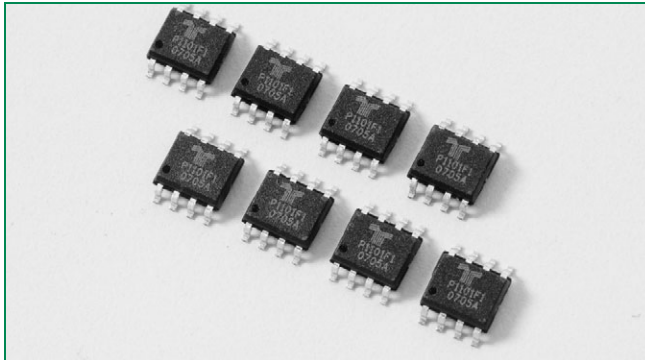


RoHS Fixed Voltage Single Port Series - MS-012



Description

The MS-012 packaged Fixed Voltage Single Port Series are SIDACtor® devices designed to protect sensitive SLICs (Subscriber Line Interface Circuit) from damaging overvoltage transients.

The series provides single port protection using a fixed voltage switching device for negative surges. Positive surges are routed through internal diodes to a ground reference. The series is also pin-to-pin compatible to industry standard programmable SO-8 SLIC protectors.

Features & Benefits

- Integrated diodes for positive voltage surges
- Single port protection in one package
- Low voltage overshoot
- Low on-state voltage
- Does not degrade with use
- Fails short circuit when surged in excess of ratings
- Pin-to-pin SO-8 compatible footprint

Applicable Global Standards

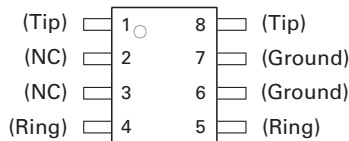
- TIA-968-A
- ITU K.20/21 Enhanced Level
- ITU K.20/21 Basic Level
- GR 1089 Inter-building*
- GR 1089 Intra-building*
- IEC 61000-4-5
- YD/T 1082
- YD/T 993
- YD/T 950

* Series resistance required

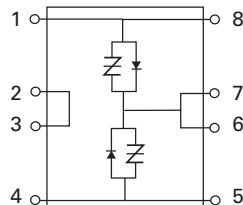
Agency Approvals

| Agency | Agency File Number |
|--------|--------------------|
| | E133083 |

Pinout



Schematic Symbol



Electrical Characteristics

| Part Number | Marking | $V_{DRM} @ I_{DRM}=5\mu A$ | $V_s @ 100V/\mu s$ | I_H | I_s | $I_T @ V_T$ | $V_T @ I_T=1$ Amps | $V_F @ 25^\circ$ | Capacitance |
|-------------|---------|----------------------------|--------------------|--------|--------|-------------|--------------------|------------------|------------------------------|
| | | V min | V max | mA min | mA max | A max | V max | V max | |
| P0641DF-1 | P0641F1 | 58 | 77 | 150 | 800 | 1 | 5 | 5 | See Capacitance Values Table |
| P0721DF-1 | P0721F1 | 65 | 88 | 150 | 800 | 1 | 5 | 5 | |
| P0901DF-1 | P0901F1 | 75 | 98 | 150 | 800 | 1 | 5 | 5 | |
| P1001DF-1 | P1001F1 | 85 | 110 | 150 | 800 | 1 | 5 | 5 | |
| P1101DF-1 | P1101F1 | 95 | 130 | 150 | 800 | 1 | 5 | 5 | |

Notes:

- Absolute maximum ratings measured at $T_a = 25^\circ C$ (unless otherwise noted).
- Devices are uni-directional
- All electrical characteristics shown are defined from Tip (pins 1 & 8) to Ground (pins 6 & 7), and Ring (pins 4 & 5) to ground (pins 6 & 7)
- $V_F > 8.5$ volts @ $10 \times 700\mu s$, 375 Amps

Capacitance Values

| Part Number | pF Pin 1,8-6,7 / 4,5-6,7 Tip-Ground, Ring-Ground | | pF Pin 1,8-4,5 Tip-Ring | |
|-------------|--|-----|-------------------------------|-----|
| | MIN | MAX | MIN | MAX |
| P0641DF-1 | 40 | 90 | 20 | 45 |
| P0721DF-1 | 35 | 85 | 20 | 45 |
| P0901DF-1 | 30 | 80 | 20 | 40 |
| P1001DF-1 | 25 | 75 | 15 | 35 |
| P1101DF-1 | 25 | 70 | 15 | 30 |

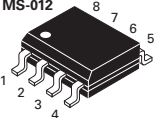
Note: Off-state capacitance (C_o) is measured at 1 MHz with a 2 V bias.

