

Thyristor Surge Suppressors

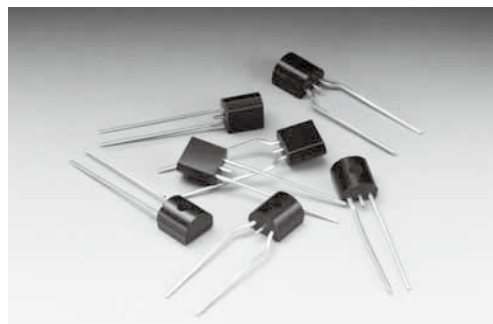
PxxxxEX Series
TO-92

Thyristor Surge Suppressors - PxxxxEX Series

Description

TO-92 Series are designed to protect baseband equipment such as modems, line cards, CPE and DSL from damaging overvoltage transients.

The series provides a cost-effective through-hole solution that enables equipment to comply with global regulatory standards.



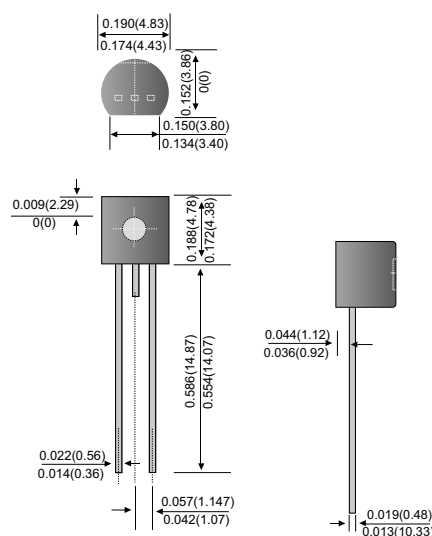
Features

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:

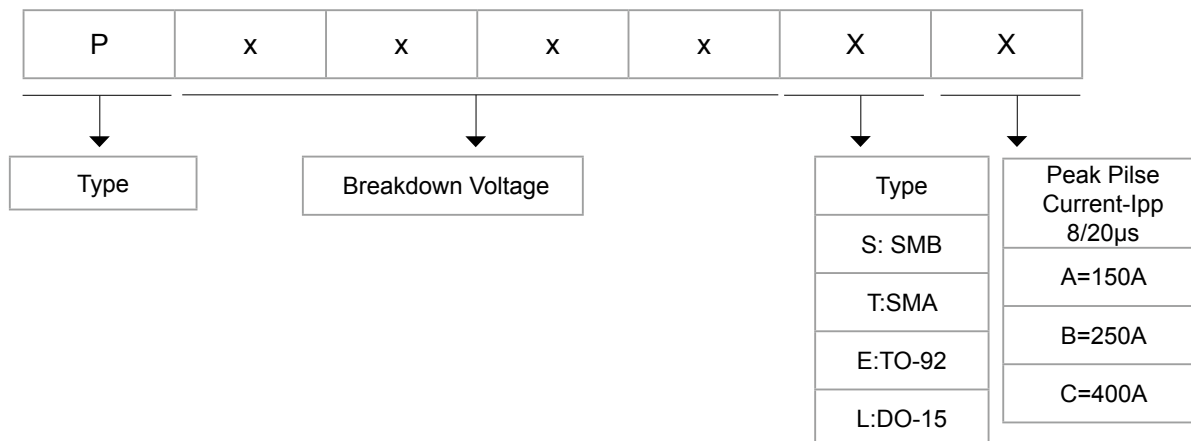
- Cannot be damaged by voltage
- Eliminate hysteresis and heat dissipation typically found with clamping devices
- Eliminate voltage overshoot caused by fast-rising transients
- Are non-degenerative
- Will not fatigue
- Have low capacitance, making them ideal for high-speed transmission equipment

Dimensions

(mm)
(inches)



