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IXYS Corporation
IXGA20N120A3

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Distributor of IXYS Corporation: Excellent Integrated System Limited
Datasheet of IXGA20N120A3 - IGBT 1200V 40A 180W TO263
Contact us: sales@integrated-circuit.com Website: www.integrated-circuit.com

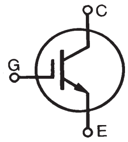
IXYS

GenX3™ 1200V IGBTs

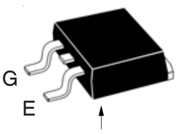
IXGA20N120A3
IXGP20N120A3
IXGH20N120A3

V_{CES} = 1200V
I_{C110} = 20A
$V_{CE(sat)}$ ≤ 2.5V

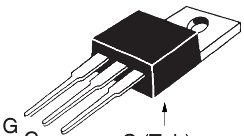
Ultra-Low Vsat PT IGBTs for up to 3 kHz Switching



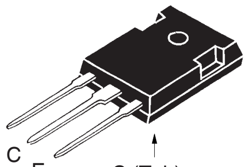
TO-263 AA (IXGA)



TO-220AB (IXGP)



TO-247 (IXGH)



G = Gate   C = Collector
E = Emitter   Tab = Collector

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	1200	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	1200	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	40	A
I_{C110}	T_C = 110°C	20	A
I_{CM}	T_C = 25°C, 1ms	120	A
SSOA	V_{GE}= 15V, T_J = 125°C, R_G = 10Ω	I_{CM} = 40	A
(RBSOA)	Clamped Inductive Load	@V_{CE} ≤ 960	V
P_C	T_C = 25°C	180	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
M_d	Mounting Torque (TO-247 & 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	°C
T_{SOLD}	1.6mm (0.062 in.) from Case for 10s	260	°C
Weight	TO-263	2.5	g
	TO-220	3.0	g
	TO-247	6.0	g

Features

- Optimized for Low Conduction Losses
- International Standard Packages

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

- Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Battery Chargers
- Welding Machines
- Lamp Ballasts
- Inrush Current Protection Circuits

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250µA, V_{GE} = 0V	1200			V
$V_{GE(th)}$	I_C = 250µA, V_{CE} = V_{GE}	2.5		5.0	V
I_{CES}	V_{CE} = 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 = 20A, V_{GE} = 15V, Note 1		2.3	2.5	V
	T_J = 125°C		2.5		V

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IXYS

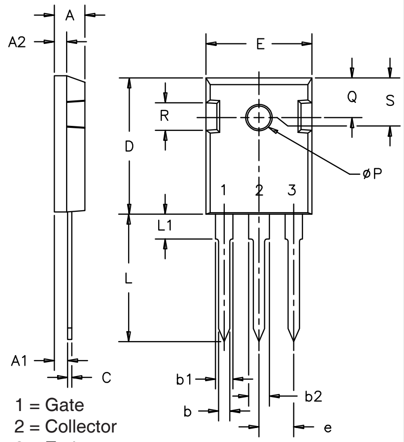
IXGA20N120A3 IXGP20N120A3 IXGH20N120A3

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.
g_{fs}	I_C = 20A, V_{CE} = 10V, Note 1	7	12	S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		1075	pF
C_{oes}			80	pF
C_{res}			27	pF
Q_g	I_C = 20A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		50	nC
Q_{ge}			7.3	nC
Q_{gc}			23	nC
$t_{d(on)}$	**Inductive Load, T_J = 25°C**		16	ns
t_{ri}	I_C = 20A, V_{GE} = 15V		44	ns
E_{on}	V_{CE} = 960V, R_G = 10Ω		2.85	mJ
$t_{d(off)}$	Note 2		290	ns
t_{fi}			715	ns
E_{off}			6.47	mJ
$t_{d(on)}$	**Inductive Load, T_J = 125°C**		16	ns
t_{ri}	I_C = 20A, V_{GE} = 15V		50	ns
E_{on}	V_{CE} = 960V, R_G = 10Ω		5.53	mJ
$t_{d(off)}$	Note 2		310	ns
t_{fi}			1220	ns
E_{off}			10.10	mJ
R_{thJC}				0.69 °C/W
R_{thCK}	TO-220		0.50	°C/W
	TO-247		0.21	°C/W

Notes:

1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.
2. Switching times & energy losses may increase for higher V_{CE}(Clamp), T_J or R_G.

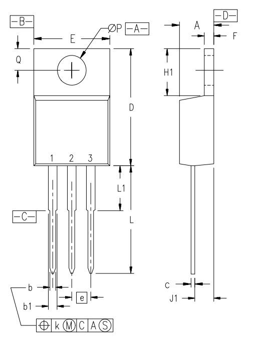
TO-247 (IXGH) AD Outline



1 = Gate
2 = Collector
3 = Emitter
Tab = Collector

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.185	.209	4.7	5.3
A1	.087	.102	2.2	2.54
A2	.059	.098	2.2	2.6
b	.040	.055	1.0	1.4
b1	.065	.084	1.65	2.13
b2	.113	.123	2.87	3.12
C	.016	.031	.4	.8
D	.819	.845	20.80	21.46
E	.610	.640	15.75	16.26
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1		.177		4.50
ØP	.140	.144	3.55	3.65
Q	.212	.244	5.4	6.2
R	.170	.216	4.32	5.49
S	.242 BSC		6.15 BSC	

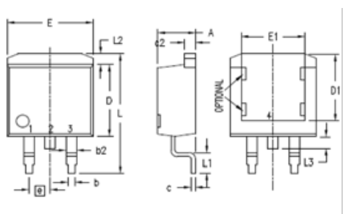
TO-220 (IXGP) Outline



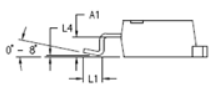
Pins: 1 - Gate 2 - Collector
3 - Emitter 4 - Collector

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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
2 = Collector
3 = Emitter
Tab = Collector



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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

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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

Fig. 1. Output Characteristics @ T_J = 25ºC

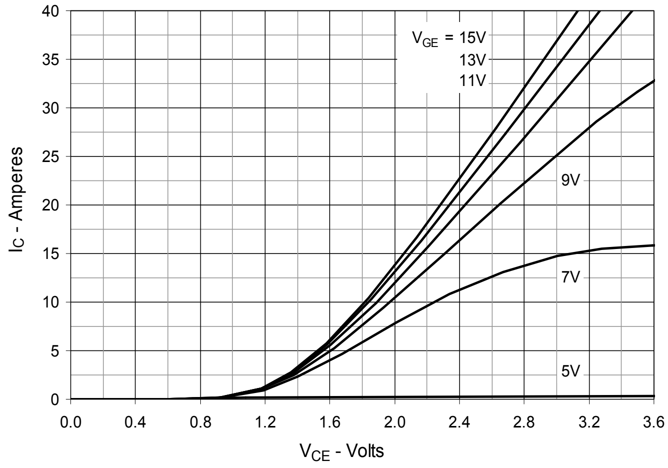

Fig. 2. Extended Output Characteristics @ T_J = 25ºC

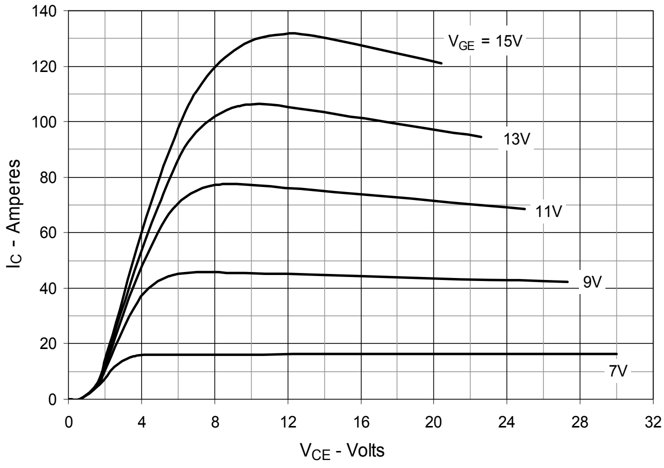

Fig. 3. Output Characteristics @ T_J = 125ºC

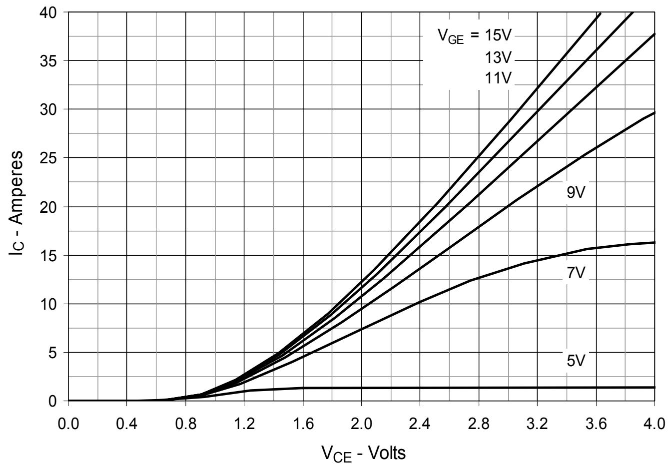

Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

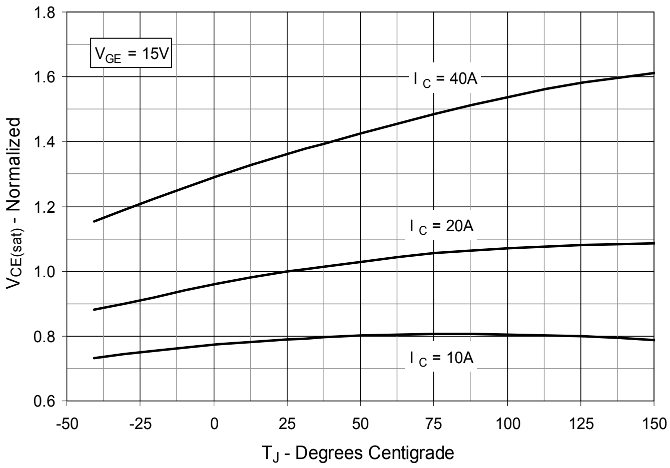

Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

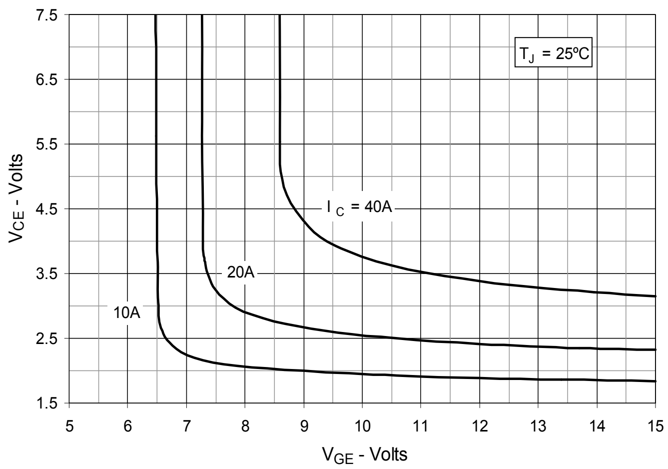

Fig. 6. Input Admittance

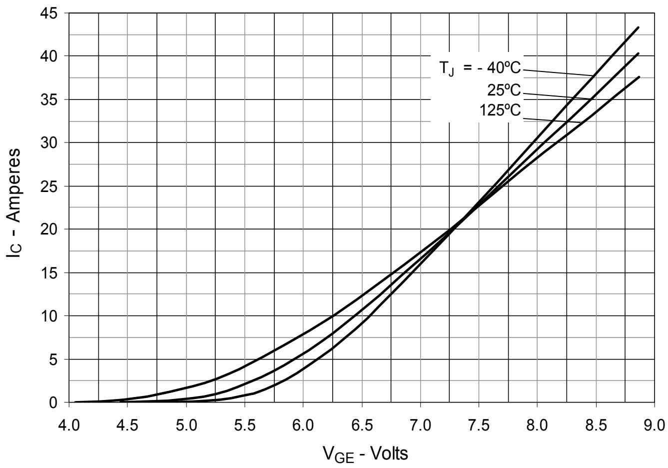

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Fig. 7. Transconductance

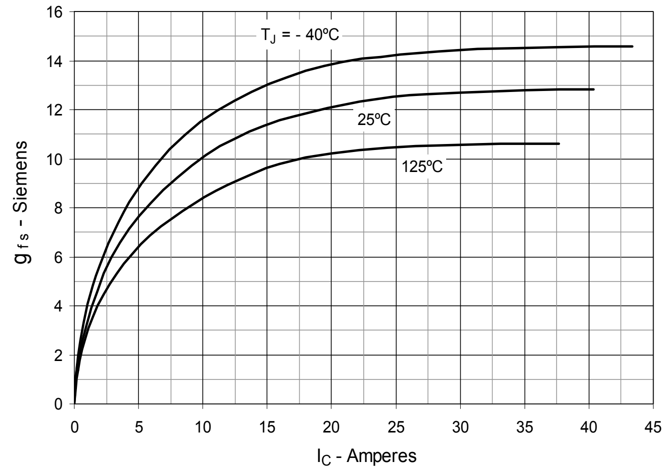

Fig. 8. Gate Charge

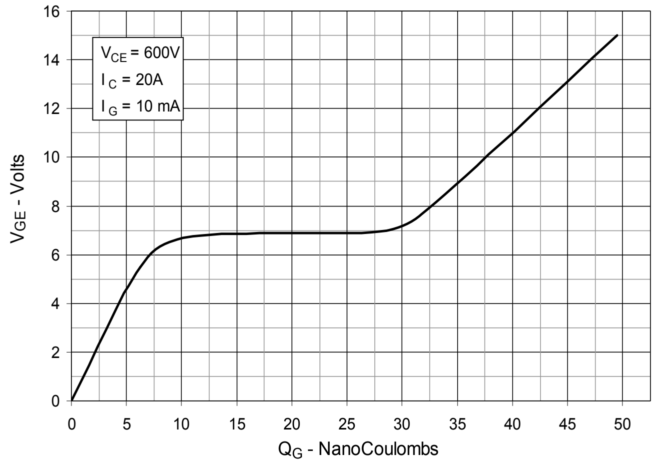

Fig. 9. Capacitance

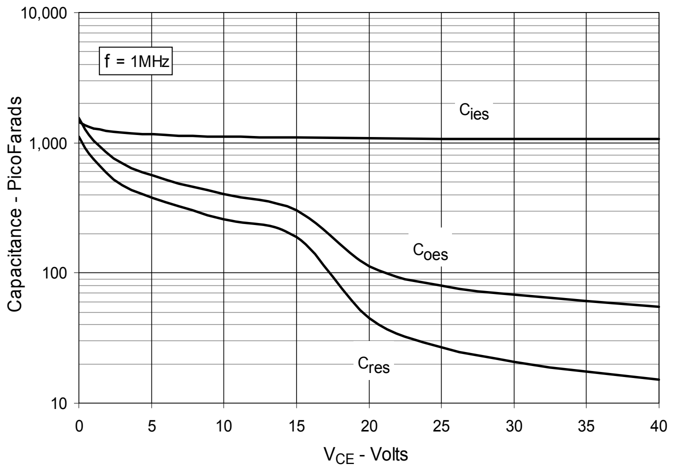

Fig. 10. Reverse-Bias Safe Operating Area

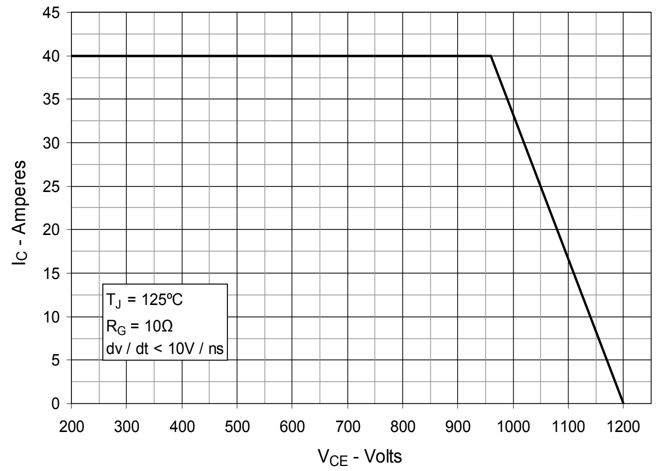

Fig. 11. Maximum Transient Thermal Impedance

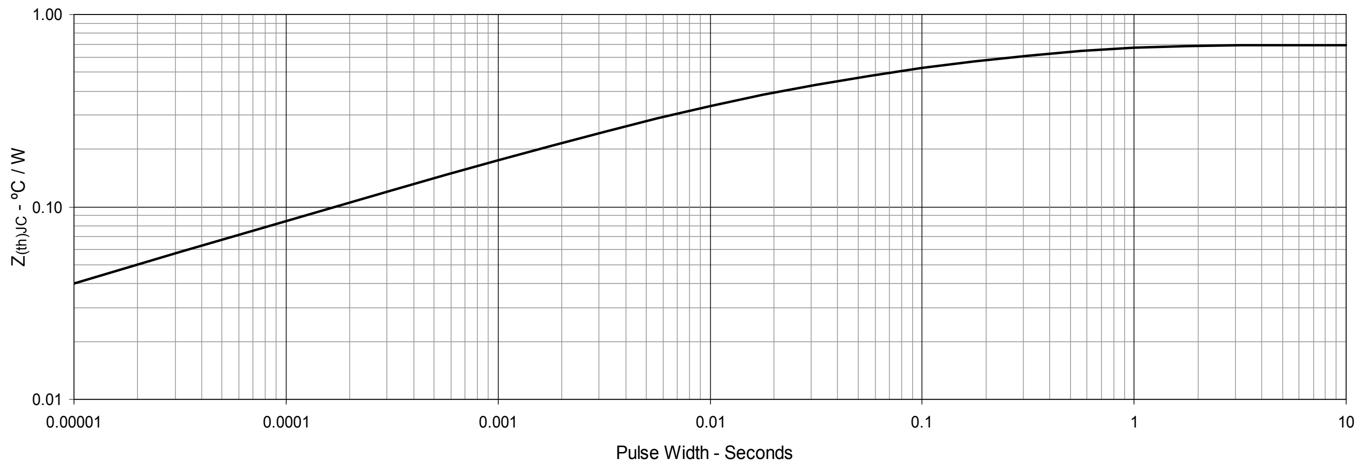

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Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

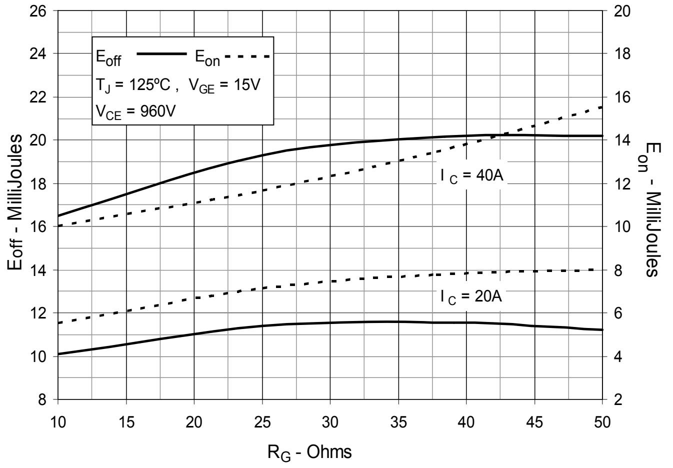

Fig. 13. Inductive Switching Energy Loss vs. Collector Current

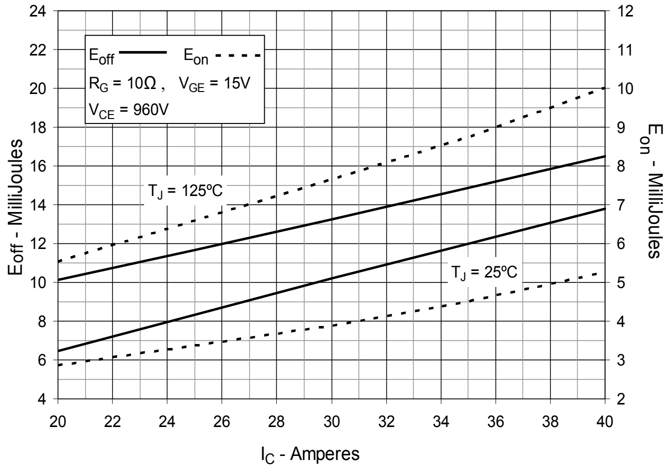

Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

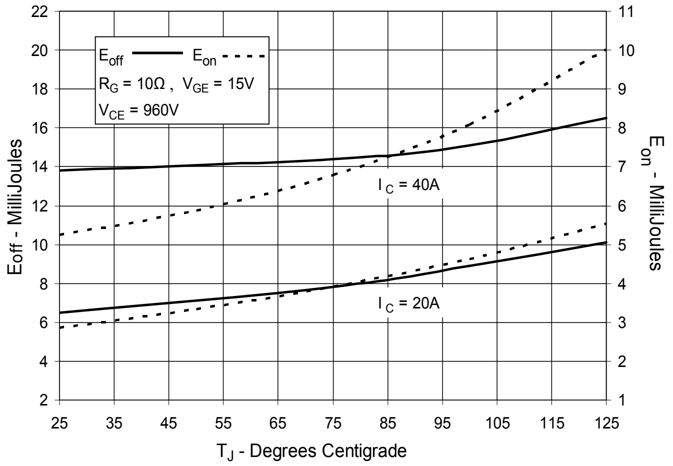

Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

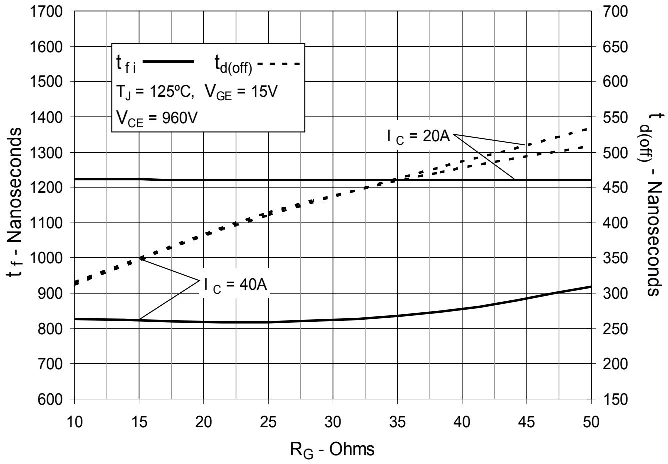

Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

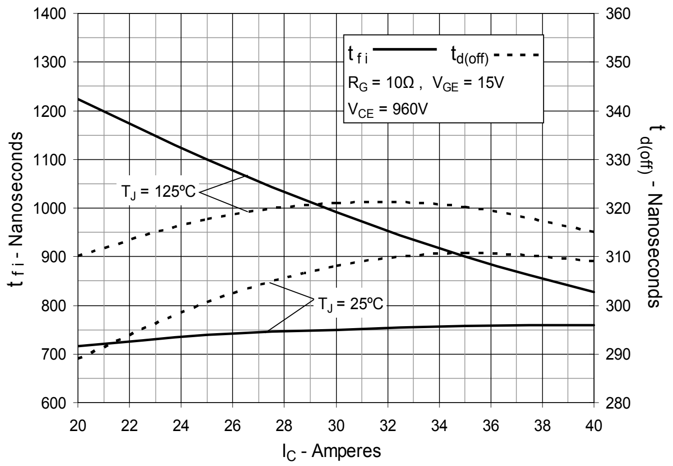

Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

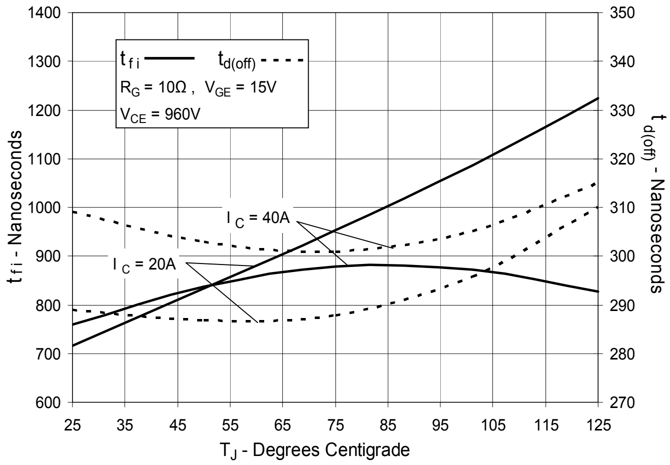

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Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

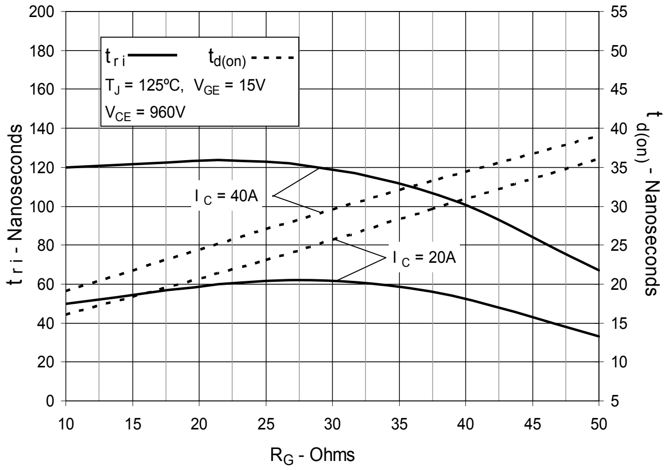


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

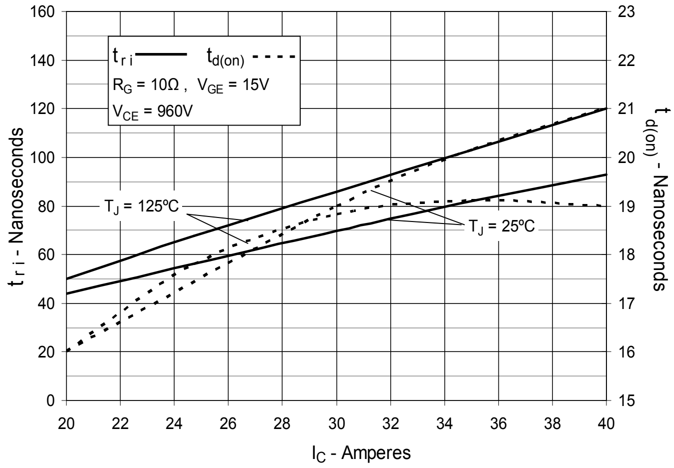
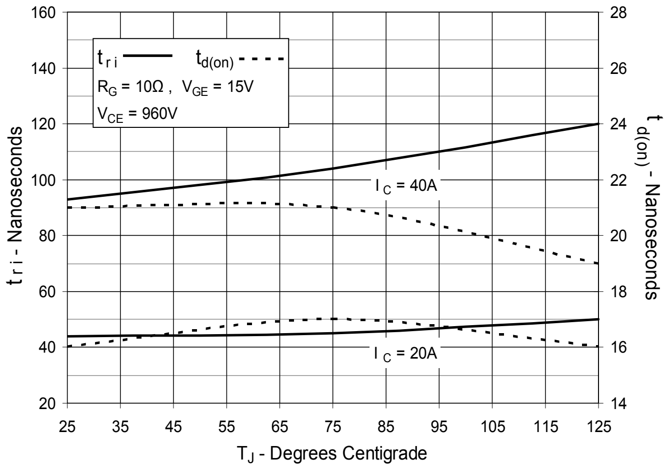


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature



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