Advance Information

TRIACS

Silicon Bidirectional Thyristors

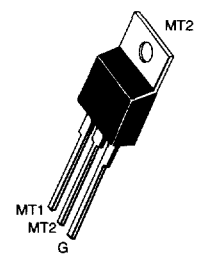
MACH15 SERIES*

*Motorola Preferred Devices

Designed for high performance full-wave ac control applications where high noise immunity and high commutating dv/dt are required.

- Blocking Voltage to 800 Volts
- On-State Current Rating of 15 Amperes RMS at 80°C
- Uniform Gate Trigger Currents in Three Modes
- High Immunity to dv/dt — 500 V/μs minimum at 125°C
- Minimizes Snubber Networks for Protection
- Industry Standard TO-220AB Package
- High Commutating di/dt — 28 A/ms minimum at 125°C

TRIACS
15 AMPERES RMS
400 thru 800
VOLTS



TO-220AB
CASE 221A-04

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

Ratings		Symbol	Value	Unit
Peak Repetitive Off-State Voltage, Note1 (T_J = 25 to 125°C, Half Sine Wave, 50 to 60 Hz, Gate Open)	MACH15D MACH15M MACH15N	V_{DRM}	 400 600 800	Volts
On-State RMS Current (One Full Cycle, 60 Hz, T_C = 80°C)		$I_{T(RMS)}$	15	A
Peak Non-Repetitive Surge Current (One Full Cycle, 60 Hz, T_C = 125°C)		I_{TSM}	150	A
Circuit Fusing Consideration (t = 8.3 ms)		I^2t	93	A^2sec
Peak Gate Power (Pulse Width ≤ 1.0 μs, T_C = 80°C)		P_{GM}	20	Watts
Average Gate Power (t = 8.3 ms, T_C = 80°C)		$P_{G(AV)}$	0.5	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	$R_{\theta JC}$ $R_{\theta JA}$	2.0 62.5	°C/W
Maximum Lead Temperature for Soldering Purposes 1/8″ from Case for 5 Seconds	T_L	260	°C

Note 1: V_{DRM} 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.

This document contains information on a new product. Specifications and information herein are subject to change without notice.

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

Characteristics		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Peak Repetitive Blocking Current (V_D = Rated V_{DRM}, Gate Open)	T_J = 25°C T_J = 125°C	I_{DRM}	— —	— —	0.1 2.0	mA
ON CHARACTERISTICS						
Peak On-State Voltage* (I_{TM} = ±21 A)		V_{TM}	—	—	1.6	Volts
Continuous Gate Trigger Current (V_D = 12 V, R_L = 140 Ω) MT2(+), G(+); MT2(–), G(–)		I_{GT}	—	—	35	mA
Hold Current (V_D = 12 V, Gate Open, Initiating Current = ±150 mA)		I_H	—	—	40	mA
Latch Current (V_D = 24 V, I_G = 50 mA) MT2(+), G(+); MT2(+), G(–); MT2(–), G(–)		I_L	—	—	50	mA
Gate Trigger Voltage (V_D = 12 V, R_L = 12 Ω) MT2(+), G(+); MT2(+), G(–); MT2(–), G(–)		V_{GT}	—	—	1.5	Volts
DYNAMIC CHARACTERISTICS						
Rate of Change of Commutating Current* (V_D = 400 V, I_{TM} = 8.0 A, Commutating dv/dt = 28 V/μs, Gate Open, T_J = 125°C, f = 250 Hz, No Snubber)		$(di/dt)_c$	12	—	—	A/ms
Critical Rate of Rise of Off-State Voltage (V_D = Rated V_{DRM}, Exponential Waveform, Gate Open, T_J = 125°C)		dv/dt	500	—	—	V/μs

