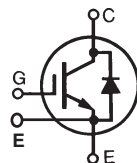


XPT™ 600V IGBT GenX3™ w/ Diode

IXXN100N60B3H1

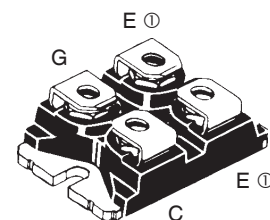


$V_{CES} = 600V$
 $I_{C90} = 100A$
 $V_{CE(sat)} \leq 1.80V$
 $t_{fi(typ)} = 150ns$

Extreme Light Punch Through
IGBT for 10-30kHz 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}	$T_J = 25^\circ C$ to $150^\circ C$	600	V
V_{CGR}	$T_J = 25^\circ C$ to $150^\circ C$, $R_{GE} = 1M\Omega$	600	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ C$ (Chip Calability)	170	A
I_{C90}	$T_C = 90^\circ C$	100	A
I_{F110}	$T_C = 110^\circ C$	50	A
I_{CM}	$T_C = 25^\circ C$, 1ms	440	A
I_A	$T_C = 25^\circ C$	50	A
E_{AS}	$T_C = 25^\circ C$	600	mJ
SSOA (RBSOA)	$V_{GE} = 15V$, $T_{VJ} = 150^\circ C$, $R_G = 2\Omega$ Clamped Inductive Load	$I_{CM} = 200$ @ $V_{CE} \leq V_{CES}$	A
t_{sc} (SCSOA)	$V_{GE} = 15V$, $V_{CE} = 360V$, $T_J = 150^\circ C$ $R_G = 10\Omega$, Non Repetitive	10	μs
P_C	$T_C = 25^\circ C$	500	W
T_J		-55 ... +150	$^\circ C$
T_{JM}		150	$^\circ C$
T_{stg}		-55 ... +150	$^\circ C$
V_{ISOL}	50/60Hz $I_{ISOL} \leq 1mA$	$t = 1min$ $t = 1s$	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

Features

- Optimized for Low Switching Losses
- International Standard Package
- Square RBSOA
- Isolation Voltage 2500V~
- Anti-Parallel Ultra Fast Diode
- Optimized for 10-30kHz Switching
- Avalanche Rated
- Short Circuit Capability
- High Current Handling Capability

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 ($T_J = 25^\circ C$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 250\mu A$, $V_{GE} = 0V$	600		V
$V_{GE(th)}$	$I_C = 250\mu A$, $V_{CE} = V_{GE}$	3.0		5.5 V
I_{CES}	$V_{CE} = V_{CES}$, $V_{GE} = 0V$ $T_J = 125^\circ C$			50 μA 4 mA
I_{GES}	$V_{CE} = 0V$, $V_{GE} = \pm 20V$			± 100 nA
$V_{CE(sat)}$	$I_C = 70A$, $V_{GE} = 15V$, Note 1 $T_J = 150^\circ C$		1.50 1.77	V V

Symbol Test Conditions ($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)		Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$I_C = 60\text{A}, V_{CE} = 10\text{V}, \text{Note 1}$	22	40	S
C_{ies}	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		4860	pF
C_{oes}			475	pF
C_{res}			83	pF
$Q_{g(on)}$	$I_C = 70\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$		143	nC
Q_{ge}			37	nC
Q_{gc}			60	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = 70\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 360\text{V}, R_G = 2\Omega$ Note 2		30	ns
t_{ri}			70	ns
E_{on}			1.9	mJ
$t_{d(off)}$			120	ns
t_{fi}			150	ns
E_{off}		2.0	2.8	mJ
$t_{d(on)}$	Inductive load, $T_J = 150^\circ\text{C}$ $I_C = 70\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 360\text{V}, R_G = 2\Omega$ Note 2		32	ns
t_{ri}			60	ns
E_{on}			2.3	mJ
$t_{d(off)}$			150	ns
t_{fi}			200	ns
E_{off}		2.8	mJ	
R_{thJC}			0.25	$^\circ\text{C}/\text{W}$
R_{thCS}		0.05		$^\circ\text{C}/\text{W}$