Surge Ratings

| Series | I_{PP} | | | | I_{TSM} | di/dt |
|--------|--------------|-----------------------------|----------------------|-----------------|------------------------|-------------------|
| | 2x10 μ s | 1.2x50 μ s/8x20 μ s | 10x700/5x310 μ s | 10x1000 μ s | 600V _{RMS} 1s | |
| | A min | A min | A min | A min | A min | Amps/ μ s max |
| F | 120 | 100 | 50 | 30 | 1 | 500 |

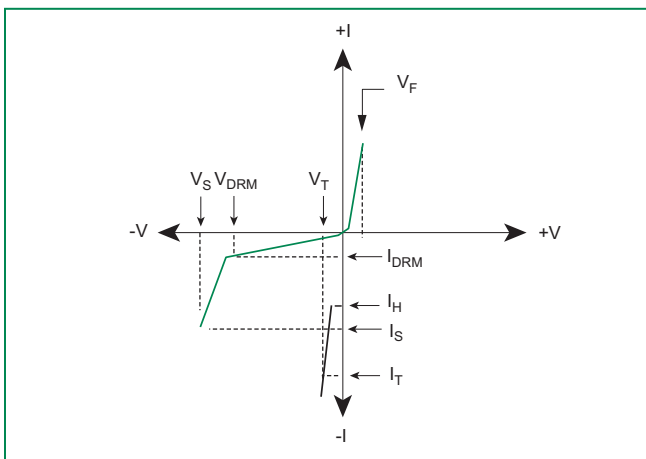
- Notes:
- Peak pulse current rating (I_{PP}) is repetitive and guaranteed for the life of the product.
 - I_{PP} ratings applicable over temperature range of -40°C to +85°C
 - The device must initially be in thermal equilibrium with -40°C \leq T_j \leq +150°C

Thermal Considerations

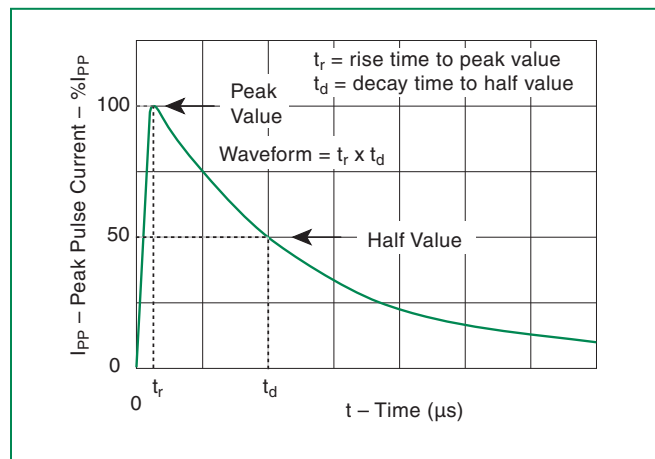
| Package | Symbol | Parameter | Value | Unit |
|---|-----------------|---|-------------|------|
|  MS-012 | T_j | Operating Junction Temperature Range | -40 to +150 | °C |
| | T_s | Storage Temperature Range | -65 to +150 | °C |
| | $R_{\theta JA}$ | Thermal Resistance: Junction to Ambient | 120 | °C/W |

