

# Triacs

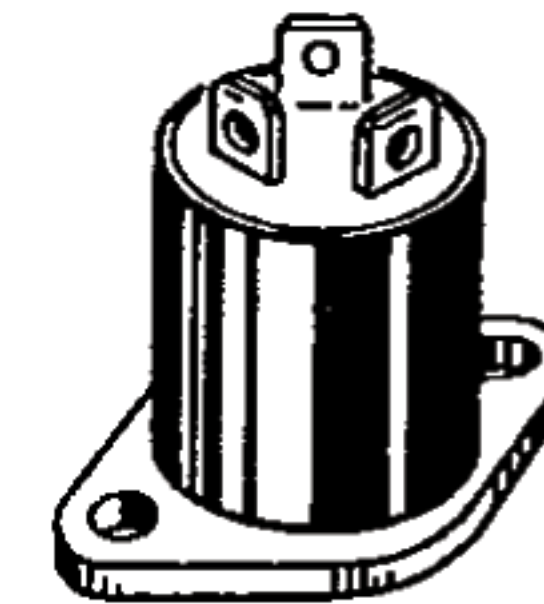
## Silicon Bidirectional Triode Thyristors

... 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**

**3**

**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)	$I_T(\text{RMS})$	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	$\text{A}^2\text{s}$
Average Gate Power	$P_{G(AV)}$	0.5	0.5	0.75	Watt
Peak Gate Current ( $10 \mu\text{s}$ )	$I_{GM}$	2	2	4	Amps
Operating Junction Temperature Range	$T_J$	0 to $+125$			$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	$-40$ to $+125$			$^\circ\text{C}$

**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.  
 $T_C = 125^{\circ}\text{C}$

**ELECTRICAL CHARACTERISTICS**

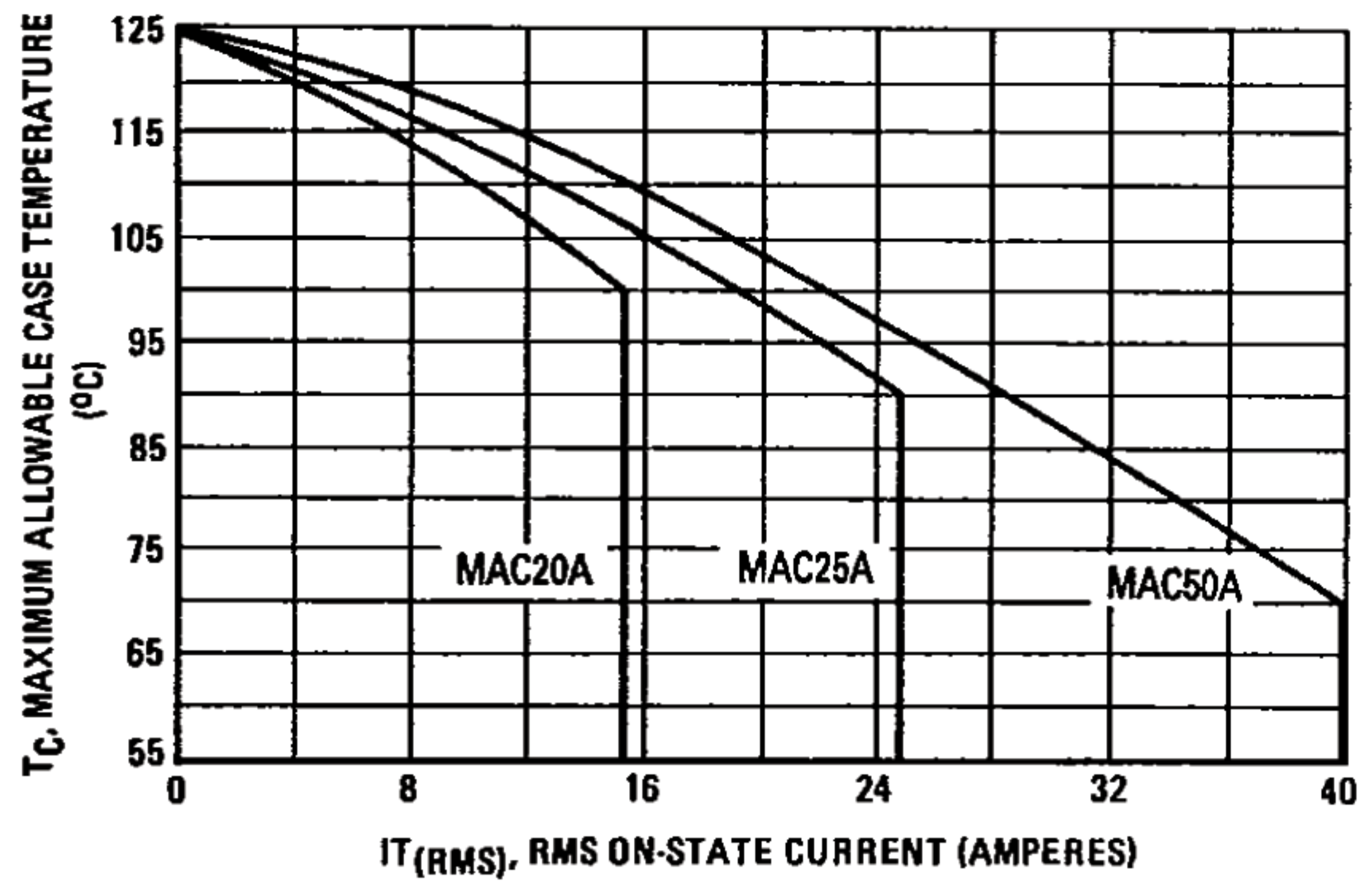
(All voltage polarity reference to MT1; applies to either polarity of MT2 to MT1;  $T_C = 25^{\circ}\text{C}$  unless otherwise noted.)

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	$\mu\text{A}$ 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) MAC50A	$V_{TM}$	—	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 $\Omega$ , $T_C = 125^{\circ}\text{C}$ )	$V_{GT}$	—	0.9 1.4 0.2	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	—	—	—	—	—	—	—	$\mu\text{s}$
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	—	—	—	—	—	—	—	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	—	V/ $\mu\text{s}$

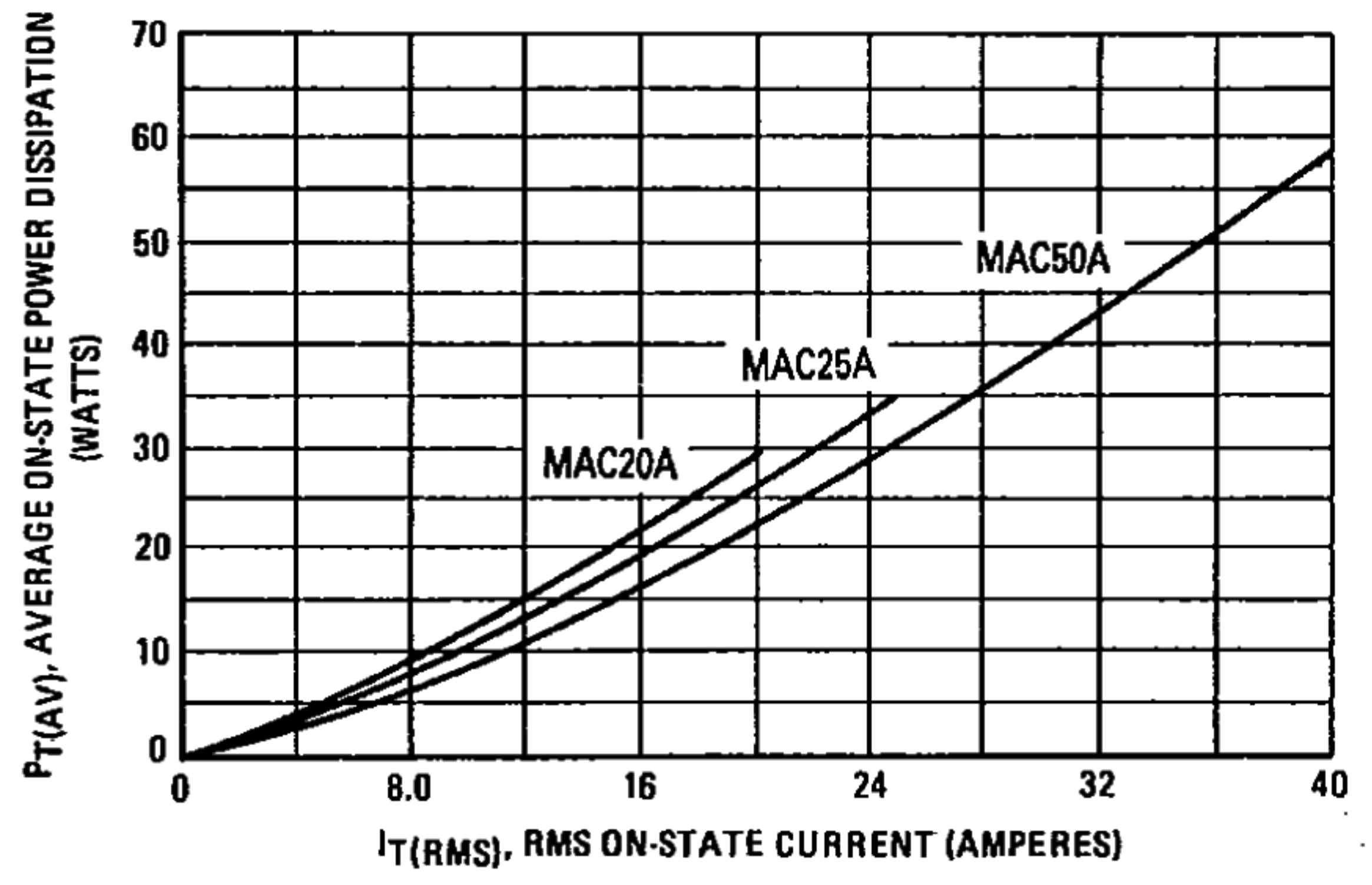


**MAC20A • MAC25A • MAC50A**

**FIGURE 1 – CURRENT DERATING**



**FIGURE 2 – MAXIMUM POWER DISSIPATION**



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