IXYS

Preliminary Technical Information

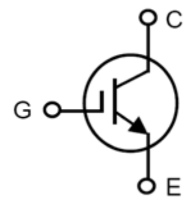
GenX3™ 600V IGBT

IXGR72N60C3*

***Obsolete Part Number**

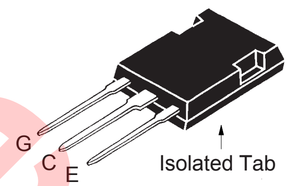
(Electrically Isolated Tab)

High-Speed Low-Vsat PT IGBT
40-100 kHz Switching



V_{CES}	=	600V
I_{C110}	=	35A
$V_{CE(sat)}$	≤	2.7V
$t_{fi(typ)}$	=	55ns

ISOPLUS 247™



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	80	A
I_{C110}	T_C = 110°C	35	A
I_{CM}	T_C = 25°C, 1ms	400	A
I_A	T_C = 25°C	50	A
E_{AS}	T_C = 25°C	500	mJ
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 2Ω Clamped Inductive Load	I_{CM} = 150 $V_{CE} \le V_{CES}$	A
P_C	T_C = 25°C	200	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}	Plastic Body for 10s	260	°C
V_{ISOL}	50/60 Hz, 1 Minute	2500	V~
F_C	Mounting Force	20..120/4.5..27	N/lb
Weight		5	g

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Optimized for Low Switching Losses
- Square RBSOA
- Isolated Mounting Surface
- Avalanche Rated
- 2500V Electrical Isolation

Advantages

- High Power Density
- Low Gate Drive Requirement

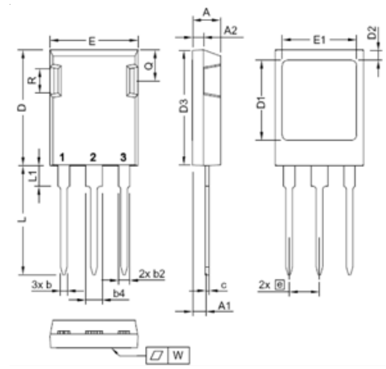
Applications

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

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		5.5	V
I_{CES}	$V_{CE} = V_{CES}$, V_{GE} = 0V			300	μA
	T_J = 125°C			1	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 50A, V_{GE} = 15V		2.10	2.70	V
	T_J = 125°C		1.65		V

Symbol	Test Conditions ($T_J = 25°C$, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	I_C = 50A, V_{CE} = 10V, Note 1	33	55		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		4780		pF
C_{oes}			330		pF
C_{res}			117		pF
Q_g	I_C = 50A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		175		nC
Q_{ge}			33		nC
Q_{gc}			72		nC
$t_{d(on)}$	**Inductive Load, T_J = 25°C**		27		ns
t_{ri}	I_C = 50A, V_{GE} = 15V		37		ns
E_{on}	V_{CE} = 480V, R_G = 2Ω, Note 2		1.03		mJ
$t_{d(off)}$			77	130	ns
t_{fi}			55	110	ns
E_{off}			0.48	0.95	mJ
$t_{d(on)}$	**Inductive Load, T_J =1 25°C**		26		ns
t_{ri}	I_C = 50A, V_{GE} = 15V		36		ns
E_{on}	V_{CE} = 480V, R_G = 2Ω, Note 2		1.48		mJ
$t_{d(off)}$			120		ns
t_{fi}			124		ns
E_{off}			0.93		mJ
R_{thJC}				0.62	°C/W
R_{thCS}			0.15		°C/W

ISOPLUS247 (IXGR) Outline



1 - Gate
2 - Collector
3 - Emitter

Dim.	Millimeter min	max	Inches min	max
A	4.83	5.21	0.190	0.205
A1	2.29	2.54	0.090	0.100
A2	1.91	2.16	0.075	0.085
b	1.14	1.40	0.045	0.055
b2	1.91	2.20	0.075	0.087
b4	2.92	3.24	0.115	0.128
c	0.61	0.83	0.024	0.033
D	20.80	21.34	0.819	0.840
D1	15.75	16.26	0.620	0.640
D2	1.65	2.15	0.065	0.085
D3	20.30	20.70	0.799	0.815
E	15.75	16.13	0.620	0.635
E1	13.21	13.72	0.520	0.540
e	5.45 BSC		0.215 BSC	
L	19.81	20.60	0.780	0.811
L1	3.81	4.38	0.150	0.172
Q	5.59	6.20	0.220	0.244
R	4.25	5.50	0.167	0.217
W	-	0.10	-	0.004

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.

