

SIDActo[®] Protection Thyristor Series - DO-214



Description

SIDActo[®] Series DO-214AA are designed to protect baseband equipment such as 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.

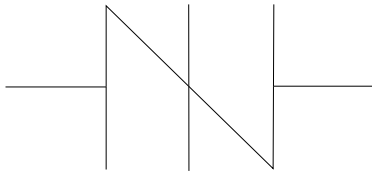
Features and Benefits

- Low voltage overshoot
- Low on-state voltage
- Does not degrade in capability after multiple surge events within limit.
- Low capacitance
- Fails short circuit when surged in excess of ratings
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin(Sn) (IPC/JEDEC J-STD-609A.01)
- UL Recognized to UL 497B as an Isolated Loop Circuit Protector

Agency Approvals

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

Schematic Symbol



Applicable Global Standards

- TIA-968-A
- TIA-968-B
- ITU K.20/21 Enhanced Level*
- ITU K.20/21 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

*A/B-rated parts require series resistance

Electrical Characteristics

| Part Number | Marking | V_{DRM} @ $I_{DRM} = 5\mu A$ | 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 |
| P0080SALRP | P-8A | 6 | 25 | 50 | 800 | 2.2 | 4 | 20 | 35 |
| P1200SALRP | P12A | 100 | 130 | 120 | 800 | 2.2 | 4 | 15 | 40 |
| P2000SALRP | P20A | 180 | 220 | 120 | 800 | 2.2 | 4 | 15 | 35 |
| P0220SALRP | P22A | 15 | 32 | 50 | 800 | 2.2 | 4 | 20 | 40 |
| P2500SALRP | P25A | 230 | 290 | 120 | 800 | 2.2 | 4 | 15 | 35 |
| P0300SALRP | P03A | 25 | 40 | 50 | 800 | 2.2 | 4 | 15 | 40 |
| P0640SALRP | P06A | 58 | 77 | 150 | 800 | 2.2 | 4 | 15 | 40 |
| P0720SALRP | P07A | 65 | 88 | 150 | 800 | 2.2 | 4 | 15 | 40 |
| P0900SALRP | P09A | 75 | 98 | 150 | 800 | 2.2 | 4 | 15 | 40 |
| P1100SALRP | P11A | 90 | 130 | 150 | 800 | 2.2 | 4 | 15 | 40 |
| P1300SALRP | P13A | 120 | 160 | 150 | 800 | 2.2 | 4 | 15 | 40 |
| P1500SALRP | P15A | 140 | 180 | 150 | 800 | 2.2 | 4 | 15 | 40 |
| P1800SALRP | P18A | 170 | 220 | 150 | 800 | 2.2 | 4 | 15 | 35 |
| P2100SALRP | P21A | 180 | 240 | 150 | 800 | 2.2 | 4 | 15 | 35 |
| P2300SALRP | P23A | 190 | 260 | 150 | 800 | 2.2 | 4 | 15 | 35 |
| P2600SALRP | P26A | 220 | 300 | 150 | 800 | 2.2 | 4 | 15 | 35 |
| P3100SALRP | P31A | 275 | 350 | 150 | 800 | 2.2 | 4 | 15 | 35 |
| P3500SALRP | P35A | 320 | 400 | 150 | 800 | 2.2 | 4 | 15 | 35 |
| P0080SBLRP | P-8B | 6 | 25 | 50 | 800 | 2.2 | 4 | 20 | 50 |
| P0220SBLRP | P22B | 15 | 32 | 50 | 800 | 2.2 | 4 | 20 | 50 |
| P0300SBLRP | P03B | 25 | 40 | 50 | 800 | 2.2 | 4 | 15 | 50 |
| P0640SBLRP | P06B | 58 | 77 | 150 | 800 | 2.2 | 4 | 20 | 50 |
| P0720SBLRP | P07B | 65 | 88 | 150 | 800 | 2.2 | 4 | 20 | 50 |

Electrical Parameters (continued)

