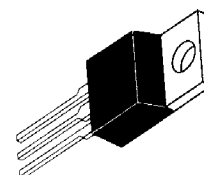


**MAC320  
Series  
MAC320A  
Series**

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



(TO-220AB)

**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)

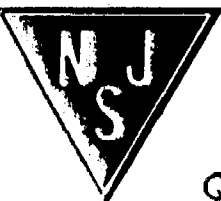
**MAXIMUM RATINGS** ( $T_C = 25^\circ\text{C}$  unless otherwise noted.)

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage <sup>(1)</sup> ( $T_J = -40$ to $+125^\circ\text{C}$ , 1/2 Sine Wave 50 to 60 Hz, Gate Open)	$V_{DRM}$	200 400 600 800	Volts
		MAC320-4, MAC320A4 MAC320-6, MAC320A6 MAC320-8, MAC320A8 MAC320-10, MAC320A10	
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 ( $T_C = +75^\circ\text{C}$ , $t = 8.3$ 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	$^\circ\text{C/W}$

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.



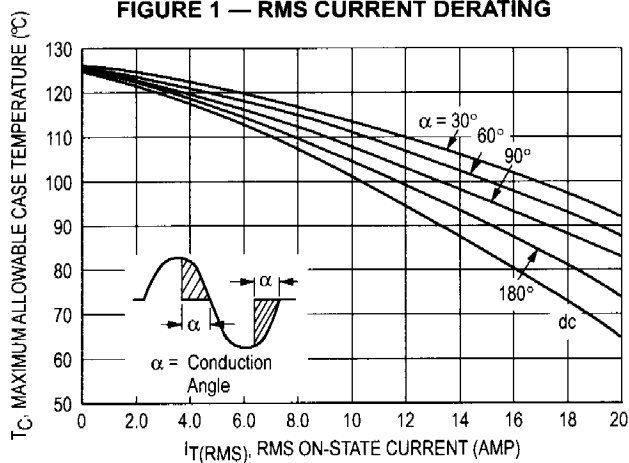
NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However, NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

## 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) $T_J = 25^\circ\text{C}$ $T_J = +125^\circ\text{C}$	$I_{DRM}$	— —	— —	10 2	$\mu\text{A}$ $\text{mA}$
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 75	$\text{mA}$
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	$V_{GT}$	— — 0.2 0.2	0.9 1.4 — —	2 2.5 — —	Volts
Holding Current (Either Direction) (Main Terminal Voltage = 12 Vdc, Gate Open, Initiating Current = 200 mA)	$I_H$	—	6	40	$\text{mA}$
Turn-On Time ( $V_D = \text{Rated } V_{DRM}$ , $I_{TM} = 28\text{ A}$ , $I_{GT} = 120\text{ mA}$ , Rise Time = 0.1 $\mu\text{s}$ , Pulse Width = 2 $\mu\text{s}$ )	$t_{gt}$	—	1.5	—	$\mu\text{s}$
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	—	$\text{V}/\mu\text{s}$

**FIGURE 1 — RMS CURRENT DERATING**



**FIGURE 2 — ON-STATE POWER DISSIPATION**

