

P0080EB - P5000EB Series - TO-92

ROHS

@10/700 μ S, 4KV

Thyristor Surge Suppressors (TSS)

Description

P0080EB - P5000EB Series are designed to protect broadband equipment such as modems, line card, CPE and DSL from damaging over-voltage transients.

The series provides a surface mount solution that enables equipment to comply with global regulatory standards.

Features and Benefits

- ◆ Low voltage overshoot
- ◆ Low on-state voltage
- ◆ Does not degrade surge capability after multiple surge events within limit
- ◆ Fails short circuit when surged in excess of ratings
- ◆ Low Capacitance

Applicable Global Standards

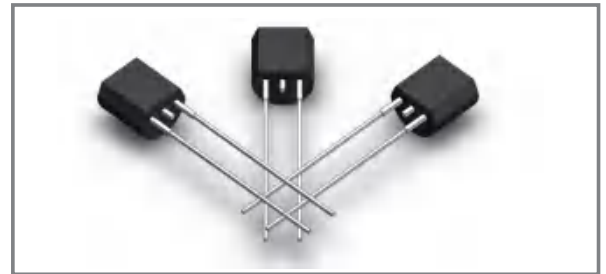
- ◆ TIA-968-A / TIA-968-B
- ◆ ITU K.20/21 Enhanced level
- ◆ ITU K.20/21 Basic Level
- ◆ GR 1089 Inter building
- ◆ IEC 6100-4-5
- ◆ YD/T 1082
- ◆ YD/T 993
- ◆ YD/T 950

Electrical Parameters

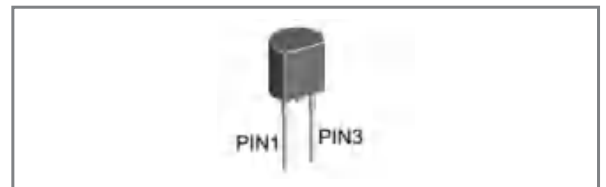
Parameter	Definition
I_S	Switching Current - maximum current required to switch to on state
I_{DRM}	Leakage Current - maximum peak off-state current measured at V_{DRM}
I_H	Holding Current - minimum current required to maintain on state
I_T	On-state Current - maximum rated continuous on-state current
V_S	Switching Voltage - maximum voltage prior to switching to on state
V_{DRM}	Peak Off-state Voltage - maximum voltage that can be applied while maintaining off state
V_T	On-state Voltage - maximum voltage measured at rated on-state current
C_0	Off-state Capacitance - typical capacitance measured in off state



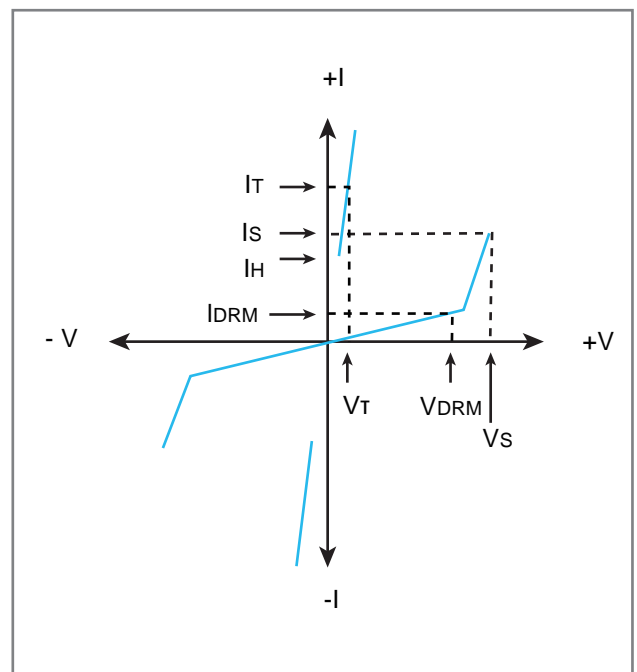
www.unsemi.com.tw



Pinout Designation



Schematic Symbol



Electrical Characteristics

Part Number	Marking	V_{DRM} @ $I_{DRM}=5\mu A$	I_{DRM}	V_s @100V/ μ S	I_s	V_T @ $I_T=2.2A$	I_T	I_H	C_o @1MHz
		VMin.	μ A Max.	VMax.	mA Max.	VMax.	A Max.	mA Min.	pF Max.
P0080EB	P0080EB	6	5	25	800	4	2.2	50	85
P0300EB	P0300EB	25	5	40	800	4	2.2	50	85
P0640EB	P0640EB	58	5	77	800	4	2.2	150	60
P0720EB	P0720EB	65	5	88	800	4	2.2	150	60
P0900EB	P0900EB	75	5	98	800	4	2.2	150	55
P1100EB	P1100EB	90	5	130	800	4	2.2	150	55
P1300EB	P1300EB	120	5	160	800	4	2.2	150	55
P1500EB	P1500EB	140	5	180	800	4	2.2	150	60
P1800EB	P1800EB	170	5	220	800	4	2.2	150	60
P2000EB	P2000EB	180	5	220	800	4	2.2	150	60
P2300EB	P2300EB	190	5	260	800	4	2.2	150	55
P2600EB	P2600EB	220	5	300	800	4	2.2	150	50
P3100EB	P3100EB	275	5	350	800	4	2.2	150	45
P3500EB	P3500EB	320	5	400	800	4	2.2	150	40
P3800EB	P3800EB	360	5	460	800	4	2.2	150	30
P4200EB	P4200EB	400	5	520	800	4	2.2	150	30
P4500EB	P4500EB	420	5	540	800	4	2.2	150	30
P5000EB	P5000EB	440	5	600	800	4	2.2	150	30

Notes:

- Absolute maximum ratings measured at TA= 25°C (unless otherwise noted).
- Devices are bi-directional.


Surge Ratings

Series	2/10 μ S ¹	8/20 μ S ¹	10/560 μ S ¹	10/560 μ S ¹	10/1000 μ S ¹	5/320 μ S ¹	I_{TSM} 50/60Hz	di/dt
	2/10 μ S ²	1.2/50 μ S ²	10/560 μ S ²	10/560 μ S ²	10/1000 μ S ²	10/700 μ S ²		
	A min	A min	A min	A min	A min	A min	A min	Amps/ μ s max
B	250	250	250	200	80	100	30	500

Notes:

- Current waveform in μ s
 - Voltage waveform in μ s
- Peak pulse current rating (IPP) is repetitive and guaranteed for the life of the product.
 - IPP ratings applicable over temperature range of -40°C to +85°C
 - The device must initially be in thermal equilibrium with -40°C < TJ < +150°C

Thermal Considerations

Package	Symbol	Parameter	Value	Unit
	TJ	Operating Junction Temperature Range	- 40 to +150	°C
	Ts	Storage Temperature Range	- 40 to +150	°C
	R θ JA	Thermal Resistance: Junction to Ambient	90	°C/W

Characteristic Curves

Figure 1 - V- I Characteristics

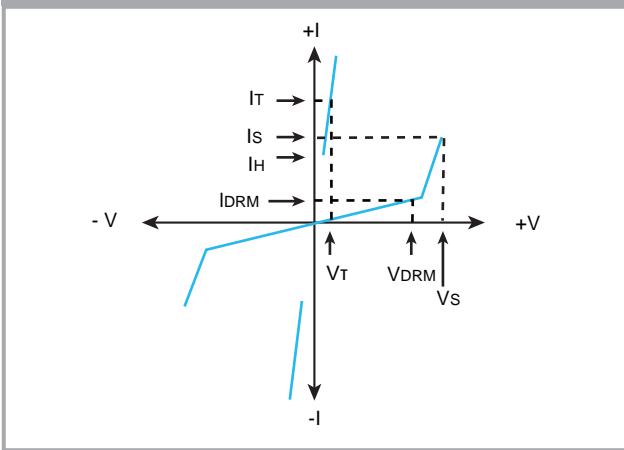


Figure 2 - $t_r \times t_d$ Pulse Waveform

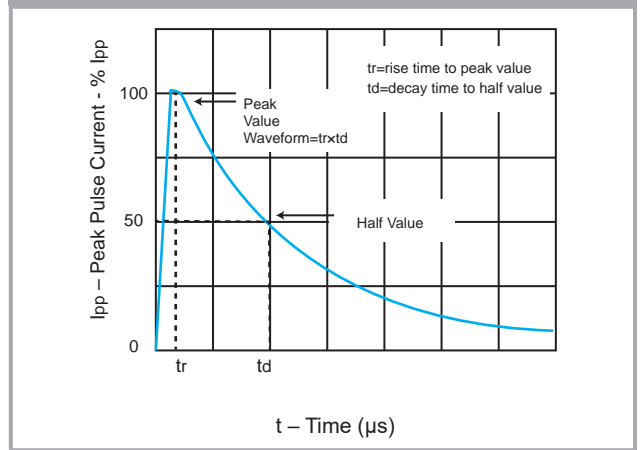


Figure 3 - Normalized V_S Change Versus Junction Temperature

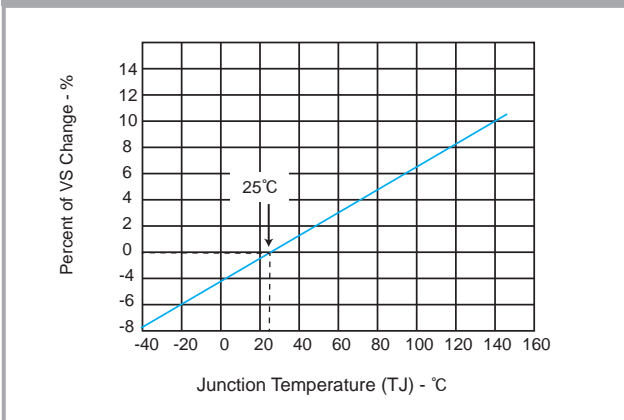
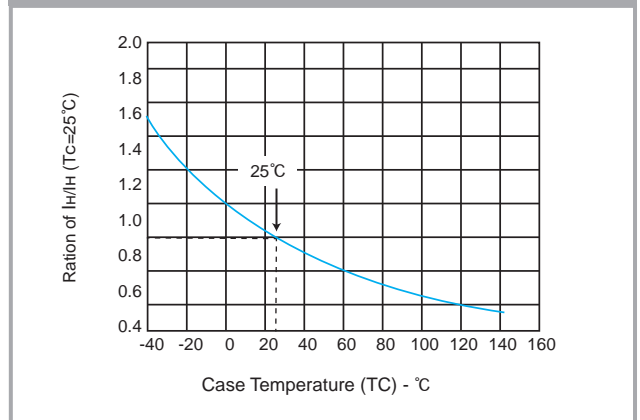


Figure 4 - Normalized DC Holding Current Versus Case Temperature



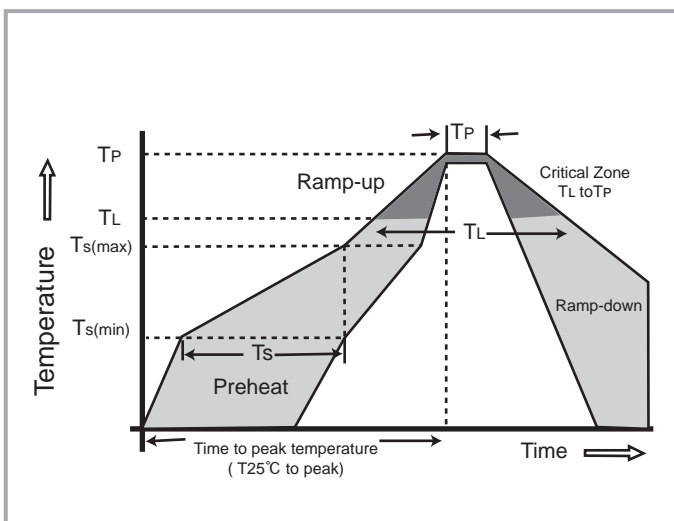
Environmental Specifications

High Temp Voltage Blocking	80% Rated VDRM (VAC Peak) +125°C or +150°C, Lead Material Copper Alloy High Temp Voltage Blocking 504 or 1008 hrs. MIL-STD-750 (Method 1040) JEDEC, JESD22-A-101
Temp Cying	-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 VDC (+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, Thermal Shock 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/Cooker Test) 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 Level (+260°C Peak). JEDEC-J-STD-020, Level 1

Physical Specifications

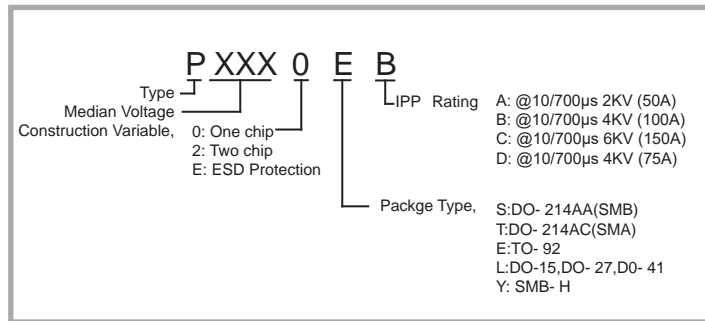
Lead Material	Copper Alloy
Terminal Finish	100% Matte-Tin Plated
Body Material	UL recognized epoxy meeting flammability classification 94V-0

Soldering Parameters

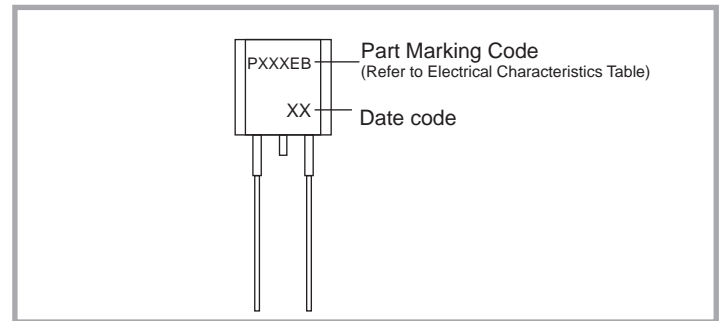


Reflow Condition		Lead-free assembly
Pre Heat	-Temperature Min (Ts(min))	+150°C
	-Temperature Max (Ts(max))	+200°C
	- Time (min to max) (Ts)	60 -180 Seconds
Average ramp up rate (Liquidus Temp TL) to peak		3°C/Second max
Ts(max) to TL - Ramp-up Rate		5°C/Second max
Reflow	- Temperature (TL) (Liquidus)	217°C
	- Time (min to max) (Ts)	60 -150 Seconds
Peak Temperature (TP)		260 +0/-5°C
Time within 5°C of actual peak Temperature (TP)		30 Seconds Max
Ramp-down Rate		6°C/Second Max
Time 25°C to peak Temperature (TP)		8 minutes Max
Do not exceed		+260°C

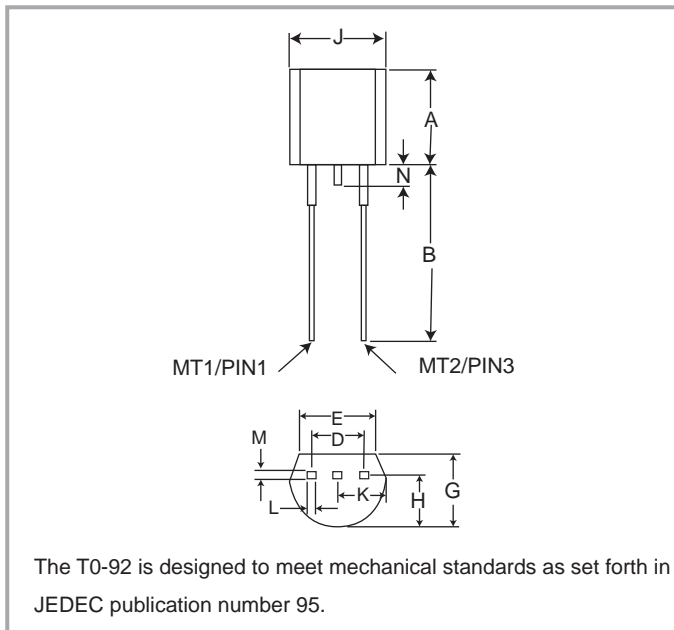
Part Numbering



Part Marking



Dimensions TO-92



Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.176	0.196	4.47	4.98
B	0.500		12.70	
D	0.095	0.105	2.41	2.67
E	0.150		3.81	
G	0.135	0.145	3.43	3.68
H	0.088	0.096	2.23	2.44
J	0.176	0.186	4.47	4.73
K	0.088	0.096	2.23	2.44
L	0.013	0.019	0.33	0.48
M	0.013	0.017	0.33	0.43
N		0.060		1.52

All leads are insulated from case. Case is electrically non-conductive.
(Rated at 1600 V(AC) RMS for one minute from leads to case over the operating temperature range.)

Mold flash shall not exceed 0.13 mm per side.

Packaging

Part Number	Description	Quantity
Pxxx0EB	TO-92 Bulk Pack	1000

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