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	$I_F = 60\text{A}, V_{GE} = 0\text{V}, \text{Note 1}$		1.6	2.5	V
	$T_J = 150^\circ\text{C}$		1.4	1.8	V
I_{RM}	$I_F = 60\text{A}, V_{GE} = 0\text{V},$ $-di_F/dt = 200\text{A}/\mu\text{s}, V_R = 300\text{V}$		8.3		A
t_{rr}		$T_J = 100^\circ\text{C}$		140	
R_{thJC}				0.42	$^\circ\text{C}/\text{W}$

Notes:

1. Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.
2. Switching times & energy losses may increase for higher $V_{CE}(\text{clamp})$, 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 @ $T_J = 25^\circ\text{C}$

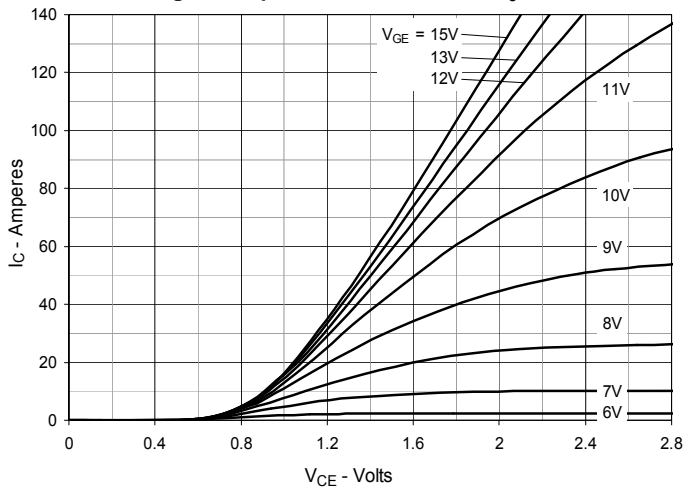


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

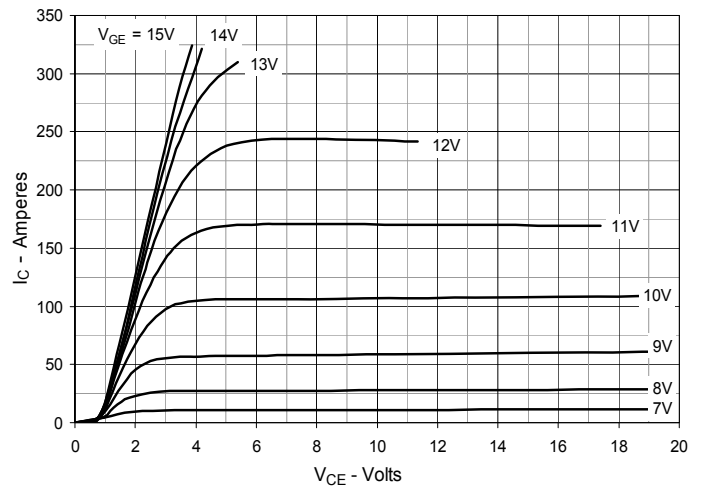


Fig. 3. Output Characteristics @ $T_J = 150^\circ\text{C}$

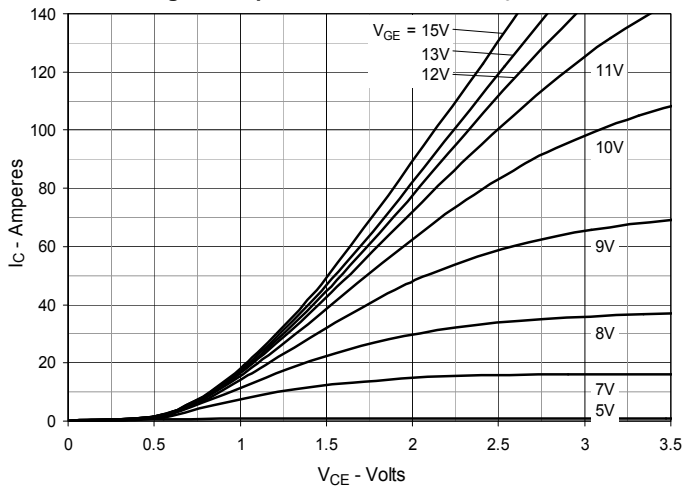


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

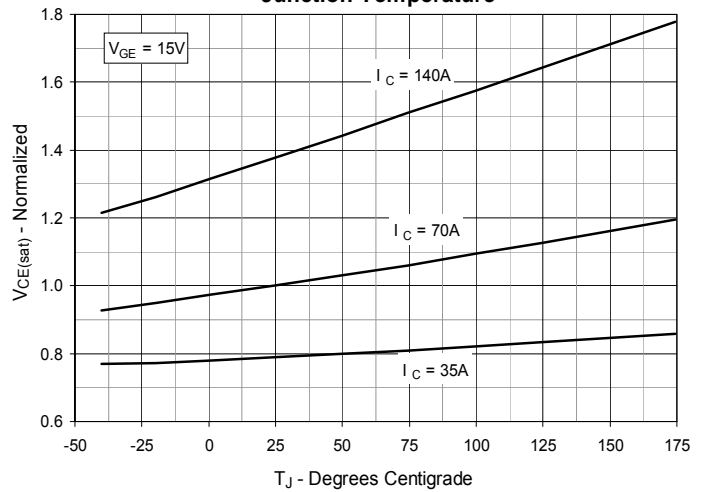


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

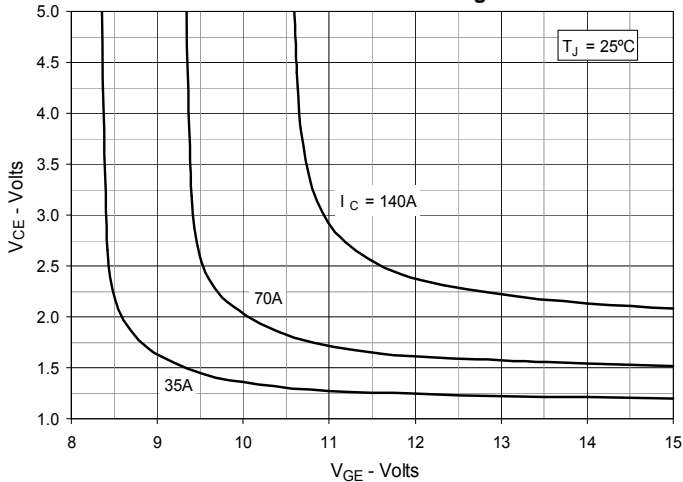


Fig. 6. Input Admittance

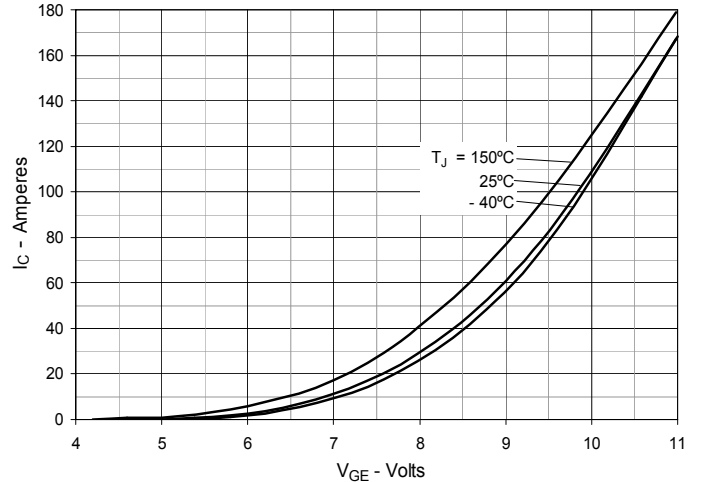


Fig. 7. Transconductance

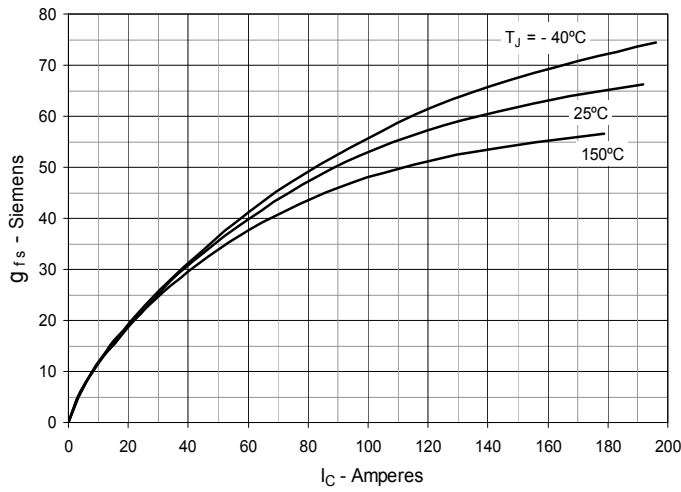


Fig. 8. Gate Charge

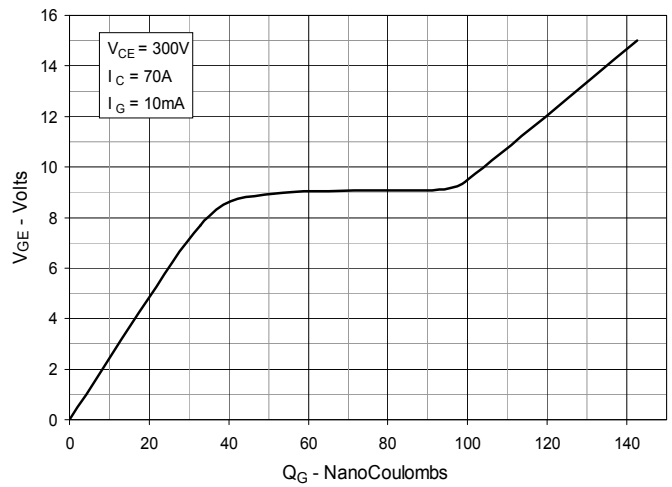


Fig. 9. Capacitance

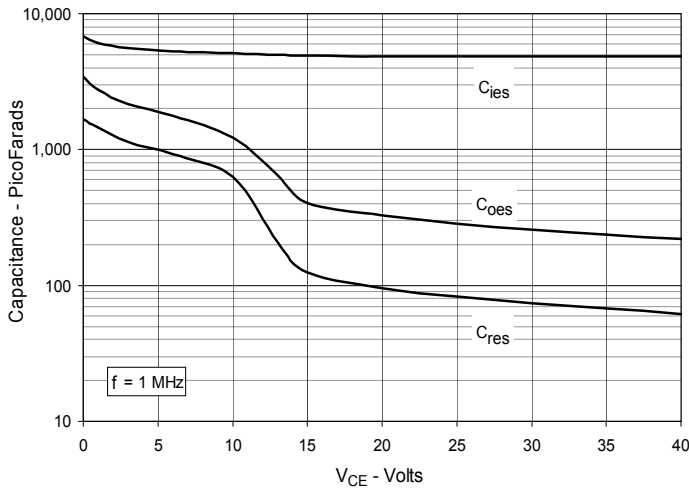


Fig. 10. Reverse-Bias Safe Operating Area

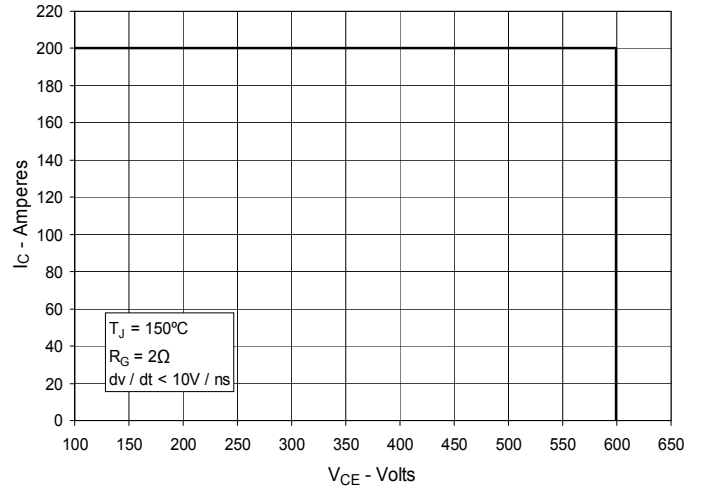


Fig. 11. Forward-Bias Safe Operating Area

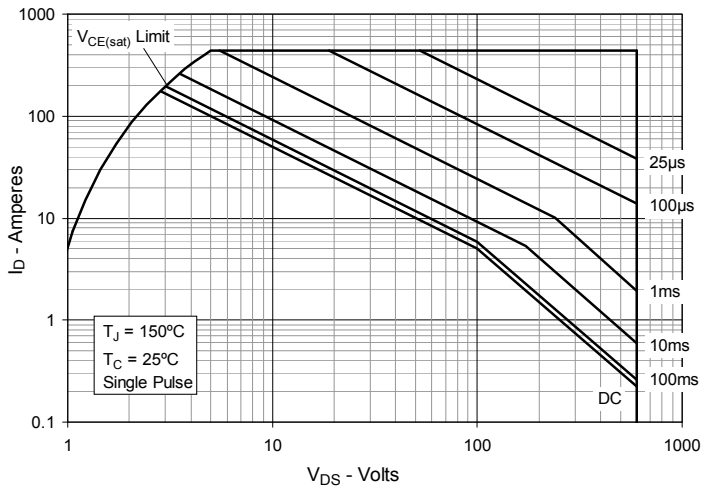


Fig. 12. Maximum Transient Thermal Impedance

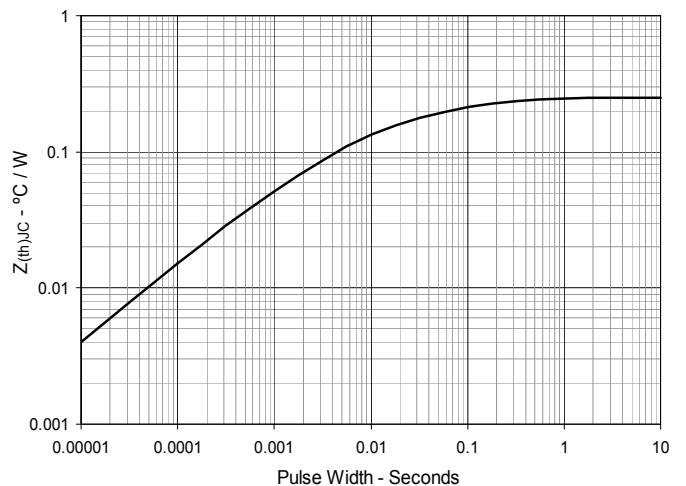


