中国中车 CRRC

TMTC,TMTD 1000

Ver：2021A

Thyristor,Diode Modules

Key Parameters

V_{RRM}	1200~1400	V
$I_{T(AV)}$	1000	A
I_{TSM}	29	kA
V_{TO}	0.89	V
r_T	0.095	mΩ

Applications

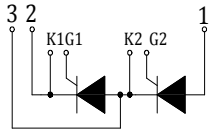
- Various rectifiers
- DC supply for PWM inverter
- Industry converter

- 3000 V_{RMS} isolating voltage with baseplate
- High power capability
- Industrial standard package

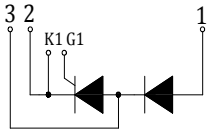
Voltage Ratings

Module Type	V_{DRM}/V_{RRM}(V)	Test Conditions
TMTC(TD) 1000	1200 1400	Tvj = 25，125 °C $I_{DRM} = I_{RRM} \leq$ 100 mA $V_{DM} = V_{DRM}$ $V_{RM} = V_{RRM}$ t_p = 10 ms $V_{DSM} = V_{DRM}$ $V_{RSM} = V_{RRM}$ + 100

TC



TD



Thermal & Mechanical Data

Symb.	Parameter	Test Conditions	Min	Type	Max	Unit
$R_{th(j-c)}$	Thermal Resistance junction to case	sine.180°,per chip sine.180°,per module	-	-	0.04 0.02	°C / W
$R_{th(c-h)}$	Thermal resistance Case to heatsink,whole Module	Mounting surface smooth flat and greased per module	-	-	0.016	°C / W
T_{vj}	Maximum junction temperature		-40	-	125	°C
T_{stg}	Storage temperature		-40	-	100	°C
F	Busbar to module M12	Mounting torque ± 10 %	-	18	-	N·m
	Module to heatsink M8		-	9	-	N·m
W	Weight		-	3.3	-	kg

Current Ratings

Symb.	Parameter	Test Conditions	Min	Type	Max	Unit
$I_{T(AV)}$	Mean on-state current	Half Sine Wave,T_C=80°C	-	-	1000	A
		Half Sine Wave,T_C=85°C			907	A
$I_{T(RMS)}$	RMS on-state current	T_C = 80°C	-	-	1570	A
I_{TSM}	Surge on-state current	t_p=10ms, Half Sine Wave, T_{vj}=25°C, V_R = 0	-	-	29.0	kA
I^2t	Limiting load integral	Sine Wave,t_p=10ms	-	-	421	10^4A^2s

Characteristics

Symb.	Parameter	Test Conditions	Min	Type	Max	Unit
V_{TM}	Peak on-state voltage	T_{vj} = 25 °C， I_{TM} = 3000A	-	-	1.3	V
		T_{vj} = 25 °C， I_{TM} = 1500 A	-	-	1.18	V
I_{DRM}	Forward leakage current	T_{vj} = 25 °C，125 °C， V_{DRM}/V_{RRM}	-	-	100	mA
I_{RRM}	Reverse leakage current					
V_{isol}	Isolation voltage	a.c.; 50 Hz; r.m.s. ; t=1min	-	3000	-	V
		a.c.; 50 Hz; r.m.s. ; t=1s	-	3600	-	V
V_{TO}	Threshold voltage	T_{vj} = 125 °C	-	-	0.89	V
r_T	Slope resistance	T_{vj} = 125 °C	-	-	0.095	mΩ
I_H	Holding current	T_{vj} = 25 °C	-	-	200	mA
I_L	Latching current	T_{vj} = 25 °C	-	-	1000	mA

Dynamic Parameters

Symb.	Parameter	Test Conditions	Min	Type	Max	Unit
dv/dt	Critical rate of rise of off-state voltage	T_{vj} = 125 ℃， Exp. to 0.67 V_{DRM}	1000	-	-	V/μs
di/dt	Critical rate of rise of on-state current	T_{vj} = 125 °C， V_{DM} = 0.67 V_{DRM}， f = 50 Hz I_{TM} = 2000 A， I_{FG} = 2 A， t_r = 0.5 μs	-	-	200	A/μs
t_q	Turn-off time	T_{vj} = 125 °C， V_{DM} = 0.67 V_{DRM}， I_T = 2000 A dv/dt = 20 V /μs， V_R = 200 V，-di/dt = 10 A/μs	-	250	-	μs
Q_{rr}	Reverse Recovery Charge	T_{vj} = 125 °C，-di/dt = 10 A/μs， I_T = 2000 A， V_R = 200 V	-	3000	-	μC

Gate Parameters

Symb.	Parameter	Test Conditions	Min	Type	Max	Unit
I_{GT}	Gate trigger current	T_{vj} = 25 ℃	200	-	-	mA
V_{GT}	Gate trigger voltage	T_{vj} = 25 ℃	3	-	-	V
V_{GD}	Gate non-trigger voltage	T_{vj} = 125 ℃， V_D = 0.4V_{DRM}	0.3	-	-	V
V_{FGM}	Peak forward gate voltage		-	-	12	V
V_{RGM}	Peak reverse gate voltage		-	-	5	V
P_{GM}	Gate peak power losses		-	-	20	W
$P_{G(AV)}$	Gate average power losses		-	-	4	W

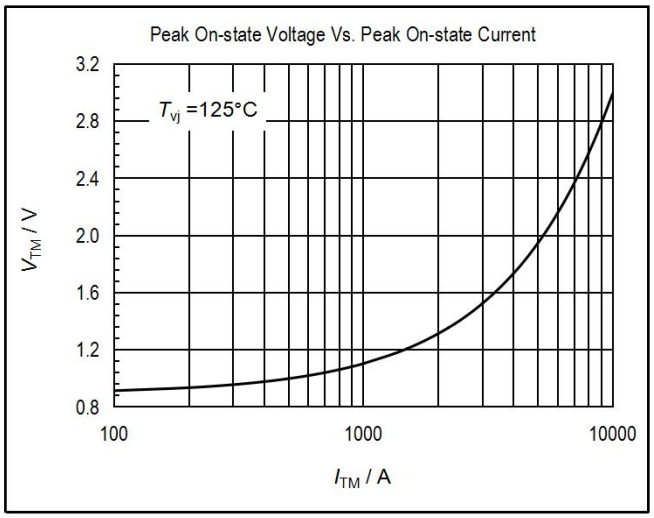


Fig1. Peak on-state Voltage Vs. Peak On-state Current

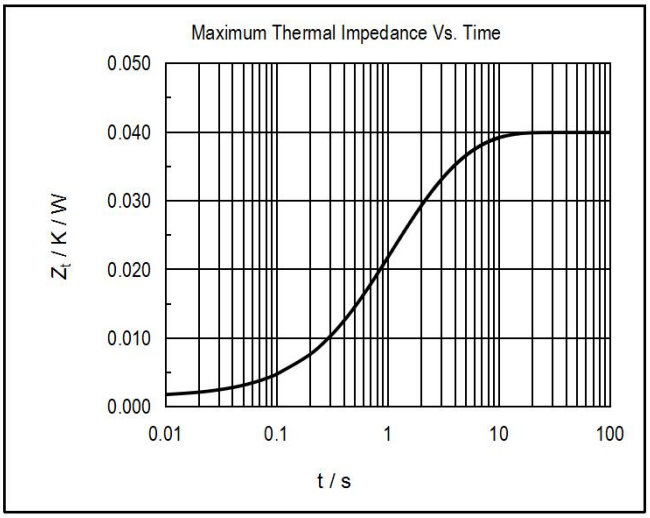


Fig2. Transinent thermal Impedance Vs. Time

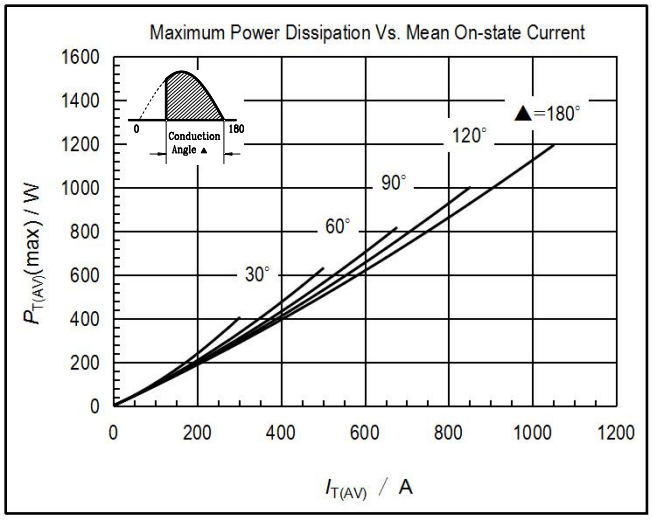


Fig3. Maximum Power Dissipation Vs. Mean On-state Current

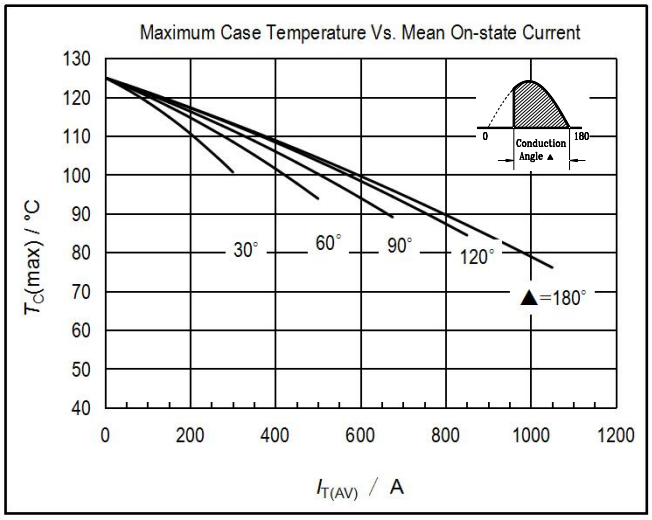


Fig4. Maximum Case Temperature Vs. Mean On-state Current

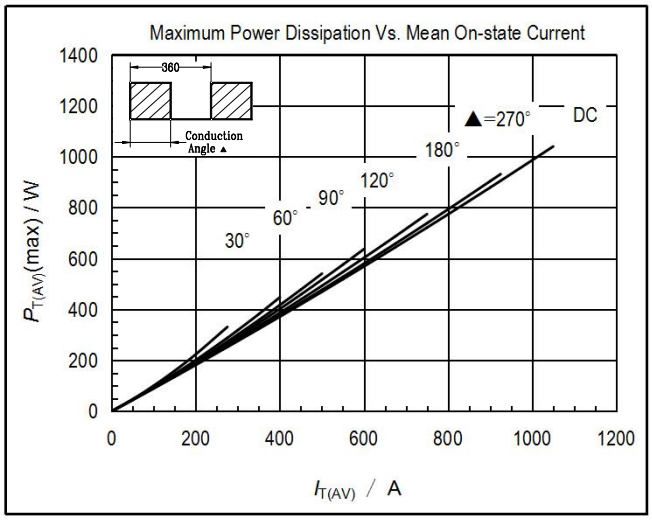


Fig5. Maximum Power Dissipation Vs. Mean On-state Current

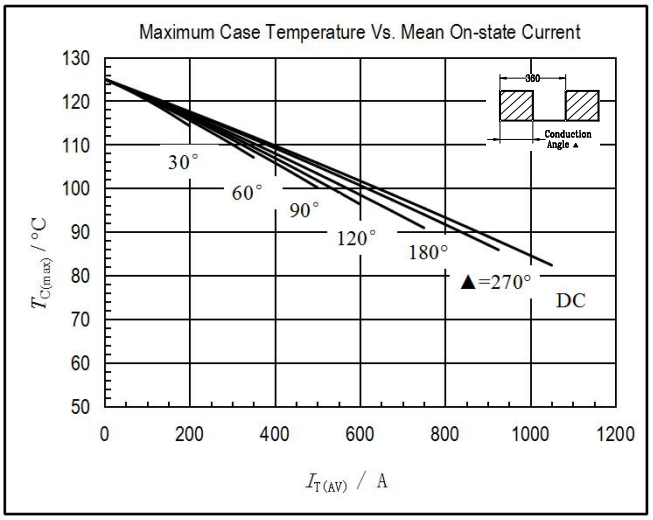
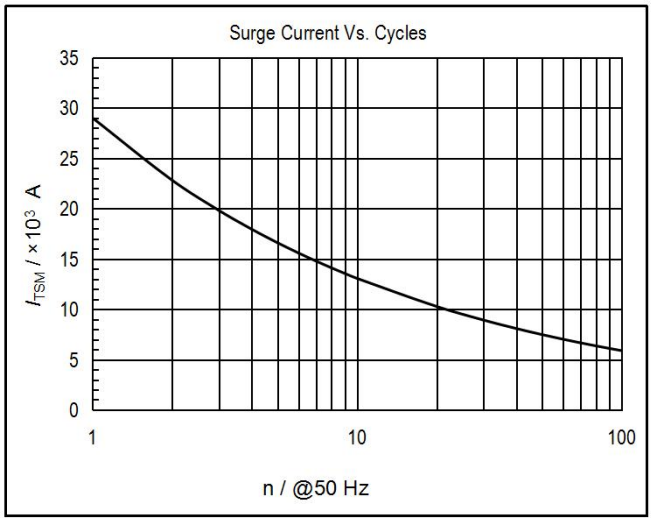
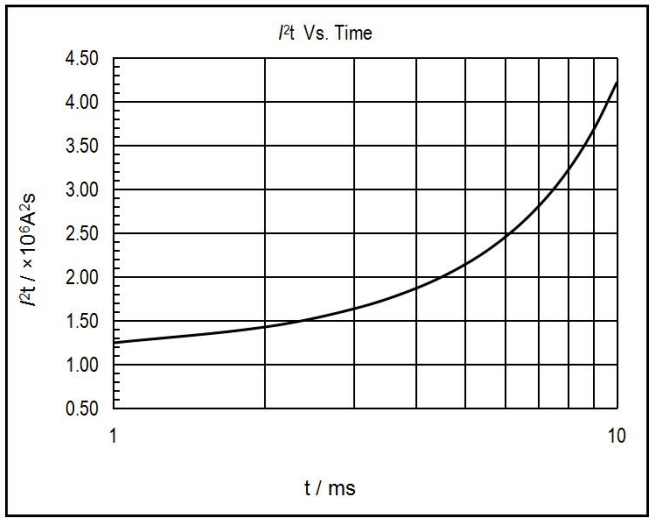


Fig6. Maximum Case Temperature Vs. Mean On-state Current





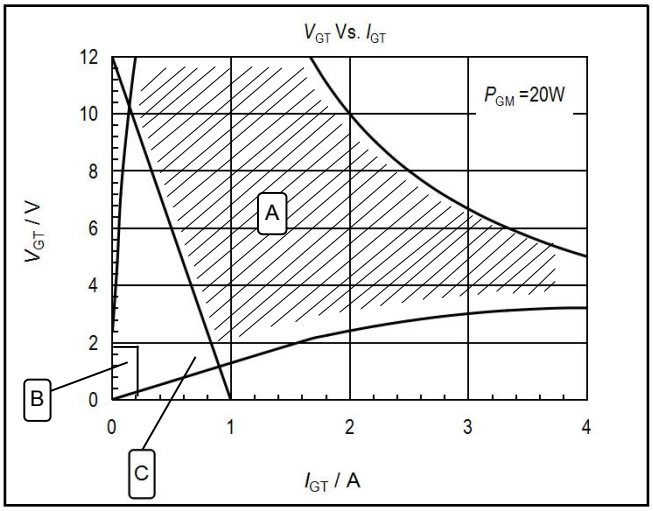


Fig9. V_{GT} Vs. I_{GT}

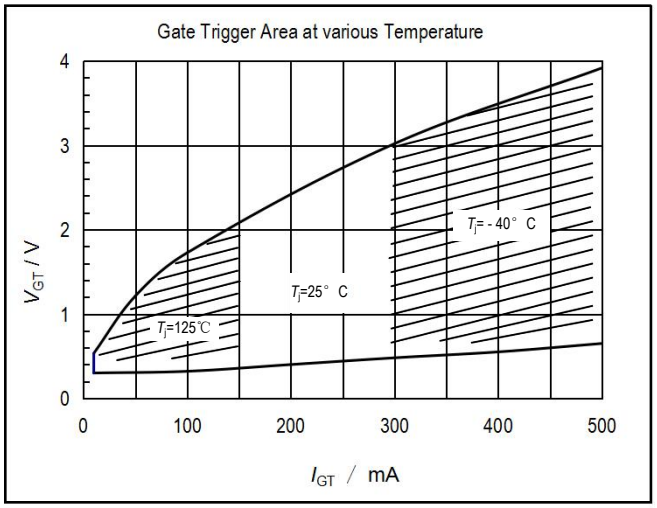


Fig10. Gate Trigger Area at various Temperature

A 为可靠触发区.
B 为不可靠触发区.
C 为建议采用的门极负载线.

A is Recommended Triggering Area.
B is Unreliable Triggering Area.
C is Recommended Gate Load Line.

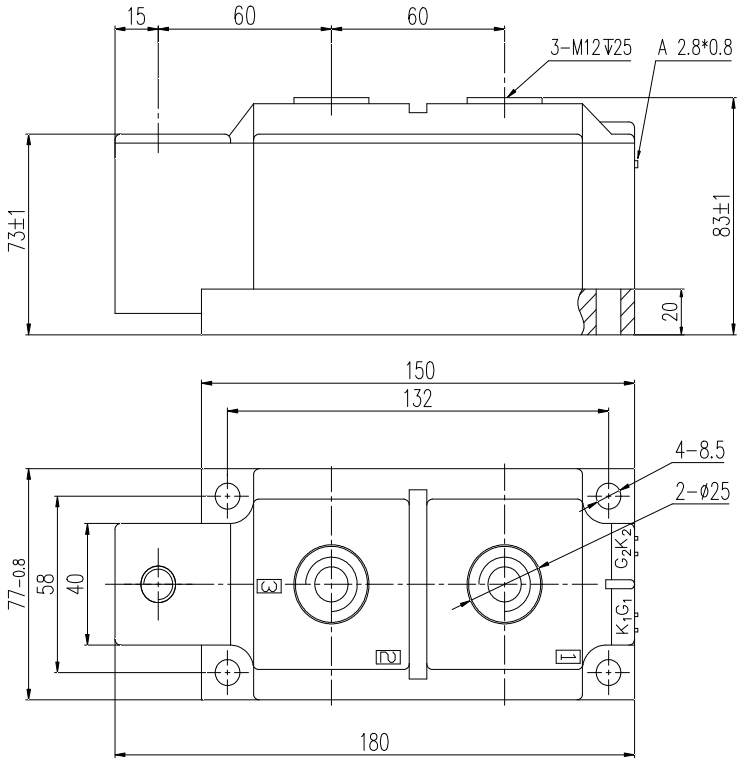


Fig9.Outline

株洲中车时代半导体有限公司
ZHUZHOU CRRC TIMES SEMICONDUCTOR Co., LTD.

Address	Tianxin，ZhuZhou City，Hunan Province，China
Zipcode	412001
Telephone	0731 - 28498268，28498124
Fax	0731 - 28498851，28498494
Email	sbu@crrczic.cc
Web Site	www.sbu.crrczic.cc