

APPLICATIONS

- ✓ T1/E1 Trunk & Line Card
- ✓ SLIC Line Card
- ✓ DBX Branch Exchange Switches
- ✓ FCC Part 68 Customer Premise Equipment
- ✓ Line Interface Modem
- ✓ xDSL Architecture Interface
- ✓ ISDN Architecture Interface

IEC COMPATIBILITY (EN61000-4)

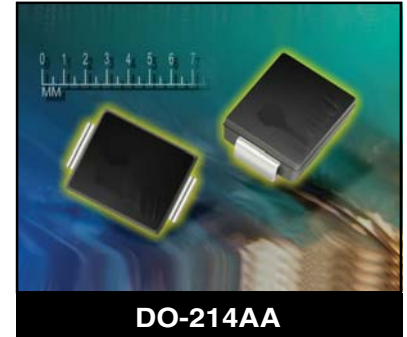
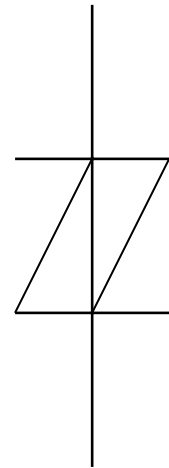
- ✓ 61000-4-2 (ESD): Air - 15kV, Contact - 8kV
- ✓ 61000-4-4 (EFT): 40A - 5/50ns
- ✓ 61000-4-5 (Surge): 8/20 μ s - 95A, L4(Line-Gnd), 48A, L4(Line-Line) & 83A, L2(Power)

FEATURES

- ✓ Complies with: FCC Part 68, UL 1459, Bellcore 1089, ITU-K.20 & K.21
- ✓ UL File Recognition # E208219
- ✓ Peak Off-State Voltage from 25 to 300 Volts
- ✓ Surge Current Capability (See Table 1)
- ✓ ESD Protection > 40 kilovolts
- ✓ Low Capacitance for T1/E1 Trunk & Line Card Applications
- ✓ Bidirectional Configurations
- ✓ RoHS Compliant

MECHANICAL CHARACTERISTICS

- ✓ Molded Plastic DO-214AA Package
- ✓ Weight 2.5 grams (Approximate)
- ✓ Available in Lead-Free Pure-Tin Plating(Annealed)
- ✓ Solder Reflow Temperature:
Pure-Tin - Sn, 100: 260-270°C
- ✓ Leaded Device Availability
- ✓ Flammability Rating UL 94V-0
- ✓ 12mm Tape and Reel Per EIA Standard 481
- ✓ Marking: Logo & Marking Code


DO-214AA
**DEVICE SYMBOL
(BIDIRECTIONAL)**

TABLE 1 - SURGE RATINGS

| SERIES | I_{PP} 2 X 10 μ s AMPS | I_{PP} 8 X 20 μ s AMPS | I_{PP} 10 X 160 μ s AMPS | I_{PP} 10 X 560 μ s AMPS | I_{PP} 10 X 1000 μ s AMPS | I_{TSM} 60 Hz AMPS | di/dt AMPS/ μ s (See Note 1) | dv/dt V/ μ s (See Note 1) |
|--------|------------------------------------|------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|----------------------------|--|-------------------------------------|
| SA | 150 | 150 | 100 | 50 | 50 | 20 | 500 | 2000 |
| SB | 300 | 300 | 150 | 100 | 80 | 32 | 500 | 2000 |
| SC | 500 | 400 | 200 | 200 | 100 | 60 | 500 | 2000 |

Note 1: Critical Rate of Rise for On-State Current (di/dt) and Off-State Voltage (dv/dt).

PP0640SA thru PP3500SC

DEVICE CHARACTERISTICS

| MAXIMUM RATINGS @ 25°C Unless Otherwise Specified | | | |
|---|-----------|------------|---------|
| PARAMETER | SYMBOL | VALUE | UNITS |
| Surge Current - 50/60 Hz | I_{TSM} | 60 | Watts |
| Junction Temperature | T_A | -40 to 150 | °C |
| Storage Temperature | T_{STG} | -55 to 150 | °C |
| Thermal Resistance (Junction) - SA & SB Series | R_{QJC} | 28 | °C/Watt |
| Thermal Resistance (Junction) - SC Series | R_{QJC} | 26 | °C/Watt |
| Thermal Resistance (Ambient) - SA & SB Series | R_{QJA} | 90 | °C/Watt |
| Thermal Resistance (Ambient) - SC Series | R_{QJA} | 85 | °C/Watt |

| ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified | | | | | | | | | |
|---|---------------------|-----------------------------------|----------------------------------|--------------------------------------|-------------------|--|---------------------------------------|------------------|----------------------------------|
| PART NUMBER | DEVICE MARKING CODE | REPETITIVE PEAK OFF-STATE VOLTAGE | SWITCHING VOLTAGE | MINIMUM HOLDING CURRENT (See Fig. 7) | SWITCHING CURRENT | MAXIMUM OFF-STATE CURRENT (See Fig. 4) | MAXIMUM ON-STATE VOLTAGE (See Fig. 5) | ON-STATE CURRENT | TYPICAL CAPACITANCE (See Note 1) |
| | | V_{DRM} VOLTS | @100V/ μ s V_S VOLTS | $di/dt = 1A/ms$ I_H mA | I_S mA | @ V_{DRM} I_{DRM} μ A | @ I_T V_T VOLTS | I_T AMPS | @2V, 1 MHz C pF |
| PP0640SA | GC | 58 | 77 | 150 | 800 | 5 | 4 | 2.2 | 60 |
| PP0720SA | GD | 65 | 88 | 150 | 800 | 5 | 4 | 2.2 | 60 |
| PP0800SA | GE | 75 | 98 | 150 | 800 | 5 | 4 | 2.2 | 60 |
| PP1100SA | GF | 90 | 130 | 150 | 800 | 5 | 4 | 2.2 | 60 |
| PP1300SA | GG | 120 | 160 | 150 | 800 | 5 | 4 | 2.2 | 40 |
| PP1500SA | GH | 140 | 180 | 150 | 800 | 5 | 4 | 2.2 | 40 |
| PP1800SA | GI | 160 | 220 | 150 | 800 | 5 | 4 | 2.2 | 40 |
| PP2300SA | GJ | 190 | 260 | 150 | 800 | 5 | 4 | 2.2 | 30 |
| PP2600SA | GK | 220 | 300 | 150 | 800 | 5 | 4 | 2.2 | 30 |
| PP3100SA | GL | 275 | 350 | 150 | 800 | 5 | 4 | 2.2 | 30 |
| PP3500SA | GM | 300 | 400 | 150 | 800 | 5 | 4 | 2.2 | 30 |
| PP0300SB | GN | 25 | 40 | 50 | 800 | 5 | 4 | 2.2 | 110 |
| PP0640SB | GP | 58 | 77 | 150 | 800 | 5 | 4 | 2.2 | 60 |
| PP0720SB | GQ | 65 | 88 | 150 | 800 | 5 | 4 | 2.2 | 60 |
| PP0800SB | GR | 75 | 98 | 150 | 800 | 5 | 4 | 2.2 | 60 |
| PP1100SB | GS | 90 | 130 | 150 | 800 | 5 | 4 | 2.2 | 60 |
| PP1300SB | GT | 120 | 160 | 150 | 800 | 5 | 4 | 2.2 | 40 |
| PP1500SB | GU | 140 | 180 | 150 | 800 | 5 | 4 | 2.2 | 40 |
| PP1800SB | GV | 160 | 220 | 150 | 800 | 5 | 4 | 2.2 | 40 |
| PP2300SB | GW | 190 | 260 | 150 | 800 | 5 | 4 | 2.2 | 30 |
| PP2600SB | GX | 220 | 300 | 150 | 800 | 5 | 4 | 2.2 | 30 |
| PP3100SB | GY | 275 | 350 | 150 | 800 | 5 | 4 | 2.2 | 30 |
| PP3500SB | GZ | 300 | 400 | 150 | 800 | 5 | 4 | 2.2 | 30 |
| PP0640SC | HC | 58 | 77 | 150 | 800 | 5 | 4 | 2.2 | 120 |
| PP0720SC | HD | 65 | 88 | 150 | 800 | 5 | 4 | 2.2 | 120 |
| PP0800SC | HE | 75 | 98 | 150 | 800 | 5 | 4 | 2.2 | 120 |
| PP1100SC | HF | 90 | 130 | 150 | 800 | 5 | 4 | 2.2 | 120 |
| PP1300SC | HG | 120 | 160 | 150 | 800 | 5 | 4 | 2.2 | 80 |
| PP1500SC | HH | 140 | 180 | 150 | 800 | 5 | 4 | 2.2 | 80 |
| PP1800SC | HI | 160 | 220 | 150 | 800 | 5 | 4 | 2.2 | 80 |
| PP2300SC | HJ | 190 | 260 | 150 | 800 | 5 | 4 | 2.2 | 60 |
| PP2600SC | HK | 220 | 300 | 150 | 800 | 5 | 4 | 2.2 | 60 |
| PP3100SC | HL | 275 | 350 | 150 | 800 | 5 | 4 | 2.2 | 60 |
| PP3500SC | HM | 300 | 400 | 150 | 800 | 5 | 4 | 2.2 | 60 |

