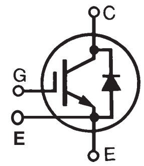
IXYS Preliminary Technical Information

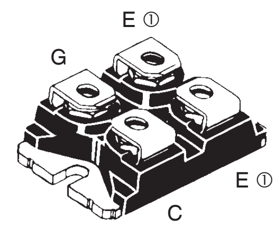
High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

IXBN42N170A

V_{CES} = 1700V
I_{C90} = 21A
$V_{CE(sat)}$ ≤ 6.0V
t_{fi} = 20ns



SOT-227B, miniBLOC
E153432



G = Gate, C = Collector, E = Emitter
① either emitter terminal can be used as Main or Kelvin Emitter

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_C = 25°C to 150°C	1700	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	1700	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	T_C = 25°C	38	A
I_{C90}	T_C = 90°C	21	A
I_{CM}	T_C = 25°C, 1ms	265	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 10Ω Clamped Inductive Load	I_{CM} = 84 1360	A V
T_{SC} (SCSOA)	V_{GE} = 15 V, V_{CES} = 1200V, T_J = 125°C R_G = 10Ω, non repetitive	10	µs
P_C	T_C = 25°C	313	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
V_{ISOL}	50/60Hz t = 1min I_{ISOL} ≤ 1mA t = 1s	2500 3000	V~ V~
M_d	Mounting Torque Terminal Connection Torque	1.5/13 1.3/11.5	Nm/lb.in. Nm/lb.in.
Weight		30	g

Features

- International Standard Package
- miniBLOC, with Aluminium Nitride Isolation
- Square RBSOA
- 2500V~ Isolation Voltage
- High Blocking Voltage
- International Standard Package
- Anti-Parallel Diode
- Low Conduction Losses

Advantages

- Low Gate Drive Requirement
- High Power Density

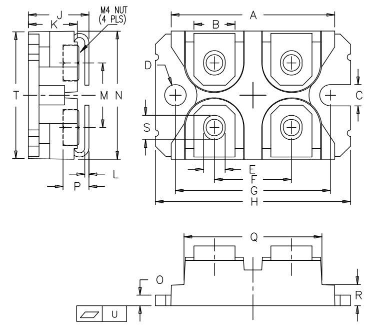
Applications

- Switch-Mode and Resonant-Mode Power Supplies
- Uninterruptible Power Supplies (UPS)
- AC Motor Drives
- Capacitor Discharge Circuits
- AC Switches

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250µA, V_{GE} = 0V	1700			V
$V_{GE(th)}$	I_C = 750µA, V_{CE} = V_{GE}	2.5		5.5	V
I_{CES}	V_{CE} = 0.8 • V_{CES}, V_{GE} = 0V			50	µA
	T_J = 125°C			1.5	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ± 20V			±100	nA
$V_{CE(sat)}$	I_C = I_{C90}, V_{GE} = 15V, Note 1		5.2	6.0	V
	T_J = 125°C		5.3		V

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	$I_C = I_{C90}$, V_{CE} = 10V, Note 1	14	23		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		3920		pF
C_{oes}			275		pF
C_{res}			107		pF
$Q_{g(on)}$	$I_C = I_{C90}$, V_{GE} = 15V, $V_{CE} = 0.5 \bullet V_{CES}$		188		nC
Q_{ge}			23		nC
Q_{gc}			80		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		19		ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = 15V		17		ns
E_{on}	$V_{CE} = 0.5 \bullet V_{CES}$, $R_G = 1\Omega$		3.43		mJ
$t_{d(off)}$	Diode Type = DH40-18A		200		ns
t_{fi}	Note 2		20		ns
E_{off}			0.43		mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		19		ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = 15V		14		ns
E_{on}	$V_{CE} = 0.5 \bullet V_{CES}$, $R_G = 1\Omega$		5.40		mJ
$t_{d(off)}$	Diode Type = DH40-18A		226		ns
t_{fi}	Note 2		82		ns
E_{off}			0.83		mJ
R_{thJC}				0.40	°C/W
R_{thCS}			0.05		°C/W

SOT-227B miniBLOC (IXXN)



