

Triacs

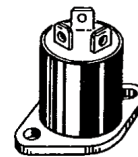
Silicon Bidirectional Triode Thyristors

... designed primarily for industrial and consumer applications for full-wave control of ac loads such as appliance controls, power supplies, solid-state relays, heating controls, motor controls, welding equipment, and power switching systems.

- Electrically Isolated From Mounting Base
- Isolation Voltage of 2500 Volts RMS
- Quick Connect/Disconnect Terminals
- Glass Passivated and Center Gate Geometry
- Gate Triggering Guaranteed in Four Modes

**MAC20A
MAC25A
MAC50A**

**TRIACS
15, 25 and 40
AMPERES RMS
200 thru 800 VOLTS**



**CASE 326-01
STYLE 2**

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MAXIMUM RATINGS ($T_J = -40$ to $+125^\circ\text{C}$ unless otherwise noted.)

Rating	Symbol	MAC series			Unit
		20A	25A	50A	
Repetitive Peak Off-State Voltage 1/2 Sine Wave 50 to 60 Hz, Gate Open MAC20A/25A/50A4 MAC20A/25A/50A6 MAC20A/25A/50A8 MAC20A/25A/50A10	V_{DRM}		200 400 600 800		Volts
RMS On-State Current ($T_C = 100^\circ\text{C}$ for MAC20A) ($T_C = 90^\circ\text{C}$ for MAC25A) ($T_C = 70^\circ\text{C}$ for MAC50A)	$I_{T(RMS)}$	15 — —	— 25 —	— — 40	Amps
Peak Non-Repetitive Surge Current (One Full Cycle, 60 Hz)	I_{TSM}	150	250	300	Amps
Circuit Fusing ($t = 1$ to 8.3 ms)	I^2t	90	260	375	A^2s
Average Gate Power	$P_{G(AV)}$	0.5	0.5	0.75	Watt
Peak Gate Current (10 μs)	I_{GM}	2	2	4	Amps
Operating Junction Temperature Range	T_J	0 to $+125$			$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-40 to $+125$			$^\circ\text{C}$

MOTOROLA THYRISTOR DEVICE DATA

3-146

MAC20A • MAC25A • MAC50A

THERMAL CHARACTERISTICS

Characteristic	Symbol	Maximum Value			Unit
Thermal Resistance, Junction to Case (DC) (Apparent) Note 1	$R_{\theta JC}$	1.6 1.3	1.5 1	1.4 0.95	°C/W

Note 1. Defined as: $\frac{(125^{\circ}\text{C} - T_C)}{P_{AV}}$ for a 60 Hz full sine wave.

ELECTRICAL CHARACTERISTICS

(All voltage polarity reference to MT1; applies to either polarity of MT2 to MT1; $T_C = 25^{\circ}\text{C}$ unless otherwise noted.)

Characteristic	Symbol	MAC20A			MAC25A			MAC50A		Unit	
		Min	Typ	Max	Min	Typ	Max	Min	Typ		Max
Peak Forward or Reverse Blocking Current (Rated V_{DRM} or V_{RRM} , gate open) $T_C = 25^{\circ}\text{C}$ $T_C = 125^{\circ}\text{C}$	I_{DRM} I_{RRM}	—	—	10 2	—	—	10 2	—	—	10 2	μA mA
Peak On-State Voltage (Pulse Width = 1 ms, Duty Cycle 2%) ($I_{TM} = 21$ A Peak) MAC20A ($I_{TM} = 35$ A Peak) MAC25A ($I_{TM} = 56$ A Peak) MAC20A	V_{TM}	—	1.3	1.6	—	—	—	—	—	—	Volts
Gate Trigger Current (Continuous dc) ($V_D = 12$ Vdc, $R_L = 50$ Ohms) MT2(+), G(+); MT2(-), G(-); MT2(+), G(-) MT2(-), G(+)	I_{GT}	—	15 30	50 75	—	20 35	70 100	—	20 35	70 100	mA
Gate Trigger Voltage (Continuous dc) ($V_D = 12$ Vdc, $R_L = 50$ Ohms) MT2(+), G(+); MT2(-), G(-); MT2(+), G(-) MT2(-), G(+) ($V_D = \text{Rated } V_{DRM}$, $R_L = 10$ k Ω , $T_C = 125^{\circ}\text{C}$)	V_{GT}	—	0.9 1.4	2 2.5	—	1.1 1.3	2 2.5	—	1.1 1.3	2 2.5	Volts
Holding Current ($V_D = 12$ Vdc, Gate Open, $R_L = 40$ Ohms)	I_H	—	6	40	—	10	75	—	10	75	mA
Turn-On Time ($V_D = \text{Rated } V_{DRM}$) ($I_{TM} = 21$ A, $I_G = 120$ mA) MAC20A ($I_{TM} = 35$ A, $I_G = 200$ mA) MAC25A ($I_{TM} = 56$ A, $I_G = 200$ mA) MAC50A	t_{gt}	—	1.5	—	—	—	—	—	—	—	μs
Critical Rate-of-Rise of Commutation Voltage ($V_D = \text{Rated } V_{DRM}$, $I_{TM} = 21$ A, Commutating $di/dt = 8$ A/ms, $T_C = 100^{\circ}\text{C}$) MAC20A ($V_D = \text{Rated } V_{DRM}$, $I_{TM} = 35$ A, Commutating $di/dt = 16$ A/ms, $T_C = 90^{\circ}\text{C}$) MAC25A ($V_D = \text{Rated } V_{DRM}$, $I_{TM} = 56$ A, Commutating $di/dt = 22$ A/ms, $T_C = 70^{\circ}\text{C}$) MAC50A	$dv/dt(c)$	5	30	—	—	—	—	—	—	—	$\text{V}/\mu\text{s}$
Critical Rate-of-Rise of Off-State Voltage (Exponential Rise) ($V_D = \text{Rated } V_{DRM}$, Gate Open, $T_C = 125^{\circ}\text{C}$)	dv/dt	—	100	—	—	100	—	—	75	—	$\text{V}/\mu\text{s}$



MAC20A • MAC25A • MAC50A

FIGURE 1 – CURRENT DERATING

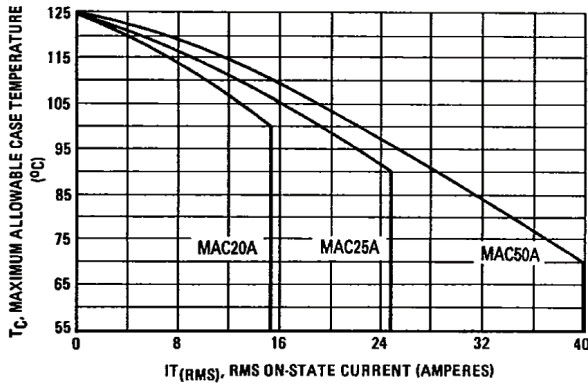
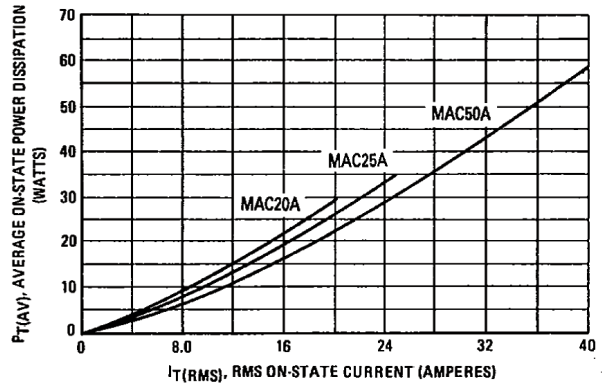


FIGURE 2 – MAXIMUM POWER DISSIPATION



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