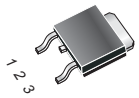
MAC4DCM

Three quadrant triacs

HAOPIN MICROELECTRONICS CO.,LTD.

Description

Passivated high commutation triacs in a plastic envelope intended for use in circuits where high static and dynamic dV/dt and high dI/dt can occur. These devices will commutate the full rated ms current at the maximum rated junction temperature without the aid of a snubber.

Symbol	Simplified outline
	 TO-252

Pin	Description
1	Main terminal 1 (T1)
2	Main terminal 2 (T2)
3	gate (G)
TAB	Main teminal 2(T2)

Applications:

- Motor control
- Industrial and domestic lighting
- Heating
- Static switching

Features

- Blocking voltage to 600 V
- On-state RMS current to 4 A

SYMBOL	PARAMETER	Value	Unit
V_{DRM}	Repetitive peak off-state voltages	600	V
$I_{T(RMS)}$	RMS on-state current （full sine wave）	4	A
I_{TSM}	Non-repetitive peak on-state current (full cycle,Tj =125℃)	40	A

SYMBOL	PARAMETER	MIN	TYP	MAX	UNIT
$R_{\theta jc}$	Thermal Resistance - Junction-to-case	-	3.5	-	℃/W
$R_{\theta ja}$	Thermal resistance - Junction to ambient	-	88	-	℃/W

Limiting values in accordance with the Maximum system(IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
V_{DRM}	Repetitive peak off-state Voltages	Tj=-40 to 125℃,sine wave, 50 to 60 Hz,Gate open	-	600	V
$I_{T(RMS)}$	RMS on-state current Full sine wave 60 Hz	Tc=110℃	-	4	A
I^2t	Circuit fusing consideration	t=8.3ms	-	6.6	A^2s
I_{GM}	Peak gate current	Pulse width≤10μs Tc=108℃	-	0.5	A
V_{GM}	Peak gate voltage	Pulse width≤10μs Tc=108℃	-	5	V
P_{GM}	Peak gate power	Pulse width≤10μs Tc=108℃	-	0.5	W
$P_{G(AV)}$	Average gate power	t=8.3ms Tc=108℃	-	0.1	W
T_{stg}	Storage temperature		-40	150	℃
T_j	Operating junction Temperature range		-40	125	℃

T_J=25°C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNIT
Static characteristics							
I_{GT}	Gate trigger current	V_D=12V;R_L=100Ω	MT2(+),G(+) MT2(+),G(-) MT2(-),G(-)	8 8 8	12 18 22	35 35 35	mA
V_{GT}	Gate trigger voltage	V_D=12V;R_L=100Ω	MT2(+),G(+) MT2(+),G(-) MT2(-),G(-)	0.5 0.5 0.5	0.8 0.8 0.8	1.3 1.3 1.3	V
I_L	Latching current	V_D=12V,I_G=35 mA	MT2(+),G(+) MT2(+),G(-) MT2(-),G(-)	-	30 50 20	60 80 60	mA
I_{DRM} I_{RRM}	V_{DRM}=V_{RRM}	Tj=25℃ Tj=125℃		-	-	0.01 2.0	mA
I_H	Holding current	V_D=12V,gote open,Initiating current=±200mA		6	22	35	mA
V_{TM}	Peak on-state voltage	I_{TM}=±6.0A		-	1.3	1.6	V
V_{GD}	Gate non-trigger voltage	V_D=12V;R_L=100Ω	Tj=125℃	0.2	0.4	-	V

Dynamic Characteristics

D_V/dt	Critical rate of rise of Off-state voltage	V_D=67% V_{DRM} gate open;Tj=125℃;	500	1700	-	V/μs
(dI/dt)c	Rate of change of commutating current	V_D=400V, I_{TM}=4.0A dv/dt=18V/μs Tj=125℃	6.0	8.4	-	A/ms

Description

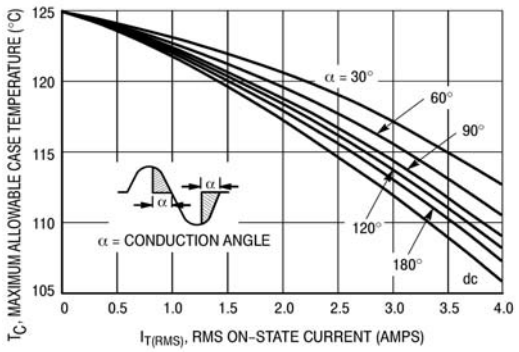


Figure 1. RMS Current Derating

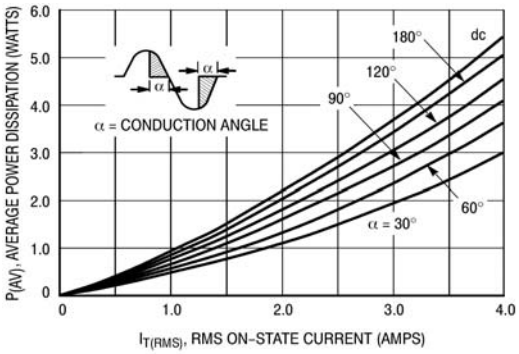


Figure 2. On−State Power Dissipation

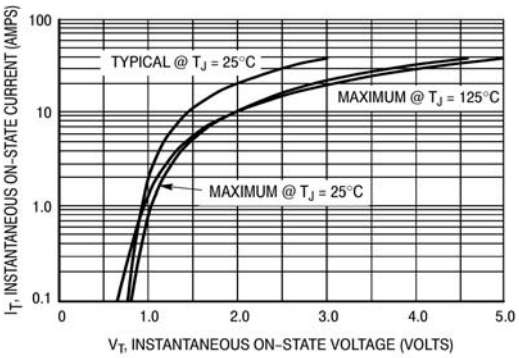


Figure 3. On−State Characteristics

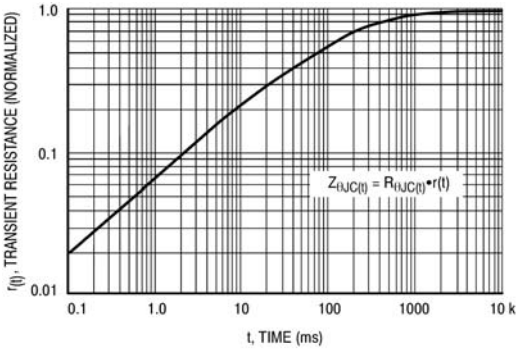


Figure 4. Transient Thermal Response

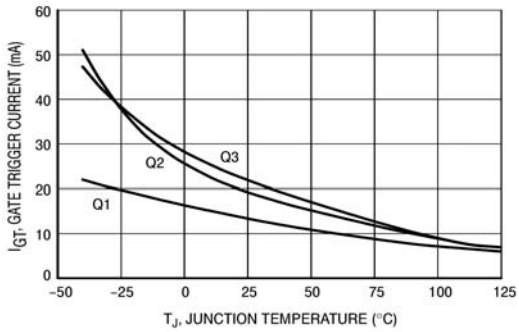


Figure 5. Typical Gate Trigger Current versus Junction Temperature

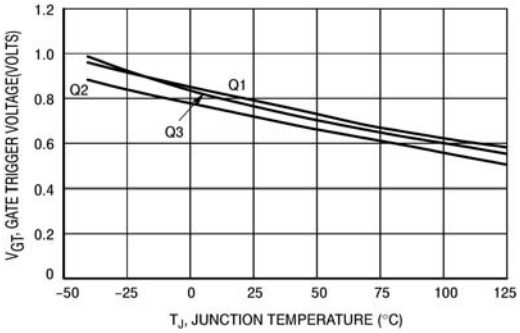


Figure 6. Typical Gate Trigger Voltage versus Junction Temperature

Description

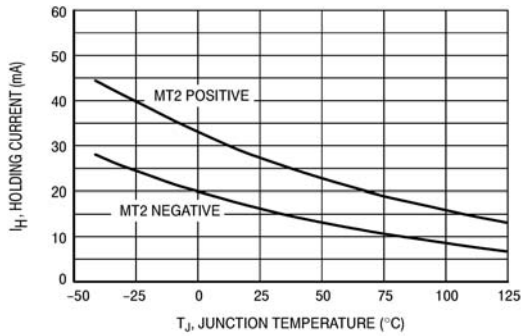


Figure 7. Typical Holding Current versus Junction Temperature

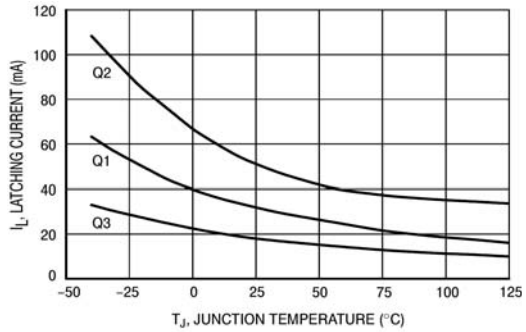


Figure 8. Typical Latching Current versus Junction Temperature

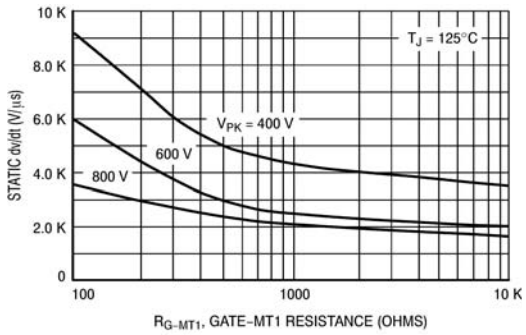


Figure 9. Exponential Static dv/dt versus Gate−MT1 Resistance, MT2(+)

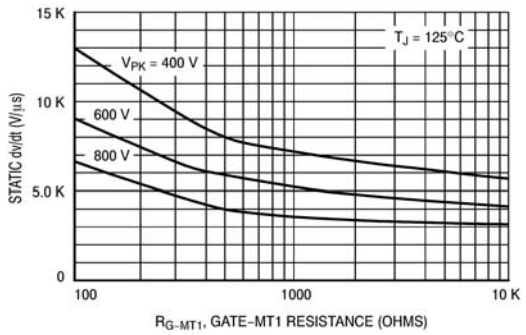


Figure 10. Exponential Static dv/dt versus Gate−MT1 Resistance, MT2(−)

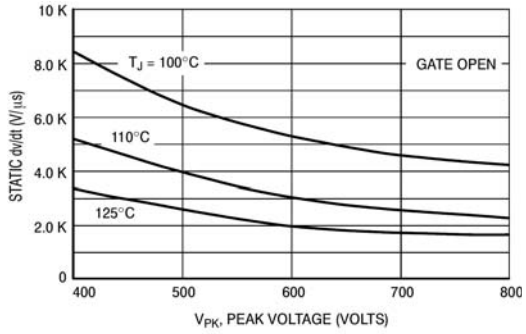


Figure 11. Exponential Static dv/dt versus Peak Voltage, MT2(+)

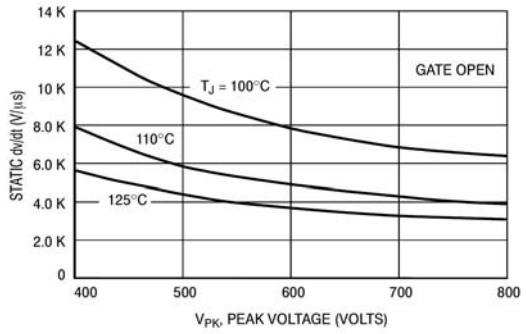


Figure 12. Exponential Static dv/dt versus Peak Voltage, MT2(−)

Description

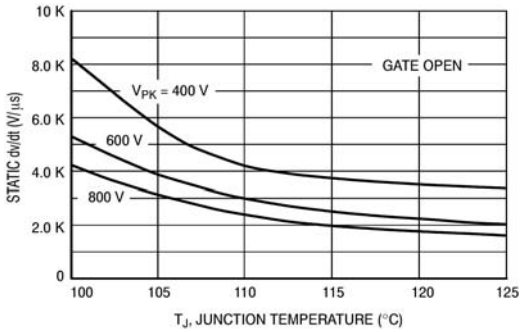


Figure 13. Typical Exponential Static dv/dt versus Junction Temperature, MT2(+)

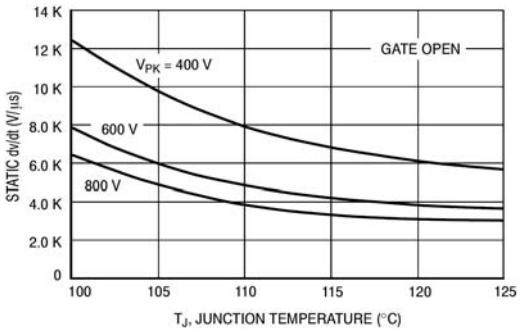


Figure 14. Typical Exponential Static dv/dt versus Junction Temperature, MT2(−)

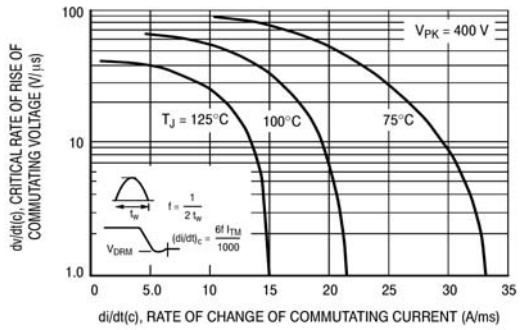
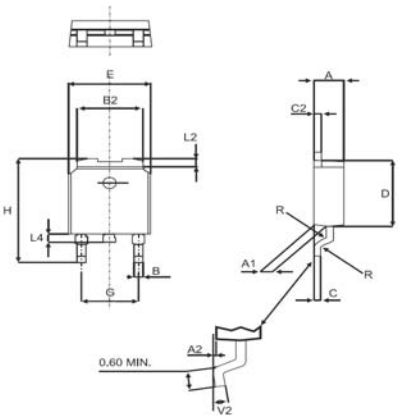


Figure 15. Critical Rate of Rise of Commutating Voltage

MECHANICAL DATA

Dimensions in mm
Net Mass: 0.4 g
TO-252



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max	Min.	Max.
A	2.20	2.40	0.086	0.094
A1	0.90	1.10	0.035	0.043
A2	0.03	0.23	0.001	0.009
B	0.64	0.90	0.025	0.035
B2	5.20	5.40	0.204	0.212
C	0.45	0.60	0.017	0.023
C2	0.48	0.60	0.018	0.023
D	6.00	6.20	0.236	0.244
E	6.40	6.60	0.251	0.259
G	4.40	4.60	0.173	0.181
H	9.35	10.10	0.368	0.397
L2	0.80 typ.		0.031 typ.	
L4	0.60	1.00	0.023	0.039
R	0.2 typ.		0.007 typ.	
V2	0°	8°	0°	8°