MMT05B350T3

Preferred Devices

Product Preview

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.

Features

- High Surge Current Capability: 50 A 10 x 1000 μsec, for Controlled Temperature Environments
- The MMT05B350T3 is used to help equipment meet various regulatory requirements including: Bellcore 1089, ITU K.20 and K.21, IEC 950, UL 1459 and 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)
- RU Indicates UL Recognized − File #E210057
- Pb−Free Package is Available

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

Rating	Symbol	Value	Unit
Off−State Voltage − Maximum	V_{DM}	300	V
Maximum Pulse Surge Short Circuit Current Non−Repetitive Double Exponential Decay Waveform (−25°C Initial Temperature) (Notes 1 and 2) 2 x 10 μsec 8 x 20 μsec 10 x 160 μsec 10 x 360 μsec 10 x 560 μsec 10 x 700 μsec 10 x 1000 μsec	 I_{PPS1} I_{PPS2} I_{PPS3} I_{PPS4} I_{PPS5} I_{PPS6} I_{PPS7}	 ±150 ±150 ±100 ±100 ±70 ±70 ±50	A(pk)
Non−Repetitive Peak On−State Current 60 Hz Full Sign Wave	I_{TSM}	32	A(pk)
Maximum Non−Repetitive Rate of Change of On−State Current Exponential Waveform, < 100 A	di/dt	± 300	A/μs

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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

This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.

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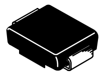
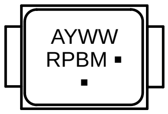
BIDIRECTIONAL TSPD (RU)
50 AMP SURGE, 350 VOLTS



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

MARKING DIAGRAMS



A = Assembly Location
Y = Year
WW = Work Week
RPBM = Specific Device Code
▪ = Pb−Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
MMT05B350T3	SMB	12 mm Tape & Reel (2.5 K/Reel)
MMT05B350T3G	SMB (Pb−Free)	12 mm Tape & Reel (2.5 K/Reel)

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

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
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)

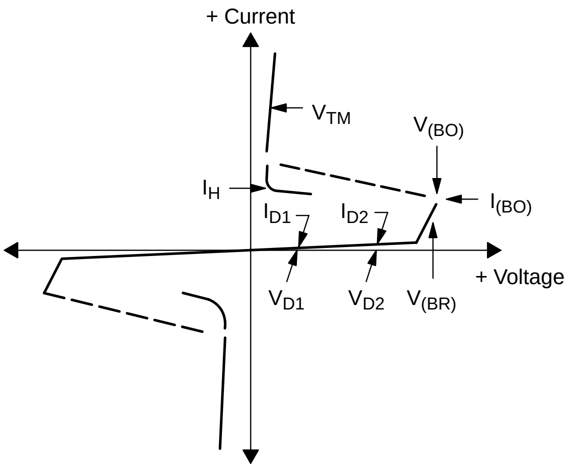
Devices are bidirectional. All electrical parameters apply to forward and reverse polarities.

Characteristics	Symbol	Min	Typ	Max	Unit
Breakover Voltage (Both polarities) (dv/dt = 100 V/μs, I_{SC} = 1.0 A, Vdc = 1000 V) (+65°C)	$V_{(BO)}$	 − −	 − −	 400 412	V
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 3) (+65°C)	$V_{(BO)}$	 − −	 − −	 400 412	V
Breakover Voltage Temperature Coefficient	$dV_{(BO)}/dT_J$	−	0.12	−	V/°C
Breakdown Voltage ($I_{(BR)}$ = 1.0 mA) Both polarities	$V_{(BR)}$	−	350	−	V
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	−	1.6	3.0	V
Breakover Current (f = 60 Hz, V_{DM} = 1000 V(rms), R_S = 1.0 kΩ) Both polarities	I_{BO}	−	475	−	mA
Holding Current (Both polarities) (Note 3) V_S = 500 V; I_T (Initiating Current) = ±1.0 A (+65°C)	I_H	150 130	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, 1.0 V rms Signal)	C_O	− −	14 27	18 30	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



