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MAC15A6FP, MAC15A8FP, MAC15A10FP

Preferred Device

Triacs

Silicon Bidirectional Thyristors

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 main terminal 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
- Ⓤ Indicates UL Registered — File #E69369
- Device Marking: Logo, Device Type, e.g., MAC15A6FP, Date Code

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

Rating	Symbol	Value	Unit
Peak Repetitive Off−State Voltage(1) (T_J = −40 to +125°C, Sine Wave 50 to 60 Hz, Gate Open) MAC15A6FP / MAC15A8FP / MAC15A10FP	V_{DRM}, V_{RRM}	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 Sine Wave, 60 Hz, T_C = +80°C) Preceded and followed by rated current	I_{TSM}	150	Amps
Circuit Fusing (t = 8.3 ms)	I^2t	93	A^2s
Peak Gate Power (T_C = +80°C, Pulse Width = 2.0 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 (Pulse Width ≤ 1.0 μsec; T_C = 80°C)	I_{GM}	2.0	Amps
Peak Gate Voltage (Pulse Width ≤ 1.0 μsec; T_C = 80°C)	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} and V_{RRM} 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.

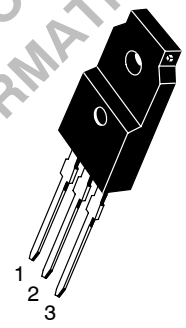
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ISOLATED TRIAC Ⓤ
15 AMPERES RMS
400 thru 800 VOLTS





ISOLATED TO−220 Full Pack
CASE 221C
STYLE 3

PIN ASSIGNMENT	
1	Main Terminal 1
2	Main Terminal 2
3	Gate

ORDERING INFORMATION

Device	Package	Shipping
MAC15A6FP	ISOLATED TO220FP	500/Box
MAC15A8FP	ISOLATED TO220FP	500/Box
MAC15A10FP	ISOLATED TO220FP	500/Box

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

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THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.0	°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
Maximum Lead Temperature for Soldering Purposes 1/8″ from Case for 10 Seconds	T_L	260	°C

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted; Electricals apply in both directions)

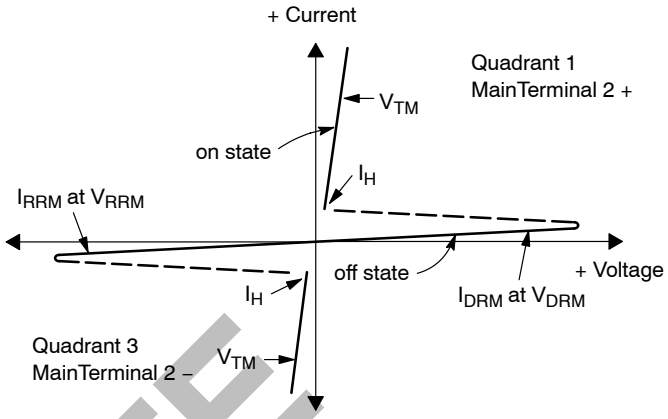
Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Peak Repetitive Blocking Current	T_J = 25°C	I_{DRM},	—	—	10	μA
(V_D = Rated V_{DRM}, V_{RRM}; Gate Open)	T_J = 125°C	I_{RRM}	—	—	2.0	mA
ON CHARACTERISTICS						
Peak On-State Voltage(1) (I_{TM} = ±21 A Peak		V_{TM}	—	1.3	1.6	Volts
Gate 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	2.0	
MT2(+), G(−)			—	0.9	2.0	
MT2(−), G(−)			—	1.1	2.0	
MT2(−), G(+)			—	1.4	2.5	
Gate Non−Trigger Voltage (Main Terminal Voltage = Rated V_{DRM}, R_L = 100 Ω, T_J = +110°C) All 4 Quadrants		V_{GD}	0.2	—	—	Volts
Holding Current (Main Terminal Voltage = 12 Vdc, Gate Open, Initiating Current = ±200 mA)		I_H	—	6.0	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
DYNAMIC CHARACTERISTICS						
Critical Rate of Rise of Commutation Voltage (V_D = Rated V_{DRM}, V_{RRM}, I_{TM} = 21 A, Commutating di/dt = 7.6 A/ms, Gate Unenergized, T_C = 80°C)		dv/dt(c)	—	5.0	—	V/μs

(1) Pulse Test: Pulse Width ≤ 2.0 ms, Duty Cycle ≤ 2%.

