


# MAC218A6FP, MAC218A10FP

Preferred Device


## Triacs

### Silicon Bidirectional Thyristors

Designed primarily for full-wave ac control applications, such as light dimmers, motor controls, heating controls and power supplies.

- Blocking Voltage to 800 Volts
- Glass Passivated Junctions for Greater Parameter Uniformity and Stability
- Isolated TO-220 Type Package for Ease of Mounting
- Gate Triggering Guaranteed in Four Modes
-  Indicates UL Registered — File #E69369
- Device Marking: Logo, Device Type, e.g., MAC218A6FP, Date Code

#### MAXIMUM RATINGS (T<sub>J</sub> = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage <sup>(1)</sup> (T <sub>J</sub> = -40 to +125°C, Sine Wave 50 to 60 Hz, Gate Open)	V <sub>DRM</sub> , V <sub>RRM</sub>	400 800	Volts
On-State RMS Current (T <sub>C</sub> = +80°C) <sup>(2)</sup> Full Cycle Sine Wave 50 to 60 Hz	I <sub>T(RMS)</sub>	8.0	Amps
Peak Non-Repetitive Surge Current (One Full Cycle, 60 Hz, T <sub>C</sub> = +80°C) Preceded and followed by rated current	I <sub>TSM</sub>	100	Amps
Circuit Fusing Considerations (t = 8.3 ms)	I <sup>2</sup> t	40	A <sup>2</sup> s
Peak Gate Power (T <sub>C</sub> = +80°C, Pulse Width = 10 μs)	P <sub>GM</sub>	16	Watts
Average Gate Power (T <sub>C</sub> = +80°C, t = 8.3 ms)	P <sub>G(AV)</sub>	0.35	Watt
Peak Gate Current (T <sub>C</sub> = +80°C, Pulse Width = 10 μs)	I <sub>GM</sub>	4.0	Amps
RMS Isolation Voltage (T <sub>A</sub> = 25°C, Relative Humidity ≤ 20%) 	V <sub>(ISO)</sub>	1500	Volts
Operating Junction Temperature	T <sub>J</sub>	-40 to +125	°C
Storage Temperature Range	T <sub>stg</sub>	-40 to +150	°C


(1) V<sub>DRM</sub> and V<sub>RRM</sub> 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.

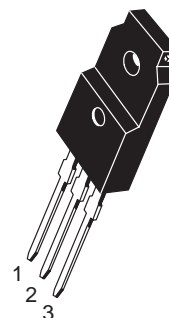
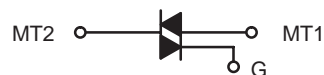
(2) The case temperature reference point for all T<sub>C</sub> measurements is a point on the center lead of the package as close as possible to the plastic body.



ON Semiconductor

<http://onsemi.com>

**ISOLATED TRIAC **  
**8 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
MAC218A6FP	ISOLATED TO220FP	500/Box
MAC218A10FP	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	$R_{\theta JC}$	2.2	$^{\circ}C/W$
Thermal Resistance, Case to Sink	$R_{\theta CS}$	2.2 (typ)	$^{\circ}C/W$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	60	$^{\circ}C/W$
Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 10 Seconds	$T_L$	260	$^{\circ}C$

## ELECTRICAL CHARACTERISTICS ( $T_C = 25^{\circ}C$ unless otherwise noted; Electricals apply in both directions)

Characteristic	Symbol	Min	Typ	Max	Unit
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## OFF CHARACTERISTICS

Peak Repetitive Blocking Current ( $V_D = \text{Rated } V_{DRM}, V_{RRM}; \text{ Gate Open}$ )	$I_{DRM}, I_{RRM}$	—	—	10	$\mu A$
$T_J = 25^{\circ}$		—	—	2.0	mA
$T_J = 125^{\circ}C$					

## ON CHARACTERISTICS

Peak On-State Voltage <sup>(1)</sup> ( $I_{TM} = \pm 11.3 \text{ A Peak}$ )	$V_{TM}$	—	1.7	2.0	Volts
Gate Trigger Current (Continuous dc) ( $V_D = 12 \text{ Vdc}, R_L = 100 \Omega$ ) MT2(+), G(+) MT2(+), G(-) MT2(-), G(-) MT2(-), G(+)	$I_{GT}$	—	—	50 50 50 75	mA
Gate Trigger Voltage (Continuous dc) (Main Terminal Voltage = 12 Vdc, $R_L = 100 \text{ Ohms}$ ) MT2(+), G(+) MT2(+), G(-) MT2(-), G(-) MT2(-), G(+)	$V_{GT}$	—	0.9 0.9 1.1 1.4	2.0 2.0 2.0 2.5	Volts
Gate Non-Trigger Voltage (Continuous dc) (Main Terminal Voltage = 12 V, $R_L = 100 \Omega, T_J = +125^{\circ}C$ ) All Four Quadrants	$V_{GD}$	0.2	—	—	Volts
Holding Current ( $V_D = 12 \text{ Vdc}, \text{ Gate Open}, \text{ Initiating Current} = \pm 200 \text{ mA}$ )	$I_H$	—	—	50	mA

## DYNAMIC CHARACTERISTICS

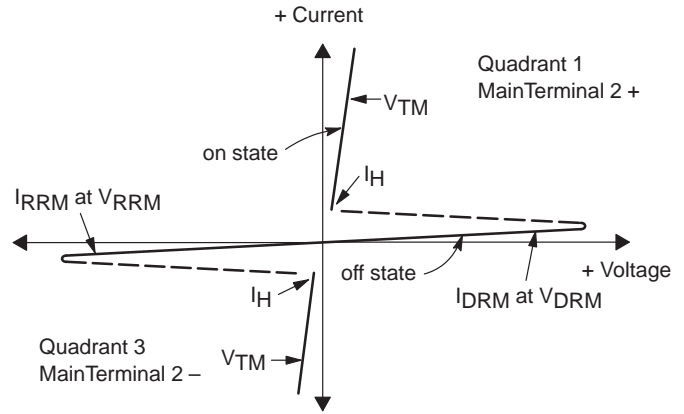
Critical Rate of Rise of Commutating Off-State Voltage ( $V_D = \text{Rated } V_{DRM}, I_{TM} = 11.3 \text{ A}, \text{ Commutating } di/dt = 4.1 \text{ A/ms}, \text{ Gate Unenergized}, T_C = 80^{\circ}C$ )	$dv/dt_{(c)}$	—	5.0	—	$V/\mu s$
Critical Rate of Rise of Off-State Voltage ( $V_D = \text{Rated } V_{DRM}, \text{ Exponential Voltage Rise}, \text{ Gate Open}, T_J = 125^{\circ}C$ )	$dv/dt$	—	100	—	$V/\mu s$

(1) Pulse Test: Pulse Width  $\leq 2.0 \text{ ms}$ , Duty Cycle  $\leq 2\%$ .