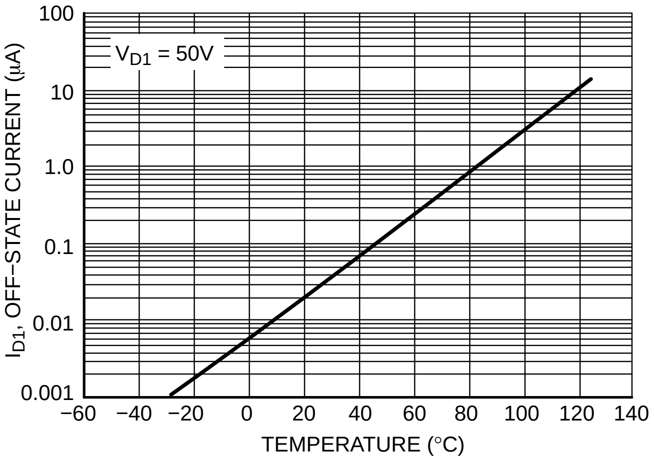


Figure 1. Typical Off−State Current versus Temperature

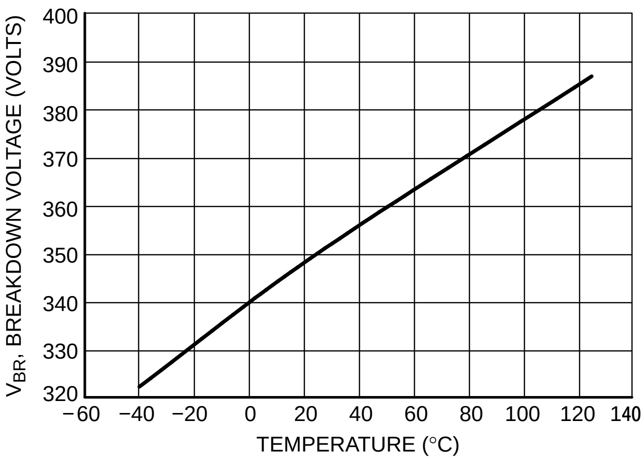


Figure 2. Typical Breakdown Voltage versus Temperature

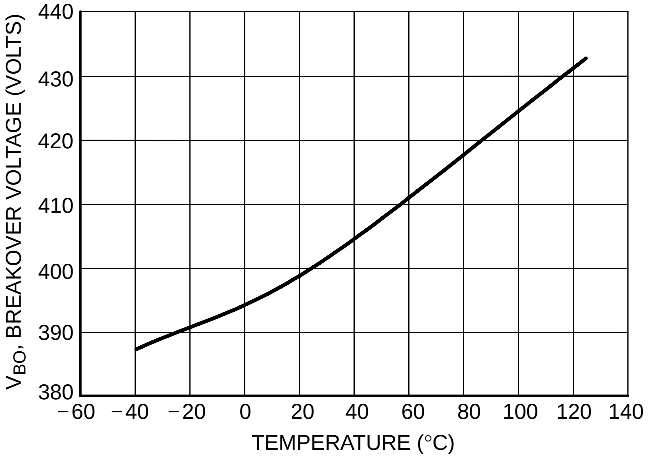


Figure 3. Maximum Breakover Voltage versus Temperature

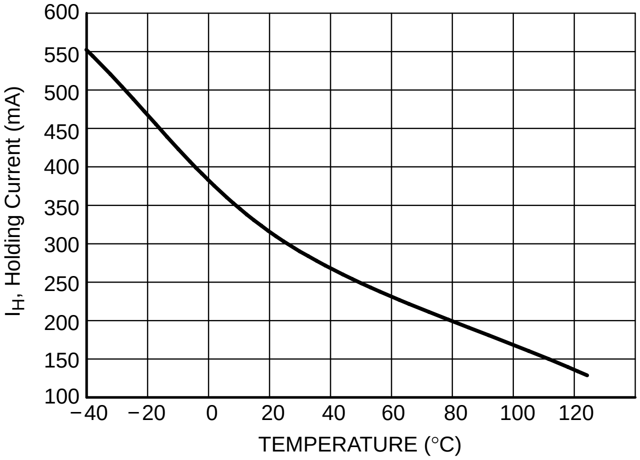


Figure 4. Typical Holding Current versus Temperature

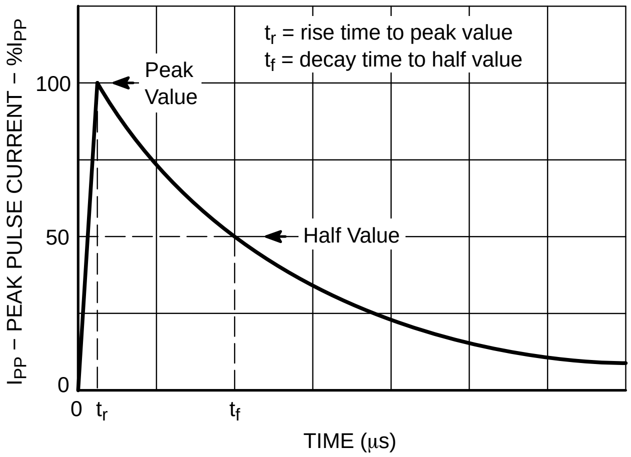


Figure 5. Exponential Decay Pulse Waveform

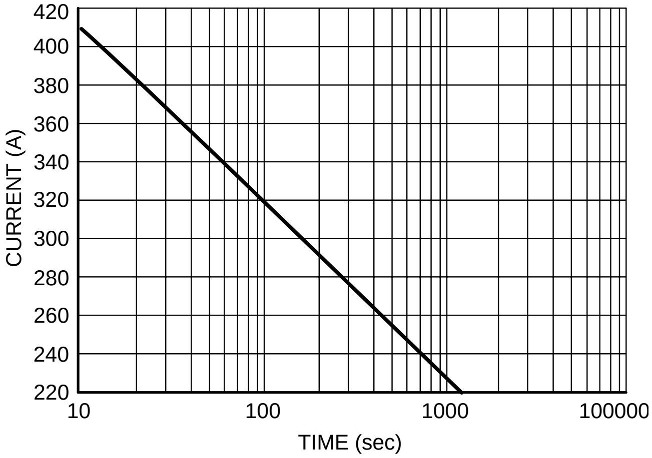
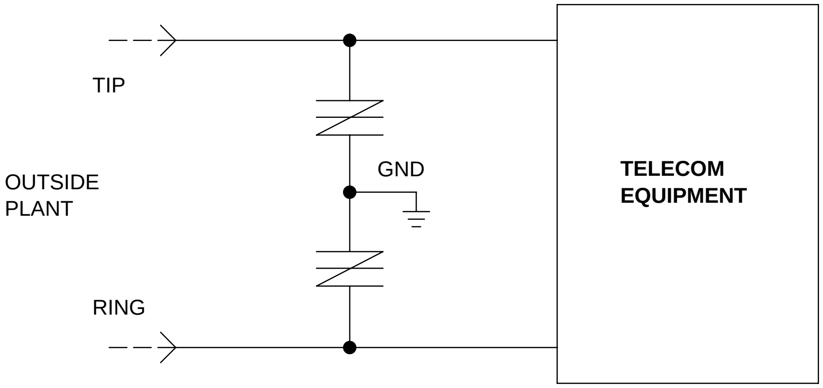
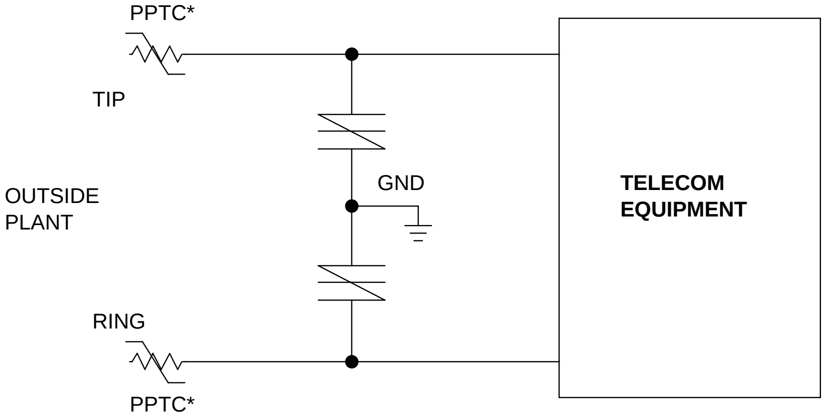
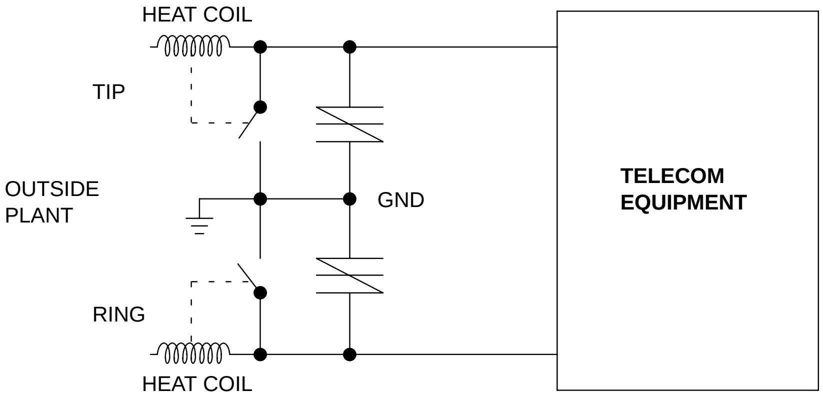


Figure 6. Peak Surge On−State Current versus Surge Current Duration, Sinusoidal Waveform



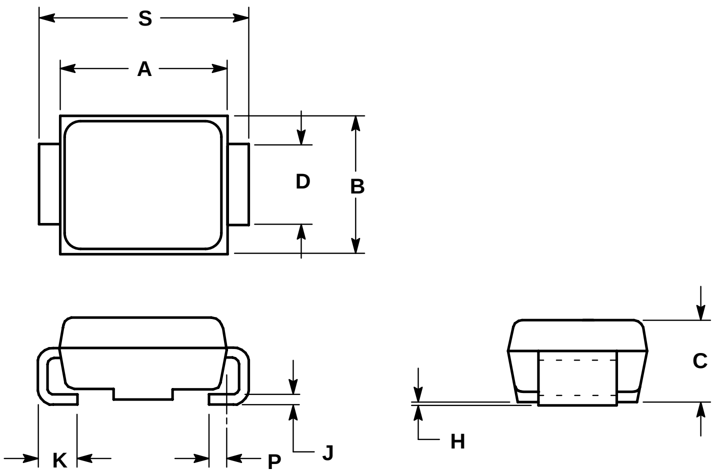


*Polymeric PTC (positive temperature coefficient) overcurrent protection device



PACKAGE DIMENSIONS

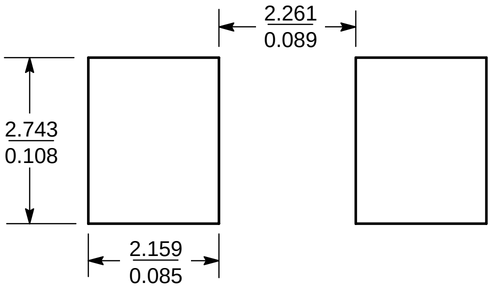
SMB
CASE 403C−01
ISSUE A



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

SOLDERING FOOTPRINT*



SCALE 8:1 $\left(\frac{\text{mm}}{\text{inches}}\right)$

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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