IXYS

Advance Technical Information

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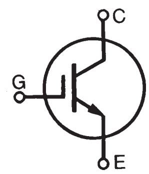
HiPerFAST™ IGBT

B2-Class High Speed IGBTs

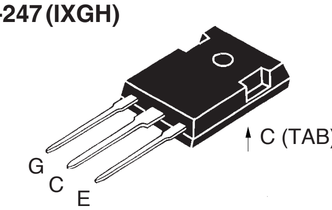
IXGH 32N90B2
IXGT 32N90B2

V_{CES}	=	900 V
I_{C25}	=	64 A
$V_{CE(sat)}$	=	2.7 V
$t_{fi\,typ}$	=	150 ns

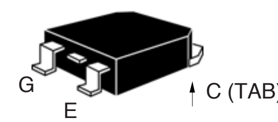


Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	900	V
V_{CGR}	T_J = 25°C to 150°C; R_{GE} = 1 MΩ	900	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C (limited by leads)	64	A
I_{C110}	T_C = 110°C	32	A
I_{CM}	T_C = 25°C, 1 ms	200	A
SSOA (RBSOA)	V_{GE} = 15 V, T_{VJ} = 125°C, R_G = 10 Ω Clamped inductive load @ ≤ 600V	I_{CM} = 64	A
P_C	T_C = 25°C	300	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	°C
Plastic body for 10 s		260	°C
M_d	Mounting torque (TO-247)	1.13/10Nm/lb.in.	
Weight	TO-247	6	g
	TO-268	4	g

TO-247 (IXGH)



TO-268 (IXGT)



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

Features

- High frequency IGBT
- High current handling capability
- MOS Gate turn-on
  - drive simplicity

Applications

- PFC circuits
- Uninterruptible power supplies (UPS)
- Switched-mode and resonant-mode power supplies
- AC motor speed control
- DC servo and robot drives
- DC choppers

Advantages

- High power density
- Very fast switching speeds for high frequency applications

Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
$V_{GE(th)}$	I_C = 250 μA, V_{CE} = V_{GE}		3.0		5.0	V
I_{CES}	V_{CE} = V_{CES}	T_J = 25°C			50	μA
	V_{GE} = 0 V	T_J = 150°C			750	μA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				±100	nA
$V_{CE(sat)}$	I_C = I_{C110}, V_{GE} = 15 V			2.2	2.7	V
		T_J = 125°C		2.1		V

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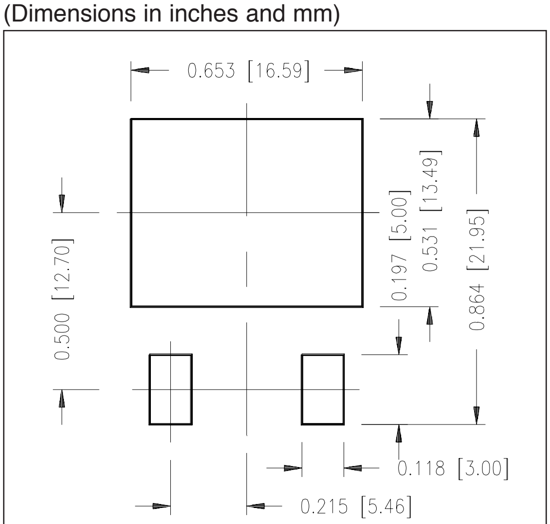
Symbol	Test Conditions	Characteristic Values ($T_J = 25°C$, unless otherwise specified) min.	typ.	max.	
g_{fs}	$I_C = I_{C110}$ A; $V_{CE} = 10$ V, Pulse test, $t \leq 300$ µs, duty cycle ≤ 2 %	18	28		S
C_{ies}	$V_{CE} = 25$ V, $V_{GE} = 0$ V, f = 1 MHz		1790		pF
C_{oes}			121		pF
C_{res}			49		pF
Q_g	$I_C = I_{C110}$, $V_{GE} = 15$ V, $V_{CE} = 0.5\ V_{CES}$		89		nC
Q_{ge}			15		nC
Q_{gc}			34		nC
$t_{d(on)}$	**Inductive load, $T_J = 25°C$** $I_C = I_{C110}$, $V_{GE} = 15$ V $V_{CE} = 720$ V, $R_G = R_{off} = 5\ \Omega$		20		ns
t_{ri}			22		ns
$t_{d(off)}$			260	400	ns
t_{fi}			150		ns
E_{off}			2.6	4.5	mJ
$t_{d(on)}$	**Inductive load, $T_J = 125°C$** $I_C = I_{C110}$ A, $V_{GE} = 15$ V $V_{CE} = 720$ V, $R_G = R_{off} = 5\ \Omega$		20		ns
t_{ri}			22		ns
E_{on}			0.5		mJ
	Note 1		3.8		mJ
$t_{d(off)}$			360		ns
t_{fi}			330		ns
E_{off}			5.75		mJ
R_{thJC}				0.42	K/W
R_{thCS}	(TO-247)		0.25		K/W

