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Key Parameters

V_{DRM}	1200~1800	V
$I_{T(AV)}$	2520	A
I_{TSM}	45	kA
V_{TO}	0.91	V
r_T	0.12	mΩ

Voltage Ratings

Device Type	V_{DRM}/V_{RRM}(V)	Test Conditions
T811 2500	1200	T_{vj} = 125 °C
T811 2500	1400	I_{DRM} = 250 mA
T811 2500	1600	I_{RRM} = 250 mA
T811 2500	1800	
		$V_{DM}=V_{DRM}$, $V_{RM}=V_{RRM}$
		t_p = 10 ms
		$V_{DSM}=V_{DRM}$
		$V_{RSM}=V_{RRM}+100$

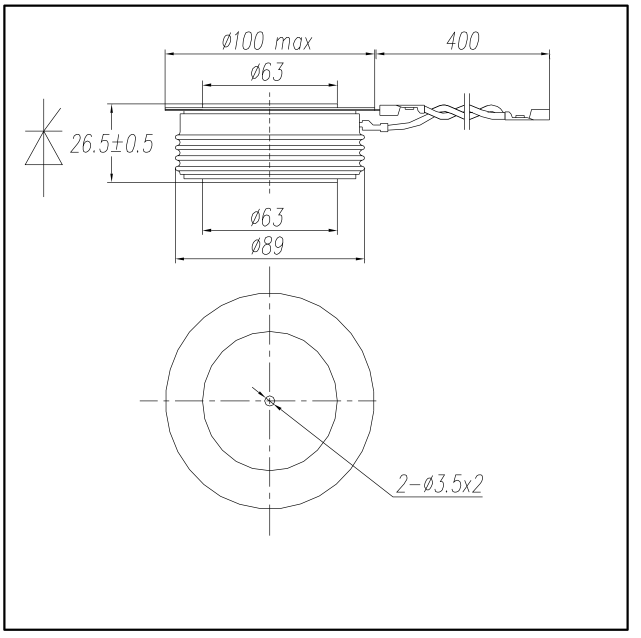
Applications

- Traction drive
- Motor drive
- Industry converter

Features

- Double-side cooling
- High power capability
- Low loss

Outline



Thermal & Mechanical Data

Symb.	Parameter	Min	Type	Max	Unit
R_{jc}	Thermal Resistance Junction to Case	-	-	0.0125	K / W
R_{cs}	Thermal Resistance Case ro Heatsink	-	-	0.004	K / W
T_{vj}	Junction Temperature	-40	-	125	°C
T_{stg}	Storage Temperature	-40	-	150	°C
F	Mounting Force	-	45	-	kN
m	Weight	-	1	-	kg

Current Ratings

Symb.	Parameter	Test Conditions		Min	Type	Max	Unit
$I_{T(AV)}$	Mean On-State Current	Half Sine Wave	T_C=70 °C	-	-	2520	A
			T_C=85 °C	-	-	2020	A
$I_{T(RMS)}$	RMS On-State Current	T_C =70 °C		-	-	3956	A
I_{TSM}	Surge (non-repetitive) On-State Current	10ms, T_{vj} =125 °C	V_R = 0	-	-	45	kA
I^2t	Limiting load integral	Sine Wave, 10ms		-	-	1010	10^4A^2s

