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[IXYS Corporation](#)

[FMM110-015X2F](#)

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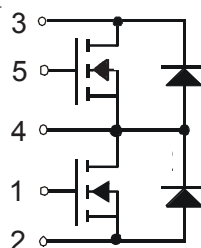
sales@integrated-circuit.com



Advance Technical Information

TrenchT2™ HiperFET N-Channel Power MOSFET

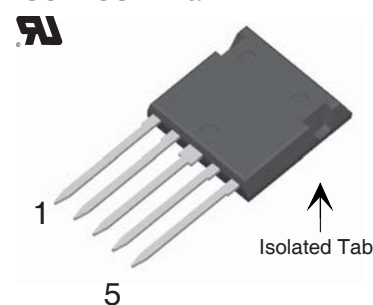
FMM110-015X2F



Phase Leg Topology

$$\begin{aligned} V_{DSS} &= 150V \\ I_{D25} &= 53A \\ R_{DS(on)} &\leq 20m\Omega \\ t_{rr(typ)} &= 85ns \end{aligned}$$

ISOPLUS i4-Pak™



Symbol	Test Conditions	Maximum Ratings	
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-55 ... +175	°C
V_{ISOLD}	50/60Hz, RMS, t = 1min, Leads-to-Tab	2500	~V
T_L	1.6mm (0.062 in.) from Case for 10s	300	°C
T_{SOLD}	Plastic Body for 10s	260	°C
F_C	Mounting Force	20..120 / 4.5..27	N/lb.

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	$T_J = 25^\circ\text{C}$ to 175°C	150	V
V_{DGR}	$T_J = 25^\circ\text{C}$ to 175°C , $R_{GS} = 1M\Omega$	150	V
V_{GSM}	Transient	± 30	V
I_{D25}	$T_C = 25^\circ\text{C}$	53	A
I_{DM}	$T_C = 25^\circ\text{C}$, Pulse Width Limited by T_{JM}	300	A
I_A	$T_C = 25^\circ\text{C}$	55	A
E_{AS}	$T_C = 25^\circ\text{C}$	800	mJ
dV/dt	$I_S \leq I_{DM}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 175^\circ\text{C}$	10	V/ns
P_D	$T_C = 25^\circ\text{C}$	180	W

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
C_P	Coupling Capacitance Between Shorted Pins and Mounting Tab in the Case		40	pF
d_S, d_A	Pin - Pin	1.7		mm
d_S, d_A	Pin - Backside Metal	5.5		mm
Weight			9	g

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
 - UL Recognized Package
 - Isolated Mounting Surface
 - 2500V Electrical Isolation
- Avalanche Rated
- Low Q_G
- Low Drain-to-Tab Capacitance
- Low Package Inductance

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

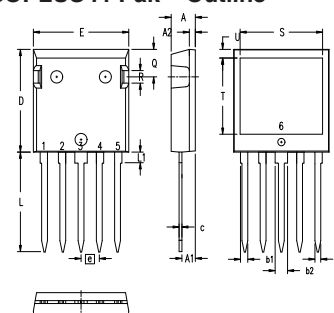
- DC-DC Converters
- Battery Chargers
- Switched-Mode and Resonant-Mode Power Supplies
- DC Choppers
- AC Motor Drives
- Uninterruptible Power Supplies
- High Speed Power Switching Applications



FMM110-015X2F

Symbol	Test Conditions ² (T _J = 25°C Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{DSS}	V _{GS} = 0V, I _D = 250μA	150		V
V_{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	2.5		4.5 V
I_{GSS}	V _{GS} = ±20 V, V _{DS} = 0V			± 200 nA
I_{DSS}	V _{DS} = V _{DSS} , V _{GS} = 0V T _J = 150°C			2 μA 500 μA
R_{DS(on)}	V _{GS} = 10V, I _D = 55A, Note 1			20 mΩ
g_{fs}	V _{DS} = 10V, I _D = 55A, Note 1	75	115	S
C_{iss}	V _{GS} = 0V, V _{DS} = 25 V, f = 1 MHz		8600	pF
C_{oss}			685	pF
C_{rss}			77	pF
t_{d(on)}	Resistive Switching Times V _{GS} = 10V, V _{DS} = 0.5 • V _{DSS} , I _D = 55A R _G = 3.3Ω (External)		33	ns
t_r			16	ns
t_{d(off)}			33	ns
t_f			18	ns
Q_{g(on)}	V _{GS} = 10V, V _{DS} = 0.5 • V _{DSS} , I _D = 55A		150	nC
Q_{gs}			42	nC
Q_{gd}			46	nC
R_{thJC}				0.83 °C/W
R_{thCS}			0.15	°C/W

ISOPLUS i4-Pak™ Outline



NOTE: Bottom heatsink meets 3000 Volts AC 1 sec isolation to the other pins.