Note 1: E_{on} measured with a DSEP 30-12A ultrafast diode clamp.

Min. Recommended Footprint
(Dimensions in inches and mm)



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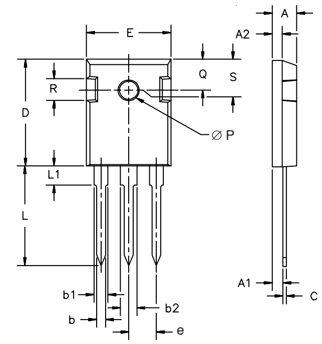
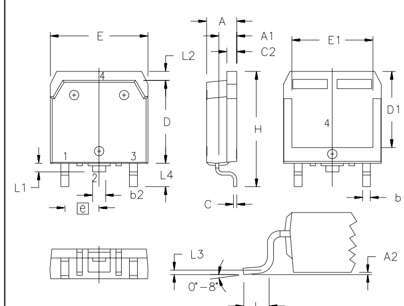
TO-247 AD Outline



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.7	5.3	.185	.209
A_1	2.2	2.54	.087	.102
A_2	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b_1	1.65	2.13	.065	.084
b_2	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
∅P	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15 BSC		242 BSC	

TO-268 Outline



SYM	INCHES MIN	MAX	MILLIMETERS MIN	MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b2	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.094	.106	2.40	2.70
L1	.047	.055	1.20	1.40
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10

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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
	4,850,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405B2	6,759,692
	4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	6771478 B2

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Fig. 1. Output Characteristics @ 25 ºC

