

MAC228A Series

Preferred Device

Sensitive Gate 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.

- Sensitive Gate Triggering in 3 Modes for AC Triggering on Sinking Current Sources
- Four Mode Triggering for Drive Circuits that Source Current
- 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
- Device Marking: Logo, Device Type, e.g., MAC228A4, Date Code



ON Semiconductor

<http://onsemi.com>

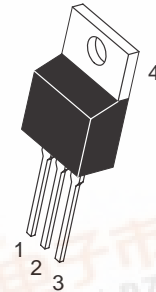
TRIACS
8 AMPERES RMS
200 thru 800 VOLTS



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

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage ⁽¹⁾ (T _J = -40 to 110°C, Sine Wave, 50 to 60 Hz, Gate Open)	V _{DRM} , V _{RRM}	200 400 600 800	Volts
On-State RMS Current (T _C = 80°C) Full Cycle Sine Wave 50 to 60 Hz	I _{T(RMS)}	8.0	Amps
Peak Non-Repetitive Surge Current (One Full Cycle Sine Wave, 60 Hz, T _J = 110°C)	I _{TSM}	80	Amps
Circuit Fusing Considerations (t = 8.3 ms)	I ² t	26	A ² s
Peak Gate Current (t ≤ 2 μs, T _C = 80°C)	I _{GM}	±2.0	Amps
Peak Gate Voltage (t ≤ 2 μs, T _C = 80°C)	V _{GM}	±10	Volts
Peak Gate Power (t ≤ 2 μs, T _C = 80°C)	P _{GM}	20	Watts
Average Gate Power (t ≤ 8.3 ms, T _C = 80°C)	P _{G(AV)}	0.5	Watt
Operating Junction Temperature Range	T _J	-40 to 110	°C
Storage Temperature Range	T _{stg}	-40 to 150	°C
Mounting Torque	—	8.0	in. lb.

(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.



TO-220AB
CASE 221A
STYLE 4

PIN ASSIGNMENT

Pin	Assignment
1	Main Terminal 1
2	Main Terminal 2
3	Gate
4	Main Terminal 2

ORDERING INFORMATION

Device	Package	Shipping
MAC228A4	TO220AB	500/Box
MAC228A6	TO220AB	500/Box
MAC228A8	TO220AB	500/Box
MAC228A10	TO220AB	500/Box

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



MAC228A Series

THERMAL CHARACTERISTICS

Characteristic	Symbol	Value	Unit
Thermal Resistance — Junction to Case — Junction to Ambient	$R_{\theta JC}$ $R_{\theta JA}$	2.0 62.5	$^{\circ}\text{C}/\text{W}$
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 2.0	μA mA

ON CHARACTERISTICS

Peak On-State Voltage ($I_{TM} = \pm 11 \text{ A Peak}$, Pulse Width $\leq 2 \text{ ms}$, Duty Cycle $\leq 2\%$)	V_{TM}	—	—	1.8	Volts
Gate Trigger Current (Continuous dc) ($V_D = 12 \text{ V}$, $R_L = 100 \Omega$) MT2(+), G(+); MT2(+), G(-); MT2(-), G(-) MT2(-), G(+)	I_{GT}	— —	— —	5.0 10	mA
Gate Trigger Voltage (Continuous dc) ($V_D = 12 \text{ V}$, $R_L = 100 \Omega$) MT2(+), G(+); MT2(+), G(-); MT2(-), G(-) MT2(-), G(+)	V_{GT}	— —	— —	2.0 2.5	Volts
Gate Non-Trigger Voltage (Continuous dc) ($V_D = 12 \text{ V}$, $T_C = 110^{\circ}\text{C}$, $R_L = 100 \Omega$) All Four Quadrants	V_{GD}	0.2	—	—	Volts
Holding Current ($V_D = 12 \text{ Vdc}$, Initiating Current = $\pm 200 \text{ mA}$, Gate Open)	I_H	—	—	15	mA
Gate-Controlled Turn-On Time ($V_D = \text{Rated } V_{DRM}$, $I_{TM} = 16 \text{ A Peak}$, $I_G = 30 \text{ mA}$)	t_{gt}	—	1.5	—	μs

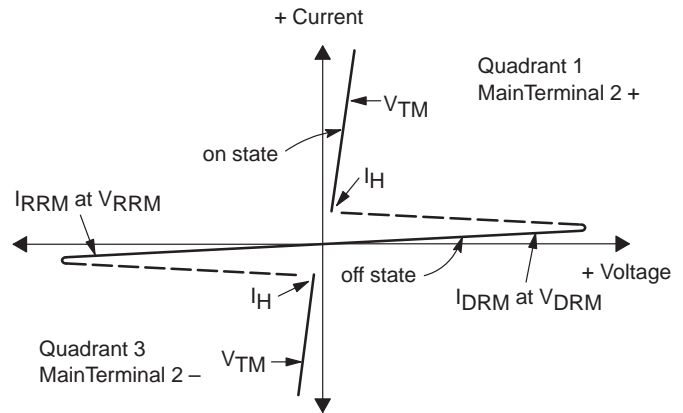
DYNAMIC CHARACTERISTICS

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

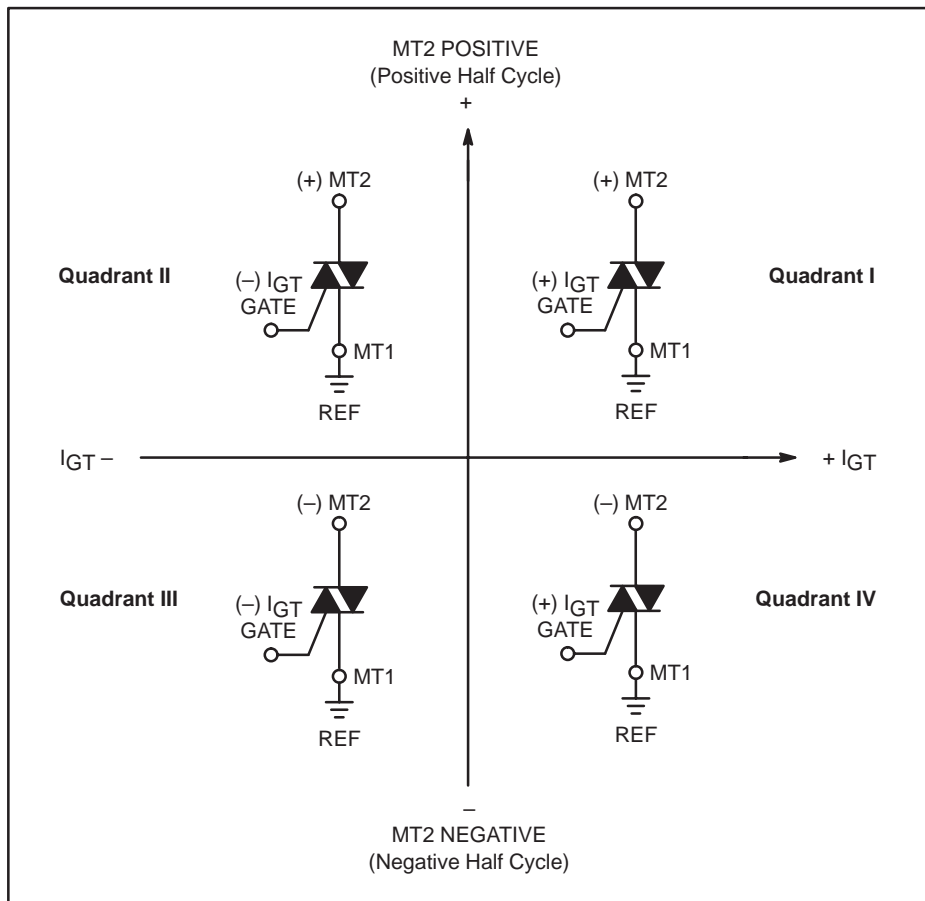
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Voltage Current Characteristic of Triacs (Bidirectional Device)

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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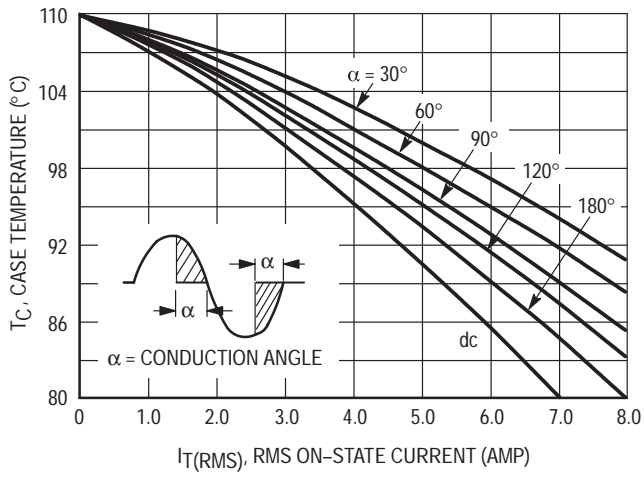


Figure 1. RMS Current Derating

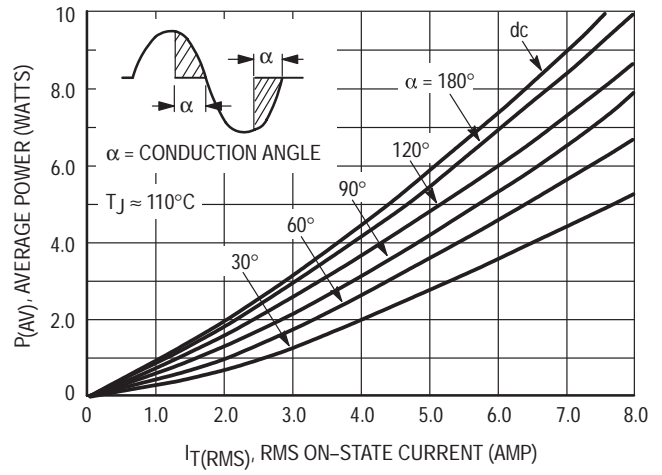
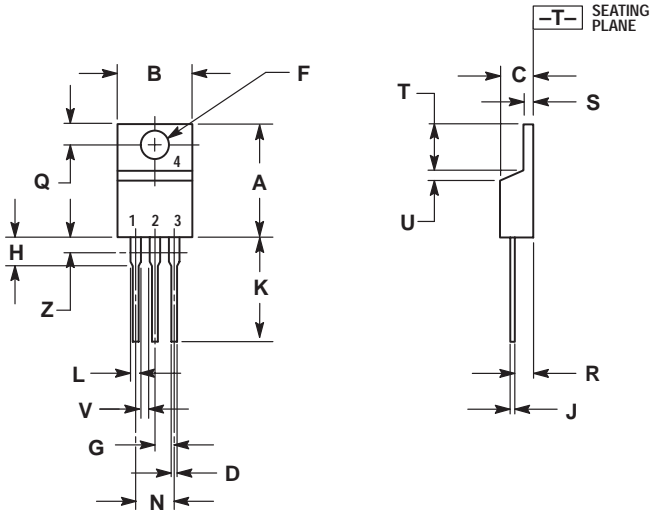


Figure 2. On-State Power Dissipation

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PACKAGE DIMENSIONS

TO-220AB
CASE 221A-07
ISSUE Z



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.014	0.022	0.36	0.55
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	---	1.15	---
Z	---	0.080	---	2.04

STYLE 4:

- PIN 1. MAIN TERMINAL 1
2. MAIN TERMINAL 2
3. GATE
4. MAIN TERMINAL 2


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Notes

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