PRELIMANARY 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.

Fig. 1. Output Characteristics @ T_J = 25ºC

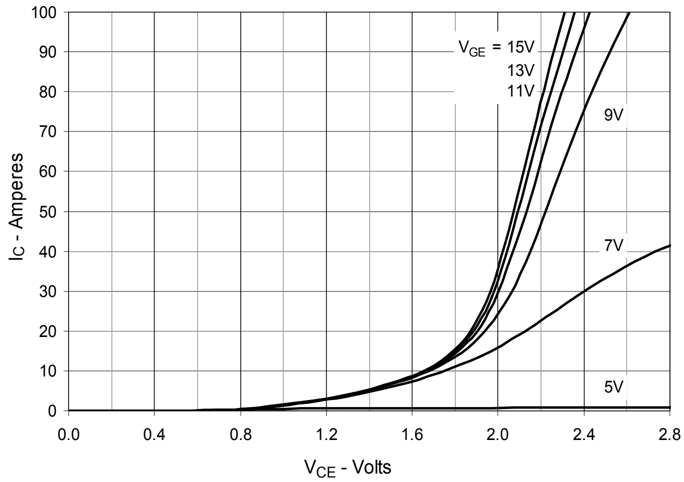


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

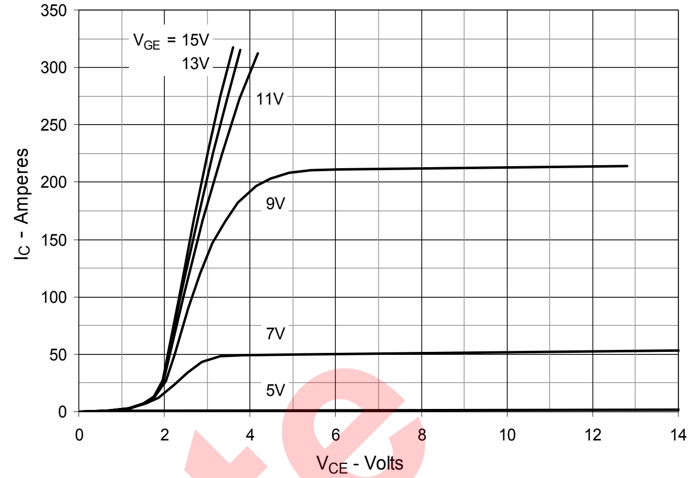


Fig. 3. Output Characteristics @ T_J = 125ºC

