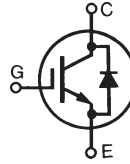


XPT™ 750V IGBT GenX4™ w/Diode

IXXX100N75B4H1 IXXK100N75B4H1

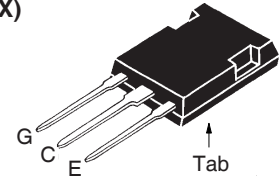
$$\begin{aligned} V_{CES} &= 750V \\ I_{C110} &= 100A \\ V_{CE(sat)} &\leq 2.10V \\ t_{fi(typ)} &= 110ns \end{aligned}$$

Extreme Light Punch Through
IGBT for 10-30kHz Switching

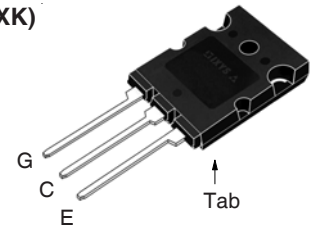


Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C}$ to 175°C	750	V
V_{CGR}	$T_J = 25^\circ\text{C}$ to 175°C , $R_{GE} = 1M\Omega$	750	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$ (Chip Capability)	240	A
I_{LRMS}	Terminal Current Limit	160	A
I_{C110}	$T_C = 110^\circ\text{C}$	100	A
I_{F110}	$T_C = 110^\circ\text{C}$	120	A
I_{CM}	$T_C = 25^\circ\text{C}$, 1ms	580	A
SSOA (RBSOA)	$V_{GE} = 15V$, $T_{VJ} = 150^\circ\text{C}$, $R_G = 2\Omega$ Clamped Inductive Load	$I_{CM} = 200$ $V_{CE} \leq V_{CES}$	A
T_{SC} (SCSOA)	$V_{GE} = 15V$, $T_J = 150^\circ\text{C}$, $R_G = 20\Omega$, $V_{CE} = 400V$, Non-Repetitive	10	μs
P_C	$T_C = 25^\circ\text{C}$	880	W
T_J		-55 ... +175	$^\circ\text{C}$
T_{JM}		175	$^\circ\text{C}$
T_{stg}		-55 ... +175	$^\circ\text{C}$
T_L	Maximum Lead Temperature for Soldering	300	$^\circ\text{C}$
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	$^\circ\text{C}$
M_d	Mounting Torque (TO-264)	1.13/10	Nm/lb.in
F_C	Mounting Force (PLUS247)	20..120 / 4.5..27	N/lb
Weight	PLUS247	6	g
	TO-264	10	g

PLUS247
(IXXX)



TO-264
(IXXK)



G = Gate C = Collector
E = Emitter Tab = Collector

Features

- Optimized for 10-30kHz Switching
- Square RBSOA
- High Current Handling Capability
- International Standard Packages

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 ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 250\mu\text{A}$, $V_{GE} = 0V$	750		V
$V_{GE(th)}$	$I_C = 250\mu\text{A}$, $V_{CE} = V_{GE}$	4.0		6.5 V
I_{CES}	$V_{CE} = V_{CES}$, $V_{GE} = 0V$ $T_J = 125^\circ\text{C}$			25 μA 5 mA
I_{GES}	$V_{CE} = 0V$, $V_{GE} = \pm 20V$			± 100 nA
$V_{CE(sat)}$	$I_C = 100A$, $V_{GE} = 15V$, Note 1 $T_J = 150^\circ\text{C}$	1.74 2.07		2.10 V V

Symbol Test Conditions

($T_1 = 25^\circ\text{C}$ Unless Otherwise Specified)

Characteristic Values

(T _J = 25°C Unless Otherwise Specified)		Min.	Typ.	Max.
g_{fs}	I _C = 60A, V _{CE} = 10V, Note 1	32	54	S
C_{ies}	$V_{CE} = 25V, V_{GE} = 0V, f = 1MHz$		4420	pF
C_{oes}			415	pF
C_{res}			98	pF
Q_{g(on)}			165	nC
Q_{ge}	$I_C = 100A, V_{GE} = 15V, V_{CE} = 0.5 \cdot V_{CES}$		43	nC
Q_{gc}			62	nC
t_{d(on)}	Inductive load, T_J = 25°C $I_C = 50A, V_{GE} = 15V$ $V_{CE} = 400V, R_G = 2\Omega$ Note 2		27	ns
t_{ri}			44	ns
E_{on}			2.75	mJ
t_{d(off)}			155	ns
t_{fi}			110	ns
E_{off}			1.75	mJ
t_{d(on)}	Inductive load, T_J = 150°C $I_C = 50A, V_{GE} = 15V$ $V_{CE} = 400V, R_G = 2\Omega$ Note 2		24	ns
t_{ri}			43	ns
E_{on}			4.00	mJ
t_{d(off)}			190	ns
t_{fi}			236	ns
E_{off}			3.00	mJ
R_{thJC}			0.15	0.17 °C/W
R_{thCS}				°C/W

Reverse Diode (FRD)

Symbol Test Conditions

($T_1 = 25^\circ\text{C}$ Unless Otherwise Specified)

Characteristic Values

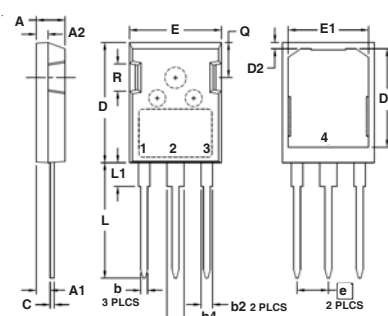
(T _J = 25°C Unless Otherwise Specified)		Min.	Typ.	Max.
V _F	I _F = 100A, V _{GE} = 0V, Note 1 T _J = 150°C		1.5 1.7	2.2 V
I _{RM} t _{rr}	I_F = 100A, V_{GE} = 0V, T_J = 150°C -di_F/dt = 500A/μs, V_R = 400V		37 245	A ns
R _{thJC}				0.20 °C/W

Notes:

1. Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.
2. Switching times & energy losses may increase for higher $V_{\text{GE}}(\text{Clamp})$, T_{J} or R_{G} .

ADVANCE TECHNICAL INFORMATION

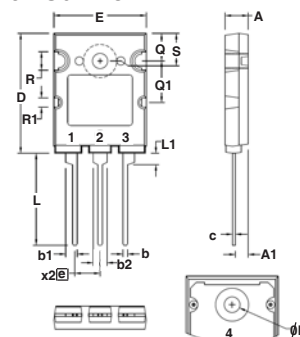
The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

PLUS247™ Outline

Terminals: 1 - Gate
2,4 - Collector
3 - Emitter

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
b2	.075	.087	1.91	2.20
b4	.115	.126	2.92	3.20
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
D1	.650	.690	16.51	17.53
D2	.035	.050	0.89	1.27
E	.620	.635	15.75	16.13
E1	.520	.560	13.08	14.22
e	.215 BSC		5.45 BSC	
L	.780	.810	19.81	20.57
L1	.150	.170	3.81	4.32
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83

TO-264 Outline



Terminals: 1 = Gate
2,4 = Collector
3 = Emitter

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.209	4.70	5.30
A1	.102	.118	2.60	3.00
b	.035	.049	0.90	1.25
b1	.091	.106	2.30	2.70
b2	.110	.126	2.80	3.20
c	.020	.033	0.50	0.85
D	1.012	1.035	25.70	26.30
E	.776	.799	19.70	20.30
e	.215 BSC		5.46 BSC	
L	.768	.807	19.50	20.50
L1	.091	.106	2.30	2.70
øP	.122	.138	3.10	3.50
Q	.228	.244	5.80	6.20
Q1	.346	.362	8.80	9.20
øR	.150	.165	3.80	4.20
øR1	.071	.087	1.80	2.20
S	.228	.244	5.80	6.20

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	6,771,463	6,771,478 B2	7,071,537	

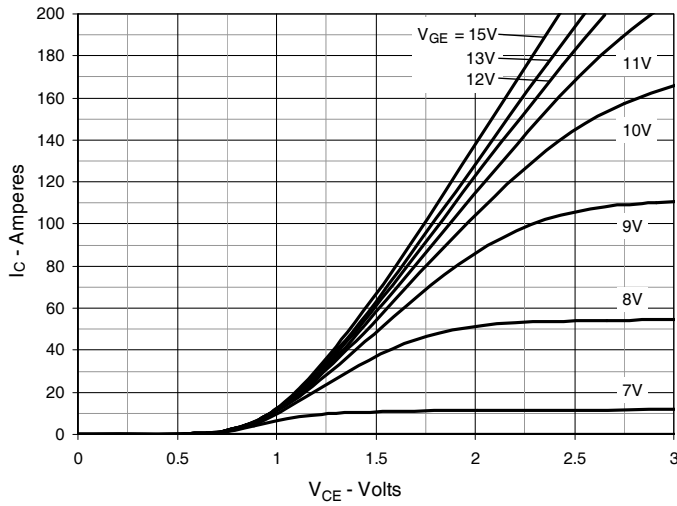
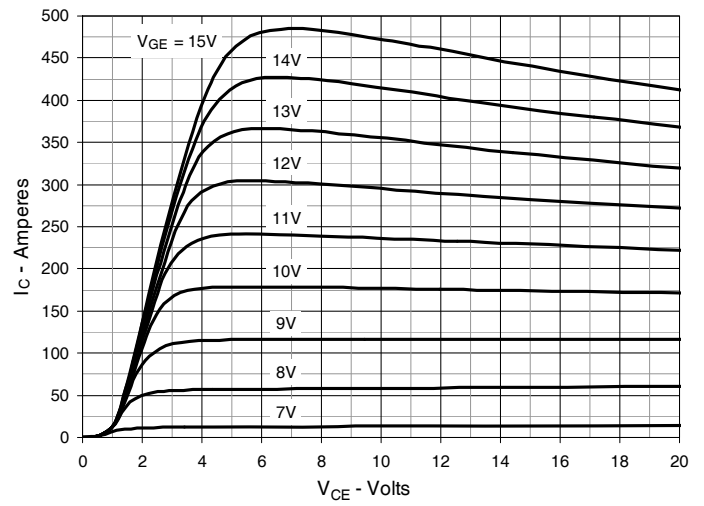
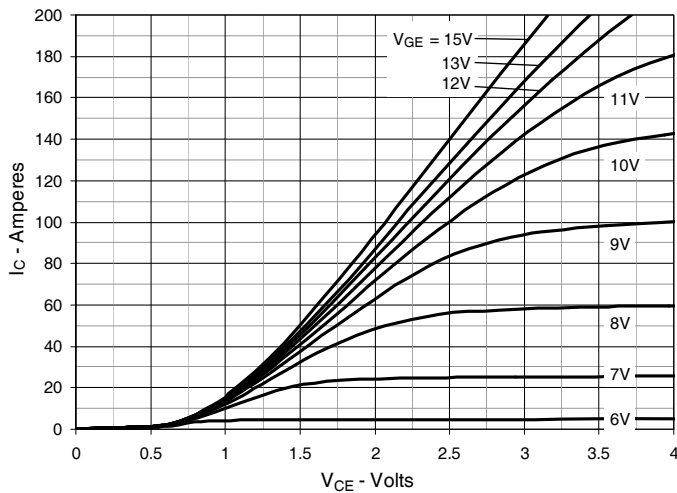
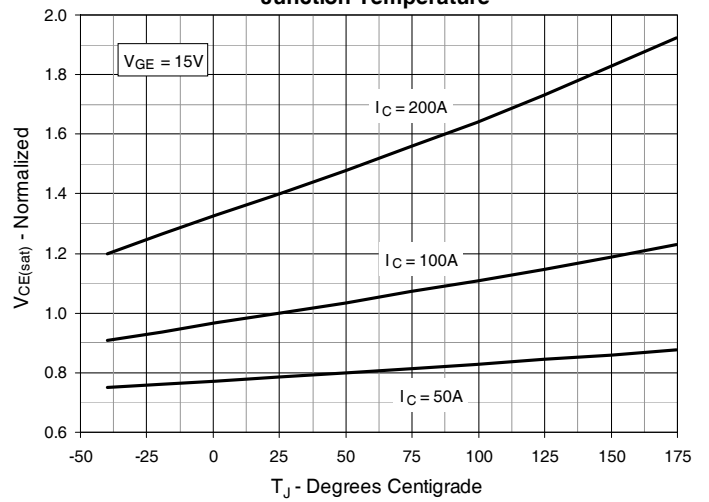
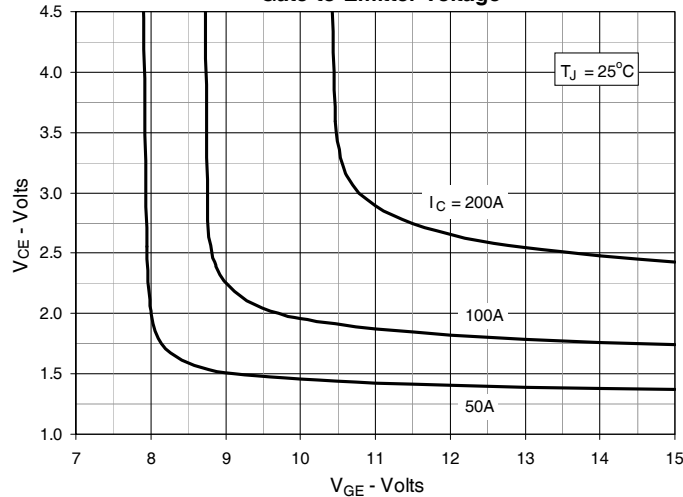
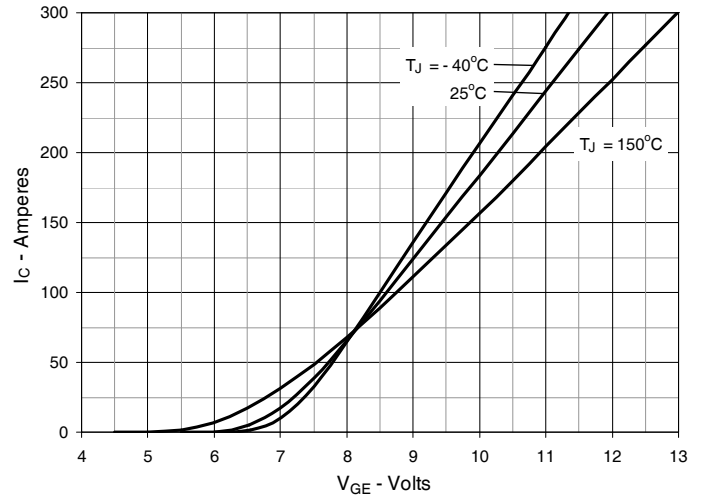
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

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

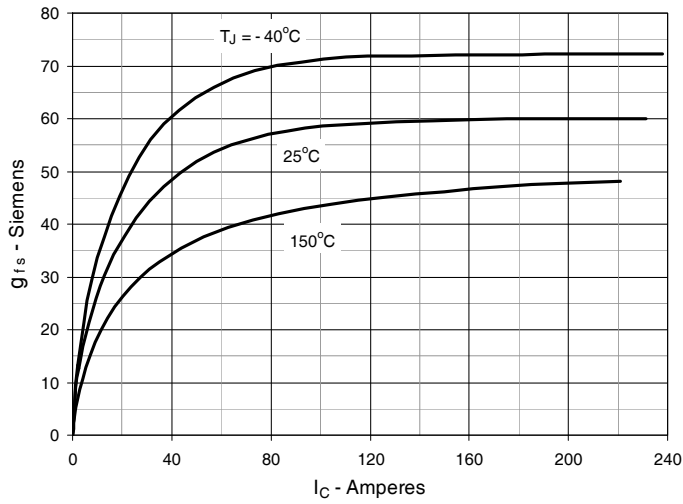


Fig. 8. Gate Charge

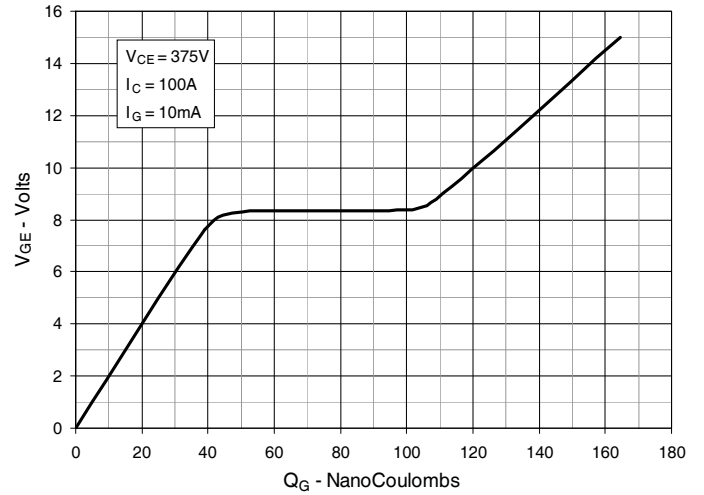


Fig. 9. Capacitance

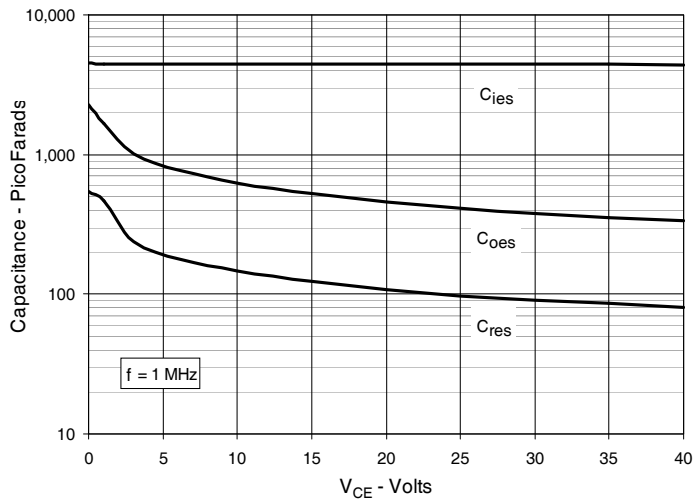


Fig. 10. Reverse-Bias Safe Operating Area

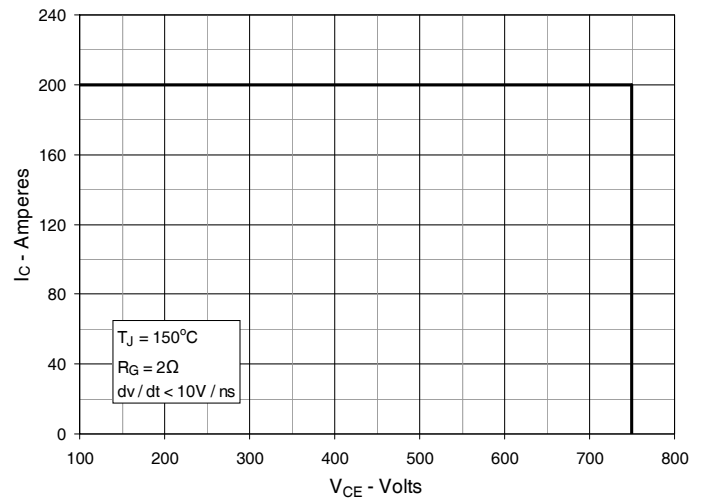


Fig. 11. Maximum Transient Thermal Impedance (IGBT)

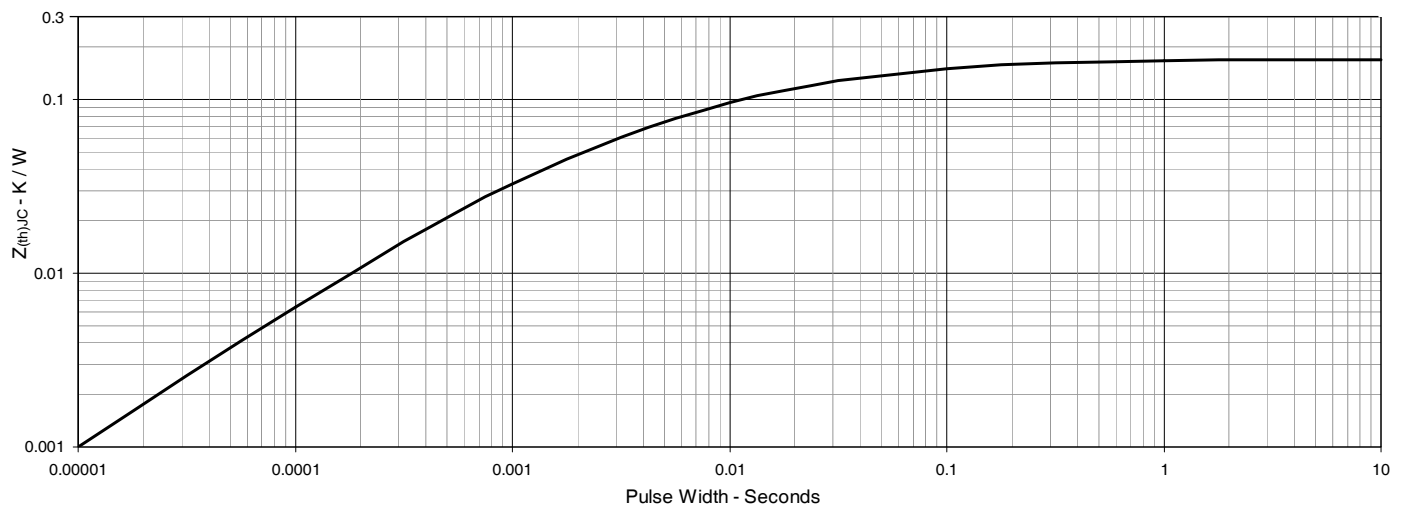


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

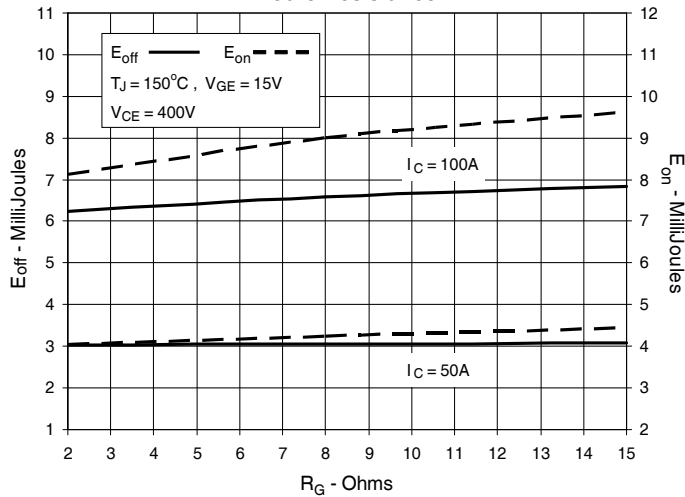


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

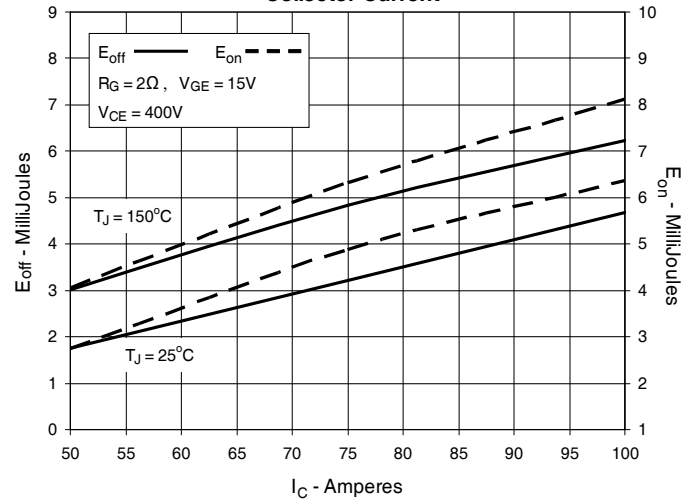


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

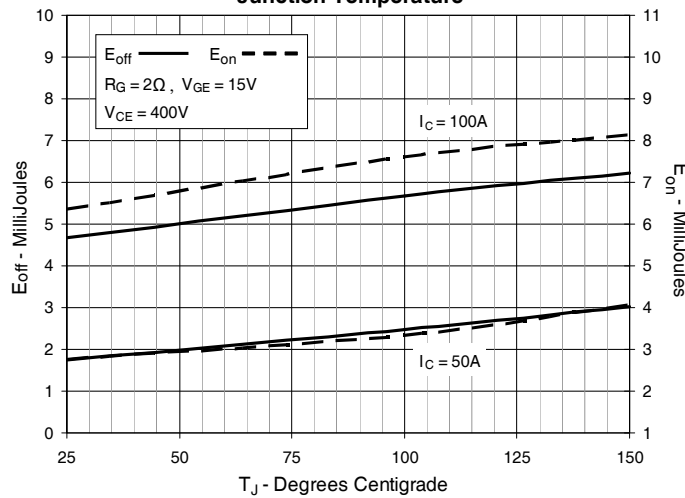


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

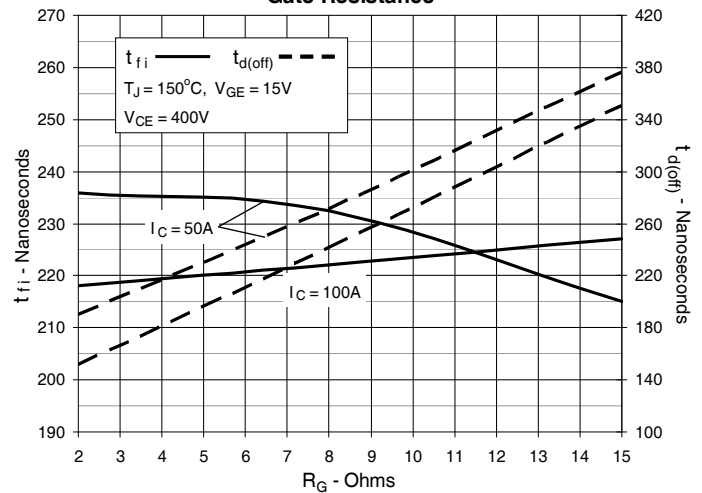


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

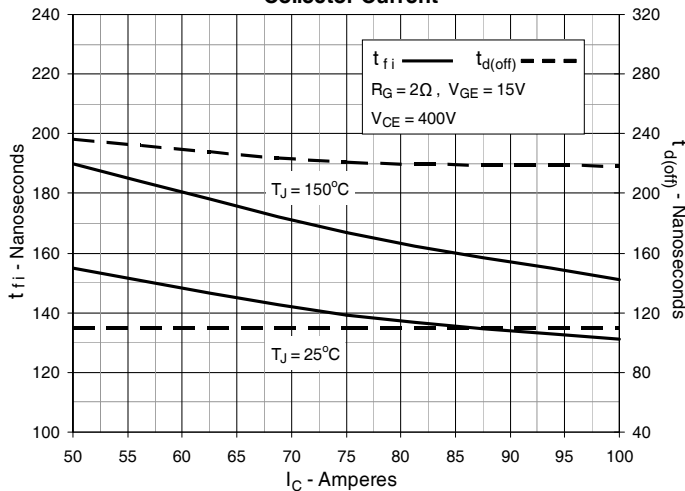


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

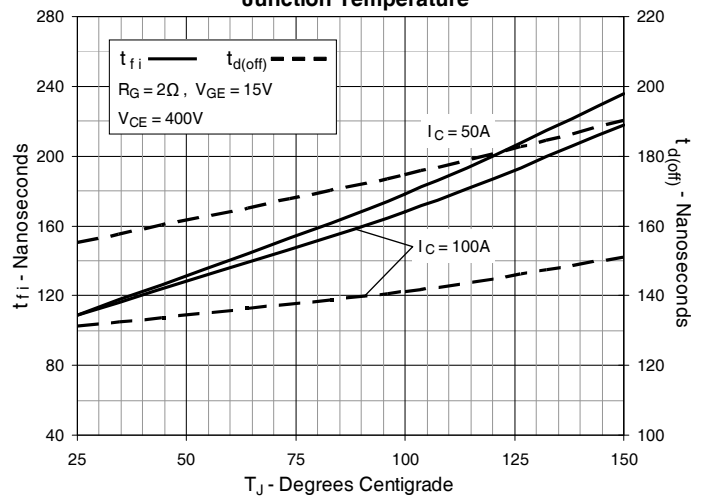


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

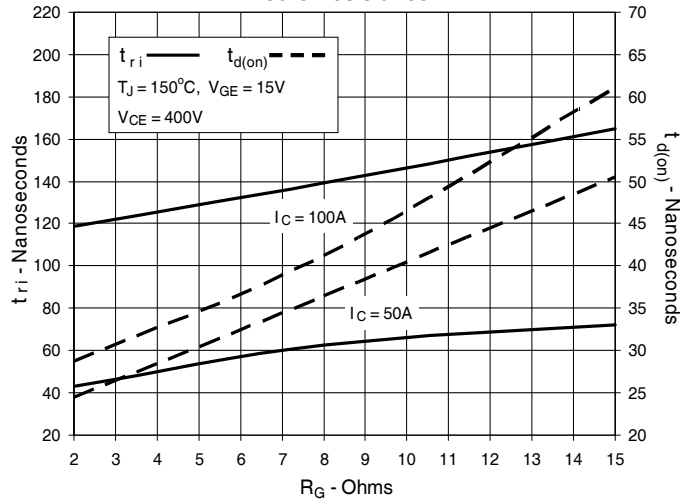


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

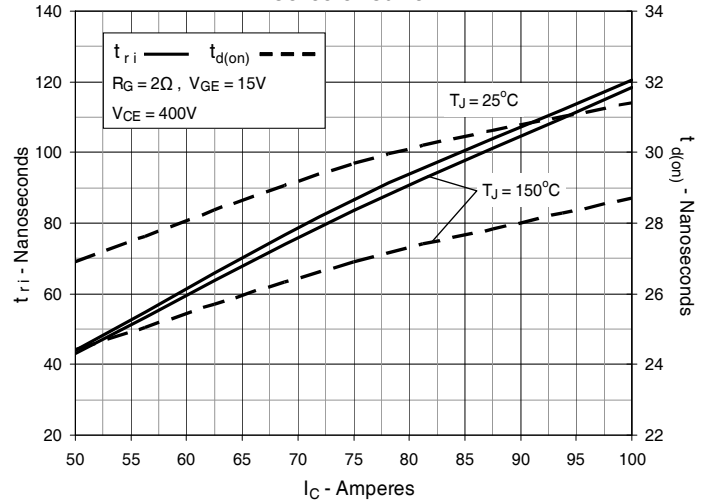


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature

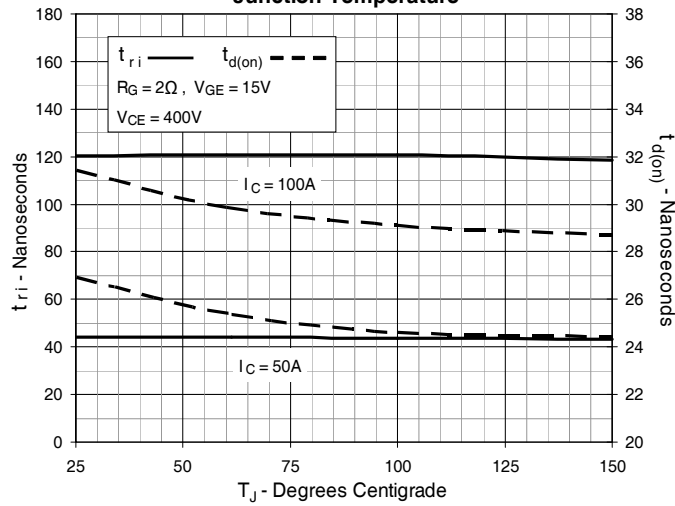
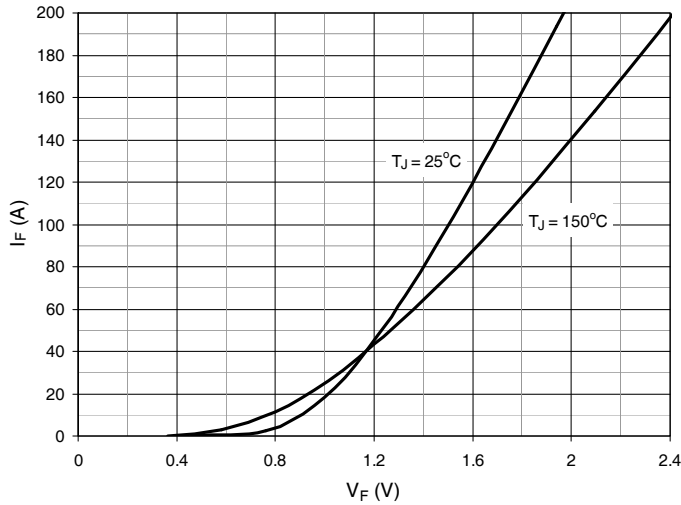
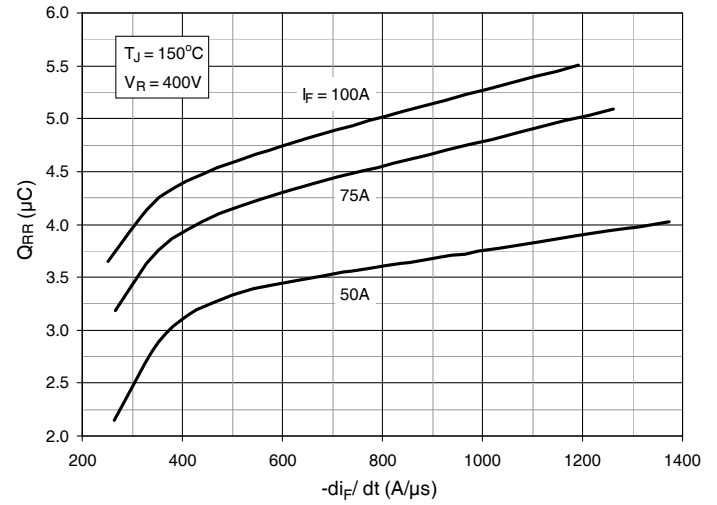
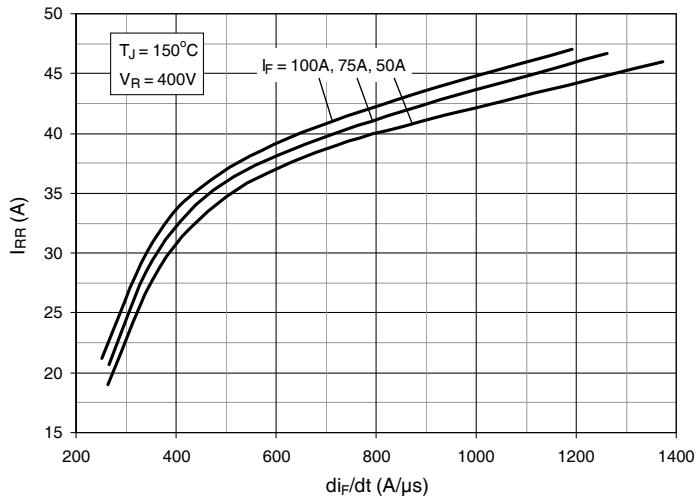
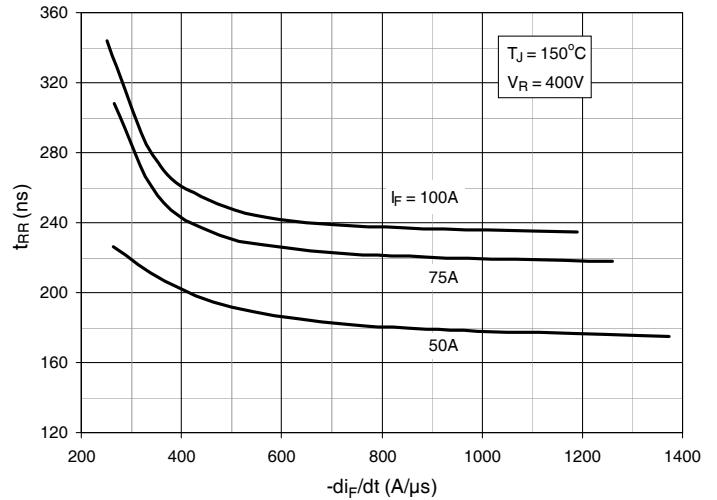
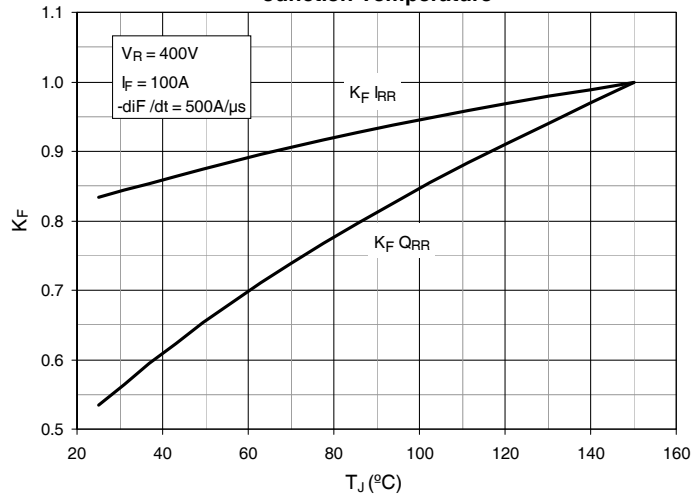
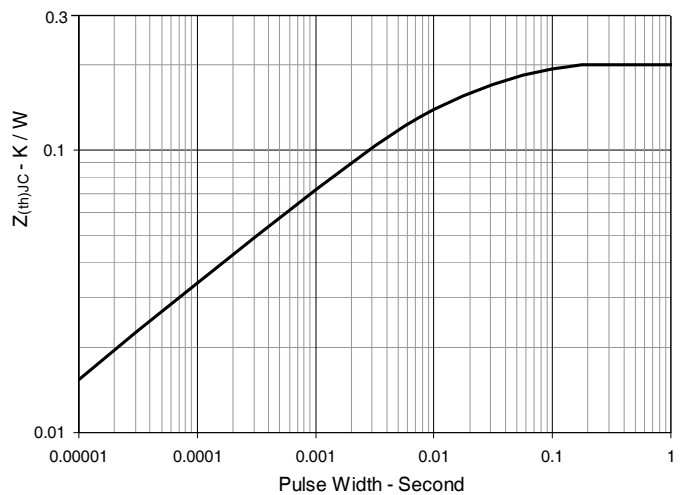


Fig. 21. Diode Forward Characteristics

Fig. 22. Reverse Recovery Charge vs. $-di_F/dt$

Fig. 23. Reverse Recovery Current vs. $-di_F/dt$

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

Fig. 25. Dynamic Parameters Q_{RR} , I_{RR} vs. Junction Temperature

Fig. 26. Maximum Transient Thermal Impedance (Diode)




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