Sensitive Gate TRIACS

Silicon Bidirectional Thyristors

Designed for high volume, low cost, industrial and consumer applications such as motor control; process control; temperature, light and speed control.

- Small Size Surface Mount DPAK Package
- · Passivated Die for Reliability and Uniformity
- · Four-Quadrant Triggering
- · Blocking Voltage to 600 V
- On-State Current Rating of 4.0 Amperes RMS at 93°C
- · Low Level Triggering and Holding Characteristics

ORDERING INFORMATION

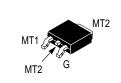
- To Obtain "DPAK" in Surface Mount Leadform (Case 369A)
 Shipped in Sleeves No Suffix, i.e. MAC4DHM
 Shipped in 16 mm Tape and Reel Add "T4" Suffix to Device Number, i.e. MAC4DHMT4
- To Obtain "DPAK" in Straight Lead Version (Case 369) Shipped in Sleeves Add "-1" Suffix to Device Number, i.e. MAC4DHM-1

MAC4DHM MAC4DLM

Motorola Preferred Devices

TRIACS 4.0 AMPERES RMS 600 VOLTS

MT2



CASE 369A-13 STYLE 6

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

Rating		Symbol	Value	Unit
Peak Repetitive Off–State Voltage (1) (T _J = -40 to 110°C, Sine Wave, 50 to 60 Hz, Gate Open)	MAC4DHM MAC4DLM	V _{DRM}	600 600	Volts
On–State RMS Current (Full Cycle Sine Wave, 60 Hz, T _C = 93°C)		I _T (RMS)	4.0	Amps
Peak Non–Repetitive Surge Current (One Full Cycle, 60 Hz, T _J = 110°C)		ITSM	40	
Circuit Fusing Consideration (t = 8.3 msec)		l ² t	6.6	A ² sec
Peak Gate Power (Pulse Width ≤ 10 μsec, T _C = 93°C)		P _{GM}	0.5	Watts
Average Gate Power (t = 8.3 msec, T _C = 93°C)		P _G (AV)	0.1	
Peak Gate Current (Pulse Width ≤ 10 μsec, T _C = 93°C)		I _{GM}	0.2	Amps
Peak Gate Voltage (Pulse Width ≤ 10 μsec, T _C = 93°C)		V _{GM}	5.0	Volts
Operating Junction Temperature Range		TJ	-40 to 110	°C
Storage Temperature Range		T _{stg}	-40 to 150	

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance — Junction to Case — Junction to Ambient — Junction to Ambient (2)	R _Ð JC R _Ð JA R _Ð JA	3.5 88 80	°C/W
Maximum Lead Temperature for Soldering Purposes (3)	TL	260	°C

- (1) VDRM for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the device are exceeded.
- (2) Surface mounted on minimum recommended pad size.
- (3) 1/8" from case for 10 seconds.

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



MAC4DHM MAC4DLM

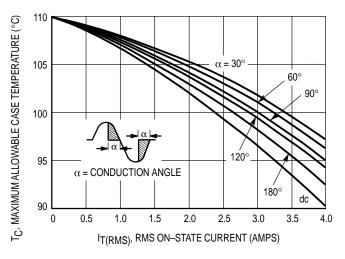
ELECTRICAL CHARACTERISTICS ($T_J = 25^{\circ}C$ unless otherwise noted)

Characteristics	Symbol	Min	Тур	Max	Unit
Peak Repetitive Blocking Current (V_D = Rated V_{DRM} , Gate Open) T_J = 25°C T_J = 110°C	IDRM		_	0.01 2.0	mA
Peak On–State Voltage (1) (I _{TM} = ±6.0 A)	V _{TM}	_	1.3	1.6	Volts
Gate Trigger Current (Continuous dc) (V_D = 12 V, R_L = 100 Ω) MT2(+), G(+) MAC4DLM MT2(+), G(-) MT2(-), G(-) MT2(-), G(+) MT2(+), G(+) MAC4DHM MT2(+), G(-) MT2(-), G(-) MT2(-), G(-)	^I GT	-	1.8 2.1 2.4 4.2 1.8 2.1 2.4 4.2	3.0 3.0 3.0 5.0 5.0 5.0 5.0	mA
Gate Trigger Voltage (Continuous dc) (V_D = 12 V, R_L = 100 Ω) MT2(+), G(+) MT2(+), G(-) MT2(-), G(-) MT2(-), G(+) (V_D = 12 V, R_L = 10 K Ω , T_J = 110°C) MT2(+), G(+); MT2(+), G(-); MT2(-), G(-); MT2(-), G(+)	VGT	0.5 0.5 0.5 0.5	0.62 0.57 0.65 0.74	1.3 1.3 1.3 1.3	Volts
Holding Current ($V_D = 12 \text{ V}$, Gate Open, $I_T = \pm 200 \text{ mA}$)	lн	_	1.5	15	mA
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	ΙL	_ _ _ _	1.75 5.2 2.1 2.2	10 10 10 10	mA

DYNAMIC CHARACTERISTICS

Characteristics	Symbol	Min	Тур	Max	Unit
Rate of Change of Commutating Current (1) (V _D = 200 V, I _{TM} = 1.8 A, Commutating dv/dt = 1.0 V/ μ sec, T _J = 110°C, f = 250 Hz, CL = 5.0 μ fd, LL = 80 mH, RS = 56 Ω , CS = 0.03 μ fd) See Figure 10	di/dt(c)	_	3.0	_	A/ms
Critical Rate of Rise of Off–State Voltage $(V_D = 0.67 \text{ X Rated V}_{DRM}, \text{Exponential Waveform}, \\ \text{Gate Open, T}_J = 110^{\circ}\text{C})$	dv/dt	_	10	_	V/μs

⁽¹⁾ Pulse test: Pulse Width ≤ 2.0 msec, Duty Cycle ≤ 2%.





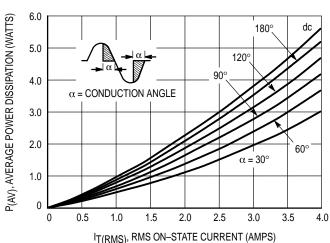


Figure 2. On-State Power Dissipation

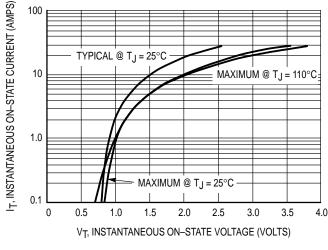


Figure 3. On-State Characteristics

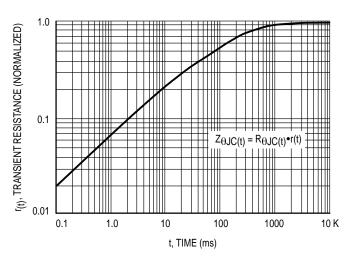


Figure 4. Transient Thermal Response

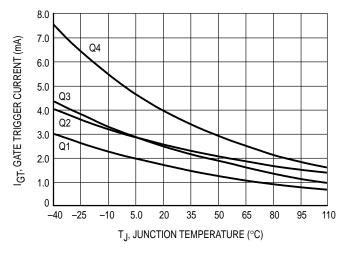


Figure 5. Typical Gate Trigger Current versus
Junction Temperature

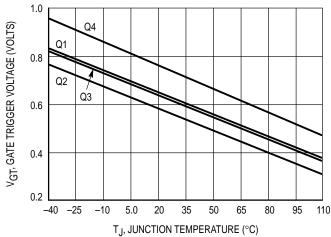


Figure 6. Typical Gate Trigger Voltage versus
Junction Temperature

MAC4DHM MAC4DLM

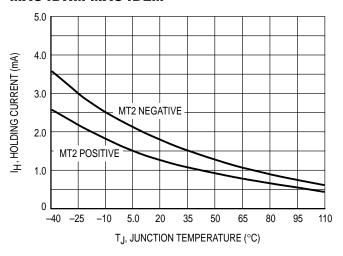


Figure 7. Typical Holding Current versus Junction Temperature

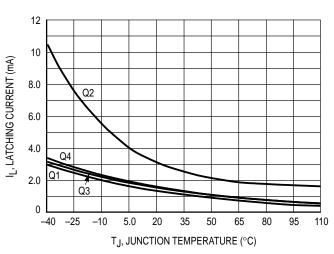


Figure 8. Typical Latching Current versus Junction Temperature

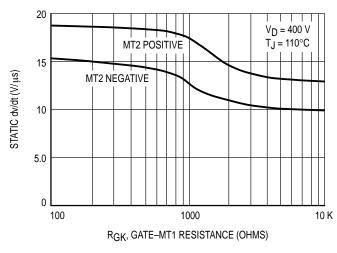


Figure 9. Exponential Static dv/dt versus Gate-MT1 Resistance, MT2(+)

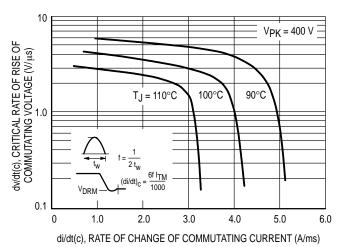
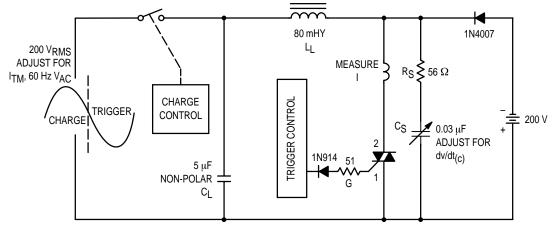


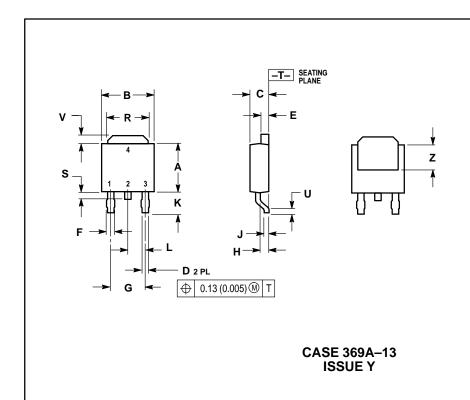
Figure 10. Critical Rate of Rise of Commutating Voltage



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

Figure 11. Simplified Test Circuit to Measure the Critical Rate of Rise of Commutating Voltage

PACKAGE DIMENSIONS



NOTES

- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- 2. CONTROLLING DIMENSION: INCH.

	INCHES		MILLIN	IETERS
DIM	MIN	MAX	MIN	MAX
Α	0.235	0.250	5.97	6.35
В	0.250	0.265	6.35	6.73
С	0.086	0.094	2.19	2.38
D	0.027	0.035	0.69	0.88
Е	0.033	0.040	0.84	1.01
F	0.037	0.047	0.94	1.19
G	0.180 BSC		4.58	BSC
Н	0.034	0.040	0.87	1.01
J	0.018	0.023	0.46	0.58
K	0.102	0.114	2.60	2.89
L	0.090 BSC		2.29 BSC	
R	0.175	0.215	4.45	5.46
S	0.020	0.050	0.51	1.27
U	0.020		0.51	
٧	0.030	0.050	0.77	1.27
Z	0.138		3.51	

STYLE 6:

PIN 1. MT1

2. MT2

GATE
 MT2

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How to reach us

USA/EUROPE/Locations Not Listed: Motorola Literature Distribution; P.O. Box 5405, Denver, Colorado 80217. 303–675–2140 or 1–800–441–2447

Mfax™: RMFAX0@email.sps.mot.com – TOUCHTONE 602–244–6609 – US & Canada ONLY 1–800–774–1848

JAPAN: Nippon Motorola Ltd.: SPD, Strategic Planning Office, 4–32–1, Nishi-Gotanda, Shinagawa-ku, Tokyo 141, Japan. 81–3–5487–8488

TOUCHTONE 602–244–6609
 ASIA/PACIFIC: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
 US & Canada ONLY 1–800–774–1848
 51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852–26629298

INTERNET: http://motorola.com/sps



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