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	1.240	1.255	31.50	31.88
B	.307	.323	7.80	8.20
C	.161	.169	4.09	4.29
D	.161	.169	4.09	4.29
E	.161	.169	4.09	4.29
F	.587	.595	14.91	15.11
G	1.186	1.193	30.12	30.30
H	1.496	1.505	38.00	38.23
J	.460	.481	11.68	12.22
K	.351	.378	8.92	9.60
L	.030	.033	0.76	0.84
M	.496	.506	12.60	12.85
N	.990	1.001	25.15	25.42
O	.078	.084	1.98	2.13
P	.195	.235	4.95	5.97
Q	1.045	1.059	26.54	26.90
R	.155	.174	3.94	4.42
S	.186	.191	4.72	4.85
T	.968	.987	24.59	25.07
U	-.002	.004	-0.05	0.1

Reverse Diode

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
V_F	$I_F = I_{C90}$, V_{GE} = 0V			5.0	V
t_{rr}	I_F = 25A, V_{GE} = 0V, $-di_F/dt$ = 50A/μs		330		ns
I_{RM}	V_R = 100V, V_{GE} = 0V		15		A

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

PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

Fig. 1. Output Characteristics @ T_J = 25ºC

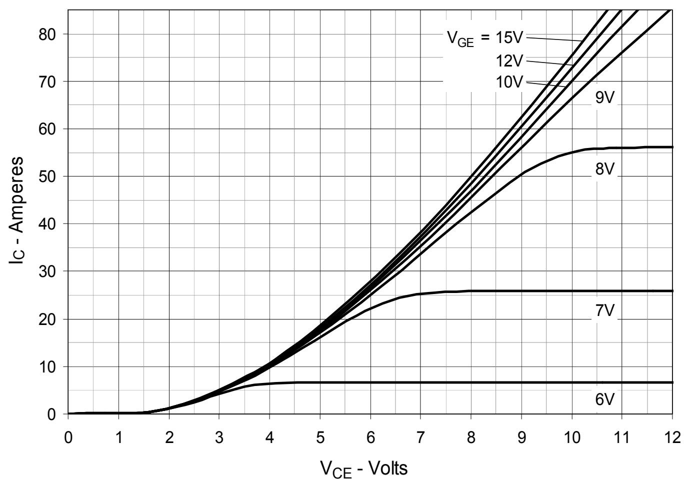


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

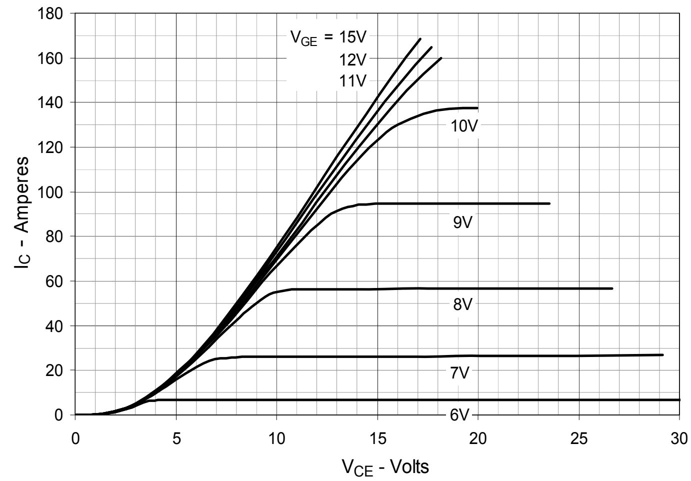


Fig. 3. Output Characteristics @ T_J = 125ºC

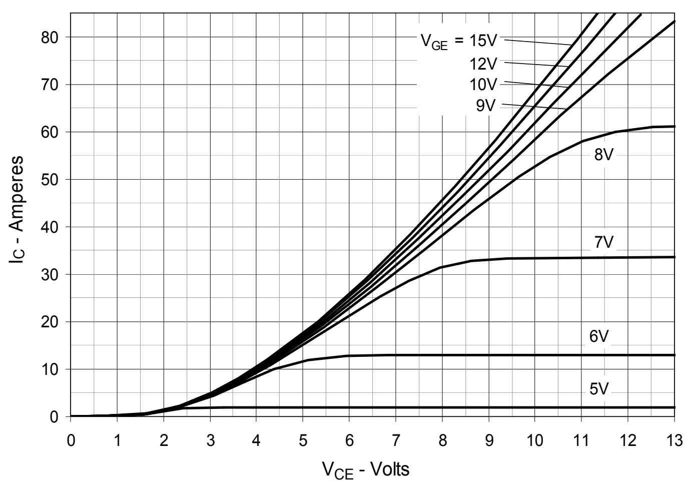


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

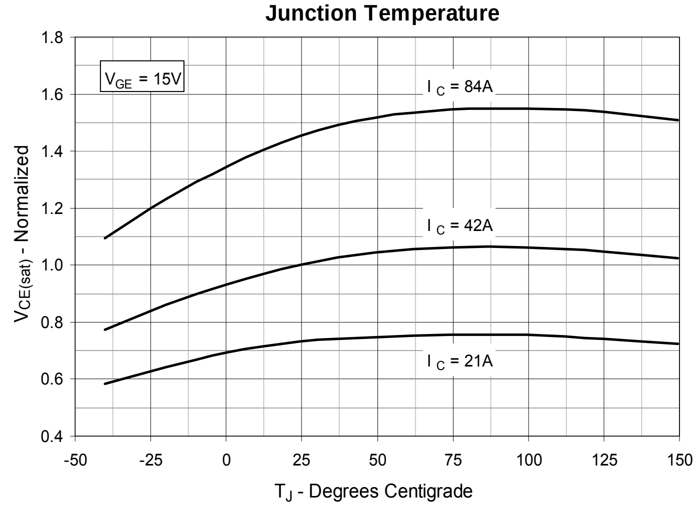


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

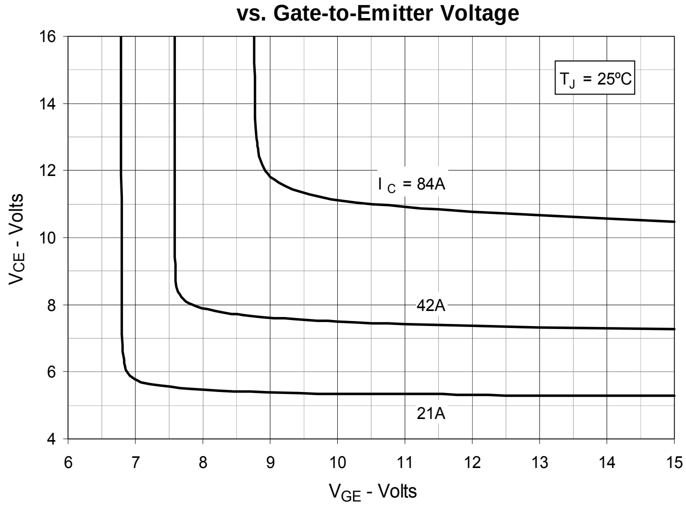


Fig. 6. Input Admittance

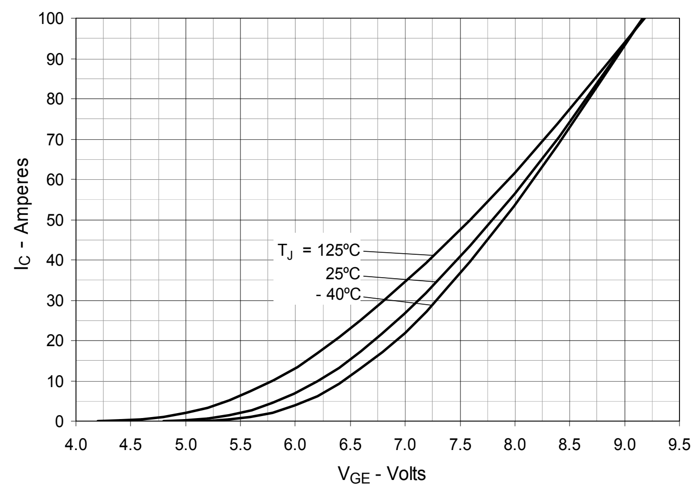


Fig. 7. Transconductance

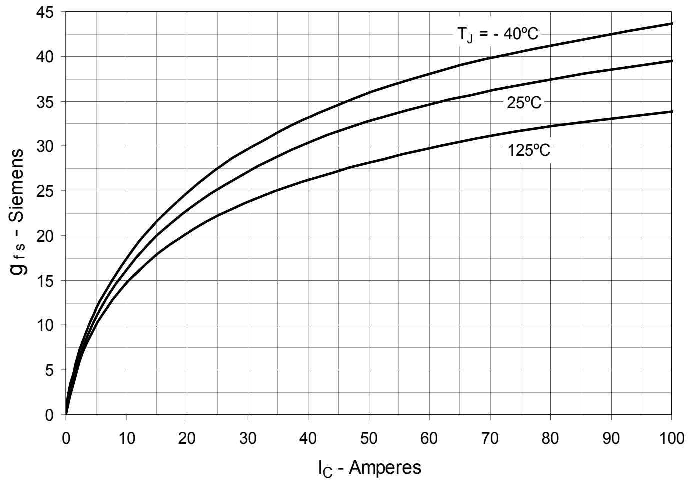


Fig. 8. Gate Charge

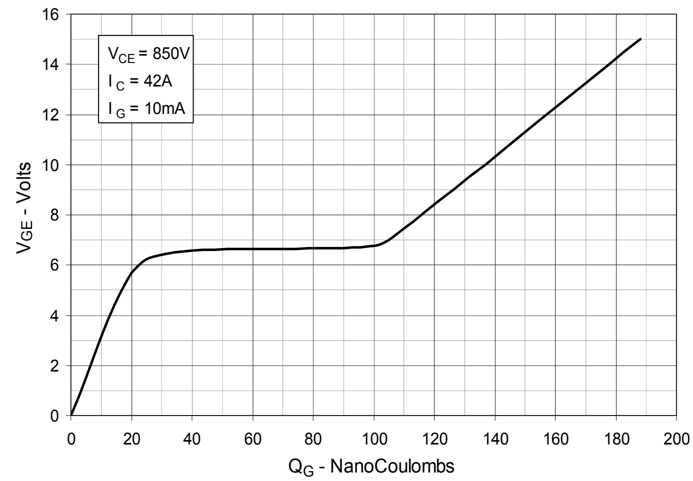


Fig. 9. Forward Voltage Drop of Intrinsic Diode

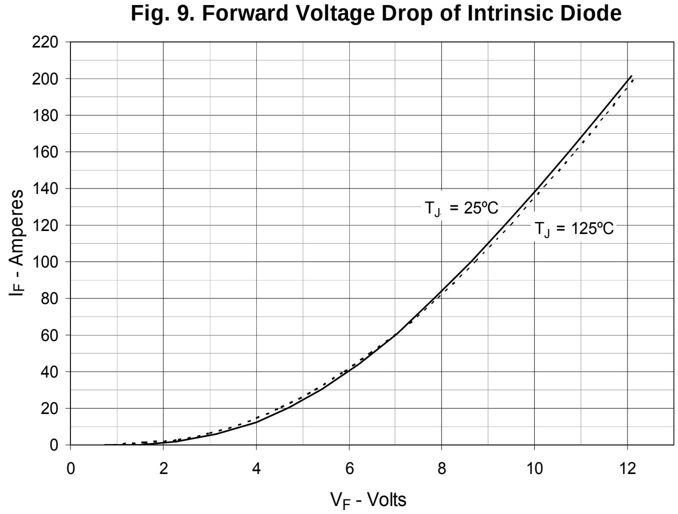


Fig. 10. Capacitance

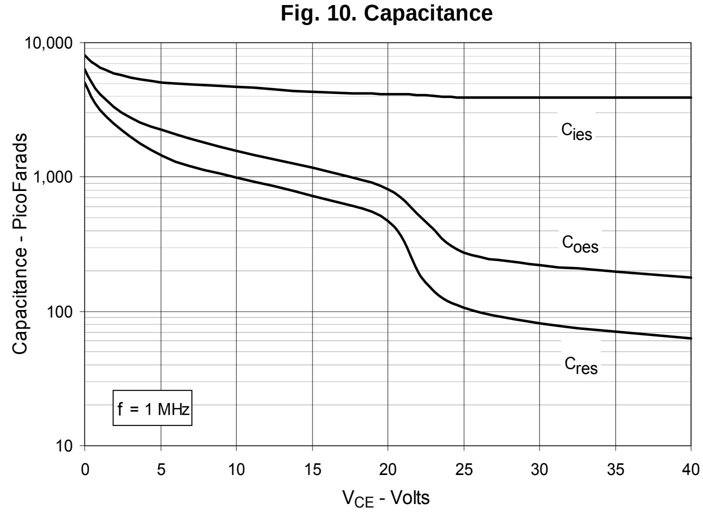


Fig. 11. Reverse-Bias Safe Operating Area

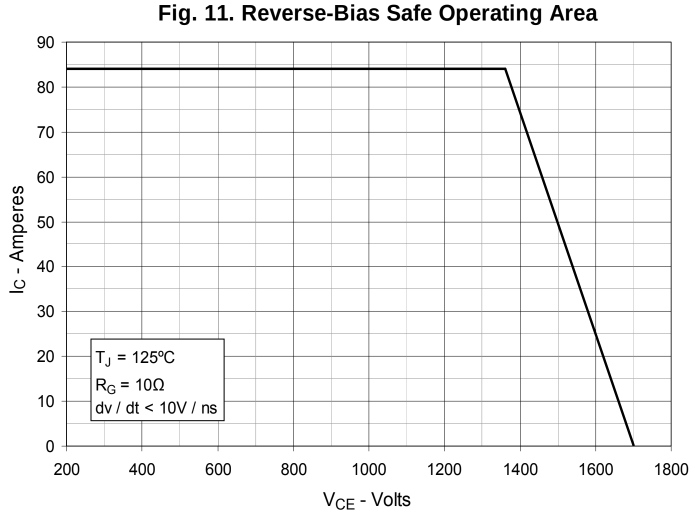
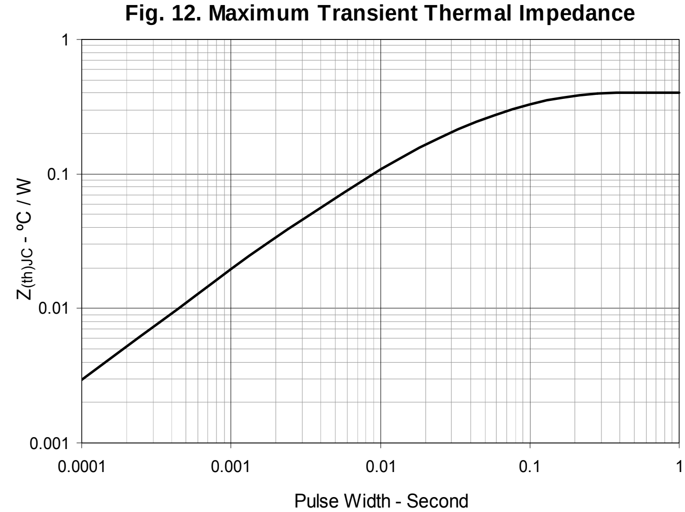


