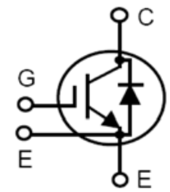
IXYS

1200V XPT™ IGBT GenX3™ w/ Diode

IXYN82N120C3H1

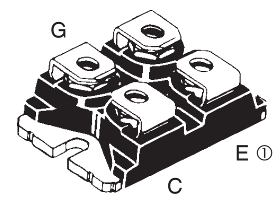
V_{CES} = 1200V
I_{C110} = 46A
$V_{CE(sat)}$ ≤ 3.2V
$t_{fi(typ)}$ = 93ns

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)		105	A
I_{C110}	T_C = 110°C		46	A
I_{F110}	T_C = 110°C		42	A
I_{CM}	T_C = 25°C, 1ms		320	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 2Ω Clamped Inductive Load		I_{CM} = 164 @$V_{CE} \le V_{CES}$	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~
	$I_{ISOL} \le$ 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 = 82A, V_{GE} = 15V, Note 1		2.75	3.20	V
	T_J = 125°C		3.50		V

Features

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

Advantages

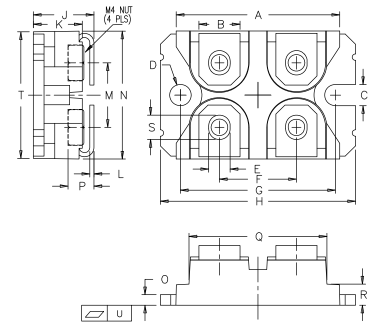
- High Power Density
- Low Gate Drive Requirement

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.	Unit
g_{fs}	I_C = 60A, V_{CE} = 10V, Note 1	30	50		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		4060		pF
C_{oes}			285		pF
C_{res}			110		pF
$Q_{g(on)}$	I_C = 75A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		215		nC
Q_{ge}			26		nC
Q_{gc}			84		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		29		ns
t_{ri}	I_C = 80A, V_{GE} = 15V		78		ns
E_{on}	V_{CE} = 0.5 • V_{CES}, R_G = 2Ω		4.95		mJ
$t_{d(off)}$	Note 2		192	280	ns
t_{fi}			93		ns
E_{off}			2.78	5.00	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		29		ns
t_{ri}	I_C = 80A, V_{GE} = 15V		90		ns
E_{on}	V_{CE} = 0.5 • V_{CES}, R_G = 2Ω		7.45		mJ
$t_{d(off)}$	Note 2		200		ns
t_{fi}			95		ns
E_{off}			3.70		mJ
R_{thJC}				0.25	°C/W
R_{thCS}			0.05		°C/W

SOT-227B miniBLOC (IXYN)



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	1.496	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 Diode (FRED)

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Min.	Typ.	Max.	Unit
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.

