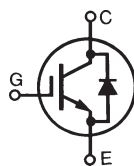


XPT™ 600V IGBT

GenX3™ w/Diode

IXXN200N60B3H1

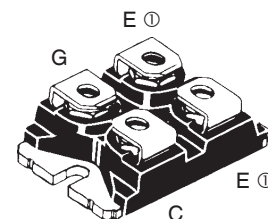


Extreme Light Punch Through
IGBT for 10-30kHz Switching

$$\begin{aligned} V_{CES} &= 600V \\ I_{C110} &= 98A \\ V_{CE(sat)} &\leq 1.7V \\ t_{fi(typ)} &= 110ns \end{aligned}$$

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}	$T_J = 25^\circ\text{C}$ to 150°C	600	V
V_{CGR}	$T_J = 25^\circ\text{C}$ to 150°C , $R_{GE} = 1M\Omega$	600	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$ (Chip Capability)	200	A
I_{C110}	$T_C = 110^\circ\text{C}$	98	A
I_{F110}	$T_C = 110^\circ\text{C}$	30	A
I_{CM}	$T_C = 25^\circ\text{C}$, 1ms	1000	A
I_A	$T_C = 25^\circ\text{C}$	100	A
E_{AS}	$T_C = 25^\circ\text{C}$	1	J
SSOA (RBSOA)	$V_{GE} = 15V$, $T_{VJ} = 150^\circ\text{C}$, $R_G = 1\Omega$ Clamped Inductive Load	$I_{CM} = 400$ @ $V_{CE} \leq V_{CES}$	A
t_{sc} (SCSOA)	$V_{GE} = 15V$, $V_{CE} = 360V$, $T_J = 150^\circ\text{C}$ $R_G = 10\Omega$, Non Repetitive	10	μs
P_C	$T_C = 25^\circ\text{C}$	780	W
T_J		-55 ... +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		-55 ... +150	$^\circ\text{C}$
V_{ISOL}	50/60Hz $t = 1\text{min}$ $I_{ISOL} \leq 1\text{mA}$ $t = 1\text{s}$	2500 3000	V~ V~
M_d	Mounting Torque Terminal Connection Torque	1.5/13 1.3/11.5	Nm/lb.in. Nm/lb.in.
Weight		30	g

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 250\mu\text{A}$, $V_{GE} = 0V$	600		V
$V_{GE(th)}$	$I_C = 250\mu\text{A}$, $V_{CE} = V_{GE}$	3.5		6.0 V
I_{CES}	$V_{CE} = V_{CES}$, $V_{GE} = 0V$ Note 2, $T_J = 150^\circ\text{C}$			50 μA 3 mA
I_{GES}	$V_{CE} = 0V$, $V_{GE} = \pm 20V$			± 200 nA
$V_{CE(sat)}$	$I_C = 100A$, $V_{GE} = 15V$, Note 1 $T_J = 150^\circ\text{C}$		1.40 1.58	V V

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- miniBLOC, with Aluminium Nitride Isolation
- Optimized for Low Conduction and Switching Losses
- Isolated Mounting Surface
- Anti-Parallel Ultra Fast Diode
- 2500V~ Electrical Isolation
- Optimized for 10-30kHz Switching
- Avalanche Rated
- Short Circuit Capability
- Very High Current Capability
- Square RBSOA

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

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

Symbol Test Conditions

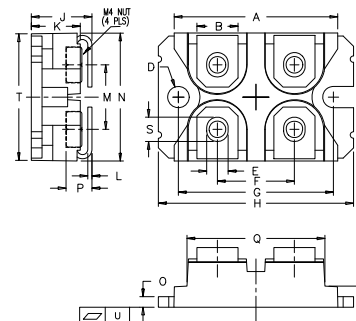
($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)

Characteristic Values

Min. Typ. Max.

g_{fs}	$I_C = 60\text{A}, V_{CE} = 10\text{V}, \text{Note 1}$	27	45	S
C_{ies}	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		9970	pF
C_{oes}			570	pF
C_{res}			183	pF
$Q_{g(on)}$	$I_C = 200\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$		315	nC
Q_{ge}			98	nC
Q_{gc}			130	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = 100\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 360\text{V}, R_G = 1\Omega$ Note 3		48	ns
t_{ri}			100	ns
E_{on}			2.85	mJ
$t_{d(off)}$			160	ns
t_{fi}			110	ns
E_{off}			2.90	mJ
$t_{d(on)}$	Inductive load, $T_J = 150^\circ\text{C}$ $I_C = 100\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 360\text{V}, R_G = 1\Omega$ Note 3		46	ns
t_{ri}			94	ns
E_{on}			4.40	mJ
$t_{d(off)}$			180	ns
t_{fi}			215	ns
E_{off}			3.45	mJ
R_{thJC}			0.16	$^\circ\text{C/W}$
R_{thCS}		0.05		$^\circ\text{C/W}$

SOT-227B miniBLOC (IXXN)



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 Diode (FRED)

Symbol Test Conditions

($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)

Characteristic Values

Min. Typ. Max.