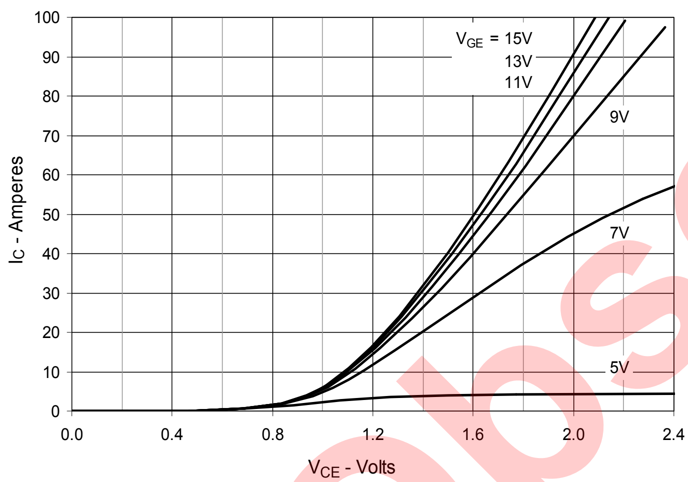


Fig. 4. Dependence of $V_{CE(sat)}$ on JunctionTemperature

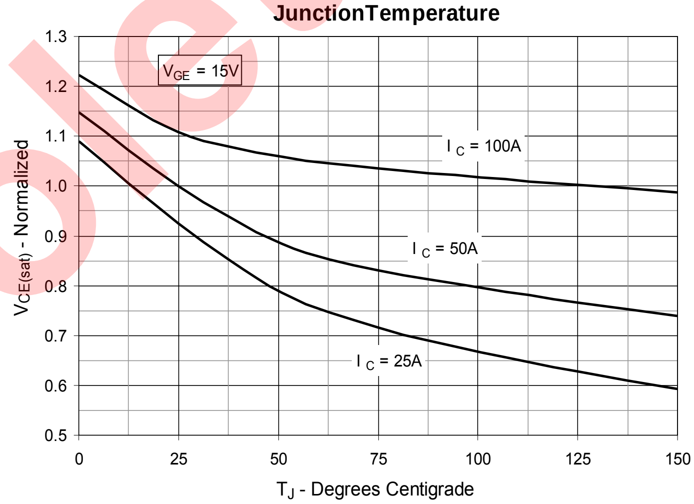


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

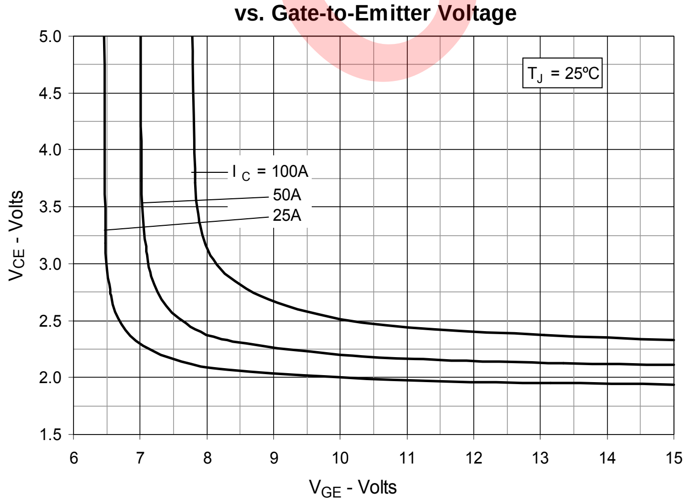


Fig. 6. Input Admittance

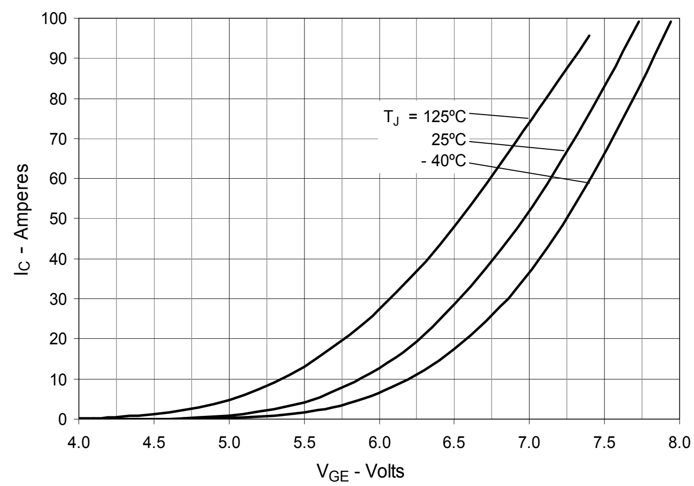


Fig. 7. Transconductance

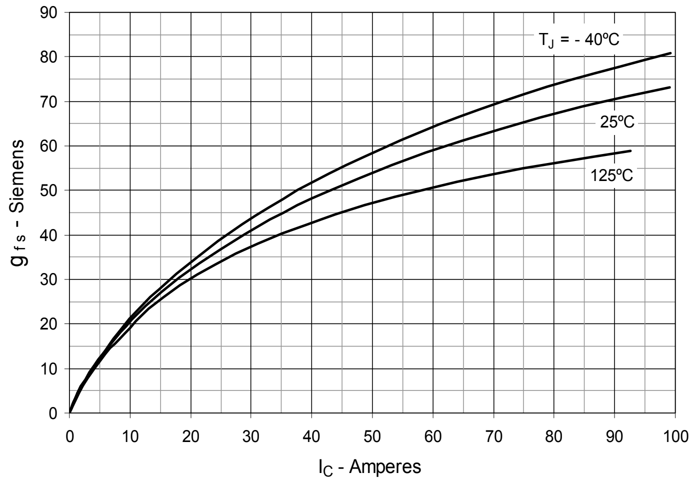


Fig. 8. Gate Charge

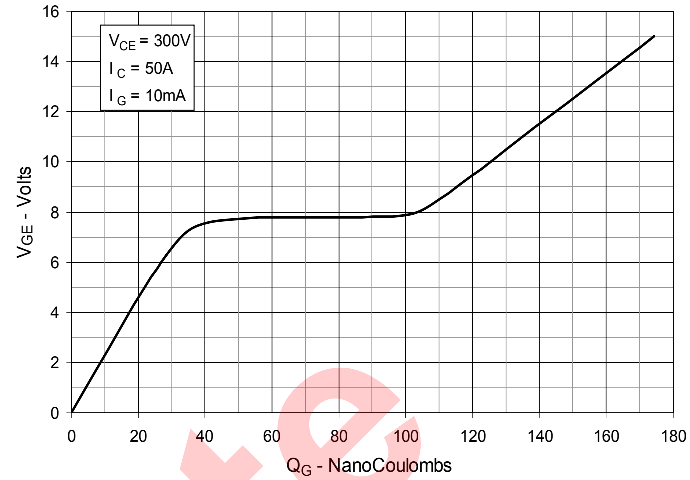


Fig. 9. Capacitance

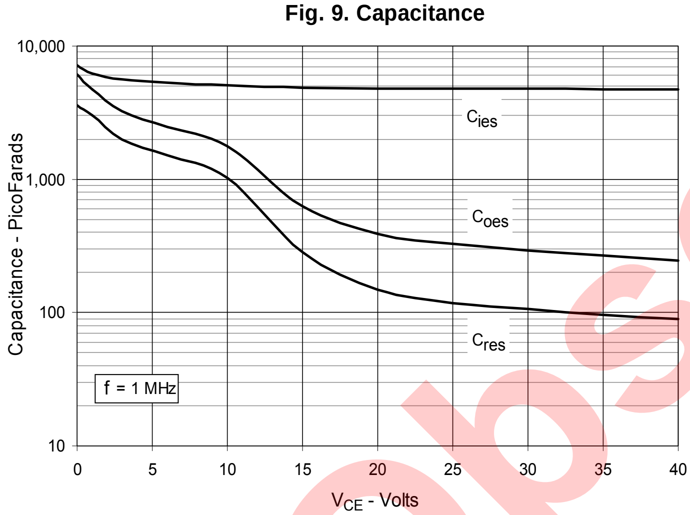


Fig. 10. Reverse-Bias Safe Operating Area

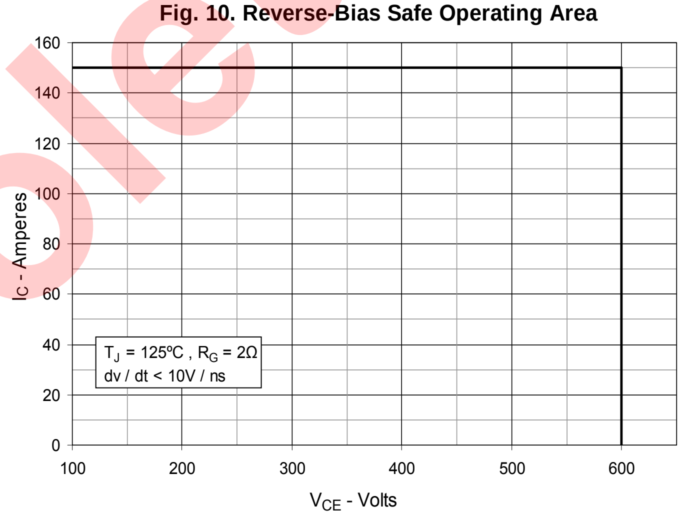


Fig. 11. Maximum Transient Thermal Impedance

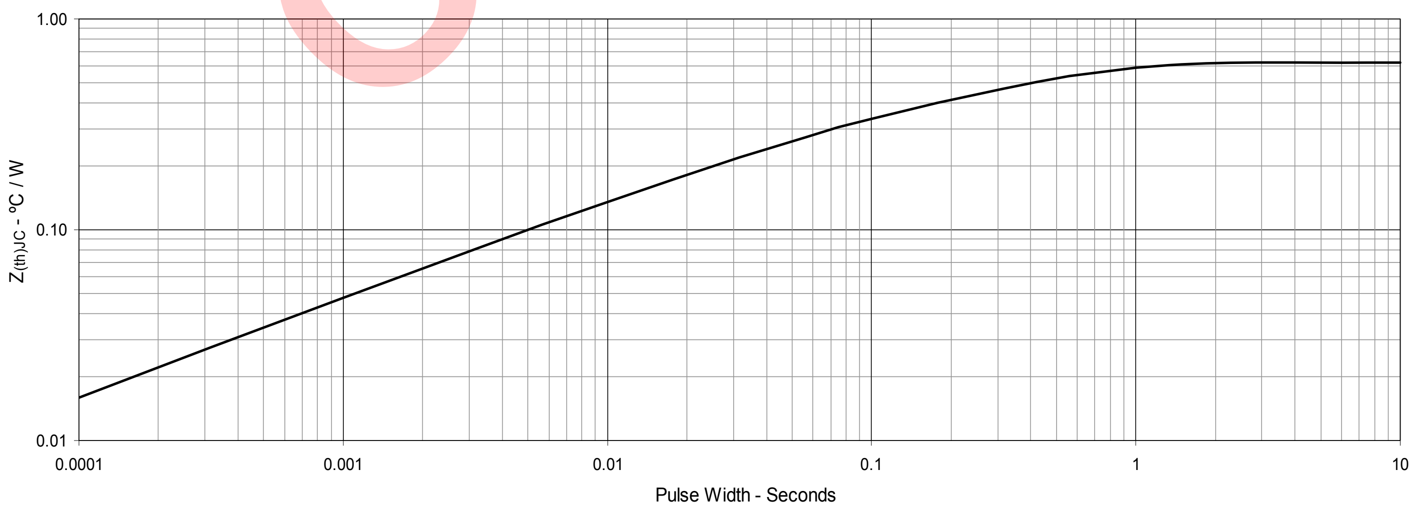


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

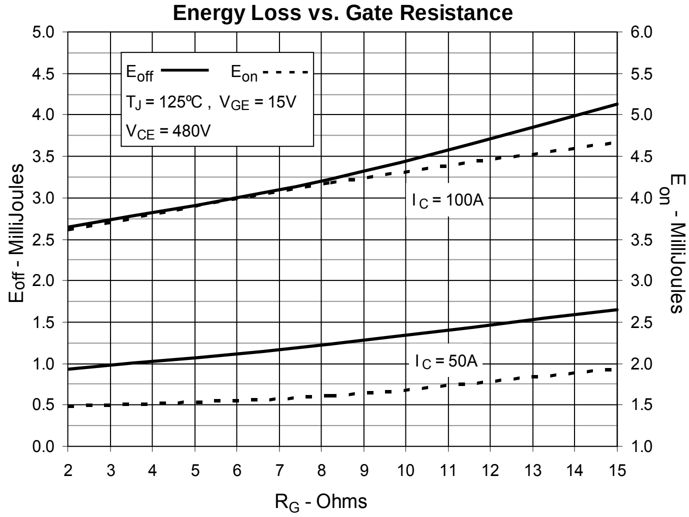


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

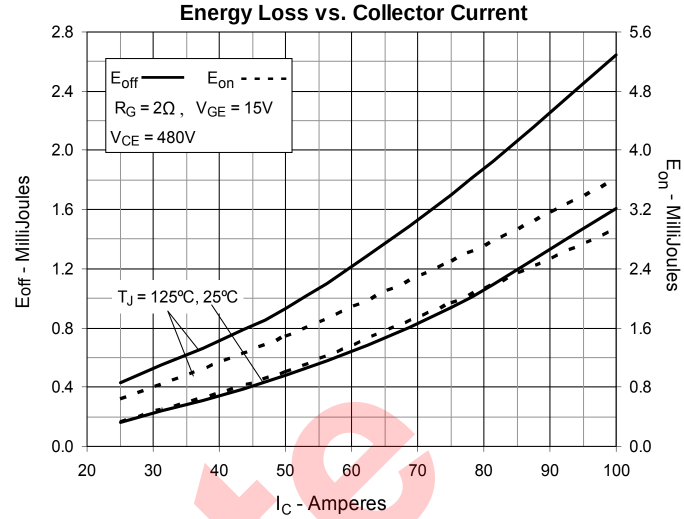


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

