DIGITRON SEMICONDUCTORS

MAC224(A) SERIES — SILICON BIDIRECTIONAL TRIODE THYRISTORS

40 AMPERES RMS

Available Non-RoHS (standard) or RoHS compliant (add PBF suffix).
Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

RATING	SYMBOL	VALUE	UNIT
Peak Repetitive Off-State Voltage(1)	V_{DRM}		Volts
(T_J = -40 to 125°C, ½ Sine Wave 50 to 60 Hz, Gate Open)			
MAC224-4, MAC224A4		200	
MAC224-5, MAC224A5		300	
MAC224-6, MAC224A6		400	
MAC224-7, MAC224A7		500	
MAC224-8, MAC224A8		600	
MAC224-9, MAC224A9		700	
MAC224-10, MAC224A10		800	
On-State RMS Current (T_C = 75°C)(2) (Full Cycle Sine Wave 50 to 60Hz)	$I_{T(RMS)}$	40	Amps
Peak Non-repetitive surge Current (One Full Cycle, 60Hz, T_J = 125°C)	I_{TSM}	350	Amps
Circuit Fusing (t = 8.3ms)	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 ≤ 8.3ms)	$P_{G(AV)}$	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.
2. This device is rated for use in applications subject to high surge conditions. Care must be taken to ensure 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	I_{DRM}	-	-	10	μA
T_J = 125°C		-	-	2	mA
Peak On-State Voltage	V_{TM}				Volts
(I_{TM} = 56 A Peak, Pulse Width ≤ 2ms, Duty Cycle ≤ 2%)		-	1.4	1.85	
Gate Trigger Current (Continuous dc)	I_{GT}				
(V_D = 12V, R_L = 100 Ω)					mA
MT2 (+), G(+); MT2(-), G(-); MT2(+), G(-)		-	25	50	
MT2(-), G(+) "A" SUFFIX ONLY		-	40	75	
Gate Trigger Voltage (Continuous dc)	V_{GT}				
(V_D = 12V, R_L = 100 Ω)					Volts
MT2 (+), G(+); MT2(-), G(-); MT2(+), G(-)		-	1.1	2	
MT2(-), G(+) "A" SUFFIX ONLY		-	1.3	2.5	

144 Market Street
Kenilworth NJ 07033 USA
phone +1.908.245-7200
fax +1.908.245-0555
sales@digitroncorp.com
www.digitroncorp.com

DIGITRON SEMICONDUCTORS

MAC224(A) SERIES — SILICON BIDIRECTIONAL TRIODE THYRISTORS

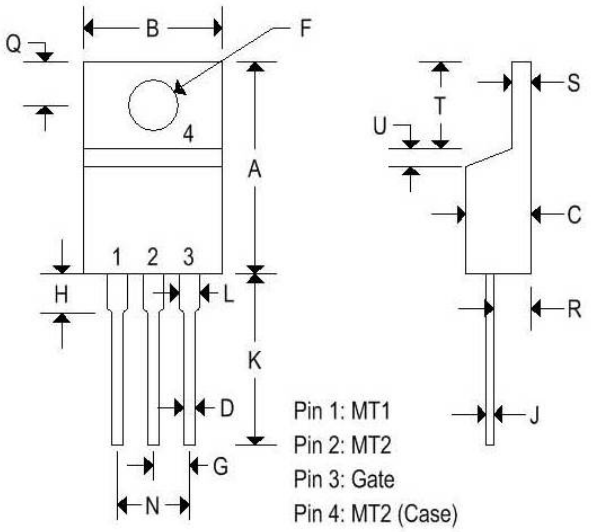
40 AMPERES RMS

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

Characteristic	Symbol	Min	Typ	Max	Unit
Gate Non-Trigger Voltage (V_D = Rated V_{DRM}, T_J = 125°C, R_L = 10k) MT2 (+), G(+); MT2(-), G(-); MT2(+), 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

MECHANICAL CHARACTERISTIC

Case	TO-220AB
Marking	Body painted, alpha-numeric
Pin out	See below



	TO-220AB			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.575	0.620	14.600	15.750
B	0.380	0.405	9.650	10.290
C	0.160	0.190	4.060	4.820
D	0.025	0.035	0.640	0.890
F	0.142	0.147	3.610	3.730
G	0.095	0.105	2.410	2.670
H	0.110	0.155	2.790	3.930
J	0.014	0.022	0.360	0.560
K	0.500	0.562	12.700	14.270
L	0.045	0.055	1.140	1.390
N	0.190	0.210	4.830	5.330
Q	0.100	0.120	2.540	3.040
R	0.080	0.110	2.040	2.790
S	0.045	0.055	1.140	1.390
T	0.235	0.255	5.970	6.480
U	-	0.050	-	1.270
V	0.045	-	1.140	-
Z	-	0.080	-	2.030

144 Market Street
Kenilworth NJ 07033 USA

phone +1.908.245-7200
fax +1.908.245-0555

sales@digitroncorp.com
www.digitroncorp.com

Rev. 20131205

DIGITRON SEMICONDUCTORS

144 Market Street
Kenilworth NJ 07033 USA

phone +1.908.245-7200
fax +1.908.245-0555

sales@digitroncorp.com
www.digitroncorp.com

Rev. 20131205

DIGITRON SEMICONDUCTORS

MAC224(A) SERIES — SILICON BIDIRECTIONAL TRIODE THYRISTORS

40 AMPERES RMS

FIGURE 1 – RMS CURRENT DERATING

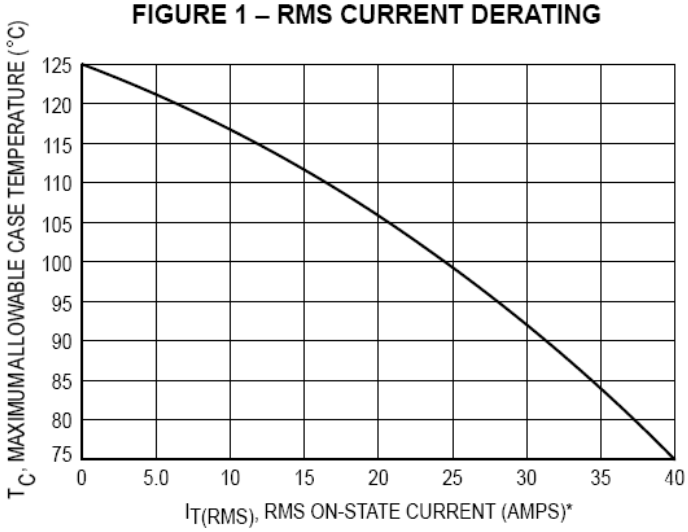


FIGURE 2 – ON-STATE POWER DISSIPATION

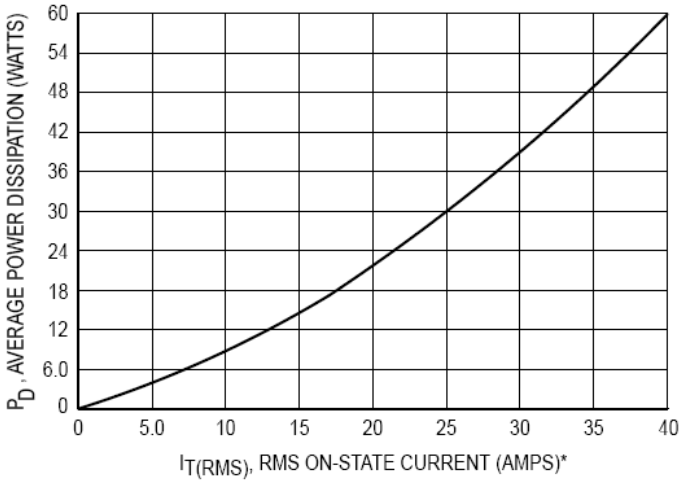


FIGURE 3 – GATE TRIGGER CURRENT

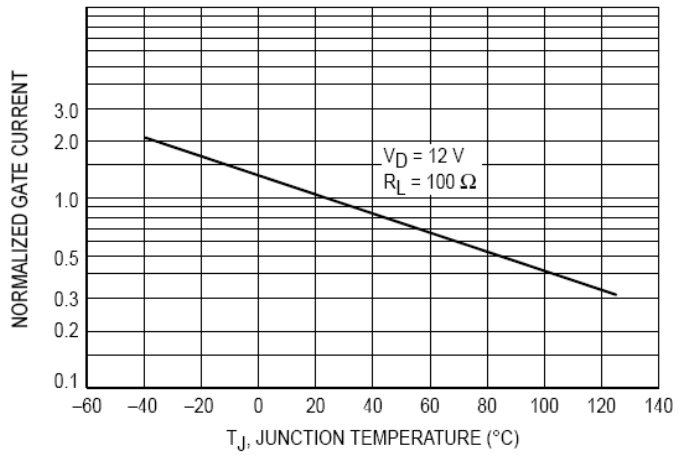


FIGURE 4 – GATE TRIGGER VOLTAGE

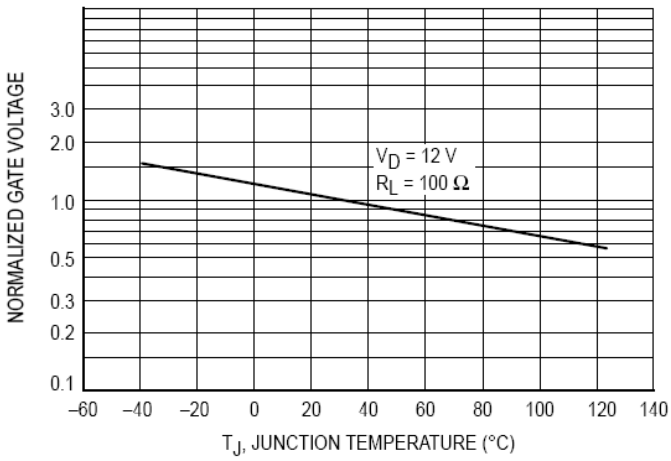


FIGURE 5 – HOLDING CURRENT

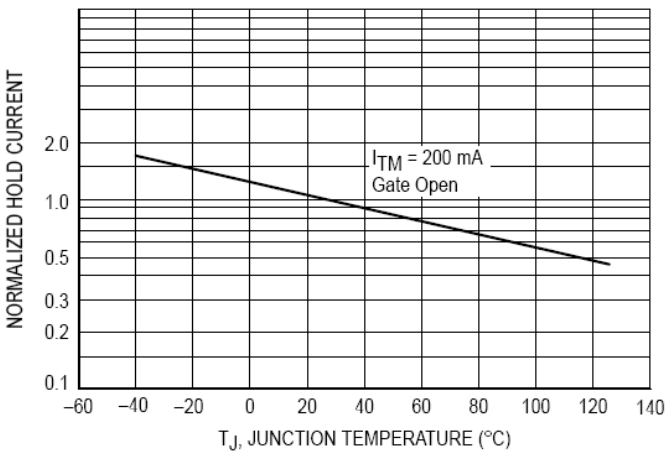
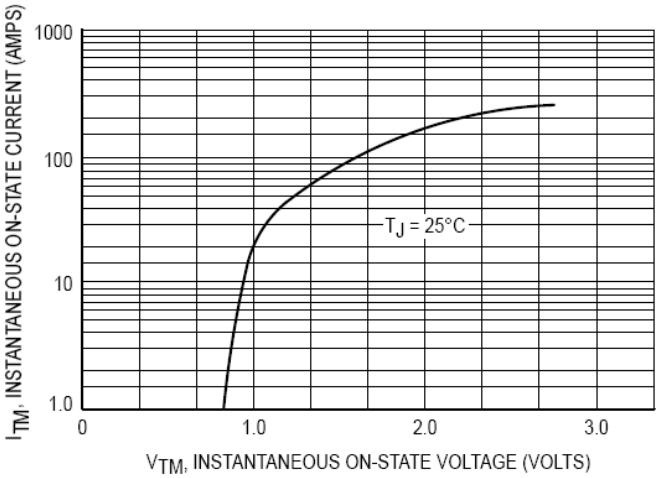


FIGURE 6 – TYPICAL ON-STATE CHARACTERISTICS



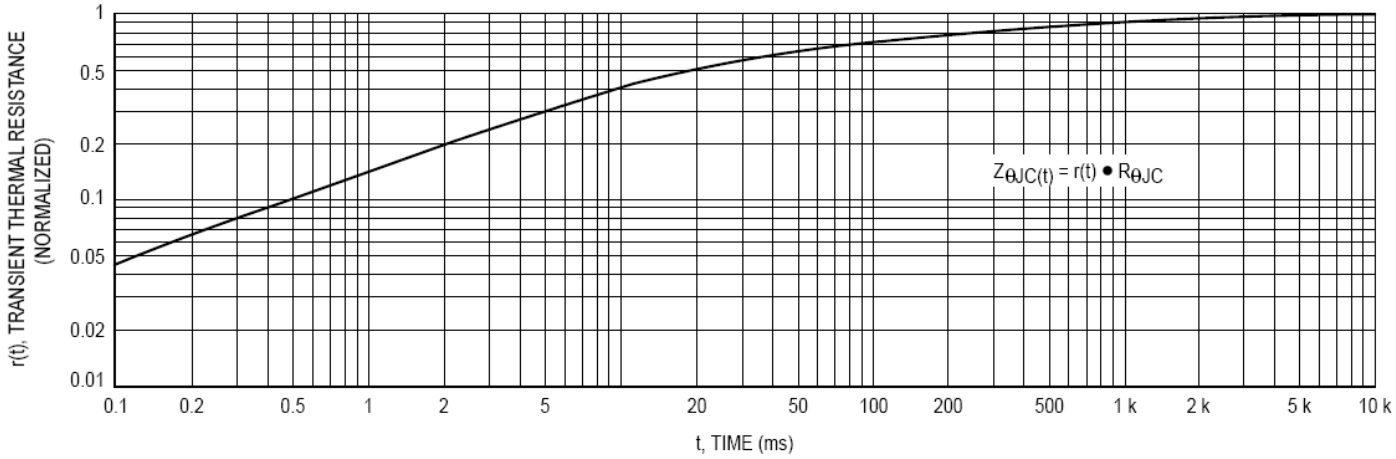
144 Market Street
Kenilworth NJ 07033 USA

phone +1.908.245-7200
fax +1.908.245-0555

sales@digitroncorp.com
www.digitroncorp.com

Rev. 20131205

FIGURE 7 – THERMAL RESPONSE



144 Market Street
Kenilworth NJ 07033 USA

phone +1.908.245-7200
fax +1.908.245-0555

sales@digitroncorp.com
www.digitroncorp.com