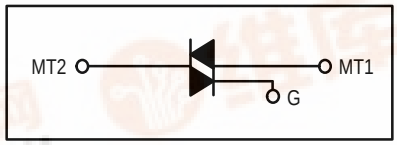
Silicon Bidirectional Triode Thyristors

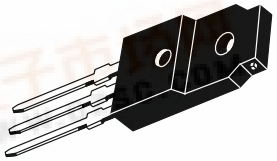
T2500FP Series

. . . 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) T2500BFP T2500DFP T2500MFP T2500NFP	V_{DRM}	 200 400 600 800	Volts
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^2t	40	A^2s
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) Case to Sink Junction to Ambient	$R_{\theta JC}$ $R_{\theta CS}$ $R_{\theta JA}$	2.7 2.2(typ) 60	°C/W

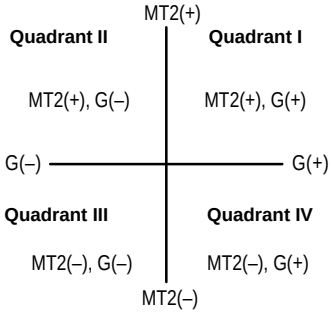
1. V_{DRM} for all types can be applied on a continuous basis. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.
2. The case temperature reference point for all T_C measurements is a point on the center lead of the package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

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

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

*Pulse Test: Pulse Width ⩽ 300 μs, Duty Cycle ⩽ 2%.

Quadrant Definitions



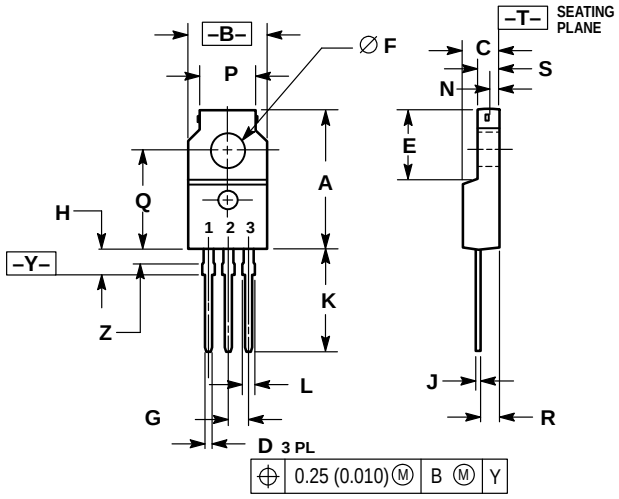
Trigger devices are recommended for gating on Triacs. They provide:

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	
Part Number	**MBS4991**	**MBS4992**
V_S	6 – 10 V	7.5 – 9 V
I_S	350 μA Max	120 μA 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.

	INCHES		MILLIMETERS	
DIM	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

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