

Triacs

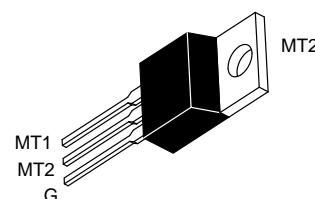
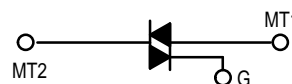
Silicon Bidirectional Thyristors

... designed primarily for full-wave ac control applications, such as light dimmers, motor controls, heating controls and power supplies; or wherever full-wave silicon gate controlled solid-state devices are needed. Triac type thyristors switch from a blocking to a conducting state for either polarity of applied anode voltage with positive or negative gate triggering.

- Blocking Voltage to 800 Volts
- All Diffused and Glass Passivated Junctions for Greater Parameter Uniformity and Stability
- Small, Rugged, Thermowatt Construction for Low Thermal Resistance, High Heat Dissipation and Durability
- Gate Triggering Guaranteed in Four Modes

MAC212A Series

TRIACs
12 AMPERES RMS
600 thru 800 VOLTS



CASE 221A-07
(TO-220AB)
STYLE 4

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

Rating	Symbol	Value	Unit
Repetitive Peak Off-State Voltage ⁽¹⁾ (T _J = -40 to +125°C, 1/2 Sine Wave 50 to 60 Hz, Gate Open) MAC212A8 MAC212A10	V _{DRM}	600 800	Volts
On-State Current RMS (T _C = +85°C) Full Cycle Sine Wave 50 to 60 Hz	I _{T(RMS)}	12	Amp
Peak Non-repetitive Surge Current (One Full Cycle, 60 Hz, T _C = +85°C) preceded and followed by Rated Current	I _{TSM}	100	Amp
Circuit Fusing Considerations (t = 8.3 ms)	I ² t	40	A ² s
Peak Gate Power (T _C = +85°C, Pulse Width = 10 μs)	P _{GM}	20	Watts
Average Gate Power (T _C = +85°C, t = 8.3 ms)	P _{G(AV)}	0.35	Watt
Peak Gate Current (T _C = +85°C, Pulse Width = 10 μs)	I _{GM}	2	Amp
Operating Junction Temperature Range	T _J	-40 to +125	°C
Storage Temperature Range	T _{stg}	-40 to +150	°C

1. V_{DRM} 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.

MAC212A Series

THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Unit
$R_{\theta JC}$ $R_{\theta JA}$	Thermal Resistance — Junction to Case — Junction to Ambient	2.0 62.5	$^{\circ}C/W$
T_L	Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 10 Seconds	260	$^{\circ}C$

ELECTRICAL CHARACTERISTICS ($T_C = 25^{\circ}C$ unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Blocking Current (Either Direction) ($V_D = \text{Rated } V_{DRM}$, Gate Open) $T_J = 25^{\circ}C$ $T_J = +125^{\circ}C$	I_{DRM}	— —	— —	10 2	μA mA
Peak On-State Voltage (Either Direction) $I_{TM} = 17 A$ Peak; Pulse Width = 1 to 2 ms, Duty Cycle $\leq 2\%$	V_{TM}	—	1.3	1.75	Volts
Gate Trigger Current (Continuous dc) (Main Terminal Voltage = 12 Vdc, $R_L = 100$ Ohms) MT2(+), G(+) MT2(+), G(-) MT2(-), G(-) MT2(-), G(+)	I_{GT}	— — — —	12 12 20 35	50 50 50 75	mA
Gate Trigger Voltage (Continuous dc) (Main Terminal Voltage = 12 Vdc, $R_L = 100$ Ohms) MT2(+), G(+) MT2(+), G(-) MT2(-), G(-) MT2(-), G(+) (Main Terminal Voltage = Rated V_{DRM} , $R_L = 10$ k Ω , $T_J = +125^{\circ}C$) MT2(+), G(+); MT2(-), G(-); MT2(+), G(-) MT2(-), G(+)	V_{GT}	— — — — 0.2 0.2	0.9 0.9 1.1 1.4	2 2 2 2.5	Volts
Holding Current (Either Direction) (Main Terminal Voltage = 12 Vdc, Gate Open, Initiating Current = 500 mA)	I_H	—	6	50	mA
Turn-On Time ($V_D = \text{Rated } V_{DRM}$, $I_{TM} = 17 A$, $I_{GT} = 120$ mA, Rise Time = 0.1 μs , Pulse Width = 2 μs)	t_{gt}	—	1.5	—	μs
Critical Rate of Rise of Commutation Voltage ($V_D = \text{Rated } V_{DRM}$, $I_{TM} = 17 A$, Commutating $di/dt = 6.1$ A/ms, Gate Unenergized, $T_C = +85^{\circ}C$)	$dv/dt(c)$	—	5	—	V/ μs
Critical Rate of Rise of Off-State Voltage ($V_D = \text{Rated } V_{DRM}$, Exponential Voltage Rise, Gate Open, $T_C = +85^{\circ}C$)	dv/dt	—	100	—	V/ μs

