

Triacs

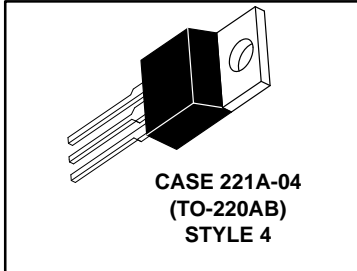
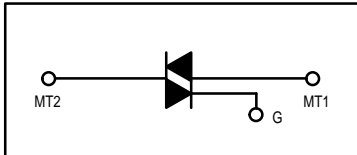
Silicon Bidirectional Triode Thyristors

... 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 (MAC223 Series) or Four Modes (MAC223A Series)

**MAC223
Series
MAC223A
Series**

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



MAXIMUM RATINGS ($T_J = 25^\circ$ unless otherwise noted.)

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage ($T_J = -40$ to 125°C)(1) (1/2 Sine Wave 50 to 60 Hz, Gate Open)	V_{DRM}	200 400 600 800	Volts
On-State RMS Current ($T_C = 80^\circ\text{C}$) (Full Cycle Sine Wave 50 to 60 Hz)	$I_T(\text{RMS})$	25	Amps
Peak Non-repetitive Surge Current (One Full Cycle, 60 Hz, $T_C = 80^\circ\text{C}$, preceded and followed by rated current)	I_{TSM}	250	Amps
Circuit Fusing ($t = 8.3$ ms)	I^2t	260	A^2s
Peak Gate Current ($t \leq 2 \mu\text{s}$)	I_{GM}	2	Amps
Peak Gate Voltage ($t \leq 2 \mu\text{s}$)	V_{GM}	± 10	Volts
Peak Gate Power ($t \leq 2 \mu\text{s}$)	P_{GM}	20	Watts
Average Gate Power ($T_C = 80^\circ\text{C}$, $t \leq 8.3$ ms)	$P_{G(AV)}$	0.5	Watts
Operating Junction Temperature Range	T_J	-40 to 125	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-40 to 150	$^\circ\text{C}$
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.

MAC223 Series MAC223A Series

THERMAL CHARACTERISTICS

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

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

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Blocking Current ⁽¹⁾ ($V_D = \text{Rated } V_{DRM}$) $T_J = 25^{\circ}C$ $T_J = 125^{\circ}C$	I_{DRM}	— —	— —	10 2	μA mA
Peak On-State Voltage ($I_{TM} = 35 A$ Peak, Pulse Width ≤ 2 ms, Duty Cycle $\leq 2\%$)	V_{TM}	—	1.4	1.85	Volts
Gate Trigger Current (Continuous dc) ($V_D = 12 V$, $R_L = 100 \Omega$) MT2(+), G(+); MT2(-), G(-); MT(+), G(-) MT2(-), G(+) "A" SUFFIX ONLY	I_{GT}	— —	20 30	50 75	mA
Gate Trigger Voltage (Continuous dc) ($V_D = 12 V$, $R_L = 100 \Omega$) MT2(+), G(+); MT2(-), G(-); MT(+), G(-) MT2(-), G(+) "A" SUFFIX ONLY ($V_D = \text{Rated } V_{DRM}$, $T_J = 125^{\circ}C$, $R_L = 10 k$) 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 ($V_D = 12 V$, $I_{TM} = 200$ mA, Gate Open)	I_H	—	10	50	mA
Gate Controlled Turn-On Time ($V_D = \text{Rated } V_{DRM}$, $I_{TM} = 35 A$ Peak, $I_G = 200$ mA)	t_{gt}	—	1.5	—	μs
Critical Rate of Rise of Off-State Voltage ($V_D = \text{Rated } V_{DRM}$, Exponential Waveform, $T_C = 125^{\circ}C$)	dv/dt	—	40	—	V/ μs
Critical Rate of Rise of Commutation Voltage ($V_D = \text{Rated } V_{DRM}$, $I_{TM} = 35 A$ Peak, Commutating di/dt = 12.6 A/ms, Gate Unenergized, $T_C = 80^{\circ}C$)	dv/dt(c)	—	5	—	V/ μs

