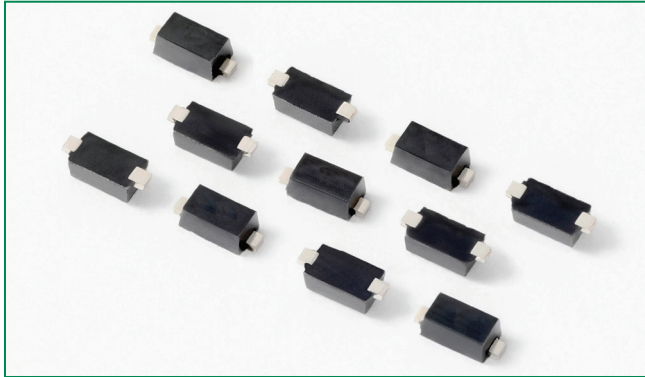


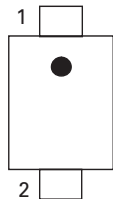
HF **RoHS** **Pb** **GREEN** **SP1003 Lead-Free/Green Series**



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

Pinout



Features

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

Functional Block Diagram



Applications

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

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

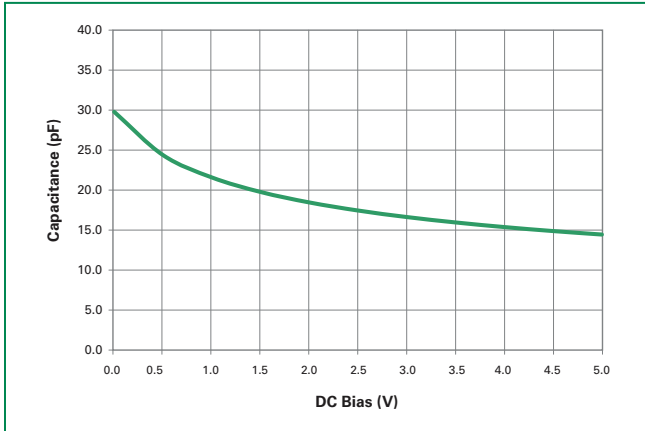
| Parameter | Rating | Units |
|------------------------------------------|------------|-------|
| Storage Temperature Range | -65 to 150 | °C |
| Maximum Junction Temperature | 150 | °C |
| Maximum Lead Temperature (Soldering 10s) | 260 | °C |

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

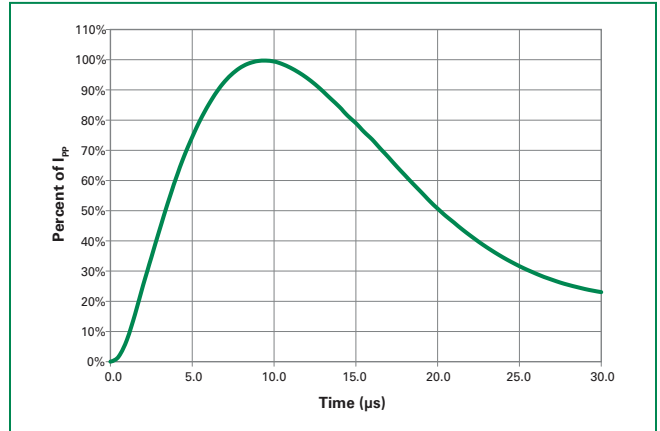
| Parameter | Symbol | Test Conditions | Min | Typ | Max | Units |
|------------------------------------|------------|-------------------------------------------|----------|------|-----|----------|
| Forward Voltage Drop | V_F | $I_F = 10mA$ | | 0.8 | 1.2 | V |
| Reverse Voltage Drop | V_R | $I_R = 1mA$ | 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 ¹ | 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 | | Ω |
| ESD Withstand Voltage ¹ | V_{ESD} | IEC61000-4-2 (Contact Discharge) | ± 30 | | | kV |
| | | IEC61000-4-2 (Air Discharge) | ± 30 | | | kV |
| Diode Capacitance ¹ | C_D | Reverse Bias=0V | | 30 | | pF |