| Part Number | Marking | V_{DRM} @ $I_{DRM} = 5\mu A$ | 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 |
| P0900SBLRP | P09B | 75 | 98 | 150 | 800 | 2.2 | 4 | 20 | 50 |
| P1100SBLRP | P11B | 90 | 130 | 150 | 800 | 2.2 | 4 | 20 | 50 |
| P1200SBLRP | P12B | 100 | 130 | 120 | 800 | 2.2 | 4 | 20 | 50 |
| P1300SBLRP | P13B | 120 | 160 | 150 | 800 | 2.2 | 4 | 20 | 50 |
| P1500SBLRP | P15B | 140 | 180 | 150 | 800 | 2.2 | 4 | 20 | 50 |
| P1800SBLRP | P18B | 170 | 220 | 150 | 800 | 2.2 | 4 | 20 | 50 |
| P2000SBLRP | P20B | 180 | 220 | 120 | 800 | 2.2 | 4 | 20 | 50 |
| P2100SBLRP | P21B | 180 | 240 | 150 | 800 | 2.2 | 4 | 20 | 35 |
| P2300SBLRP | P23B | 190 | 260 | 150 | 800 | 2.2 | 4 | 20 | 50 |
| P2500SBLRP | P25B | 230 | 290 | 120 | 800 | 2.2 | 4 | 20 | 50 |
| P2600SBLRP | P26B | 220 | 300 | 150 | 800 | 2.2 | 4 | 20 | 35 |
| P3100SBLRP | P31B | 275 | 350 | 150 | 800 | 2.2 | 4 | 20 | 35 |
| P3500SBLRP | P35B | 320 | 400 | 150 | 800 | 2.2 | 4 | 20 | 35 |
| P4500SBLRP | P45B | 400 | 530 | 150 | 800 | 2.2 | 4 | 20 | 50 |
| P0080SCLRP | P-8C | 6 | 25 | 50 | 800 | 2.2 | 4 | 25 | 70 |
| P0220SCLRP | P22C | 15 | 32 | 50 | 800 | 2.2 | 4 | 25 | 70 |
| P0300SCLRP | P03C | 25 | 40 | 50 | 800 | 2.2 | 4 | 20 | 50 |
| P0640SCLRP | P06C | 58 | 77 | 150 | 800 | 2.2 | 4 | 45 | 100 |
| P0720SCLRP | P07C | 65 | 88 | 150 | 800 | 2.2 | 4 | 45 | 100 |
| P0900SCLRP | P09C | 75 | 98 | 150 | 800 | 2.2 | 4 | 45 | 100 |
| P1100SCLRP | P11C | 90 | 130 | 150 | 800 | 2.2 | 4 | 45 | 90 |
| P1200SCLRP | P12C | 100 | 130 | 120 | 800 | 2.2 | 4 | 20 | 35 |
| P1300SCLRP | P13C | 120 | 160 | 150 | 800 | 2.2 | 4 | 40 | 85 |
| P1500SCLRP | P15C | 140 | 180 | 150 | 800 | 2.2 | 4 | 25 | 70 |
| P1800SCLRP | P18C | 170 | 220 | 150 | 800 | 2.2 | 4 | 25 | 70 |
| P2000SCLRP | P20C | 180 | 220 | 120 | 800 | 2.2 | 4 | 25 | 35 |
| P2100SCLRP | P21C | 180 | 240 | 150 | 800 | 2.2 | 4 | 25 | 70 |
| P2300SCLRP | P23C | 190 | 260 | 150 | 800 | 2.2 | 4 | 25 | 70 |
| P2500SCLRP | P25C | 230 | 290 | 120 | 800 | 2.2 | 4 | 30 | 70 |
| P2600SCLRP | P26C | 220 | 300 | 150 | 800 | 2.2 | 4 | 30 | 70 |
| P3100SCLRP | P31C | 275 | 350 | 150 | 800 | 2.2 | 4 | 30 | 70 |
| P3500SCLRP | P35C | 320 | 400 | 150 | 800 | 2.2 | 4 | 25 | 65 |
| P4500SCLRP | P45C | 400 | 530 | 150 | 800 | 2.2 | 4 | 25 | 65 |

Notes:

- Absolute maximum ratings measured at $T_A = 25^\circ C$ (unless otherwise noted).
- Components are bi-directional.


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 | 20 | 150 | 150 | 90 | 50 | 75 | 75 | 45 | 75 | 25 | 500 |
| B | 25 | 250 | 250 | 150 | 100 | 100 | 125 | 80 | 100 | 30 | 500 |
| C | 50 | 500 | 400 | 200 | 150 | 200 | 175 | 100 | 200 | 35 | 500 |

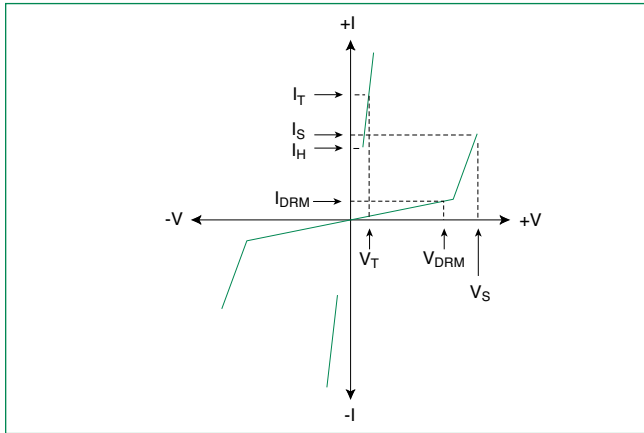
Notes:

- Current waveform in μs
 - Voltage waveform in μs
- Peak pulse current rating (I_{PP}) is repetitive and guaranteed for the life of the product.
 - I_{PP} ratings applicable over temperature range of $-40^\circ C$ to $+85^\circ C$
 - The component must initially be in thermal equilibrium with $-40^\circ C \leq T_J \leq +150^\circ C$