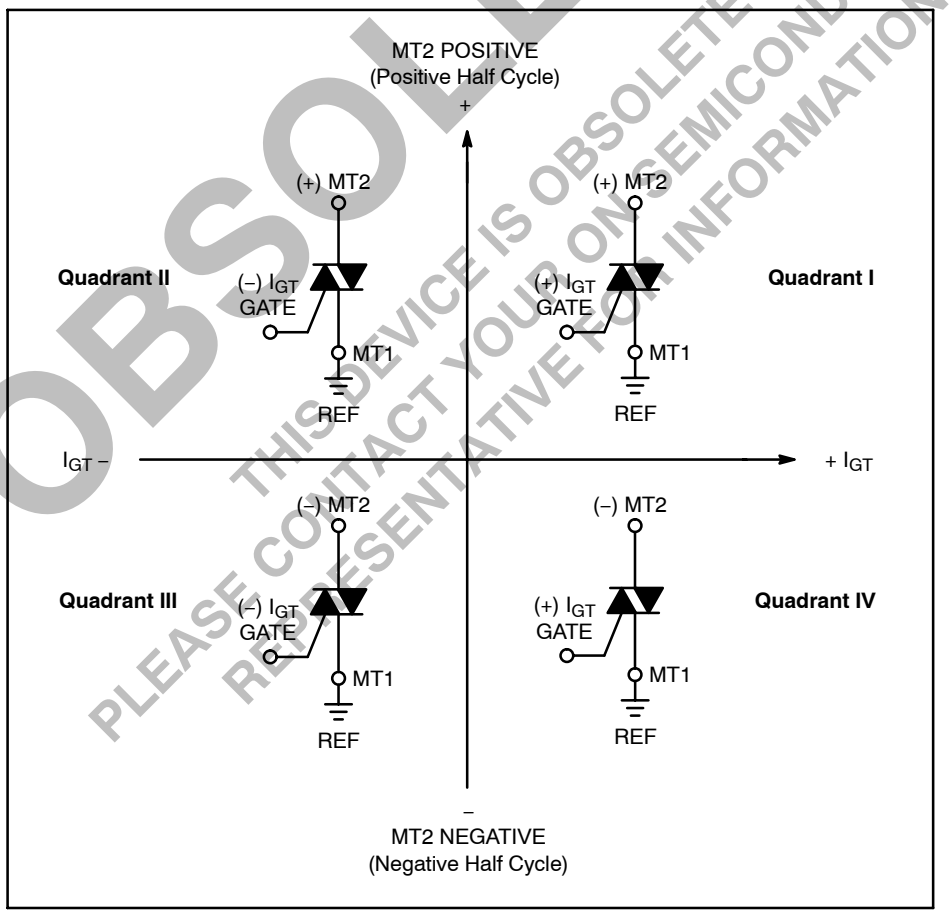
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Voltage Current Characteristic of Triacs (Bidirectional Device)

Symbol	Parameter
V_{DRM}	Peak Repetitive Forward Off State Voltage
I_{DRM}	Peak Forward Blocking Current
V_{RRM}	Peak Repetitive Reverse Off State Voltage
I_{RRM}	Peak Reverse Blocking Current
V_{TM}	Maximum On State Voltage
I_H	Holding Current



Quadrant Definitions for a Triac



All polarities are referenced to MT1.
With in−phase signals (using standard AC lines) quadrants I and III are used.

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TYPICAL CHARACTERISTICS

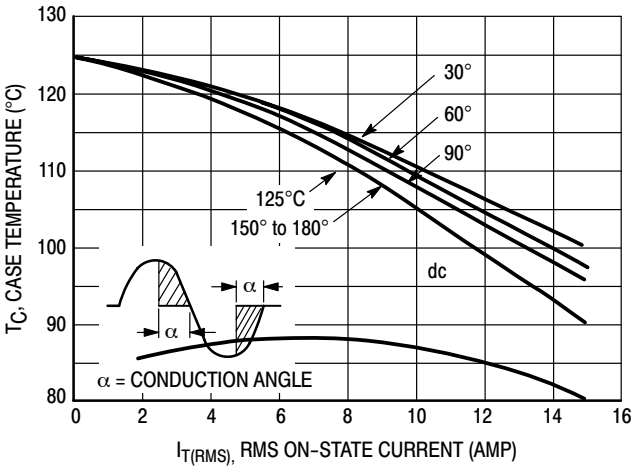


Figure 1. RMS Current Derating

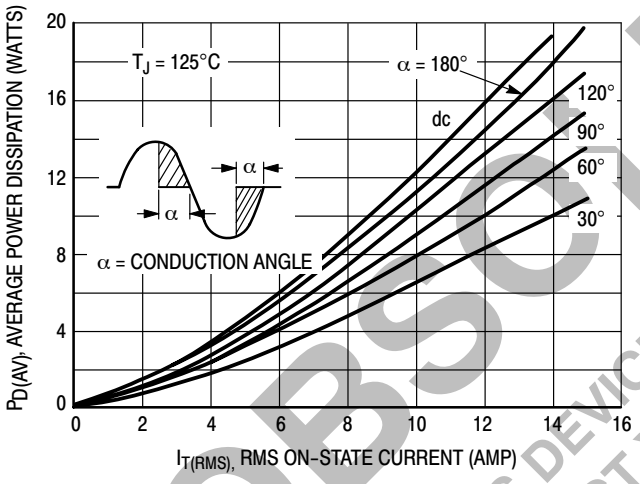


Figure 2. On−State Power Dissipation

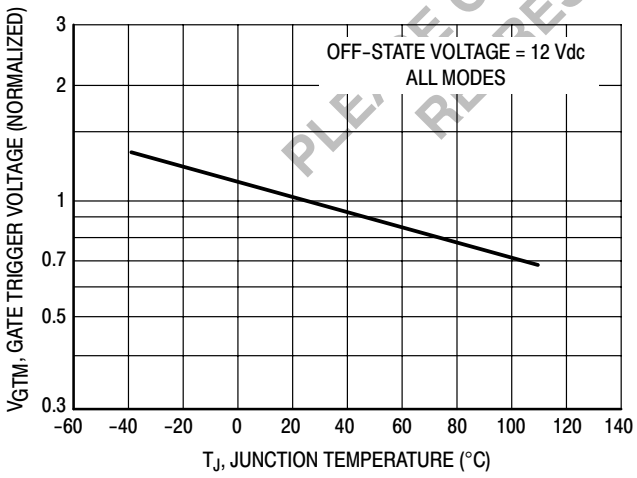


