

MAC218A6FP, MAC218A8FP MAC218A10FP

Preferred Devices

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 ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage (Note 1.) ($T_J = -40$ to $+125^\circ\text{C}$, Sine Wave 50 to 60 Hz, Gate Open) MAC218A6FP MAC218A8FP MAC218A10FP	V_{DRM} , V_{RRM}	400 600 800	Volts
On-State RMS Current ($T_C = +80^\circ\text{C}$) (Note 2.) Full Cycle Sine Wave 50 to 60 Hz	$I_{\text{T(RMS)}}$	8.0	Amps
Peak Non-Repetitive Surge Current (One Full Cycle, 60 Hz, $T_C = +80^\circ\text{C}$) Preceded and followed by rated current	I_{TSM}	100	Amps
Circuit Fusing Considerations ($t = 8.3$ ms)	I^2t	40	A^2s
Peak Gate Power ($T_C = +80^\circ\text{C}$, Pulse Width = 10 μs)	P_{GM}	16	Watts
Average Gate Power ($T_C = +80^\circ\text{C}$, $t = 8.3$ ms)	$P_{\text{G(AV)}}$	0.35	Watt
Peak Gate Current ($T_C = +80^\circ\text{C}$, Pulse Width = 10 μs)	I_{GM}	4.0	Amps
RMS Isolation Voltage ($T_A = 25^\circ\text{C}$, Relative Humidity $\leq 20\%$) 	$V_{\text{(ISO)}}$	1500	Volts
Operating Junction Temperature	T_J	-40 to $+125$	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-40 to $+150$	$^\circ\text{C}$

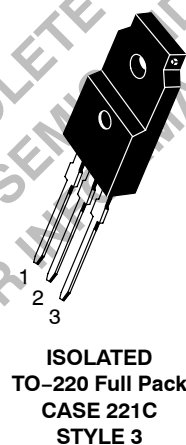
1. V_{DRM} and V_{RRM} for all types can be applied on a continuous basis. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.
2. The case temperature reference point for all T_C measurements is a point on the center lead of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



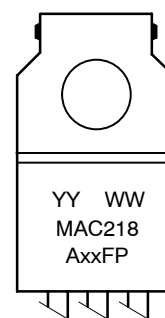
ON Semiconductor™

<http://onsemi.com>

ISOLATED TRIAC 
8 AMPERES RMS
400 thru 800 VOLTS



MARKING DIAGRAM



MAC218AxxFP = Specific Device Code
xx = 6, 8 or 10
YY = Year
WW = Work Week

PIN ASSIGNMENT

1	Main Terminal 1
2	Main Terminal 2
3	Gate

ORDERING INFORMATION

Device	Package	Shipping
MAC218A6FP	ISOLATED TO220FP	500/Box
MAC218A8FP	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	$^{\circ}\text{C/W}$
Thermal Resistance, Case to Sink	$R_{\theta CS}$	2.2 (typ)	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	60	$^{\circ}\text{C/W}$
Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 10 Seconds	T_L	260	$^{\circ}\text{C}$

ELECTRICAL CHARACTERISTICS ($T_C = 25^{\circ}\text{C}$ 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} ; Gate Open)	I_{DRM} , I_{RRM}	–	–	10	μA
$T_J = 125^{\circ}\text{C}$		–	–	2.0	mA

ON CHARACTERISTICS

Peak On-State Voltage (Note 1) ($I_{TM} = \pm 11.3 \text{ A Peak}$)	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, $R_L = 100 \Omega$, $T_J = +125^{\circ}\text{C}$) All Four Quadrants	V_{GD}	0.2	–	–	Volts
Holding Current ($V_D = 12 \text{ Vdc}$, Gate Open, Initiating Current = $\pm 200 \text{ mA}$)	I_H	–	–	50	mA

DYNAMIC CHARACTERISTICS

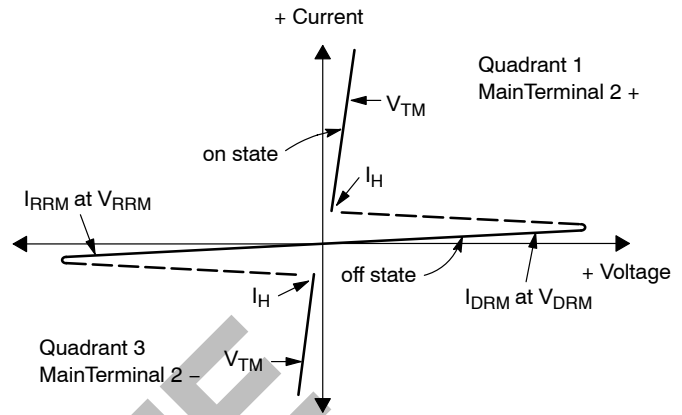
Critical Rate of Rise of Commutating Off-State Voltage ($V_D = \text{Rated } V_{DRM}$, $I_{TM} = 11.3 \text{ A}$, Commutating $di/dt = 4.1 \text{ A/ms}$, Gate Unenergized, $T_C = 80^{\circ}\text{C}$)	$dv/dt_{(c)}$	–	5.0	–	$\text{V}/\mu\text{s}$
Critical Rate of Rise of Off-State Voltage ($V_D = \text{Rated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

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

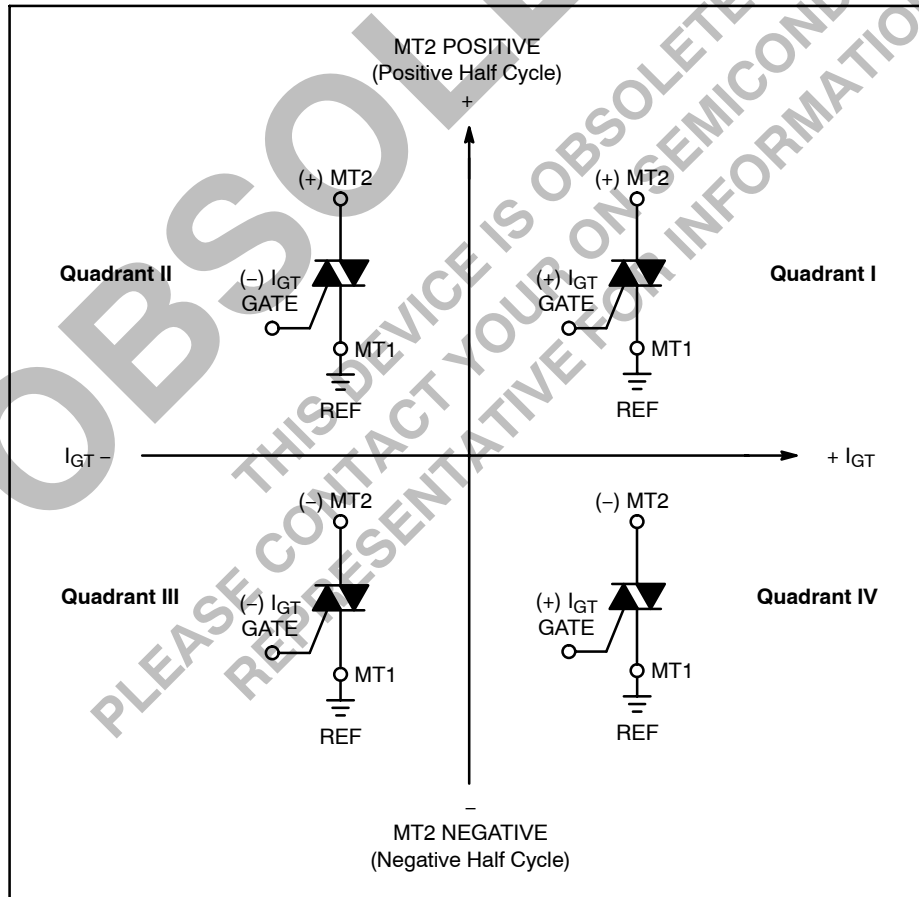
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Voltage Current Characteristic of Triacs (Bidirectional Device)

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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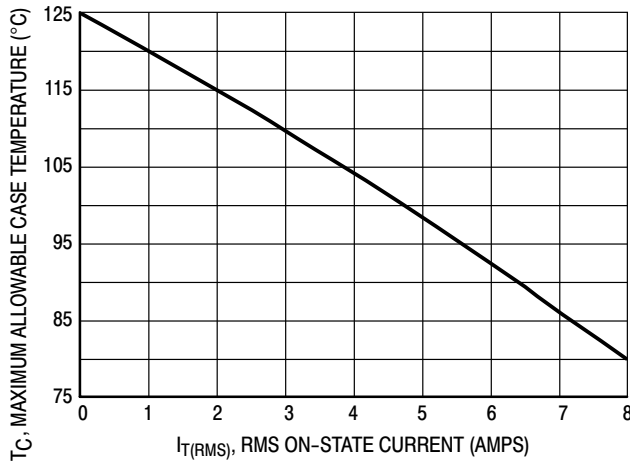


Figure 1. Current Derating

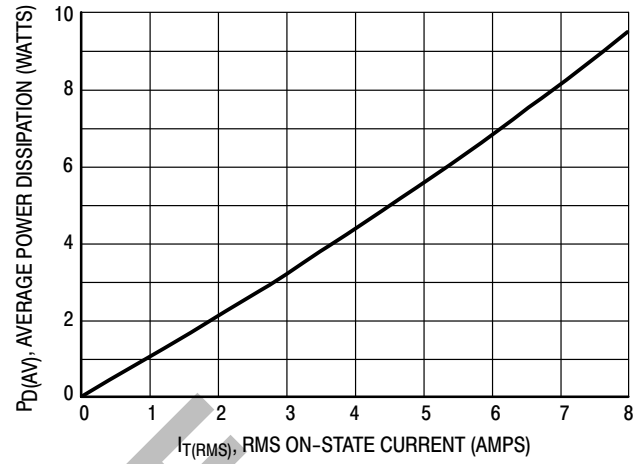


Figure 2. Power Dissipation

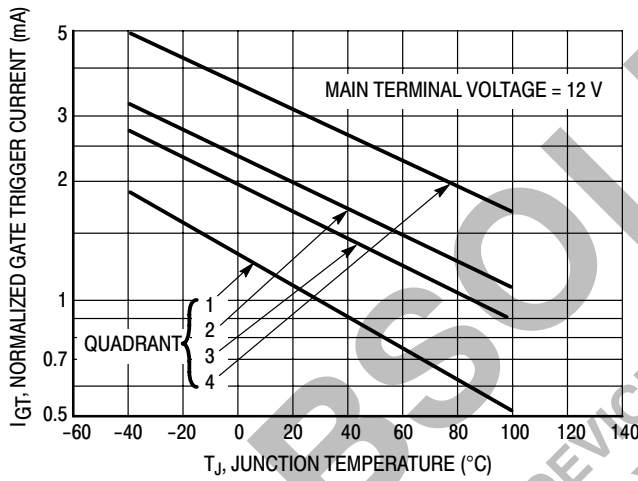


Figure 3. Normalized Gate Trigger Current

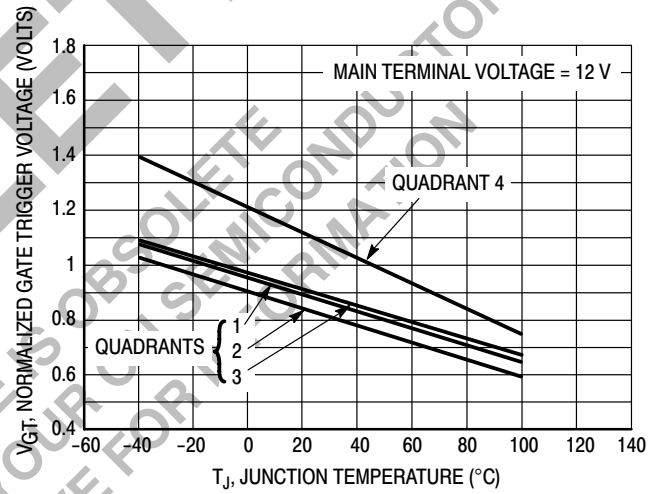


Figure 4. Normalized Gate Trigger Voltage

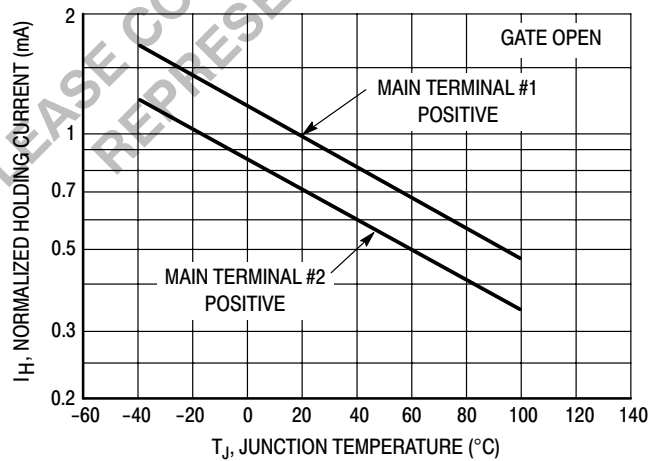
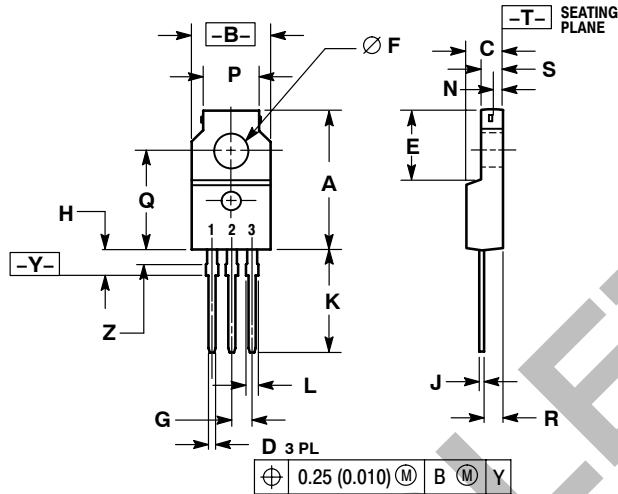


Figure 5. Normalized Holding Current

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PACKAGE DIMENSIONS

TO-220 FULLPACK THYRISTOR CASE 221C-02 ISSUE D



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:

1. MT 1
2. MT 2
3. GATE

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