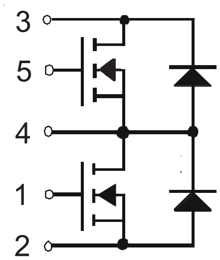
IXYS

Advance Technical Information

TrenchT2™ HiperFET N-Channel Power MOSFET

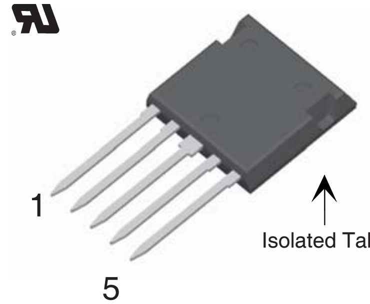
FMM150-0075X2F

V_{DSS} = 75V
I_{D25} = 120A
$R_{DS(on)}$ ≤ 5.8mΩ
$t_{rr(typ)}$ = 66ns



Phase Leg Topology

ISOPLUS i4-Pak™



Symbol	Test Conditions	Maximum Ratings	
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-55 ... +175	°C
V_{ISOL}	50/60H_Z, 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°C to 175°C	75	V
V_{DGR}	T_J = 25°C to 175°C, R_{GS} = 1MΩ	75	V
V_{GSM}	Transient	± 30	V
I_{D25}	T_C = 25°C	120	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	500	A
I_A	T_C = 25°C	115	A
E_{AS}	T_C = 25°C	850	mJ
dV/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 175°C$	20	V/ns
P_D	T_C = 25°C	170	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

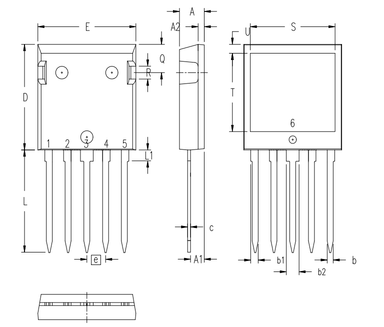
- Easy to Mount
- Space Savings
- High Power Density

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

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 250μA	75			V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2.0		4.0	V
I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0V			± 200	nA
I_{DSS}	V_{DS} = V_{DSS}, V_{GS} = 0V			25	μA
	T_J = 150°C			250	μA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 100A, Note 1			5.8	mΩ
g_{fs}	V_{DS} = 10V, I_D = 60A, Note 1	50	83		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25 V, f = 1 MHz		10.5		nF
C_{oss}			1165		pF
C_{rss}			125		pF
$t_{d(on)}$	**Resistive Switching Times**		23		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 115A		18		ns
$t_{d(off)}$	R_G = 2Ω (External)		33		ns
t_f			15		ns
$Q_{g(on)}$	V_{GS}= 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 100A		178		nC
Q_{gs}			37		nC
Q_{gd}			55		nC
R_{thJC}				0.88	°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 MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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 (T_J = 25°C Unless Otherwise Specified)	Min.	Typ.	Max.	
I_S	V_{GS} = 0V			230	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			900	A
V_{SD}	I_F = 75A, V_{GS} = 0V, Note 1			1.5	V
t_{rr}	I_F = 115A, -di/dt = 100A/μs		66		ns
I_{RM}	V_R = 37V, V_{GS} = 0V		4.4		A
Q_{RM}			145		nC

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.

Fig. 1. Output Characteristics @ T_J = 25ºC

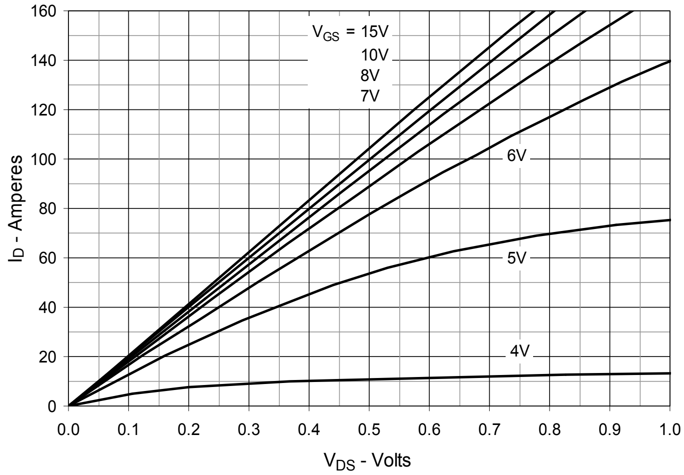


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

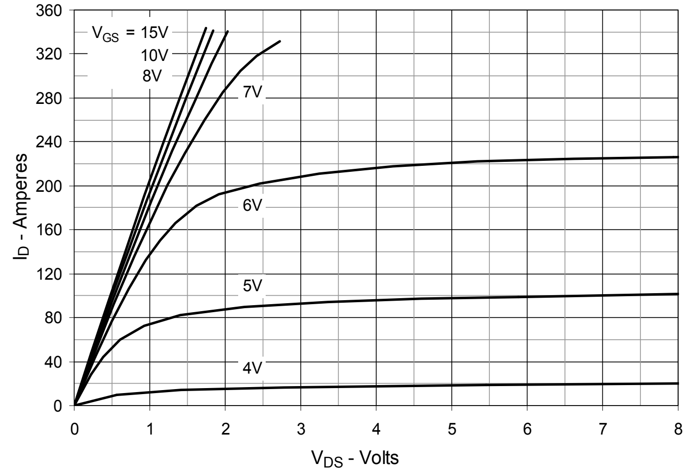


Fig. 3. Output Characteristics @ T_J = 150ºC

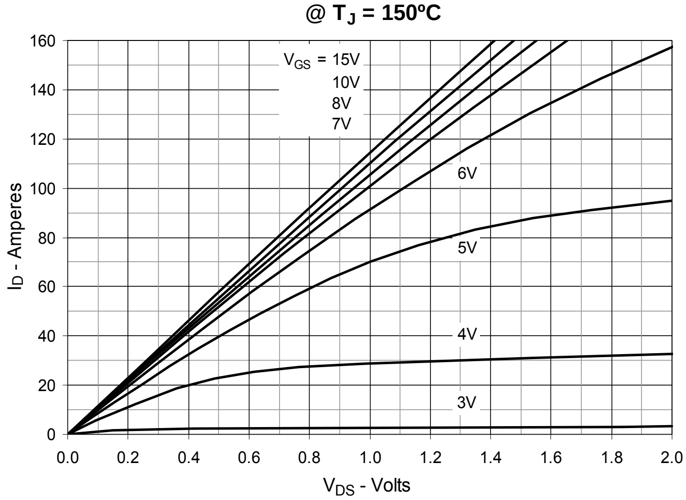


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 75A Value vs. Junction Temperature

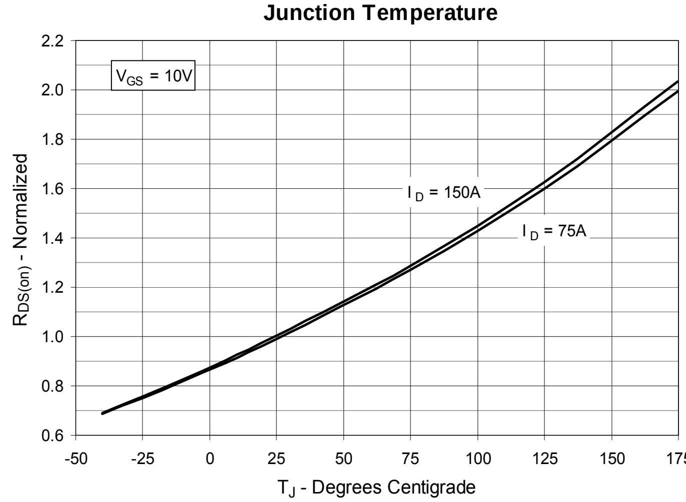


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 75A Value vs. Drain Current

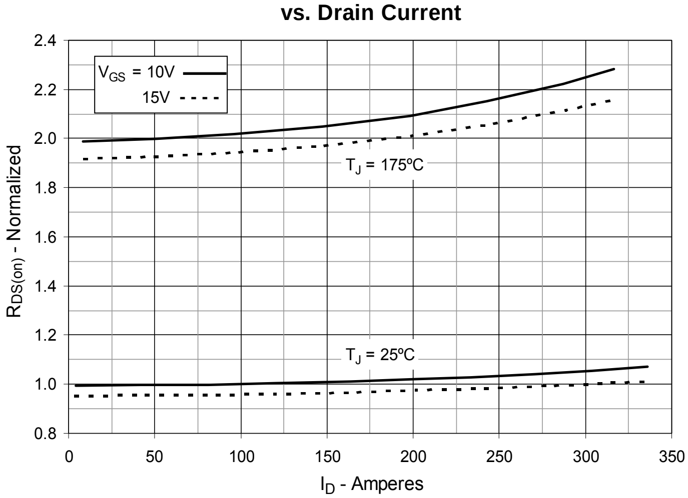


Fig. 6. Drain Current vs. Case Temperature

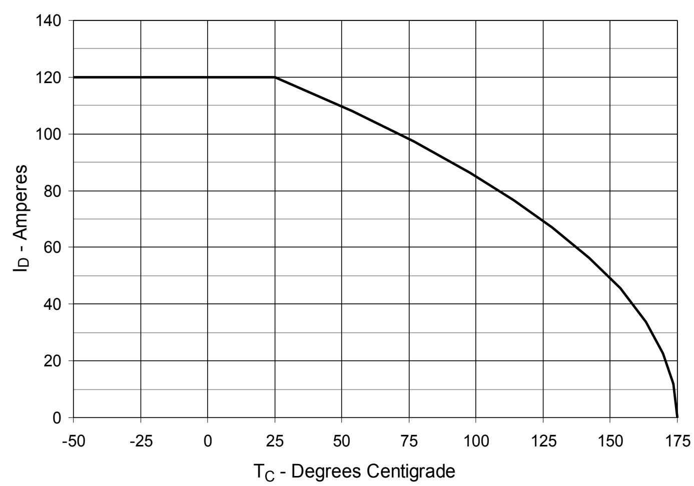


Fig. 7. Input Admittance

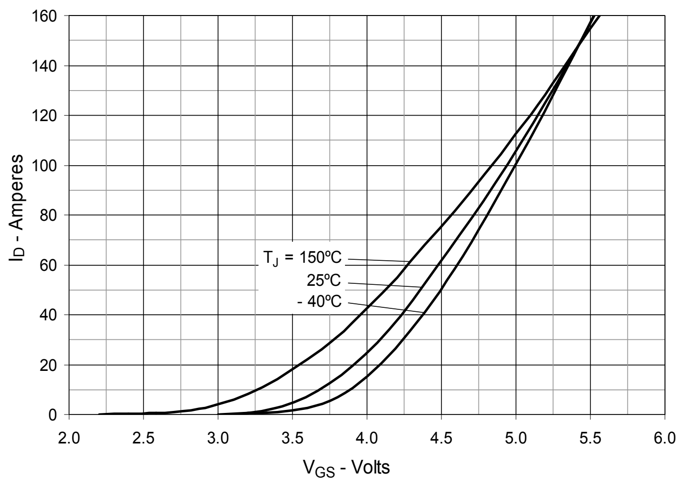


Fig. 8. Transconductance

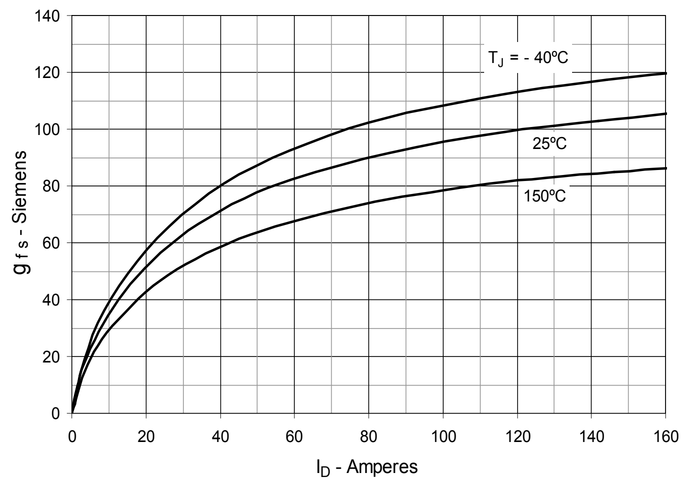


