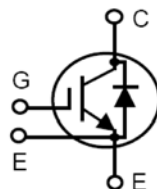


XPT™ 650V GenX3™ w/ Diode

IXYN100N65B3D1

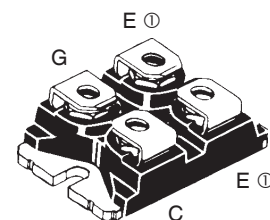
Extreme Light Punch Through
IGBT for 10-30kHz Switching



$$\begin{aligned} V_{CES} &= 650V \\ I_{C110} &= 100A \\ V_{CE(sat)} &\leq 1.85V \\ t_{fi(typ)} &= 73ns \end{aligned}$$

SOT-227B, miniBLOC

E153432



G = Gate, C = Collector, E = Emitter
Ⓢ 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 175°C	650	V
V_{CGR}	$T_J = 25^\circ\text{C}$ to 175°C , $R_{GE} = 1M\Omega$	650	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$	185	A
I_{C110}	$T_C = 110^\circ\text{C}$	100	A
I_{F110}	$T_C = 110^\circ\text{C}$	67	A
I_{CM}	$T_C = 25^\circ\text{C}$, 1ms	490	A
I_A	$T_C = 25^\circ\text{C}$	50	A
E_{AS}	$T_C = 25^\circ\text{C}$	600	mJ
SSOA (RBSOA)	$V_{GE} = 15V$, $T_{VJ} = 150^\circ\text{C}$, $R_G = 3\Omega$ Clamped Inductive Load	$I_{CM} = 200$ @ $V_{CE} \leq V_{CES}$	A
t_{sc} (SCSOA)	$V_{GE} = 15V$, $V_{CE} = 360V$, $T_J = 150^\circ\text{C}$ $R_G = 82\Omega$, Non Repetitive	8	μs
P_C	$T_C = 25^\circ\text{C}$	600	W
T_J		-55 ... +175	$^\circ\text{C}$
T_{JM}		175	$^\circ\text{C}$
T_{stg}		-55 ... +175	$^\circ\text{C}$
V_{ISOL}	50/60Hz $I_{ISOL} \leq 1\text{mA}$	$t = 1\text{min}$ $t = 1\text{s}$	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

Features

- International Standard Package
- miniBLOC, with Aluminium Nitride Isolation
- 2500V~ Isolation Voltage
- Anti-Parallel Diode
- Optimized for 10-30kHz Switching
- Square RBSOA
- Short Circuit Capability
- High Current Handling Capability

Advantages

- High Power Density
- Low Gate Drive Requirement

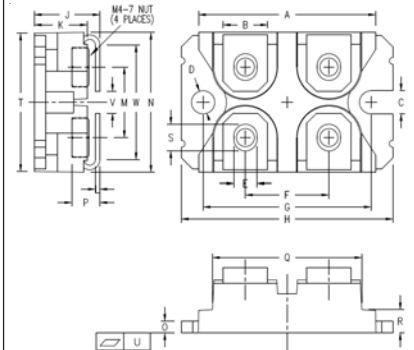
Applications

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

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 250\mu\text{A}$, $V_{GE} = 0V$	650		V
$V_{GE(th)}$	$I_C = 250\mu\text{A}$, $V_{CE} = V_{GE}$	3.5		6.0 V
I_{CES}	$V_{CE} = V_{CES}$, $V_{GE} = 0V$ $T_J = 150^\circ\text{C}$			50 μA 3 mA
I_{GES}	$V_{CE} = 0V$, $V_{GE} = \pm 20V$			± 100 nA
$V_{CE(sat)}$	$I_C = 70A$, $V_{GE} = 15V$, Note 1 $T_J = 150^\circ\text{C}$		1.53 1.77	1.85 V V

Symbol Test Conditions ($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)		Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$I_C = 60\text{A}, V_{CE} = 10\text{V}$, Note 1	30	55	S
C_{ies}	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		4740	pF
C_{oes}			470	pF
C_{res}			103	pF
$Q_{g(on)}$	$I_C = 100\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$		168	nC
Q_{ge}			30	nC
Q_{gc}			78	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = 50\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 400\text{V}, R_G = 3\Omega$ Note 2		29	ns
t_{ri}			37	ns
E_{on}			1.27	mJ
$t_{d(off)}$			150	ns
t_{fi}			73	ns
E_{off}			1.37	2.00 mJ
$t_{d(on)}$	Inductive load, $T_J = 150^\circ\text{C}$ $I_C = 50\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 400\text{V}, R_G = 3\Omega$ Note 2		28	ns
t_{ri}			37	ns
E_{on}			2.35	mJ
$t_{d(off)}$			198	ns
t_{fi}			160	ns
E_{off}			2.16	mJ
R_{thJC}			0.25	$^\circ\text{C/W}$
R_{thCS}		0.05		$^\circ\text{C/W}$

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	1.489	1.505	37.80	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
V	.130	.180	3.30	4.57
W	.780	.830	19.81	21.08

Reverse Diode (FRD)

Symbol Test Conditions ($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)		Characteristic Values		
		Min.	Typ.	Max.
V_F	$I_F = 100\text{A}, V_{GE} = 0\text{V}$, Note 1 $T_J = 150^\circ\text{C}$		2.25 1.70	V V
I_{RM}	$I_F = 100\text{A}, V_{GE} = 0\text{V}, T_J = 150^\circ\text{C}$ $-di_F/dt = 700\text{A}/\mu\text{s}, V_R = 400\text{V}$		45	A
t_{rr}			162	ns
R_{thJC}			0.40	$^\circ\text{C/W}$

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 .

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.

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 @ $T_J = 25^\circ\text{C}$

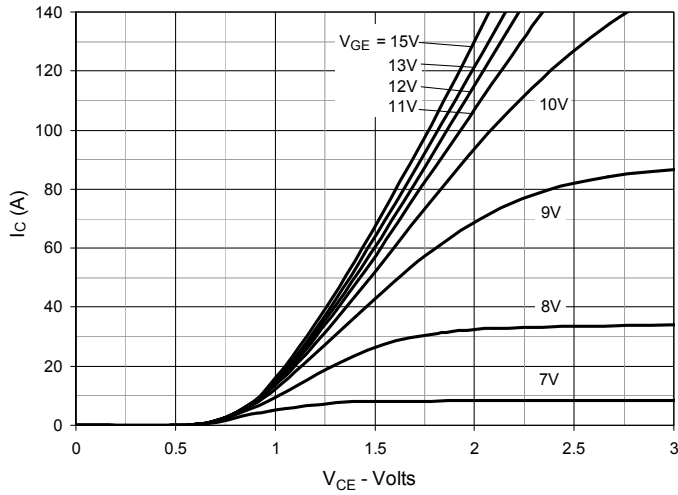


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

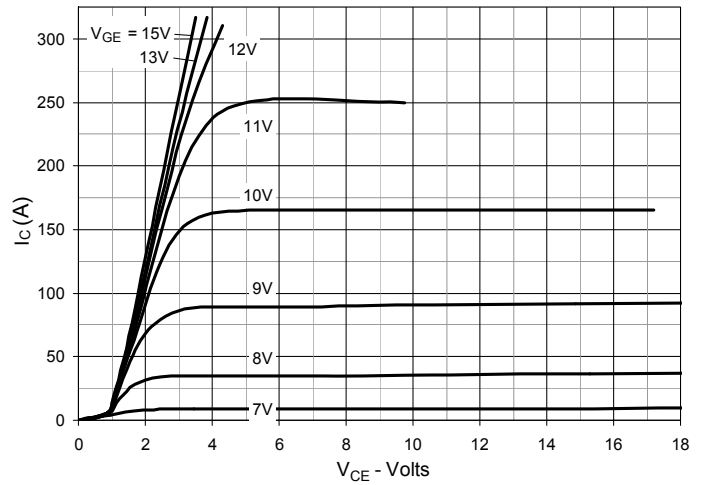


Fig. 3. Output Characteristics @ $T_J = 150^\circ\text{C}$

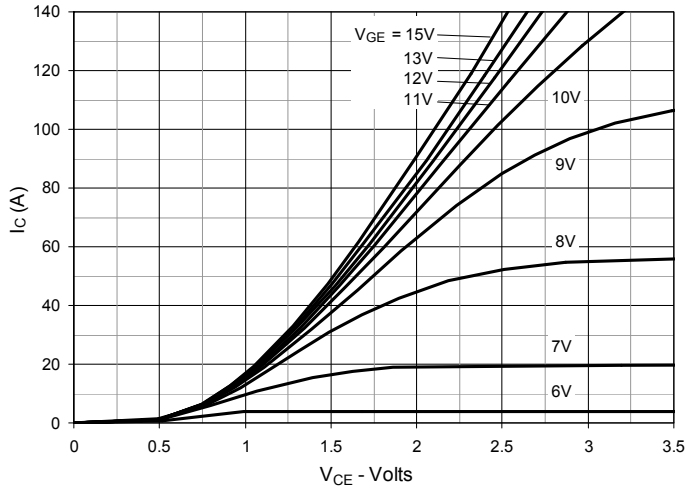


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

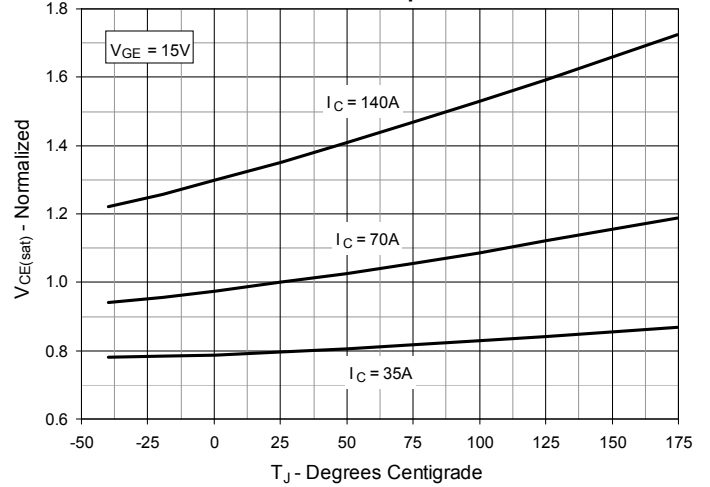


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

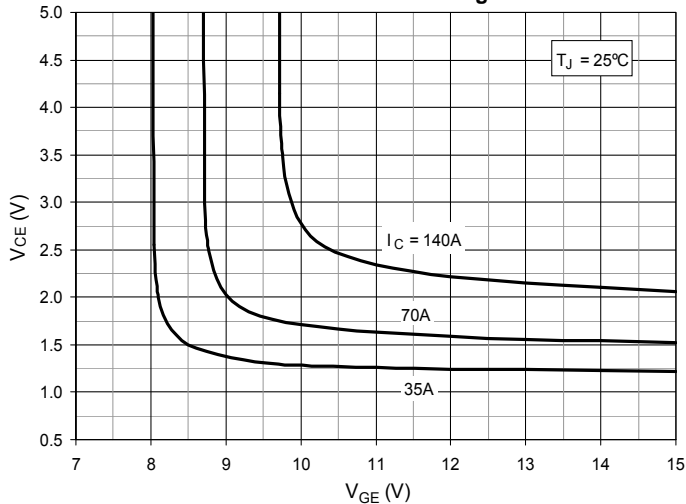


Fig. 6. Input Admittance

