

T812 3900-18-22

Key Parameters

V_{DRM}	1800~2200	V
$I_{T(AV)}$	3980	A
I_{TSM}	64.5	kA
V_{TO}	0.86	V
r_T	0.095	mΩ

Applications

- Traction drive
- Motor drive
- Industry converter

Features

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

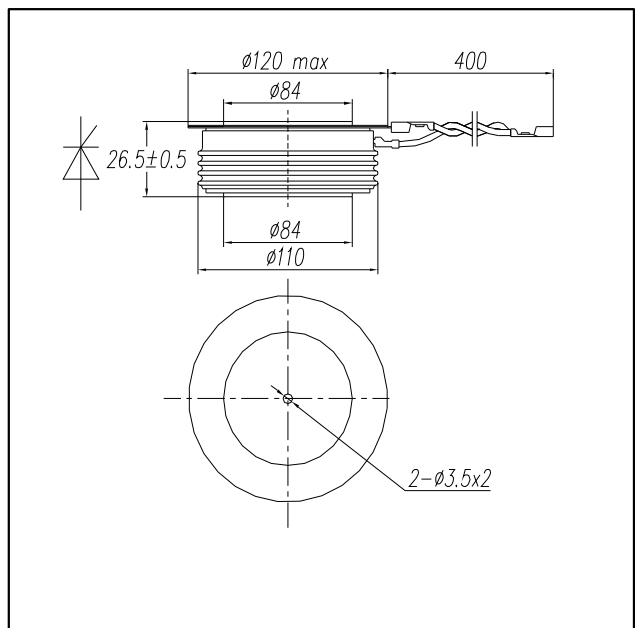
Thermal & Mechanical Data

Symb.	Parameter	Min	Type	Max	Unit
R_{thjc}	Thermal Resistance Junction to Case	-	-	0.007	K / W
R_{thcs}	Thermal Resistance Case to Heatsink	-	-	0.002	K / W
T_{vj}	Junction Temperature	-40	-	125	°C
T_{stg}	Storage Temperature	-40	-	140	°C
F	Mounting Force	-	70	-	kN
m	Weight	-	1.4	-	kg

Voltage Ratings

Device Type	$V_{DRM}/V_{RRM}(V)$	Test Conditions
T812 3900-18	1800	$T_{vj} = 125\text{ °C}$
T812 3900-20	2000	$I_{DRM} = 400\text{ mA}$
T812 3900-22	2200	$I_{RRM} = 400\text{ mA}$
		$V_{DM} = V_{DRM}, V_{RM} = V_{RRM}$
		$t_p = 10\text{ ms}$
		$V_{DSM} = V_{DRM}$
		$V_{RSM} = V_{RRM} + 100$

Outline



Current Ratings

Symb.	Parameter	Test Conditions	Min	Type	Max	Unit
$I_{T(AV)}$	Mean On-State Current	Half Sine Wave, $T_C = 70\text{ °C}$	-	-	3980	A
$I_{T(RMS)}$	RMS On-State Current	$T_C = 70\text{ °C}$	-	-	6249	A
I_{TSM}	Surge (non-repetitive) On-State Current	10ms, Half Sine Wave, $T_{vj} = 125\text{ °C}, V_R = 0$	-	-	64.5	kA
I^2t	Limiting load integral	Sine Wave, 10ms	-	-	2080	$10^4 A^2s$

T812 3900-18-22

Characteristics

Symb.	Parameter	Test Conditions	Min	Type	Max	Unit
V_{TM}	Peak on-state voltage	$T_{vj} = 125\text{ }^{\circ}\text{C}$, $I_{TM} = 3000\text{ A}$	-	-	1.15	V
I_{DRM}	Forward leakage current	$T_{vj} = 125\text{ }^{\circ}\text{C}$, V_{DRM}	-	-	400	mA
I_{RRM}	Reverse leakage current	$T_{vj} = 125\text{ }^{\circ}\text{C}$, V_{RRM}	-	-	400	mA
V_{TO}	Threshold voltage	$T_{vj} = 125\text{ }^{\circ}\text{C}$	-	-	0.86	V
r_T	Slope resistance	$T_{vj} = 125\text{ }^{\circ}\text{C}$	-	-	0.095	m Ω
I_H	Holding current	$T_{vj} = 25\text{ }^{\circ}\text{C}$	-	-	200	mA
I_L	Latching current	$T_{vj} = 25\text{ }^{\circ}\text{C}$	-	-	1000	mA

Dynamic Parameters

Symb.	Parameter	Test Conditions	Min	Type	Max	Unit
dv/dt	Critical rate of rise of off-state voltage	$T_{vj} = 125\text{ }^{\circ}\text{C}$, Exp. to $0.67 V_{DRM}$	1000	-	-	V/ $\mu\text{ s}$
di/dt	Critical rate of rise of on-state current	$T_{vj} = 125\text{ }^{\circ}\text{C}$, $V_{DM} \leq 0.67 V_{DRM}$, $f = 50\text{ Hz}$, $I_{TRM} = 4000\text{ A}$ $I_{FG} = 2\text{ A}$, $t_r = 0.5\text{ }\mu\text{ s}$	-	-	250	A/ $\mu\text{ s}$
t_q	Turn-off time	$T_{vj} = 125\text{ }^{\circ}\text{C}$, $I_T = 4000\text{ A}$, $V_R = 200\text{ V}$ $di_T/dt = -5\text{ A}/\mu\text{ s}$, $V_D \leq 0.67 V_{DRM}$, $dV_D/dt = 20\text{ V}/\mu\text{ s}$	-	400	-	$\mu\text{ s}$
Q_{rr}	Recovery Charge	$T_{vj} = 125\text{ }^{\circ}\text{C}$, $I_{TRM} = 4000\text{ A}$ $V_R = 200\text{ V}$, $di_T/dt = -5\text{ A}/\mu\text{ s}$	-	5000	-	$\mu\text{ C}$

Gate Parameters

Symb.	Parameter	Test Conditions	Min	Type	Max	Unit
I_{GT}	Gate trigger current	$T_{vj} = 25\text{ }^{\circ}\text{C}$	-	-	300	mA
V_{GT}	Gate trigger voltage	$T_{vj} = 25\text{ }^{\circ}\text{C}$	-	-	3.0	V
I_{GD}	Gate non-trigger current	$T_{vj} = 125\text{ }^{\circ}\text{C}$, $V_D = 0.4 V_{DRM}$	10	-	-	mA
V_{GD}	Gate non-trigger voltage	$T_{vj} = 125\text{ }^{\circ}\text{C}$, $V_D = 0.4 V_{DRM}$	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

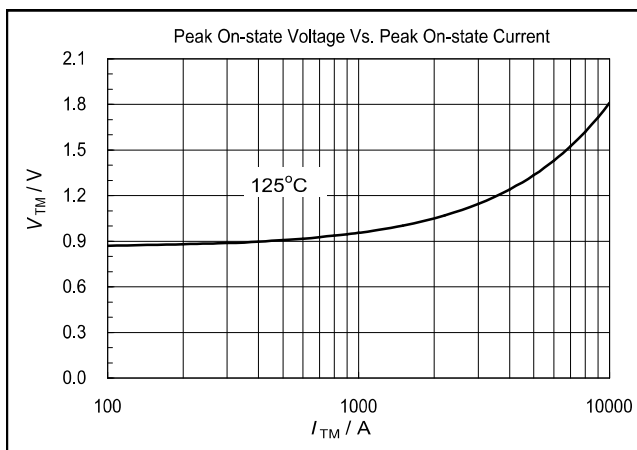


Fig1. Peak On-state Voltage Vs. Peak On-state Current

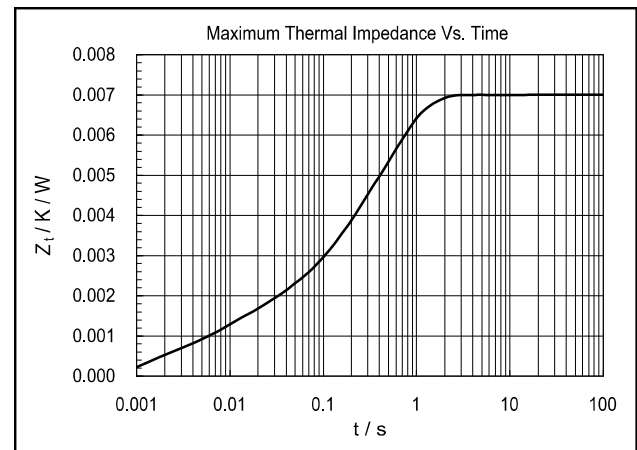


Fig2. Maximum Thermal Impedance Vs. Time

T812 3900-18-22

1

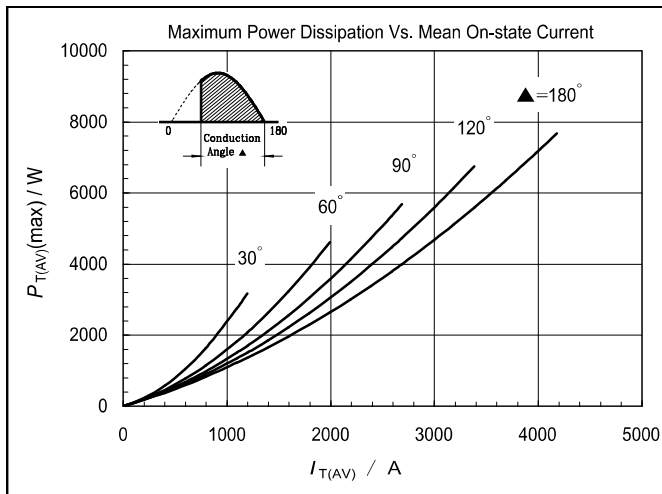


Fig3. Maximum Power Dissipation Vs. Mean On-state Current

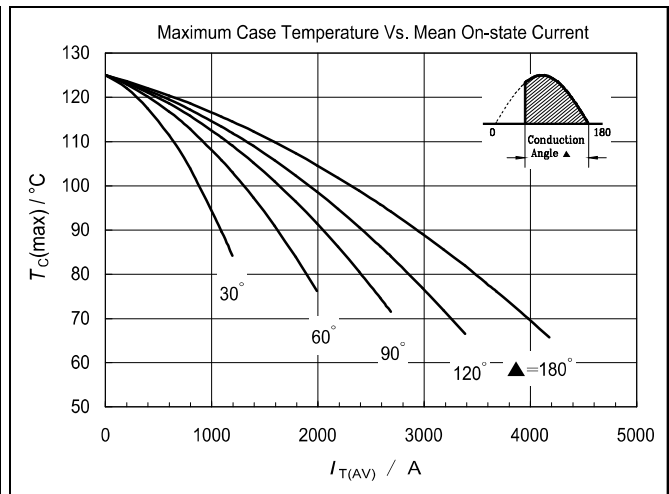


Fig4. Maximum Case Temperature Vs. Mean On-state Current

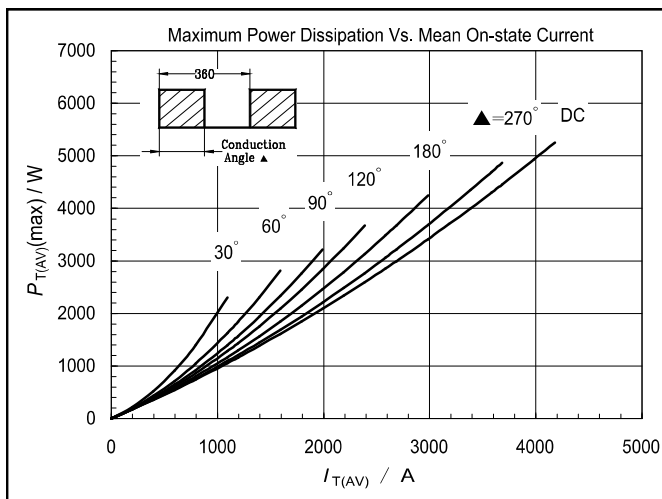


Fig5. Maximum Power Dissipation Vs. Mean On-state Current

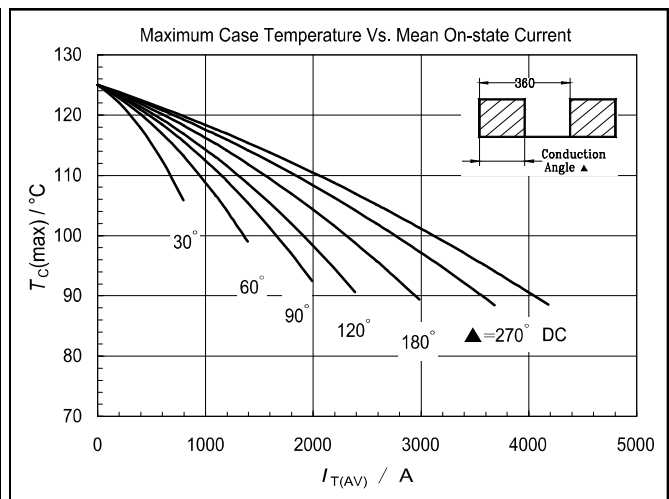


Fig6. Maximum Case Temperature Vs. Mean On-state Current

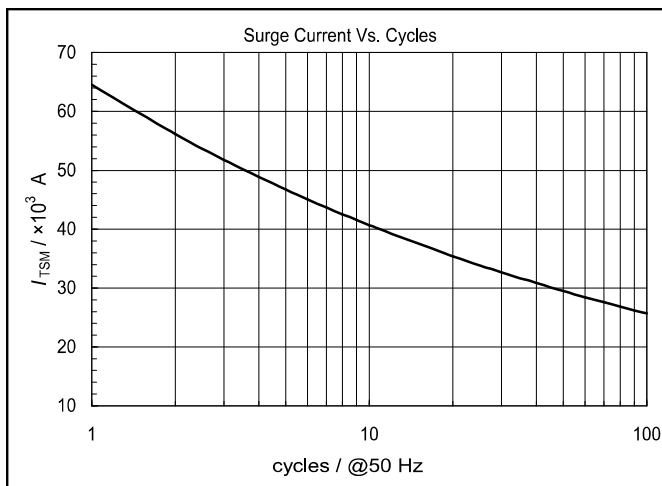


Fig7. Surge Current Vs. Cycles

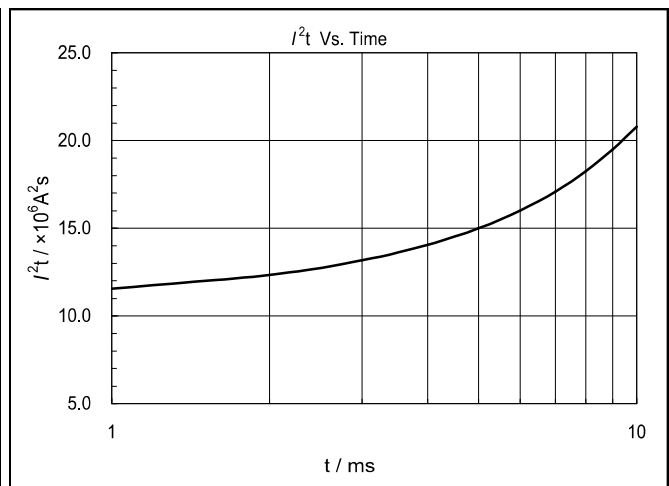


Fig8. I²t Vs. Time

T812 3900-18-22

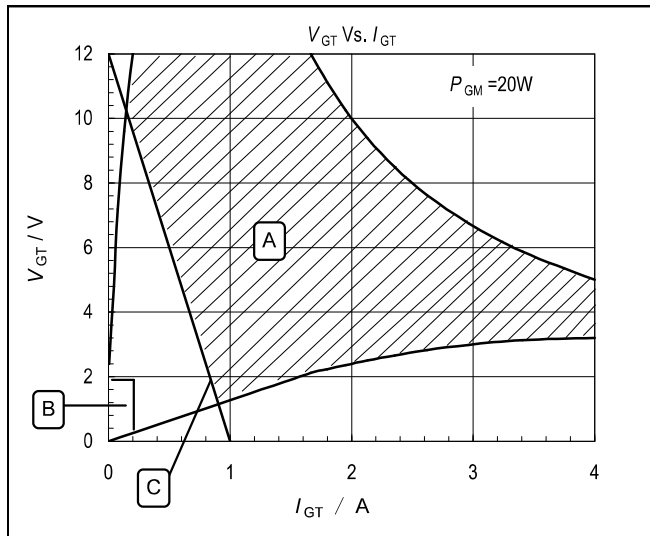


Fig9. V_{GT} Vs. I_{GT}

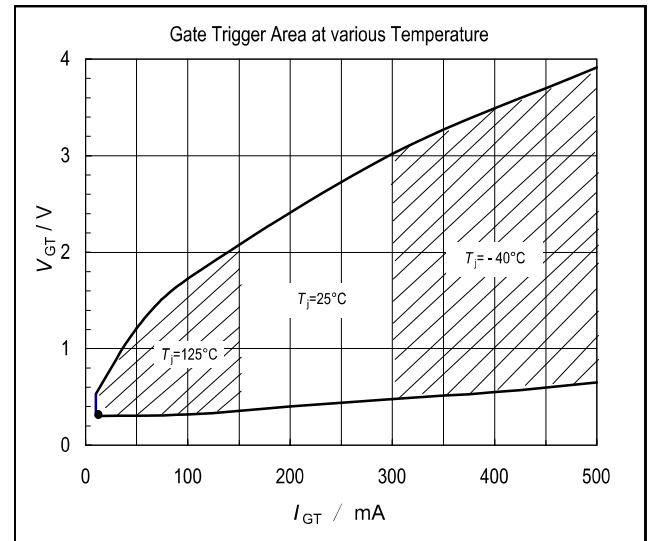
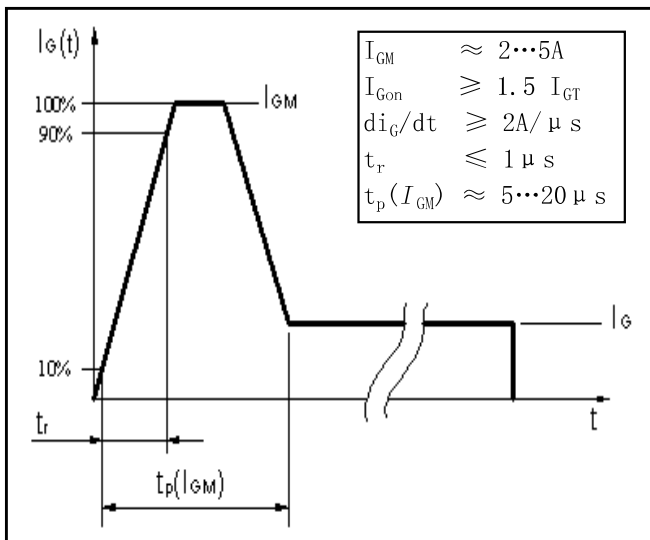


Fig10. Gate Trigger Area at various Temperature



A is Recommended Triggering Area.

B is Unreliable Triggering Area.

C is Recommended Gate Load Line.