V_F	$I_F = 100\text{A}, V_{GE} = 0\text{V}, \text{Note 1}$		2.5	V
	$T_J = 150^\circ\text{C}$	2.3		V
I_{RM}	$I_F = 100\text{A}, V_{GE} = 0\text{V},$ $-di_F/dt = 1500\text{A}/\mu\text{s}, V_R = 300\text{V}$	$T_J = 150^\circ\text{C}$	95	A
t_{rr}			100	ns
R_{thJC}			0.70	$^\circ\text{C/W}$

Notes:

1. Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.
2. Part must be heatsunk for high-temp I_{ces} measurement.
3. Switching times & energy losses may increase for higher $V_{CE}(\text{Clamp})$, T_J or R_G .

PRELIMINARY 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.

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	

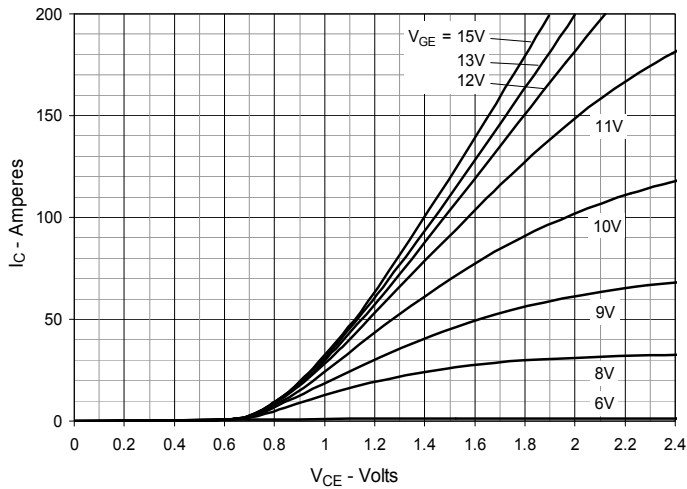
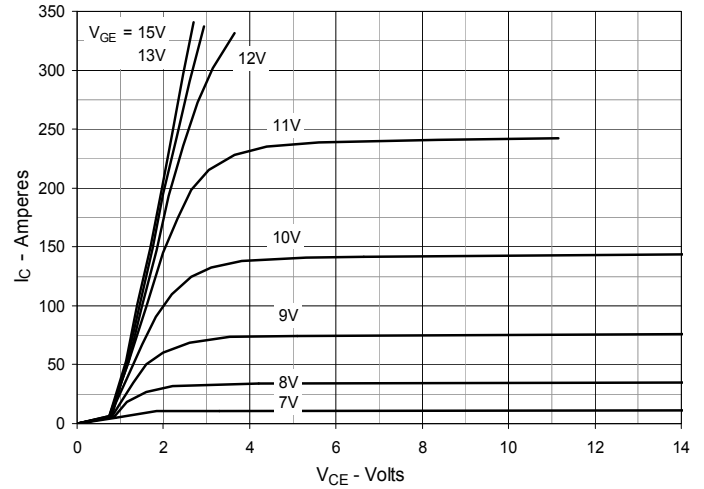
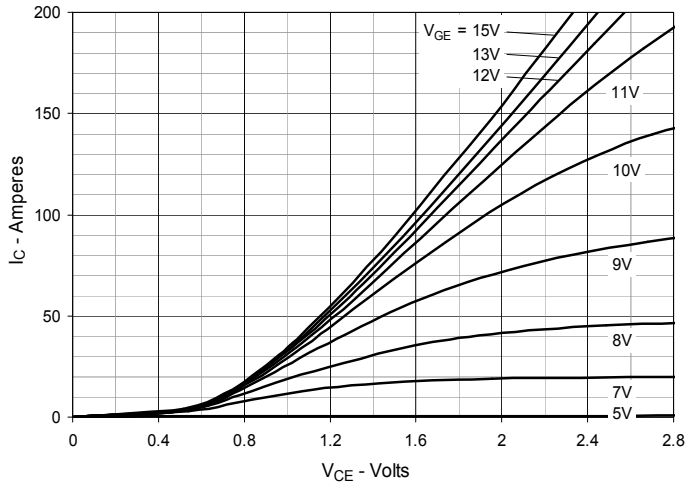
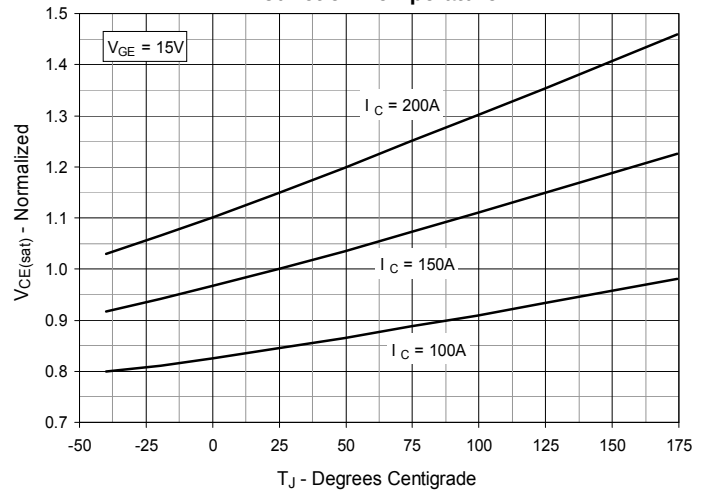
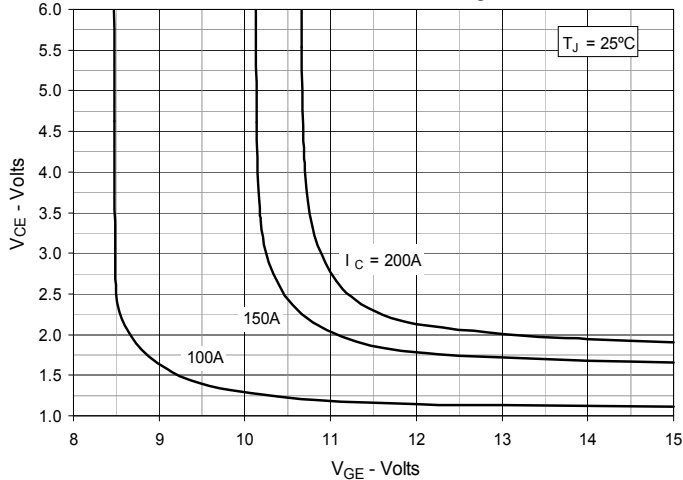
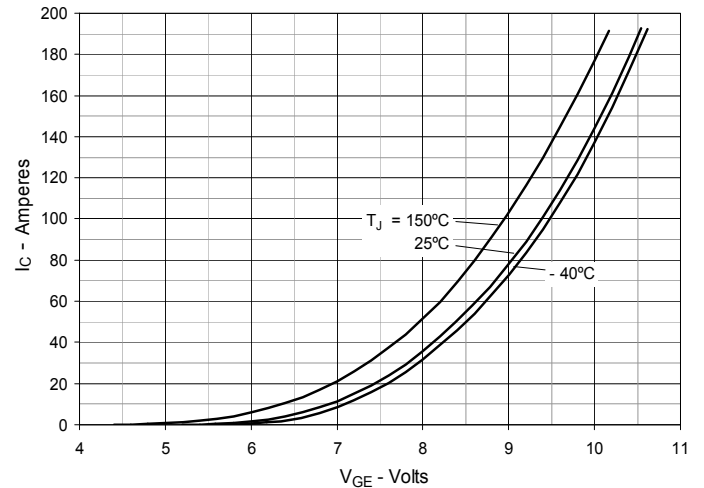
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

