THE DATASHEET OF

IXYN100N120C3H1

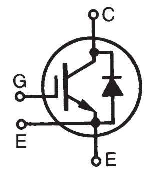
IXYS

1200V XPT™ IGBT GenX3™ w/ Diode

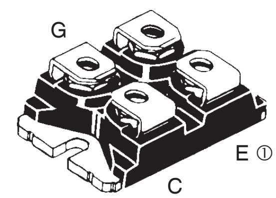
IXYN100N120C3H1

V_{CES}	=	1200V
I_{C110}	=	60A
$V_{CE(sat)}$	≤	3.50V
$t_{fi(typ)}$	=	110ns

High-Speed IGBT
for 20-50 kHz 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 150°C		1200	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ		1200	V
V_{GES}	Continuous		±20	V
V_{GEM}	Transient		±30	V
I_{C25}	T_C = 25°C (Chip Capability)		140	A
I_{C110}	T_C = 110°C		60	A
I_{F110}	T_C = 110°C		49	A
I_{CM}	T_C = 25°C, 1ms		420	A
I_A	T_C = 25°C		50	A
E_{AS}	T_C = 25°C		1.2	J
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 1Ω Clamped Inductive Load		I_{CM} = 200 @$V_{CE} \leq V_{CES}$	A
P_C	T_C = 25°C		690	W
T_J			-55 ... +150	°C
T_{JM}			150	°C
T_{stg}			-55 ... +150	°C
V_{ISOL}	50/60Hz	t = 1min	2500	V~
	$I_{ISOL} \leq$ 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	1200			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			50	μA
	T_J = 125°C			3	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 100A, V_{GE} = 15V, Note 1		2.96	3.50	V
	T_J = 150°C		3.78		V

Features

- Optimized for Low Switching Losses
- Square RBSOA
- Isolation Voltage 2500V~
- Anti-Parallel Sonic Diode
- Positive Thermal Coefficient of Vce(sat)
- Avalanche Rated
- High Current Handling Capability
- International Standard Package

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

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

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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	30	50		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		4950		pF
C_{oes}			490		pF
C_{res}			120		pF
$Q_{g(on)}$	$I_C = I_{C110}$, V_{GE} = 15V, $V_{CE} = 0.5 \bullet V_{CES}$		260		nC
Q_{ge}			47		nC
Q_{gc}			102		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		27		ns
t_{ri}	$I_C = I_{C110}$, V_{GE} = 15V		110		ns
E_{on}	$V_{CE} = 0.5 \bullet V_{CES}$, $R_G = 1\Omega$		12.00		mJ
$t_{d(off)}$	Note 2		120		ns
t_{fi}			110		ns
E_{off}			4.90		mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		27		ns
t_{ri}	$I_C = I_{C110}$, V_{GE} = 15V		116		ns
E_{on}	$V_{CE} = 0.5 \bullet V_{CES}$, $R_G = 1\Omega$		15.00		mJ
$t_{d(off)}$	Note 2		146		ns
t_{fi}			125		ns
E_{off}			6.15		mJ
R_{thJC}				0.18	°C/W
R_{thCS}			0.05		°C/W

Reverse Sonic Diode (FRD)

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
V_F	I_F = 60A, V_{GE} = 0V, Note 1			2.7	V
	T_J = 125°C		1.95		V
I_{RM}	I_F = 60A, V_{GE} = 0V, T_J = 125°C		50		A
t_{rr}	$-di_F/dt$ = 700A/μs, V_R = 600V		235		ns
R_{thJC}				0.52	°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.

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

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 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 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 @ $T_J = 25^oC$

