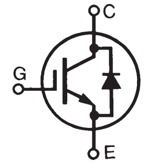
High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

IXBH42N170
IXBT42N170

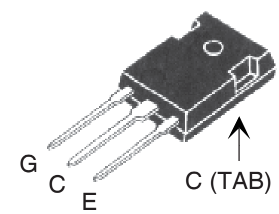
V_{CES} = 1700V
I_{C90} = 42A
$V_{CE(sat)}$ ≤ 2.8V



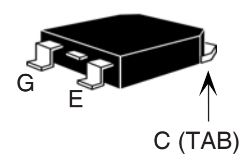
Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_C = 25°C to 150°C	1700	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	1700	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	T_C = 25°C	80	A
I_{LRMS}	Terminal Current Limit	75	A
I_{C90}	T_C = 90°C	42	A
I_{CM}	T_C = 25°C, 1ms	300	A
SSOA	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 10Ω	I_{CM} = 100	A
(RBSOA)	Clamped inductive load	V_{CES} ≤ 1350	V
P_C	T_C = 25°C	360	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_{GE} = 0V		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}				50	μA
	V_{GE} = 0V	T_J = 125°C			1.5	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ± 20V				±100	nA
$V_{CE(sat)}$	I_C = 42A, V_{GE} = 15V, Note 1				2.8	V
		T_J = 125°C		2.7		V

TO-247 (IXBH)



TO-268 (IXBT)



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

Features

- High blocking voltage
- 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

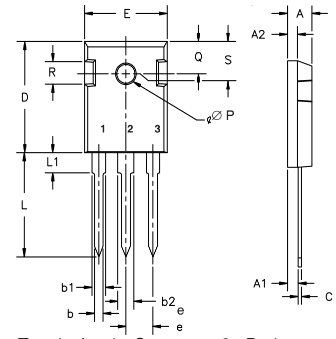
Symbol	Test Conditions (T_J = 25°C unless otherwise specified)	Min.	Typ.	Max.	
g_{fS}	I_C = 42A, V_{CE} = 10V, Note 1	24	32		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		3990		pF
C_{oes}			225		pF
C_{res}			70		pF
Q_g	I_C = 42A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		188		nC
Q_{ge}			29		nC
Q_{gc}			76		nC
$t_{d(on)}$	**Resistive Switching times, T_J = 25°C** I_C = 42A, V_{GE} = 15V, V_{CE} = 850V, R_G = 10Ω		37		ns
t_r			139		ns
$t_{d(off)}$			340		ns
t_f			665		ns
$t_{d(on)}$	**Resistive Switching times, T_J = 125°C** I_C = 42A, V_{GE} = 15V, V_{CE} = 850V, R_G = 10Ω		36		ns
t_r			188		ns
$t_{d(off)}$			330		ns
t_f			740		ns
R_{thJC}				0.35	°C/W
R_{thCS}	(TO-247)		0.25		°C/W

Reverse Diode

Symbol	Test Conditions (T_J = 25°C unless otherwise specified)	Min.	Typ.	Max.	
V_F	I_F = 42A, V_{GE} = 0V			2.8	V
t_{rr}	I_F = 21A, V_{GE} = 0V, $-di_F/dt$ = 100A/μs, V_R = 100V		1.32		μs
I_{RM}			36		A

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

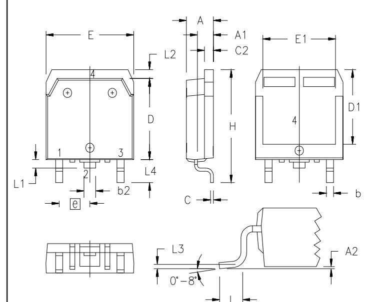
TO-247 (IXBH) Outline



Terminals: 1 - Gate, 2 - Drain, 3 - Source, Tab - Drain

Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches 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
∅P	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	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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.

