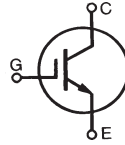


GenX3™ 1200V IGBT
**IXGA20N120B3
IXGP20N120B3**

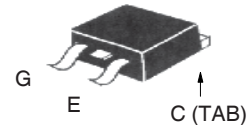
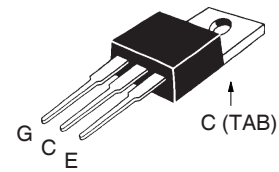
$$V_{CES} = 1200V$$

$$I_{C90} = 20A$$

$$V_{CE(sat)} \leq 3.1V$$

 High Speed Low Vsat PT
IGBTs 3-20 kHz Switching


Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ C$ to $150^\circ C$	1200	V
V_{CGR}	$T_J = 25^\circ C$ to $150^\circ C$, $R_{GE} = 1M\Omega$	1200	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ C$	36	A
I_{C90}	$T_C = 90^\circ C$	20	A
I_{CM}	$T_C = 25^\circ C$, 1ms	80	A
SSOA (RBSOA)	$V_{GE} = 15V$, $T_J = 125^\circ C$, $R_G = 15\Omega$ Clamped Inductive load	$I_{CM} = 40$ @ $V_{CE} \leq 1200$	A V
P_C	$T_C = 25^\circ C$	180	W
T_J		-55 ... +150	$^\circ C$
T_{JM}		150	$^\circ C$
T_{stg}		-55 ... +150	$^\circ C$
M_d	Mounting Torque (TO-220)	1.13/10	Nm/lb.in.
F_C	Mounting Force (TO-263)	10..65 / 2.2..14.6	N/lb.
T_L	Maximum Lead Temperature for Soldering	300	$^\circ C$
T_{SOLD}	1.6mm (0.062 in.) from Case for 10s	260	$^\circ C$
Weight	TO-263	2.5	g
	TO-220	3.0	g

TO-263 (IXGA)

TO-220 (IXGP)


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

Features

- Optimized for Low Conduction and Switching Losses
- Square RBSOA
- International Standard Packages

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

- Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Welding Machines
- Inductive Heating

Symbol	Test Conditions ($T_J = 25^\circ C$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 250\mu A$, $V_{GE} = 0V$	1200		V
$V_{GE(th)}$	$I_C = 250\mu A$, $V_{CE} = V_{GE}$	2.5		V
I_{CES}	$V_{CE} = V_{CES}$, $V_{GE} = 0V$ $T_J = 125^\circ C$			25 μA 1 mA
I_{GES}	$V_{CE} = 0V$, $V_{GE} = \pm 20V$			± 100 nA
$V_{CE(sat)}$	$I_C = 16A$, $V_{GE} = 15V$, Note 2 $T_J = 125^\circ C$		2.7 2.8	3.1 V V

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$I_C = 16\text{A}, V_{CE} = 10\text{V}$, Note 2	7.5	12.5	S
C_{ies}	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		1070	pF
C_{oes}			80	pF
C_{res}			32	pF
Q_g	$I_C = 16\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$		51	nC
Q_{ge}			7.4	nC
Q_{gc}			23	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = 16\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 600\text{V}, R_G = 15\Omega$ Note 1		16	ns
t_{ri}			31	ns
E_{on}			0.92	mJ
$t_{d(off)}$			150	ns
t_{fi}			155	ns
E_{off}			0.56	1.00 mJ
$t_{d(on)}$	Inductive load, $T_J = 125^\circ\text{C}$ $I_C = 16\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 600\text{V}, R_G = 15\Omega$ Note 1		16	ns
t_{ri}			45	ns
E_{on}			1.60	mJ
$t_{d(off)}$			180	ns
t_{fi}			540	ns
E_{off}			1.63	mJ
R_{thJC}	TO-220			0.69 $^\circ\text{C/W}$
R_{thCK}		0.50		$^\circ\text{C/W}$

- Notes: 1. Switching Times may Increase for V_{CE} (Clamp) $> 0.5 \cdot V_{CES}$, Higher T_J or Increased R_G .
2. Pulse Test, $t \leq 300\mu\text{s}$; Duty Cycle, $d \leq 2\%$.

