Advance Information

TRIACS

Silicon Bidirectional Thyristors

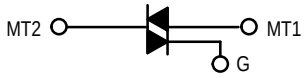
Designed primarily for full-wave ac control applications, such as motor controls, heating controls or dimmers; or where ever full–wave, silicon gate–controlled devices are needed.

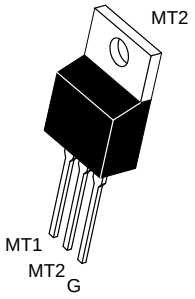
- Uniform Gate Trigger Currents in Three Modes
- High Commutating di/dt and High Immunity to dv/dt @ 125°C
- Minimizes Snubber Networks for Protection
- Blocking Voltage to 800 Volts
- On-State Current Rating of 12 Amperes RMS at 80°C
- High Surge Current Capability – 100 Amperes
- Industry Standard TO-220AB Package for Ease of Design
- Glass Passivated Junctions for Reliability and Uniformity

MAC12HC Series*

***Motorola preferred devices**

TRIACS
12 AMPERES RMS
400 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)	MAC12HCD MAC12HCM MAC12HCN	V_{DRM} V_{RRM}	 400 600 800	Volts
On-State RMS Current (All conduction angles; T_C = 80°C)		$I_{T(RMS)}$	12	A
Peak Non-Repetitive Surge Current (One Full Cycle, 60 Hz, T_J = 125°C)		I_{TSM}	100	A
Circuit Fusing Consideration (t = 8.33 ms)		I^2t	41	A^2sec
Peak Gate Power (Pulse Width ≤ 1.0 μs, T_C = 80°C)		P_{GM}	16	Watts
Average Gate Power (t = 8.3 ms, T_C = 80°C)		$P_{G(AV)}$	0.35	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.

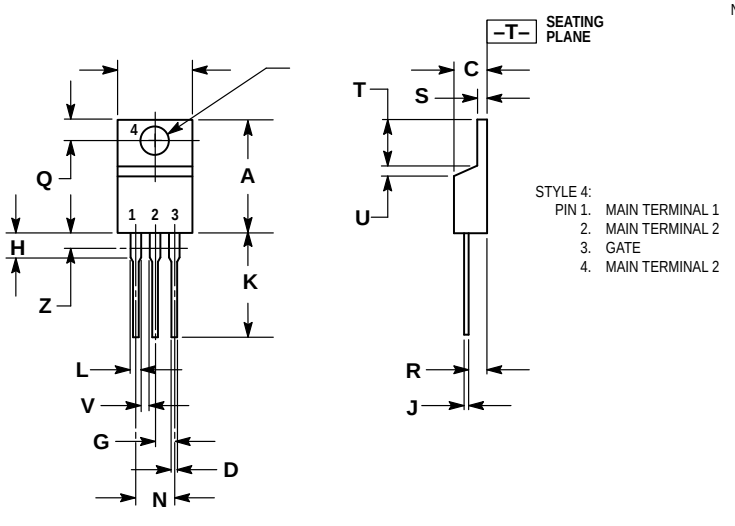
Preferred devices are Motorola recommended choices for future use and best overall value.

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} = ±17 A)		—	—	1.85	V
I_{GT}	Gate Trigger Current (Continuous dc) (V_D = 12 V, R_L = 100 Ω) MT2(+), G(+) MT2(+), G(–) MT2(–), G(–)		 10 10 10	 — — —	 50 50 50	mA
I_H	Holding Current (V_D = 12 V, Gate Open, Initiating Current = ±150 mA)		—	—	60	mA
I_L	Latch Current (V_D = 12 V, I_G = 10 mA) MT2(+), G(+) MT2(+), G(–) MT2(–), G(–)		 — — —	 — — —	 60 80 60	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	 — — —	 1.5 1.5 1.5	V
DYNAMIC CHARACTERISTICS						
$(di/dt)_c$	Rate of Change of Commutating Current[1] (V_D = 400 V, I_{TM} = 4.4 A, Commutating dv/dt = 18 V/μs, Gate Open, T_J = 125°C, f = 250 Hz, C_L = 10 μF, L_L = 40 mH, with Snubber)		15	—	—	A/ms
dv/dt	Critical Rate of Rise of Off-State Voltage (V_D = Rated V_{DRM}, Exponential Waveform, Gate Open, T_J = 125°C)		600	—	—	V/μs
di/dt	Repetitive Critical Rate of Rise of On-State Current		—	—	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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