DIGITRON™ Semiconductors

High-reliability discrete products
and engineering services since 1977

MAC250 SERIES
MAC250()3 SERIES

BIDIRECTIONAL THYRISTORS

FEATURES

- Available as “HR” (high reliability) screened per MIL-PRF-19500, JANTX level. Add “HR” suffix to base part number.
- Available as non-RoHS (Sn/Pb plating), standard, and as RoHS by adding “-PBF” suffix.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak repetitive off-state voltage			
SC251B, MAC250B, MAC250B3	V_{DRM}	200	Volts
SC251D, MAC250D, MAC250D3		400	
SC251M, MAC250M, MAC250M3		600	
SC251N, MAC250N		800	
RMS on-state current	$I_{T(RMS)}$	15	Amps
Peak non-repetitive surge current (1 cycle, 60Hz)	I_{TSM}	100	Amps
Circuit fusing considerations			
(t = 1ms)	I^2t	20	A^2s
(t = 8.3ms)		41.5	
Peak gate power	P_{GM}	10	Watts
Average gate power	$P_{G(AV)}$	0.5	Watts
Peak gate power (pulse width = 10µs)	I_{GM}	2	Amps
Operating junction temperature range	T_J	-40 to +115	°C
Storage temperature range	T_{stg}	-40 to +125	°C
Mounting torque		30	In. lb.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Maximum	Unit
Thermal resistance, junction to case			
MAC250, SC251	$R_{\Theta JC}$	2.0	°C/W
MAC250()3		2.3	

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ELECTRICAL CHARACTERISTICS @ 25°C unless otherwise noted

Characteristic	Symbol	Min	Typ.	Max	Unit
Peak blocking current					
(V_D = Rated V_{DRM}, T_C = 25°C)	I_{DRM}	-	-	10	µA
(V_D = Rated V_{DRM}, T_C = 115°C)		-	-	0.5	mA
Peak on-state voltage					
(I_{TM} = 21A peak, pulse width = 1ms, duty cycle ≤ 2%)	V_{TM}	-	-	1.65	Volts
Critical rate of rise of off-state voltage					
(Rated V_{DRM}, exponential waveform, gate open, T_C = 115°C)	dv/dt	100	-	-	V/µs
Critical rate of rise of commutating off-state voltage					
($I_{T(RMS)}$ = rated RMS on-state current, V_D = V_{DRM}, commutating di/dt = 8A/ms, gate open)					
T_C = 84°C, MAC250, SC251	dv/dt(c)	4	-	-	V/µs
T_C = 78°CMAC250()3		4	-	-	
DC gate trigger current (continuous dc)					
(V_D = 12V)					
MT2(+),G(+); MT2(-),G(-); R_L = 100Ω	I_{GT}	-	-	50	mA
MT2(+),G(-), R_L = 50Ω		-	-	50	
DC gate trigger current (continuous dc)					
(V_D = 12V, T_C = -40°C)					
MT2(+),G(+); MT2(-),G(-); R_L = 50Ω	I_{GT}	-	-	80	mA
MT2(+),G(-), R_L = 25Ω		-	-	80	
Gate trigger voltage (continuous dc)	V_{GT}				Volts
(V_D = 12V)					
MT2(+),G(+); MT2(-),G(-); R_L = 100Ω		-	-	2.5	
MT2(+),G(-), R_L = 50Ω		-	-	2.5	
Gate trigger voltage (continuous dc)	V_{GT}				Volts
(V_D = 12V, T_C = -40°C)					
MT2(+),G(+); MT2(-),G(-); R_L = 50Ω		-	-	3.5	
MT2(+),G(-), R_L = 25Ω		-	-	3.5	
DC gate non-trigger voltage	V_{GD}				Volts
(V_D = Rated V_{DRM}, R_L = 1kΩ, T_C = 115°C)		0.20	-	-	
All trigger modes					
Holding current	I_H				mA
(V_D = 24V, peak initiating current = 0.5A, pulse width = 0.1 to 10ms, gate trigger)					
(Source = 7V, 20Ω)					
T_C = 25°C		-	-	50	
T_C = -40°C		-	-	100	
Latching current	I_L				mA
(V_D = 24V, gate trigger source = 15V, 100Ω, pulse width = 50µs, 5µs maximum rise and fall times)					
MT2(+),G(+); MT2(-),G(-); MT2(+),G(-), T_C = 25°C		-	-	100	
MT2(+),G(+); MT2(-),G(-); MT2(+),G(-), T_C = -40°C		-	-	200	

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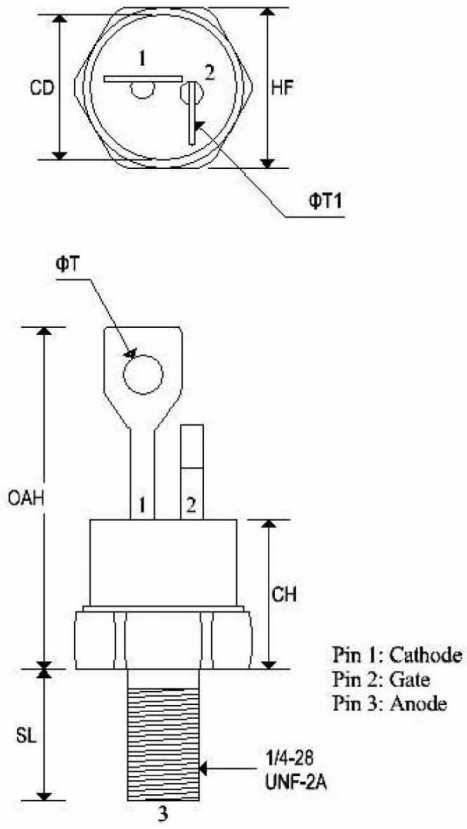
MECHANICAL CHARACTERISTICS

Case	TO-48 (MAC250 Series)
Marking	Alpha-numeric
Polarity	Cathode is stud



	TO-48			
	Inches		Millimeters	
	Min	Max	Min	Max
CD	-	0.543	-	13.793
CH	-	0.550	-	13.970
HF	0.544	0.563	13.817	14.301
OAH	-	1.193	-	30.303
SL	0.422	0.453	10.718	11.507
ΦT	0.125	0.165	3.175	4.191
ΦT_1	0.060	0.075	1.524	1.905

Note: Contour and angular orientation of terminals 1 and 2 with respect to hex portion and to each other are optional.

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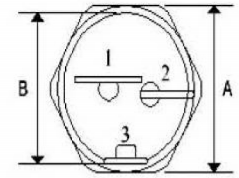
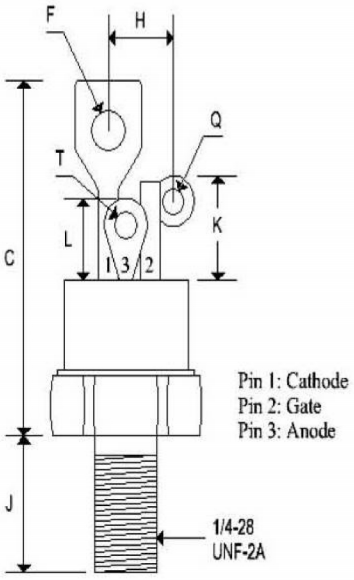
MECHANICAL CHARACTERISTIC

Case	TO-48 ISO (MAC250()3 Series)
Marking	Alpha-numeric
Polarity	Cathode is stud





	TO-48 ISO			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.551	0.559	14.000	14.200
B	0.501	0.505	12.730	12.830
C	-	1.280	-	32.510
F	-	0.160	-	4.060
H	-	0.265	-	6.730
J	0.420	0.455	10.670	11.560
K	0.300	0.350	7.620	8.890
L	0.255	0.275	6.480	6.990
Q	0.055	0.085	1.400	2.160
T	0.135	0.150	3.430	3.810

FIGURE 1 – CURRENT DERATING

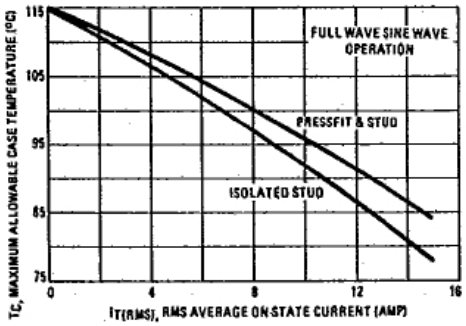


FIGURE 2 – MAXIMUM ON-STATE POWER DISSIPATION