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.190	.205	4.83	5.21
A1	.102	.118	2.59	3.00
A2	.046	.085	1.17	2.16
b	.045	.055	1.14	1.40
b1	.058	.068	1.47	1.73
b2	.100	.110	2.54	2.79
C	.020	.029	0.51	0.74
D	.819	.840	20.80	21.34
E	.770	.799	19.56	20.29
e	.150 BSC		3.81 BSC	
L	.780	.840	19.81	21.34
L1	.083	.102	2.11	2.59
Q	.210	.244	5.33	6.20
R	.100	.180	2.54	4.57
S	.660	.690	16.76	17.53
T	.590	.620	14.99	15.75
U	.065	.080	1.65	2.03

Ref: IXYS CO 0077 R0

Source-Drain Diode

Symbol	Test Conditions ³	Characteristic Values T _J = 25°C Unless Otherwise Specified)		
		Min.	Typ.	Max.
I_S	V _{GS} = 0V			110 A
I_{SM}	Repetitive, Pulse Width Limited by T _{JM}			440 A
V_{SD}	I _F = 100A, V _{GS} = 0V, Note 1			1.3 V
t_{rr}	I _F = 55A, -di/dt = 100A/μs V _R = 100V, V _{GS} = 0V		85	ns
I_{RM}			6.80	A
Q_{RM}			0.29	μC

Note 1: Pulse Test, t ≤ 300μs, Duty Cycle, d ≤ 2 %.

ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated objective result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

IXYS Reserves The Right to Change Limits, Test Conditions, and Dimensions.

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

4,835,592	4,931,844	5,049,961	5,237,481	6,162,665	6,404,065 B1	6,683,344	6,727,585	7,005,734 B2	7,157,338B2
4,850,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	6,759,692	7,063,975 B2	
4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	6,771,478 B2	7,071,537	

