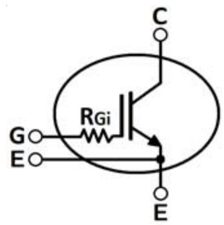
IXYS Preliminary Technical Information

XPT™ 650V IGBT GenX4™

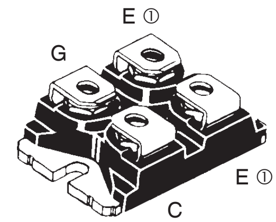
IXXN200N65A4

V_{CES} = 650V
I_{C110} = 200A
$V_{CE(sat)}$ ≤ 1.80V
$t_{fi(typ)}$ = 123ns

Extreme Light Punch Through
IGBT for 5-20kHz Switching



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

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 4mA, V_{GE} = 0V	650			V
$V_{GE(th)}$	I_C = 3mA, V_{CE} = V_{GE}	5.0		6.5	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			10	µA
	T_J = 150°C			500	µA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±200	nA
$V_{CE(sat)}$	I_C = 150A, V_{GE} = 15V, Note 1		1.44	1.80	V
	T_J = 150°C		1.15		V

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

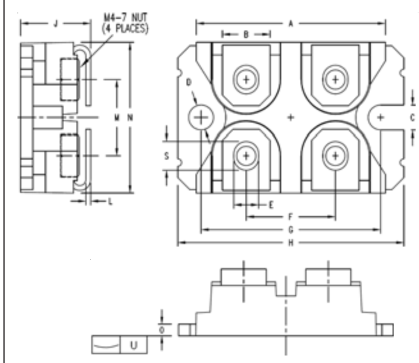
- High Power Density
- Low Gate Drive Requirement

Applications

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

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

SOT-227B miniBLOC (IXXN)



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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 ≤ 300μs, duty cycle, d ≤ 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.

Fig. 1. Output Characteristics @ $T_J = 25^oC$

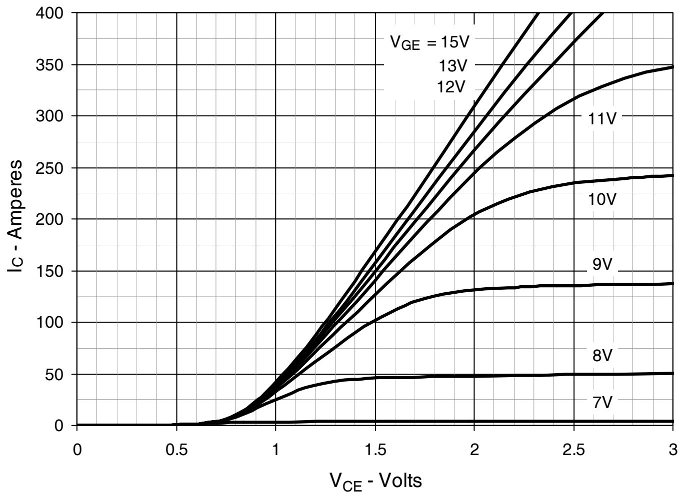


Fig. 2. Extended Output Characteristics @ $T_J = 25^oC$

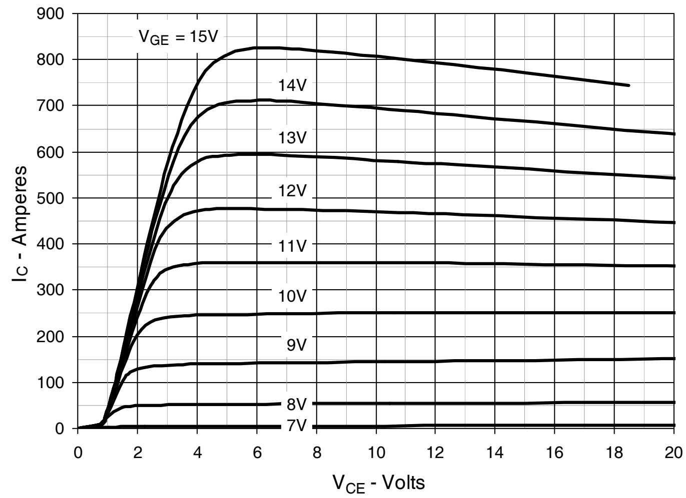


Fig. 3. Output Characteristics @ $T_J = 150^oC$

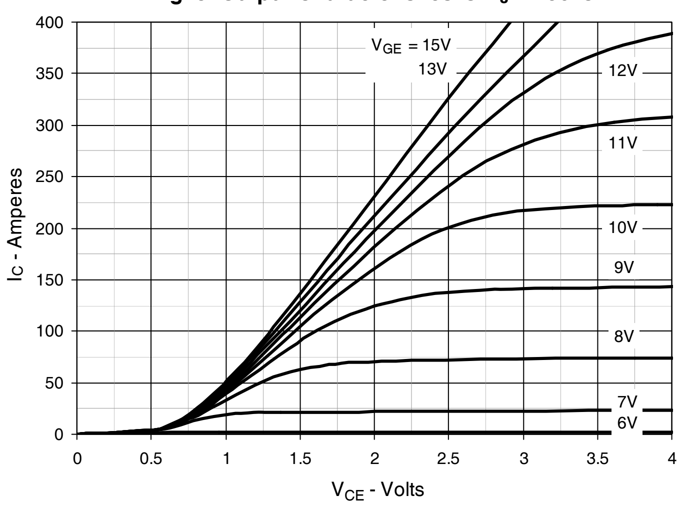


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

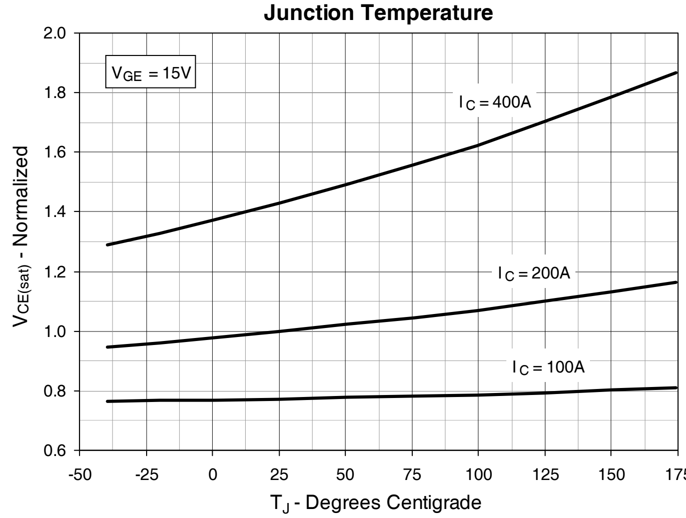


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

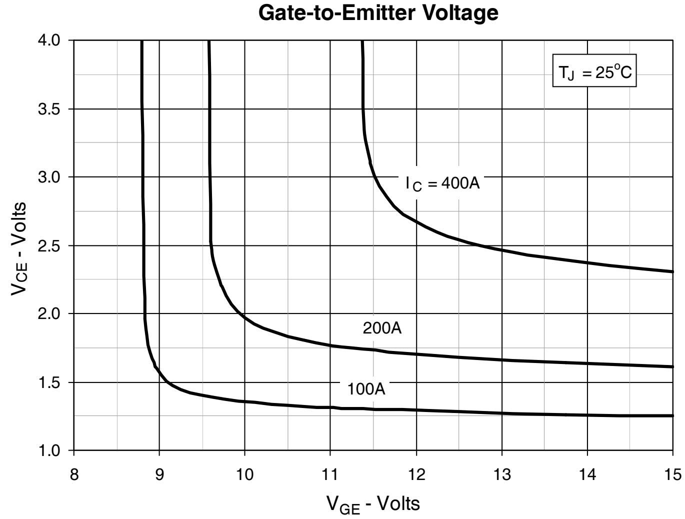
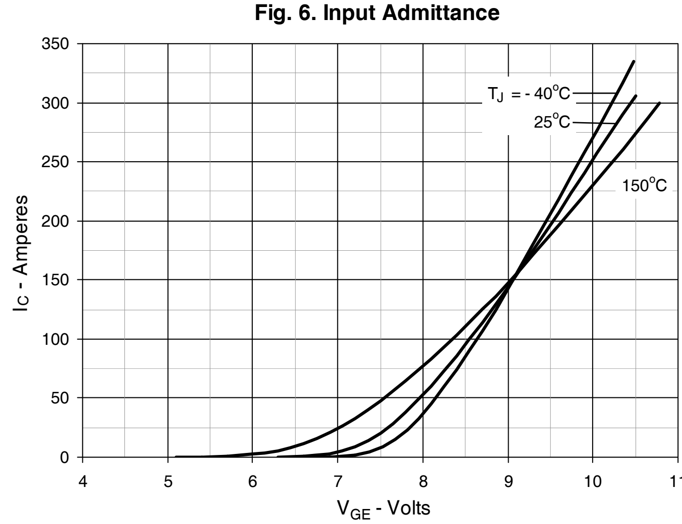


Fig. 6. Input Admittance



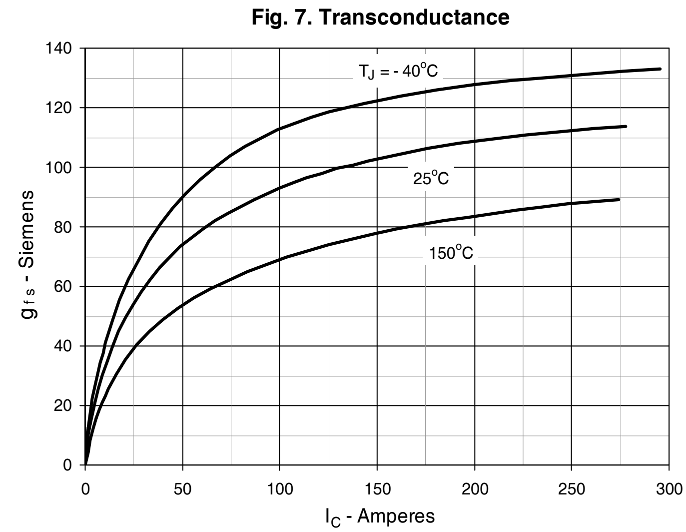


Fig. 7. Transconductance
T_J = - 40°C
25°C
150°C
g_{fs} - Siemens
I_C - Amperes

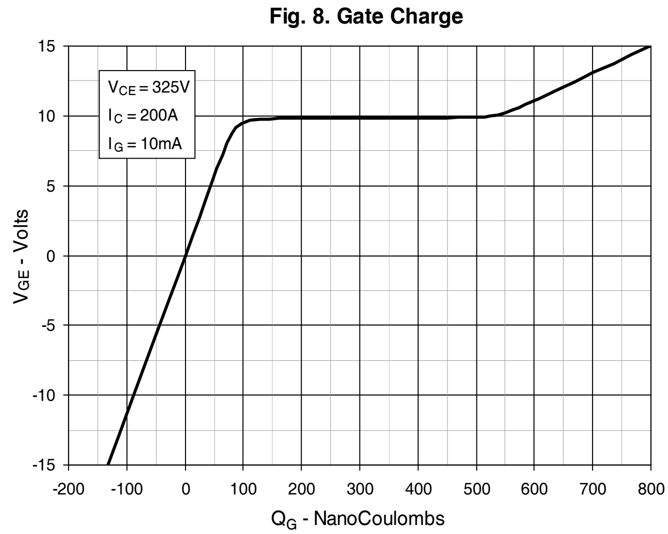


Fig. 8. Gate Charge
V_{CE} = 325V
I_C = 200A
I_G = 10mA
V_{GE} - Volts
Q_G - NanoCoulombs

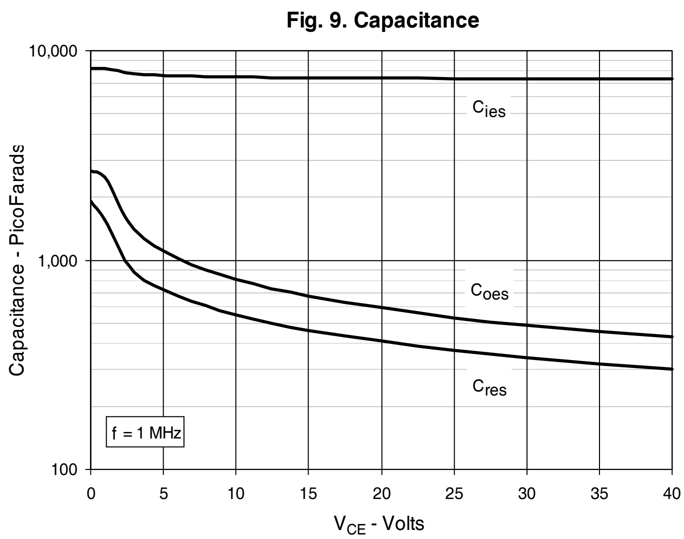


Fig. 9. Capacitance
C_{ies}
C_{oes}
C_{res}
f = 1 MHz
Capacitance - PicoFarads
V_{CE} - Volts

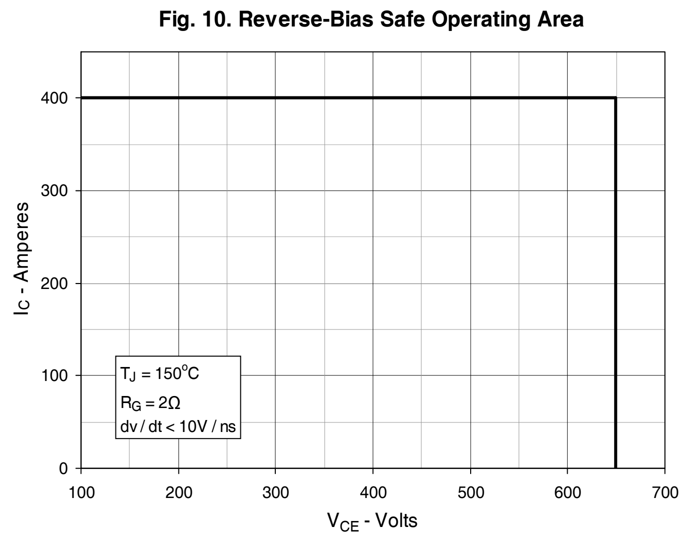


Fig. 10. Reverse-Bias Safe Operating Area
T_J = 150°C
R_G = 2Ω
dv / dt < 10V / ns
I_C - Amperes
V_{CE} - Volts

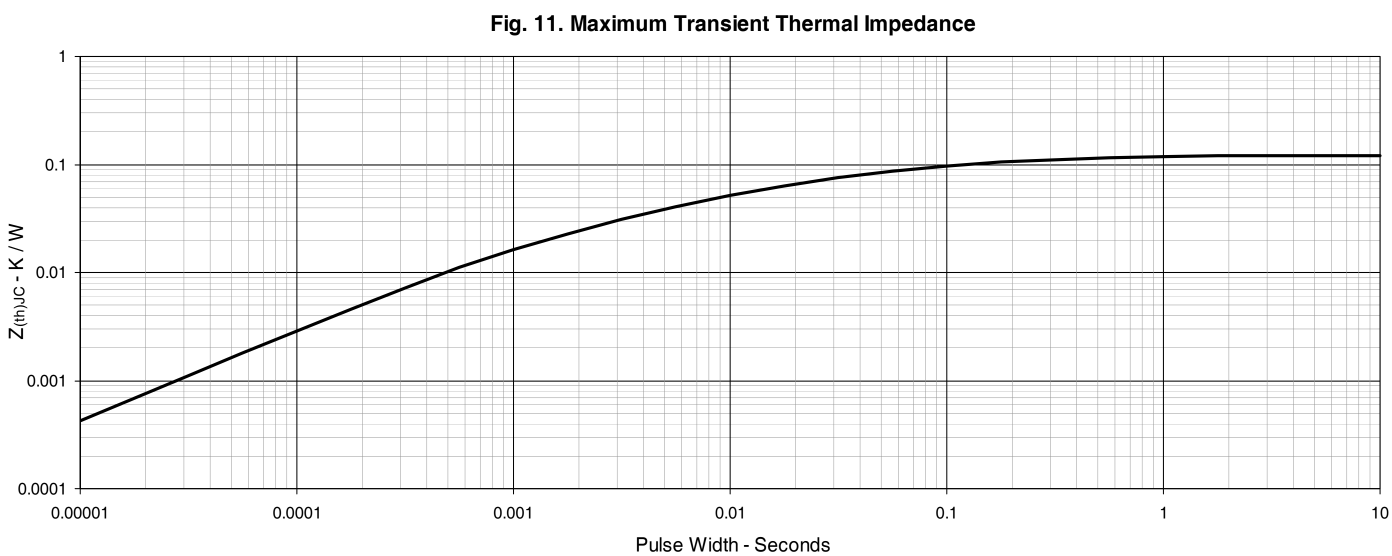


Fig. 11. Maximum Transient Thermal Impedance
$Z_{(th)JC}$ - K / W
Pulse Width - Seconds