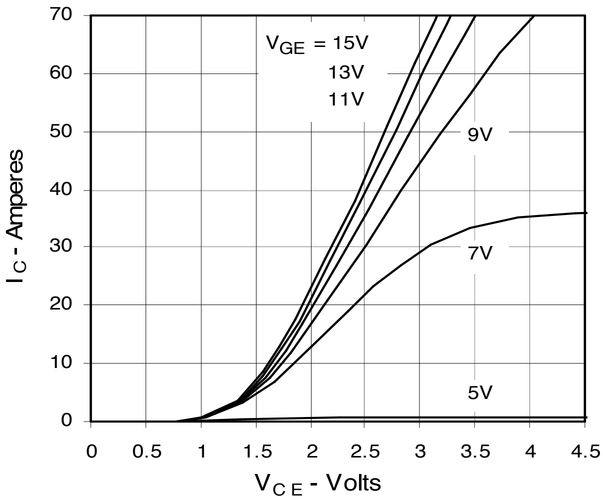

Fig. 2. Extended Output Characteristics @ 25 ºC

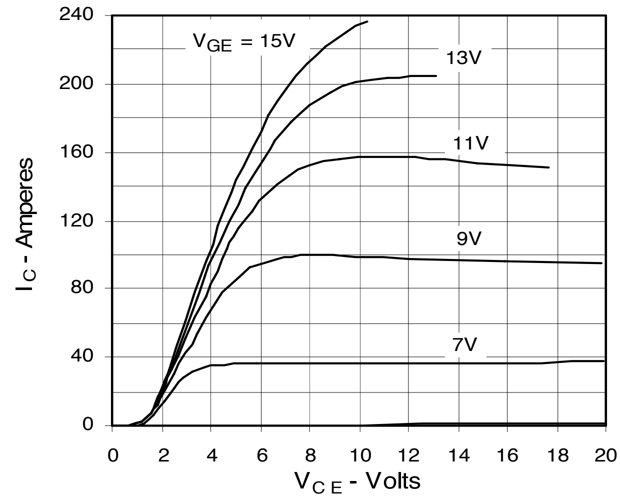

Fig. 3. Output Characteristics @ 125 ºC

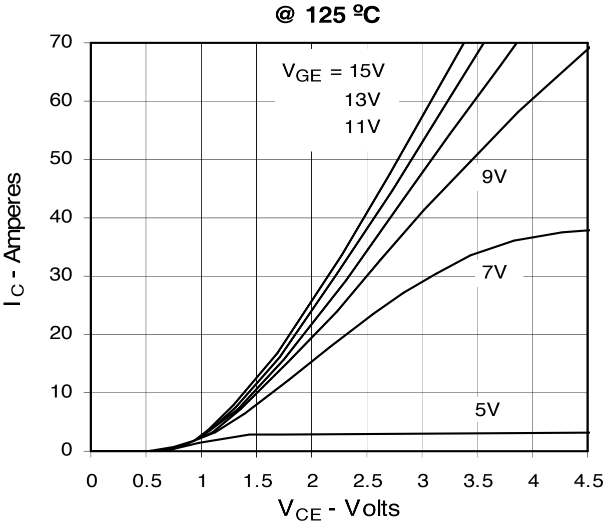

Fig. 4. Dependence of $V_{CE(sat)}$ on Temperature

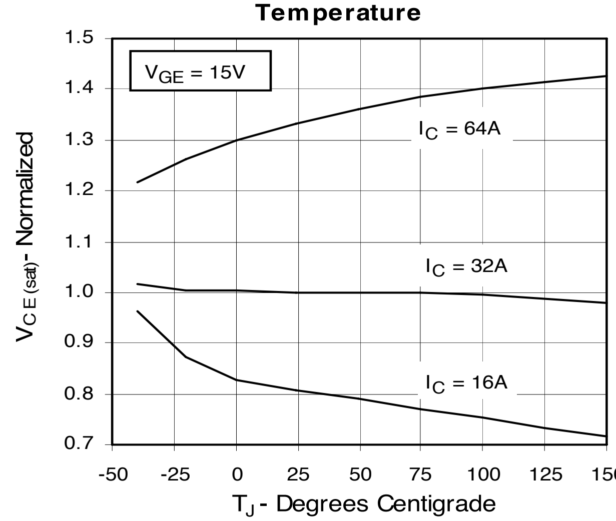

Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter voltage

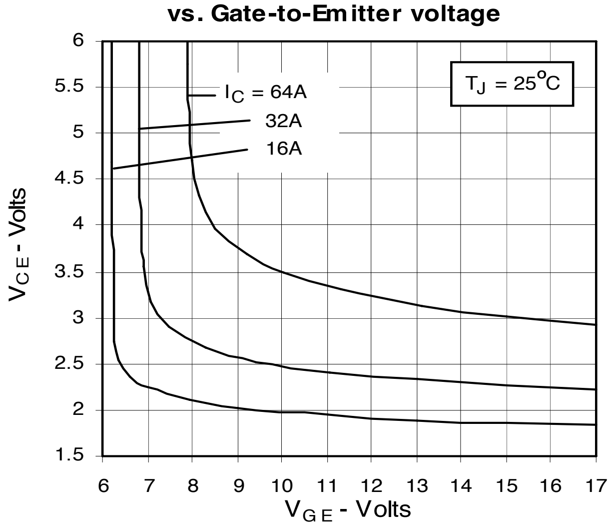

Fig. 6. Input Admittance

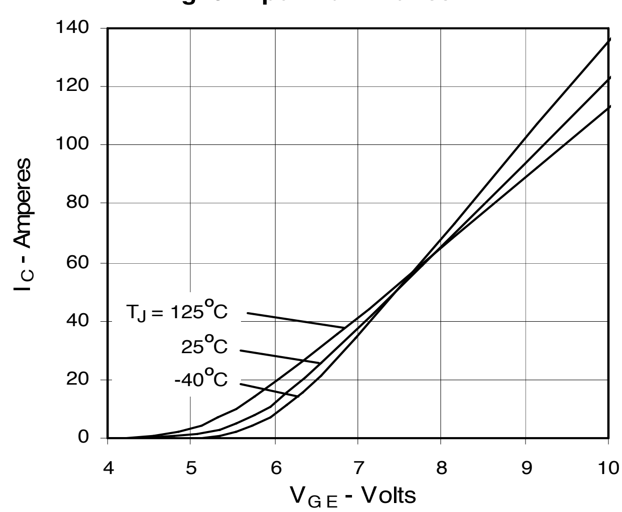

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Fig. 7. Transconductance

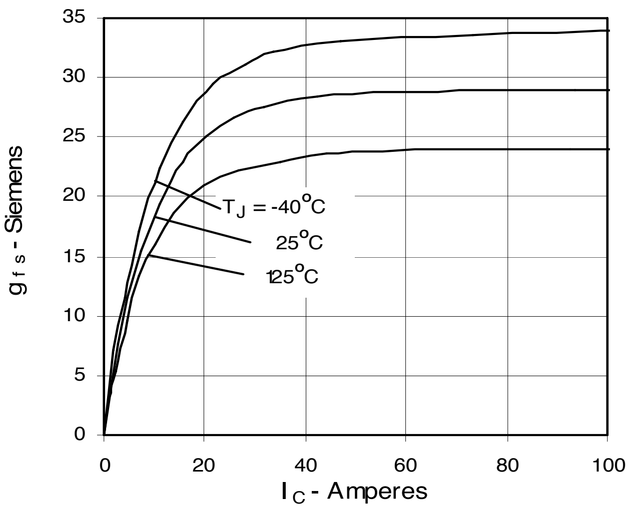

Fig. 8. Gate Charge

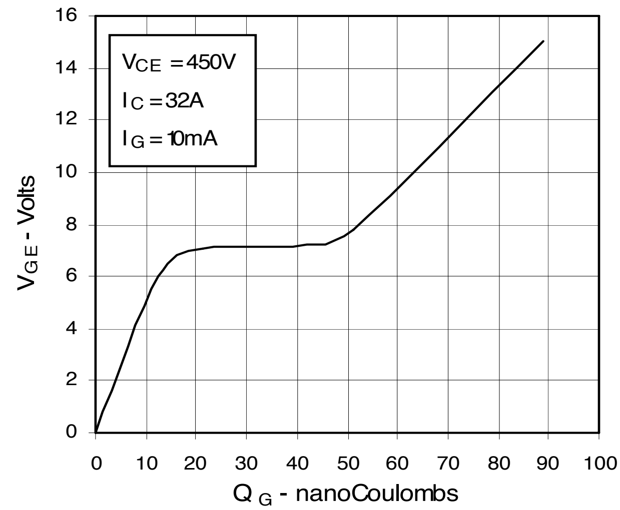

Fig. 9. Capacitance

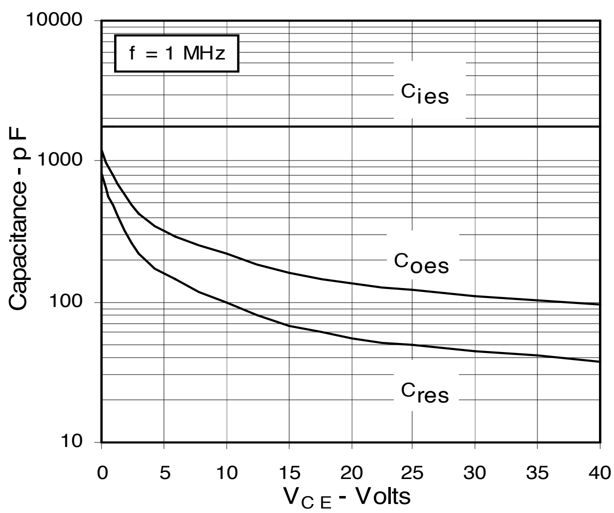

Fig. 10. Reverse-Bias Safe Operating Area

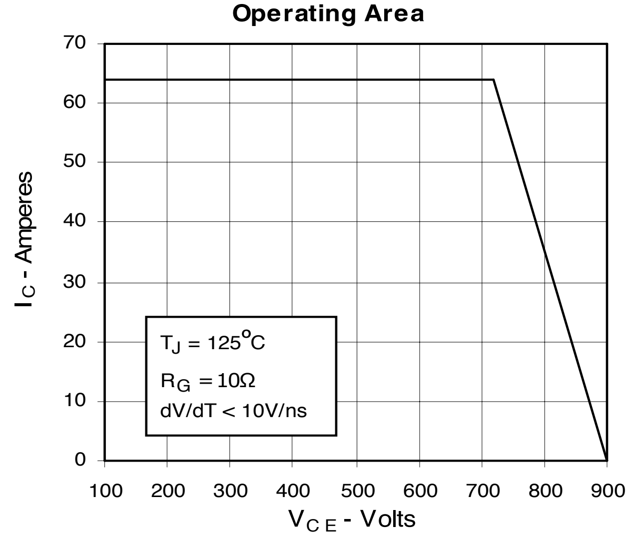

Fig. 11. Maximum Transient Thermal Resistance

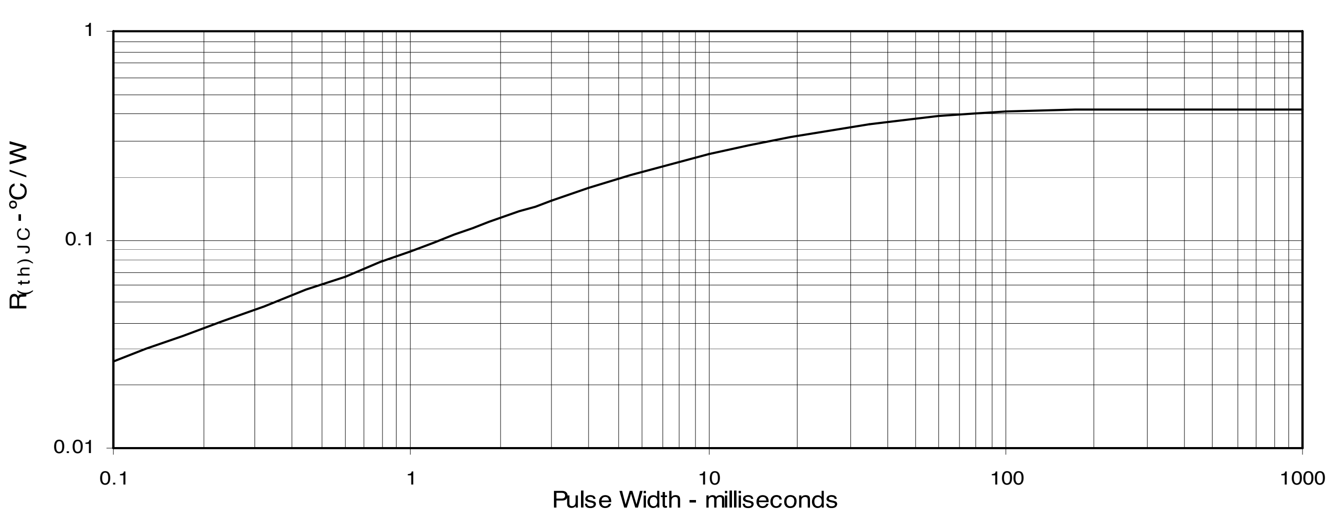

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Fig. 12. Dependence of Turn-off Energy Loss on Gate Resistance

