IXYS

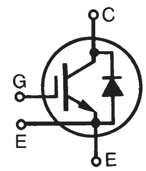
Advance Technical Information

900V XPT™ IGBT GenX3™ w/ Diode

IXYN80N90C3H1

V_{CES} = 900V
I_{C90} = 70A
$V_{CE(sat)}$ ≤ 2.7V
$t_{fi(typ)}$ = 86ns

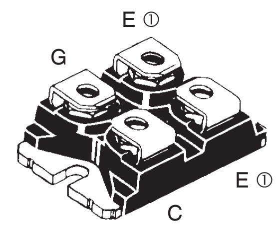
High-Speed IGBT
for 20-50 kHz Switching



Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	900	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	900	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C (Chip Capability)	115	A
I_{C90}	T_C = 90°C	70	A
I_{F110}	T_C = 110°C	42	A
I_{CM}	T_C = 25°C, 1ms	340	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 150°C, R_G = 2Ω Clamped Inductive Load	I_{CM} = 160 @$V_{CE} \leq V_{CES}$	A
P_C	T_C = 25°C	500	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	950			V
$V_{GE(th)}$	I_C = 250µA, V_{CE} = V_{GE}	3.5		5.5	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			25	µA
	T_J = 125°C			1.5	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 80A, V_{GE} = 15V, Note 1		2.3	2.7	V
	T_J = 125°C		2.9		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 Switching Losses
- Square RBSOA
- Isolation Voltage 2500V~
- Anti-Parallel Sonic Diode
- Positive Thermal Coefficient of Vce(sat)
- High Current Handling Capability
- International Standard Package

Advantages

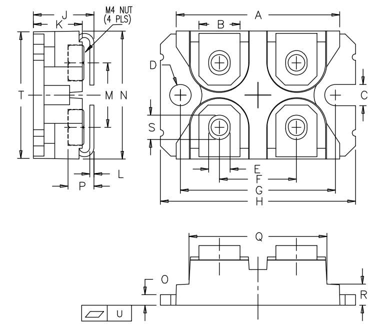
- High Power Density
- Low Gate Drive Requirement

Applications

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

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Min.	Typ.	Max.	
g_{fs}	I_C = 60A, V_{CE} = 10V, Note 1	23	38		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		4550		pF
C_{oes}			243		pF
C_{res}			77		pF
$Q_{g(on)}$	I_C = 80A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		145		nC
Q_{ge}			42		nC
Q_{gc}			65		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		34		ns
t_{ri}	I_C = 80A, V_{GE} = 15V		103		ns
E_{on}	V_{CE} = 0.5 • V_{CES}, R_G = 2Ω		4.3		mJ
$t_{d(off)}$	Note 2		90		ns
t_{fi}			86		ns
E_{off}			1.9	2.7	mJ
$t_{d(on)}$	**Inductive load, T_J = 150°C**		34		ns
t_{ri}	I_C = 80A, V_{GE} = 15V		100		ns
E_{on}	V_{CE} = 0.5 • V_{CES}, R_G = 2Ω		5.7		mJ
$t_{d(off)}$	Note 2		103		ns
t_{fi}			98		ns
E_{off}			2.5		mJ
R_{thJC}				0.25	°C/W
R_{thCS}			0.05		°C/W

SOT-227B miniBLOC (IXYN)



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	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	1.496	1.505	38.00	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

Reverse Sonic Diode (FRD)

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Min.	Typ.	Max.	
V_F	I_F = 60A, V_{GE} = 0V, Note 1			2.7	V
	T_J = 125°C		1.9		V
I_{RM}	I_F = 60A, V_{GE} = 0V, T_J = 125°C		41		A
t_{rr}	-di_F/dt = 700A/μs, V_R = 600V		420		ns
R_{thJC}				0.42	°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.