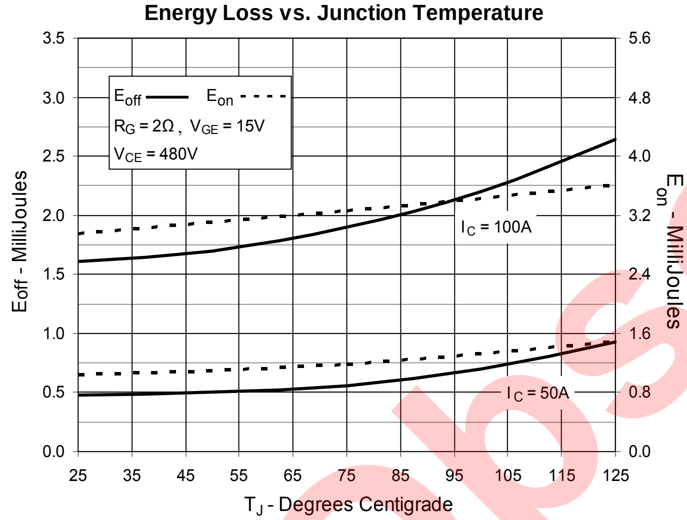


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

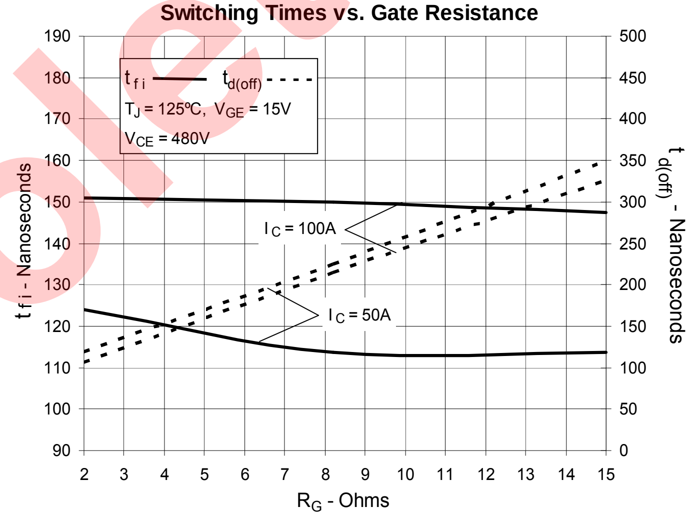


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

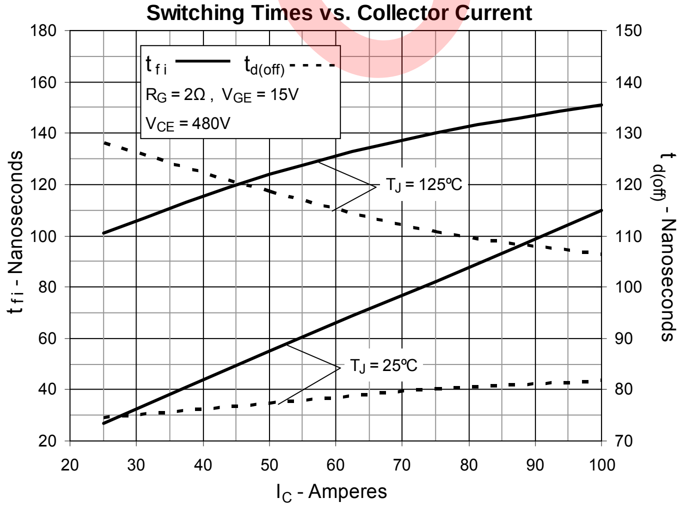


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

