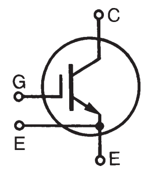
650V XPT™ IGBT GenX3™

IXYN300N65A3

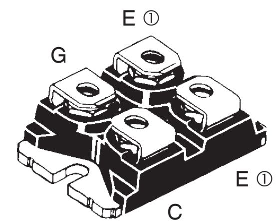
V_{CES}	=	650V
I_{C110}	=	270A
$V_{CE(sat)}$	≤	1.60V
$t_{fi(typ)}$	=	160ns

Ultra Low-Vsat PT IGBT



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)	470	A
$I_{L(RMS)}$	External Lead Current Limit	200	A
I_{C110}	T_C = 110°C	270	A
I_{CM}	T_C = 25°C, 1ms	1600	A
I_A	T_C = 25°C	100	A
E_{AS}	T_C = 25°C	2	J
SSOA	V_{GE} = 15V, T_{VJ} = 150°C, R_G = 1Ω	I_{CM} = 600	A
(RBSOA)	Clamped Inductive Load	$V_{CE} \leq V_{CES}$	
t_{sc}	V_{GE} = 15V, V_{CE} = 360V, T_J = 150°C	8	μs
(SCSOA)	R_G = 82Ω, Non Repetitive		
P_C	T_C = 25°C	1500	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	650			V
$V_{GE(th)}$	I_C = 250μA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			25	μA
	T_J = 150°C			1	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±200	nA
$V_{CE(sat)}$	I_C = 100A, V_{GE} = 15V, Note 1		1.32	1.60	V
	T_J = 150°C		1.35		V

Features

- miniBLOC, with Aluminium Nitride Isolation
- International Standard Package
- Isolation Voltage 2500V~
- Square RBSOA
- Avalanche Rated
- Short Circuit Capability
- High Current Handling Capability

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

- UPS
- Motor Drives
- SMPS
- Battery Chargers
- Low Frequency Power Inverters

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	60	100	S
C_{ies}	$V_{CE} = 25V$, $V_{GE} = 0V$, f = 1MHz		14	nF
C_{oes}			836	pF
C_{res}			310	pF
$Q_{g(on)}$	$I_C = 300A$, $V_{GE} = 15V$, $V_{CE} = 0.5 \bullet V_{CES}$		565	nC
Q_{ge}			83	nC
Q_{gc}			230	nC
$t_{d(on)}$	**Inductive load, $T_J = 25°C$**		42	ns
t_{ri}	$I_C = 100A$, $V_{GE} = 15V$		125	ns
E_{on}	$V_{CE} = 400V$, $R_G = 1\Omega$		7.8	mJ
$t_{d(off)}$	Note 2		190	ns
t_{fi}			160	ns
E_{off}			4.7	mJ
$t_{d(on)}$	**Inductive load, $T_J = 150°C$**		40	ns
t_{ri}	$I_C = 100A$, $V_{GE} = 15V$		115	ns
E_{on}	$V_{CE} = 400V$, $R_G = 1\Omega$		8.8	mJ
$t_{d(off)}$	Note 2		260	ns
t_{fi}			175	ns
E_{off}			7.3	mJ
R_{thJC}				0.10 °C/W
R_{thCS}			0.05	°C/W

Notes:

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

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

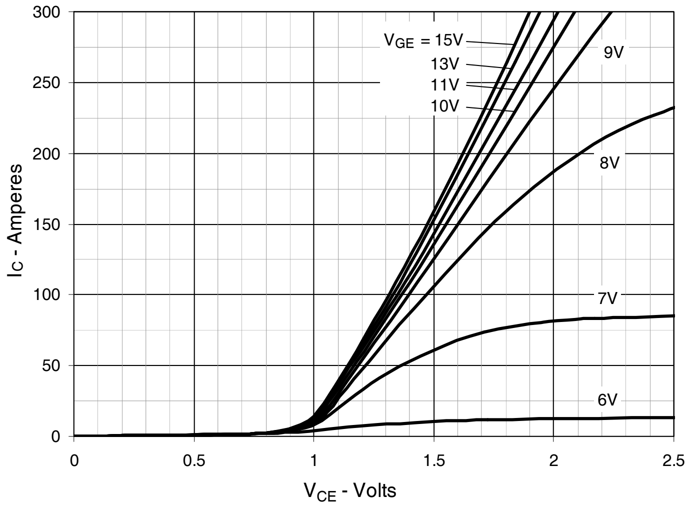


Fig. 2. Extended Output Characteristics @ $T_J = 25^oC$

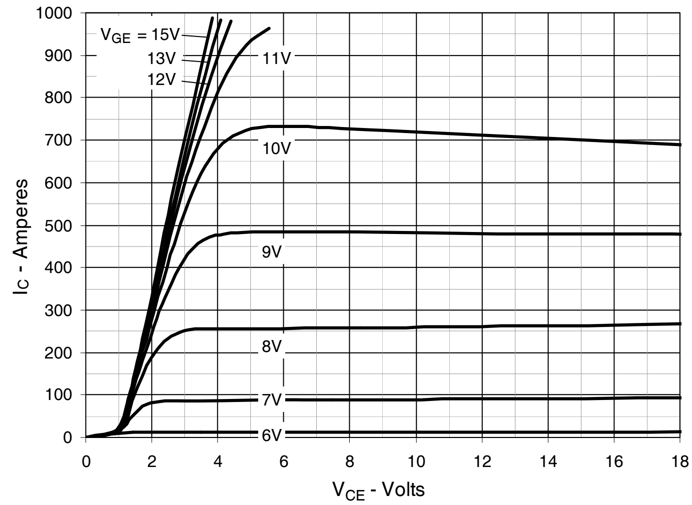


Fig. 3. Output Characteristics @ $T_J = 150^oC$

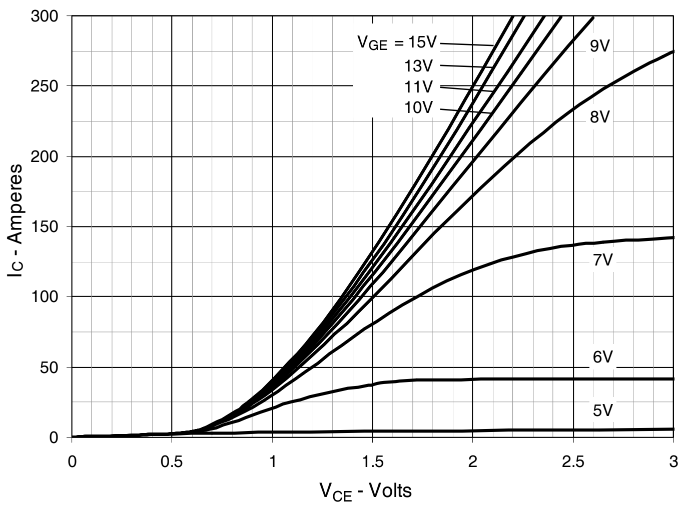


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

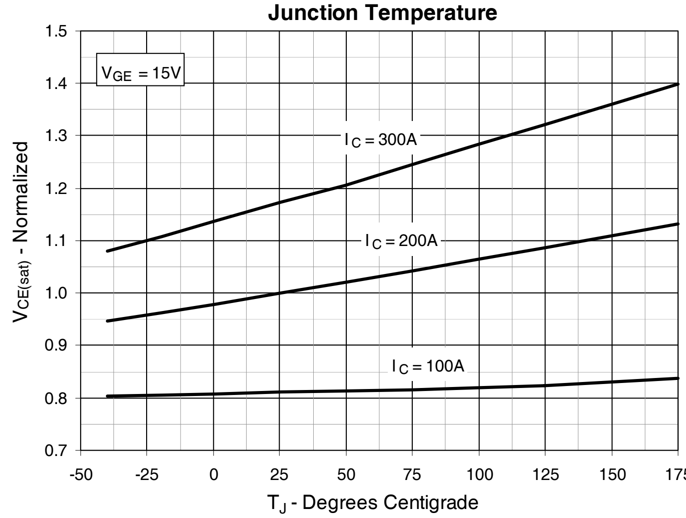


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

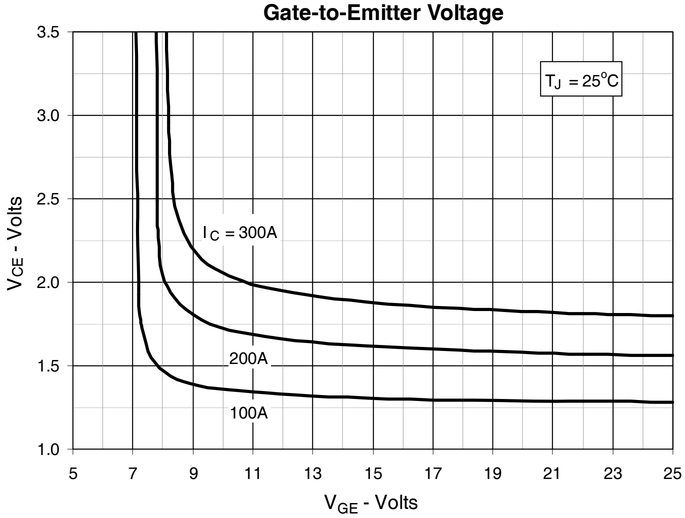


Fig. 6. Input Admittance

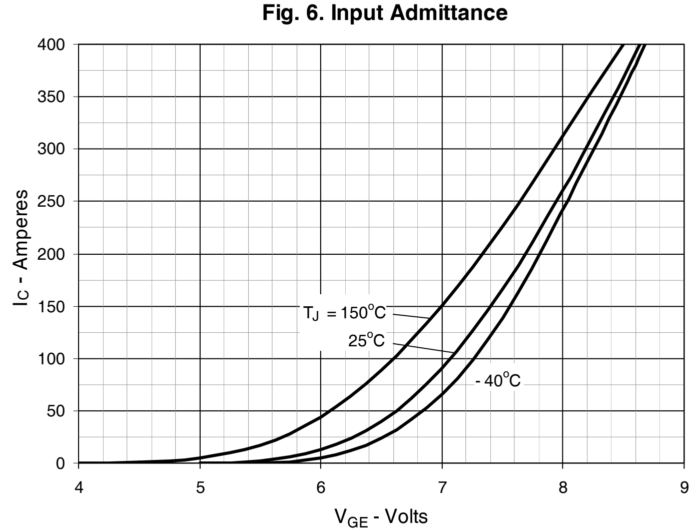


Fig. 7. Transconductance

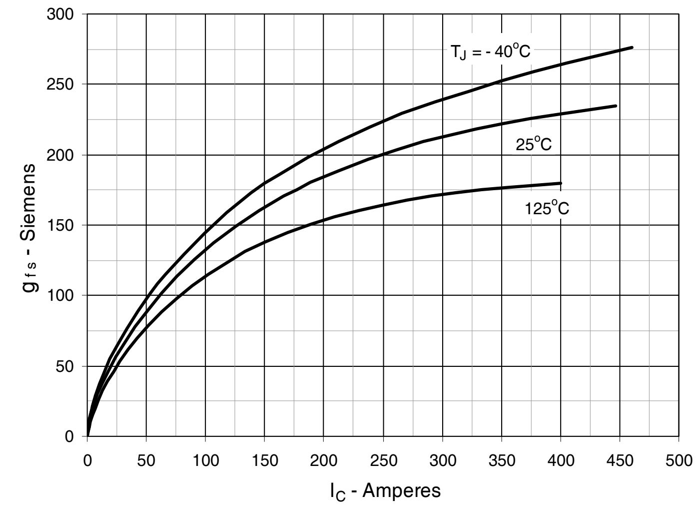


Fig. 8. Gate Charge

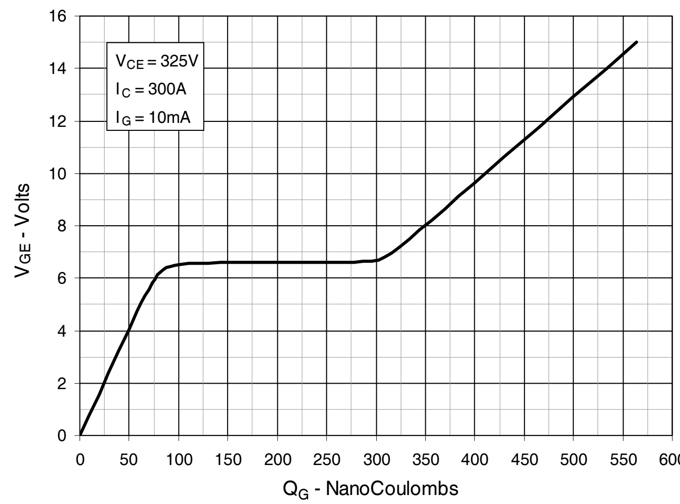


Fig. 9. Capacitance

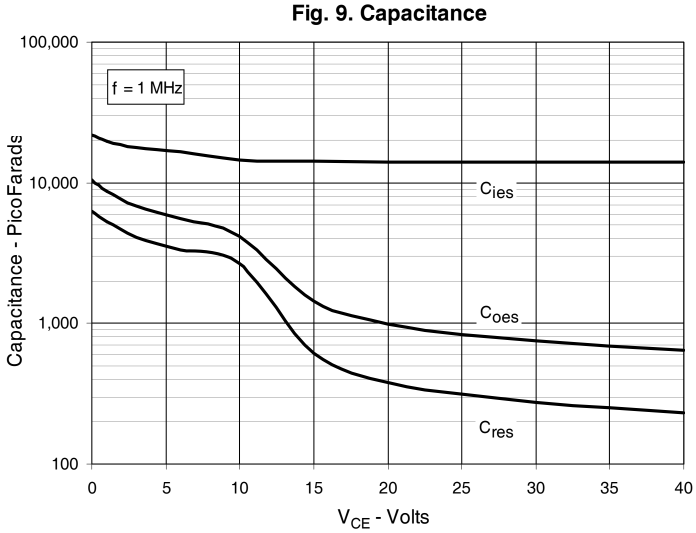


Fig. 10. Reverse-Bias Safe Operating Area

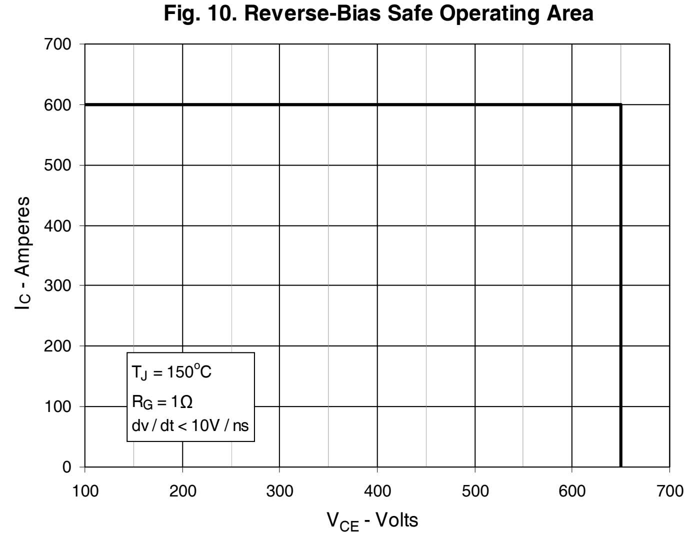


Fig. 11. Maximum Transient Thermal Impedance

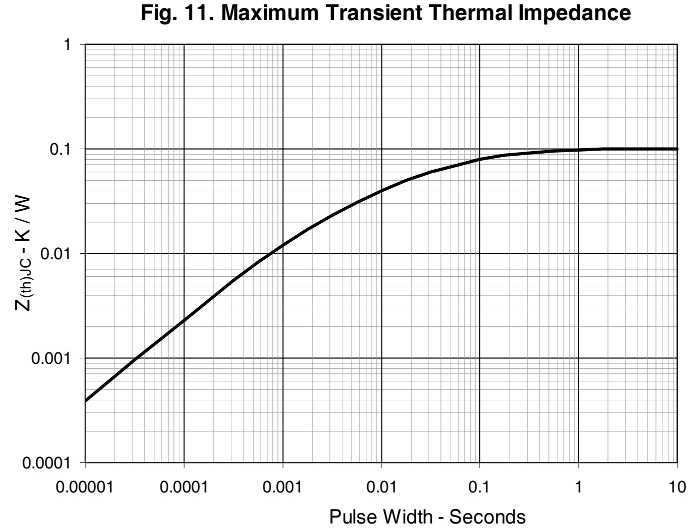


Fig. 12. Forward-Bias Safe Operating Area

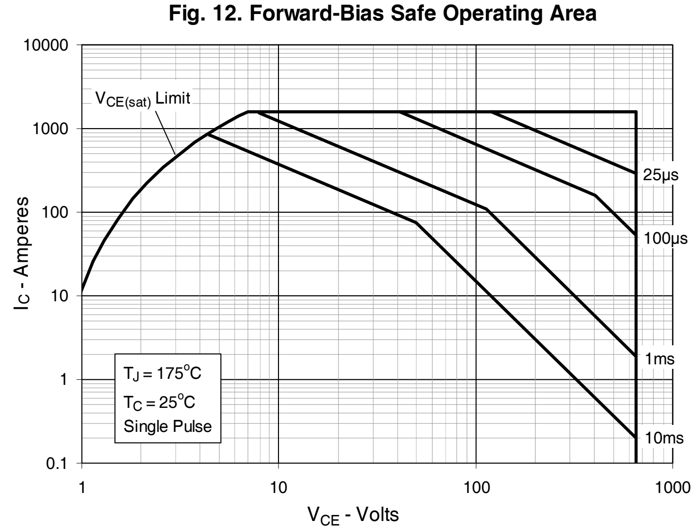


Fig. 13. Inductive Switching Energy Loss vs. Gate Resistance

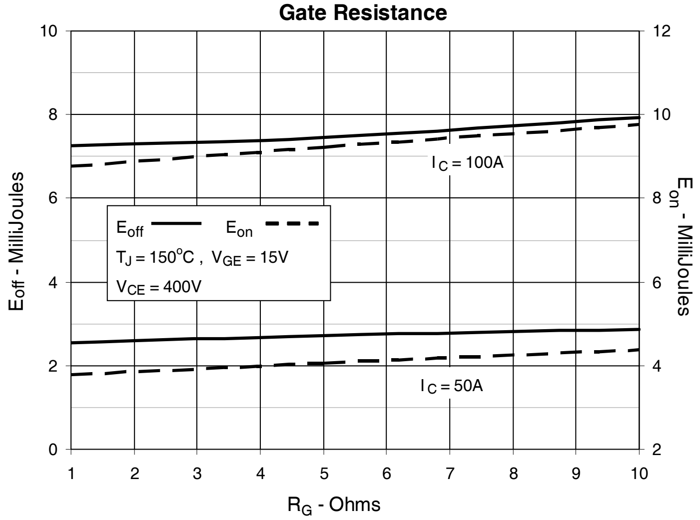


Fig. 14. Inductive Switching Energy Loss vs. Collector Current

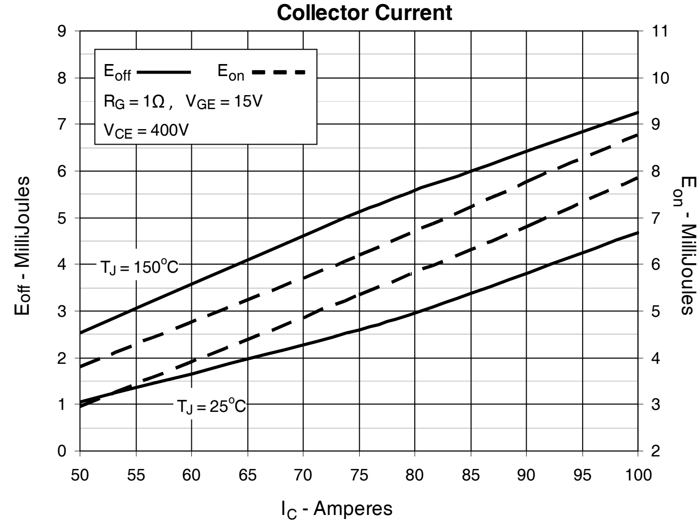


Fig. 15. Inductive Switching Energy Loss vs. Junction Temperature

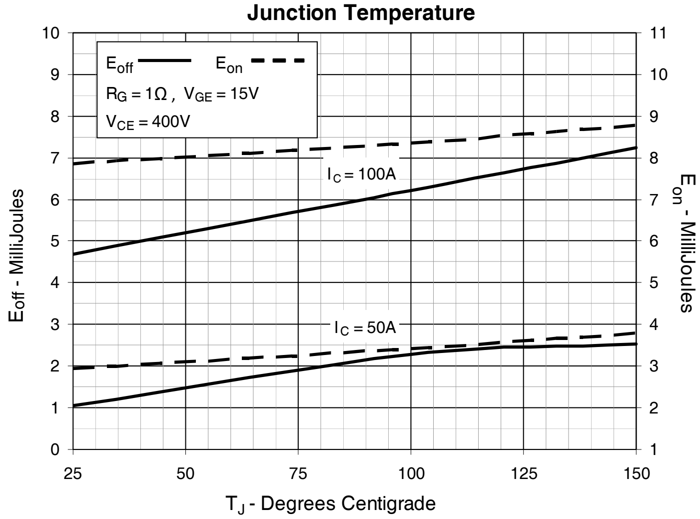


Fig. 16. Inductive Turn-off Switching Times vs. Gate Resistance

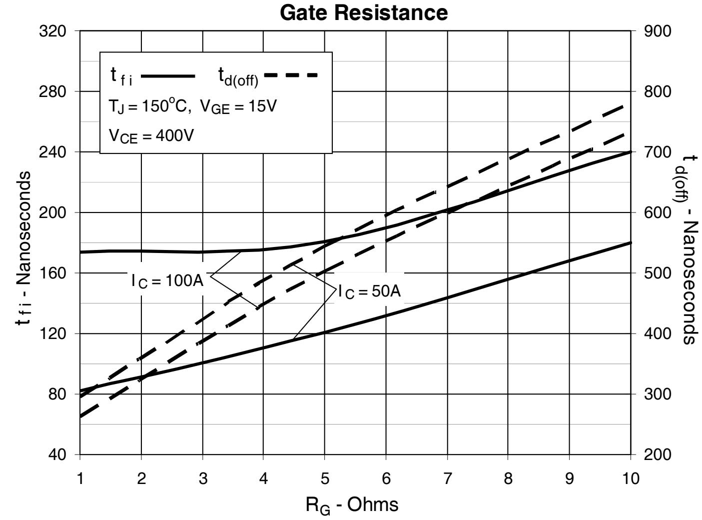


Fig. 17. Inductive Turn-off Switching Times vs. Collector Current

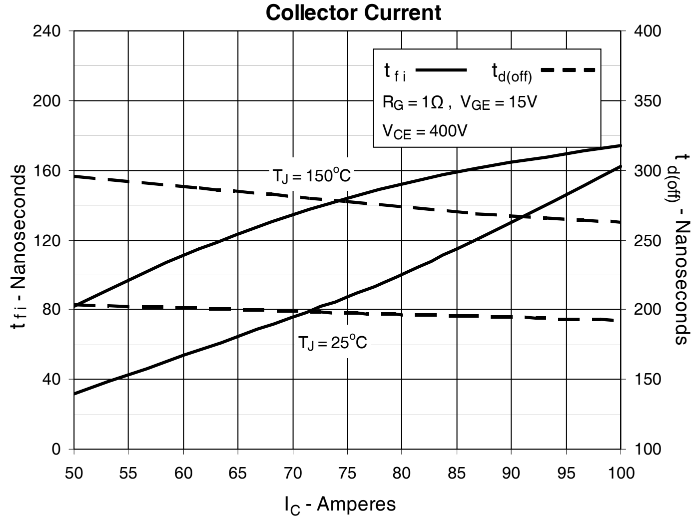


Fig. 18. Inductive Turn-off Switching Times vs. Junction Temperature

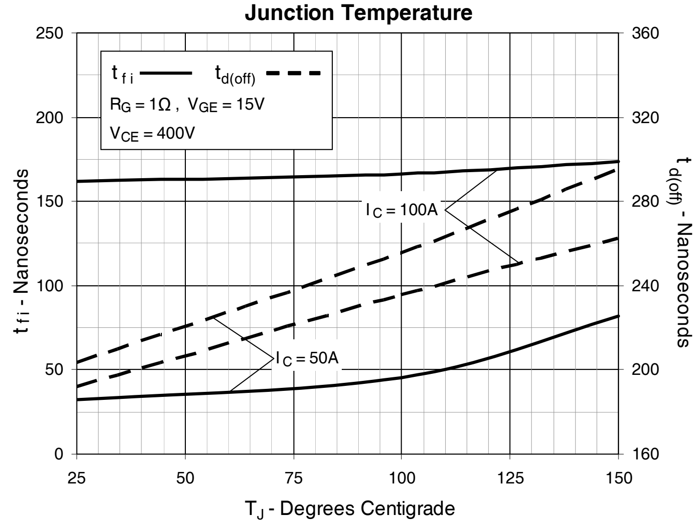


Fig. 19. Inductive Turn-on Switching Times vs. Gate Resistance

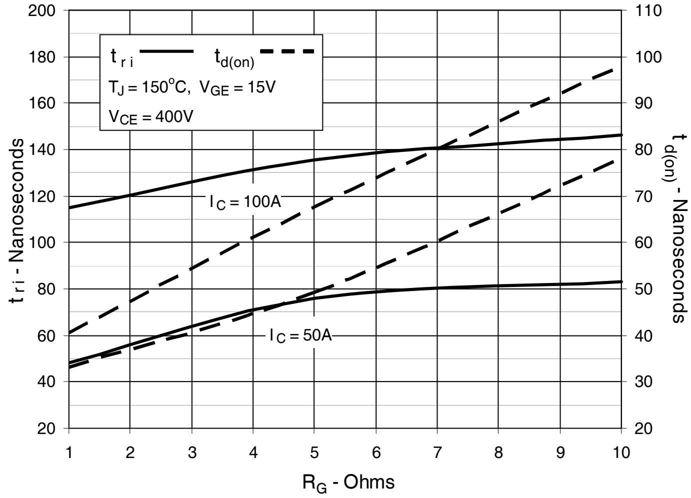


Fig. 20. Inductive Turn-on Switching Times vs. Collector Current

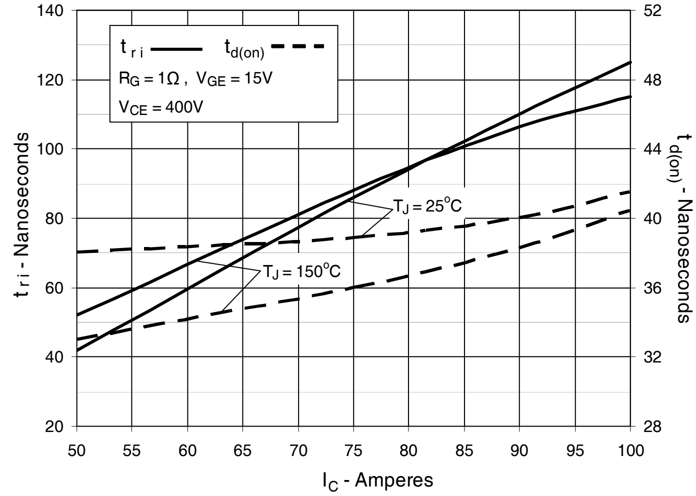
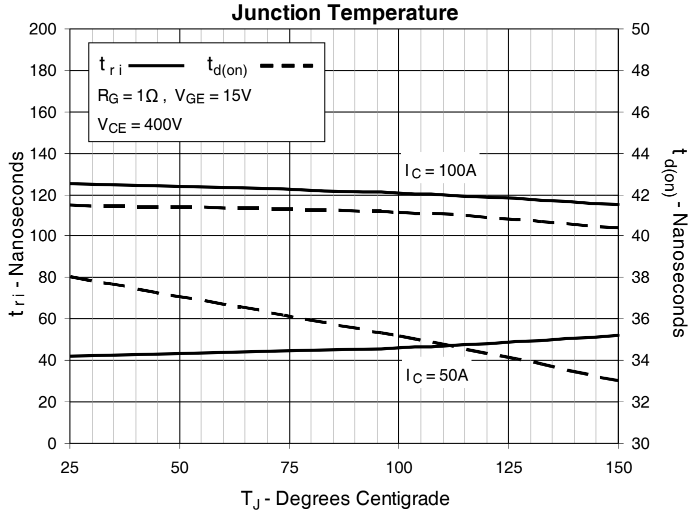
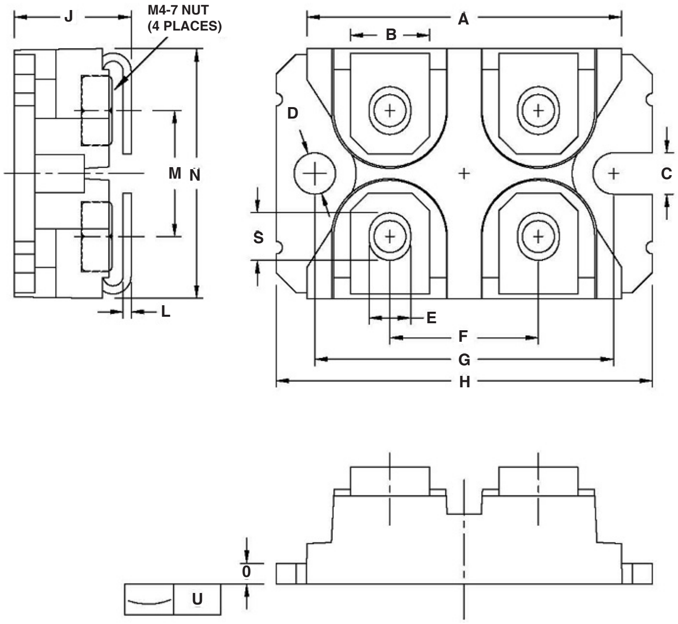


Fig. 21. Inductive Turn-on Switching Times vs. Junction Temperature



SOT-227 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

1. NUT MATERIAL:
   STANDARD – Low carbon steel with Ni plating.
   OPTIONAL: – Brass Nut is available.
   PART NUMBER–BN
2. ALL METAL SURFACE ARE PRE NI PLATED EXCEPT TRIM AREA.