Fixed Voltage Single

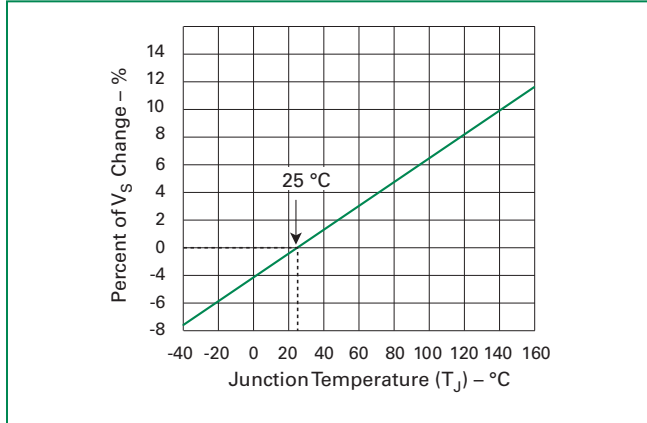
V-I Characteristics



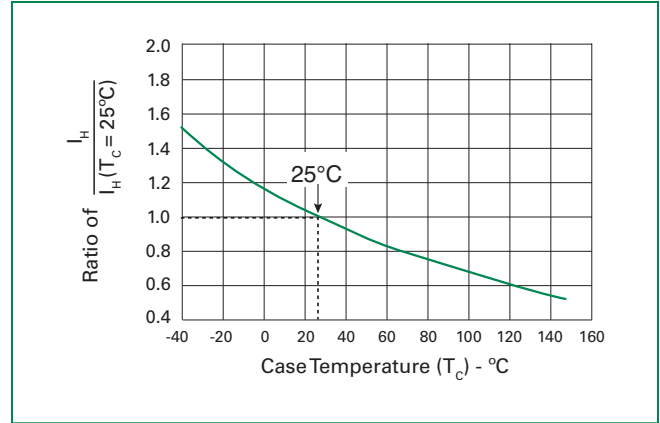
$t_r \times t_d$ Pulse Waveform



Normalized V_s Change vs. Junction Temperature

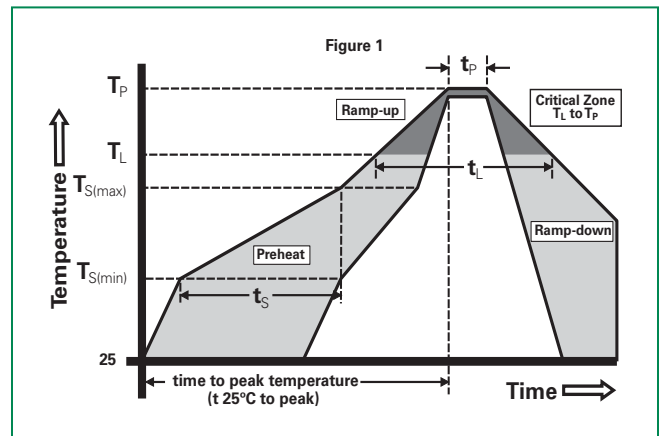


Normalized DC Holding Current vs. Case Temperature



Soldering Parameters

| | | |
|--|------------------------------------|-------------------------------|
| Reflow Condition | | Pb-Free assembly (see Fig. 1) |
| 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/sec. Max. |
| $T_{s(\max)}$ to T_L - Ramp-up Rate | | 3°C/sec. Max. |
| Reflow | -Temperature (T_L) (Liquidus) | +217°C |
| | -Temperature (t_l) | 60-150 secs. |
| Peak Temp (T_p) | | +260(+0/-5)°C |
| Time within 5°C of actual Peak Temp (t_p) | | 30 secs. Max. |
| Ramp-down Rate | | 6°C/sec. Max. |
| Time 25°C to Peak Temp (T_p) | | 8 min. Max. |
| Do not exceed | | +260°C |