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

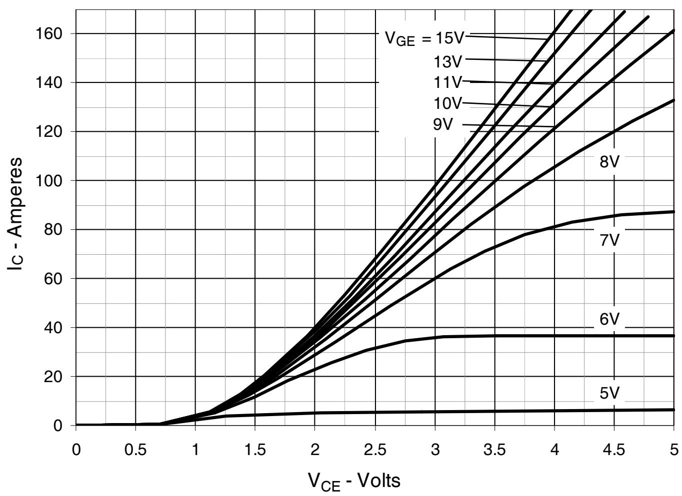


Fig. 2. Extended Output Characteristics @ $T_J = 25^oC$

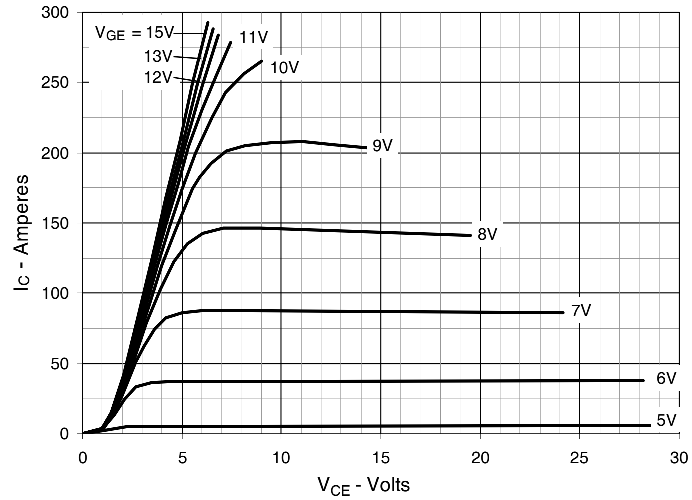


Fig. 3. Output Characteristics @ $T_J = 125^oC$

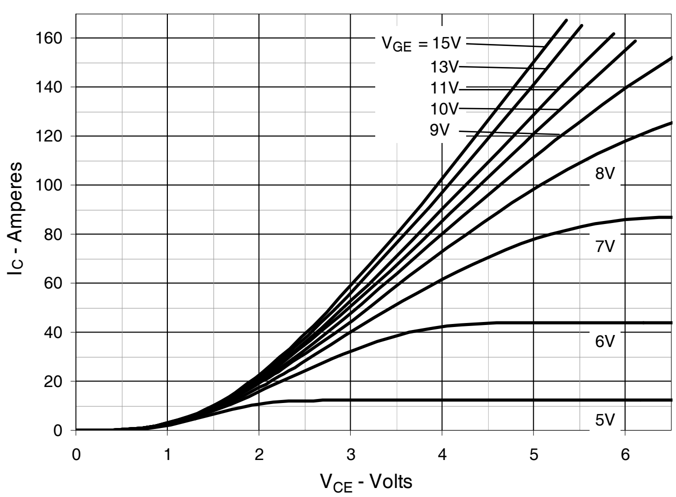