Fig. 12. Maximum Transient Thermal Impedance



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

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

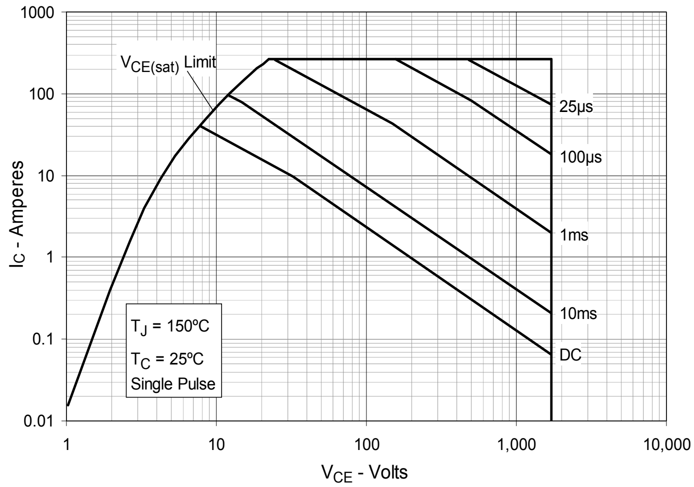


Fig. 14. Forward-Bias Safe Operating Area @ T_C = 75ºC

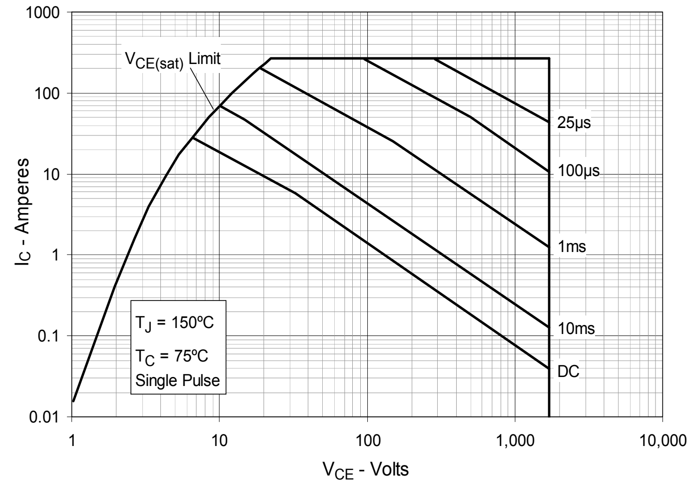


Fig. 15. Inductive Switching Energy Loss vs. Gate Resistance

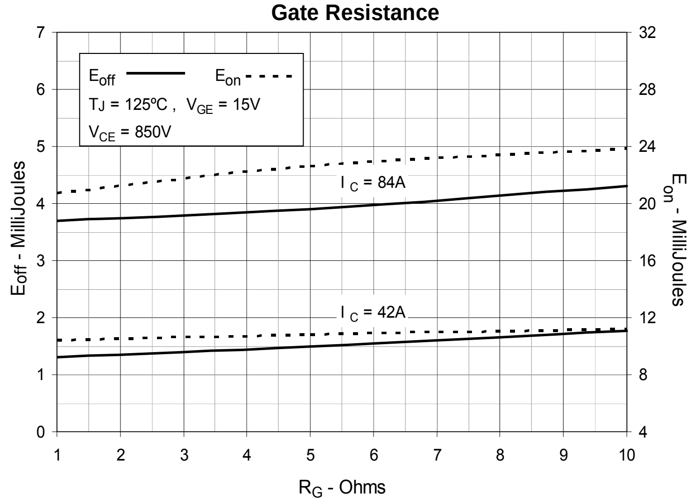


Fig. 16. Inductive Switching Energy Loss vs. Collector Current

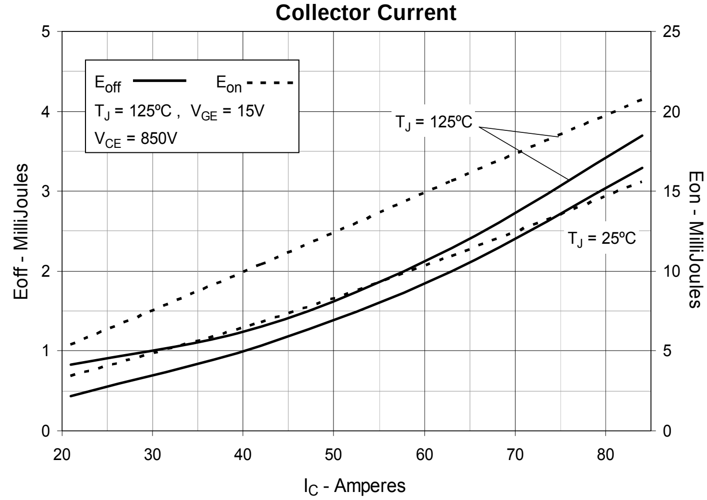


Fig. 17. Inductive Switching Energy Loss vs. Junction Temperature

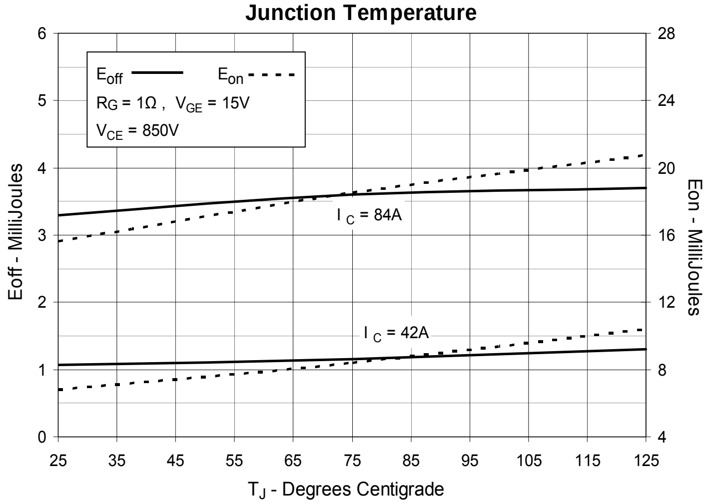


Fig. 18. Inductive Turn-off Switching Times vs. Gate Resistance

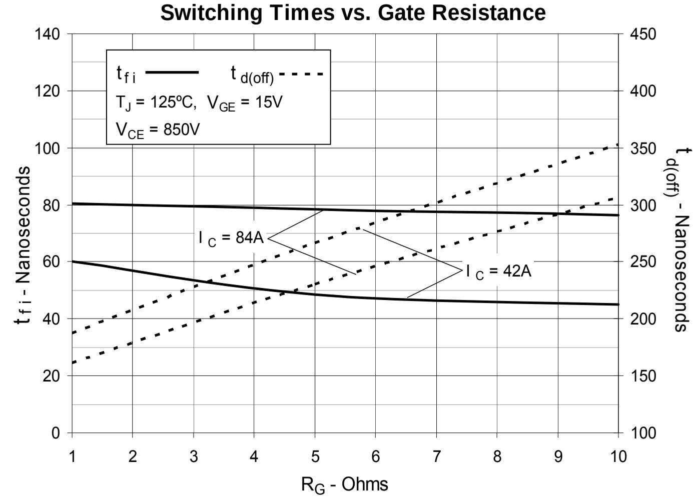


Fig. 19. Inductive Turn-off Switching Times vs. Collector Current

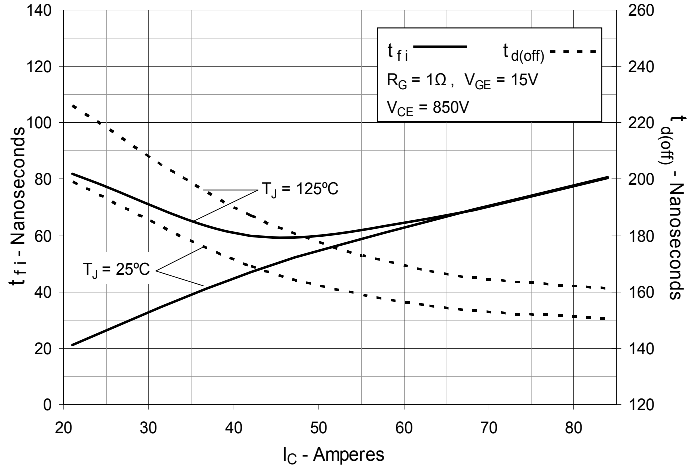


Fig. 20. Inductive Turn-off Switching Times vs. Junction Temperature