Fig. 1. Output Characteristics @ 25ºC

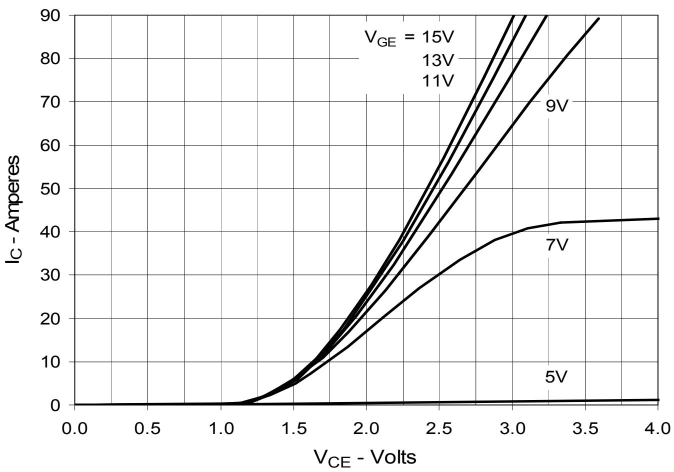


Fig. 2. Extended Output Characteristics @ 25ºC

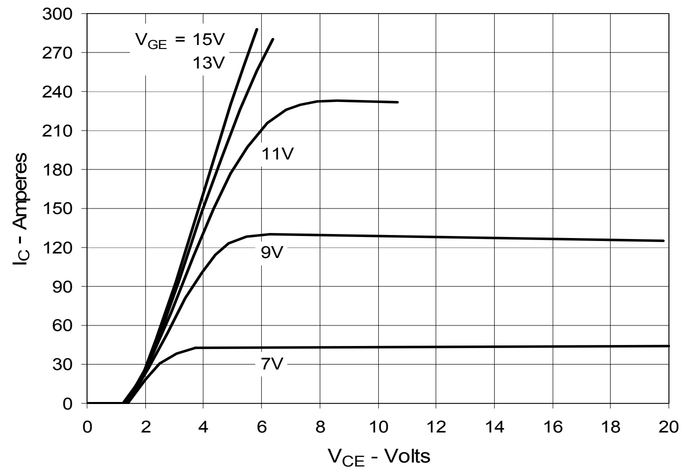


Fig. 3. Output Characteristics @ 125ºC

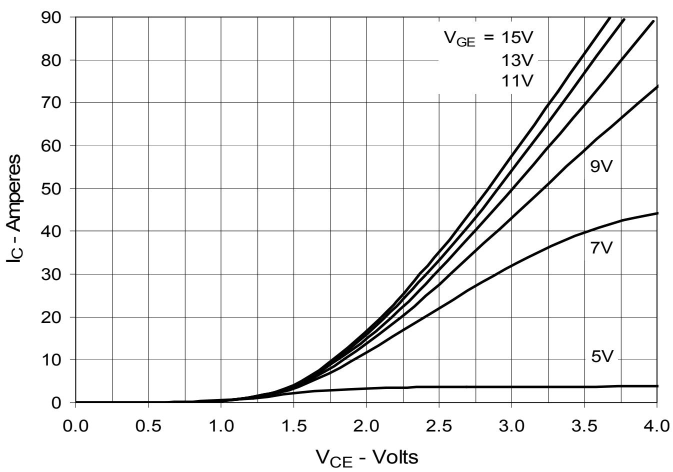


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

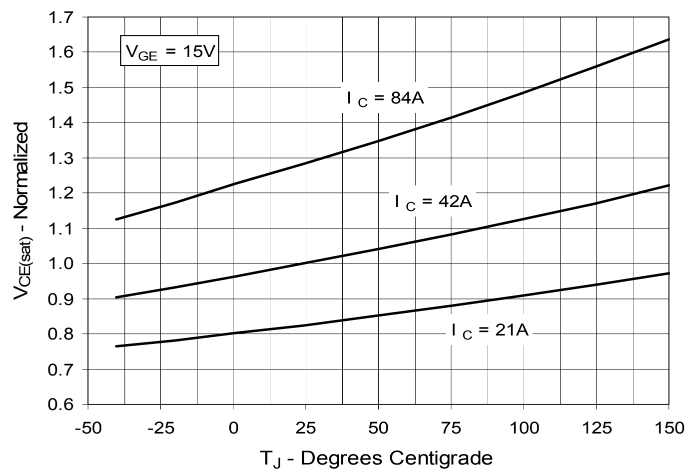


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