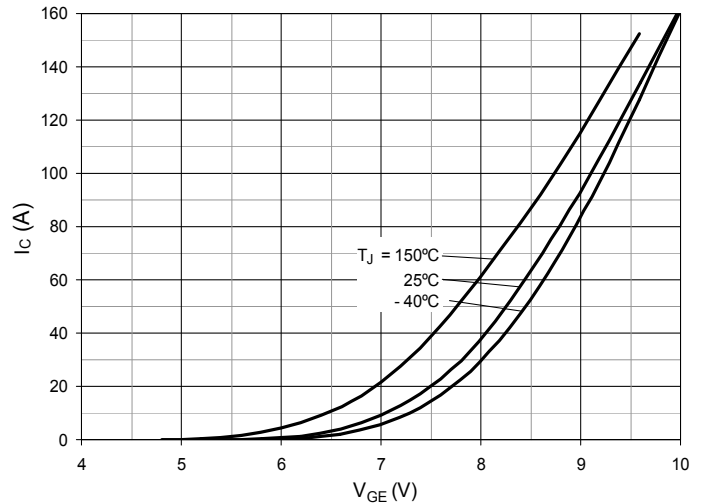


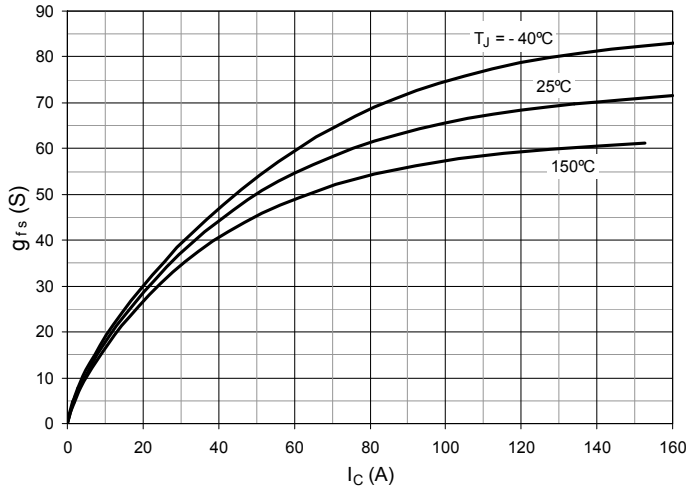
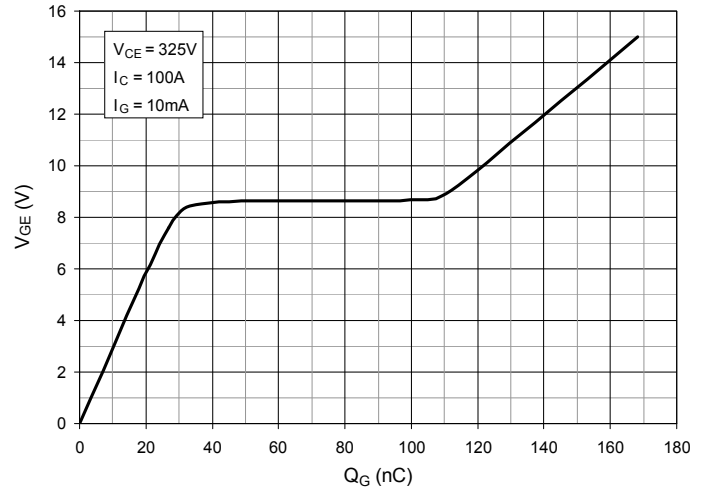
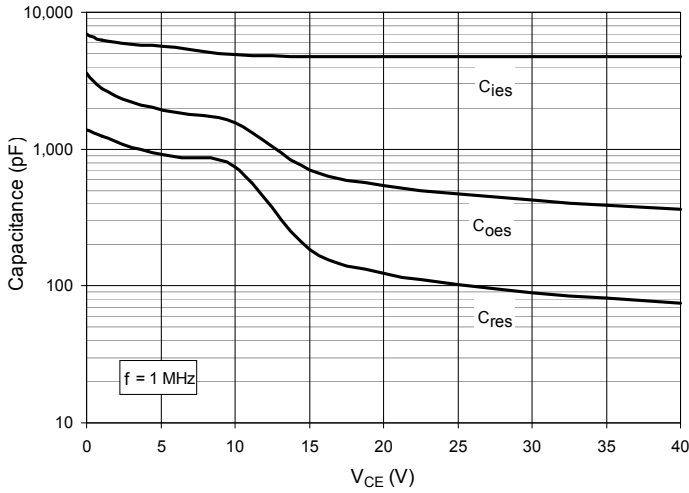
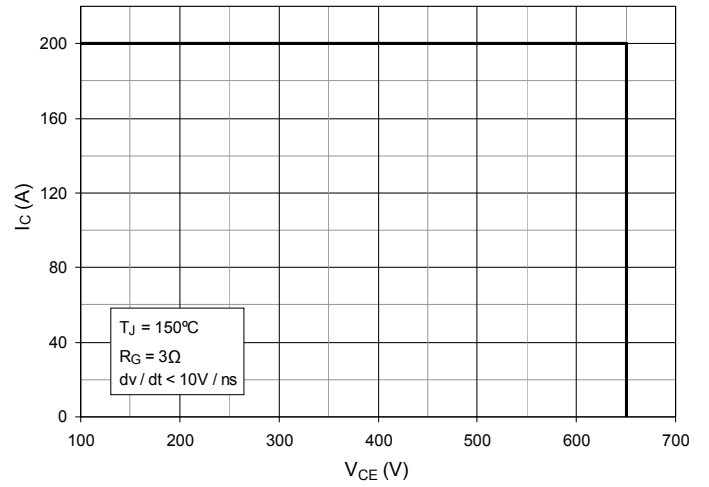
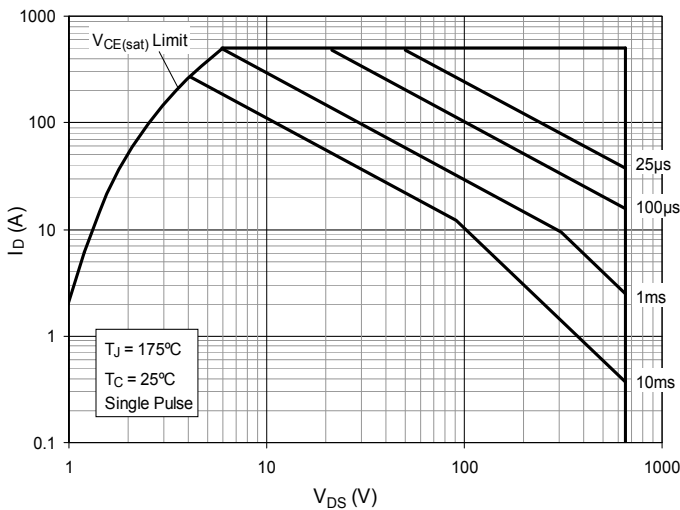
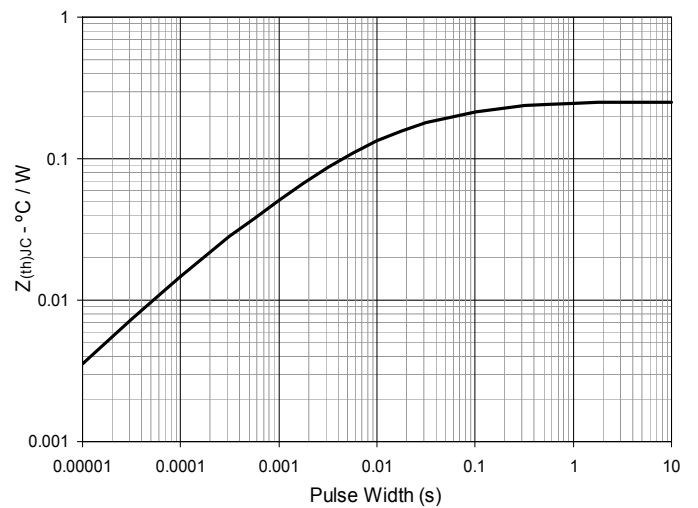
Fig. 7. Transconductance

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 (IGBT)


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

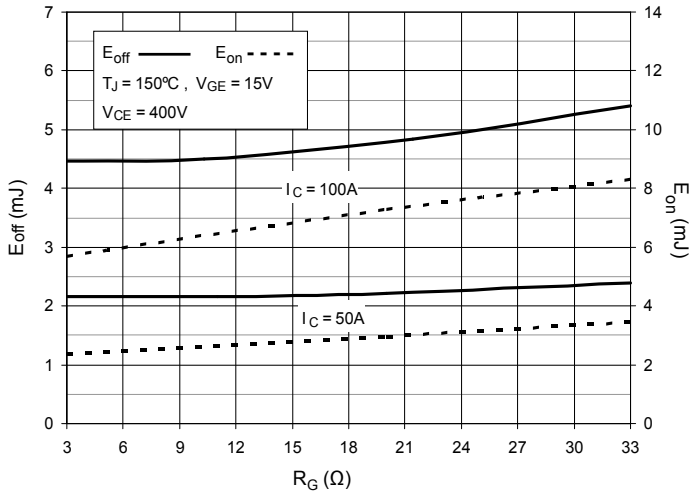


Fig. 14. Inductive Switching Energy Loss vs. Collector Current

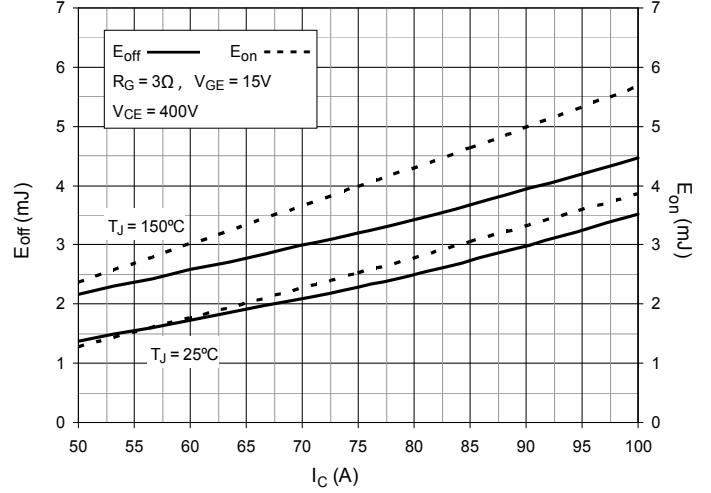


Fig. 15. Inductive Switching Energy Loss vs. Junction Temperature

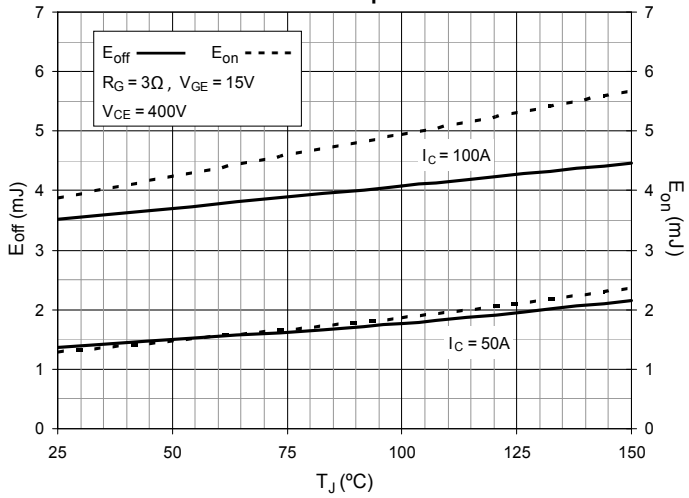


Fig. 16. Inductive Turn-off Switching Times vs. Gate Resistance

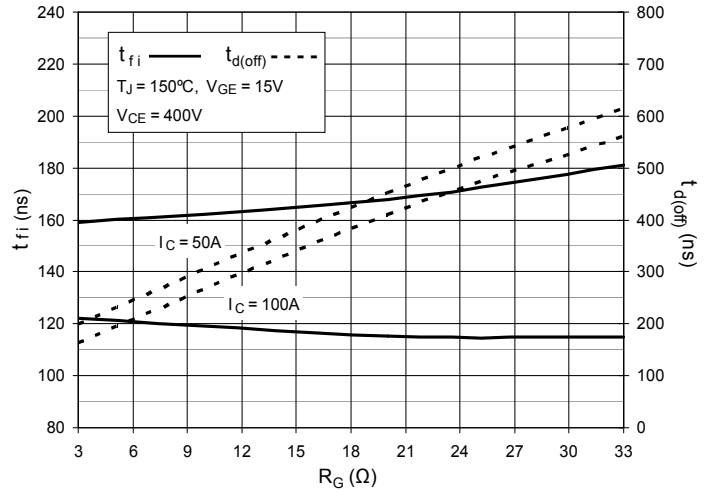


Fig. 17. Inductive Turn-off Switching Times vs. Collector Current

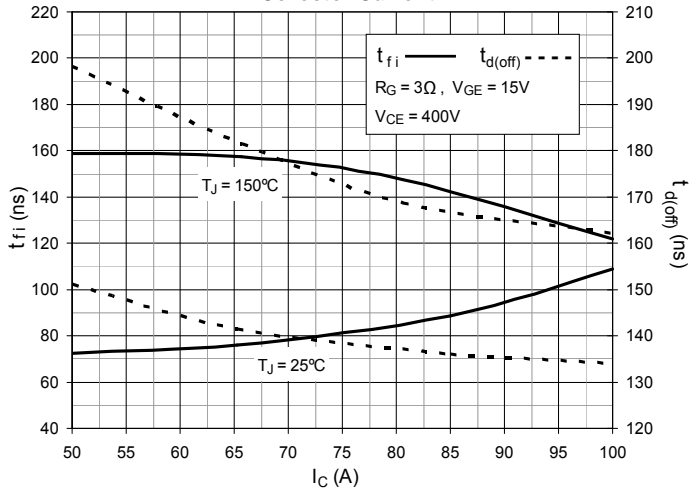


Fig. 18. Inductive Turn-off Switching Times vs. Junction Temperature

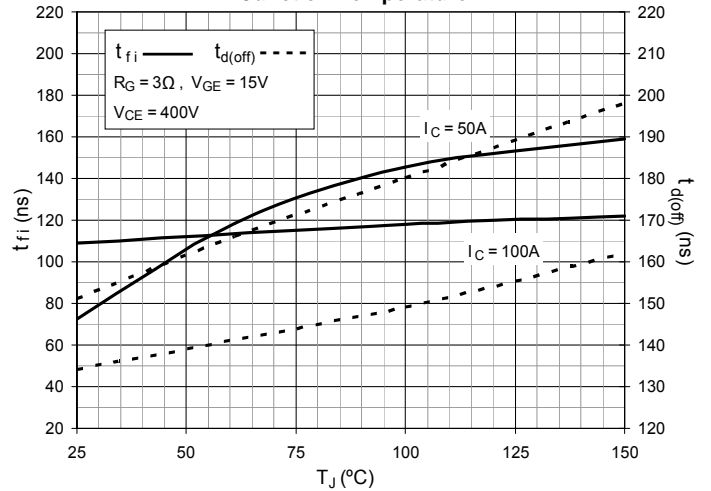


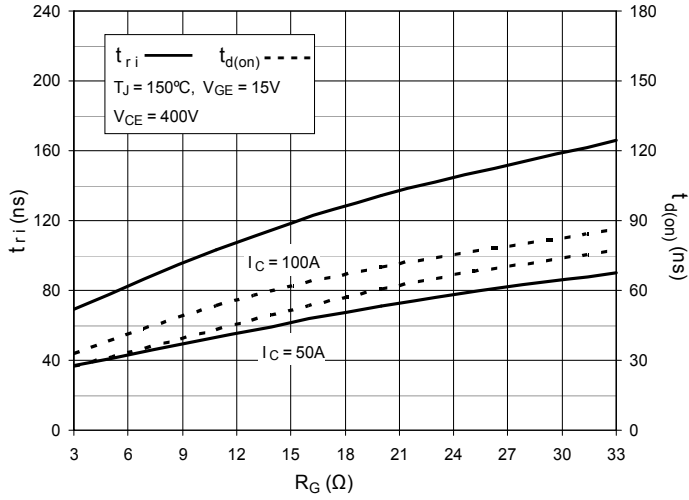
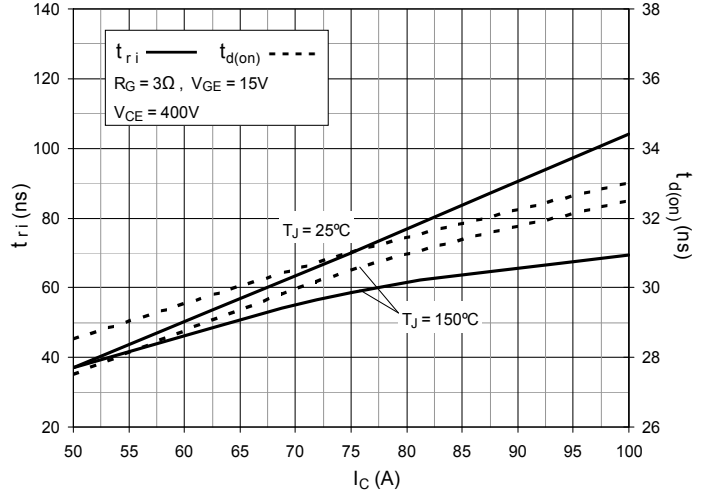
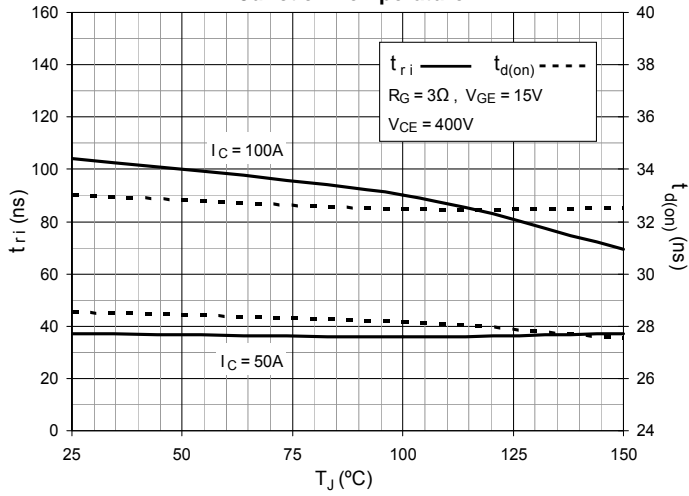
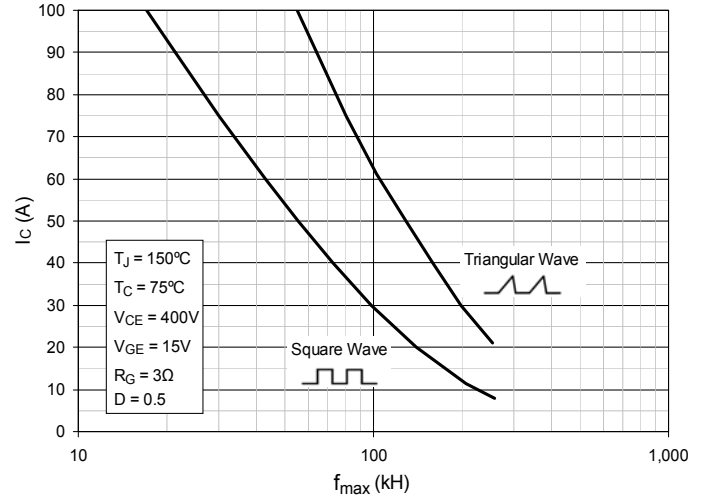
Fig. 19. Inductive Turn-on Switching Times vs. Gate Resistance

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

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

Fig. 22. Maximum Peak Load Current vs. Frequency


Fig. 23. Diode Forward Characteristics

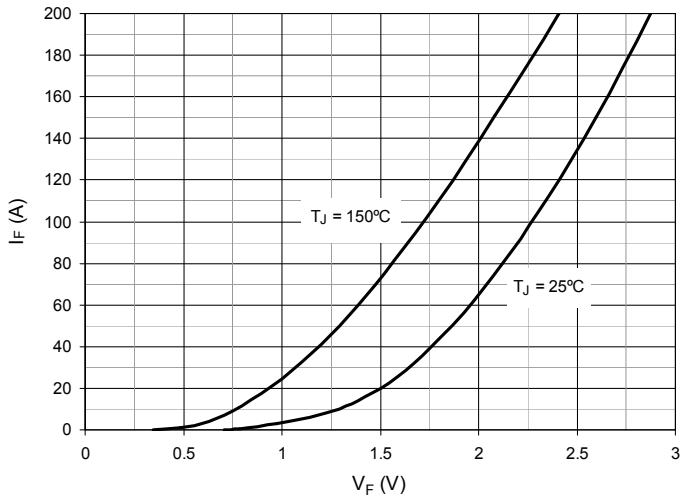


Fig. 24. Reverse Recovery Charge vs. $-di_F/dt$

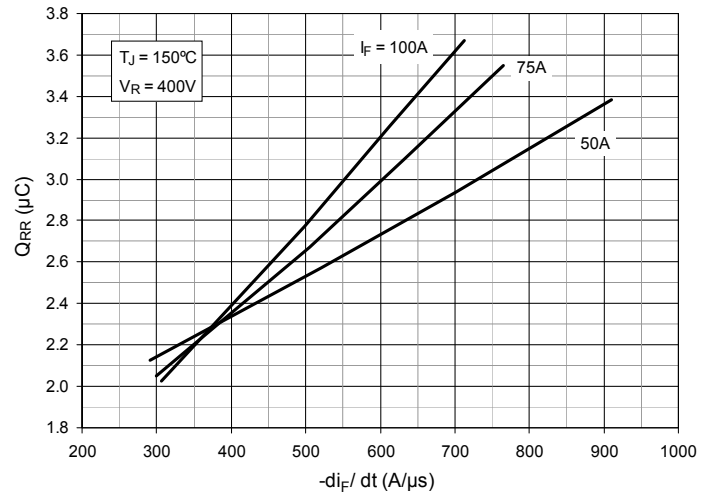


Fig. 25. Reverse Recovery Current vs. $-di_F/dt$

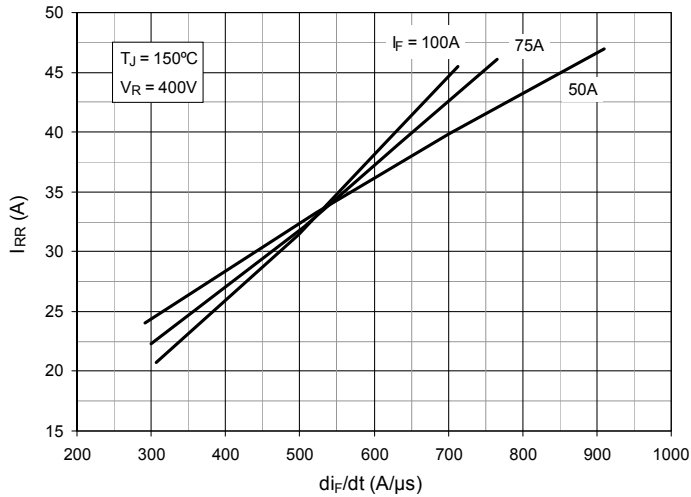


Fig. 26. Reverse Recovery Time vs. $-di_F/dt$

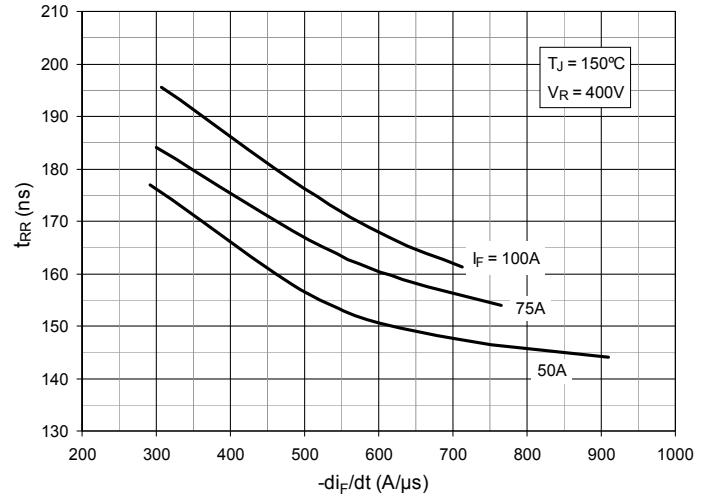


Fig. 27. Dynamic Parameters Q_{RR} , I_{RR} vs. Junction Temperature

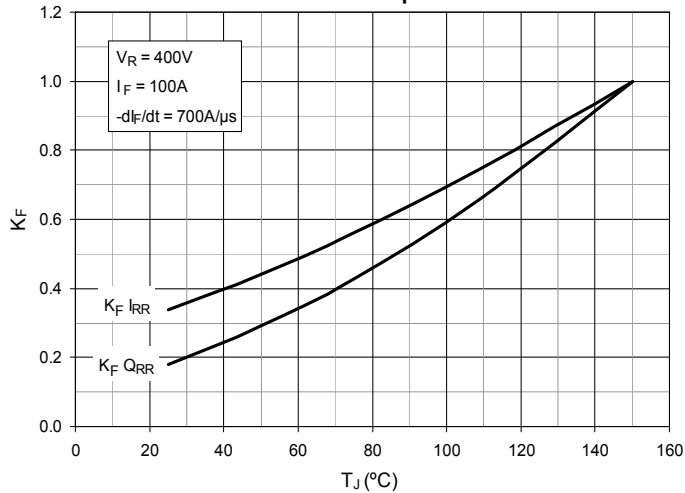
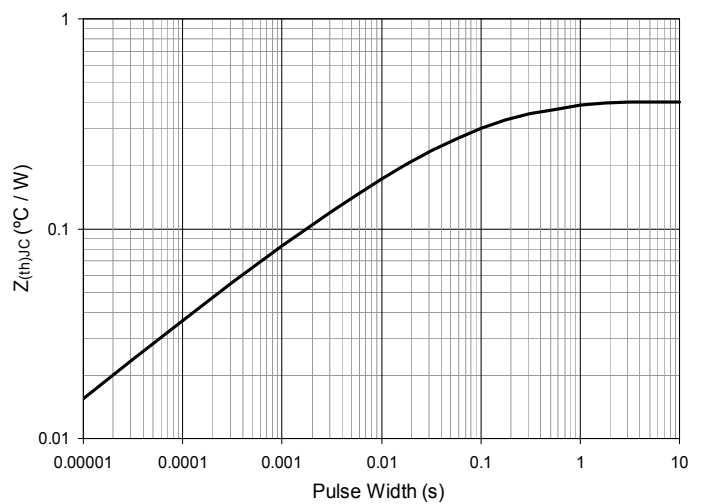


Fig. 28. Maximum Transient Thermal Impedance (Diode)





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