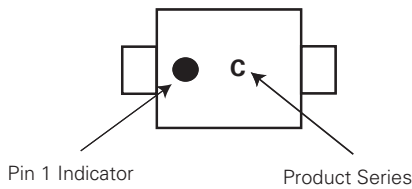


Symbol	SOD723			
	Millimeters		Inches	
	Min	Max	Min	Max
<b>A</b>	0.46	0.51	0.018	0.020
<b>b</b>	0.23	0.28	0.009	0.011
<b>c</b>	0.08	0.13	0.003	0.005
<b>D</b>	0.99	1.04	0.039	0.041
<b>E</b>	0.58	0.64	0.023	0.025
<b>HE</b>	1.37	1.47	0.054	0.058
<b>L</b>	0.15	0.25	0.006	0.010

**Part Numbering System**



**Part Marking System**



**Product Characteristics**

<b>Lead Plating</b>	Pre-Plated Frame or Matte Tin
<b>Lead Material</b>	Copper Alloy
<b>Lead Coplanarity</b>	0.0004 inches (0.102mm)
<b>Substitute Material</b>	Silicon
<b>Body Material</b>	Molded Epoxy
<b>Flammability</b>	UL94-V-0

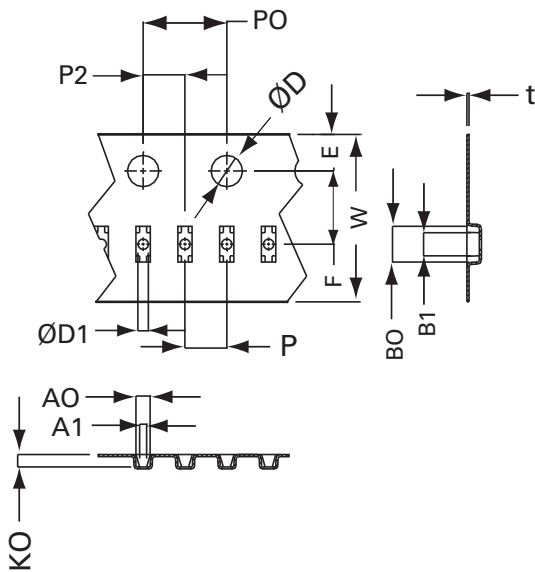
Notes :

1. All dimensions are in millimeters
2. Dimensions include solder plating.
3. Dimensions are exclusive of mold flash & metal burr.
4. All specifications comply to JEDEC SPEC MO-223 Issue A
5. Blo is facing up for mold and facing down for trim/form, i.e. reverse trim/form.
6. Package surface matte finish VDI 11-13.

**Ordering Information**

Part Number	Package	Marking	Min. Order Qty.
SP1003-01DTG	SOD723	C	8000

**Embossed Carrier Tape & Reel Specification – SOD723**



Symbol	Millimetres		Inches	
	Min	Max	Min	Max
<b>E</b>	1.65	1.85	0.064	0.072
<b>F</b>	3.45	3.55	0.135	0.139
<b>D1</b>	0.45	0.55	0.017	0.021
<b>D</b>	150	--	0.06	--
<b>PO</b>	3.90	4.10	0.153	0.161
<b>10PO</b>	40.0+/- 0.20		1.57+/-0.01	
<b>W</b>	7.90	8.20	0.311	0.322
<b>PO</b>	1.90	2.10	0.074	0.082
<b>AO</b>	0.63	0.73	0.024	0.028
<b>A1</b>	0.33 REF		0.01 REF	
<b>BO</b>	1.66	1.76	0.07	0.07
<b>B1</b>	1.10 REF		0.04 REF	
<b>KO</b>	0.54	0.64	0.021	0.025
<b>t</b>	--	0.21	--	0.008