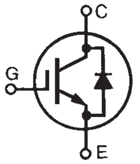
Advance Technical Information

XPT™ 650V GenX4™ w/ Sonic Diode IXXR110N65B4H1

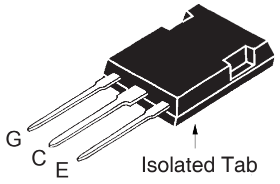
V_{CES} = 650V
I_{C110} = 70A
$V_{CE(sat)}$ ≤ 2.15V
$t_{fi(typ)}$ = 85ns

(Electrically Isolated Tab)

Extreme Light Punch Through
IGBT for 10-30kHz Switching



ISOPLUS247™



G = Gate C = Collector
E = 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)	150	A
I_{C110}	T_C = 110°C	70	A
I_{F110}	T_C = 110°C	48	A
I_{CM}	T_C = 25°C, 1ms	460	A
SSOA **(RBSOA)**	V_{GE} = 15V, T_{VJ} = 150°C, R_G = 2Ω Clamped Inductive Load	I_{CM} = 220 @$V_{CE} \leq V_{CES}$	A
t_{sc} **(SCSOA)**	V_{GE}= 15V, V_{CE} = 360V, T_J = 150°C R_G = 82Ω, Non Repetitive	10	µs
P_C	T_C = 25°C	455	W
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-55 ... +175	°C
T_L	1.6mm (0.062 in.) from Case for 10s	300	°C
T_{SOLD}	Plastic Body for 10s	260	°C
V_{ISOL}	50/60 Hz, 1 Minute	2500	V~
F_C	Mounting Force	20..120/4.5..27	N/lb.
Weight		5	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}	4.0		6.5	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			25	µA
	T_J = 150°C			3	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 110A, V_{GE} = 15V, Note 1		1.75	2.15	V
	T_J = 150°C		2.15		V

eatures

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 2500V~ Electrical Isolation
- Optimized for 10-30kHz Switching
- Square RBSOA
- Short Circuit Capability
- Anti-Parallel Sonic Diode
- High Current Handling Capabilit

Advantages

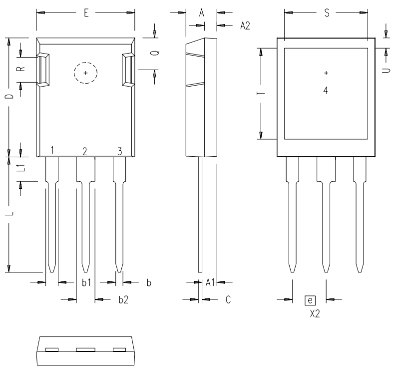
- High Power Density
- Low Gate Drive Requirement

Applications

- Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Battery Chargers
- Welding Machines
- Lamp Ballasts
- High 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	24	40		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		3650		pF
C_{oes}			440		pF
C_{res}			143		pF
$Q_{g(on)}$	I_C = 110A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		183		nC
Q_{ge}			32		nC
Q_{gc}			83		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C** I_C = 55A, V_{GE} = 15V V_{CE} = 400V, R_G = 2Ω Note 2		38		ns
t_{ri}			46		ns
E_{on}			2.20		mJ
$t_{d(off)}$			156		ns
t_{fi}			85		ns
E_{off}			1.05	1.70	mJ
$t_{d(on)}$	**Inductive load, T_J = 150°C** I_C = 55A, V_{GE} = 15V V_{CE} = 400V, R_G = 2Ω Note 2		34		ns
t_{ri}			46		ns
E_{on}			3.15		mJ
$t_{d(off)}$			160		ns
t_{fi}			105		ns
E_{off}			1.40		mJ
R_{thJC}				0.33	°C/W
R_{thCS}			0.15		°C/W

ISOPLUS247 (IXXR) Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b1	.075	.084	1.91	2.13
b2	.115	.123	2.92	3.12
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
E	.620	.635	15.75	16.13
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1	.150	.170	3.81	4.32
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83
S	.520	.540	13.21	13.72
T	.620	.640	15.75	16.26
U	.065	.080	1.65	2.03

1 - Gate
2,4 - Collector
3 - Emiiter

Reverse Sonic Diode (FRD)

Symbol	**Test Conditions** (T_J = 25°C Unless Otherwise Specified)		**Characteristic Values** **Min.**	**Typ.**	**Max.**	
V_F	I_F = 100A, V_{GE} = 0V, Note 1			1.7	2.0	V
		T_J = 150°C		1.8		V
I_{RM}	I_F = 100A, V_{GE} = 0V, $-di_F/dt$ = 1500A/μs, V_R = 300V	T_J = 150°C		95		A
t_{rr}				100		ns
R_{thJC}					0.70	°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

