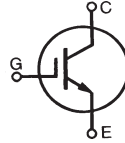


GenX3™ 600V IGBT

IXGA48N60C3
IXGH48N60C3
IXGP48N60C3

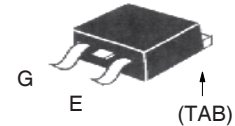
High Speed PT IGBTs for
 40-100kHz switching



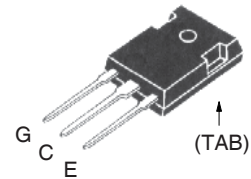
V_{CES} = 600V
I_{C110} = 48A
V_{CE(sat)} ≤ 2.5V
t_{fi(typ)} = 38ns

Symbol	Test Conditions	Maximum Ratings	
V _{CES}	T _C = 25°C to 150°C	600	V
V _{CGR}	T _J = 25°C to 150°C, R _{GE} = 1MΩ	600	V
V _{GES}	Continuous	± 20	V
V _{GEM}	Transient	± 30	V
I _{C25}	T _C = 25°C (Limited by Leads)	75	A
I _{C110}	T _C = 110°C	48	A
I _{CM}	T _C = 25°C, 1ms	250	A
I _A	T _C = 25°C	30	A
E _{AS}	T _C = 25°C	300	mJ
SSOA (RBSOA)	V _{GE} = 15V, T _{VJ} = 125°C, R _G = 3Ω Clamped Inductive Load @ ≤ 600V	I _{CM} = 100	A
P _C	T _C = 25°C	300	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&TO-220)	1.13/10	Nm/lb.in.
Weight	TO-247	6.0	g
	TO-220	3.0	g
	TO-263	2.5	g

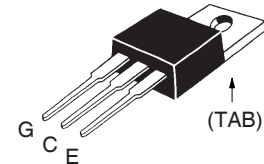
TO-263 (IXGA)



TO-247 (IXGH)



TO-220 (IXGP)



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

Features

- Optimized for Low Switching Losses
- Square RBSOA
- Avalanche Rated
- Fast Switching
- International Standard Packages

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

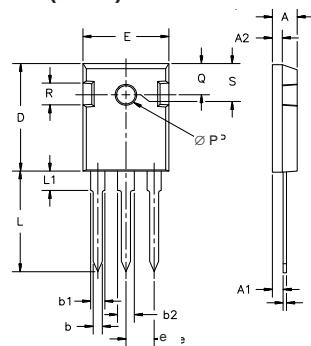
- High Frequency Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Battery Chargers
- Welding Machines
- Lamp Ballasts

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
BV _{CES}	I _C = 250μA, V _{GE} = 0V	600		V
V _{GE(th)}	I _C = 250μA, V _{CE} = V _{GE}	3.0		5.5 V
I _{CES}	V _{CE} = V _{CES} V _{GE} = 0V T _J = 125°C			25 μA
				250 μA
I _{GES}	V _{CE} = 0V, V _{GE} = ± 20V			±100 nA
V _{CE(sat)}	I _C = 30A, V _{GE} = 15V, Note 1 T _J = 125°C		2.3	2.5 V
			1.8	V

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$I_C = 30A, V_{CE} = 10V$, Note 1	20	30	S
C_{ies}	$V_{CE} = 25V, V_{GE} = 0V, f = 1MHz$		1960	pF
C_{oes}			207	pF
C_{res}			66	pF
Q_g	$I_C = 30A, V_{GE} = 15V, V_{CE} = 0.5 \cdot V_{CES}$		77	nC
Q_{ge}			16	nC
Q_{gc}			32	nC
$t_{d(on)}$	Inductive Load, $T_J = 25^\circ C$ $I_C = 30A, V_{GE} = 15V$ $V_{CE} = 400V, R_G = 3\Omega$		19	ns
t_{ri}			26	ns
E_{on}			0.41	mJ
$t_{d(off)}$			60	100 ns
t_{fi}			38	ns
E_{off}			0.23	0.42 mJ
$t_{d(on)}$			19	ns
t_{ri}	Inductive Load, $T_J = 125^\circ C$ $I_C = 30A, V_{GE} = 15V$ $V_{CE} = 400V, R_G = 3\Omega$		26	ns
E_{on}			0.65	mJ
$t_{d(off)}$			92	ns
t_{fi}			95	ns
E_{off}			0.57	mJ
R_{thJC}				0.42 °C/W
R_{thCS}		(TO-247)	0.21	°C/W
	(TO-220)	0.50	°C/W	

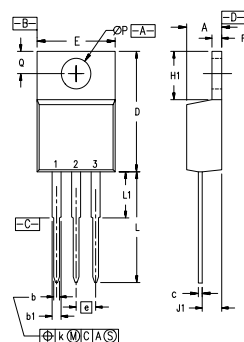
Note 1: Pulse Test, $t \leq 300\mu s$; Duty Cycle, $d \leq 2\%$.

TO-247 (IXGH) Outline



Dim.	Millimeter		Inches	
	Min.	Max.	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

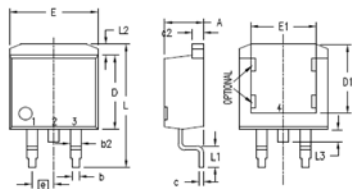
TO-220 (IXGP) Outline



Pins: 1 - Gate 2 - Drain
3 - Source 4 - Drain

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.170	.190	4.32	4.83
b	.025	.040	0.64	1.02
b1	.045	.065	1.15	1.65
c	.014	.022	0.35	0.56
D	.580	.630	14.73	16.00
E	.390	.420	9.91	10.66
e	.100 BSC		2.54 BSC	
F	.045	.055	1.14	1.40
H1	.230	.270	5.85	6.85
J1	.090	.110	2.29	2.79
k	0	.015	0	0.38
L	.500	.550	12.70	13.97
L1	.110	.230	2.79	5.84
ØP	.139	.161	3.53	4.08
Q	.100	.125	2.54	3.18

TO-263 (IXGA) Outline



1. GATE (COLLECTOR)
2. DRAIN (COLLECTOR)
3. SOURCE (EMITTER)
4. DRAIN (COLLECTOR) BOTTOM SIDE

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.160	.190	4.06	4.83
A1	.080	.110	2.03	2.79
b	.020	.039	0.51	0.99
b2	.045	.055	1.14	1.40
c	.016	.029	0.40	0.74
c2	.045	.055	1.14	1.40
D	.340	.380	8.64	9.65
D1	.315	.350	8.00	8.89
E	.380	.410	9.65	10.41
E1	.245	.320	6.22	8.13
e	.100 BSC		2.54 BSC	
L	.575	.625	14.61	15.88
L1	.090	.110	2.29	2.79
L2	.040	.055	1.02	1.40
L3	.050	.070	1.27	1.78
L4	0	.005	0	0.13

IXYS reserves the right to change limits, test conditions and dimensions.

IXYS MOSFETs and IGBTs are covered 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
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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 @ 25°C

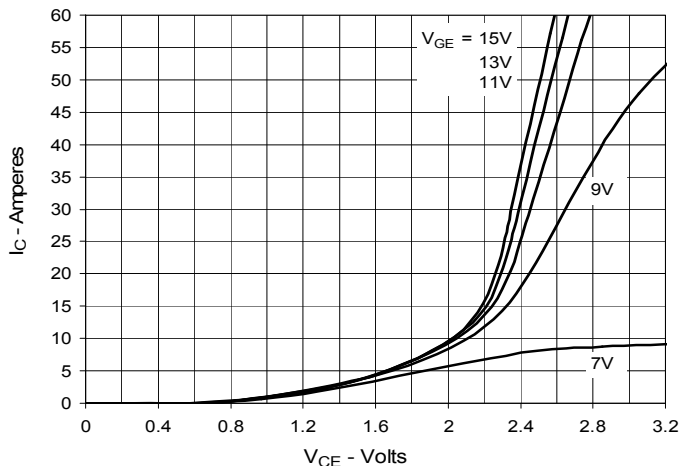


Fig. 2. Extended Output Characteristics @ 25°C

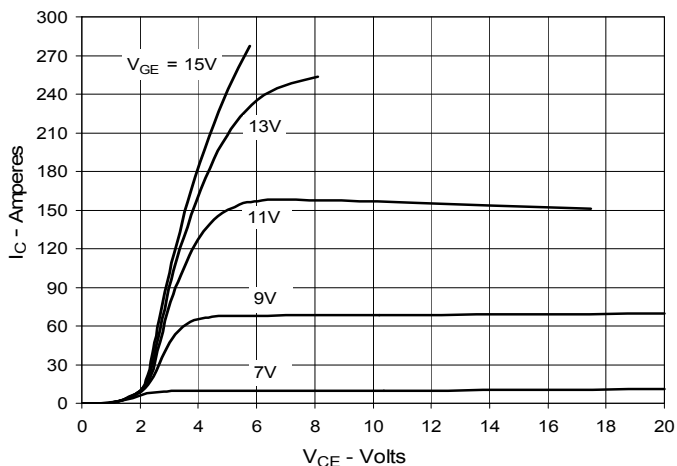


Fig. 3. Output Characteristics @ 125°C

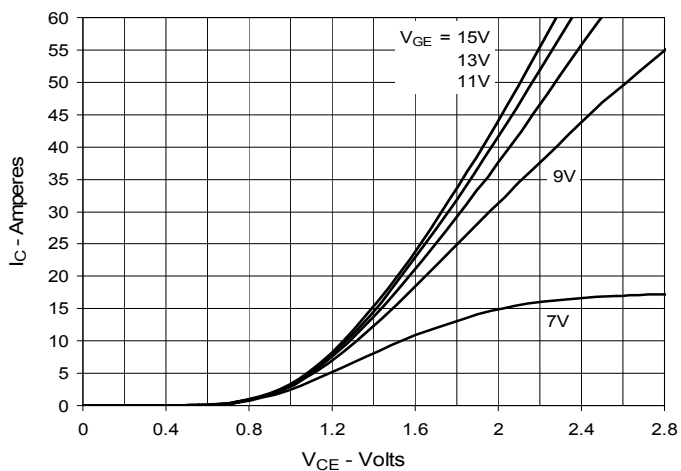


Fig. 4. Dependence of VCE(sat) on Junction Temperature

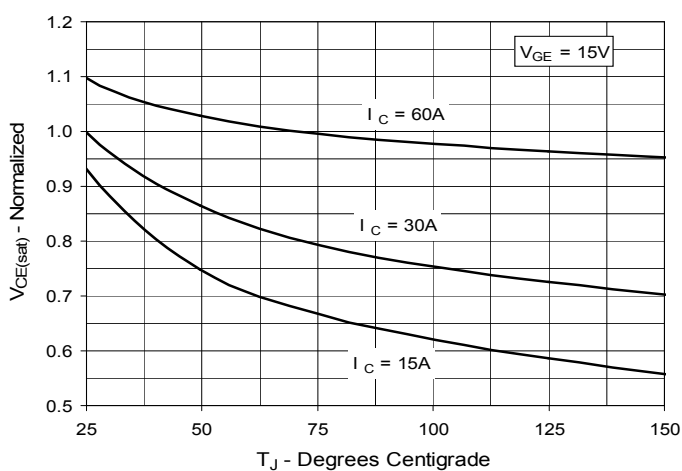


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

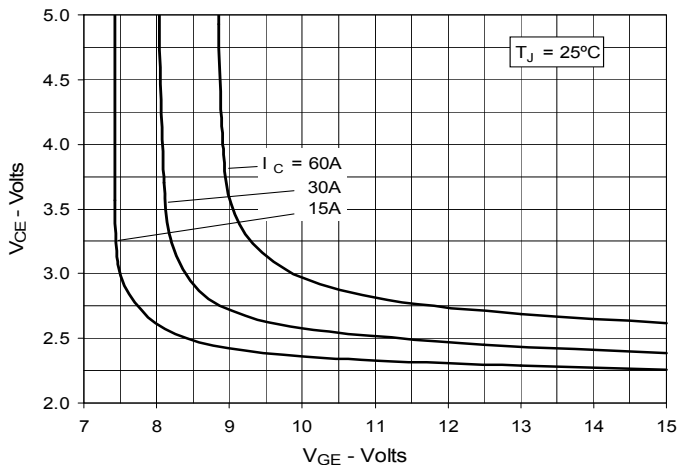


Fig. 6. Input Admittance

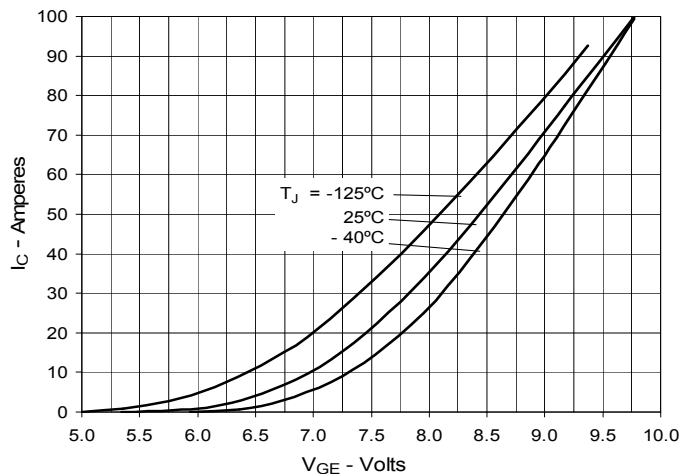


Fig. 7. Transconductance

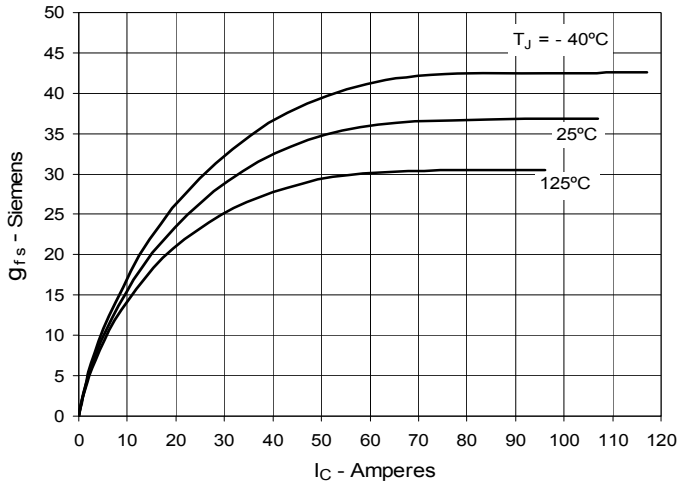


Fig. 8. Gate Charge

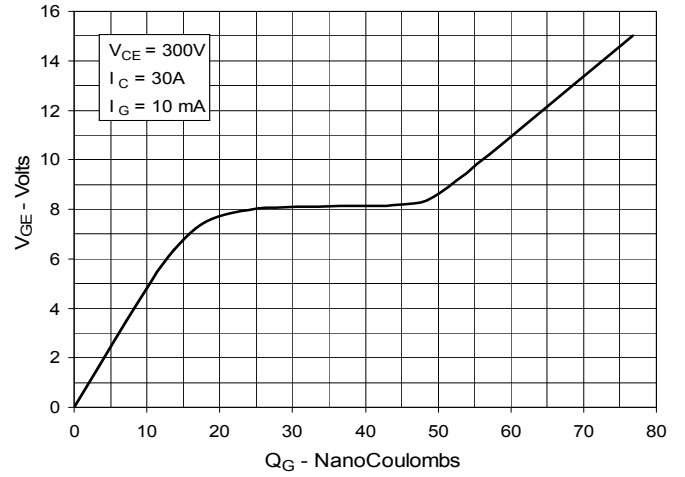


Fig. 9. Capacitance

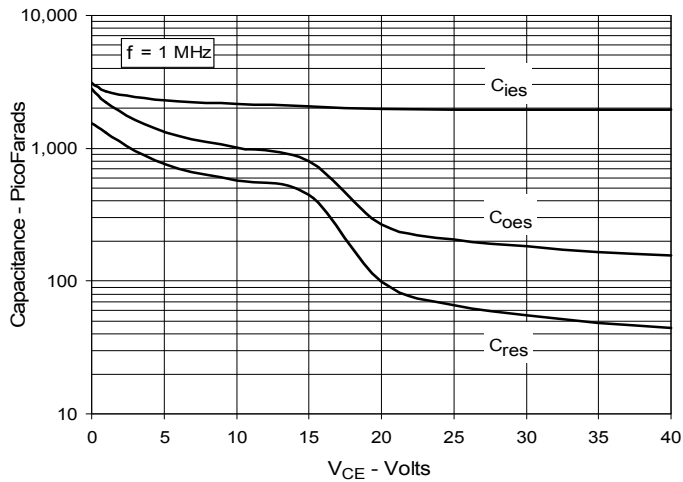


Fig. 10. Reverse-Bias Safe Operating Area

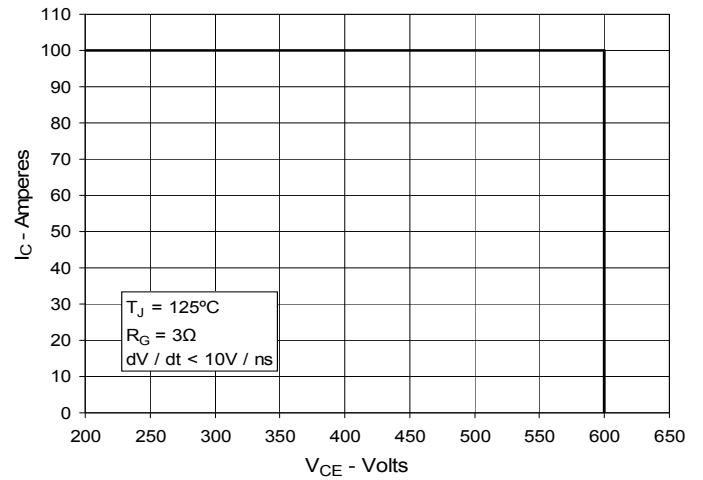
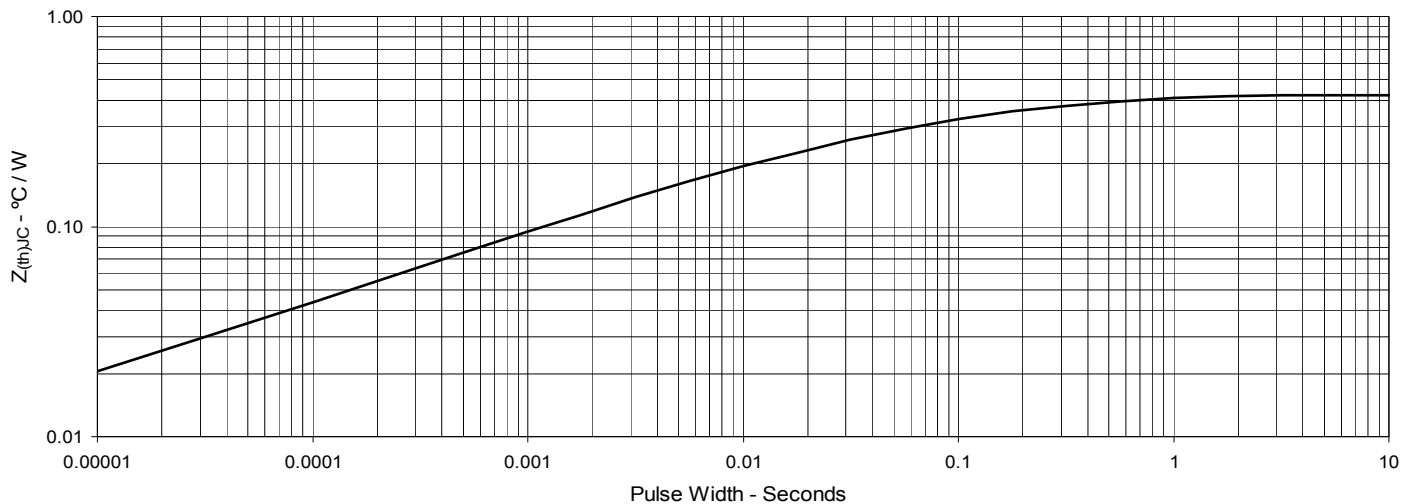


Fig. 11. Maximum Transient Thermal Impedance



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Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

