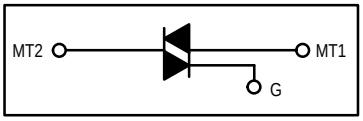
Triacs
Silicon Bidirectional Thyristors

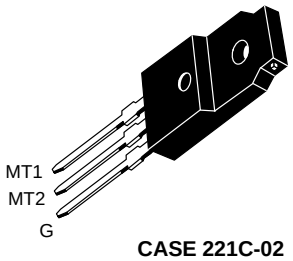
MAC320A8FP

ISOLATED TRIACs
THYRISTORS
20 AMPERES RMS
600 VOLTS

. . . 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 Four Modes





CASE 221C-02
STYLE 3

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

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage(1) (T_J = –40 to +125°C, 1/2 Sine Wave 50 to 60 Hz, Gate Open) MAC320A8FP	V_{DRM}	600	Volts
Peak Gate Voltage	V_{GM}	10	Volts
On-State RMS Current (T_C = +75°C, Full Cycle Sine Wave 50 to 60 Hz)(2)	$I_{T(RMS}$	20	Amps
Peak Nonrepetitive Surge Current (One Full Cycle, 60 Hz, T_C = +75°C, preceded and followed by rated current)	I_{TSM}	150	Amps
Peak Gate Power (T_C = +75°C, Pulse Width = 2 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	Amps
RMS Isolation Voltage (T_A = 25°C, Relative Humidity ⩽ 20%)	$V_{(ISO}$	1500	Volts
Operating Junction Temperature	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
Thermal Resistance, Case to Sink	$R_{\theta CS}$	2.2 (typ)	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	60	°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.
2. The case temperature reference point for all T_C measurements is a point on the center lead of the package as close as possible to the plastic body.

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

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Blocking Current	I_{DRM}				
(V_D = Rated V_{DRM}, Gate Open) T_J = 25°C		—	—	10	μA
T_J = +125°C		—	—	2	mA
Peak On-State Voltage (Either Direction)	V_{TM}	—	1.4	1.7	Volts
(I_{TM} = 28 A Peak; Pulse Width = 1 to 2 ms, Duty Cycle ≤ 2%)					
Peak Gate Trigger Current	I_{GT}				mA
(Main Terminal Voltage = 12 Vdc, R_L = 100 Ohms					
Minimum Gate Pulse Width = 2 μs)					
MT2(+), G(+)		—	—	50	
MT2(+), G(–)		—	—	50	
MT2(–), G(–)		—	—	50	
MT2(–), G(+)		—	—	75	
Peak Gate Trigger Voltage	V_{GT}				Volts
(Main Terminal Voltage = 12 Vdc, R_L = 100 Ohms					
Minimum Gate Pulse Width = 2 μs)					
MT2(+), G(+)		—	0.9	2	
MT2(+), G(–)		—	0.9	2	
MT2(–), G(–)		—	1.1	2	
MT2(–), G(+)		—	1.4	2.5	
(Main Terminal Voltage = Rated V_{DRM}, R_L = 10 , T_J = +110°C)					
MT2(+), G(+); MT2(+), G(–)		0.2	—	—	
MT2(–), G(–); MT2(–), G(+)		0.2	—	—	
Holding Current (Either Direction)	I_H	—	6	40	mA
(Main Terminal Voltage = 12 Vdc, Gate Open,					
Initiating Current = 200 mA)					
Turn-On Time	t_{gt}	—	1.5	10	μs
(V_D = Rated V_{DRM}, I_{TM} = 28 A, I_{GT} = 120 mA,					
Rise Time = 0.1 μs, Pulse Width = 2 μs)					
Critical Rate of Rise of Commutation Voltage	dv/dt(c)	—	5	—	V/μs
(V_D = Rated V_{DRM}, I_{TM} = 28 A, Commutating di/dt = 10 A/ms,					
Gate Unenergized, T_C = +75°C)					

TYPICAL CHARACTERISTICS

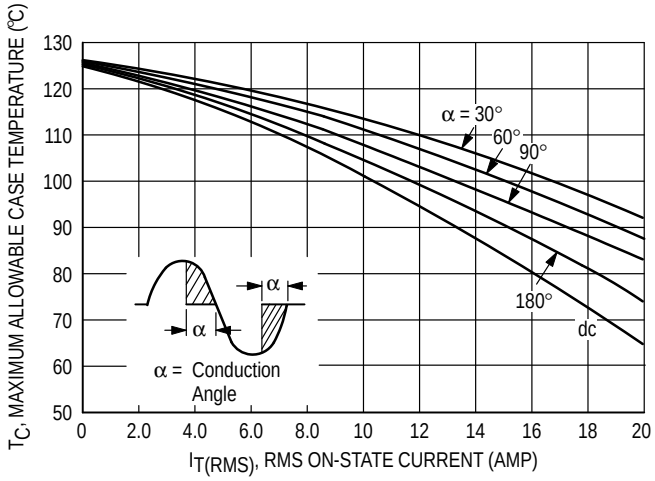


Figure 1. RMS Current Derating

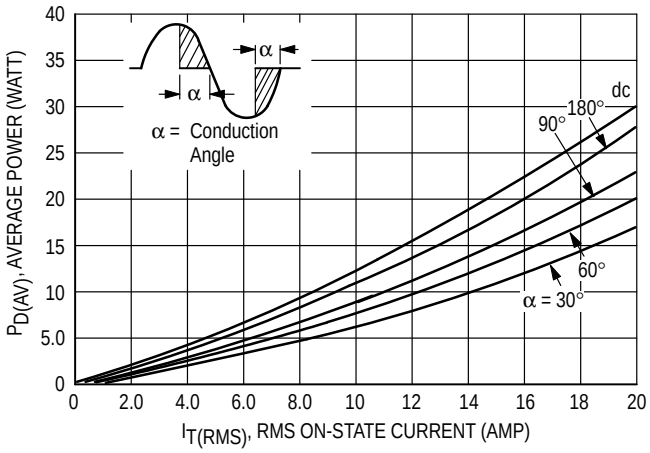


Figure 2. On-State Power Dissipation

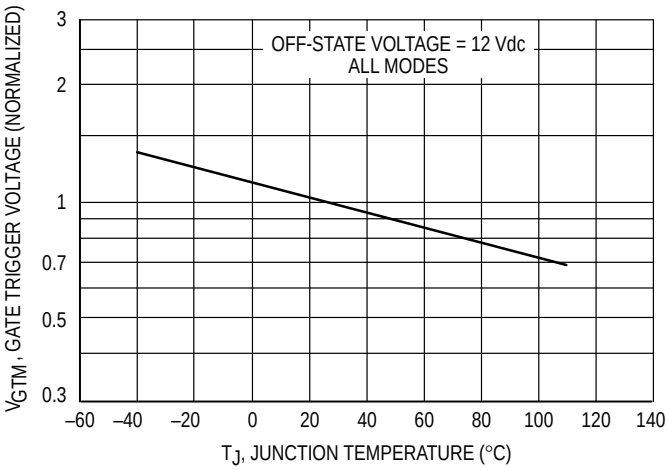


Figure 3. Typical Gate Trigger Voltage

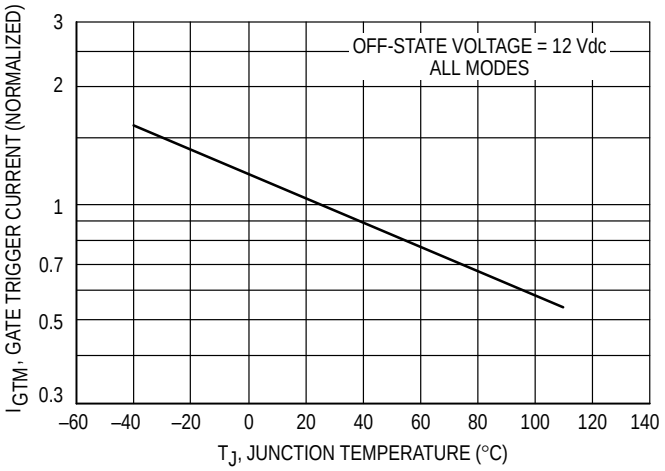


Figure 4. Typical Gate Trigger Current

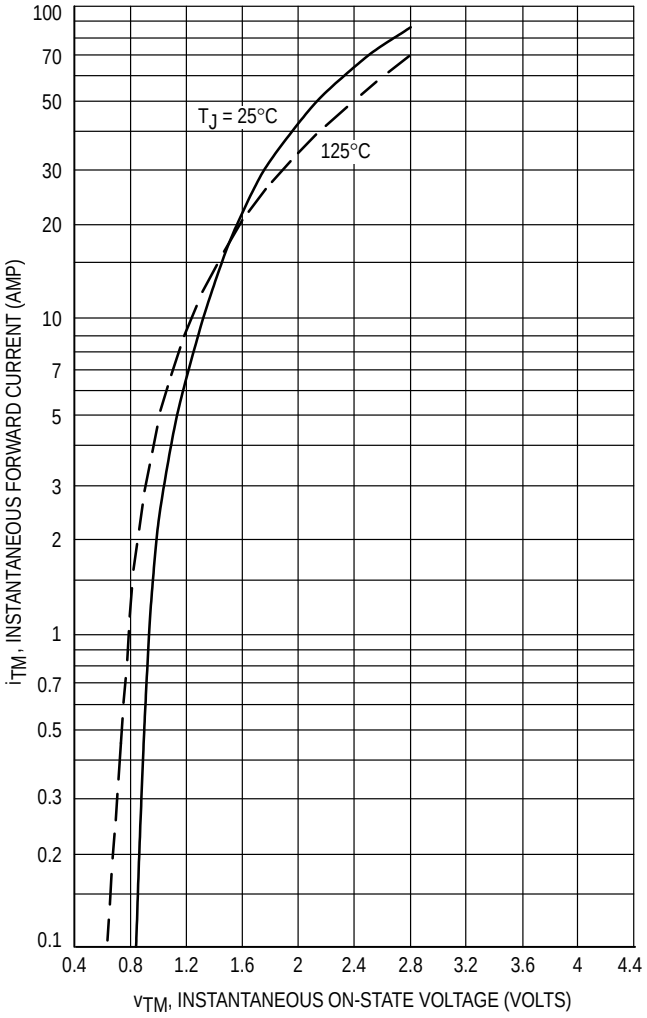


Figure 5. Maximum On-State Characteristics

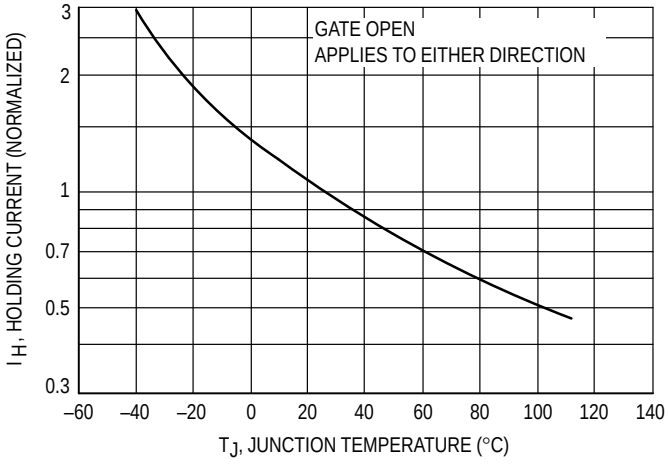


Figure 6. Typical Holding Current

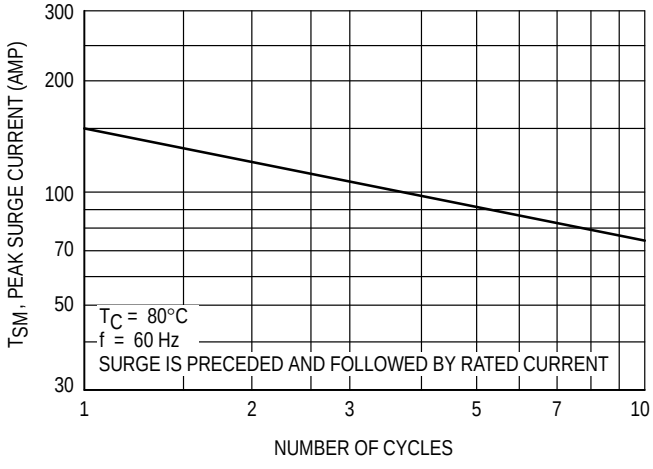


Figure 7. Maximum Nonrepetitive Surge Current

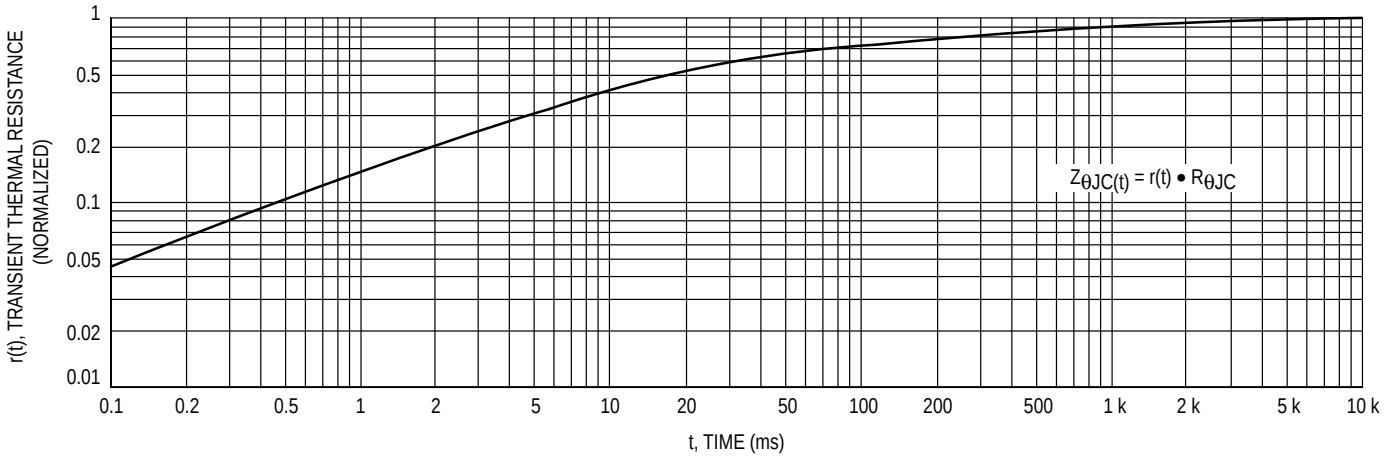
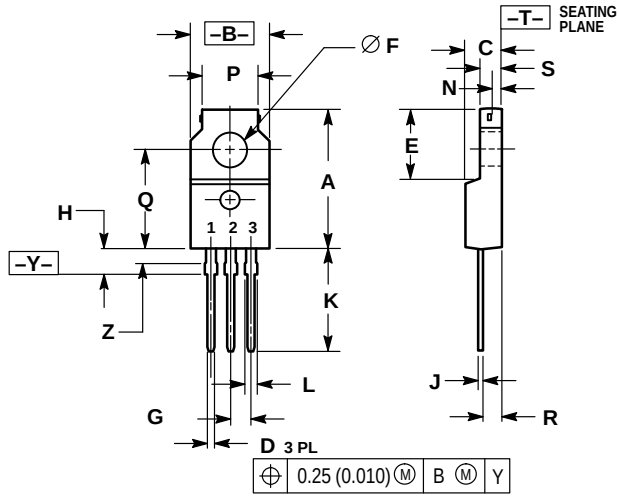


Figure 8. Thermal Response

PACKAGE DIMENSIONS



STYLE 3:
PIN 1. MT 1
2. MT 2
3. GATE

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. LEAD DIMENSIONS UNCONTROLLED WITHIN DIMENSION Z.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.680	0.700	17.28	17.78
B	0.388	0.408	9.86	10.36
C	0.175	0.195	4.45	4.95
D	0.025	0.040	0.64	1.01
E	0.340	0.355	8.64	9.01
F	0.140	0.150	3.56	3.81
G	0.100 BSC		2.54 BSC	
H	0.110	0.155	2.80	3.93
J	0.018	0.028	0.46	0.71
K	0.500	0.550	12.70	13.97
L	0.045	0.070	1.15	1.77
N	0.049	—	1.25	—
P	0.270	0.290	6.86	7.36
Q	0.480	0.500	12.20	12.70
R	0.090	0.120	2.29	3.04
S	0.105	0.115	2.67	2.92
Z	0.070	0.090	1.78	2.28

CASE 221C-02
ISSUE B

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/