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

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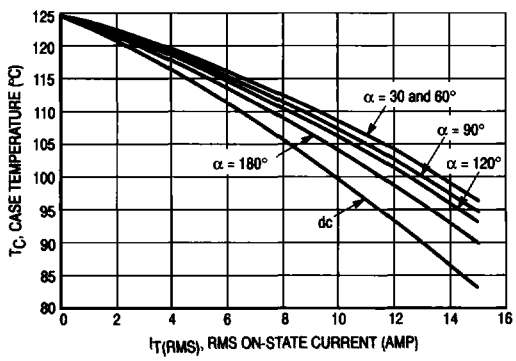

Figure 1. RMS Current Derating

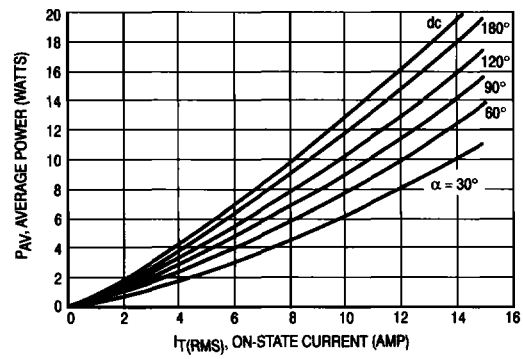

Figure 2. On-State Power Dissipation

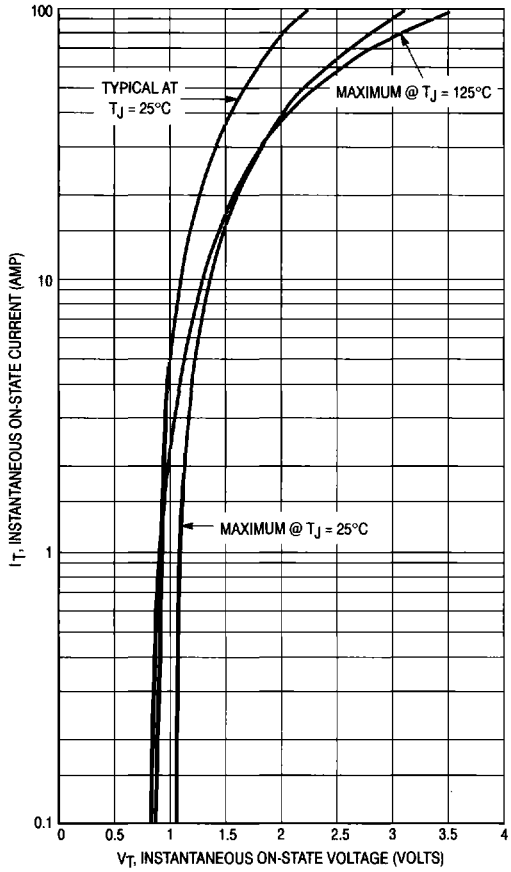

Figure 3. On-State Characteristics

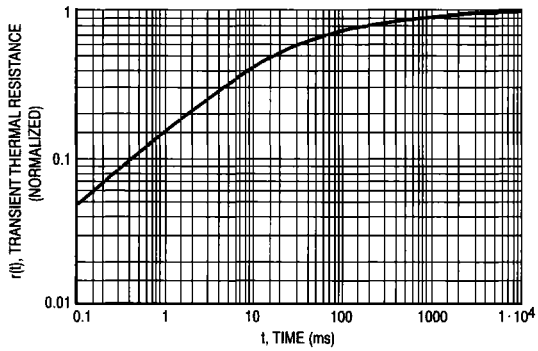

Figure 4. Thermal Response

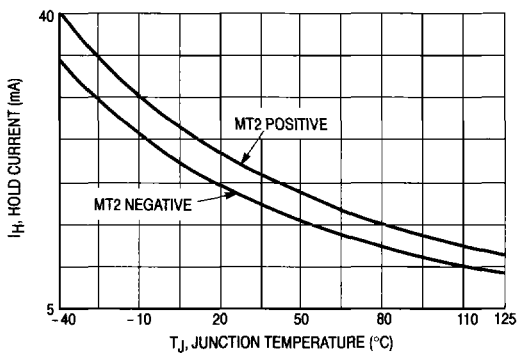

Figure 5. Hold Current Variation

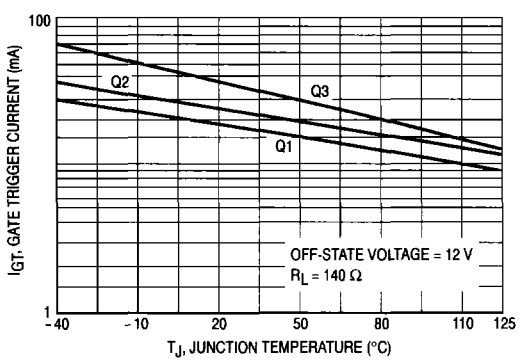

Figure 6. Gate Trigger Current Variation

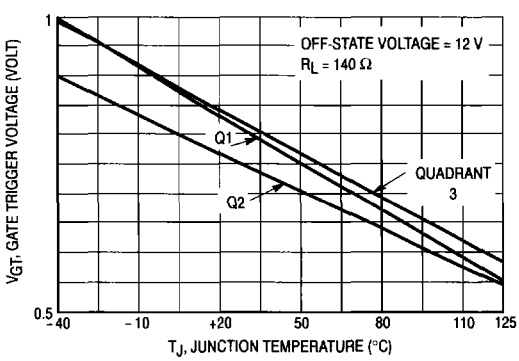

Figure 7. Gate Trigger Voltage Variation

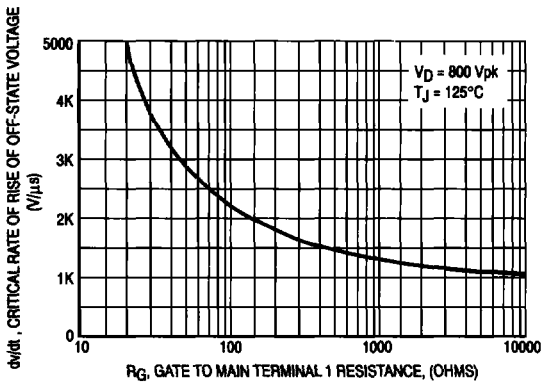

Figure 8. Critical Rate of Rise of Off-State Voltage (Exponential)

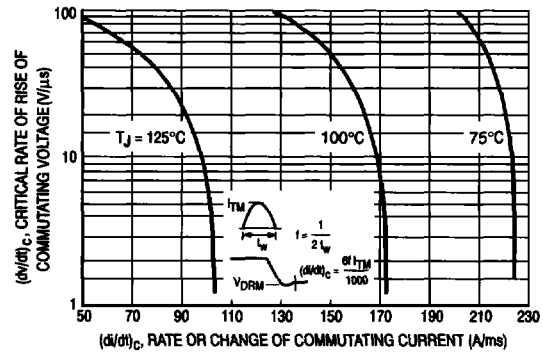

Figure 9. Critical Rate of Rise of Commutating Voltage

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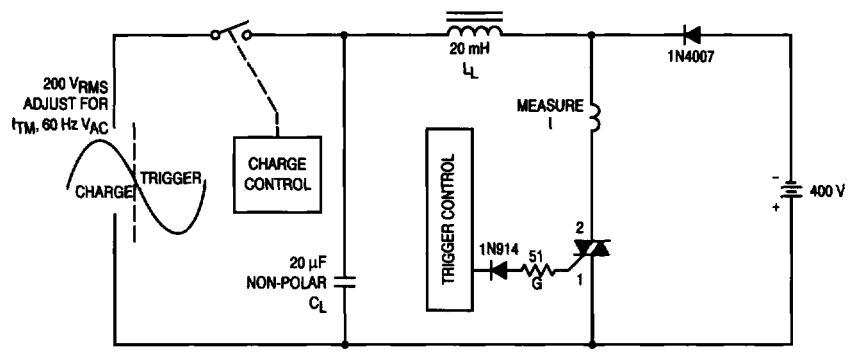

Note: Component values are for verification of rated $(dv/dt)_c$. See AN1048 for additional information.

Figure 10. Simplified Test Circuit to Measure the Critical Rate of Rise of Commutating Voltage