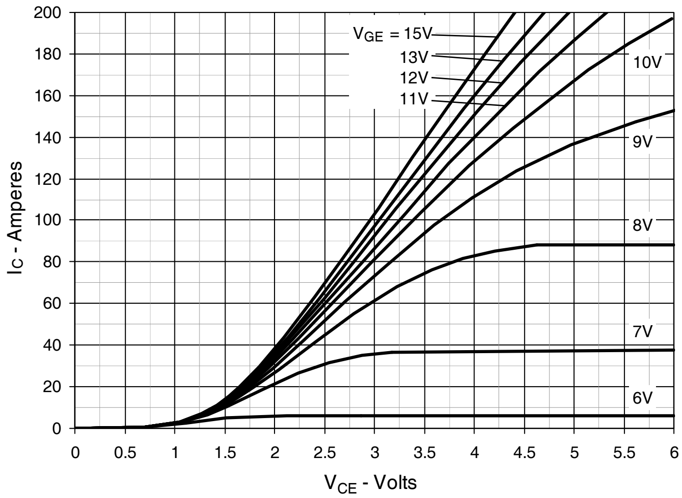

Fig. 2. Extended Output Characteristics @ $T_J = 25^oC$

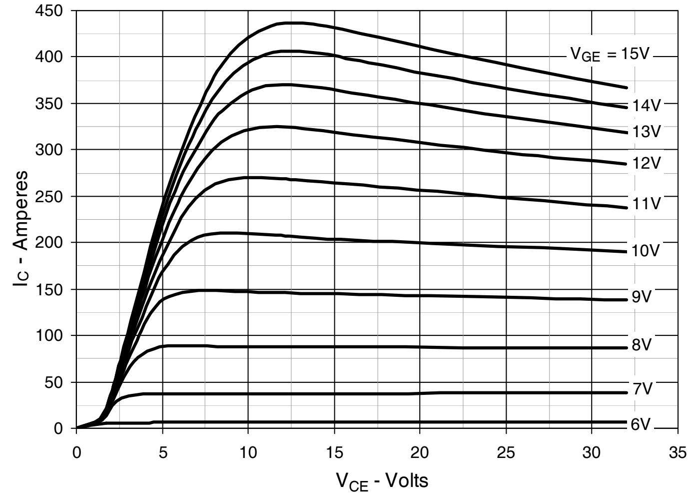

Fig. 3. Output Characteristics @ $T_J = 150^oC$

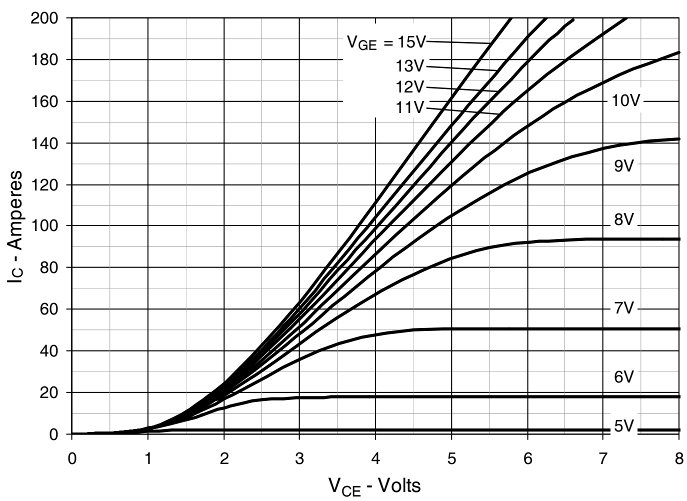

Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

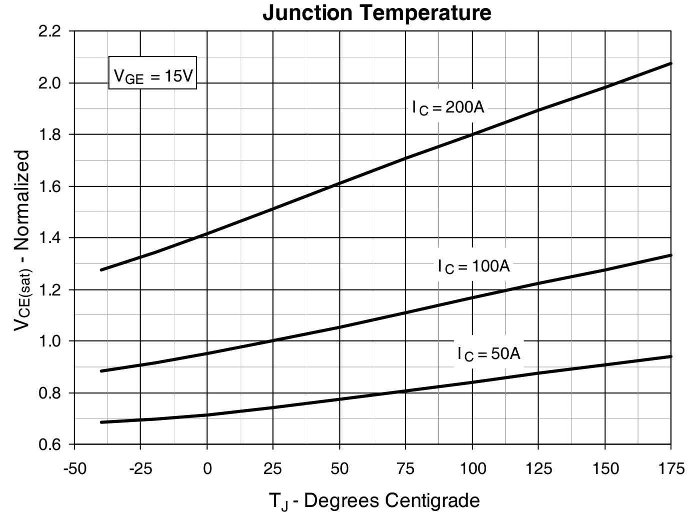

Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

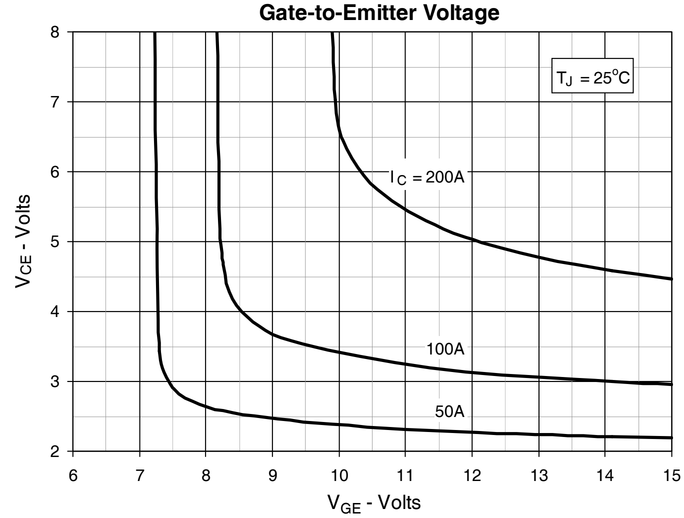

Fig. 6. Input Admittance

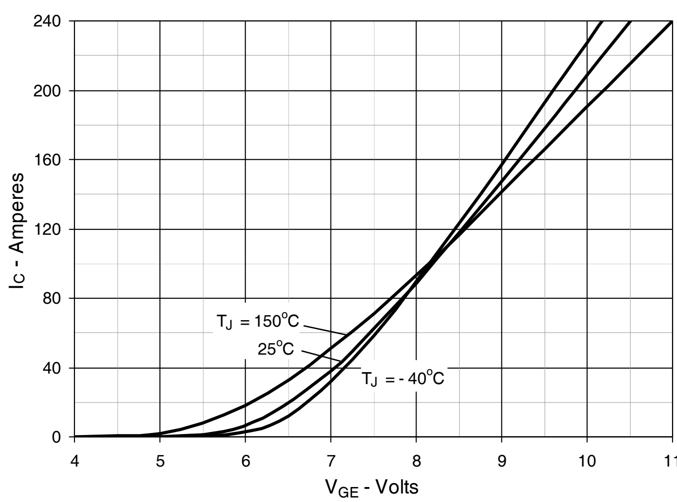

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Fig. 7. Transconductance

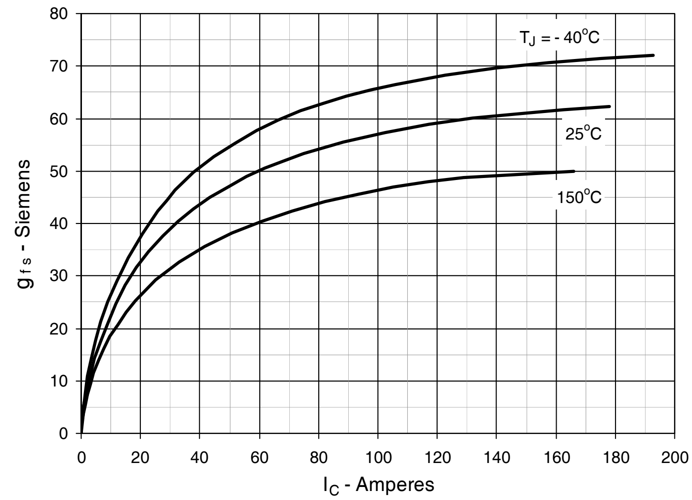


Fig. 8. Gate Charge

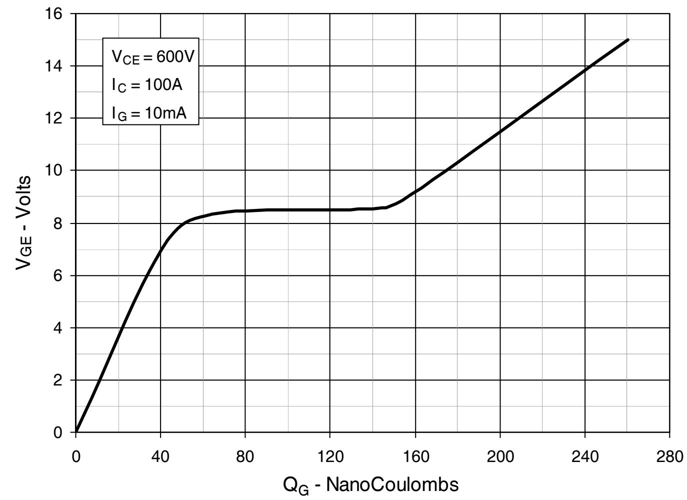


Fig. 9. Capacitance

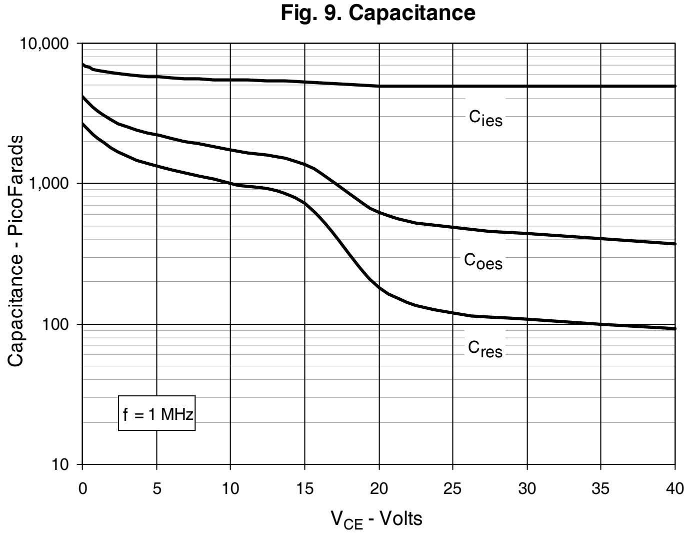


Fig. 10. Reverse-Bias Safe Operating Area

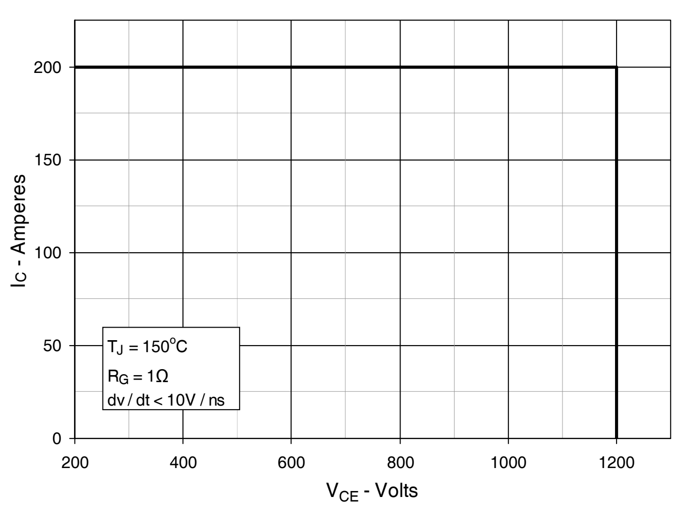
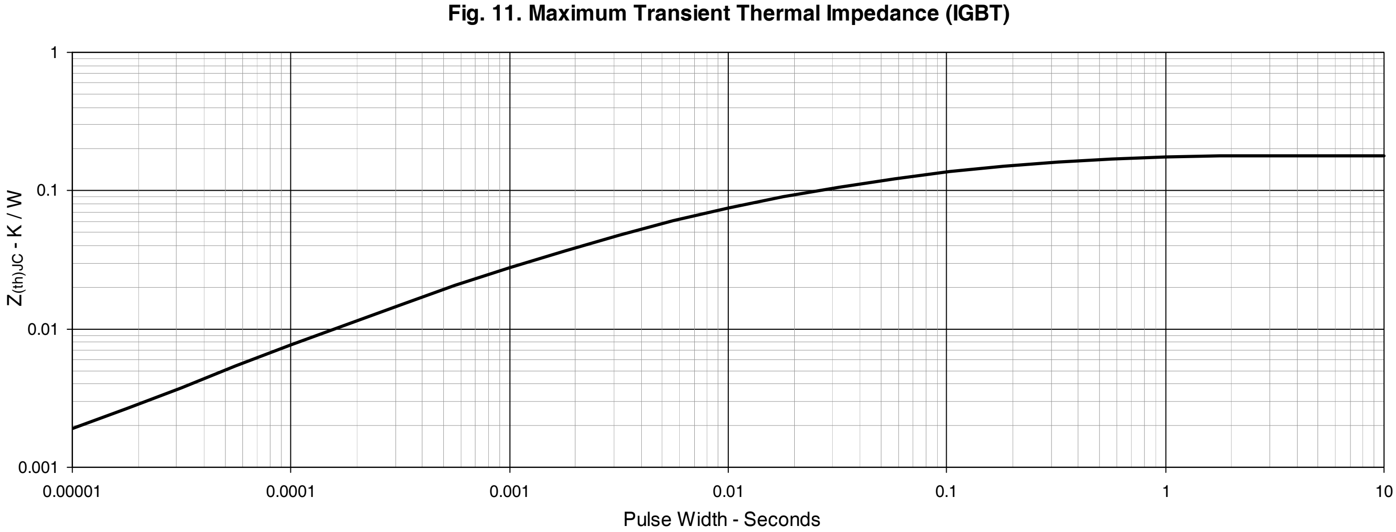


Fig. 11. Maximum Transient Thermal Impedance (IGBT)



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

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

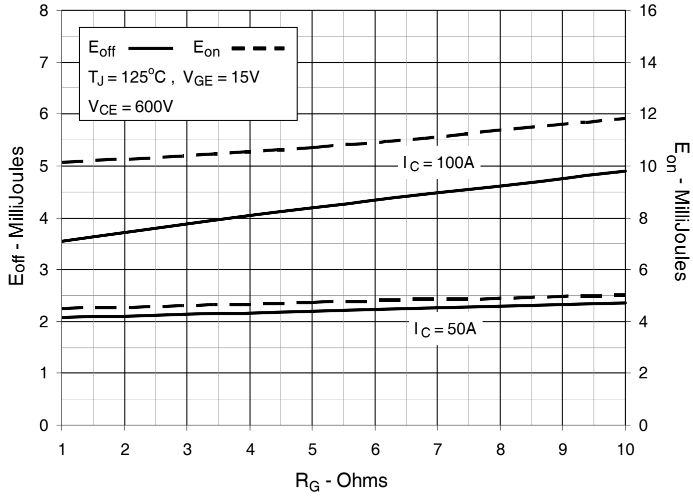


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

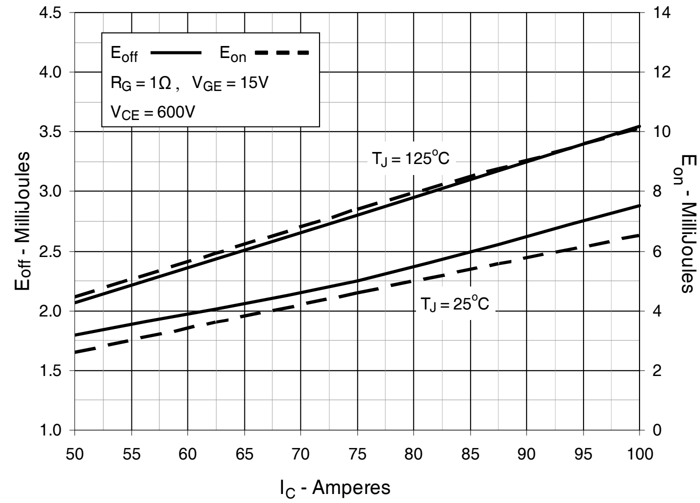


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

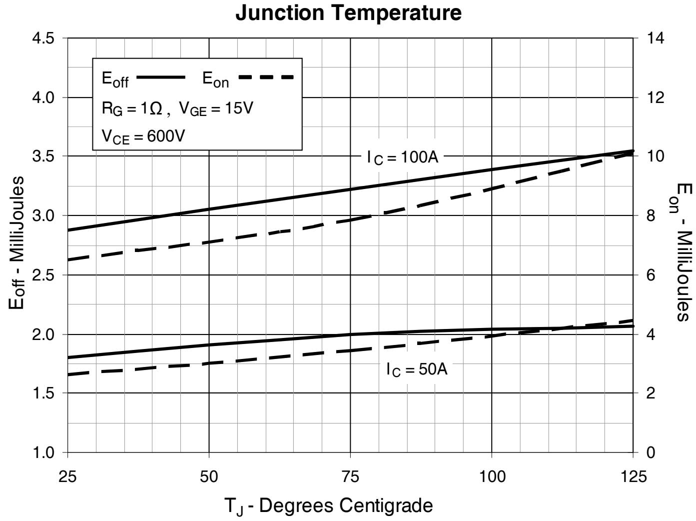


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

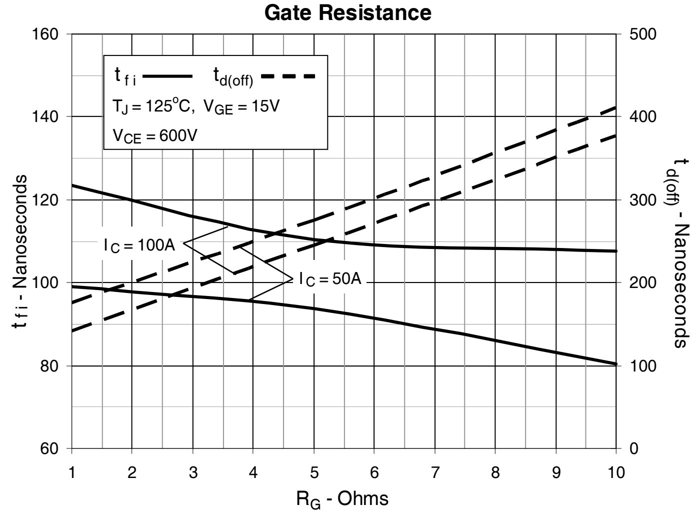


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

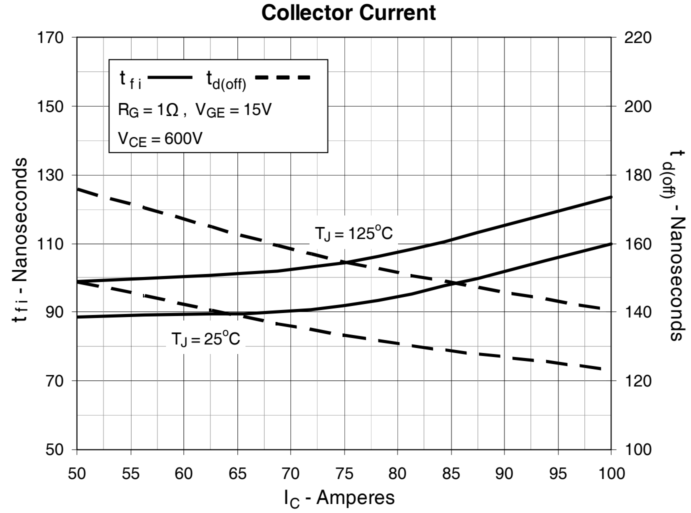