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

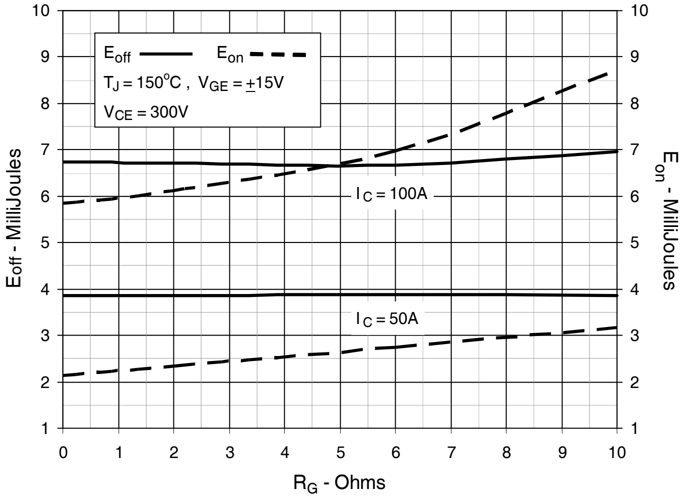


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

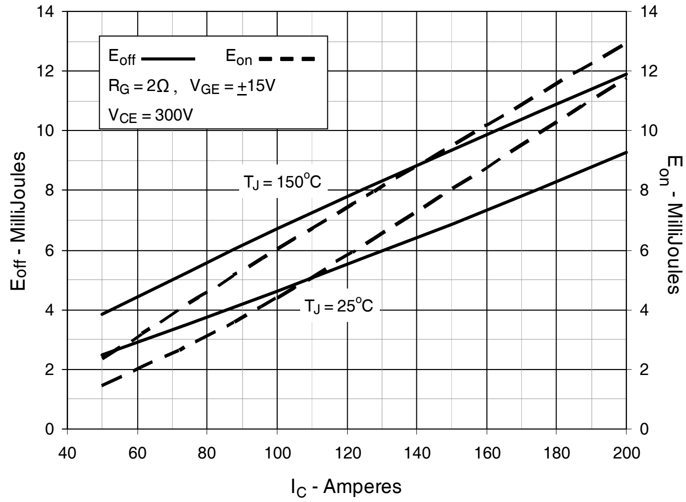


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

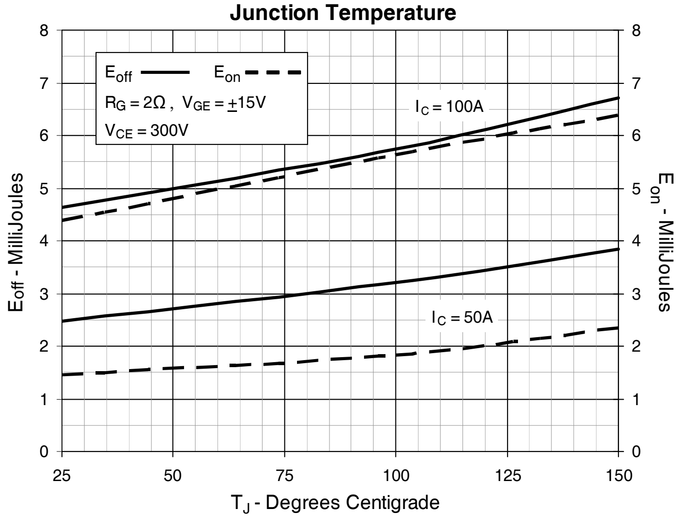


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

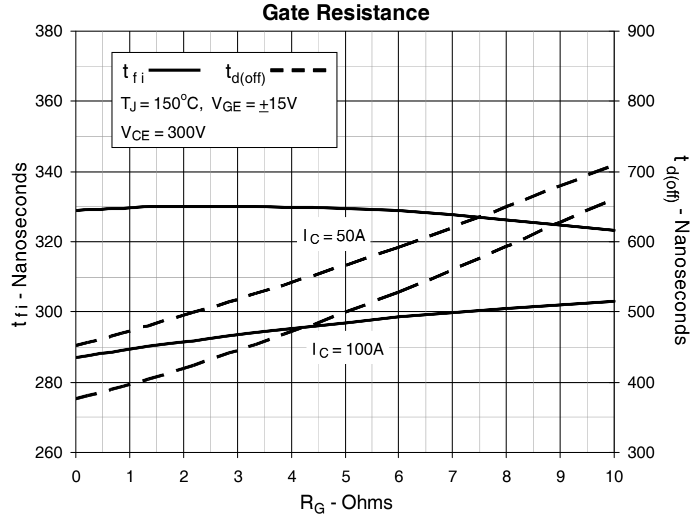


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

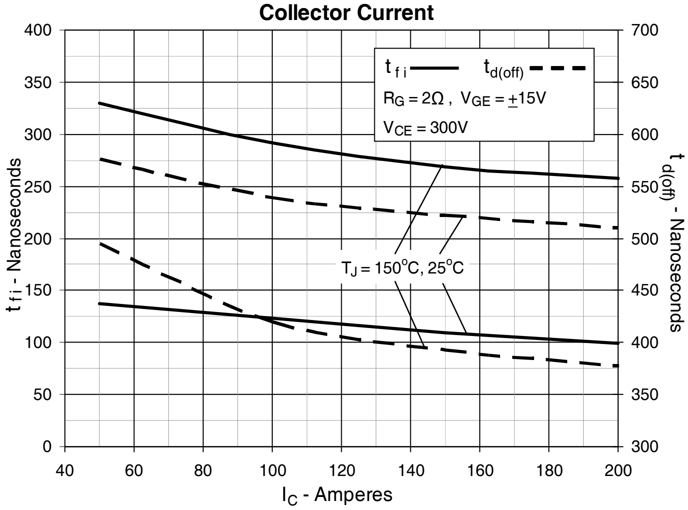


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

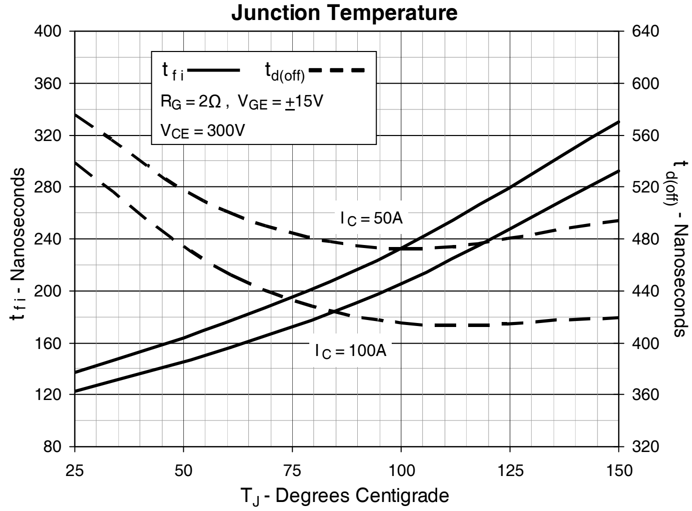


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

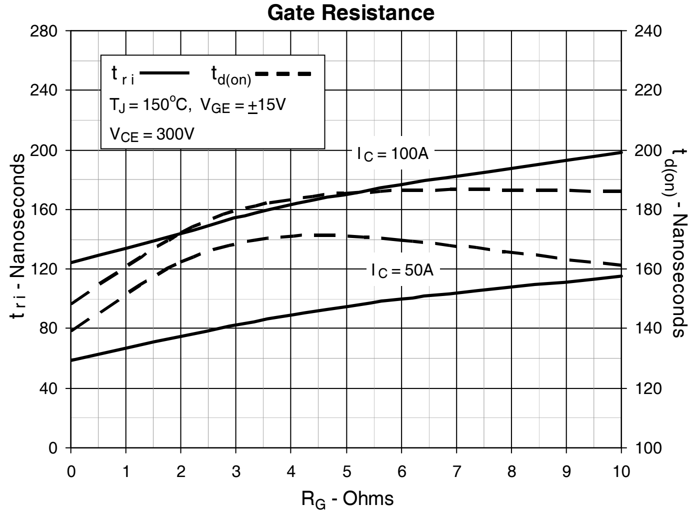


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

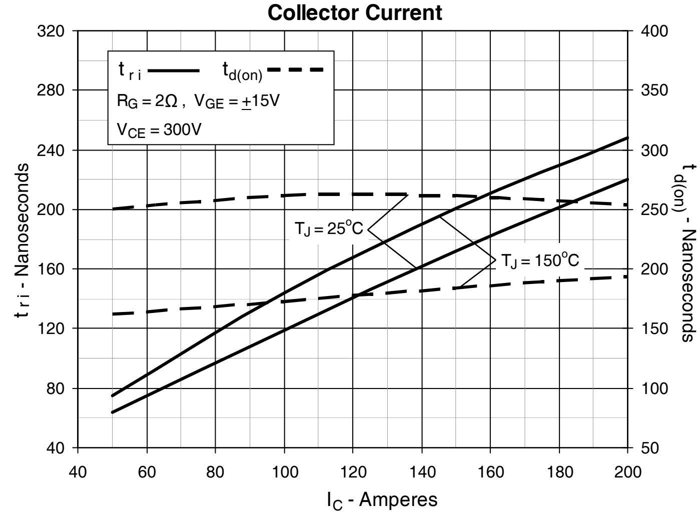


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature