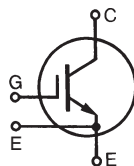


600V XPT™ IGBT

GenX3™

IXYN150N60B3

Extreme Light Punch through
IGBT for 10-30kHz Switching



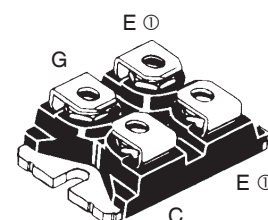
$$\begin{aligned} V_{CES} &= 600V \\ I_{C110} &= 140A \\ V_{CE(sat)} &\leq 2.20V \\ t_{fi(typ)} &= 80ns \end{aligned}$$

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)	250	A
I_{LRMS}	Terminal Current Limit	200	A
I_{C110}	$T_C = 110^\circ\text{C}$	140	A
I_{CM}	$T_C = 25^\circ\text{C}, 1\text{ms}$	750	A
I_A	$T_C = 25^\circ\text{C}$	75	A
E_{AS}	$T_C = 25^\circ\text{C}$	1	J
SSOA (RBSOA)	$V_{GE} = 15V, T_{VJ} = 150^\circ\text{C}, R_G = 2\Omega$ Clamped Inductive Load	$I_{CM} = 300$ $V_{CE} \leq V_{CES}$	A
t_{sc} (SCSOA)	$V_{GE} = 15V, V_{CE} = 360V, T_J = 150^\circ\text{C}$ $R_G = 82\Omega$, Non Repetitive	8	μs
P_C	$T_C = 25^\circ\text{C}$	830	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 $t = 1\text{min}$ $I_{ISOL} \leq 1\text{mA}$ $t = 1\text{s}$	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

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 250\mu\text{A}, V_{GE} = 0V$	600		V
$V_{GE(th)}$	$I_C = 250\mu\text{A}, V_{CE} = V_{GE}$	3.0		5.5 V
I_{CES}	$V_{CE} = V_{CES}, V_{GE} = 0V$ $T_J = 150^\circ\text{C}$			10 μA 1 mA
I_{GES}	$V_{CE} = 0V, V_{GE} = \pm 20V$			± 200 nA
$V_{CE(sat)}$	$I_C = 150A, V_{GE} = 15V$, Note 1 $T_J = 150^\circ\text{C}$		1.77 2.10	V V

SOT-227B, miniBLOC

E153432



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

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)

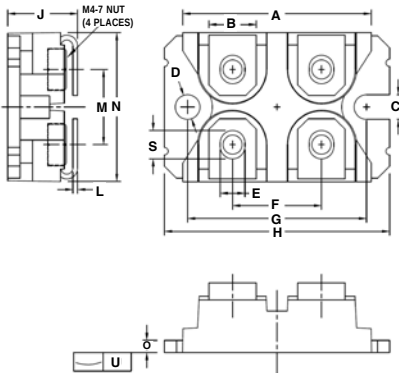
Characteristic Values

		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)}			26	ns
t_{ri}	Inductive load, T _J = 150°C I _C = 75A, V _{GE} = 15V V _{CE} = 400V, R _G = 2Ω Note 2		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		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

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.

IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

IXYS MOSFETs and IGBTs are covered 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
by one or more of the following U.S. patents: 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

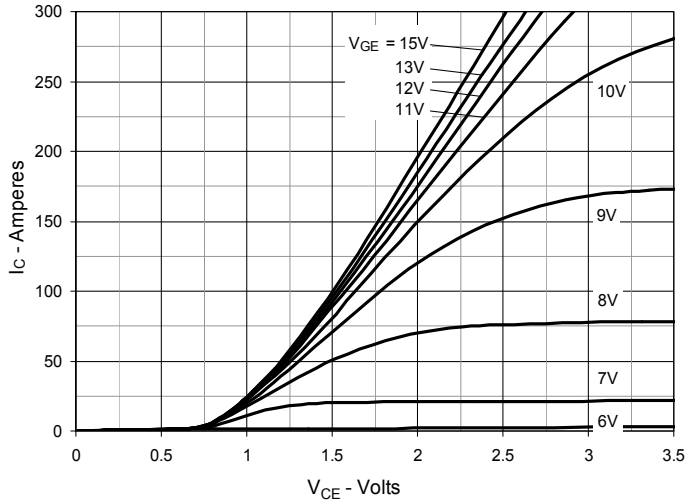
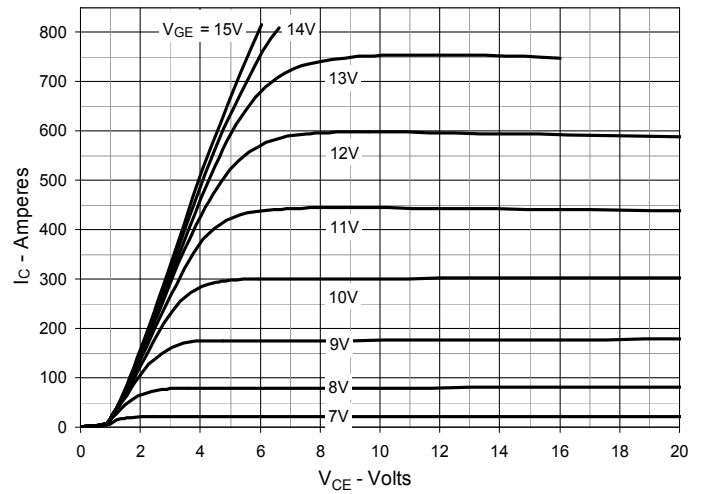
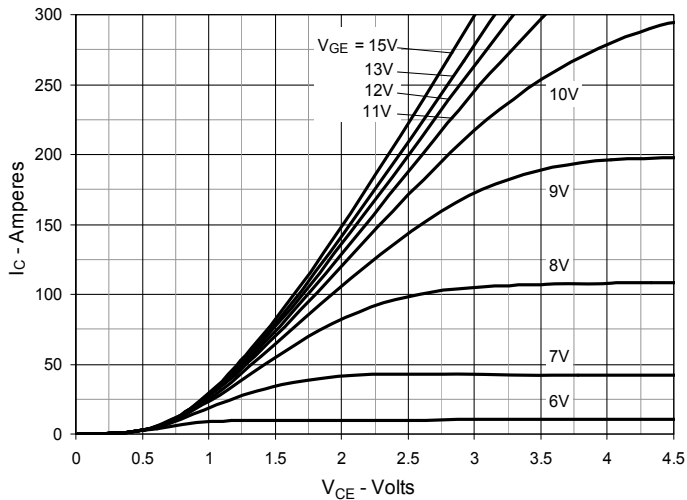
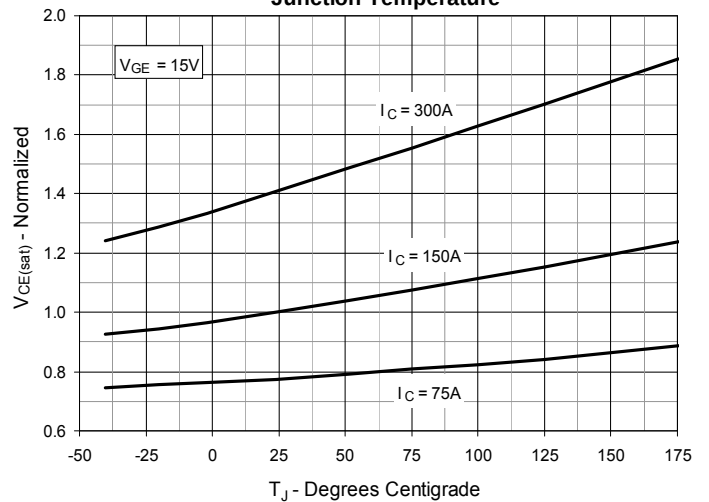
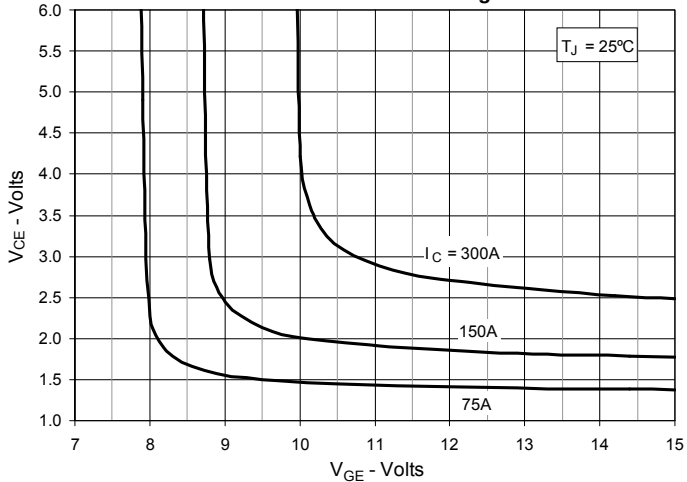
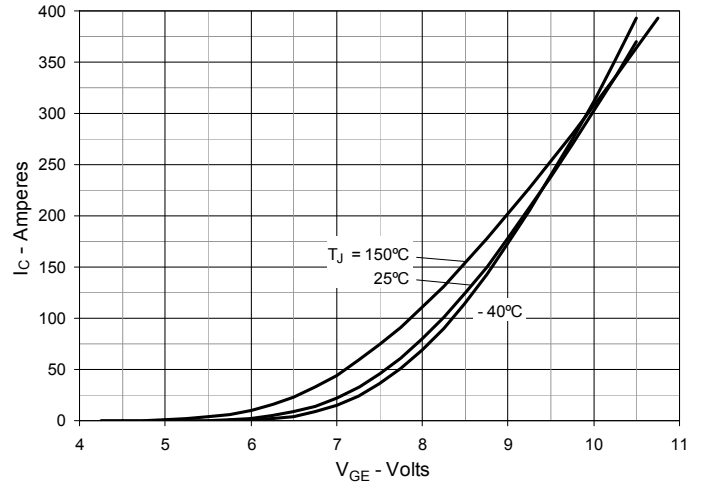
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

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


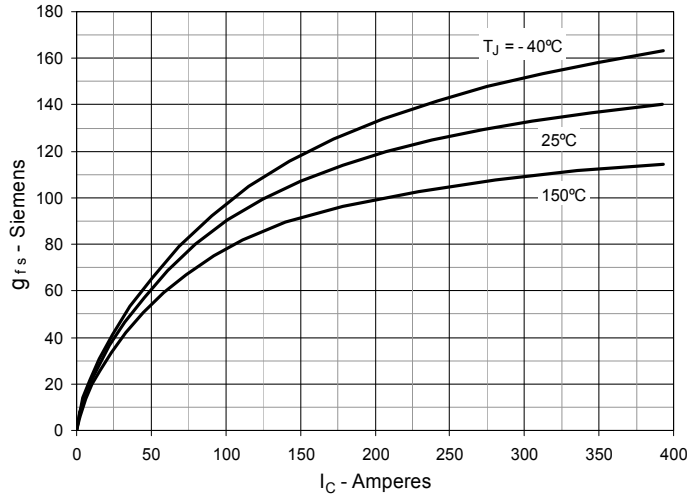
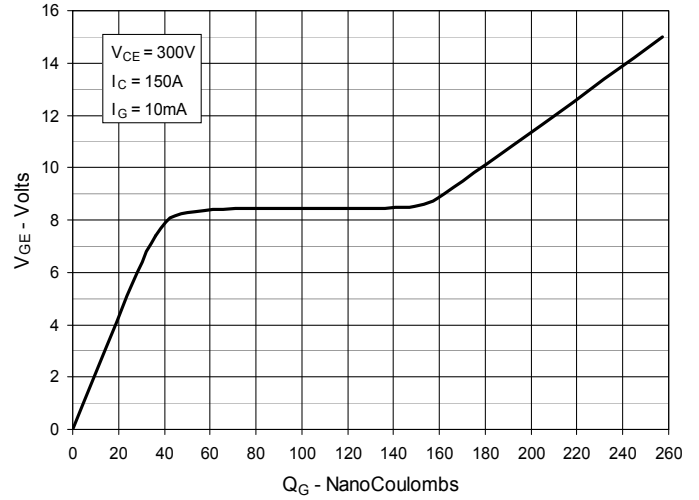
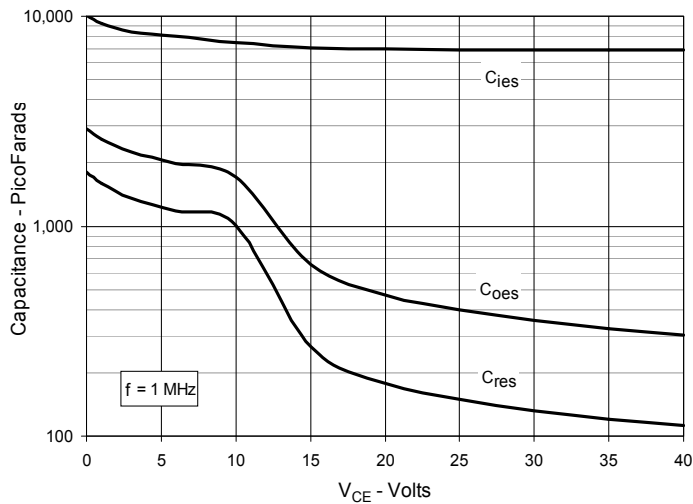
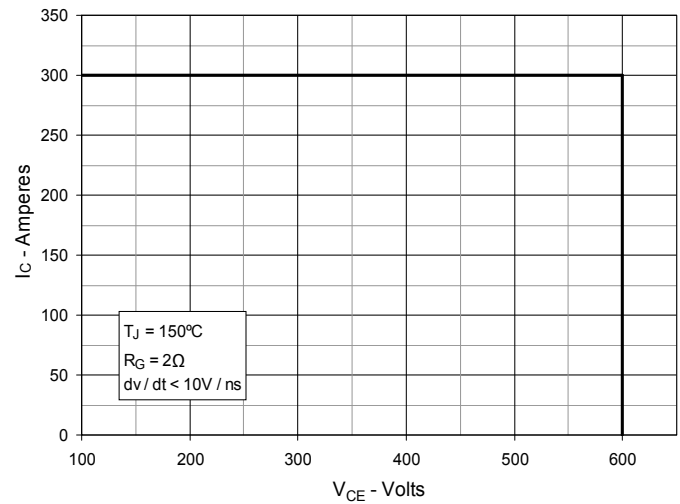
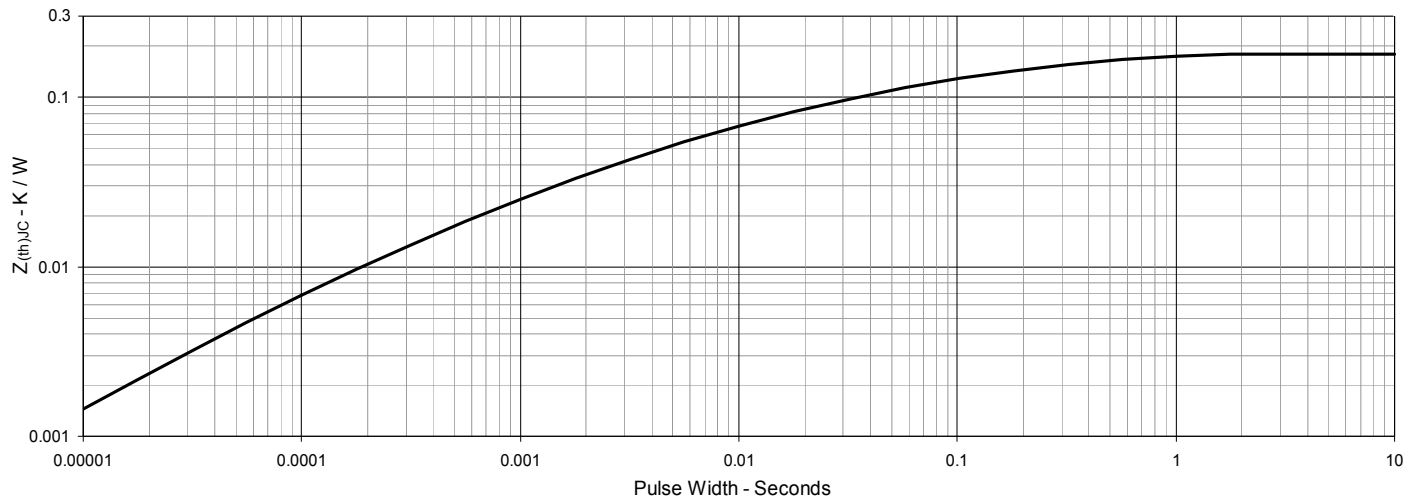
Fig. 7. Transconductance

Fig. 8. Gate Charge

Fig. 9. Capacitance

Fig. 10. Reverse-Bias Safe Operating Area

Fig. 11. Maximum Transient Thermal Impedance


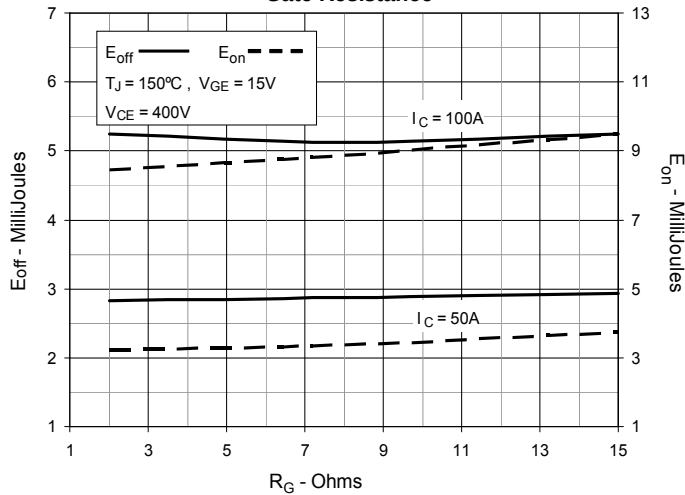
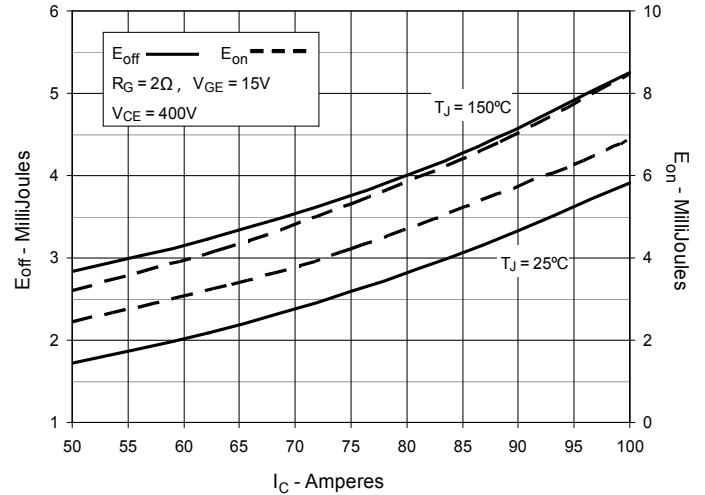
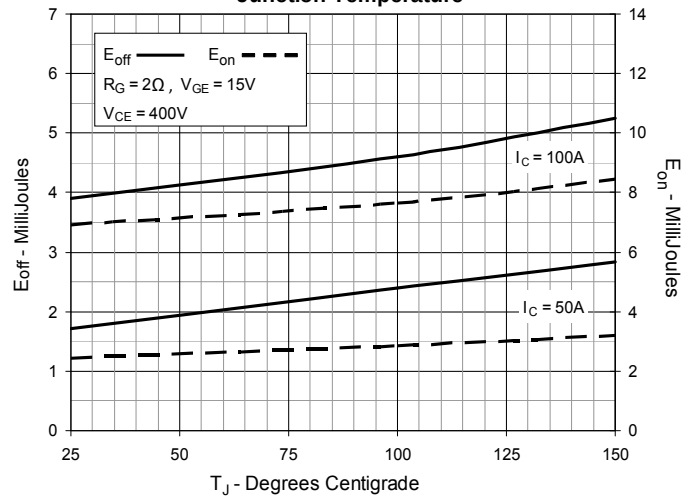
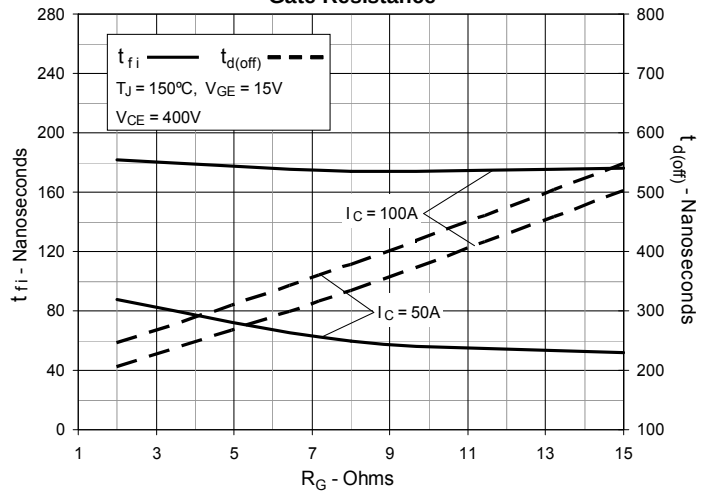
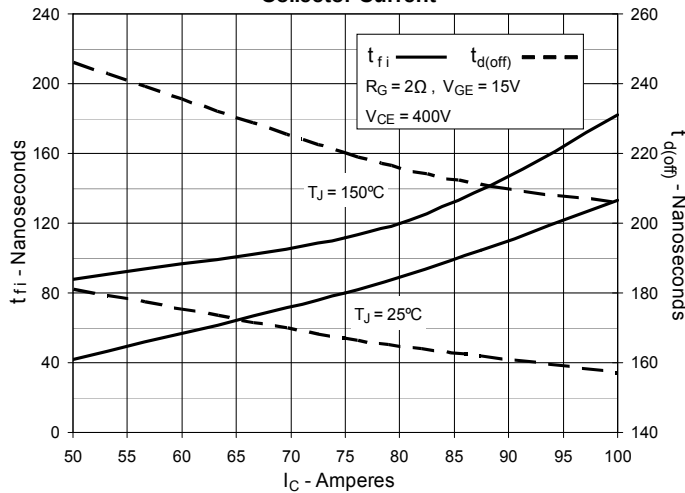
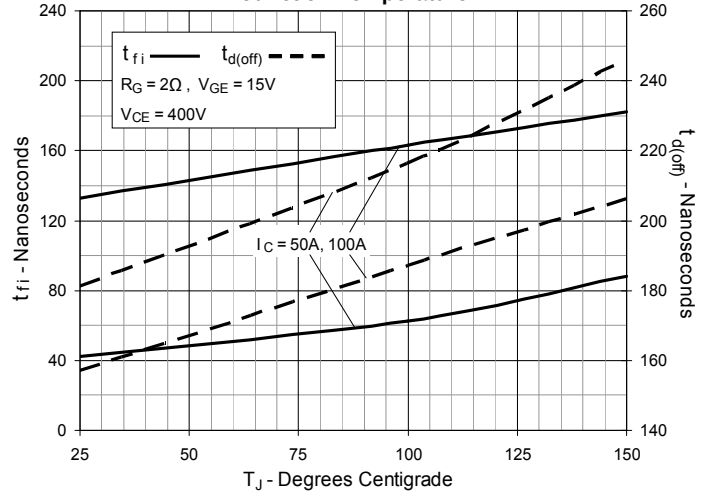
Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

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

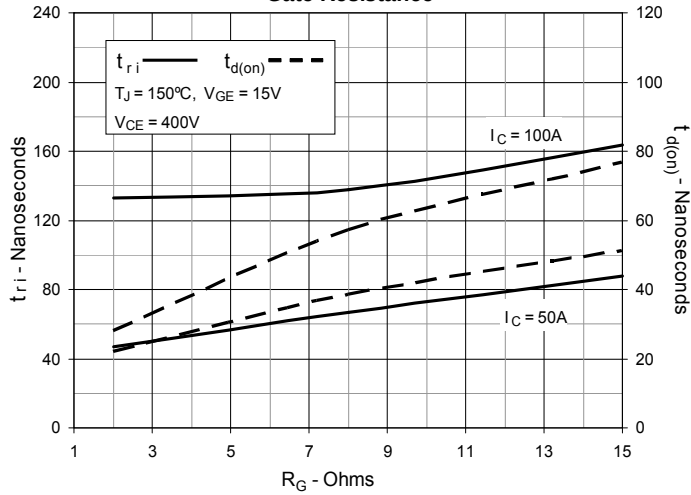


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

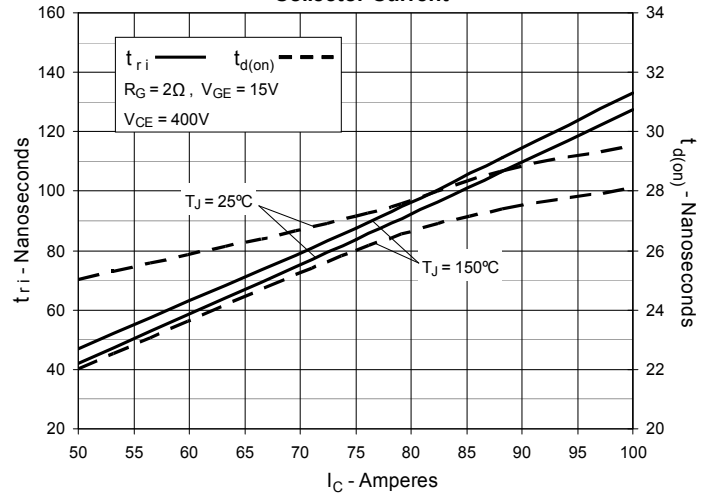
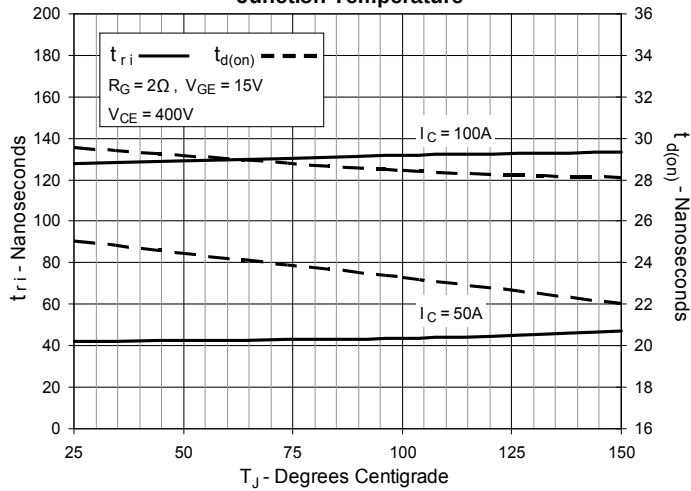


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature





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