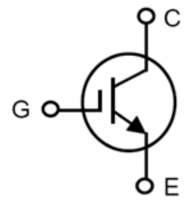
Advance Technical Information

GenX3™ 600V IGBT

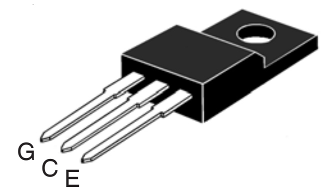
IXGP28N60A3M

V_{CES} = 600V
I_{C110} = 15A
$V_{CE(sat)}$ ≤ 1.4V

Ultra Low Vsat PT IGBT for up to 5kHz Switching



OVERMOLDED TO-220



G = Gate   C = Collector
E = Emitter

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	38	A
I_{C110}	T_C = 110°C	15	A
I_{CM}	T_C = 25°C, 1ms	200	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 10Ω Clamped Inductive Load	I_{CM} = 48 @$V_{CE} \le V_{CES}$	A
P_C	T_C = 25°C	64	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	°C
M_d	Mounting Torque	1.13 / 10	Nm/lb.in
Weight		3.0	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250μA, V_{GE} = 0V	600			V
$V_{GE(th)}$	I_C = 250μA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			25	μA
	T_J = 125°C			250	μA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 24A, V_{GE} = 15V, Note 1			1.4	V
	T_J = 125°C		1.3		V

Features

- Plastic Overmolded Tab
- Optimized for Low Conduction Losses
- Square RBSOA
- International Standard Package

Advantages

- High Power Density
- Extremely Rugged
- Low Gate Drive Requirement

Applications

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

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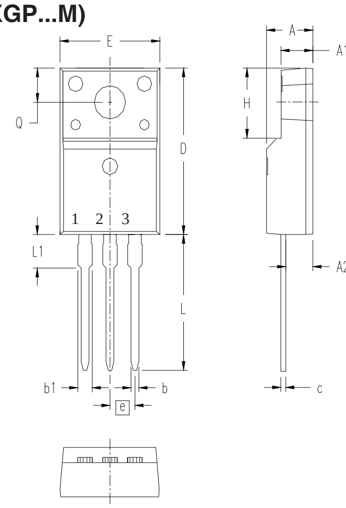
Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Min.	Typ.	Max.	
g_{fs}	I_C = 24A, V_{CE} = 10V, Note 1	17	30		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		1790		pF
C_{oes}			100		pF
C_{res}			26		pF
$Q_{g(on)}$	I_C = 24A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		66		nC
Q_{ge}			13		nC
Q_{gc}			24		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C** I_C = 24A, V_{GE} = 15V V_{CE} = 480V, R_G = 10Ω Note 2		18		ns
t_{ri}			26		ns
E_{on}			0.7		mJ
$t_{d(off)}$			300		ns
t_{fi}			260		ns
E_{off}			2.4		mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C** I_C = 24A, V_{GE} = 15V V_{CE} = 480V, R_G = 10Ω Note 2		20		ns
t_{ri}			26		ns
E_{on}			1.4		mJ
$t_{d(off)}$			470		ns
t_{fi}			400		ns
E_{off}			4.2		mJ
R_{thJC}				1.94	°C/W
R_{thCS}			0.50		°C/W

OVERMOLDED TO-220 (IXGP...M)



Terminals: 1 - Gate
2 - Collector
3 - Emitter

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.177	.193	4.50	4.90
A1	.092	.108	2.34	2.74
A2	.101	.117	2.56	2.96
b	.028	.035	0.70	0.90
b1	.050	.058	1.27	1.47
c	.018	.024	0.45	0.60
D	.617	.633	15.67	16.07
E	.392	.408	9.96	10.36
e	.100 BSC		2.54 BSC	
H	.255	.271	6.48	6.88
L	.499	.523	12.68	13.28
L1	.119	.135	3.03	3.43
ØP	.121	.129	3.08	3.28
Q	.126	.134	3.20	3.40

Notes:
1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.
2. Switching times & energy losses may increase for higher V_{CE}(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 = 25ºC

