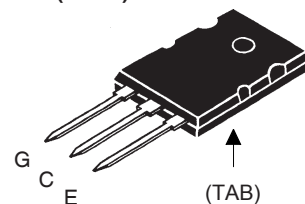
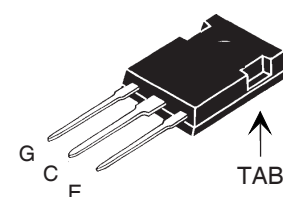


**GenX3™ 600V IGBT
with Diode**
**IXGK72N60B3H1
IXGX72N60B3H1**

 Medium speed low V_{sat} PT
IGBTs 5-40 kHz switching


$$\begin{aligned} V_{CES} &= 600V \\ I_{C110} &= 72A \\ V_{CE(sat)} &\leq 1.8V \\ t_{fi(typ)} &= 92ns \end{aligned}$$

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}	$T_C = 25^\circ\text{C}$ (limited by leads)	75	A
I_{C110}	$T_C = 110^\circ\text{C}$	72	A
I_{CM}	$T_C = 25^\circ\text{C}$, 1ms	450	A
SSOA (RBSOA)	$V_{GE} = 15V$, $T_{VJ} = 125^\circ\text{C}$, $R_G = 3\Omega$ Clamped inductive load @ $V_{CE} \leq 600V$	$I_{CM} = 240$	A
P_C	$T_C = 25^\circ\text{C}$	540	W
T_J		-55 ... +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		-55 ... +150	$^\circ\text{C}$
M_d	Mounting torque (TO-264)	1.13 / 10	Nm/lb.in.
F_C	Mounting force (PLUS247)	20..120 / 4.5..27	N/lb.
T_L	Maximum lead temperature for soldering	300	$^\circ\text{C}$
T_{SOLD}	1.6mm (0.062 in.) from case for 10s	260	$^\circ\text{C}$
Weight	TO-264	10	g
	PLUS247	6	g

TO-264 (IXGK)

PLUS247 (IXGX)


G = Gate C = Collector
E = Emitter TAB = Collector

Features

- Optimized for low conduction and switching losses
- Square RBSOA
- Anti-parallel ultra fast diode
- International standard packages

Advantages

- High power density
- Low gate drive requirement

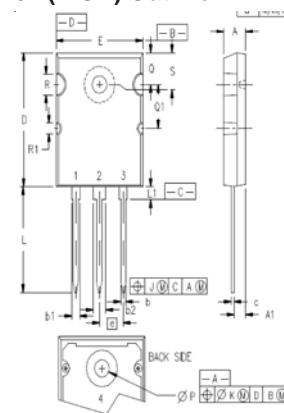
Applications

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

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		Min.	Typ.	Max.
$V_{GE(th)}$	$I_C = 250\mu\text{A}$, $V_{CE} = V_{GE}$	3.0		5.0 V
I_{CES}	$V_{CE} = V_{CES}$ $V_{GE} = 0V$ $T_J = 125^\circ\text{C}$			300 μA 5 mA
I_{GES}	$V_{CE} = 0V$, $V_{GE} = \pm 20V$			± 100 nA
$V_{CE(sat)}$	$I_C = 60A$, $V_{GE} = 15V$, Note 1 $I_C = 120A$		1.50 1.75	1.80 V

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$I_C = 50A, V_{CE} = 10V$, Note 1	45	76	S
C_{ies}	$V_{CE} = 25V, V_{GE} = 0V, f = 1MHz$		6800	pF
C_{oes}			575	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	240 ns
t_{fi}			92	150 ns
E_{off}			1.0	2.0 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}			0.23	$^\circ C/W$
R_{thCS}		0.15		$^\circ C/W$

TO-264 (IXGK) Outline



1 - GATE
2, 4 - DRAIN (COLLECTOR)
3 - SOURCE (EMITTER)

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.185	0.209	4.70	5.31
A1	0.102	0.118	2.59	3.00
b	0.037	0.055	0.94	1.40
b1	0.087	0.102	2.21	2.59
b2	0.110	0.126	2.79	3.20
c	0.017	0.029	0.43	0.74
D	1.007	1.047	25.58	26.59
E	0.760	0.799	19.30	20.29
e	.215 BSC		5.46 BSC	
J	0.000	0.010	0.00	0.25
K	0.000	0.010	0.00	0.25
L	0.779	0.842	19.79	21.39
L1	0.087	0.102	2.21	2.59
OP	0.122	0.138	3.10	3.51
Q	0.240	0.256	6.10	6.50
Q1	0.330	0.346	8.38	8.79
ØR	0.155	0.187	3.94	4.75
ØR1	0.085	0.093	2.16	2.36
S	0.243	0.253	6.17	6.43