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. Output Characteristics @ T_J = 25ºC

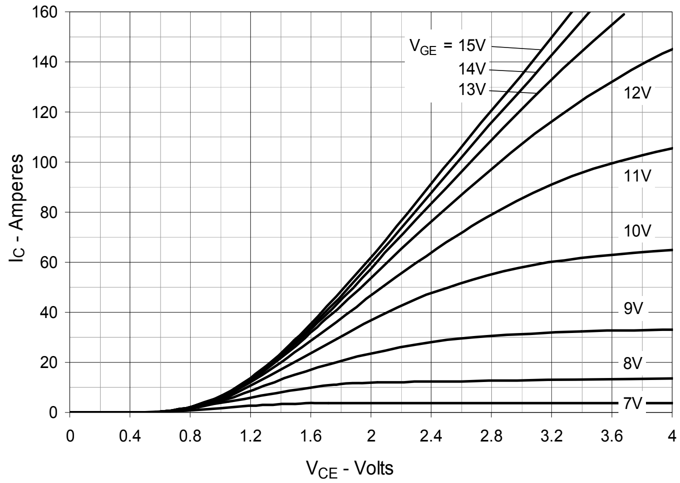


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

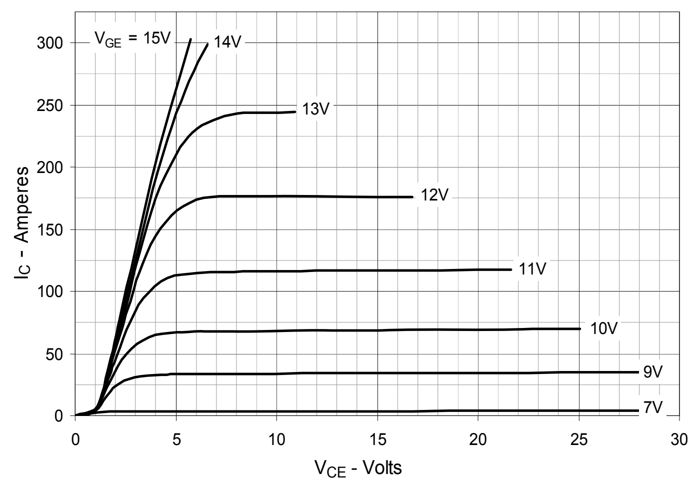


Fig. 3. Output Characteristics @ T_J = 150ºC