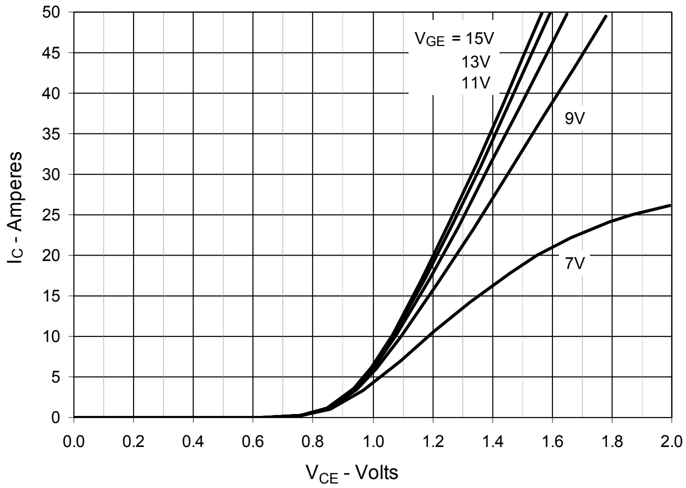


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

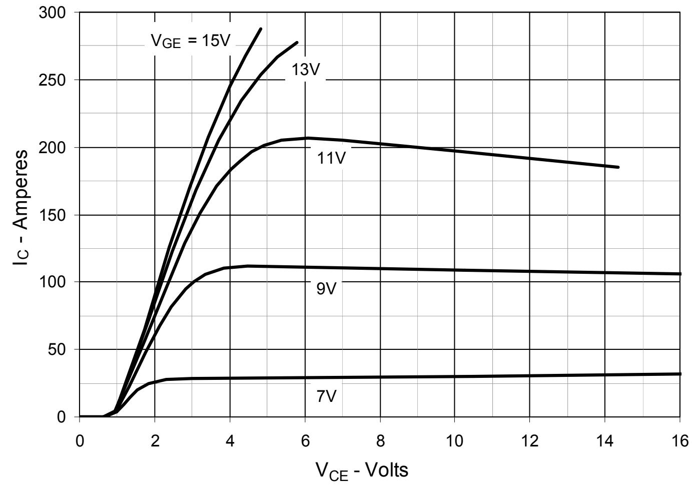


Fig. 3. Output Characteristics @ T_J = 125ºC

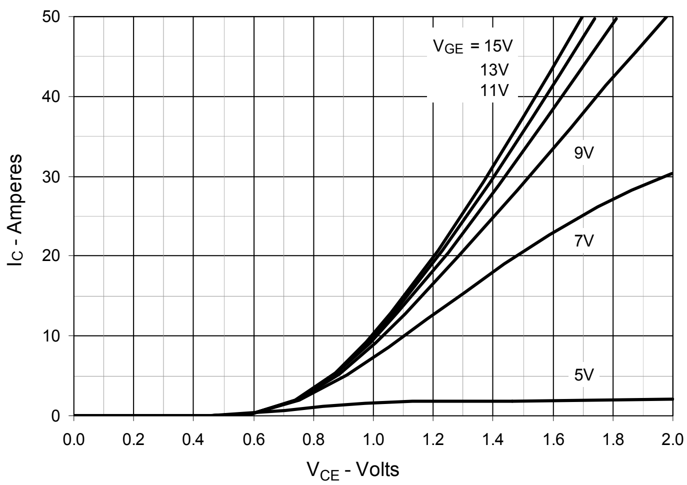


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

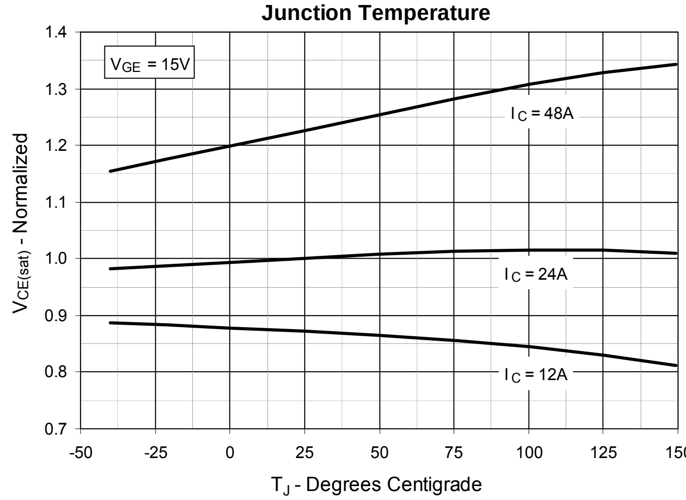


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

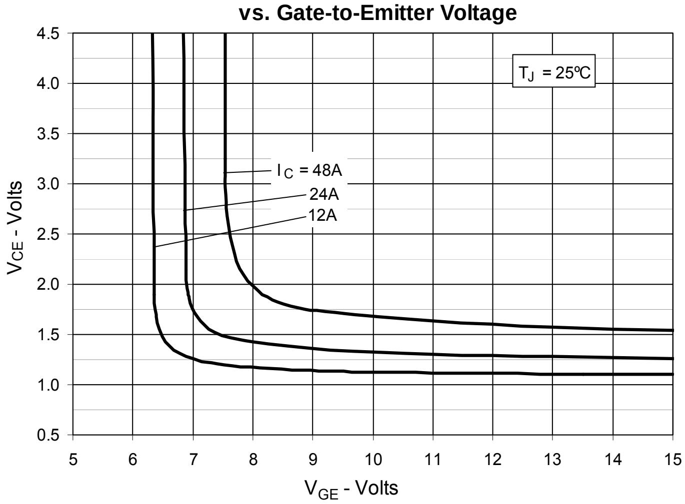


Fig. 6. Input Admittance

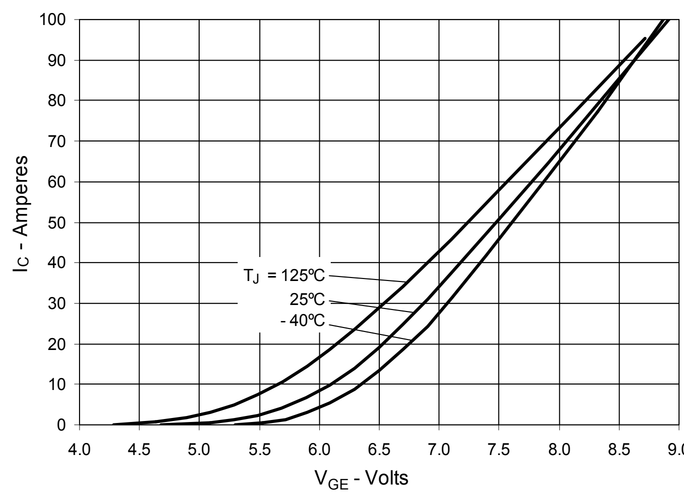


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Fig. 7. Transconductance

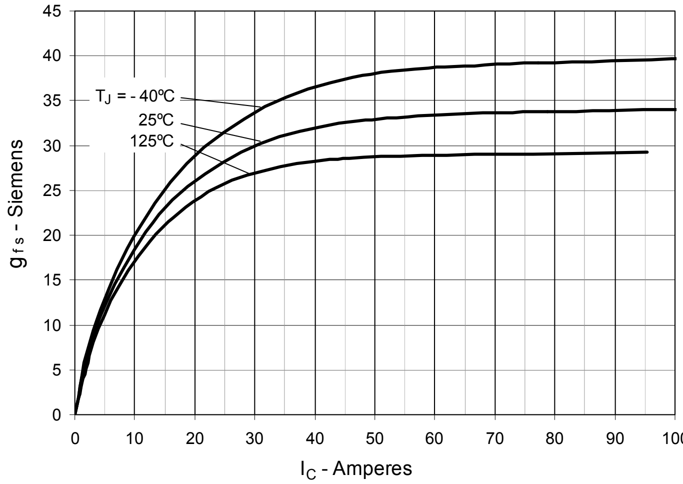

Fig. 8. Gate Charge