Reverse Diode (FRED)

Characteristic Values
($T_J = 25^\circ C$, unless otherwise specified)

Symbol	Test Conditions	Min.	Typ.	Max.
V_F	$I_F = 60A, V_{GE} = 0V$, Note 1 $T_J = 150^\circ C$	1.6	2.0	V
		1.4	1.8	V
I_{RM}	$I_F = 60A, V_{GE} = 0V$, $-di_F/dt = 200A/\mu s, V_R = 300V$ $T_J = 100^\circ C$	8.3		A
t_{rr}		140		ns
R_{thJC}			0.3	$^\circ C/W$

Note 1: Pulse test, $t \leq 300\mu s$, duty cycle, $d \leq 2\%$.

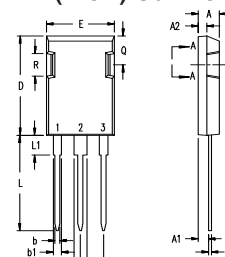
PRELIMINARY TECHNICAL INFORMATION

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.

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	7,157,338 B2
	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	

PLUS247™ (IXGX) Outline



Terminals: 1 - Gate
2 - Drain (Collector)
3 - Source (Emitter)
4 - Drain (Collector)

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.83	5.21	.190	.205
A ₁	2.29	2.54	.090	.100
A ₂	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b ₁	1.91	2.13	.075	.084
b ₂	2.92	3.12	.115	.123
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	5.45 BSC		.215 BSC	
L	19.81	20.32	.780	.800
L1	3.81	4.32	.150	.170
Q	5.59	6.20	.220	0.244
R	4.32	4.83	.170	.190

