

TF811 2000-16-20

Key Parameters

V_{DRM}	1600 ~ 2000	V
$I_{T(AV)}$	2016	A
I_{TSM}	21	kA
V_{TO}	1.66	V
r_T	0.229	mΩ

Applications

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

Features

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

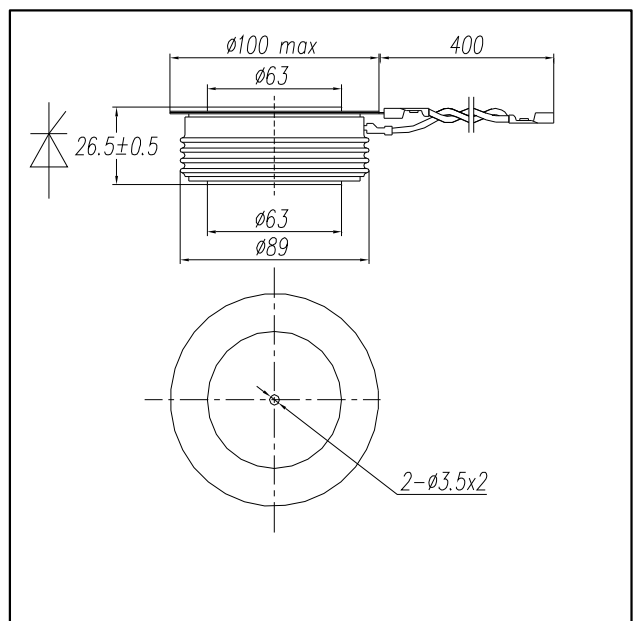
Thermal & Mechanical Data

Symb.	Parameter	Min	Type	Max	Unit
R_{jc}	Thermal Resistance Junction to Case	-	-	0.0125	K / W
R_{cs}	Thermal Resistance Case to Heatsink	-	-	0.004	K / W
T_j	Junction Temperature	-40	-	125	°C
T_{stg}	Storage Temperature	-40	-	150	°C
F	Mounting Force	-	45	-	kN
m	Weight	-	1.00	-	kg

Voltage Ratings

Device Type	V_{DRM}/V_{RRM} (V)	Test Conditions
TF811 2000-16	1600	$T_j = 125\text{ °C}$
TF811 2000-18	1800	$I_{DRM} = I_{RRM} \leq 250\text{ mA}$
TF811 2000-20	2000	$T_j = 25\text{ °C}$ $I_{DRM} = I_{RRM} \leq 5\text{ mA}$ $V_{DM} = V_{DRM}$ $V_{RM} = V_{RRM}$ $t_p = 10\text{ ms}$ $V_{DSM} = V_{DRM}$ $V_{RSM} = V_{RRM}$

Outline



Current Ratings

Symb.	Parameter	Test Conditions	Min	Type	Max	Unit
$I_{T(AV)}$	Mean On-State Current	Half Sine Wave, $T_C = 55\text{ °C}$	-	-	2016	A
$I_{T(AV)}$	Mean On-State Current	Half Sine Wave, $T_C = 70\text{ °C}$	-	-	1694	A
$I_{T(RMS)}$	RMS On-State Current	$T_C = 55\text{ °C}$	-	-	2660	A
I_{TSM}	Surge (non-repetitive) On-State Current	10ms, Half Sine Wave, $T_C = 125\text{ °C}$, $V_R = 0$	-	-	21	kA
I^2t	Limiting load integral	Sine Wave, 10ms	-	-	221	$10^4 A^2s$

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Characteristics

Symb.	Parameter	Test Conditions	Min	Type	Max	Unit
V_{TM}	Peak on-state voltage	$T_J = 125\text{ }^{\circ}\text{C}$, $I_{TM} = 3000\text{ A}$	-	-	2.35	V
I_{DRM}	Forward leakage current	$T_J = 125\text{ }^{\circ}\text{C}$, V_{DRM}/V_{RRM}	-	-	250	mA
I_{RRM}	Reverse leakage current					
V_{TO}	Threshold voltage	$T_J = 125\text{ }^{\circ}\text{C}$	-	-	1.660	V
r_T	Slope resistance	$T_J = 125\text{ }^{\circ}\text{C}$	-	-	0.229	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	$T_J = 125\text{ }^{\circ}\text{C}$, $67\% V_{DRM}$	500	1000	-	V/us
di/dt	Critical rate of rise of on-state current	$T_J = 125\text{ }^{\circ}\text{C}$, $V_{DM} = 50\% V_{DRM}$, $f = 1\text{ Hz}$, $t = 5\text{ s}$, $I_{TM} = 4000\text{ A}$, $I_{FG} = 2.0\text{ A}$, $t_r = 0.5\text{ }\mu\text{s}$	-	-	1000	A/us
t_{gt}	Turn-on time	$T_J = 25\text{ }^{\circ}\text{C}$, $V_{DM} = 50\% V_{DRM}$, $f = 1\text{ Hz}$, $I_{TM} = 4000\text{ A}$, $I_{FG} = 2.0\text{ A}$, $t_r = 0.5\text{ }\mu\text{s}$, $di/dt = 60\text{ A}/\mu\text{s}$	-	-	3	μs
t_q	Turn-off time	$T_J = 125\text{ }^{\circ}\text{C}$, $t_p = 1000\text{ }\mu\text{s}$, $V_{DM} = 67\% V_{DRM}$, $f = 1\text{ Hz}$, $dv/dt = 20\text{ V}/\mu\text{s}$, $V_R \geq 50\text{ V}$, $-di/dt = 60\text{ A}/\mu\text{s}$, $I_T = 3000\text{ A}$	-	-	50	μs
Q_{rr}	Recovery Charge	$T_J = 125\text{ }^{\circ}\text{C}$, $-di/dt = 60\text{ A}/\mu\text{s}$, $t_p = 1000\text{ }\mu\text{s}$, $I_T = 3000\text{ A}$, $V_R = 50\text{ V}$, trapezoid wave	-	1060	-	μC

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	-	180	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

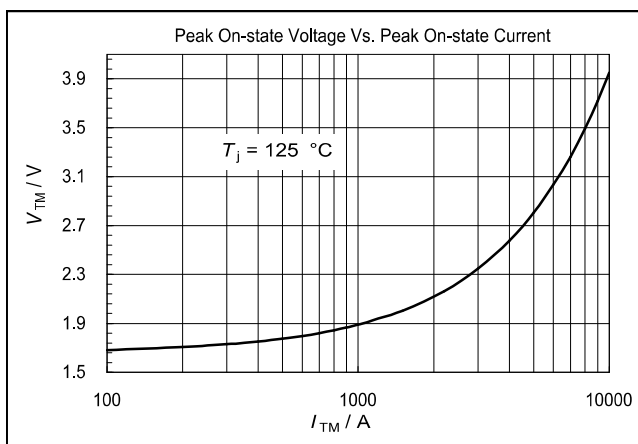


Fig1. Peak On-state Voltage Vs. Peak On-state Current

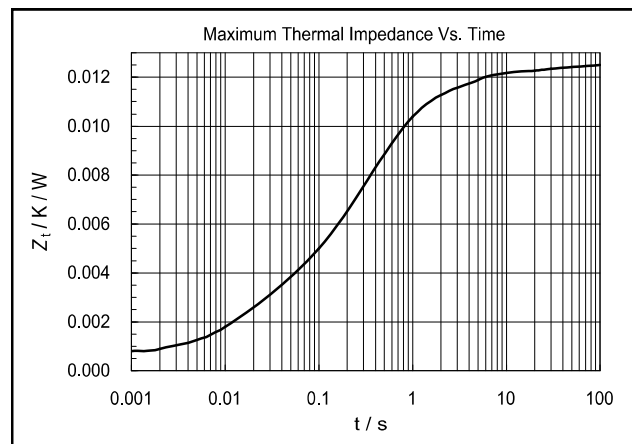


Fig2. Maximum Thermal Impedance Vs. Time

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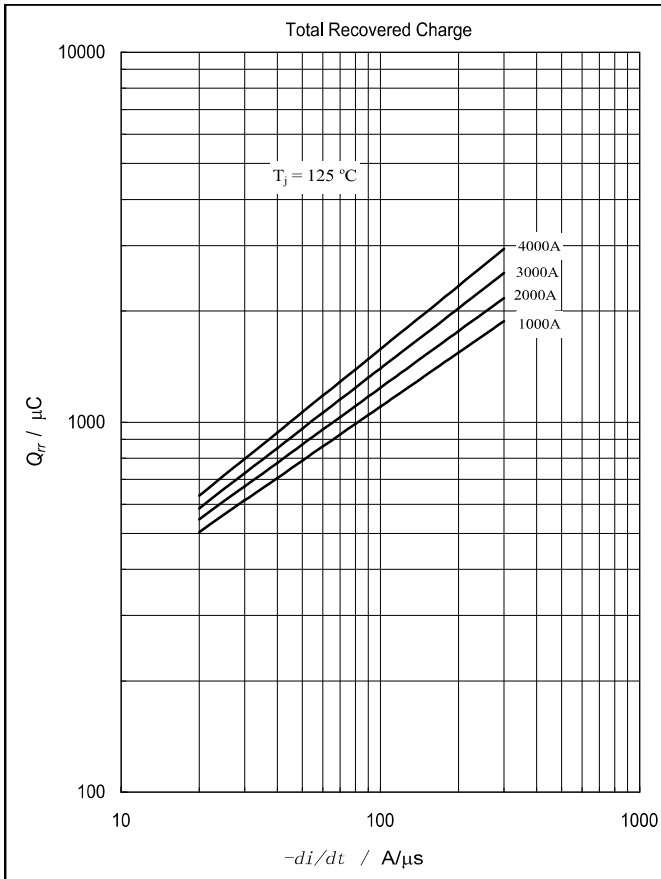


Fig3. Total Recovered Charge Vs. Commutation Rate

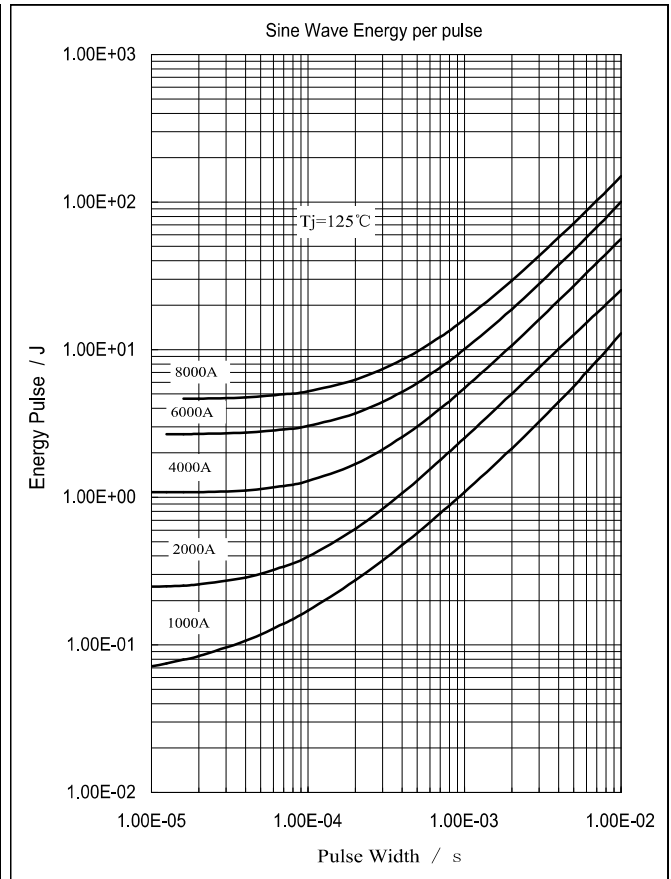


Fig4. Sine Wave Frequency Ratings

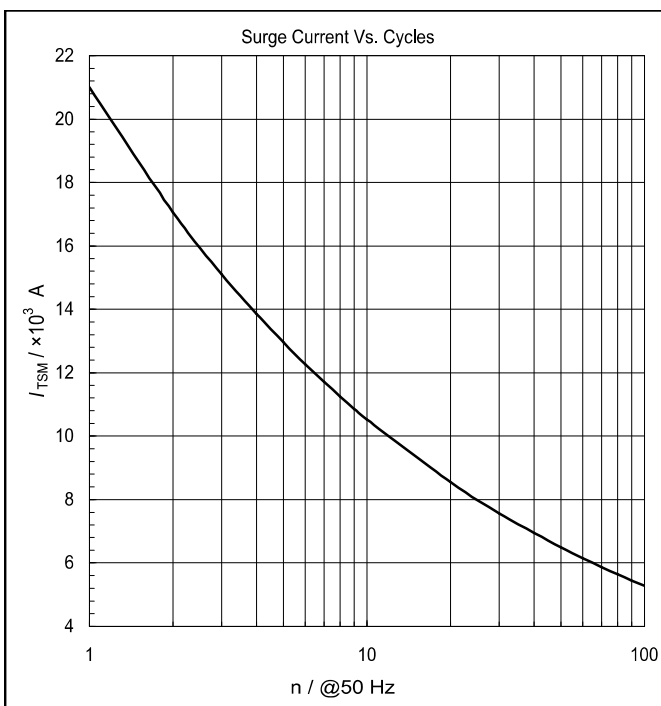


Fig5. Surge Current Vs. Cycles

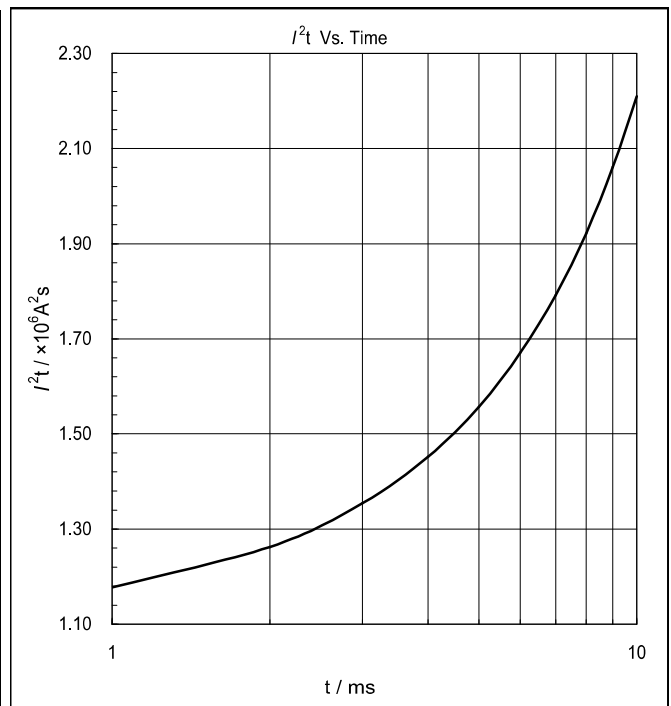
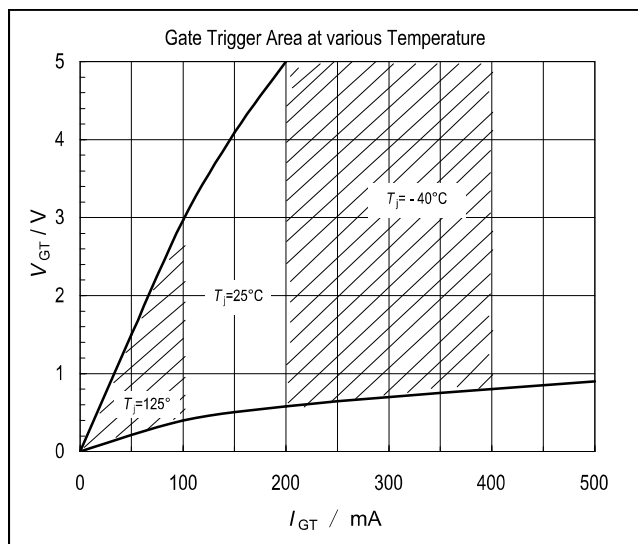