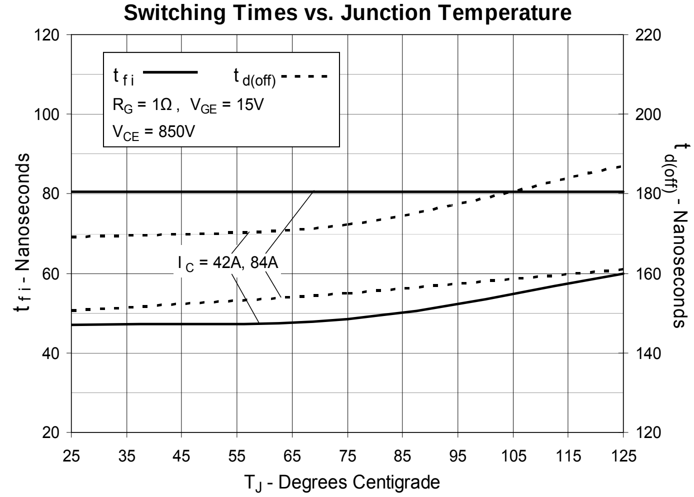


Fig. 21. Inductive Turn-on Switching Times vs. Gate Resistance

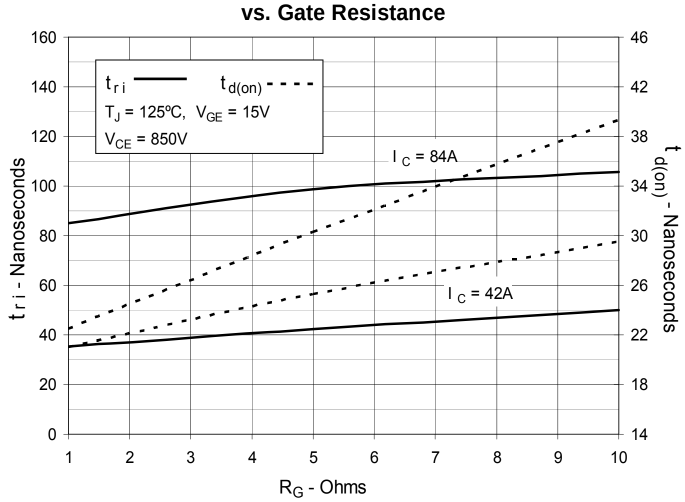


Fig. 22. Inductive Turn-on Switching Times vs. Collector Current

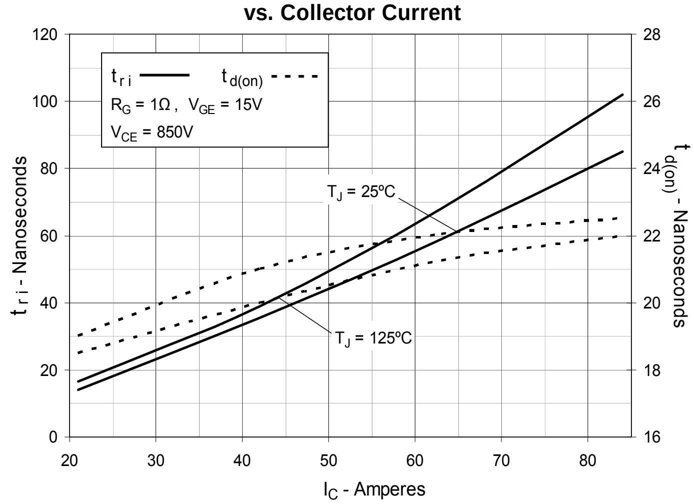
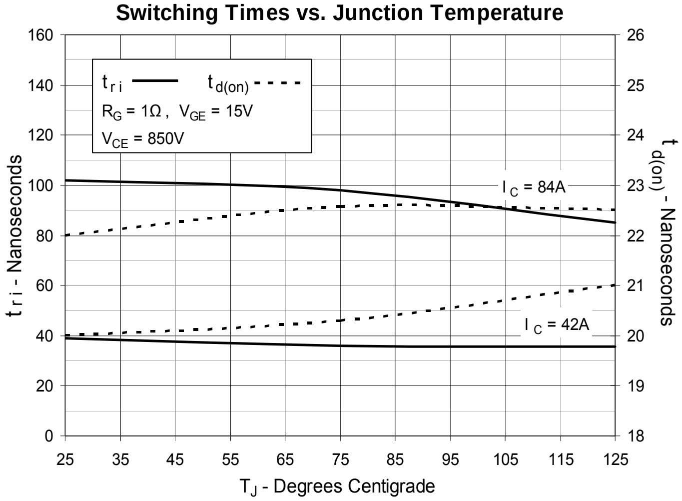


Fig. 23. Inductive Turn-on Switching Times vs. Junction Temperature



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[>>Littelfuse(美国力特)]