

Thyristor Surge Suppressors (TSS) Data Sheet

Description

DO-214AC 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 – maximum current required to maintain on state |
| C_O | Off-state Capacitance – typical capacitance measured in off state |
| I_{PP} | Peak Pulse Current – maximum rated peak impulse current |
| I_{TSM} | Peak One-cycle Surge Current – maximum rated one-cycle AC current |
| di/dt | Rate of Rise of Current – maximum rated value of the acceptable rate of rise in current over time |

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) | Marking |
|-------------|----------------------|--------------------|--------------------|-----------------------|---------------------|--------------------|---------------------|---------------------|---------|
| P0080TA | 6 | 25 | 4 | 5 | 800 | 2.2 | 50 | 50 | P008A |
| P0300TA | 25 | 40 | 4 | 5 | 800 | 2.2 | 50 | 70 | P03A |
| P0640TA | 58 | 77 | 4 | 5 | 800 | 2.2 | 150 | 50 | P06A |
| P0720TA | 65 | 88 | 4 | 5 | 800 | 2.2 | 150 | 50 | P07A |
| P0900TA | 75 | 98 | 4 | 5 | 800 | 2.2 | 150 | 45 | P09A |
| P1100TA | 90 | 130 | 4 | 5 | 800 | 2.2 | 150 | 45 | P11A |
| P1300TA | 120 | 160 | 4 | 5 | 800 | 2.2 | 150 | 45 | P13A |
| P1500TA | 140 | 180 | 4 | 5 | 800 | 2.2 | 150 | 40 | P15A |
| P1800TA | 170 | 220 | 4 | 5 | 800 | 2.2 | 150 | 40 | P18A |
| P2300TA | 190 | 260 | 4 | 5 | 800 | 2.2 | 150 | 35 | P23A |
| P2600TA | 220 | 300 | 4 | 5 | 800 | 2.2 | 150 | 35 | P26A |
| P3100TA | 275 | 350 | 4 | 5 | 800 | 2.2 | 150 | 30 | P31A |
| P3500TA | 320 | 400 | 4 | 5 | 800 | 2.2 | 150 | 30 | P35A |


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.
- For surge ratings, see table below.

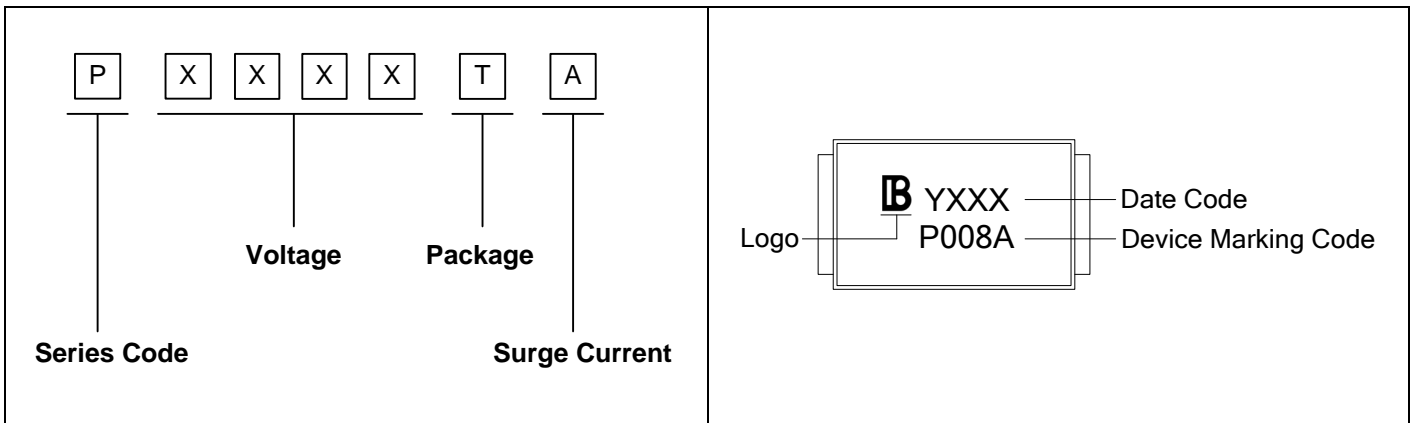
Surge Ratings

| Series | I _{PP} 2×10μs (A) | I _{PP} 8×20μs (A) | I _{PP} 10×160μs (A) | I _{PP} 10×560μs (A) | I _{PP} 10×1000μs (A) | I _{TSM} 60Hz (A) | di/dt (A/μs) |
|--------|----------------------------|----------------------------|------------------------------|------------------------------|-------------------------------|---------------------------|--------------|
| A | 150 | 150 | 90 | 50 | 45 | 20 | 500 |

Thermal Considerations

| Package DO-214AC/SMA | Symbol | Parameter | Value | Unit |
|---|------------------|--|-------------|------|
|  | T _J | Operating Junction Temperature | -40 to +125 | °C |
| | T _S | Storage Temperature Range | -40 to +150 | °C |
| | R _{θJA} | Junction to Ambient on printed circuit | 120 | °C/W |

Part Number Code and Marking



Characteristics Curves

Figure 1. V-I Characteristics

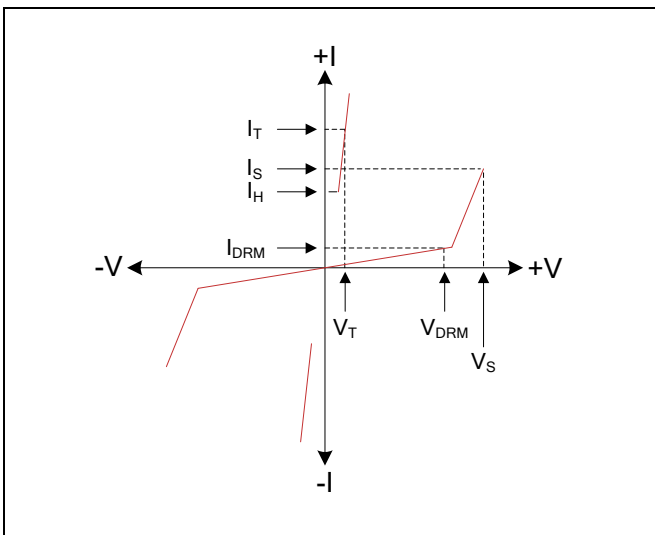


Figure 2. $t_r \times t_d$ Pulse Wave-form

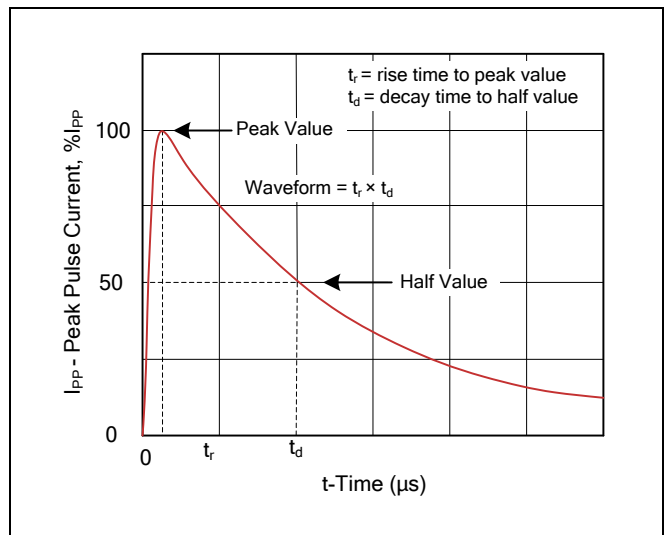


Figure 3. Normalized V_S Change versus Junction Temperature

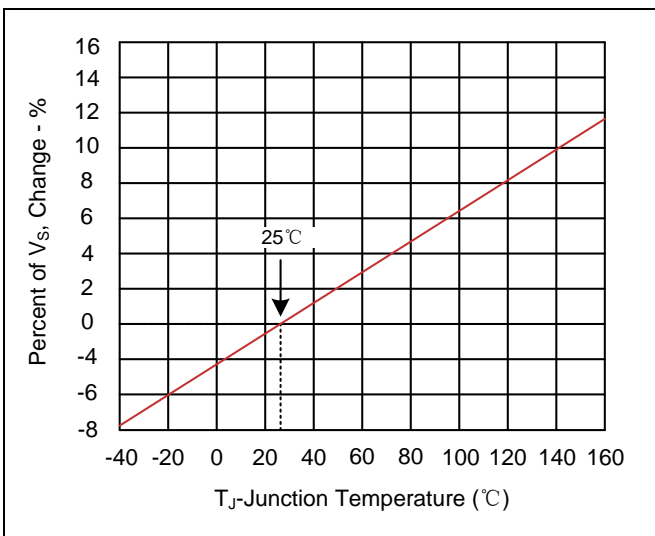
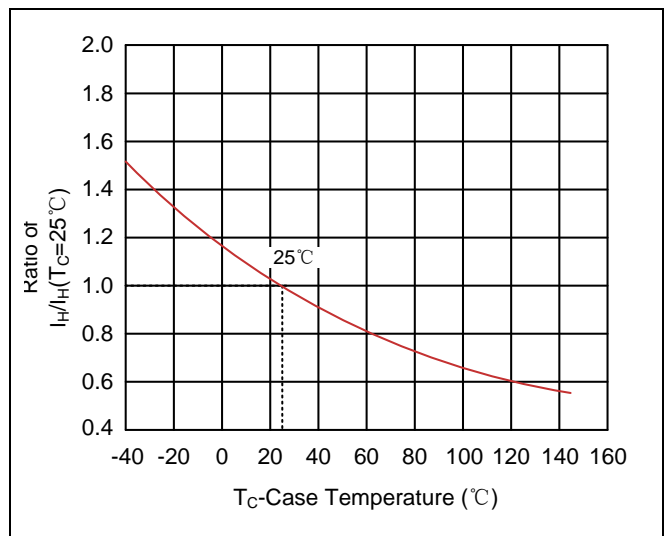
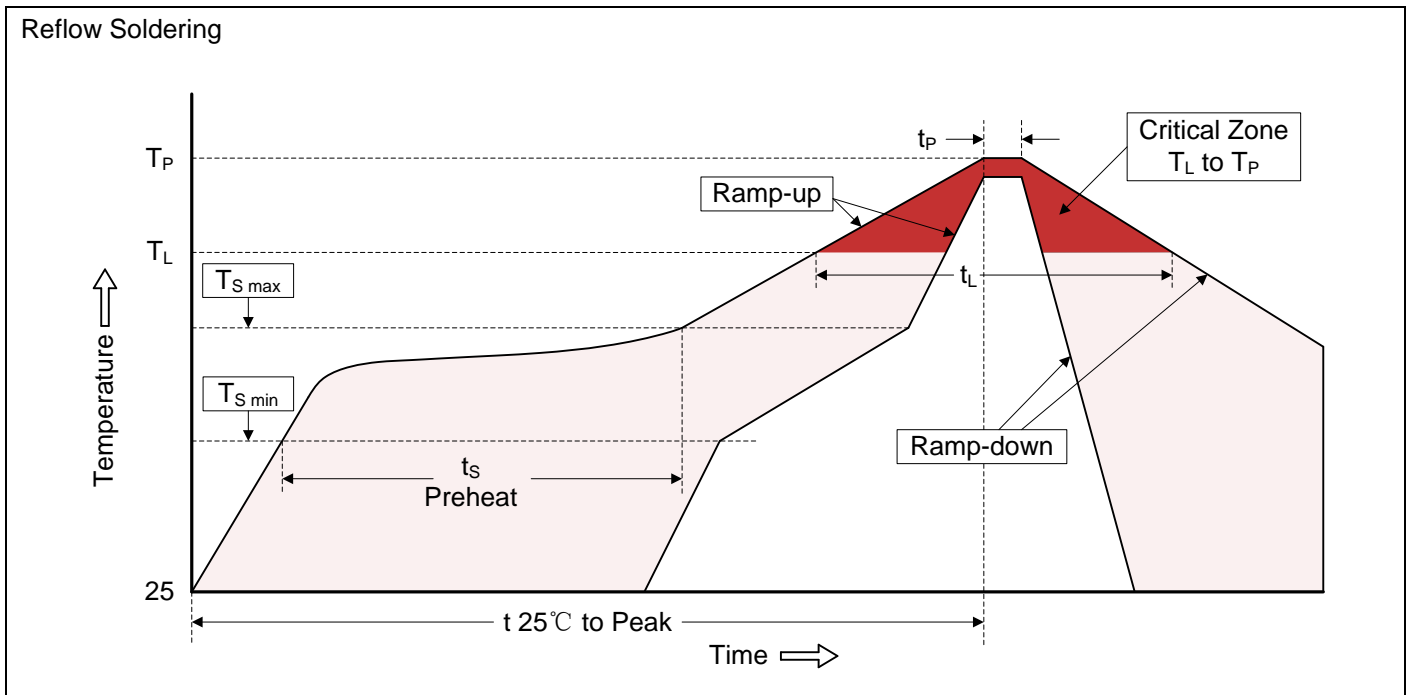


Figure 4. Normalized DC Holding Current versus Case Temperature



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 (SMA/DO-214AC)

| | Millimeters | | Inches | | |
|---|-------------|------|--------|-------|-------|
| | Symbol | Min. | Max. | Min. | Max. |
| | L | 3.99 | 4.50 | 0.157 | 0.177 |
| | D | 2.54 | 2.79 | 0.100 | 0.110 |
| | D1 | 1.25 | 1.65 | 0.049 | 0.065 |
| | T | 4.93 | 5.28 | 0.194 | 0.208 |
| | T1 | 0.76 | 1.52 | 0.030 | 0.060 |
| | d | - | 0.203 | - | 0.008 |
| H | 2.00 | 2.50 | 0.079 | 0.098 | |

Packaging

| <p>Tape</p> | Symbol | Dimension (mm) |
|-------------|-------------------|----------------|
| | W | 12.00±0.20 |
| | P0 | 4.00±0.10 |
| | P1 | 4.00±0.10 |
| | P2 | 2.00±0.10 |
| | D0 | Φ1.50±0.10 |
| | D1 | Φ1.50±0.10 |
| | E | 1.75±0.10 |
| | F | 5.50±0.10 |
| | A0 | 2.79±0.10 |
| <p>Reel</p> | D2 | Φ330.0±2.0 |
| | D3 | Φ13.5±0.5 |
| | H | 2.5±0.5 |
| | W1 | 16.0±1.0 |
| | Quantity: 5000PCS | |