

TF816 3200-35-45

Key Parameters

V_{DRM}	3500 ~ 4500	V
$I_{T(AV)}$	3216	A
I_{TSM}	41	kA
V_{TO}	1.64	V
r_T	0.215	mΩ

Applications

M.F. Inductive heating systems
DC choppers
Pulse electrical power supplies

Features

Double-side cooling
Low switching loss
Shorter turn-off time

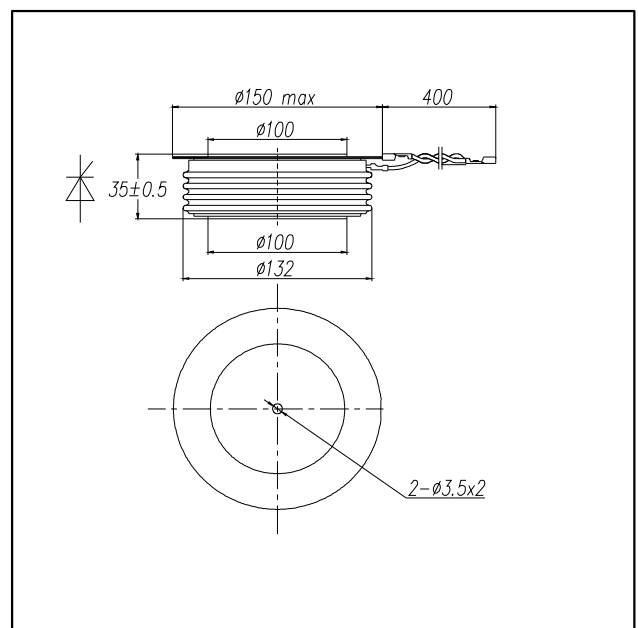
Thermal & Mechanical Data

Symb.	Parameter	Min	Type	Max	Unit
R_{jc}	Thermal Resistance Junction to Case	-	-	0.0057	K / W
R_{cs}	Thermal Resistance Case to Heatsink	-	-	0.002	K / W
T_j	Junction Temperature	-40	-	125	°C
T_{stg}	Storage Temperature	-40	-	150	°C
F	Mounting Force	-	90	-	kN
m	Weight	-	2.50	-	kg

Voltage Ratings

Device Type	V_{DRM}/V_{RRM} (V)	Test Conditions
TF816 3200-35	3500	$T_j = 125\text{ °C}$
TF816 3200-40	4000	$I_{DRM} = I_{RRM} \leq 500\text{ mA}$
TF816 3200-45	4500	$T_j = 25\text{ °C}$ $I_{DRM} = I_{RRM} \leq 15\text{ mA}$ $V_{DM} = V_{DRM}$ $V_{RM} = V_{RRM}$ $t_p = 10\text{ ms}$ $V_{DSM} = V_{DRM}$ $V_{RSM} = V_{RRM}$

Outline



Current Ratings

Symb.	Parameter	Test Conditions	Min	Type	Max	Unit
$I_{T(AV)}$	Mean On-State Current	Half Sine Wave, $T_C = 55\text{ °C}$	-	-	3216	A
$I_{T(AV)}$	Mean On-State Current	Half Sine Wave, $T_C = 70\text{ °C}$	-	-	2736	A
$I_{T(RMS)}$	RMS On-State Current	$T_C = 70\text{ °C}$	-	-	4300	A
I_{TSM}	Surge (non-repetitive) On-State Current	10ms, Half Sine Wave, $T_C = 125\text{ °C}$, $V_R = 0$	-	-	41	kA
I^2t	Limiting load integral	Sine Wave, 10ms	-	-	841	$10^4\text{ A}^2\text{s}$

