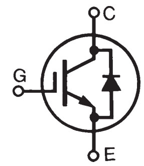
IXYS

Preliminary Technical Information

High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

IXBH12N300
IXBT12N300

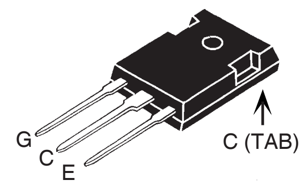
V_{CES} = 3000V
I_{C110} = 12A
$V_{CE(sat)} \leq$ 3.2V



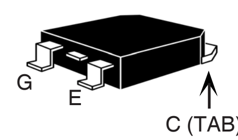
Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_C = 25°C to 150°C	3000	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	3000	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	T_C = 25°C	30	A
I_{C110}	T_C = 110°C	12	A
I_{CM}	T_C = 25°C, 1ms	100	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 30Ω Clamped Inductive Load	I_{CM} = 30 $V_{CES} \leq$ 2400	A V
P_C	T_C = 25°C	160	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 TO-268	6 4	g g

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)		Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250µA, V_{GE} = 0V		3000			V
$V_{GE(th)}$	I_C = 250µA, V_{CE} = V_{GE}		3.0		5.0	V
I_{CES}	V_{CE} = 0.8 • V_{CES}, V_{GE} = 0V				25	µA
		T_J = 125°C			1	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ± 20V				±100	nA
$V_{CE(sat)}$	I_C = 12A, V_{GE} = 15V, Note 1			2.8	3.2	V
		T_J = 125°C		3.5		V

TO-247 (IXBH)



TO-268 (IXBT)



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

Features

- High Blocking Voltage
- International Standard Packages
- Anti-Parallel Diode
- Low Conduction Losses

Advantages

- Low Gate Drive Requirement
- High Power Density

Applications:

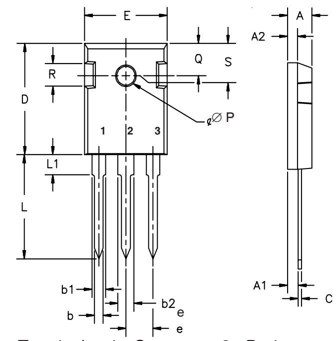
- Switched-Mode and Resonant-Mode Power Supplies
- Uninterruptible Power Supplies (UPS)
- Laser Generators
- Capacitor Discharge Circuits
- AC Switches

IXYS

IXBH12N300
IXBT12N300

Symbol	**Test Conditions** (T_J = 25°C Unless Otherwise Specified)	**Characteristic Values** Min.	Typ.	Max.	
g_{fS}	I_C = 12A, V_{CE} = 10V, Note 1	6.5	10.8		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		1290		pF
C_{oes}			56		pF
C_{res}			19		pF
Q_g	I_C = 12A, V_{GE} = 15V, V_{CE} = 1000V		62		nC
Q_{ge}			13		nC
Q_{gc}			8.5		nC
$t_{d(on)}$	**Resistive Switching Times, T_J = 25°C**		64		ns
t_r	I_C = 12A, V_{GE} = 15V		140		ns
$t_{d(off)}$	V_{CE} = 1250V, R_G = 10Ω		180		ns
t_f			540		ns
$t_{d(on)}$	**Resistive Switching Times, T_J = 125°C**		65		ns
t_r	I_C = 12A, V_{GE} = 15V		395		ns
$t_{d(off)}$	V_{CE} = 1250V, R_G = 10Ω		175		ns
t_f			530		ns
R_{thJC}				0.78	°C/W
R_{thCS}	(TO-247)		0.21		°C/W

TO-247 (IXBH) Outline



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

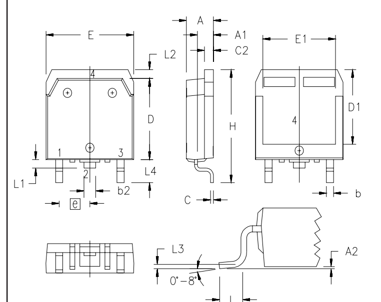
Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.7	5.3	.185	.209
A_1	2.2	2.54	.087	.102
A_2	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b_1	1.65	2.13	.065	.084
b_2	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
∅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	

Reverse Diode

Symbol	**Test Conditions** (T_J = 25°C Unless Otherwise Specified)	**Characteristic Values** Min.	Typ.	Max.	
V_F	I_F = 12A, V_{GE} = 0V			2.1	V
t_{rr}	I_F = 6A, V_{GE} = 0V, $-di_F/dt$ = 100A/μs		1.4		μs
I_{RM}	V_R = 100V, V_{GE} = 0V		21		A

Note 1: Pulse Test, t ≤ 300μs, Duty Cycle, d ≤ 2%.

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

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.

Fig. 1. Output Characteristics @ 25ºC

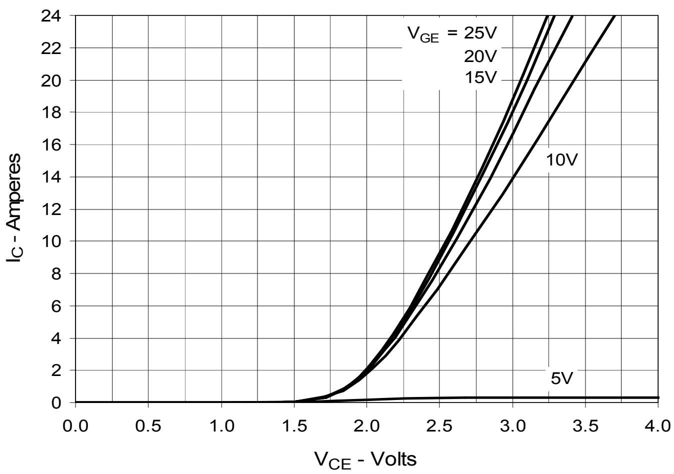


Fig. 2. Extended Output Characteristics @ 25ºC

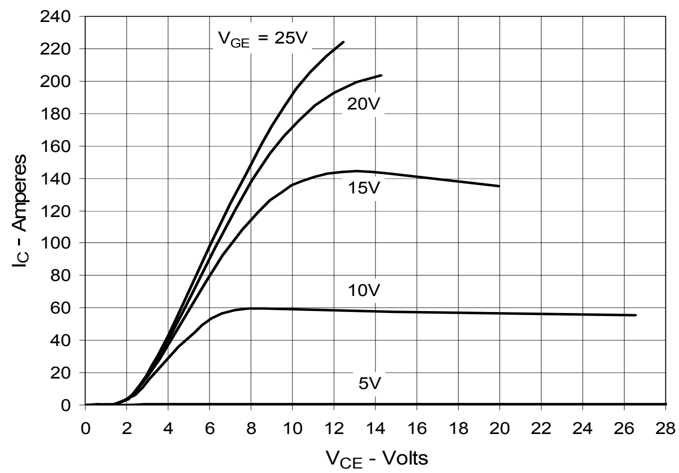


Fig. 3. Output Characteristics @ 125ºC

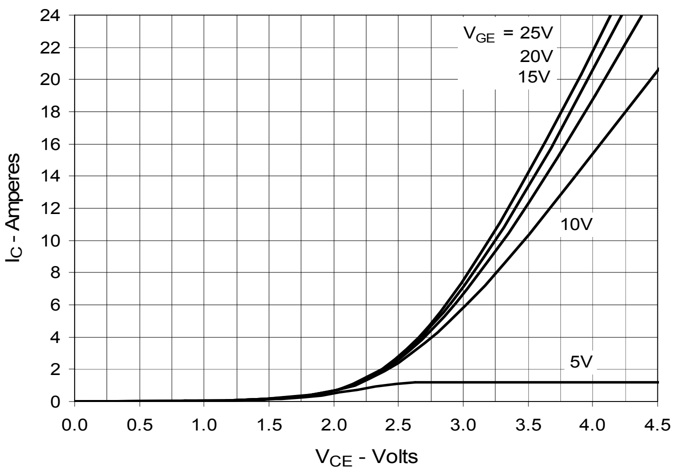


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

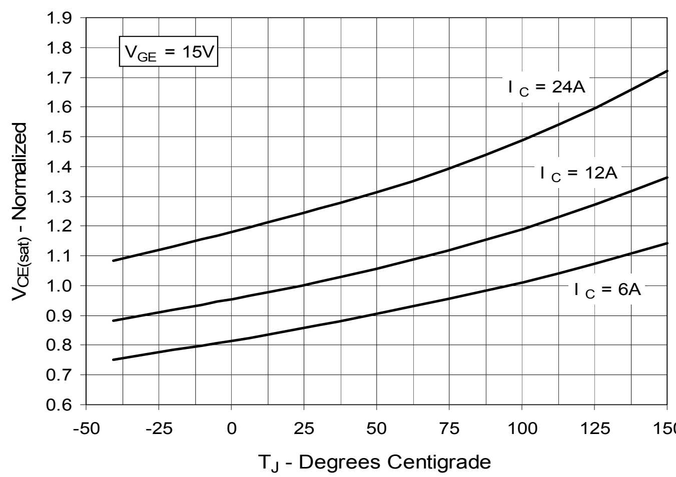


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

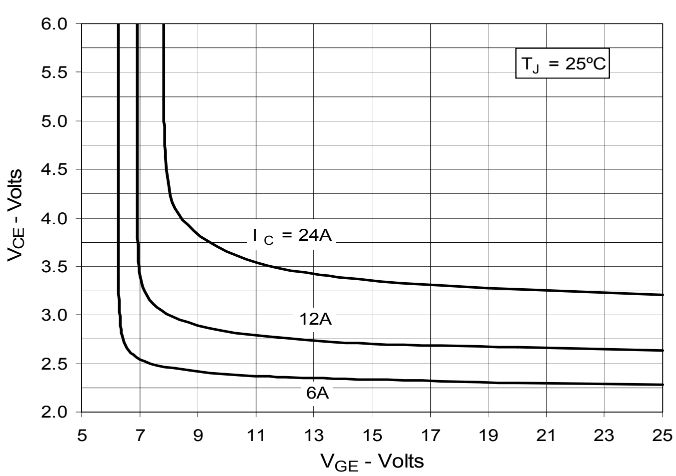


Fig. 6. Input Admittance

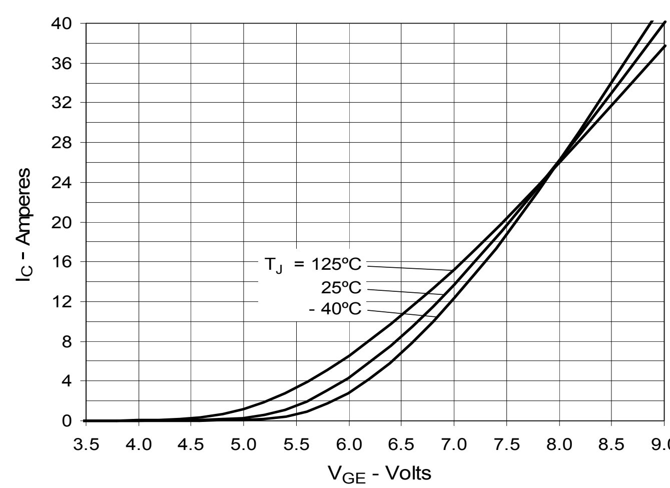


Fig. 7. Transconductance

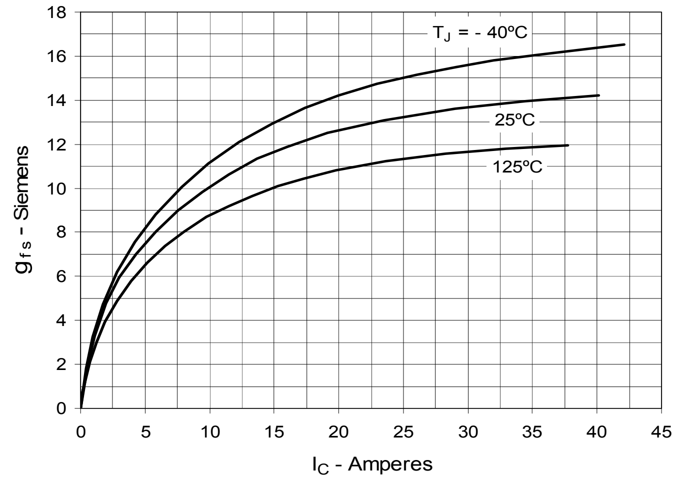


Fig. 8. Forward Voltage Drop of Intrinsic Diode

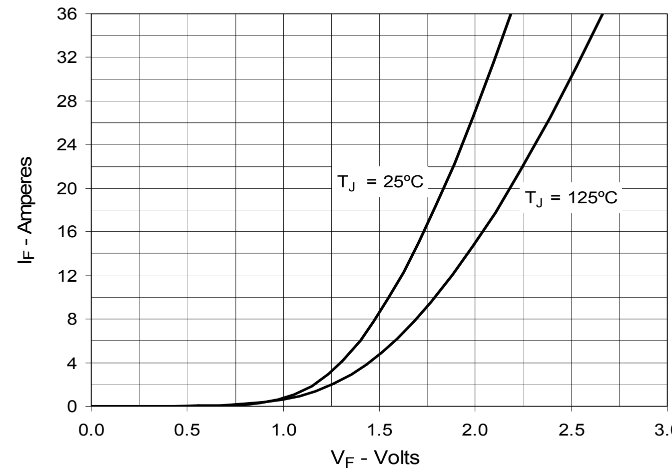


Fig. 9. Gate Charge

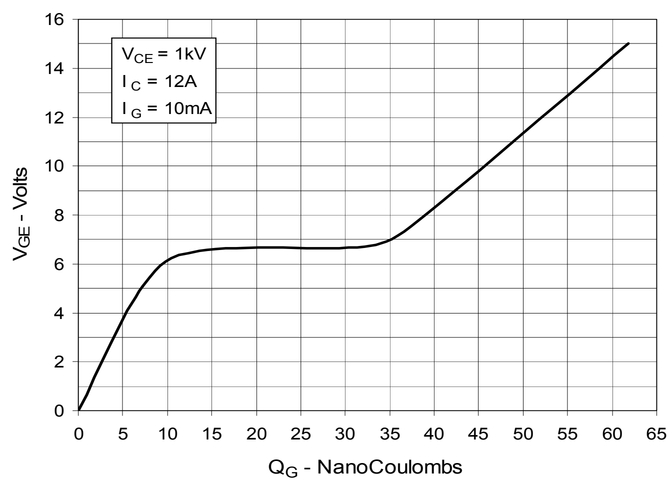


Fig. 10. Capacitance