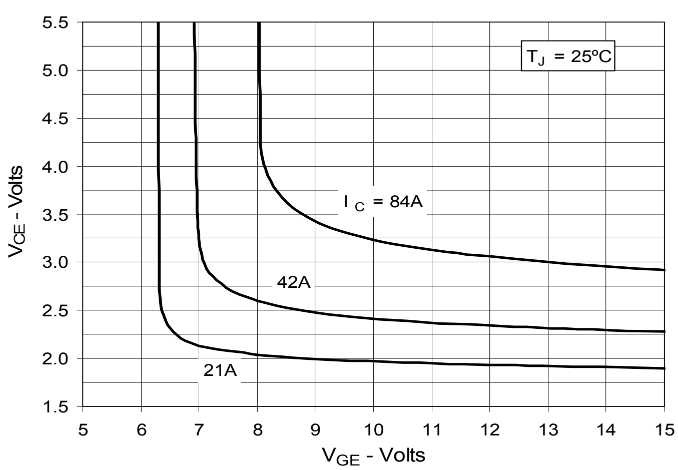


Fig. 6. Input Admittance

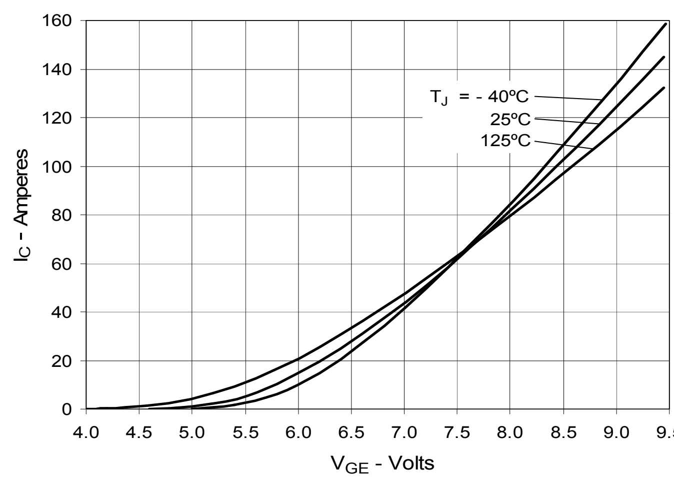


Fig. 7. Transconductance

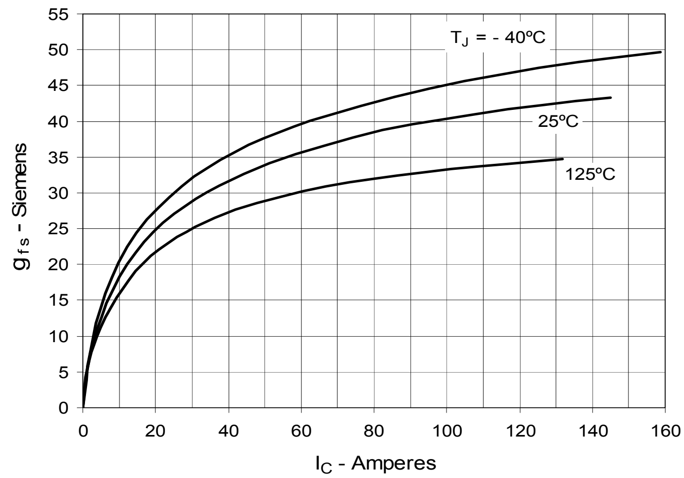


Fig. 8. Forward Voltage Drop of Intrinsic Diode

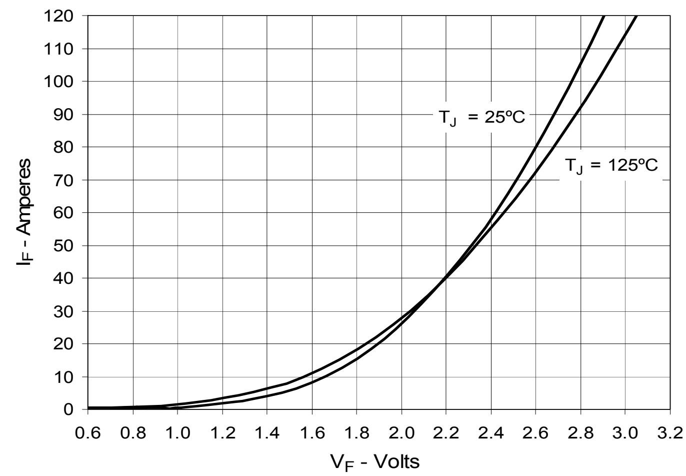


Fig. 9. Gate Charge

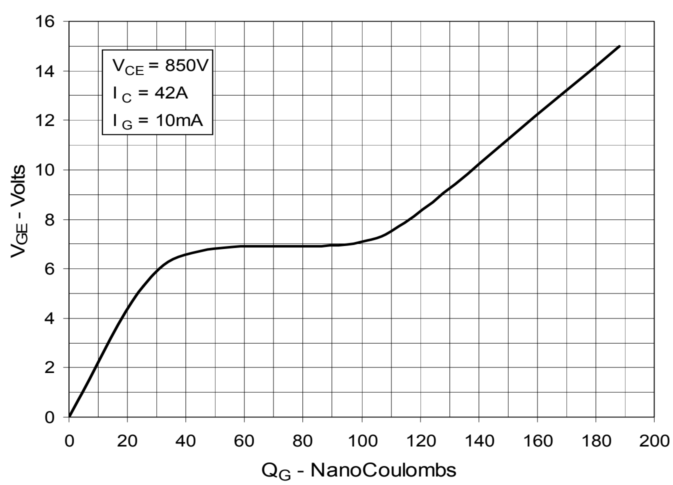


Fig. 10. Capacitance