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

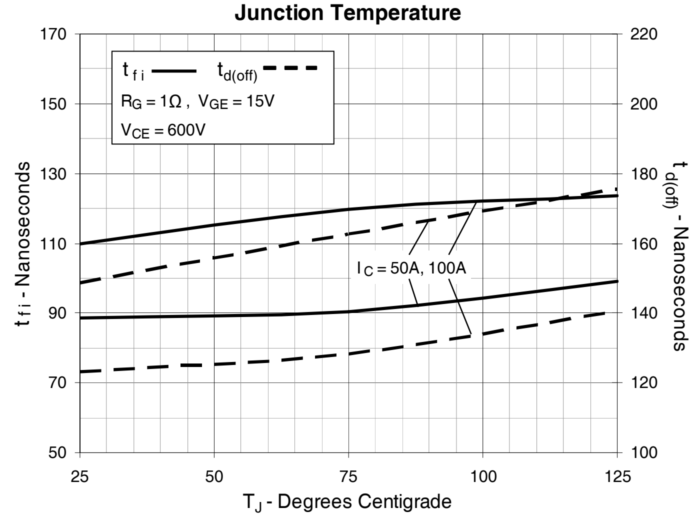


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Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

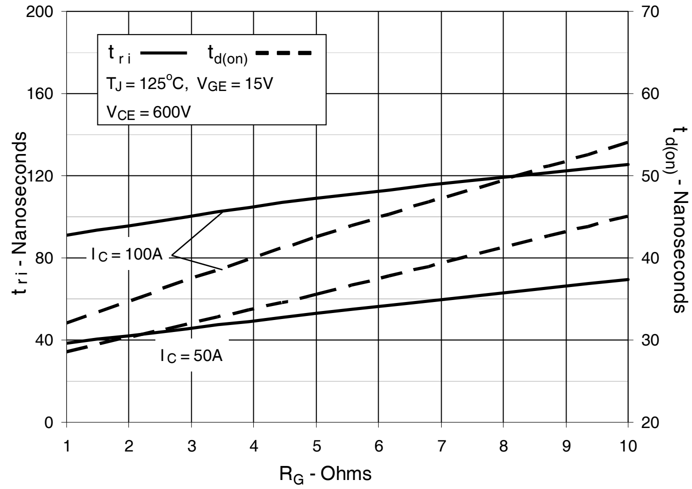

Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

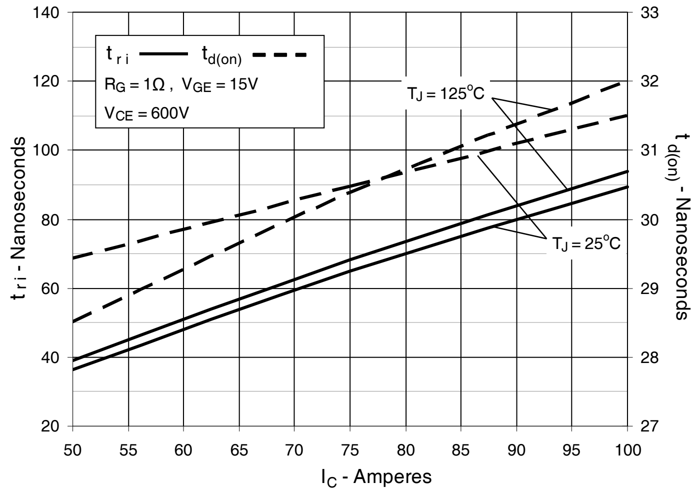

Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature

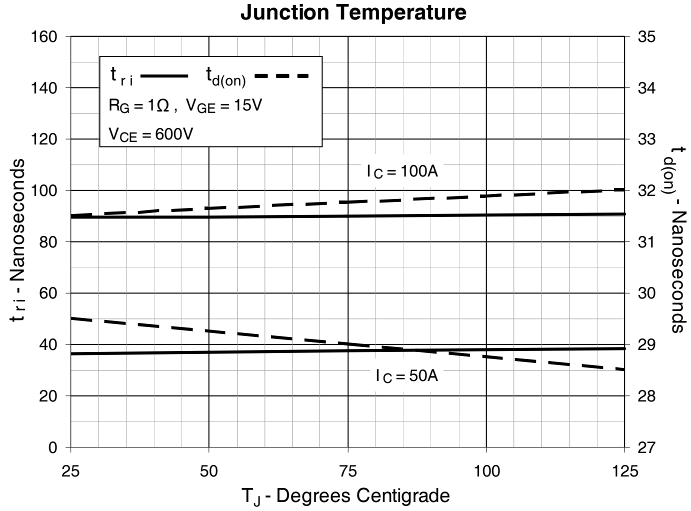

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Fig. 21. Diode Forward Characteristics