Fig. 1. Output Characteristics @ 25°C

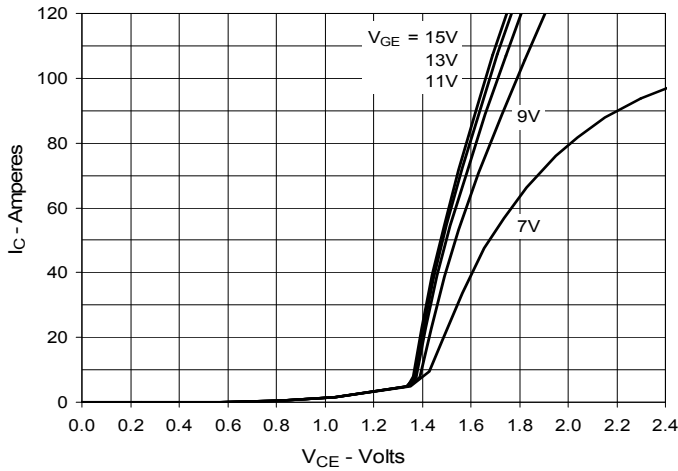


Fig. 2. Extended Output Characteristics @ 25°C

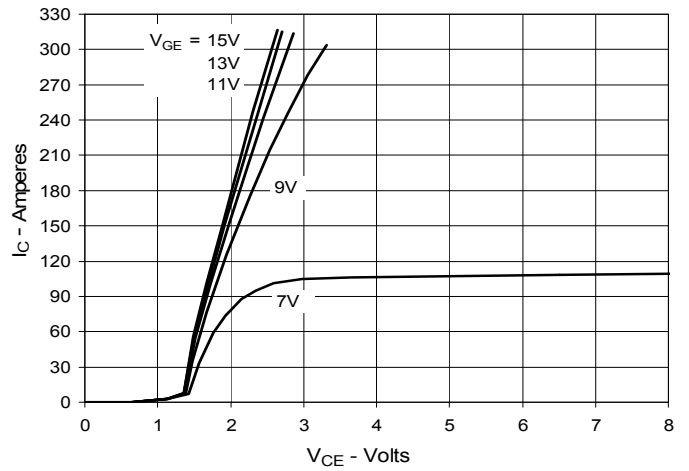


Fig. 3. Output Characteristics @ 125°C

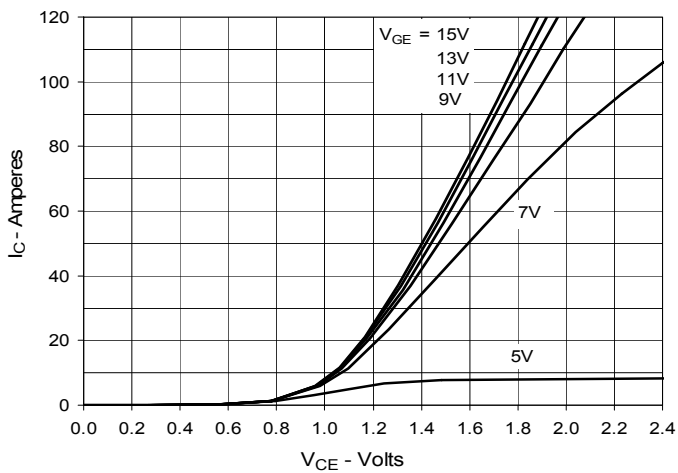


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

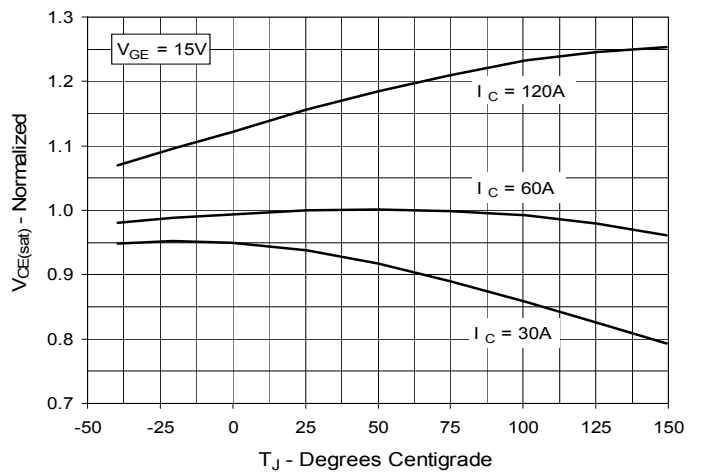