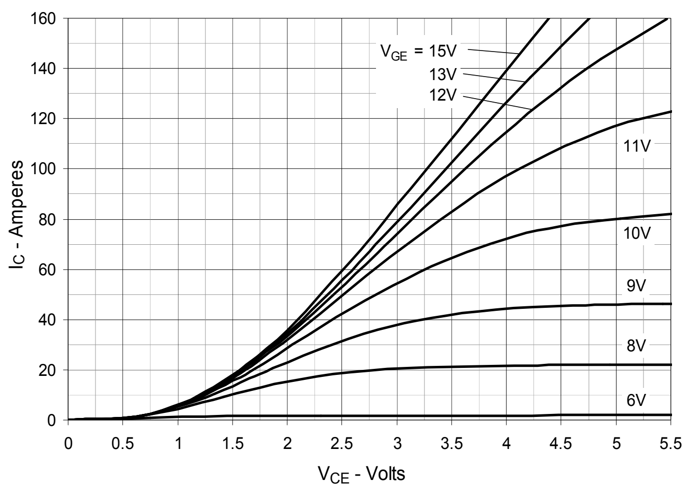


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

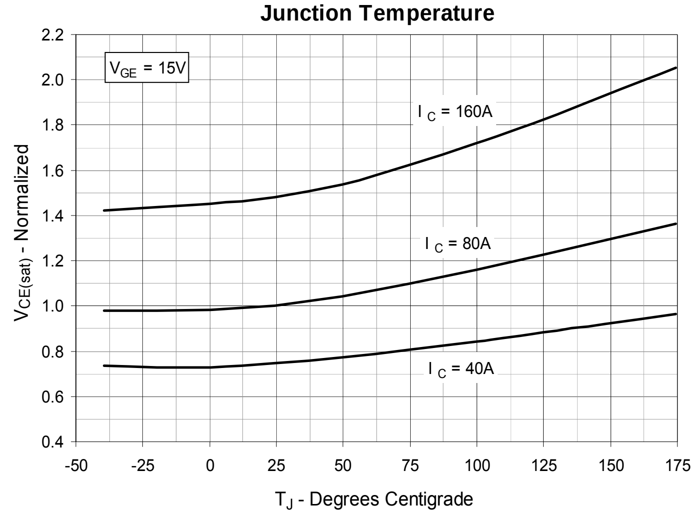


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

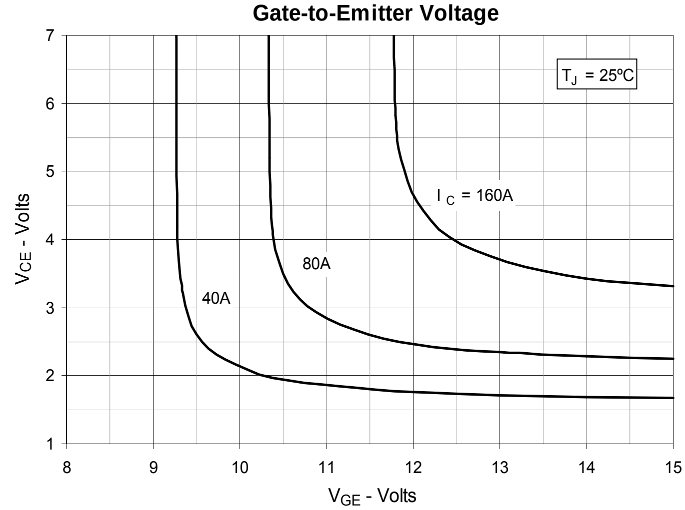


Fig. 6. Input Admittance

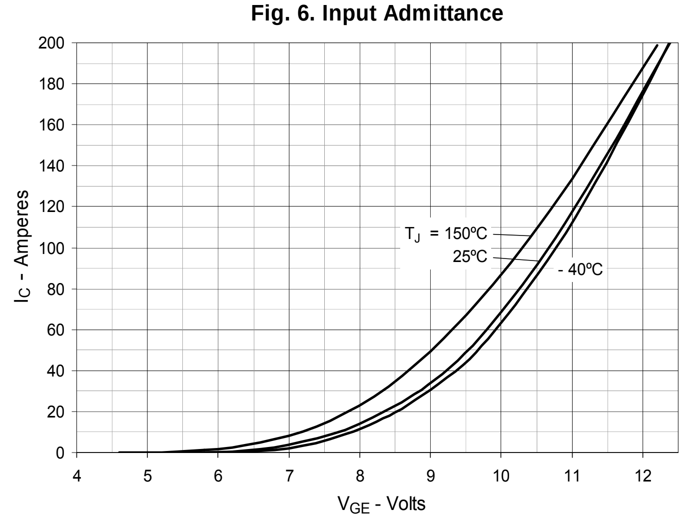


