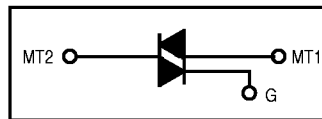


## Triacs

### Silicon Bidirectional Triode Thyristors

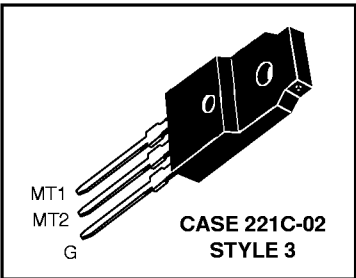
... designed primarily for full-wave ac control applications, such as lighting systems, heater controls, motor controls and power supplies; or wherever full-wave silicon-gate-controlled devices are needed.

- Off-State Voltages to 800 Volts
- All Diffused and Glass Passivated Junctions for Parameter Uniformity and Stability
- Small, Rugged Thermowatt Construction for Thermal Resistance and High Heat Dissipation
- Gate Triggering Guaranteed in Four Modes



## MAC223AFP Series

ISOLATED TRIACs  
THYRISTORS  
25 AMPERES RMS  
400 thru 800 VOLTS



#### MAXIMUM RATINGS ( $T_J = 25^\circ\text{C}$ 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)	$V_{\text{DRM}}$	400 600 800	Volts
On-State RMS Current ( $T_C = +80^\circ\text{C}$ ) Full Cycle Sine Wave 50 to 60 Hz <sup>(2)</sup>	$I_{\text{T(RMS)}}$	25	Amps
Peak Nonrepetitive Surge Current (One Full Cycle, 60 Hz, $T_C = 80^\circ\text{C}$ , preceded and followed by rated current)	$I_{\text{TSM}}$	250	Amps
Circuit Fusing ( $t = 8.3$ ms)	$I^2t$	260	$\text{A}^2\text{s}$
Peak Gate Power ( $t \leq 2$ $\mu\text{s}$ )	$P_{\text{GM}}$	20	Watts
Average Gate Power ( $T_C = +80^\circ\text{C}$ , $t \leq 8.3$ ms)	$P_{\text{G(AV)}}$	0.5	Watt
Peak Gate Current ( $t \leq 2$ $\mu\text{s}$ )	$I_{\text{GM}}$	2	Amps
Peak Gate Voltage ( $t \leq 2$ $\mu\text{s}$ )	$V_{\text{GM}}$	$\pm 10$	Volts
RMS Isolation Voltage ( $T_A = 25^\circ\text{C}$ , Relative Humidity $\leq 20\%$ )	$V_{\text{(ISO)}}$	1500	Volts
Operating Junction Temperature	$T_J$	$-40$ to $+125$	$^\circ\text{C}$
Storage Temperature Range	$T_{\text{stg}}$	$-40$ to $+150$	$^\circ\text{C}$
Mounting Torque	—	8	in. lb.

1.  $V_{\text{DRM}}$  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.

#### THERMAL CHARACTERISTICS

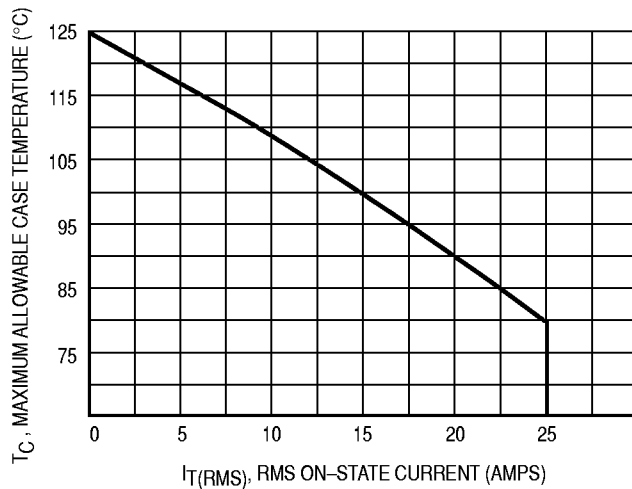
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta\text{JC}}$	1.2	$^\circ\text{C/W}$
Thermal Resistance, Case to Sink	$R_{\theta\text{CS}}$	2.2	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta\text{JA}}$	60	$^\circ\text{C/W}$

## MAC223AFP Series

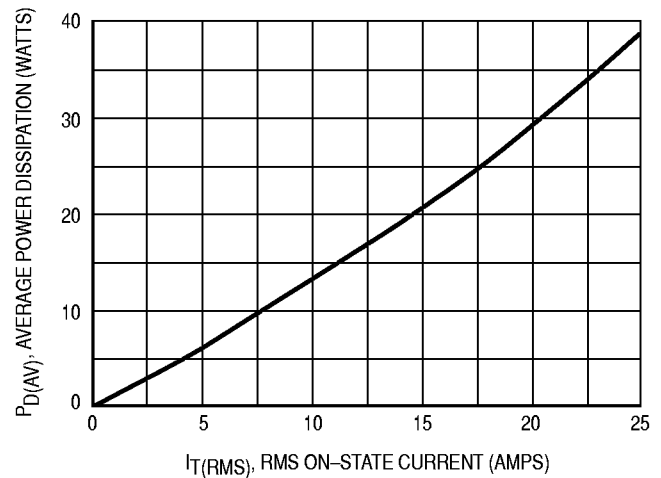
**ELECTRICAL CHARACTERISTICS** ( $T_C = 25^\circ\text{C}$  and either polarity of MT2 to MT1 voltage unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Blocking Current(1) ( $V_D = \text{Rated } V_{DRM}$ , Gate Open)	$I_{DRM}$	—	—	10	$\mu\text{A}$ mA
Peak On-State Voltage ( $I_{TM} = 35 \text{ A Peak}$ , Pulse Width $\leq 2 \text{ ms}$ , Duty Cycle $\leq 2\%$ )	$V_{TM}$	—	1.4	1.85	Volts
Gate Trigger Current (Continuous dc) ( $V_D = 12 \text{ V}$ , $R_L = 100 \Omega$ ) MT2(+), G(+); MT2(-), G(-); MT2(+), G(-) MT2(-), G(+)	$I_{GT}$	—	20	50	mA
Gate Trigger Voltage (Continuous dc) ( $V_D = 12 \text{ V}$ , $R_L = 100 \Omega$ ) MT2(+), G(+); MT2(-), G(-); MT2(+), G(-) MT2(-), G(+) ( $V_D = \text{Rated } V_{DRM}$ , $T_J = 125^\circ\text{C}$ , $R_L = 10 \text{ k}$ ) MT(+), G(+); MT2(-), G(-); MT2(+), G(-) MT2(-), G(+)	$V_{GT}$	—	1.1 1.3 0.2 0.2	2 2.5 — —	Volts
Holding Current ( $V_D = 12 \text{ V}$ , $I_{TM} = 200 \text{ mA}$ , Gate Open)	$I_H$	—	10	50	mA
Gate Controlled Turn-On Time ( $V_D = \text{Rated } V_{DRM}$ , $I_{TM} = 35 \text{ A Peak}$ , $I_G = 200 \text{ mA}$ )	$t_{gt}$	—	1.5	—	$\mu\text{s}$
Critical Rate of Rise of Off-State Voltage ( $V_D = \text{Rated } V_{DRM}$ , Exponential Waveform, $T_C = 125^\circ\text{C}$ )	$dv/dt$	—	40	—	$\text{V}/\mu\text{s}$
Critical Rate of Rise of Commutation Voltage ( $V_D = \text{Rated } V_{DRM}$ , $I_{TM} = 35 \text{ A Peak}$ , Commutating $di/dt = 12.6 \text{ A/ms}$ , Gate Unenergized, $T_C = 80^\circ\text{C}$ )	$dv/dt(c)$	—	5	—	$\text{V}/\mu\text{s}$

1. Ratings apply for open gate conditions. Devices shall not be tested with a constant current source for blocking voltage such that the voltage applied exceeds the rated blocking voltage.



**Figure 1. RMS Current Derating**



**Figure 2. On-State Power Dissipation**

TYPICAL CHARACTERISTICS

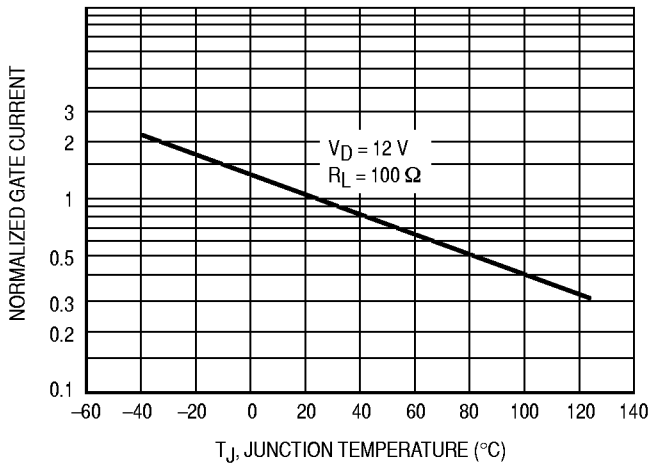


Figure 3. Gate Trigger Current

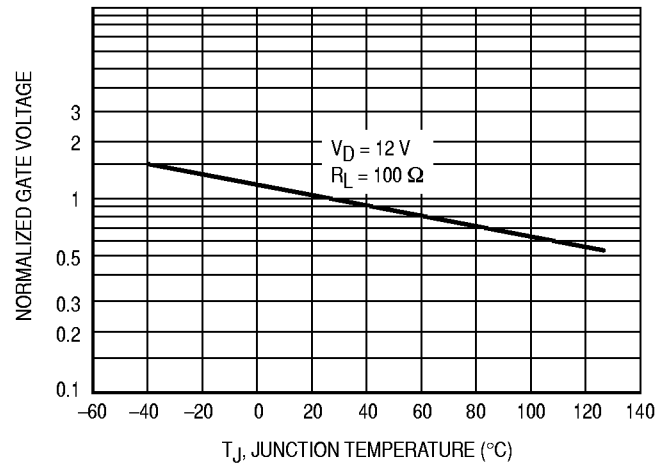


Figure 4. Gate Trigger Voltage

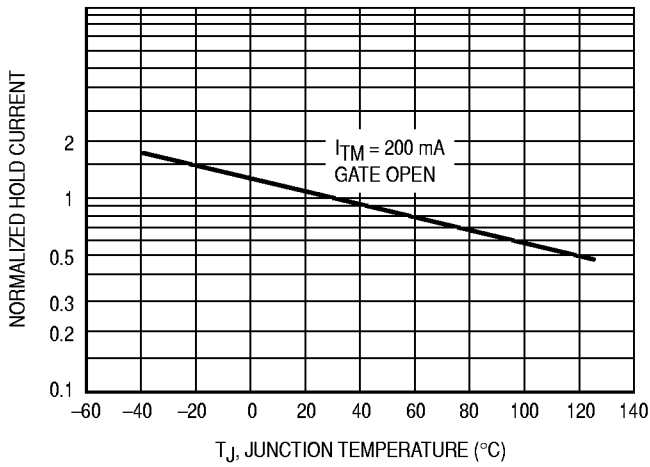


Figure 5. Hold Current

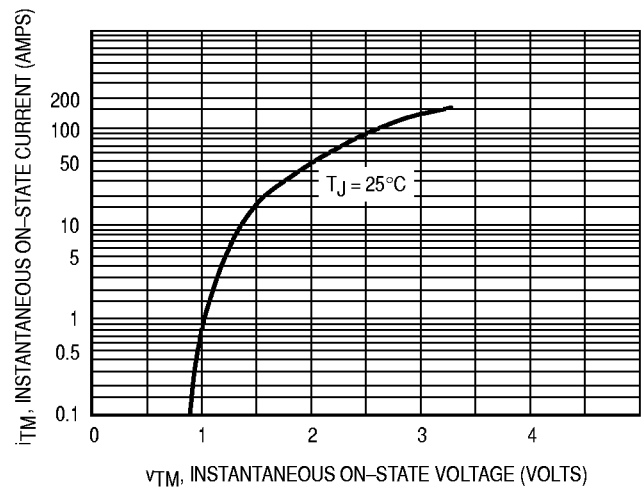
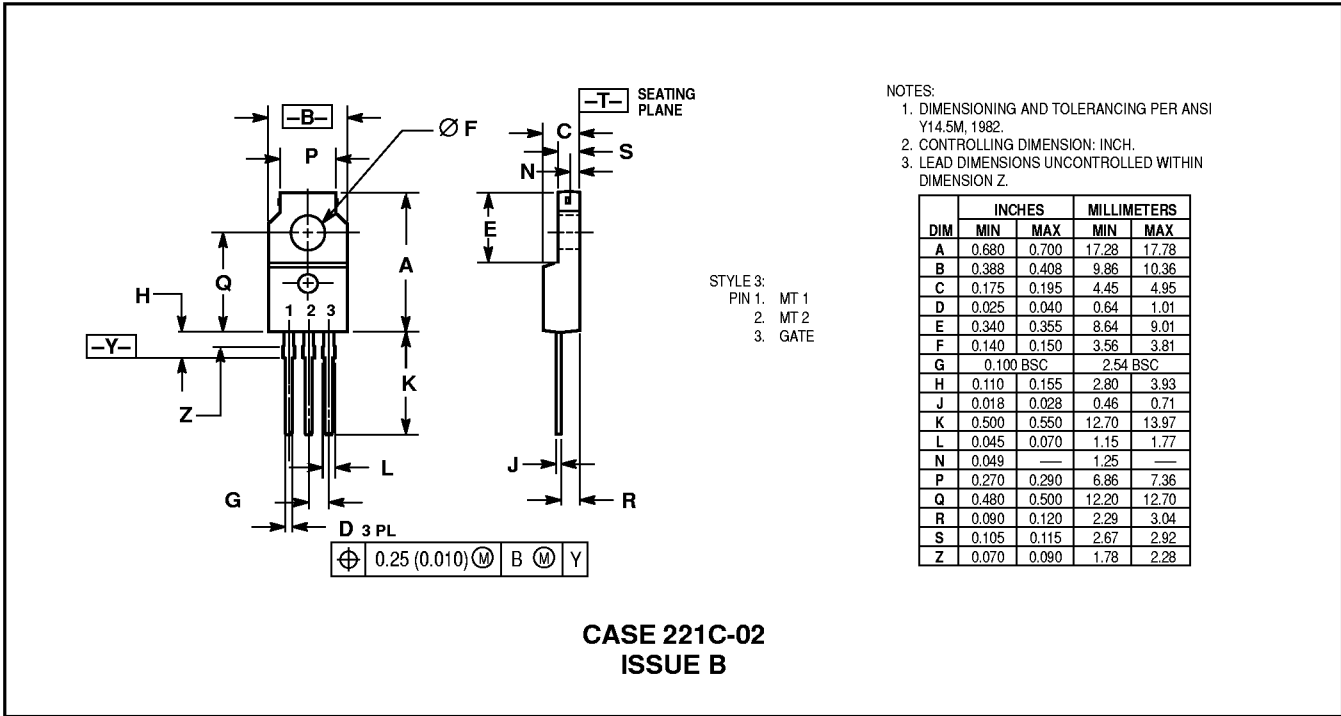


Figure 6. Typical On-State Characteristics

PACKAGE DIMENSIONS



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