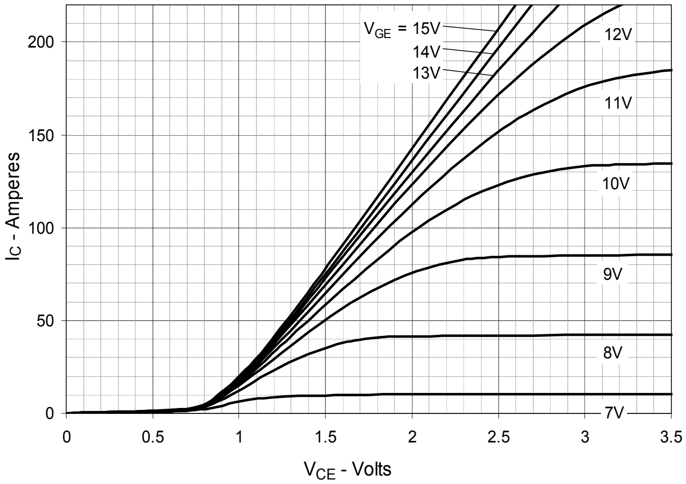


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

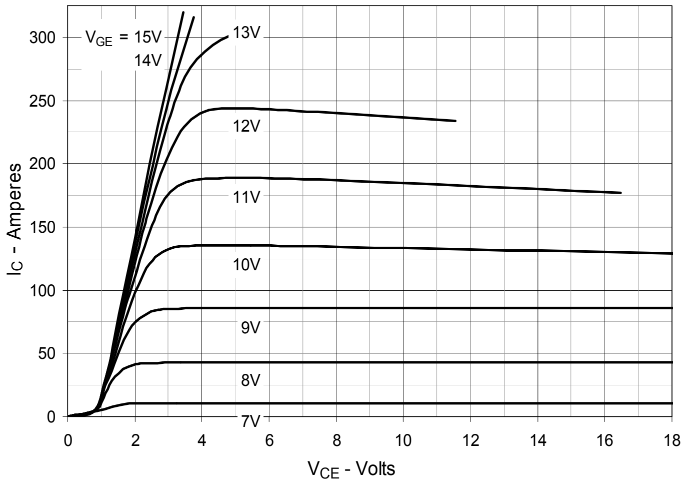


Fig. 3. Output Characteristics @ T_J = 150ºC

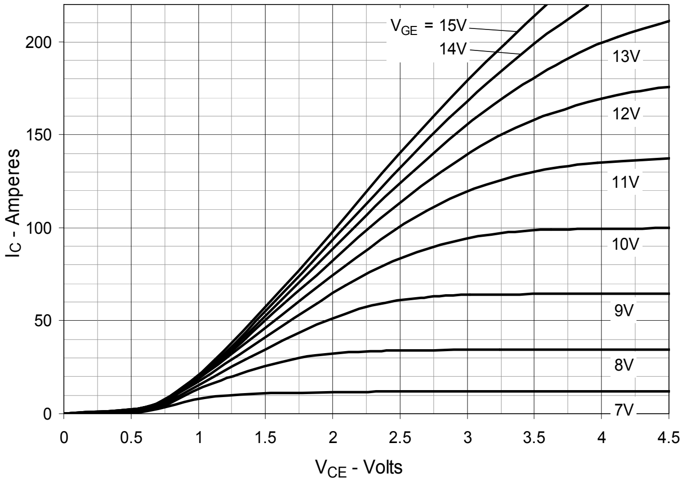


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

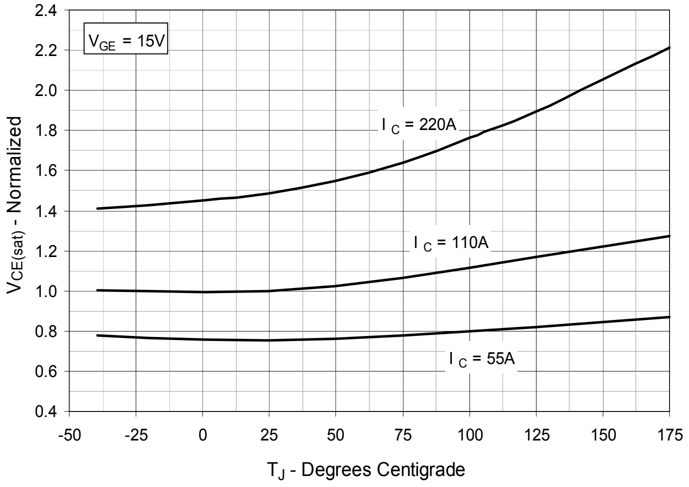


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

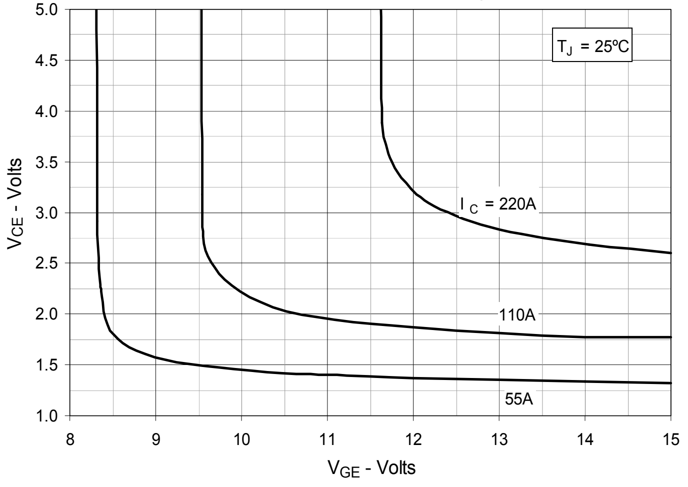


Fig. 6. Input Admittance

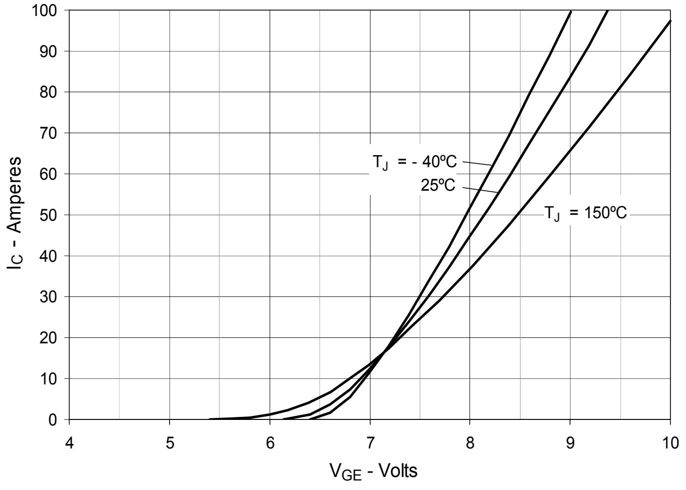


Fig. 7. Transconductance

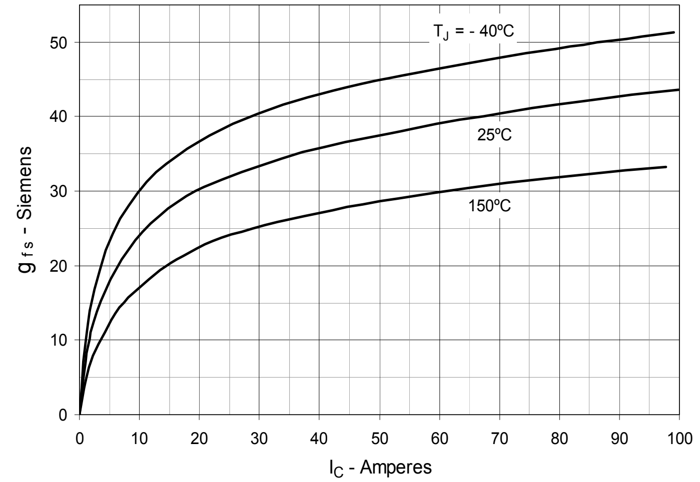


Fig. 8. Gate Charge

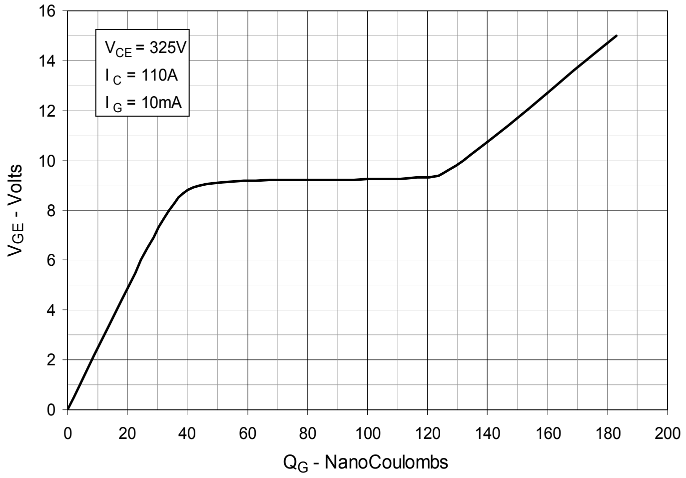


Fig. 9. Capacitance

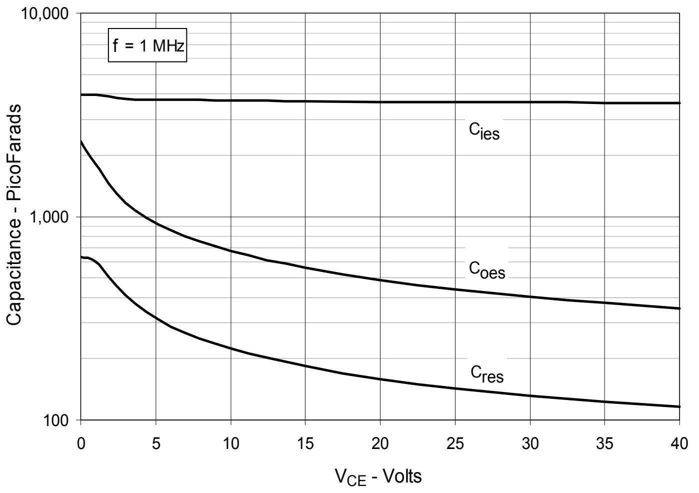


Fig. 10. Reverse-Bias Safe Operating Area

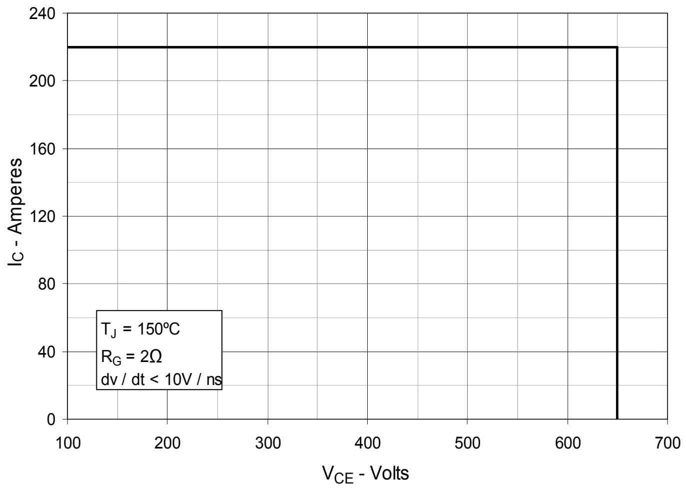


Fig. 11. Maximum Transient Thermal Impedance

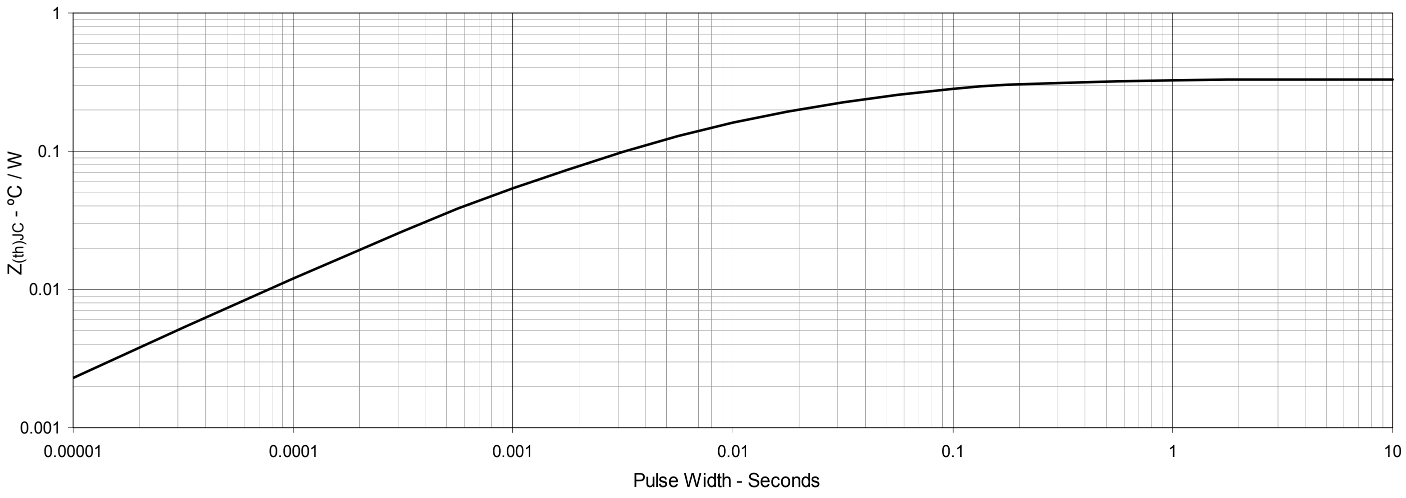


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

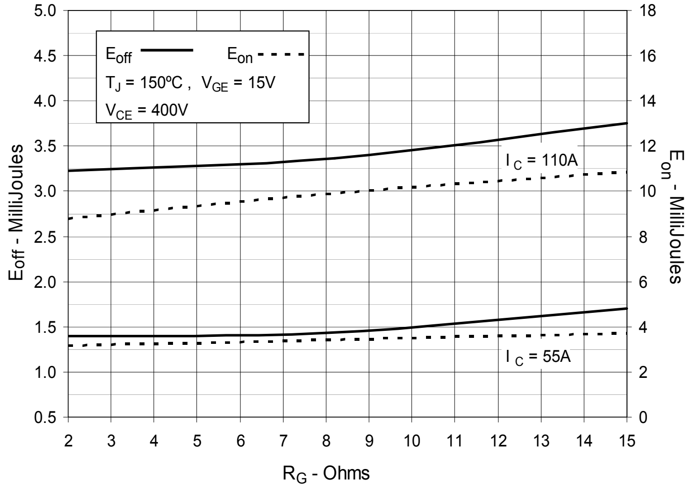


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

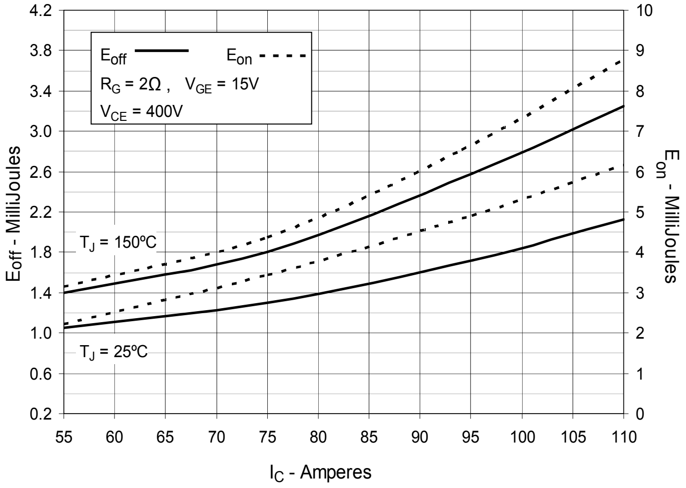


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

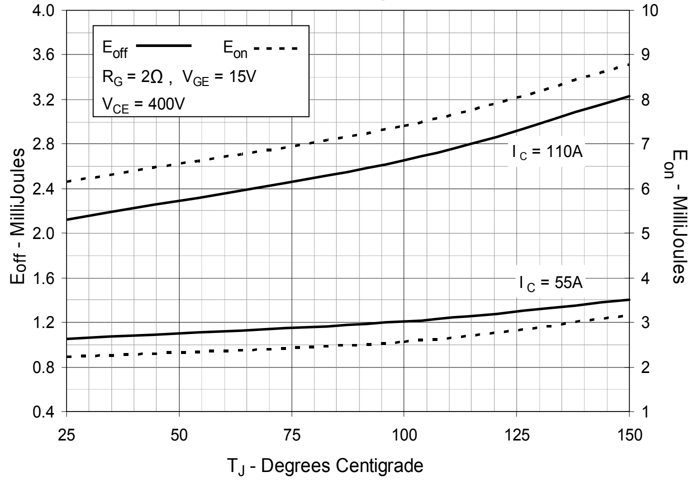


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

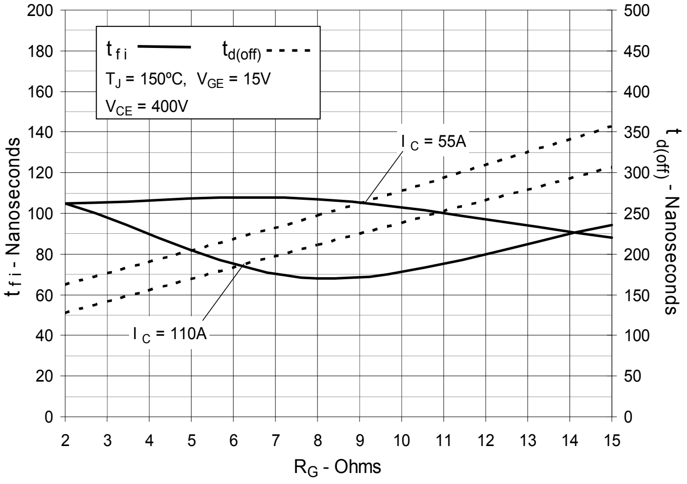


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

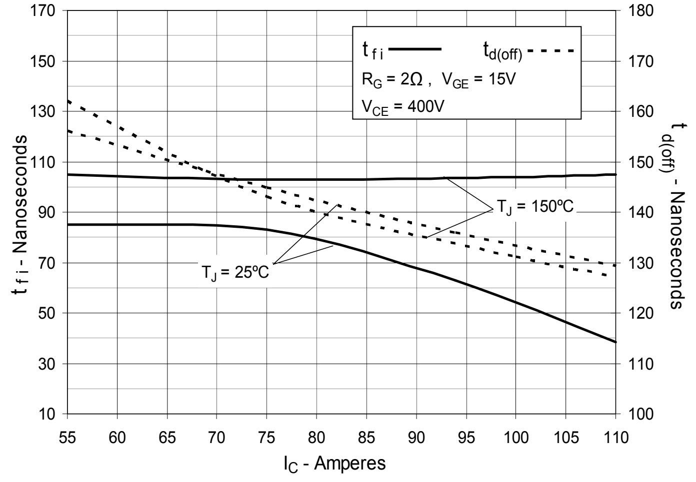


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

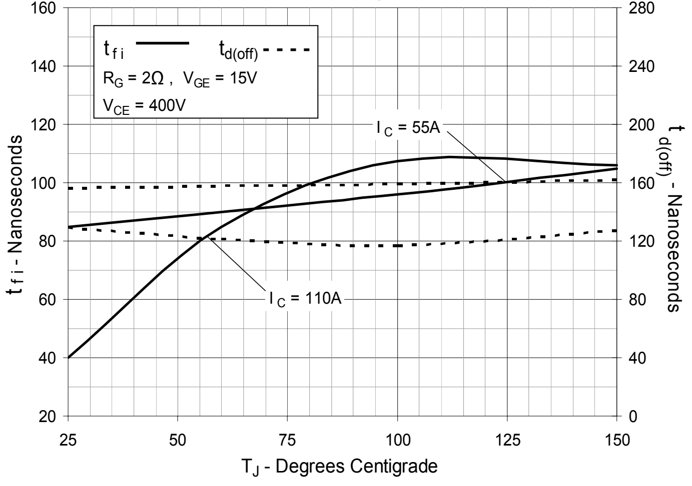


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

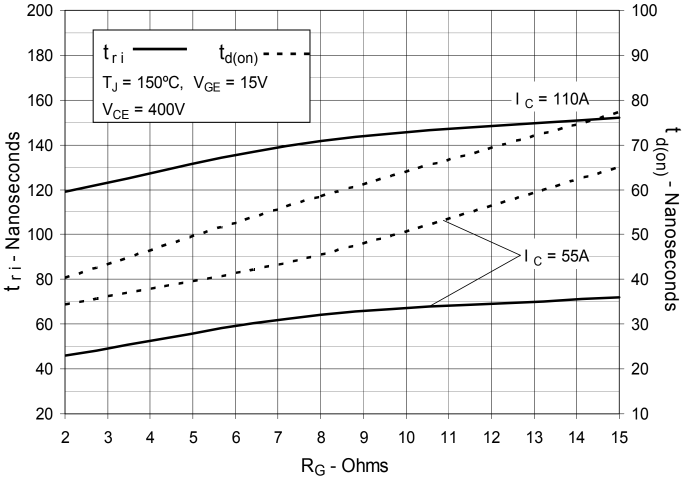


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

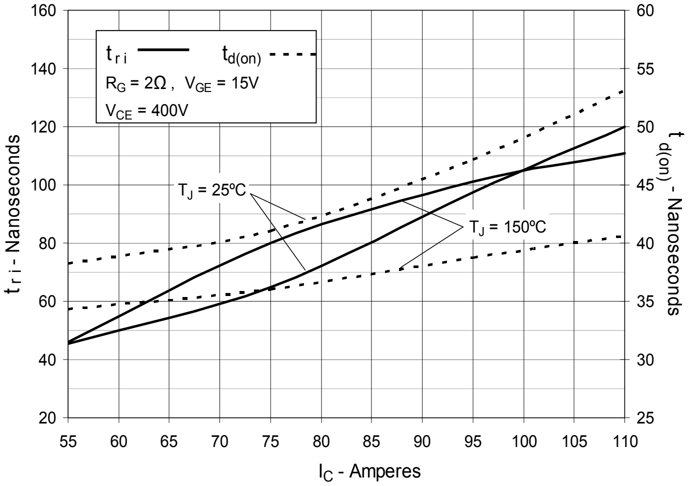


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature

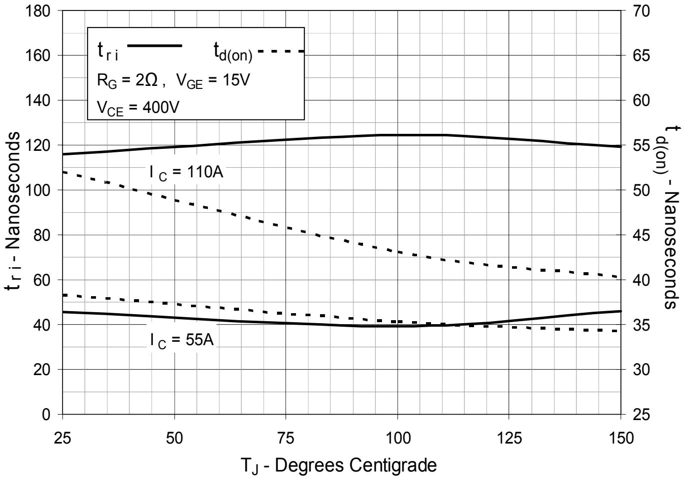


