MMT10B230T3, MMT10B260T3, MMT10B310T3

Preferred Device

Thyristor Surge Protectors

High Voltage Bidirectional TSPD

These Thyristor Surge Protective devices (TSPD) prevent overvoltage damage to sensitive circuits by lightning, induction and power line crossings. They are breakover–triggered crowbar protectors. Turn–off occurs when the surge current falls below the holding current value.

Secondary protection applications for electronic telecom equipment at customer premises.

- Outstanding High Surge Current Capability: 100 Amps 10x1000 μsec Guaranteed at the extended temp range of –20°C to 65°C
- The MMT10B230T3 Series is used to help equipment meet various regulatory requirements including: Bellcore 1089, ITU K.20 & K.21, IEC 950, UL 1459 & 1950 and FCC Part 68.
- Bidirectional Protection in a Single Device
- Little Change of Voltage Limit with Transient Amplitude or Rate
- Freedom from Wearout Mechanisms Present in Non–Semiconductor Devices
- Fail–Safe, Shorts When Overstressed, Preventing Continued Unprotected Operation.
- Surface Mount Technology (SMT)
- Complies with GR1089 Second Level Surge Spec at 500 Amps 2x10 μsec Waveforms
- UL Indicates UL Registered – File #E116110
- Device Marking: MMT10B230T3: RPDF; MMT10B260T3: RPDG; MMT10B310T3: RPDJ, and Date Code

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

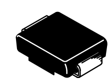
Rating	Symbol	Value	Unit
Off–State Voltage – Maximum MMT10B230T3 MMT10B260T3 MMT10B310T3	V_{DM}	 ±170 ±200 ±270	Volts
Maximum Pulse Surge Short Circuit Current Non–Repetitive Double Exponential Decay Waveform (Notes 1. and 2.) 10 x 1000 μsec (–20°C to +65°C) 2 x 10 μsec 10 x 700 μsec	 I_{PPS1} I_{PPS2} I_{PPS3}	 ±100 ±500 ±180	A(pk)
Maximum Non–Repetitive Rate of Change of On–State Current Double Exponential Waveform, R = 2.0, L = 1.5 μH, C = 1.67 μF, I_{pk} = 110A	di/dt	±100	A/μs

1. Allow cooling before testing second polarity.
2. Measured under pulse conditions to reduce heating.

ON Semiconductor™

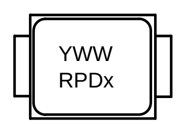
http://onsemi.com

BIDIRECTIONAL TSPD (UL)
100 AMP SURGE
265 thru 365 VOLTS



SMB
(No Polarity)
(Essentially JEDEC DO–214AA)
CASE 403C

MARKING DIAGRAMS



RPDx	= Specific Device Code	
x	= F, G or J	
Y	= Year	
WW	= Work Week	

ORDERING INFORMATION

Device	Package	Shipping
MMT10B230T3	SMB	12mm Tape and Reel (2.5K/Reel)
MMT10B260T3	SMB	12mm Tape and Reel (2.5K/Reel)
MMT10B310T3	SMB	12mm Tape and Reel (2.5K/Reel)

Preferred devices are recommended choices for future use and best overall value.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Operating Temperature Range Blocking or Conducting State	T_{J1}	–40 to +125	°C
Overload Junction Temperature – Maximum Conducting State Only	T_{J2}	+175	°C
Instantaneous Peak Power Dissipation (I_{pk} = 100 A, 10x1000 μsec @ 25°C)	P_{PK}	4000	W
Maximum Lead Temperature for Soldering Purposes 1/8″ from Case for 10 Seconds	T_L	260	°C

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

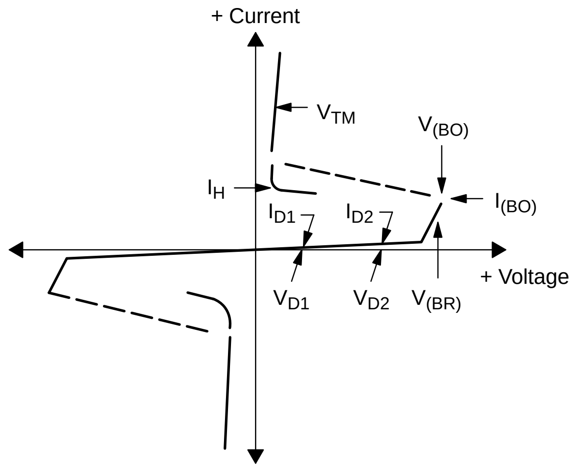
Devices are bidirectional. All electrical parameters apply to forward and reverse polarities.

Characteristic	Symbol	Min	Typ	Max	Unit
Breakover Voltage (Both polarities) (dv/dt = 100 V/μs, I_{SC} = 1.0 A, Vdc = 1000 V) MMT10B230T3 MMT10B260T3 MMT10B310T3 (+65°C) MMT10B230T3 MMT10B260T3 MMT10B310T3	$V_{(BO)}$	 – – – – – –	 – – – – – –	 265 320 365 290 340 400	Volts
Breakover Voltage (Both polarities) (f = 60 Hz, I_{SC} = 1.0 A(rms), V_{OC} = 1000 V(rms), MMT10B230T3 R_I = 1.0 kΩ, t = 0.5 cycle) (Note 3.) MMT10B260T3 MMT10B310T3 (+65°C) MMT10B230T3 MMT10B260T3 MMT10B310T3	$V_{(BO)}$	 – – – – – –	 – – – – – –	 265 320 365 290 340 400	Volts
Breakover Voltage Temperature Coefficient	$dV_{(BO)}/dT_J$	–	0.08	–	%/°C
Breakdown Voltage ($I_{(BR)}$ = 1.0 mA) Both polarities MMT10B230T3 MMT10B260T3 MMT10B310T3	$V_{(BR)}$	 – – –	 190 240 280	 – – –	Volts
Off State Current (V_{D1} = 50 V) Both polarities (V_{D2} = V_{DM}) Both polarities	I_{D1} I_{D2}	– –	– –	2.0 5.0	μA
On–State Voltage (I_T = 1.0 A) (PW ≤ 300 μs, Duty Cycle ≤ 2%) (Note 3.)	V_T	–	1.53	5.0	Volts
Breakover Current (f = 60 Hz, V_{DM} = 1000 V(rms), R_S = 1.0 kΩ) Both polarities	I_{BO}	–	260	–	mA
Holding Current (Both polarities) (Note 3.) V_S = 500 Volts; I_T (Initiating Current) = ± 1.0 A (+65°C)	I_H	175 130	270 –	– –	mA
Critical Rate of Rise of Off–State Voltage (Linear waveform, V_D = Rated V_{BR}, T_J = 25°C)	dv/dt	2000	–	–	V/μs
Capacitance (f = 1.0 MHz, 50 Vdc, 1.0 V rms Signal) (f = 1.0 MHz, 2.0 Vdc, 15 mV rms Signal)	C_O	– –	65 160	– 200	pF

3. Measured under pulse conditions to reduce heating.

Voltage Current Characteristic of TSPD (Bidirectional Device)

Symbol	Parameter
I_{D1}, I_{D2}	Off State Leakage Current
V_{D1}, V_{D2}	Off State Blocking Voltage
V_{BR}	Breakdown Voltage
V_{BO}	Breakover Voltage
I_{BO}	Breakover Current
I_H	Holding Current
V_{TM}	On State Voltage



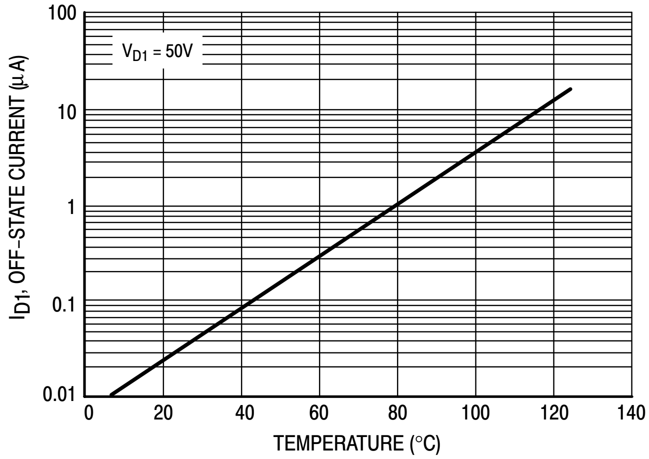


Figure 1. Off–State Current versus Temperature

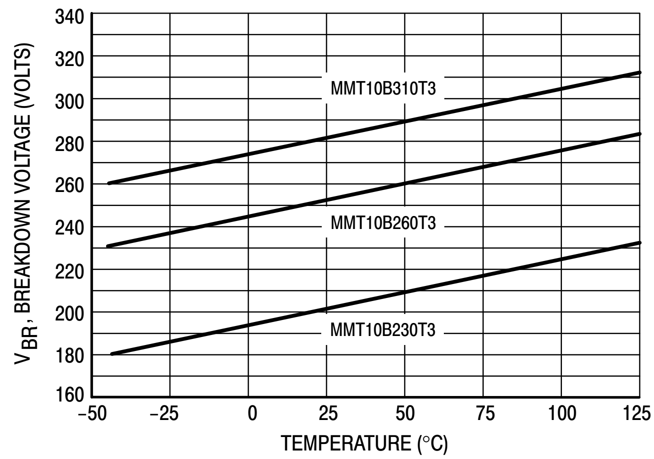


Figure 2. Breakdown Voltage versus Temperature

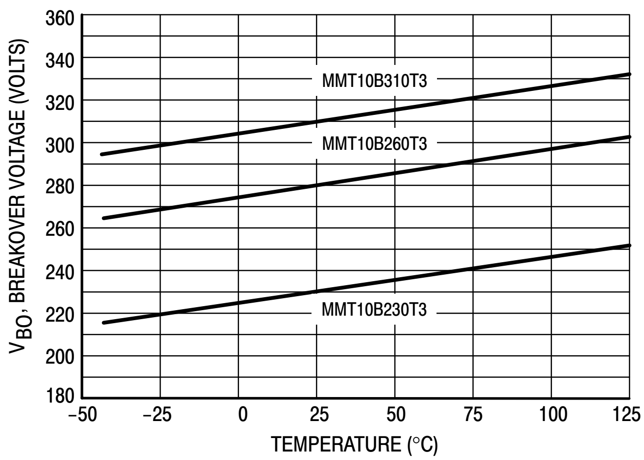


Figure 3. Breakover Voltage versus Temperature

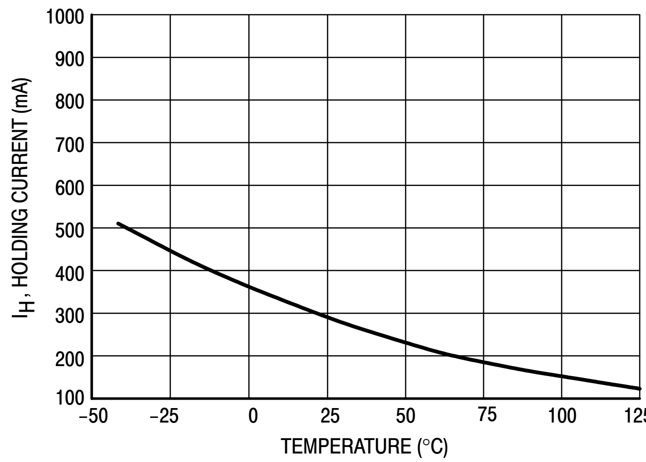


Figure 4. Holding Current versus Temperature

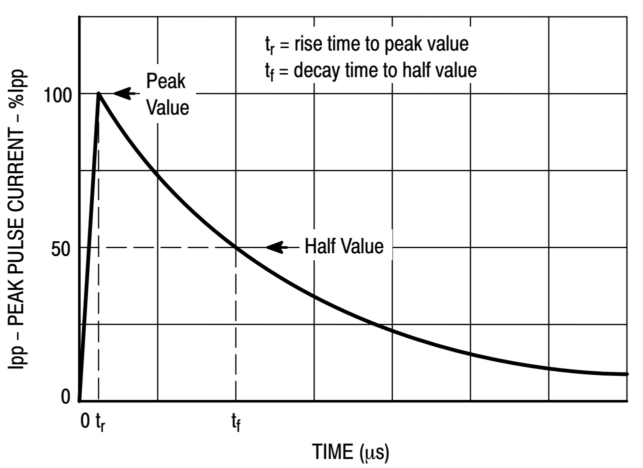


Figure 5. Exponential Decay Pulse Waveform

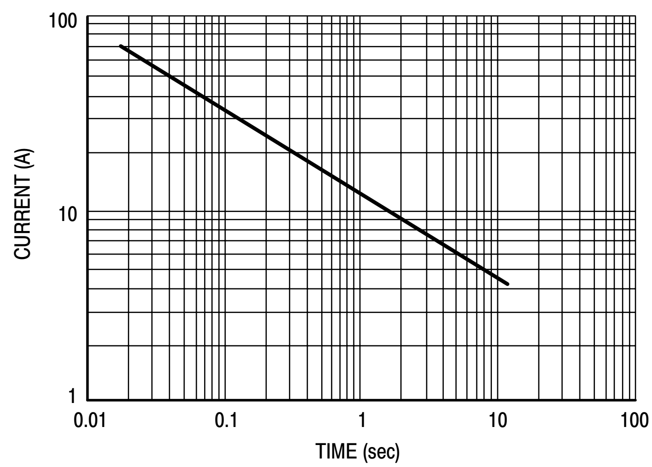
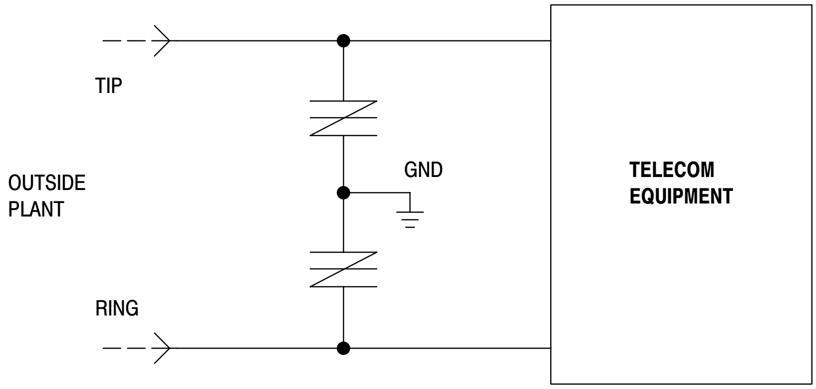
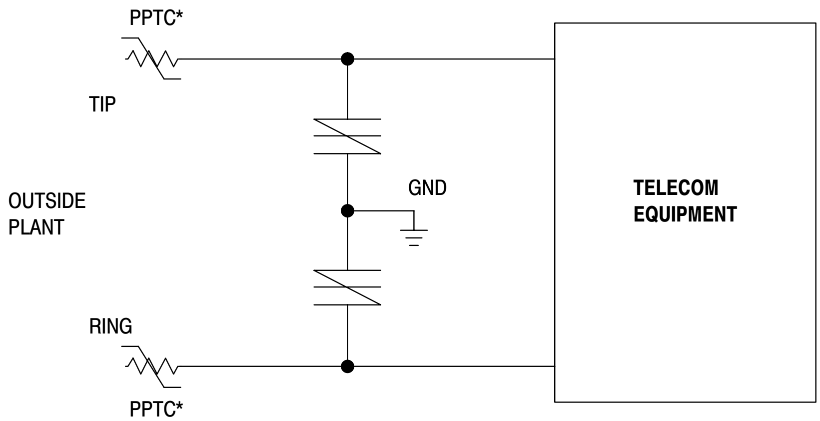
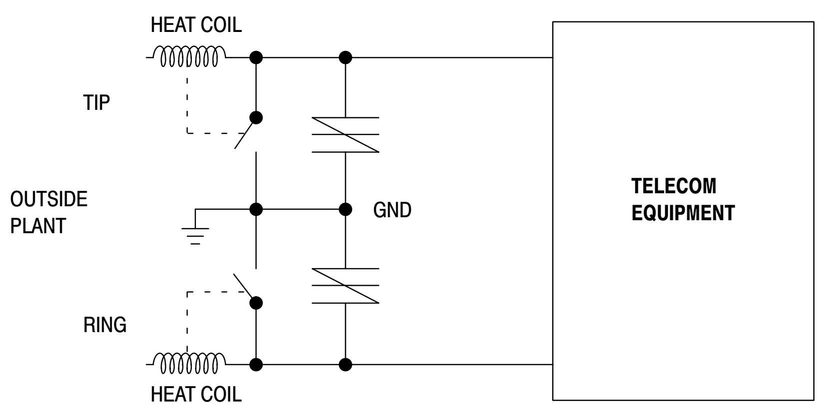


Figure 6. Peak Surge On–State Current versus Surge Current Duration, Sinusoidal Waveform



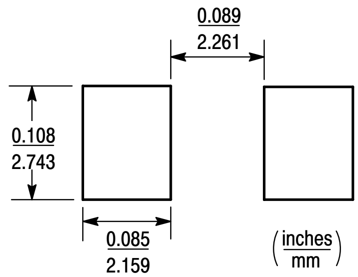


*Polymeric PTC (positive temperature coefficient) overcurrent protection device



MINIMUM RECOMMENDED FOOTPRINT FOR SURFACE MOUNTED APPLICATIONS

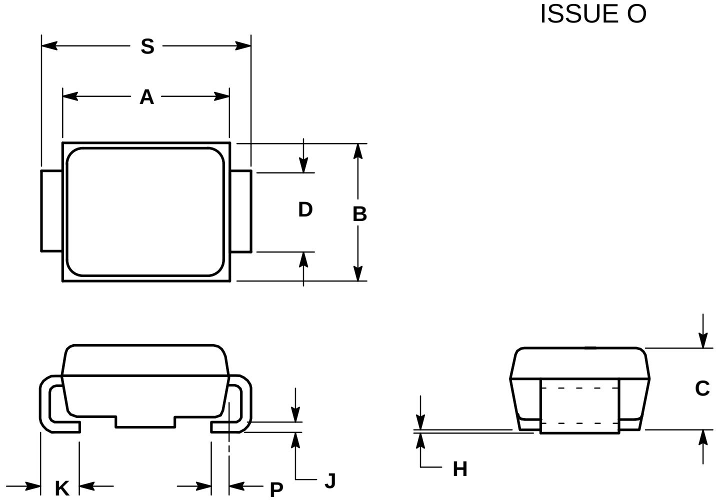
Surface mount board layout is a critical portion of the total design. The footprint for the semiconductor packages must be the correct size to insure proper solder connection interface between the board and the package. With the correct pad geometry, the packages will self align when subjected to a solder reflow process.



SMB

PACKAGE DIMENSIONS

SMB
(No Polarity)
(Essentially JEDEC DO–214AA)
CASE 403C–01
ISSUE O



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. D DIMENSION SHALL BE MEASURED WITHIN DIMENSION P.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.160	0.180	4.06	4.57
B	0.130	0.150	3.30	3.81
C	0.075	0.095	1.90	2.41
D	0.077	0.083	1.96	2.11
H	0.0020	0.0060	0.051	0.152
J	0.006	0.012	0.15	0.30
K	0.030	0.050	0.76	1.27
P	0.020 REF		0.51 REF	
S	0.205	0.220	5.21	5.59

Notes

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