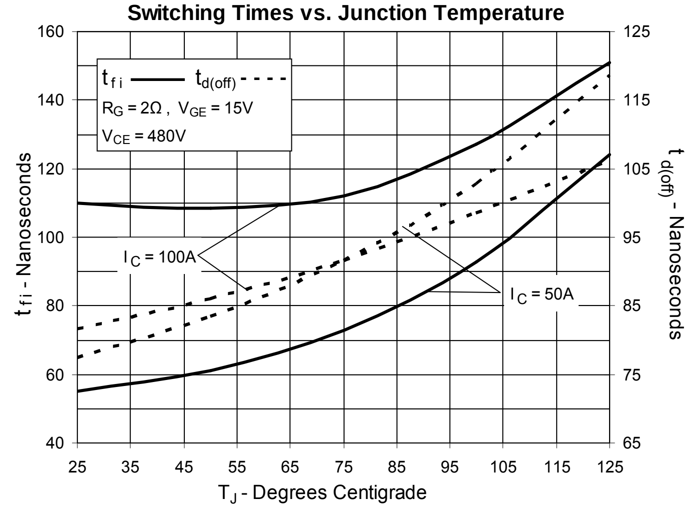


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

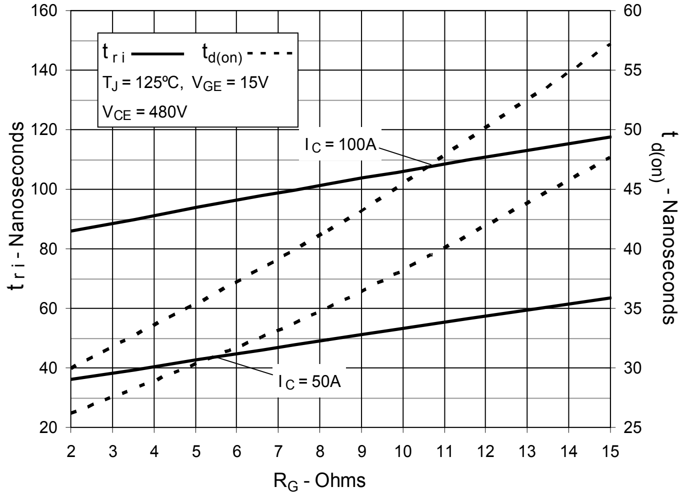


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

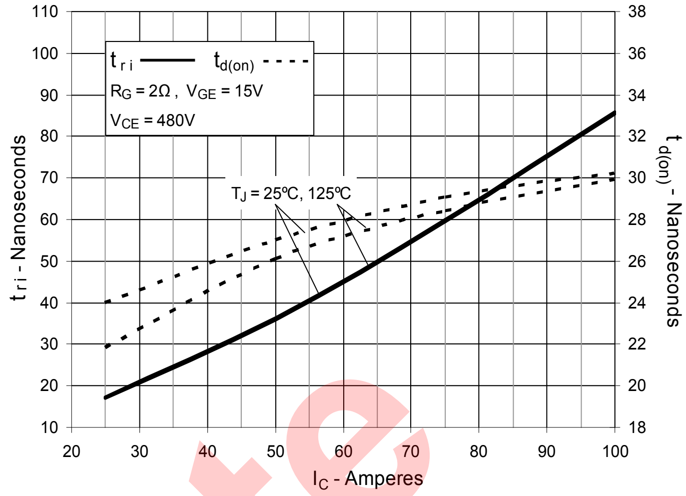


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature