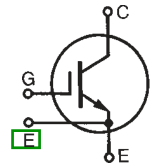
IXYS

Advance Technical Information

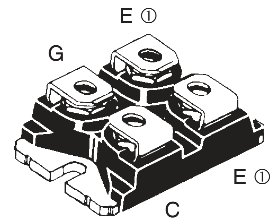
High Voltage IGBT

IXGN200N170

V_{CES} = 1700V
I_{C90} = 160A
$V_{CE(sat)}$ ≤ 2.6V
$t_{fi(typ)}$ = 535ns



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 150°C	1700	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	1700	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C (Chip Capability)	280	A
I_{LRMS}	Terminal Current Limit	200	A
I_{C90}	T_C = 90°C	160	A
I_{CM}	T_C = 25°C, 1ms	1050	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 1Ω	I_{CM} = 300	A
	Clamped Inductive Load	1360	V
P_C	T_C = 25°C	1250	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°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 (TT_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 3mA, V_{GE} = 0V	1700			V
$V_{GE(th)}$	I_C = 1mA, V_{CE} = V_{GE}	3.5		5.5	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			25	µA
	T_J = 125°C			5	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±200	nA
$V_{CE(sat)}$	I_C = 100A, V_{GE} = 15V, Note 1		2.1	2.6	V
	T_J = 125°C		2.5		V

Features

- miniBLOC, with Aluminium Nitride Isolation
- International Standard Package
- Isolation Voltage 2500V~
- High Current Handling Capability

Advantages

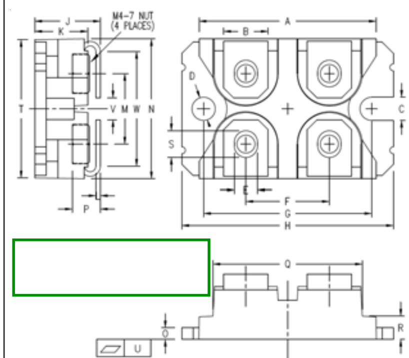
- High Power Density
- Low Gate Drive Requirement

Applications

- Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- 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	50	82	S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		12.5	nF
C_{oes}			580	pF
C_{res}			220	pF
$Q_{g(on)}$	I_C = 200A$_0$, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		540	nC
Q_{ge}			78	nC
Q_{gc}			265	nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		37	ns
t_{ri}	I_C = 100A, V_{GE} = 15V		133	ns
E_{on}	V_{CE} = 0.5 • V_{CES}, R_G = 1Ω		28	mJ
$t_{d(off)}$	Note 2		320	ns
t_{fi}			535	ns
E_{off}			30	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		40	ns
t_{ri}	I_C = 100A, V_{GE} = 15V		143	ns
E_{on}	V_{CE} = 0.5 • V_{CES}, R_G = 1Ω		31	mJ
$t_{d(off)}$	Note 2		430	ns
t_{fi}			610	ns
E_{off}			44	mJ
R_{thJC}				0.10 °C/W
R_{thCS}			0.05	°C/W

SOT-227B miniBLOC (IXGN)



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	1.240	1.255	31.50	31.88
B	.307	.323	7.80	8.20
C	.161	.169	4.09	4.29
D	.161	.169	4.09	4.29
E	.161	.169	4.09	4.29
F	.587	.595	14.91	15.11
G	1.186	1.193	30.12	30.30
H	1.489	1.505	37.80	38.23
J	.460	.481	11.68	12.22
K	.351	.378	8.92	9.60
L	.030	.033	0.76	0.84
M	.496	.506	12.60	12.85
N	.990	1.001	25.15	25.42
O	.078	.084	1.98	2.13
P	.195	.235	4.95	5.97
Q	1.045	1.059	26.54	26.90
R	.155	.174	3.94	4.42
S	.186	.191	4.72	4.85
T	.968	.987	24.59	25.07
U	−.002	.004	−0.05	0.1
V	.130	.180	3.30	4.57
W	.780	.830	19.81	21.08

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.

ADVANCE 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. Extended Output Characteristics @ T_J = 25ºC

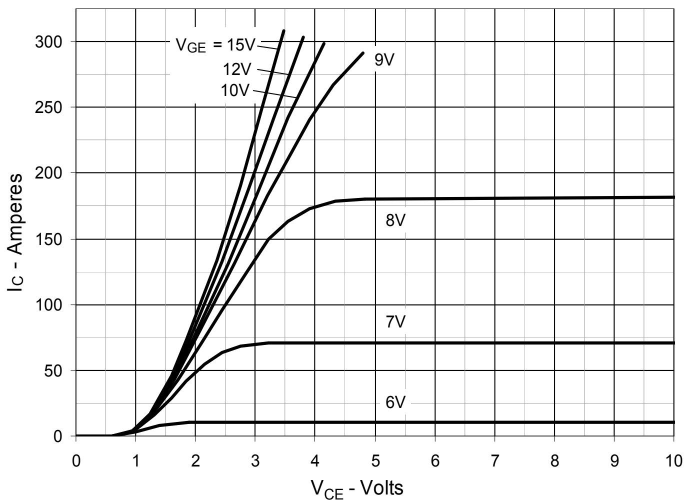


Fig. 2. Output Characteristics @ T_J = 125ºC

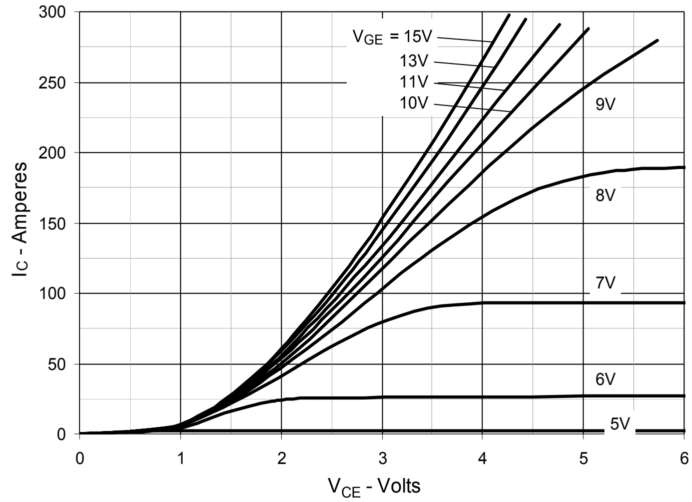


Fig. 3. Dependence of $V_{CE(sat)}$ on Junction Temperature

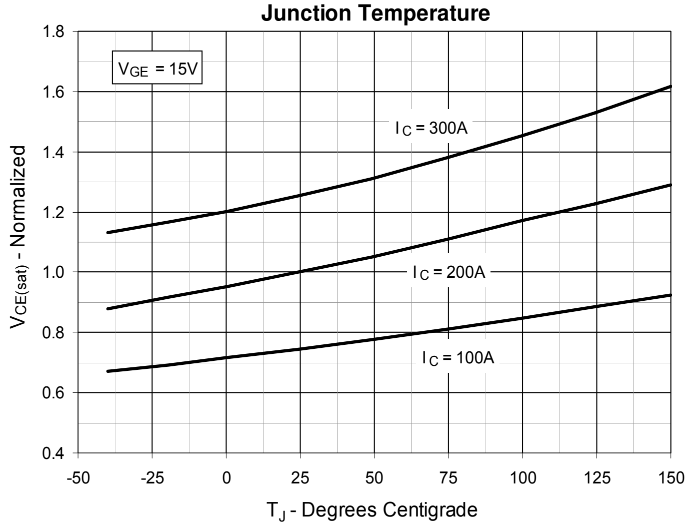


Fig. 4. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

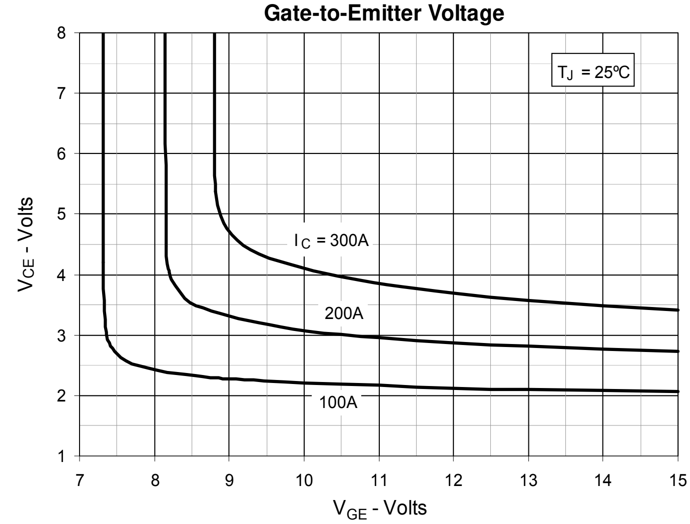


Fig. 5. Input Admittance

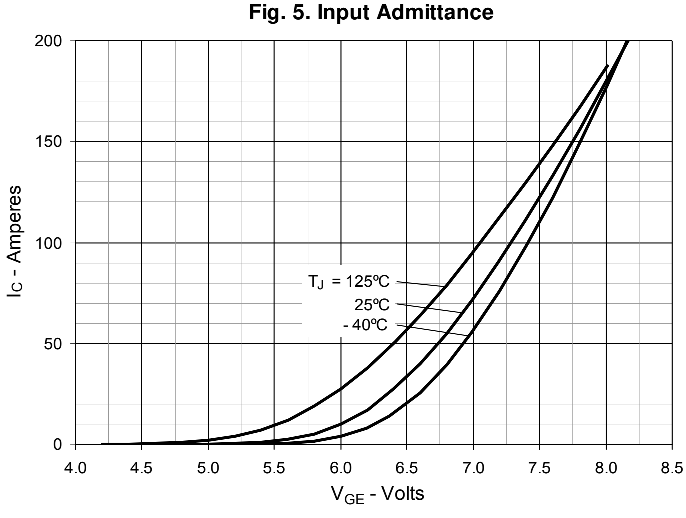


Fig. 6. Transconductance

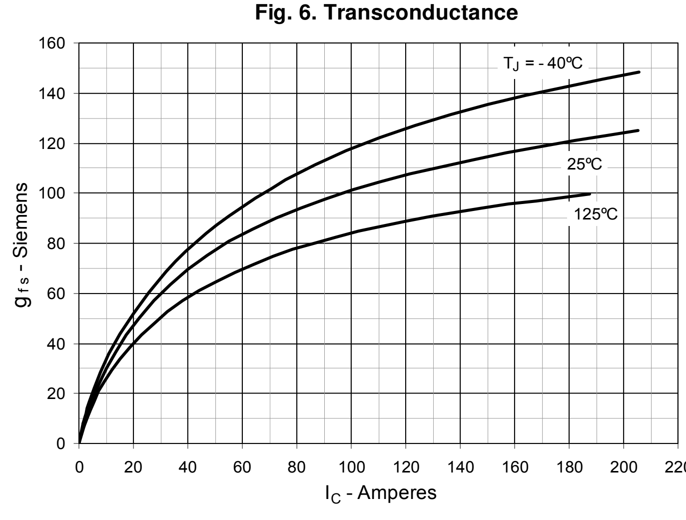


Fig. 7. Gate Charge

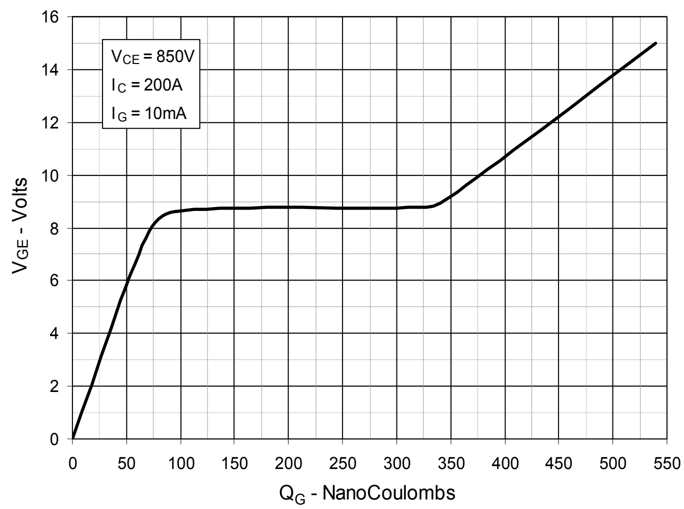


Fig. 8. Capacitance

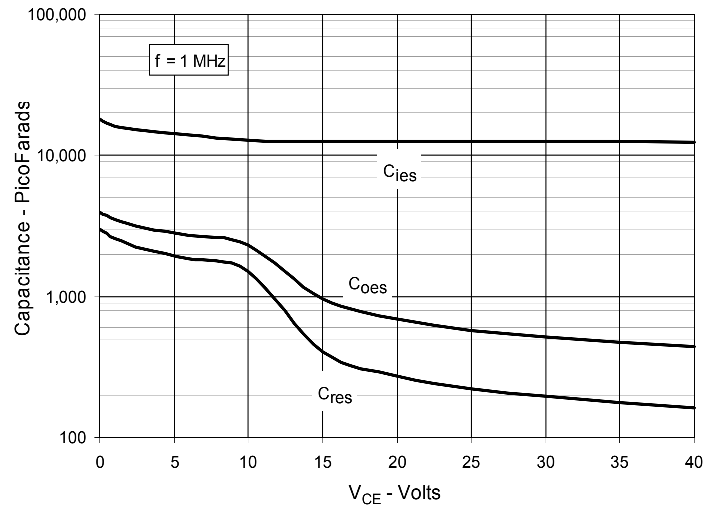


Fig. 9. Reverse-Bias Safe Operating Area

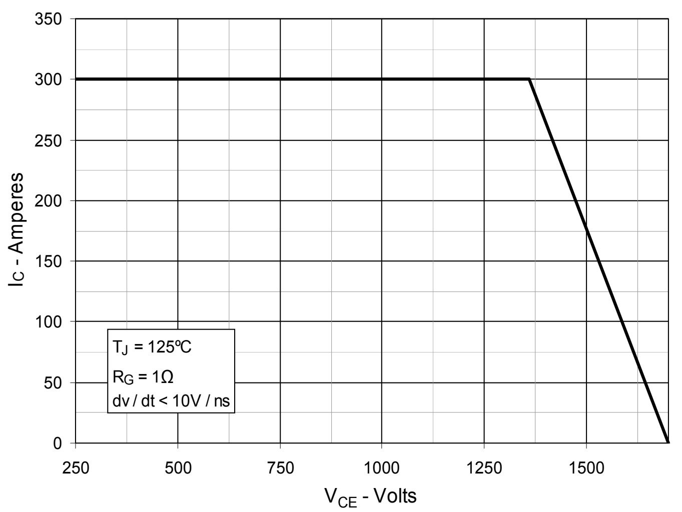


Fig. 10. Maximum Transient Thermal Impedance

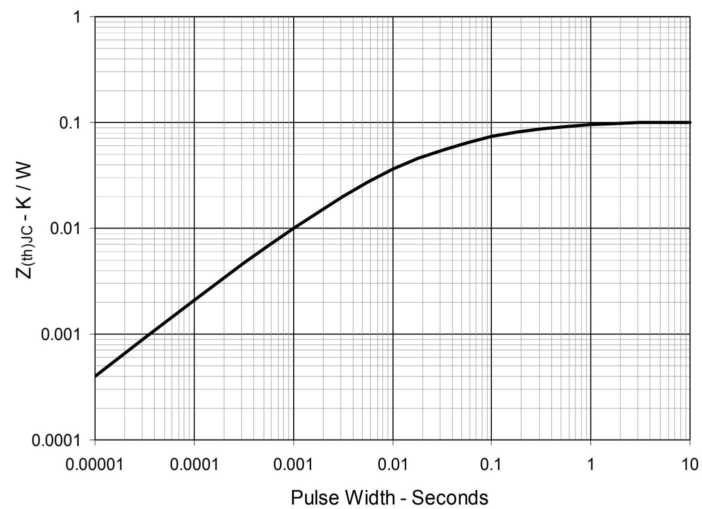


Fig. 11. Inductive Switching Energy Loss vs. Gate Resistance

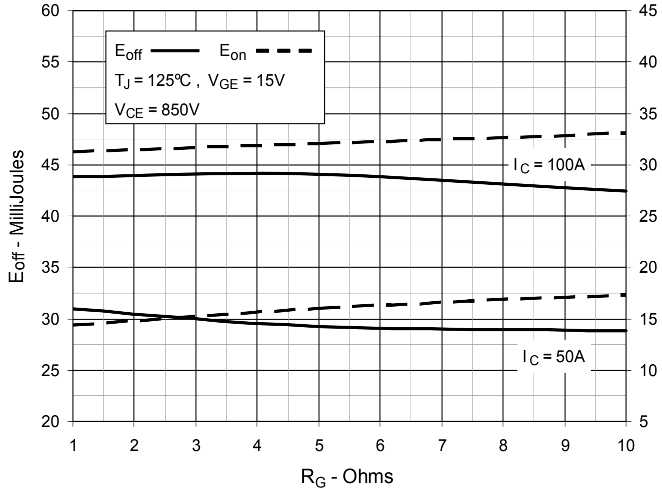


Fig. 12. Inductive Switching Energy Loss vs. Collector Current

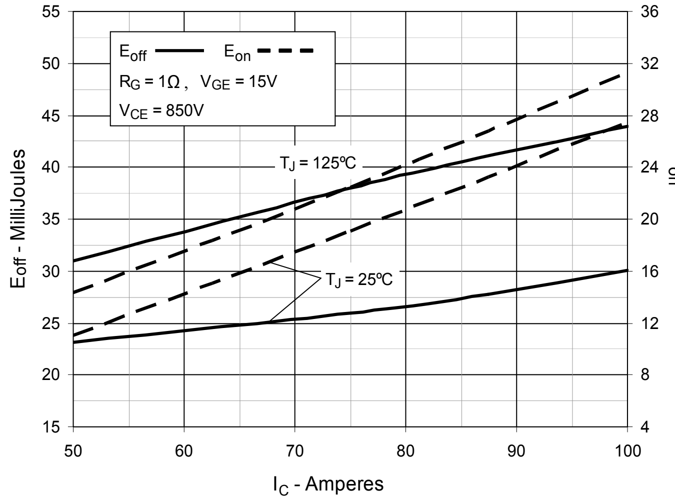


Fig. 13. Inductive Switching Energy Loss vs. Junction Temperature

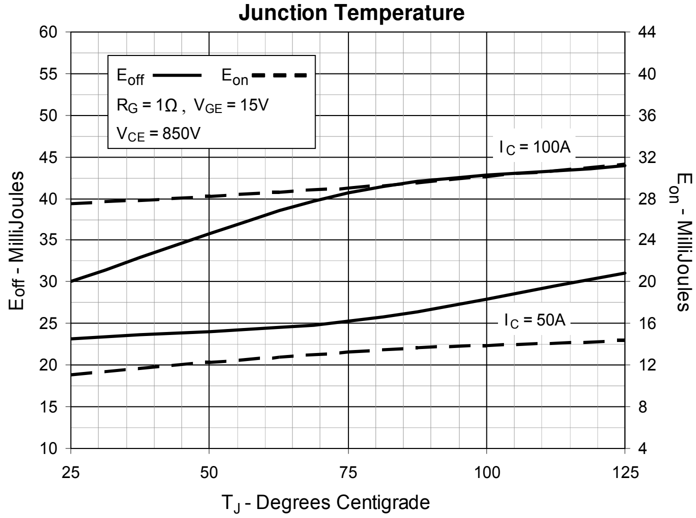


Fig. 14. Inductive Turn-off Switching Times vs. Gate Resistance

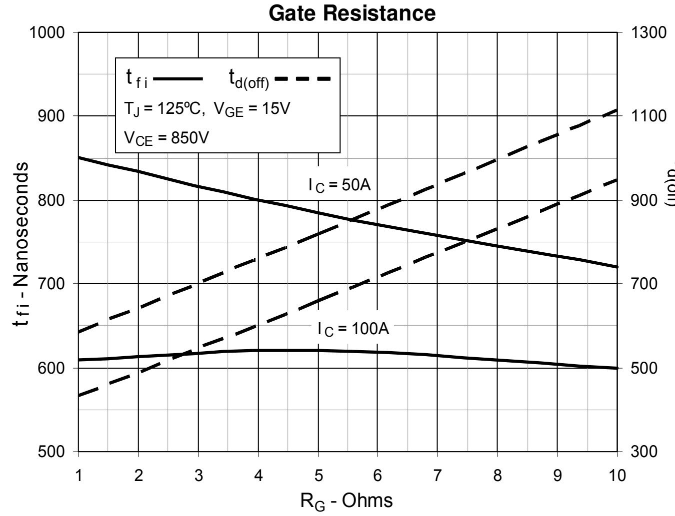


Fig. 15. Inductive Turn-off Switching Times vs. Collector Current

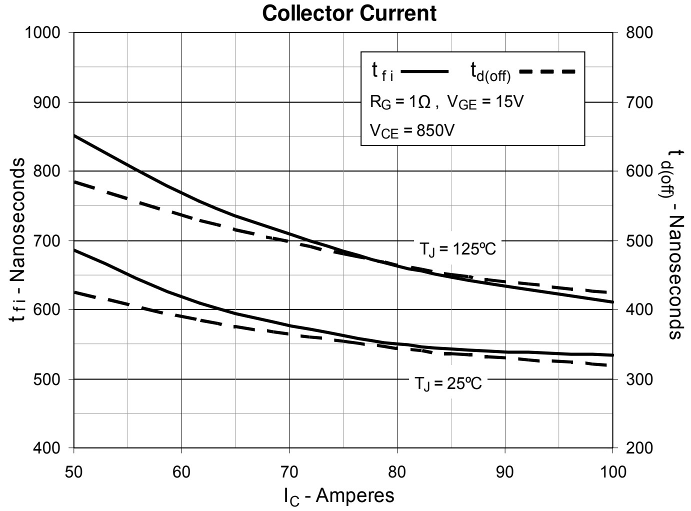
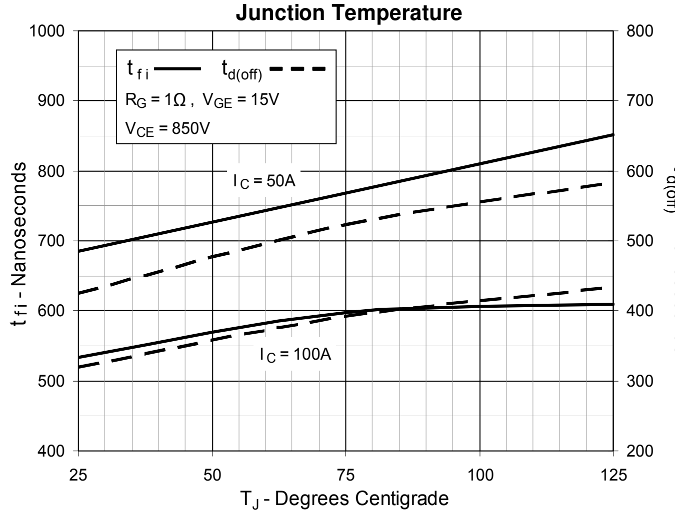


Fig. 16. Inductive Turn-off Switching Times vs. Junction Temperature



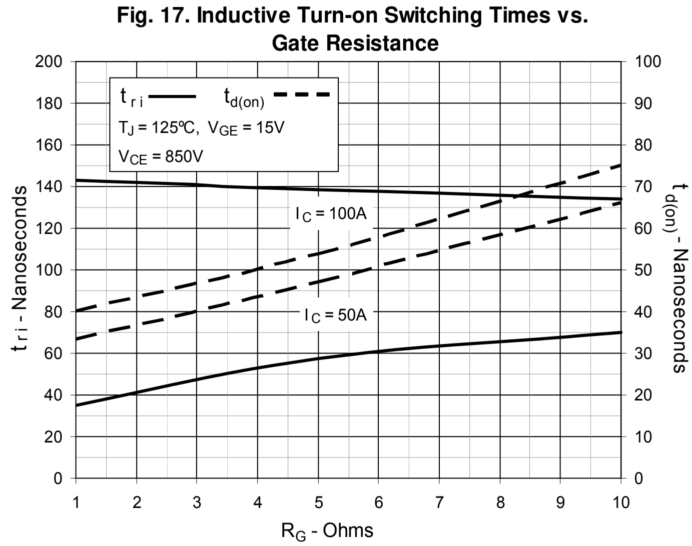


Fig. 17. Inductive Turn-on Switching Times vs.
Gate Resistance
t r i
td(on)
TJ = 125ºC, VGE = 15V
VCE = 850V
I C = 100A
I C = 50A
t r i - Nanoseconds
t d(on) - Nanoseconds
RG - Ohms

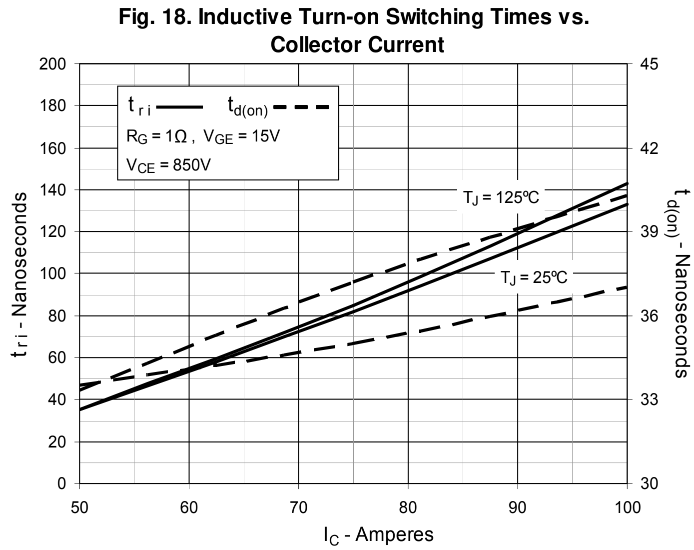


Fig. 18. Inductive Turn-on Switching Times vs.
Collector Current
t r i
td(on)
RG = 1Ω , VGE = 15V
VCE = 850V
TJ = 125ºC
TJ = 25ºC
t r i - Nanoseconds
t d(on) - Nanoseconds
IC - Amperes

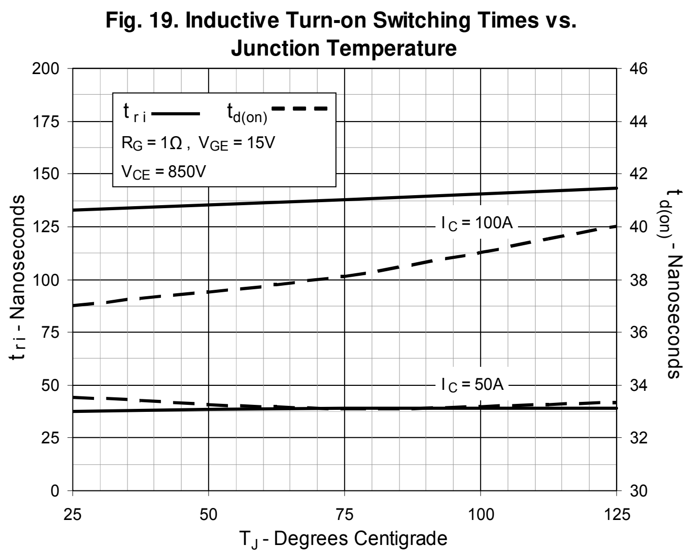


Fig. 19. Inductive Turn-on Switching Times vs.
Junction Temperature
t r i
td(on)
RG = 1Ω , VGE = 15V
VCE = 850V
I C = 100A
I C = 50A
t r i - Nanoseconds
t d(on) - Nanoseconds
TJ - Degrees Centigrade