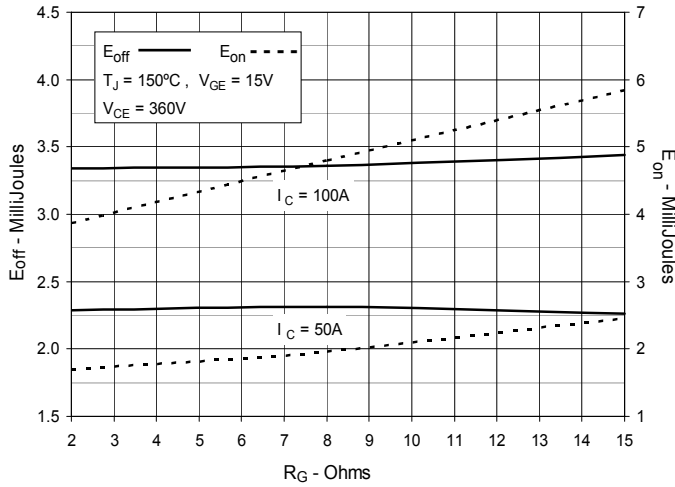
Fig. 13. Inductive Switching Energy Loss vs. Gate Resistance

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

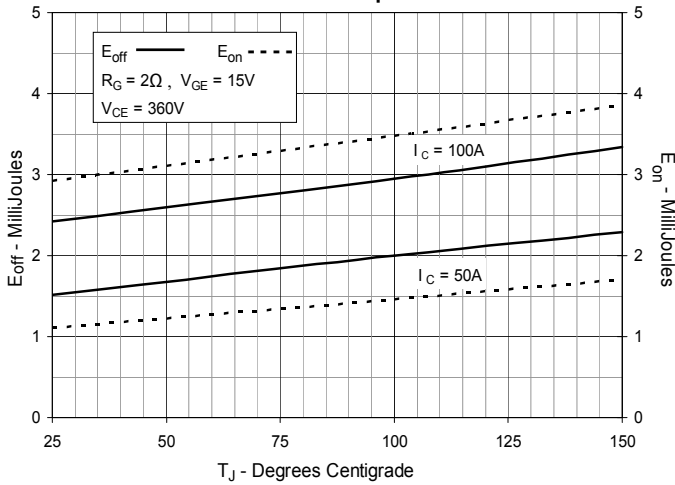
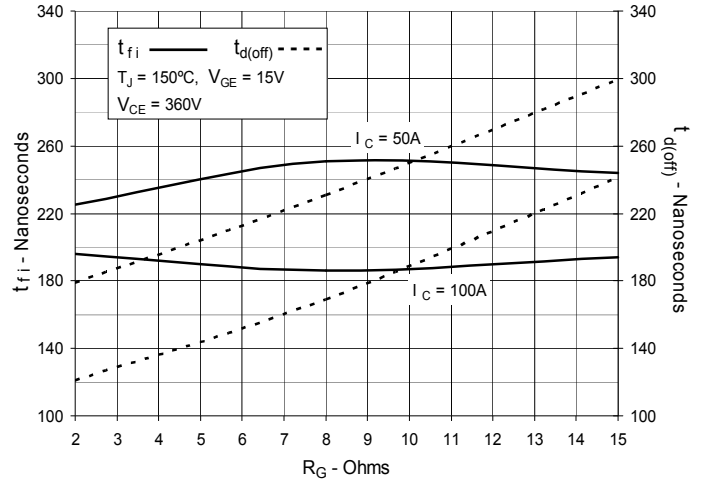
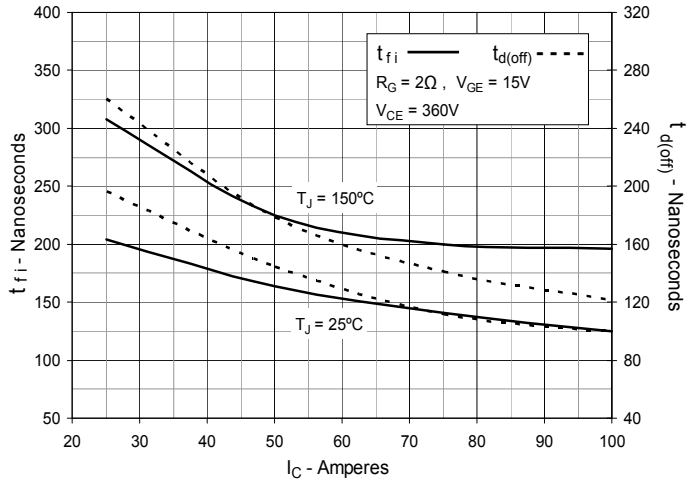
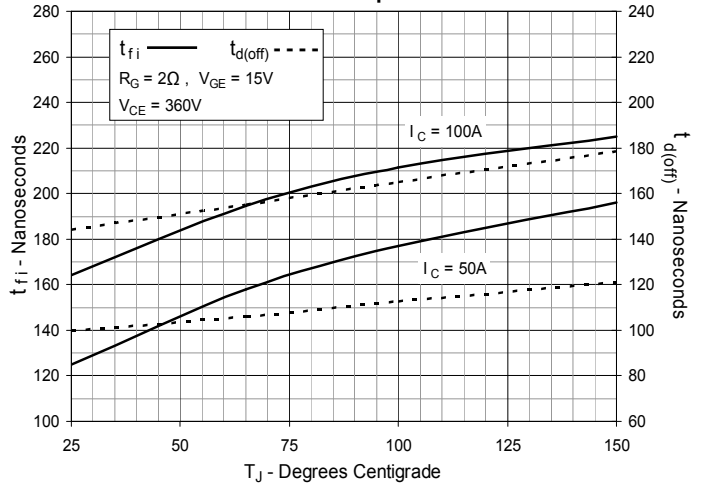
Fig. 15. Inductive Switching Energy Loss vs. Junction Temperature