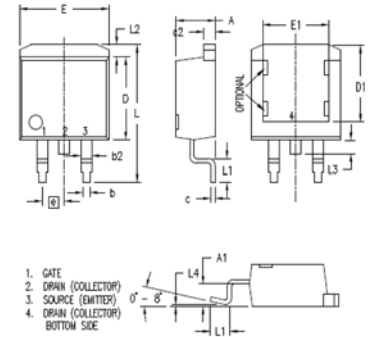
PRELIMINARY TECHNICAL INFORMATION

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.

IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

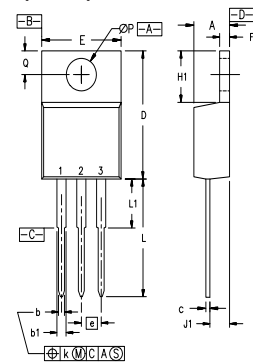
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585 7,005,734 B2 7,157,338B2
4,850,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405 B2 6,759,692 7,063,975 B2
4,881,106 5,034,796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

TO-263 (IXGA) Outline



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

TO-220 (IXGP) Outline



Pins: 1 - Gate 2 - 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

Fig. 1. Output Characteristics @ 25°C

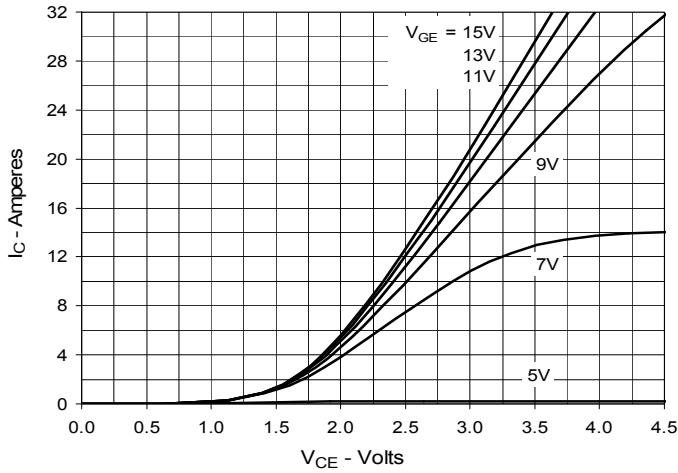


Fig. 2. Extended Output Characteristics @ 25°C

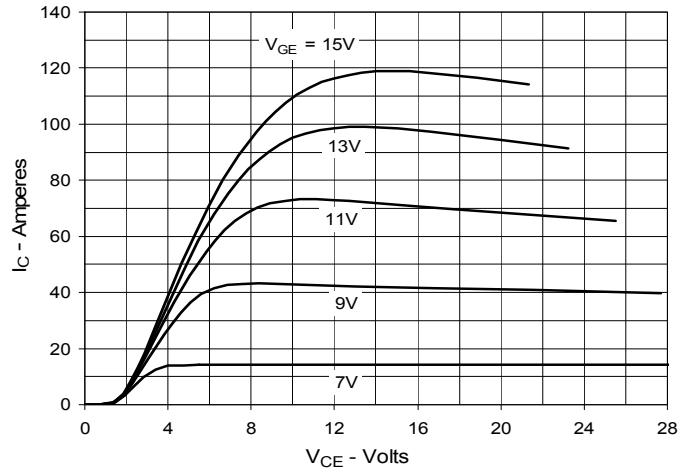