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

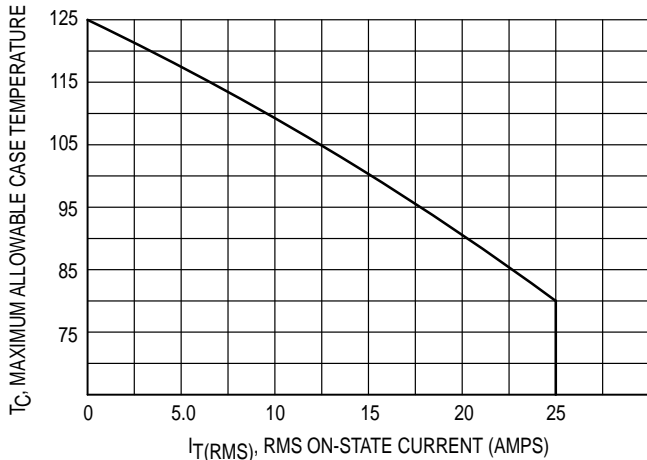


FIGURE 2 – ON-STATE POWER DISSIPATION

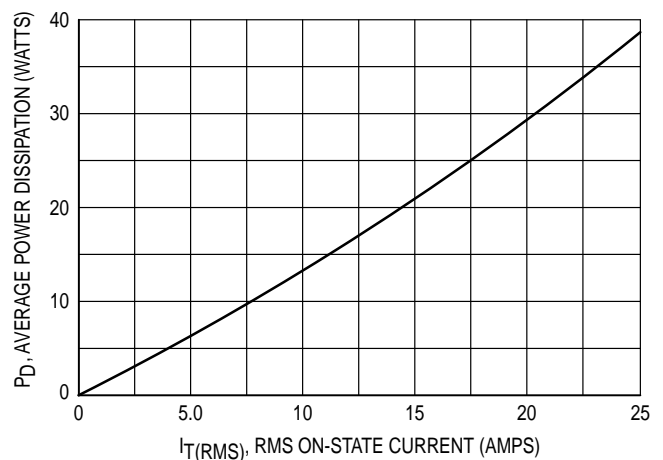


FIGURE 3 – GATE TRIGGER CURRENT

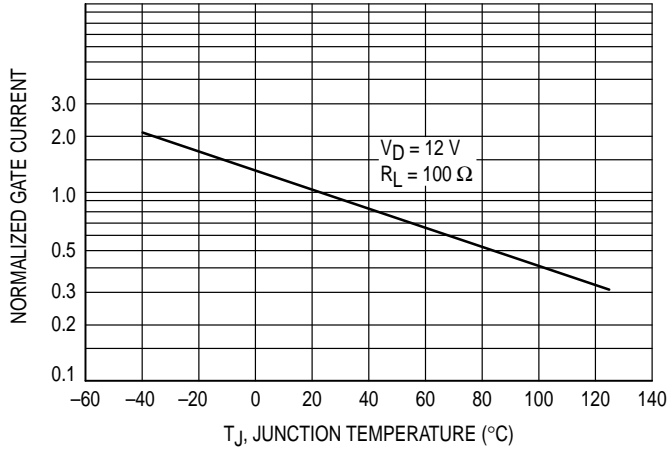


FIGURE 4 – GATE TRIGGER VOLTAGE

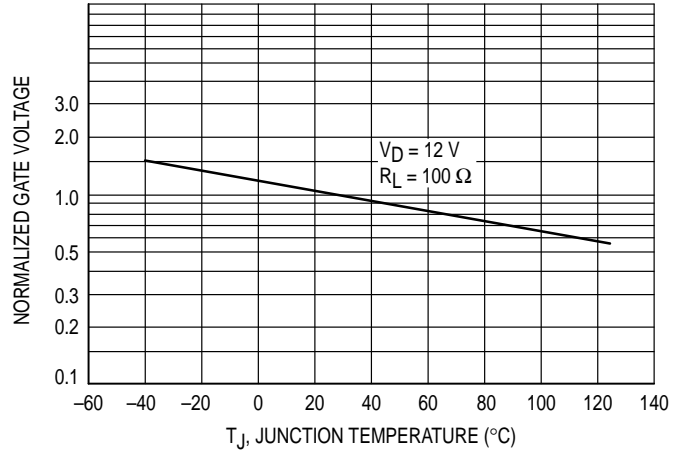


FIGURE 5 – HOLD CURRENT

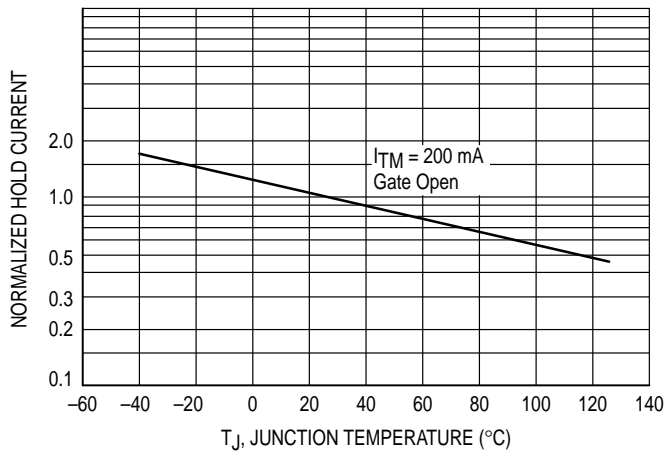
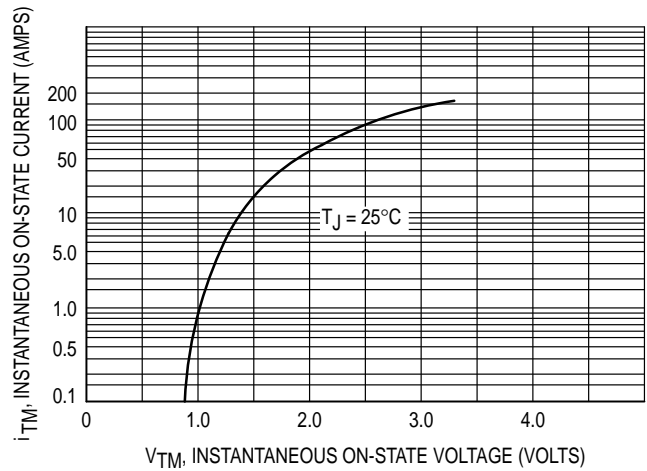
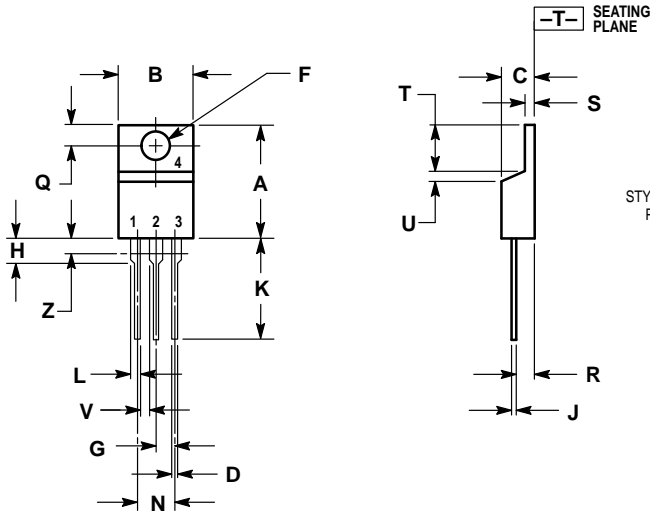


FIGURE 6 – TYPICAL ON-STATE CHARACTERISTICS



PACKAGE DIMENSIONS



STYLE 4:
 PIN 1. MAIN TERMINAL 1
 2. MAIN TERMINAL 2
 3. GATE
 4. MAIN TERMINAL 2

- NOTES:
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.014	0.022	0.36	0.55
K	0.500	0.562	12.70	14.27
L	0.045	0.055	1.15	1.39
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	—	1.15	—
Z	—	0.080	—	2.04

CASE 221A-04
 (TO-220AB)

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