


# MMT08B310T3

Preferred Devices

## 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.

- High Surge Current Capability: 80 Amps 10 x 1000  $\mu$ sec, for Controlled Temperature Environments
- The MMT08B310 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)
-  Indicates UL Registered – File #E210057
- Pb-Free Package is Available

#### MAXIMUM RATINGS ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Off-State Voltage – Maximum MMT08B310T3	$V_{DM}$	$\pm 270$	V
Maximum Pulse Surge Short Circuit Current Non-Repetitive Double Exponential Decay Waveform (Notes 1 and 2) 10 x 1000 $\mu$ sec ( $-25^\circ\text{C}$ Initial Temperature)	$I_{PPS1}$	$\pm 80$	A(pk)
8 x 20 $\mu$ sec	$I_{PPS2}$	$\pm 250$	
10 x 160 $\mu$ sec	$I_{PPS3}$	$\pm 150$	
10 x 560 $\mu$ sec	$I_{PPS4}$	$\pm 100$	
Maximum Non-Repetitive Rate of Change of On-State Current Double Exponential Waveform, $R = 1.0$ , $L = 1.5 \mu\text{H}$ , $C = 1.67 \mu\text{F}$ , $I_{pk} = 110\text{A}$	$di/dt$	$\pm 150$	A/ $\mu$ s

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

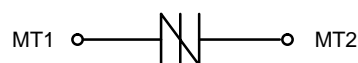
1. Allow cooling before testing second polarity.
2. Measured under pulse conditions to reduce heating.



**ON Semiconductor**<sup>®</sup>

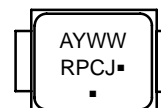
<http://onsemi.com>

**BIDIRECTIONAL TSPD (⚡)**  
**80 AMP SURGE**  
**310 VOLTS**



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

#### MARKING DIAGRAM



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

#### ORDERING INFORMATION

Device	Package	Shipping†
MMT08B310T3	SMB	2500 Tape & Reel
MMT08B310T3G	SMB Pb-Free	2500 Tape & Reel

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

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

# MMT08B310T3

## 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 ( $I_{pk} = 50$ A, 10x1000 $\mu$ sec @ 25°C)	$P_{PK}$	2000	W
Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 10 Seconds	$T_L$	260	°C

## ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

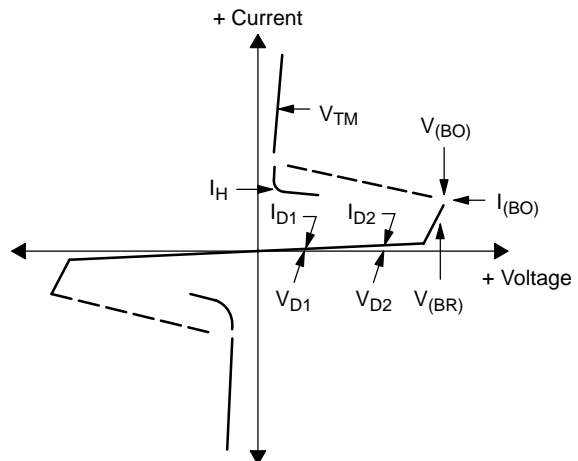
Devices are bidirectional. All electrical parameters apply to forward and reverse polarities.

