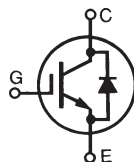


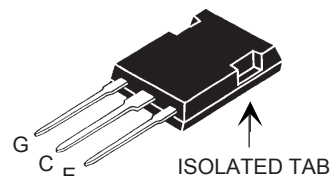
GenX3™ 600V IGBT
IXGR72N60B3H1

(Electrically Isolated Back Surface)

**Medium Speed Low V_{sat} PT IGBT
for 5-40 kHz Switching**


V_{CES}	= 600V
I_{C110}	= 40A
V_{CE(sat)}	≤ 1.80V
t_{fi(typ)}	= 92ns

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T _J = 25°C to 150°C	600	V
V_{CGR}	T _J = 25°C to 150°C, R _{GE} = 1MΩ	600	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T _C = 25°C (Limited by Leads)	75	A
I_{C110}	T _C = 110°C	40	A
I_{F110}	T _C = 110°C	34	A
I_{CM}	T _C = 25°C, 1ms	450	A
SSOA	V _{GE} = 15V, T _{VJ} = 125°C, R _G = 3Ω	I _{CM} = 240	A
(RBSOA)	Clamped Inductive Load	V _{CE} ≤ 600	V
P_C	T _C = 25°C	200	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
V_{ISOL}	50/60 Hz, RMS, t = 1minute	2500	V~
	I _{ISOL} < 1mA t = 20 seconds	3000	V~
F_C	Mounting Force	20..120/4.5..27	N/lb
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	1.6mm (0.062 in.) from Case for 10s	260	°C
Weight		5	g

ISOPLUS 247™


G = Gate C = Collector
E = Emitter

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 2500V Electrical Isolation
- Optimized for Low Conduction and Switching Losses
- Square RBSOA
- Anti-Parallel Ultra Fast Diode

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

- Switch-Mode and Resonant-Mode Power Supplies
- Uninterruptible Power Supplies (UPS)
- DC Choppers
- AC Motor Speed Control
- DC Servo and Robot Drives

Symbol	Test Conditions (T _J = 25°C, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
V_{GE(th)}	I _C = 250μA, V _{CE} = V _{GE}	3.0		5.0 V
I_{CES}	V _{CE} = V _{CES} , V _{GE} = 0V T _J = 125°C			300 μA 5 mA
I_{GES}	V _{CE} = 0V, V _{GE} = ±20V			±100 nA
V_{CE(sat)}	I _C = 60A, V _{GE} = 15V, Note 1 I _C = 120A		1.50 1.75	V V

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$I_C = 50A, V_{CE} = 10V, \text{Note 1}$	45	76	S
C_{ies}	$V_{CE} = 25V, V_{GE} = 0V, f = 1MHz$		6800	pF
C_{oes}			576	pF
C_{res}			80	pF
Q_g	$I_C = 60A, V_{GE} = 15V, V_{CE} = 0.5 \cdot V_{CES}$		225	nC
Q_{ge}			40	nC
Q_{gc}			82	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ C$ $I_C = 50A, V_{GE} = 15V$ $V_{CE} = 480V, R_G = 3\Omega$		31	ns
t_{ri}			33	ns
E_{on}			1.4	mJ
$t_{d(off)}$			152	ns
t_{fi}			92	ns
E_{off}			1.0	mJ
$t_{d(on)}$	Inductive load, $T_J = 125^\circ C$ $I_C = 50A, V_{GE} = 15V$ $V_{CE} = 480V, R_G = 3\Omega$		29	ns
t_{ri}			34	ns
E_{on}			2.7	mJ
$t_{d(off)}$			228	ns
t_{fi}			142	ns
E_{off}			2.2	mJ
R_{thJC}			0.62	$^\circ C/W$
R_{thCS}		0.15		$^\circ C/W$

Reverse Diode (FRED)

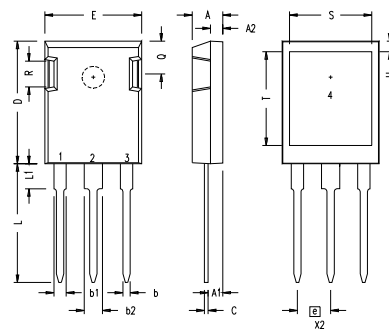
Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
V_F	$I_F = 60A, V_{GE} = 0V, \text{Note 1}$		1.6	2.0 V
	$T_J = 150^\circ C$		1.4	1.8 V
I_{RM}	$I_F = 60A, V_{GE} = 0V, -di_F/dt = 200A/\mu s, V_R = 300V$		8.3	A
t_{rr}	$I_F = 60A, -di/dt = 200A/\mu s, V_R = 300V, T_J = 100^\circ C$		140	ns
R_{thJC}				0.8 $^\circ C/W$

Note 1. Pulse Test, $t \leq 300\mu s$; Duty Cycle, $d \leq 2\%$.

PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

ISOPLUS247 (IXGR) 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 - DRAIN (COLLECTOR)
- 3 - SOURCE (EMITTER)
- 4 - NO CONNECTION

NOTE: This drawing will meet all dimensions requirement of JEDEC outline TO-247AD except screw hole.

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
	4,850,072	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	

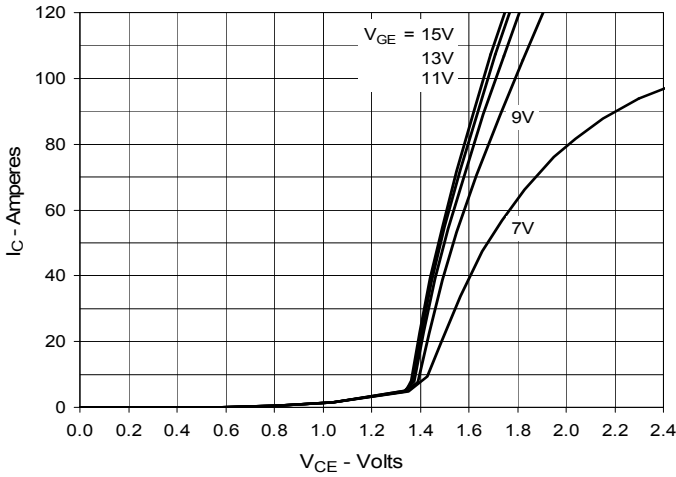
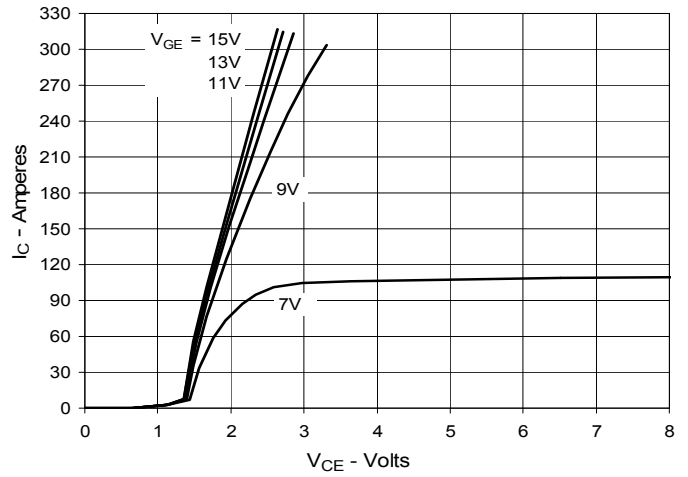
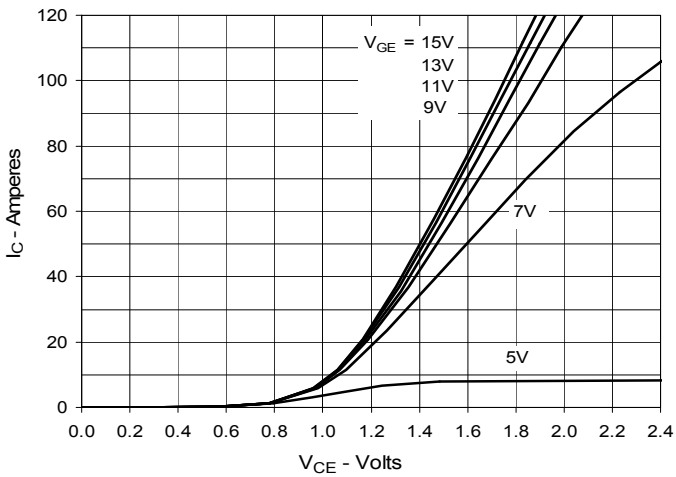
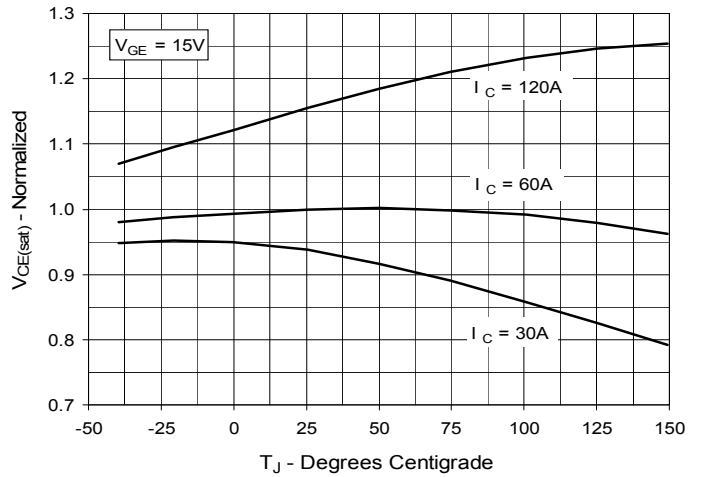
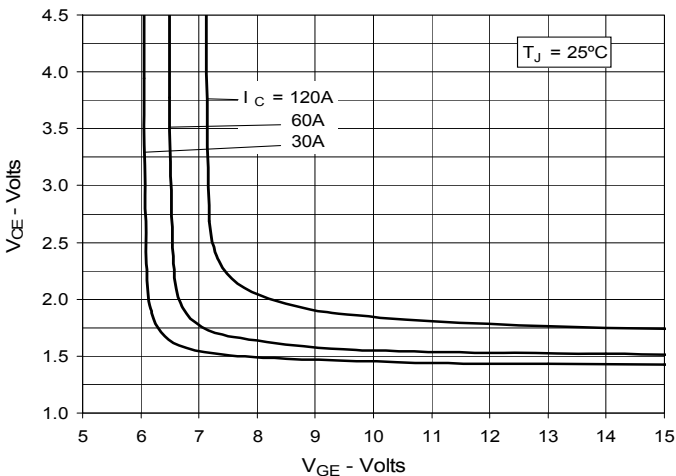
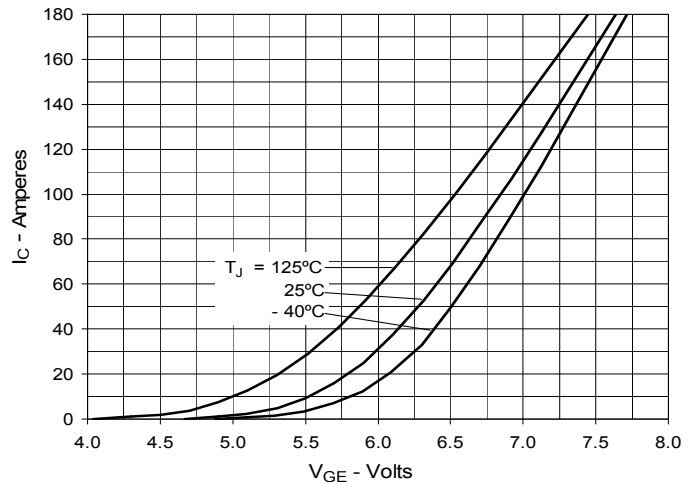
**Fig. 1. Output Characteristics
@ 25°C**

**Fig. 2. Extended Output Characteristics
@ 25°C**

**Fig. 3. Output Characteristics
@ 125°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

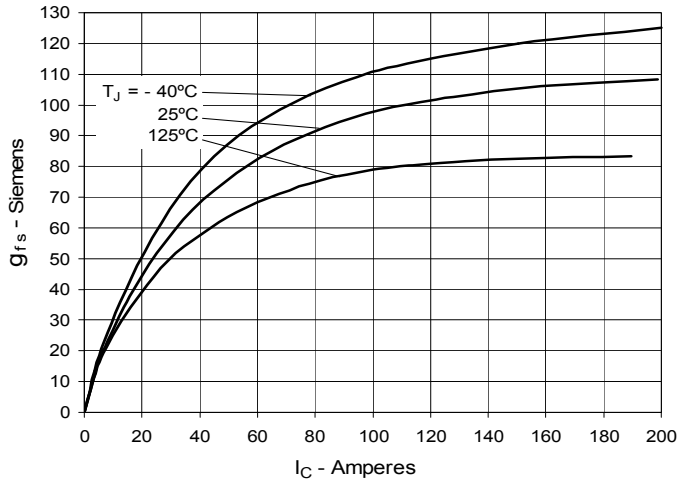


Fig. 8. Gate Charge

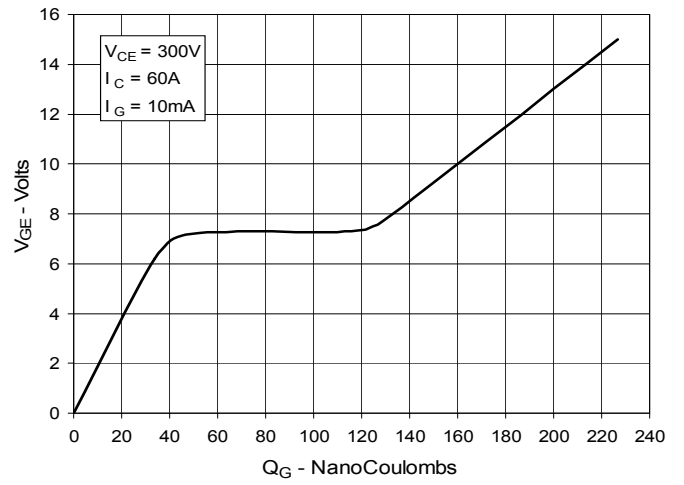


Fig. 9. Capacitance

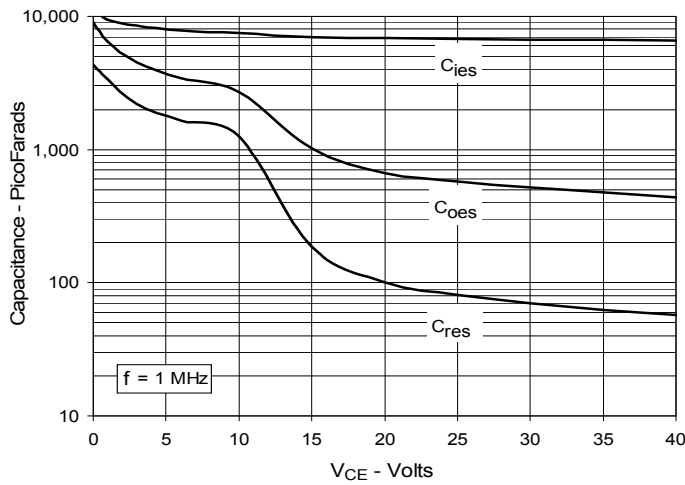


Fig. 10. Reverse-Bias Safe Operating Area

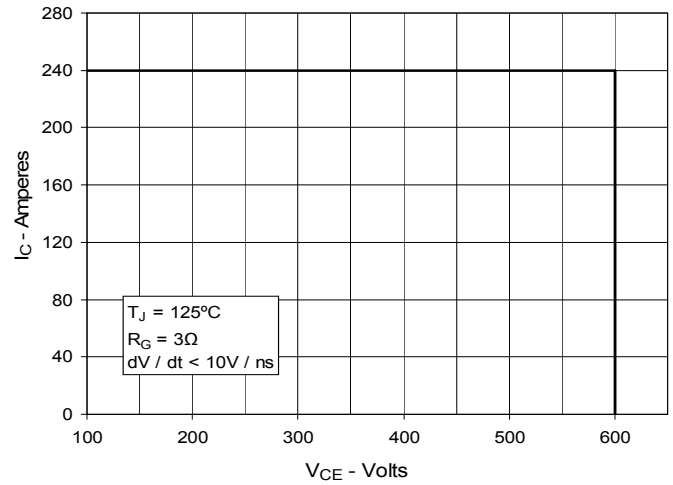


Fig. 11. Maximum Transient Thermal Impedance

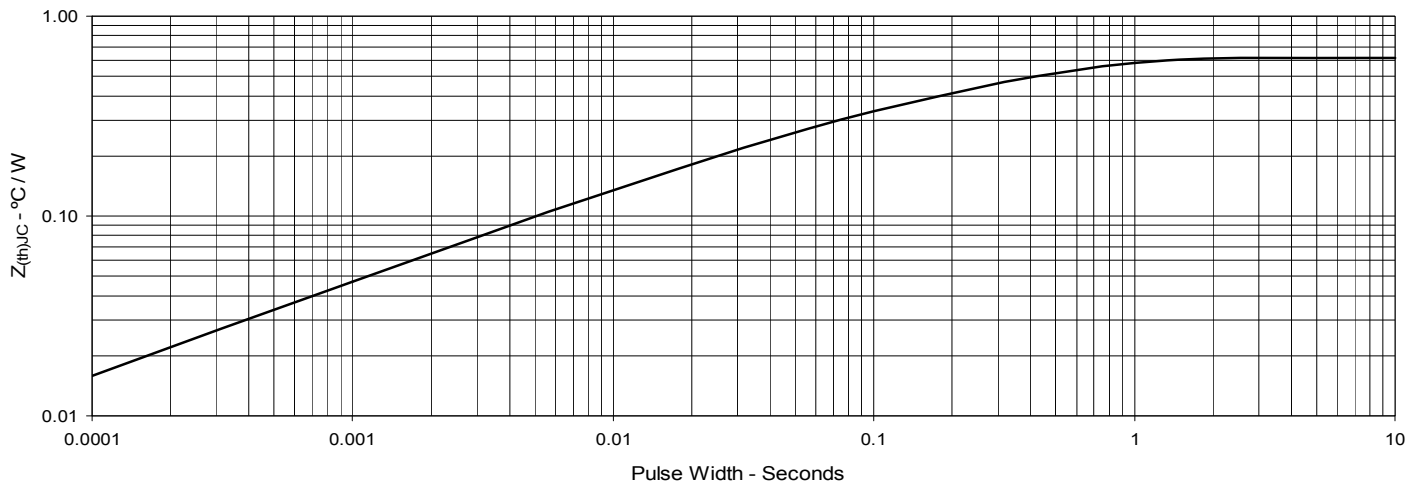


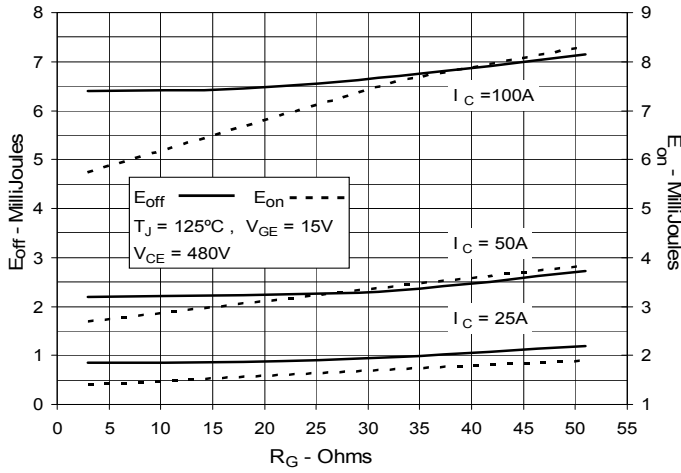
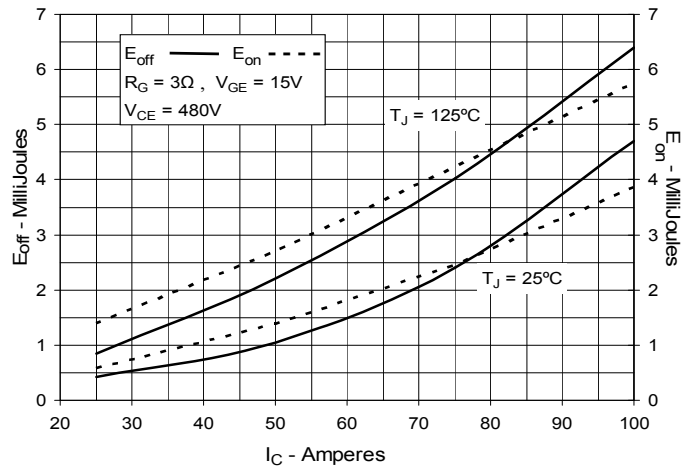
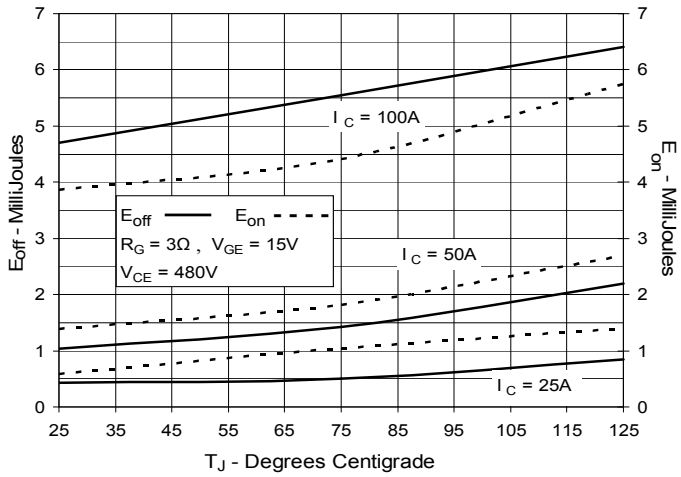
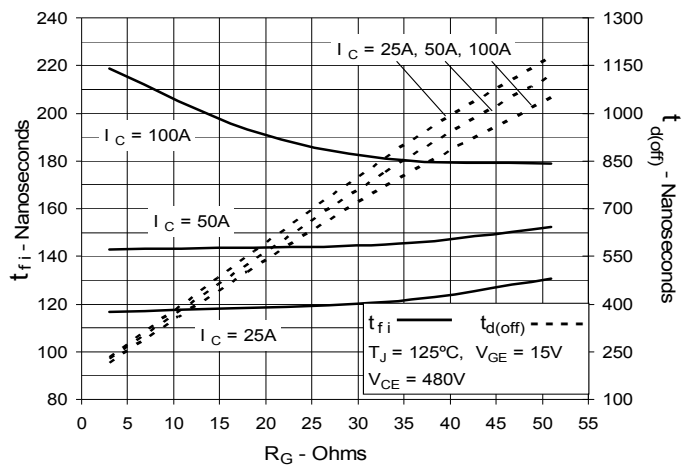
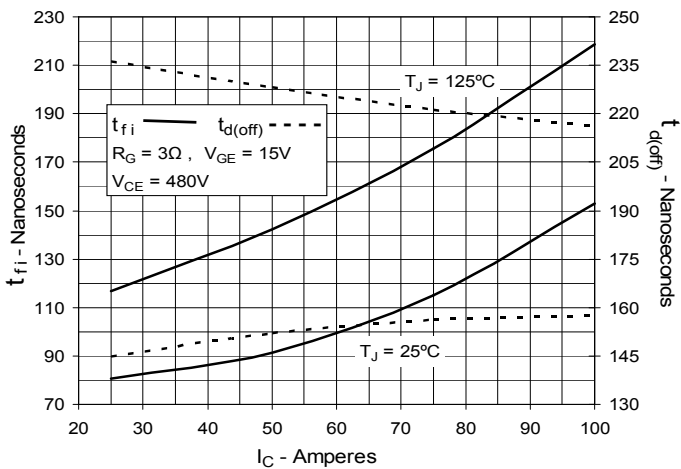
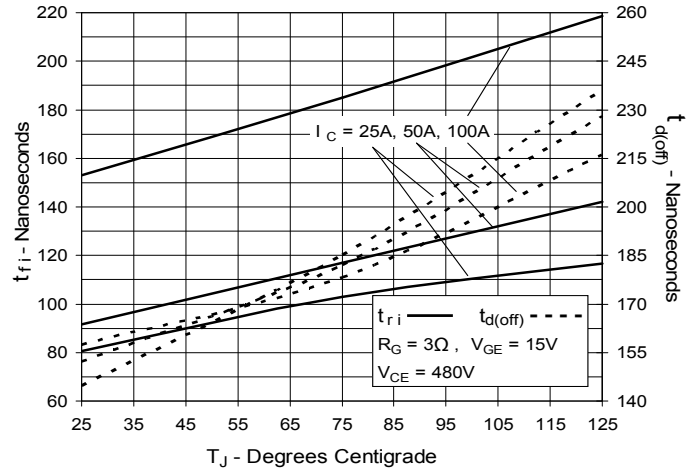
Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

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

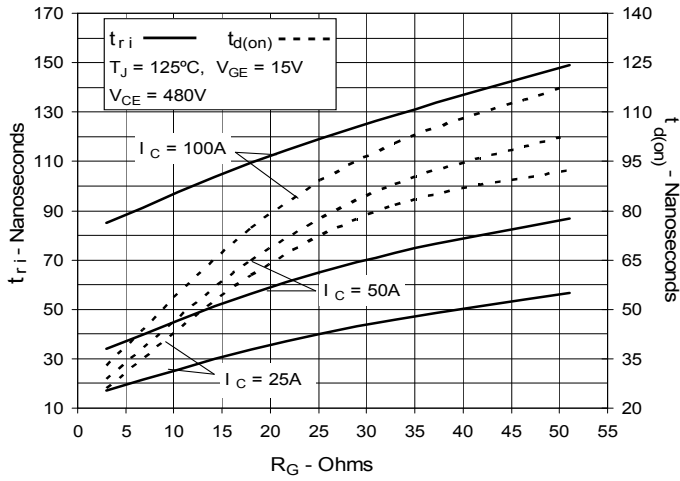


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

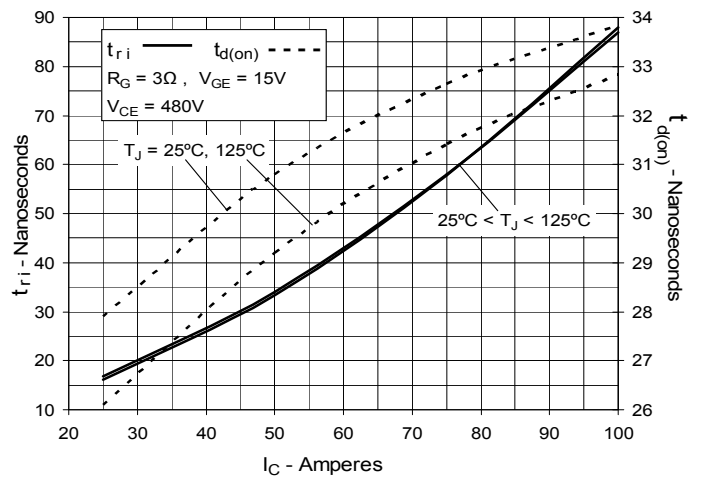
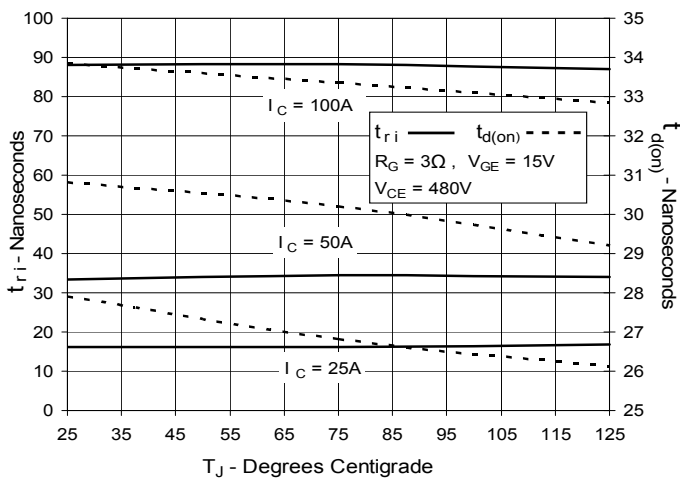


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature



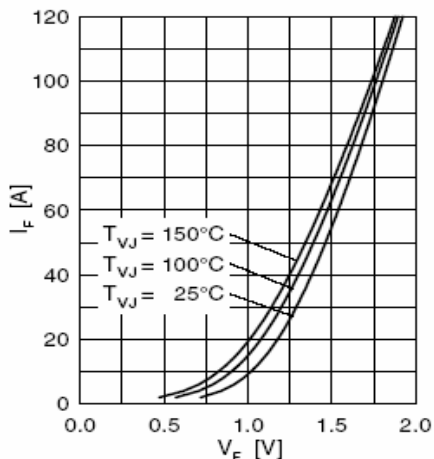


Fig. 21 Forward Current I_F vs. V_F

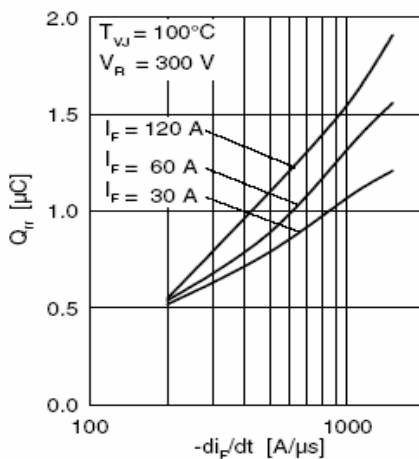


Fig. 22 Typ. Reverse Recovery Charge Q_{rr}

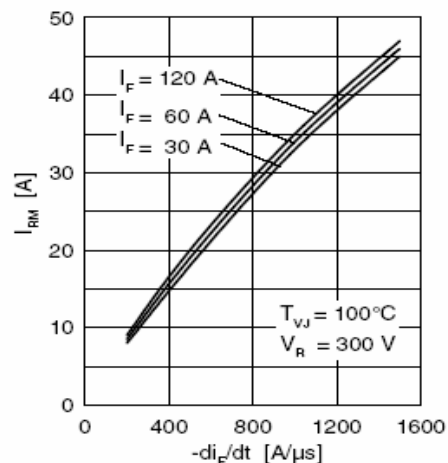


Fig. 23 Typ. Peak Reverse Current I_{RM}

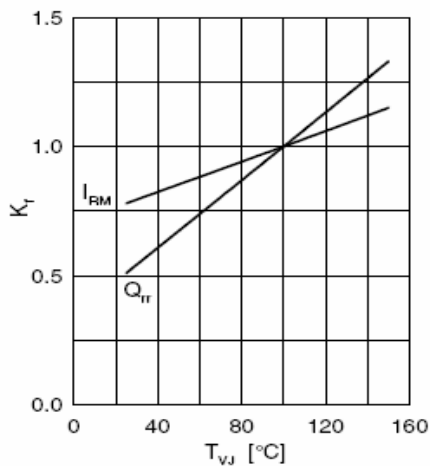


Fig. 24 Typ. Dynamic Parameters Q_{rr} , I_{RM}

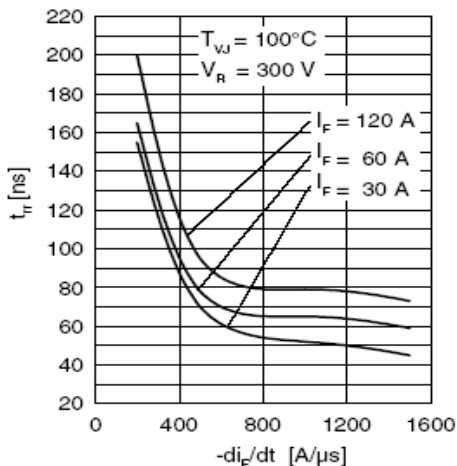


Fig. 25 Typ Recovery Time t_{rr}

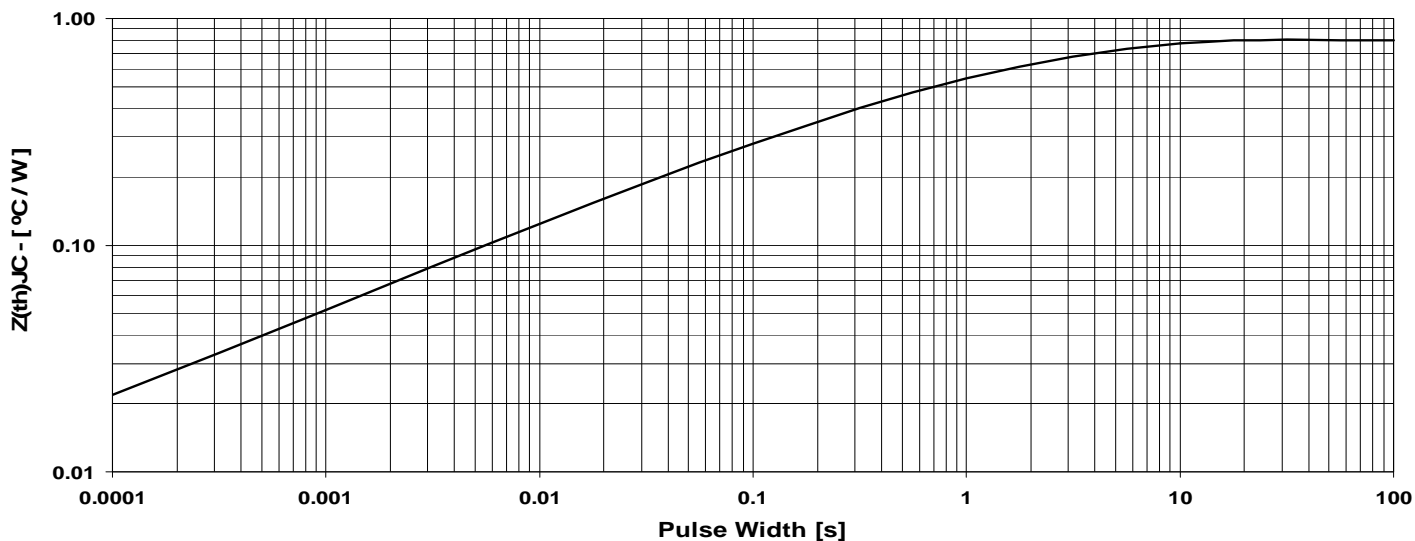


Fig. 26 Maximum Transient Thermal Impedance Junction to Case (for Diode)