Figure 3. Typical Gate Trigger Voltage

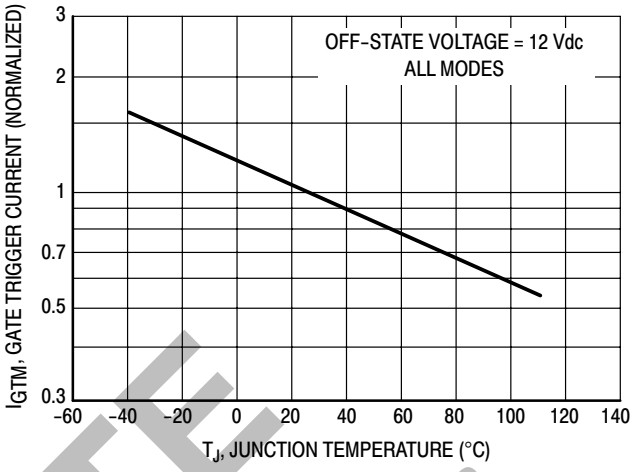


Figure 4. Typical Gate Trigger Current

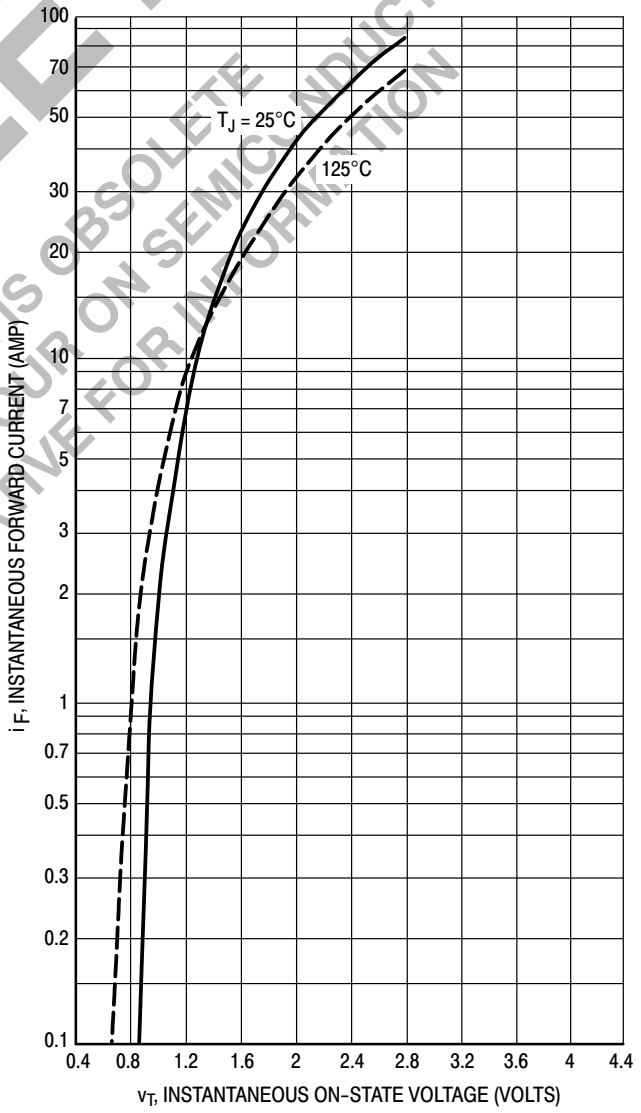


Figure 5. Maximum On−State Characteristics

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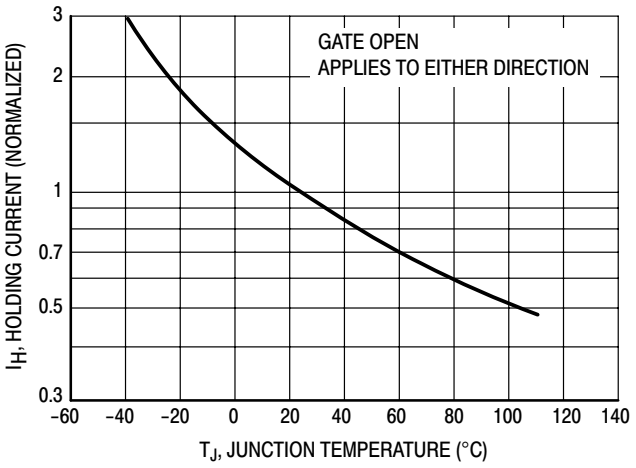


Figure 6. Typical Holding Current

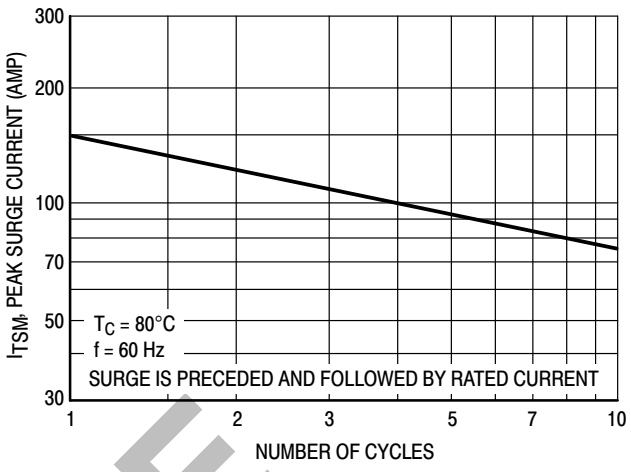


Figure 7. Maximum Nonrepetitive Surge Current

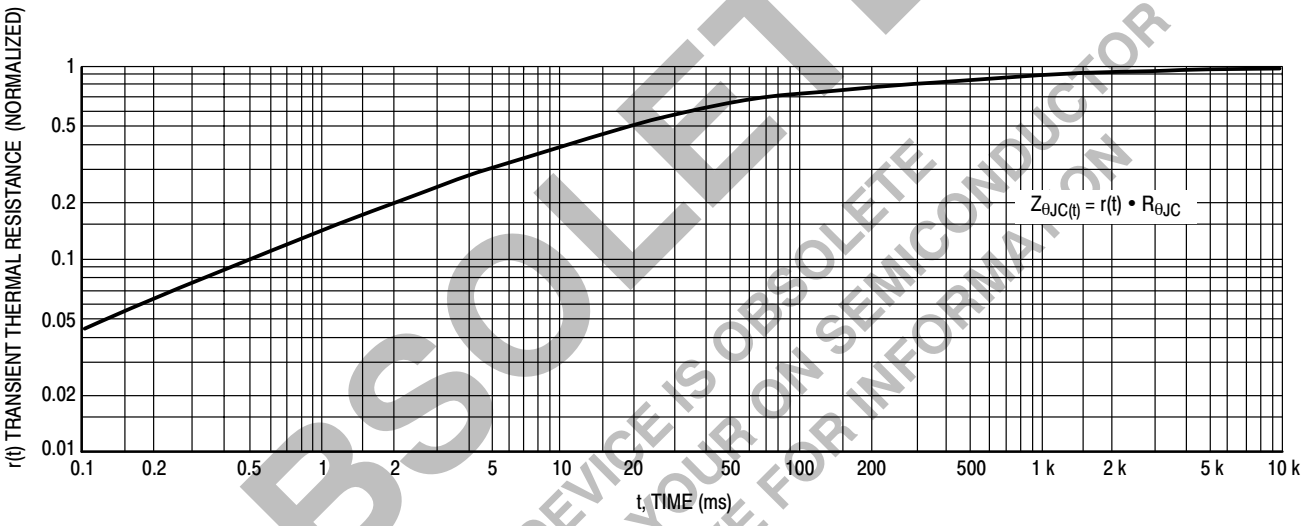
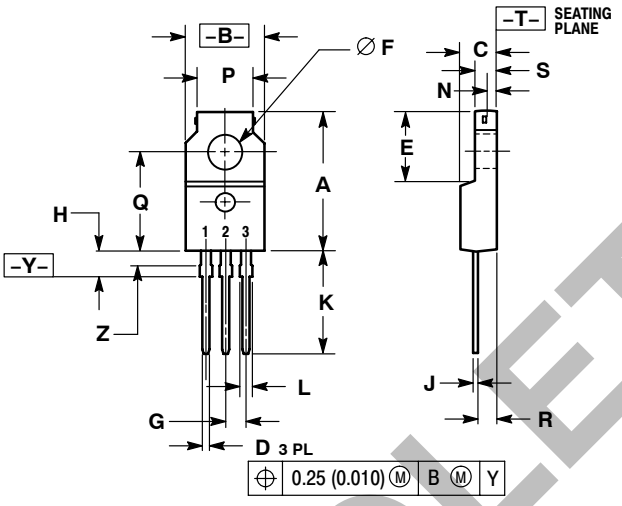


Figure 8. Thermal Response

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PACKAGE DIMENSIONS

ISOLATED TO−220 Full Pack
CASE 221C−02
ISSUE C



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

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

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