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Characteristics

Symb.	Parameter	Test Conditions	Min	Type	Max	Unit
V_{TM}	Peak on-state voltage	$T_j = 125\text{ }^{\circ}\text{C}$, $I_{TM} = 4000\text{ A}$	-	-	2.50	V
I_{DRM}	Forward leakage current	$T_j = 25\text{ }^{\circ}\text{C}$, $125\text{ }^{\circ}\text{C}$, V_{DRM}/V_{RRM}	-	-	500	mA
I_{RRM}	Reverse leakage current		-	-		
V_{TO}	Threshold voltage	$T_j = 125\text{ }^{\circ}\text{C}$	-	-	1.64	V
r_T	Slope resistance	$T_j = 125\text{ }^{\circ}\text{C}$	-	-	0.215	m Ω
I_H	Holding current	$T_j = 25\text{ }^{\circ}\text{C}$, $I_G = 2\text{ A}$, $I_{TM} = 50\text{ A}$, $V_D = 12\text{ V}$	-	-	300	mA
I_L	Latching current	$T_j = 25\text{ }^{\circ}\text{C}$, $I_G = 2\text{ A}$, $V_D = 12\text{ V}$	-	-	1000	mA

Dynamic Parameters

Symb.	Parameter	Test Conditions	Min	Type	Max	Unit
dv/dt	Critical rate of rise of off-state voltage	$T_j = 125\text{ }^{\circ}\text{C}$, $0.67\% V_{DRM}$	500	1000	-	V/ μ s
di/dt	Critical rate of rise of on-state current	$T_j = 125\text{ }^{\circ}\text{C}$, $V_{DM} = 67\% V_{DRM}$, $f = 1\text{ Hz}$, $t = 30\text{ s}$, $I_{TM} = 6000\text{ A}$, $I_{FG} = 2.0\text{ A}$, $tr = 0.5\text{ }\mu$ s	-	-	500	A/ μ s
t_{gt}	Turn-on time	$T_j = 25\text{ }^{\circ}\text{C}$, $V_{DM} = 67\% V_{DRM}$, $f = 1\text{ Hz}$, $I_{TM} = 4000\text{ A}$, $I_{FG} = 2.0\text{ A}$, $tr = 0.5\text{ }\mu$ s, $di/dt = 60\text{ A}/\mu$ s	-	-	5	μ s
t_q	Turn-off time	$T_j = 125\text{ }^{\circ}\text{C}$, $t_p = 1000\text{ }\mu$ s, $V_{DM} = 67\% V_{DRM}$, $f = 1\text{ Hz}$, $dv/dt = 20\text{ V}/\mu$ s, $V_R \geq 50\text{ V}$, $-di/dt = 60\text{ A}/\mu$ s, $I_T = 4000\text{ A}$	-	-	200	μ s
Q_{rr}	Recovery Charge	$T_j = 125\text{ }^{\circ}\text{C}$, $-di/dt = 60\text{ A}/\mu$ s, $t_p = 1000\text{ }\mu$ s, $I_T = 4000\text{ A}$, $V_R \geq 50\text{ V}$, trapezoid wave	-	9600	-	μ C

Gate Parameters

Symb.	Parameter	Test Conditions	Min	Type	Max	Unit
I_{GT}	Gate trigger current	$T_j = 25\text{ }^{\circ}\text{C}$, $V_D = 12\text{ V}$, $R_L = 6\Omega$	40	-	200	mA
V_{GT}	Gate trigger voltage	$T_j = 25\text{ }^{\circ}\text{C}$, $V_D = 12\text{ V}$, $R_L = 6\Omega$	0.8	-	3	V
V_{GD}	Gate non-trigger voltage	$T_j = 125\text{ }^{\circ}\text{C}$, $V_D = 0.4 V_{DRM}$	0.2	-	-	V
V_{FGM}	Peak forward gate voltage	$T_j = 125\text{ }^{\circ}\text{C}$	-	-	16	V
V_{RGM}	Peak reverse gate voltage	$T_j = 125\text{ }^{\circ}\text{C}$	-	-	5	V
I_{FGM}	Peak forward gate current	$T_j = 125\text{ }^{\circ}\text{C}$	-	-	4	A
P_{GM}	Gate power losses	$T_j = 125\text{ }^{\circ}\text{C}$	-	-	20	W
$P_{G(AV)}$	Gate power losses (mean)	$T_j = 125\text{ }^{\circ}\text{C}$	-	-	4	W

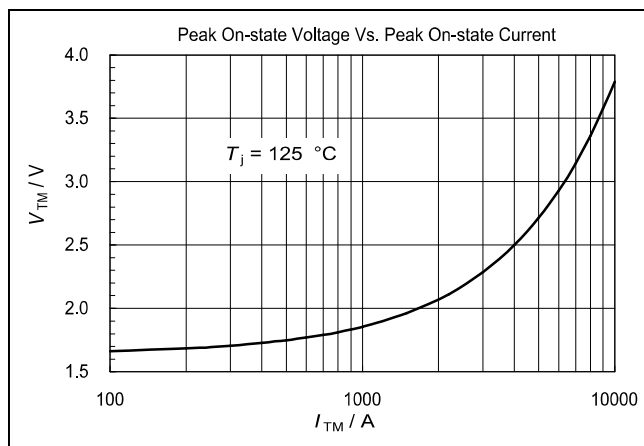


Fig1. Peak On-state Voltage Vs. Peak On-state Current

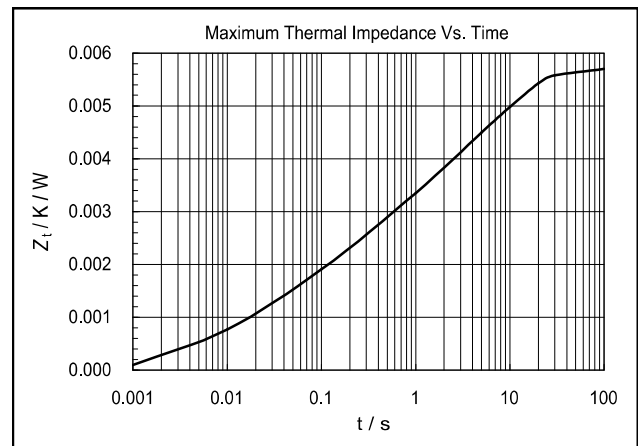
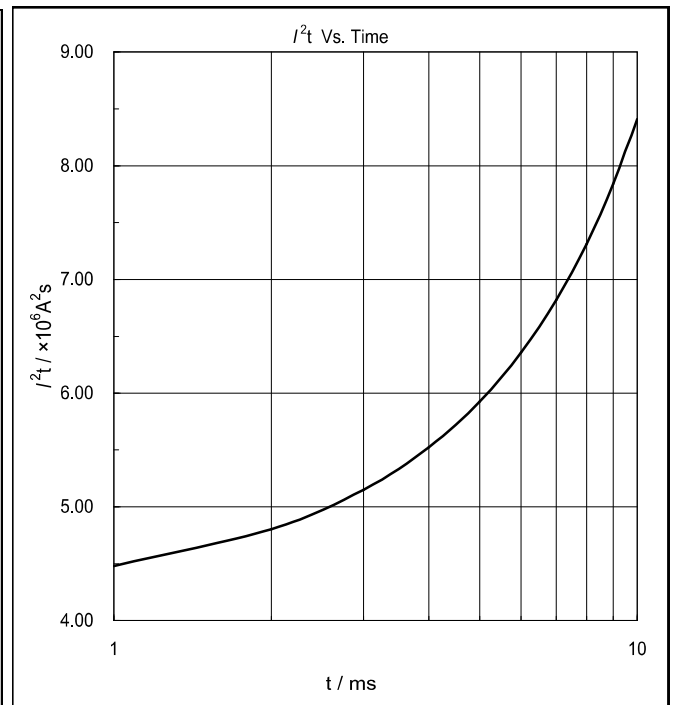
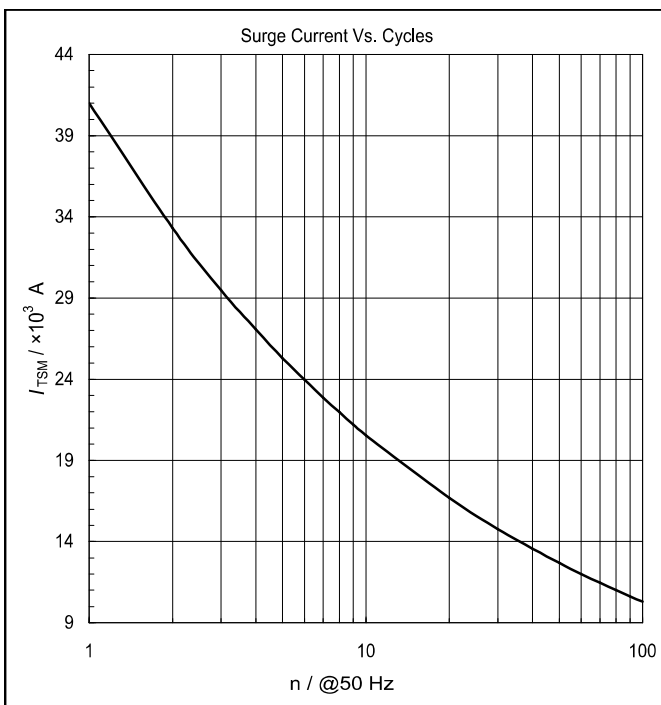
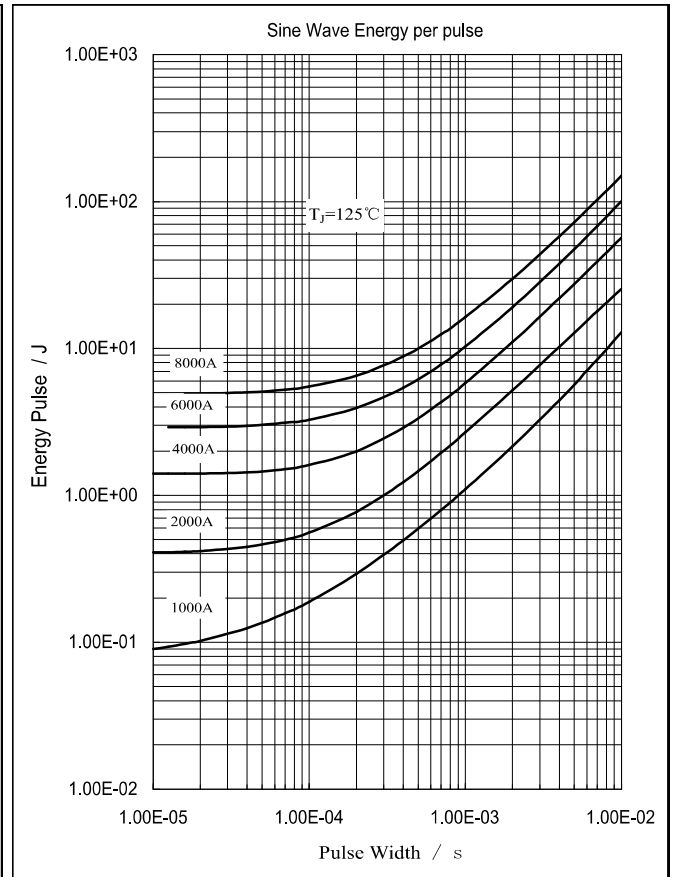
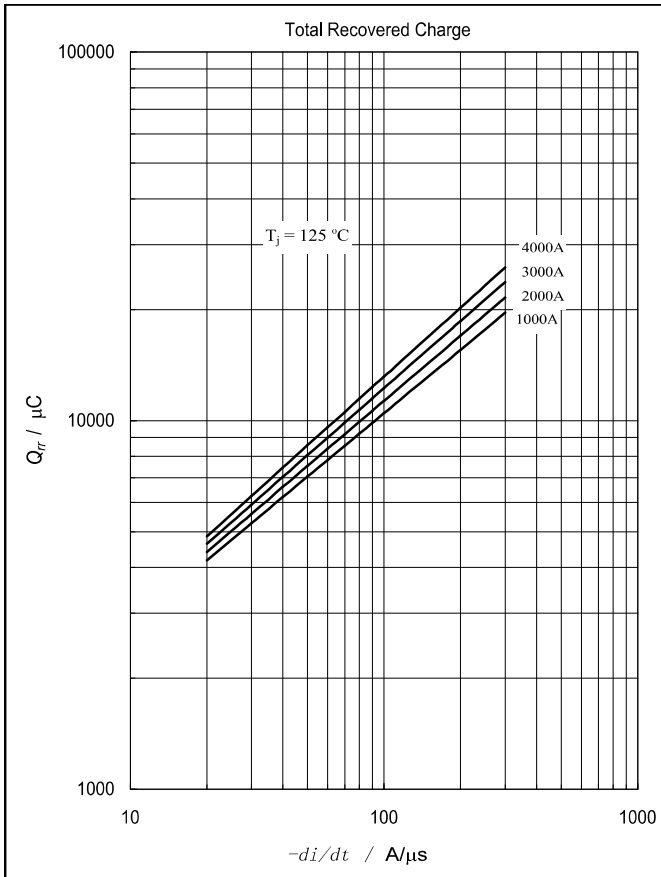


Fig2. Maximum Thermal Impedance Vs. Time

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TF816 3200-35-45

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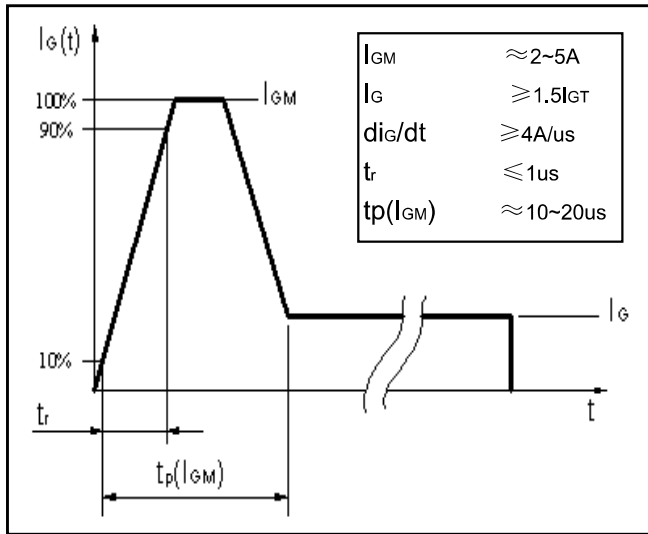


Fig7. Recommended gate current waveform

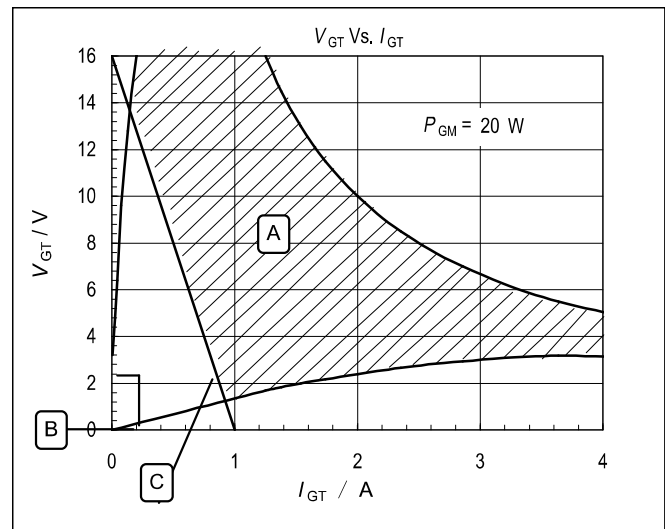


Fig8 V_{GT} Vs. I_{GT}

A is Recommended Triggering Area.

B is Unreliable Triggering Area.

C is Recommended Gate Load Line.

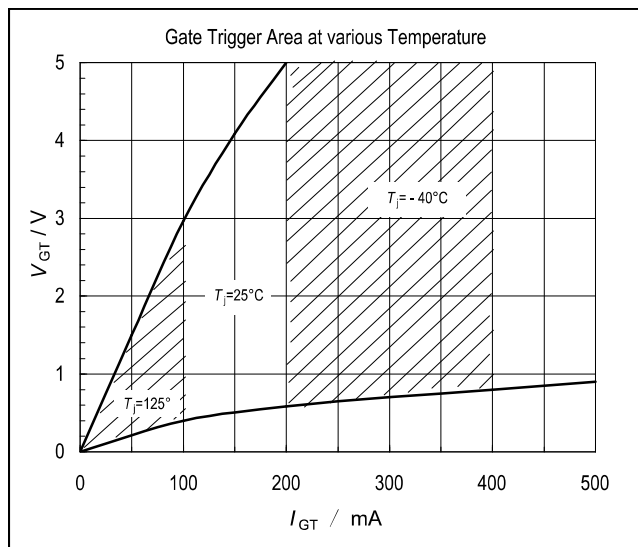


Fig9. Gate Trigger Area at various Temperature