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

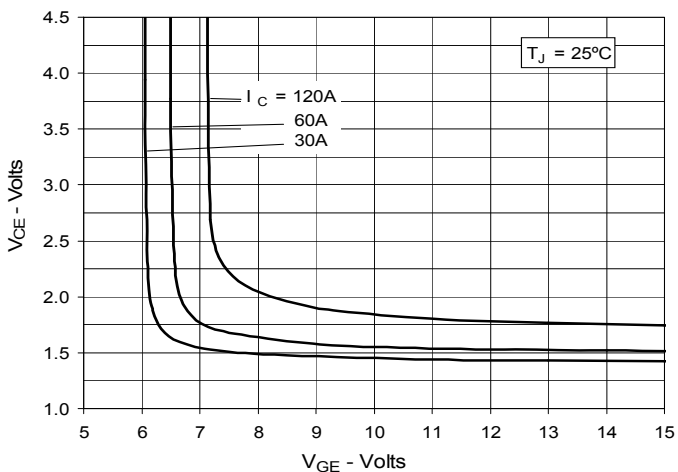


Fig. 6. Input Admittance

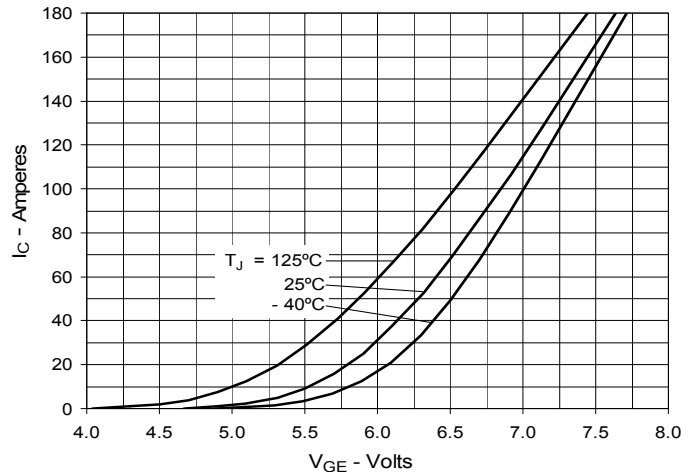


Fig. 7. Transconductance

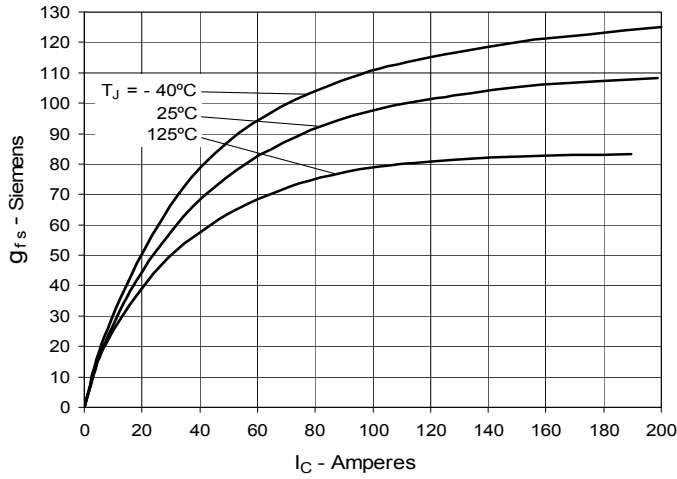


Fig. 8. Gate Charge

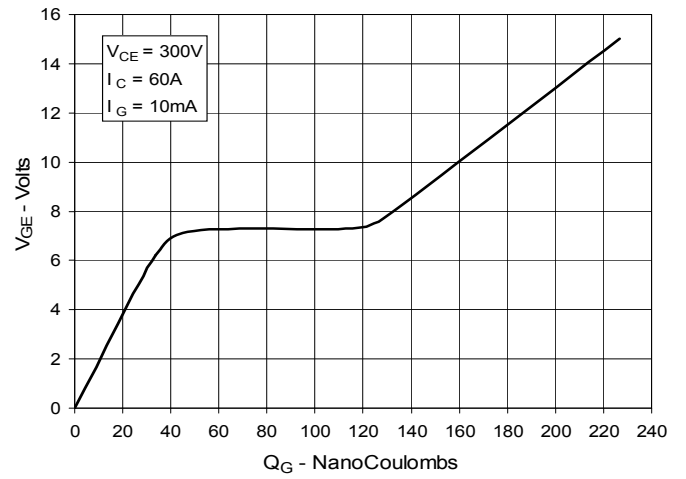


Fig. 9. Capacitance

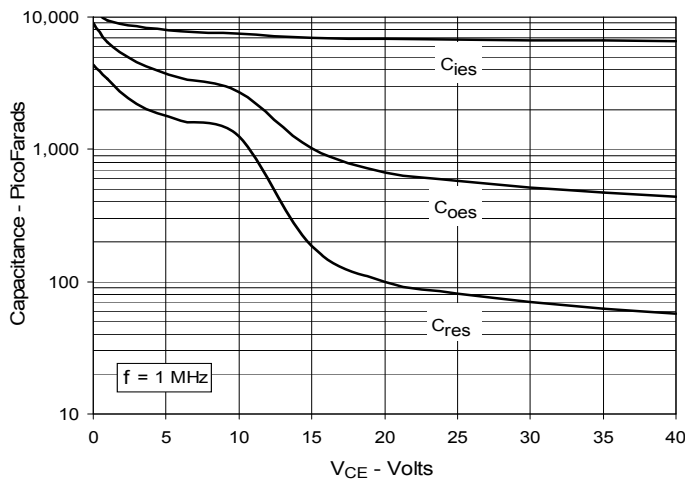


Fig. 10. Reverse-Bias Safe Operating Area

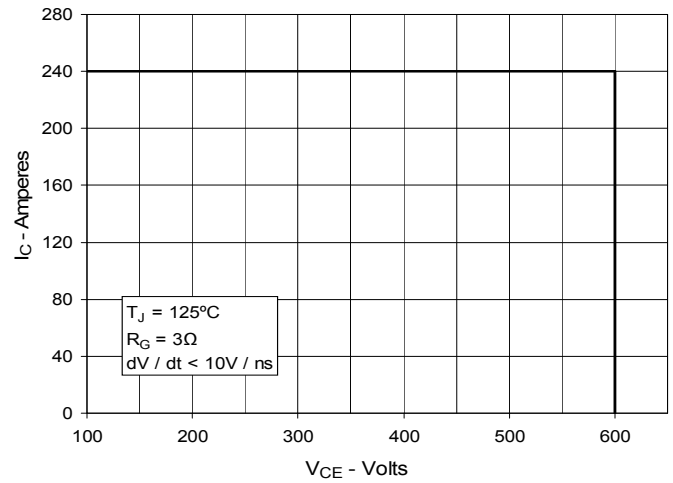


Fig. 11. Maximum Transient Thermal Impedance

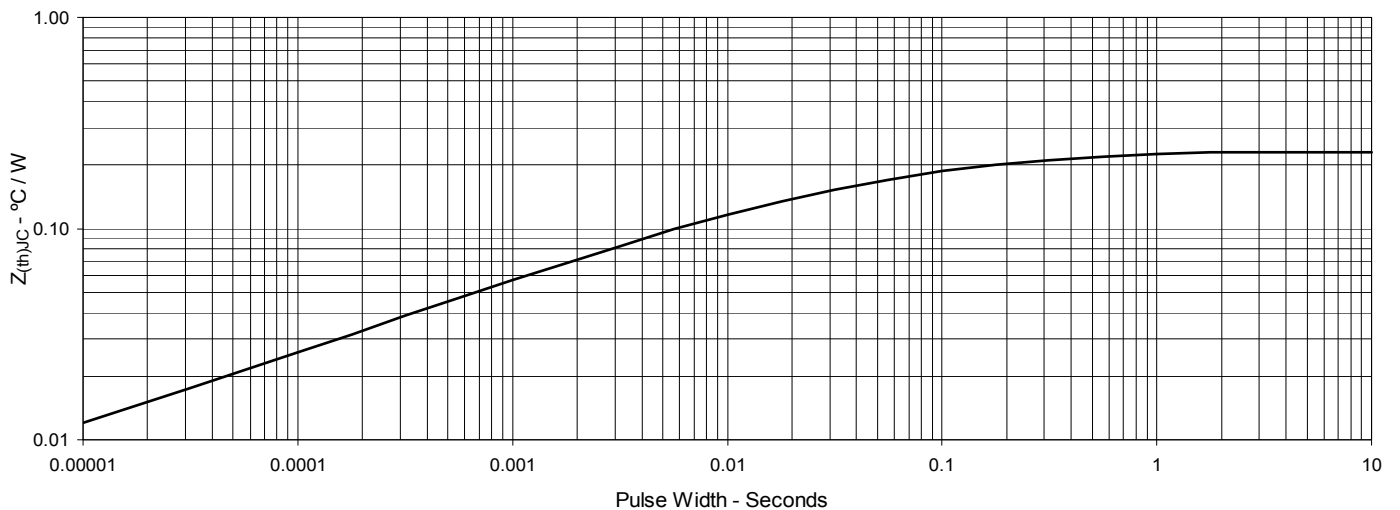


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

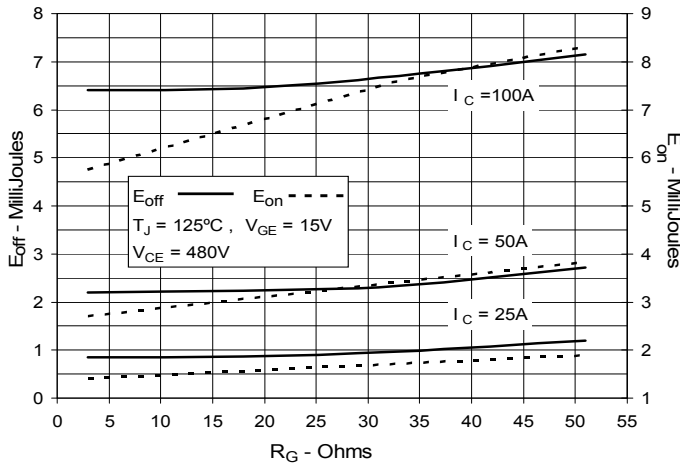


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

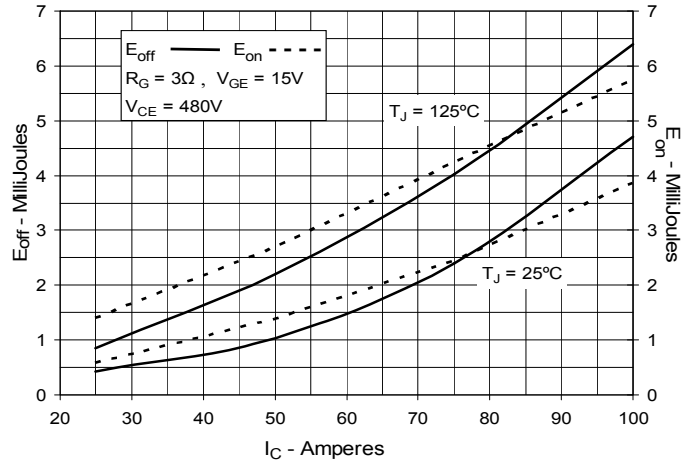


