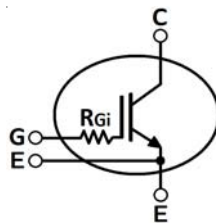


XPT™ 650V IGBT

GenX4™

IXXN200N65A4

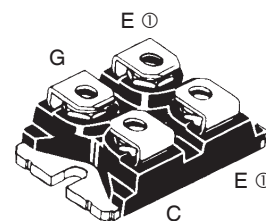
Extreme Light Punch Through
IGBT for 5-20kHz Switching



$$\begin{aligned} V_{CES} &= 650V \\ I_{C110} &= 200A \\ V_{CE(sat)} &\leq 1.80V \\ t_{fi(typ)} &= 123ns \end{aligned}$$

SOT-227B, miniBLOC

 E153432



G = Gate, C = Collector, E = Emitter
① either emitter terminal can be used as Main or Kelvin Emitter

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C to } 175^\circ\text{C}$	650	V
V_{CGR}	$T_J = 25^\circ\text{C to } 175^\circ\text{C}, R_{GE} = 1M\Omega$	650	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$ (Chip Capability)	410	A
I_{LRMS}	Leads Current Limit	200	A
I_{C110}	$T_C = 110^\circ\text{C}$	200	A
I_{CM}	$T_C = 25^\circ\text{C}, 1\text{ms}$	1200	A
SSOA (RBSOA)	$V_{GE} = 15\text{V}, T_{VJ} = 150^\circ\text{C}, R_G = 2\Omega$ Clamped Inductive Load	$I_{CM} = 400$ @ $V_{CE} \leq V_{CES}$	A
t_{sc} (SCSOA)	$V_{GE} = 15\text{V}, V_{CE} = 360\text{V}, T_J = 150^\circ\text{C}$ $R_G = 2\Omega$, Non Repetitive	10	μs
P_C	$T_C = 25^\circ\text{C}$	1250	W
T_J		-55 ... +175	$^\circ\text{C}$
T_{JM}		175	$^\circ\text{C}$
T_{stg}		-55 ... +175	$^\circ\text{C}$
V_{ISOL}	50/60Hz $I_{ISOL} \leq 1\text{mA}$	$t = 1\text{min}$ $t = 1\text{s}$	2500 3000 V~ V~
M_d	Mounting Torque Terminal Connection Torque	1.5/13 1.3/11.5	Nm/lb.in. Nm/lb.in.
Weight		30	g

Features

- Optimized for Low Conduction and Switching Losses
- miniBLOC, with Aluminium Nitride Isolation
- International Standard Package
- Isolation Voltage 2500V~
- Optimized for 5-20kHz Switching
- Square RBSOA
- Short Circuit Capability
- High Current Handling Capability
- Easy to Parallel

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

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

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 4\text{mA}, V_{GE} = 0\text{V}$	650		V
$V_{GE(th)}$	$I_C = 3\text{mA}, V_{CE} = V_{GE}$	5.0		6.5 V
I_{CES}	$V_{CE} = V_{CES}, V_{GE} = 0\text{V}$ $T_J = 150^\circ\text{C}$			10 μA 500 μA
I_{GES}	$V_{CE} = 0\text{V}, V_{GE} = \pm 20\text{V}$			± 200 nA
$V_{CE(sat)}$	$I_C = 150\text{A}, V_{GE} = 15\text{V}$, Note 1 $T_J = 150^\circ\text{C}$		1.44 1.15	V V

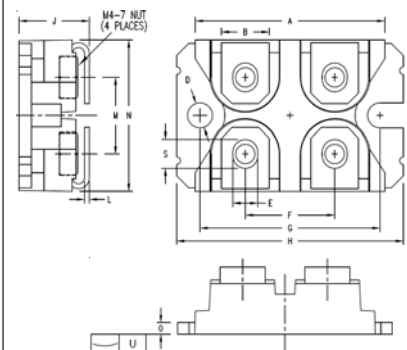
Symbol Test Conditions

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

Characteristic Values

		Min.	Typ.	Max.
g_{fs}	$I_C = 60\text{A}$, $V_{CE} = 10\text{V}$, Note 1	48	80	S
C_{ies}	$V_{CE} = 25\text{V}$, $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$		7400	pF
C_{oes}			526	pF
C_{res}			370	pF
R_{Gi}	Integrated Gate Resistor		4	Ω
Q_g	$I_C = 200\text{A}$, $V_{GE} = \pm 15\text{V}$, $V_{CE} = 0.5 \cdot V_{CES}$		930	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = 100\text{A}$, $V_{GE} = \pm 15\text{V}$ $V_{CE} = 300\text{V}$, $R_G = 2\Omega$ Note 2		260	ns
t_{ri}			120	ns
E_{on}			4.4	mJ
$t_{d(off)}$			540	ns
t_{fi}			123	ns
E_{off}			4.6	mJ
$t_{d(on)}$	Inductive load, $T_J = 150^\circ\text{C}$ $I_C = 100\text{A}$, $V_{GE} = \pm 15\text{V}$ $V_{CE} = 300\text{V}$, $R_G = 2\Omega$ Note 2		170	ns
t_{ri}			144	ns
E_{on}			6.1	mJ
$t_{d(off)}$			420	ns
t_{fi}			290	ns
E_{off}			6.7	mJ
R_{thJC}				0.12°C/W
R_{thCS}		0.05		$^\circ\text{C/W}$

SOT-227B miniBLOC (IXXN)



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.224	1.260	31.10	32.00
B	.303	.327	7.70	8.30
C	.161	.173	4.10	4.40
D	.161	.173	4.10	4.40
E	.161	.173	4.10	4.40
F	.587	.598	14.90	15.20
G	1.181	1.201	30.00	30.50
H	1.488	1.508	37.80	38.30
J	.461	.484	11.70	12.30
L	.030	.033	0.75	0.85
M	.492	.512	12.50	13.00
N	.984	1.004	25.00	25.50
O	.075	.087	1.90	2.20
S	.181	.193	4.60	4.90
U	.000	.005	0.00	0.13

Notes:

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

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
4,860,072	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	

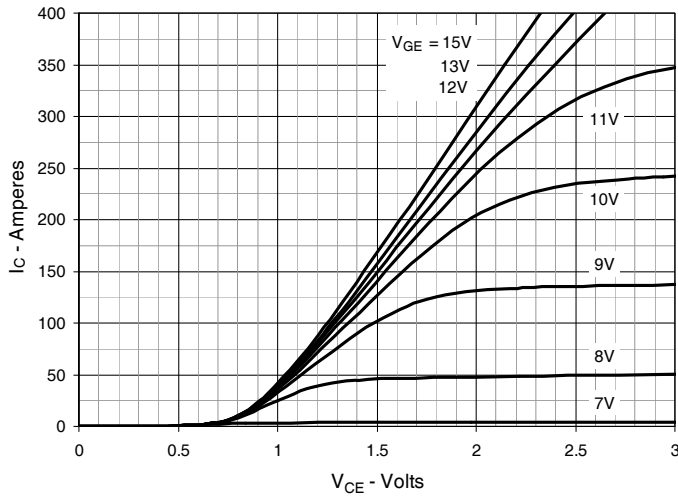
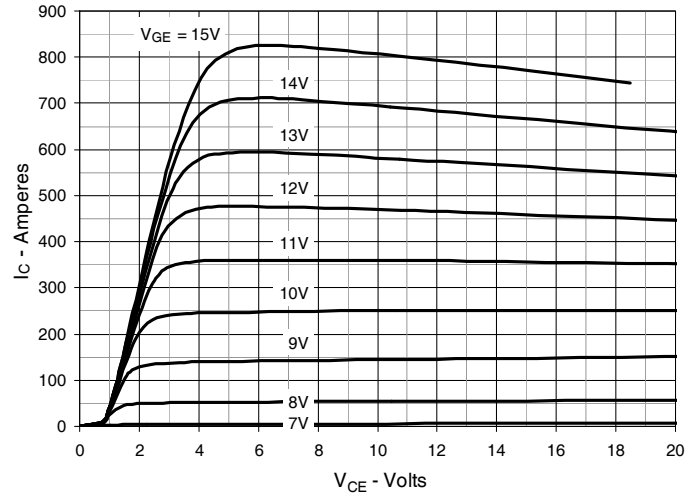
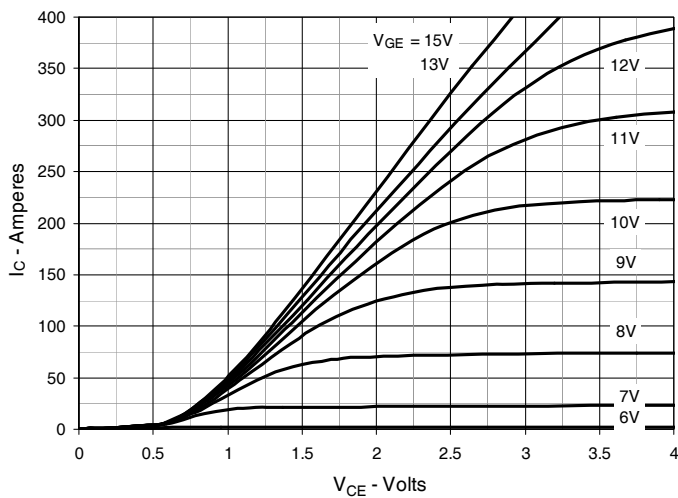
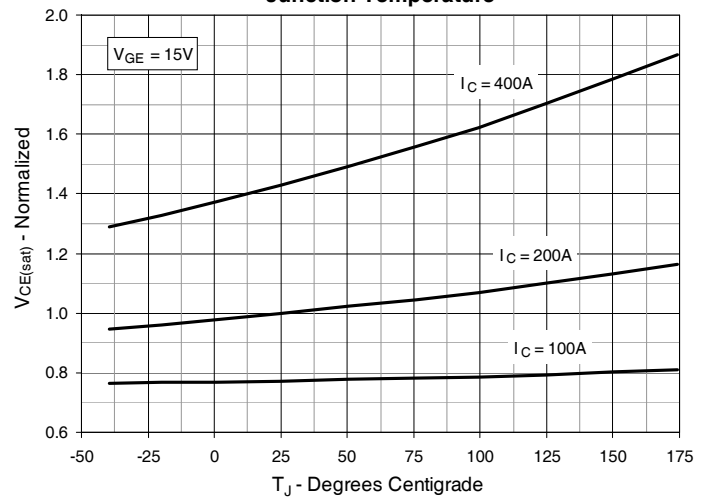
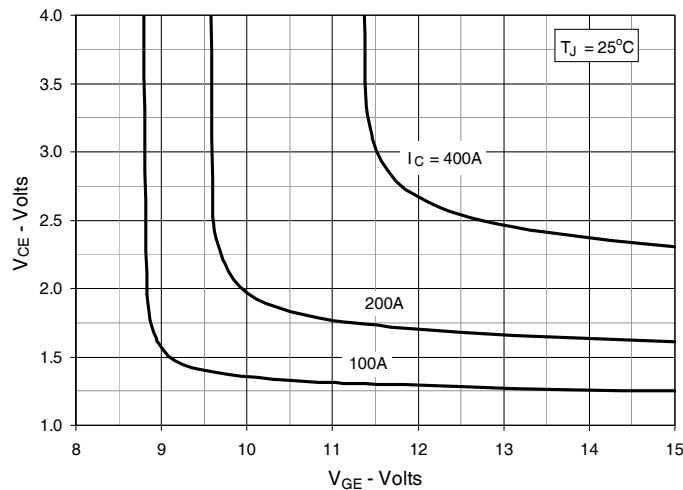
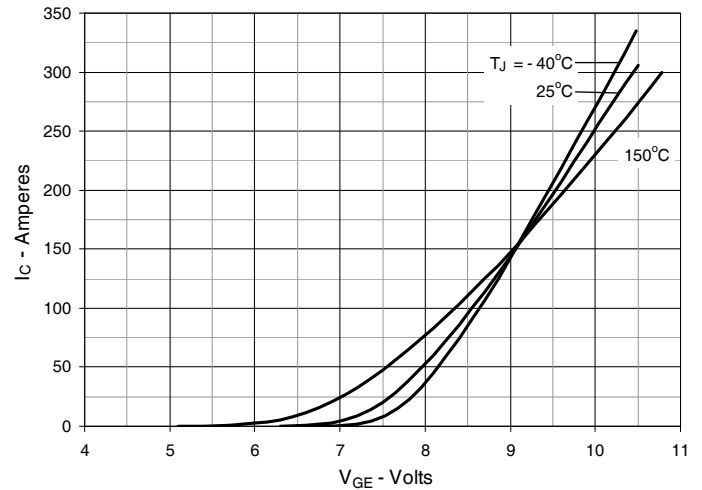
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

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


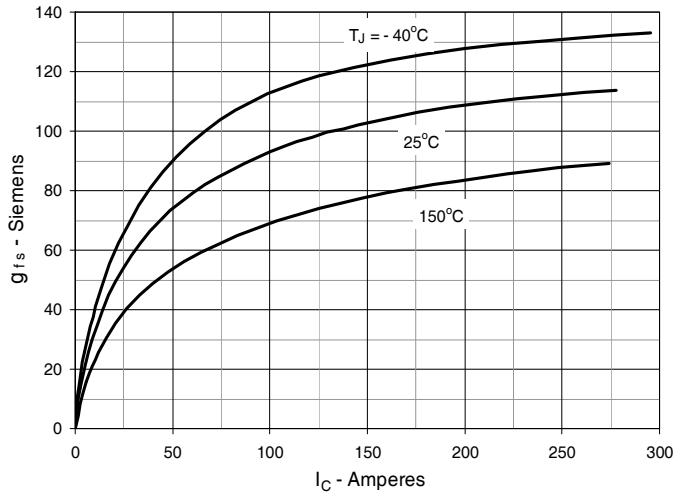
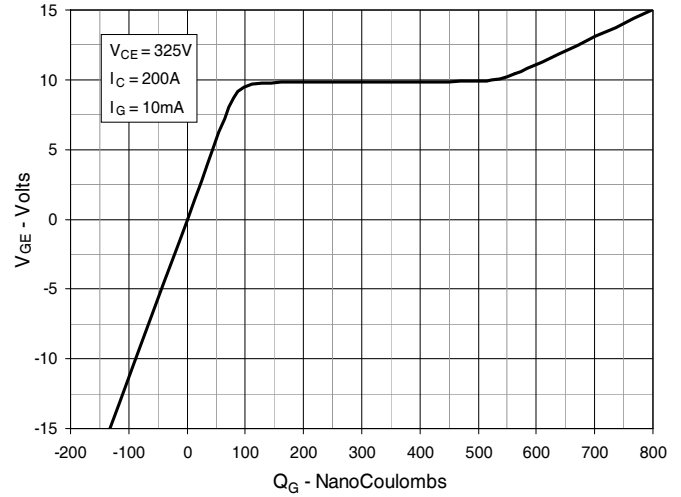
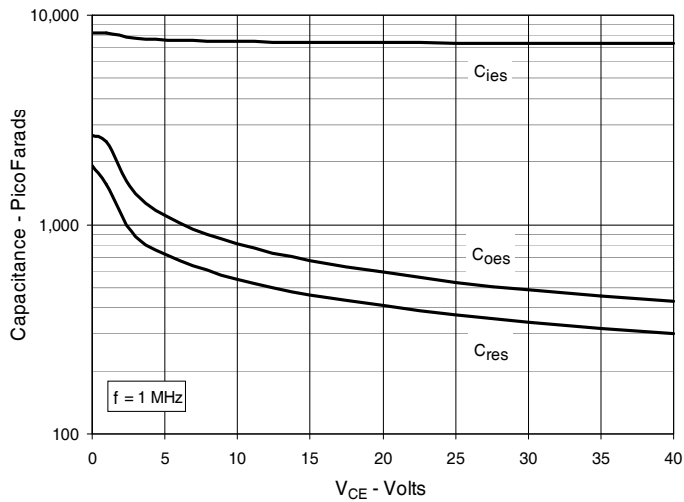
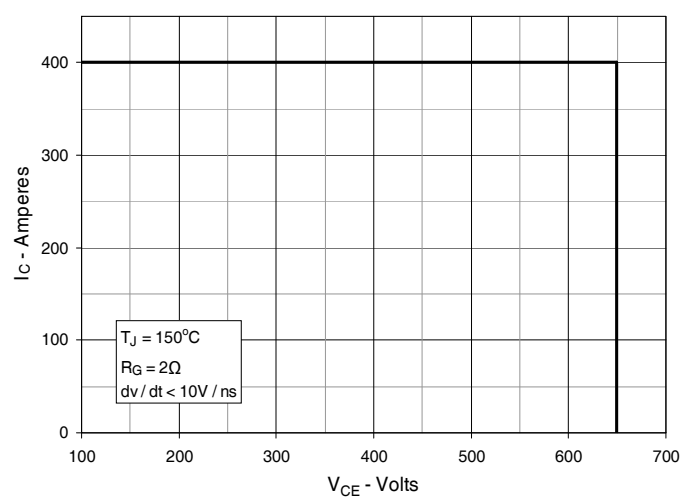
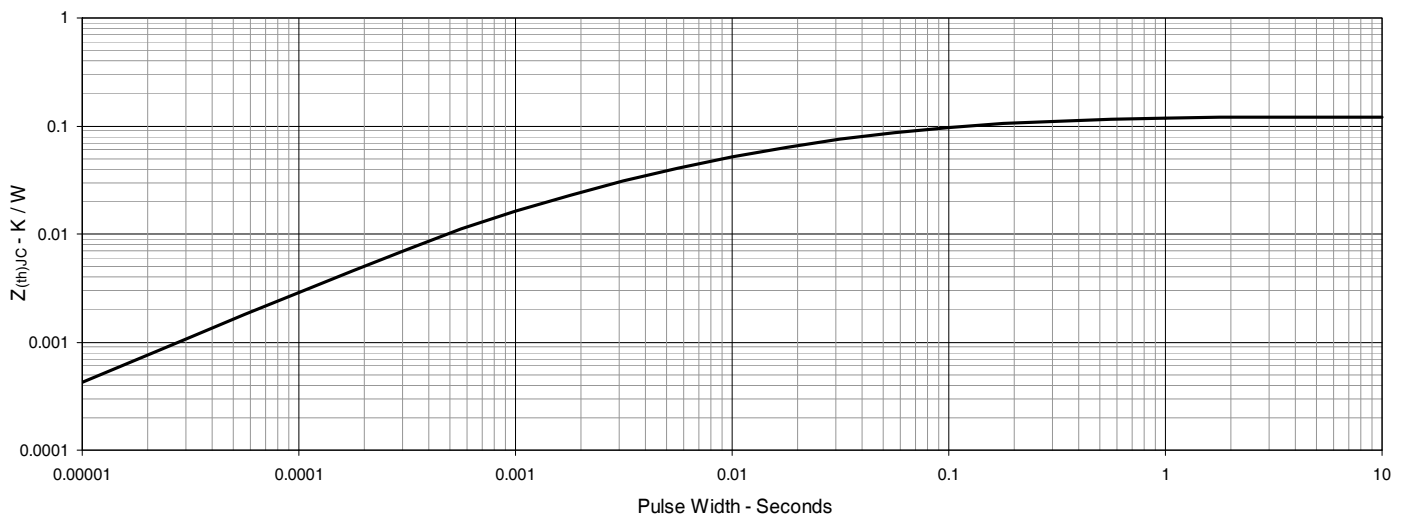
Fig. 7. Transconductance

Fig. 8. Gate Charge

Fig. 9. Capacitance

Fig. 10. Reverse-Bias Safe Operating Area

Fig. 11. Maximum Transient Thermal Impedance


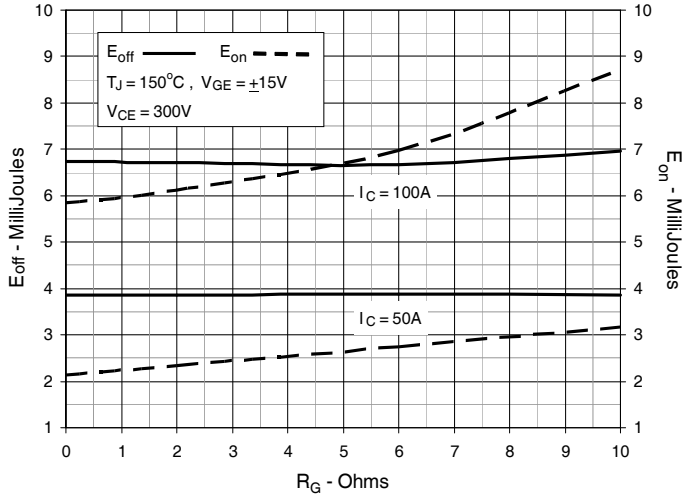
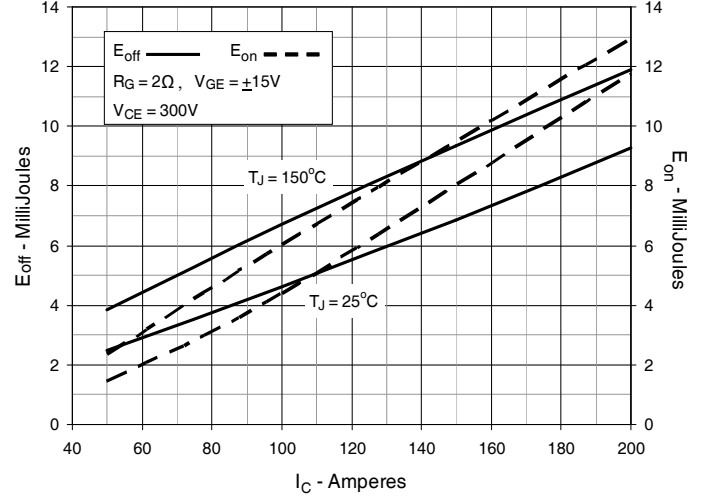
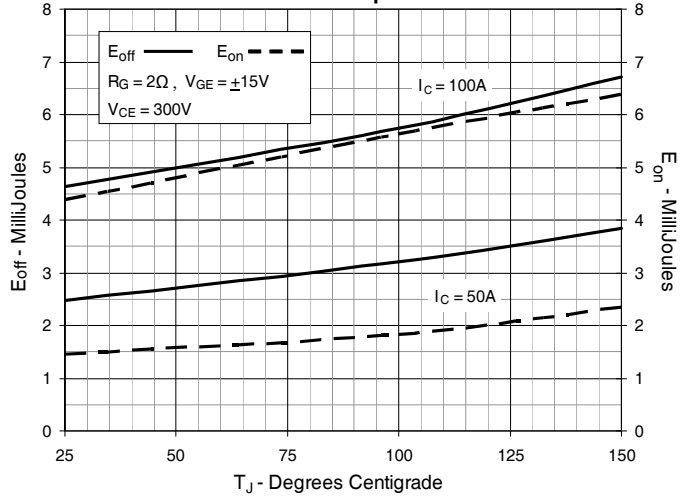
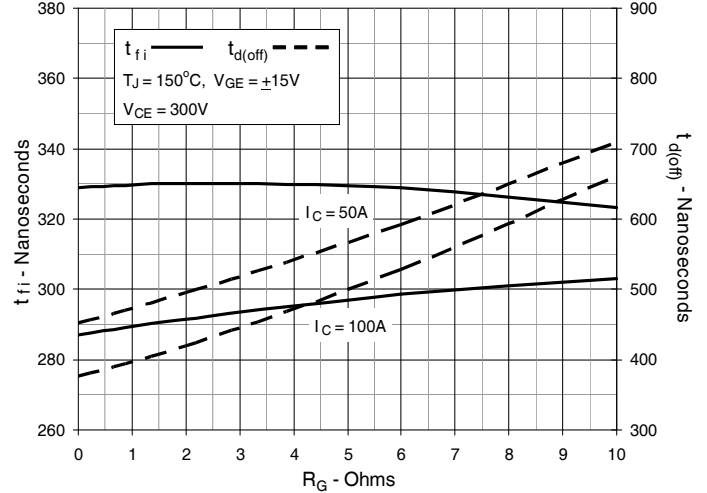
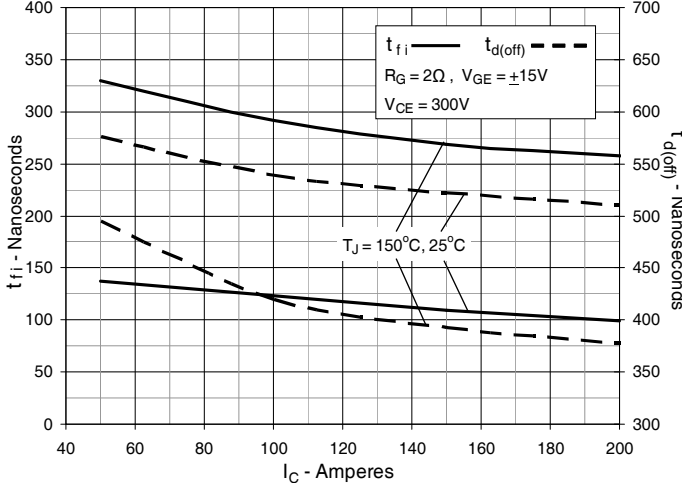
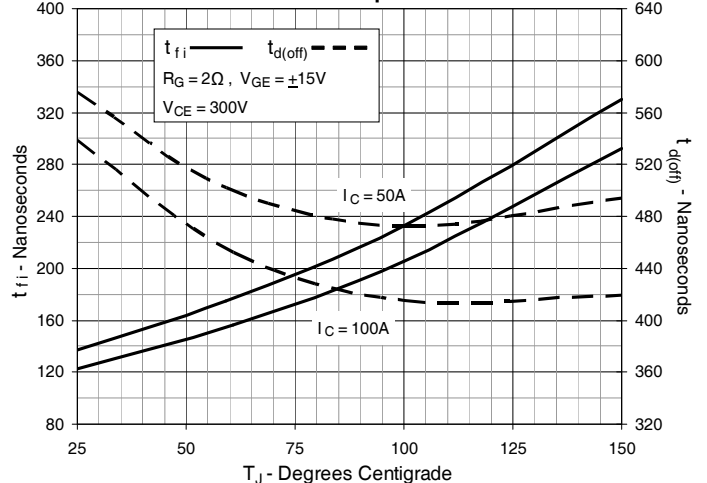
Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

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

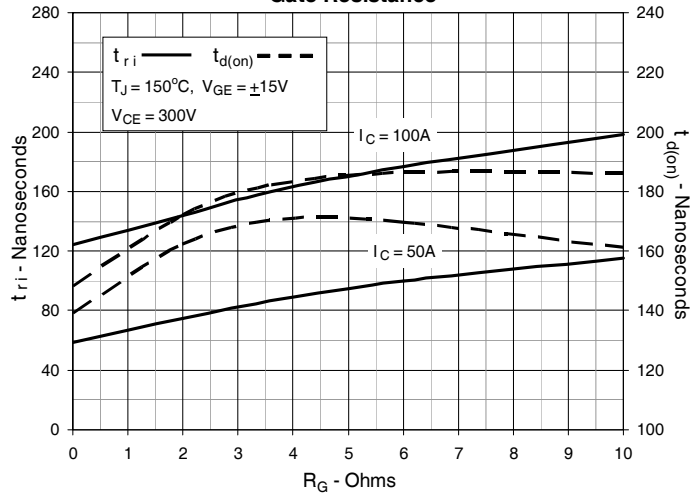


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

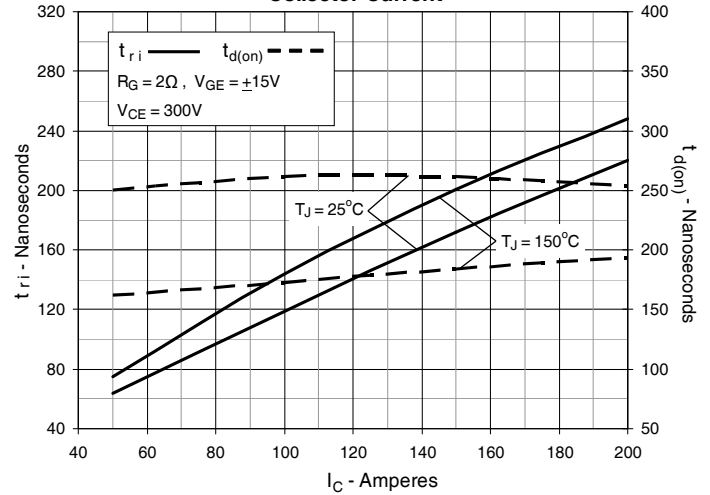


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature