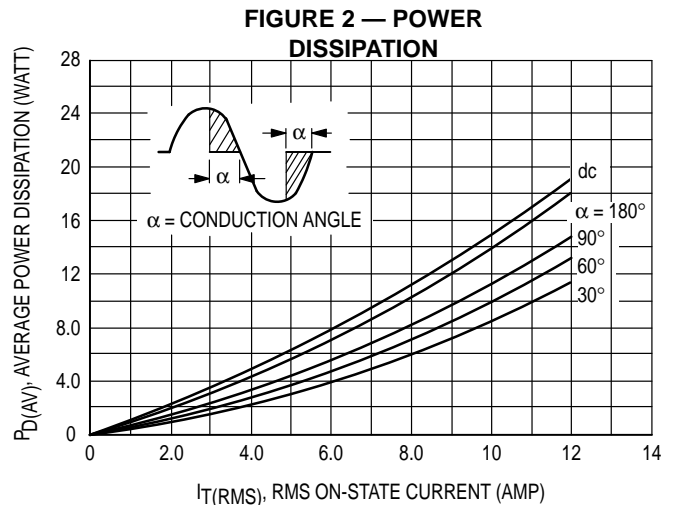
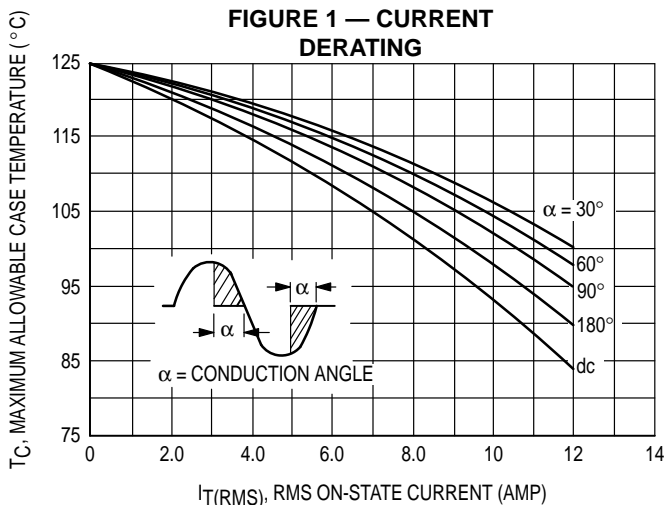