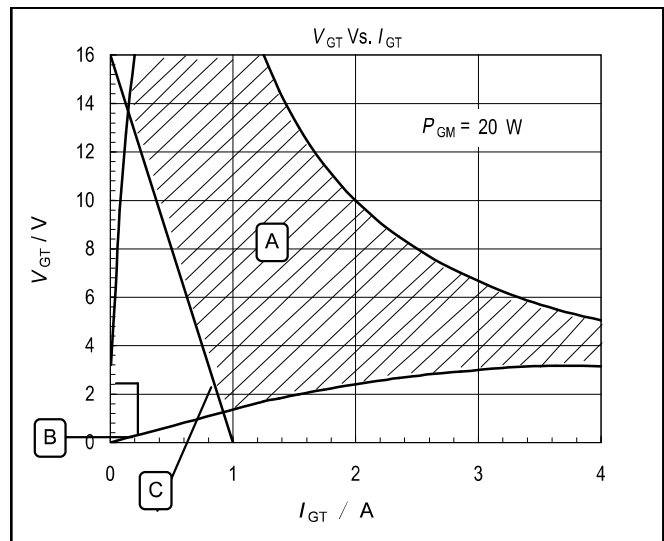
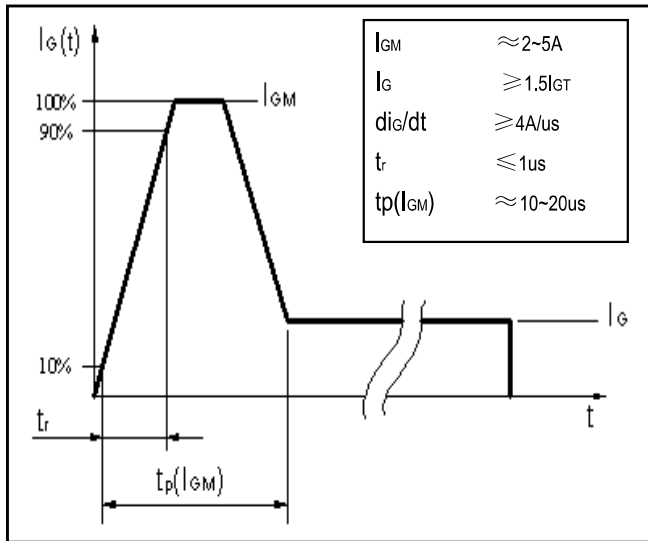


Fig6. I^2t Vs. Time

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A is Recommended Triggering Area.

B is Unreliable Triggering Area.

C is Recommended Gate Load Line.