Fig. 3. Output Characteristics @ $T_J = 150^\circ\text{C}$

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

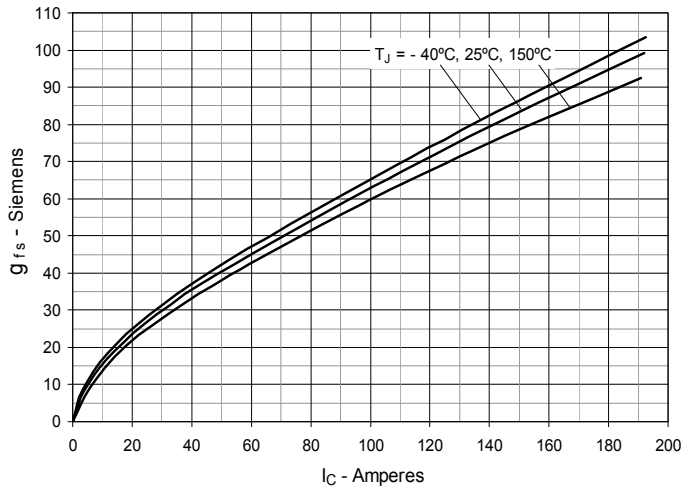


Fig. 8. Gate Charge

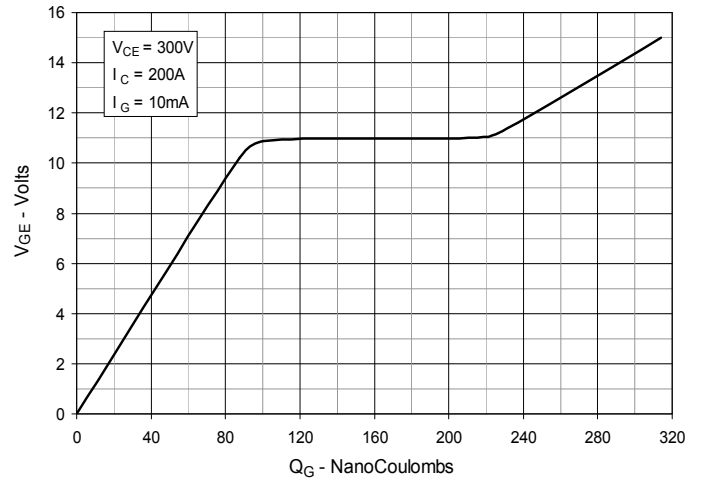


Fig. 9. Capacitance

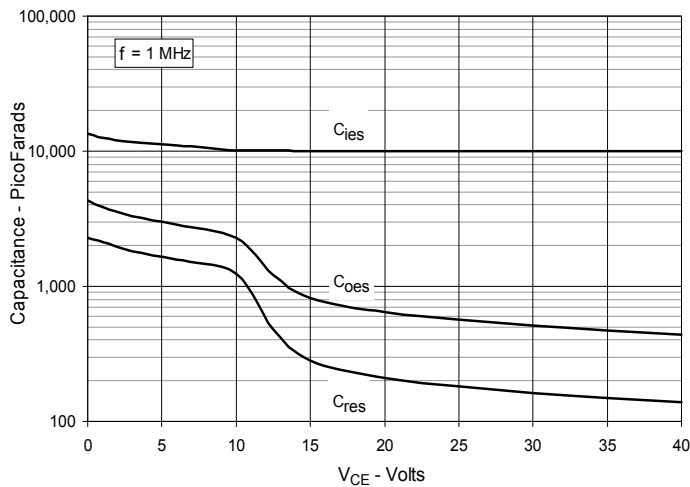


Fig. 10. Reverse-Bias Safe Operating Area

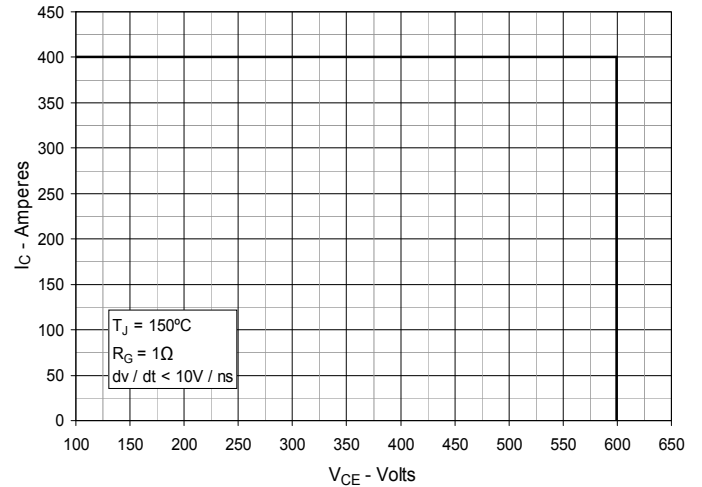


Fig. 11. Forward-Bias Safe Operating Area

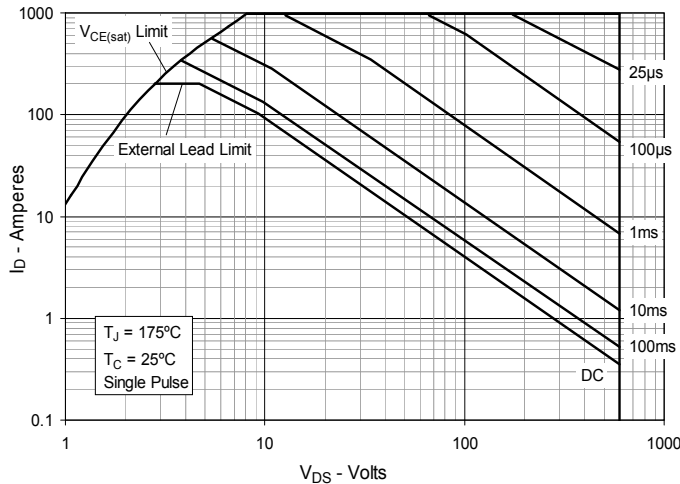


Fig. 12. Maximum Transient Thermal Impedance

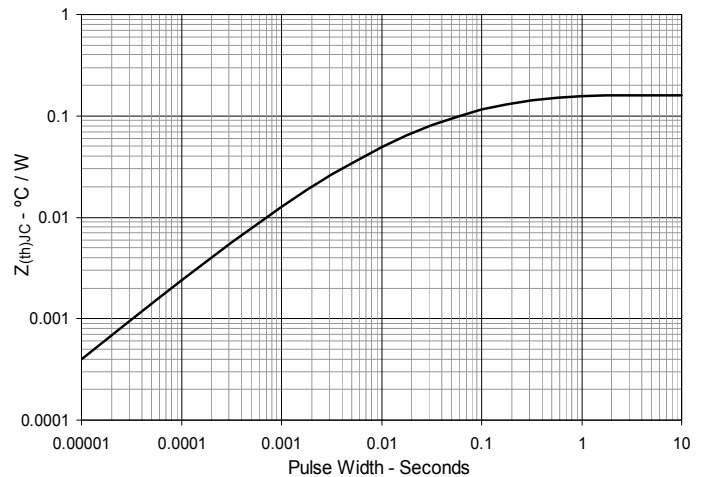


Fig. 13. Inductive Switching Energy Loss vs. Gate Resistance

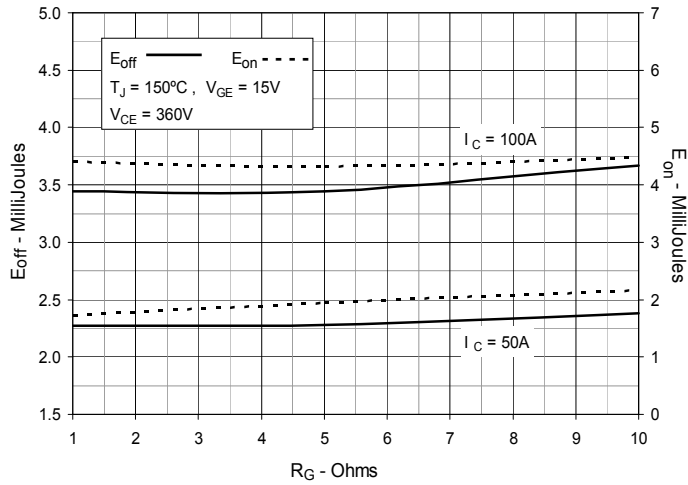


Fig. 14. Inductive Switching Energy Loss vs. Collector Current

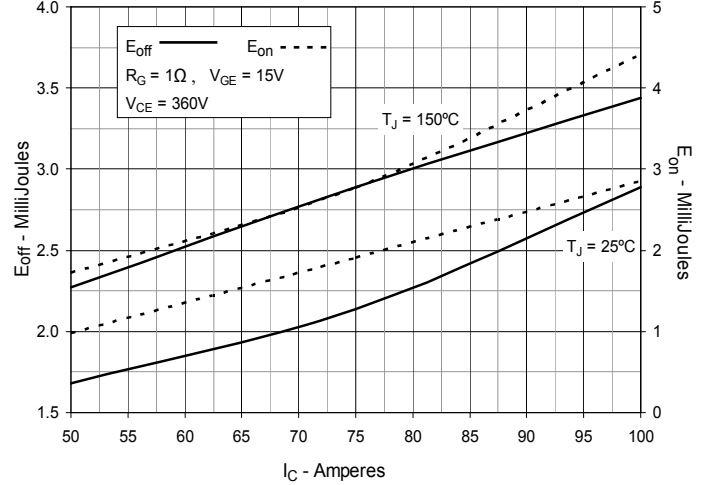


Fig. 15. Inductive Switching Energy Loss vs. Junction Temperature

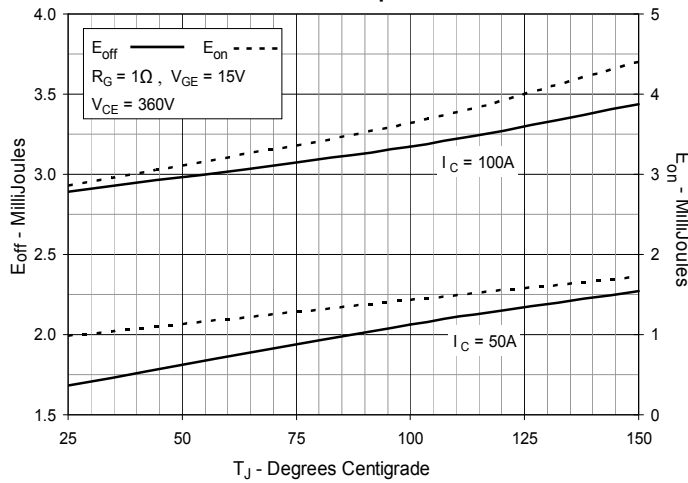


Fig. 16. Inductive Turn-off Switching Times vs. Gate Resistance

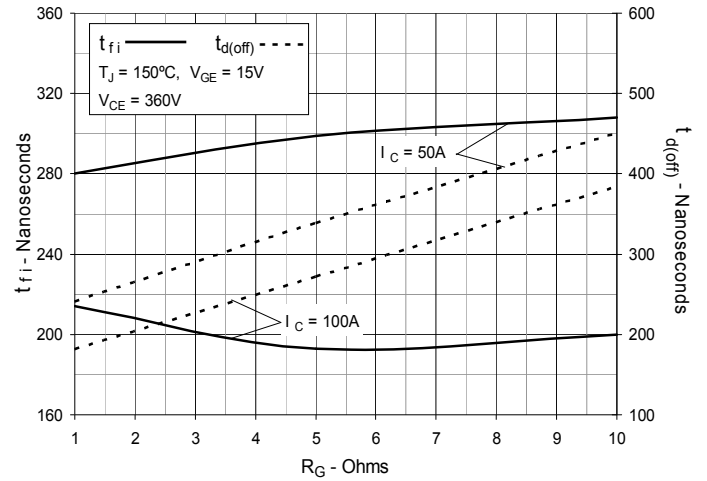


Fig. 17. Inductive Turn-off Switching Times vs. Collector Current

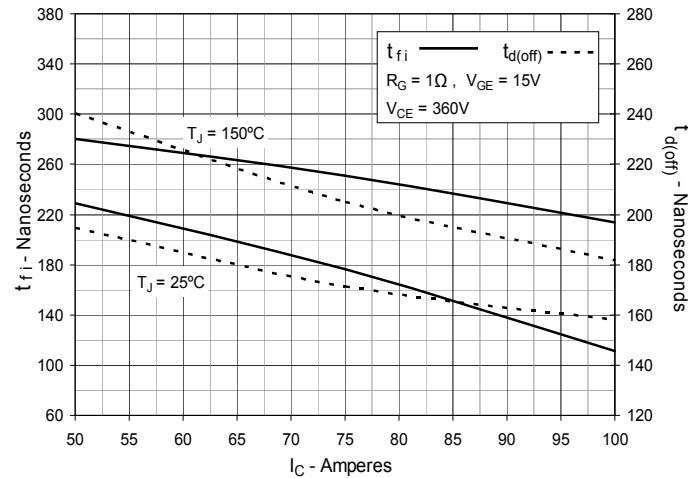


Fig. 18. Inductive Turn-off Switching Times vs. Junction Temperature

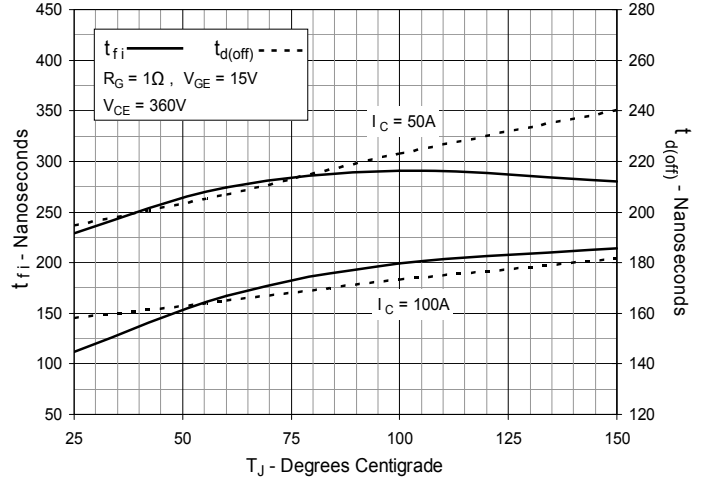


Fig. 19. Inductive Turn-on Switching Times vs. Gate Resistance

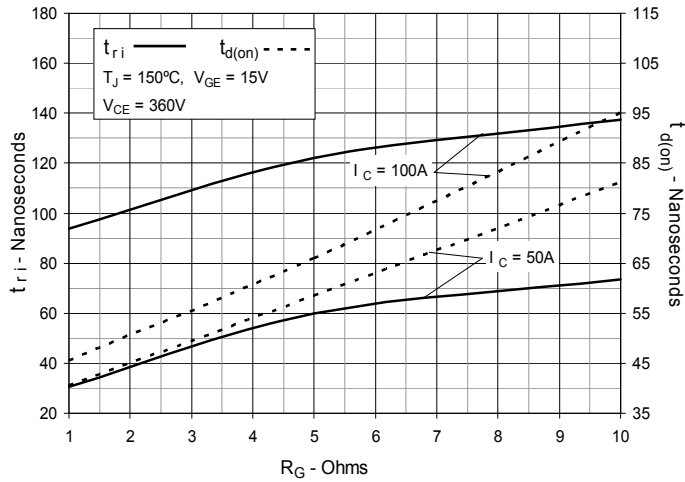


Fig. 20. Inductive Turn-on Switching Times vs. Collector Current

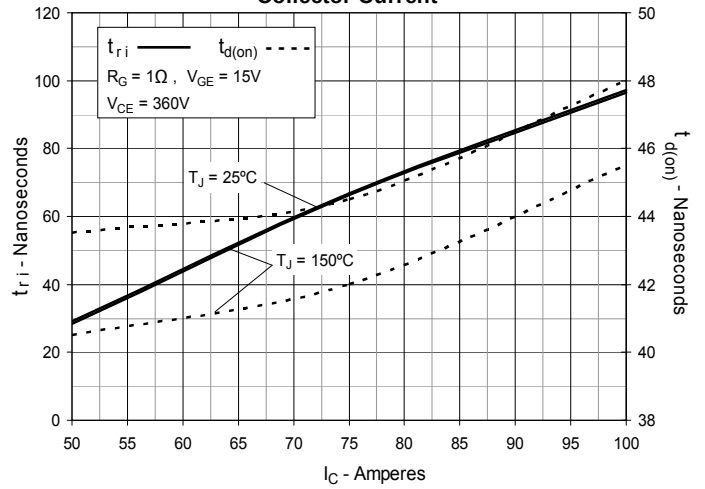


Fig. 21. Inductive Turn-on Switching Times vs. Junction Temperature

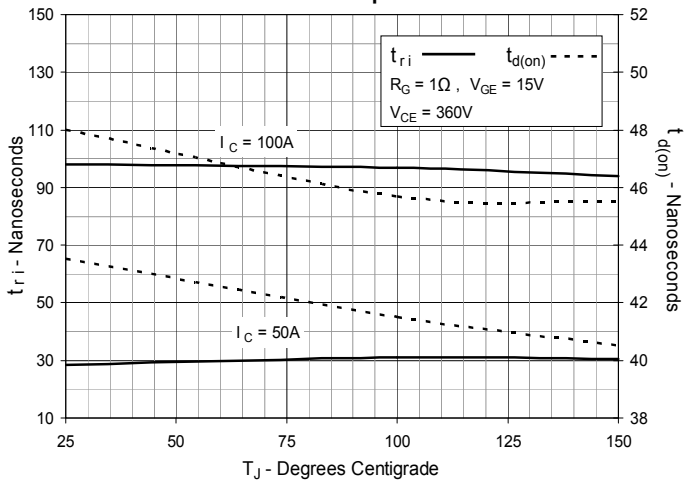


Fig. 22. Typ. Forward characteristics

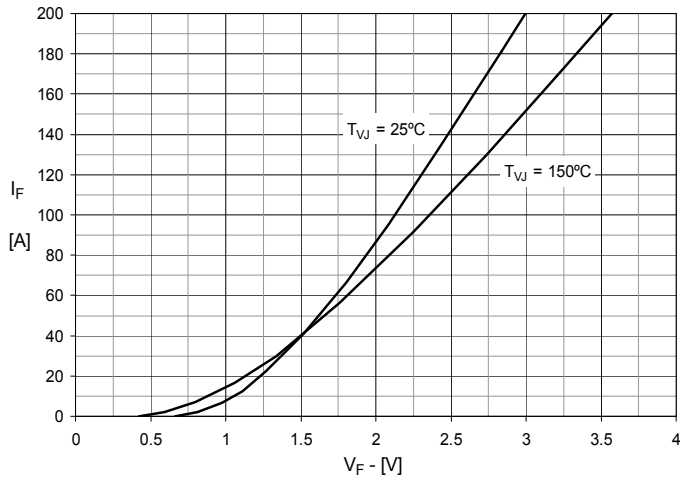


Fig. 23. Typ. Reverse Recovery Charge Q_{rr} vs. $-di_F/dt$

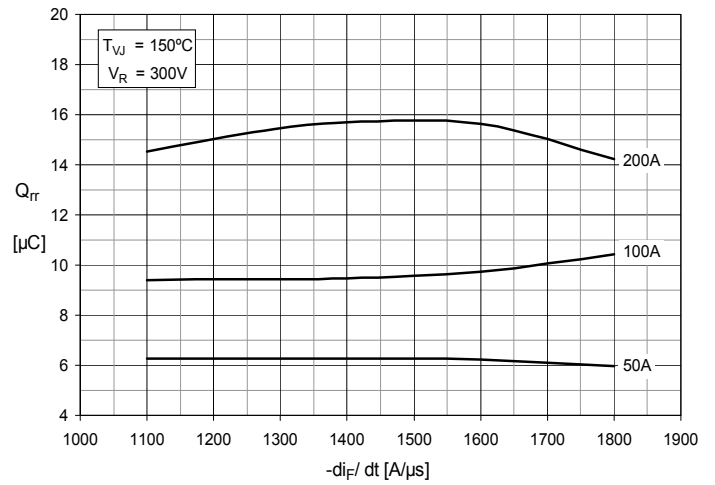


Fig. 24. Typ. Peak Reverse Current I_{RM} vs. $-di_F/dt$

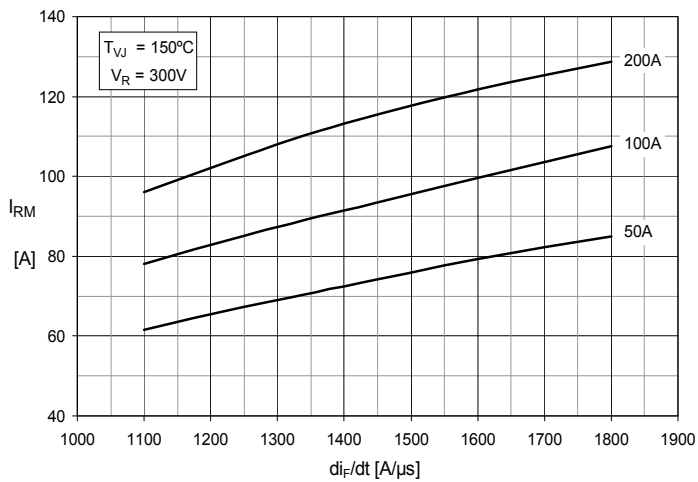


Fig. 25. Typ. Recovery Time t_{rr} vs. $-di_F/dt$

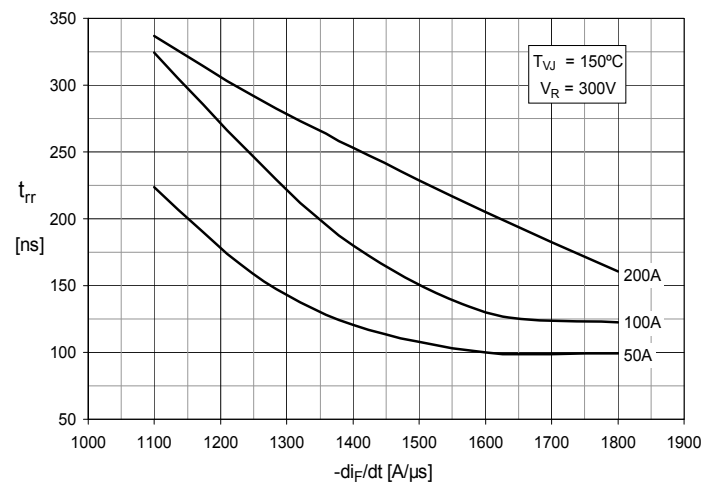
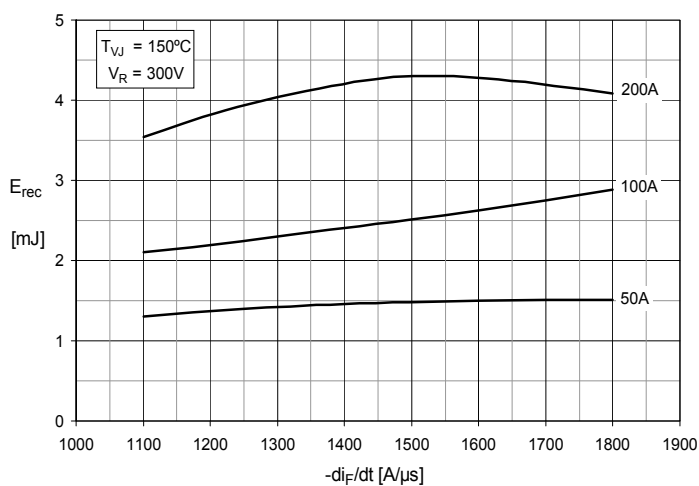


Fig. 26. Typ. Recovery Energy E_{rec} vs. $-di_F/dt$



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