

# Thyristor Surge Suppressors

**PxxxxLX Series  
DO-15**

## Thyristor Surge Suppressors -PxxxxLX Series

### Description

DO-15 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.

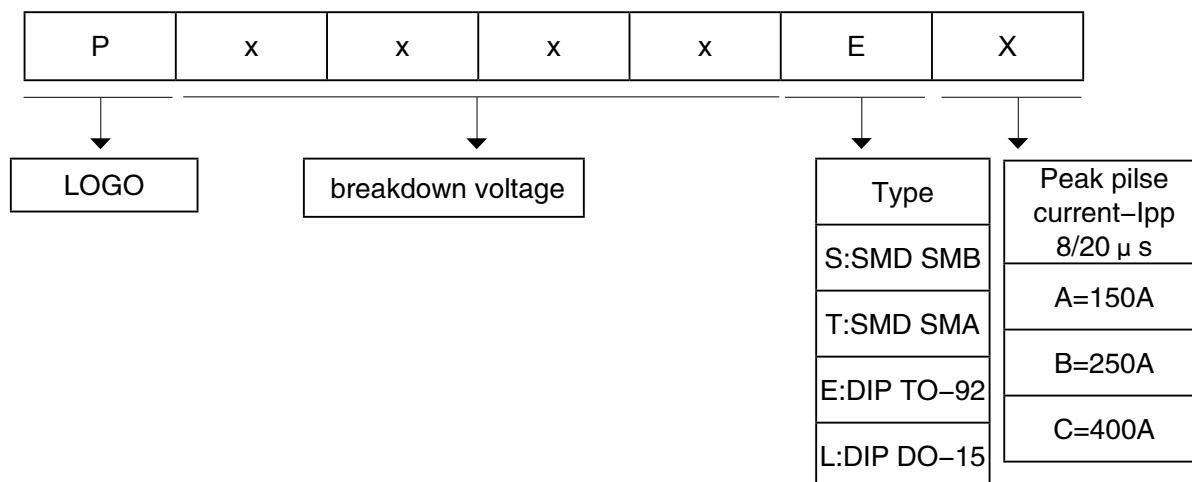


### Features

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

### Part Number Code



## Electrical Characteristics

Type Number	VDRM	IDRM	VBO	IH	IS	IT	VT	CJ	
	V	$\mu$ A	V	MA	MA	A	V	pFMin	pFMax
P0080LA	6	5	25	50	800	2.2	4	25	150
P0080LB	6	5	25	50	800	2.2	4	25	150
P0080LC	6	5	25	50	800	2.2	4	35	260
P0300LA	25	5	40	50	800	2.2	4	15	140
P0300LB	25	5	40	50	800	2.2	4	15	140
P0300LC	25	5	40	50	800	2.2	4	25	250
P0640LA	58	5	77	150	800	2.2	4	40	60
P0640LB	58	5	77	150	800	2.2	4	40	60
P0640LC	58	5	77	150	800	2.2	4	55	155
P0720LA	65	5	88	150	800	2.2	4	35	60
P0720LB	65	5	88	150	800	2.2	4	35	75
P0720LC	65	5	88	150	800	2.2	4	50	150
P0900LA	75	5	98	150	800	2.2	4	35	55
P0900LB	75	5	98	150	800	2.2	4	35	70
P0900LC	75	5	98	150	800	2.2	4	45	140
P1100LA	90	5	130	150	800	2.2	4	30	50
P1100LB	90	5	130	150	800	2.2	4	30	70
P1100LC	90	5	130	150	800	2.2	4	45	115
P1300LA	120	5	160	150	800	2.2	4	25	45
P1300LB	120	5	160	150	800	2.2	4	25	60
P1300LC	120	5	160	150	800	2.2	4	40	105
P1500LA	140	5	180	150	800	2.2	4	25	40
P1500LB	140	5	180	150	800	2.2	4	25	55
P1500LC	140	5	180	150	800	2.2	4	35	95
P1800LA	170	5	220	150	800	2.2	4	25	35
P1800LB	170	5	220	150	800	2.2	4	25	50
P1800LC	170	5	220	150	800	2.2	4	35	90
P2300LA	190	5	260	150	800	2.2	4	25	35
P2300LB	190	5	260	150	800	2.2	4	25	50
P2300LC	190	5	260	150	800	2.2	4	30	80
P2600LA	220	5	300	150	800	2.2	4	20	35
P2600LB	220	5	300	150	800	2.2	4	20	45
P2600LC	220	5	300	150	800	2.2	4	30	80
P3100LA	275	5	350	150	800	2.2	4	20	35
P3100LB	275	5	350	150	800	2.2	4	20	45
P3100LC	275	5	350	150	800	2.2	4	30	70
P3500LA	320	5	400	150	800	2.2	4	20	35
P3500LB	320	5	400	150	800	2.2	4	20	40
P3500LC	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

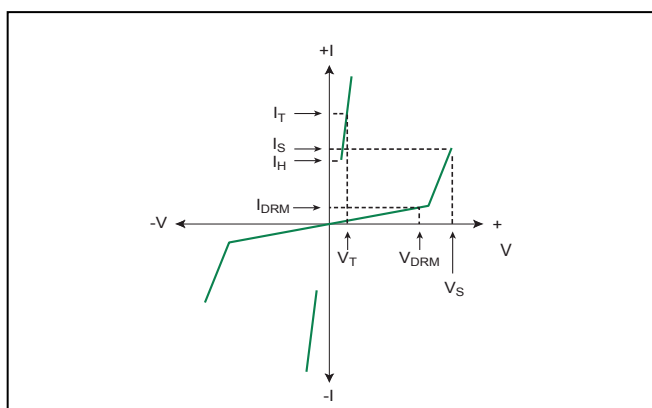
### Surge Ratings

SERIES	Peak Pulse Current-I <sub>pp</sub> (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

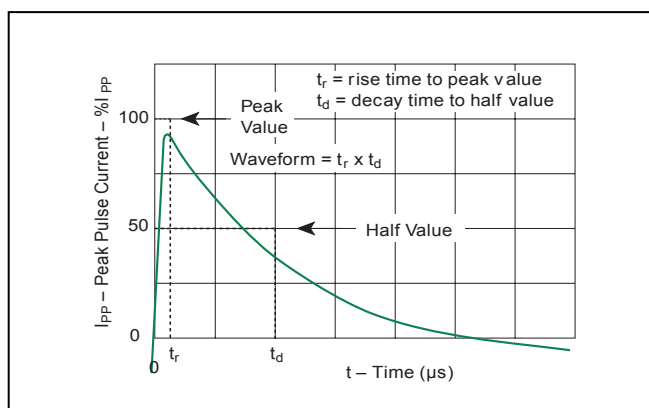
Notes:

- 1 Current waveform in μs
- 2 Voltage waveform in μs
- Peak pulse current rating (I<sub>pp</sub>) is repetitive and guaranteed for the life of the product.
- I<sub>pp</sub> ratings applicable over temperature range of -40°C to +85°C
- The device must initially be in thermal equilibrium with -40°C ≤ T<sub>j</sub> ≤ +150°C

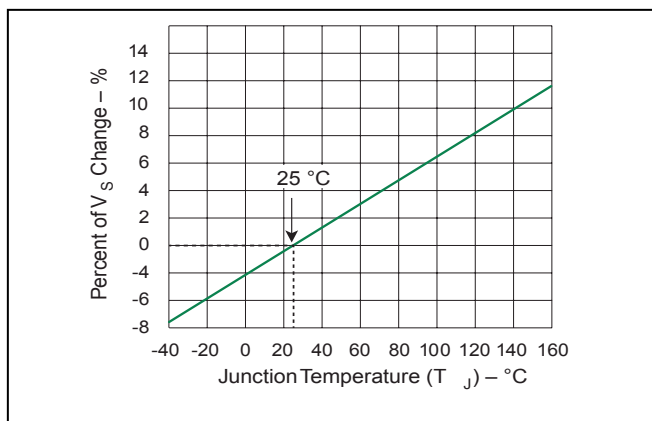
#### V-I Characteristics



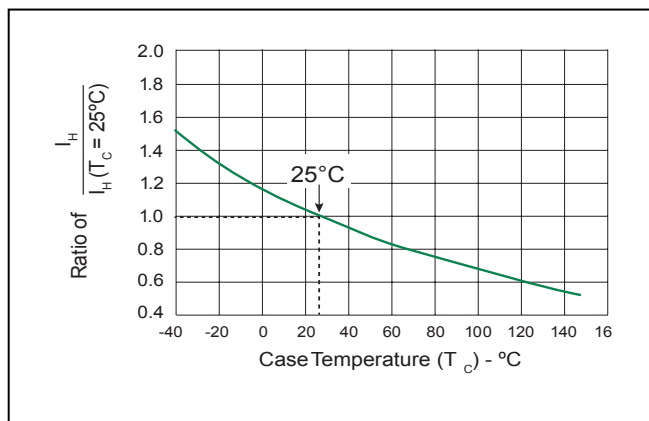
#### t<sub>r</sub> x t<sub>d</sub> Pulse Waveform



#### Normalized V<sub>s</sub> Change vs. Junction Temperature



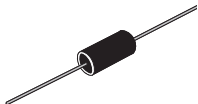
#### Normalized DC Holding Current vs. Case Temperature



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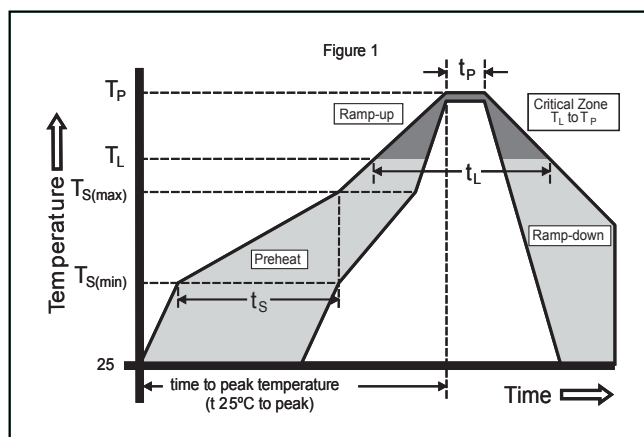
## Thyristor Surge Suppressors - PxxxxLX Series

### Thermal Considerations

Package	Symbol	Parameter	Value	Unit
 DO-15	$T_J$	Operating Junction Temperature Range	-40 to +150	°C
	$T_S$	Storage Temperature Range	-65 to +150	°C
	$R_{\theta JA}$	Thermal Resistance: Junction to Ambient	60	°C/W

### Soldering Parameters

Reflow Condition		Pb-Free assembly (see Fig. 1)
Pre Heat	-Temperature Min ( $T_{s(min)}$ )	+150°C
	-Temperature Max ( $T_{s(max)}$ )	+200°C
	-Time (Min to Max) ( $t_p$ )	60-180 secs.
Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak)		3°C/sec. Max.
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		3°C/sec. Max.
Reflow	-Temperature ( $T_L$ ) (Liquidus)	+217°C
	-Temperature ( $t_L$ )	60-150 secs.
Peak Temp ( $T_p$ )		+260(+0/-5)°C
Time within 5°C of actual Peak Temp ( $t_p$ )		30 secs. Max.
Ramp-down Rate		6°C/sec. Max.
Time 25°C to Peak Temp ( $T_p$ )		8 min. Max.



# Thyristor Surge Suppressors -PxxxxLX Series

## Physical Specifications

Lead Material	Copper Alloy
Terminal Finish	100% Matte-Tin Plated
Body Material	UL recognized epoxy meeting flammability classification 94V-0

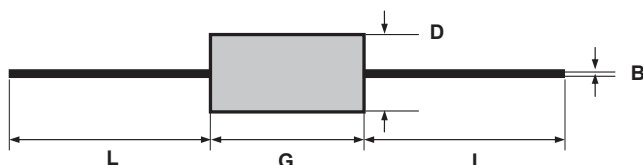
## Packing Options

Package Type	Description	Quantity	Added Suffix	Industry Standard
L	DO-15 Axial Tape & Reel	2000	RP	EIA-RS-296-D

## Environmental Specifications

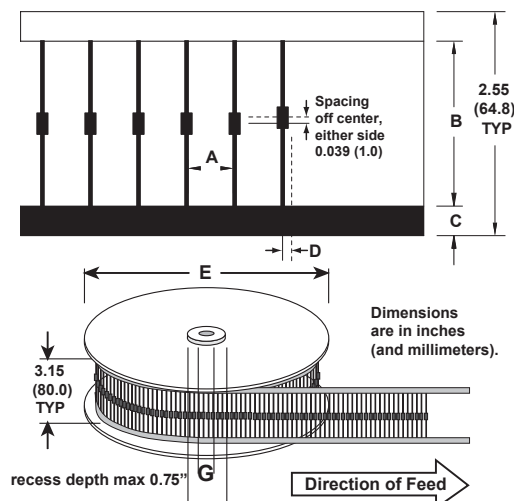
High Temp Voltage Blocking	80% Rated $V_{DRM}$ ( $V_{AC}$ Peak) +125°C or +150°C, 504 or 1008 hrs. MIL-STD-750 (Method 1040) JEDEC, JESD22-A-101
Temp Cycling	-65°C to +150°C, 15 min. dwell, 10 up to 100 cycles. MIL-STD-750 (Method 1051) EIA/JEDEC, JESD22-A104
Biased Temp & Humidity	52 $V_{DC}$ (+85°C) 85%RH, 504 up to 1008 hrs. EIA/JEDEC, JESD22-A-101
High Temp Storage	+150°C 1008 hrs. MIL-STD-750 (Method 1031) JEDEC, JESD22-A-101
Low Temp Storage	-65°C, 1008 hrs.
Thermal Shock	0°C to +100°C, 5 min. dwell, 10 sec. transfer, 10 cycles. MIL-STD-750 (Method 1056) JEDEC, JESD22-A-106
Autoclave (Pressure Cooker Test)	+121°C, 100%RH, 2atm, 24 up to 168 hrs. EIA/JEDEC, JESD22-A-102
Resistance to Solder Heat	+260°C, 30 secs. MIL-STD-750 (Method 2031)
Moisture Sensitivity Level	85%RH, +85°C, 168 hrs., 3 reflow cycles (+260°C Peak). JEDEC-J-STD-020, Level 1

## Dimensions — DO-15



Dimension	Inches		Millimeters	
	MIN	MAX	MIN	MAX
B	0.028	0.034	0.711	0.864
D	0.12	0.14	3.048	3.556
G	0.235	0.27	5.969	6.858
L	1		25.4	

## Tape and Reel Specification — DO-15



Symbols	Description	Inches	MM
A	Component Spacing (lead to lead)	0.200 ± 0.020"	5.08 ± 0.508
B	Inner Tape Pitch	2.062 ± 0.059"	52.37 ± 1.498
C	Tape Width	0.250"	6.35
D	Max. Off Alignment	0.048"	1.219
E	Reel Dimension	13"	330.2
F	Max. Hub Recess	3"	76.19
G	Max. Abor Hole	0.68"	17.27

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