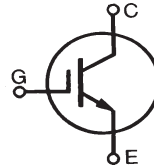


XPT™ 600V IGBTs GenX3™

IXXK200N60B3 IXXX200N60B3

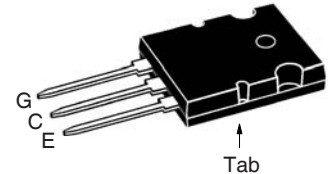
Extreme Light Punch Through
IGBT for 10-30kHz Switching



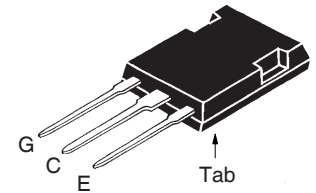
$$\begin{aligned} V_{CES} &= 600V \\ I_{C110} &= 200A \\ V_{CE(sat)} &\leq 1.7V \\ t_{fi(typ)} &= 110ns \end{aligned}$$

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C to } 175^\circ\text{C}$	600	V
V_{CGR}	$T_J = 25^\circ\text{C to } 175^\circ\text{C}, R_{GE} = 1M\Omega$	600	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$ (Chip Capability)	380	A
I_{LRMS}	Leads Current Limit	160	A
I_{C110}	$T_C = 110^\circ\text{C}$	200	A
I_{CM}	$T_C = 25^\circ\text{C}, 1ms$	900	A
I_A	$T_C = 25^\circ\text{C}$	100	A
E_{AS}	$T_C = 25^\circ\text{C}$	1	J
SSOA (RBSOA)	$V_{GE} = 15V, T_{VJ} = 150^\circ\text{C}, R_G = 1\Omega$ Clamped Inductive Load	$I_{CM} = 400$ @ $V_{CE} \leq V_{CES}$	A
t_{sc} (SCSOA)	$V_{GE} = 15V, V_{CE} = 360V, T_J = 150^\circ\text{C}$ $R_G = 10\Omega$, Non Repetitive	10	μs
P_C	$T_C = 25^\circ\text{C}$	1630	W
T_J		-55 ... +175	$^\circ\text{C}$
T_{JM}		175	$^\circ\text{C}$
T_{stg}		-55 ... +175	$^\circ\text{C}$
T_L	Maximum Lead Temperature for Soldering	300	$^\circ\text{C}$
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	$^\circ\text{C}$
M_d	Mounting Torque (TO-264)	1.13/10	Nm/lb.in.
F_C	Mounting Force (PLUS247)	20..120 /4.5..27	N/lb.
Weight	TO-264	10	g
	PLUS247	6	g

TO-264 (IXXK)



PLUS247 (IXXX)



G = Gate
C = Collector

E = Emitter
Tab = Collector

Features

- International Standard Packages
- Optimized for 10-30kHz Switching
- Square RBSOA
- Avalanche Rated
- Short Circuit Capability
- High Current Handling Capability

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

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

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 250\mu A, V_{GE} = 0V$	600		V
$V_{GE(th)}$	$I_C = 250\mu A, V_{CE} = V_{GE}$	3.5		6.0 V
I_{CES}	$V_{CE} = V_{CES}, V_{GE} = 0V$ $T_J = 150^\circ\text{C}$			50 μA 3 mA
I_{GES}	$V_{CE} = 0V, V_{GE} = \pm 20V$			± 200 nA
$V_{CE(sat)}$	$I_C = 100A, V_{GE} = 15V$, Note 1 $T_J = 150^\circ\text{C}$	1.40 1.58		V V

Symbol Test Conditions

($T_1 = 25^\circ\text{C}$ Unless Otherwise Specified)