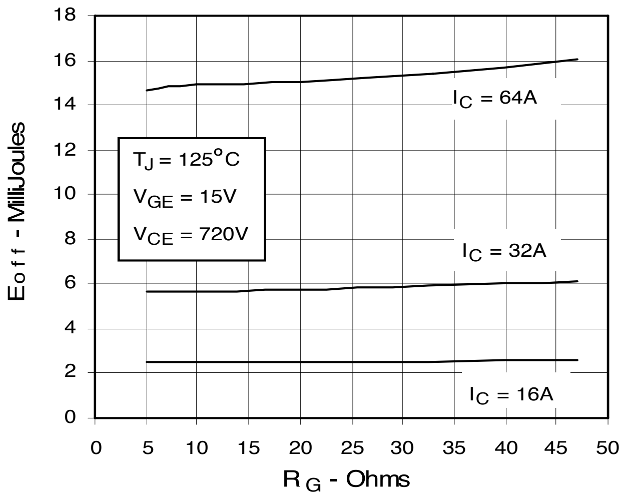


Fig. 13. Dependence of Turn-on Energy Loss on Gate Resistance

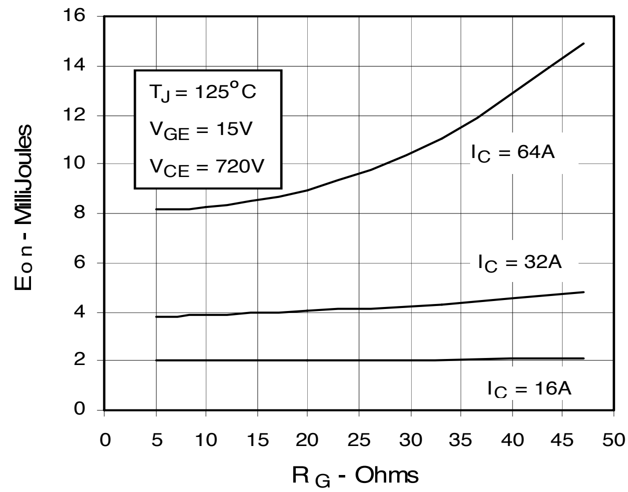


Fig. 14. Dependence of Turn-off Energy Loss on Collector Current

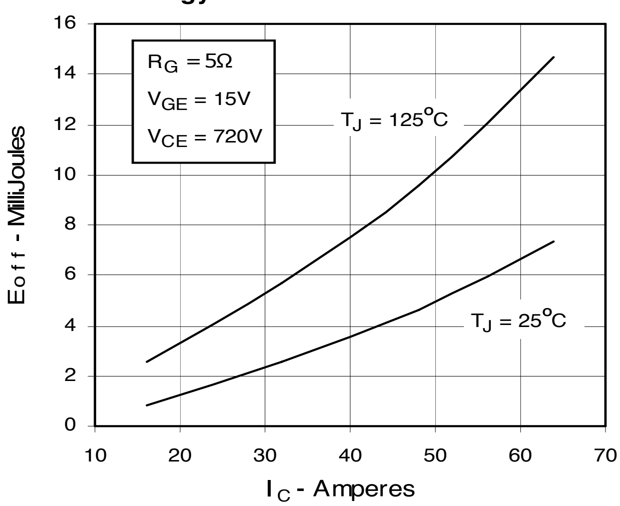


Fig. 15. Dependence of Turn-on Energy Loss on Collector Current

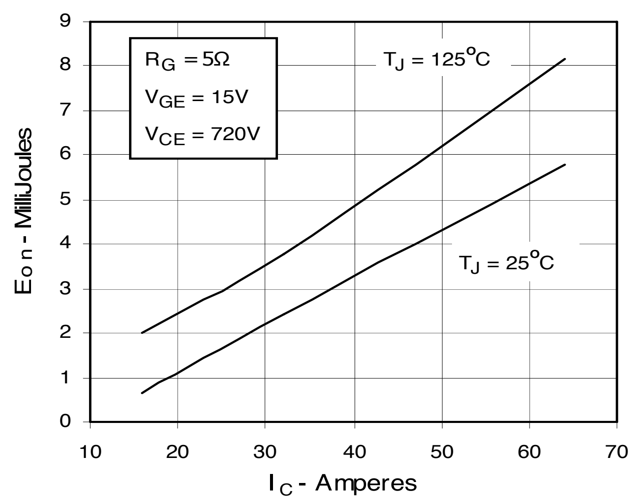


Fig. 16. Dependence of Turn-off Energy Loss on Temperature

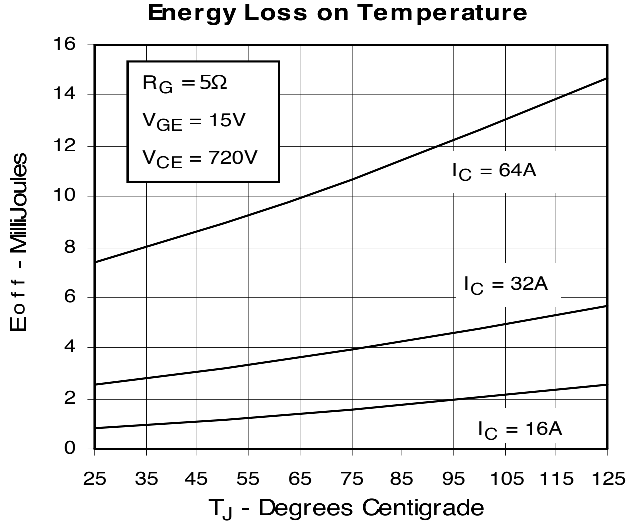
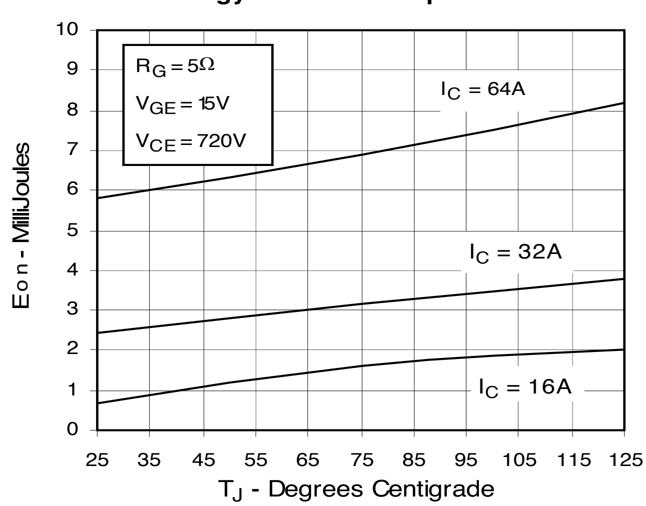


Fig. 17. Dependence of Turn-on Energy Loss on Temperature



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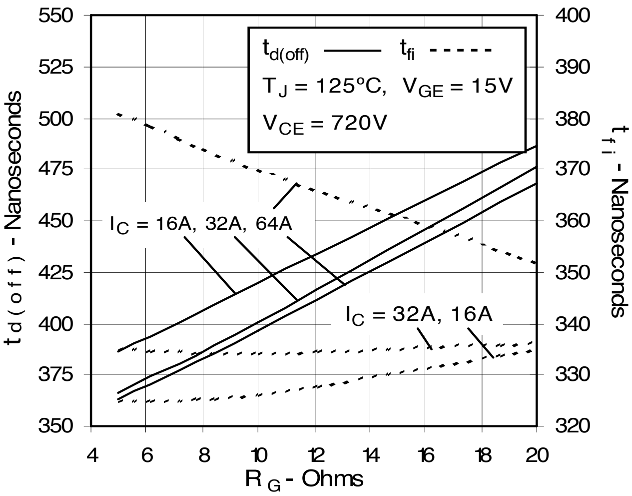

Fig. 18. Dependence of Turn-off Switching Time on Gate Resistance

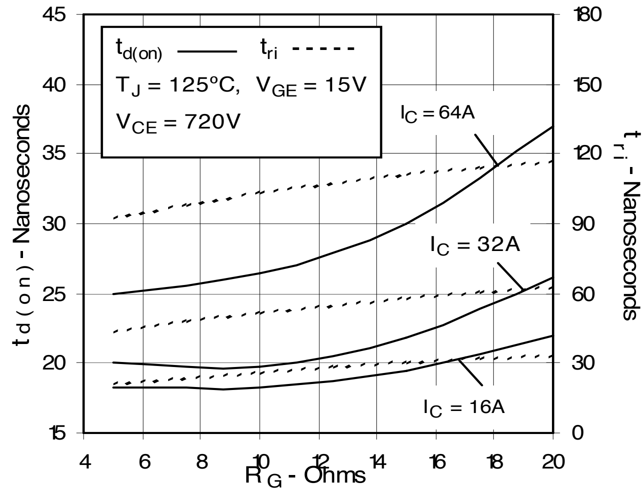

Fig. 19. Dependence of Turn-on Switching Time on Gate Resistance

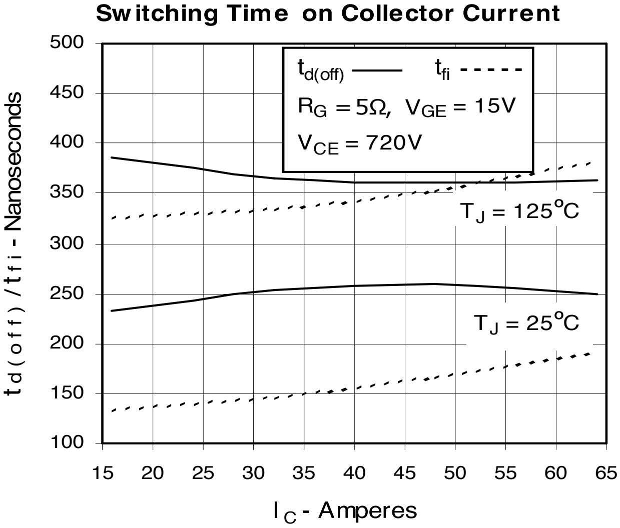

Fig. 20. Dependence of Turn-off Switching Time on Collector Current

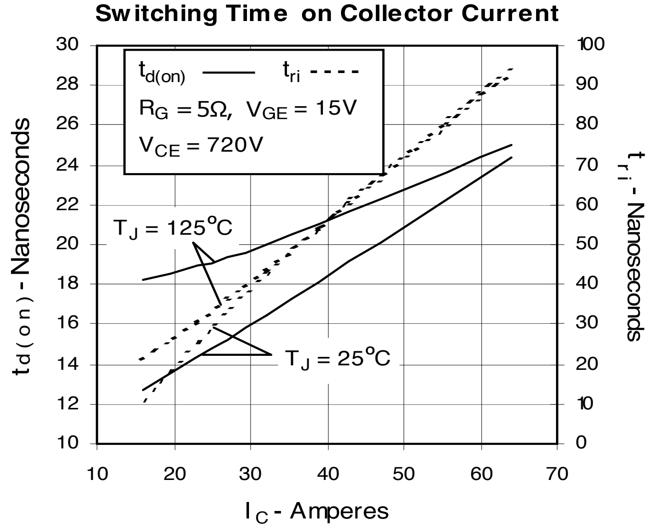

Fig. 21. Dependence of Turn-on Switching Time on Collector Current

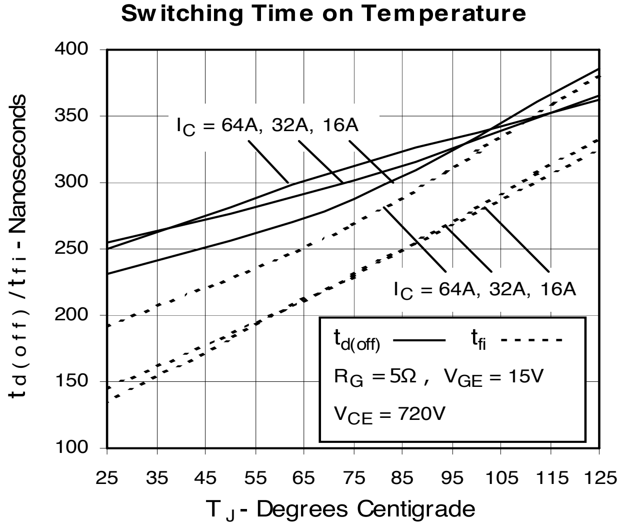

Fig. 22. Dependence of Turn-off Switching Time on Temperature

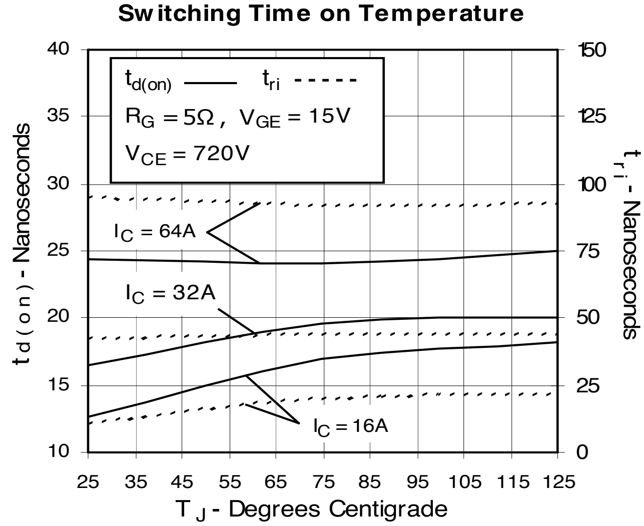

Fig. 23. Dependence of Turn-on Switching Time on Temperature

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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 objective result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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