

# MAC229A8FP, MAC229A10FP

## Triacs

### Silicon Bidirectional Thyristors

Designed primarily for industrial and consumer applications for full wave control of ac loads such as appliance controls, heater controls, motor controls, and other power switching applications.

- All Diffused and Glass-Passivated Junctions for Parameter Uniformity and Stability
- Small, Rugged, Thermowatt Construction for Low Thermal Resistance and High Heat Dissipation
- Center Gate Geometry for Uniform Current Spreading
- Gate Triggering Guaranteed in Four Modes
-  Indicates UL Registered — File #E69369
- Device Marking: Logo, Device Type, e.g., MAC229A8FP, Date Code

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

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage <sup>(1)</sup> ( $T_J = -40$ to $110^\circ\text{C}$ , Sine Wave 50 to 60 Hz, Gate Open)	$V_{\text{DRM}}$ , $V_{\text{RRM}}$		Volts
MAC229A8FP MAC229A10FP		600 800	
On-State RMS Current ( $T_C = 80^\circ\text{C}$ ) Full Cycle Sine Wave 50 to 60 Hz	$I_{\text{T(RMS)}}$	8.0	Amps
Peak Non-Repetitive Surge Current (One Full Cycle Sine Wave, 60 Hz, $T_J = 110^\circ\text{C}$ )	$I_{\text{TSM}}$	80	Amps
Circuit Fusing Consideration ( $t = 8.3$ ms)	$I^2t$	26	$\text{A}^2\text{s}$
Peak Gate Current ( $t \leq 2 \mu\text{s}$ , $T_C = 80^\circ\text{C}$ )	$I_{\text{GM}}$	$\pm 2.0$	Amps
Peak Gate Voltage ( $t \leq 2 \mu\text{s}$ , $T_C = 80^\circ\text{C}$ )	$V_{\text{GM}}$	$\pm 10$	Volts
Peak Gate Power ( $t \leq 2 \mu\text{s}$ , $T_C = 80^\circ\text{C}$ )	$P_{\text{GM}}$	20	Watts
Average Gate Power ( $T_C = 80^\circ\text{C}$ , $t \leq 8.3$ ms)	$P_{\text{G(AV)}}$	0.5	Watt
RMS Isolation Voltage ( $T_A = 25^\circ\text{C}$ , Relative Humidity $\leq 20\%$ ) 	$V_{\text{(ISO)}}$	1500	Volts
Operating Junction Temperature Range	$T_J$	-40 to 110	$^\circ\text{C}$
Storage Temperature Range	$T_{\text{stg}}$	-40 to 150	$^\circ\text{C}$
Mounting Torque	—	8.0	in. lb.

(1)  $V_{\text{DRM}}$  and  $V_{\text{RRM}}$  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.

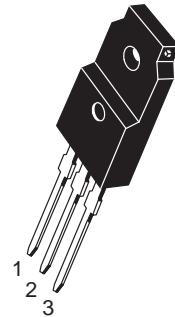
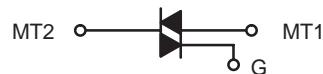
(2) The case temperature reference point for all TC measurements is a point on the center lead of the package as close as possible to the plastic body.



**ON Semiconductor**

<http://onsemi.com>

**ISOLATED TRIAC (93)  
8 AMPERES RMS  
600 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
MAC229A8FP	ISOLATED TO220FP	500/Box
MAC229A10FP	ISOLATED TO220FP	500/Box

# MAC229A8FP, MAC229A10FP

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.2	°C/W
Thermal Resistance, Case to Sink	$R_{\theta CS}$	2.2	°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** ( $T_C = 25^\circ\text{C}$  unless otherwise noted; Electricals apply in both directions)

Characteristic	Symbol	Min	Typ	Max	Unit
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## OFF CHARACTERISTICS

Peak Repetitive Blocking Current <sup>(1)</sup> ( $V_D$ = Rated $V_{DRM}$ ; $V_{RRM}$ ; Open Gate)	$I_{DRM}$ , $I_{RRM}$	—	—	10 2.0	$\mu\text{A}$ mA
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## ON CHARACTERISTICS

Peak On-State Voltage ( $I_{TM} = \pm 11$ A Peak, Pulse Width $\leq 2$ ms, Duty Cycle $\leq 2\%$ )	$V_{TM}$	—	—	1.8	Volts
Gate Trigger Current (Continuous dc) ( $V_D = 12$ V, $R_L = 100 \Omega$ ) MT2(+), G(+); MT2(+), G(−); MT2(−), G(−) MT2(−), G(+)	$I_{GT}$	— —	— —	10 20	mA
Gate Trigger Voltage (Continuous dc) ( $V_D = 12$ V, $R_L = 100 \Omega$ ) MT2(+), G(+); MT2(+), G(−); MT2(−), G(−) MT2(−), G(+)	$V_{GT}$	— —	— —	2.0 2.5	Volts
Gate Non-Trigger Voltage (Continuous dc) ( $V_D = 12$ V, $T_C = 110^\circ\text{C}$ , $R_L = 100 \Omega$ ) All Four Quadrants	$V_{GD}$	0.2	—	—	Volts
Holding Current ( $V_D = 12$ Vdc, Initiating Current = $\pm 200$ mA, Gate Open)	$I_H$	—	—	15	mA
Gate-Controlled Turn-On Time ( $V_D$ = Rated $V_{DRM}$ , $I_{TM} = 16$ A Peak, $I_G = 30$ mA)	$t_{gt}$	—	1.5	—	$\mu\text{s}$

## DYNAMIC CHARACTERISTICS

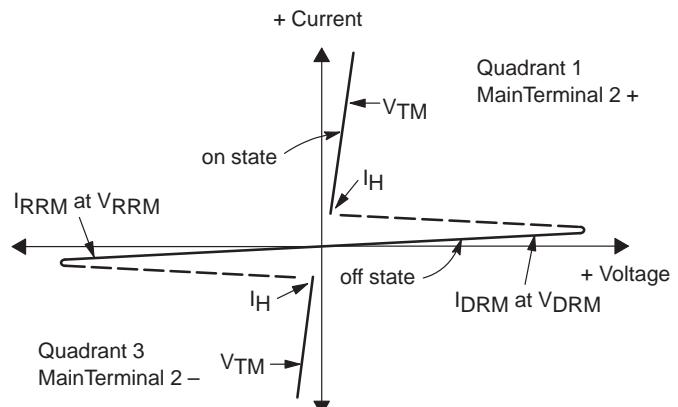
Critical Rate of Rise of Off-State Voltage ( $V_D$ = Rated $V_{DRM}$ ; Exponential Waveform, $T_C = 110^\circ\text{C}$ )	$dv/dt$	—	25	—	$\text{V}/\mu\text{s}$
Critical Rate of Rise of Commutation Voltage ( $V_D$ = Rated $V_{DRM}$ , $I_{TM} = 11.3$ A, Commutating $di/dt = 4.1$ A/ms, Gate Unenergized, $T_C = 80^\circ\text{C}$ )	$dv/dt(c)$	—	5.0	—	$\text{V}/\mu\text{s}$

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

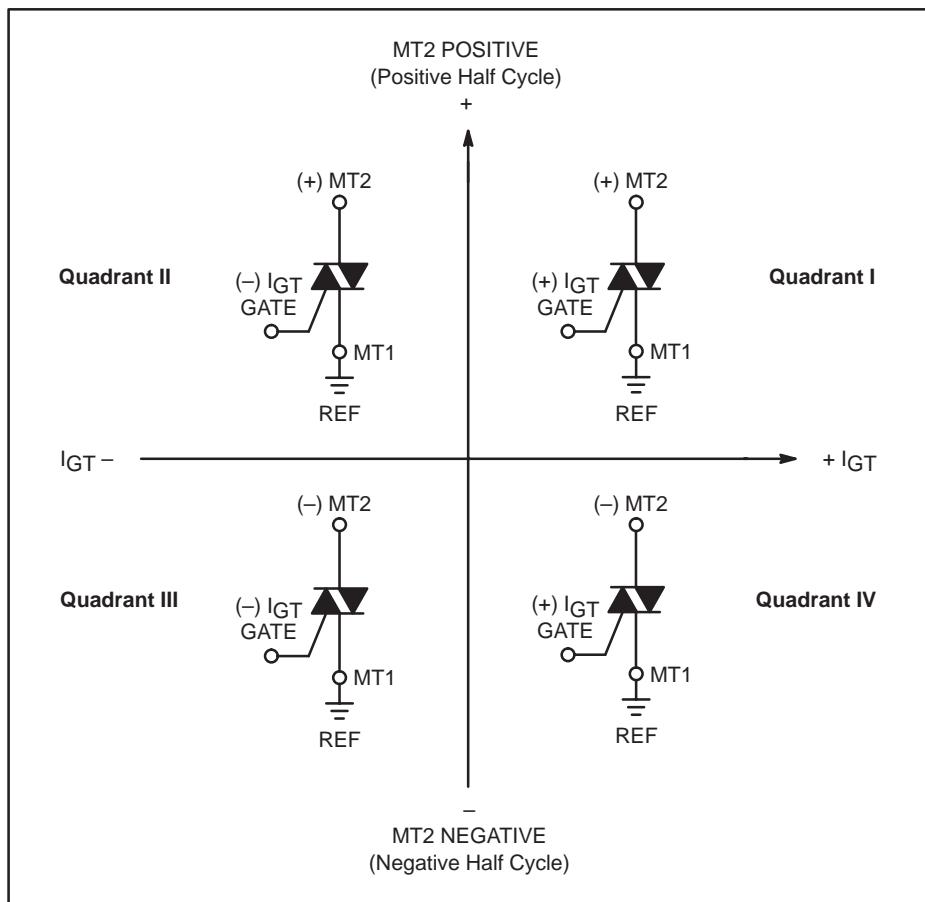
# MAC229A8FP, MAC229A10FP

## 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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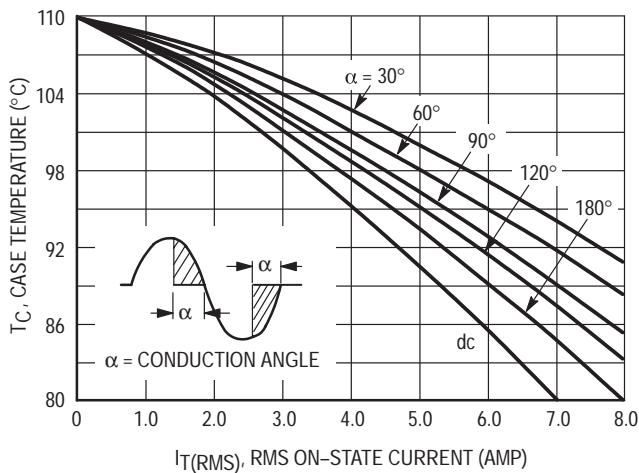


Figure 1. RMS Current Derating

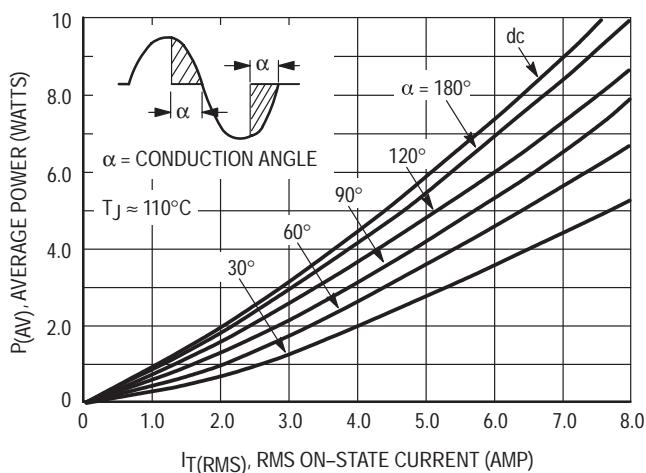
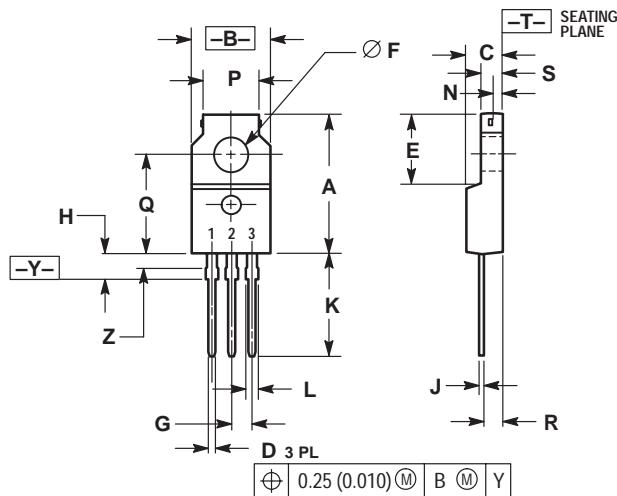


Figure 2. On-State Power Dissipation

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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:

1. MT 1
2. MT 2
3. GATE

## **Notes**

## Notes

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