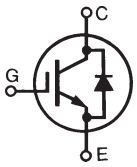
IXYS

High Voltage, High Gain BiMOSFET™

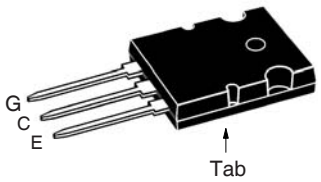
IXBK64N250
IXBX64N250

V_{CES} = 2500V
I_{C110} = 64A
$V_{CE(sat)}$ ≤ 3.0V

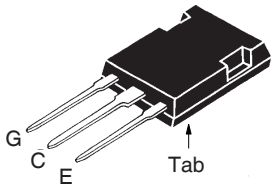
Monolithic Bipolar MOS Transistor



TO-264 (IXBK)



PLUS247™ (IXBX)



G = Gate C = Collector
E = Emitter Tab = Collector

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	2500	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	2500	V
V_{GES}	Continuous	±25	V
V_{GEM}	Transient	±35	V
I_{C25}	T_C = 25°C (Chip Capability)	156	A
I_{LRMS}	Lead Current Limit, RMS	120	A
I_{C100}	T_C = 110°C	64	A
I_{CM}	T_C = 25°C, 1ms	600	A
SSOA	V_{GE}= 15V, T_{VJ} = 125°C, R_G = 1Ω	I_{CM} = 160	A
(RBSOA)	Clamped Inductive Load	$V_{CE} \leq 0.8 \bullet V_{CES}$	
T_{SC} (SCSOA)	V_{GE} = 15V, T_J = 125°C, R_G = 5Ω, V_{CE} = 1250V, Non-Repetitive	10	μs
P_C	T_C = 25°C	735	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	1.6 mm (0.062 in.) from Case for 10	260	°C
M_d	Mounting Torque (TO-264)	1.13/10	Nm/lb.in.
F_C	Mounting Force (PLUS247)	20..120/4.5..27	N/lb.
Weight	TO-264	10	g
	PLUS247	6	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 1mA, V_{GE} = 0V	2500			V
$V_{GE(th)}$	I_C = 4mA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = 0.8 • V_{CES}, V_{GE} = 0V			50	μA
	T_J = 125°C			6	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ± 25V			±200	nA
$V_{CE(sat)}$	I_C = I_{C110}, V_{GE} = 15V, Note 1		2.5	3.0	V
	T_J = 125°C		3.1		V

Features

- High Blocking Voltage
- Low Switching Losses
- High Current Handling Capability
- Anti-Parallel Diode

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

- Switch-Mode and Resonant-Mode Power Supplies
- Uninterrupted Power Supplies (UPS)
- Capacitor Discharge Circuits
- Laser Generators

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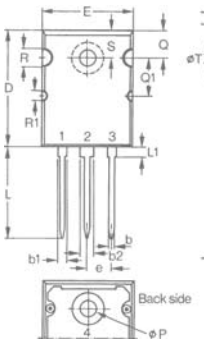
Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fS}	$I_C = I_{C110}$, V_{CE} = 10V, Note 1	40	72		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		8900		pF
C_{oes}			345		pF
C_{res}			118		pF
Q_g	$I_C = I_{C110}$, V_{GE} = 15V, V_{CE} = 600V		400		nC
Q_{ge}			46		nC
Q_{gc}			155		nC
$t_{d(on)}$	**Resistive Switching Times, T_J = 25°C**		49		ns
t_r	I_C = 128A, V_{GE} = 15V, tp = 1μs		318		ns
$t_{d(off)}$	V_{CE} = 1250V, R_G = 1Ω		232		ns
t_f			170		ns
$t_{d(on)}$	**Resistive Switching Times, T_J = 125°C**		54		ns
t_r	I_C = 128A, V_{GE} = 15V, tp = 1μs		578		ns
$t_{d(off)}$	V_{CE} = 1250V, R_G = 1Ω		222		ns
t_f			175		ns
R_{thJC}				0.17	°C/W
R_{thCS}			0.15		°C/W

TO-264 Outline



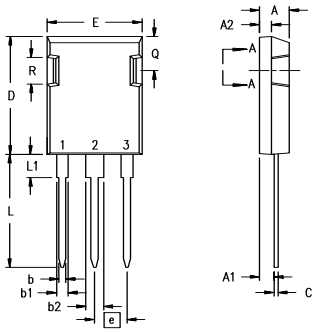
Terminals: 1 - Gate
2 - Collector
3 - Emitter
4 - Collector

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.82	5.13	.190	.202
A1	2.54	2.89	.100	.114
A2	2.00	2.10	.079	.083
b	1.12	1.42	.044	.056
b1	2.39	2.69	.094	.106
b2	2.90	3.09	.114	.122
c	0.53	0.83	.021	.033
D	25.91	26.16	1.020	1.030
E	19.81	19.96	.780	.786
e	5.46 BSC		.215 BSC	
J	0.00	0.25	.000	.010
K	0.00	0.25	.000	.010
L	20.32	20.83	.800	.820
L1	2.29	2.59	.090	.102
P	3.17	3.66	.125	.144
Q	6.07	6.27	.239	.247
Q1	8.38	8.69	.330	.342
R	3.81	4.32	.150	.170
R1	1.78	2.29	.070	.090
S	6.04	6.30	.238	.248
T	1.57	1.83	.062	.072

Reverse Diode

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max	
V_F	$I_F = I_{C110}$, V_{GE} = 0V, Note 1			3.0	V
t_{rr}	$I_F = I_{C110}$, V_{GE} = 0V, $-di_F/dt$ = 650A/μs		160		ns
I_{RM}	V_R = 600V, V_{GE} = 0V		480		A

PLUS247™ Outline



Terminals: 1 - Gate
2 - Collector
3 - Emitter

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.83	5.21	.190	.205
A_1	2.29	2.54	.090	.100
A_2	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b_1	1.91	2.13	.075	.084
b_2	2.92	3.12	.115	.123
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	5.45 BSC		.215 BSC	
L	19.81	20.32	.780	.800
L1	3.81	4.32	.150	.170
Q	5.59	6.20	.220	0.244
R	4.32	4.83	.170	.190

Note 1: Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.

Additional provisions for lead-to-lead isolation are required at V_{CE} >1200V.

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

IXYS MOSFETs and IGBTs are covered by one or moreof 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 @ T_J = 25ºC

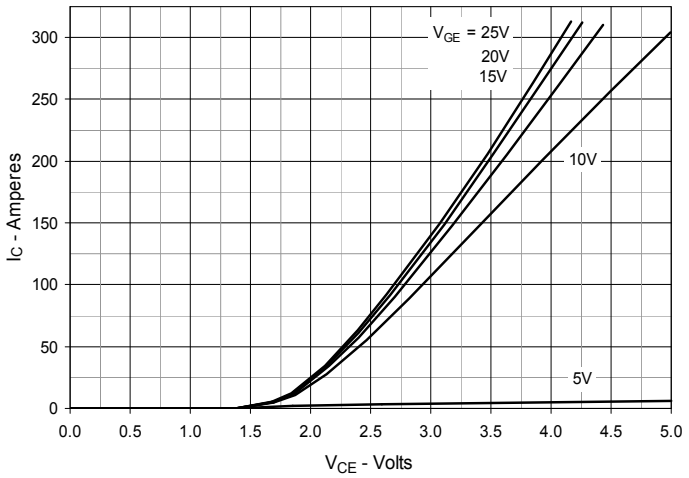


Fig. 2. Output Characteristics @ T_J = 125ºC

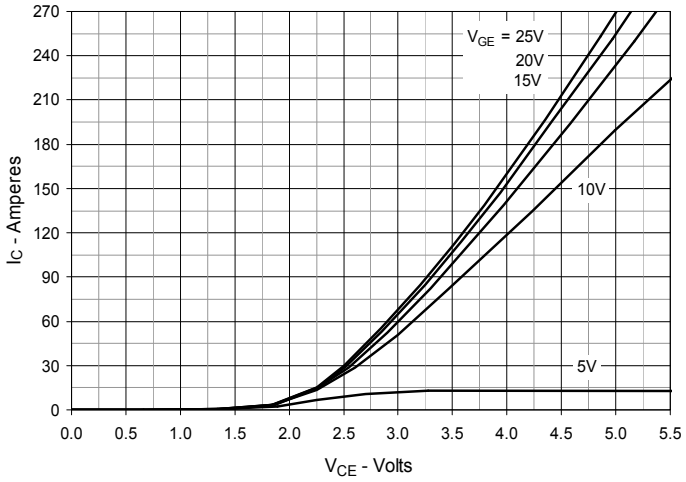


Fig. 3. Dependence of $V_{CE(sat)}$ on Junction Temperature

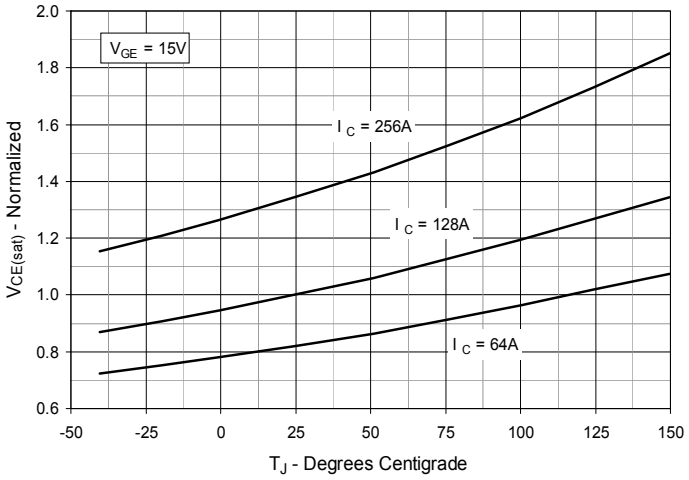


Fig. 4. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

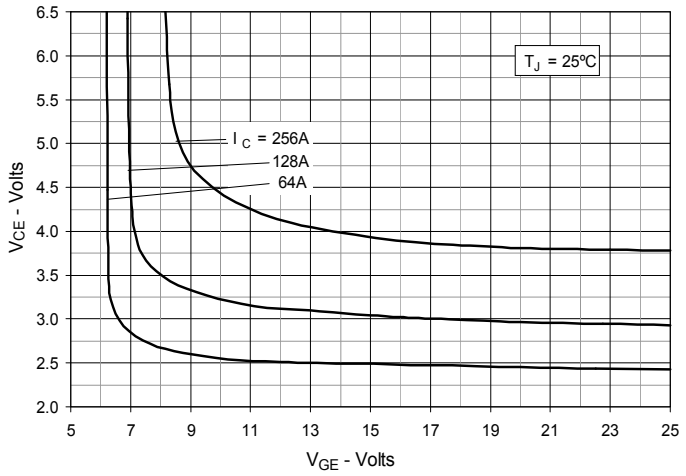


Fig. 5. Breakdown & Threshold Voltages vs. Junction Temperature

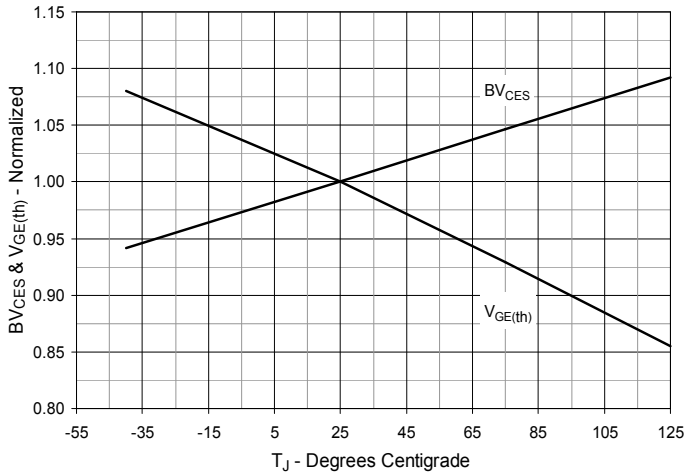


Fig. 6. Input Admittance

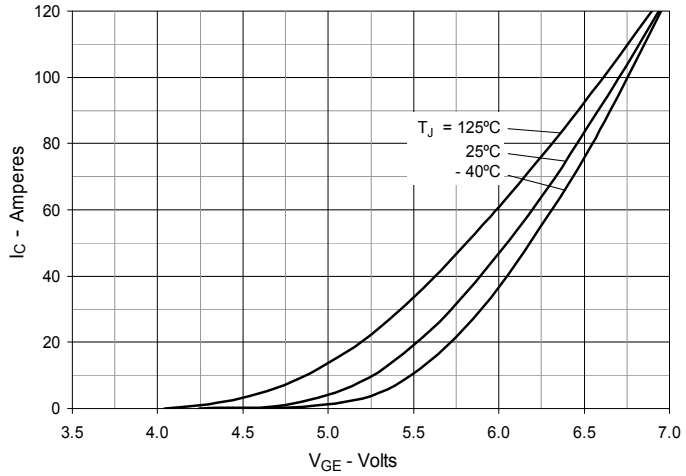


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Fig. 7. Transconductance

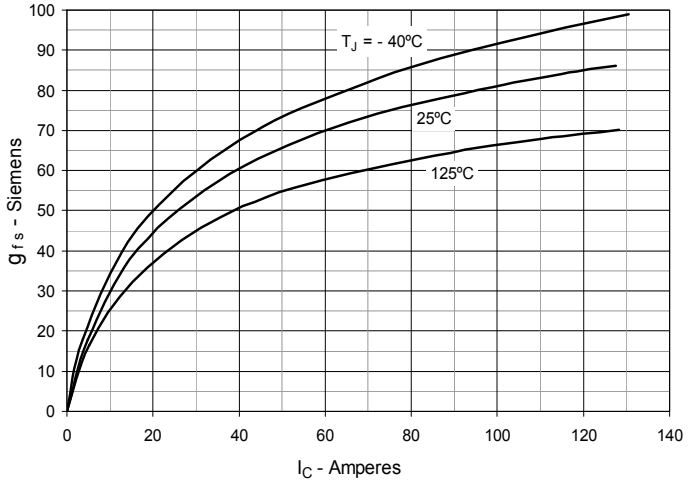


Fig. 8. Forward Voltage Drop of Intrinsic Diode

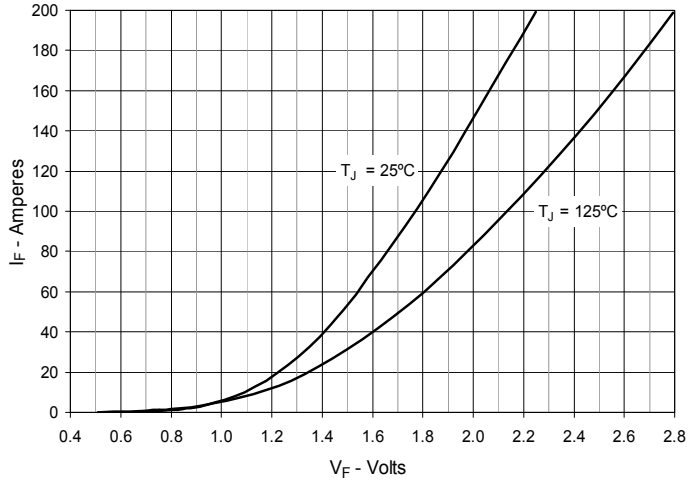


Fig. 9. Gate Charge

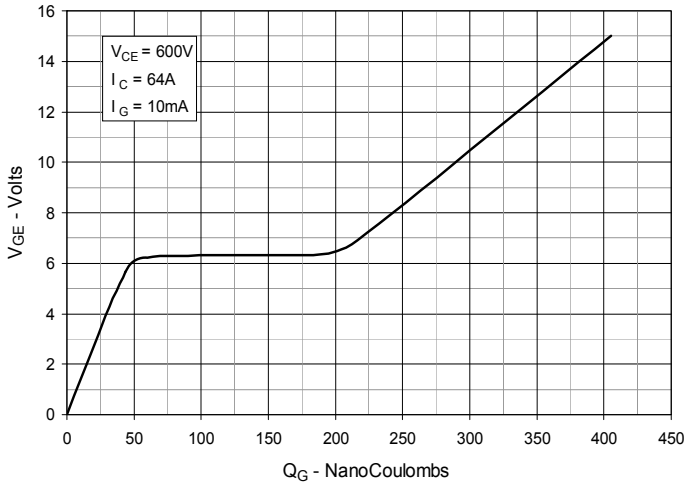


Fig. 10. Capacitance

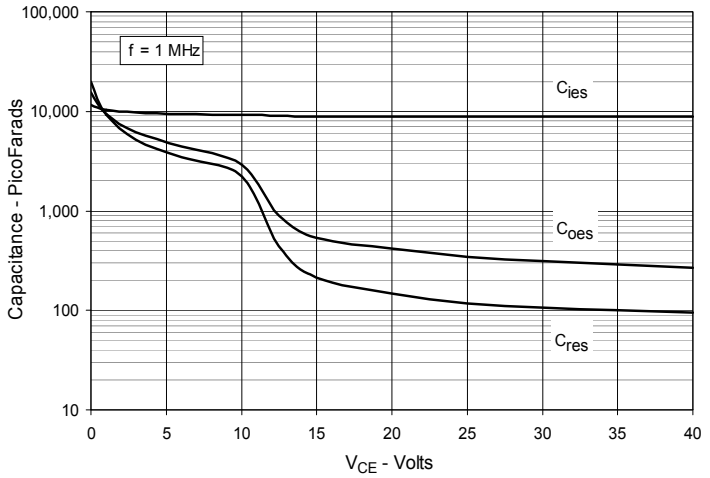


Fig. 11. Reverse-Bias Safe Operating Area

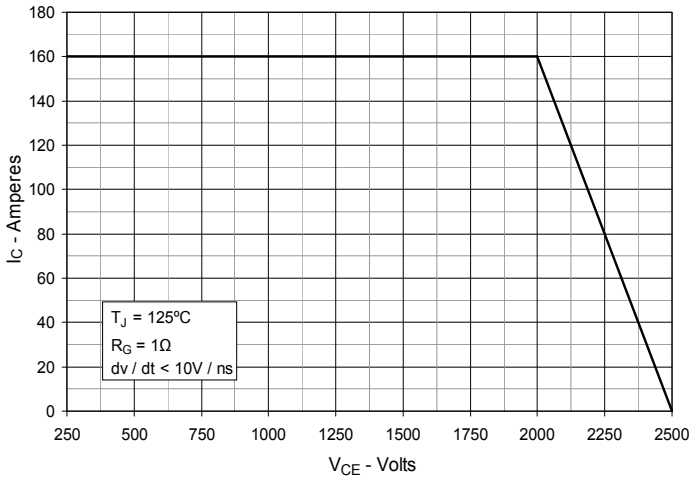
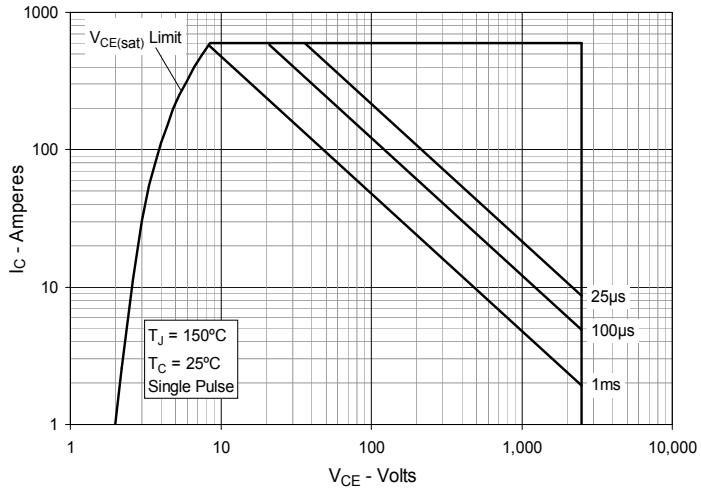


Fig. 12. Forward-Bias Safe Operating Area



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

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

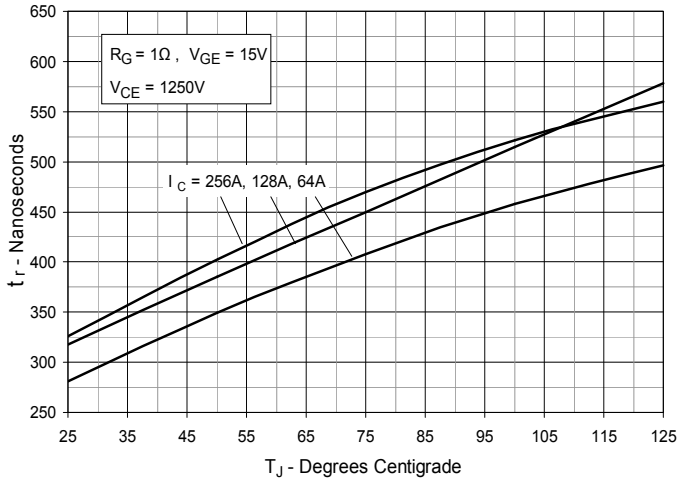


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

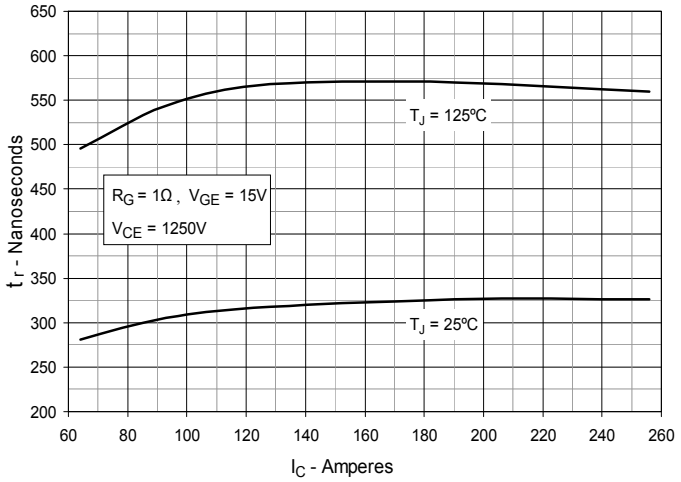


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

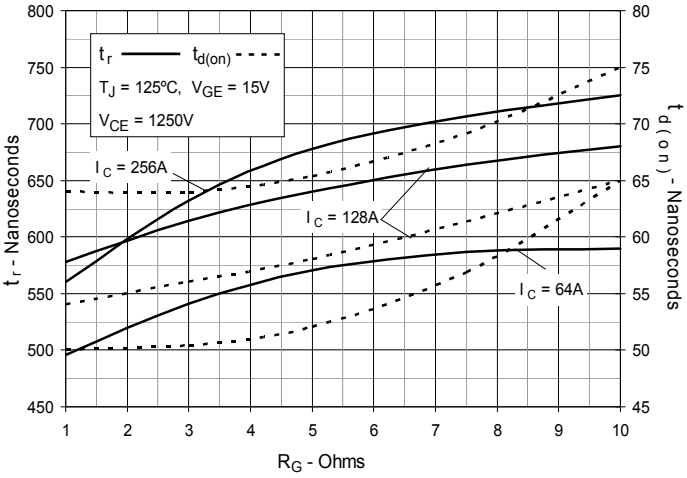


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

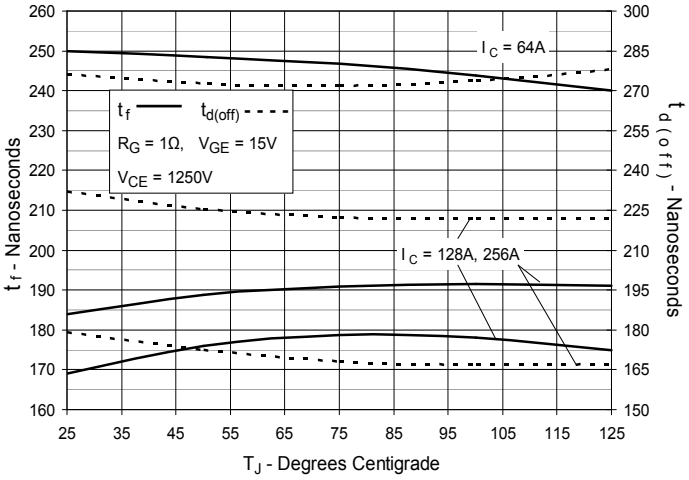


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

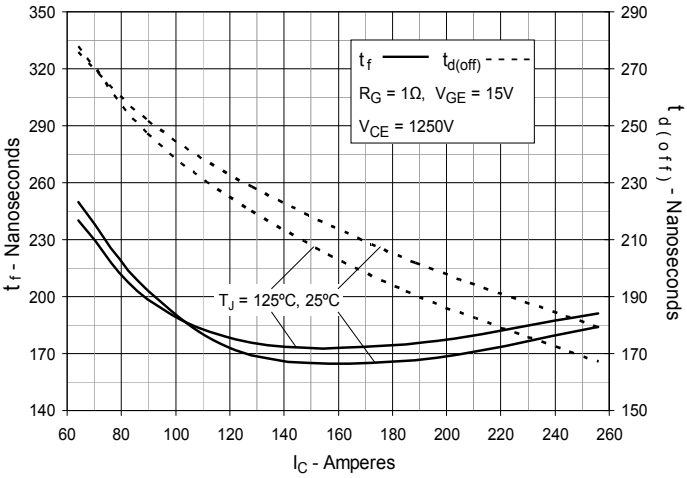
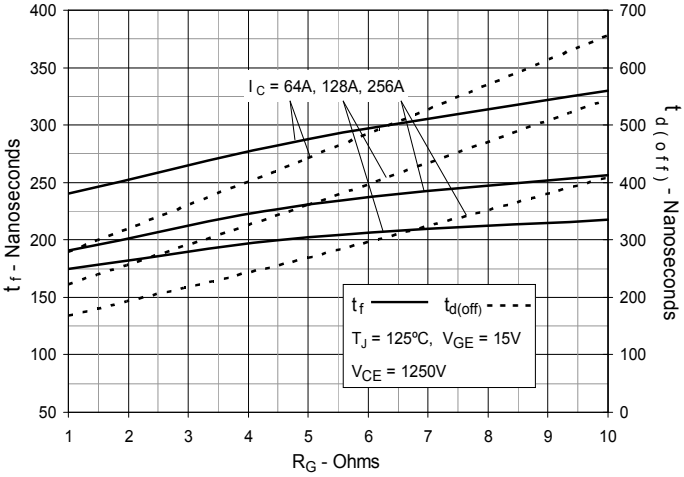


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance



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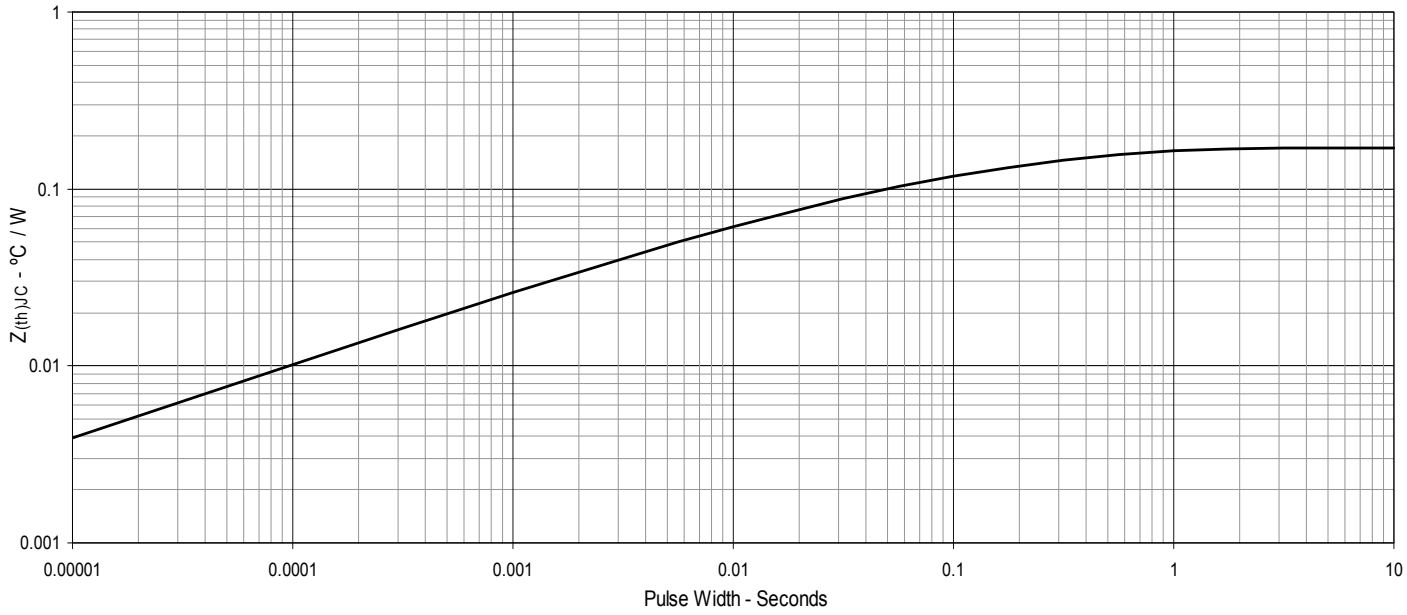
Fig. 19. Maximum Transient Thermal Impedance