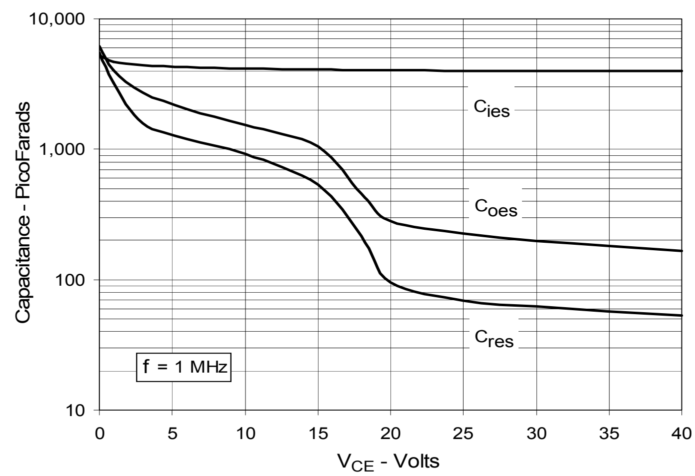


Fig. 11. Reverse-Bias Safe Operating Area

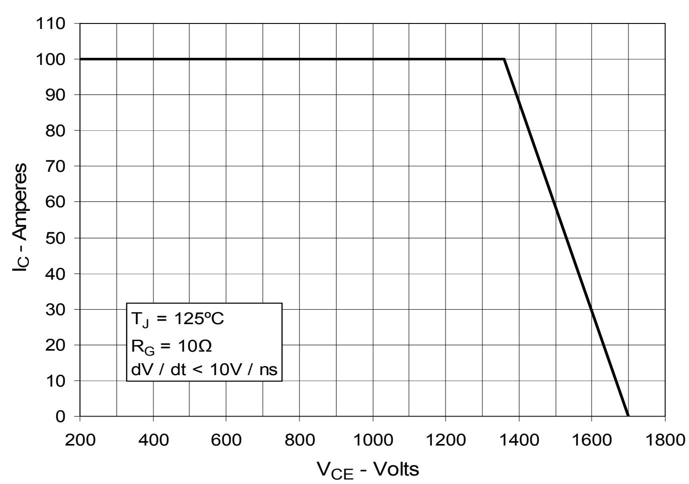


Fig. 12. Maximum Transient Thermal Impedance

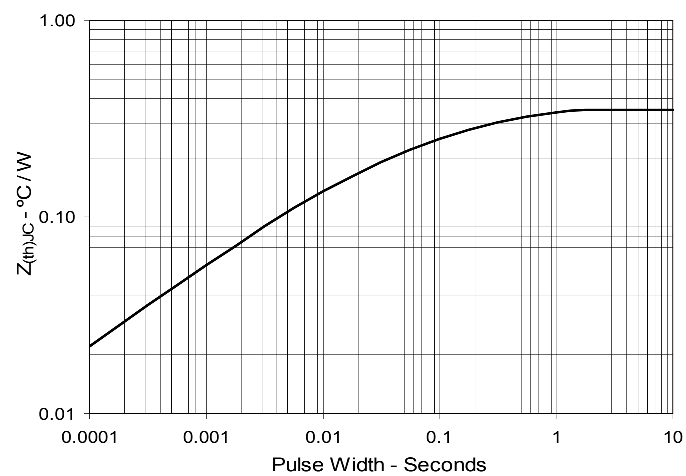


Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

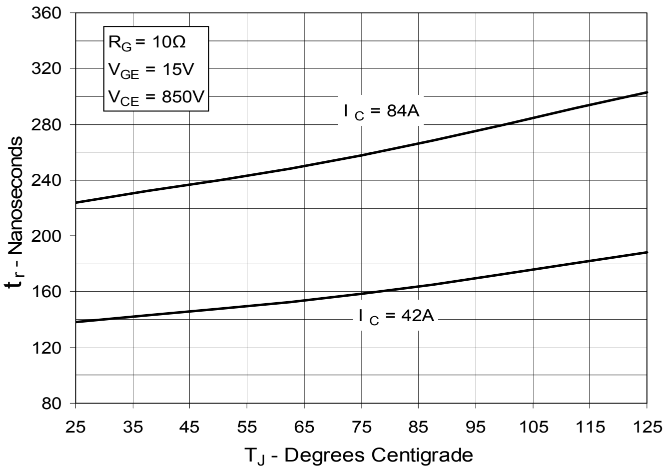


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

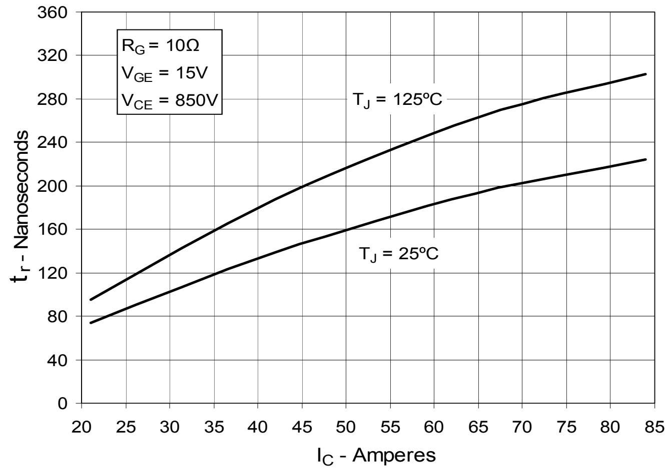


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

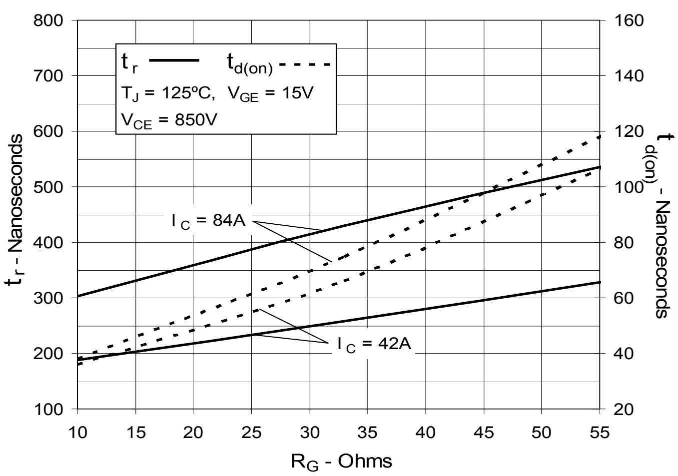


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

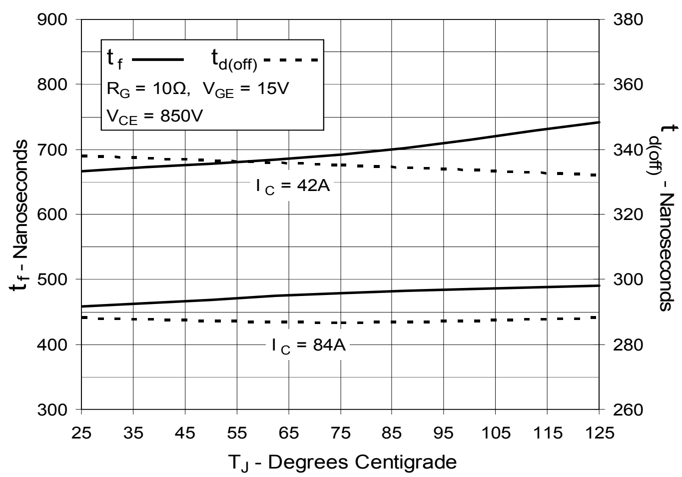


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

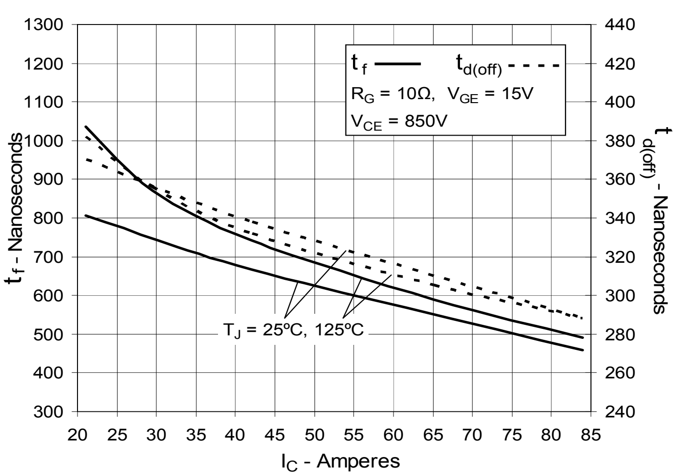


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance