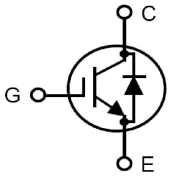
IXYS

High Voltage, BiMOSFET™ Monolithic Bipolar MOS Transistor

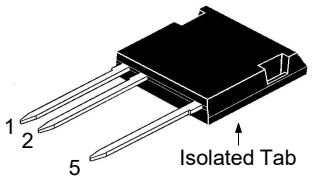
IXBF42N300

V_{CES} = 3000V
I_{C110} = 24A
$V_{CE(sat)} \leq$ 3.0V



(Electrically Isolated Tab)

ISOPLUS i4-Pak™



1 = Gate 5 = Collector
2 = Emitter

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_C = 25°C to 150°C	3000	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	3000	V
V_{GES}	Continuous	± 25	V
V_{GEM}	Transient	± 35	V
I_{C25}	T_C = 25°C	60	A
I_{C110}	T_C = 110°C	24	A
I_{CM}	T_C = 25°C, 1ms	400	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 20Ω Clamped Inductive Load	I_{CM} = 84 1500	A V
T_{SC} **(SCSOA)**	V_{GE} = 15V, T_J = 125°C, R_G = 82Ω, V_{CE} = 1500V, Non-Repetitive	10	µs
P_C	T_C = 25°C	240	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	Maximum Lead Temperature for Soldering 1.6 mm (0.062 in.) from Case for 10s	300	°C
F_C	Mounting Force	20..120 / 4.5..27	N/lb
V_{ISOL}	50/60Hz, 1 Minute	3000	V~
Weight		5	g

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 1mA, V_{GE} = 0V	3000			V
$V_{GE(th)}$	I_C = 1mA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = 0.8 • V_{CES}, V_{GE} = 0V			50	µA
	Note 2, T_J = 125°C		250		µA
I_{GES}	V_{CE} = 0V, V_{GE} = ± 25V			±200	nA
$V_{CE(sat)}$	I_C = 42A, V_{GE} = 15V, Note 1		2.5	3.0	V
	T_J = 125°C		3.1		V

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 3000V~ Electrical Isolation
- High Blocking Voltage
- High Peak Current Capability
- Low Saturation Voltage
- FBSOA Rated
- SCSOA Rated

Advantages

- Low Gate Drive Requirement
- High Power Density

Applications

- Laser Generators
- Capacitor Discharge Circuits
- AC Switches
- Protection Circuits

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Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fS}	I_C = 42A, V_{CE} = 10V, Note 1	28	45		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		4780		pF
C_{oes}			170		pF
C_{res}			56		pF
R_{Gi}	Gate Input Resistance		3.0		Ω
Q_g	I_C = 42A, V_{GE} = 15V, V_{CE} = 1000V		200		nC
Q_{ge}			28		nC
Q_{gc}			75		nC
$t_{d(on)}$	**Resistive Switching Times, T_J = 25°C** I_C = 42A, V_{GE} = 15V V_{CE} = 1500V, R_G = 20Ω		72		ns
t_r			330		ns
$t_{d(off)}$			445		ns
t_f			610		ns
$t_{d(on)}$	**Resistive Switching Times, T_J = 125°C** I_C = 42A, V_{GE} = 15V V_{CE} = 1500V, R_G = 20Ω		72		ns
t_r			580		ns
$t_{d(off)}$			460		ns
t_f			490		ns
R_{thJC}				0.52	°C/W
R_{thCS}			0.15		°C/W

Reverse Diode

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max	
V_F	I_F = 42A, V_{GE} = 0V, Note 1			2.5	V
t_{rr}	I_F = 21A, V_{GE} = 0V, $-di_F/dt$ = 100A/μs		1.7		μs
I_{RM}	V_R = 100V, V_{GE} = 0V		43		A

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.

Additional provisions for lead-to-lead isolation are required at V_{CE} > 1250V.

Littelfuse reserves the right to change limits, test conditions and dimensions.

