

Additional Information







Accessories



Samples

Functional Diagram



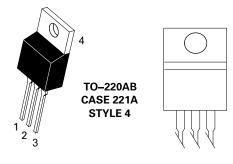
Description

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.

Features

- 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
- These Devices are Pb-Free and are RoHS Compliant

Pin Out





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

Rating	Symbol	Value	Unit	
Peak Repetitive Off-State Voltage (Note 1) (T _J =-40 to 110°C, Sine Wave, 50 to 60 Hz, Gate Open)	MAC228A4 MAC228A6 MAC228A8 MAC228A10	V _{DRM} ,	200 400 600 800	V
On-State RMS Current (T _c = 80°C) Full Cycle Sine Wave, 50 to	60 Hz	I _{T (RMS)}	8.0	А
Peak Non-Repetitive Surge Current (One Full Cycle Sine Wave, 60 Hz, TJ = 110°C)	I _{TSM}	80	А	
Circuit Fusing Consideration (t = 8.3 ms)	l²t	26	A²sec	
Peak Gate Current, (t \leq 2 μ s, T_{C} = 80°C)		I _{GM}	±2.0	А
Peak Gate Voltage, (t ≤ 2 μs, TC = 80°C)		$V_{_{\mathrm{GM}}}$	±10	V
Peak Gate Power (t \leq 2 μ s, T $_{\rm C}$ = 80°C)		P_GM	20	W
Average Gate Power (t \leq 8.3 ms, T _C = 80°C)	P _{G (AV)}	0.5	W	
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

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

Thermal Characteristics

Rating		Symbol	Value	Unit
Thermal Resistance,	Junction-to-Case (AC) Junction-to-Ambient	R _{ejc} R _{eja}	2.0 62.5	°C/W
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds		T_L	260	°C

Electrical Characteristics - OFF $(T_J = 25^{\circ}\text{C unless otherwise noted}$; Electricals apply in both directions)

Characteristic		Symbol	Min	Тур	Max	Unit
Peak Repetitive Blocking Current	T ₁ = 25°C	I _{DRM} ,	-	-	10	μΑ
$(V_D = V_{DRM} = V_{RRM}; Gate Open)$	$T_{J}^{3} = 110^{\circ}C$	I _{RRM}	-	-	2.0	mA

Electrical Characteristics - ON $(T_J = 25^{\circ}\text{C unless otherwise noted; Electricals apply in both directions)$

Characteristic			Min	Тур	Max	Unit
Peak On–State Voltage ($I_{TM} = \pm 11$ A Peak, Pulse Width ≤ 2 ms, Duty Cycle $\leq 2\%$)			-	_	1.8	V
	MT2(+), G(+)		_	_	5.0	
Gate Trigger Current	MT2(+), G(-)		_	_	5.0	Λ
(Continuous dc) $(V_D = 12 \text{ V}, R_L = 100 \Omega)$	MT2(-), G(-)	GT	_	_	5.0	mA
	MT2(-), G(+)		-	_	10	
	MT2(+), G(+)		-	_	2.0	
Gate Trigger Voltage	MT2(+), G(-)	\/	-	_	2.0	V
(Continuous dc) $(V_D = 12 \text{ V}, R_1 = 100 \Omega)$	MT2(-), G(-)	V _{GT}	-	_	2.0	V
, p , L , r	MT2(-), G(+)		-	_	2.5	
Gate Non–Trigger Voltage (Continuous DC), (V $_{\rm D}$ = 12 V, T $_{\rm C}$ = 110°C, R $_{\rm L}$ = 100 $\Omega)$ All Four Quadrants			0.2	_	-	V
Holding Current ($V_D = 12 V_{dc'}$, Gate Open, Initiating Current = ±200 mA))			-	_	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	_	μs



^{1.} V_{DBM} and V_{SBM} for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; however, positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.

Dynamic Characteristics

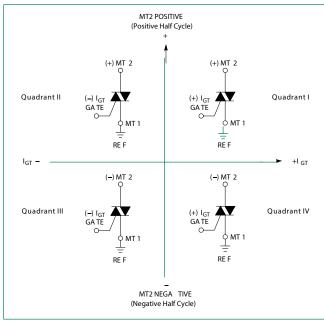
Characteristic	Symbol	Min	Тур	Max	Unit
Critical Rate of Rise of Commutation Voltage (V_D = Rated $V_{DRM'}$ I_{TM} = 11.3 A, Commutating di/dt = 4.1 A/ms, Gate Unenergized, $\overline{I_C}$ = 80°C)	di/dt _(c)	_	5.0	-	V/µs
Critical Rate of Rise of Off-State Voltage $(V_D = Rated V_{DRM}, Exponential Waveform, Gate Open, T_C = 110°C)$	dv/dt	_	25	_	V/µs

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

Voltage Current Characteristic of SCR

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

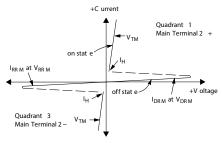


Figure 1.
Current Derating

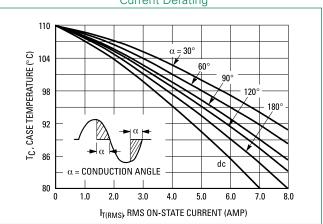
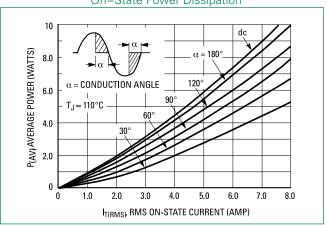


Figure 2.On–State Power Dissipation

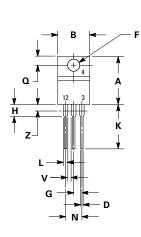


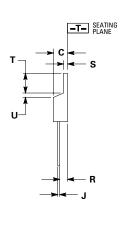


MAC228A

Sensitive Gate Triacs - 400V - 800V

Dimensions

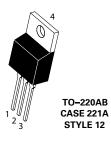


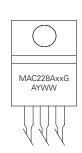


D:	Inc	hes	Millimeters		
Dim	Min	Max	Min	Max	
Α	0.590	0.620	14.99	15.75	
В	0.380	0.420	9.65	10.67	
С	0.178	0.188	4.52	4.78	
D	0.025	0.035	0.64	0.89	
F	0.142	0.147	3.61	3.73	
G	0.095	0.105	2.41	2.67	
Н	0.110	0.130	2.79	3.30	
J	0.018	0.024	0.46	0.61	
K	0.540	0.575	13.72	14.61	
L	0.060	0.075	1.52	1.91	
N	0.195	0.205	4.95	5.21	
Q	0.105	0.115	2.67	2.92	
R	0.085	0.095	2.16	2.41	
S	0.045	0.060	1.14	1.52	
Т	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	

1.	Dimensioning	and	tolerancing	ner	ansi v14.5m.	1982.

Part Marking System





= 4, 6, 8, or 10

A= Assembly Location (Optional)*

Υ= Year WW = Work Week = Pb-Free Package

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

Ordering Information

Device	Package	Shipping
MAC228A4G	TO-220AB (Pb-Free)	
MAC228A6G		
MAC228A6TG		1000 Units/ Box
MAC228A8G		1000 Offits/ Box
MAC228A8TG		
MAC228A10G		





^{2.} Controlling dimension: inch.
3. Dimension z defines a zone where all body and lead irregularities are allowed.