

# PP0640SA PP3500SC

# BIDIRECTIONAL THYRISTOR SURGE SUPPRESSOR

#### **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

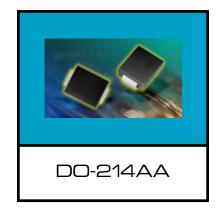
✓ 61000-4-5 (Surge): 8/20µs - 95A, L4(Line-Gnd), 48A, L4(Line-Line) & 83A, L2(Power)

### **FEATURES**

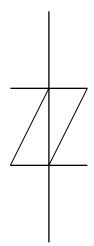
- ✓ Complies with: FCC Part 68, UL 1459, Bellcore 1089, ITU-K.20 & K.21
- ✔ Peak Off-State Voltage from 25 to 300 Volts
- ✓ Surge Current Capability(See Table 1)
- ✓ ESD Protection > 40 kilovolts
- ✓ Low Capacitance for T1/E1 Trunk & Line Card Applications

## **MECHANICAL CHARACTERISTICS**

- ✓ Molded Plastic DO-214AA Package
- ✓ Weight 2.5 grams (Approximate)
- ✓ Flammability Rating UL 94V-0
- ✓ 12mm Tape and Reel Per EIA Standard 481
- ✓ Device Marking: Logo & Marking Code



DEVICE SYMBOL (BIDIRECTIONAL)



T/	TABLE 1 - SURGE RATINGS									
	SERIES	I <sub>PP</sub> 2 X 10µs AMPS	Ι <sub>ΡΡ</sub> 8 X 20μs AMPS	I <sub>PP</sub> 10 X 160µs AMPS	I <sub>PP</sub> 10 X 560µs AMPS	Ι <sub>ΡΡ</sub> 10 Χ 1000μs ΑΜΡS		di/dt AMPS/µs (See Note 1)	dv/dt AMPS/µs (See Note 1)	
	SA SB SC	125 300 500	150 300 400	100 150 200	50 100 200	50 80 100	20 32 60	500 500 500	2000 2000 2000	

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

# PP0640SA thru PP3500SC

# **DEVICE CHARACTERISTICS**

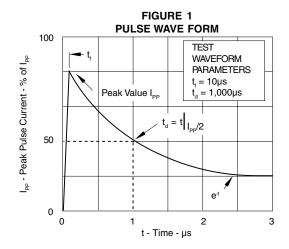
MAXIMUM RATINGS @ 25°C Unless Otherwise Specified							
PARAMETER	SYMBOL	VALUE	UNITS				
Surge Current - 50/60 Hz	I <sub>TSM</sub>	60	Amps				
Junction Temperature	T <sub>j</sub>	-40 to 150	°C				
Storage Temperature	T <sub>STG</sub>	-55 to 150	°C				
Thermal Resistance(Junction) - SA & SB Series	$R_{\scriptscriptstyle{ hetajc}}$	28	°C/Watt				
Thermal Resistance(Junction) - SC Series	$R_{\scriptscriptstyle{ hetajc}}$	26	°C/Watt				
Thermal Resistance(Ambient) - SA & SB Series	$R_{\scriptscriptstyle{\theta ja}}$	90	°C/Watt				
Thermal Resistance(Ambient) - SC Series	R <sub>eja</sub>	85	°C/Watt				

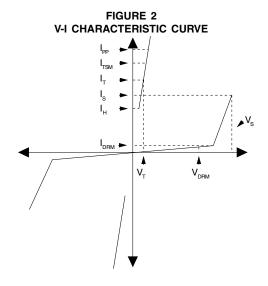
ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified									
PART NUMBER	DEVICE MARKING CODE	REPETITIVE PEAK OFF-STATE VOLTAGE	SWITCHING VOLTAGE	MINIMUM HOLDING CURRENT (See Fig. 4)	SWITCHING CURRENT	MAXIMUM OFF-STATE CURRENT (See Fig. 3)	MAXIMUM ON-STATE VOLTAGE (See Fig. 3)	ON-STATE CURRENT	TYPICAL CAPACITANCE (See Note 1)
		V <sub>DRM</sub> VOLTS	@100V/µs V <sub>s</sub> VOLTS	di/dt = 1A/ms I <sub>H</sub> mA	I <sub>s</sub> mA	@V <sub>DRM</sub> Ι <sub>DRM</sub> μΑ	@Ι <sub>τ</sub> V <sub>τ</sub> VOLTS	I <sub>T</sub> AMPS	@2V, 1 MHz C pF
PP0640SA PP0720SA PP0800SA PP1100SA	GC GD GE GF	58 65 75 90	77 88 98 130	150 150 150 150	800 800 800 800	5 5 5 5	4 4 4 4	2.2 2.2 2.2 2.2	60 60 60 60
PP1300SA PP1500SA PP1800SA PP2300SA	GG GH GI GJ	120 140 160 190	160 180 220 260	150 150 150 150	800 800 800 800	5 5 5 5	4 4 4 4	2.2 2.2 2.2 2.2	40 40 40 30
PP2600SA PP3100SA PP3500SA	GK GL GM	220 275 300	300 350 400	150 150 150	800 800 800	5 5 5	4 4 4	2.2 2.2 2.2	30 30 30
PP0300SB PP0640SB PP0720SB PP0800SB	GN GP GQ GR	25 58 65 75	40 77 88 98	50 150 150 150	800 800 800 800	5 5 5 5	4 4 4 4	2.2 2.2 2.2 2.2	110 60 60 60
PP1100SB PP1300SB PP1500SB PP1800SB	GS GT GU GV	90 120 140 160	130 160 180 220	150 150 150 150	800 800 800 800	5 5 5 5	4 4 4 4	2.2 2.2 2.2 2.2 2.2	60 40 40 40
PP2300SB PP2600SB PP3100SB PP3500SB	GW GX GY GZ	190 220 275 300	260 300 350 400	150 150 150 150	800 800 800 800	5 5 5 5	4 4 4 4	2.2 2.2 2.2 2.2 2.2	30 30 30 30 30
PP0640SC PP0720SC PP0800SC	HC HD HE	58 65 75	77 88 98	150 150 150	800 800 800	5 5 5	4 4 4 4	2.2 2.2 2.2 2.2	120 120 120
PP1100SC PP1300SC PP1500SC PP1800SC	HF HG HH	90 120 140 160	130 160 180 220	150 150 150 150	800 800 800	5 5 5 5	4 4 4 4	2.2 2.2 2.2 2.2 2.2	120 120 80 80 80
PP2300SC PP2600SC PP3100SC	HJ HK HL	190 220 275	260 300 350	150 150 150	800 800 800 800	5 5 5	4 4 4	2.2 2.2 2.2	60 60 60
PP3500SC	HM	300	400	150	800	5	4	2.2	60

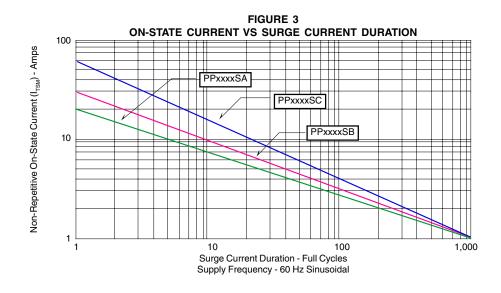
Note 1: Capacitance imbalance between positive and negative polarities is typically < 15pF.

