

Designer's™ Data Sheet

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: 150 Amps 10x1000 μ sec
Guaranteed at the extended temp range of -20°C to 65°C
- 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 μ sec waveforms
- Supplied in 12mm Tape and Reel, 2500 units per reel. (T3 suffix)

MMT10B230T3
MMT10B280T3
MMT10B310T3

Motorola preferred devices

**BIDIRECTIONAL
THYRISTOR SURGE
PROTECTOR**



CASE 403A-03
SMB

DEVICE RATINGS: @ 25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Off-State Voltage — Maximum MMT10B230T3 MMT10B280T3 MMT10B310T3	V_{DM}	± 170 ± 200 ± 240	Volts
Minimum Impulse Surge Short Circuit Current Non-Repetitive double exponential wave, Notes 1, 2 10 x 1000 μ sec (-20°C to $+65^{\circ}\text{C}$) 2 x 10 μ sec 10 x 700 μ sec	I_{PPS1} I_{PPS2} I_{PPS3}	± 150 ± 500 ± 180	A(pk)
Maximum Non-Repetitive Rate of Change of On-State Current Double Exponential Waveform, $R = 2.0$, $L = 1.5 \mu\text{H}$, $C = 1.67 \mu\text{F}$, $I_{PK} = 110\text{A}$	di/dt	± 100	A/ μ s

DEVICE THERMAL RATINGS

Operating Temperature Range Blocking or Conducting State	T_{J1}	-40 to $+125$	$^{\circ}\text{C}$
Overload Junction Temperature — Maximum Conducting State Only	T_{J2}	$+175$	$^{\circ}\text{C}$
Instantaneous Peak Power Dissipation ($I_{PK} = 100\text{A}$, 10x100 μ sec @ 25°C)	P_{PK}	4000	W

Designer's Data for "Worst Case" Conditions — The Designer's Data Sheet permits the design of most circuits entirely from the information presented. SOA Limit curves — representing boundaries on device characteristics — are given to facilitate "worst case" design.

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



MMT10B230T3 MMT10B280T3 MMT10B310T3

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

Characteristics	Symbol	Min	Typ	Max	Unit
Breakover Voltage (Both polarities) (dv/dt = 100 V/μs, I _{SC} = 1.0 A, V _{dc} = 1000 V) (+65°C)	V _(BO)	—	230 280 310	265 320 350	Volts
Breakover Voltage (Both polarities) (f = 60 Hz, I _{SC} = 1.0 A(rms), V _{OC} = 1000 V(rms), R _I = 1.0 kΩ, t = 0.5 cycle, Note 2) (+65°C)	V _(BO)	—	230 280 310	265 320 350	Volts
Breakover Voltage Temperature Coefficient	dV _(BO) /dT _J	—	0.08	—	%/°C
Breakdown Voltage (I _(BR) = 1.0 mA) Both polarities	V _(BR)	190 220 265	— — —	— — —	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 2)	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 2 (+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 V, 1.0 V) (f = 1.0 MHz, 2.0 V, 15 mV)	C _O	— —	65 160	— 200	pF

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

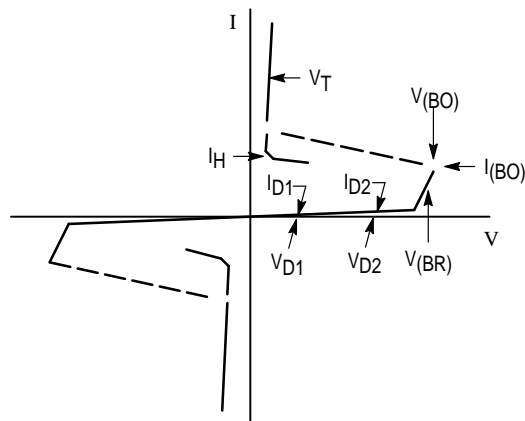


Figure 1. Voltage – Current Characteristics

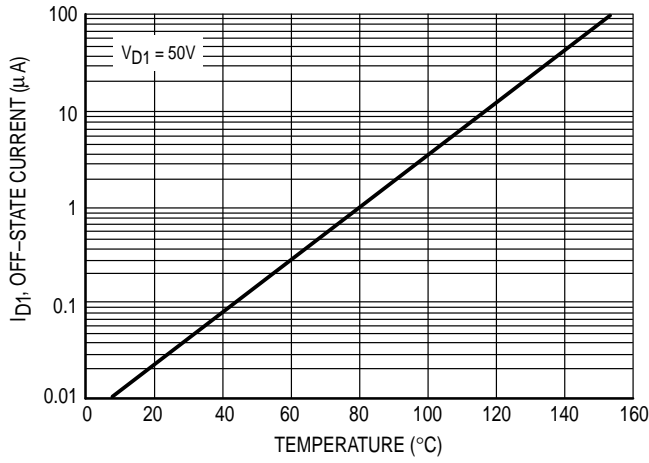


Figure 2. Off-State Current versus Temperature

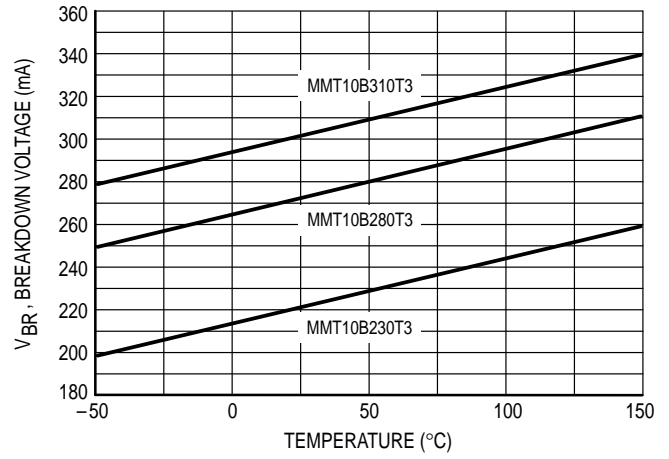


Figure 3. Breakdown Voltage versus Temperature

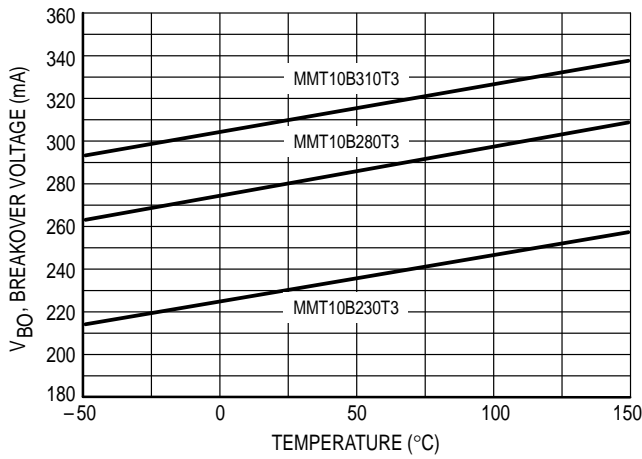


Figure 4. Breakover Voltage versus Temperature

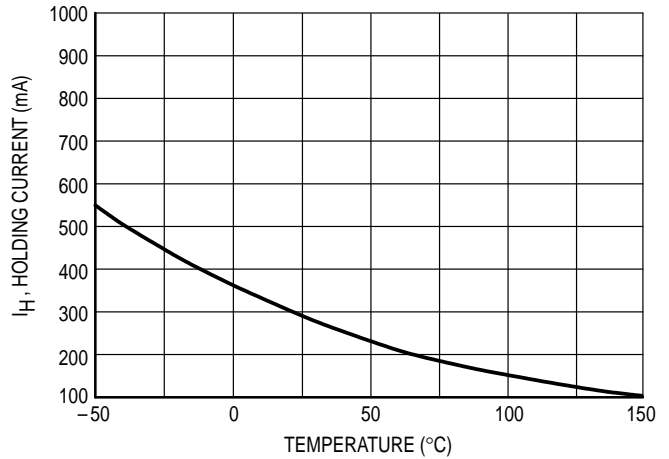


Figure 5. Holding Current versus Temperature

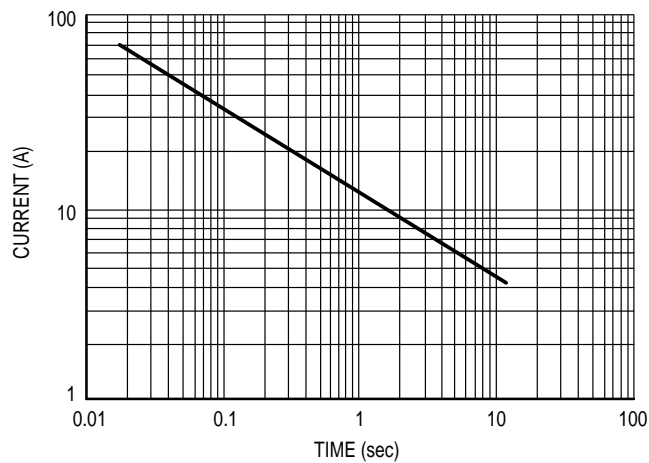
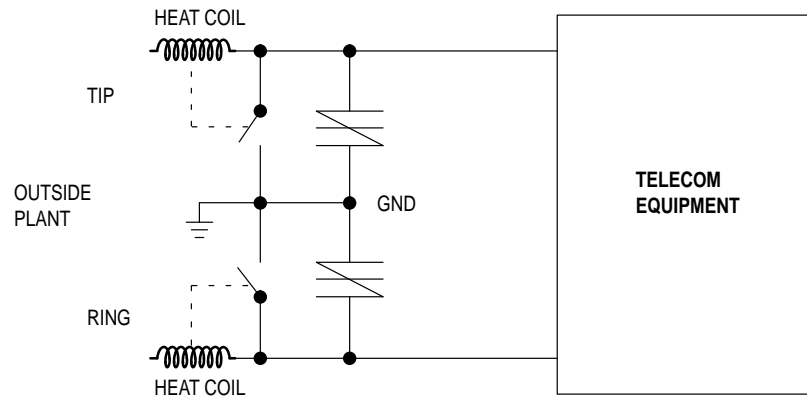
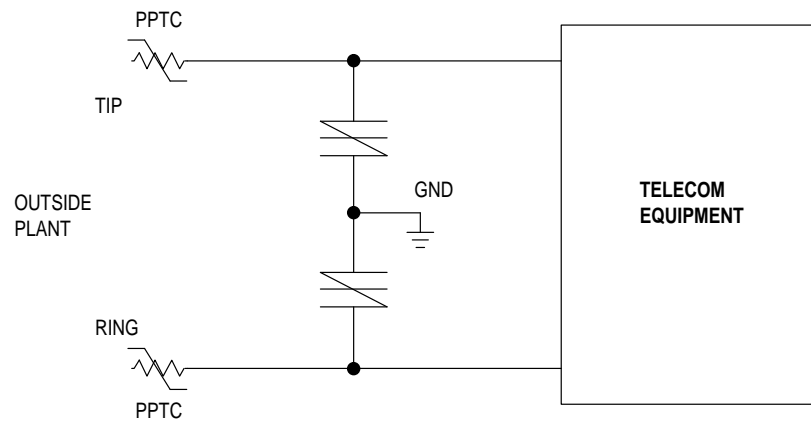
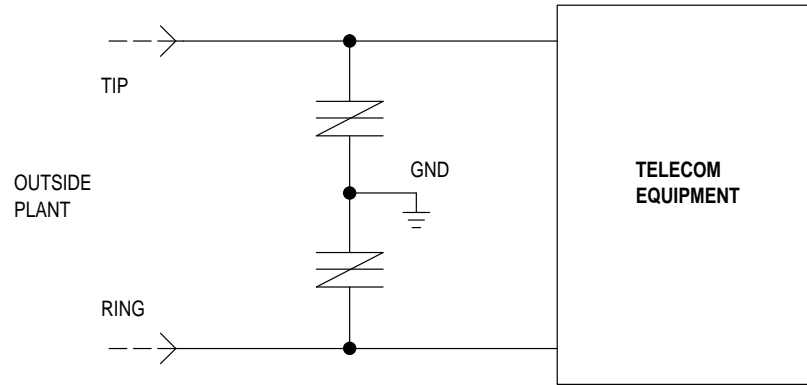
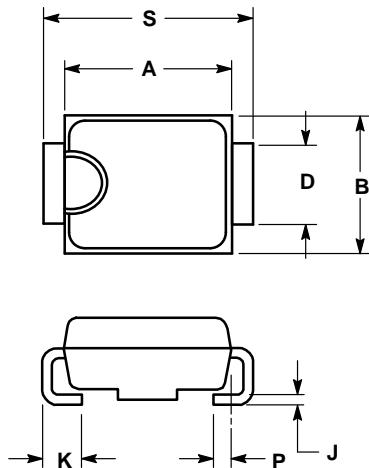


Figure 6. Peak Surge On-State Current versus Surge Current Duration

MMT10B230T3 MMT10B280T3 MMT10B310T3



PACKAGE DIMENSIONS




NOTES:

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

DIM	INCHES		MILLIMETERS	
	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

CASE 403A-03
ISSUE C

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