Note 1: Capacitance imbalance between positive and negative polarities is typically < 15pF.

GRAPHS

FIGURE 1
 PULSE WAVE FORM



FIGURE 2
 V-I CHARACTERISTIC CURVE

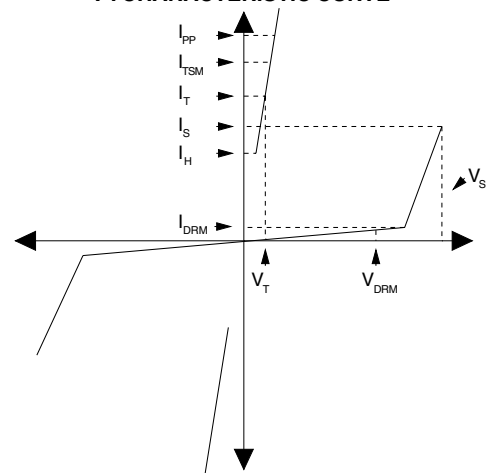


FIGURE 3
 ON-STATE CURRENT VS SURGE CURRENT DURATION



GRAPHS

FIGURE 4

TYPICAL PEAK OFF-STATE CURRENT VS JUNCTION TEMPERATURE

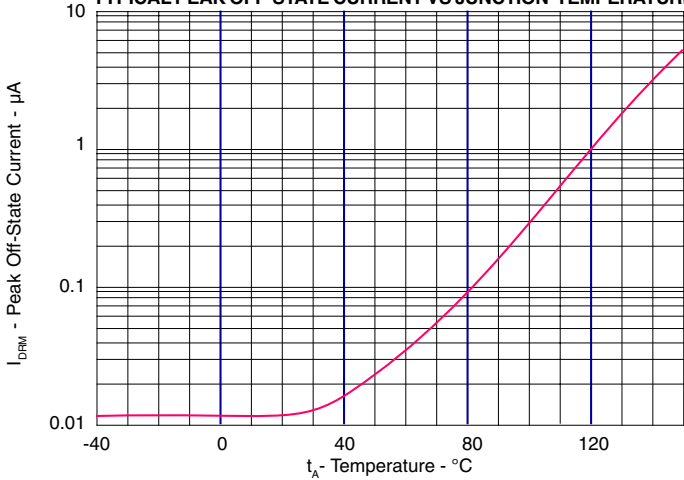


FIGURE 5

TYPICAL ON-STATE CURRENT VS ON-STATE VOLTAGE

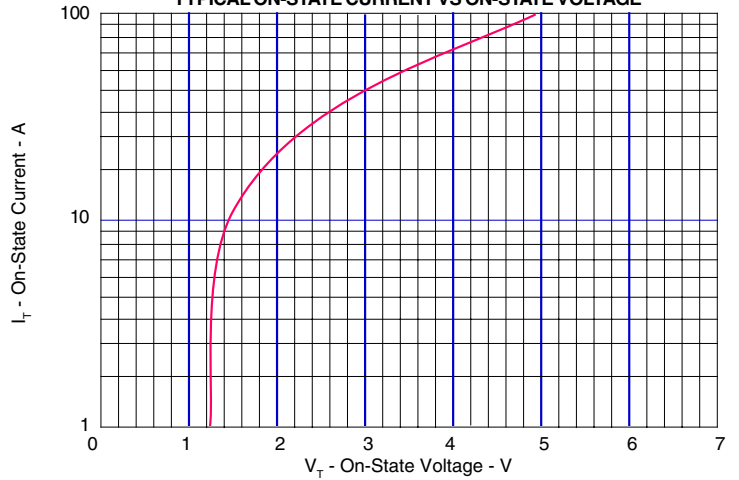


FIGURE 6

TYPICAL NORMALIZED SWITCHING VOLTAGE VS JUNCTION TEMPERATURE

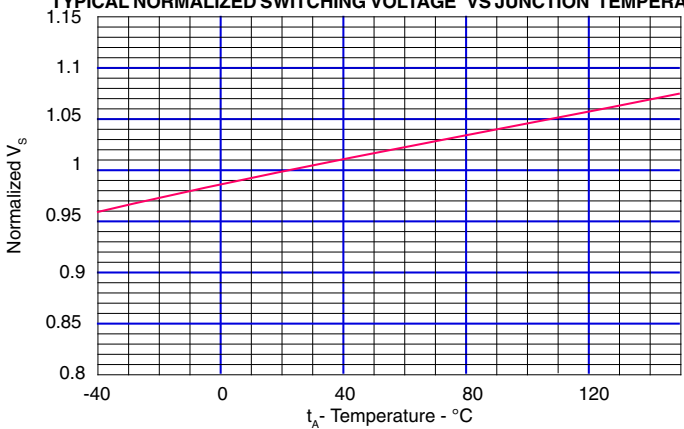
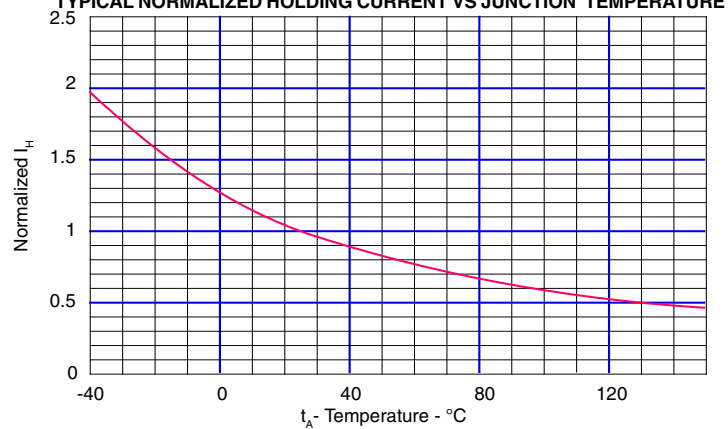


FIGURE 7

TYPICAL NORMALIZED HOLDING CURRENT VS JUNCTION TEMPERATURE



APPLICATION NOTE

FIGURE 1: UL 1459 & FCC Part 68 - Metallic Protection

The TSS (Thyristor Surge Suppressor) device is located across the tip-to-ring after a limiting resistor and fuse combination. R_{TIP} and R_{RING} resistors are optional depending upon the TSS device selection. Without the resistors, the PP3100SB/SC is recommended. However, with a resistance value of 7.5 Ohms for tip and ring, the PP3100SA is recommended. Digital signals may use a lower TSS device depending upon the total tip to ring voltage range. Selection of the TSS device, either PPxxxxSA or SB/SC is based upon the value of the tip and ring resistors. For the National Electric Code (NEC) article 800, it is recommended that at least one fuse be used in the tip or ring line for metallic surges. Fuses may be replaced with a suitable Positive Temperature Coefficient (PTC) automatic resettable current limiting device.

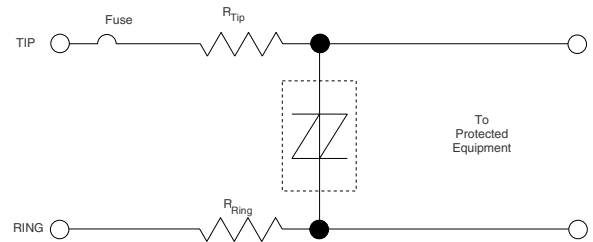


FIGURE 1 - Metallic Protection

FIGURE 2 - UL 1459 & FCC Part 68 - Longitudinal Protection

There are two TSS devices, one located from tip-to-ground and one ring-to-ground. For standard analog signals, the PP3100SA is recommended with a typical resistor value for tip and ring of 15 Ohms. The PP3100SB/SC is recommended for resistor values of 7.5 Ohms each. The National Electric Code (NEC) article 800 requires two fuse elements when connecting to ground. Fuses or a suitable Positive Temperature Coefficient (PTC) automatic resettable current limiting device may be used. The purpose of this circuit is to limit AC power current from getting on the ground line causing any safety hazard.

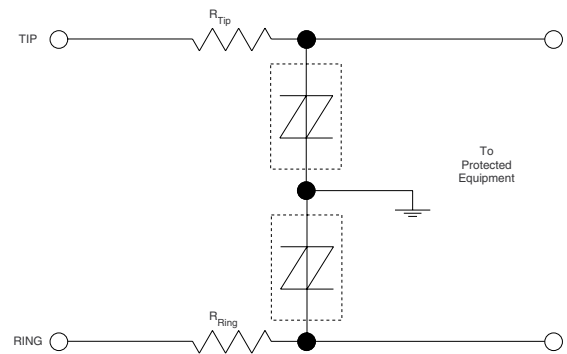


FIGURE 2 - Longitudinal Protection

FIGURE 3 - UL 1459 & FCC Part 68 - Metallic & Longitudinal Protection

Three equal TSS devices are used in this application for metallic (tip-to-ring) and longitudinal (tip-to-ground and ring-to-ground) protection. For analog signals, the PP3100SB/SC is recommended. With a resistance value of 15 Ohms for the tip and ring resistors, the PP3100SA may be used. The National Electric Code (NEC) article 800 requires two fuse elements when connecting to ground. Fuses or a suitable Positive Temperature Coefficient (PTC) automatic resettable current limiting device may be used. This circuit is recommended for protection against the Bellcore requirement: First Level Lightning Surge Tests (Telecommunications Port), document # GR-1089-CORE.

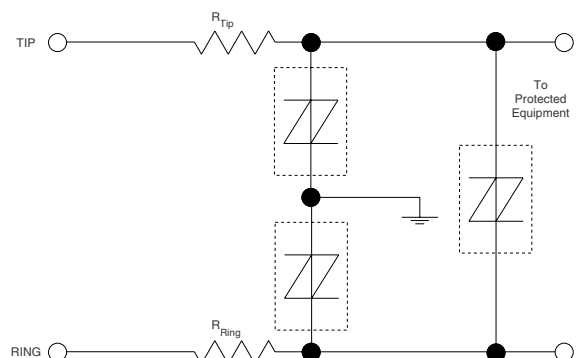


FIGURE 3 - Metallic & Longitudinal Protection

PP0640SA thru PP3500SC

DO-214AA PACKAGE OUTLINE & DIMENSIONS

PACKAGE OUTLINE

The technical drawing shows two views of the DO-214AA package. The top view shows a rectangular package with dimensions A (height), B (total height including leads), and C (width). The side view shows the package profile with dimensions D (total height), E (lead height), F (lead width), G (lead thickness), and H (lead length).

DO-214AA (SMB)

DIMENSIONS

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|------|--------|-------|
| | MIN | MAX | MIN | MAX |
| A | 1.96 | 2.21 | 0.077 | 0.087 |
| B | 3.30 | 3.94 | 0.130 | 0.155 |
| C | 4.06 | 4.57 | 0.160 | 0.180 |
| D | 2.00 | 2.50 | 0.079 | 0.098 |
| E | 0.76 | 1.52 | 0.030 | 0.060 |
| F | 5.21 | 5.59 | 0.205 | 0.220 |
| G | 0.10 | 0.20 | 0.004 | 0.008 |
| H | 0.15 | 0.31 | 0.006 | 0.012 |

NOTES

- Dimensions are exclusive of mold flash and metal burrs.

TAPE & REEL ORDERING NOMENCLATURE

- Surface mount product is taped and reeled in accordance with EIA-481.
- Suffix-T = 13 Inch Reel - 3,000 pieces per 12mm tape, i.e., PP0640SA-T.
- Suffix - LF = Lead-Free, Pure-Tin Plating, .e., PP0640SA-LF-T.

Outline & Dimensions: Rev 0 - 4/02, 06030

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