

Low IH Series- Pxxx0SxLHL



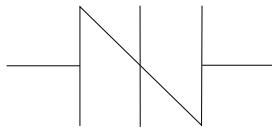
Agency Approvals

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

Pinout Designation

Not Applicable

Schematic Symbol



Description

The low IH series is 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 surge capability after multiple surge events within limit.
- Halogen free and RoHS compliant
- Fails short circuit when surged in excess of ratings
- Low capacitance
- UL Recognized to UL 497B as an Isolated Loop Circuit Protector

Applicable Global Standards

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

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 |
| P4500SBLHLRP | P45BL | 400 | 570 | 20* | 800 | 2.2 | 4 | 10 | 50 |
| P4500SCLHLRP | P45L | 400 | 530 | 50 | 800 | 2.2 | 4 | 20 | 50 |
| P3100SDLHLRP | P31DL | 275 | 380 | 10 | 800 | 2.2 | 4 | 30 | 65 |
| P4500SDLHLRP | P45DL | 400 | 570 | 10 | 800 | 2.2 | 4 | 25 | 65 |

Notes:

- Absolute maximum ratings measured at $T_A = 25^\circ C$ (unless otherwise noted).
- Components are bi-directional.
- *P4500SBLHLRP I_H max is 50mA

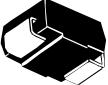
Surge Ratings

| 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 | 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 | | |
| B | 25 | 250 | 250 | 150 | 100 | 125 | 65 | 100 | 25 | 500 |
| C | 50 | 500 | 400 | 200 | 200 | 175 | 100 | 150 | 35 | 500 |
| D | - | 600 | 550 | - | - | - | 130 | 250 | 50 | 500 |

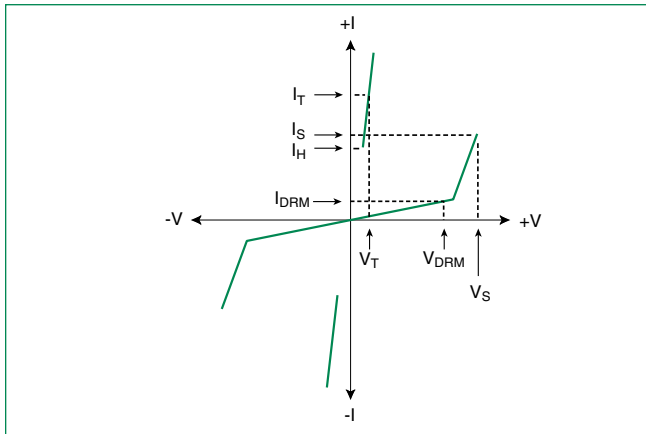
Notes:

- 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.
- I_{PP} ratings applicable over temperature range of $-40^\circ C$ to $+85^\circ C$
- The component must initially be in thermal equilibrium with $-40^\circ C \leq T_J \leq +150^\circ C$

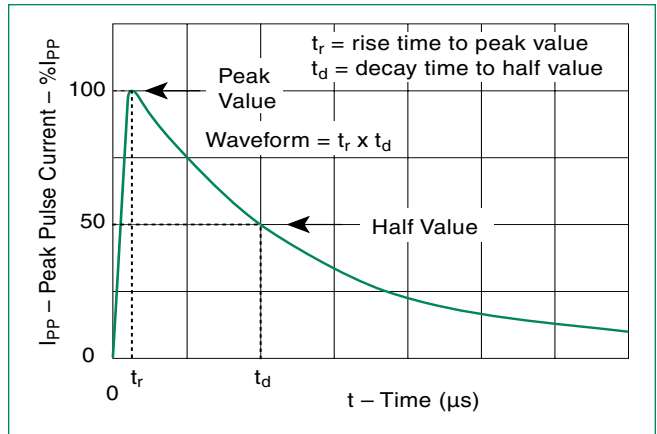
Thermal Considerations

| Package | Symbol | Parameter | Value | Unit |
|---|-----------------|---|-------------|------|
|  | 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 |

