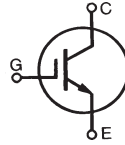


**GenX3™ 1200V IGBT**
**IXGA20N120B3  
IXGP20N120B3**

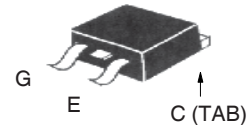
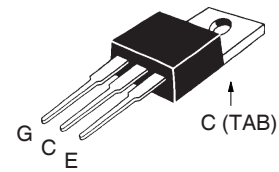
$$V_{CES} = 1200V$$

$$I_{C90} = 20A$$

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

 High Speed Low Vsat PT  
IGBTs 3-20 kHz Switching


Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	1200	V
$V_{CGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ , $R_{GE} = 1M\Omega$	1200	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ\text{C}$	36	A
$I_{C90}$	$T_C = 90^\circ\text{C}$	20	A
$I_{CM}$	$T_C = 25^\circ\text{C}$ , 1ms	80	A
<b>SSOA</b> <b>(RBSOA)</b>	$V_{GE} = 15V$ , $T_J = 125^\circ\text{C}$ , $R_G = 15\Omega$ Clamped Inductive load	$I_{CM} = 40$ @ $V_{CE} \leq 1200$	A V
$P_C$	$T_C = 25^\circ\text{C}$	180	W
$T_J$		-55 ... +150	$^\circ\text{C}$
$T_{JM}$		150	$^\circ\text{C}$
$T_{stg}$		-55 ... +150	$^\circ\text{C}$
$M_d$	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	$^\circ\text{C}$
$T_{SOLD}$	1.6mm (0.062 in.) from Case for 10s	260	$^\circ\text{C}$
<b>Weight</b>	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 ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{CES}$	$I_C = 250\mu\text{A}$ , $V_{GE} = 0V$	1200		V
$V_{GE(th)}$	$I_C = 250\mu\text{A}$ , $V_{CE} = V_{GE}$	2.5		V
$I_{CES}$	$V_{CE} = V_{CES}$ , $V_{GE} = 0V$ $T_J = 125^\circ\text{C}$			25 $\mu\text{A}$ 1 mA
$I_{GES}$	$V_{CE} = 0V$ , $V_{GE} = \pm 20V$			$\pm 100$ nA
$V_{CE(sat)}$	$I_C = 16A$ , $V_{GE} = 15V$ , Note 2 $T_J = 125^\circ\text{C}$		2.7 2.8	3.1 V V

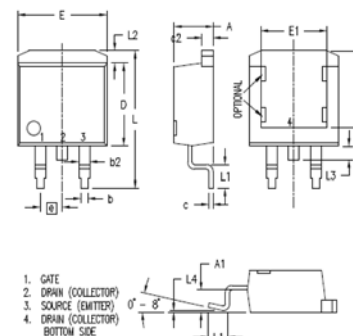
Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$I_C = 16\text{A}$ , $V_{CE} = 10\text{V}$ , Note 2	7.5	12.5	S
$C_{ies}$ $C_{oes}$ $C_{res}$	$V_{CE} = 25\text{V}$ , $V_{GE} = 0\text{V}$ , $f = 1\text{MHz}$		1070	pF
			80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

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

### PRELIMINARY TECHNICAL INFORMATION

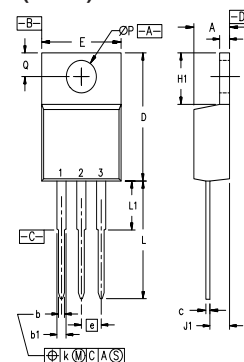
The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

### TO-263 (IXGA) Outline

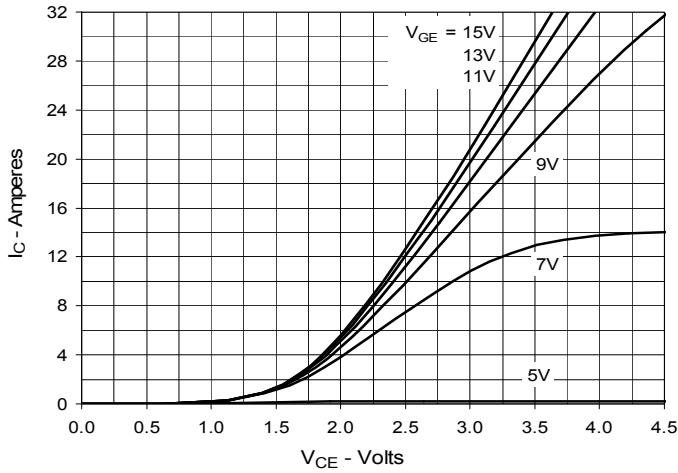


SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.160	.190	4.06	4.83
A1	.080	.110	2.03	2.79
b	.020	.039	0.51	0.99
b2	.045	.055	1.14	1.40
c	.016	.029	0.40	0.74
c2	.045	.055	1.14	1.40
D	.340	.380	8.64	9.65
D1	.315	.350	8.00	8.89
E	.380	.410	9.65	10.41
E1	.245	.320	6.22	8.13
e	.100 BSC		2.54 BSC	
L	.575	.625	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

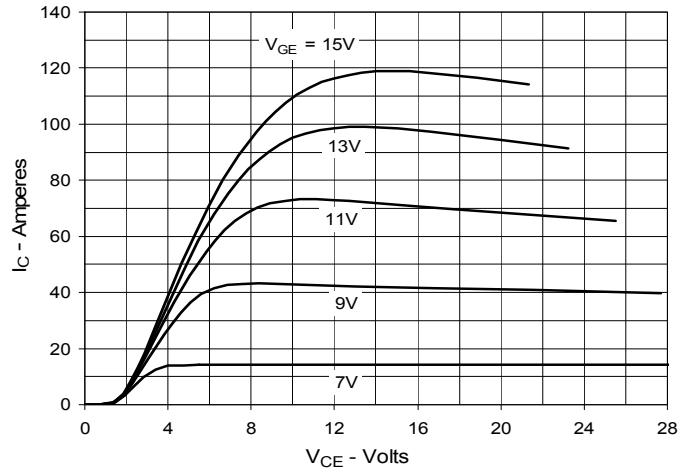
### TO-220 (IXGP) Outline



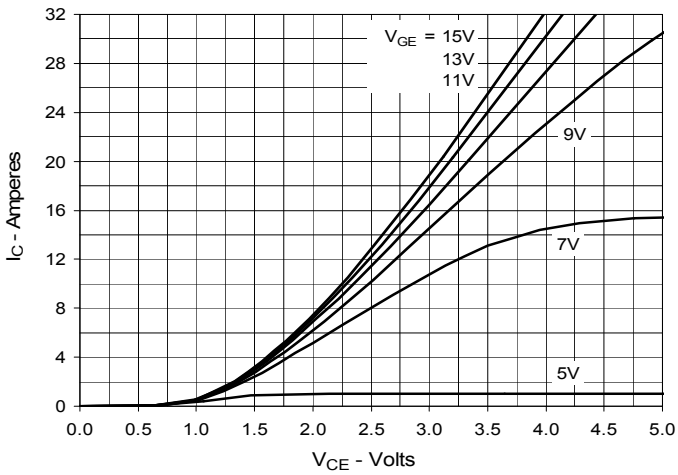
**Fig. 1. Output Characteristics @ 25°C**



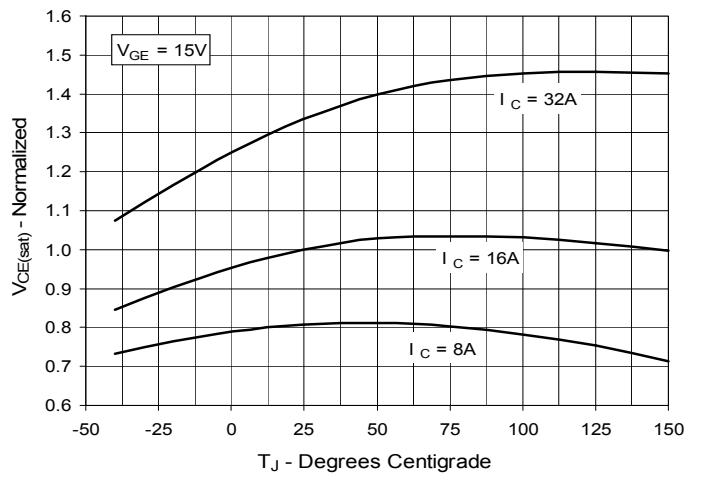
**Fig. 2. Extended Output Characteristics @ 25°C**



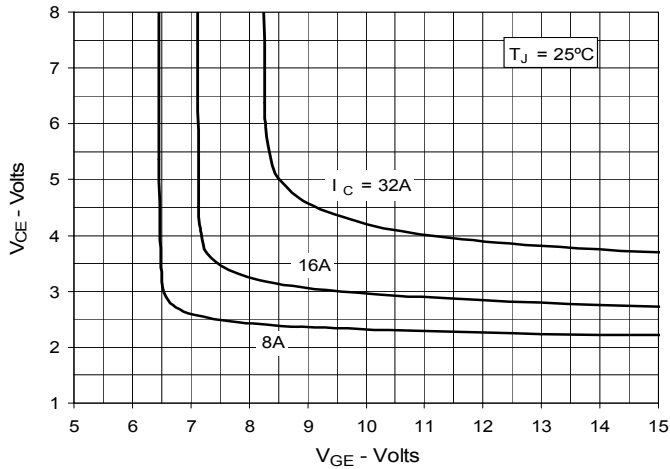
**Fig. 3. Output Characteristics @ 125°C**



**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**

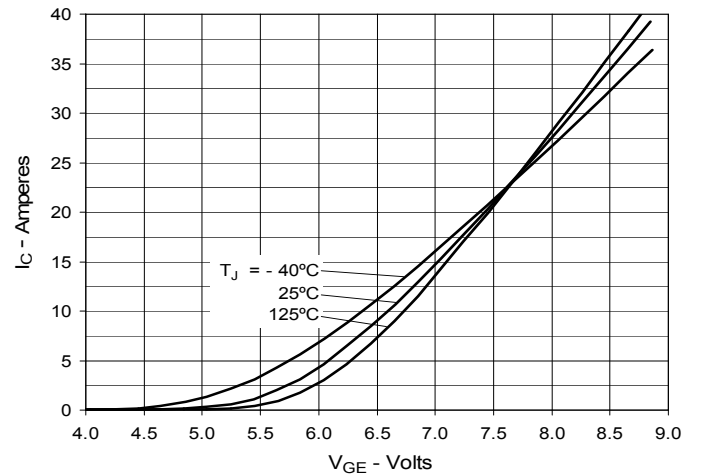


Fig. 7. Transconductance

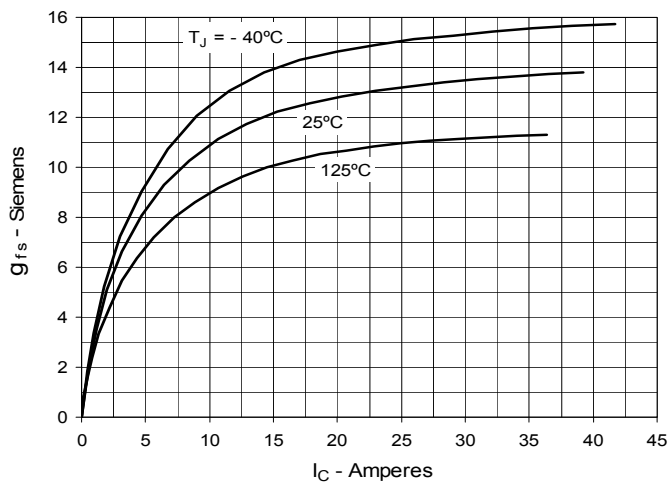


Fig. 8. Gate Charge

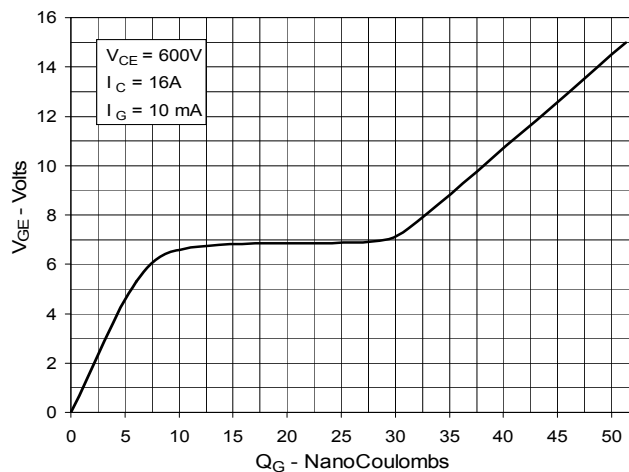


Fig. 9. Capacitance

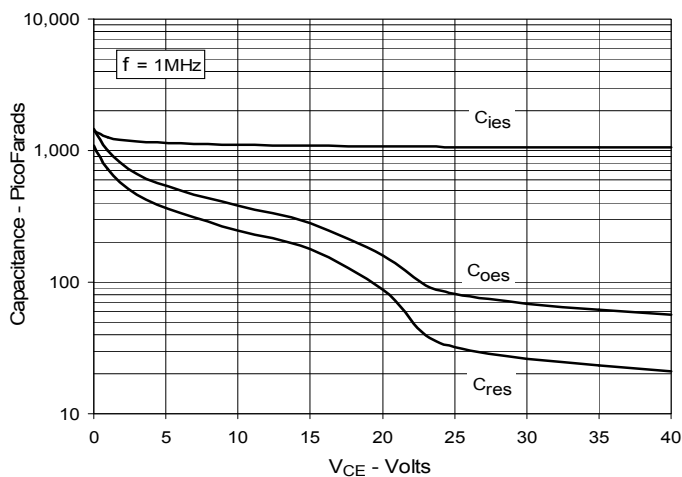


Fig. 10. Reverse-Bias Safe Operating Area

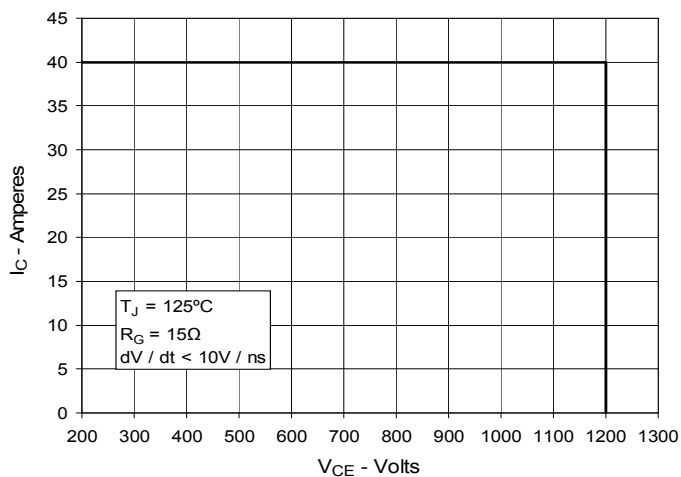
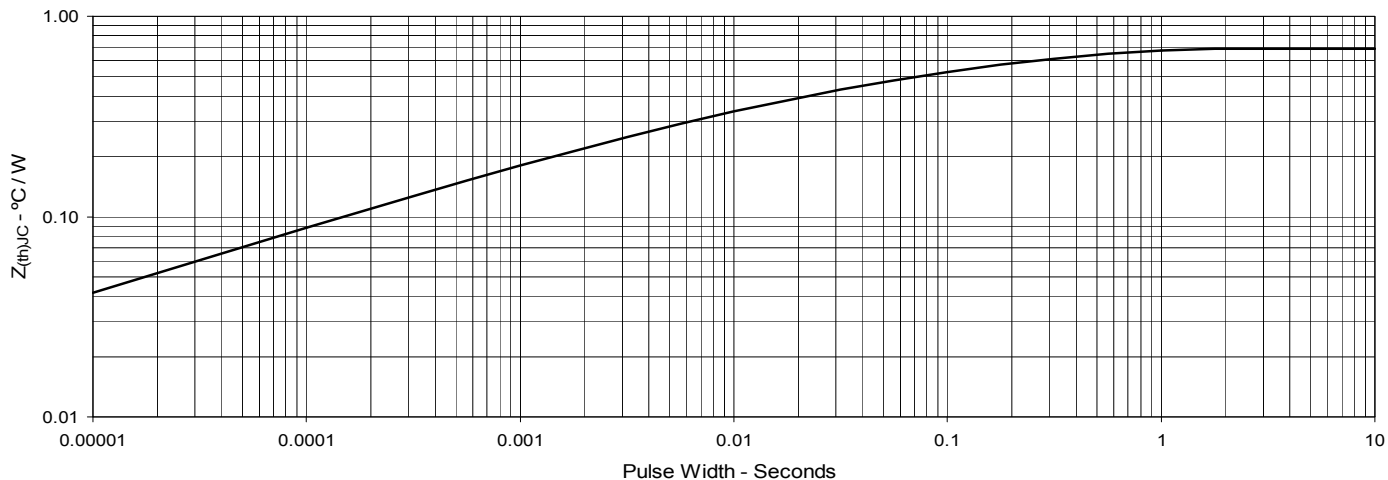
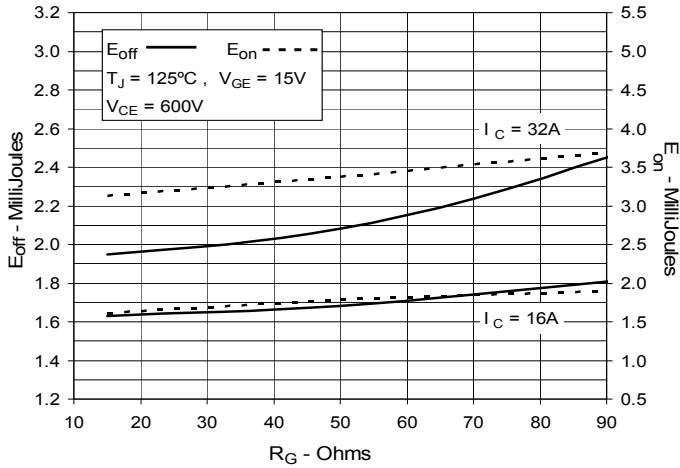


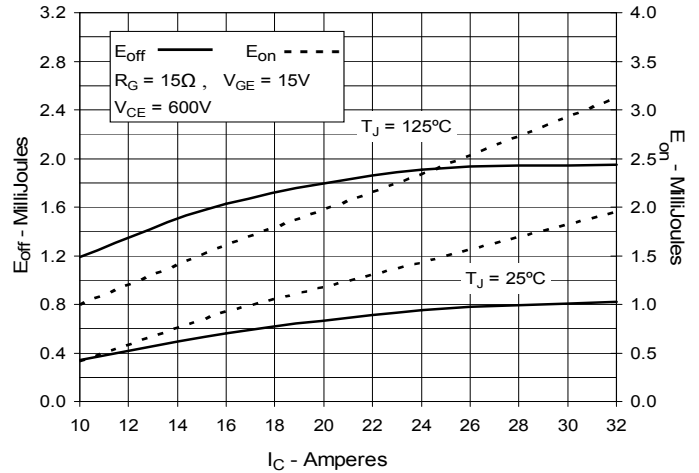
Fig. 11. Maximum Transient Thermal Impedance



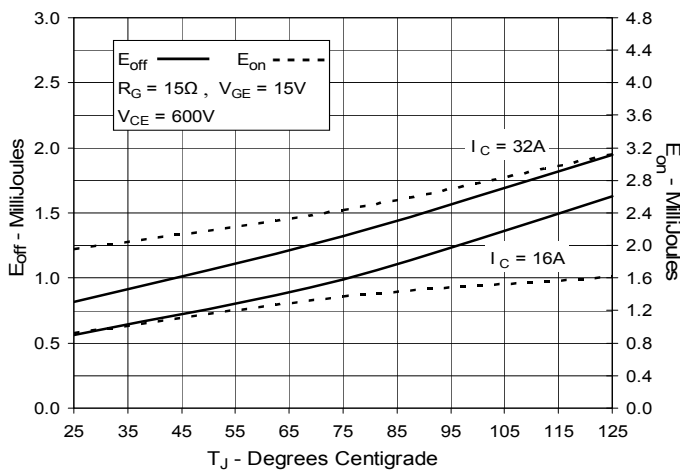
**Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance**



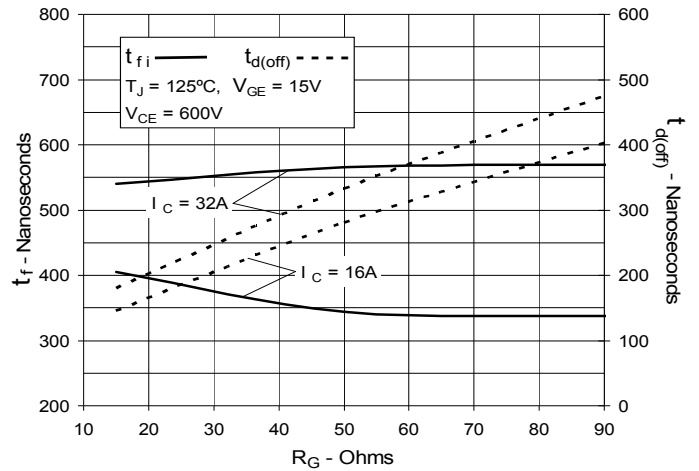
**Fig. 13. Inductive Switching Energy Loss vs. Collector Current**



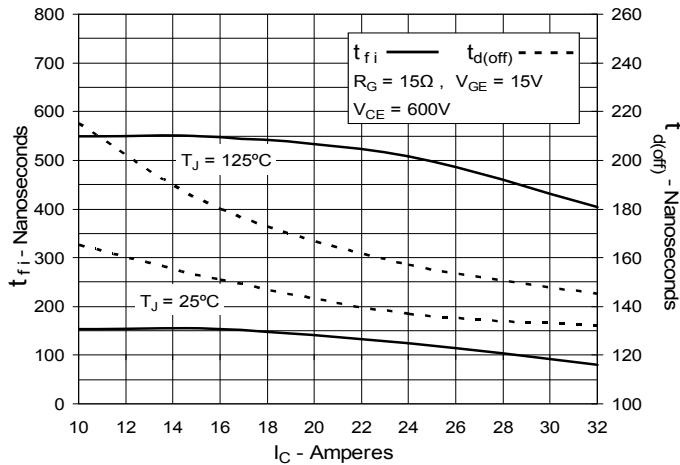
**Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature**



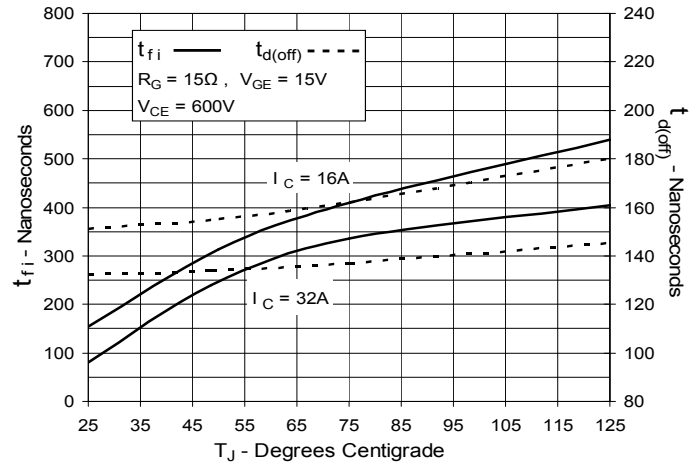
**Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance**



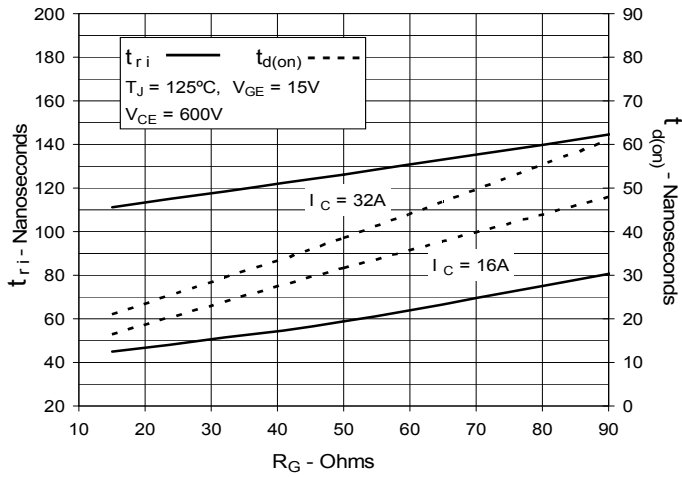
**Fig. 16. Inductive Turn-off Switching Times vs. Collector Current**



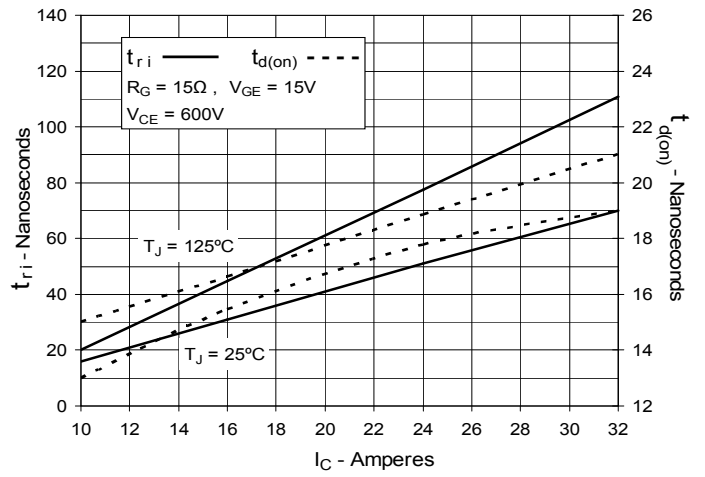
**Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature**



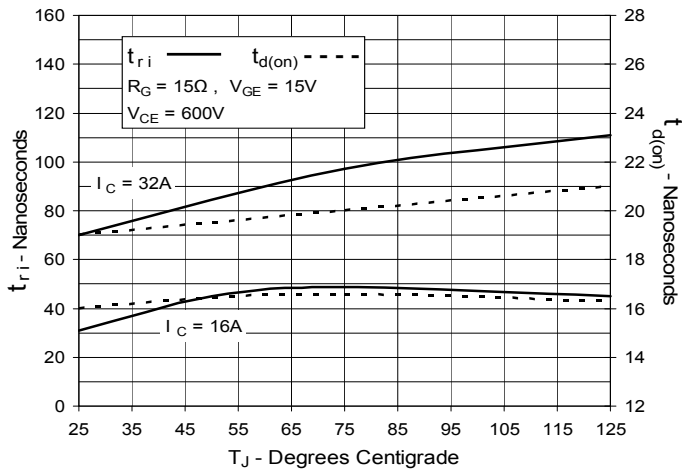
**Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance**



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



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





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