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Characteristics

Symb.	Parameter	Test Conditions	Min	Type	Max	Unit
V_{TM}	Peak on-state voltage	T_{vj} = 125 °C, I_{TM} = 3000 A	-	-	1.27	V
I_{DRM}	Forward leakage current	T_{vj} = 125 °C, V_{DRM}	-	-	250	mA
I_{RRM}	Reverse leakage current	T_{vj} = 125 °C, V_{RRM}	-	-	250	mA
V_{TO}	Threshold voltage	T_{vj} = 125 °C	-	-	0.91	V
r_T	Slope resistance	T_{vj} = 125 °C	-	-	0.12	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 °C, 0.67V_{DRM}		1000	-	-	V/μs
di/dt	Critical rate of rise of on-state current	T_{vj} =125°C, V_{DM} =0.5V_{DRM}, I_{TM} =4000A I_{FG} = 2 A, t_r = 0.5 μs	f = 1 Hz	-	-	1000	A/μs
			f = 50 Hz	-	-	200	
t_d	Delay time	T_{vj} = 25 °C, V_{DM} = 0.67V_{DRM}, I_{TM} = 2400 A I_{FG} = 2 A, t_r = 0.5 μs, di_T/dt = 60 A/μs		-	-	1.5	μs
t_{on}	Turn-on time			-	-	2.5	
t_q	Turn-off time	T_{vj}=125°C, V_{DM}=0.67V_{DRM}, dv_D/dt=20V/μs, V_R=50V di_T/dt = -10 A/μs, I_T = 4000 A		-	300	-	μs
Q_{rr}	Recovery Charge	T_{vj} = 125°C, di_T/dt = -10A/μs, V_R = 50V, I_T = 4000A		-	2500	-	μC
Q_{ra}	Recovery Charge, 50% chord			-	1760	-	μC
I_{rr}	Reverse recovery current			-	155	-	A
t_{rr}	Reverse recovery time			-	23	-	μs

Gate Parameters

Symb.	Parameter	Test Conditions	Min	Type	Max	Unit
I_{GT}	Gate trigger current	T_{vj} = 25 °C	-	-	300	mA
V_{GT}	Gate trigger voltage	T_{vj} = 25 °C	-	-	3	V
V_{GD}	Gate non-trigger voltage	T_{vj} = 125 °C, V_D = 0.4V_{DRM}	0.3	-	-	V
V_{FGM}	Peak forward gate voltage		-	-	12	V
V_{RGM}	Peak reverse gate voltage		-	-	5	V
I_{FGM}	Peak forward gate current		-	-	4	A
P_{GM}	Gate power losses		-	-	20	W
$P_{G(AV)}$	Gate power losses (mean)		-	-	4	W

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Max. on-state characteristic model

$$V_T = A + B \cdot \ln(I_T) + C \cdot I_T + D \cdot \sqrt{I_T}$$

	25 °C	125 °C
A	1.04396687	0.846189547
B	-0.048977391	-0.041135347
C	2.24134×10^{-5}	3.48837×10^{-5}
D	0.010423599	0.011840009

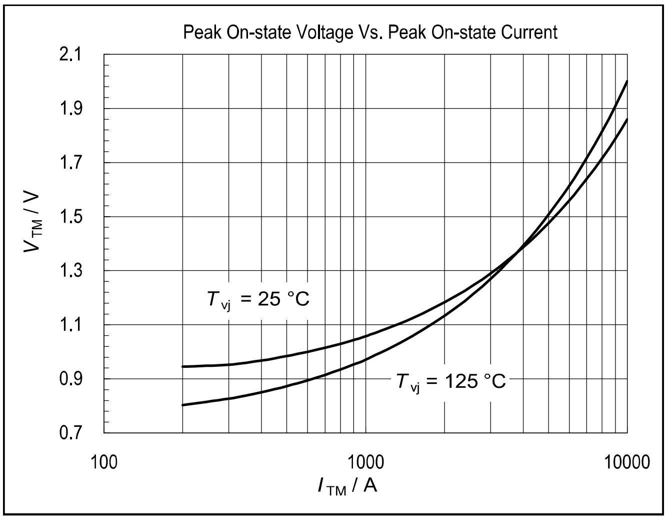

Fig1. Peak On-state Voltage Vs. Peak On-state Current

Transient thermal impedance function (double side cooled)

$$R_{jc}(t) = \sum_{i=1}^{n} R_{thi} \cdot \left(1 - e^{-\frac{t}{\tau_i}}\right)$$

