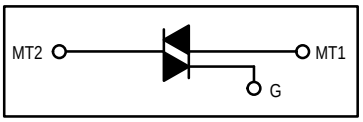
Triacs
Silicon Bidirectional Thyristors

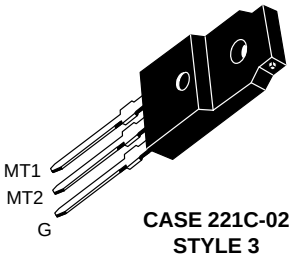
MAC15AFP Series

ISOLATED TRIACs
THYRISTORS
15 AMPERES RMS
400 thru 800 VOLTS

. . . 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, Thermowatt Construction for Low Thermal Resistance, High Heat Dissipation and Durability
- Gate Triggering Guaranteed in Four Modes





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 +125°C, 1/2 Sine Wave 50 to 60 Hz, Gate Open) MAC15A6FP MAC15A8FP MAC15A10FP	V_{DRM}	 400 600 800	Volts
On-State RMS Current (T_C = +80°C)(2) Full Cycle Sine Wave 50 to 60 Hz (T_C = +95°C)	$I_{T(RMS}$	15 12	Amps
Peak Nonrepetitive Surge Current (One Full Cycle, 60 Hz, T_C = +80°C) preceded and followed by rated current	I_{TSM}	150	Amps
Peak Gate Power (T_C = +80°C, Pulse Width = 2 µs)	P_{GM}	20	Watts
Average Gate Power (T_C = +80°C, t = 8.3 ms)	$P_{G(AV)}$	0.5	Watt
Peak Gate Current	I_{GM}	2	Amps
Peak Gate Voltage	V_{GM}	10	Volts
RMS Isolation Voltage (T_A = 25°C, Relative Humidity ⩽ 20%)	$V_{(ISO}$	1500	Volts
Operating Junction Temperature	T_J	–40 to +125	°C
Storage Temperature Range	T_{stg}	–40 to +150	°C

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.

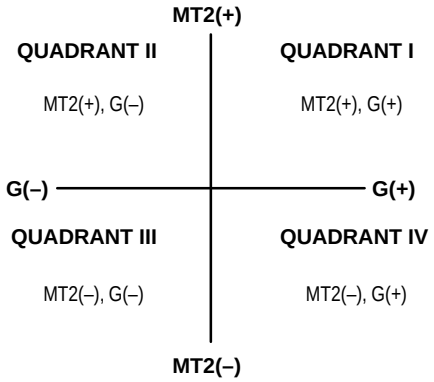
THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2	°C/W
Thermal Resistance, Case to Sink	$R_{\theta CS}$	2.2 (typ)	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	60	°C/W

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

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Blocking Current (Either Direction) T_J = 25°C	I_{DRM}	—	—	10	μA
(V_D = Rated V_{DRM}, T_J = 125°C, Gate Open)		—	—	2	mA
Peak On-State Voltage (Either Direction) (I_{TM} = 21 A Peak; Pulse Width = 1 to 2 ms, Duty Cycle ≤ 2%)	V_{TM}	—	1.3	1.6	Volts
Gate Trigger Current (Continuous dc)	I_{GT}				mA
(Main Terminal Voltage = 12 Vdc, R_L = 100 Ohms)					
MT2(+), G(+)		—	—	50	
MT2(+), G(–)		—	—	50	
MT2(–), G(–)		—	—	50	
MT2(–), G(+)		—	—	75	
Gate Trigger Voltage (Continuous dc)	V_{GT}				Volts
(Main Terminal Voltage = 12 Vdc, R_L = 100 Ohms)					
MT2(+), G(+)		—	0.9	2	
MT2(+), G(–)		—	0.9	2	
MT2(–), G(–)		—	1.1	2	
MT2(–), G(+)		—	1.4	2.5	
(Main Terminal Voltage = Rated V_{DRM}, R_L = 10 kΩ, T_J = +110°C)					
MT2(+), G(+); MT2(–), G(–); MT2(+), G(–);		0.2	—	—	
MT2(–), G(+)		0.2	—	—	
Holding Current (Either Direction) (Main Terminal Voltage = 12 Vdc, Gate Open, Initiating Current = 200 mA)	I_H	—	6	40	mA
Turn-On Time (V_D = Rated V_{DRM}, I_{TM} = 17 A, I_{GT} = 120 mA, Rise Time = 0.1 μs, Pulse Width = 2 μs)	t_{gt}	—	1.5	—	μs
Critical Rate of Rise of Commutation Voltage (V_D = Rated V_{DRM}, I_{TM} = 21 A, Commutating di/dt = 7.6 A/ms, Gate Unenergized, T_C = 80°C)	dv/dt(c)	—	5	—	V/μs

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	

1. Ratings apply for open gate conditions. Thyristor devices shall not be tested with a constant current source for blocking capability such that the voltage applied exceeds the rated blocking voltage.

TYPICAL CHARACTERISTICS

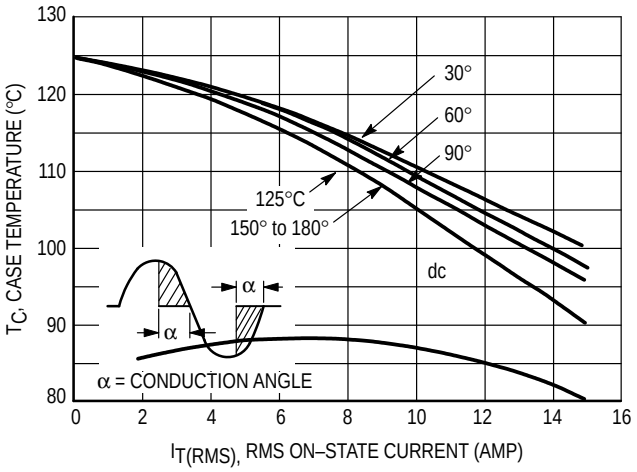


Figure 1. RMS Current Derating

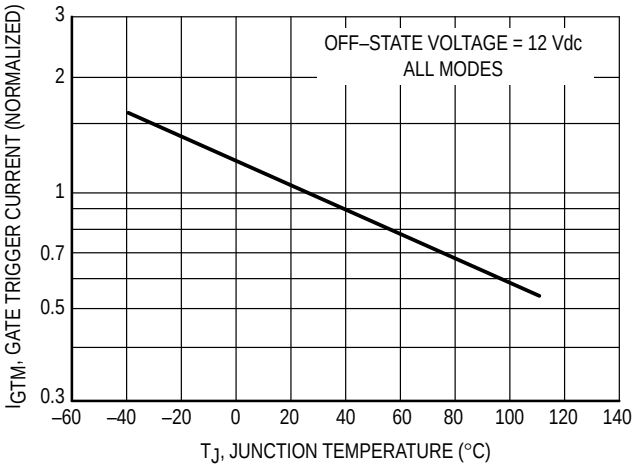


Figure 4. Typical Gate Trigger Current

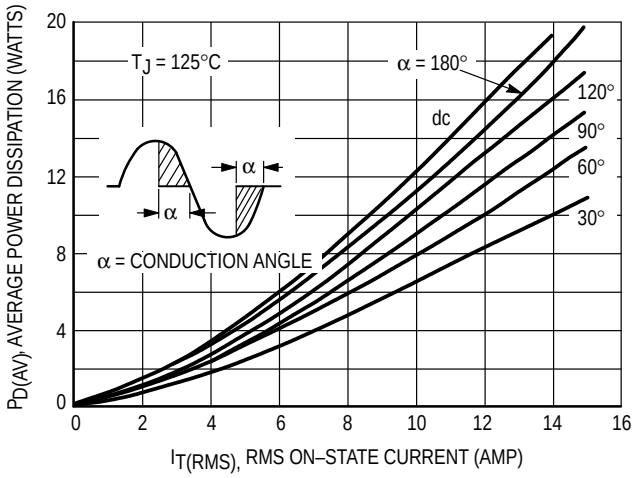
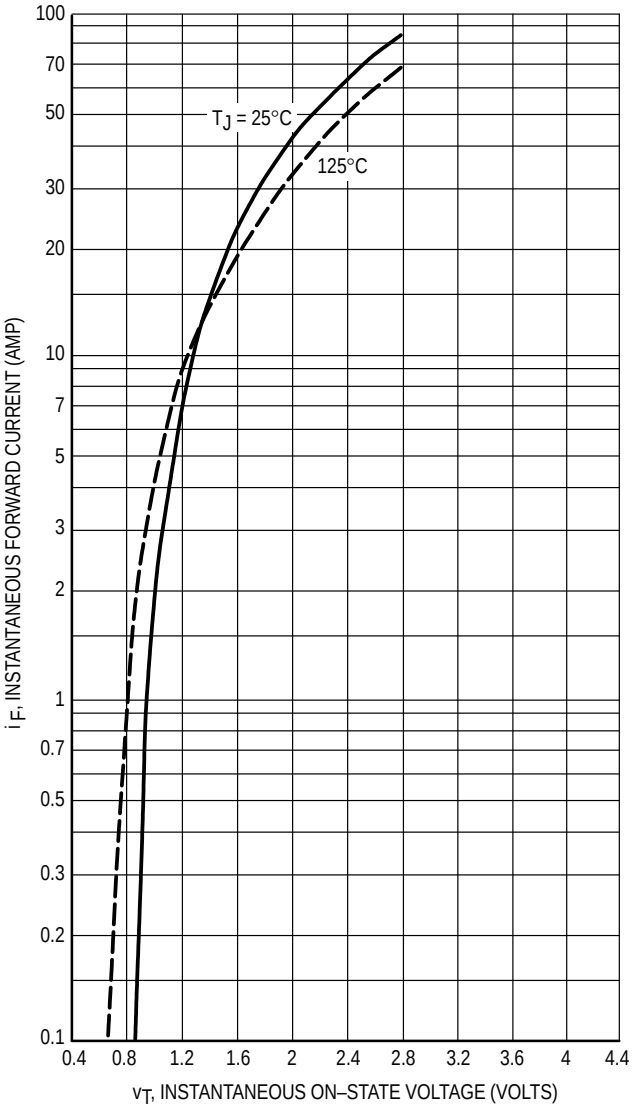


Figure 2. On–State Power Dissipation



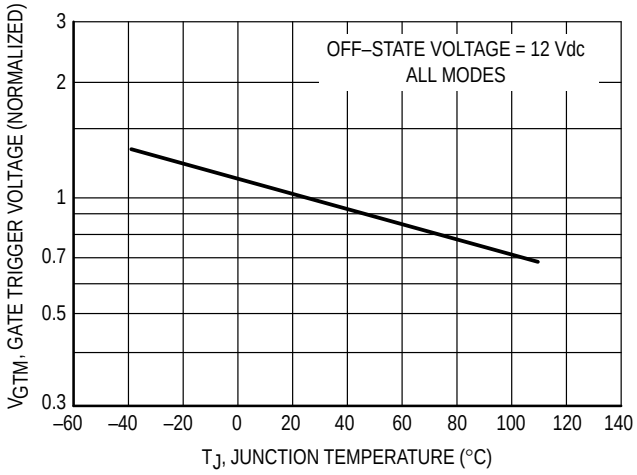


Figure 3. Typical Gate Trigger Voltage

Figure 5. Maximum On–State Characteristics

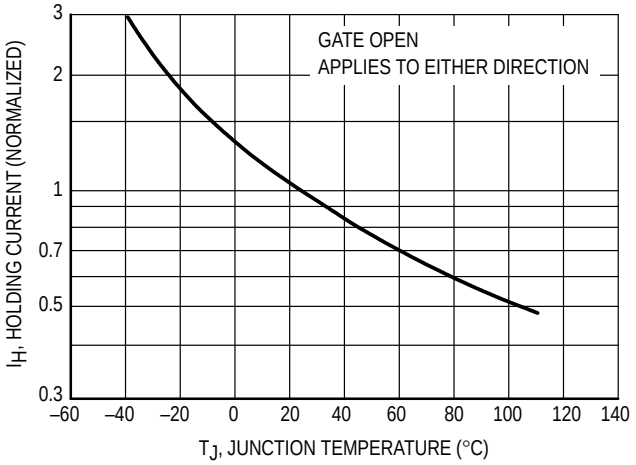


Figure 6. Typical Holding Current

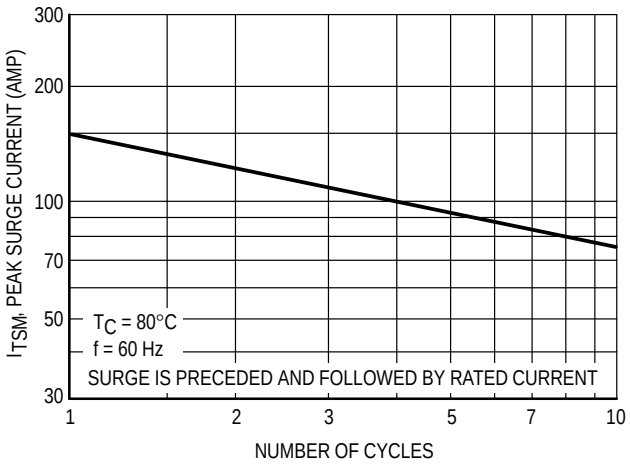


Figure 7. Maximum Nonrepetitive Surge Current

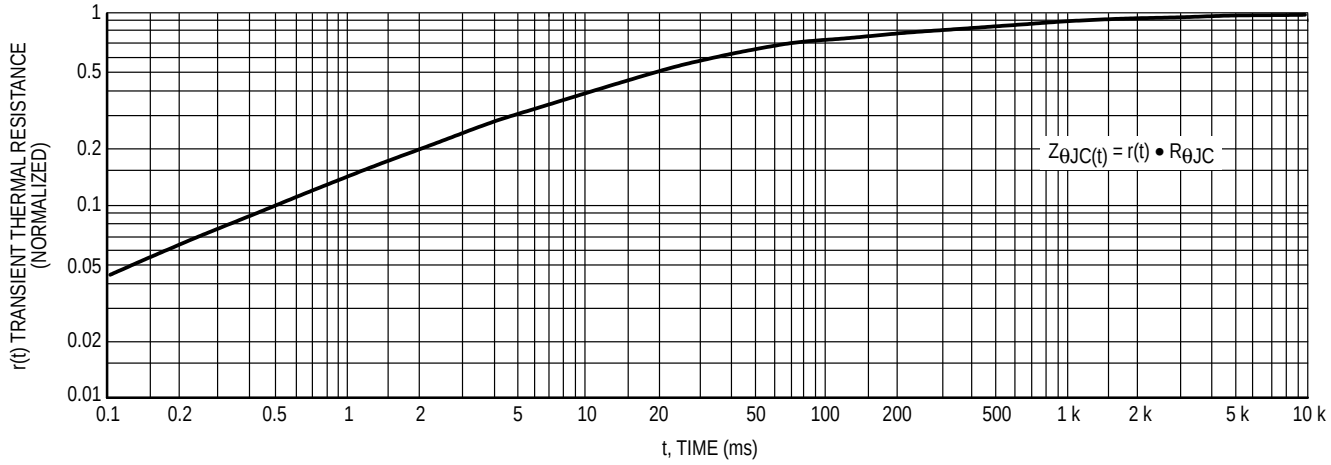
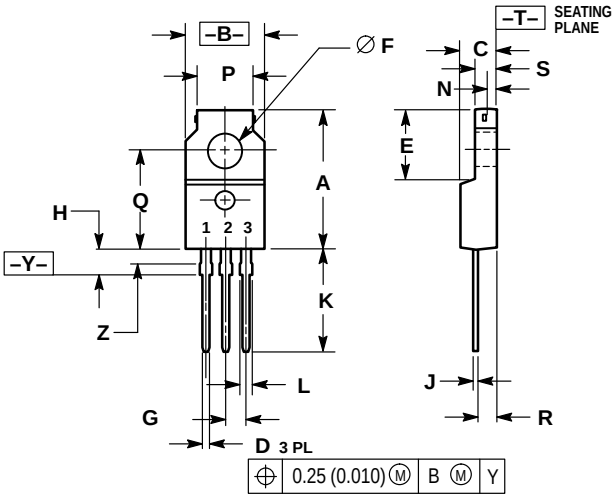


Figure 8. Thermal Response

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
ISSUE B

NOTES

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