Fig. 3. Output Characteristics @ 125°C

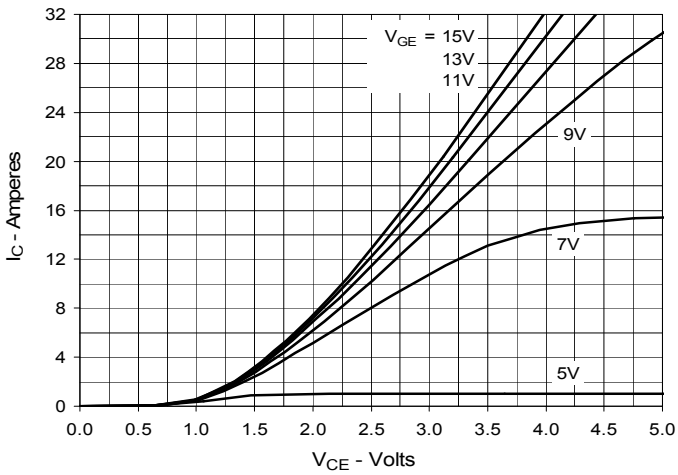


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

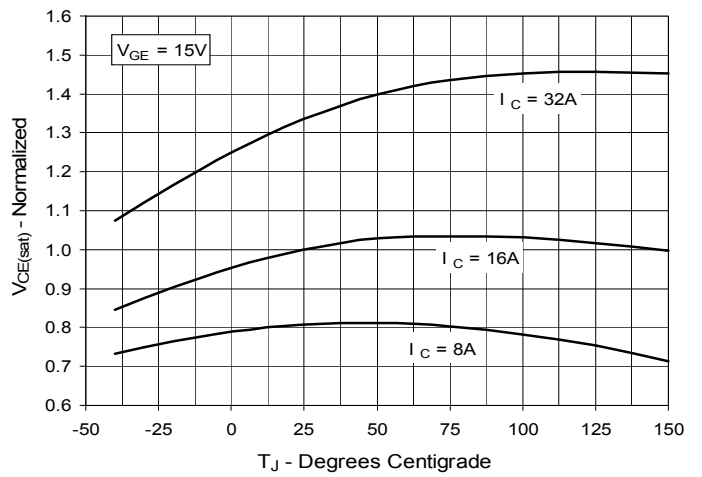


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

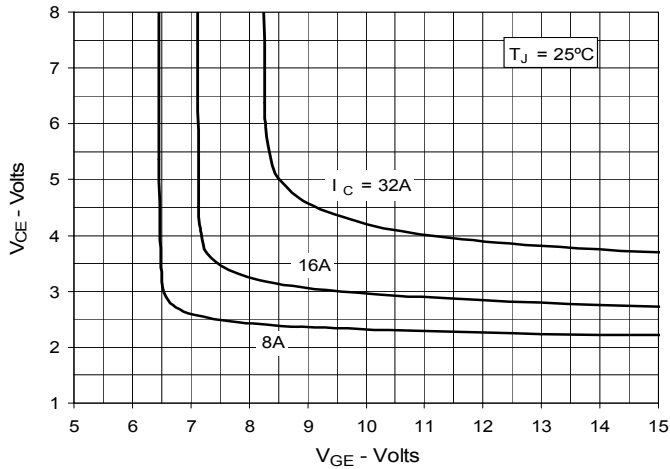


Fig. 6. Input Admittance

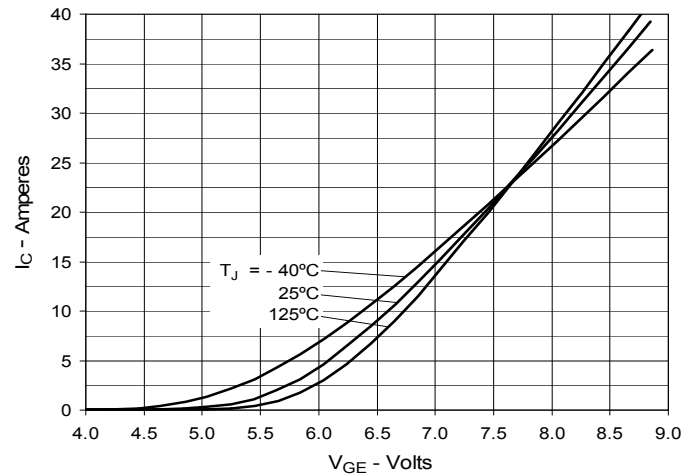


Fig. 7. Transconductance

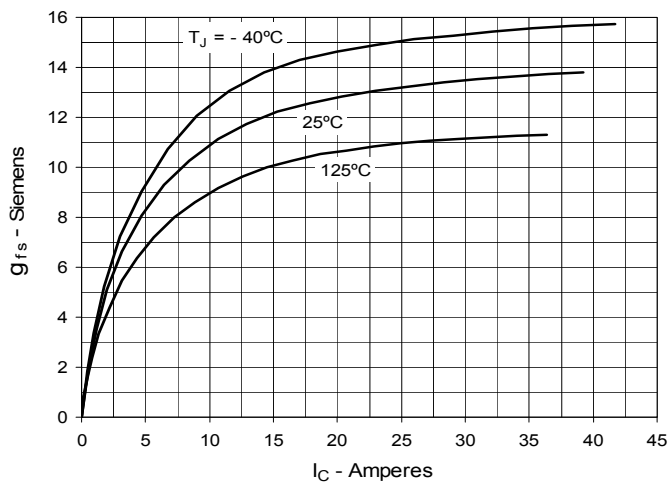