i	1	2	3	4
R_{thi} (K/kW)	7.12	3.26	1.27	0.85
τ_i (s)	1.82	0.346	0.085	0.012

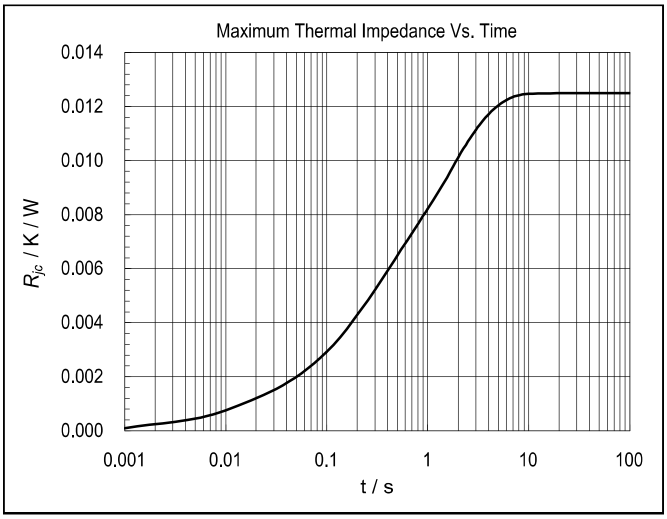

Fig2. Maximum Thermal Impedance Vs. Time

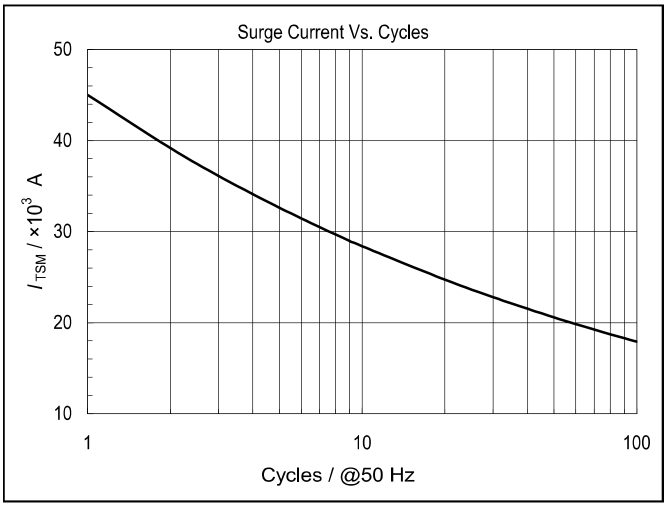

Fig3. Surge Current Vs. Cycles

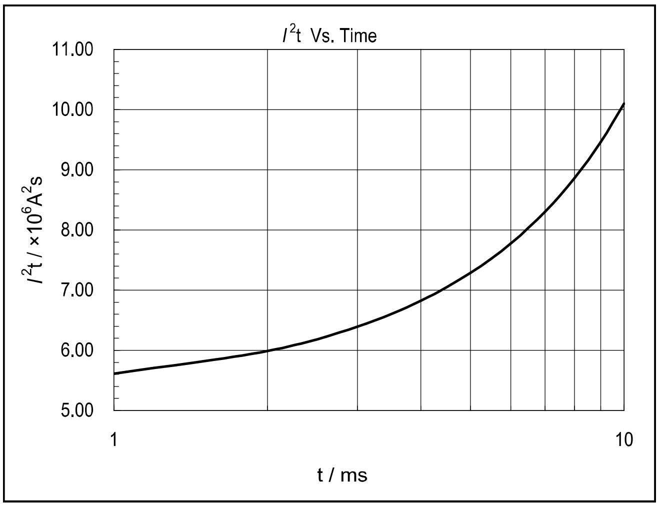

Fig4. I^2t Vs. Time

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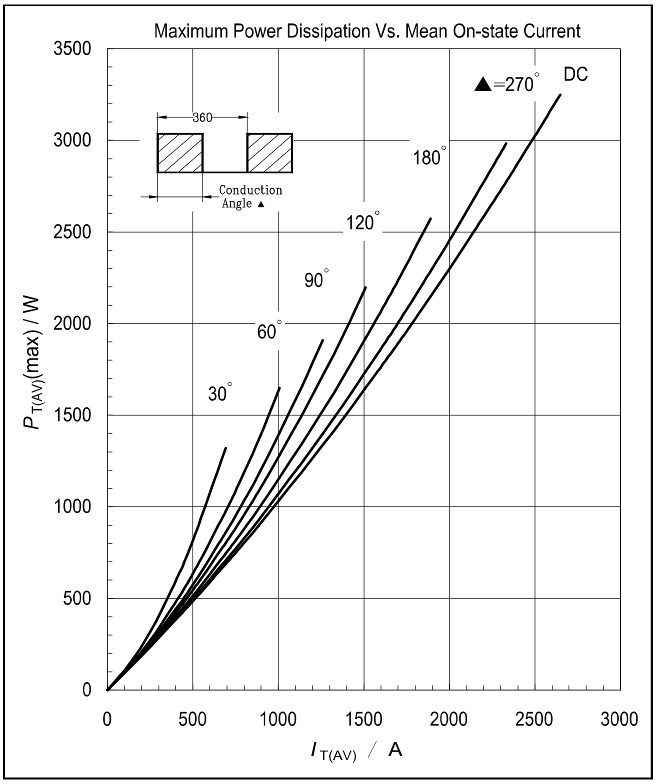

Fig5. Maximum Power Dissipation Vs. Mean On-state Current

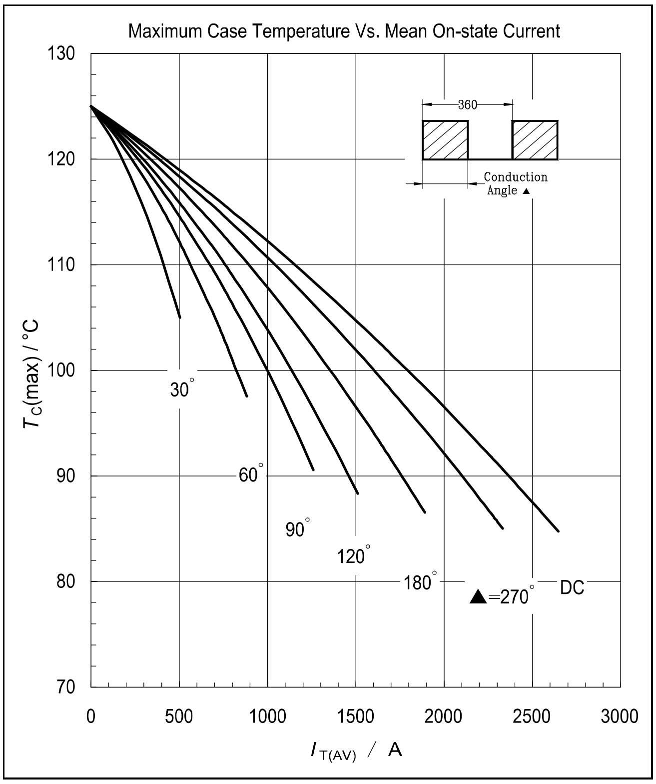

Fig6. Maximum Case Temperature Vs. Mean On-state Current

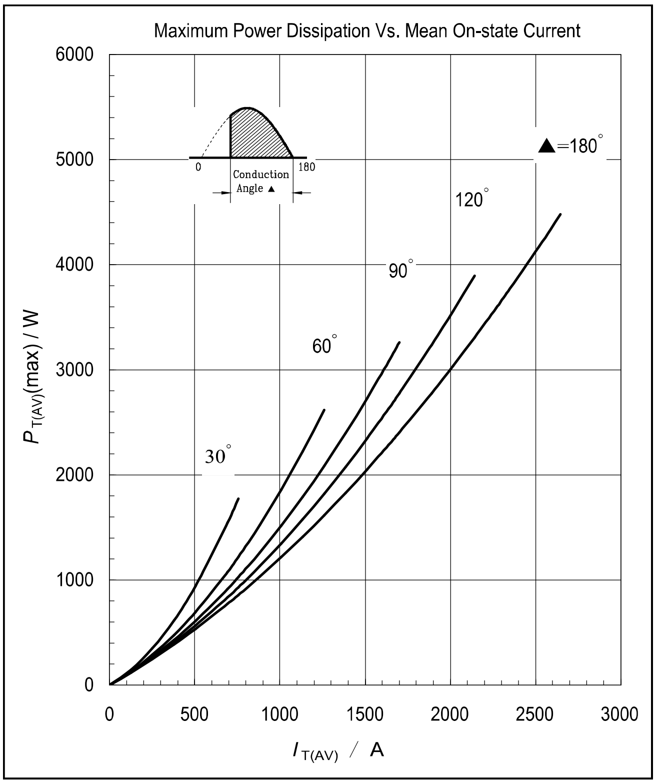

Fig7. Maximum Power Dissipation Vs. Mean On-state Current

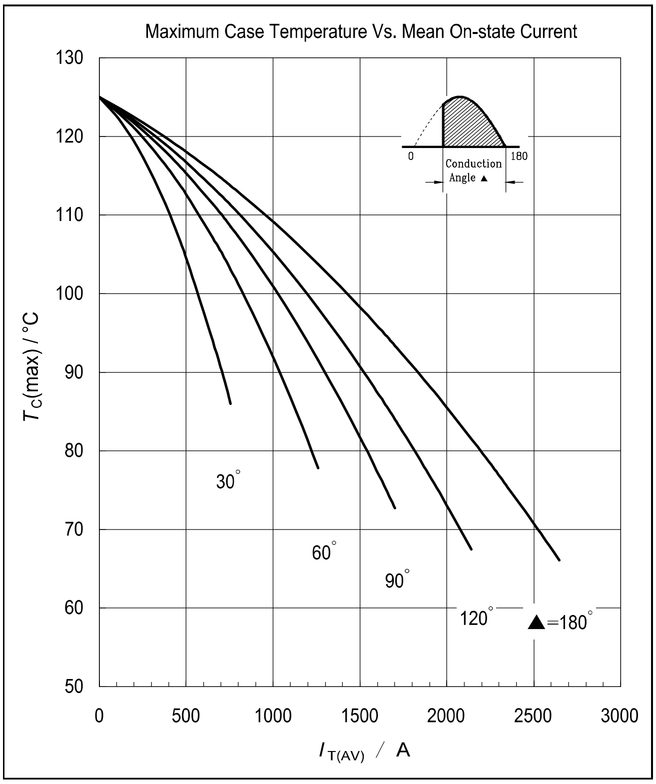

Fig8. Maximum Case Temperature Vs. Mean On-state Current

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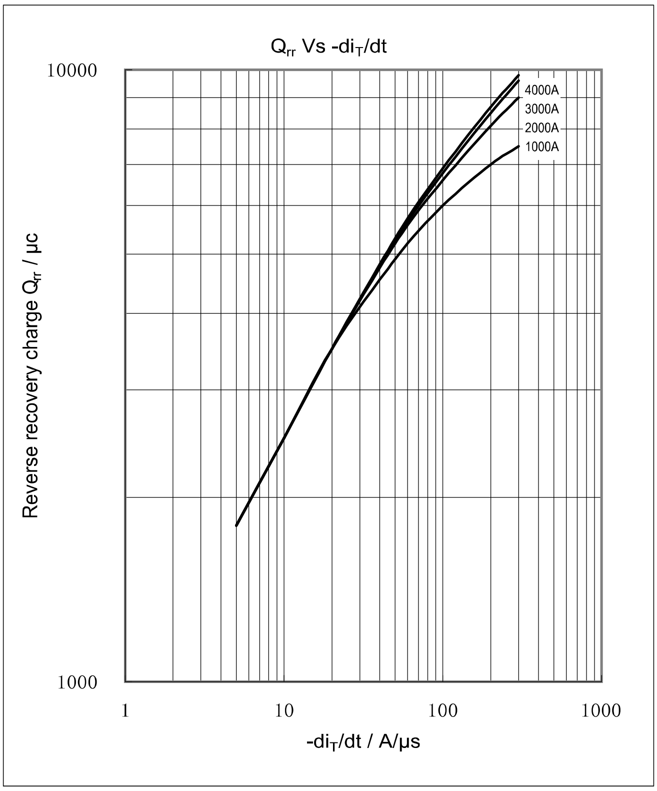

Fig9. Reverse recovery charge Vs. $-di_T/dt$

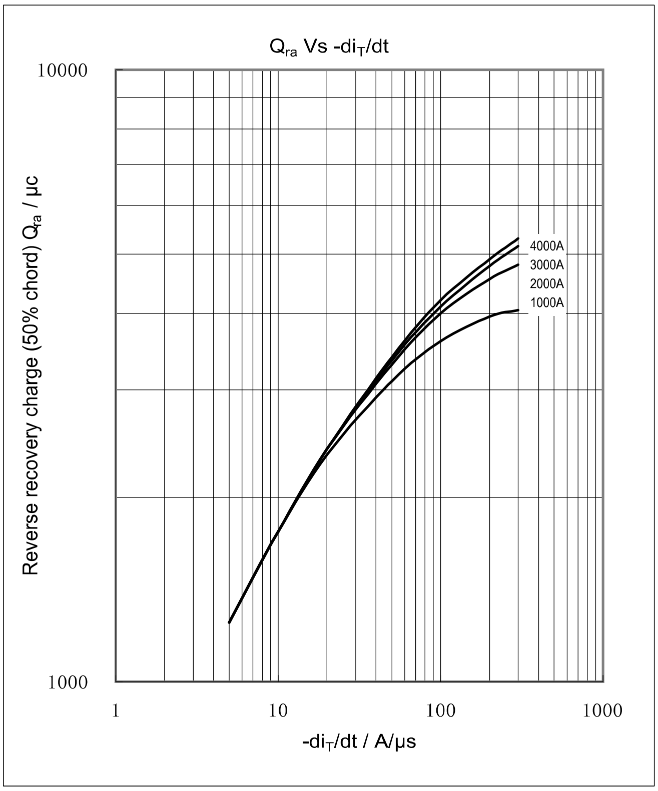

Fig10. Reverse recovery charge (50% chord) Vs. $-di_T/dt$

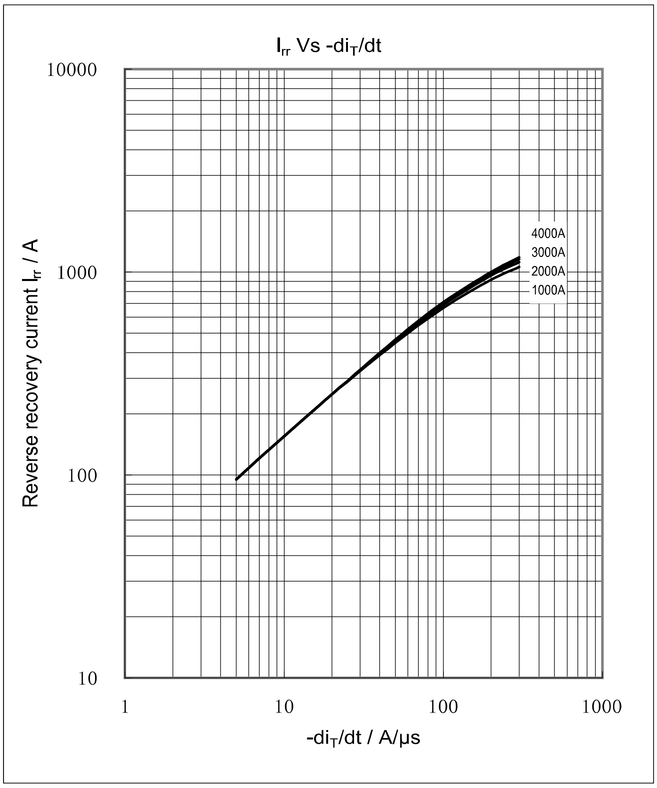

Fig11. Reverse recovery current Vs. $-di_T/dt$

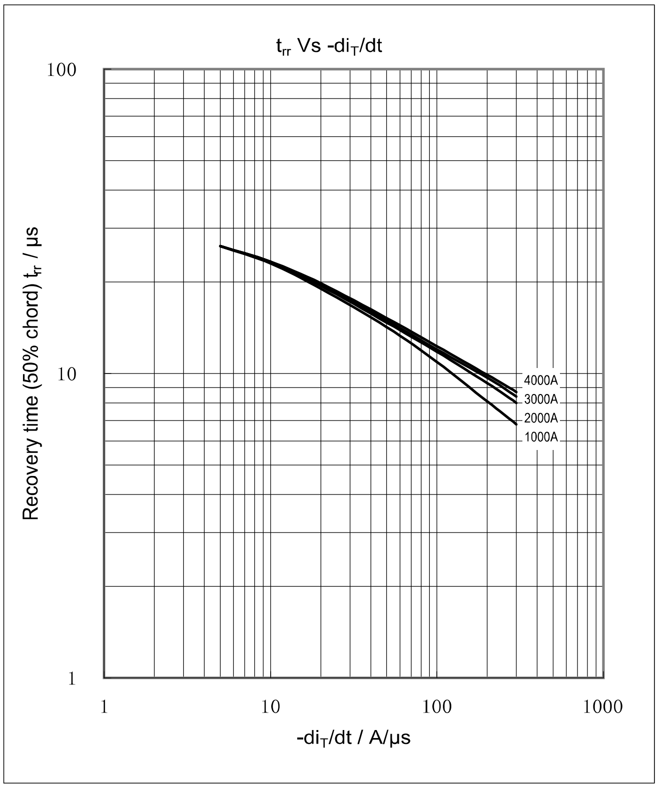

Fig12. Reverse recovery time Vs. $-di_T/dt$

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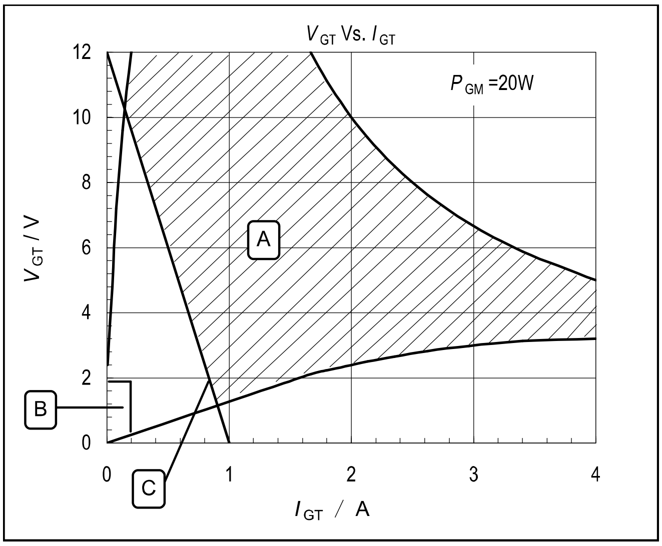

Fig13. V_{GT} Vs. I_{GT}

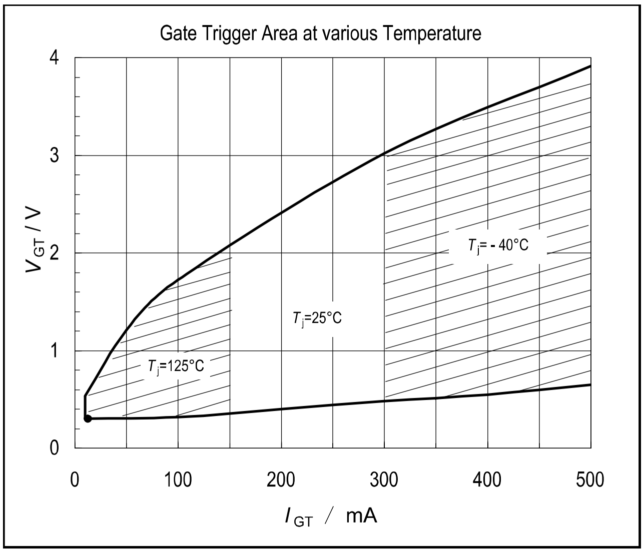

Fig14. Gate Trigger Area at various Temperature

A is Recommended Triggering Area.

B is Unreliable Triggering Area.

C is Recommended Gate Load Line.