MMT10V275*
MMT10V400*
***Motorola preferred devices**

Advance Information

Thyristor Surge Suppressors

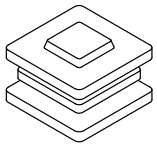
High Voltage Bidirectional TVS Devices

BIDIRECTIONAL THYRISTOR SURGE SUPPRESSORS 25 WATTS STEADY STATE

These transient voltage suppression (TVS) devices 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.

Applications include current loop lines in telephony and control systems, central office stations, repeaters, building and residence entrance terminals and electronic telecom equipment.

- High Surge Current Capability
- 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.



CASE 416A–01

DEVICE RATINGS:
0°C to 50°C for MMT10V275
–40°C to 65°C for MMT10V400 (except surge)

Parameter	Symbol	Value	Unit
Peak Repetitive Off–State Voltage — Maximum MMT10V275 MMT10V400	V_{DM}	 ±200 ±265	Volts
On–State Surge Current — Maximum Nonrepetitive (MMT10V400 –20°C to 65°C) 10 x 1000 μs exponential wave, Notes 1, 2, 3 60 Hz ac, 1000 V(rms), R_S = 1.0 kΩ, 1 second 60 Hz ac, 480 V(rms), R_S = 48 Ω, 2 seconds	 I_{TSM1} I_{STM2} I_{STM3}	 ±100 ±10 ±1.0	 A(pk) A(rms) A(rms)
Rate of Change of On–State Current — Maximum Nonrepetitive Critical Damped Wave, C = 1.2 μF, L = 16 μH, R = 7.4, V_{Cl} = 1000 V, I(pk) = 100 A (short circuit), 0 to 50% I (pk)	di/dt	50	A/μs

DEVICE THERMAL RATINGS

Operating Temperature Range Blocking or Conducting State	T_{J1}	–40 to +125	°C
Overload Junction Temperature — Maximum Conducting State Only	T_{J2}	+175	°C
Thermal Resistance, Junction to Case — Maximum	$R_{\theta JC}$	1.5	°C/W
Thermal Resistance, Case to Ambient, Without Heatsink	—	+200	°C/W

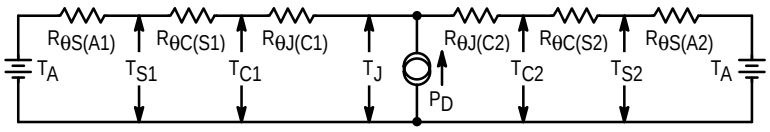
This document contains information on a new product. Specifications and information herein are subject to change without notice.

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

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

Characteristics		Symbol	Min	Typ	Max	Unit
Breakover Voltage (dv/dt = 100 V/μs, I_{SC} = 10 A, Vdc = 1000 V)	MMT10V275 MMT10V400	$V_{(BO)1}$	 — —	 — —	 275 400	Volts
Breakover Voltage (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)	MMT10V275 MMT10V400	$V_{(BO)2}$	 — —	 — —	 275 400	Volts
Breakover Voltage Temperature Coefficient		$dV_{(BO)}/dT_J$	—	0.05	—	%/°C
Breakdown Voltage ($I_{(BR)}$ = 1.0 mA)	MMT10V275 MMT10V400	$V_{(BR)}$	 200 265	 — —	 — —	Volts
Breakdown Voltage Temperature Coefficient		$dV_{(BO)}/dT_J$	—	0.11	—	%/°C
Off State Current (V_D = 160 V)		I_D	—	—	3.0	μA
On–State Voltage (I_T = 10 A) (PW ≤ 300 μs, Duty Cycle ≤ 2%, Note 2)		V_T	—	3.0	4.0	Volts
Breakover Current (f = 60 Hz, V_{DM} = 1000 V(rms), R_S = 1.0 kΩ)		I_{BO}	—	500	—	mA
Holding Current (10 x 100 Ms exponential wave, I_T = 10 A, V = 52 V, R_S = 200 Ω)	Note 2	I_H	—	400	—	mA
Critical Rate of Rise of Off–State Voltage (Linear waveform, V_D = 0.8 x Rated V_{DRM}, T_J = 125°C)		dv/dt	2000	—	—	V/μs
Capacitance (f = 1.0 MHz, 50 V, 15 mV)		C_O	—	55	—	pF

1. Allow cooling before testing second polarity.
2. Measured under pulse conditions to reduce heating.
3. Requires $\theta_{CS} \leq 6$°C/W each side, infinite heatsink.



Terms in the model signify:

T_A = Ambient Temp. $R_{\theta SA}$ = Thermal Resistance, Heatsink to Ambient
T_S = Heatsink Temp. $R_{\theta CS}$ = Thermal Resistance, Case to Heatsink
T_C = Case Temp. $R_{\theta JC}$ = Thermal Resistance, Junction to Case
T_J = Junction Temp. P_D = Power Dissipation

Subscripts 1 and 2 denote the device terminals, MT1 and MT2, respectively.
Thermal resistance values are: $R_{\theta CS}$ = 6°C/W maximum (each side)
$R_{\theta JC}$ = 3°C/W maximum (each side)

The $R_{\theta CS}$ values are estimates for dry mounting with heatsinks contacting the raised pedestal on the package. For minimum thermal resistance, the device should be sandwiched between clean, flat, smooth conducting electrodes and securely held in place with a compressive force of 2 pounds maximum. The electrodes should contact the entire pedestal area. When the device is mounted symmetrically, the thermal resistances are identical. The values for $R_{\theta SA}$ and $R_{\theta CS}$ are controlled by the user and depend on heatsink design and mounting conditions.

Figure 1. Thermal Circuit, Device Mounted Between Heatsinks

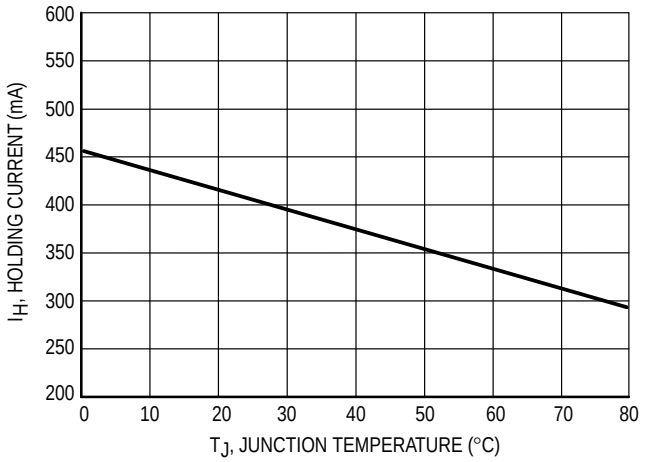


Figure 2. Typical Holding Current

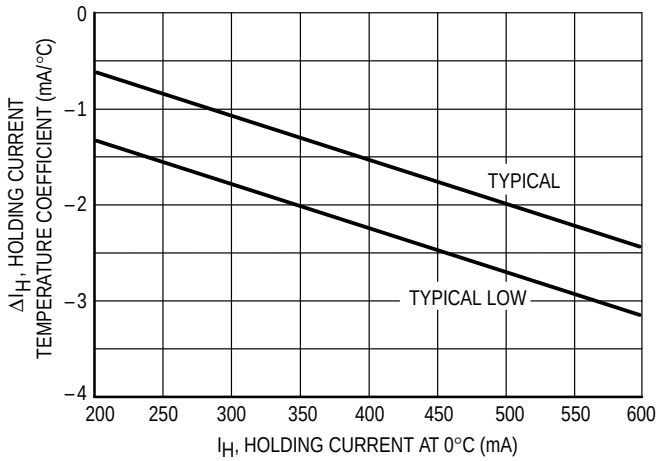


Figure 3. Holding Current Temperature Coefficient

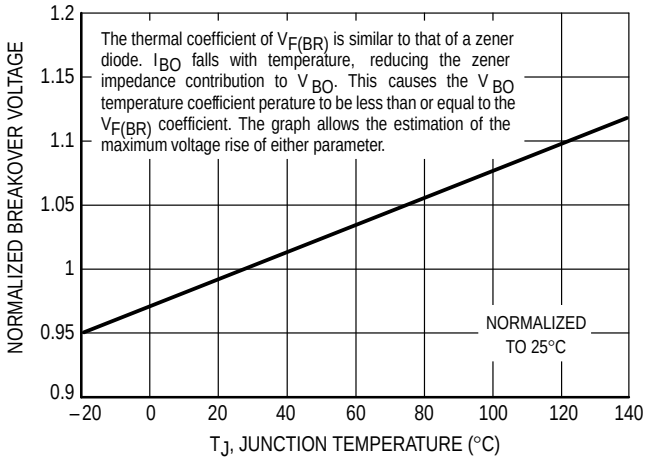


Figure 4. Normalized Maximum 60 Hz V_{BO} versus Junction Temperature

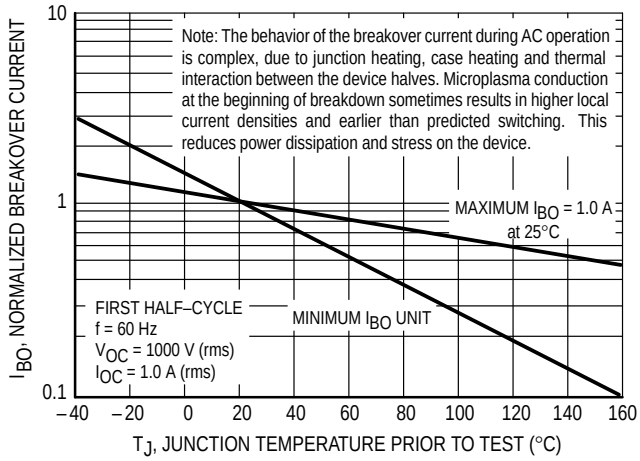
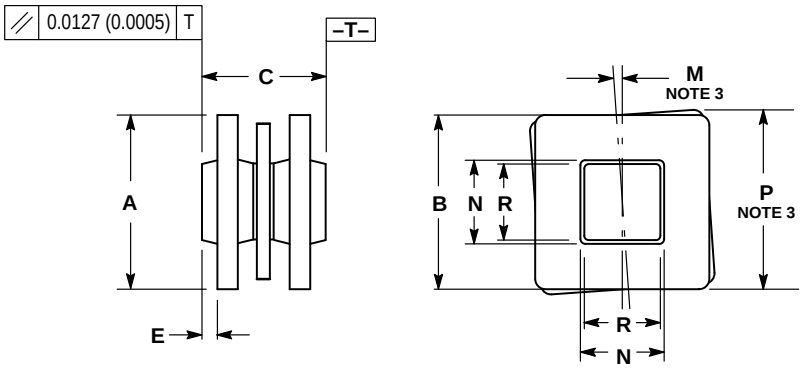


Figure 5. Temperature Dependence of 60 Hz Breakover Current

PACKAGE DIMENSIONS



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION M AND P MAXIMUM MISALIGNMENT OF HALFS.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.110	0.120	2.79	3.05
B	0.110	0.120	2.79	3.05
C	0.072	0.080	1.83	2.03
E	0.006	0.010	0.15	0.25
M	—	4 °	—	4 °
N	0.073	0.077	1.85	1.96
P	—	0.130	—	3.30
R	0.065	0.070	1.65	1.78

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