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

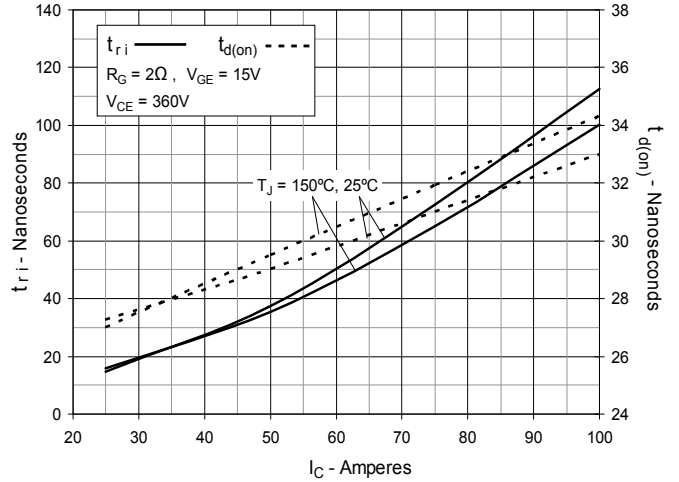
Fig. 20. Inductive Turn-on Switching Times vs. Collector Current

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




Fig. 22. Forward Current I_F Versus V_F



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

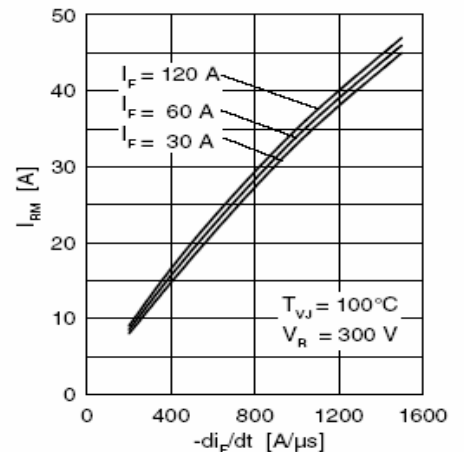


Fig. 24. Peak Reverse Current I_{RM} Versus $-di_F/dt$

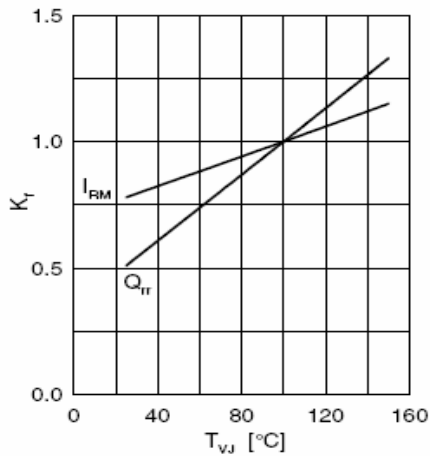


Fig. 25. Dynamic Parameters Q_{rr} , I_{RM} Versus T_{VJ}

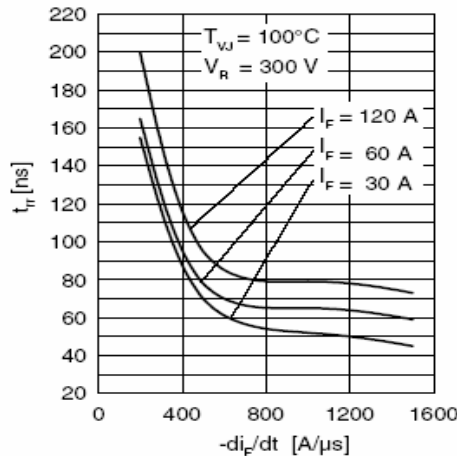


Fig. 26. Recovery Time t_{rr} Versus $-di_F/dt$

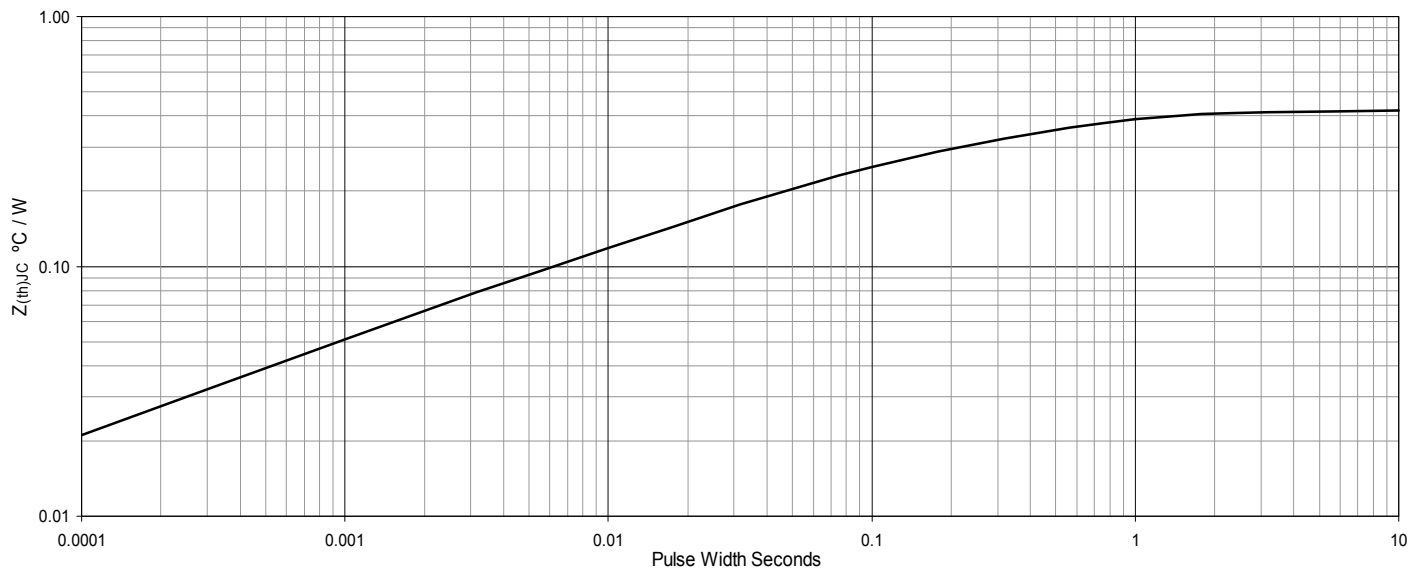


Fig. 27. Maximum Transient Thermal Impedance



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