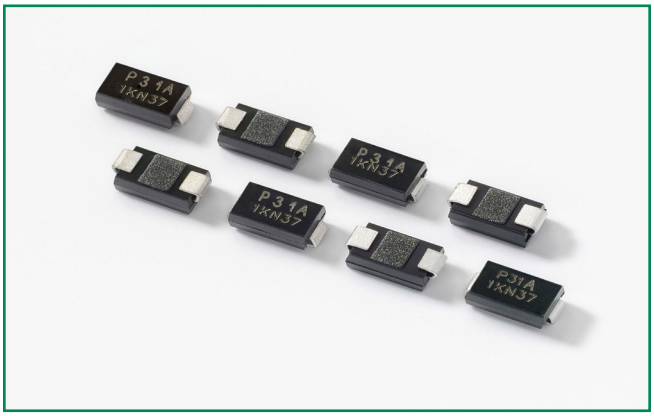
# SIDACtor® Protection Thyristors
Baseband Protection (Voice-DS1)

Littelfuse
Expertise Applied | Answers Delivered

## SIDACtor® Series - SMA

HF RoHS




## Description

SIDACtor® SMA Thyristors Series are designed to protect baseband equipment such as phones, faxes, modems, line cards, CPE and DSL from damaging overvoltage transients.

The series provides a surface mount solution that enables equipment to comply with global regulatory standards.

## Features and Benefits

- Low voltage overshoot
- Low on-state voltage
- Does not degrade surge capability after multiple surge events within limit.
- RoHS Compliant and Halogen-Free
- Fails short circuit when surged in excess of ratings
- Low capacitance
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin(Sn) (IPC/JEDEC J-STD-609A.01)

## Agency Approvals

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

## Applicable Global Standards

- TIA-968-A*
- TIA-968-B*
- ITU K.20/21/45 Enhanced Level*
- ITU K.20/21/45 Basic Level
- GR 1089 Inter-building*
- GR 1089 Intra-building
- IEC 61000-4-5 2nd edition
- YD/T 1082
- YD/T 993
- YD/T 950

* Line impedance required to pass operationally

## Schematic Symbol

## Electrical Characteristics

| Part Number | Marking | $V_{DRM}$ @$I_{DRM}$=5µA | $V_S$ @100V/µs | $I_H$ | $I_S$ | $I_T$ | $V_T$ @$I_T$=2.2 Amps | Capacitance @1MHz, 2V bias | |
|---|---|---|---|---|---|---|---|---|---|
| | | V min | V max | mA min | mA max | A max | V max | pF min | pF max |
| P0080S1ALRP | P-8A | 6 | 25 | 50 | 800 | 2.2 | 4 | 25 | 35 |
| P0220S1ALRP | P22A | 15 | 32 | 50 | 800 | 2.2 | 4 | 10 | 30 |
| P0300S1ALRP | P03A | 25 | 40 | 50 | 800 | 2.2 | 4 | 10 | 30 |
| P0640S1ALRP | P06A | 58 | 77 | 150 | 800 | 2.2 | 4 | 10 | 30 |
| P1800S1ALRP | P18A | 170 | 220 | 150 | 800 | 2.2 | 4 | 10 | 30 |
| P2300S1ALRP | P23A | 190 | 260 | 150 | 800 | 2.2 | 4 | 10 | 30 |
| P2600S1ALRP | P26A | 220 | 300 | 150 | 800 | 2.2 | 4 | 10 | 30 |
| P3100S1ALRP | P31A | 275 | 350 | 150 | 800 | 2.2 | 4 | 10 | 30 |
| P3500S1ALRP | P35A | 320 | 400 | 150 | 800 | 2.2 | 4 | 10 | 30 |
| P0080S1BLRP | P-8B | 6 | 25 | 50 | 800 | 2.2 | 4 | 20 | 35 |
| P0220S1BLRP | P22B | 15 | 32 | 50 | 800 | 2.2 | 4 | 10 | 30 |
| P0300S1BLRP | P03B | 25 | 40 | 50 | 800 | 2.2 | 4 | 10 | 30 |
| P0640S1BLRP | P06B | 58 | 77 | 120 | 800 | 2.2 | 4 | 10 | 30 |
| P1800S1BLRP | P18B | 170 | 220 | 120 | 800 | 2.2 | 4 | 10 | 30 |
| P2300S1BLRP | P23B | 190 | 260 | 120 | 800 | 2.2 | 4 | 10 | 30 |
| P2600S1BLRP | P26B | 220 | 300 | 120 | 800 | 2.2 | 4 | 10 | 30 |
| P3100S1BLRP | P31B | 275 | 350 | 120 | 800 | 2.2 | 4 | 10 | 30 |
| P3500S1BLRP | P35B | 320 | 400 | 120 | 800 | 2.2 | 4 | 10 | 30 |

Notes:
- Absolute maximum ratings measured at $T_A$= 25°C (unless otherwise noted).
- Components are bi-directional (unless otherwise noted).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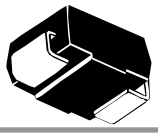
# SIDACtor® Protection Thyristors
## Baseband Protection (Voice-DS1)

## Surge Ratings

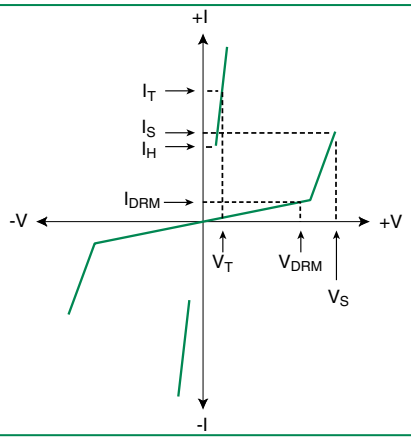
| Series | $I_{PP}$ | | | | | | | | | $I_{TSM}$ 50/60 Hz | di/dt |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.2/310 [1] 0.5/700 [2] | 2/10 [1] 2/10 [2] | 8/20 [1] 1.2/50 [2] | 10/160 [1] 10/160 [2] | 10/560 [1] 10/560 [2] | 5/320 [1] 9/720 [2] | 10/360 [1] 10/360 [2] | 10/1000 [1] 10/1000 [2] | 5/310 [1] 10/700 [2] | | |
| | A min | A min | A min | A min | A min | A min | A min | A min | A min | A min | Amps/µs max |
| A | 20 | 150 | 150 | 90 | 50 | 75 | 75 | 50 | 75 | 20 | 500 |
| B | - | 250 | 250 | 90 | 60 | 75 | 75 | 55 | 75 | 25 | 500 |

Notes:
1 Current waveform in µs
2 Voltage waveform in µs
- Peak pulse current rating ($I_{PP}$) is repetitive and guaranteed for the life of the product that remains in thermal equilibrium.
- $I_{PP}$ ratings applicable over temperature range of -40°C to +85°C
- The component must initially be in thermal equilibrium with -40°C ≤ $T_J$ ≤ +150°C

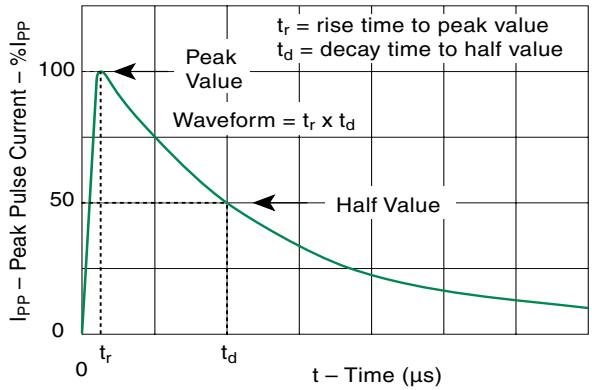
## Thermal Considerations

| Package | Symbol | Parameter | Value | Unit |
|---|---|---|---|---|
| DO-214AC  | $T_J$ | 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 | 90 | °C/W |

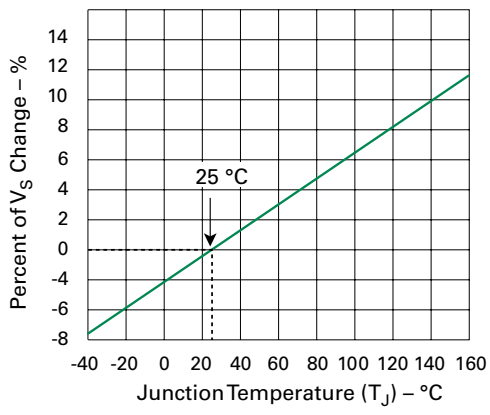
## V-I Characteristics



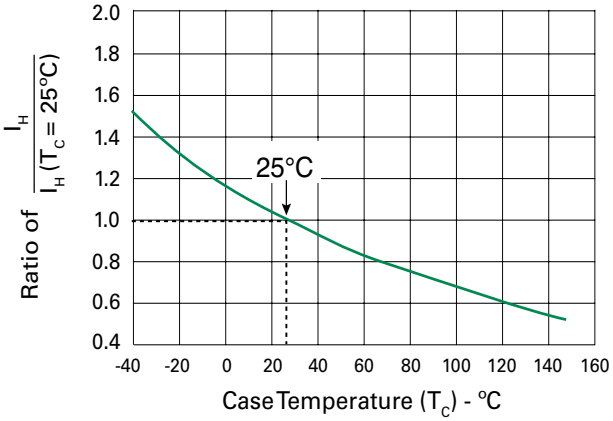

## $t_r$ x $t_d$ Pulse Waveform




## Normalized $V_S$ Change vs. Junction Temperature




## Normalized DC Holding Current vs. Case Temperature





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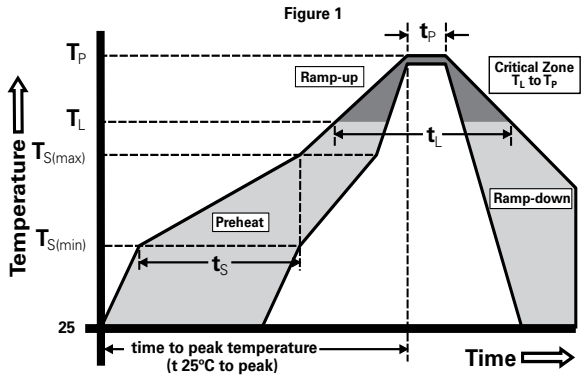
## Soldering Parameters

| | | |
|---|---|---|
| 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 |

Figure 1




## Physical Specifications

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

## Environmental Specifications

| | |
|---|---|
| **High Temp Voltage Blocking** | 80% Rated $V_{DRM}$ ($V_{AC}$ Peak) +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-A104 |
| **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 |

## Additional Information

**Datasheet** | **Resources** | **Samples**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