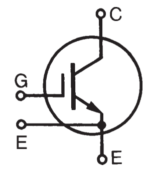
IXYS Preliminary Technical Information

600V XPT™ IGBT GenX3™

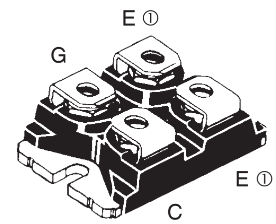
IXYN150N60B3

V_{CES} = 600V
I_{C110} = 140A
$V_{CE(sat)}$ ≤ 2.20V
$t_{fi(typ)}$ = 80ns

Extreme Light Punch through IGBT for 10-30kHz 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	600	V
V_{CGR}	T_J = 25°C to 175°C, R_{GE} = 1MΩ	600	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C (Chip Capability)	250	A
I_{LRMS}	Terminal Current Limit	200	A
I_{C110}	T_C = 110°C	140	A
I_{CM}	T_C = 25°C, 1ms	750	A
I_A	T_C = 25°C	75	A
E_{AS}	T_C = 25°C	1	J
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 150°C, R_G = 2Ω Clamped Inductive Load	I_{CM} = 300 $V_{CE} \leq V_{CES}$	A
t_{sc} (SCSOA)	V_{GE} = 15V, V_{CE} = 360V, T_J = 150°C R_G = 82Ω, Non Repetitive	8	µs
P_C	T_C = 25°C	830	W
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-55 ... +175	°C
V_{ISOL}	50/60Hz t = 1min	2500	V~
	$I_{ISOL} \leq$ 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 = 250µA, V_{GE} = 0V	600			V
$V_{GE(th)}$	I_C = 250µA, V_{CE} = V_{GE}	3.0		5.5	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			10	µA
	T_J = 150°C			1	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±200	nA
$V_{CE(sat)}$	I_C = 150A, V_{GE} = 15V, Note 1		1.77	2.20	V
	T_J = 150°C		2.10		V

Features

- Optimized for Low Conduction and Switching Losses
- miniBLOC, with Aluminium Nitride Isolation
- International Standard Package
- Isolation Voltage 2500V~
- 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

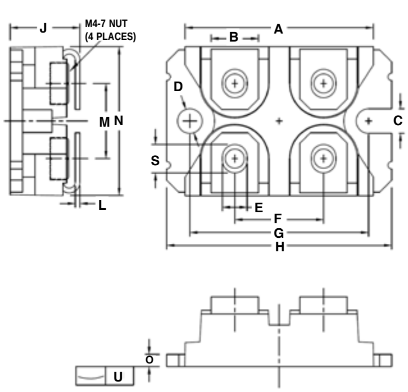
- Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Battery Chargers
- Welding Machines
- Lamp Ballasts

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	I_C = 60A, V_{CE} = 10V, Note 1	40	70		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		6950		pF
C_{oes}			400		pF
C_{res}			150		pF
$Q_{g(on)}$	I_C = 150A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		260		nC
Q_{ge}			39		nC
Q_{gc}			115		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C** I_C = 75A, V_{GE} = 15V V_{CE} = 400V, R_G = 2Ω Note 2		27		ns
t_{ri}			88		ns
E_{on}			4.20		mJ
$t_{d(off)}$			167		ns
t_{fi}			80		ns
E_{off}			2.60		mJ
$t_{d(on)}$	**Inductive load, T_J = 150°C** I_C = 75A, V_{GE} = 15V V_{CE} = 400V, R_G = 2Ω Note 2		26		ns
t_{ri}			84		ns
E_{on}			5.30		mJ
$t_{d(off)}$			220		ns
t_{fi}			110		ns
E_{off}			3.76		mJ
R_{thJC}				0.18	°C/W
R_{thCS}			0.05		°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.

SOT-227B (IXYN) OUTLINE



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

PRELIMANARY 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.

Fig. 1. Output Characteristics @ T_J = 25ºC

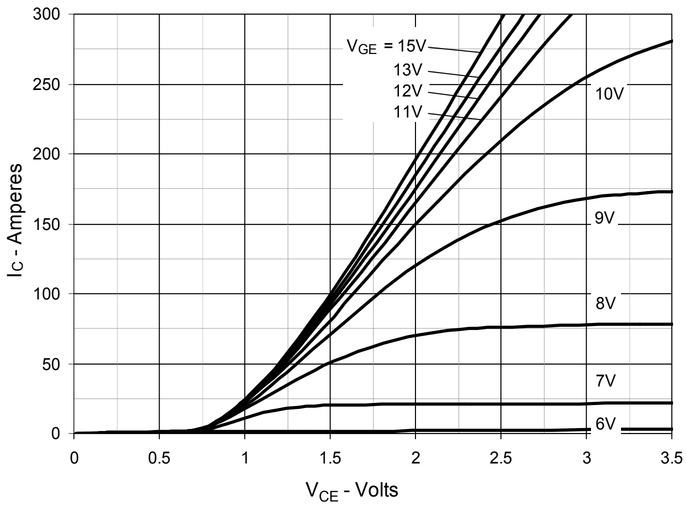


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

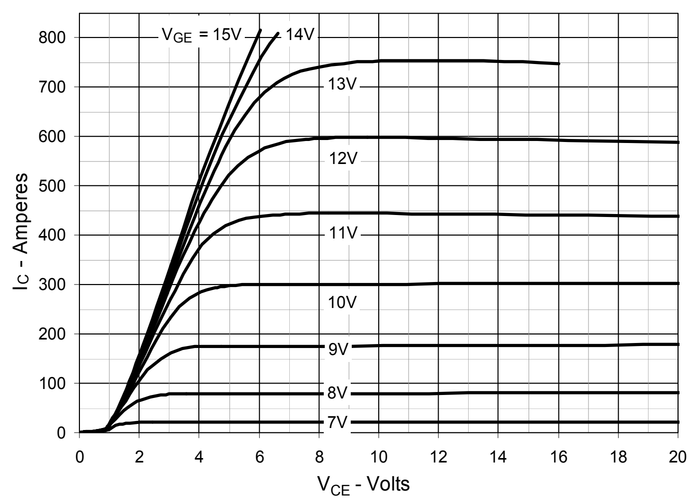


Fig. 3. Output Characteristics @ T_J = 150ºC

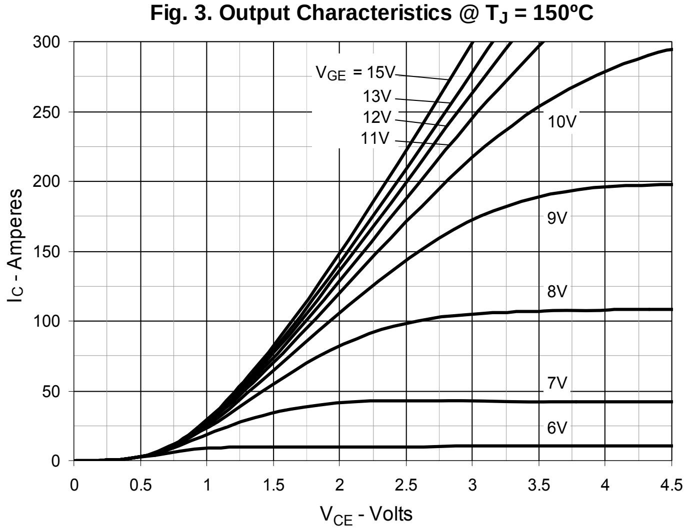


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

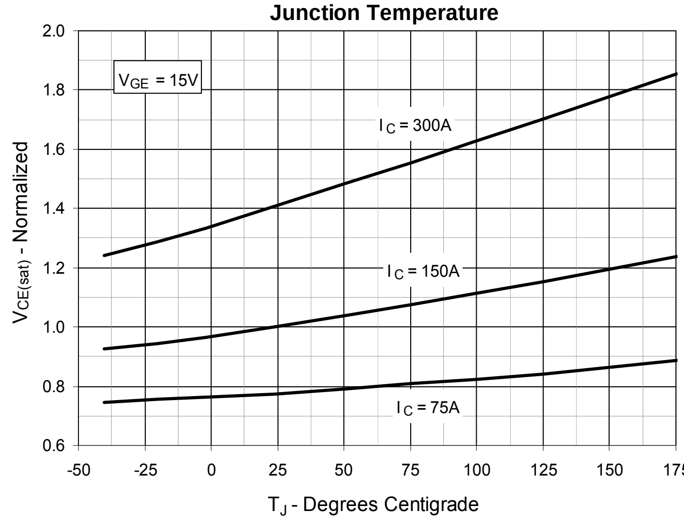


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

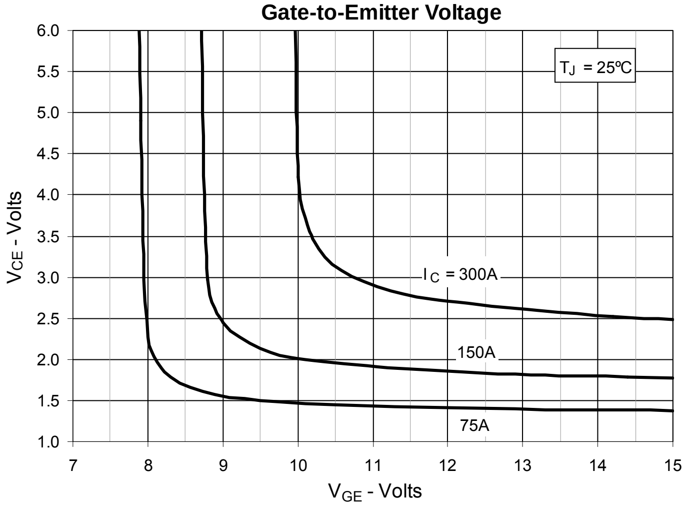


Fig. 6. Input Admittance

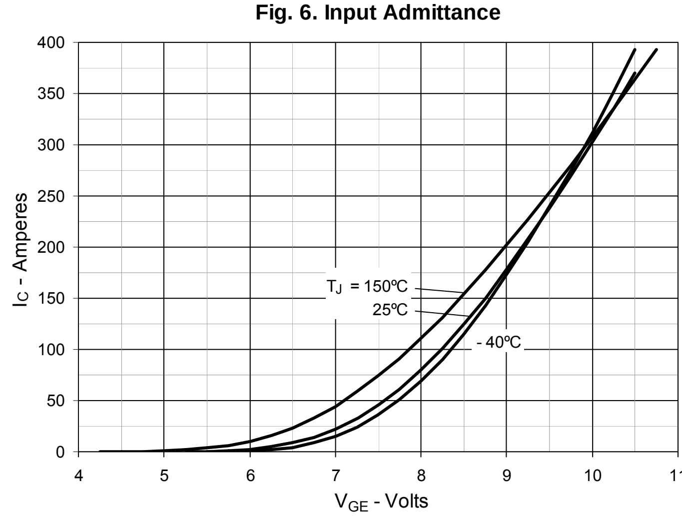


Fig. 7. Transconductance

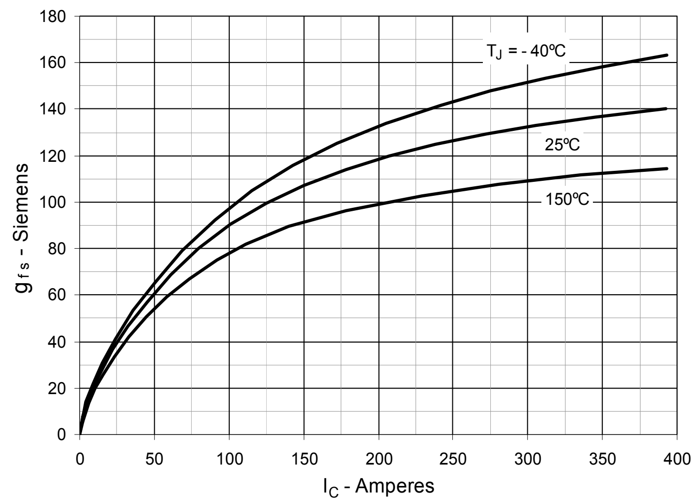


Fig. 8. Gate Charge

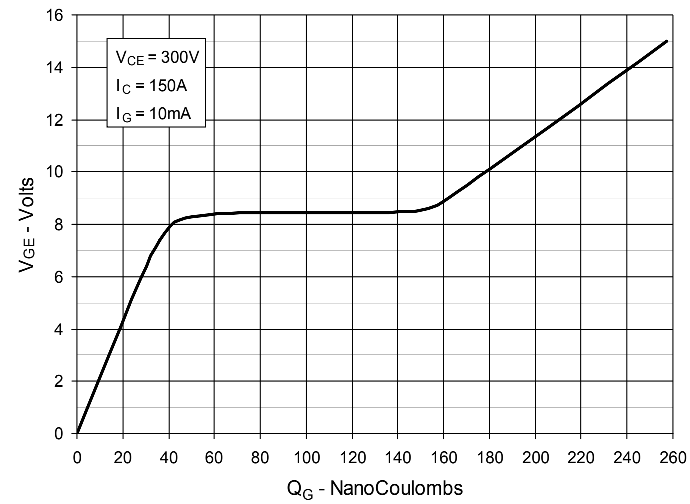


Fig. 9. Capacitance

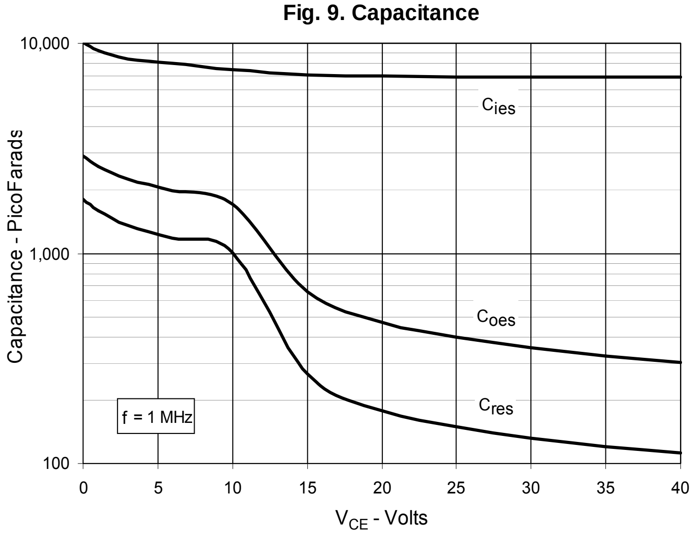


Fig. 10. Reverse-Bias Safe Operating Area

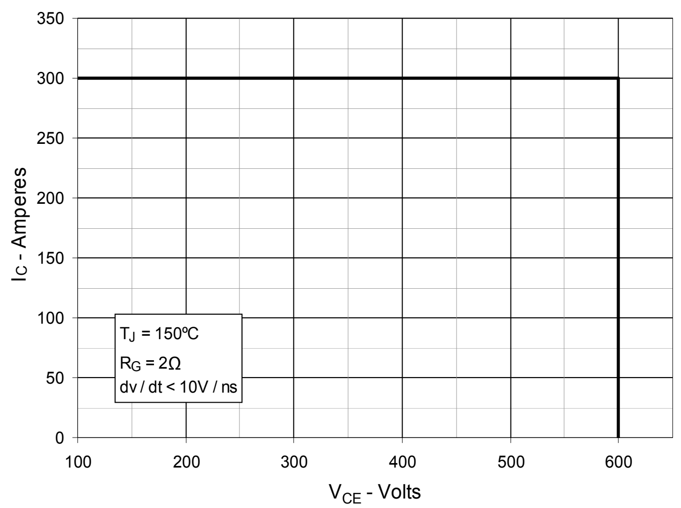
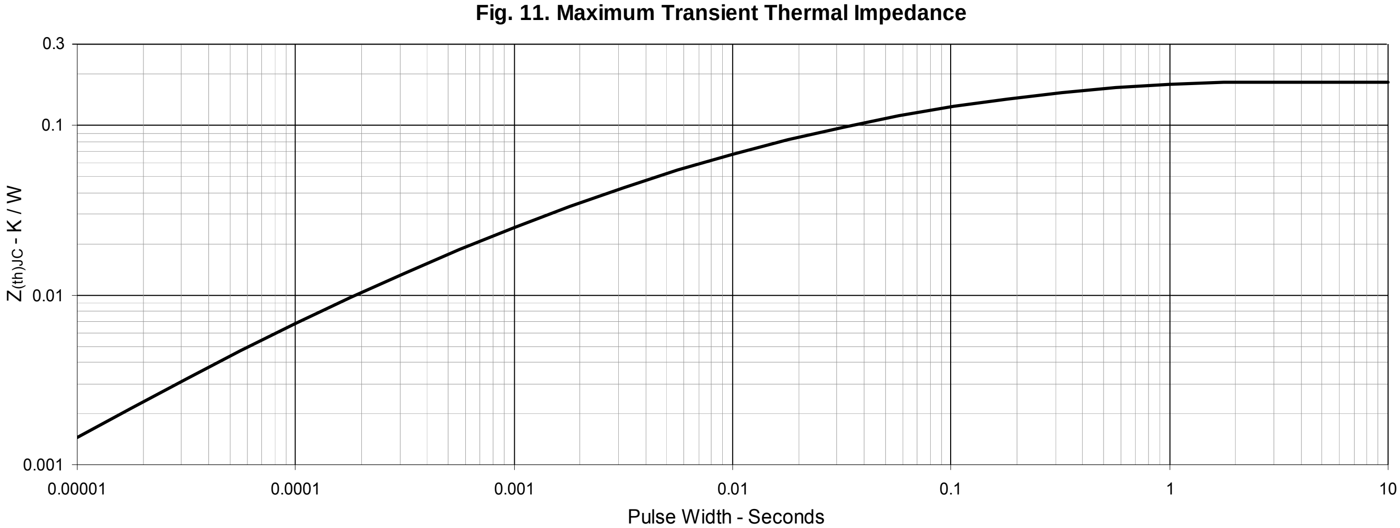


Fig. 11. Maximum Transient Thermal Impedance



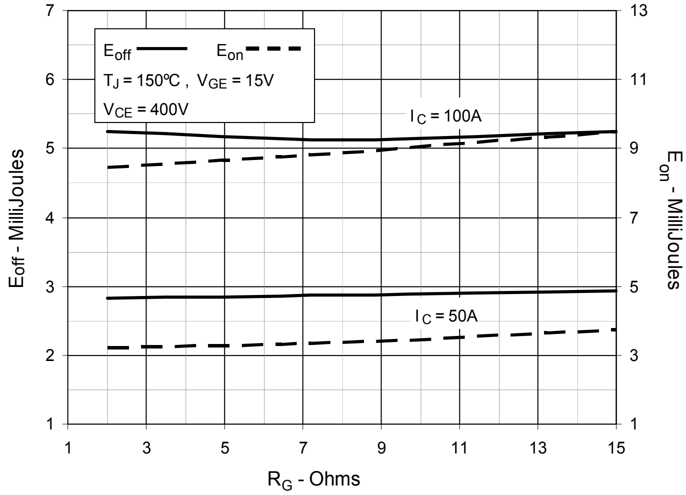


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

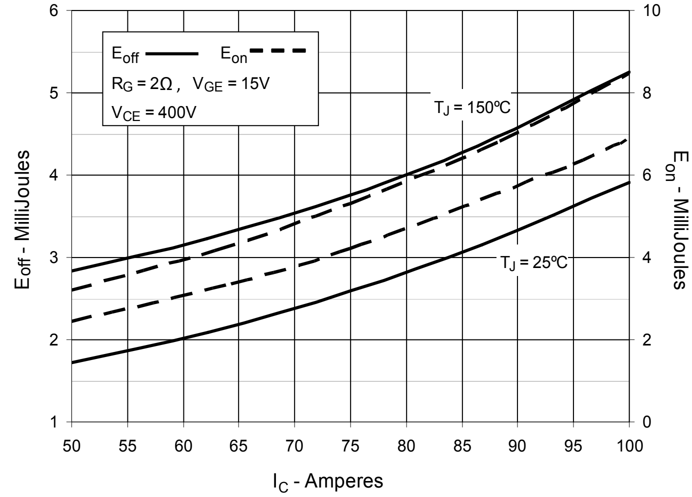


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

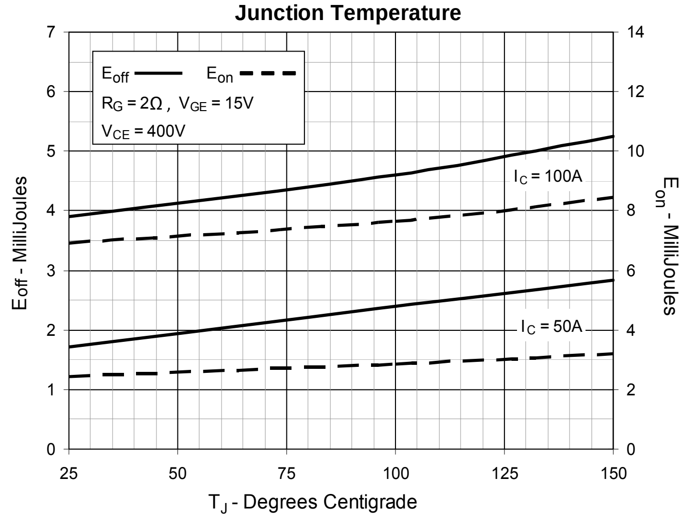


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

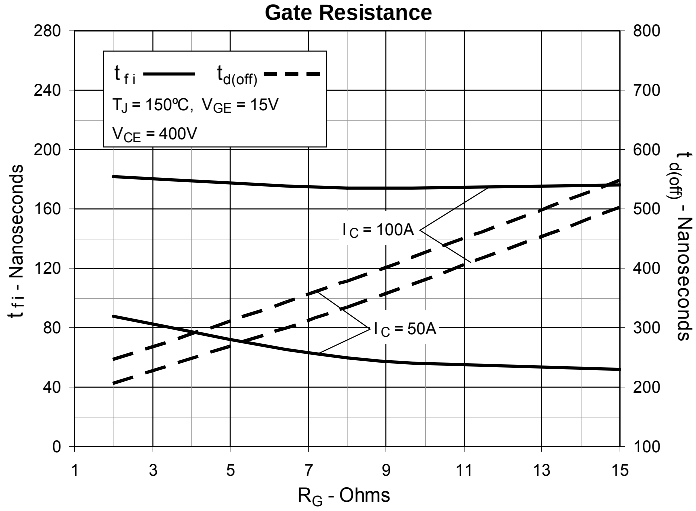


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

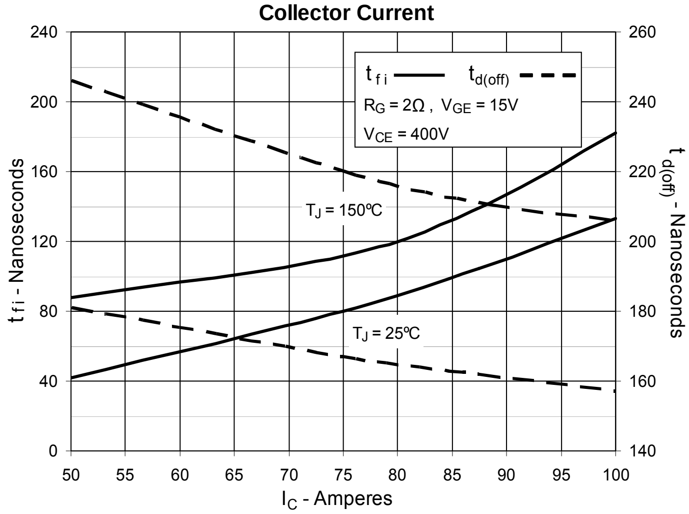


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

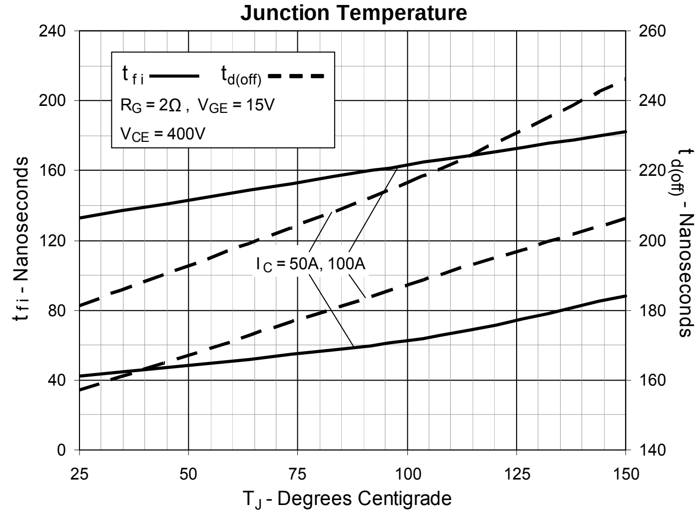


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

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

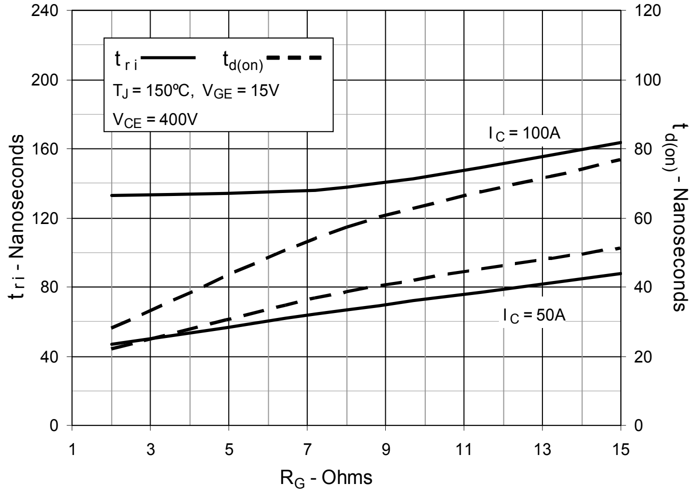


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

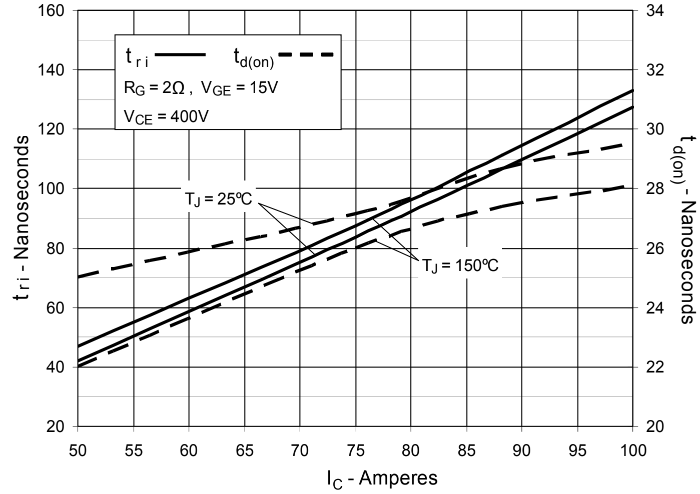
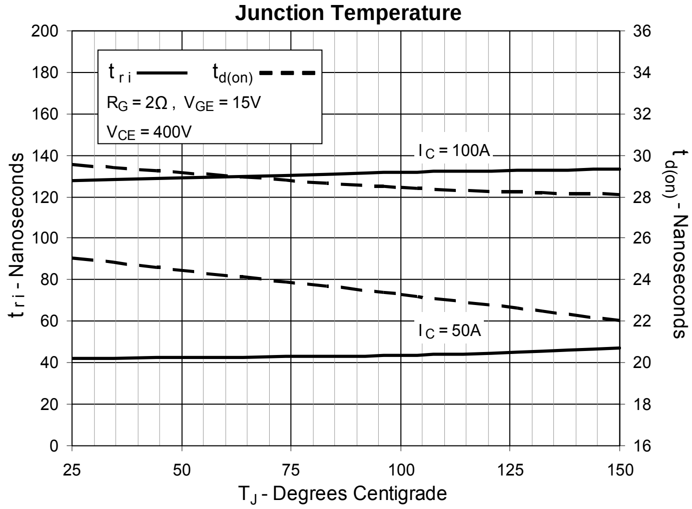


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature



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