Fig. 8. Gate Charge

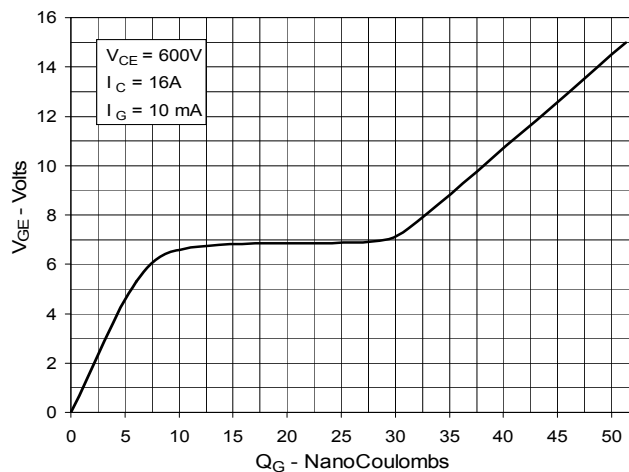


Fig. 9. Capacitance

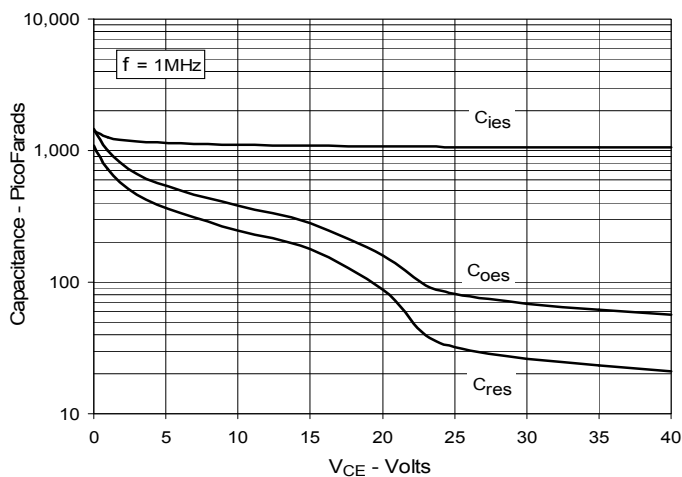


Fig. 10. Reverse-Bias Safe Operating Area

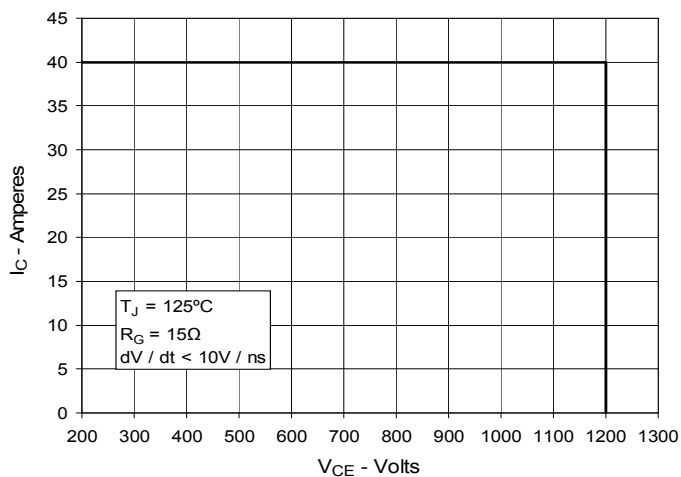


Fig. 11. Maximum Transient Thermal Impedance

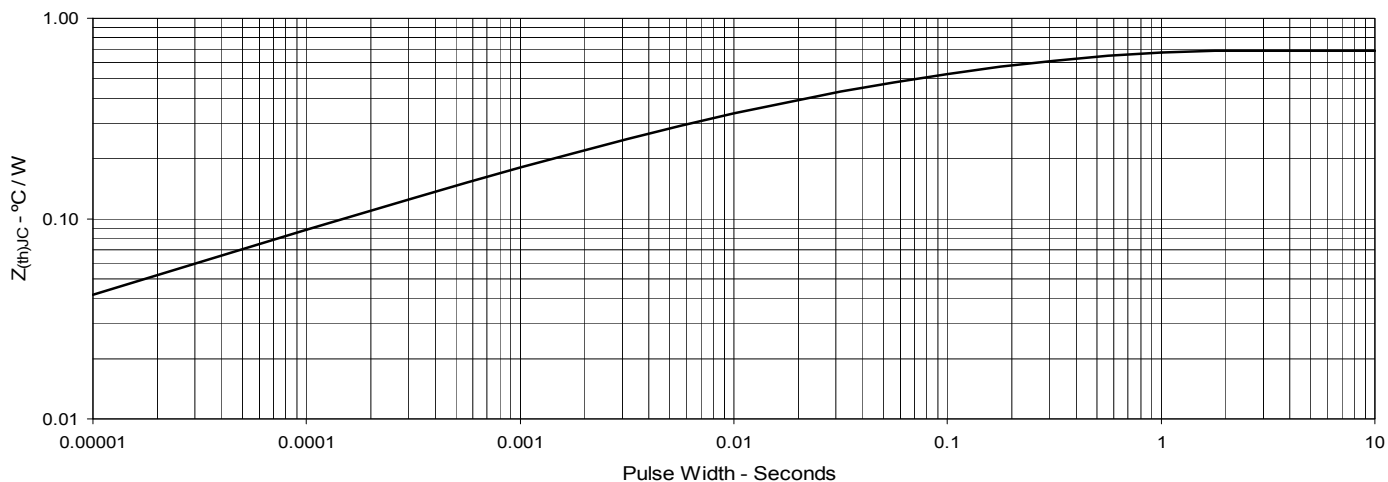


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

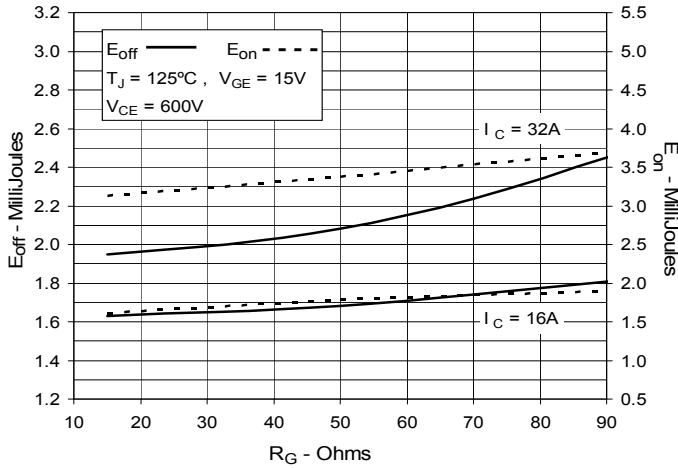


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

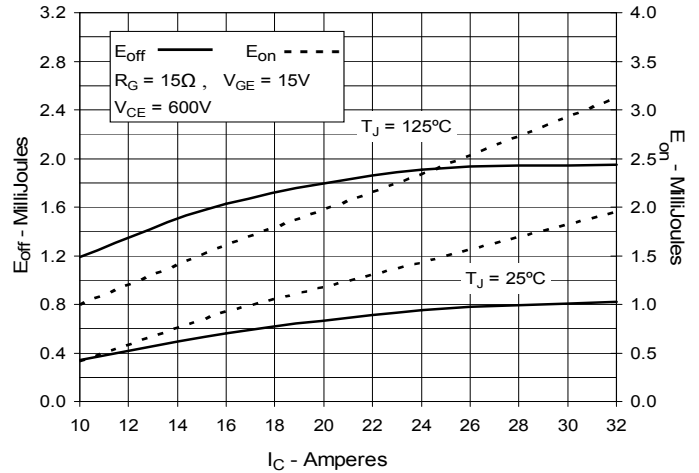


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

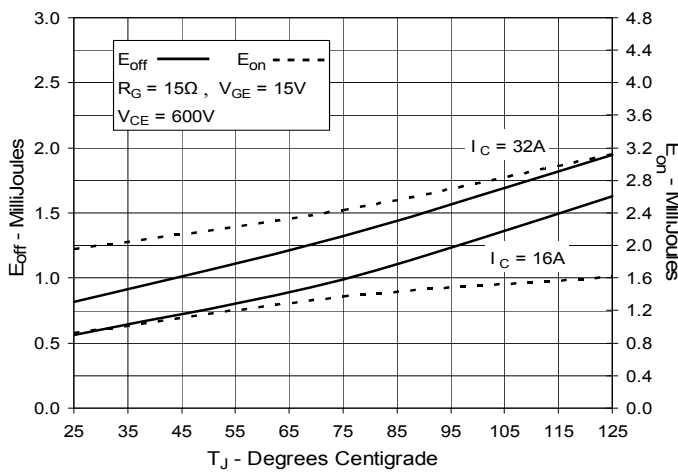


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

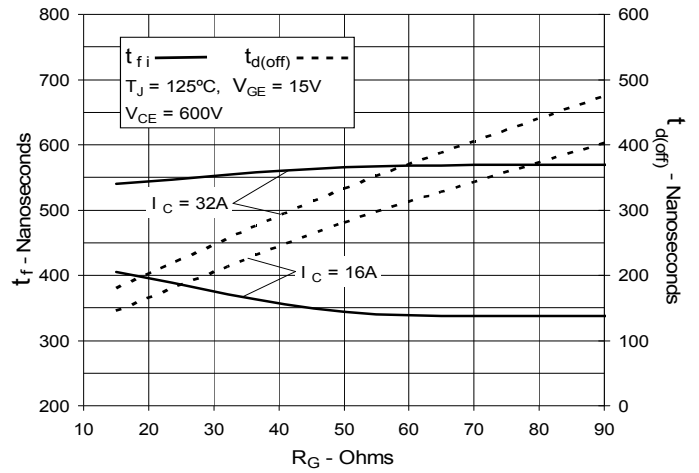


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

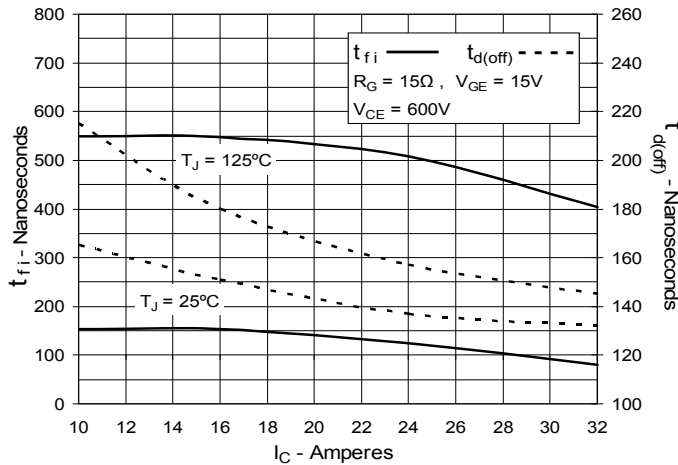
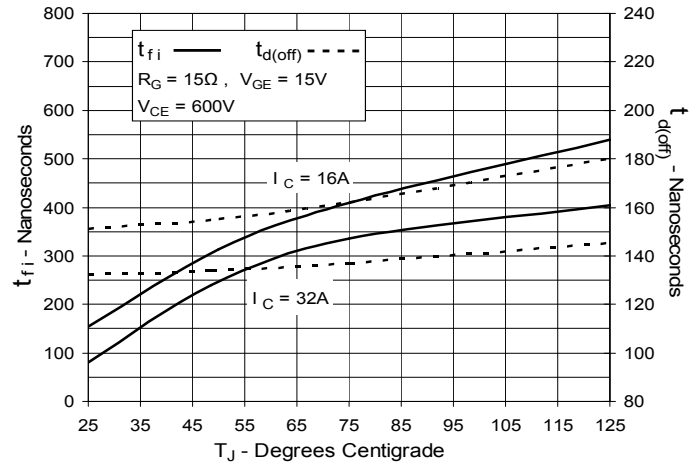