Fig. 21. Typ. Forward characteristics

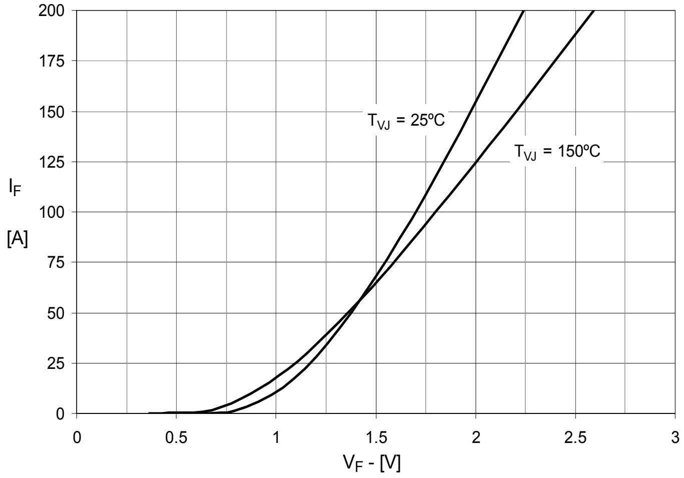


Fig. 22. Typ. Reverse Recovery Charge Q_{rr} vs. $-di_F/dt$

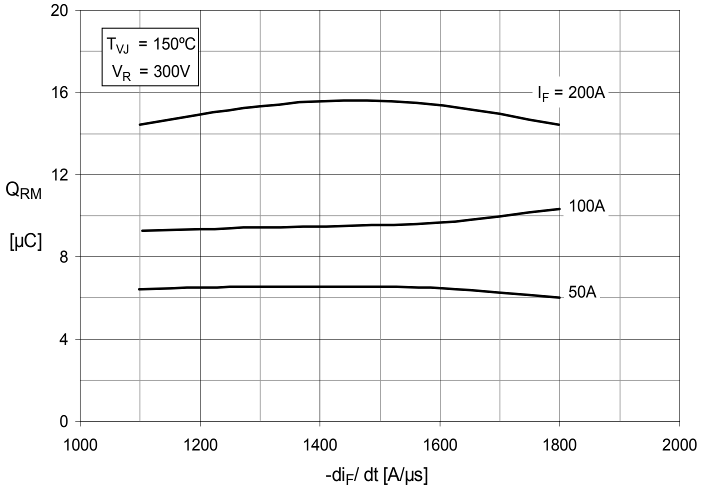


Fig. 23. Typ. Peak Reverse Current I_{RM} vs. $-di_F/dt$

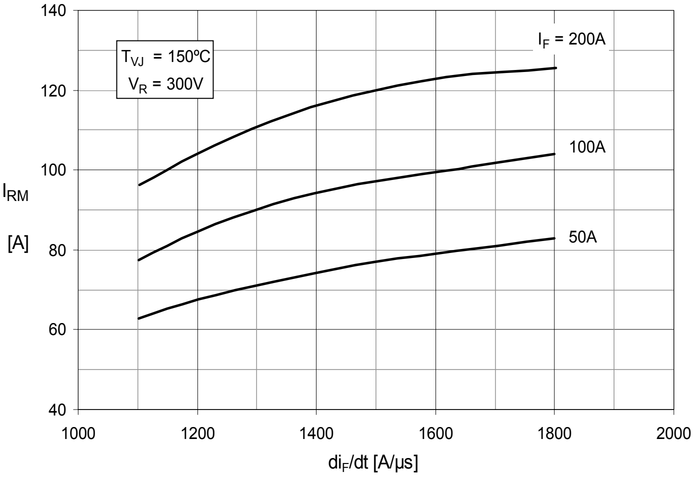


Fig. 24. Typ. Recovery Time t_{rr} vs. $-di_F/dt$

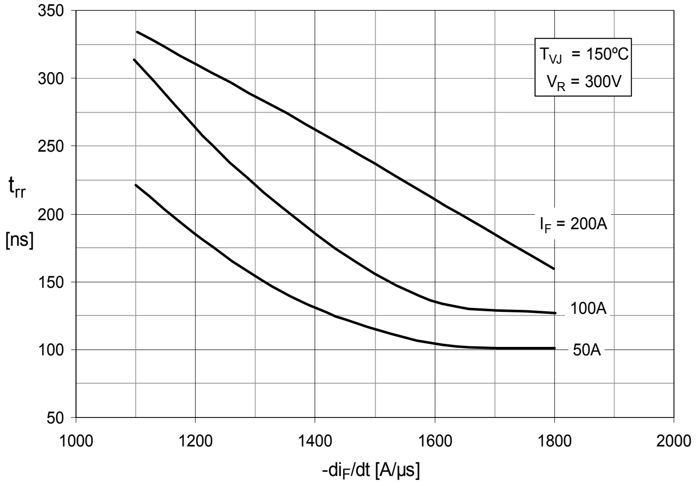


Fig. 25. Typ. Recovery Energy E_{rec} vs. $-di_F/dt$

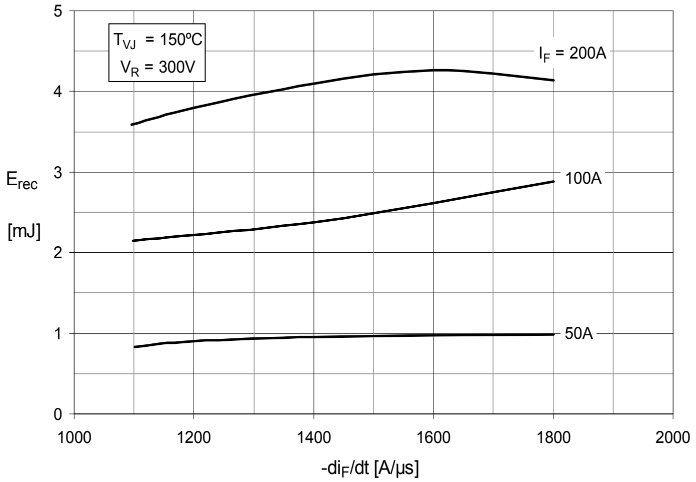
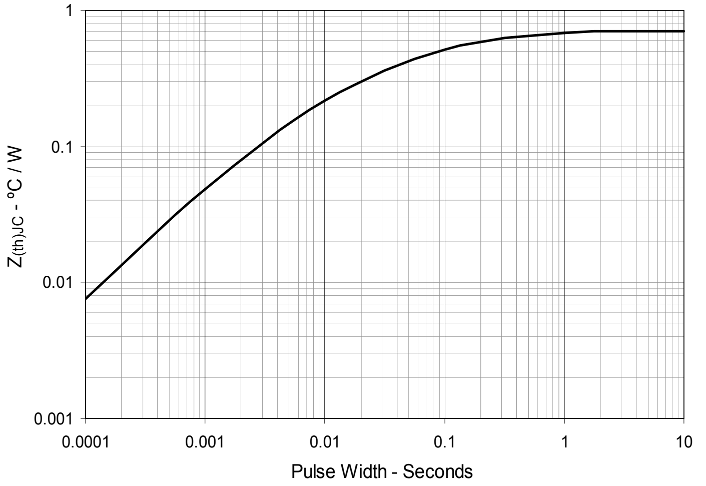


Fig. 26. Maximum Transient Thermal Impedance



IXYS REF: IXX_110N65B4H1(E8) 02-04-13-B

Стандарт
Электрон
Связь

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