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

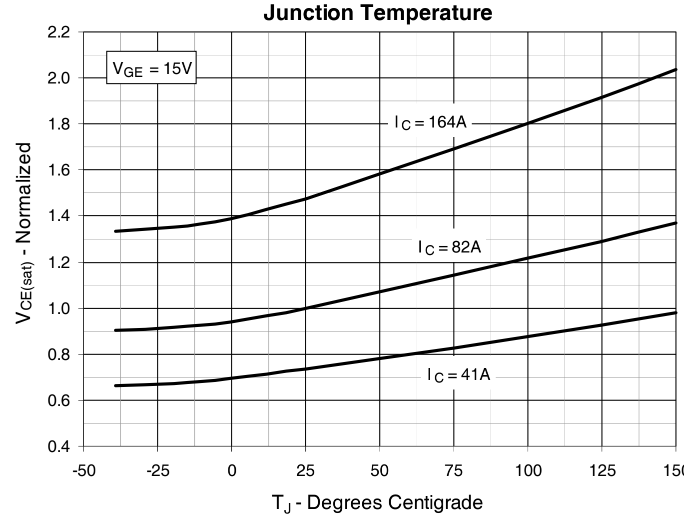


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

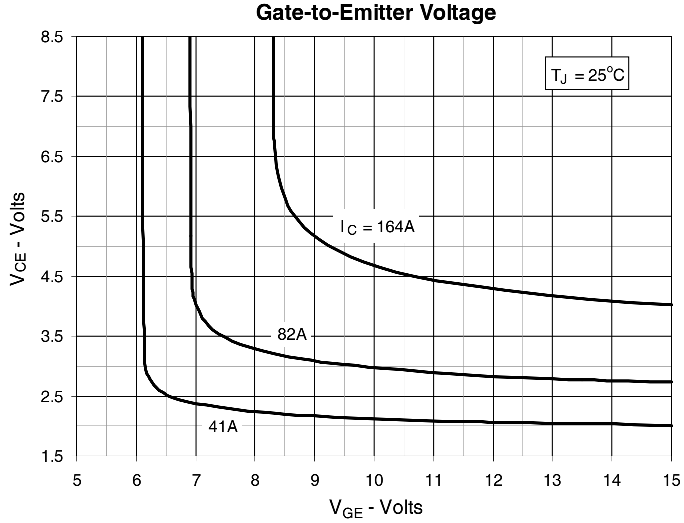


Fig. 6. Input Admittance

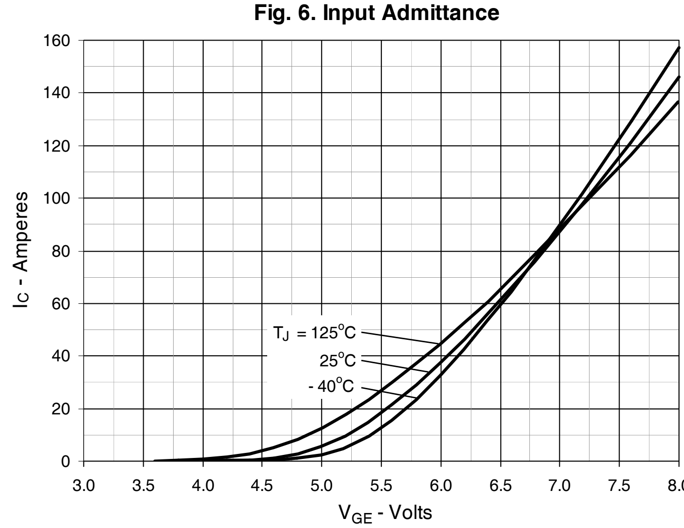


Fig. 7. Transconductance

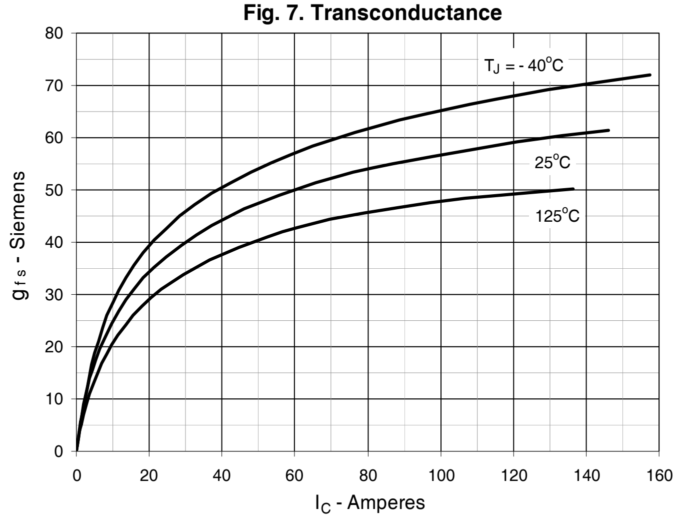


Fig. 8. Gate Charge

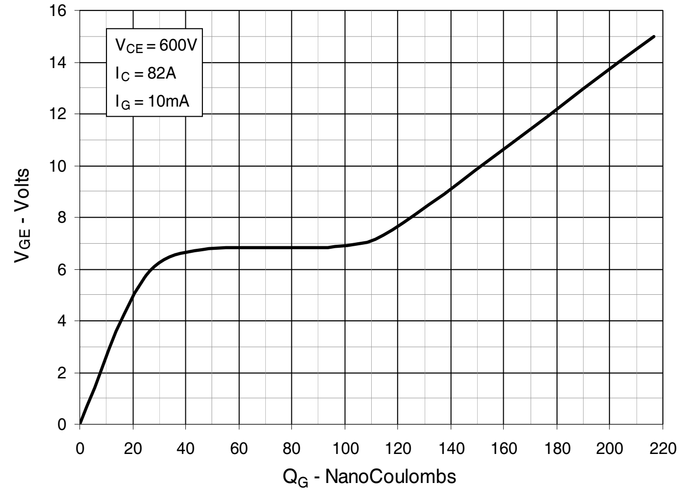


Fig. 9. Capacitance

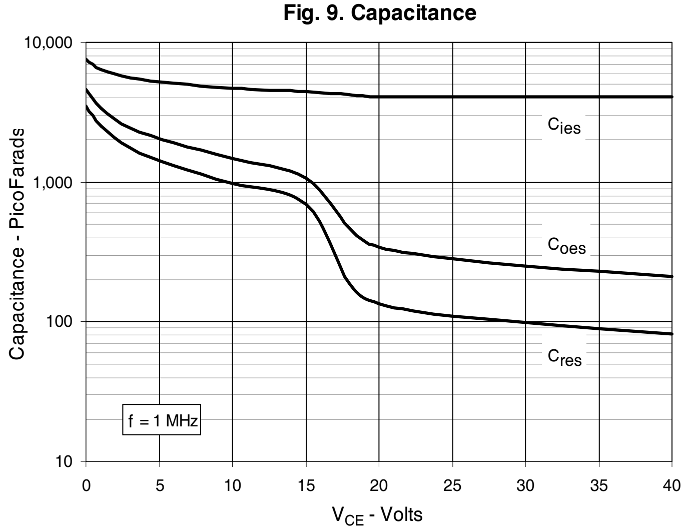


Fig. 10. Reverse-Bias Safe Operating Area

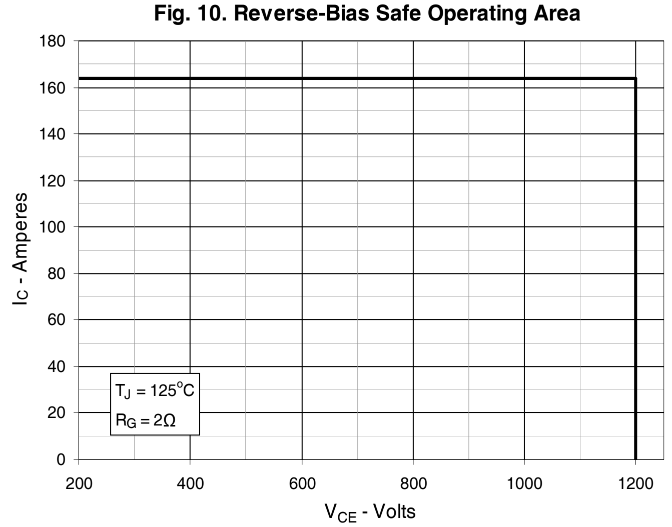
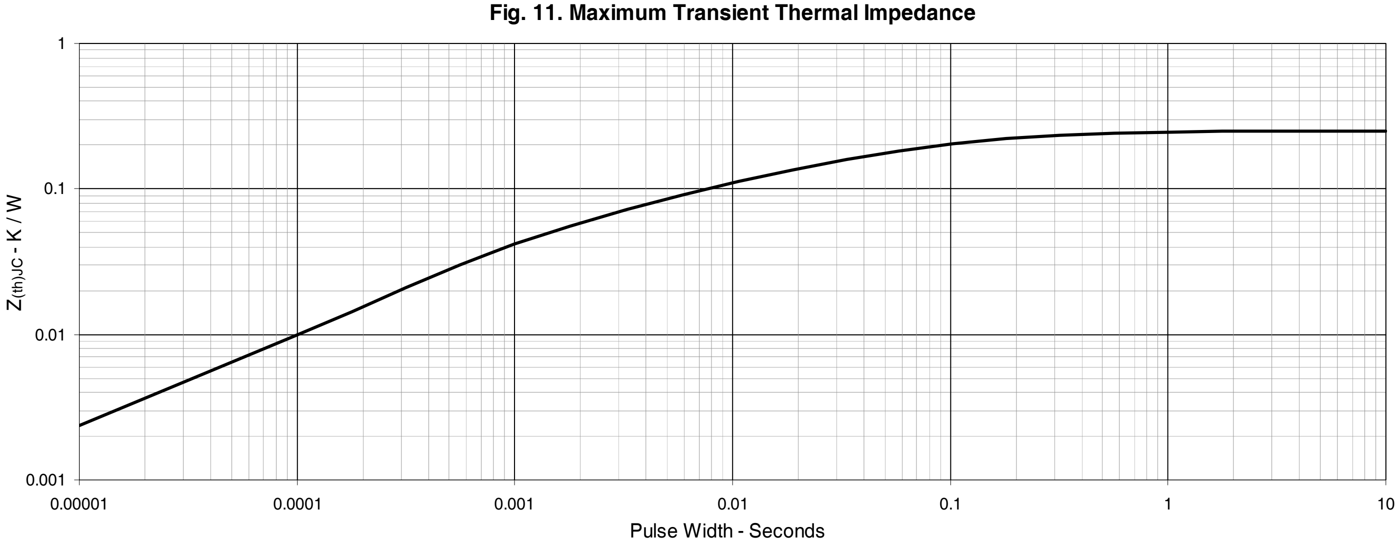


Fig. 11. Maximum Transient Thermal Impedance



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

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

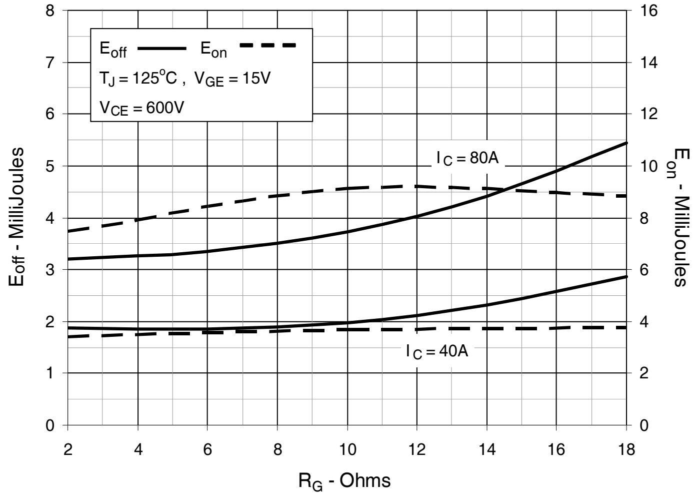


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

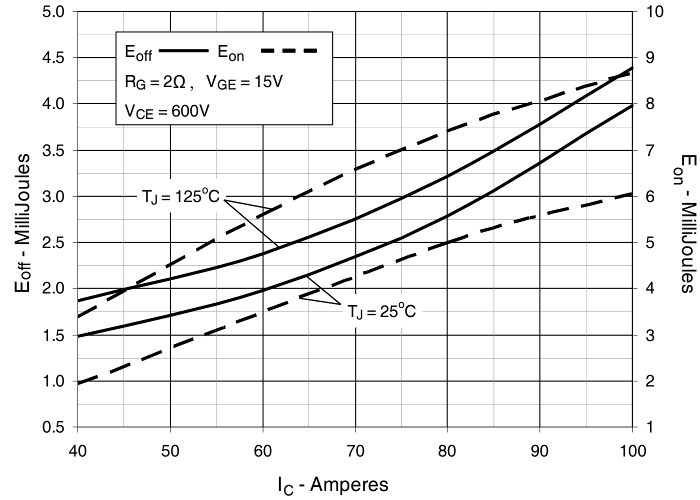


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

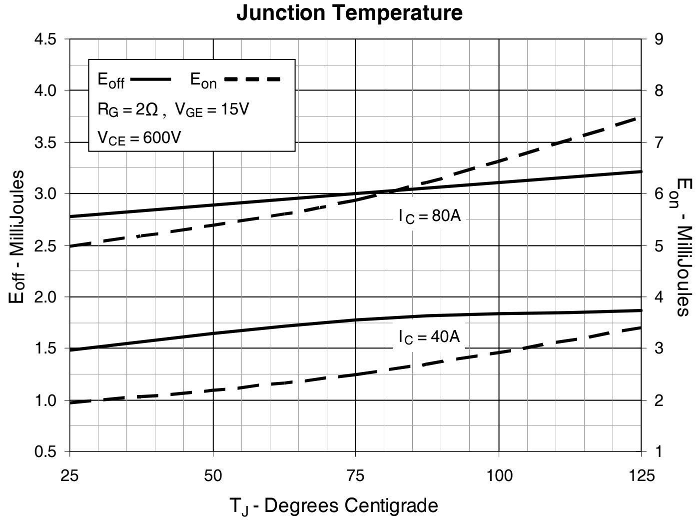


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

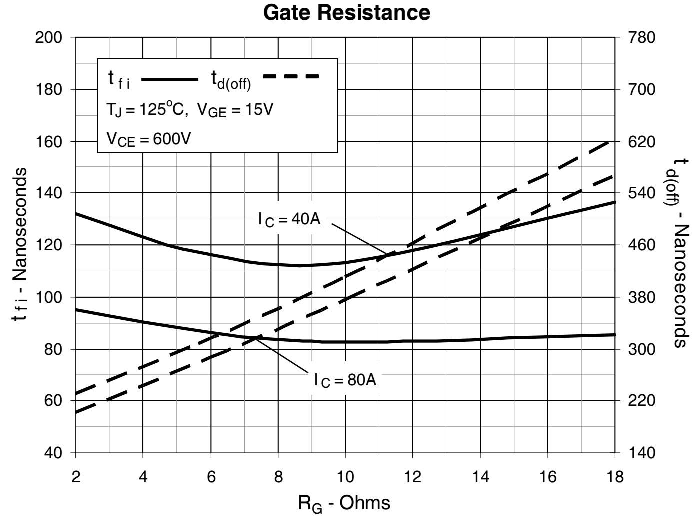


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

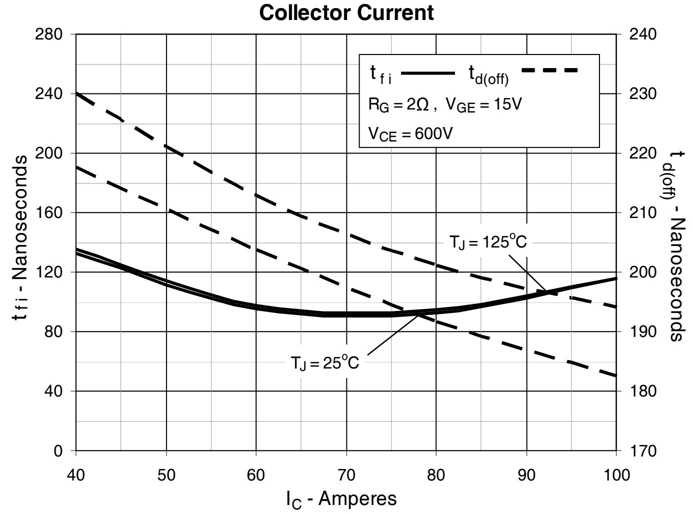


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

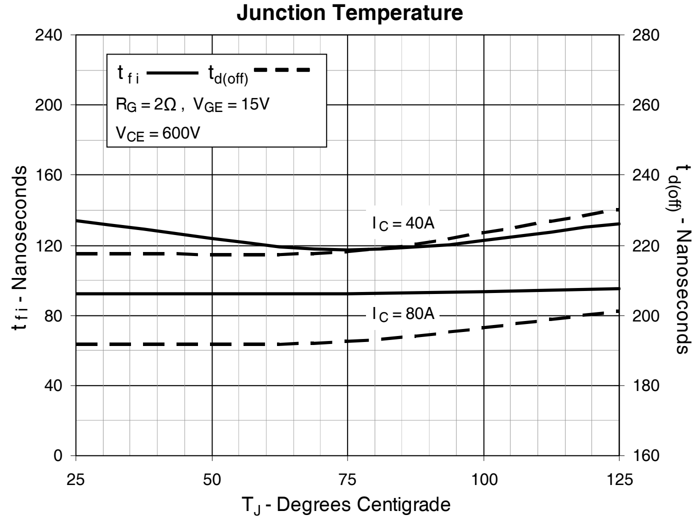


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

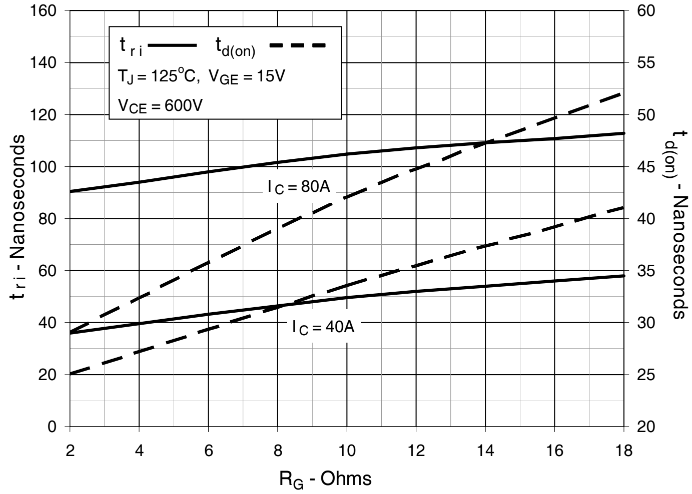


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

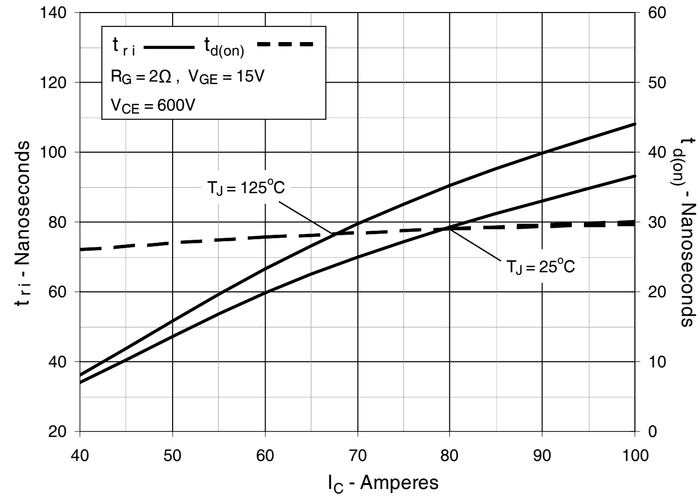


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature

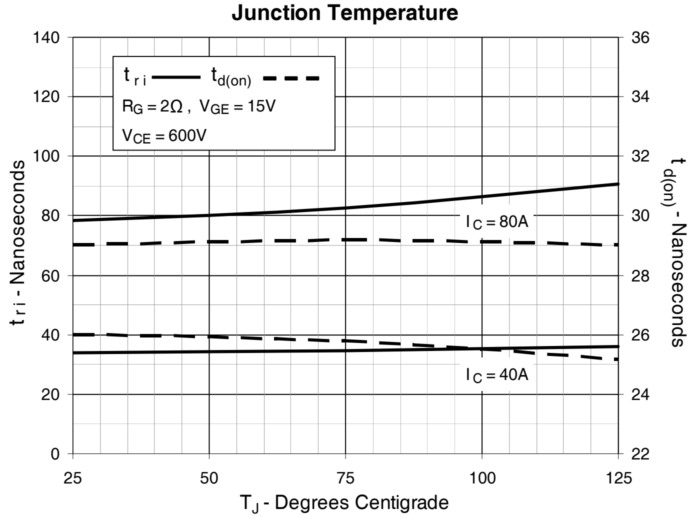


Fig. 21. Forward Characteristics

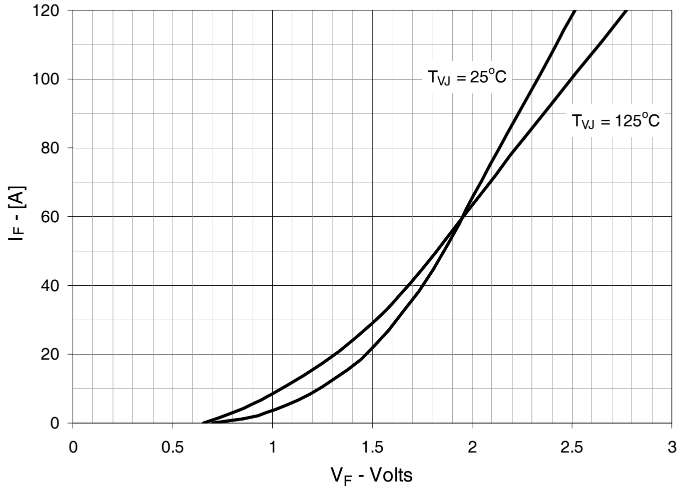


Fig. 22. Reverse Recovery Charge Q_{rr} vs. $-di_F/dt$

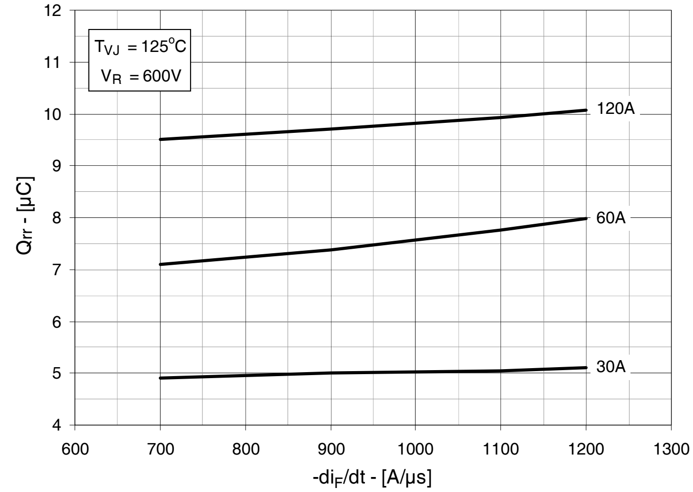


Fig. 23. PeakReverse Current I_{RM} vs. $-di_F/dt$

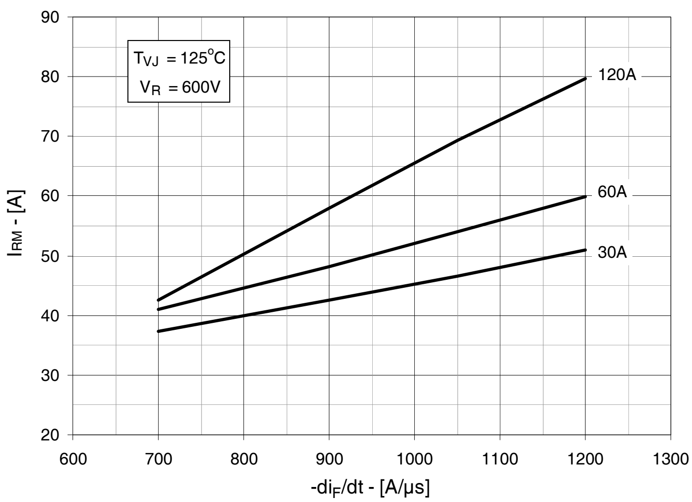


Fig. 24. Recovery Time t_{rr} vs. $-di_F/dt$

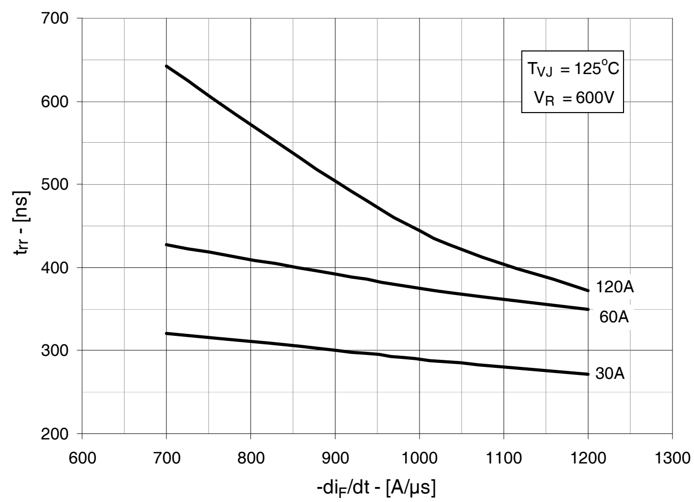


Fig. 25. Recovery Energy E_{rec} vs. $-di_F/dt$

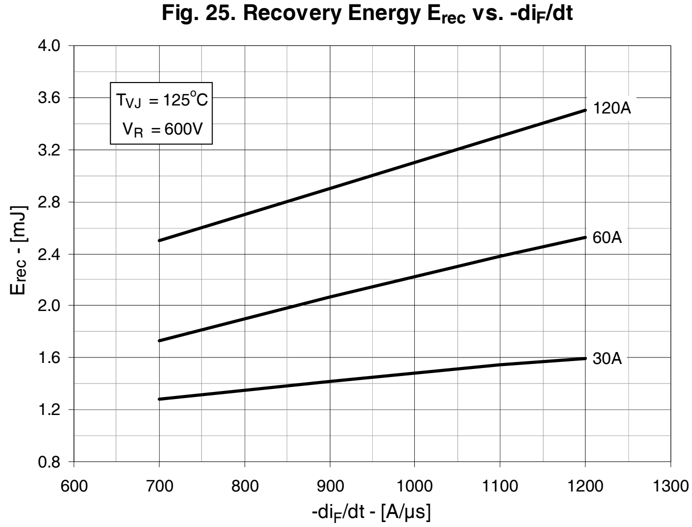


Fig. 26. Maximum Transient Thermal Impedance