Fig. 9. Forward Voltage Drop of Intrinsic Diode

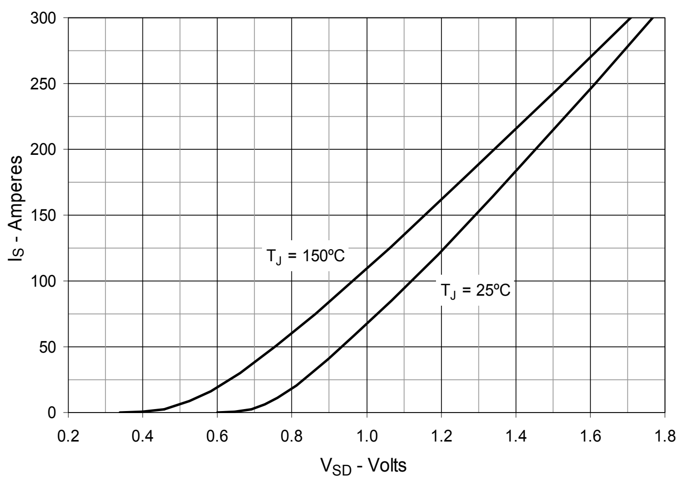


Fig. 10. Gate Charge

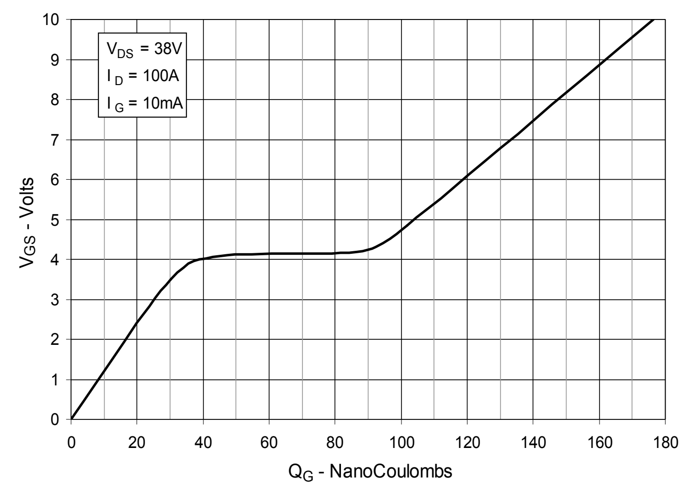


Fig. 11. Capacitance

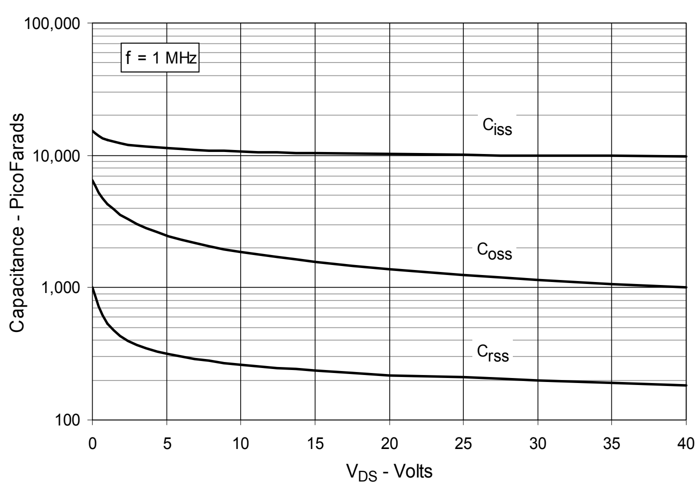
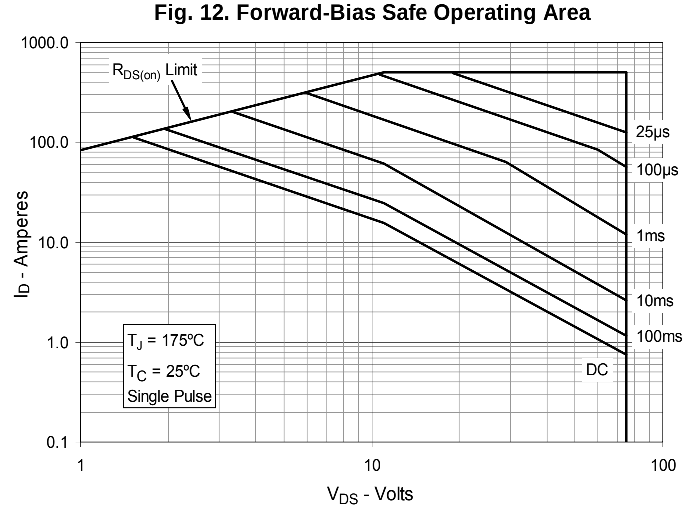


Fig. 12. Forward-Bias Safe Operating Area



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

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

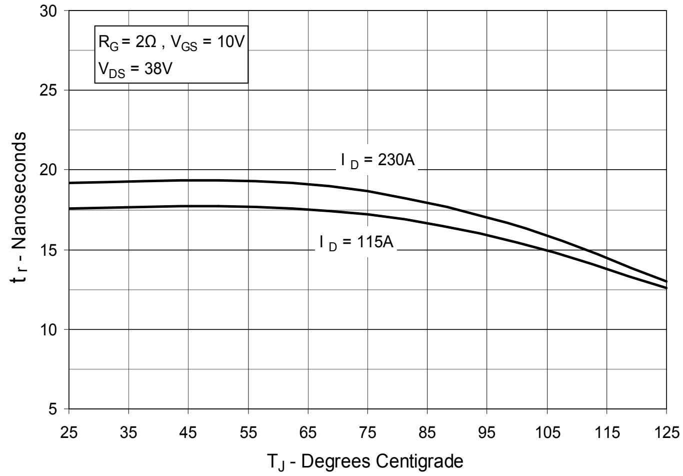


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

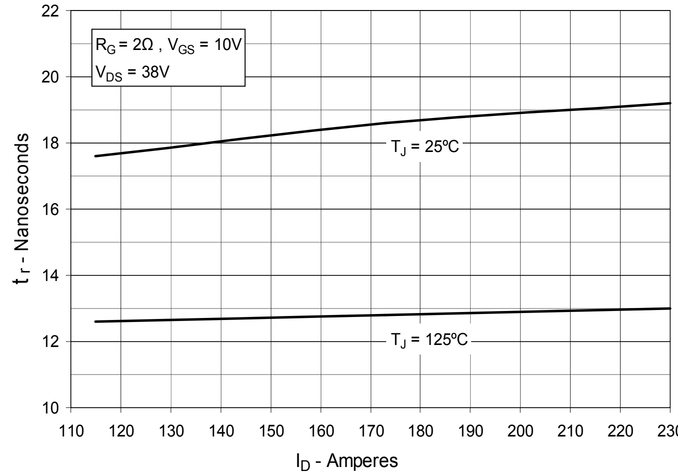


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

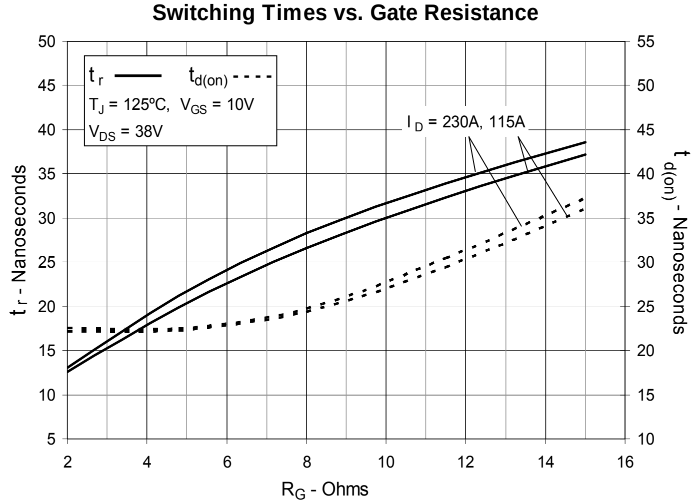


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

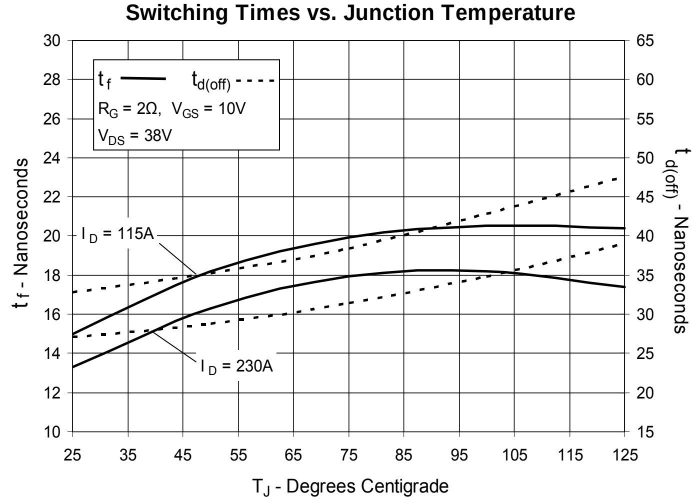


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

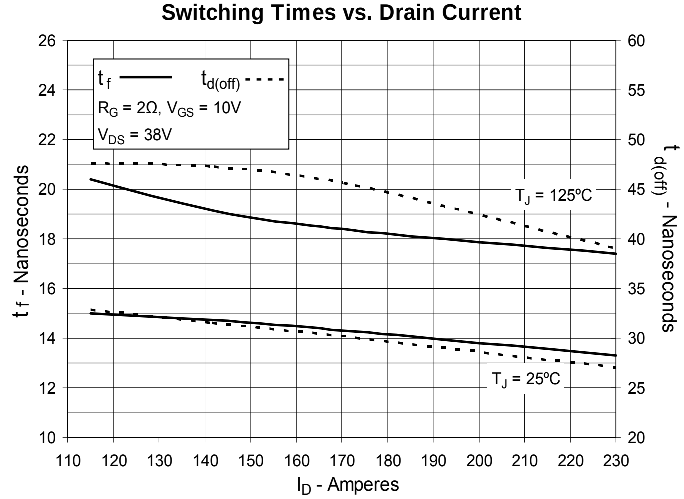


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance

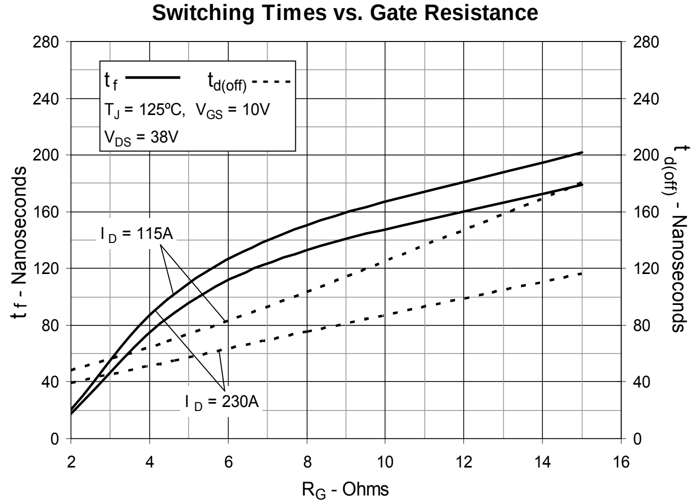


Fig. 19. Maximum Transient Thermal Impedance