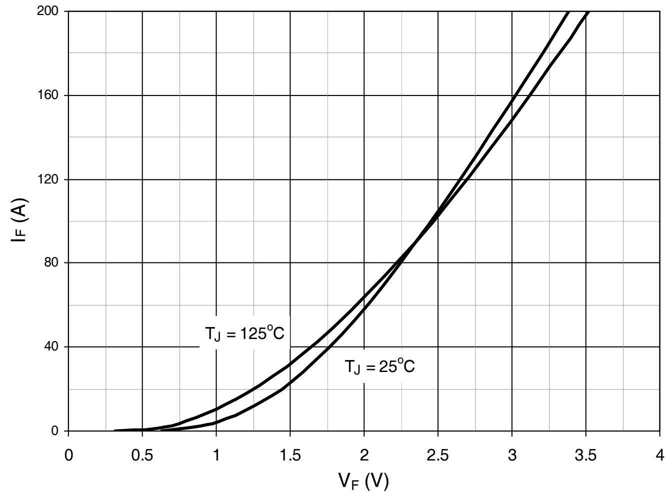


Fig. 22. Reverse Recovery Charge vs. -di_F/dt

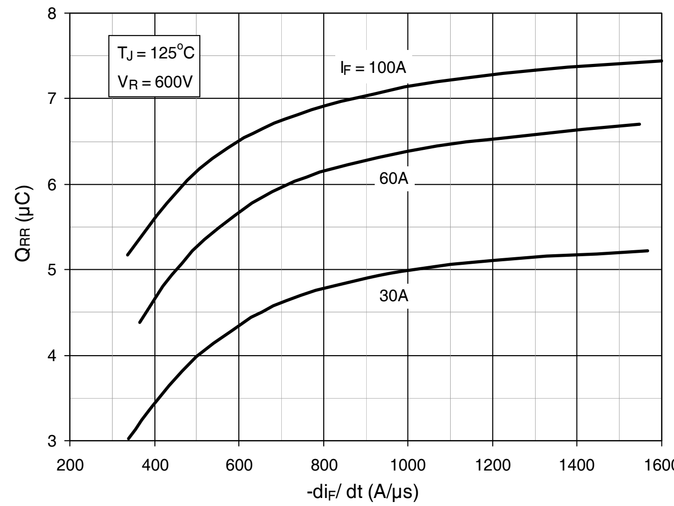


Fig. 23. Reverse Recovery Current vs. -di_F/dt

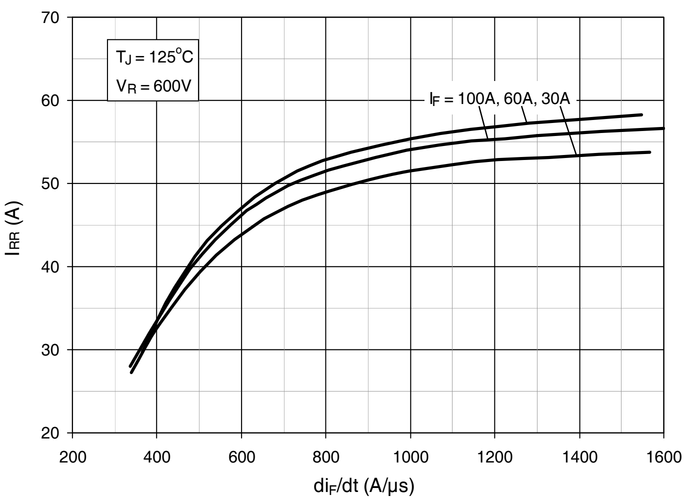


Fig. 24. Reverse Recovery Time vs. -di_F/dt

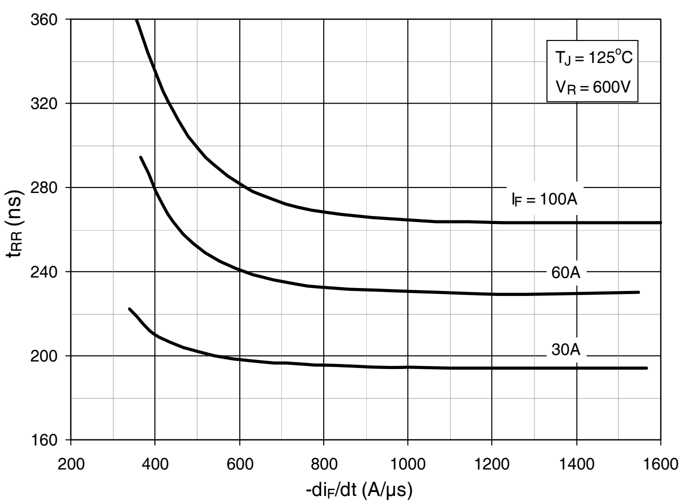


Fig. 25. Dynamic Parameters Q_RR, I_RR vs. Junction Temperature

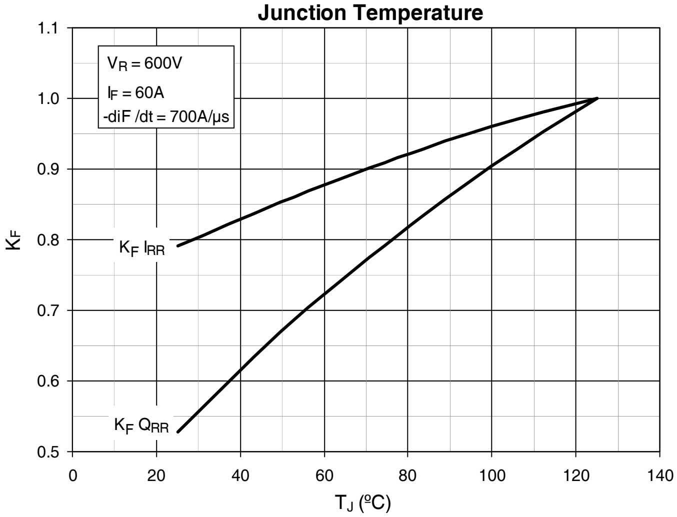
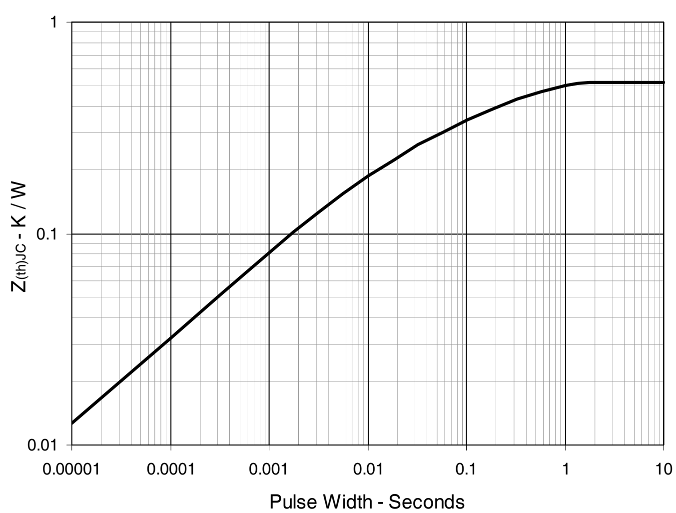


Fig. 26. Maximum Transient Thermal Impedance (Diode)



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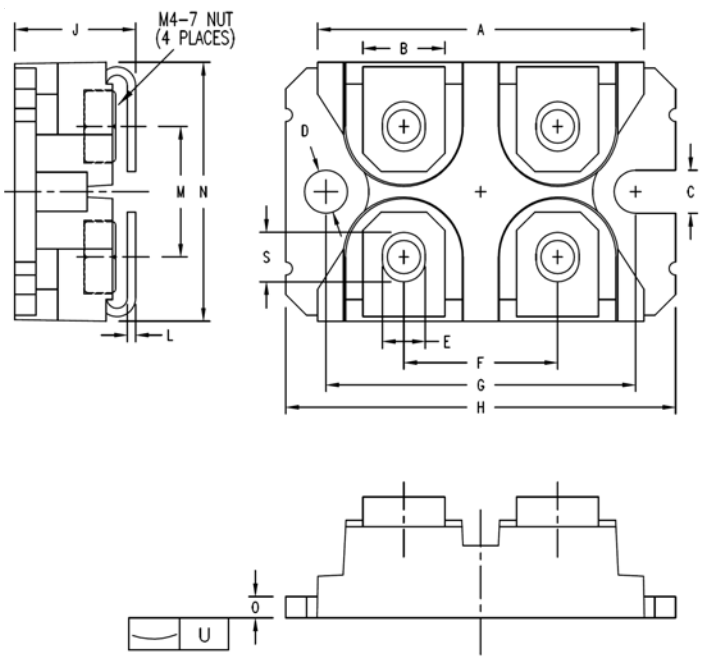
SOT-227 miniBLOC (IXYN)



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.

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