

Triacs

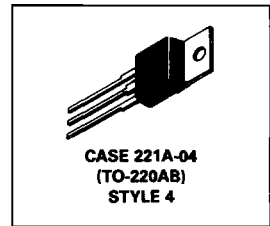
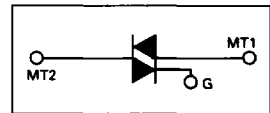
Silicon Bidirectional Thyristors

... designed primarily for full-wave ac control applications, such as solid-state relays, 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 Three Modes (MAC320 Series) or Four Modes (MAC320A Series)

**MAC320
Series
MAC320A
Series**

**TRIACs
20 AMPERES RMS
200 thru 800 VOLTS**



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

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage, Note 1 ($T_J = -40$ to $+125^\circ\text{C}$, 1/2 Sine Wave 50 to 60 Hz, Gate Open) <i>MAC320-4, MAC320A4</i> <i>MAC320-6, MAC320A6</i> <i>MAC320-8, MAC320A8</i> <i>MAC320-10, MAC320A10</i>	V_{DRM}	200 400 600 800	Volts
Peak Gate Voltage	V_{GM}	10	Volts
On-State Current RMS ($T_C = +75^\circ\text{C}$) (Full Cycle, Sine Wave, 50 to 60 Hz)	$I_T(\text{RMS})$	20	Amp
Peak Surge Current (One Full Cycle, 60 Hz, $T_C = +75^\circ\text{C}$) preceded and followed by rated current	I_{TSM}	150	Amp
Peak Gate Power ($T_C = +75^\circ\text{C}$, Pulse Width = $2 \mu\text{s}$)	P_{GM}	20	Watts
Average Gate Power ($T_C = +75^\circ\text{C}$, $t = 8.3 \text{ ms}$)	$P_{G(AV)}$	0.5	Watt
Peak Gate Current	I_{GM}	2	Amp
Operating Junction Temperature Range	T_J	-40 to $+125$	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-40 to $+150$	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.8	$^\circ\text{C}/\text{W}$

Note 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.

Devices listed in bold, italic are Motorola preferred devices.

MAC320 Series • MAC320A Series

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

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Blocking Current (V_D Rated V_{DRM} , Gate Open)	I_{DRM}	—	—	10	μA
		—	—	2	mA
		$T_J = 25^\circ\text{C}$			
		$T_J = +125^\circ\text{C}$			
Peak On-State Voltage (Either Direction) ($I_{TM} = 28\text{ A Peak}$; Pulse Width = 1 to 2 ms, Duty Cycle $\leq 2\%$)	V_{TM}	—	1.4	1.7	Volts
Gate Trigger Current (Continuous dc) (Main Terminal Voltage = 12 Vdc, $R_L = 100\text{ Ohms}$) MT2 (+), G(+); MT2 (+), G(-); MT2 (-), G(-) MT2 (-), G(+)"A" SUFFIX ONLY	I_{GT}	—	—	50	mA
		—	—	75	
Gate Trigger Voltage (Continuous dc) (Main Terminal Voltage = 12 Vdc, $R_L = 100\text{ Ohms}$) MT2 (+), G(+); MT2 (+), G(-); MT2 (-), G(-) MT2 (-), G(+)"A" SUFFIX ONLY (Main Terminal Voltage = Rated V_{DRM} , $R_L = 10\text{ k}\Omega$, $T_J = +110^\circ\text{C}$) MT2 (+), G(+); MT2 (-), G(-); MT2 (+), G(-); MT2 (-), G(+)"A" SUFFIX ONLY	V_{GT}	—	0.9	2	Volts
		—	1.4	2.5	
		0.2	—	—	
		0.2	—	—	
Holding Current (Either Direction) (Main Terminal Voltage = 12 Vdc, Gate Open, Initiating Current = 200 mA)	I_H	—	6	40	mA
Turn-On Time ($V_D = \text{Rated } V_{DRM}$, $I_{TM} = 28\text{ A}$, $I_{GT} = 120\text{ mA}$, Rise Time = 0.1 μs , Pulse Width = 2 μs)	t_{gt}	—	1.5	—	μs
Critical Rate of Rise of Commutation Voltage ($V_D = \text{Rated } V_{DRM}$, $I_{TM} = 28\text{ A}$, Commutating $di/dt = 10\text{ A/ms}$, Gate Unenergized, $T_C = +75^\circ\text{C}$)	$dv/dt(C)$	—	5	—	$\text{V}/\mu\text{s}$

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FIGURE 1 — RMS CURRENT DERATING

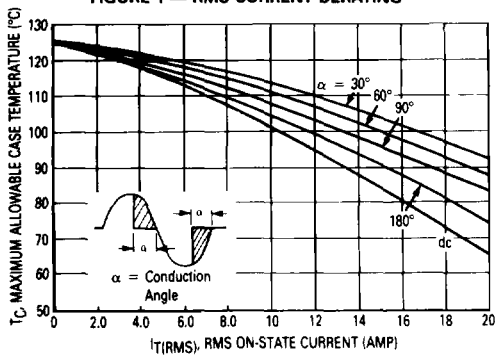
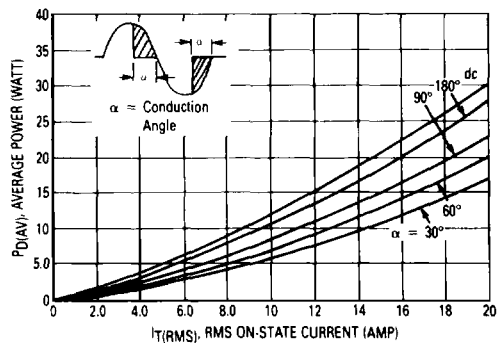


