

Pxxx0S3N Series

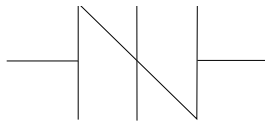
High Surge Current SIDACtor® - D0214AB



Agency Approvals

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

Schematic Symbol



Description

The Pxxx0S3N Series DO-214AB thyristors are components designed to protect equipment located in hostile environments from overvoltage transients.

The Pxxx0S3N Series protect exposed interfaces in industrial and ICT applications, such as RS-485 data interfaces or AC and DC power supplies. These components' switching voltage V_S are much lower than alternative Gas Discharge Tubes (GDT), and on-state voltage V_T are much lower than alternative GDTs, Metal Oxide Varistors (MOV) and TVS Diodes.

This Pxxx0S3N series are rated 3000A 8/20 μ s, enabling equipment compliance with regulatory and customer surge requirements.

Features and Benefits

- Low voltage overshoot
- Low on-state voltage
- Component properties do not degrade after multiple surge events within its limits
- Fails short circuit when surged in excess of ratings
- Fast response in microseconds
- 3000A 8/20 μ s Surge Rating
- RoHS Compliant and Halogen-Free
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin (Sn) (IPC/JEDEC J-STD609A.01)

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 Ed
- YD/T 1082
- YD/T 993
- YD/T 950

Electrical Characteristics

| Part Number | Marking | V_{DRM} @ $I_{DRM}=5\mu A$ | V_S @ 100V/ μ s | I_H | I_S | I_T | V_T @ $I_T=2.2A$ | Capacitance @ 1MHz, 2V bias | |
|-------------|---------|---------------------------------|--------------------------|--------|--------|-------|-----------------------|--------------------------------|--------|
| | | V min | V max | mA min | mA max | A max | V max | pF min | pF max |
| P0080S3NLRP | P-8N | 6 | 25 | 50 | 800 | 2.2 | 4 | 80 | 150 |
| P0300S3NLRP | P03N | 30 | 45 | 50 | 800 | 2.2 | 4 | 80 | 150 |
| P0640S3NLRP | P06N | 58 | 77 | 50 | 800 | 2.2 | 4 | 150 | 550 |
| P0720S3NLRP | P07N | 65 | 88 | 50 | 800 | 2.2 | 4 | 150 | 550 |
| P0900S3NLRP | P09N | 75 | 98 | 50 | 800 | 2.2 | 4 | 150 | 550 |
| P1100S3NLRP | P11N | 90 | 130 | 50 | 800 | 2.2 | 4 | 150 | 450 |
| P1300S3NLRP | P13N | 120 | 160 | 50 | 800 | 2.2 | 4 | 150 | 450 |
| P1500S3NLRP | P15N | 140 | 180 | 50 | 800 | 2.2 | 4 | 150 | 450 |
| P1900S3NLRP | P19N | 155 | 220 | 50 | 800 | 2.2 | 4 | 150 | 450 |
| P2300S3NLRP | P23N | 180 | 260 | 50 | 800 | 2.2 | 4 | 150 | 450 |
| P2600S3NLRP | P26N | 220 | 300 | 50 | 800 | 2.2 | 4 | 150 | 450 |
| P3100S3NLRP | P31N | 275 | 350 | 50 | 800 | 2.2 | 4 | 150 | 450 |
| P3500S3NLRP | P35N | 320 | 400 | 50 | 800 | 2.2 | 4 | 150 | 450 |
| P3800S3NLRP | P38N | 350 | 430 | 50 | 800 | 2.2 | 4 | 150 | 450 |

Notes:

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

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Surge Ratings


| Series | I_{PP} | I_{TSM} 50 / 60 Hz | di/dt |
|--------|--|-------------------------|-------|
| | 8/20 ¹ 1.2/50 ² | | |
| | A min | | |
| N | 2500/3000 | 250 | 420 |

Notes:

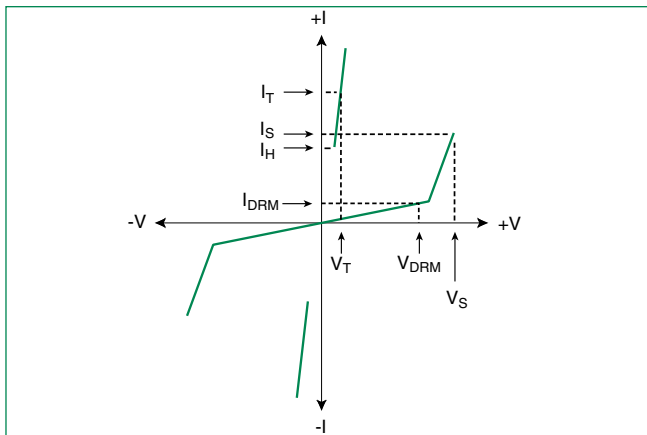
1. Current waveform in μs
2. Voltage waveform in μs
3. Surge Rating 2500A for P0080S3NLRP and P0300S3NLRP

