

## 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
$V_{DRM}$	<b>Peak Off-state Voltage</b> – maximum voltage that can be applied while maintaining off state
$V_S$	<b>Switching Voltage</b> – maximum voltage prior to switching to on state
$V_T$	<b>On-state Voltage</b> – maximum voltage measured at rated on-state current
$I_{DRM}$	<b>Leakage Current</b> – maximum peak off-state current measured at $V_{DRM}$
$I_S$	<b>Switching Current</b> – maximum current required to switch to on state
$I_T$	<b>On-state Current</b> – maximum rated continuous on-state current
$I_H$	<b>Holding Current</b> – minimum current required to maintain on state
$C_O$	<b>Off-state Capacitance</b> – typical capacitance measured in off state
$I_{PP}$	<b>Peak Pulse Current</b> – maximum rated peak impulse current
$I_{TSM}$	<b>Peak One-cycle Surge Current</b> – maximum rated one-cycle AC current
$di/dt$	<b>Rate of Rise of Current</b> – 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)	$I_{DRM}$ ( $\mu$ A)	$I_S$ (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.

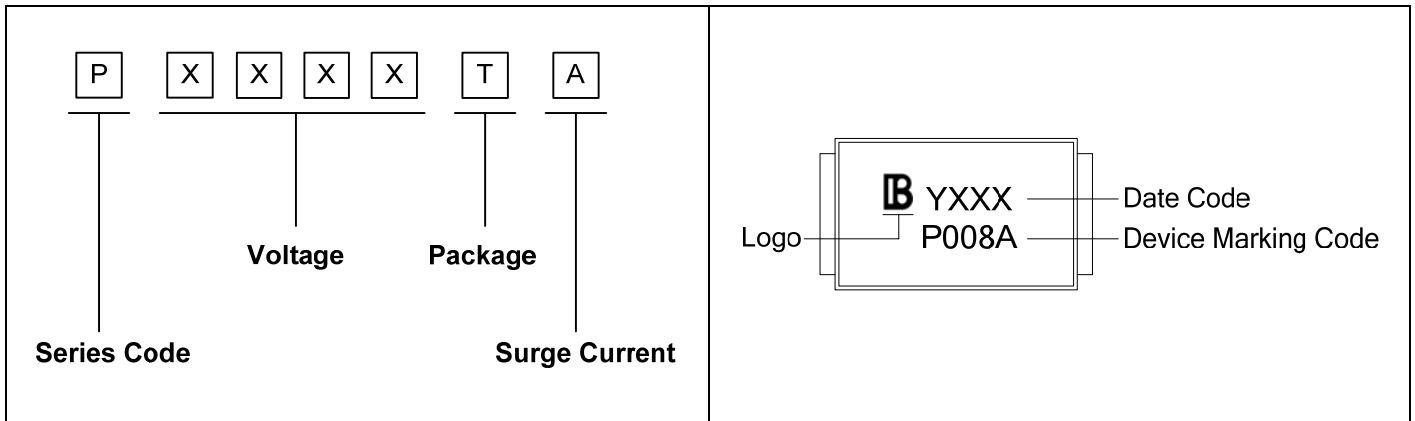
**Surge Ratings**

Series	$I_{PP}$ 2×10 $\mu$ s (A)	$I_{PP}$ 8×20 $\mu$ s (A)	$I_{PP}$ 10×160 $\mu$ s (A)	$I_{PP}$ 10×560 $\mu$ s (A)	$I_{PP}$ 10×1000 $\mu$ s (A)	$I_{TSM}$ 60Hz (A)	di/dt (A/ $\mu$ s)
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 +150	°C
	$T_S$	Storage Temperature Range	-40 to +150	°C
	$R_{\theta JA}$	Junction to Ambient on printed circuit	120	°C/W

Part Number Code and Marking



Characteristics Curves

Figure 1. V-I Characteristics

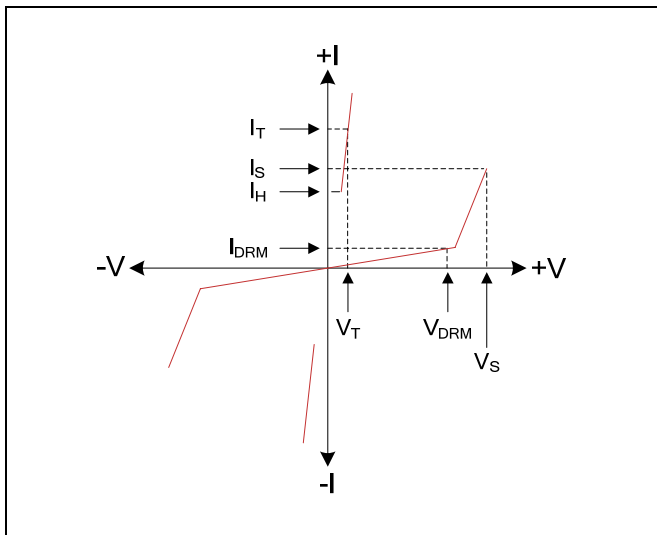


Figure 2.  $t_r \times t_d$  Pulse Wave-form

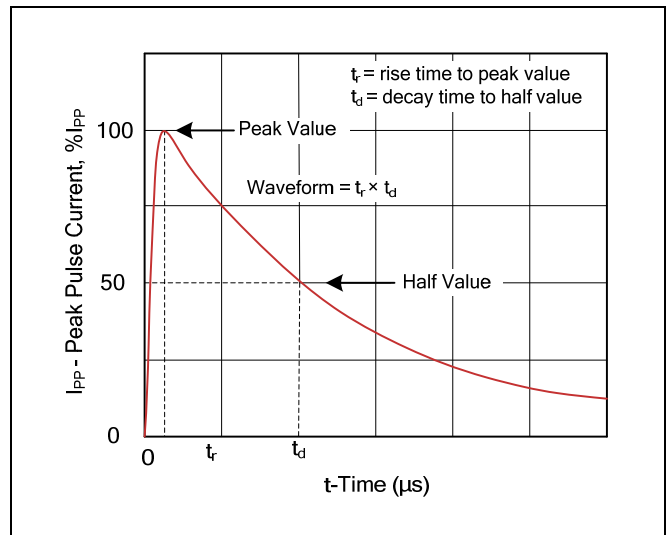


Figure 3. Normalized  $V_S$  Change versus Junction Temperature

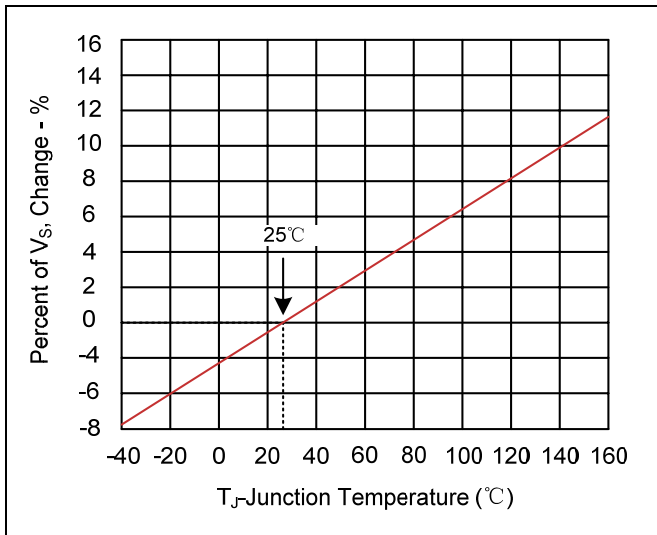
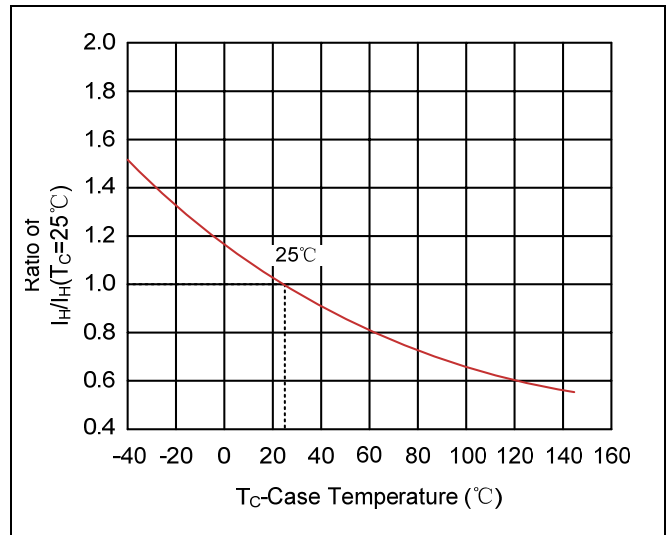
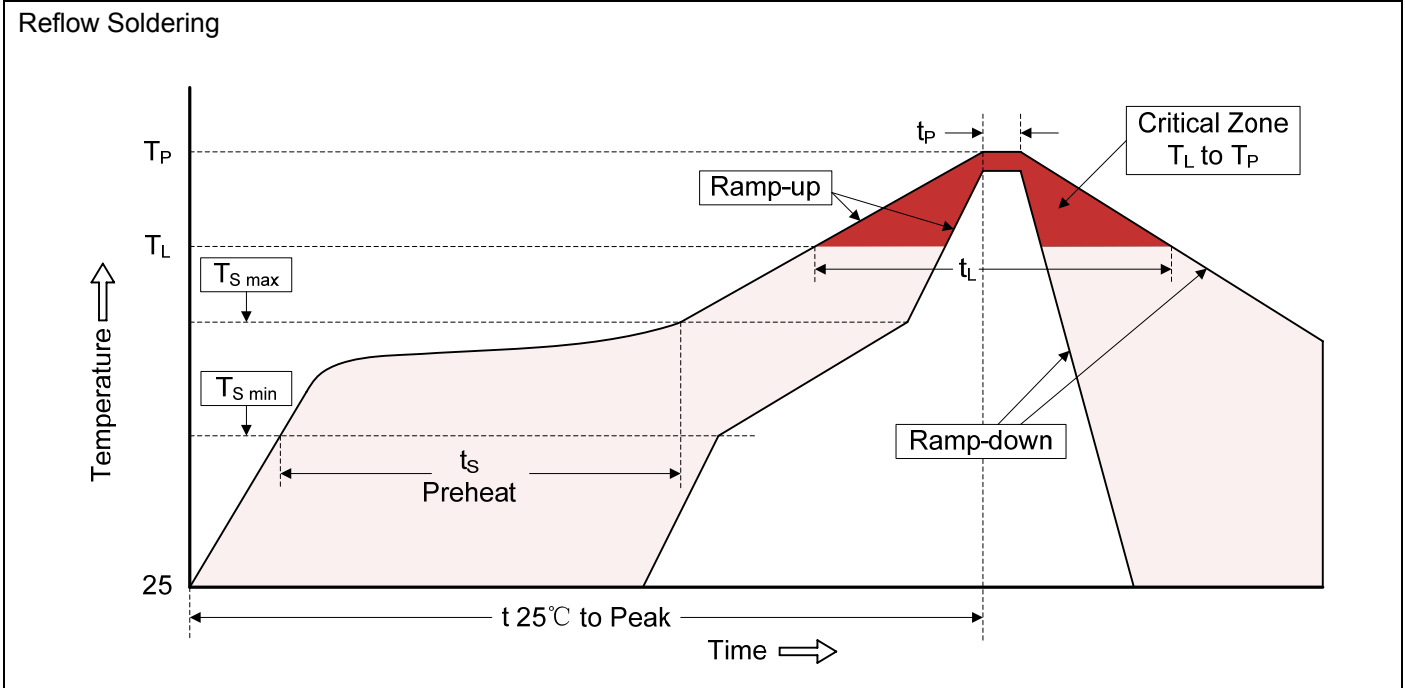


Figure 4. Normalized DC Holding Current versus Case Temperature



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)**

Symbol	Millimeters		Inches	
	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**

Tape		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
		B0	5.33±0.10
		K0	2.55±0.10
		T	0.25±0.05
		D2	Φ330.0±2.0
		D3	Φ13.5±0.5
		H	2.5±0.5
		W1	16.0±1.0
		Quantity: 5000PCS	