Characteristics	Symbol	Min	Typ	Max	Unit
Breakover Voltage (Both polarities) ( $dv/dt = 100$ V/ $\mu$ s, $I_{SC} = 1.0$ A, $V_{dc} = 1000$ V) (+65°C)	$V_{(BO)}$	-	-	365	V
		-	-	400	
Breakover Voltage (Both polarities) ( $f = 60$ Hz, $I_{SC} = 1.0$ A(rms), $V_{OC} = 1000$ V(rms), $R_l = 1.0$ k $\Omega$ , $t = 0.5$ cycle) (Note 3) (+65°C)	$V_{(BO)}$	-	-	365	V
		-	-	400	
Breakover Voltage Temperature Coefficient	$dV_{(BO)}/dT_J$	-	0.08	-	%/°C
Breakdown Voltage ( $I_{(BR)} = 1.0$ mA) Both polarities	$V_{(BR)}$	-	310	-	V
Off State Current ( $V_{D1} = 50$ V) Both polarities ( $V_{D2} = V_{DM}$ ) Both polarities	$I_{D1}$ $I_{D2}$	-	-	2.0 5.0	$\mu$ A
On-State Voltage ( $I_T = 1.0$ A) ( $PW \leq 300$ $\mu$ s, Duty Cycle $\leq 2\%$ ) (Note 3)	$V_T$	-	1.53	3.0	V
Breakover Current ( $f = 60$ Hz, $V_{DM} = 1000$ V(rms), $R_S = 1.0$ k $\Omega$ ) Both polarities	$I_{BO}$	-	230	-	mA
Holding Current (Both polarities) (Note 3) $V_S = 500$ Volts; $I_T$ (Initiating Current) = $\pm 1.0$ Amp	$I_H$	150	340	-	mA
Critical Rate of Rise of Off-State Voltage (Linear waveform, $V_D = \text{Rated } V_{BR}$ , $T_J = 25^\circ\text{C}$ )	$dv/dt$	2000	-	-	V/ $\mu$ s
Capacitance ( $f = 1.0$ MHz, 50 Vdc, 1.0 V rms Signal) ( $f = 1.0$ MHz, 2.0 Vdc, 1.0 V rms Signal)	$C_O$	-	23	25 50	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



# MMT08B310T3

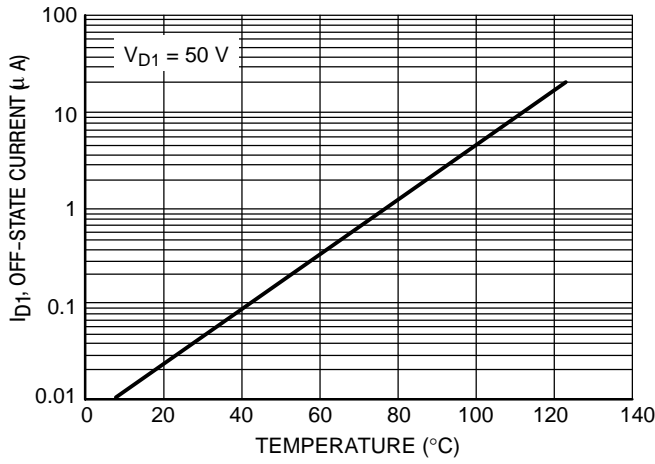


Figure 1. Off-State Current versus Temperature

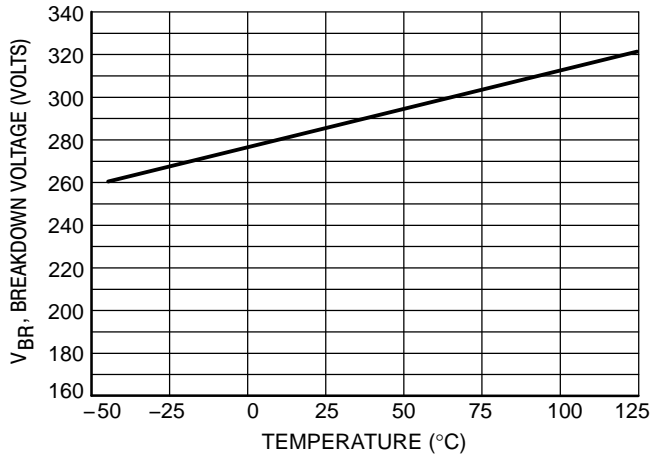


Figure 2. Breakdown Voltage versus Temperature

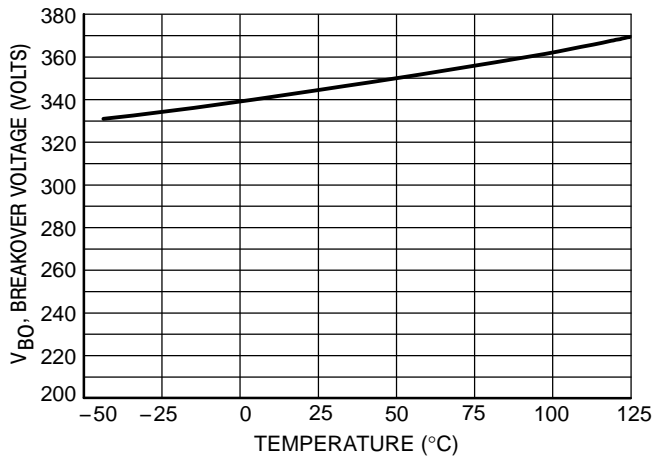


Figure 3. Breakover Voltage versus Temperature

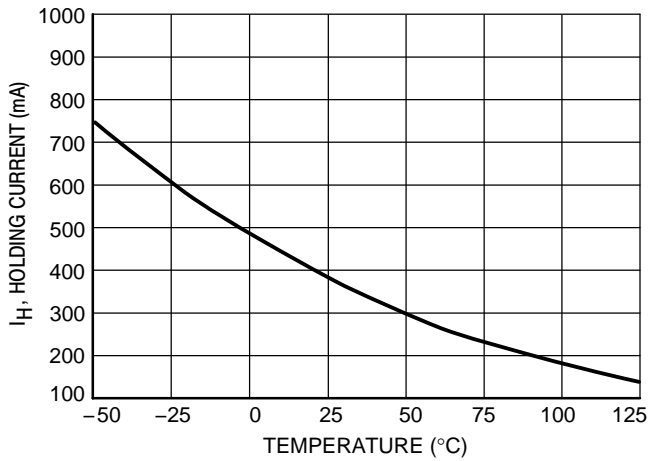


Figure 4. Holding Current versus Temperature

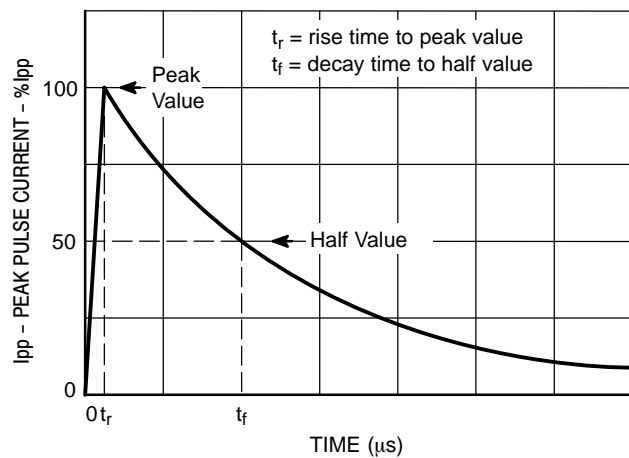


Figure 5. Exponential Decay Pulse Waveform

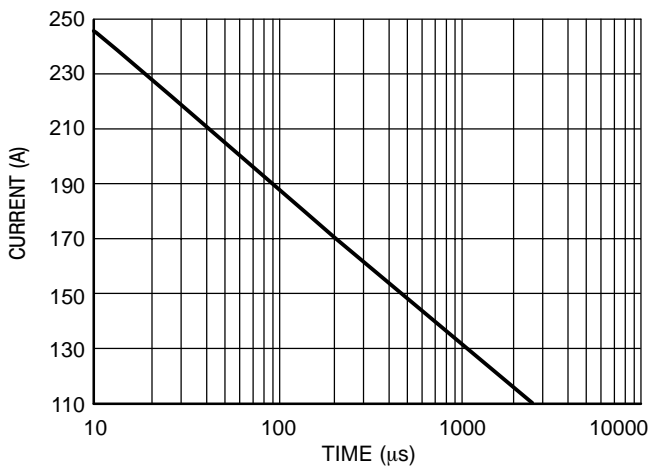
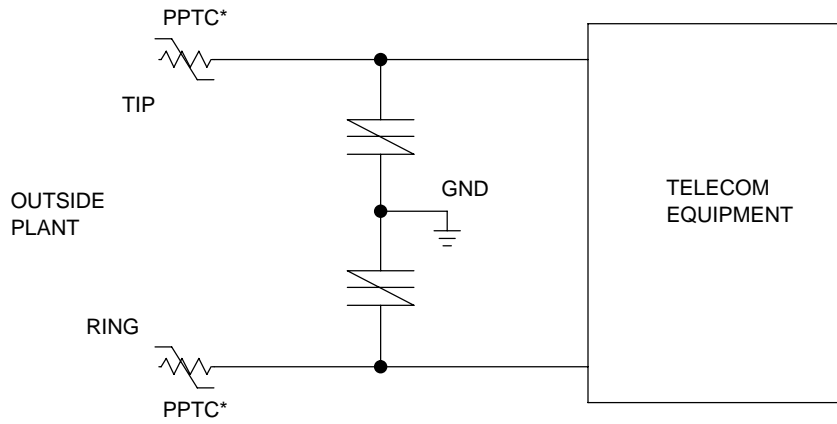
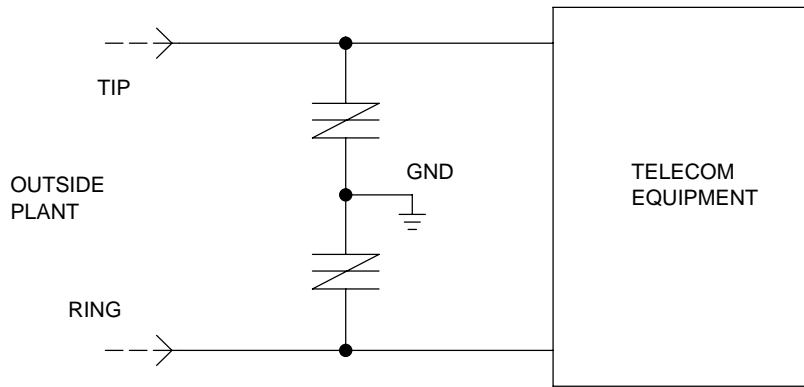
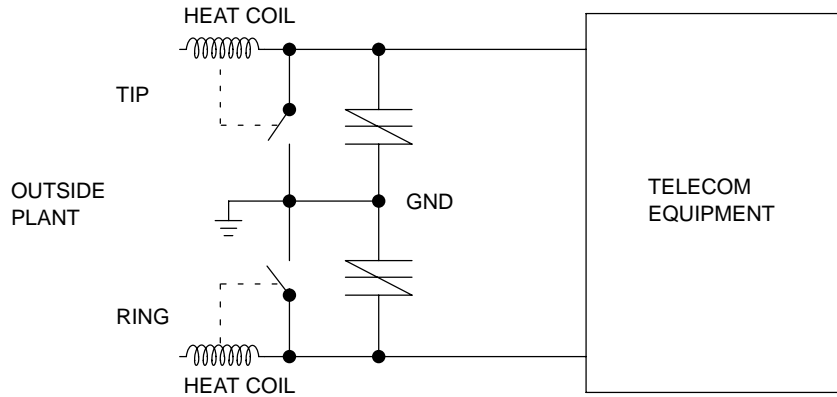


Figure 6. Peak Surge On-State Current versus Surge Current Duration, Sinusoidal Waveform

# MMT08B310T3



\*Polymeric PTC (positive temperature coefficient) overcurrent protection device



# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

ON Semiconductor®

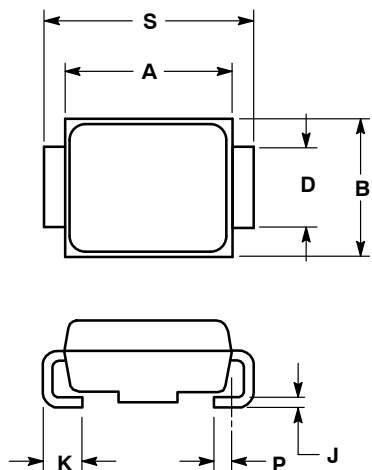


### SMB CASE 403C-01 ISSUE A

DATE 01/02/2000



SCALE 1:1



- 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

### MARKING DIAGRAM



- xxxx = Specific Device Code
- Y = Year
- WW = Work Week

<b>DOCUMENT NUMBER:</b>	<b>98ARB18918C</b>	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
<b>DESCRIPTION:</b>	<b>SMB</b>	<b>PAGE 1 OF 1</b>

ON Semiconductor and are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. ON Semiconductor does not convey any license under its patent rights nor the rights of others.

ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## PUBLICATION ORDERING INFORMATION

### LITERATURE FULFILLMENT:

Email Requests to: [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

ON Semiconductor Website: [www.onsemi.com](http://www.onsemi.com)

### TECHNICAL SUPPORT

North American Technical Support:  
Voice Mail: 1 800-282-9855 Toll Free USA/Canada  
Phone: 011 421 33 790 2910

Europe, Middle East and Africa Technical Support:

Phone: 00421 33 790 2910

For additional information, please contact your local Sales Representative