Characteristic Values

(T _J = 25°C Unless Otherwise Specified)		Min.	Typ.	Max.
g_{fs}	I _C = 60A, V _{CE} = 10V, Note 1	27	45	S
C_{ies}	$\left. \begin{array}{l} \\ \\ \end{array} \right\} V_{CE} = 25V, V_{GE} = 0V, f = 1MHz$		9970	pF
C_{oes}			570	pF
C_{res}			183	pF
Q_{g(on)}	$\left. \begin{array}{l} \\ \\ \end{array} \right\} I_C = 200A, V_{GE} = 15V, V_{CE} = 0.5 \cdot V_{CES}$		315	nC
Q_{ge}			98	nC
Q_{gc}			130	nC
t_{d(on)}	$\left. \begin{array}{l} \\ \\ \\ \\ \\ \end{array} \right\} \begin{array}{l} \textbf{Inductive load, T}_J = 25^\circ\text{C} \\ I_C = 100A, V_{GE} = 15V \\ V_{CE} = 360V, R_G = 1\Omega \\ \text{Note 2} \end{array}$		48	ns
t_{ri}			100	ns
E_{on}			2.85	mJ
t_{d(off)}			160	ns
t_{fi}			110	ns
E_{off}			2.90	4.40 mJ
t_{d(on)}	$\left. \begin{array}{l} \\ \\ \\ \\ \\ \end{array} \right\} \begin{array}{l} \textbf{Inductive load, T}_J = 150^\circ\text{C} \\ I_C = 100A, V_{GE} = 15V \\ V_{CE} = 360V, R_G = 1\Omega \\ \text{Note 2} \end{array}$		46	ns
t_{ri}			94	ns
E_{on}			4.40	mJ
t_{d(off)}			180	ns
t_{fi}			215	ns
E_{off}			3.45	mJ
R_{thJC}				0.092 °C/W
R_{thCS}			0.15	°C/W

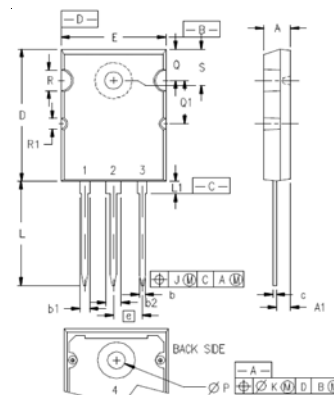
Notes:

1. Pulse test, $t \leq 300\mu s$, duty cycle, $d \leq 2\%$.
2. Switching times & energy losses may increase for higher $V_{CE}(clamp)$, T_J or R_{GS} .

PRELIMINARY TECHNICAL INFORMATION

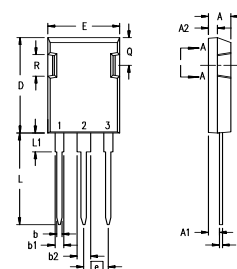
The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

TO-264 Outline



Terminals: 1 = Gate
2,4 = Collector
3 = Emitter

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.209	4.70	5.31
A1	.102	.118	2.59	3.00
b	.037	.055	0.94	1.40
b1	.087	.102	2.21	2.59
b2	.110	.126	2.79	3.20
c	.017	.029	0.43	0.74
D	1.007	1.047	25.58	26.59
E	.760	.799	19.30	20.29
e	.215 BSC		5.46 BSC	
J	.000	.010	0.00	0.25
K	.000	.010	0.00	0.25
L	.779	.842	19.79	21.39
L1	.087	.102	2.21	2.59
ØP	.122	.138	3.10	3.51
Q	.240	.256	6.10	6.50
ØR	.330	.346	8.38	8.79
ØR1	.155	.187	3.94	4.75
R	.085	.093	2.16	2.36
S	.243	.253	6.17	6.43

PLUS247™ Outline

Terminals: 1 - Gate
2 - Collector
3 - Emitter

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.83	5.21	.190	.205
A ₁	2.29	2.54	.090	.100
A ₂	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b ₁	1.91	2.13	.075	.084
b ₂	2.92	3.12	.115	.123
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	5.45 BSC		.215 BSC	
L	19.81	20.32	.780	.800
L1	3.81	4.32	.150	.170
Q	5.59	6.20	.220	0.244
R	4.32	4.83	.170	.190

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
	4,860,072	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	

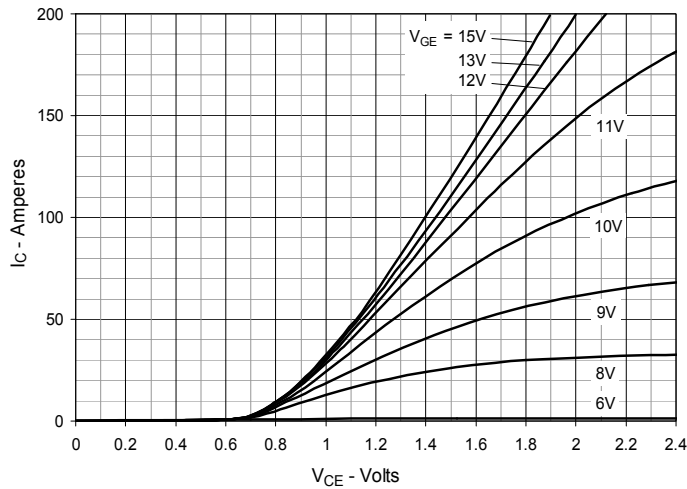
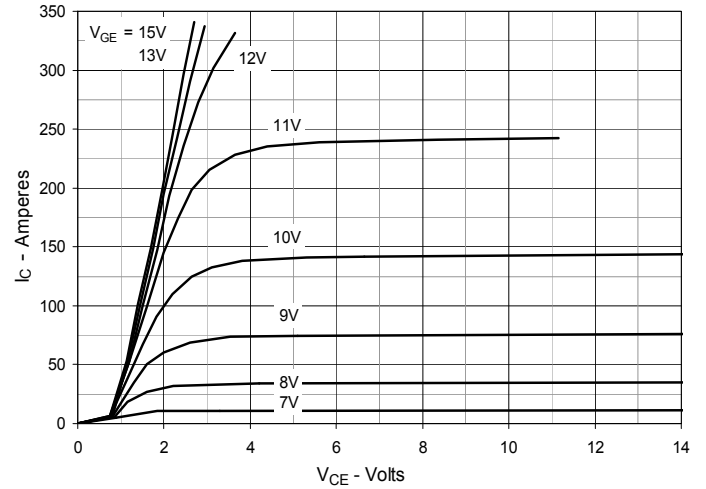
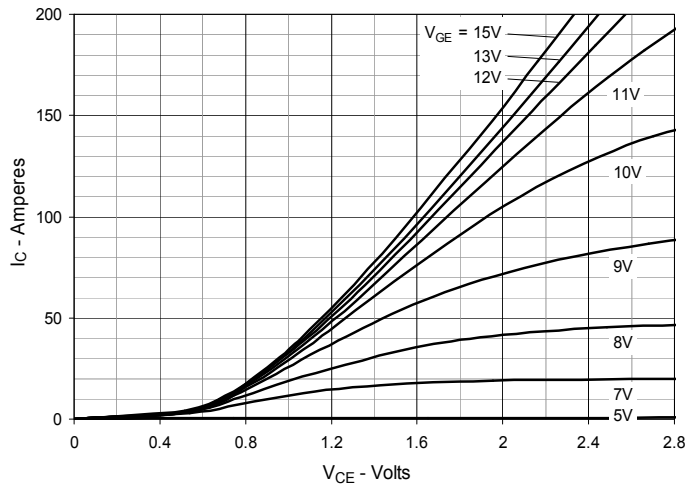
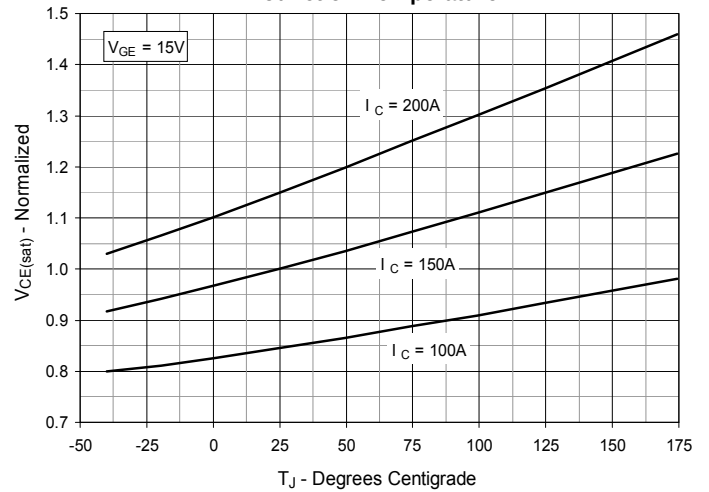
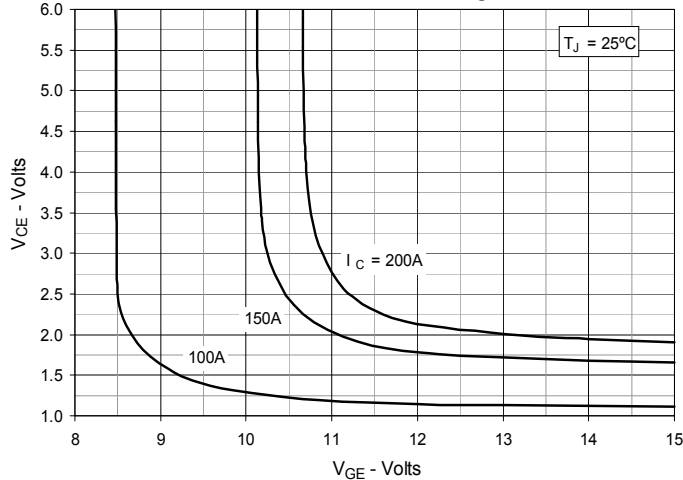
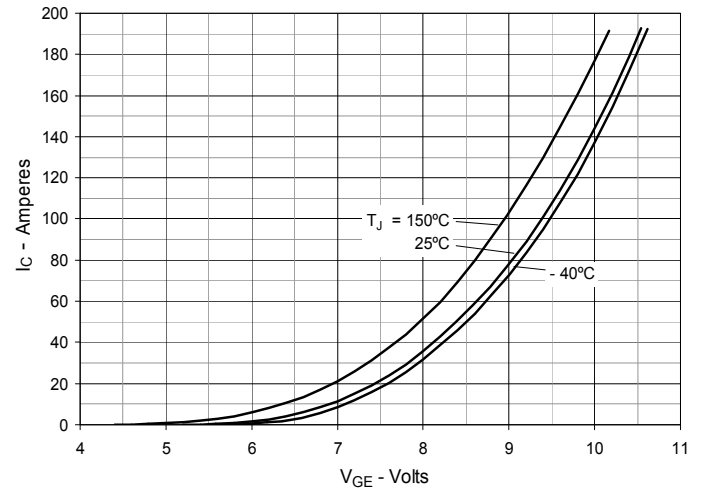
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

Fig. 3. Output Characteristics @ $T_J = 150^\circ\text{C}$

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

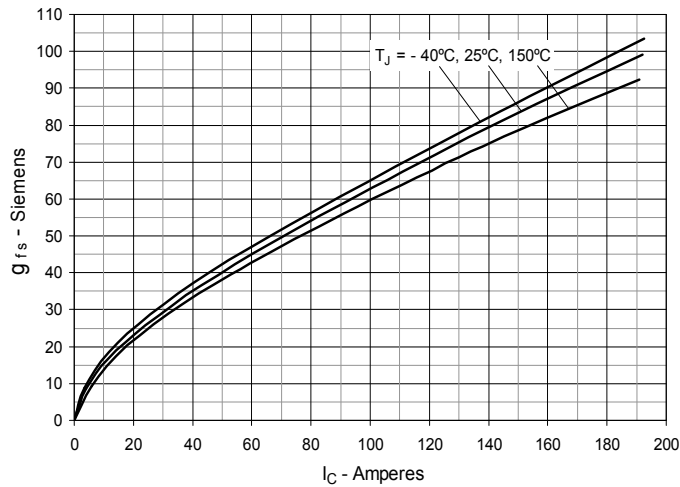


Fig. 8. Gate Charge

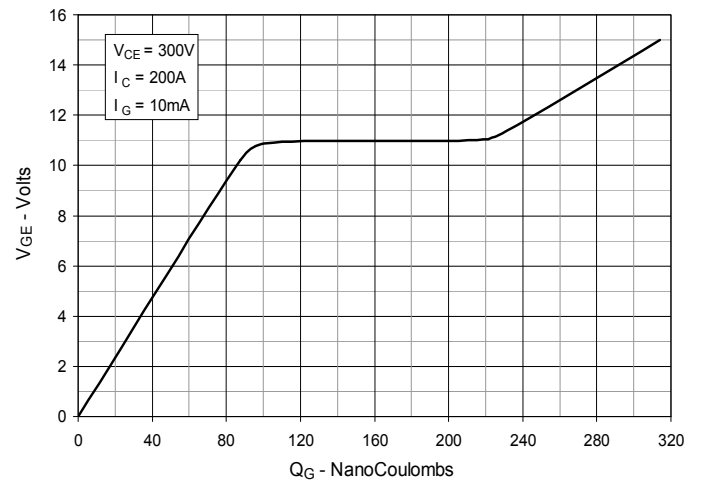


Fig. 9. Capacitance

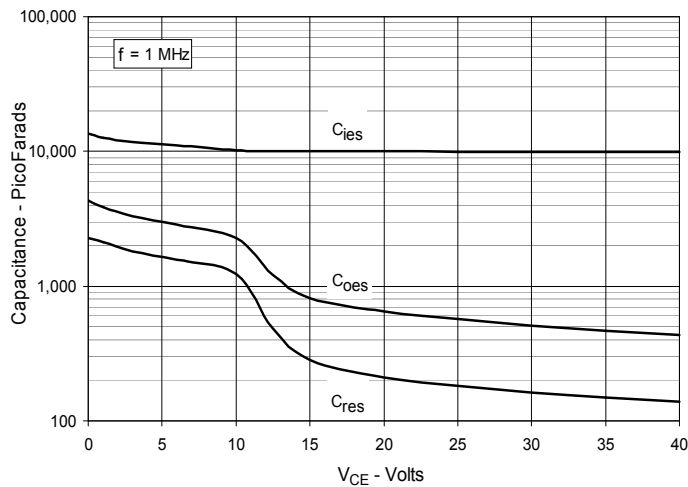


Fig. 10. Reverse-Bias Safe Operating Area

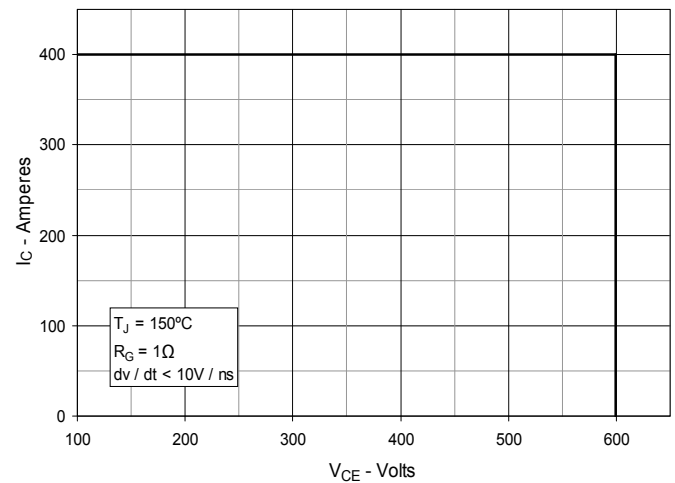


Fig. 11. Forward-Bias Safe Operating Area

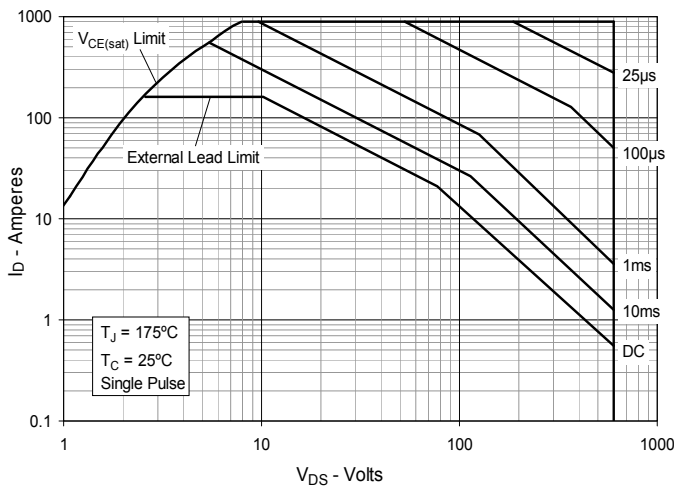


Fig. 12. Maximum Transient Thermal Impedance

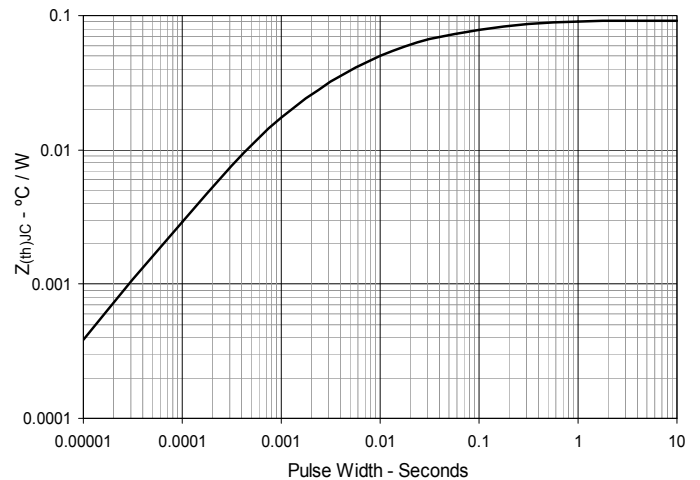


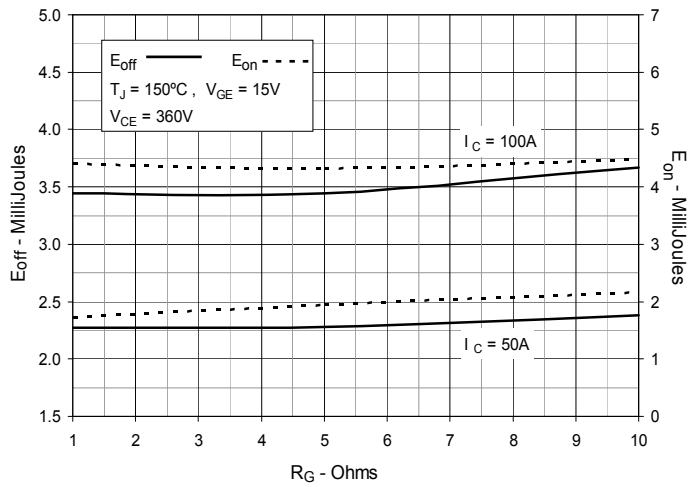
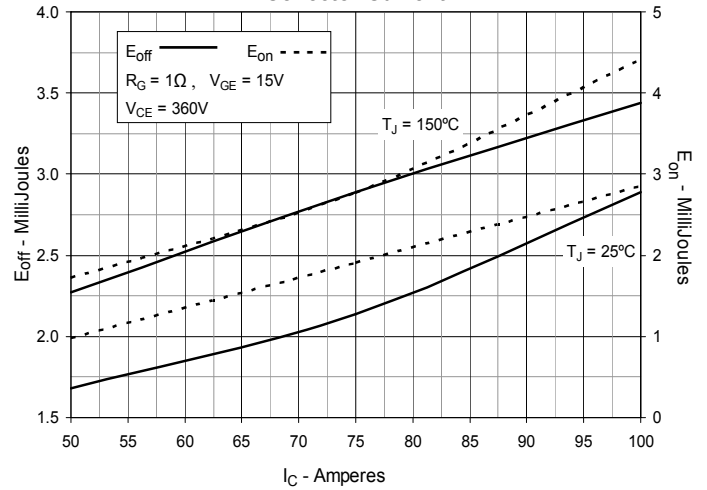
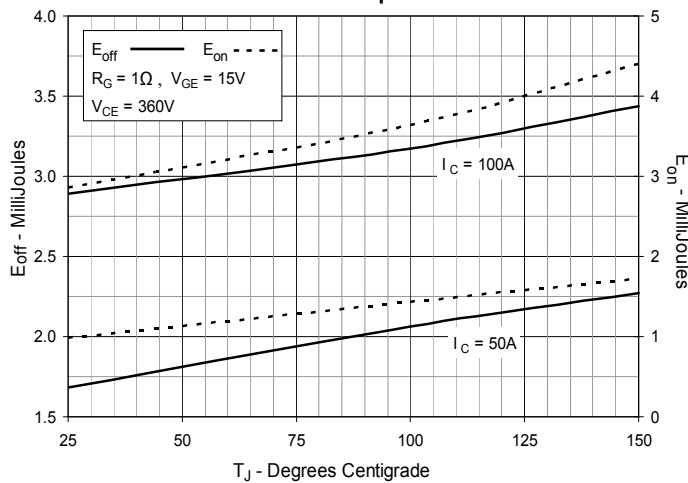
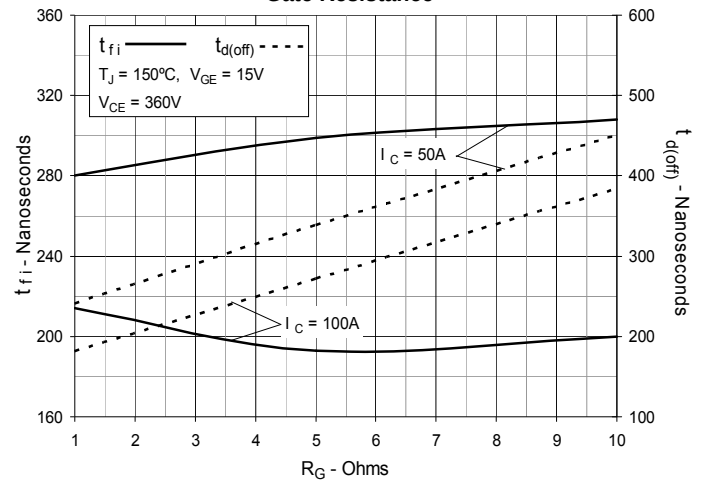
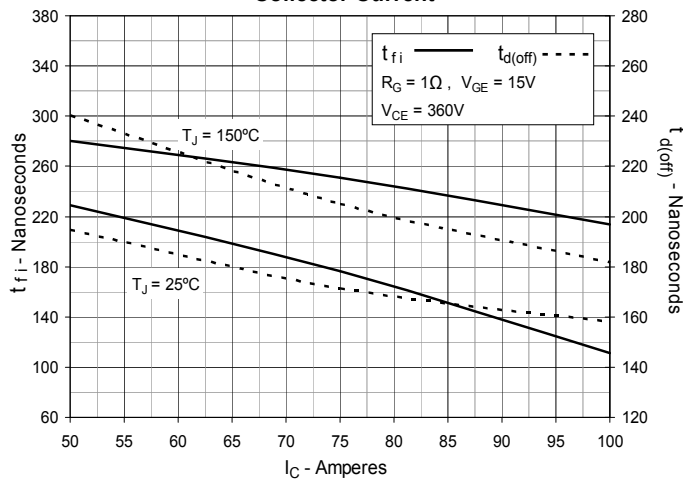
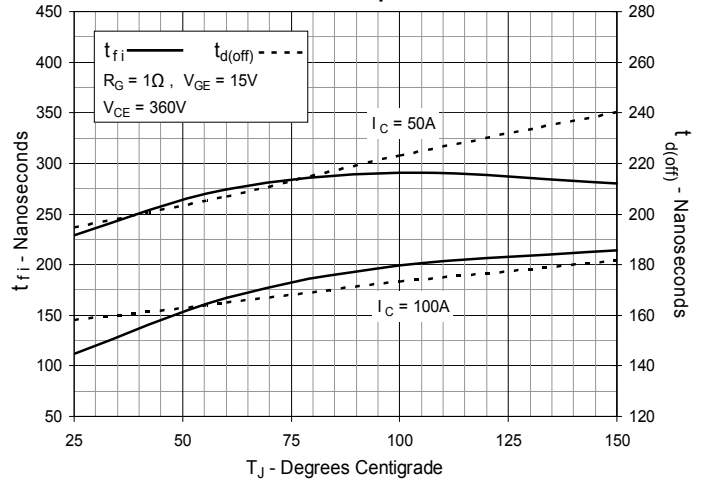
Fig. 13. Inductive Switching Energy Loss vs. Gate Resistance

Fig. 14. Inductive Switching Energy Loss vs. Collector Current

Fig. 15. Inductive Switching Energy Loss vs. Junction Temperature

Fig. 16. Inductive Turn-off Switching Times vs. Gate Resistance

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

Fig. 18. Inductive Turn-off Switching Times vs. Junction Temperature


Fig. 19. Inductive Turn-on Switching Times vs. Gate Resistance

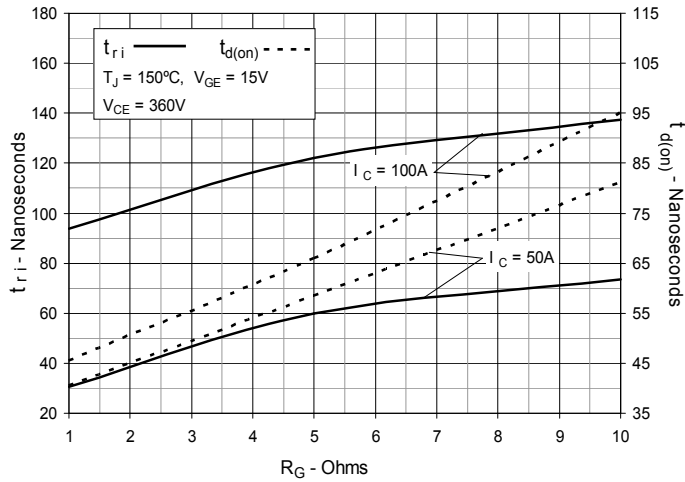


Fig. 20. Inductive Turn-on Switching Times vs. Collector Current

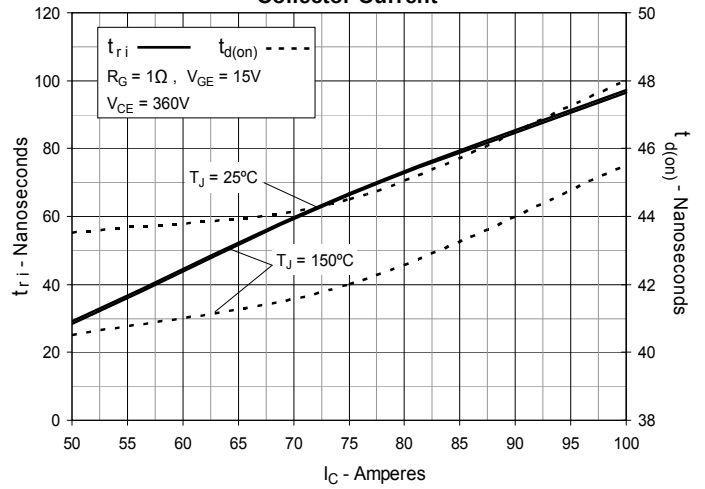
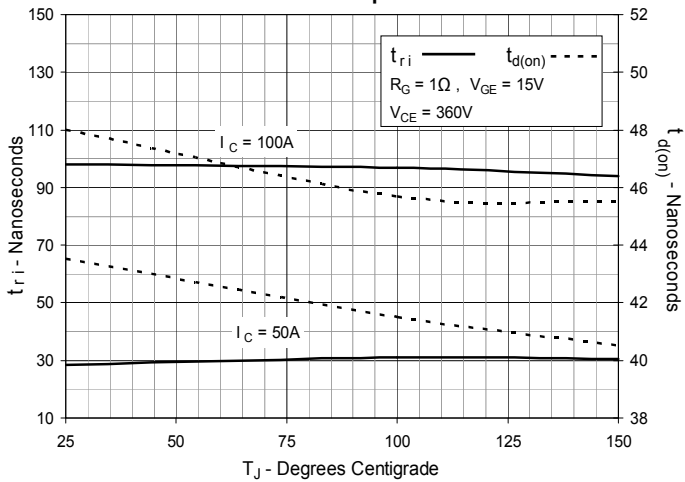


Fig. 21. Inductive Turn-on Switching Times vs. Junction Temperature





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