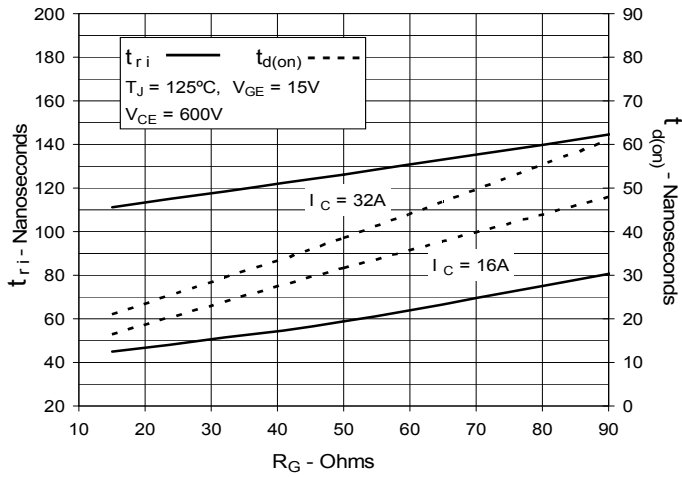


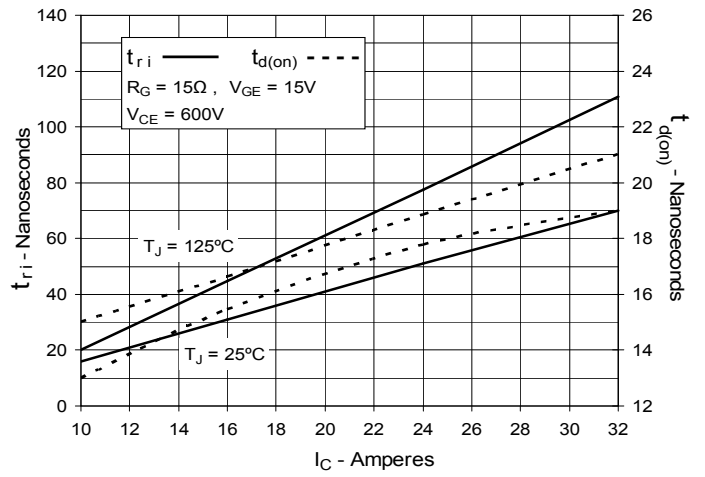
Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature



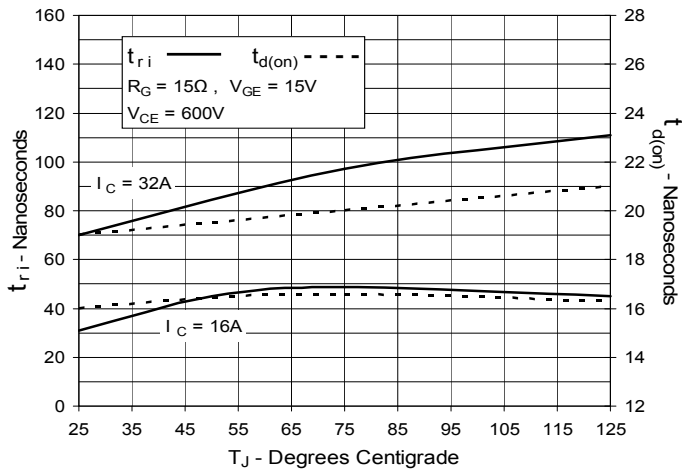
**Fig. 18. Inductive Turn-on
Switching Times vs. Gate Resistance**



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



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





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