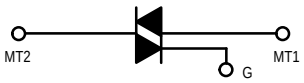
Triacs
Silicon Bidirectional Triode Thyristors

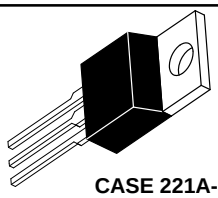
. . . designed primarily for full-wave ac control applications such as lighting sysjtems, heater controls, motor controls and power supplies; or wherever full-wave silicon-gate-controlled devices are needed.

- 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





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

MAXIMUM RATINGS (T_J = 25° 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) MAC223-4, MAC223A4 MAC223-6, MAC223A6 MAC223-8, MAC223A8 MAC223-10, MAC223A10	V_{DRM}	 200 400 600 800	Volts
On-State RMS Current (T_C = 80°C) (Full Cycle Sine Wave 50 to 60 Hz)	$I_{T(RMS)}$	25	Amps
Peak Non-repetitive 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^2t	260	A^2s
Peak Gate Current (t ≤ 2 μs)	I_{GM}	2	Amps
Peak Gate Voltage (t ≤ 2 μs)	V_{GM}	±10	Volts
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	Watts
Operating Junction Temperature Range	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.

THERMAL CHARACTERISTICS

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

ELECTRICAL CHARACTERISTICS (T_C = 25°C and either polarity of MT2 to MT1 voltage unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Blocking Current(1)	I_{DRM}				
(V_D = Rated V_{DRM}) T_J = 25°C		—	—	10	μA
T_J = 125°C		—	—	2	mA
Peak On-State Voltage	V_{TM}	—	1.4	1.85	Volts
(I_{TM} = 35 A Peak, Pulse Width ≤ 2 ms, Duty Cycle ≤ 2%)					
Gate Trigger Current (Continuous dc)	I_{GT}				mA
(V_D = 12 V, R_L = 100 Ω)					
MT2(+), G(+); MT2(–), G(–); MT(+), G(–)		—	20	50	
MT2(–), G(+) "A" SUFFIX ONLY		—	30	75	
Gate Trigger Voltage (Continuous dc)	V_{GT}				Volts
(V_D = 12 V, R_L = 100 Ω)					
MT2(+), G(+); MT2(–), G(–); MT(+), G(–)		—	1.1	2	
MT2(–), G(+) "A" SUFFIX ONLY		—	1.3	2.5	
(V_D = Rated V_{DRM}, T_J = 125°C, R_L = 10 k)		0.2	0.4	—	
MT(+), G(+); MT2(–), G(–); MT2(+), G(–)					
MT2(–), G(+) "A" SUFFIX ONLY		0.2	0.4	—	
Holding Current	I_H	—	10	50	mA
(V_D = 12 V, I_{TM} = 200 mA, Gate Open)					
Gate Controlled Turn-On Time	t_{gt}	—	1.5	—	μs
(V_D = Rated V_{DRM}, I_{TM} = 35 A Peak, I_G = 200 mA)					
Critical Rate of Rise of Off-State Voltage	dv/dt	—	40	—	V/μs
(V_D = Rated V_{DRM}, Exponential Waveform, T_C = 125°C)					
Critical Rate of Rise of Commutation Voltage	dv/dt(c)	—	5	—	V/μs
(V_D = Rated V_{DRM}, I_{TM} = 35 A Peak, Commutating di/dt = 12.6 A/ms, Gate Unenergized, T_C = 80°C)					

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

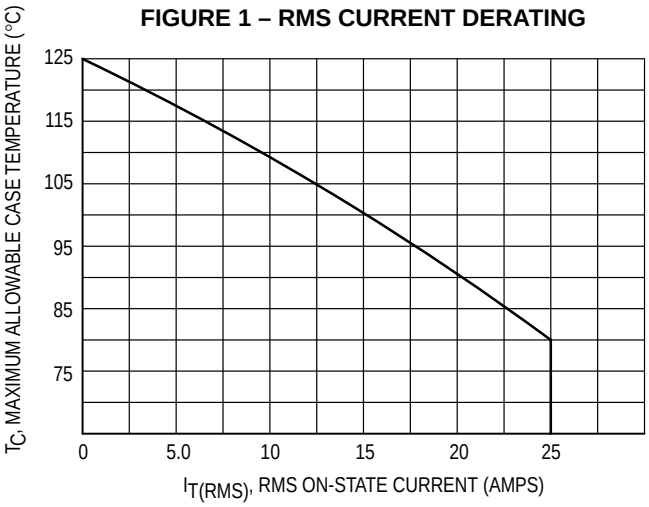


FIGURE 2 – ON-STATE POWER DISSIPATION

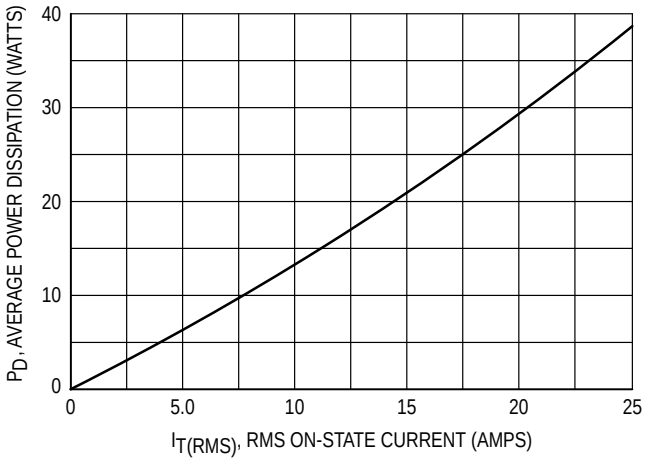


FIGURE 3 – GATE TRIGGER CURRENT

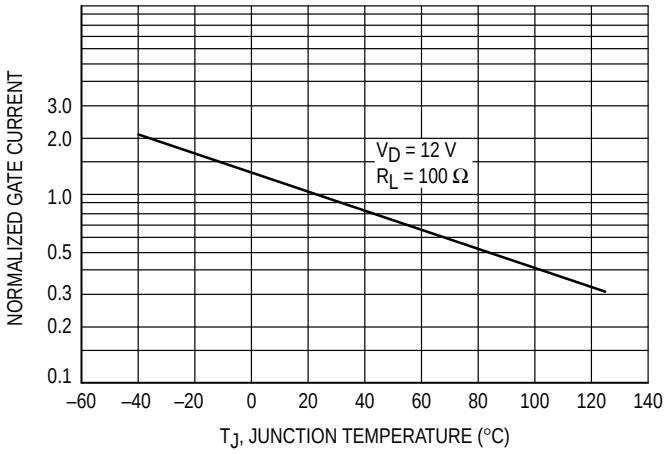


FIGURE 4 – GATE TRIGGER VOLTAGE

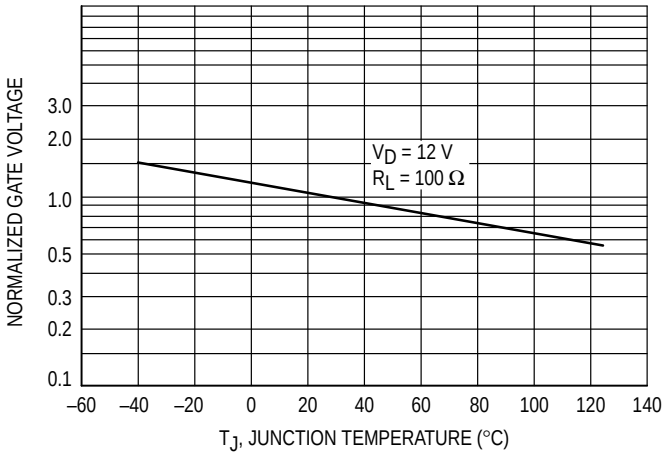


FIGURE 5 – HOLD CURRENT

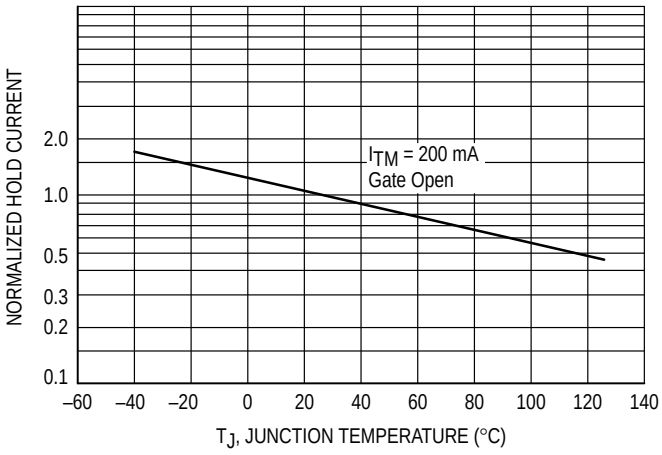
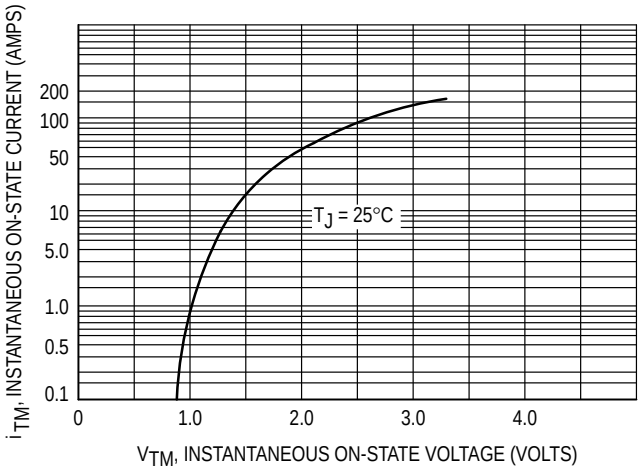
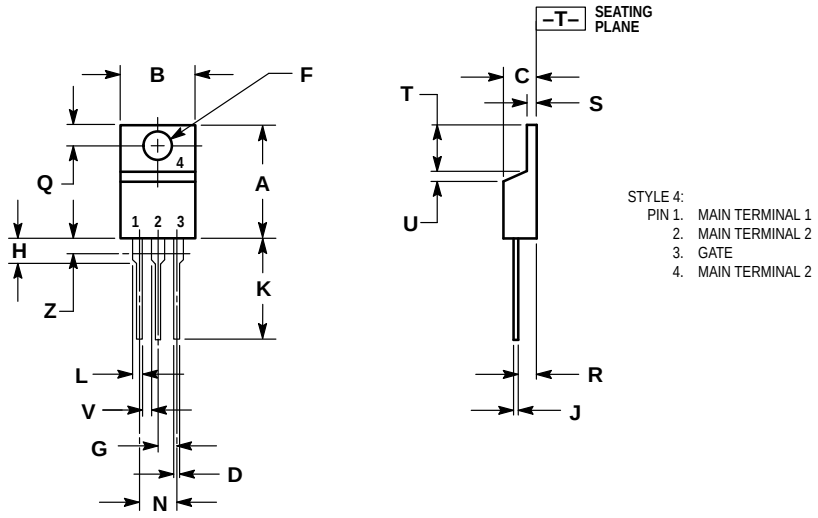


FIGURE 6 – TYPICAL ON-STATE CHARACTERISTICS



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.

	INCHES		MILLIMETERS	
DIM	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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