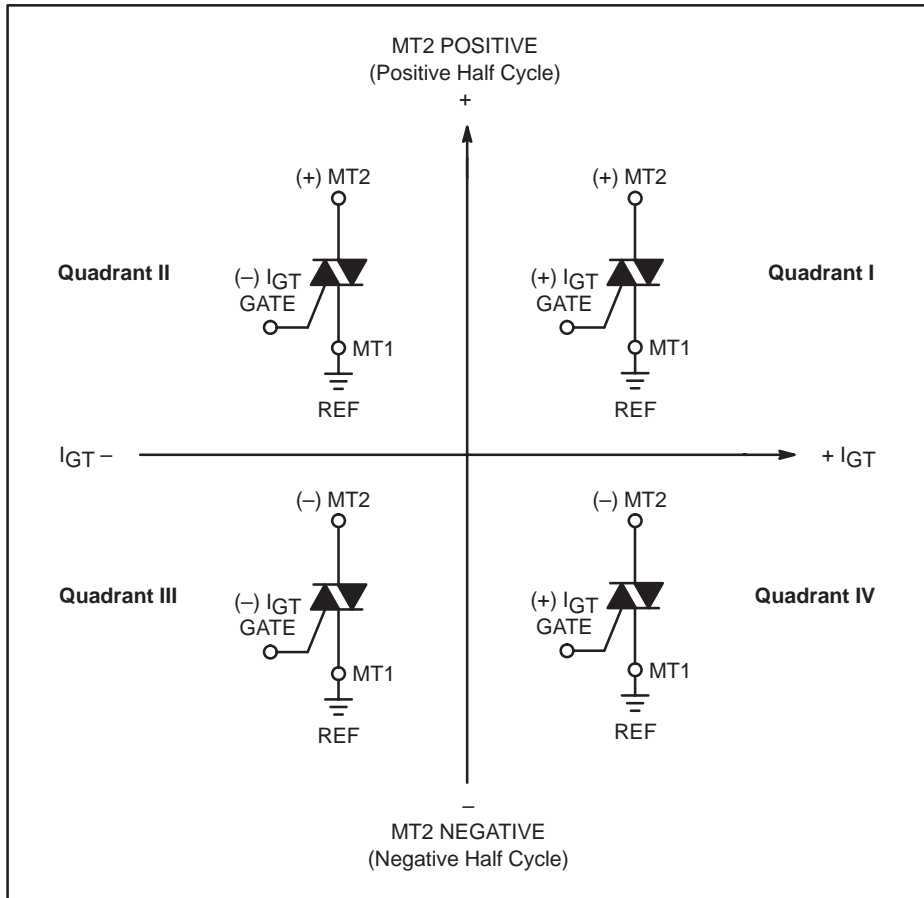
# MAC218A6FP, MAC218A10FP

## 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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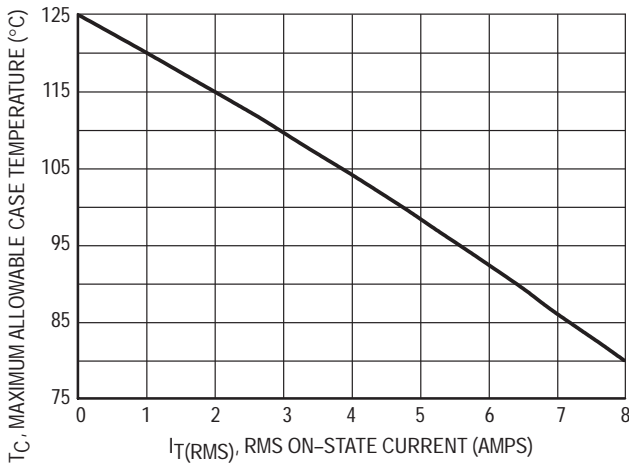


Figure 1. Current Derating

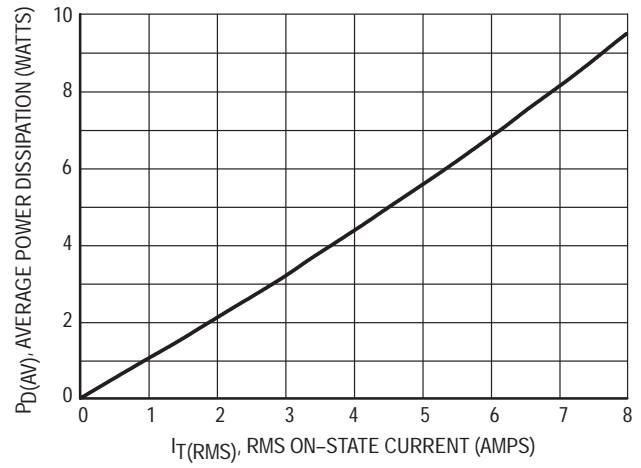


Figure 2. Power Dissipation

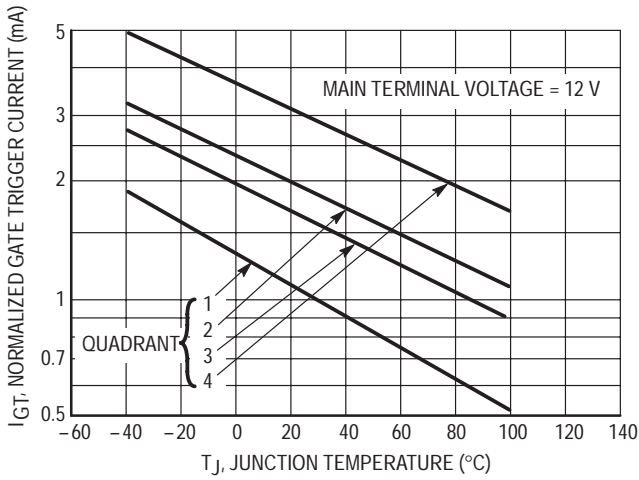


Figure 3. Normalized Gate Trigger Current

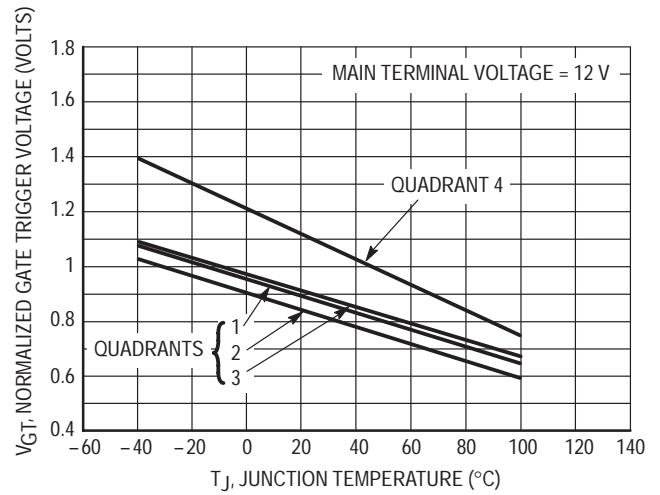


Figure 4. Normalized Gate Trigger Voltage

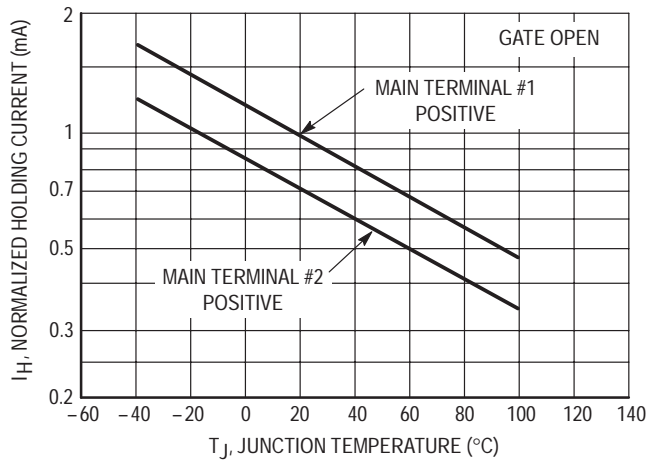
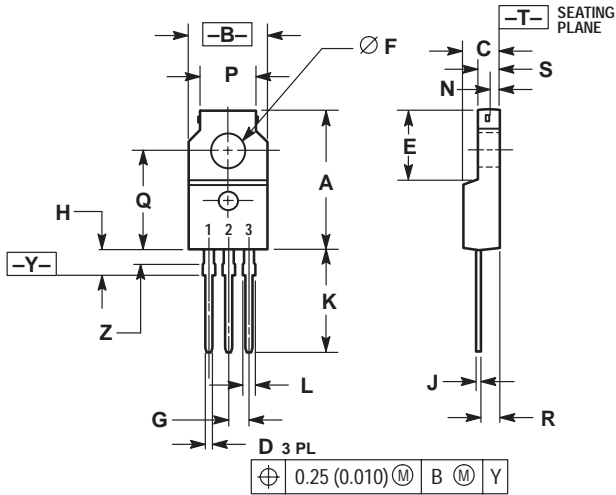


Figure 5. Normalized Holding Current

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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.


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

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

## Notes

## Notes

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