- 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 ≤ T_J ≤ +150°C

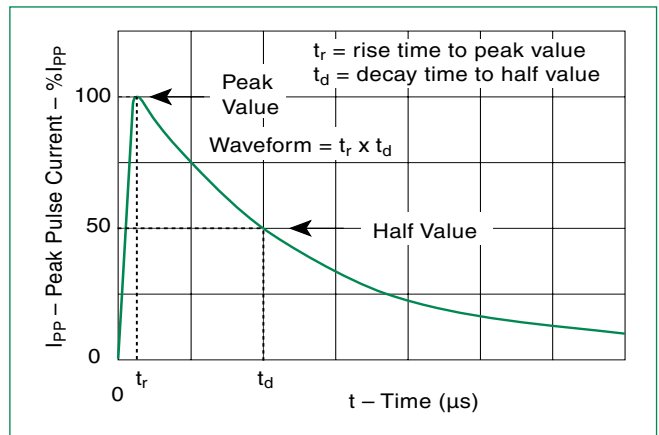
Thermal Considerations

| Package | Symbol | Parameter | Value | Unit |
|---|-----------|---|-------------|------|
| DO-214AB  | T_J | Operating Junction Temperature Range | -65 to +150 | °C |
| | T_S | Storage Temperature Range | -65 to +150 | °C |
| | $R_{θJA}$ | Thermal Resistance: Junction to Ambient | 75 | °C/W |

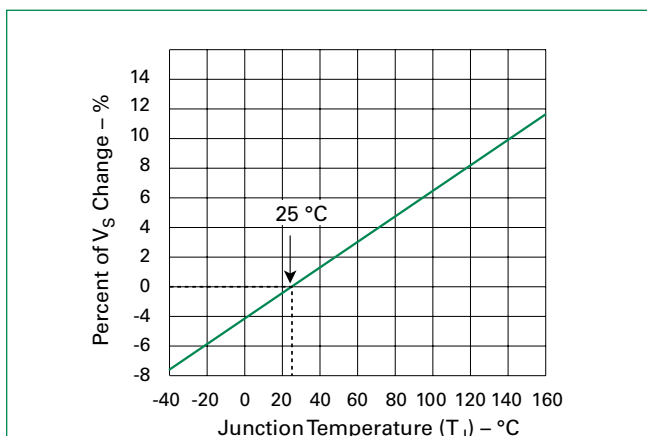
V-I Characteristics



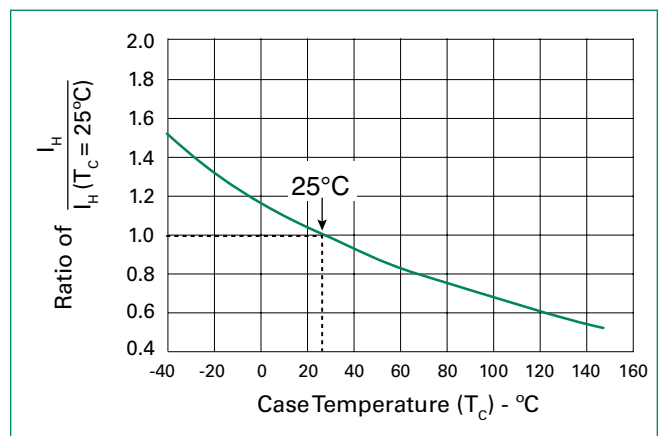
tr x td Pulse Waveform



Normalized V_S Change vs. Junction Temperature



Normalized DC Holding Current vs. Case Temperature

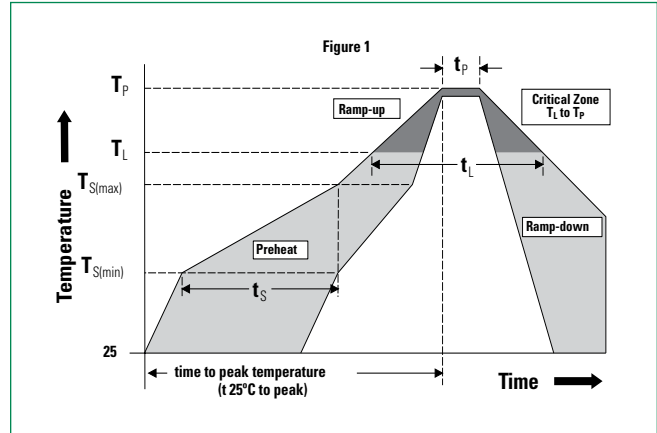


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Soldering Parameters

| | | |
|--|------------------------------------|-------------------------------|
| 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) | 60-120 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 |



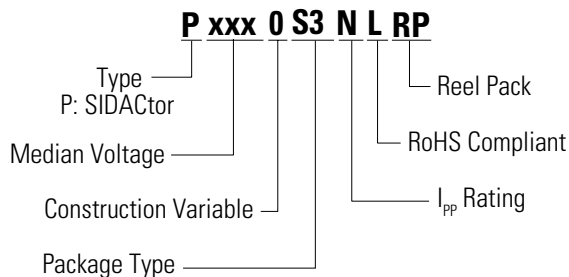
Physical Specifications

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