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

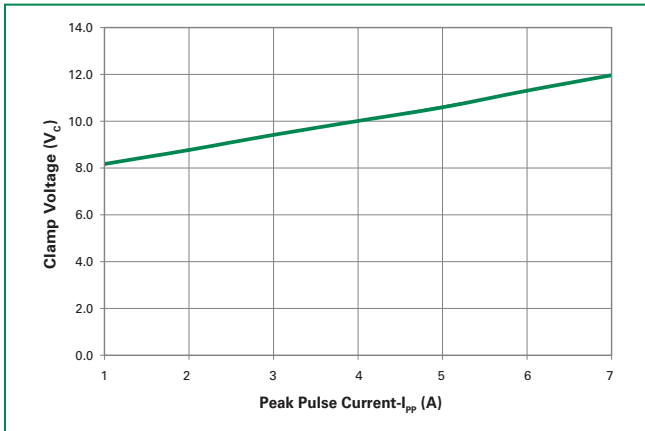
Capacitance vs. Reverse Bias



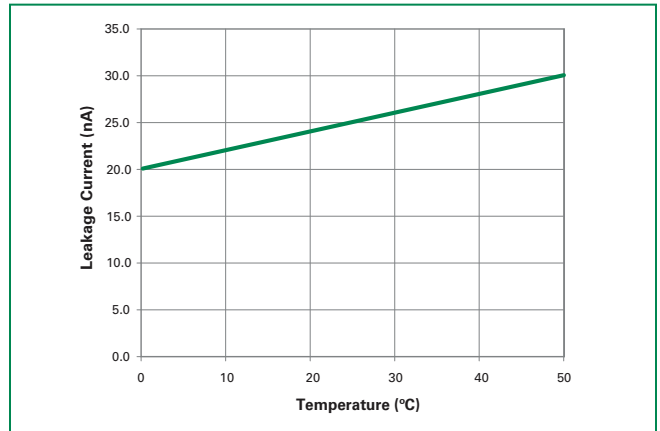
Pulse Waveform



Clamping Voltage vs. I_{pp}

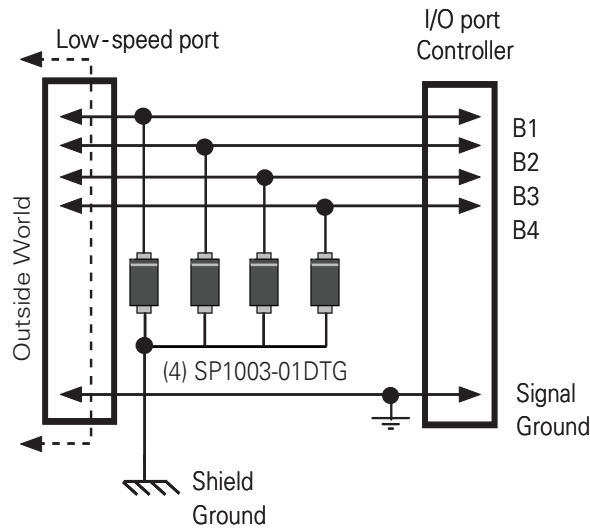


Leakage vs. Temperature



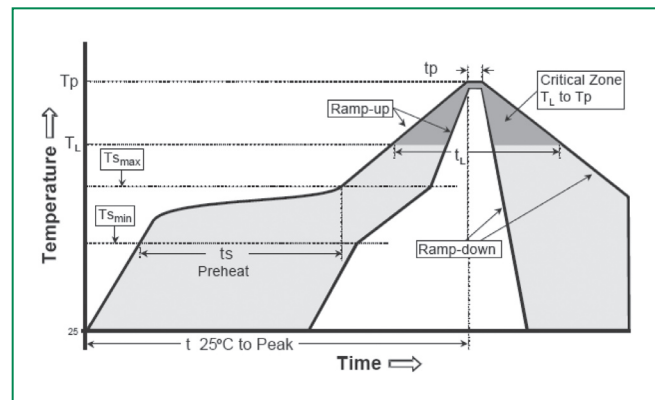
Lead-Free/Green SP1003

Application Example

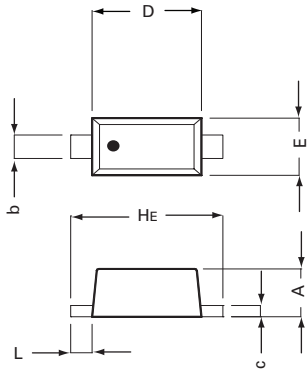


Soldering Parameters

| | | |
|--------------------------------------------------------|------------------------------------|-------------------------|
| 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 ^{+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 |

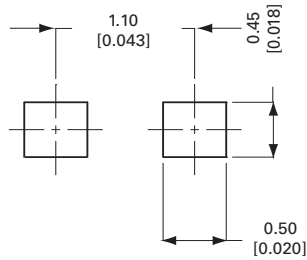


Package Dimensions - SOD723



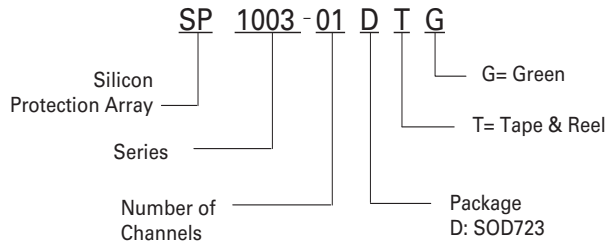
| Symbol | SOD723 | | | |
|-----------|-------------|------|--------|-------|
