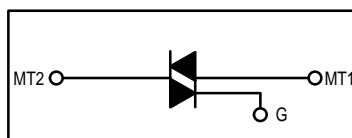


Triacs

Silicon Bidirectional Triode Thyristors

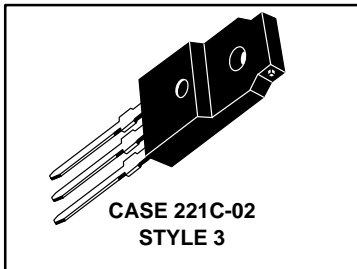
... designed primarily for full-wave ac control applications, such as lighting systems, heater controls, motor controls and power supplies; or wherever full-wave silicon-gate-controlled devices are needed.

- 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 Three Modes (MAC223FP Series) or Four Modes (MAC223AFP Series)



**MAC223FP
Series
MAC223AFP
Series**

**ISOLATED TRIACS
THYRISTORS
25 AMPERES RMS
200 thru 800 VOLTS**



MAXIMUM RATINGS (T_J = 25° 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)	V _{DRM}	200 400 600 800	Volts
On-State RMS Current (T _C = +80°C) Full Cycle Sine Wave 50 to 60 Hz ⁽²⁾	I _{T(RMS)}	25	Amps
Peak Nonrepetitive Surge Current (One Full Cycle, 60 Hz, T _C = 80°C, preceded and followed by rated current)	I _{TSM}	250	Amps
Circuit Fusing (t = 8.3 ms)	I ² t	260	A ² s
Peak Gate Power (t ≤ 2 μs)	P _{GM}	20	Watts
Average Gate Power (T _C = +80°C, t ≤ 8.3 ms)	P _{G(AV)}	0.5	Watt
Peak Gate Current (t ≤ 2 μs)	I _{GM}	2	Amps
Peak Gate Voltage (t ≤ 2 μs)	V _{GM}	±10	Volts
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
Mounting Torque	—	8	in. lb.

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.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	R _{θJC}	1.2	°C/W
Thermal Resistance, Case to Sink	R _{θCS}	2.2	°C/W
Thermal Resistance, Junction to Ambient	R _{θJA}	60	°C/W

MAC223FP Series 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 2	μA 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(+) "A" SUFFIX ONLY	I_{GT}	— —	20 30	50 75	mA
Gate Trigger Voltage (Continuous dc) ($V_D = 12 \text{ V}$, $R_L = 100 \Omega$) MT2(+), G(+); MT2(-), G(-); MT(+), G(-) MT2(-), G(+) "A" SUFFIX ONLY ($V_D = \text{Rated } V_{DRM}$, $T_J = 125^\circ\text{C}$, $R_L = 10 \text{ k}$) MT(+), G(+); MT2(-), G(-); MT2(+), G(-) MT2(-), G(+) "A" SUFFIX ONLY	V_{GT}	— — 0.2 0.2	1.1 1.3 0.4 0.4	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	—	μs
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.

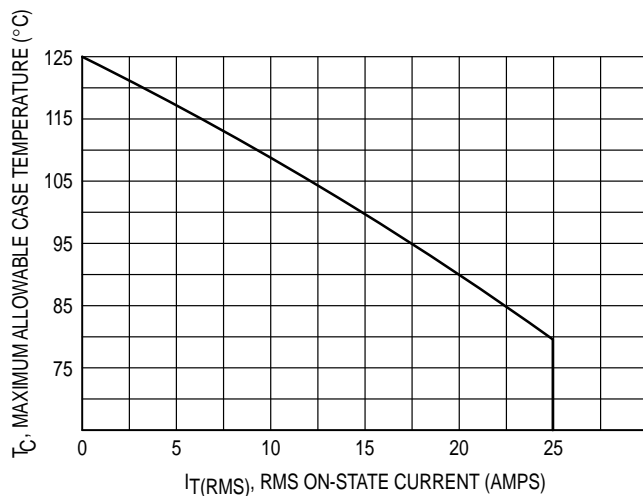


Figure 1. RMS Current Derating

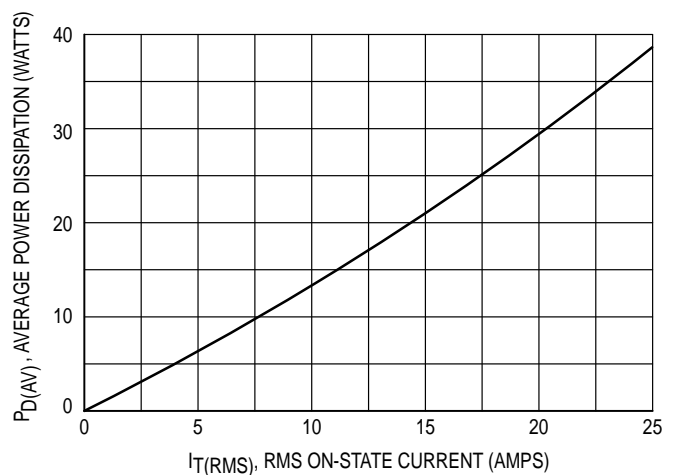


Figure 2. On-State Power Dissipation

TYPICAL CHARACTERISTICS

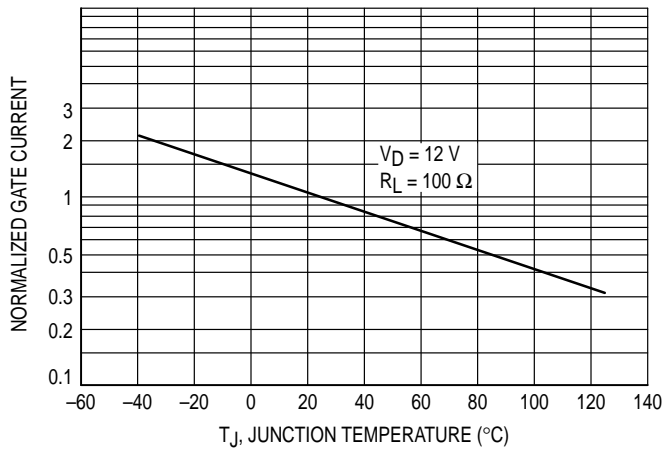


Figure 3. Gate Trigger Current

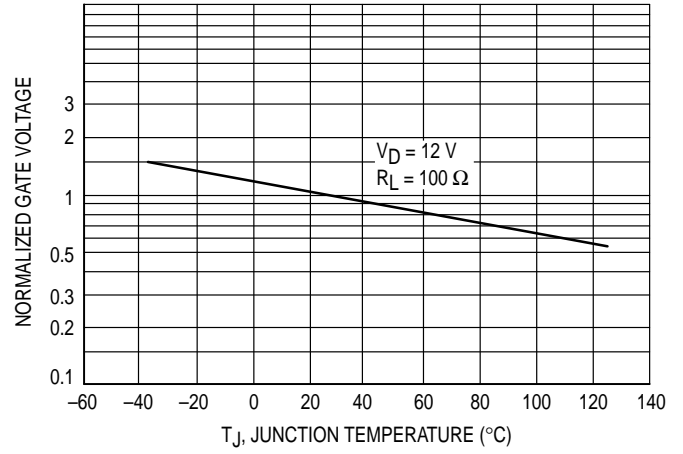


Figure 4. Gate Trigger Voltage

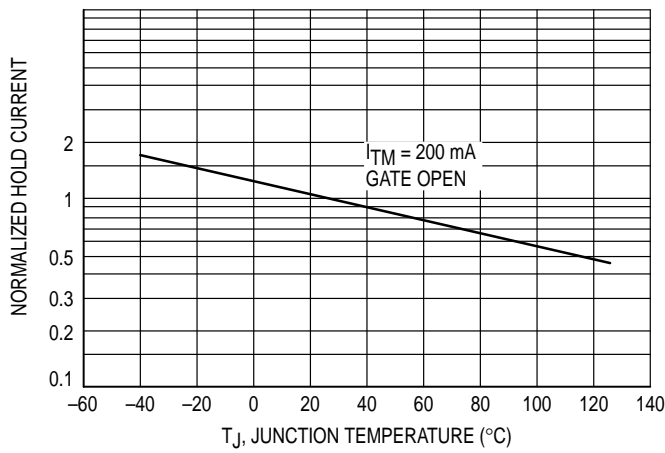


Figure 5. Hold Current

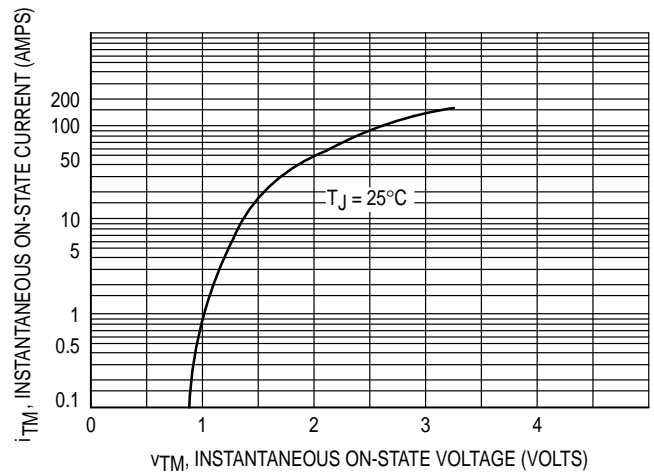
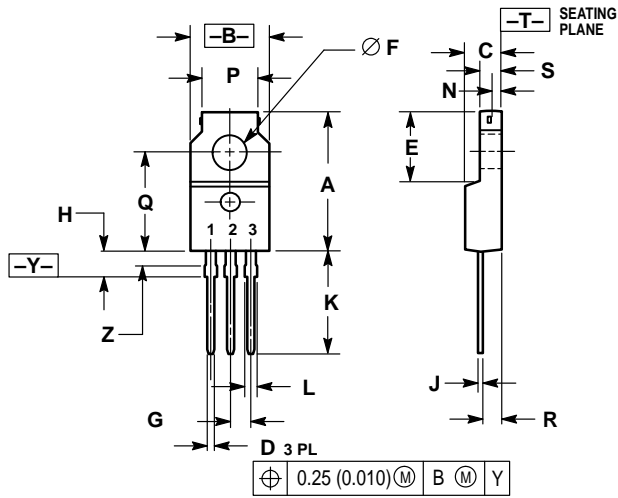


Figure 6. Typical On-State Characteristics

MAC223FP Series MAC223AFP Series

PACKAGE DIMENSIONS



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

DIM	INCHES		MILLIMETERS	
	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

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

CASE 221C-02

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MAC223FP/D