# PP0640SA thru PP3500SC

# **GRAPHS**

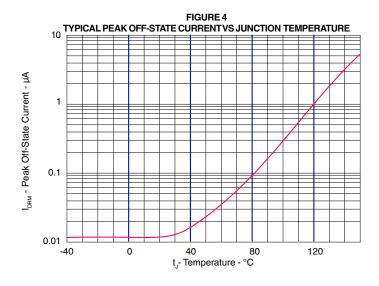


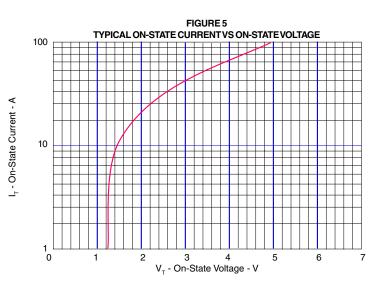


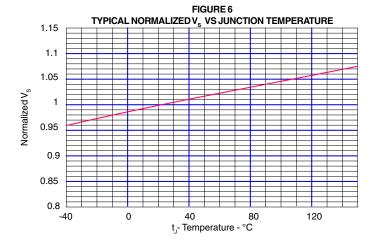


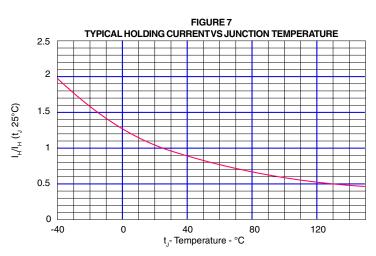
# PP0640SA thru PP3500SC

# **GRAPHS**









# PP0640SA PP3500SC

### APPLICATION NOTES

#### 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.  $R_{\mbox{\tiny TIP}}$  and  $R_{\mbox{\tiny RING}}$  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 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 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.

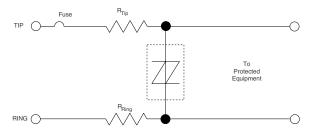


FIGURE 1 - Metallic Protection

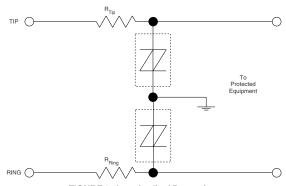


FIGURE 2 - Longitudinal Protection

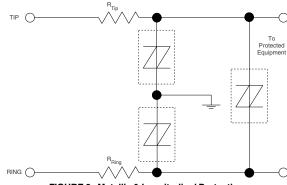
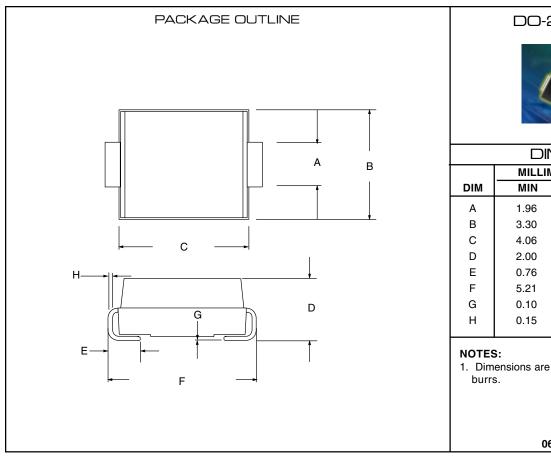


FIGURE 3 - Metallic & Longitudinal Protection

# PP0640SA PP3500SC

# PACKAGE OUTLINE & DIMENSIONS



### DO-214AA (SMB)



## DIMENSIONS

	MILLIMI	ETERS	INCHES			
DIM	MIN	MAX	MIN	MAX		
Α	1.96	2.21	0.077	0.087		
В	3.30	3.94	0.130	0.155		
С	4.06	4.57	0.160	0.180		
D	2.00	2.50	0.079	0.098		
Е	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		
Н	0.15	0.31	0.006	0.012		

Dimensions are exclusive of mold flash and metal hurrs

06030 Rev 0 - 4/02

## **TAPE & REEL PACKAGING:**

Surface mount product is taped and reeled in accordance with EIA-481. Suffix -T13 = 13 Inch Reel - 3,000 pieces per reel, i.e., PP0640SA-T13

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