| | Millimeters | | Inches | |
| | Min | Max | Min | Max |
| A | 0.46 | 0.51 | 0.018 | 0.020 |
| b | 0.23 | 0.28 | 0.009 | 0.011 |
| c | 0.08 | 0.13 | 0.003 | 0.005 |
| D | 0.99 | 1.04 | 0.039 | 0.041 |
| E | 0.58 | 0.64 |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

Recommended Solder Pad Layout
Millimeters (Inches)



Lead-Free/Green SP1003

Part Numbering System



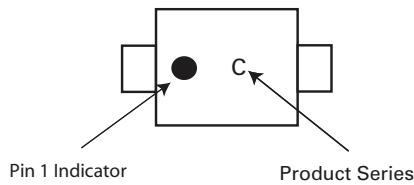
Product Characteristics

| | |
|----------------------------|-------------------------------|
| Lead Plating | Pre-Plated Frame or Matte Tin |
| Lead Material | Copper Alloy |
| Lead Coplanarity | 0.0004 inches (0.102mm) |
| Substitute Material | Silicon |
| Body Material | Molded Epoxy |
| Flammability | 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.

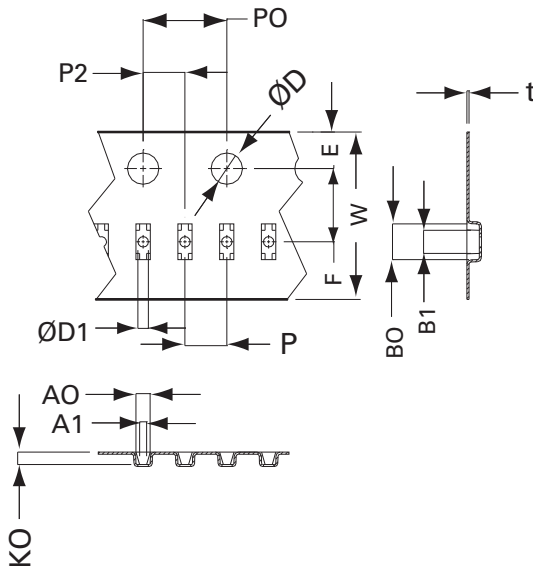
Part Marking System



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