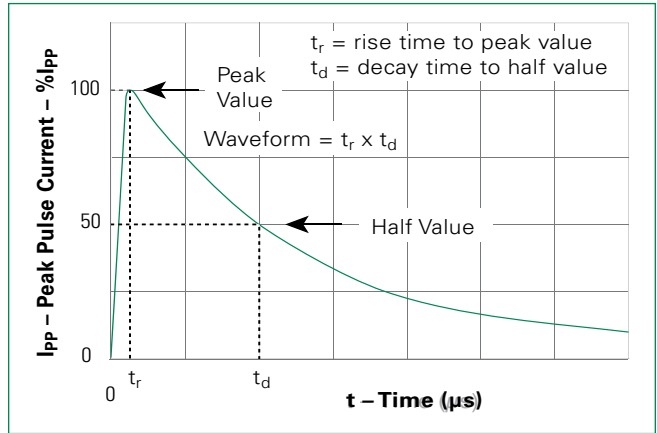
Thermal Considerations

| Package | Symbol | Parameter | Value | Unit |
|---|-----------------|---|-------------|------|
| DO-214AA  | 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 |

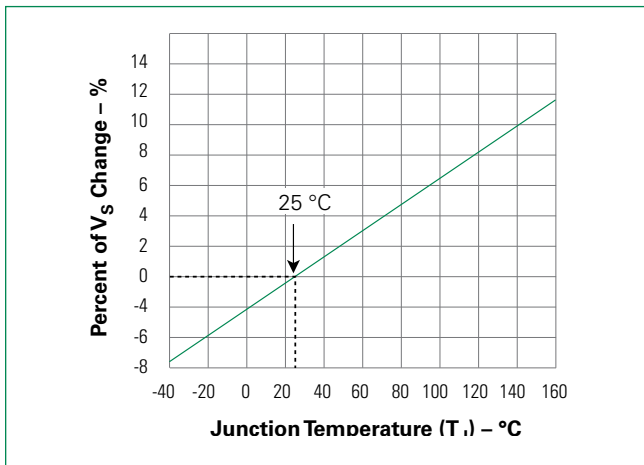
V-I Characteristics



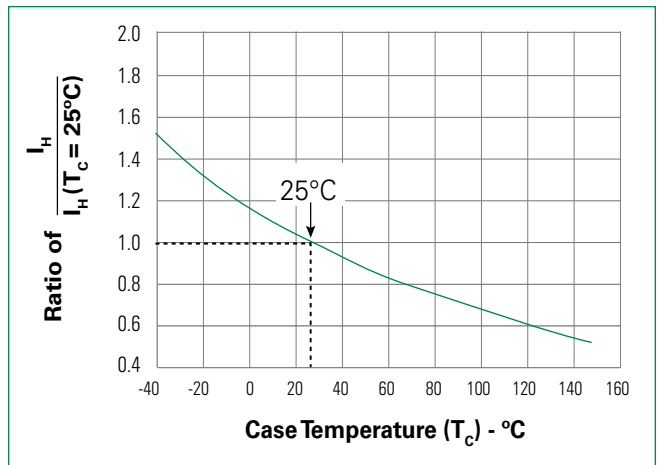
$t_r \times t_d$ Pulse Waveform



Normalized V_S Change vs. Junction Temperature

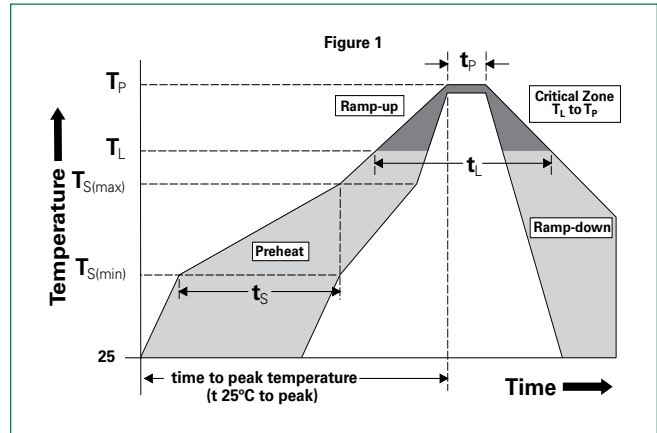


Normalized DC Holding Current vs. Case Temperature



Soldering Parameters

| | | |
|--|------------------------------------|------------------|
| Reflow Condition | | Pb-Free assembly |
| 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 |



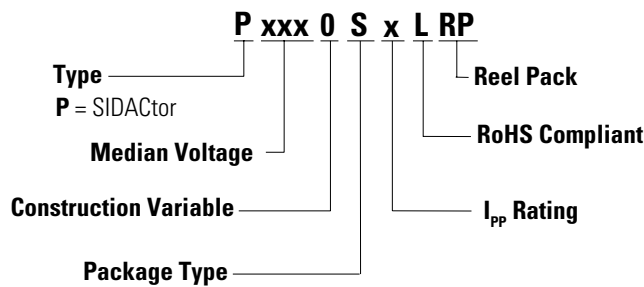
Physical Specifications

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

Part Numbering



Part Marking

