IXYS

GenX3™ 600V IGBT

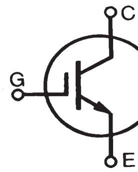
IXGR72N60A3*

*Obsolete Part Number

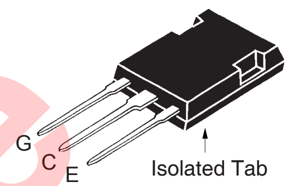
V_{CES}	=	600V
I_{C110}	=	52A
$V_{CE(sat)}$	≤	1.45V
$t_{fi(typ)}$	=	250ns

(Electrically Isolated Tab)

Ultra-Low Vsat PT IGBT for up to 5kHz Switching



ISOPLUS247™



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	75	A
I_{C110}	T_C = 110°C	52	A
I_{CM}	T_C = 25°C, 1ms	400	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 3Ω 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
V_{ISOL}	50/60 Hz, RMS, t = 1minute	2500	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

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			75	μA
	T_J = 125°C			750	μA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 60A, V_{GE} = 15V, Note 1			1.45	V

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 2500V Electrical Isolation
- Optimized for Low Conduction Losses
- Square RBSOA
- International Standard Package

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

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

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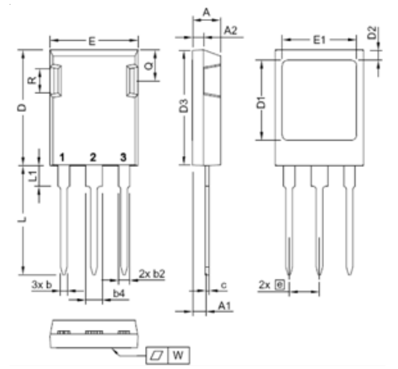
IXGR72N60A3

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	I_C = 60A, V_{CE} = 10V, Note 1	48	75		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		6600		pF
C_{oes}			360		pF
C_{res}			80		pF
Q_g	I_C = 60A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		230		nC
Q_{ge}			40		nC
Q_{gc}			80		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C** I_C = 50A, V_{GE} = 15V V_{CE} = 480V, R_G = 3Ω		31		ns
t_{ri}			34		ns
E_{on}			1.4		mJ
$t_{d(off)}$			320		ns
t_{fi}			250		ns
E_{off}			3.5		mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C** I_C = 50A, V_{GE} = 15V V_{CE} = 480V, R_G = 3Ω		29		ns
t_{ri}			34		ns
E_{on}			2.6		mJ
$t_{d(off)}$			510		ns
t_{fi}			375		ns
E_{off}			6.5		mJ
R_{thJC}				0.62	°C/W
R_{thCS}			0.15		°C/W

Note 1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.

ISOPLUS247 (IXGR) Outline



1 - Gate
2 - Collector
3 - Emitter

Dim.	Millimeter min	Millimeter max	Inches min	Inches 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

IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

Fig. 1. Output Characteristics @ T_J = 25ºC

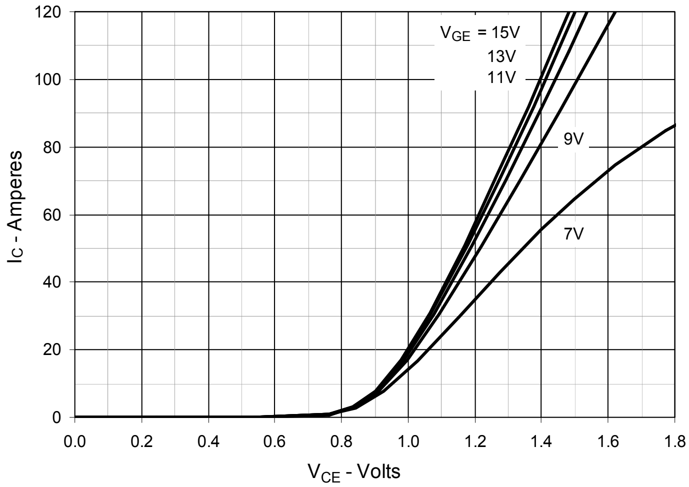


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

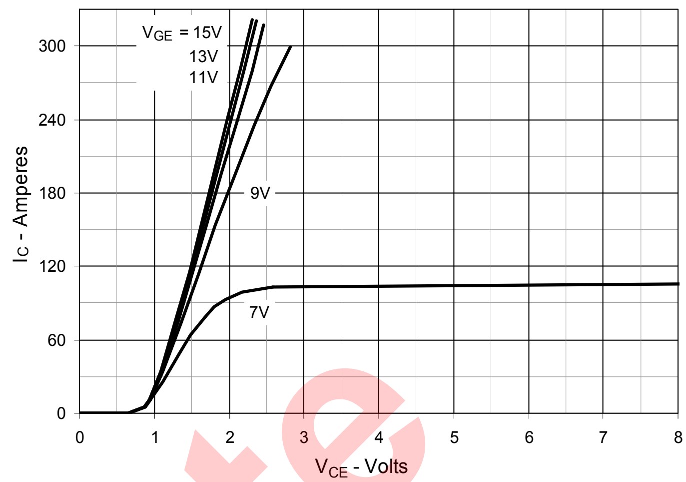


Fig. 3. Output Characteristics @ T_J = 125ºC

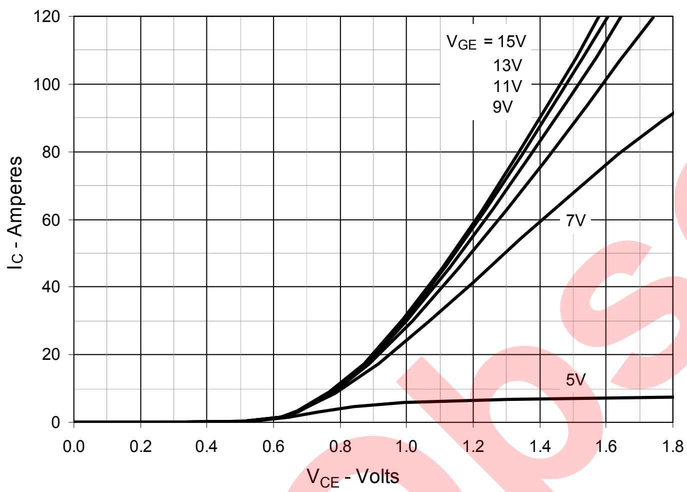


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

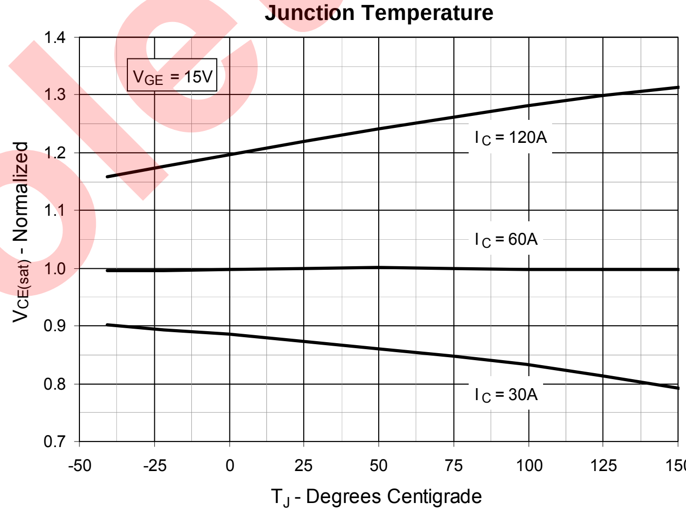


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

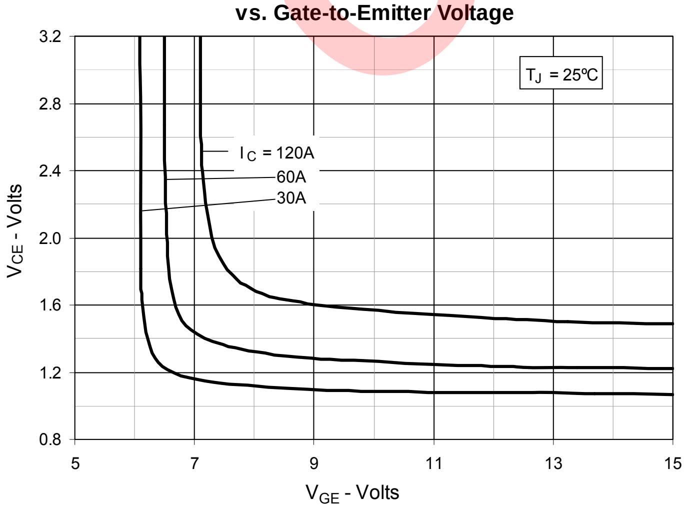


Fig. 6. Input Admittance

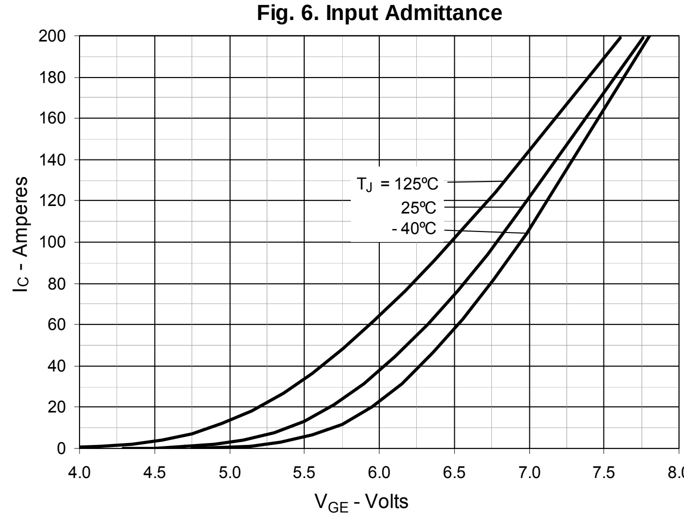


Fig. 7. Transconductance

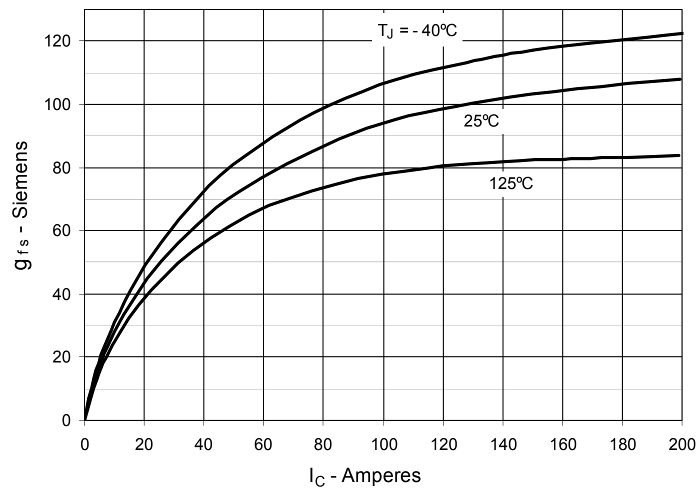


Fig. 8. Gate Charge

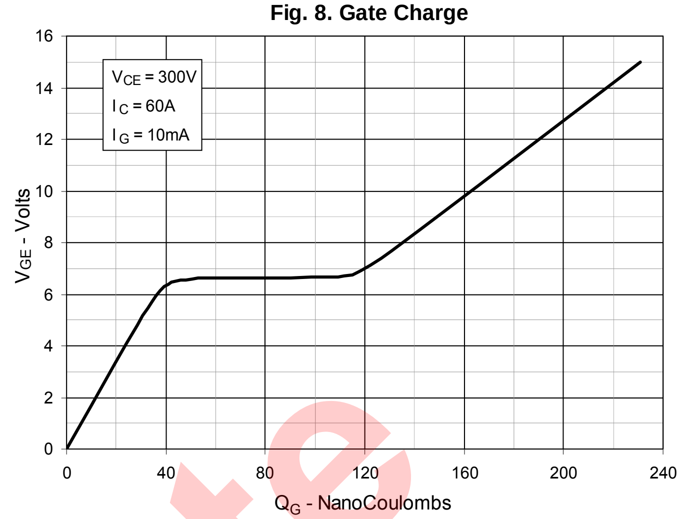


Fig. 9. Capacitance

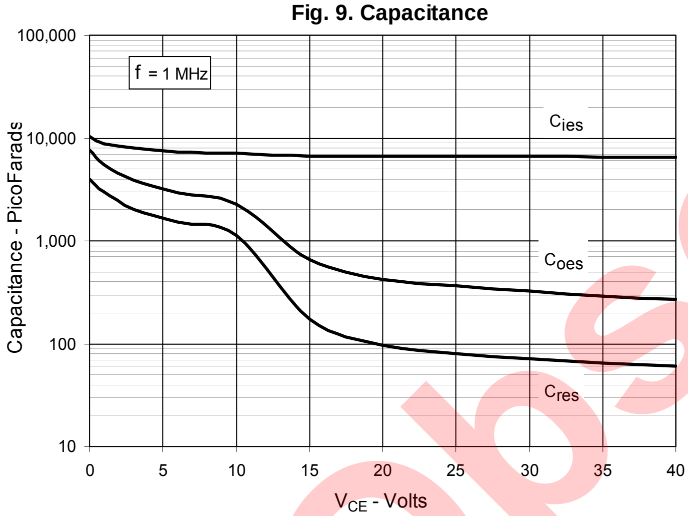


Fig. 10. Reverse-Bias Safe Operating Area

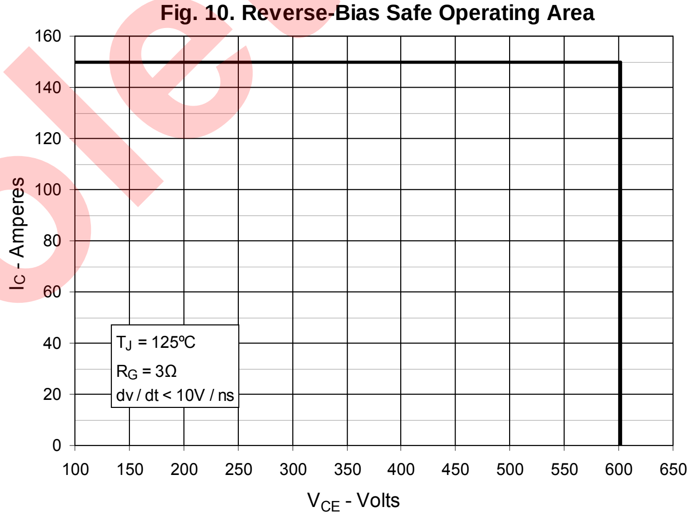


Fig. 11. Maximum Transient Thermal Impedance

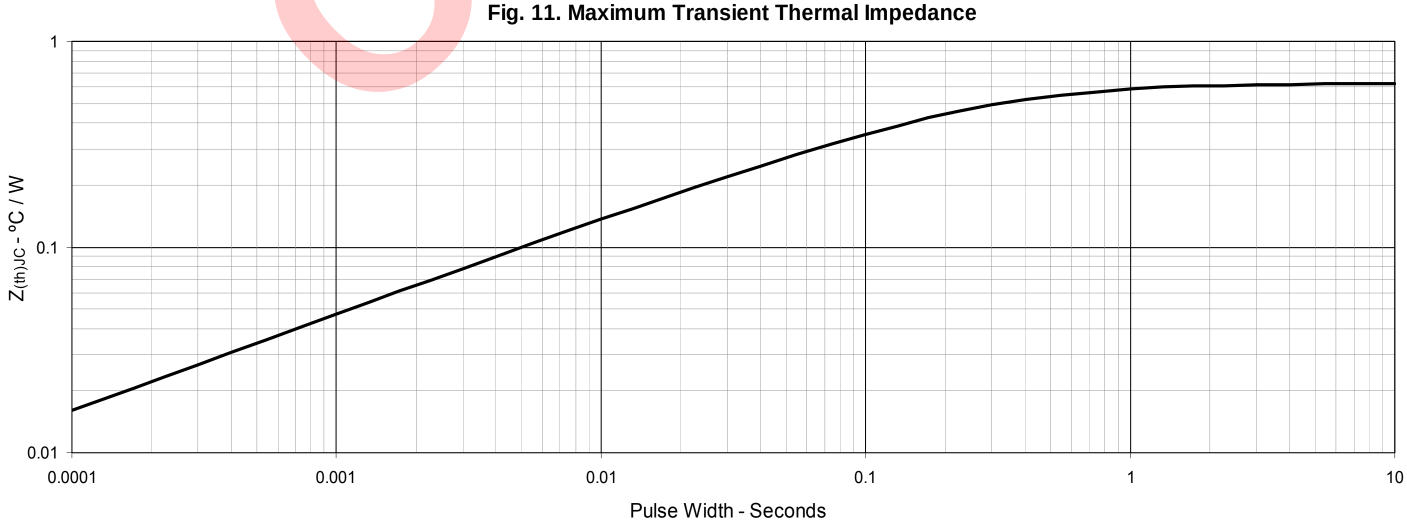


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

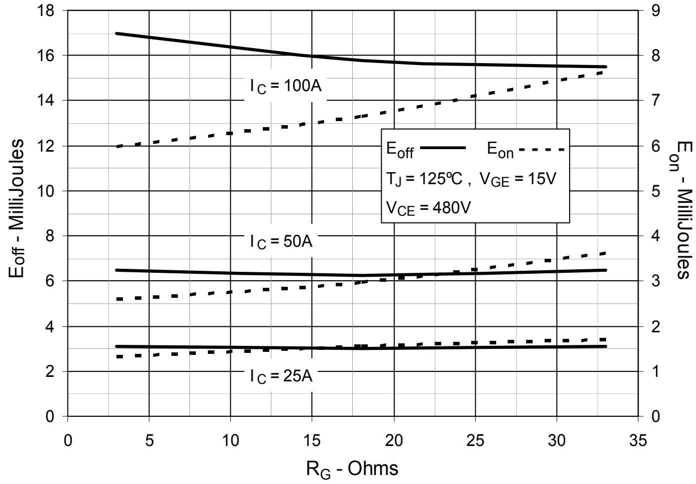


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

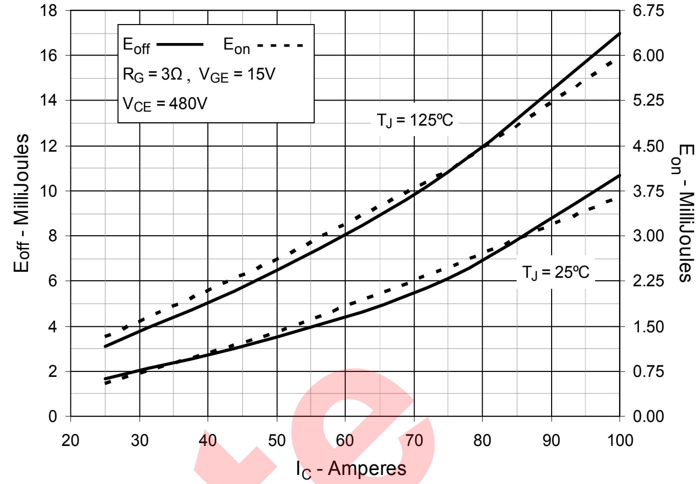


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

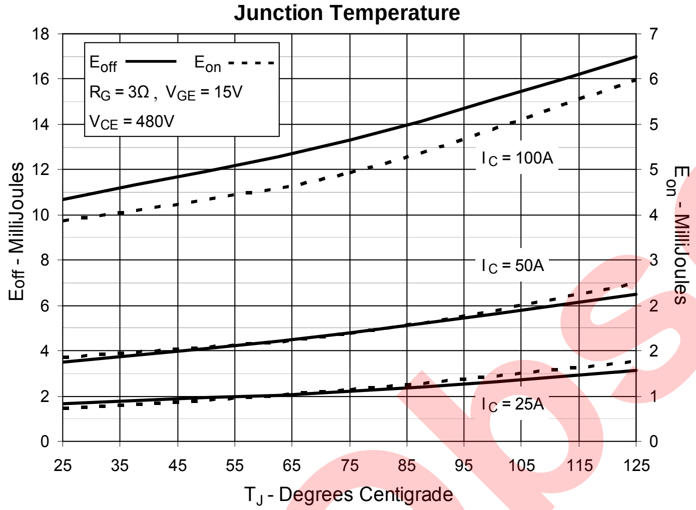


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

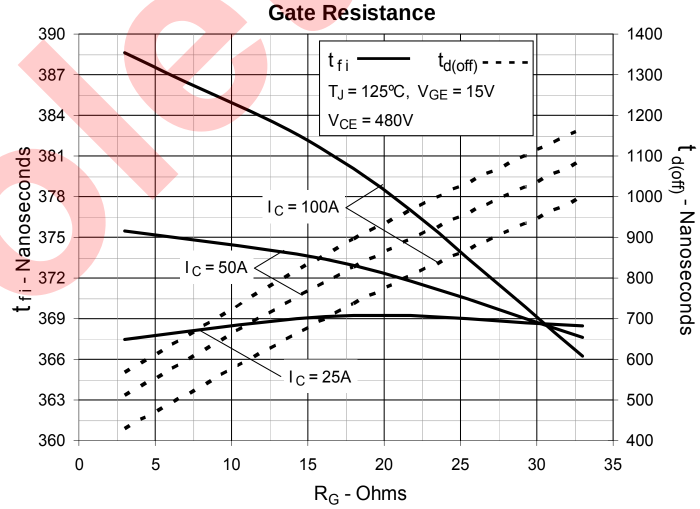


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

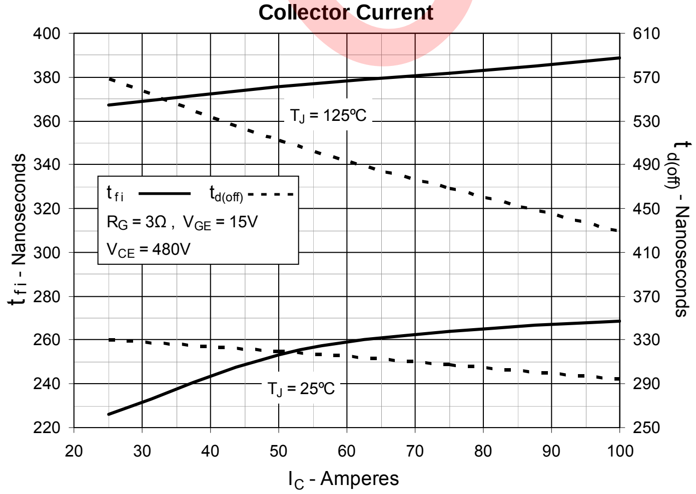


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

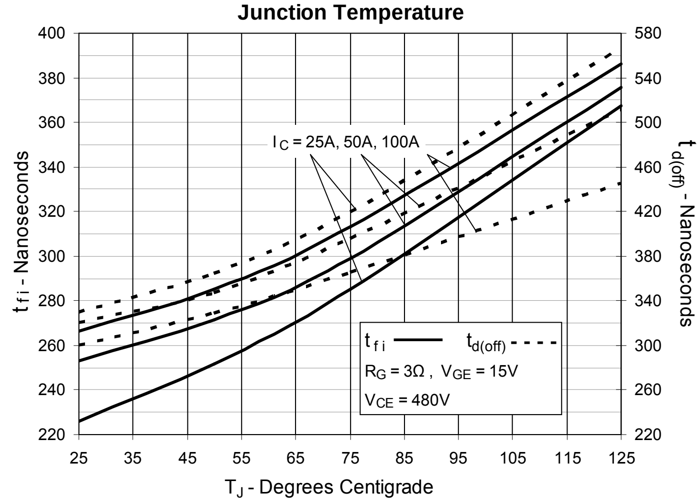


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

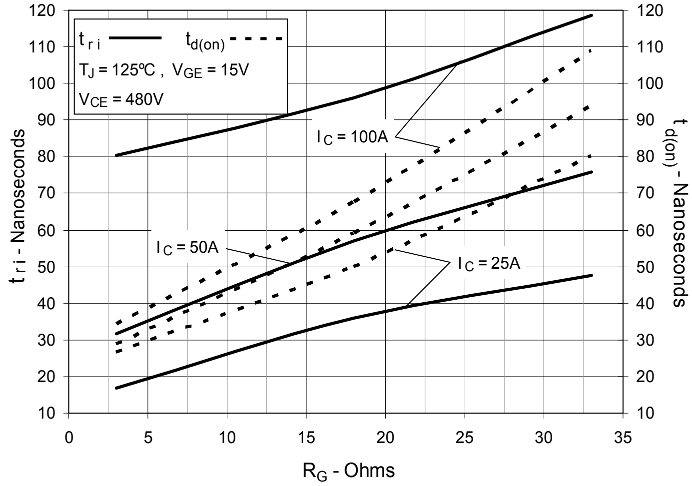


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

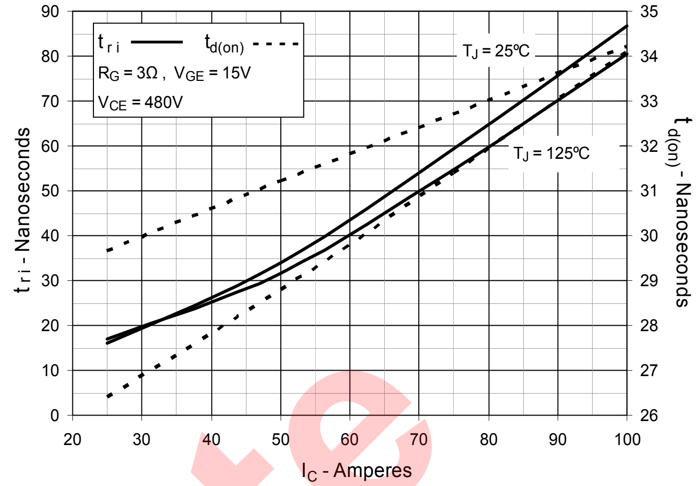
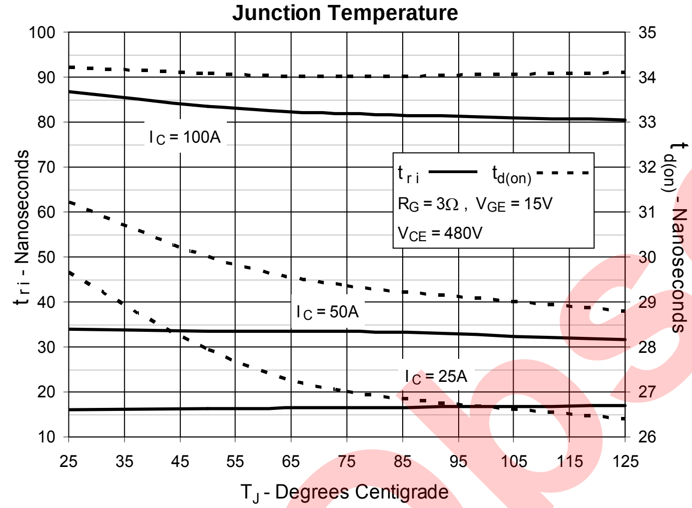


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature



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A Littelfuse Technology