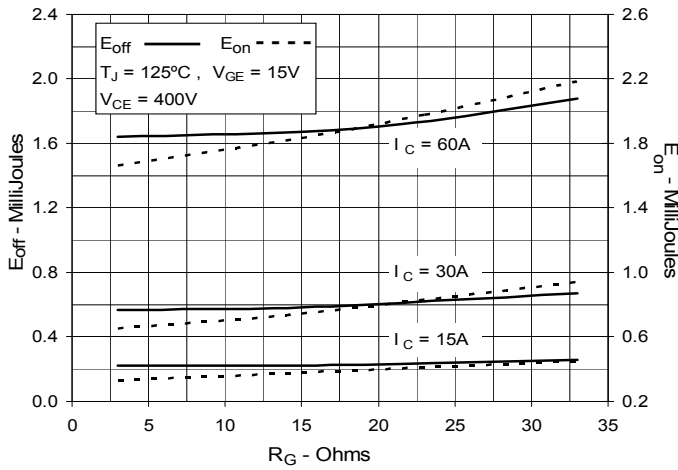


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

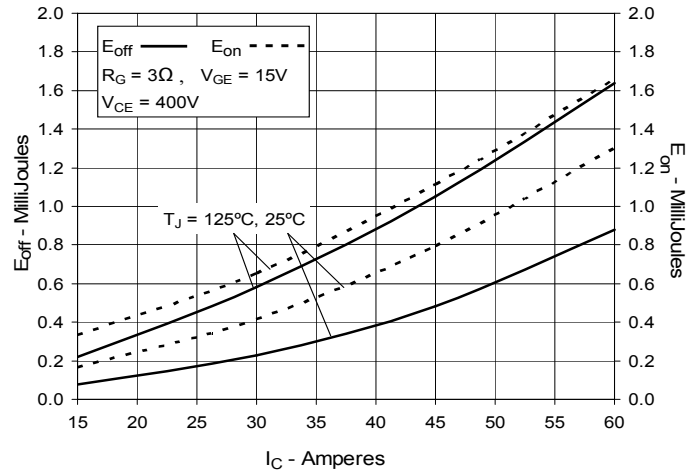


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

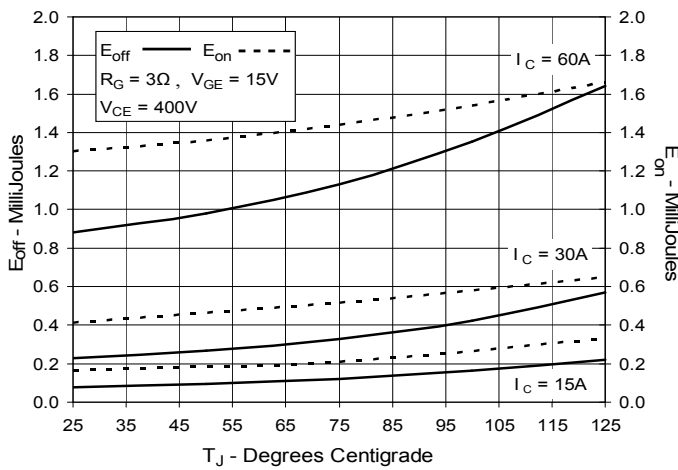


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

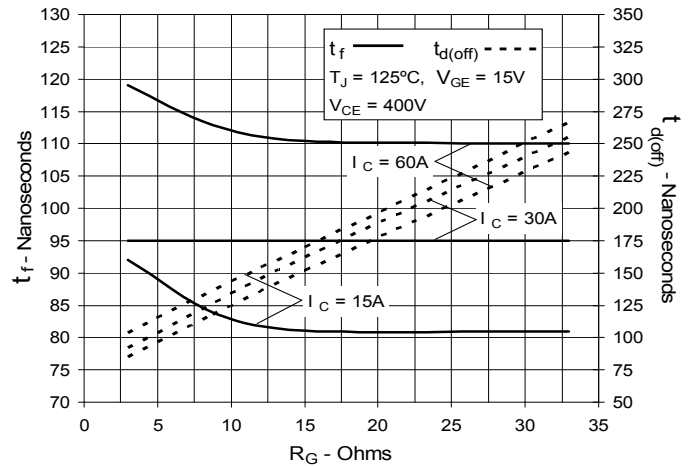


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

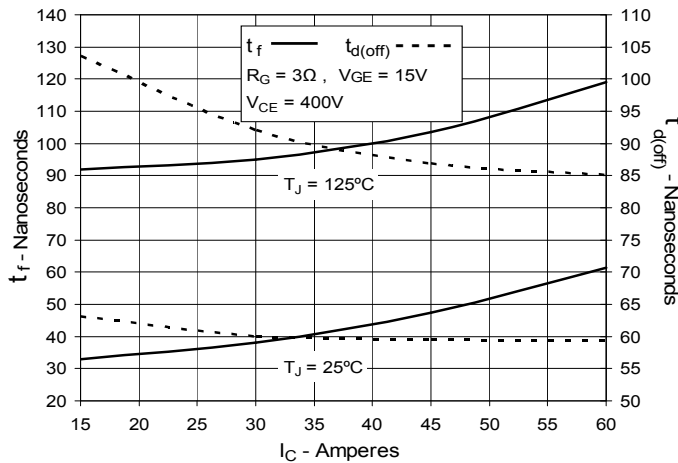
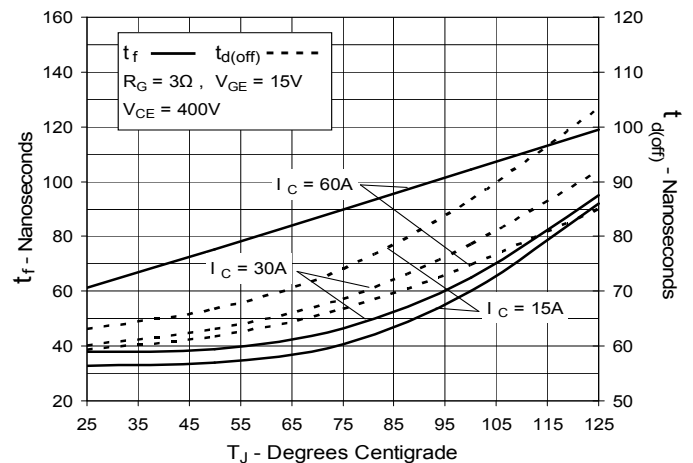