Part Number Code



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Electrical Characteristics

| Type Number | V _{DRM} | I _{DRM} | V _S | I _H | I _S | I _T | V _T | C _J | |
|-------------|------------------|------------------|----------------|----------------|----------------|----------------|----------------|-------------------|-------------------|
| | V | μA | V | MA | MA | A | V | pF _{Min} | pF _{Max} |
| P0080EA | 6 | 5 | 25 | 50 | 800 | 2.2 | 4 | 25 | 150 |
| P0080EB | 6 | 5 | 25 | 50 | 800 | 2.2 | 4 | 25 | 150 |
| P0080EC | 6 | 5 | 25 | 50 | 800 | 2.2 | 4 | 35 | 260 |
| P0300EA | 25 | 5 | 40 | 50 | 800 | 2.2 | 4 | 15 | 140 |
| P0300EB | 25 | 5 | 40 | 50 | 800 | 2.2 | 4 | 15 | 140 |
| P0300EC | 25 | 5 | 40 | 50 | 800 | 2.2 | 4 | 25 | 250 |
| P0640EA | 58 | 5 | 77 | 150 | 800 | 2.2 | 4 | 40 | 60 |
| P0640EB | 58 | 5 | 77 | 150 | 800 | 2.2 | 4 | 40 | 60 |
| P0640EC | 58 | 5 | 77 | 150 | 800 | 2.2 | 4 | 55 | 155 |
| P0720EA | 65 | 5 | 88 | 150 | 800 | 2.2 | 4 | 35 | 60 |
| P0720EB | 65 | 5 | 88 | 150 | 800 | 2.2 | 4 | 35 | 75 |
| P0720EC | 65 | 5 | 88 | 150 | 800 | 2.2 | 4 | 50 | 150 |
| P0900EA | 75 | 5 | 98 | 150 | 800 | 2.2 | 4 | 35 | 55 |
| P0900EB | 75 | 5 | 98 | 150 | 800 | 2.2 | 4 | 35 | 70 |
| P0900EC | 75 | 5 | 98 | 150 | 800 | 2.2 | 4 | 45 | 140 |
| P1100EA | 90 | 5 | 130 | 150 | 800 | 2.2 | 4 | 30 | 50 |
| P1100EB | 90 | 5 | 130 | 150 | 800 | 2.2 | 4 | 30 | 70 |
| P1100EC | 90 | 5 | 130 | 150 | 800 | 2.2 | 4 | 45 | 115 |
| P1300EA | 120 | 5 | 160 | 150 | 800 | 2.2 | 4 | 25 | 45 |
| P1300EB | 120 | 5 | 160 | 150 | 800 | 2.2 | 4 | 25 | 60 |
| P1300EC | 120 | 5 | 160 | 150 | 800 | 2.2 | 4 | 40 | 105 |
| P1500EA | 140 | 5 | 180 | 150 | 800 | 2.2 | 4 | 25 | 40 |
| P1500EB | 140 | 5 | 180 | 150 | 800 | 2.2 | 4 | 25 | 55 |
| P1500EC | 140 | 5 | 180 | 150 | 800 | 2.2 | 4 | 35 | 95 |
| P1800EA | 170 | 5 | 220 | 150 | 800 | 2.2 | 4 | 25 | 35 |
| P1800EB | 170 | 5 | 220 | 150 | 800 | 2.2 | 4 | 25 | 50 |
| P1800EC | 170 | 5 | 220 | 150 | 800 | 2.2 | 4 | 35 | 90 |
| P2300EA | 190 | 5 | 260 | 150 | 800 | 2.2 | 4 | 25 | 35 |
| P2300EB | 190 | 5 | 260 | 150 | 800 | 2.2 | 4 | 25 | 50 |
| P2300EC | 190 | 5 | 260 | 150 | 800 | 2.2 | 4 | 30 | 80 |
| P2600EA | 220 | 5 | 300 | 150 | 800 | 2.2 | 4 | 20 | 35 |
| P2600EB | 220 | 5 | 300 | 150 | 800 | 2.2 | 4 | 20 | 45 |
| P2600EC | 220 | 5 | 300 | 150 | 800 | 2.2 | 4 | 30 | 80 |
| P3100EA | 275 | 5 | 350 | 150 | 800 | 2.2 | 4 | 20 | 35 |
| P3100EB | 275 | 5 | 350 | 150 | 800 | 2.2 | 4 | 20 | 45 |
| P3100EC | 275 | 5 | 350 | 150 | 800 | 2.2 | 4 | 30 | 70 |
| P3500EA | 320 | 5 | 400 | 150 | 800 | 2.2 | 4 | 20 | 35 |
| P3500EB | 320 | 5 | 400 | 150 | 800 | 2.2 | 4 | 20 | 40 |
| P3500EC | 320 | 5 | 400 | 150 | 800 | 2.2 | 4 | 25 | 65 |

Notes:


- Is: Switching Current – maximum current required to switch to on state
- IDRM: Leakage Current – maximum peak off-state current measured at VDRM
- IH: Holding Current – minimum current required to maintain on state
- IPP: Peak Pulse Current – maximum rated peak impulse current
- IT: On-state Current – maximum rated continuous on-state current
- VDRM: Peak Off-state Voltage – maximum voltage that can be applied while maintaining off state
- VT: On-state Voltage – maximum voltage measured at rated on-state current
- VS: Switching Voltage – maximum voltage prior to switching to on state

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Surge Ratings

| Series | Peak Pulse Current-Ipp(A) | | | | |
|--------|---------------------------|--------|----------|----------|-----------|
| | 2/10µs | 8/20µs | 10/160µs | 10/560µs | 10/1000µs |
| A | 200 | 150 | 100 | 60 | 50 |
| B | 250 | 250 | 150 | 100 | 80 |
| C | 500 | 400 | 200 | 120 | 100 |

Thermal Considerations

| Package | Symbol | Parameter | Value | Unit |
|--|--------|--|-------------|------|
|  TO-92 | TJ | Operating Junction Temperature | -40 to +150 | °C |
| | TS | Storage Temperature Range | -40 to +150 | °C |
| | RθJA | Junction to Ambient on printed circuit | 90 | °C/W |

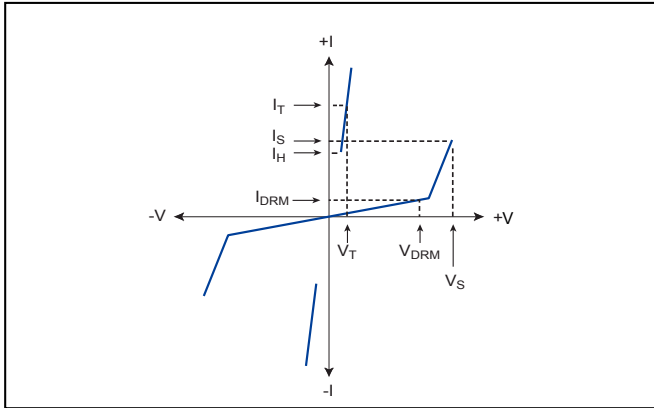
Thermal Considerations

| Part Number | Description | Quantity |
|-------------|-------------|----------|
| PXXXXEX | TO-92 | 1000 pcs |

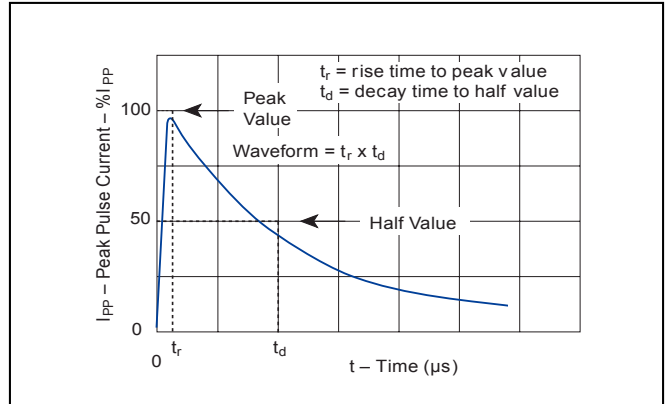
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Characteristics Curves

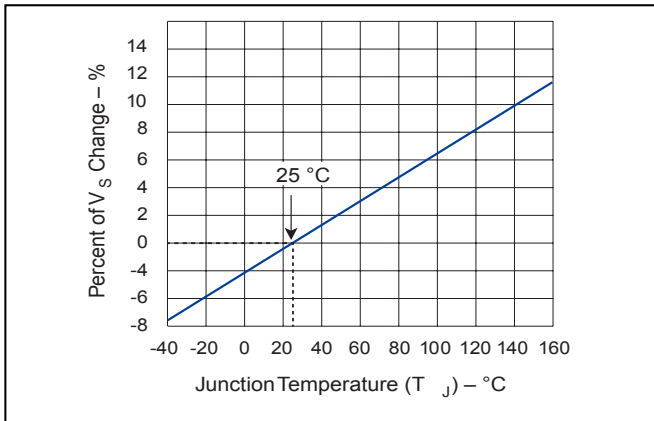
V-I Characteristics



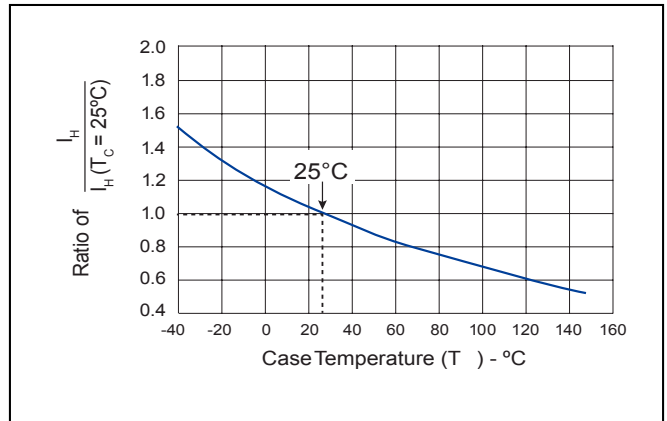
$t_r \times t_d$ Pulse Waveform



Normalized V_S Change vs. Junction Temperature

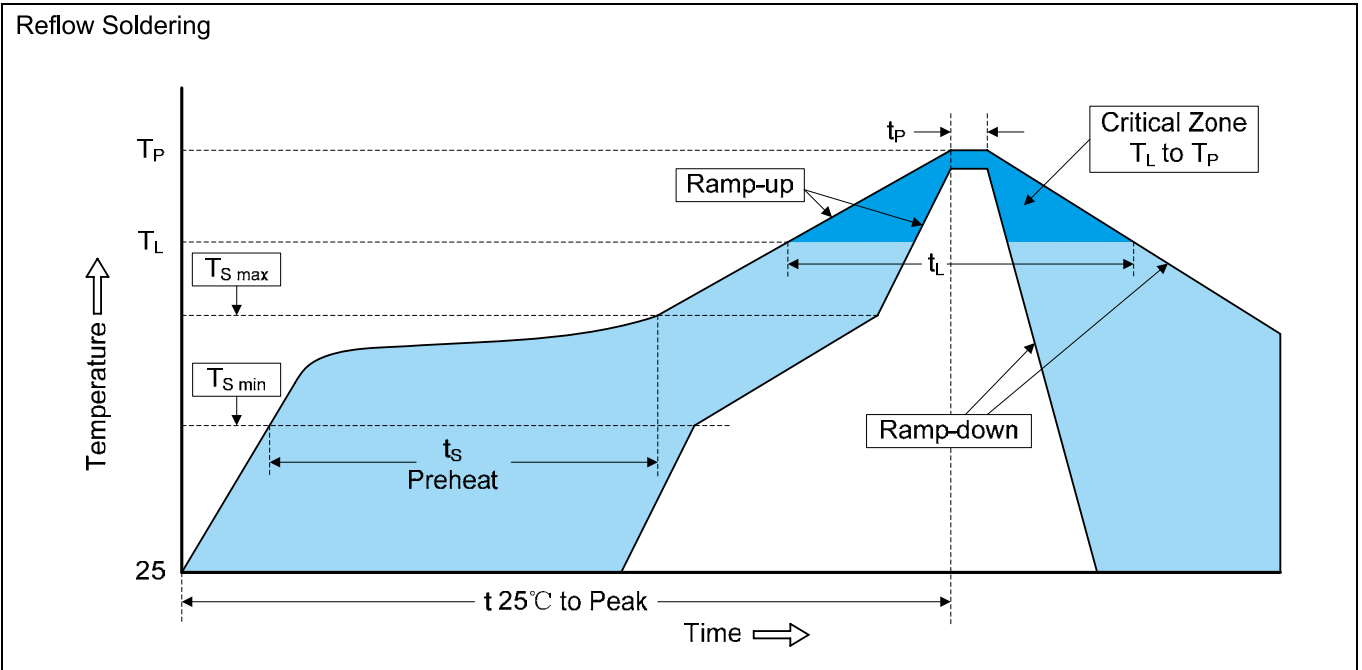


Normalized DC Holding Current vs. Case Temperature



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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 ($T_{S\ min}$) | 150°C |
| -Temperature Max ($T_{S\ max}$) | 200°C |
| -Time (min to max) (t_s) | 60-180 seconds |
| $T_{S\ max}$ to T_L | |
| -Ramp-up Rate | 3°C/second max. |
| Time maintained above: | |
| -Temperature (T_L) | 217°C |
| -Time (t_L) | 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. |

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