Fig. 7. Transconductance

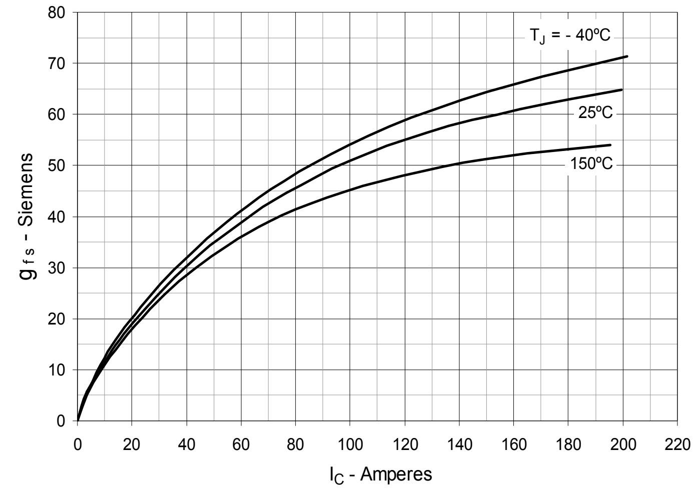


Fig. 8. Gate Charge

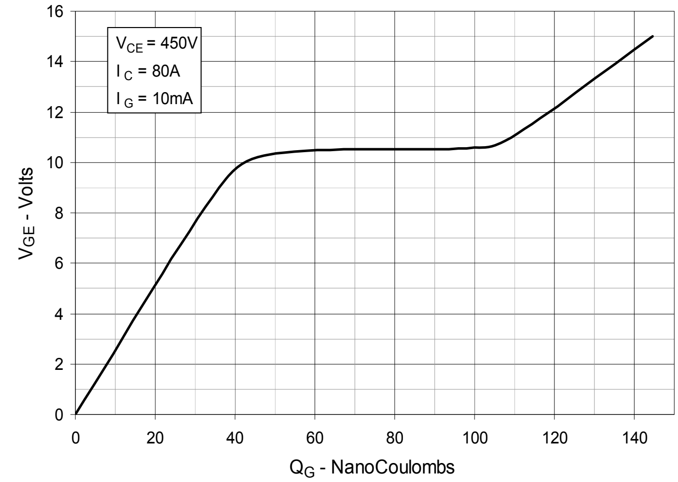


Fig. 9. Capacitance

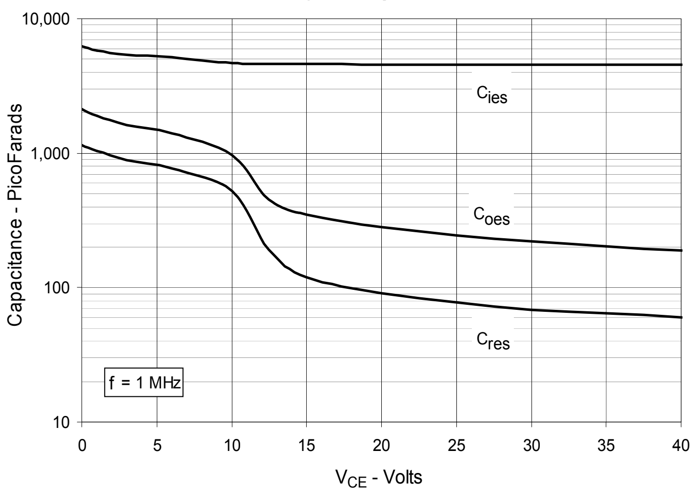


Fig. 10. Reverse-Bias Safe Operating Area

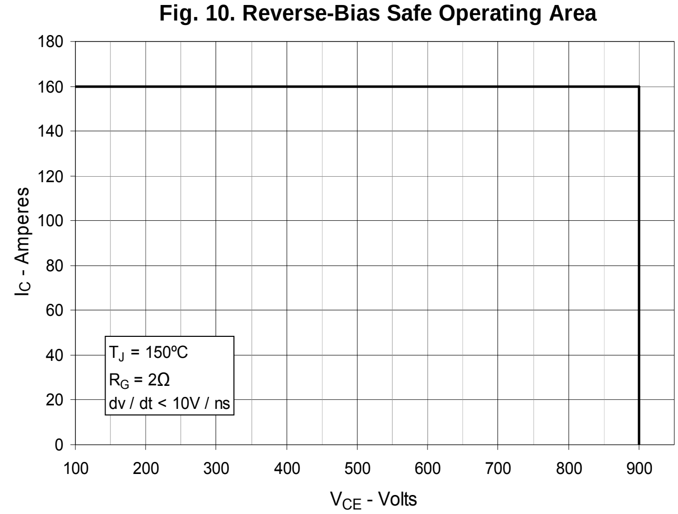


Fig. 11. Maximum Transient Thermal Impedance

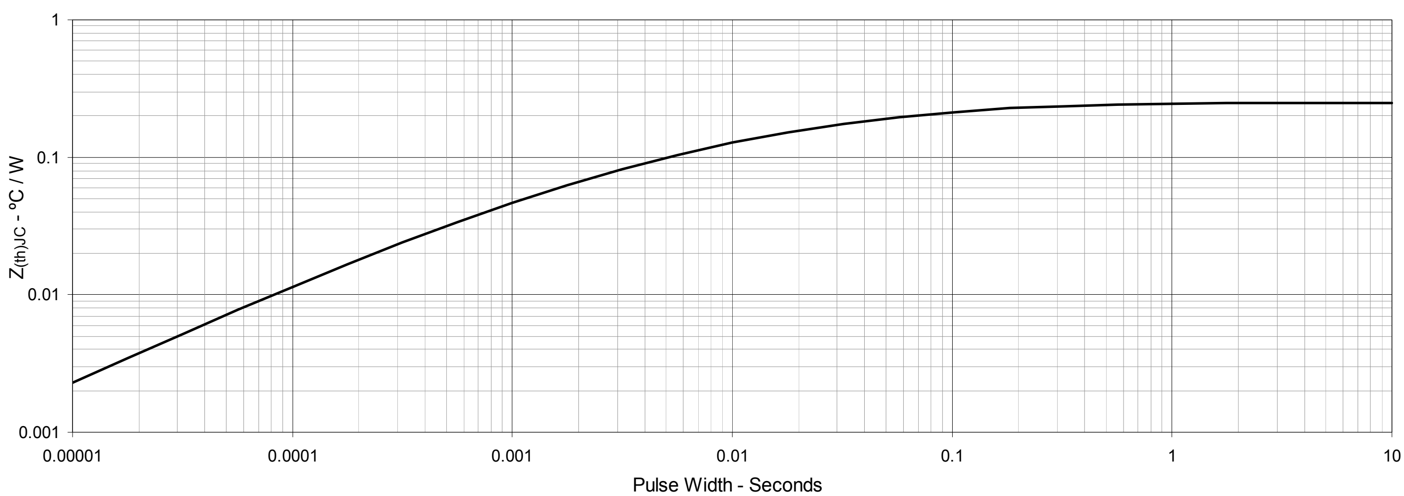


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

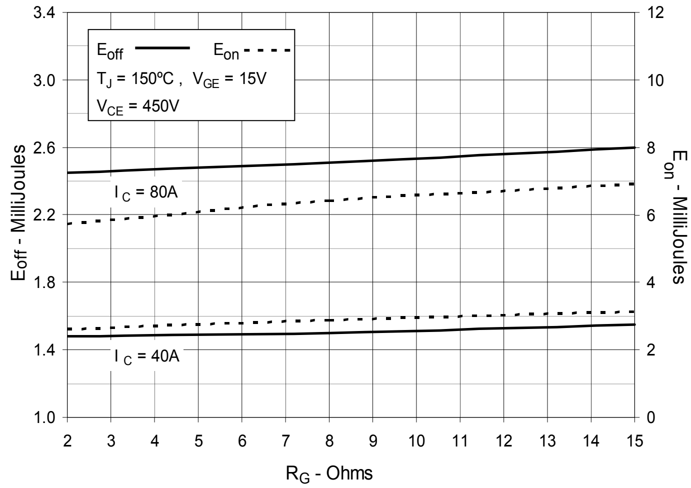


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

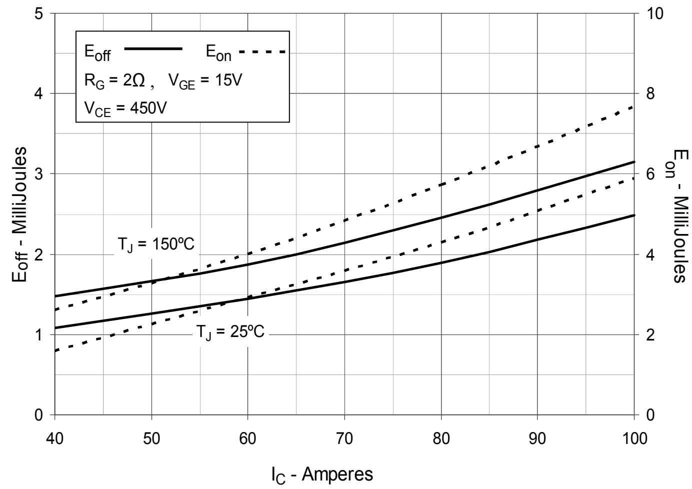


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

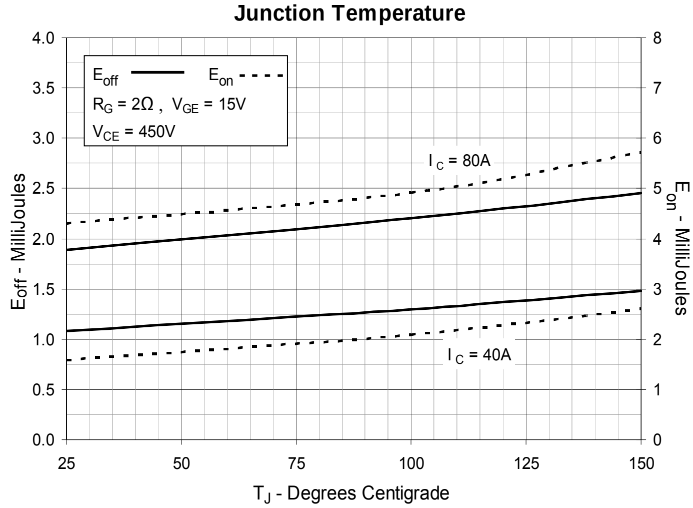


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

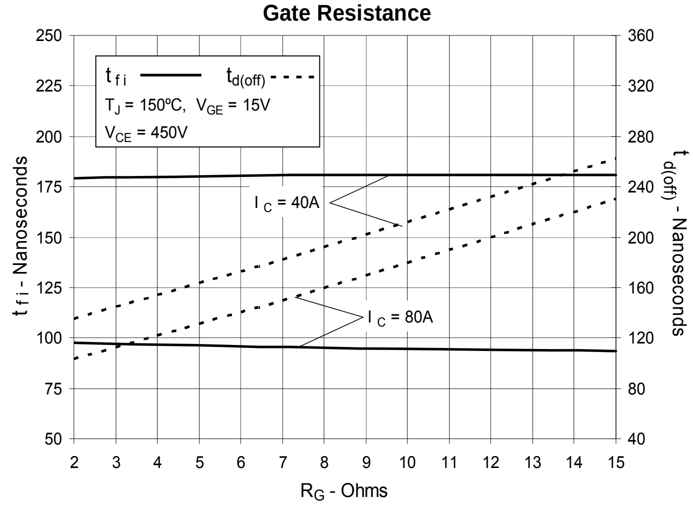


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

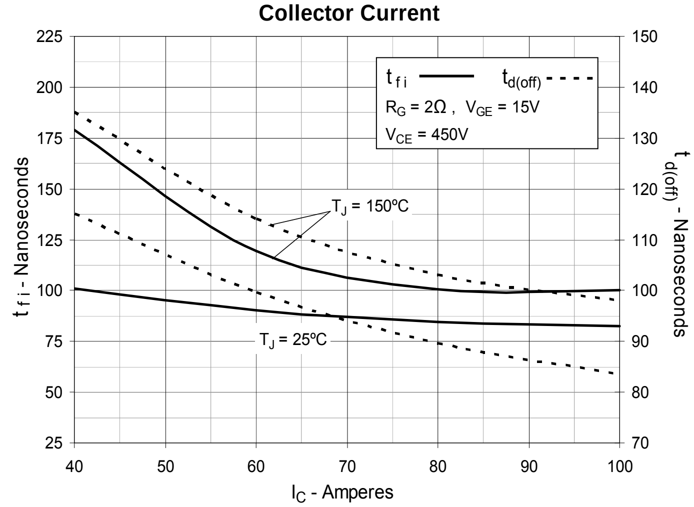
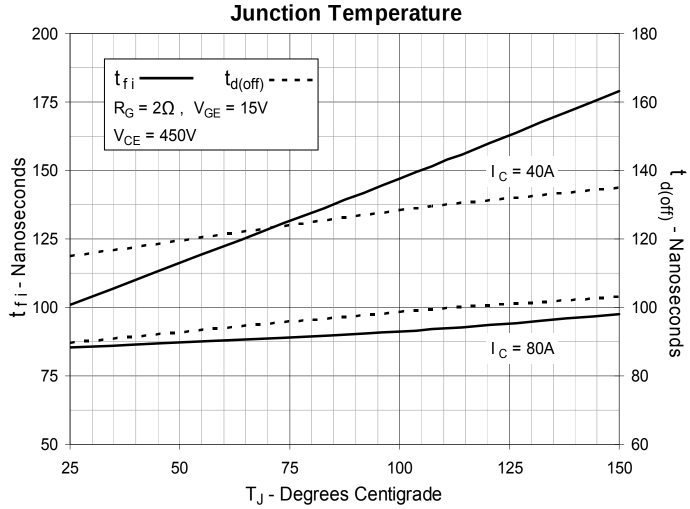


