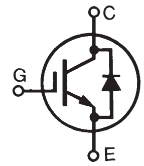
IXYS

Preliminary Technical Information

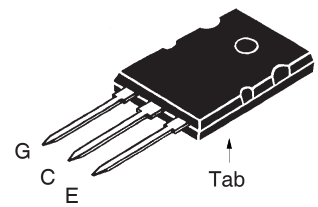
BiMOSFET™ Monolithic Bipolar MOS Transistor

IXBK75N170
IXBX75N170

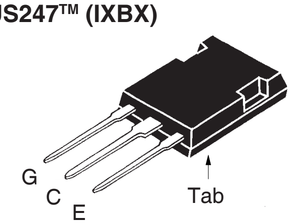
V_{CES} = 1700V
I_{C110} = 75A
$V_{CE(sat)}$ ≤ 3.1V



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	1700	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	1700	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C (Chip Capabilitty)	200	A
I_{LRMS}	T_C = 25°C (Lead RMS Limit)	160	A
I_{C110}	T_C = 110°C	75	A
I_{CM}	T_C = 25°C, 1ms	580	A
SSOA	V_{GE}= 15V, T_{VJ} = 125°C, R_G = 1Ω	I_{CM} = 150	A
(RBSOA)	Clamped Inductive Load	V_{CE} ≤ 0.8 • V_{CES}	
P_C	T_C = 25°C	1040	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 = 250μA, V_{GE} = 0V	1700			V
$V_{GE(th)}$	I_C = 1.5mA, V_{CE} = V_{GE}	2.5		5.5	V
I_{CES}	V_{CE} = 0.8 • V_{CES}, V_{GE} = 0V			25	μA
	T_J = 125°C			2	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ± 20V			±100	nA
$V_{CE(sat)}$	I_C = I_{C110}, V_{GE} = 15V, Note 1		2.6	3.1	V
	T_J = 125°C		3.1		V

Features

- International Standard Packages
- High Blocking Voltage
- High Current Handling Capability
- Anti-Parallel Diode

Advantages

- High Power Density
- Low Gate Drive Requirement
- Intergrated Diode Can Be Used for Protection

Applications

- Capacitor Discharge
- AC Switches
- Switch-Mode and Resonant-Mode Power Supplies
- UPS
- AC Motor Drives

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Min.	Typ.	Max.	
g_{fS}	$I_C = I_{C110}$, V_{CE} = 10V, Note 1	34	56		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		6930		pF
C_{oes}			400		pF
C_{res}			150		pF
Q_g	$I_C = I_{C110}$, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		350		nC
Q_{ge}			50		nC
Q_{gc}			160		nC
$t_{d(on)}$	**Resistive load, T_J = 25°C**		46		ns
t_r	$I_C = I_{C110}$, V_{GE} = 15V		160		ns
$t_{d(off)}$	R_G = 1Ω, V_{CE} = 0.5 • V_{CES}		260		ns
t_f			440		ns
$t_{d(on)}$	**Resistive load, T_J = 125°C**		47		ns
t_r	$I_C = I_{C110}$, V_{GE} = 15V		230		ns
$t_{d(off)}$	R_G = 1Ω, V_{CE} = 0.5 • V_{CES}		260		ns
t_f			580		ns
R_{thJC}				0.12	°C/W
R_{thCS}			0.15		°C/W

Reverse Diode

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Min.	Typ.	Max	
V_F	$I_F = I_{C110}$, V_{GE} = 0V, Note 1			3.0	V
t_{rr}	I_F = 37A, V_{GE} = 0V, -di_F/dt = 100A/μs		1.5		μs
I_{RM}	V_R = 100V, V_{GE} = 0V		50		A
Q_{RM}			38.2		μC

Note

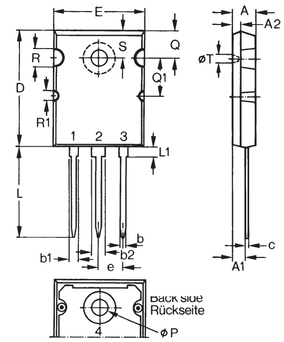
1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.

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

PRELIMINARY TECHNICAL INFORMATION

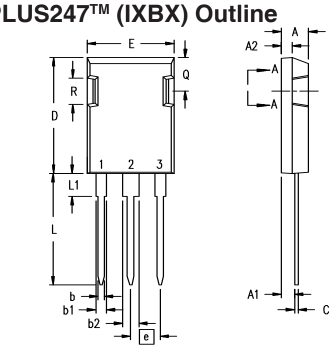
The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

TO-264 AA (IXBK) Outline



Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches 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

PLUS247™ (IXBX) Outline



Terminals: 1 - Gate
2 - Drain (Collector)
3 - Source (Emitter)

Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches 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

IXYS MOSFETs and IGBTs are covered by one or moreof the following U.S. patents: 4,835,592 4,850,072 4,881,106 4,931,844 5,017,508 5,034,796 5,049,961 5,063,307 5,187,117 5,237,481 5,381,025 5,486,715 6,162,665 6,259,123 B1 6,306,728 B1 6,404,065 B1 6,534,343 6,583,505 6,683,344 6,710,405 B2 6,710,463 6,727,585 6,759,692 6,771,478 B2 7,005,734 B2 7,063,975 B2 7,071,537 7,157,338B2

Fig. 1. Output Characteristics @ 25ºC

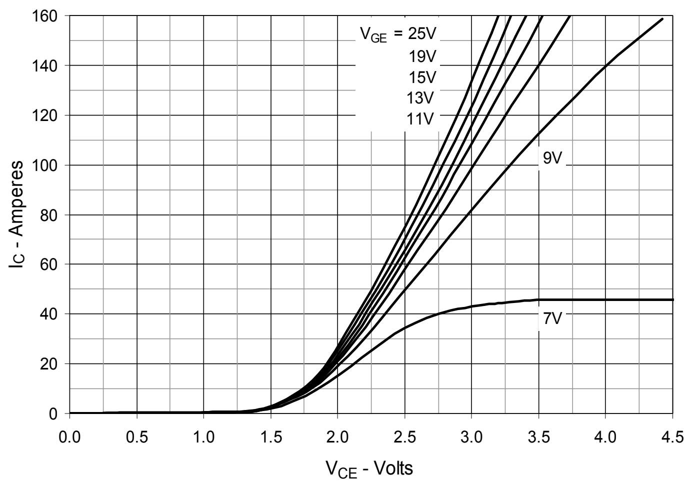


Fig. 2. Extended Output Characteristics @ 25ºC

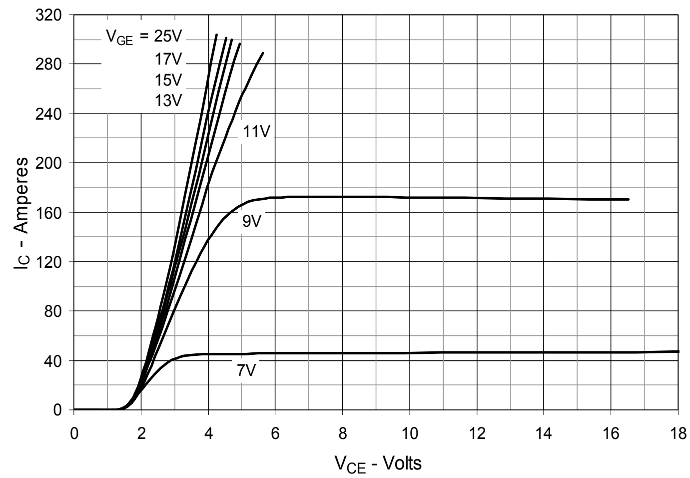


Fig. 3. Output Characteristics @ 125ºC

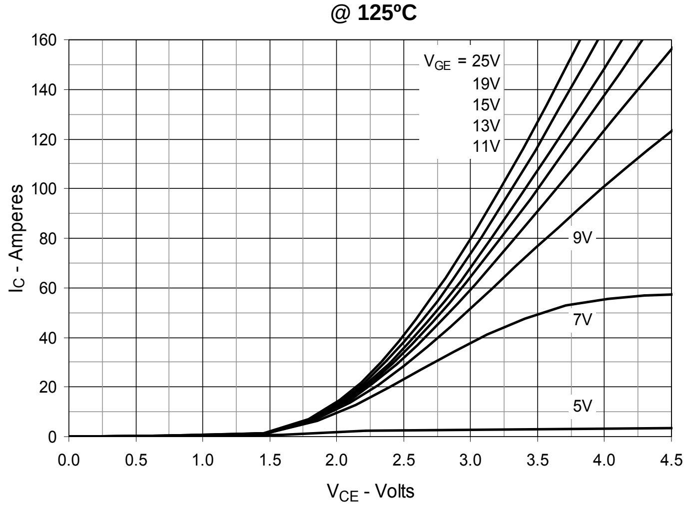


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

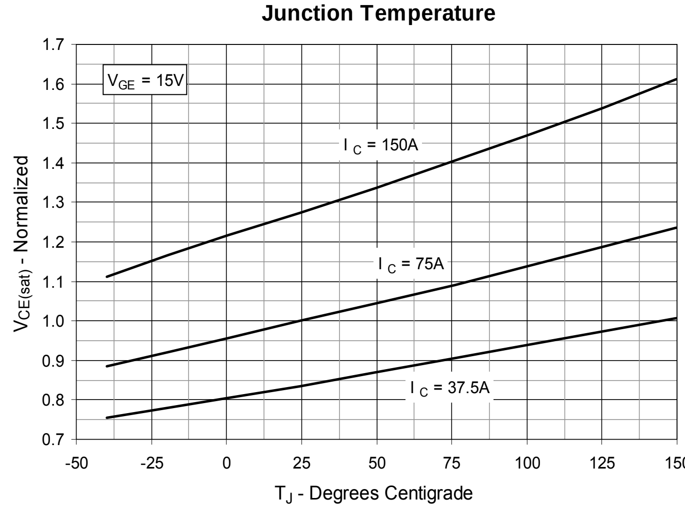


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

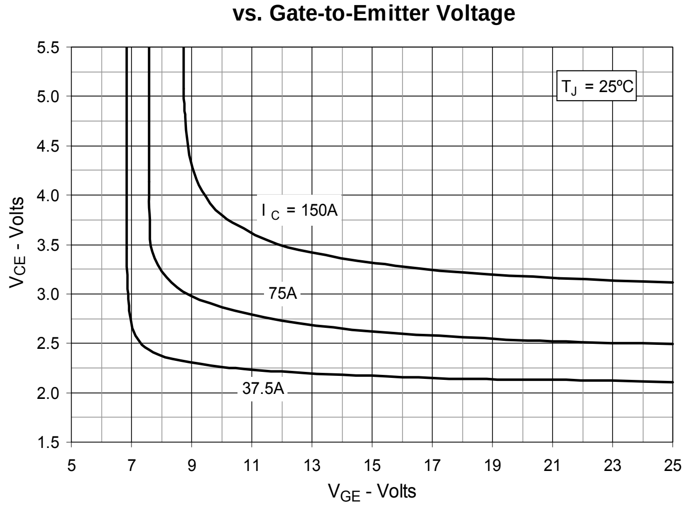


Fig. 6. Input Admittance

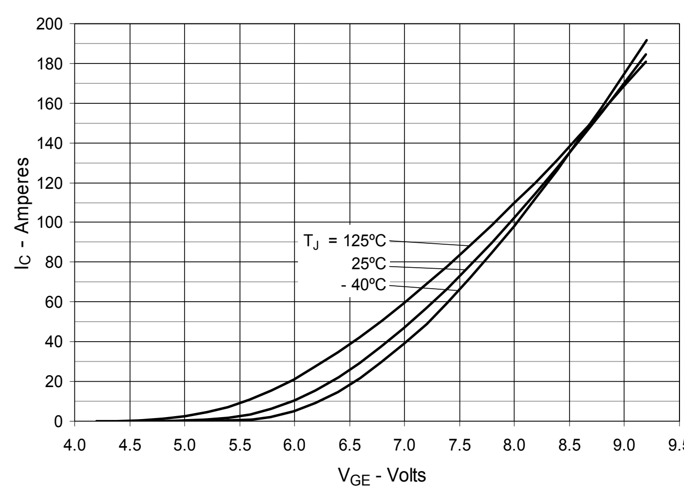


Fig. 7. Transconductance

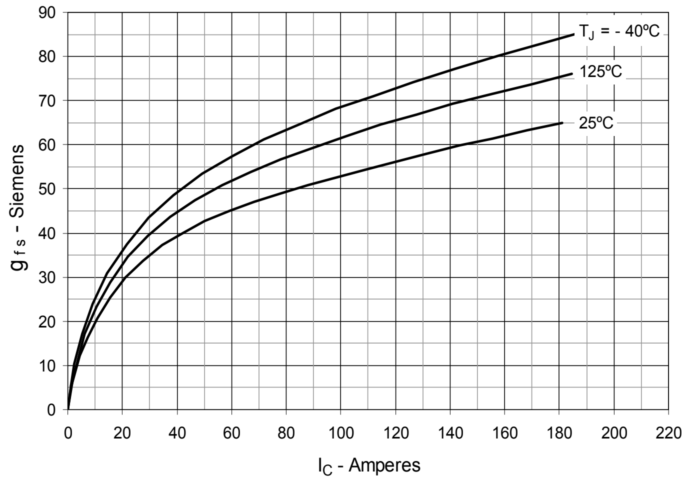


Fig. 8. Forward Voltage Drop of Intrinsic Diode

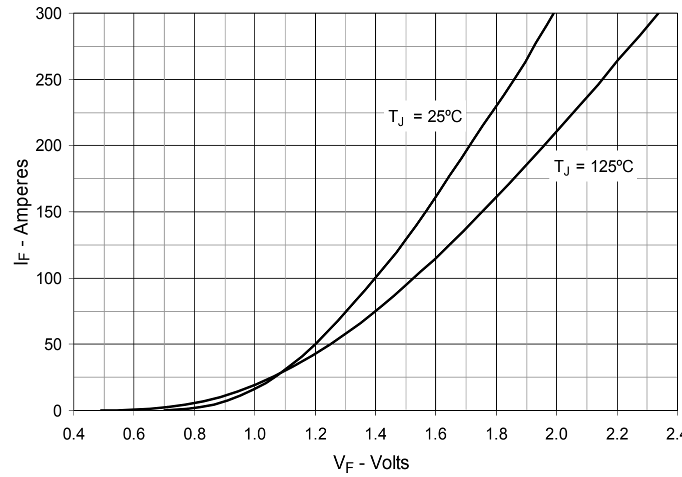


Fig. 9. Gate Charge

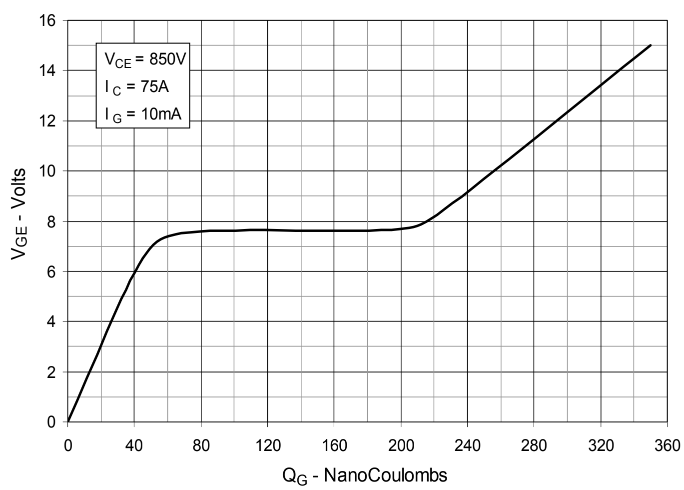


Fig. 10. Capacitance

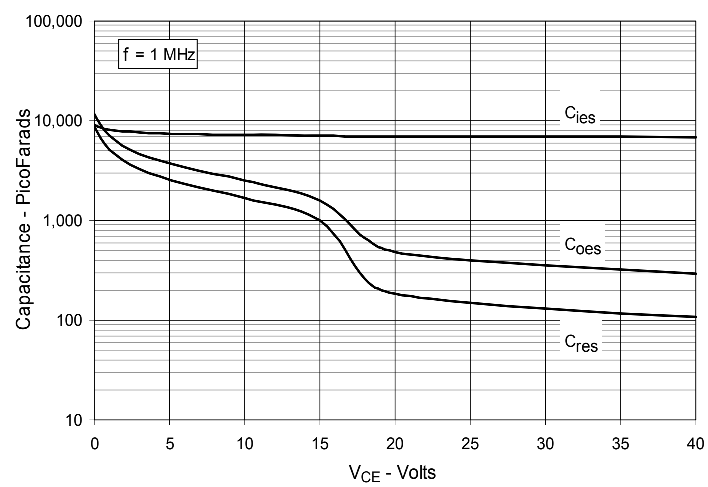


Fig. 11. Reverse-Bias Safe Operating Area

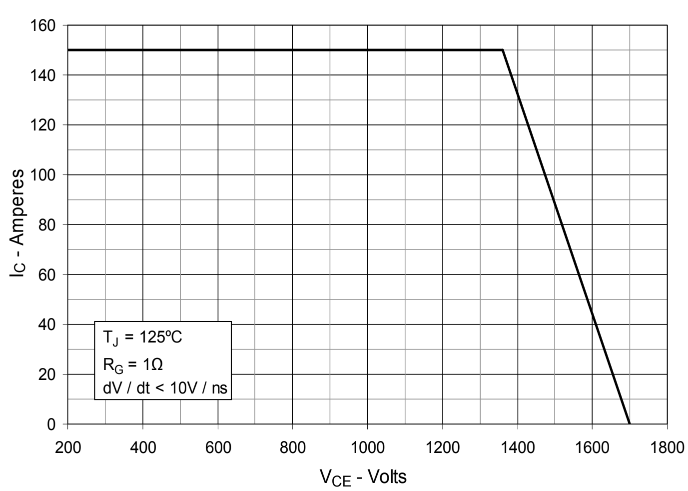


Fig. 12. Maximum Transient Thermal Impedance

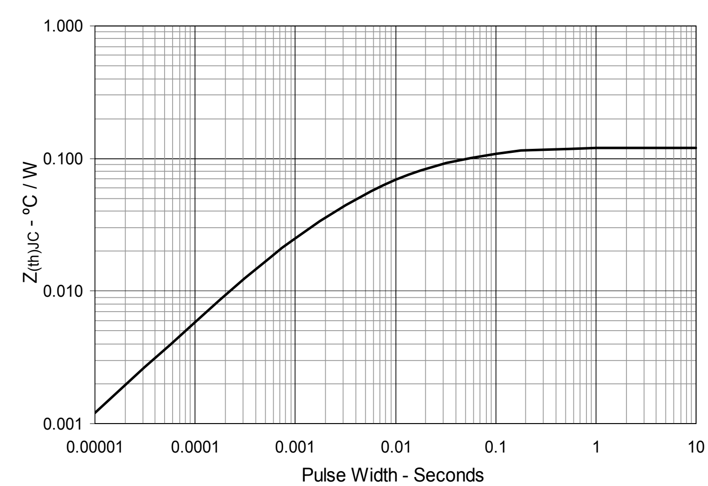


Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

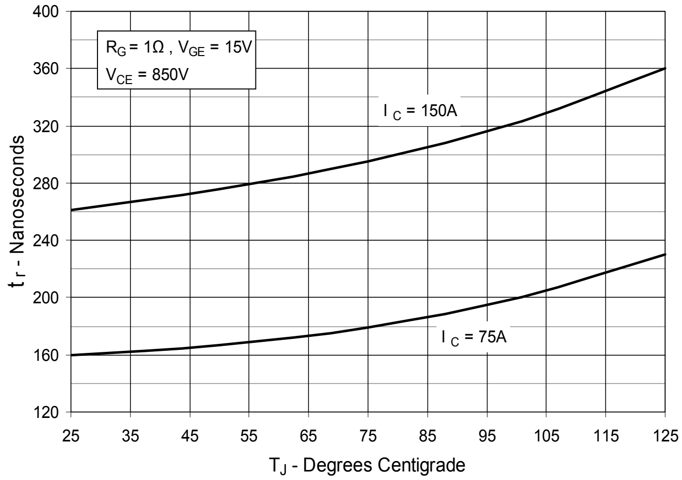


Fig. 14. Resistive Turn-on Rise Time vs. Collector Current

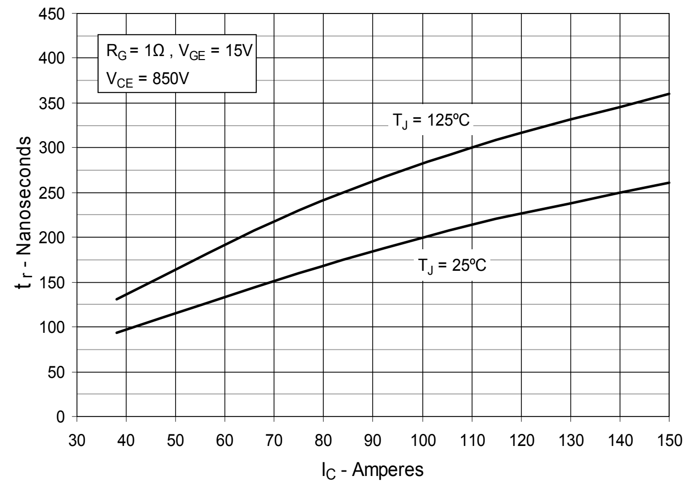


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

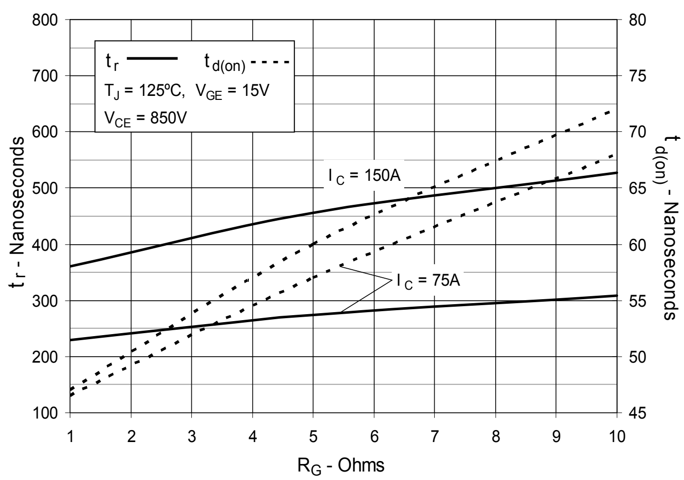


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

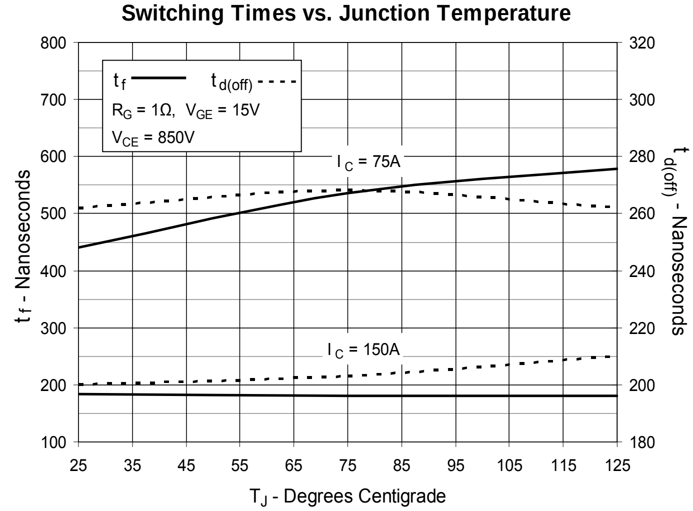


Fig. 17. Resistive Turn-off Switching Times vs. Collector Current

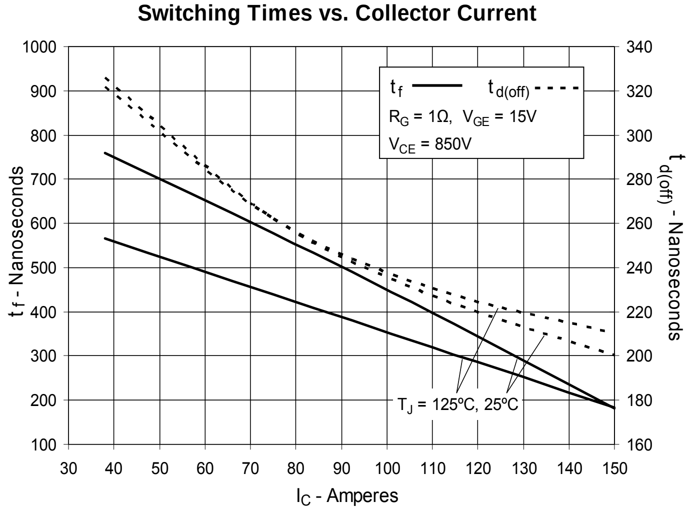


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance