Advance Information

TRIACS

Silicon Bidirectional Thyristors

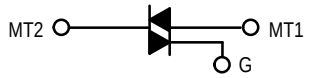
Designed for industrial and consumer applications for full wave control of ac loads such as appliance controls, heater controls, motor controls, and other power switching applications.

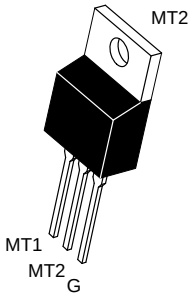
- Sensitive Gate Allows Triggering by Microcontrollers and other Logic Circuits
- High Immunity to dv/dt — 50 V/μs Minimum at 125°C
- Commutating di/dt — 3.0 A/ms Minimum at 125°C
- Minimum and Maximum Values of I_{GT}, V_{GT} and I_H Specified for ease of Design
- On-State Current Rating of 4 Amperes RMS at 100°C
- High Surge Current Capability — 40 Amperes
- Blocking Voltage to 800 Volts
- Rugged, Economical TO220AB Package

MAC4SM
MAC4SN

Motorola preferred devices

TRIACS
4 AMPERES RMS
600 thru 800
VOLTS





CASE 221A–09
(TO-220AB)
Style 4

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

Parameter	Symbol	Value	Unit
Peak Repetitive Off-State Voltage (1) Peak Repetitive Reverse Voltage (T_J = –40 to 125°C, Sine Wave, 50 to 60 Hz, Gate Open) MAC4SM MAC4SN	V_{DRM} V_{RRM}	 600 800	Volts
On-State RMS Current (Full Cycle Sine Wave, 60 Hz, T_C = 100°C)	$I_{T(RMS)}$	4.0	A
Peak Non-Repetitive Surge Current (One Full Cycle, 60 Hz, T_J = 125°C)	I_{TSM}	40	A
Circuit Fusing Consideration (t = 8.33 ms)	I^2t	6.6	A^2sec
Peak Gate Power (Pulse Width ≤ 1.0 μs, T_C = 100°C)	P_{GM}	0.5	Watts
Average Gate Power (t = 8.3 ms, T_C = 100°C)	$P_{G(AV)}$	0.1	Watts
Operating Junction Temperature Range	T_J	–40 to +125	°C
Storage Temperature Range	T_{stg}	–40 to +150	°C

THERMAL CHARACTERISTICS

Thermal Resistance — Junction to Case — Junction to Ambient	$R_{\theta JC}$ $R_{\theta JA}$	2.2 62.5	°C/W
Maximum Lead Temperature for Soldering Purposes 1/8″ from Case for 5 Seconds	T_L	260	°C

(1) V_{DRM} and V_{RRM} 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.

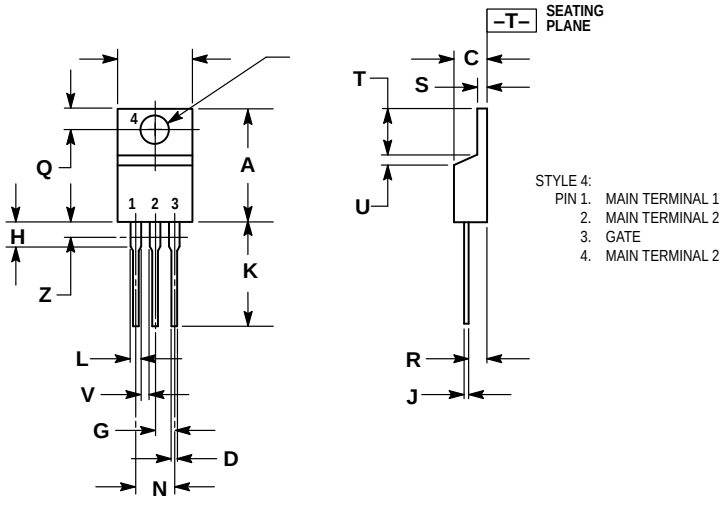
Preferred devices are Motorola recommended choices for future use and best overall value.

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

Symbol	Characteristic	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
I_{DRM}	Peak Repetitive Blocking Current (V_D = Rated V_{DRM}, Gate Open) T_J = 25°C T_J = 125°C	 — —	 — —	 0.01 2.0	mA
ON CHARACTERISTICS					
V_{TM}	Peak On-State Voltage[1] (I_{TM} = ±6.0 A)	—	—	1.6	V
I_{GT}	Gate Trigger Current (Continuous dc) (V_D = 12 V, R_L = 100 Ω) MT2(+), G(+) MT2(+), G(–) MT2(–), G(–)	 2.9 2.9 2.9	 — — —	 10 10 10	mA
I_H	Holding Current (V_D = 12 V, Gate Open, Initiating Current = ±200 mA)	2.0	—	15	mA
I_L	Latching Current (V_D = 12 V, I_G = 10 mA) MT2(+), G(+) MT2(+), G(–) MT2(–), G(–)	 — — —	 — — —	 30 30 30	mA
V_{GT}	Gate Trigger Voltage (Continuous dc) (V_D = 12 V, R_L = 100 Ω) MT2(+), G(+) MT2(+), G(–) MT2(–), G(–)	 0.5 0.5 0.5	 — — —	 1.3 1.3 1.3	V
DYNAMIC CHARACTERISTICS					
$(di/dt)_c$	Rate of Change of Commutating Current[1] (V_D = 400 V, I_{TM} = 3.5 A, Commutating dv/dt = 10 V/μs, Gate Open, T_J = 125°C, f = 500 Hz, C_L = 5.0 μF, L_L = 20 mH, No Snubber)	3.0	—	—	A/ms
dv/dt	Critical Rate of Rise of Off-State Voltage (V_D = 0.67 x Rated V_{DRM}, Exponential Waveform, Gate Open, T_J = 125°C)	50	—	—	V/μs
di/dt	Repetitive Critical Rate of Rise of On-State Voltage	—	—	10	A/μs

1. Pulse Test: Pulse Width ≤ 2.0 ms, Duty Cycle ≤ 2%.

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	0.018	0.025	0.46	0.64
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
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-09
TO-220AB

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