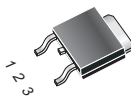# MAC4DCN

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
T2 —◁— T1 G	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 800 V
◆ On-state RMS current to 4 A

SYMBOL	PARAMETER	Value	Unit
V_{DRM}	Repetitive peak off-state voltages	800	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 θ jc	Thermal Resistance - Junction-to-case	-	3.5	-	℃/W
R θ ja	Thermal resistance - Junction to ambient	-	88	-	℃/W

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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	-	800	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	℃

$T_J=25^oC$ 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

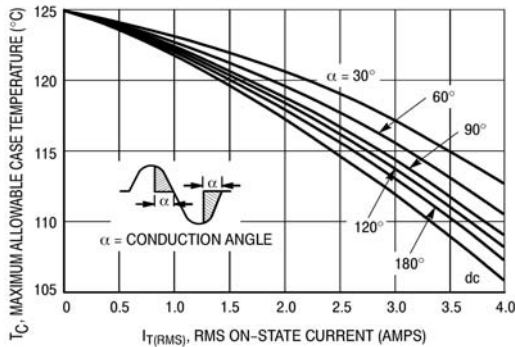**HAOPIN MICROELECTRONICS CO.,LTD.**

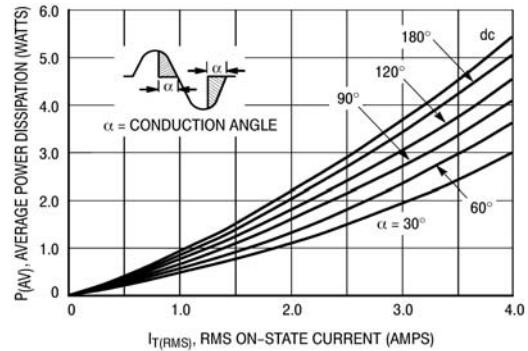## Description

Figure 1. RMS Current Derating

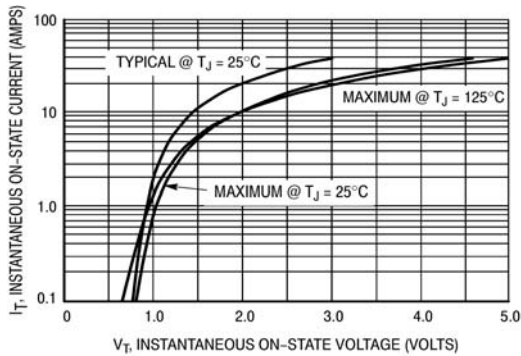Figure 2. On-State Power Dissipation

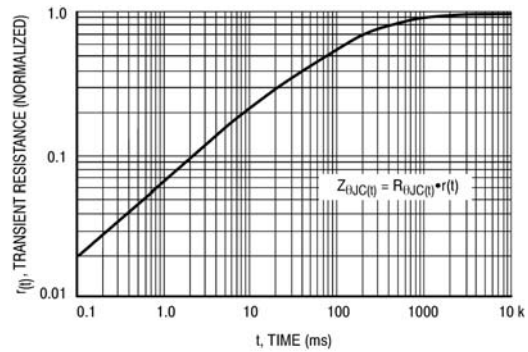Figure 3. On-State Characteristics
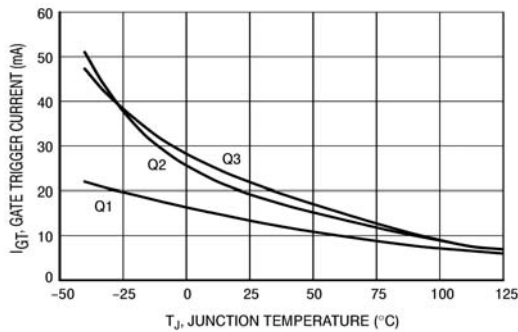

Figure 4. Transient Thermal Response

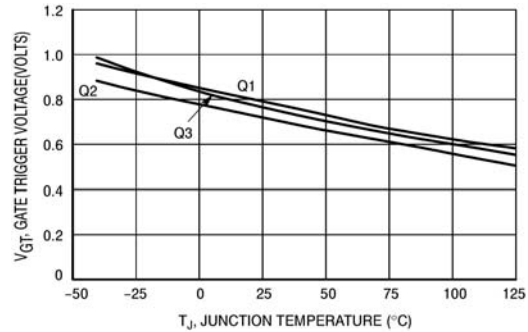Figure 5. Typical Gate Trigger Current versus Junction Temperature

Figure 6. Typical Gate Trigger Voltage versus Junction Temperature

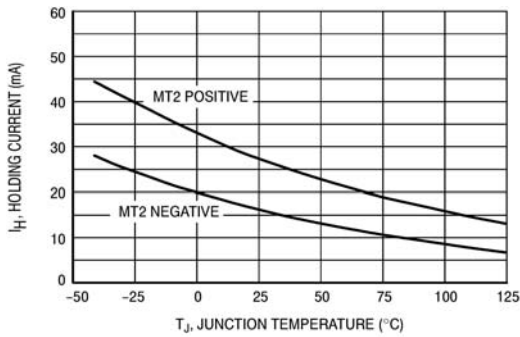**HAOPIN MICROELECTRONICS CO.,LTD.**

Description

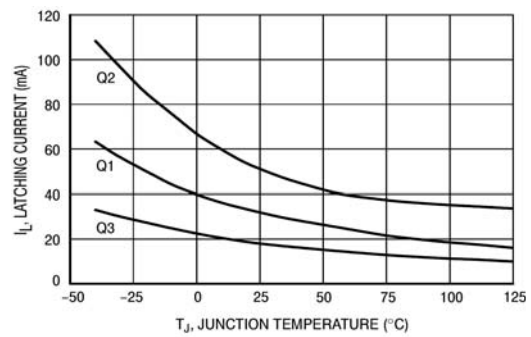Figure 7. Typical Holding Current versus Junction Temperature

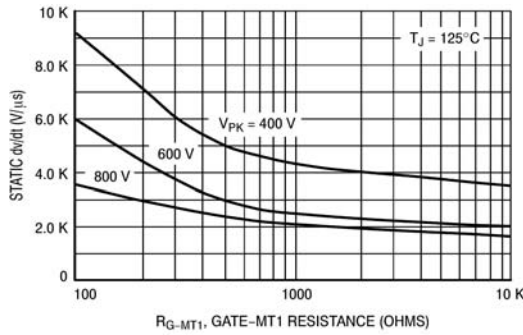Figure 8. Typical Latching Current versus Junction Temperature

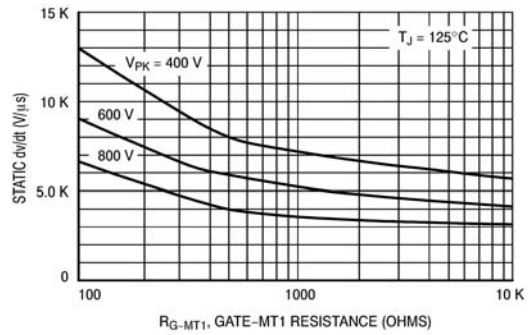Figure 9. Exponential Static dv/dt versus Gate−MT1 Resistance, MT2(+)

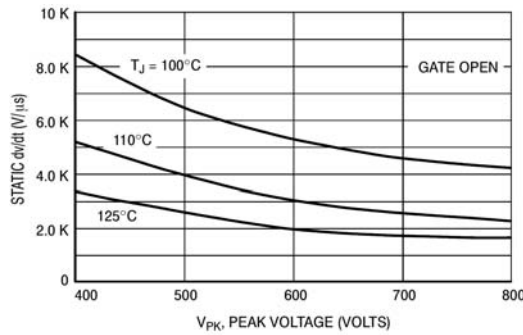Figure 10. Exponential Static dv/dt versus Gate−MT1 Resistance, MT2(−)

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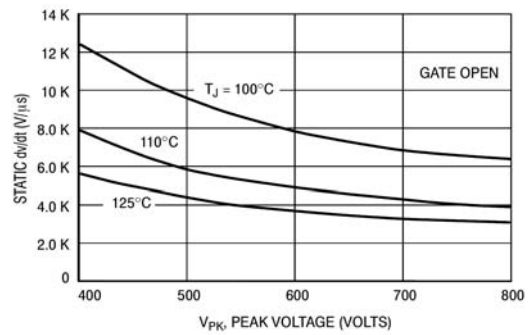

Figure 12. Exponential Static dv/dt versus Peak Voltage, MT2(−)

MAC4DCN

Three quadrant triacs

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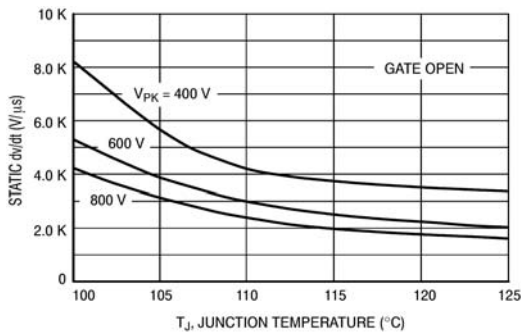
Description

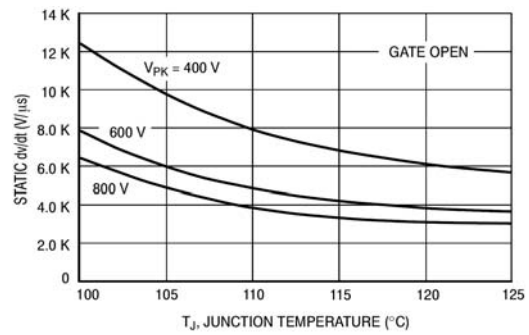Figure 13. Typical Exponential Static dv/dt versus Junction Temperature, MT2(+)

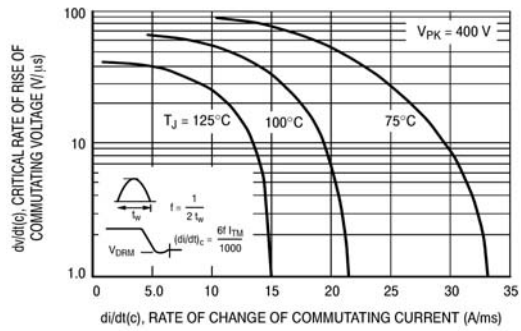Figure 14. Typical Exponential Static dv/dt versus Junction Temperature, MT2(−)

Figure 15. Critical Rate of Rise of Commutating Voltage

HPM™

HAOPIN MICROELECTRONICS CO.,LTD.

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°