Fig. 1. Output Characteristics
@ 25°C

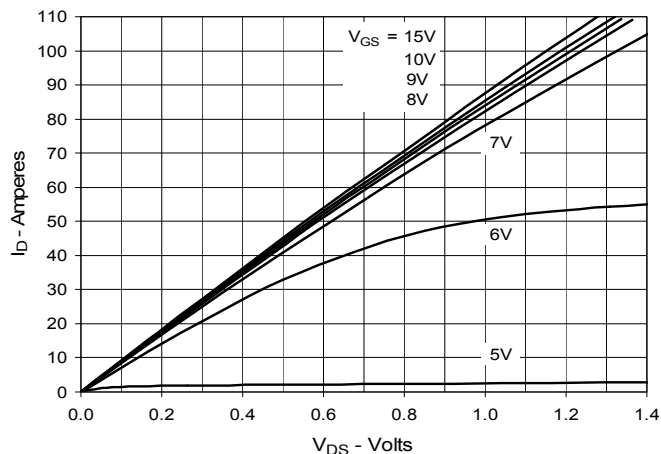


Fig. 2. Extended Output Characteristics
@ 25°C

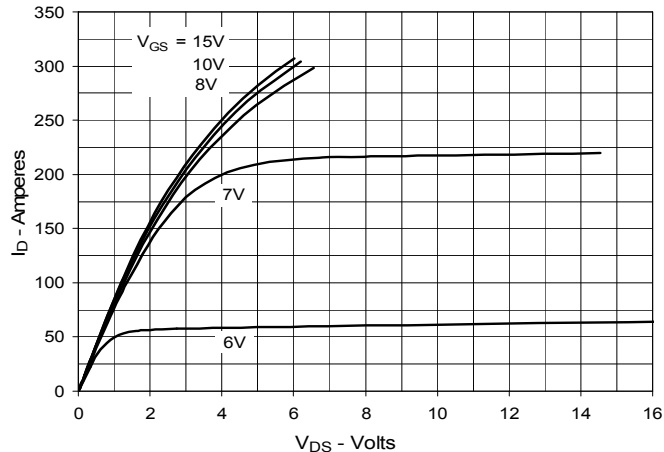


Fig. 3. Output Characteristics
@ 150°C

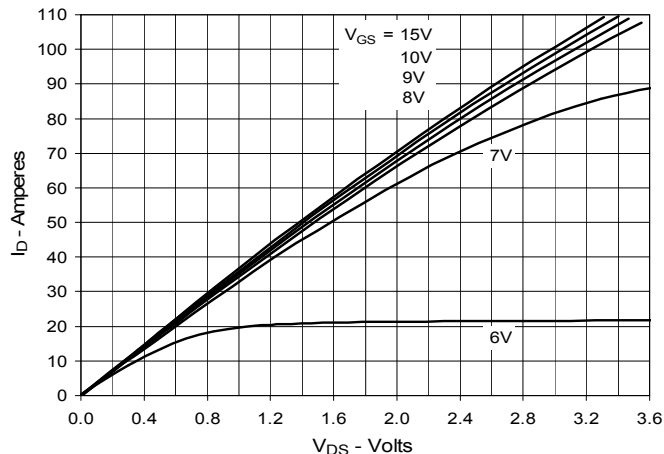


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 55A$ Value
vs. Junction Temperature

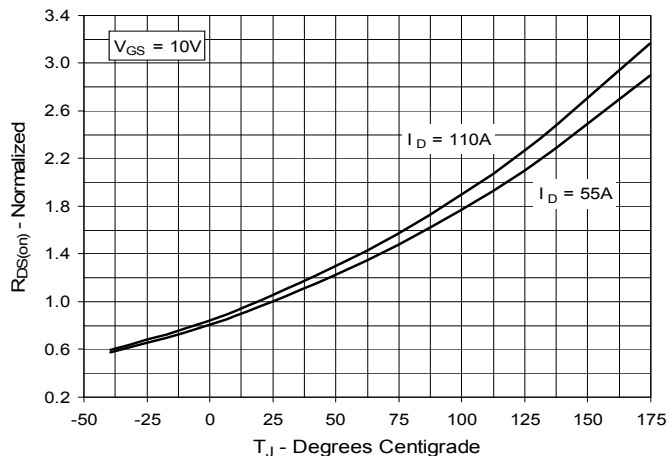


Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 55A$ Value
vs. Drain Current

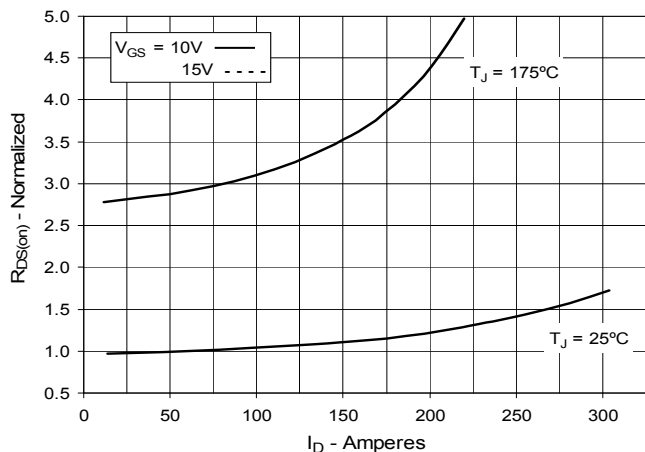


Fig. 6. Drain Current vs. Case Temperature

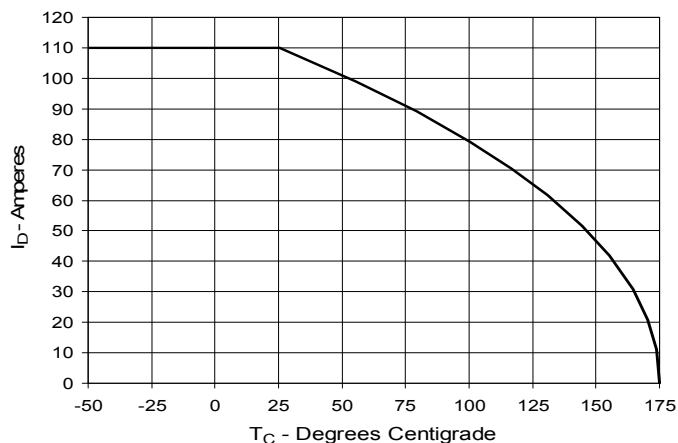


Fig. 7. Input Admittance

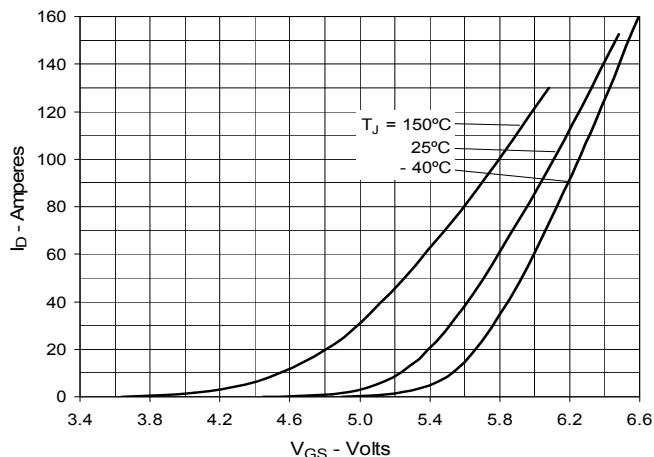


Fig. 8. Transconductance

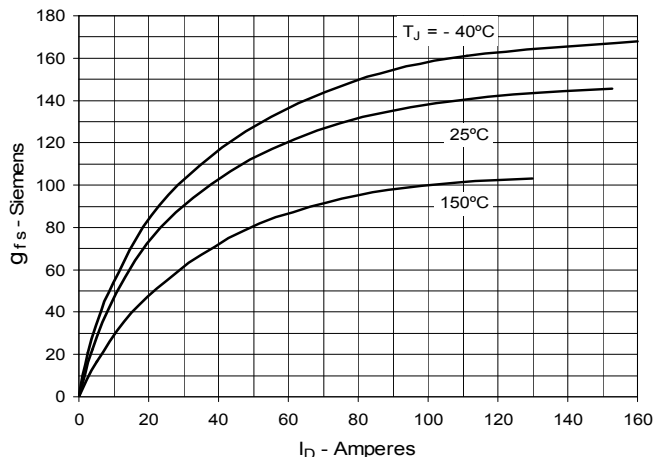


Fig. 9. Forward Voltage Drop of Intrinsic Diode

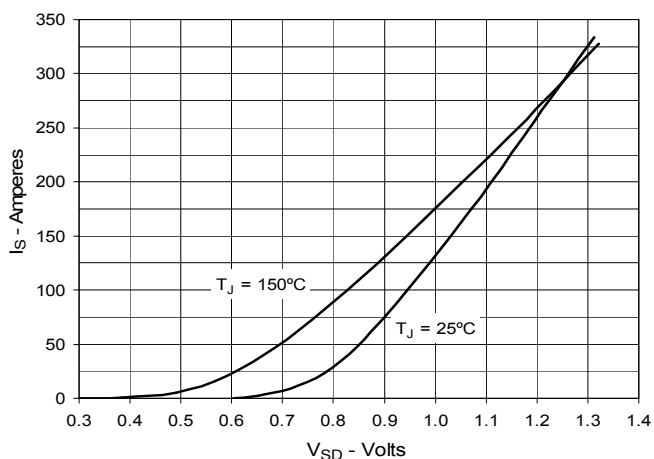


Fig. 10. Gate Charge

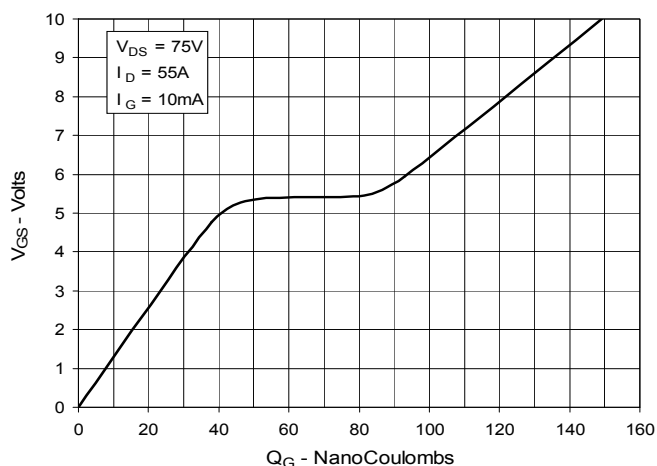


Fig. 11. Capacitance

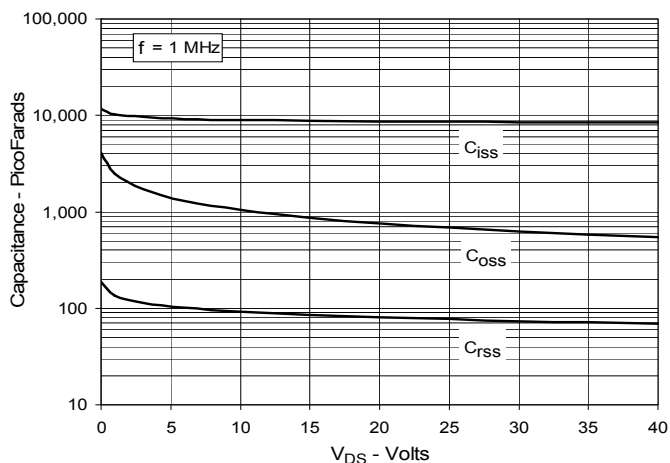
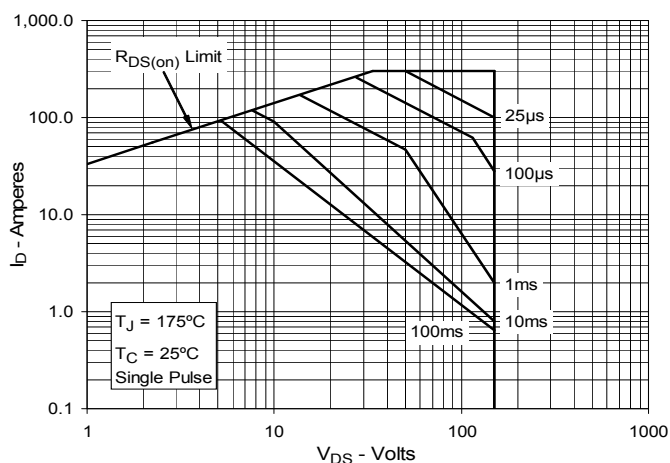
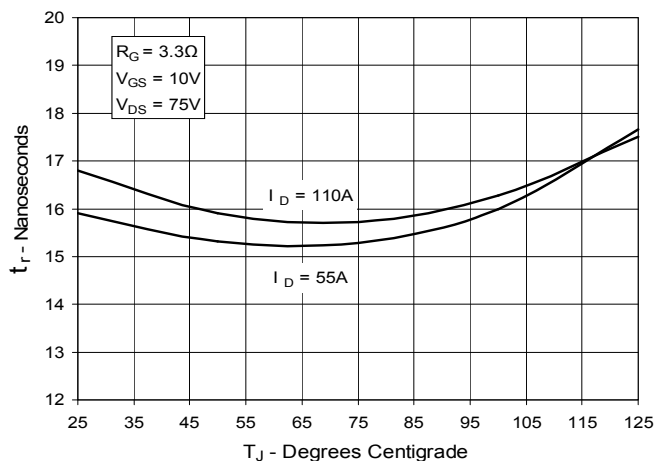


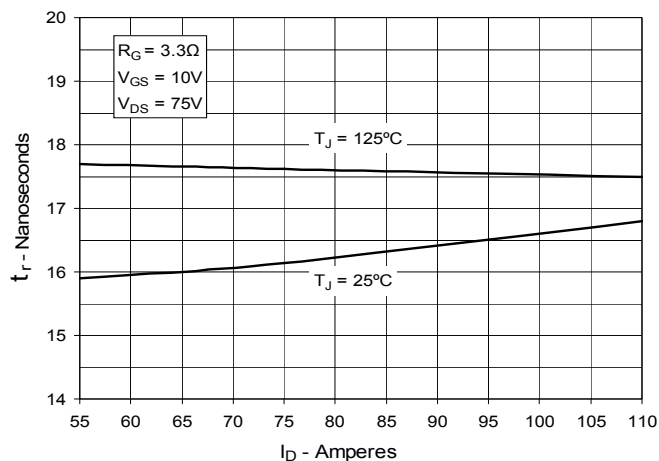
Fig. 12. Forward-Bias Safe Operating Area



