MAC224 Series MAC224A Series

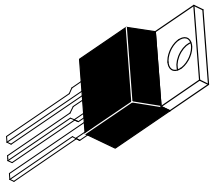
Triacs

Silicon Bidirectional 40 Amperes RMS Triode Thyristors

. . . designed primarily for full-wave ac control applications such as lighting systems, heater controls, motor controls and power supplies.

- Blocking Voltage to 800 Volts
- All Diffused and Glass-Passivated Junctions for Parameter Uniformity and Stability
- Gate Triggering Guaranteed in Three Modes (MAC224 Series) or Four Modes (MAC224A Series)

TRIACs
40 AMPERES RMS
200 thru 800 VOLTS



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

MAXIMUM RATINGS (T_J = 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) MAC224-4, MAC224A4 MAC224-6, MAC224A6 MAC224-8, MAC224A8 MAC224-10, MAC224A10	V_{DRM}	 200 400 600 800	Volts
On-State RMS Current (T_C = 75°C)(2) (Full Cycle Sine Wave 50 to 60 Hz)	$I_{T(RMS)}$	40	Amps
Peak Non-repetitive Surge Current (One Full Cycle, 60 Hz, T_J = 125°C)	I_{TSM}	350	Amps
Circuit Fusing (t = 8.3 ms)	I^2t	500	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 = 75°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. (cont.)
2. This device is rated for use in applications subject to high surge conditions. Care must be taken to insure proper heat sinking when the device is to be used at high sustained currents. (See Figure 1 for maximum case temperatures.)

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1	°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 (Rated V_{DRM}, Gate Open) T_J = 25°C T_J = 125°C	I_{DRM}	 — —	 — —	 10 2	 μA mA
Peak On-State Voltage (I_{TM} = 56 A Peak, Pulse Width ⩽ 2 ms, Duty Cycle ⩽ 2%)	V_{TM}	—	1.4	1.85	Volts
Gate Trigger Current (Continuous dc) (V_D = 12 V, R_L = 100 Ω) MT2(+), G(+); MT2(+), G(–); MT2(+), G(–) MT2(–), G(+) "A" SUFFIX ONLY	I_{GT}	 — —	 25 40	 50 75	mA
Gate Trigger Voltage (Continuous dc) (V_D = 12 V, R_L = 100 Ω) MT2(+), G(+); MT2(–), G(–); MT(+), G(–) MT2(–), G(+) "A" SUFFIX ONLY	V_{GT}	 — —	 1.1 1.3	 2 2.5	Volts
Gate Non-Trigger Voltage (V_D = Rated V_{DRM}, T_J = 125°C, R_L = 10 k) MT2(+), G(+); MT2(–), G(–); MT(+), G(–) MT2(–), G(+)	V_{GD}	 0.2 0.2	 — —	 — —	Volts
Holding Current (V_D = 12 Vdc, Gate Open)	I_H	—	30	75	mA
Gate Controlled Turn-On Time (V_D = Rated V_{DRM}, I_{TM} = 56 A Peak, I_G = 200 mA)	t_{gt}	—	1.5	—	μs
Critical Rate of Rise of Off-State Voltage (V_D = Rated V_{DRM}, Exponential Waveform, T_C = 125°C)	dv/dt	—	50	—	V/μs
Critical Rate of Rise of Commutation Voltage (V_D = Rated V_{DRM}, I_{TM} = 56 A Peak, Commutating di/dt = 20.2 A/ms, Gate Unenergized, T_C = 75°C)	dv/dt(c)	—	5	—	V/μs

FIGURE 1 – RMS CURRENT DERATING

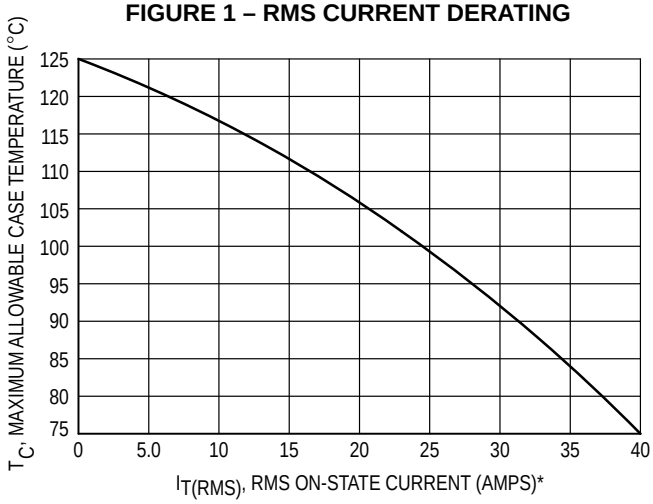
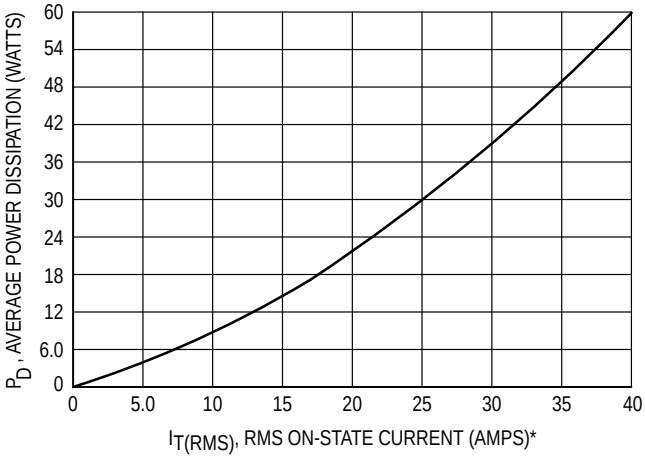


FIGURE 2 – ON-STATE POWER DISSIPATION



*This device is rated for use in applications subject to high surge conditions. Care must be taken to insure proper heat sinking when the device is to be used at high sustained currents.

FIGURE 3 – GATE TRIGGER CURRENT

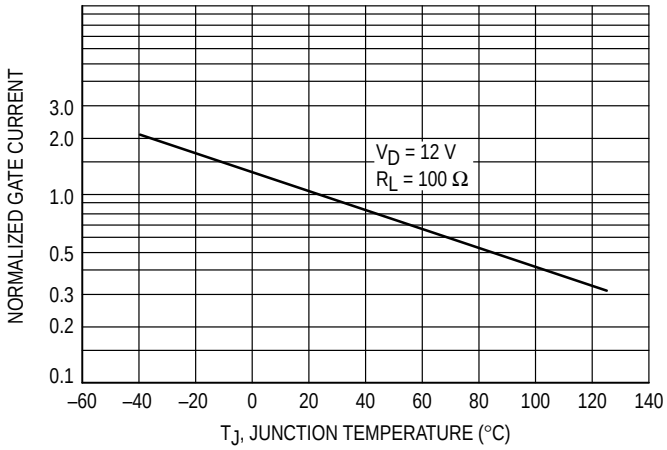


FIGURE 4 – GATE TRIGGER VOLTAGE

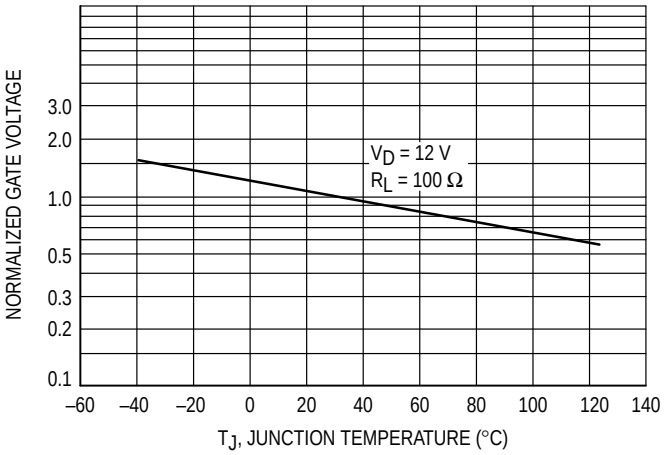


FIGURE 5 – HOLDING CURRENT

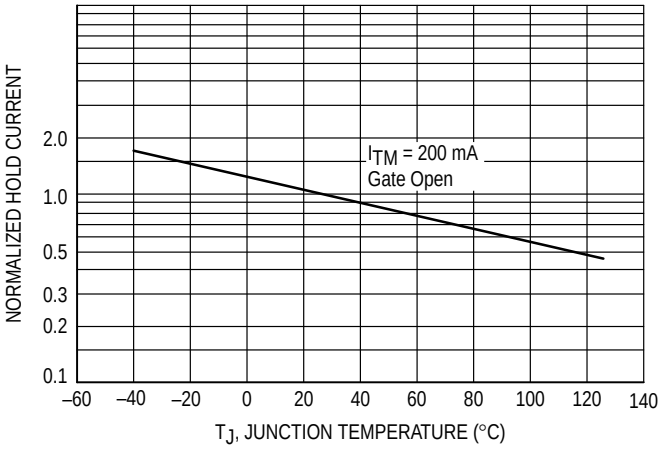


FIGURE 6 – TYPICAL ON-STATE CHARACTERISTICS

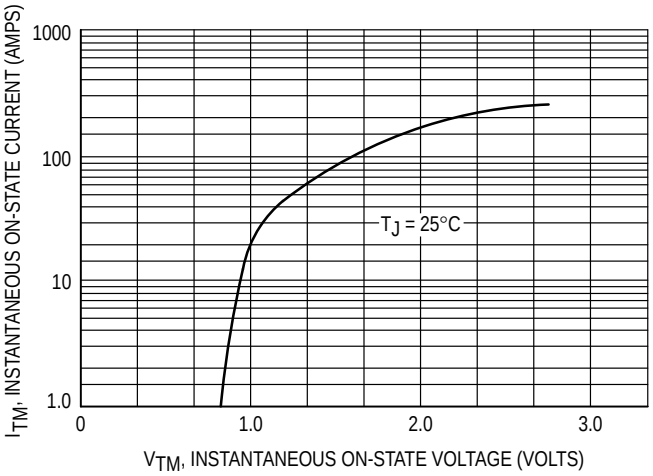
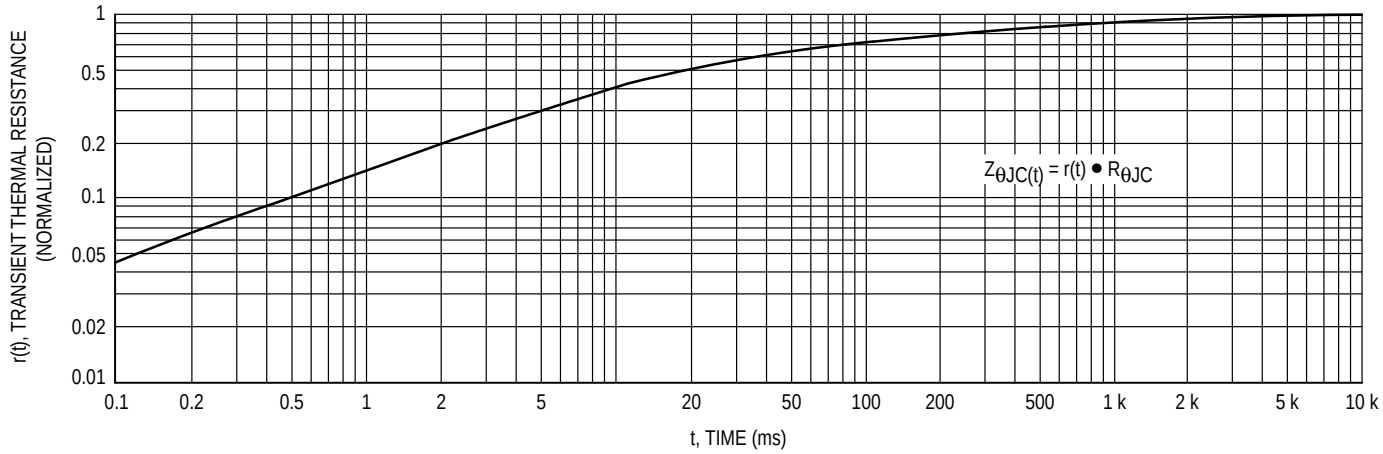
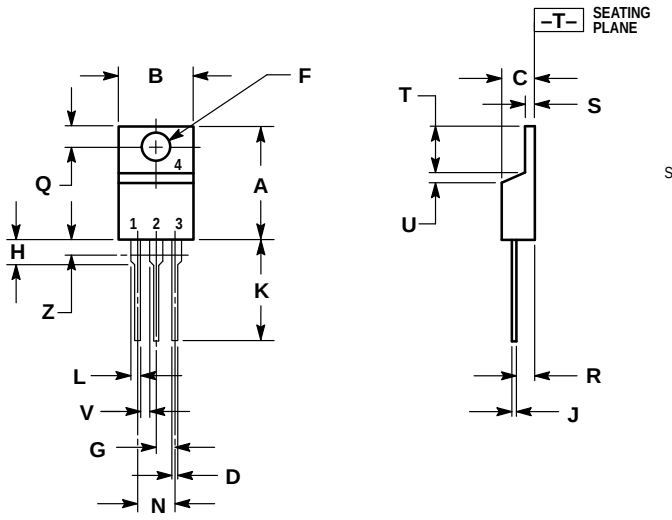


FIGURE 7 – THERMAL RESPONSE



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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