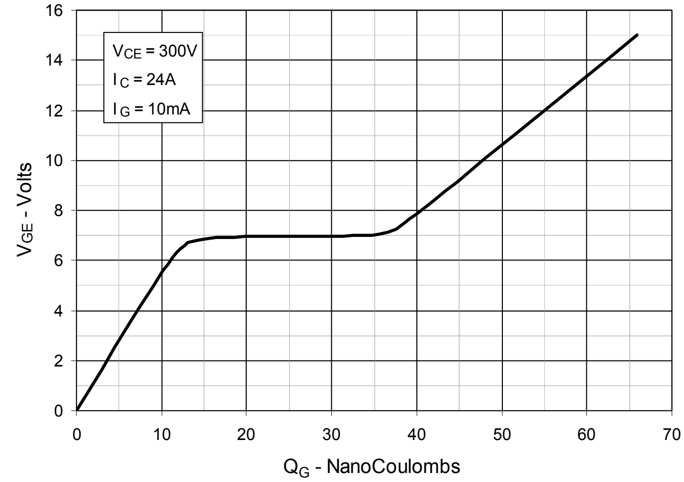

Fig. 9. Reverse-Bias Safe Operating Area

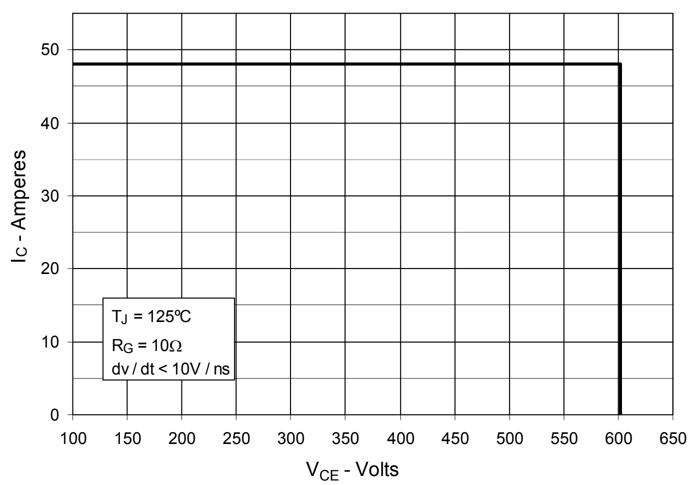

Fig. 10. Capacitance

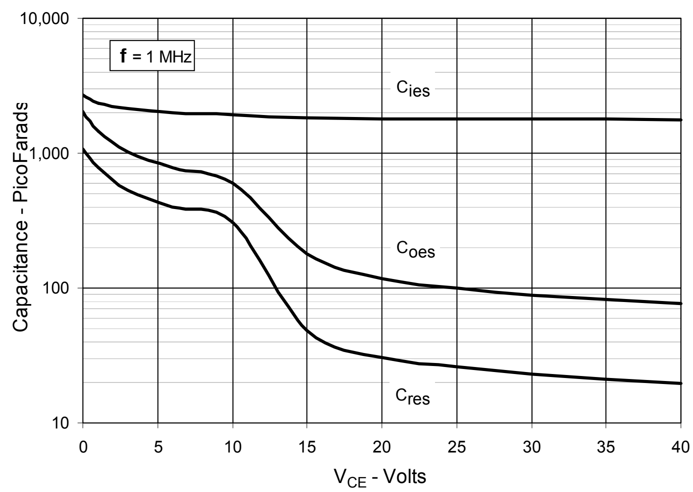

Fig. 11. Maximum Transient Thermal Impedance

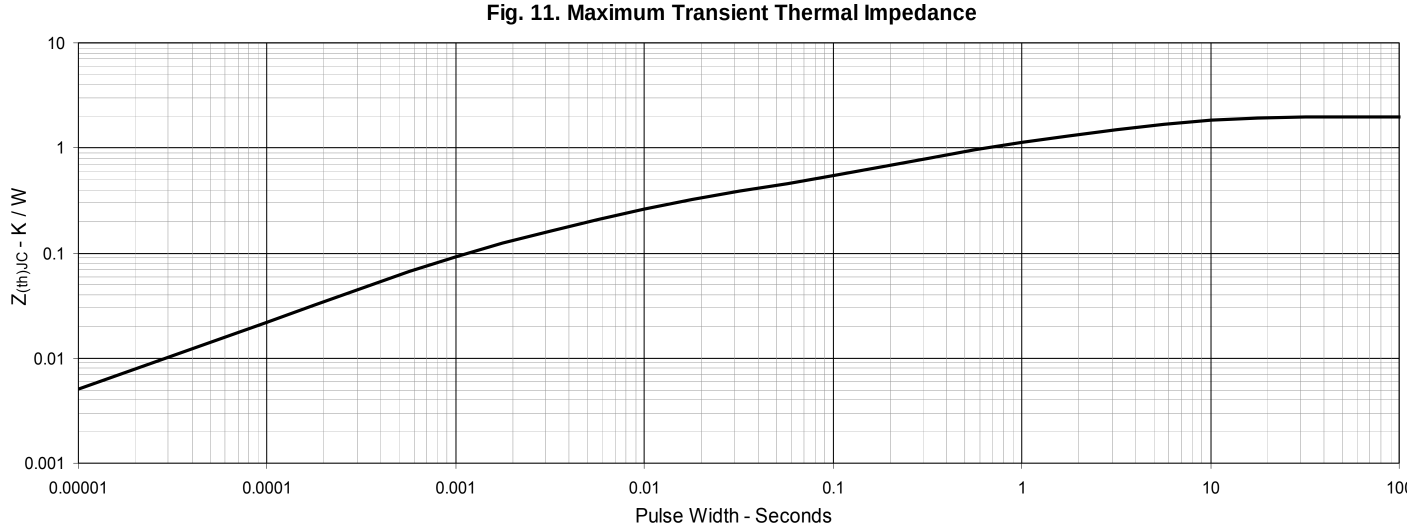

Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

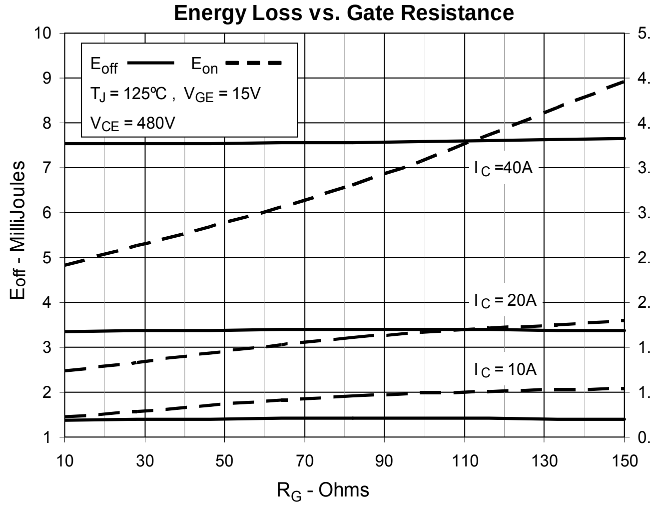

Fig. 13. Inductive Switching Energy Loss vs. Junction Temperature

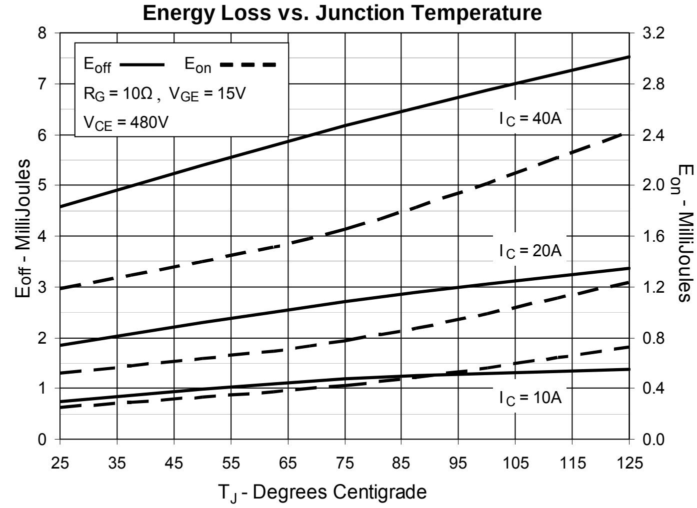

Fig. 14. Inductive Switching Energy Loss vs. Collector Current

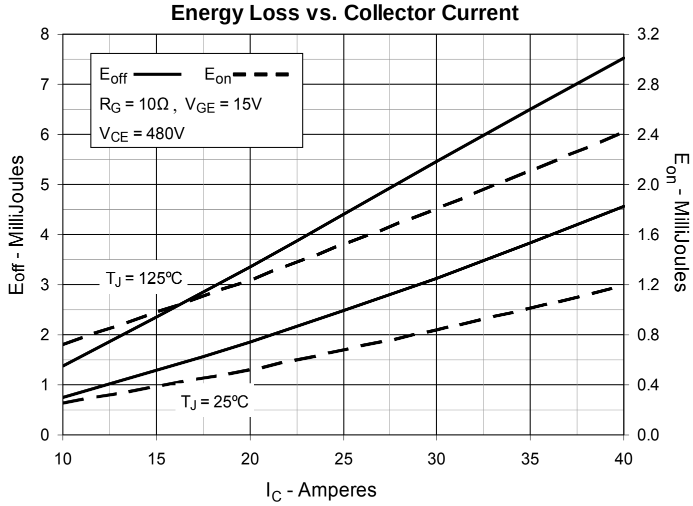

Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

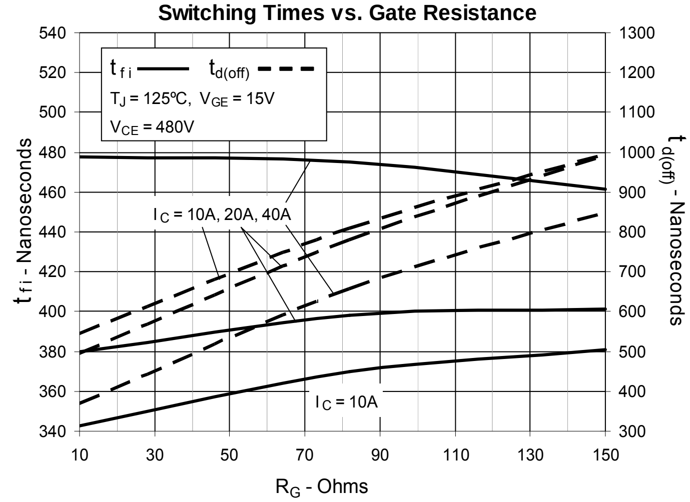

Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

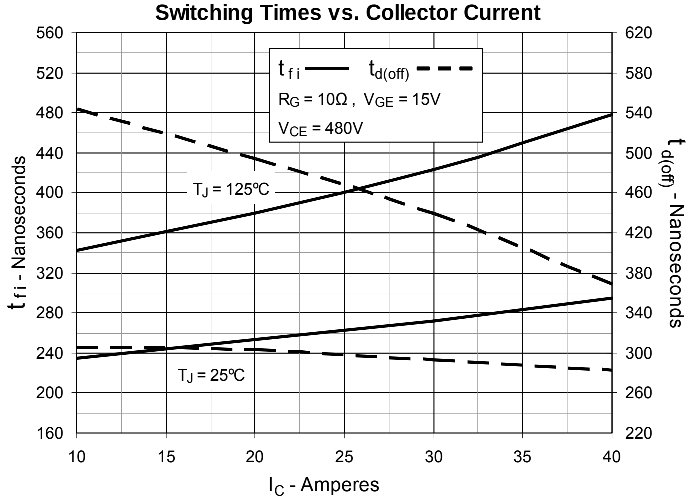

Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

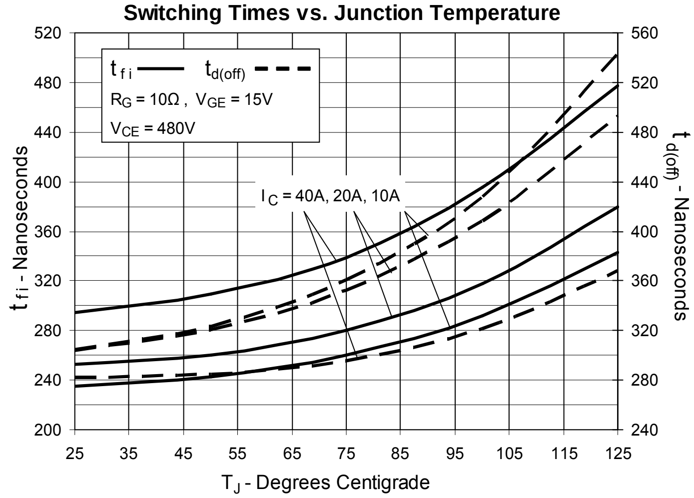

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Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

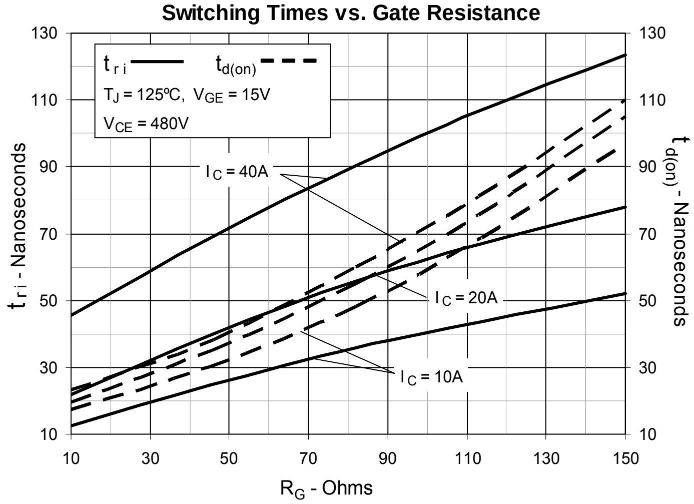


Fig. 19. Inductive Turn-on Switching Times vs. Junction Temperature

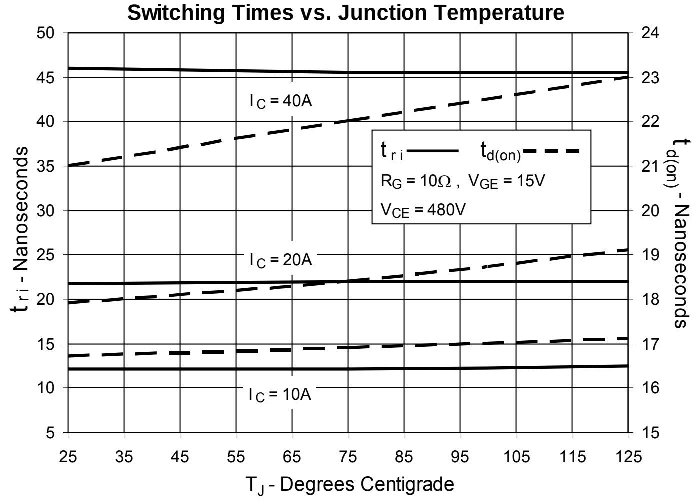
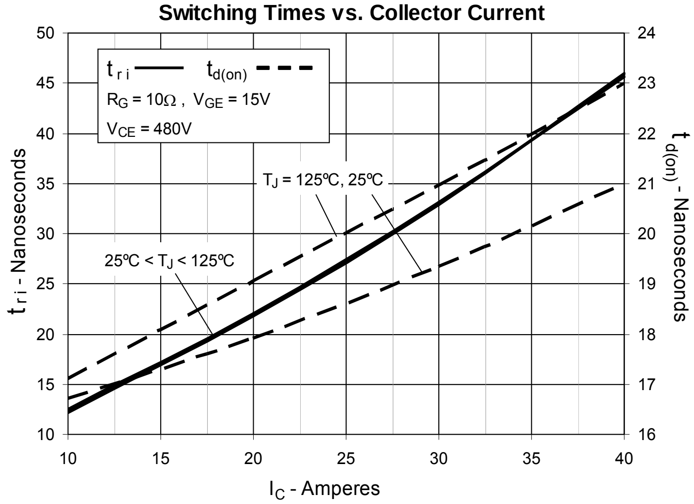


Fig. 20. Inductive Turn-on Switching Times vs. Collector Current



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