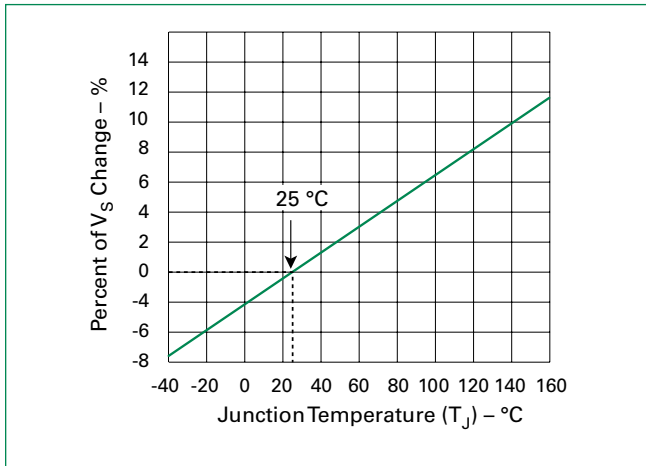
V-I Characteristics



$t_r \times t_d$ Pulse Waveform



Normalized V_S Change vs. Junction Temperature



Normalized DC Holding Current vs. Case Temperature

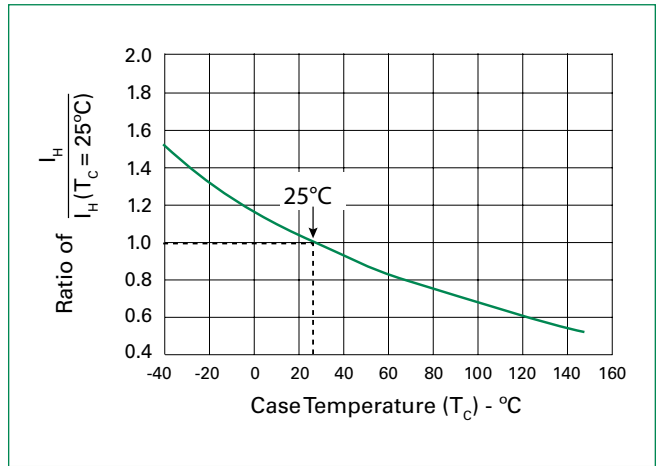
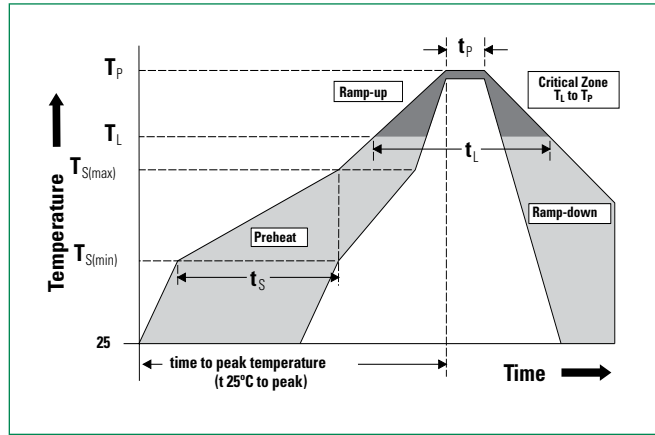


Figure 1. Soldering Parameters

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



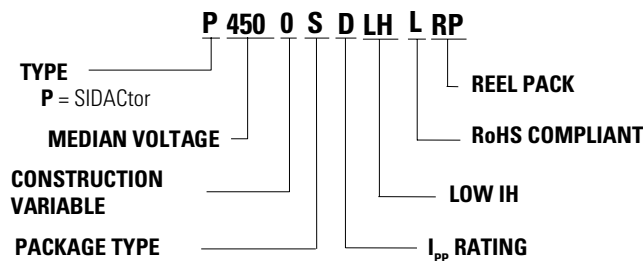
Physical Specifications

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

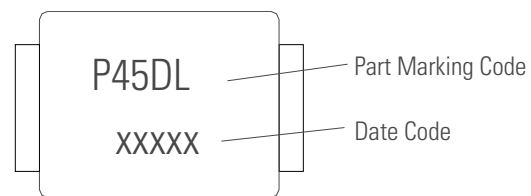
Environmental Specifications

| | |
|---|---|
| High Temp V oltage Blocking | 80% Rated V_{DRM} (V_{AC} Peak) +125°C, 504 or 1008 hrs. MIL-STD-750 (Method 1040) JEDEC, JESD22-A-101 |
| Temp Cycling | -55°C to +150°C, 15 min. dwell, 1000 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. |
| Autoclave (Pressure Cooker Test) | +121°C, 100%RH, 2atm, 96 hrs. EIA/JEDEC, JESD22-A-102 |
| Resistance to Solder Heat | +260°C, 10 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 |

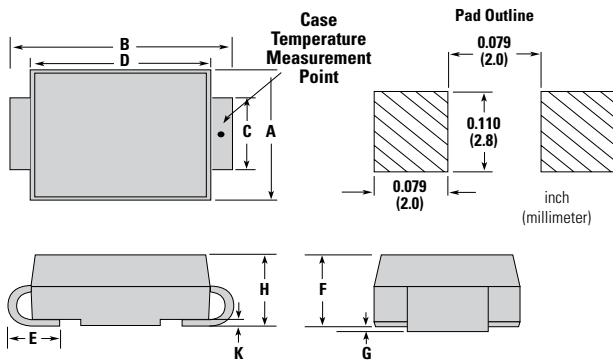
Part Numbering



Part Marking



Dimensions — DO-214AA



| Dimensions | Inches | | Millimeters | |
|------------|--------|-------|-------------|------|
| | Min | Max | Min | Max |
| A | 0.130 | 0.156 | 3.30 | 3.95 |
| B | 0.201 | 0.220 | 5.10 | 5.60 |
| C | 0.077 | 0.087 | 1.95 | 2.20 |
| D | 0.159 | 0.181 | 4.05 | 4.60 |
| E | 0.030 | 0.063 | 0.75 | 1.60 |
| F | 0.075 | 0.087 | 1.90 | 2.20 |
| G | 0.002 | 0.008 | 0.05 | 0.20 |
| H | 0.077 | 0.094 | 1.95 | 2.40 |
| K | 0.006 | 0.016 | 0.15 | 0.41 |

Packing Options

| Package Type | Description | Quantity | Added Suffix | Industry Standard |
|--------------|------------------------------|----------|--------------|-------------------|
| S | DO-214AA Tape & Reel Pack | 2500 | RP | EIA-481-D |

Tape and Reel Specification — DO-214AA

