

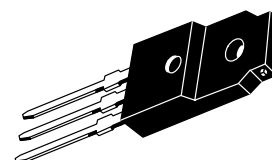
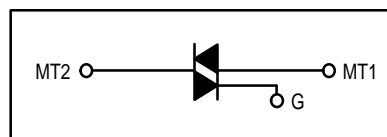
Silicon Bidirectional Triode Thyristors

T2500FP Series

... designed primarily for full-wave ac control applications, such as solid-state relays, motor controls, heating controls and power supplies; or wherever full-wave silicon gate controlled solid-state devices are needed. Triac type thyristors switch from a blocking to a conducting state for either polarity of applied anode voltage with positive or negative gate triggering.

- Blocking Voltage to 800 Volts
- All Diffused and Glass Passivated Junctions for Greater Parameter Uniformity and Stability
- Small, Rugged, Isolated Construction for Low Thermal Resistance, High Heat Dissipation and Durability

**ISOLATED TRIACS
 THYRISTORS
 6 AMPERES RMS
 200 thru 800 VOLTS**



**CASE 221C-02
 STYLE 3**

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

Rating	Symbol	Value	Unit
Repetitive Peak Off-State Voltage ⁽¹⁾ (T _J = -40 to +100°C, Gate Open)	V _{DRM}		Volts
		T2500BFP T2500DFP T2500MFP T2500NFP	200 400 600 800
On-State RMS Current (T _C = +80°C) ⁽²⁾ (Full Cycle Sine Wave 50 to 60 Hz)	I _{T(RMS)}	6	Amps
Peak Non-repetitive Surge Current (One Full Cycle, 60 Hz, T _C = +80°C)	I _{TSM}	60	Amps
Circuit Fusing Considerations (t = 8.3 ms)	I ² t	40	A ² s
Peak Gate Power (T _C = +80°C, Pulse Width = 1 μs)	P _{GM}	1	Watt
Average Gate Power (T _C = +80°C, t = 8.3 ms)	P _{G(AV)}	0.2	Watt
Peak Gate Trigger Current (Pulse Width = 10 μs)	I _{GTM}	4	Amps
RMS Isolation Voltage (T _A = 25°C, Relative Humidity ≤ 20%)	V _{ISO}	1500	Volts
Operating Junction Temperature Range	T _J	-40 to +100	°C
Storage Temperature Range	T _{stg}	-40 to +150	°C

THERMAL CHARACTERISTICS

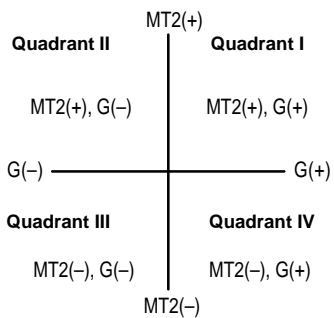
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case ⁽²⁾	R _{θJC}	2.7	°C/W
Case to Sink	R _{θCS}	2.2(typ)	
Junction to Ambient	R _{θJA}	60	

1. V_{DRM} for all types can be applied on a continuous basis. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.
2. The case temperature reference point for all T_C measurements is a point on the center lead of the package as close as possible to the plastic body.



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

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Off-State Current (Either Direction) ($V_D = \text{Rated } V_{DRM}$, $T_J = 100^\circ\text{C}$, Gate Open)	I_{DRM}	—	—	2	mA
Maximum On-State Voltage (Either Direction)* ($I_T = 30 \text{ A Peak}$)	V_{TM}	—	—	2	Volts
Gate Trigger Current (Continuous dc) ($V_D = 12 \text{ Vdc}$, $R_L = 12 \text{ Ohms}$)	I_{GT}				mA
MT2(+), G(+)		—	10	25	
MT2(+), G(-)		—	20	60	
MT2(-), G(-)		—	15	25	
MT2(-), G(+)		—	30	60	
Gate Trigger Voltage (Continuous dc) (All Quadrants) ($V_D = 12 \text{ Vdc}$, $R_L = 12 \text{ Ohms}$) ($V_D = V_{DROM}$, $R_L = 125 \text{ Ohms}$, $T_C = 100^\circ\text{C}$, All Trigger Models)	V_{GT}	— 0.2	1.25 —	2.5 —	Volts
Holding Current (Either Direction) (Main Terminal Voltage = 12 Vdc, Gate Open, Initiating Current = 150 mA, $T_C = 25^\circ\text{C}$)	I_H	—	15	30	mA
Gate Controlled Turn-On Time ($V_D = \text{Rated } V_{DRM}$, $I_T = 10 \text{ A}$, $I_{GT} = 160 \text{ mA}$, Rise Time $\leq 0.1 \mu\text{s}$)	t_{gt}	—	1.6	—	μs
Critical Rate-of-Rise of Commutation Voltage ($V_D = \text{Rated } V_{DRM}$, $I_T(\text{RMS}) = 6 \text{ A}$, Commutating $di/dt = 3.2 \text{ A/ms}$, Gate Unenergized, $T_C = 80^\circ\text{C}$)	$dv/dt(c)$	—	10	—	$\text{V}/\mu\text{s}$
Critical Rate-of-Rise of Off-State Voltage ($V_D = \text{Rated } V_{DRM}$, Exponential Voltage Rise, Gate Open, $T_C = 100^\circ\text{C}$)	dv/dt	—	100	—	$\text{V}/\mu\text{s}$

*Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2\%$.**Quadrant Definitions**

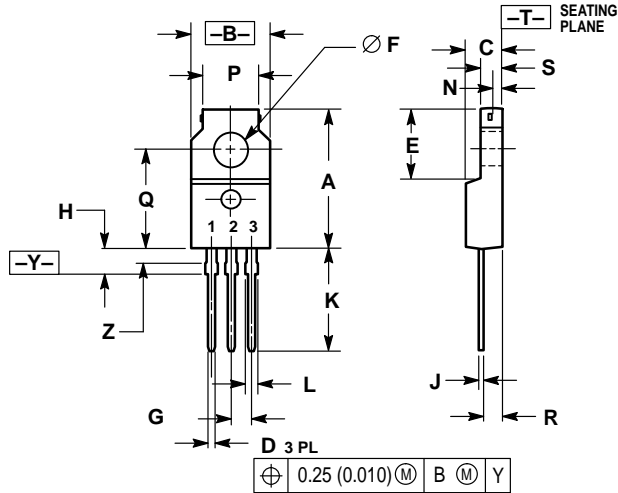
Trigger devices are recommended for gating on Triacs. They provide:

1. Consistent predictable turn-on points.
2. Simplified circuitry.
3. Fast turn-on time for cooler, more efficient and reliable operation.

Electrical Characteristics of Recommended Bidirectional Switches

Usage	General	
	MBS4991	MBS4992
V_S	6 – 10 V	7.5 – 9 V
I_S	350 $\mu\text{A Max}$	120 $\mu\text{A Max}$
$V_{S1} - V_{S2}$	0.5 V Max	0.2 V Max
Temperature Coefficient	0.02%/°C Typ	

PACKAGE DIMENSIONS




STYLE 3:
 PIN 1. MT 1
 2. MT 2
 3. GATE

- NOTES:
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. LEAD DIMENSIONS UNCONTROLLED WITHIN DIMENSION Z.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.680	0.700	17.28	17.78
B	0.388	0.408	9.86	10.36
C	0.175	0.195	4.45	4.95
D	0.025	0.040	0.64	1.01
E	0.340	0.355	8.64	9.01
F	0.140	0.150	3.56	3.81
G	0.100	BSC	2.54	BSC
H	0.110	0.155	2.80	3.93
J	0.018	0.028	0.46	0.71
K	0.500	0.550	12.70	13.97
L	0.045	0.070	1.15	1.77
N	0.049	—	1.25	—
P	0.270	0.290	6.86	7.36
Q	0.480	0.500	12.20	12.70
R	0.090	0.120	2.29	3.04
S	0.105	0.115	2.67	2.92
Z	0.070	0.090	1.78	2.28

CASE 221C-02

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  are registered trademarks of Motorola, Inc. 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.