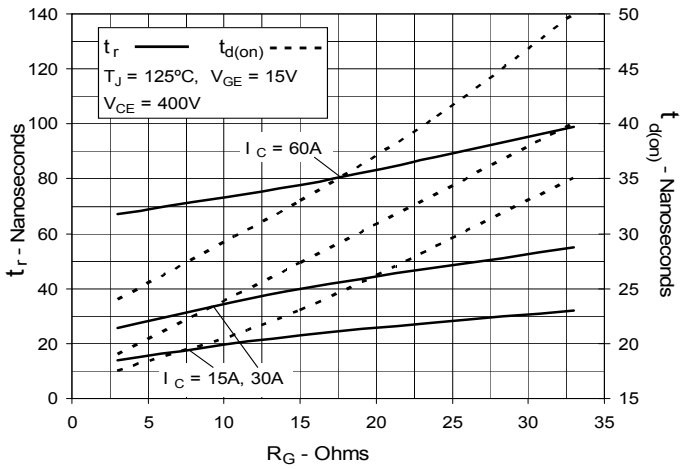


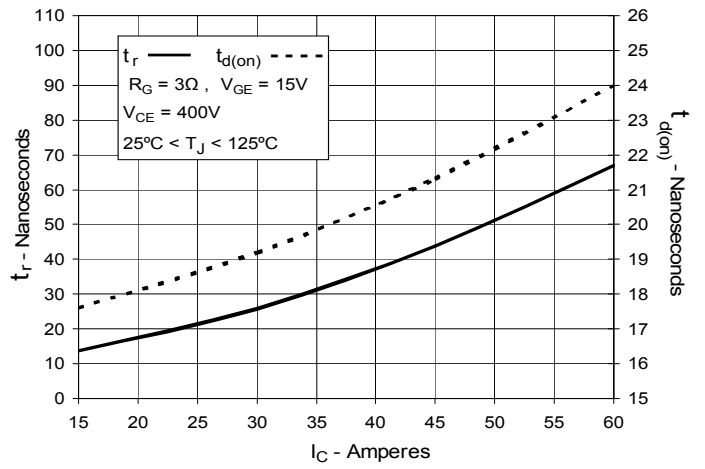
Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature



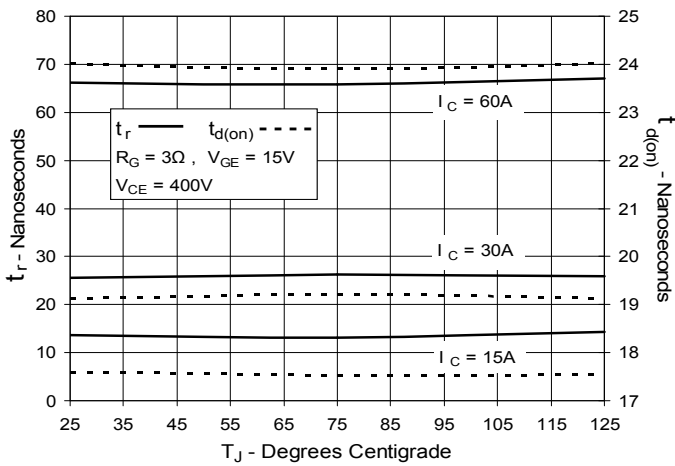
**Fig. 18. Inductive Turn-on
Switching Times vs. Gate Resistance**



**Fig. 19. Inductive Turn-on
Switching Times vs. Collector Current**



**Fig. 20. Inductive Turn-on
Switching Times vs. Junction Temperature**



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