

Thyristor Surge Suppressors (TSS) Data Sheet

Description

DO-214AA Thyristor solid state protection thyristor protect telecommunications equipment such as modems, line cards, fax machines, and other CPE.

P Series devices are used to enable equipment to meet various regulatory requirements including GR 1089, ITU K.20, K.21 and K.45, IEC 60950, UL 60950, and TIA-968 (formerly known as FCC Part 68).



Features

Compared to surge suppression using other technologies, P Series devices offer absolute surge protection regardless of the surge current available and the rate of applied voltage (dv/dt). P Series devices:

- Cannot be damaged by voltage
- Eliminate hysteresis and heat dissipation typically found with clamping devices
- Eliminate voltage overshoot caused by fast-rising transients
- Are non-degenerative
- Will not fatigue
- Have low capacitance, making them ideal for high-speed transmission equipment
- Meets MSL level 1, per J-STD-020
- Safety certification: UL: E244458

Electrical Parameters

| Parameter | Definition |
|-----------|-------------------------------------------------------------------------------------------------|
| V_{DRM} | Peak Off-state Voltage – maximum voltage that can be applied while maintaining off state |
| V_S | Switching Voltage – maximum voltage prior to switching to on state |
| V_T | On-state Voltage – maximum voltage measured at rated on-state current |
| I_{DRM} | Leakage Current – maximum peak off-state current measured at V_{DRM} |
| I_S | Switching Current – maximum current required to switch to on state |
| I_T | On-state Current – maximum rated continuous on-state current |
| I_H | Holding Current – minimum current required to maintain on state |
| C_O | Off-state Capacitance – typical capacitance measured in off state |
| V_{PP} | Peak Pulse Voltage – maximum rated peak impulse voltage |
| I_{PP} | Peak Pulse Current – maximum rated peak impulse current |

Electrical Characteristics

| Part Number | V _{DRM} (V) | V _S (V) | V _T (V) | I _{DRM} (μA) | I _S (mA) | I _T (A) | I _H (mA) | C _O (pF) | V _{PP} 10/700μs (V) | I _{PP} 10/1000μs (A) | Marking |
|-------------|----------------------|--------------------|--------------------|-----------------------|---------------------|--------------------|---------------------|---------------------|------------------------------|-------------------------------|---------|
| P0080SA | 6 | 25 | 4 | 5 | 800 | 2.2 | 50 | 50 | 2000 | 45 | P008A |
| P0080SB | 6 | 25 | 4 | 5 | 800 | 2.2 | 50 | 70 | 4000 | 80 | P008B |
| P0080SC | 6 | 25 | 4 | 5 | 800 | 2.2 | 50 | 100 | 6000 | 100 | P008C |
| P0300SA | 25 | 40 | 4 | 5 | 800 | 2.2 | 50 | 70 | 2000 | 45 | P03A |
| P0300SB | 25 | 40 | 4 | 5 | 800 | 2.2 | 50 | 70 | 4000 | 80 | P03B |
| P0300SC | 25 | 40 | 4 | 5 | 800 | 2.2 | 50 | 100 | 6000 | 100 | P03C |
| P0640SA | 58 | 77 | 4 | 5 | 800 | 2.2 | 150 | 50 | 2000 | 45 | P06A |
| P0640SB | 58 | 77 | 4 | 5 | 800 | 2.2 | 150 | 60 | 4000 | 80 | P06B |
| P0640SC | 58 | 77 | 4 | 5 | 800 | 2.2 | 150 | 100 | 6000 | 100 | P06C |
| P0720SA | 65 | 88 | 4 | 5 | 800 | 2.2 | 150 | 50 | 2000 | 45 | P07A |
| P0720SB | 65 | 88 | 4 | 5 | 800 | 2.2 | 150 | 60 | 4000 | 80 | P07B |
| P0720SC | 65 | 88 | 4 | 5 | 800 | 2.2 | 150 | 100 | 6000 | 100 | P07C |
| P0900SA | 75 | 98 | 4 | 5 | 800 | 2.2 | 150 | 45 | 2000 | 45 | P09A |
| P0900SB | 75 | 98 | 4 | 5 | 800 | 2.2 | 150 | 55 | 4000 | 80 | P09B |
| P0900SC | 75 | 98 | 4 | 5 | 800 | 2.2 | 150 | 90 | 6000 | 100 | P09C |
| P1100SA | 90 | 130 | 4 | 5 | 800 | 2.2 | 150 | 45 | 2000 | 45 | P11A |
| P1100SB | 90 | 130 | 4 | 5 | 800 | 2.2 | 150 | 55 | 4000 | 80 | P11B |
| P1100SC | 90 | 130 | 4 | 5 | 800 | 2.2 | 150 | 90 | 6000 | 100 | P11C |
| P1300SA | 120 | 160 | 4 | 5 | 800 | 2.2 | 150 | 45 | 2000 | 45 | P13A |
| P1300SB | 120 | 160 | 4 | 5 | 800 | 2.2 | 150 | 55 | 4000 | 80 | P13B |
| P1300SC | 120 | 160 | 4 | 5 | 800 | 2.2 | 150 | 90 | 6000 | 100 | P13C |
| P1500SA | 140 | 180 | 4 | 5 | 800 | 2.2 | 150 | 40 | 2000 | 45 | P15A |
| P1500SB | 140 | 180 | 4 | 5 | 800 | 2.2 | 150 | 60 | 4000 | 80 | P15B |
| P1500SC | 140 | 180 | 4 | 5 | 800 | 2.2 | 150 | 85 | 6000 | 100 | P15C |
| P1800SA | 170 | 220 | 4 | 5 | 800 | 2.2 | 150 | 40 | 2000 | 45 | P18A |
| P1800SB | 170 | 220 | 4 | 5 | 800 | 2.2 | 150 | 60 | 4000 | 80 | P18B |
| P1800SC | 170 | 220 | 4 | 5 | 800 | 2.2 | 150 | 85 | 6000 | 100 | P18C |
| P2300SA | 190 | 260 | 4 | 5 | 800 | 2.2 | 150 | 35 | 2000 | 45 | P23A |
| P2300SB | 190 | 260 | 4 | 5 | 800 | 2.2 | 150 | 55 | 4000 | 80 | P23B |
| P2300SC | 190 | 260 | 4 | 5 | 800 | 2.2 | 150 | 80 | 6000 | 100 | P23C |


Electrical Characteristics

| Part Number | V _{DRM} (V) | V _S (V) | V _T (V) | I _{DRM} (μA) | I _S (mA) | I _T (A) | I _H (mA) | C _O (pF) | V _{PP} 10/700μs (V) | I _{PP} 10/1000μs (A) | Marking |
|-------------|----------------------|--------------------|--------------------|-----------------------|---------------------|--------------------|---------------------|---------------------|------------------------------|-------------------------------|---------|
| P2600SA | 220 | 300 | 4 | 5 | 800 | 2.2 | 150 | 35 | 2000 | 45 | P26A |
| P2600SB | 220 | 300 | 4 | 5 | 800 | 2.2 | 150 | 50 | 4000 | 80 | P26B |
| P2600SC | 220 | 300 | 4 | 5 | 800 | 2.2 | 150 | 80 | 6000 | 100 | P26C |
| P3100SA | 275 | 350 | 4 | 5 | 800 | 2.2 | 150 | 30 | 2000 | 45 | P31A |
| P3100SB | 275 | 350 | 4 | 5 | 800 | 2.2 | 150 | 45 | 4000 | 80 | P31B |
| P3100SC | 275 | 350 | 4 | 5 | 800 | 2.2 | 150 | 65 | 6000 | 100 | P31C |
| P3500SA | 320 | 400 | 4 | 5 | 800 | 2.2 | 150 | 30 | 2000 | 45 | P35A |
| P3500SB | 320 | 400 | 4 | 5 | 800 | 2.2 | 150 | 40 | 4000 | 80 | P35B |
| P3500SC | 320 | 400 | 4 | 5 | 800 | 2.2 | 150 | 65 | 6000 | 100 | P35C |

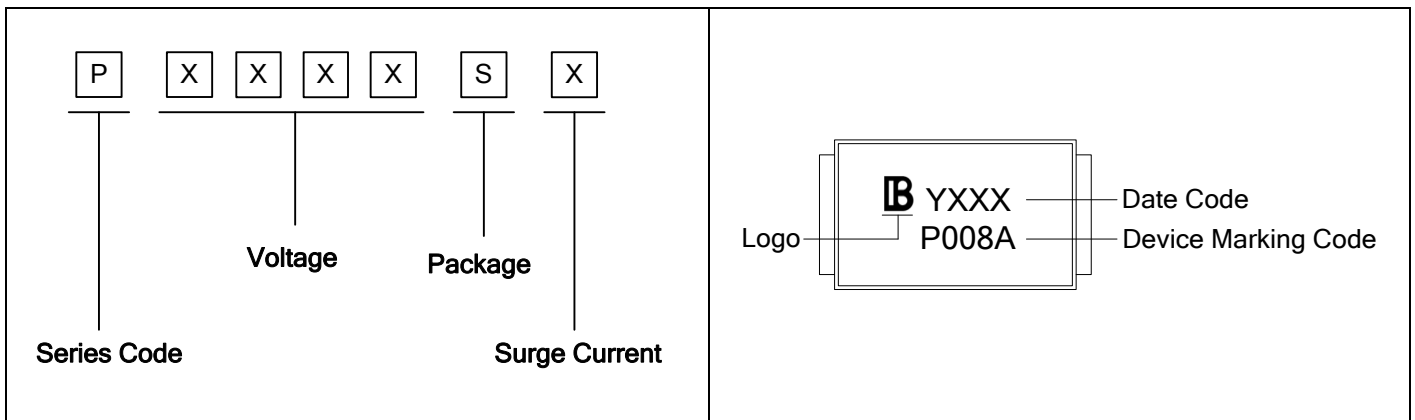
Notes:

- All measurements are made at an ambient temperature of 25°C. I_{PP} applies to -40°C through +85°C temperature range.
- Off-state capacitance(C_O) is measured at 1 MHz with a 2V bias and is typical value.

Thermal Considerations

| Package DO-214AA/SMB | Symbol | Parameter | Value | Unit |
|-------------------------------------------------------------------------------------|------------------|----------------------------------------|-------------|------|
|  | T _J | Operating Junction Temperature | -40 to +150 | °C |
| | T _S | Storage Temperature Range | -40 to +150 | °C |
| | R _{θJA} | Junction to Ambient on printed circuit | 90 | °C/W |

Part Number Code and Marking



Characteristics Curves

Figure 1. V-I Characteristics

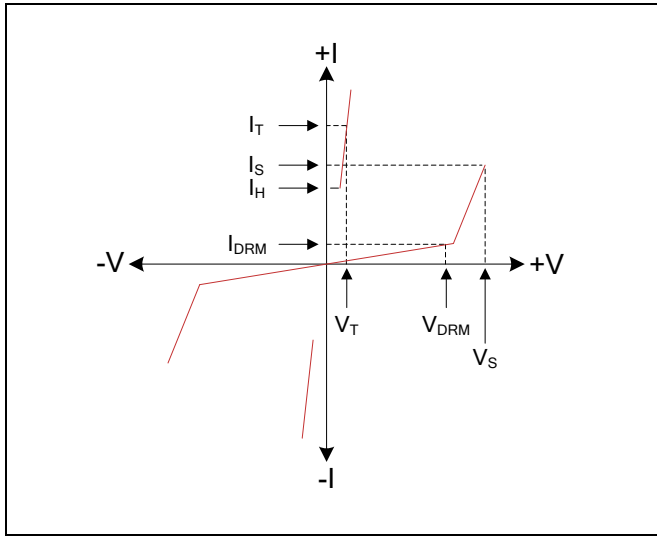


Figure 2. $t_r \times t_d$ Pulse Wave-form

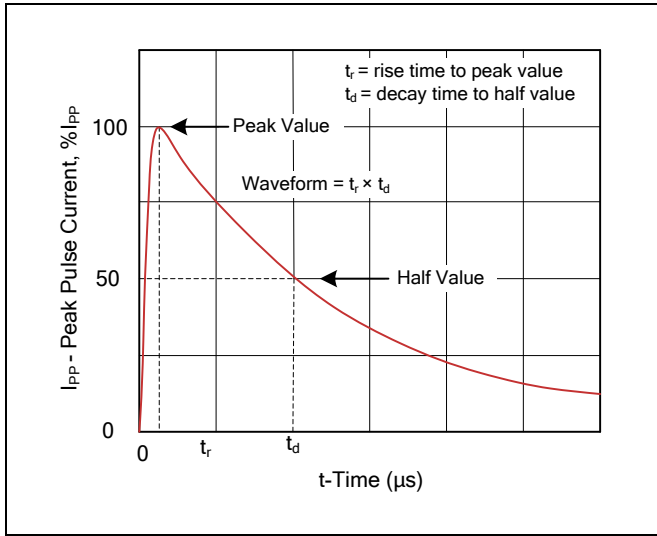


Figure 3. Normalized V_S Change versus Junction Temperature

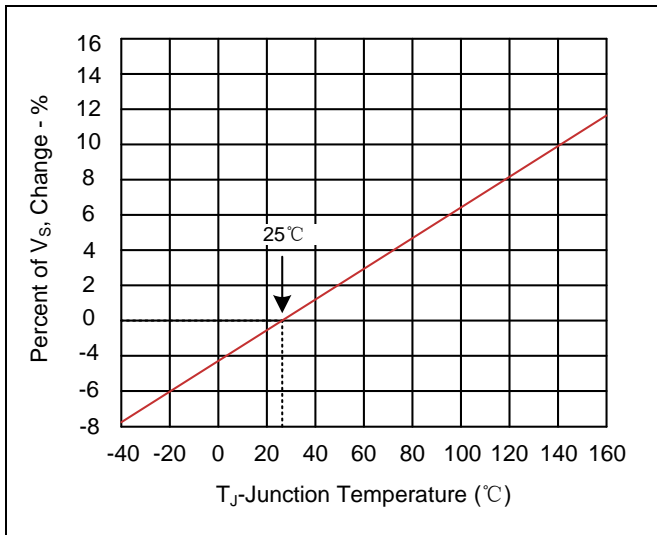
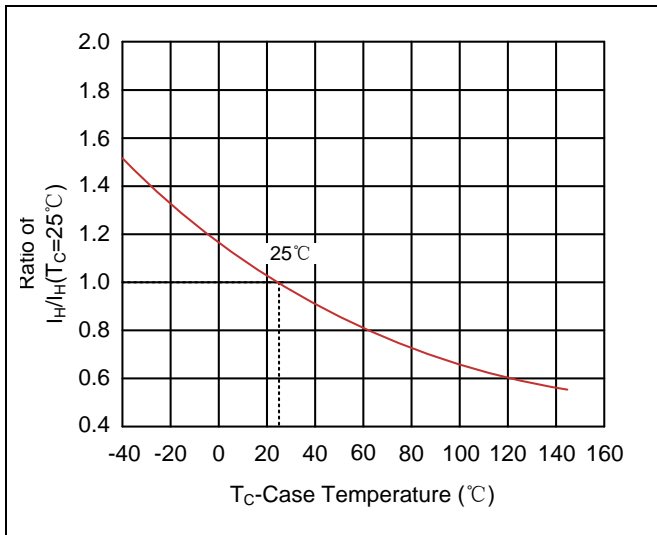
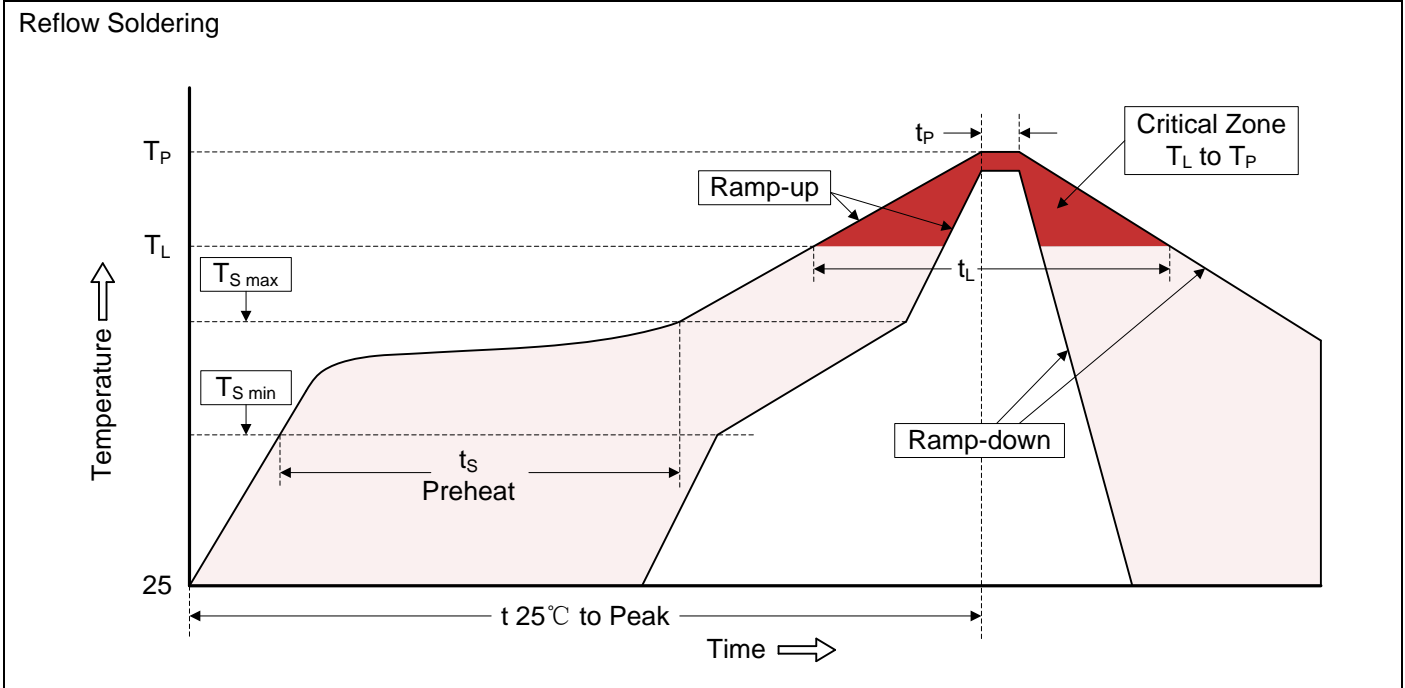