Physical Specifications

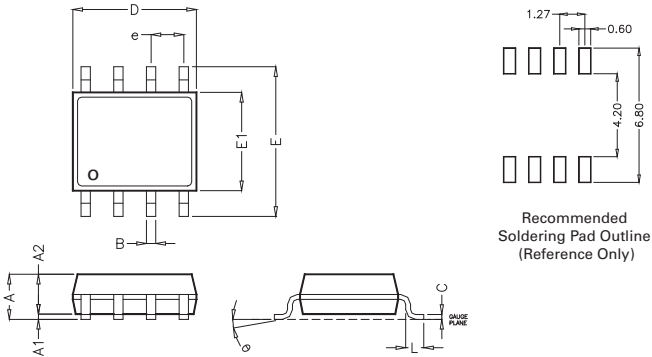
| | |
|------------------------|---|
| Lead Material | Copper Alloy |
| Terminal Finish | 100% Matte-Tin Plated |
| Body Material | UL recognized epoxy meeting flammability classification 94V-0 |

Environmental Specifications

| | |
|---|---|
| High Temp Voltage Blocking | 80% Rated V_{DRM} (V_{DC}) +125°C or +150°C, 504 or 1008 hrs. MIL-STD-750 (Method 1040) JEDEC, JESD22-A-101 |
| Temp Cycling | -65°C to +150°C, 15 min. dwell, 10 up to 100 cycles. MIL-STD-750 (Method 1051) EIA/JEDEC, JESD22-A-104 |
| Biased Temp & Humidity | 52 V_{DC} (+85°C) 85%RH, 504 up to 1008 hrs. EIA/JEDEC, JESD22-A-101 |
| High Temp Storage | +150°C 1008 hrs. MIL-STD-750 (Method 1031) JEDEC, JESD22-A-101 |
| Low Temp Storage | -65°C, 1008 hrs. |
| Thermal Shock | 0°C to +100°C, 5 min. dwell, 10 sec. transfer, 10 cycles. MIL-STD-750 (Method 1056) JEDEC, JESD22-A-106 |
| Autoclave (Pressure Cooker Test) | +121°C, 100%RH, 2atm, 24 up to 168 hrs. EIA/JEDEC, JESD22-A-102 |
| Resistance to Solder Heat | +260°C, 30 secs. MIL-STD-750 (Method 2031) |
| Moisture Sensitivity Level | 85%RH, +85°C, 168 hrs., 3 reflow cycles (+260°C Peak). JEDEC-J-STD-020, Level 1 |

Fixed Voltage Single

Dimensions — MS-012

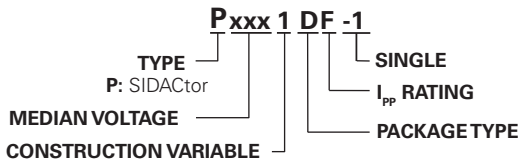


| Dimension | Inches | | Millimeters | |
|-----------|------------|-------|-------------|------|
| | MIN | MAX | MIN | MAX |
| A | 0.053 | 0.069 | 1.35 | 1.75 |
| A1 | 0.004 | 0.010 | 0.10 | 0.25 |
| A2 | 0.043 | 0.065 | 1.25 | 1.65 |
| B | 0.012 | 0.020 | 0.31 | 0.51 |
| C | 0.007 | 0.010 | 0.17 | 0.25 |
| D | 0.189 | 0.197 | 4.80 | 5.00 |
| E | 0.228 | 0.244 | 5.80 | 6.20 |
| E1 | 0.150 | 0.157 | 3.80 | 4.00 |
| e | 0.050 BSC* | | 1.27 BSC* | |
| L | 0.016 | 0.050 | 0.40 | 1.27 |

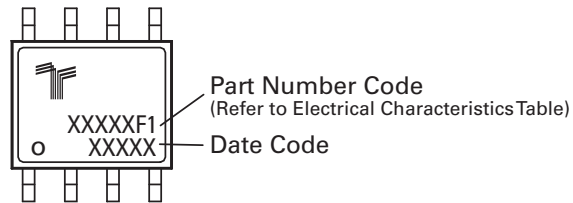
* BSC = Basic Spacing between Centers

Fixed Voltage Single

Part Numbering



Part Marking



Packing Options

| Package Type | Description | Quantity | Added Suffix | Industry Standard |
|--------------|--|----------|--------------|-------------------|
| D | MS-012 SMT 8-pin SOIC Tape and Reel Pack | 2500 | N/A | EIA-481-D |

Tape and Reel Specifications — MS-012