FIGURE 2 — ON-STATE POWER DISSIPATION



MAC320 Series • MAC320A Series

FIGURE 3 — TYPICAL GATE TRIGGER VOLTAGE

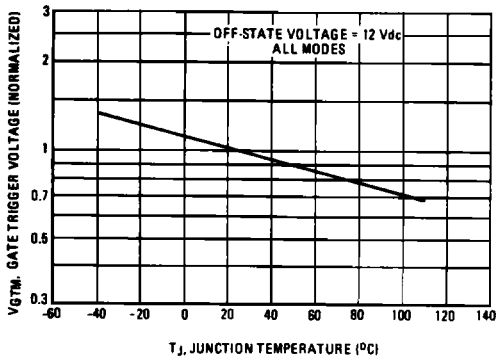


FIGURE 4 — TYPICAL GATE TRIGGER CURRENT

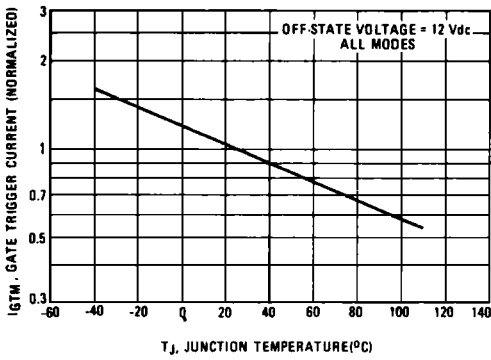
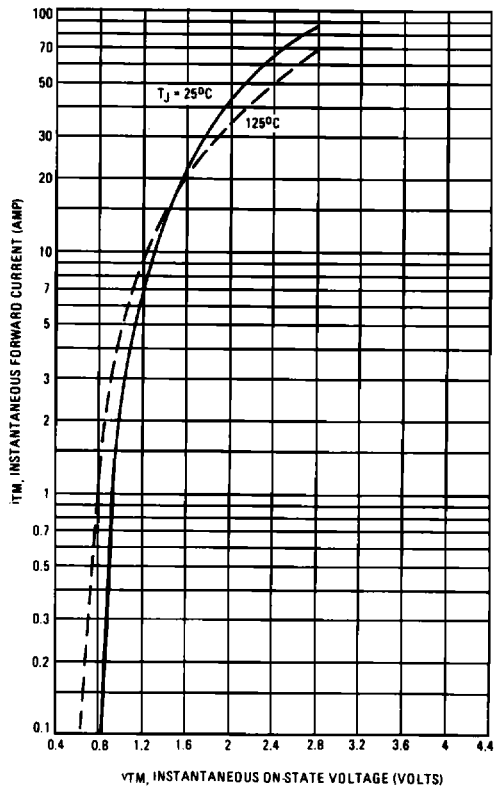


FIGURE 5 — MAXIMUM ON-STATE CHARACTERISTICS



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MAC320 Series • MAC320A Series

FIGURE 6 — TYPICAL HOLDING CURRENT

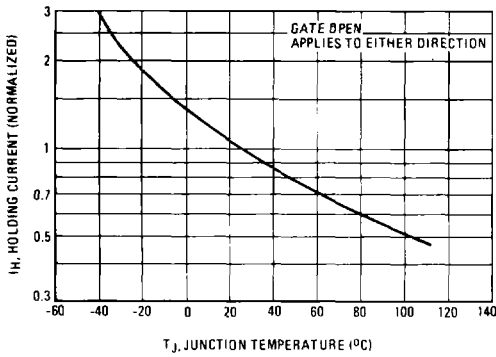


FIGURE 7 — MAXIMUM ON-REPETITIVE SURGE CURRENT

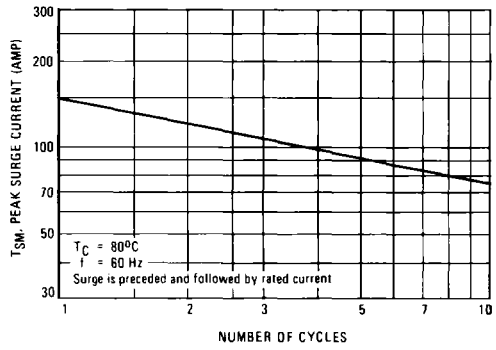
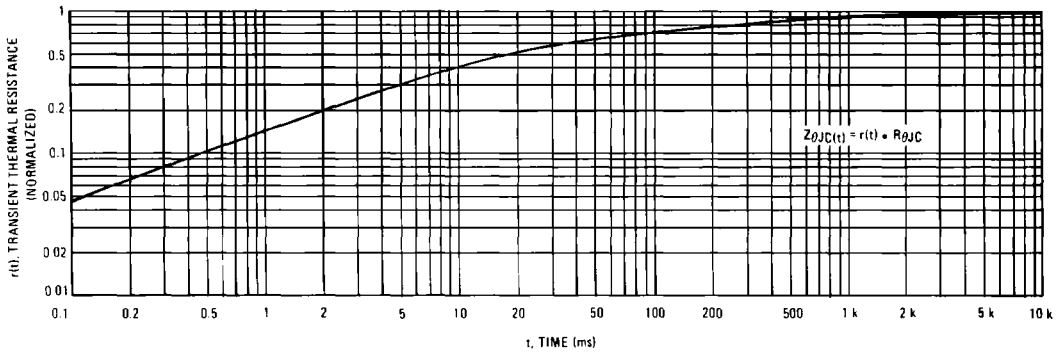


FIGURE 8 — THERMAL RESPONSE



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