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature



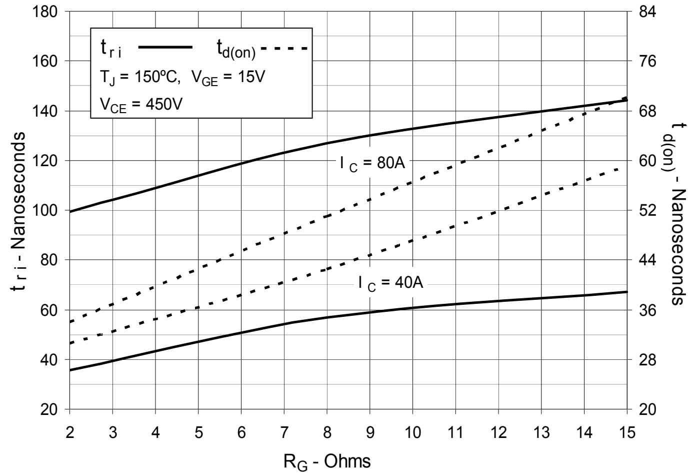


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

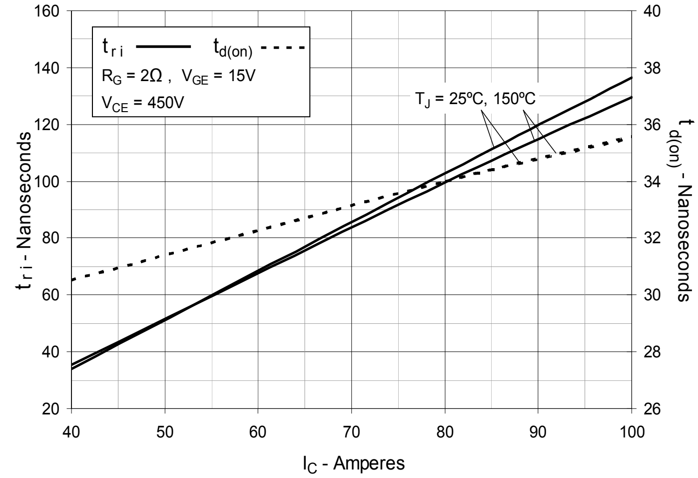


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

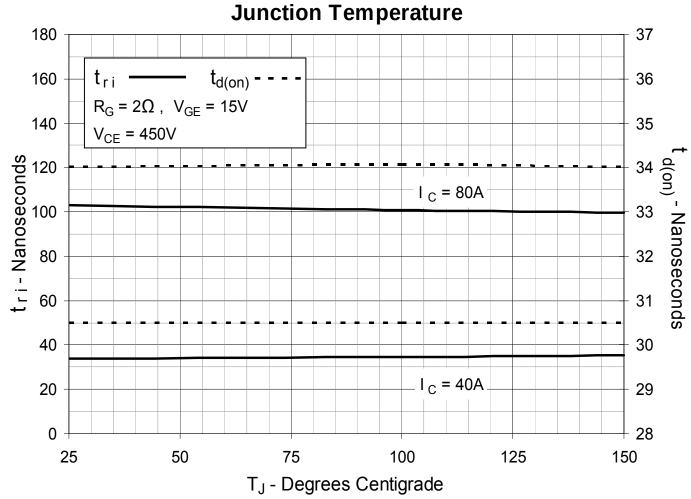


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature

Fig. 21. Typ. Forward Characteristics

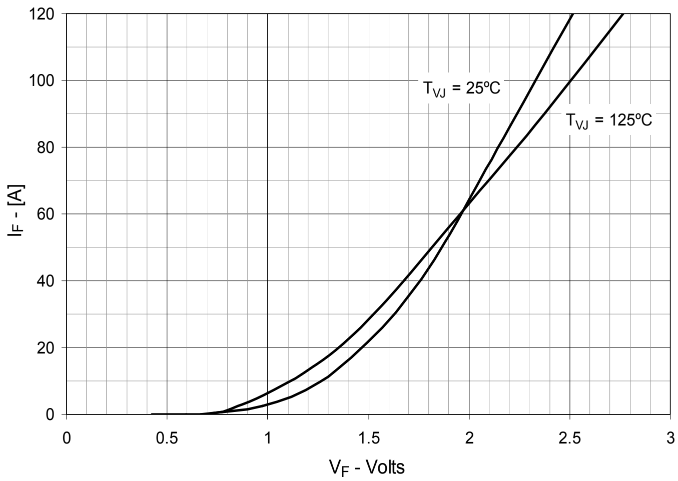


Fig. 22. Typ. Reverse Recovery Charge Q_{rr} vs. $-di_F/dt$

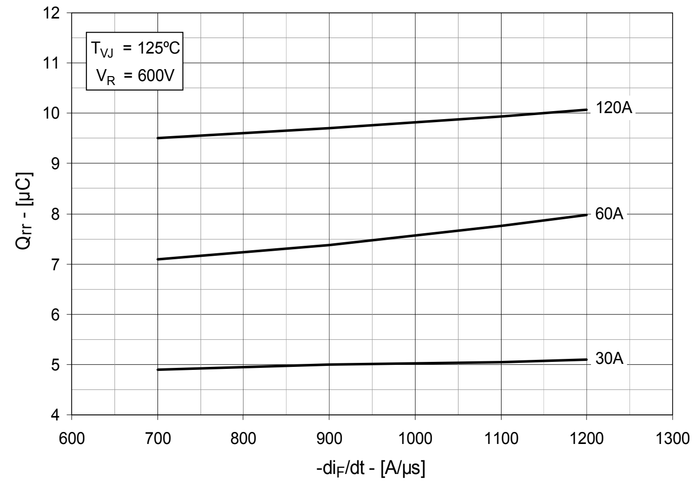


Fig. 23. Typ. PeakReverse Current I_{RM} vs. $-di_F/dt$

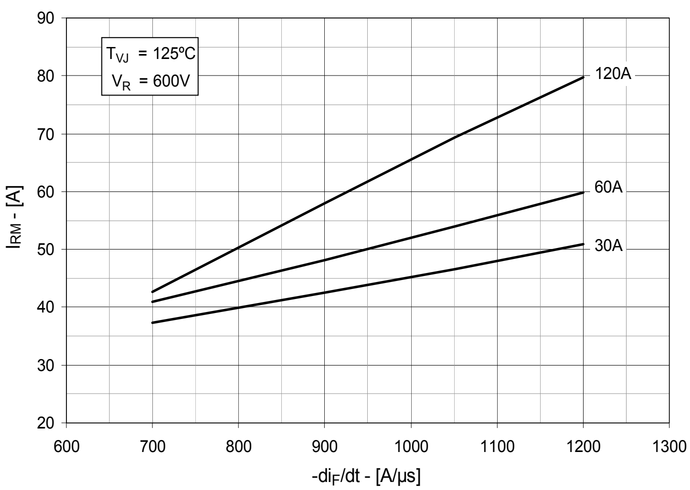


Fig. 24. Typ. Recovery Time t_{rr} vs. $-di_F/dt$

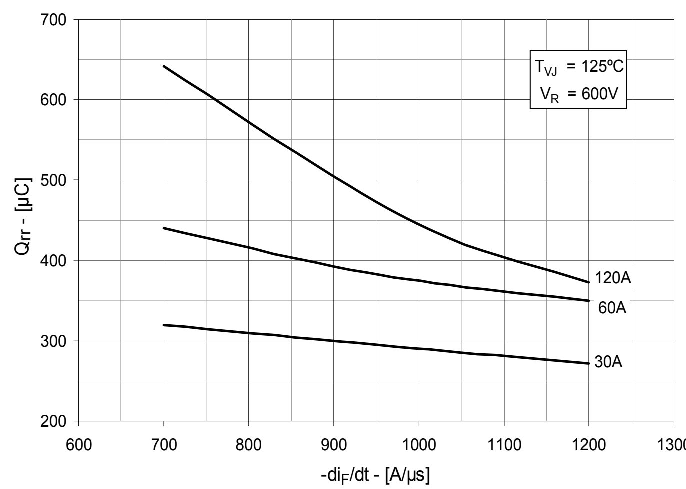


Fig. 25. Typ. Recovery Energy E_{rec} vs. $-di_F/dt$

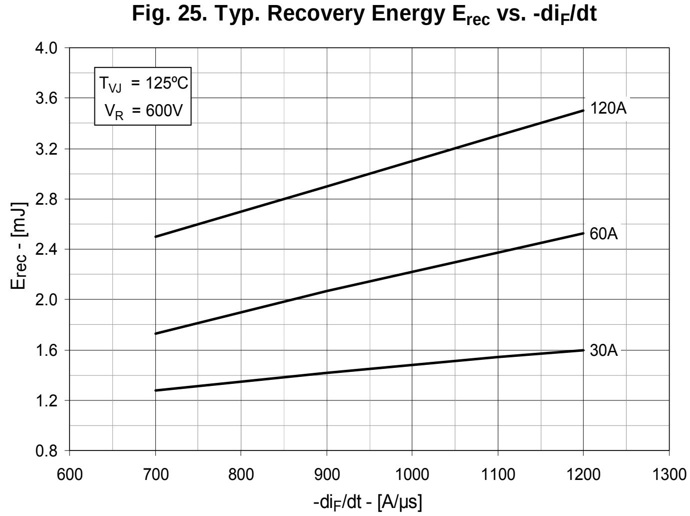


Fig. 26. Maximum Transient Thermal Impedance