IXYS

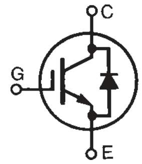
Advance Technical Information

High Voltage, High Frequency, BiMOSFET™ Monolithic Bipolar MOS Transistor

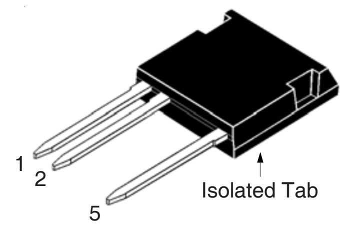
IXBF15N300C

V_{CES} = 3000V
I_{C110} = 15A
$V_{CE(sat)} \leq$ 6.0V

(Electrically Isolated Tab)



ISOPLUS i4-Pak™



1 = Gate
2 = Emitter
5 = Collector

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	3000	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	3000	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	T_C = 25°C	37	A
I_{C110}	T_C = 110°C	15	A
I_{CM}	T_C = 25°C, 1ms	300	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 10Ω Clamped Inductive Load	I_{CM} = 120 $V_{CES} \leq$ 1500	A V
T_{SC} (SCSOA)	V_{GE} = 15V, T_J = 125°C, R_G = 52Ω, V_{CE} = 1500V, Non-Repetitive	10	μs
P_C	T_C = 25°C	300	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
F_C	Mounting Force	20..120 / 4.5..27	N/lb.
V_{ISOL}	50/60Hz, 5 Seconds	4000	V~
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	3000			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
	Note 2, T_J = 125°C			5	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ± 20V			±200	nA
$V_{CE(sat)}$	I_C = 15A, V_{GE} = 15V, Note 1		4.7	6.0	V
	T_J = 125°C		5.0		V

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 4000V~ Electrical Isolation
- High Blocking Voltage
- High Frequency Operation

Advantages

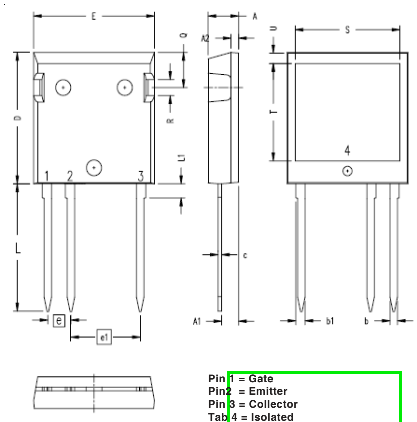
- Low Gate Drive Requirement
- High Power Density

Applications

- Switch-Mode and Resonant-Mode Power Supplies

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.
g_{fs}	I_C = 15A, V_{CE} = 10V, Note 1	18	30	S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		6230	pF
C_{oes}			260	pF
C_{res}			93	pF
$Q_{g(on)}$	I_C = 15A, V_{GE} = 15V, V_{CE} = 1000V		267	nC
Q_{ge}			33	nC
Q_{gc}			99	nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		40	ns
t_{ri}	I_C = 15A, V_{GE} = 15V		23	ns
E_{on}	V_{CE} = 1500V, R_G = 10Ω		9.15	mJ
$t_{d(off)}$	Note 3		455	ns
t_{fi}			90	ns
E_{off}			1.40	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		38	ns
t_{ri}	I_C = 15A, V_{GE} = 15V		20	ns
E_{on}	V_{CE} = 1500V, R_G = 10Ω		9.15	mJ
$t_{d(off)}$	Note 3		515	ns
t_{fi}			150	ns
E_{off}			2.75	mJ
R_{thJC}				0.42 °C/W
R_{thCS}			0.15	°C/W

ISOPLUS i4-Pak™ (HV) Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.190	.205	4.83	5.21
A1	.102	.118	2.59	3.00
A2	.046	.085	1.17	2.16
b	.045	.055	1.14	1.40
b1	.058	.068	1.47	1.73
C	.020	.029	0.51	0.74
D	.819	.840	20.80	21.34
E	.770	.799	19.56	20.29
e	.150 BSC		3.81 BSC	
e1	.450 BSC		11.43 BSC	
L	.780	.840	19.81	21.34
L1	.083	.102	2.11	2.59
Q	.210	.244	5.33	6.20
R	.100	.180	2.54	4.57
S	.660	.690	16.76	17.53
T	.590	.620	14.99	15.75
U	.065	.080	1.65	2.03

Reverse Diode

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max
V_F	I_F = 15A, V_{GE} = 0V, Note 1			5.0 V
t_{rr}	I_F = 15A, V_{GE} = 0V, $-di_F/dt$ = 100A/μs		706	ns
I_{RM}	V_R = 100V, V_{GE} = 0V		26	A
Q_{RM}			9.2	μC

Notes:

1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.
2. Device must be heatsunk for high-temperature leakage current measurements to avoid thermal runaway.
3. 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.

Fig. 1. Output Characteristics @ T_J = 25ºC

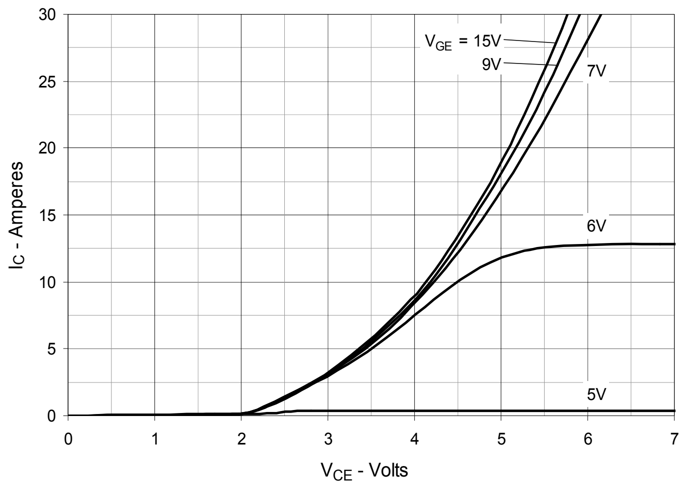


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

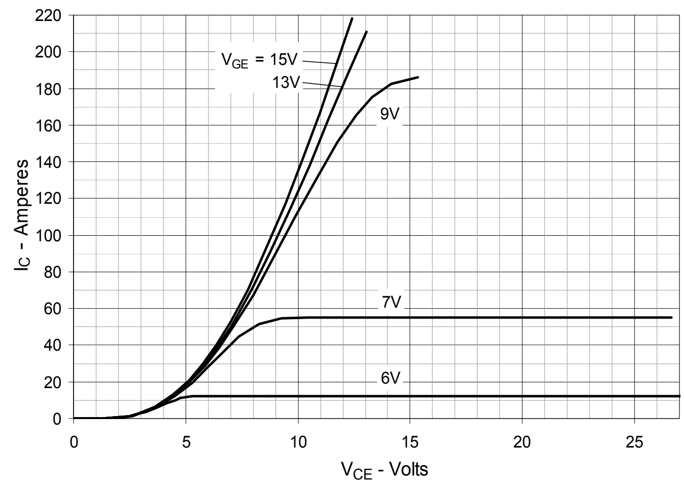


Fig. 3. Output Characteristics @ T_J = 125ºC

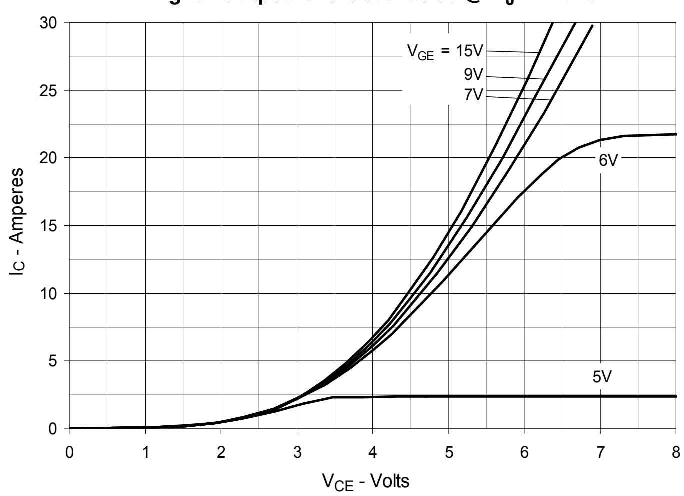


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

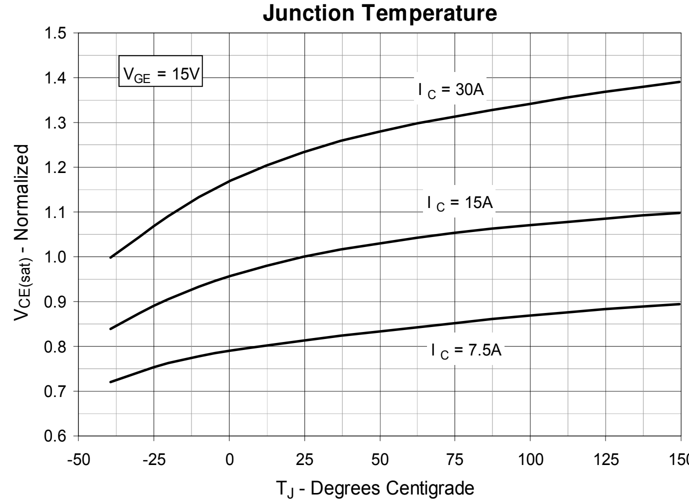


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

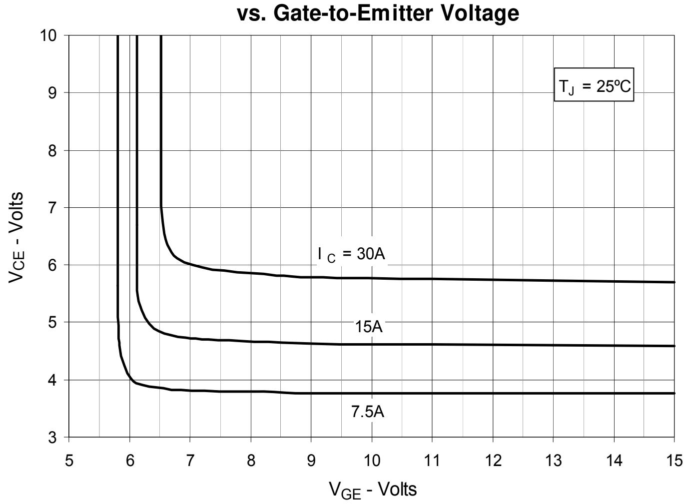


Fig. 6. Input Admittance