Figure 4. Normalized DC Holding Current versus Case Temperature



Recommended Soldering Conditions



Recommended Conditions

| Profile Feature | Pb-Free Assembly |
|-------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Average ramp-up rate (T_L to T_P) | 3°C/second max. |
| Preheat -Temperature Min ($T_{S\ min}$) -Temperature Max ($T_{S\ max}$) -Time (min to max) (t_s) | 150°C 200°C 60-180 seconds |
| $T_{S\ max}$ to T_L -Ramp-up Rate | 3°C/second max. |
| Time maintained above: -Temperature (T_L) -Time (t_L) | 217°C 60-150 seconds |
| Peak Temperature (T_P) | 260°C |
| Time within 5°C of actual Peak Temperature (t_P) | 20-40 seconds |
| Ramp-down Rate | 6°C/second max. |
| Time 25°C to Peak Temperature | 8 minutes max. |

Dimensions (SMB/DO-214AA)

| Symbol | Millimeters | | Inches | |
|--------|-------------|------|--------|-------|
| | Min. | Max. | Min. | Max. |
| L | 4.22 | 4.70 | 0.166 | 0.185 |
| D | 3.40 | 3.94 | 0.134 | 0.155 |
| D1 | 1.90 | 2.20 | 0.075 | 0.086 |
| T | 5.21 | 5.59 | 0.205 | 0.220 |
| T1 | 0.91 | 1.42 | 0.036 | 0.056 |
| d | 0.05 | 0.20 | 0.002 | 0.008 |
| H | 1.95 | 2.40 | 0.077 | 0.095 |

Packaging

| Tape | | Symbol | Dimension (mm) |
|------|--|---------------------------------------|----------------|
| | | W | 12.00±0.30 |
| | | P0 | 4.00±0.10 |
| | | P1 | 8.00±0.10 |
| | | P2 | 2.00±0.10 |
| | | D0 | Φ1.55±0.05 |
| | | D1 | Φ1.55±0.05 |
| | | E | 1.75±0.10 |
| | | F | 5.50±0.10 |
| | | A0 | 3.76±0.10 |
| | | B0 | 5.69±0.10 |
| | | K0 | 2.70±0.10 |
| | | T | 0.25±0.10 |
| | | D2 | Φ330.0±2.0 |
| | | D3 | Φ13.5±0.5 |
| | | H | 2.5±0.5 |
| | | W1 | 16.0±1.0 |
| | | Quantity: 2500PCS P0080SB: 3000PCS | |