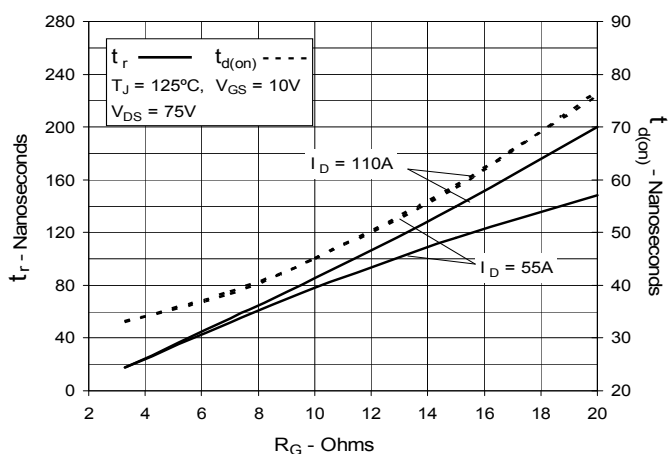
**Fig. 13. Resistive Turn-on
Rise Time vs. Junction Temperature**



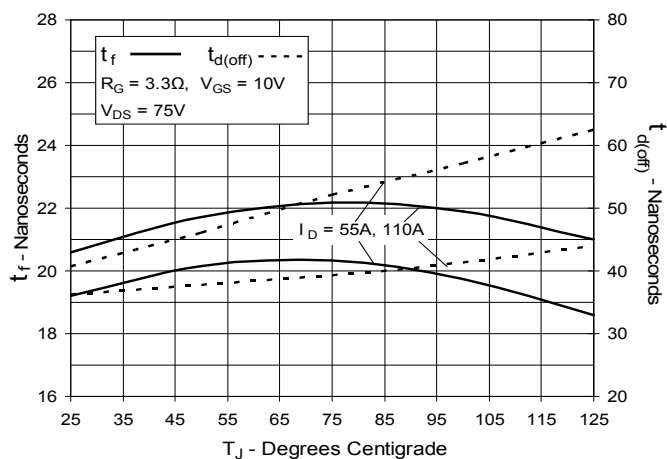
**Fig. 14. Resistive Turn-on
Rise Time vs. Drain Current**



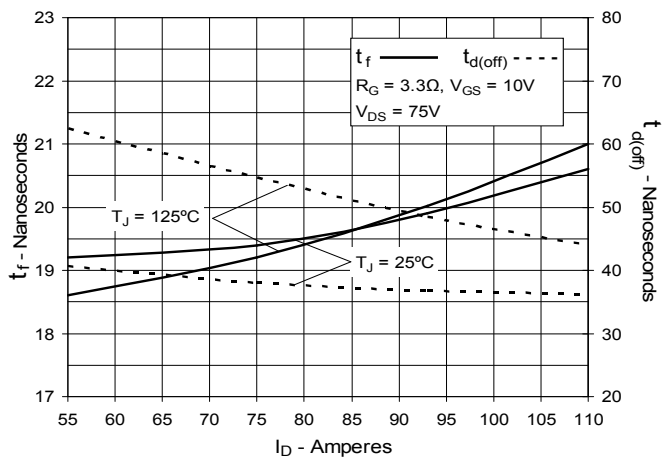
**Fig. 15. Resistive Turn-on
Switching Times vs. Gate Resistance**



**Fig. 16. Resistive Turn-off
Switching Times vs. Junction Temperature**



**Fig. 17. Resistive Turn-off
Switching Times vs. Drain Current**



**Fig. 18. Resistive Turn-off
Switching Times vs. Gate Resistance**

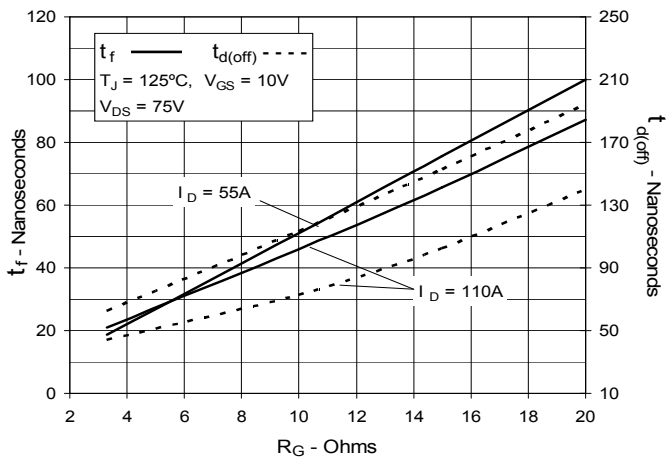


Fig. 19. Maximum Transient Thermal Impedance