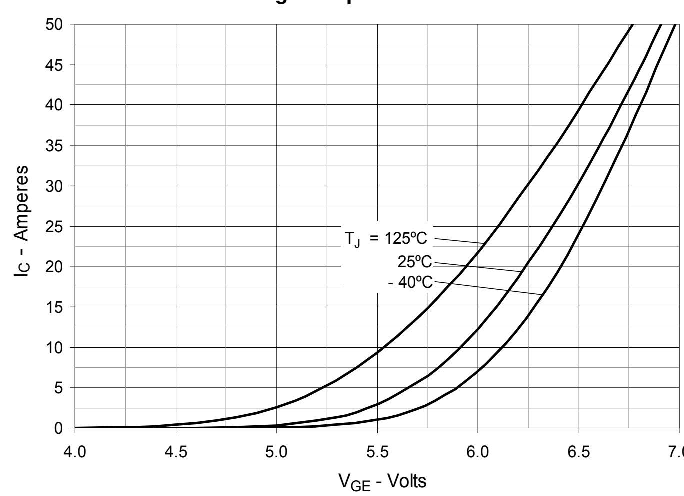


Fig. 7. Transconductance

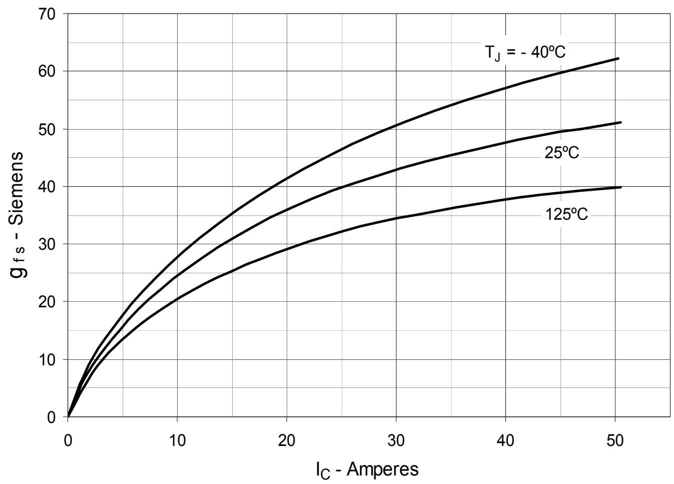


Fig. 8. Gate Charge

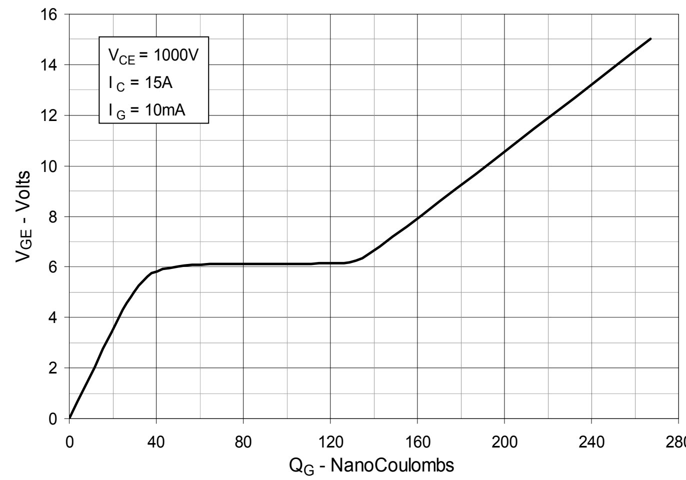


Fig. 9. Forward Voltage Drop of Intrinsic Diode

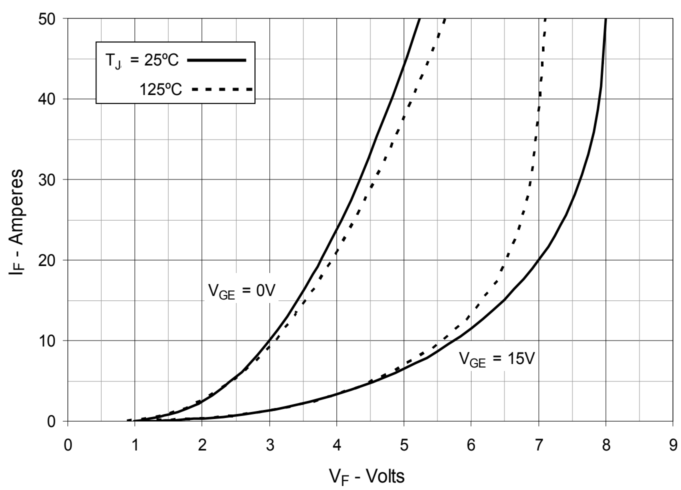


Fig. 10. Capacitance

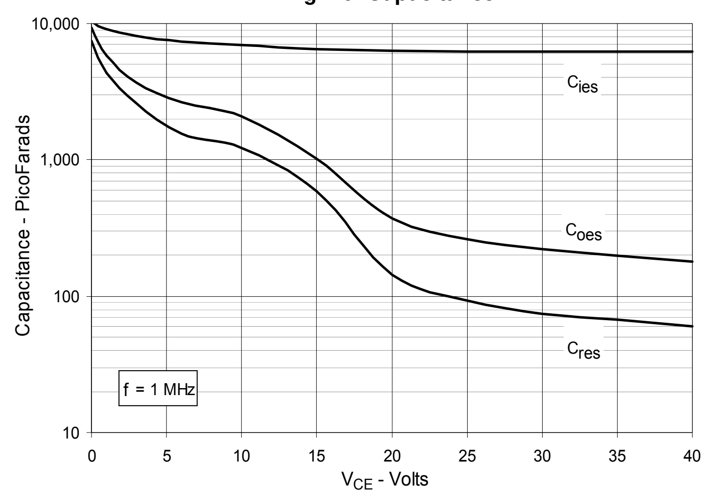


Fig. 11. Reverse-Bias Safe Operating Area

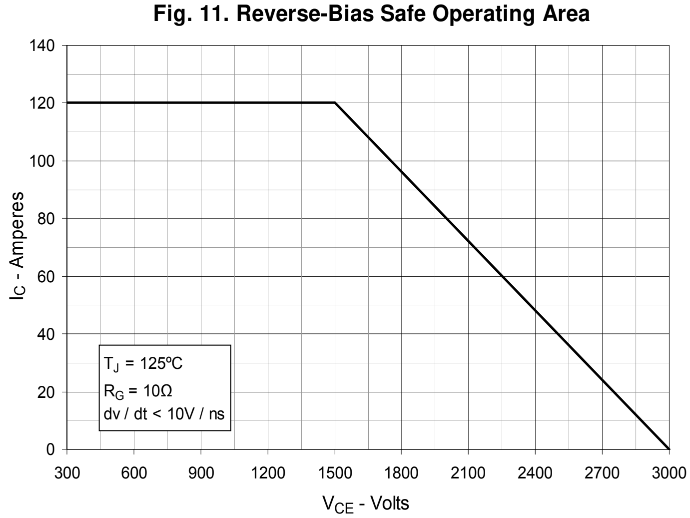
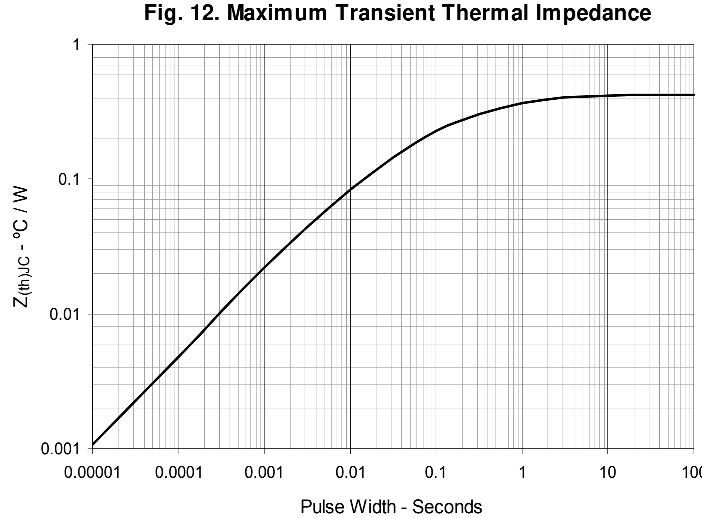


Fig. 12. Maximum Transient Thermal Impedance



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

Fig. 13. Forward-Bias Safe Operating Area @ T_C = 25ºC

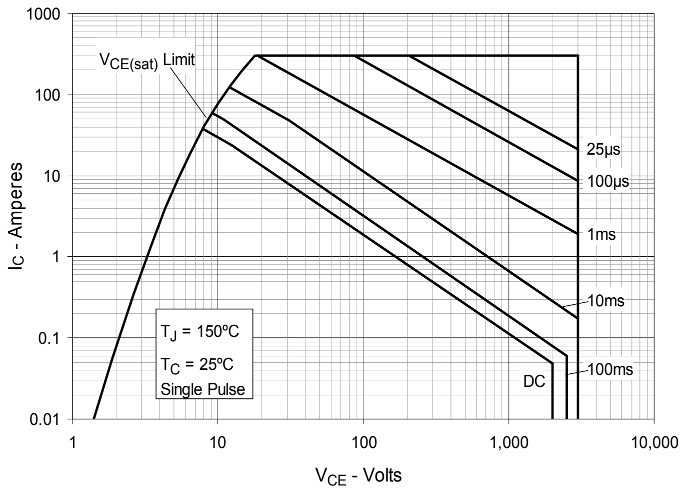


Fig. 14. Forward-Bias Safe Operating Area @ T_C = 75ºC

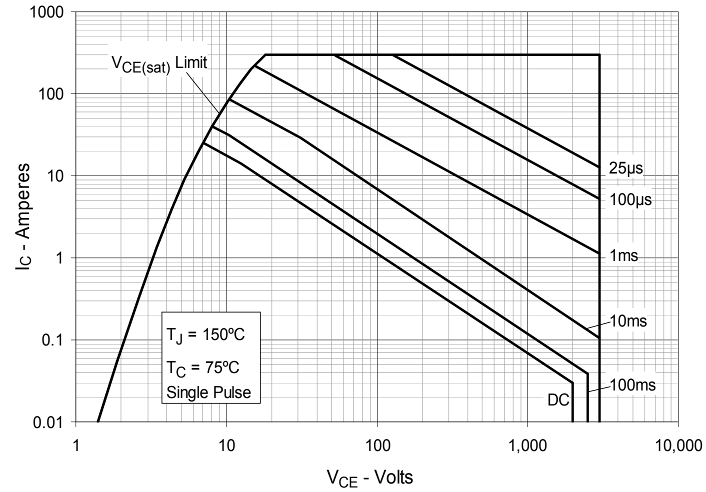


Fig. 15. Inductive Switching Energy Loss vs. Gate Resistance

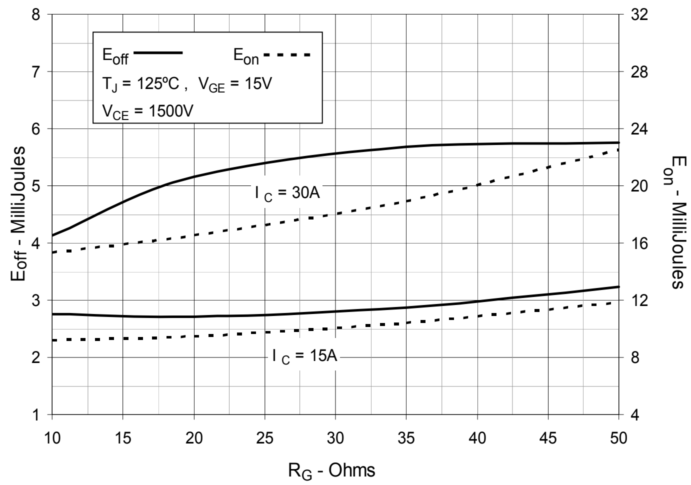


Fig. 16. Inductive Switching Energy Loss vs. Collector Current

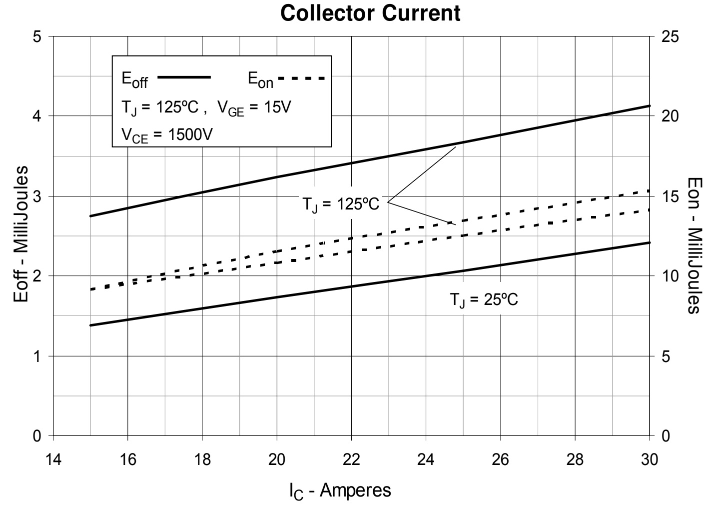


Fig. 17. Inductive Switching Energy Loss vs. Junction Temperature

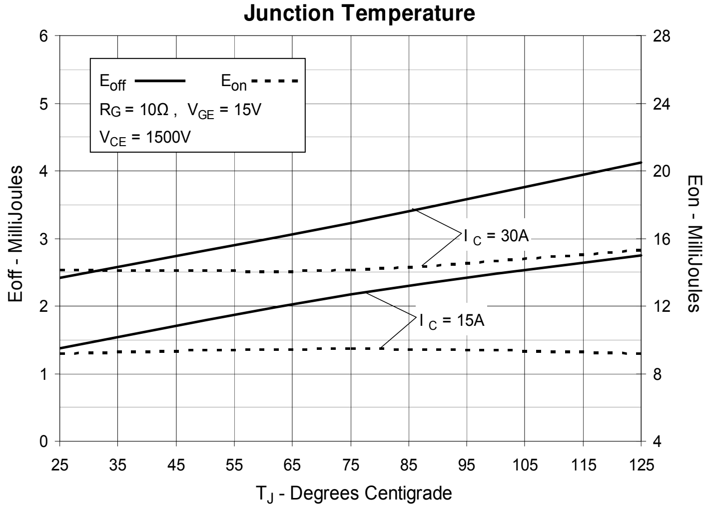


Fig. 18. Inductive Turn-off Switching Times vs. Gate Resistance

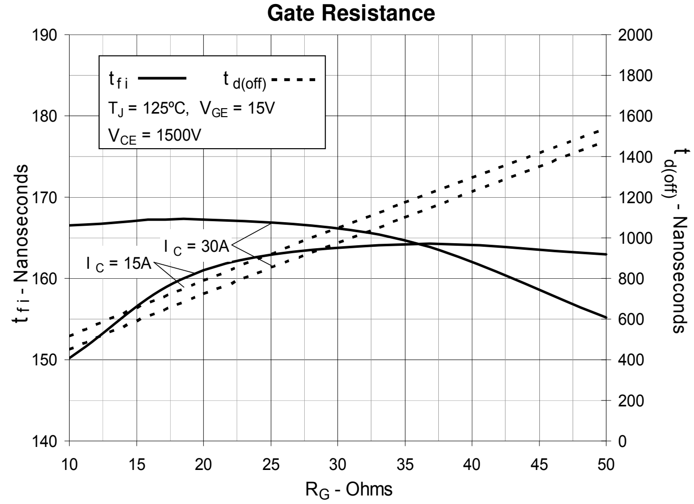


Fig. 19. Inductive Turn-off Switching Times vs. Collector Current

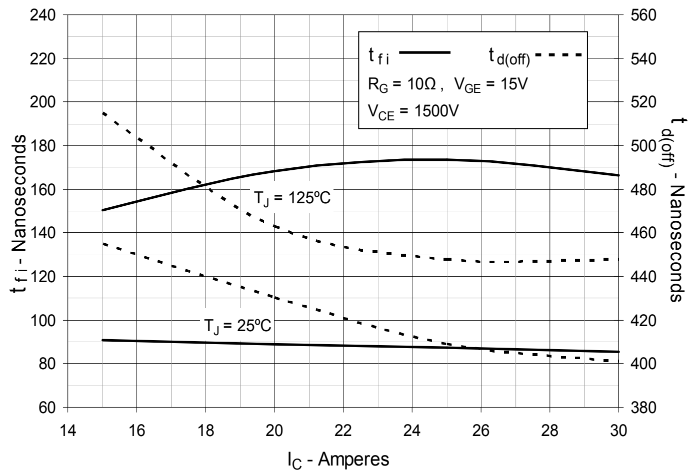


Fig. 20. Inductive Turn-off Switching Times vs. Junction Temperature

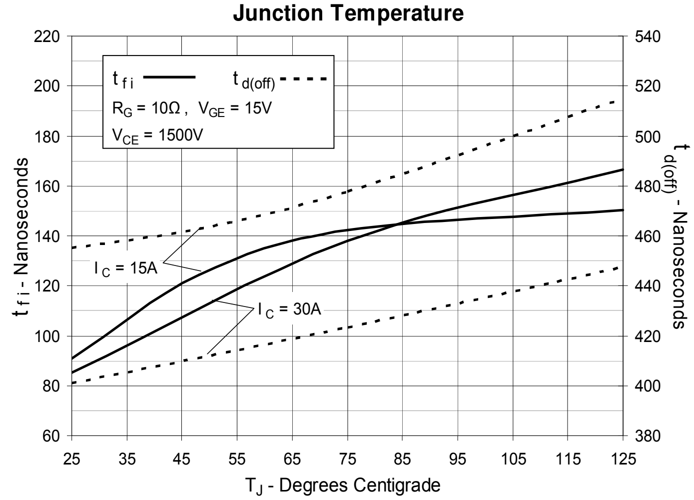


Fig. 21. Inductive Turn-on Switching Times vs. Gate Resistance

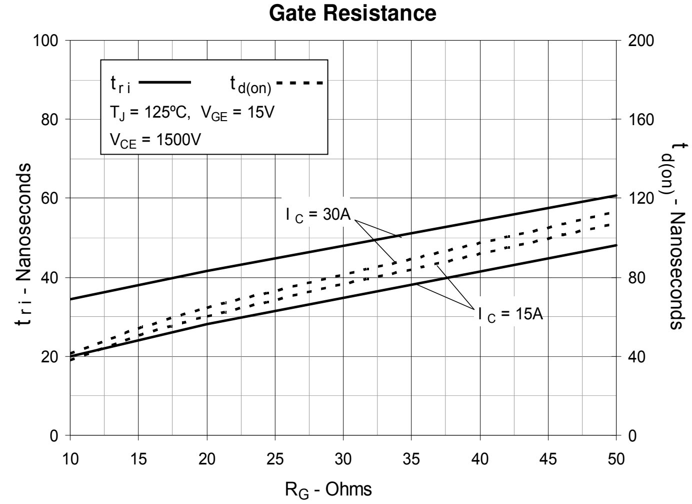


Fig. 22. Inductive Turn-on Switching Times vs. Collector Current

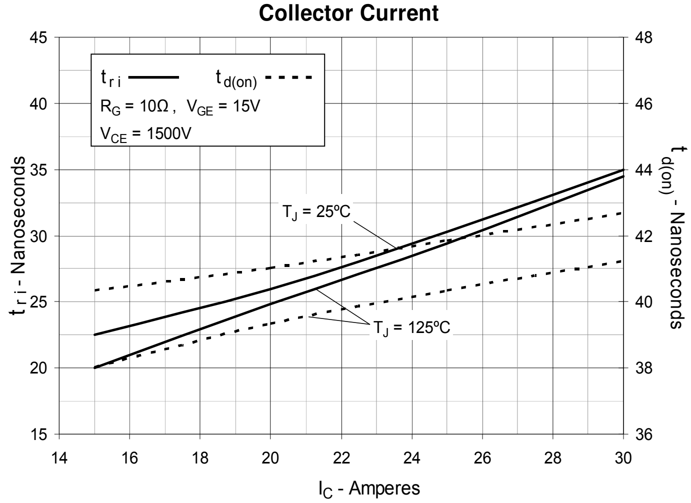


Fig. 23. Inductive Turn-on Switching Times vs. Junction Temperature