FIGURE 3 — MAXIMUM ON-STATE CHARACTERISTICS

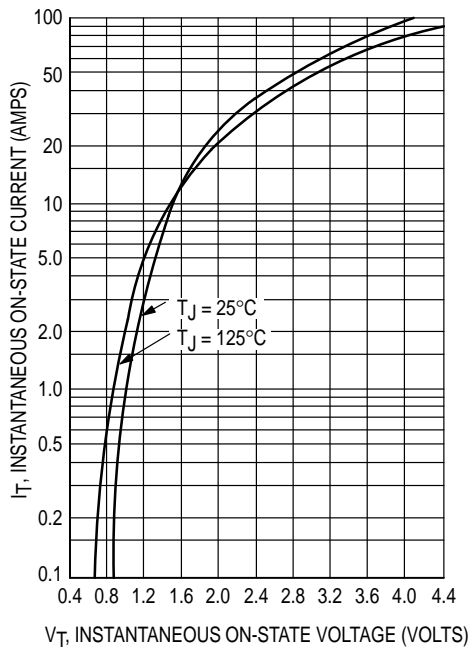


FIGURE 4 — MAXIMUM NON-REPETITIVE SURGE CURRENT

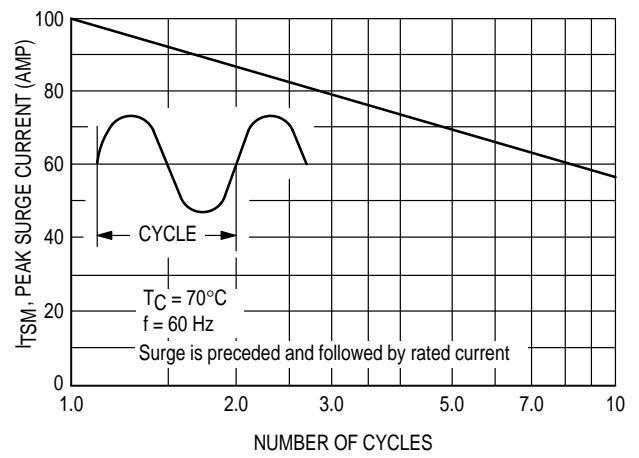


FIGURE 5 — TYPICAL GATE TRIGGER VOLTAGE

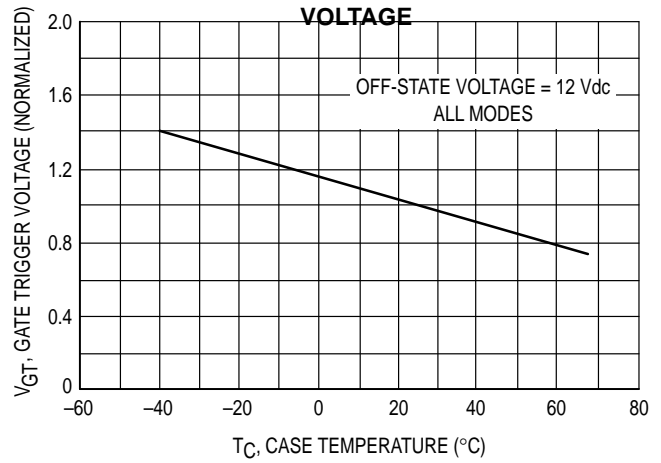


FIGURE 6 — TYPICAL GATE TRIGGER CURRENT

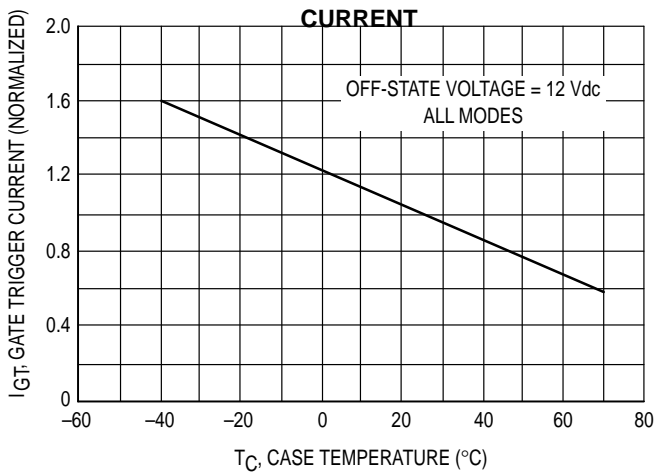


FIGURE 7 — TYPICAL HOLDING CURRENT

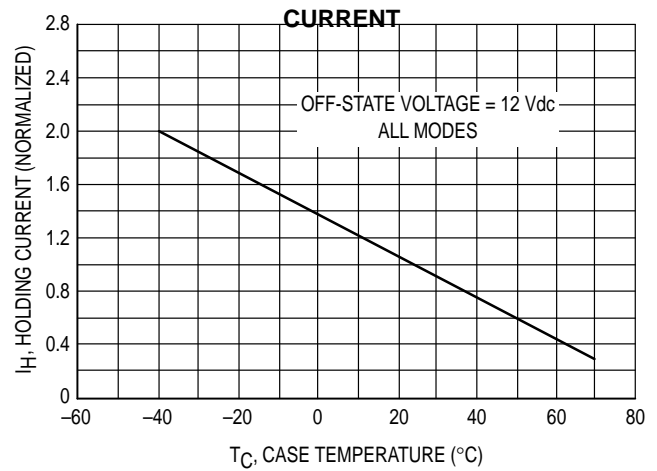
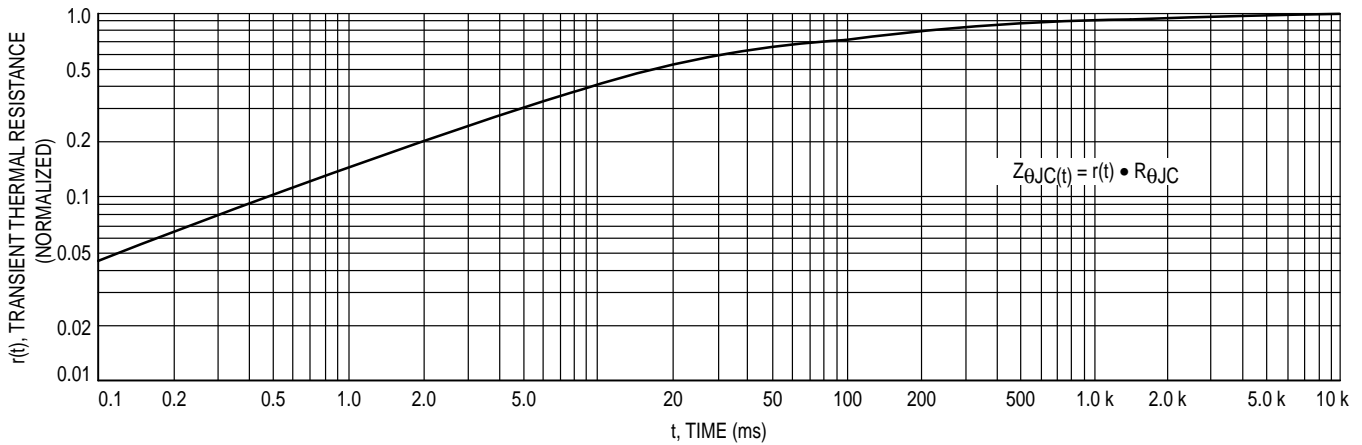
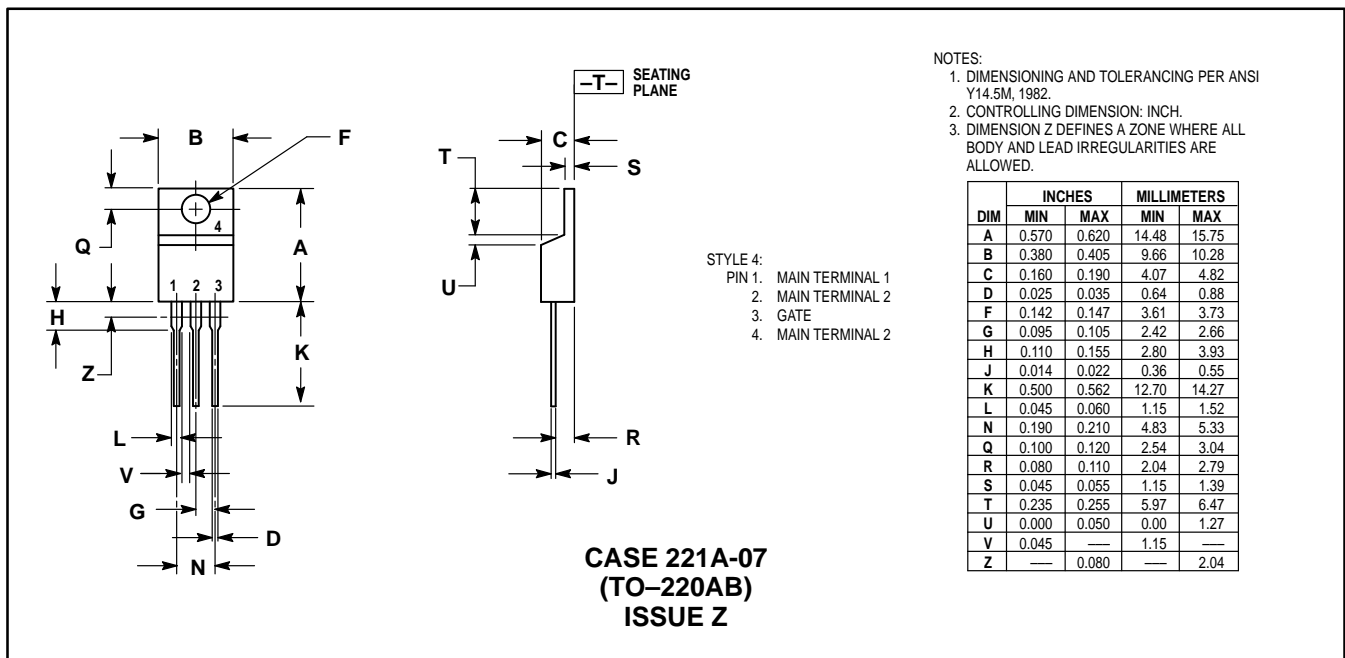


FIGURE 8 – THERMAL RESPONSE



PACKAGE DIMENSIONS



Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters which may be provided in Motorola data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

Mfax is a trademark of Motorola, Inc.

How to reach us:

USA/EUROPE/Locations Not Listed: Motorola Literature Distribution;
P.O. Box 5405, Denver, Colorado 80217. 1-303-675-2140 or 1-800-441-2447

JAPAN: Motorola Japan Ltd.; SPD, Strategic Planning Office, 141,
4-32-1 Nishi-Gotanda, Shinagawa-ku, Tokyo, Japan. 81-3-5487-8488

Customer Focus Center: 1-800-521-6274

Mfax™: RMFAX0@email.sps.mot.com – TOUCHTONE 1-602-244-6609
Motorola Fax Back System – US & Canada ONLY 1-800-774-1848
– http://sps.motorola.com/mfax/

ASIA/PACIFIC: Motorola Semiconductors H.K. Ltd.; Silicon Harbour Centre,
2, Dai King Street, Tai Po Industrial Estate, Tai Po, N.T., Hong Kong.
852-26629298

HOME PAGE: <http://motorola.com/sps/>