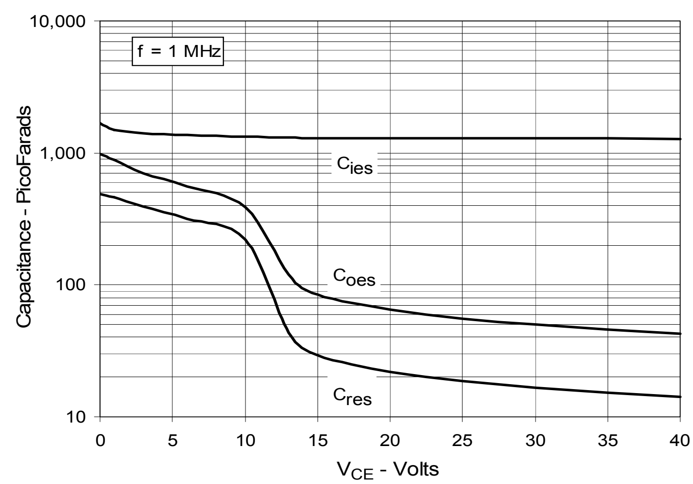


Fig. 11. Reverse-Bias Safe Operating Area

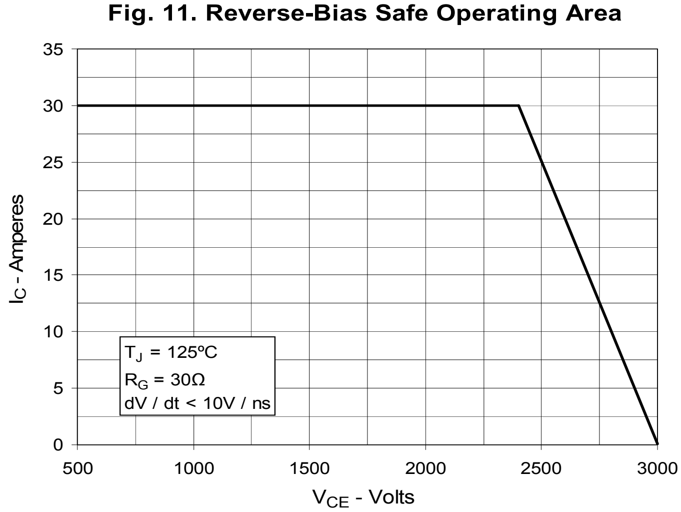


Fig. 12. Maximum Transient Thermal Impedance

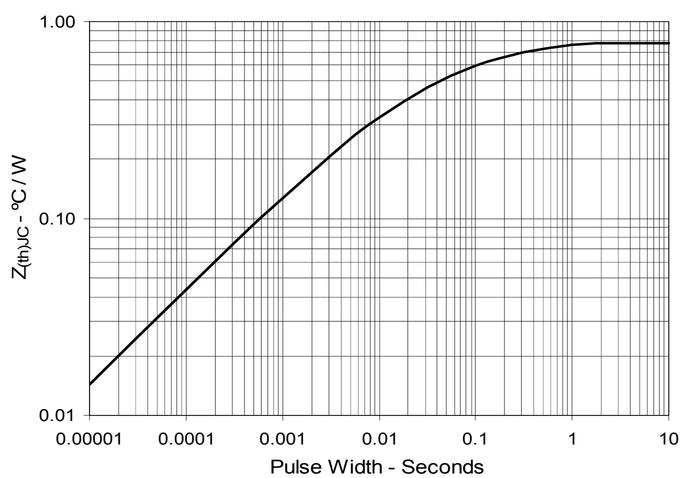


Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

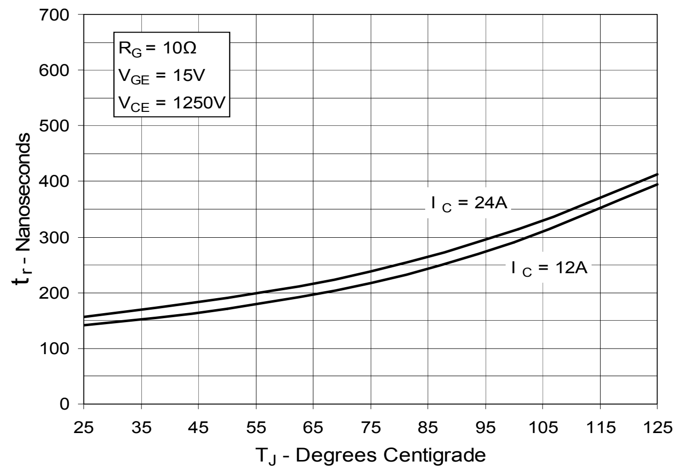


Fig. 14. Resistive Turn-on Rise Time vs. Collector Current

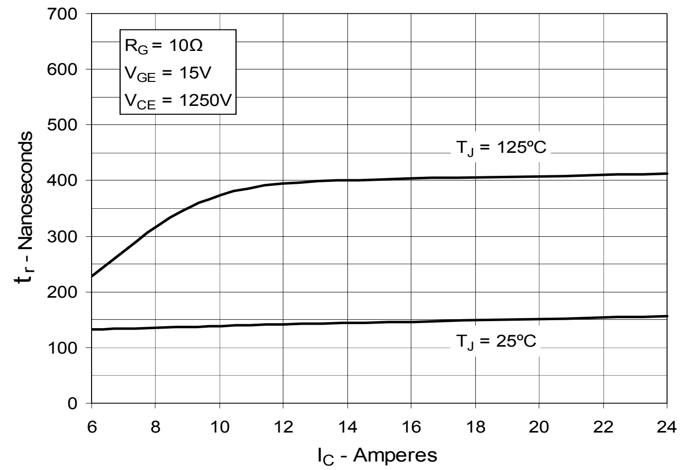


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

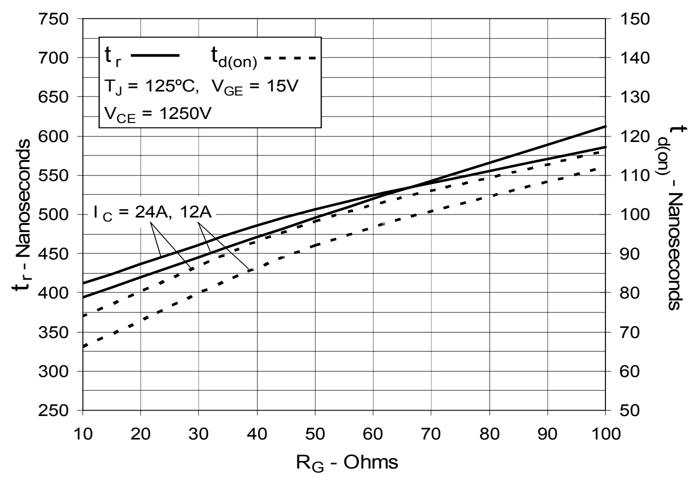


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

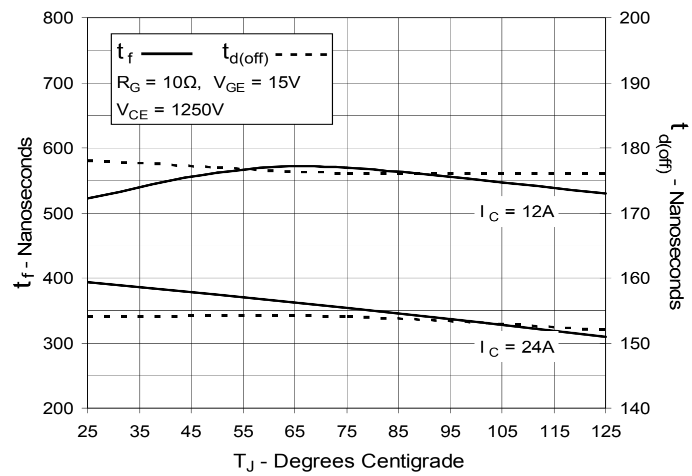


Fig. 17. Resistive Turn-off Switching Times vs. Collector Current

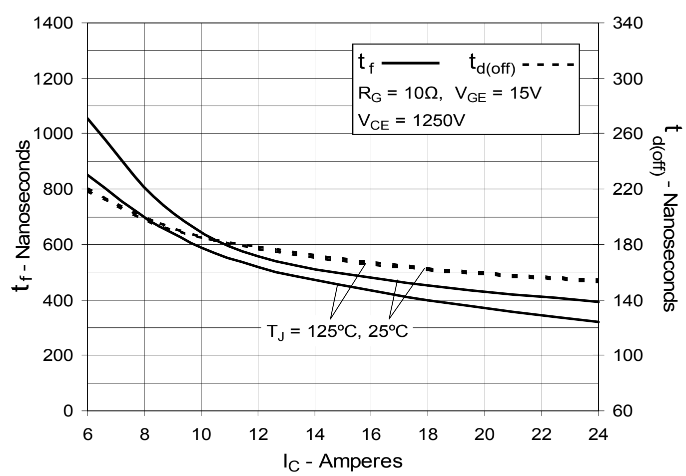


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance