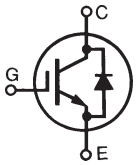
IXYS

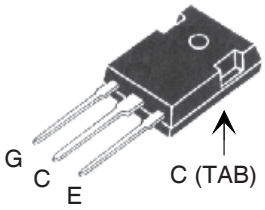
High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

IXBH6N170
IXBT6N170

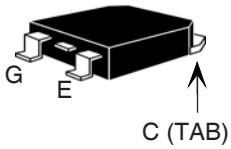
V_{CES} = 1700V
I_{C90} = 6A
$V_{CE(sat)} \leq$ 3.4V



TO-247 (IXBH)



TO-268 (IXBT)



G = Gate C = Collector
E = Emitter TAB = Collector

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_C = 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	12	A
I_{C90}	T_C = 90°C	6	A
I_{CM}	T_C = 25°C, 1ms	36	A
SSOA	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 24Ω	I_{CM} = 16	A
(RBSOA)	Clamped inductive load	$V_{CES} \leq$ 1350	V
P_C	T_C = 25°C	75	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	1.6mm (0.062 in.) from case for 10s	300	°C
T_{SOLD}	Plastic body for 10 seconds	260	°C
M_d	Mounting torque (TO-247)	1.13/10	Nm/lb.in.
Weight	TO-247	6	g
	TO-268	4	g

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250μA, V_{CE} = V_{GE}	1700			V
$V_{GE(th)}$	I_C = 250μA, V_{CE} = V_{GE}	2.5		5.5	V
I_{CES}	V_{CE} = 0.8 • V_{CES}			10	μA
	V_{GE} = 0V T_J = 125°C			100	μA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 6A, V_{GE} = 15V, Note 1		2.84	3.40	V
	T_J = 125°C		3.46		V

Features

- High blocking voltage
- Integrated Anti-parallel diode
- International standard packages
- Low conduction losses

Advantages

- Low gate drive requirement
- High power density

Applications:

- Switched-mode and resonant-mode power supplies
- Uninterruptible power supplies (UPS)
- Laser generator
- Capacitor discharge circuit
- AC switches

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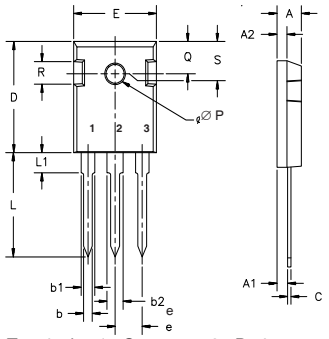
Symbol	Test Conditions (T_J = 25°C unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fS}	I_C = 6A, V_{CE} = 10V, Note 1	2.0	3.5		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		378		pF
C_{oes}			25		pF
C_{res}			9		pF
Q_g	I_C = 6A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		17.0		nC
Q_{ge}			2.5		nC
Q_{gc}			9.6		nC
$t_{d(on)}$	**Resistive Switching times, T_J = 25°C**		32		ns
t_r	I_C = 6A, V_{GE} = 15V		59		ns
$t_{d(off)}$	V_{CE} = 850V, R_G = 24Ω		105		ns
t_f			690		ns
$t_{d(on)}$	**Resistive Switching times, T_J = 125°C**		35		ns
t_r	I_C = 6A, V_{GE} = 15V		69		ns
$t_{d(off)}$	V_{CE} = 850V, R_G = 24Ω		100		ns
t_f			600		ns
R_{thJC}				1.65	°C/W
R_{thCS}			0.25		°C/W

Reverse Diode

Symbol	Test Conditions (T_J = 25°C unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
V_F	I_F = 6A, V_{GE} = 0V, Note 1			3.0	V
t_{rr}	I_F = 6A, V_{GE} = 0V, -di_F/dt = 100A/μs		1.08		μs
I_{RM}	V_R = 100V, V_{GE} = 0V		12.0		A

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

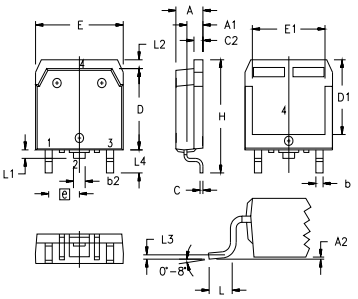
TO-247 (IXBH) Outline



Terminals: 1 - Gate 2 - Drain
3 - Source

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.7	5.3	.185	.209
A_1	2.2	2.54	.087	.102
A_2	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b_1	1.65	2.13	.065	.084
b_2	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
ØP	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15 BSC		242 BSC	

TO-268 (IXBT) Outline



SYM	INCHES MIN	MAX	MILLIMETERS MIN	MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b2	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.094	.106	2.40	2.70
L1	.047	.055	1.20	1.40
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10

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 @ 25ºC

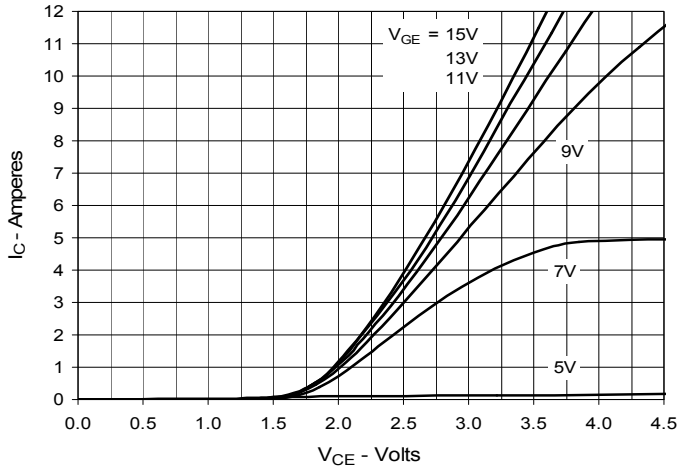


Fig. 2. Extended Output Characteristics @ 25ºC

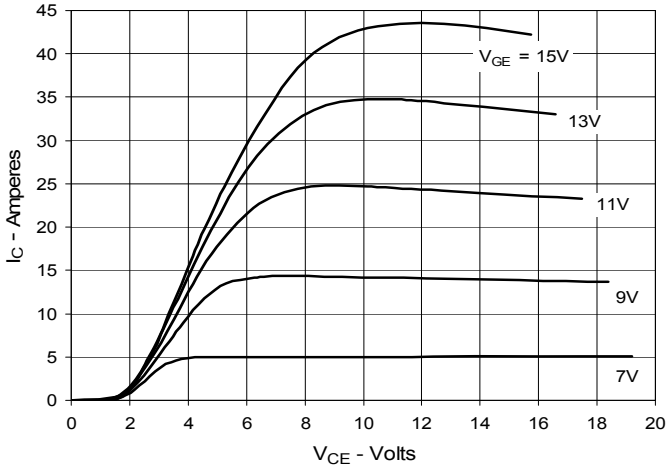


Fig. 3. Output Characteristics @ 125ºC

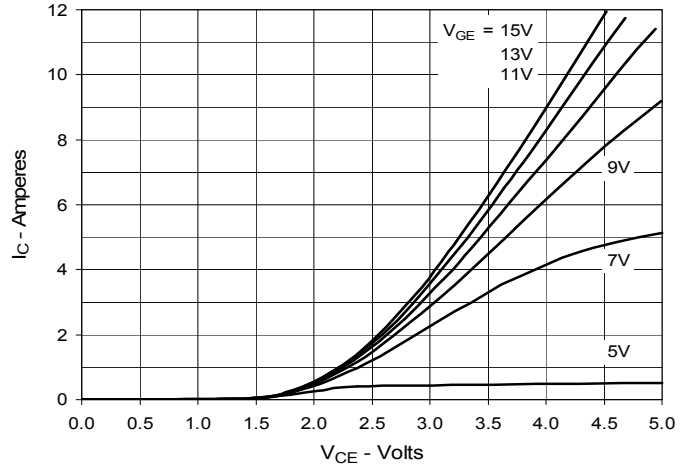


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

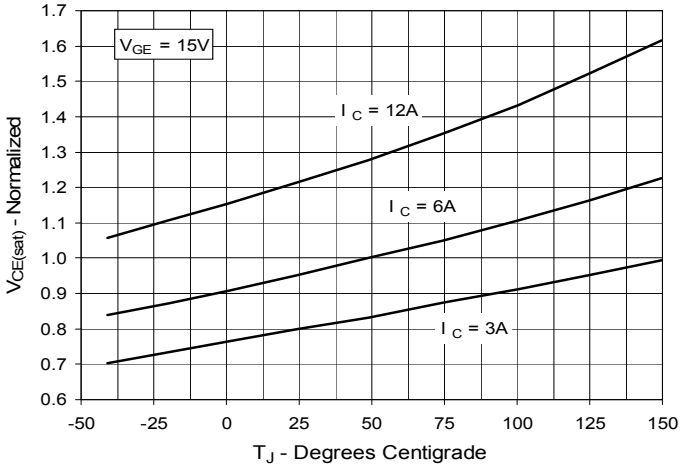


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

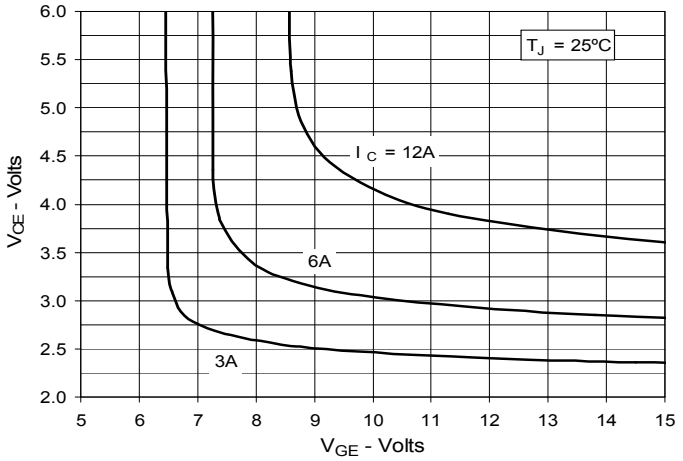


Fig. 6. Input Admittance

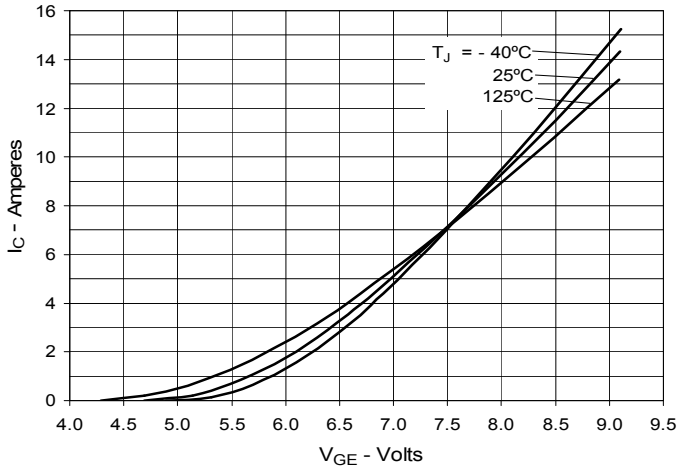


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Fig. 7. Transconductance

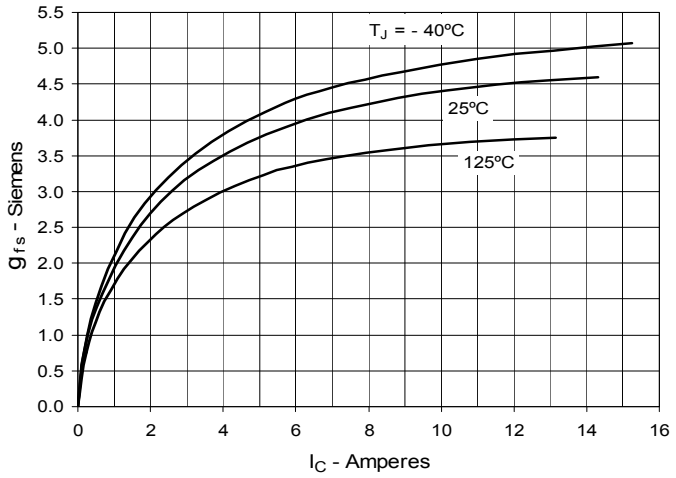

Fig. 8. Forward Voltage Drop of Intrinsic Diode

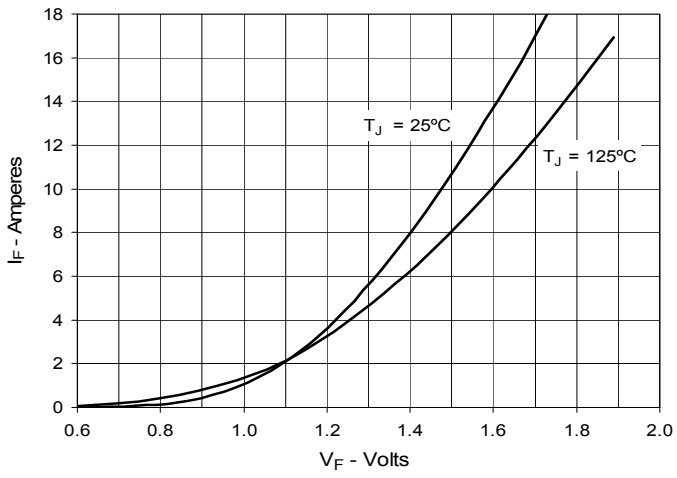

Fig. 9. Gate Charge

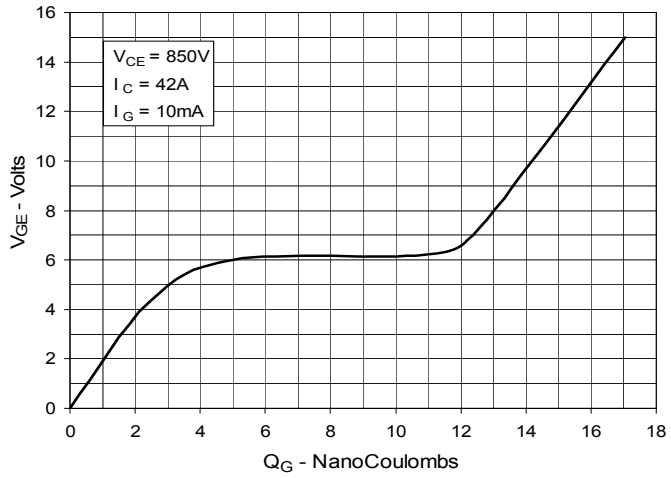

Fig. 10. Capacitance

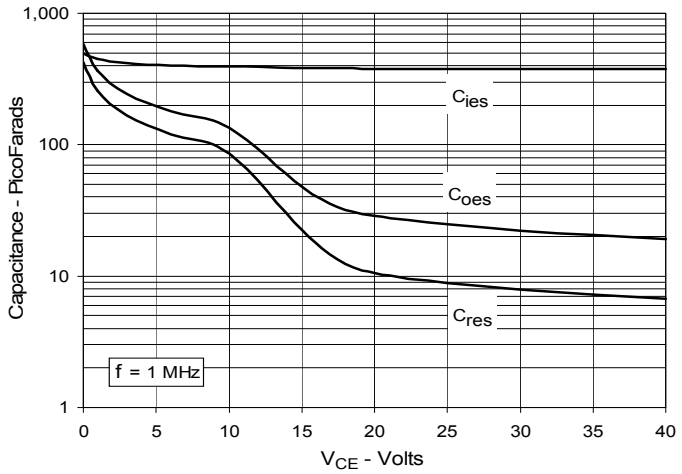

Fig. 11. Reverse-Bias Safe Operating Area

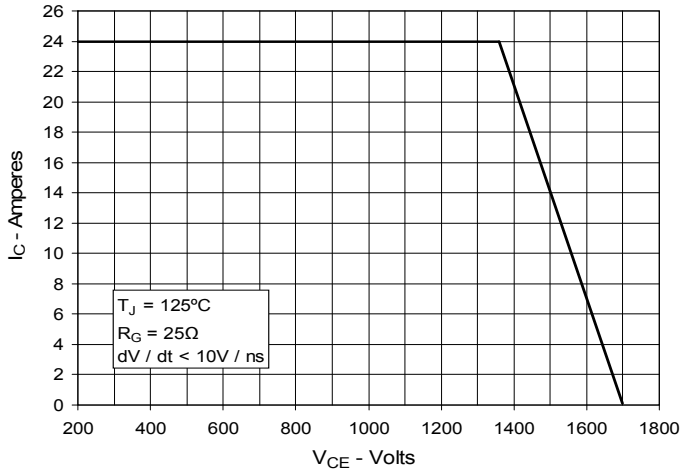

Fig. 12. Maximum Transient Thermal Impedance

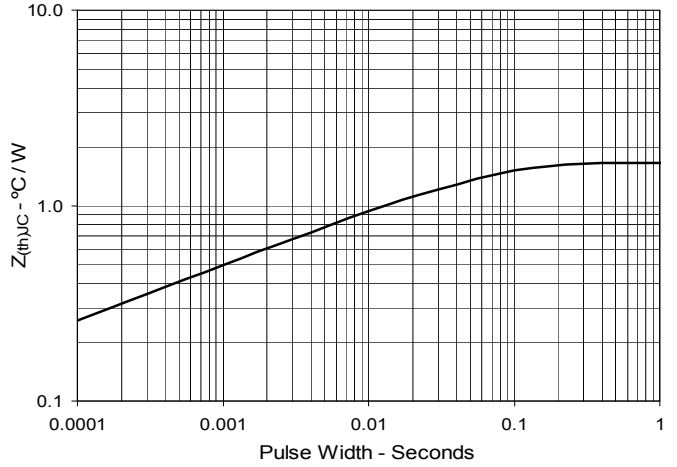

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Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

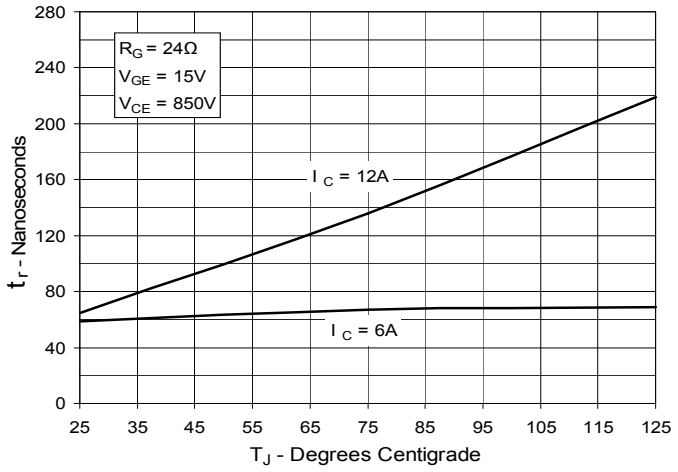


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

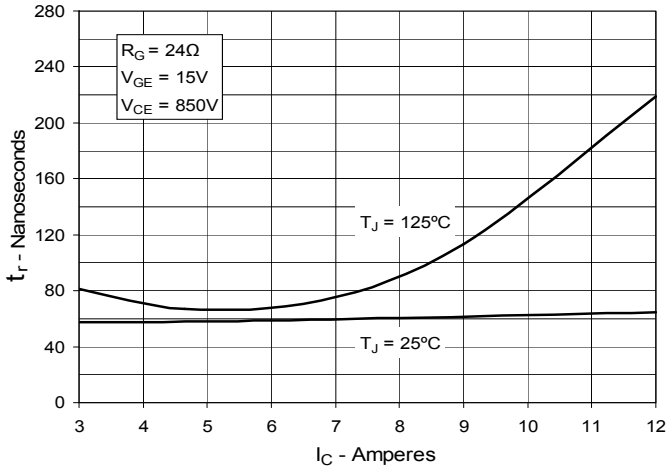


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

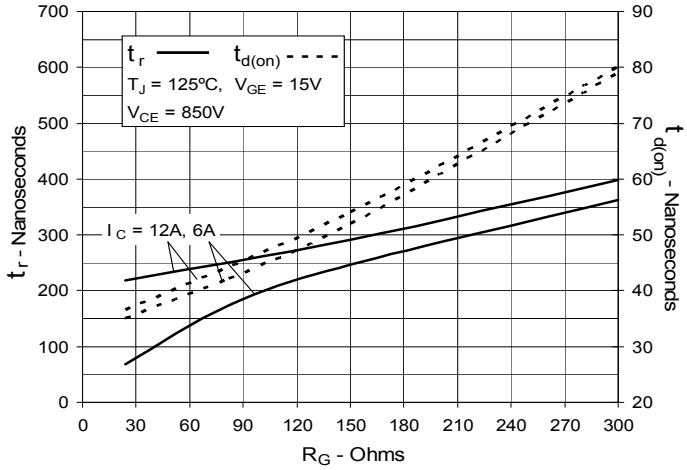


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

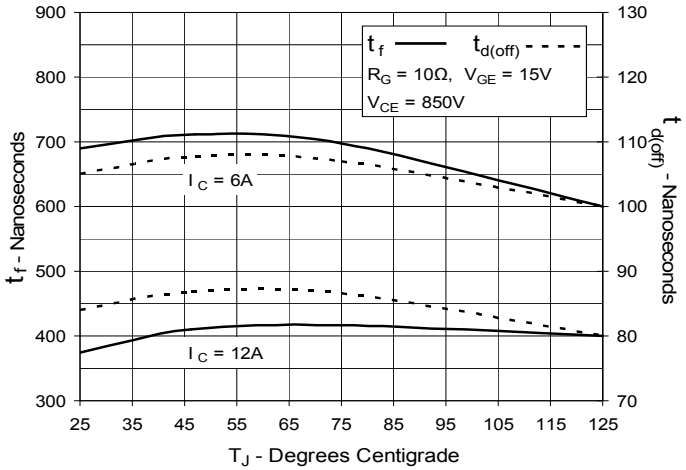


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

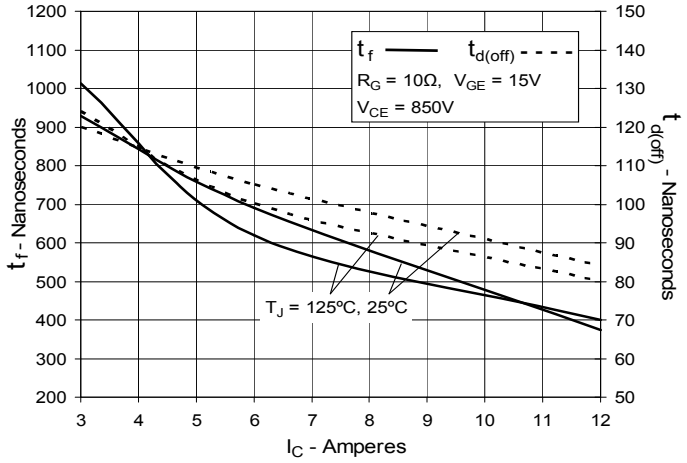
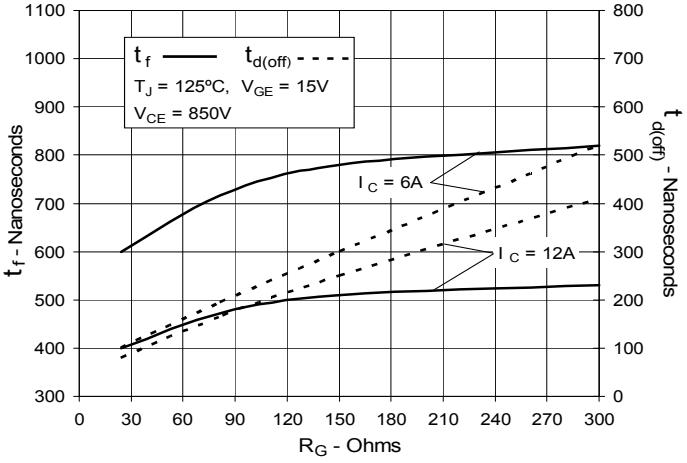


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance



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