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

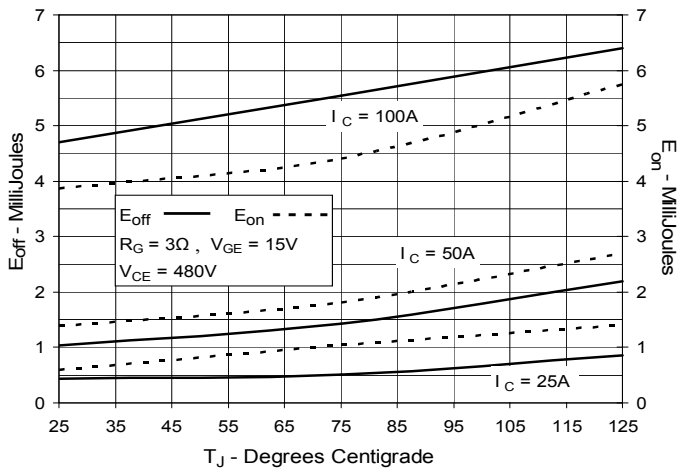


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

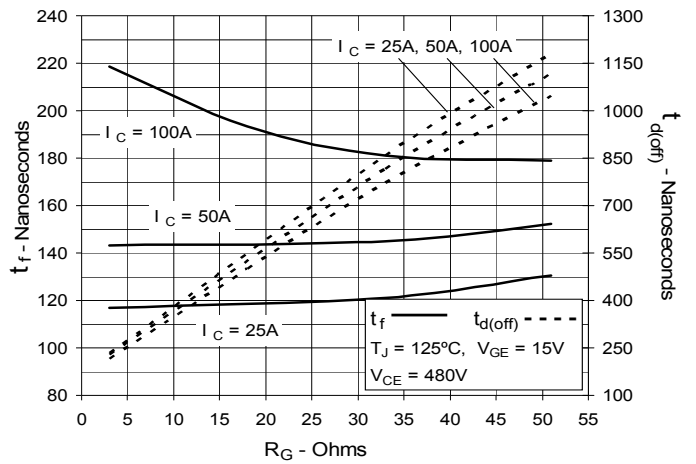


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

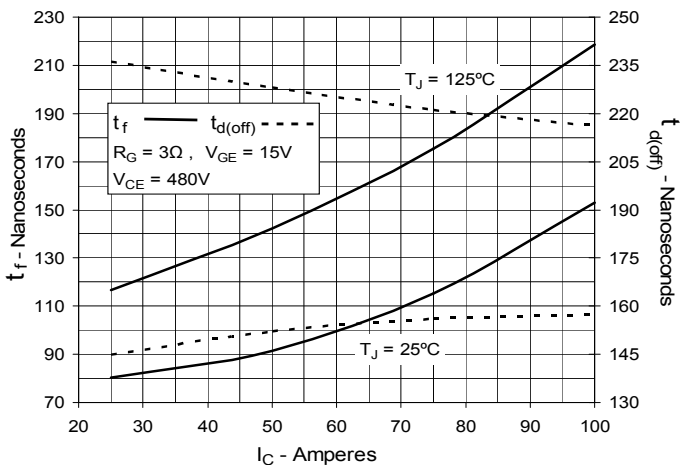
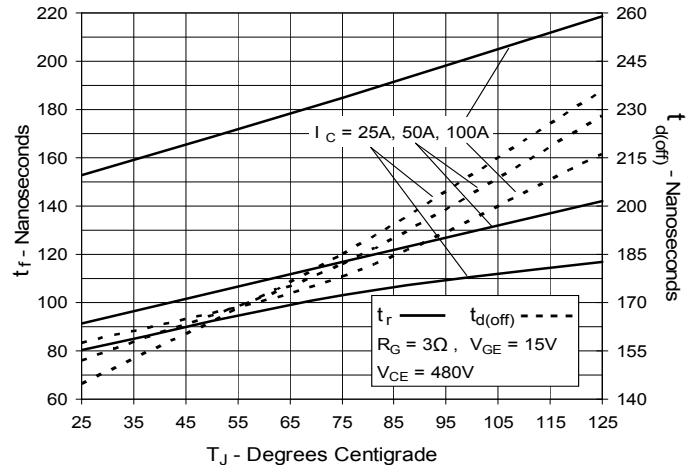
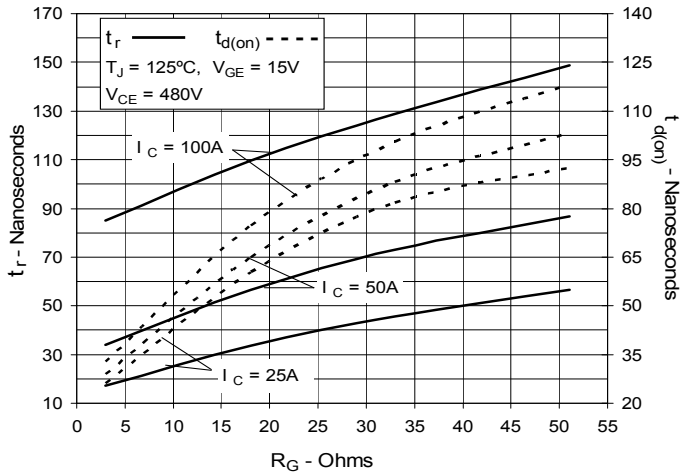


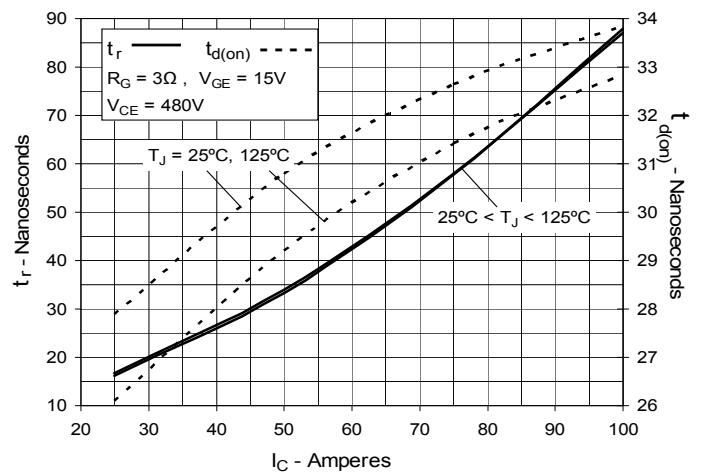
Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature



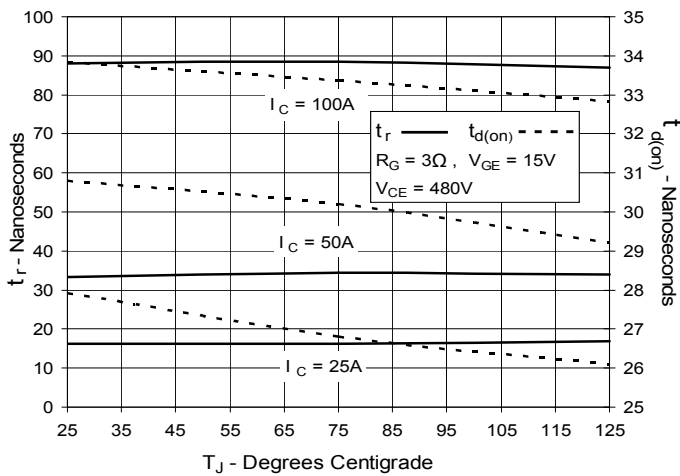
**Fig. 18. Inductive Turn-on
Switching Times vs. Gate Resistance**



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



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



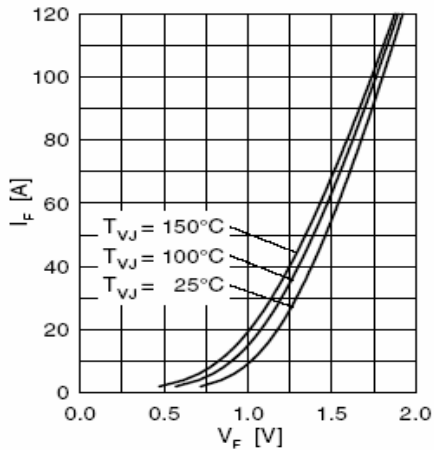


Fig. 21 Forward current I_F vs. V_F

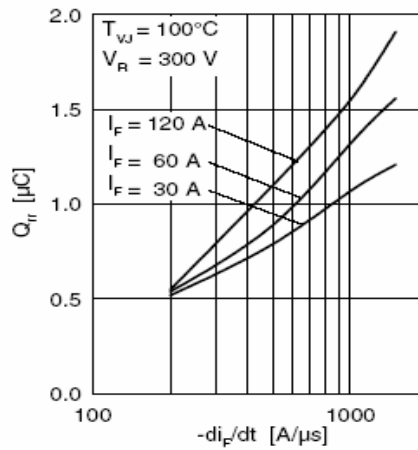


Fig. 22 Typ. reverse recovery charge Q_{rr}

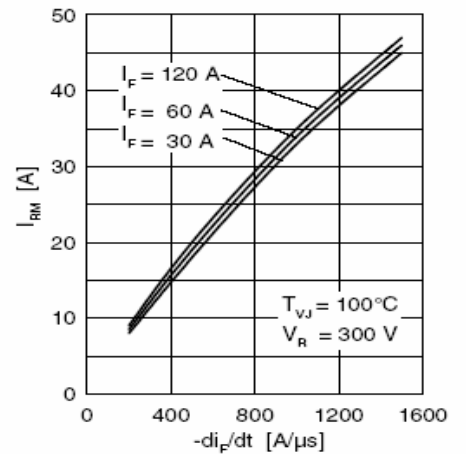


Fig. 23 Typ. peak reverse current I_{RM}



Fig. 24 Typ. dynamic parameters Q_{rr} , I_{RM}



Fig. 25 Typ. recovery time t_{rr}

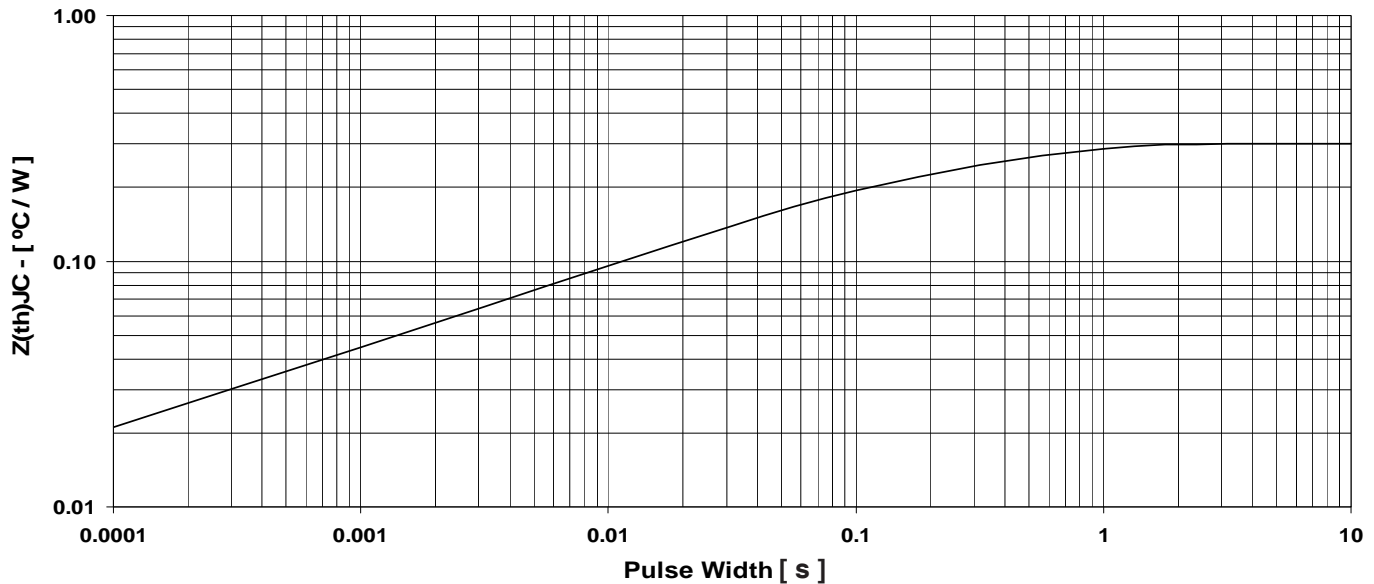


Fig. 26 Maximum transient thermal impedance junction to case (for diode)