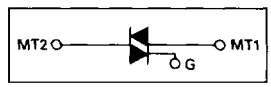
Triacs
Silicon Bidirectional Thyristors

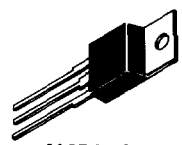
MAC321 Series

TRIACs
20 AMPERES RMS
200 thru 800 VOLTS

. . . designed for full-wave ac control applications primarily in industrial environments needing noise immunity.

- Guaranteed High Commutation Voltage
  dv/dt — 500 V/μs Min @ T_C = 25°C
- High Blocking Voltage — V_{DRM} to 800 V
- Photo Glass Passivated Junction for Improved Power Cycling Capability and Reliability





CASE 221A-04
(TO-220AB)
STYLE 4

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

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage, Note 1 (T_J = −40 to +125°C, 1/2 Sine Wave 50 to 60 Hz, Open Gate) ***MAC321-4*** ***MAC321-6*** ***MAC321-8*** MAC321-10	V_{DRM}	 200 400 600 800	Volts
Peak Gate Voltage	V_{GM}	10	Volts
On-State Current RMS (T_C = +75°C Full Cycle Sine Wave 50 to 60 Hz)	$I_{T(RMS)}$	20	Amp
Peak Surge Current (One Full Cycle, 60 Hz, T_C = +75°C preceded and followed by Rated Current)	I_{TSM}	150	Amp
Circuit Fusing Considerations (t = 8.3 ms)	I^2t	93	A^2s
Peak Gate Power (T_C = +75°C, Pulse Width = 2.0 μs)	P_{GM}	20	Watts
Average Gate Power (T_C = +75°C, t = 8.3 ms)	$P_{G(AV)}$	0.5	Watt
Peak Gate Current	I_{GM}	2.0	Amp
Operating Junction Temperature Range	T_J	−40 to +125	°C
Storage Temperature Range	T_{stg}	−40 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.8	°C/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.

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Blocking Current (V_D = Rated V_{DRM}, Gate Open)	I_{DRM}				
T_J = 25°C		—	—	10	μA
T_J = +125°C		—	—	2.0	mA
Peak On-State Voltage (Either Direction) (I_{TM} = 28 A Peak; Pulse Width ≤ 2.0 ms, Duty Cycle ≤ 2.0%)	V_{TM}	—	1.4	1.7	Volts
Gate Trigger Current (Continuous dc) (Main Terminal Voltage = 12 Vdc, R_L = 100 Ohms)	I_{GT}				mA
MT2(+), G(+)		—	—	100	
MT2(+), G(−)		—	—	100	
MT2(−), G(−)		—	—	100	
Gate Trigger Voltage (Continuous dc) (Main Terminal Voltage = 12 Vdc, R_L = 100 Ohms)	V_{GT}				Volts
MT2(+), G(+)		—	—	2.0	
MT2(+), G(−)		—	—	2.0	
MT2(−), G(−)		—	—	2.0	
(Main Terminal Voltage = Rated V_{DRM}, R_L = 10 kΩ, T_J = +125°C) MT2(+), G(+); MT2(−), G(−); MT2(+), G(−)		0.2	—	—	
Holding Current (Either Direction) (Main Terminal Voltage = 12 Vdc, Gate Open, Initiating Current = 200 mA)	I_H	—	—	100	mA
Turn-On Time (V_D = Rated V_{DRM}, I_{TM} = 28 A, I_{GT} = 120 mA, Rise Time = 0.1 μs, Pulse Width = 2.0 μs)	t_{gt}	—	1.5	—	μs
Critical Rate of Rise of Off-State Voltage (V_D = Rated V_{DRM}, Exponential Voltage Rise, Gate Open)	dv/dt(s)				V/μs
T_J = 25°C		500	—	—	
T_J = +125°C		200	—	—	

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TYPICAL CHARACTERISTICS

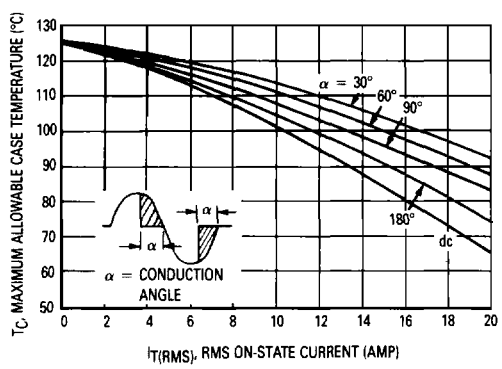

Figure 1. RMS Current Derating

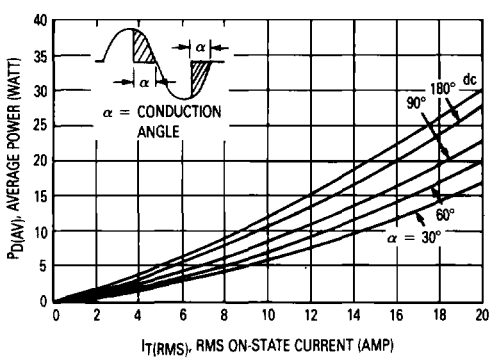

Figure 2. On-State Power Dissipation

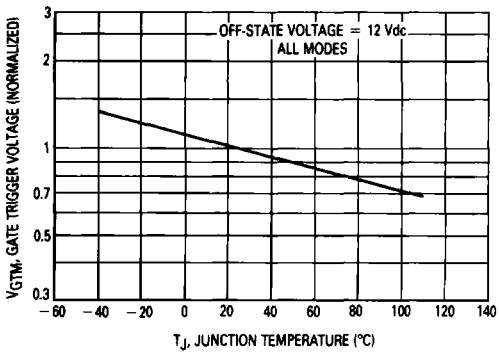

Figure 3. Typical Gate Trigger Voltage

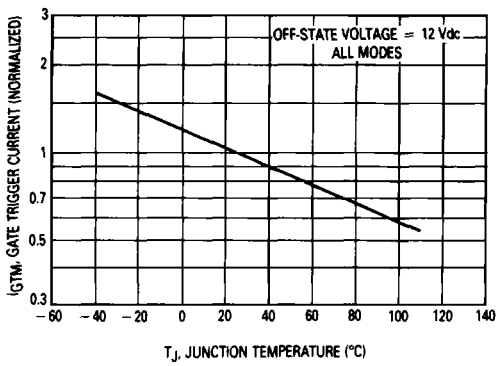

Figure 4. Typical Gate Trigger Current

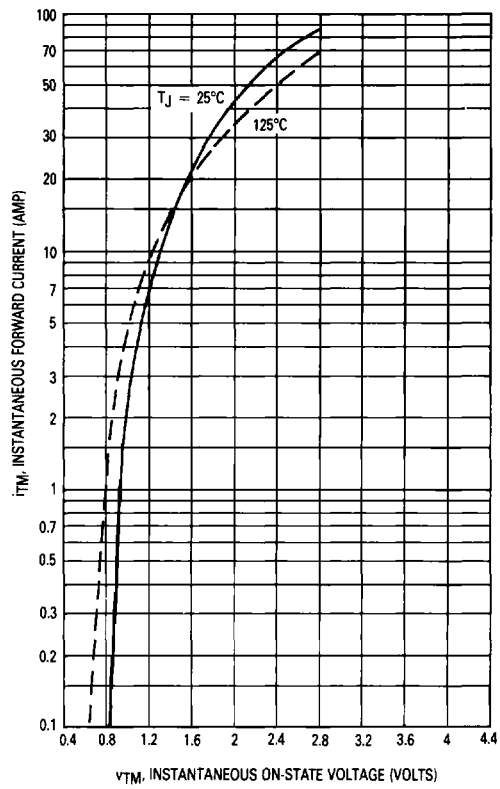

Figure 5. Maximum On-State Characteristics

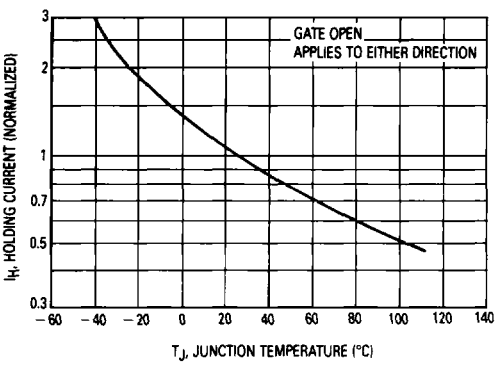

Figure 6. Typical Holding Current

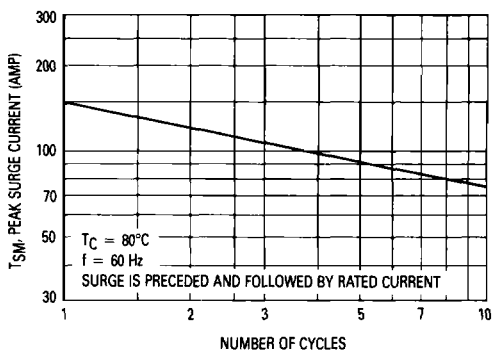

Figure 7. Maximum On-Repetitive Surge Current

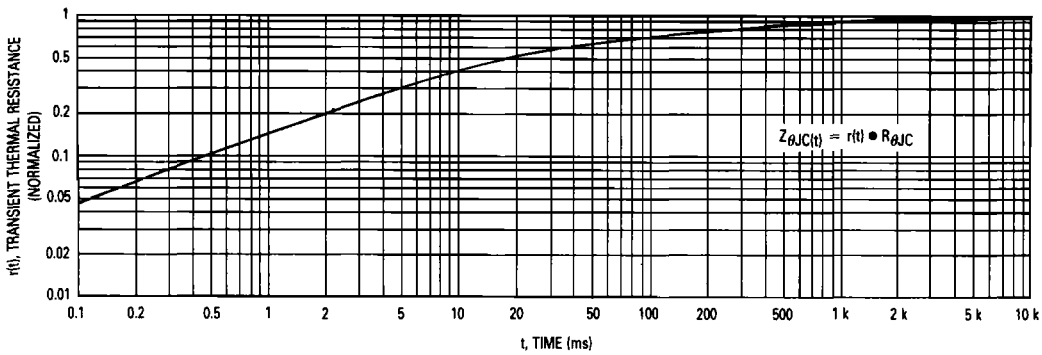

Figure 8. Thermal Response

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