Advance Information

Thyristor Surge SuppressorsHigh Voltage Bidirectional TVS Devices

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.

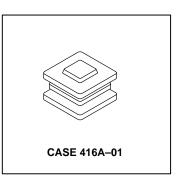
Applications include current loop lines in telephony and control systems, central office stations, repeaters, building and residence entrance terminals and electronic telecom equipment.

- 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.

MMT10V275* MMT10V400*

*Motorola preferred devices

BIDIRECTIONAL THYRISTOR SURGE SUPPRESSORS 25 WATTS STEADY STATE



DEVICE RATINGS:

0°C to 50°C for MMT10V275

-40°C to 65°C for MMT10V400 (except surge)

Parameter		Value	Unit
Peak Repetitive Off-State Voltage — Maximum MMT10V275 MMT10V400	VDM	±200 ±265	Volts
On–State Surge Current — Maximum Nonrepetitive (MMT10V400 -20° C to 65°C 10 x 1000 μ s exponential wave, Notes 1, 2, 3 60 Hz ac, 1000 V(rms), R _S = 1.0 k Ω , 1 second 60 Hz ac, 480 V(rms), R _S = 48 Ω , 2 seconds) TSM1 STM2 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 μ F, L = 16 μ H, 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.

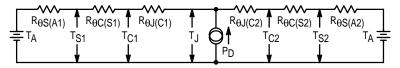


MMT10V275 MMT10V400

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

Characteristics		Symbol	Min	Тур	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, ISC = 1.0 A(rms), VOC = 1000 V(rms), R _I = 1.0 k Ω , t = 0.5 cycle, Note 2)	MMT10V275 MMT10V400	V(BO)2	_ _	_	275 400	Volts
Breakover Voltage Temperature Coefficient		dV _(BO) /dTJ	_	0.05	_	%/°C
Breakdown Voltage (I(BR) = 1.0 mA)	MMT10V275 MMT10V400	V(BR)	200 265	_	_	Volts
Breakdown Voltage Temperature Coefficient		dV _(BO) /dTJ	T -	0.11	_	%/°C
Off State Current (V _D = 160 V)		I _D	T -	_	3.0	μΑ
On–State Voltage (IT = 10 A) (PW \leq 300 μ s, Duty Cycle \leq 2%, Note 2)		VT	_	3.0	4.0	Volts
Breakover Current (f = 60 Hz, V _{DM} = 1000 V(rms), Rs	S = 1.0 kΩ)	I _{BO}	_	500	_	mA
Holding Current (10 x 100 Ms exponential wave, I _T = 10 A, V = 52 V	Note 2, $R_S = 200 \Omega$)	Ιн		400	_	mA
Critical Rate of Rise of Off–State Voltage (Linear waveform, V _D = 0.8 x Rated V _{DRM} , T _J = 12	25°C)	dv/dt	2000	_	_	V/µs
Capacitance (f = 1.0 MHz, 50 V, 15 mV)		CO	_	55	_	pF

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



Terms in the model signify:

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

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

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

MMT10V275 MMT10V400

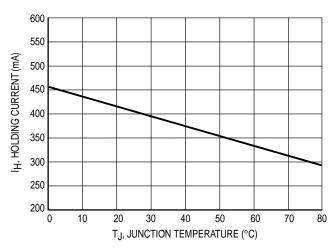


Figure 2. Typical Holding Current

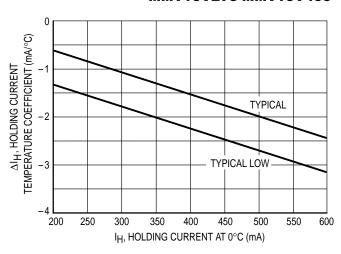


Figure 3. Holding Current Temperature Coefficient

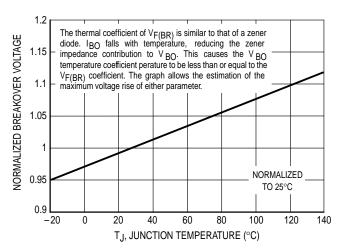


Figure 4. Normalized Maximum 60 Hz VBO versus Junction Temperature

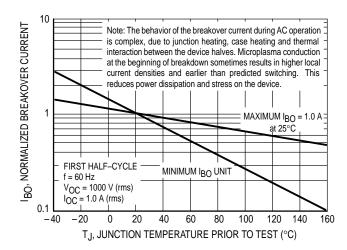
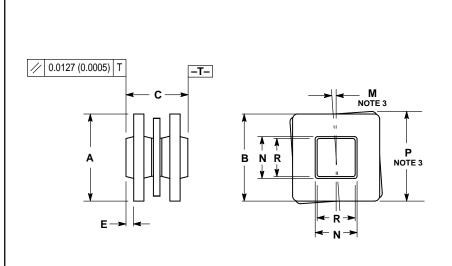


Figure 5. Temperature Dependence of 60 Hz
Breakover Current

PACKAGE DIMENSIONS



NOTES:

- 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	
Α	0.110	0.120	2.79	3.05	
В	0.110	0.120	2.79	3.05	
С	0.072	0.080	1.83	2.03	
E	0.006	0.010	0.15	0.25	
М		4°		4°	
N	0.073	0.077	1.85	1.96	
Р		0.130		3.30	
R	0.065	0.070	1.65	1.78	

CASE 416A-01

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola 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 consequential or incidental damages. "Typical" parameters can and do vary in different applications. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola 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 Motorola was negligent regarding the design or manufacture of the part. Motorola and a re registered trademarks of Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

Literature Distribution Centers:

USA: Motorola Literature Distribution; P.O. Box 20912; Phoenix, Arizona 85036.

EUROPE: Motorola Ltd.; European Literature Centre; 88 Tanners Drive, Blakelands, Milton Keynes, MK14 5BP, England.

JAPAN: Nippon Motorola Ltd.; 4-32-1, Nishi-Gotanda, Shinagawa-ku, Tokyo 141, Japan.

ASIA PACIFIC: Motorola Semiconductors H.K. Ltd.; Silicon Harbour Center, No. 2 Dai King Street, Tai Po Industrial Estate, Tai Po, N.T., Hong Kong.