LF 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 7,157,338 B2 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

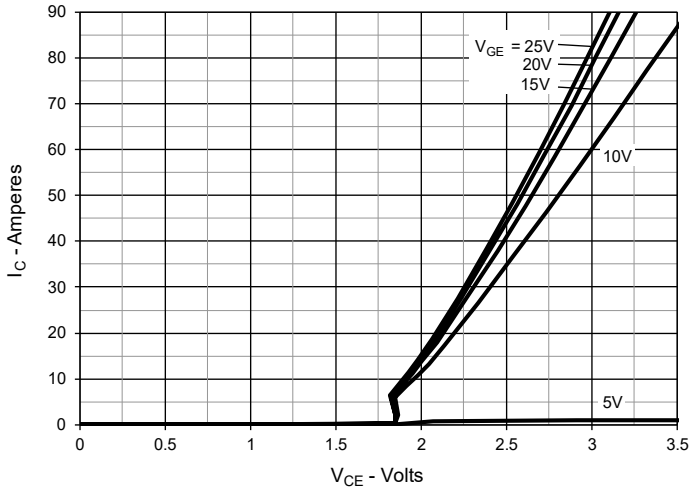

Fig. 2. Extended Output Characteristics @ T_J = 25ºC

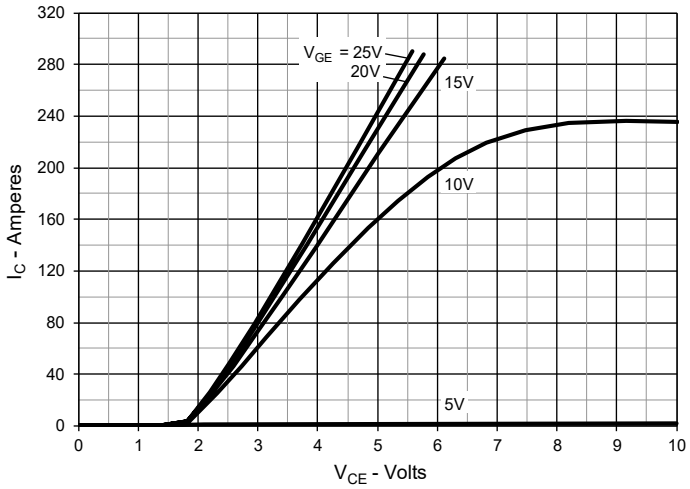

Fig. 3. Output Characteristics @ T_J = 125ºC

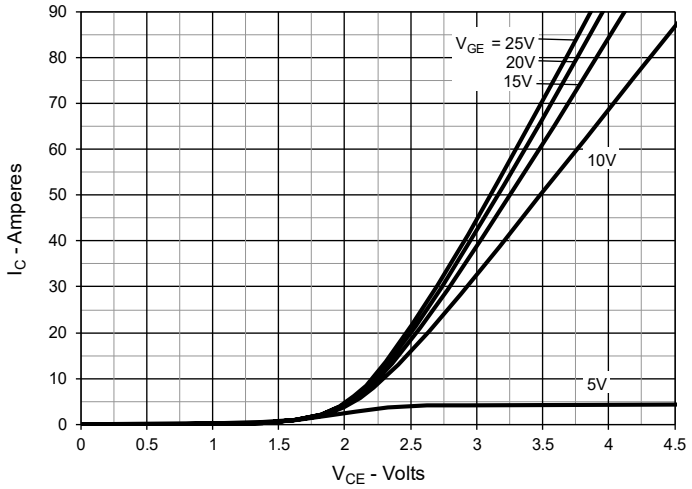

Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

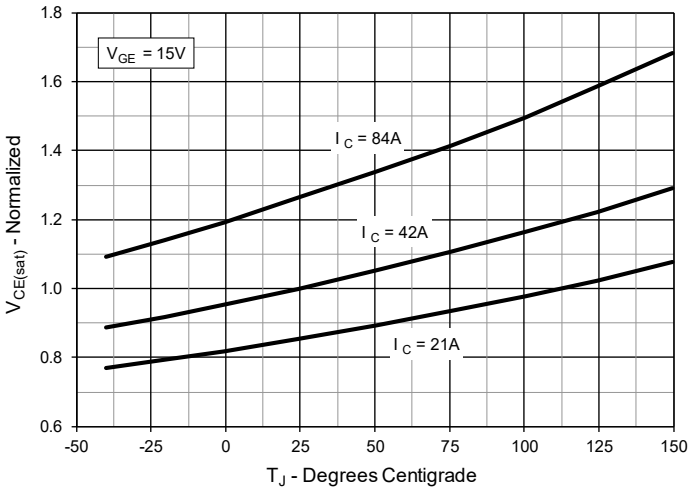

Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

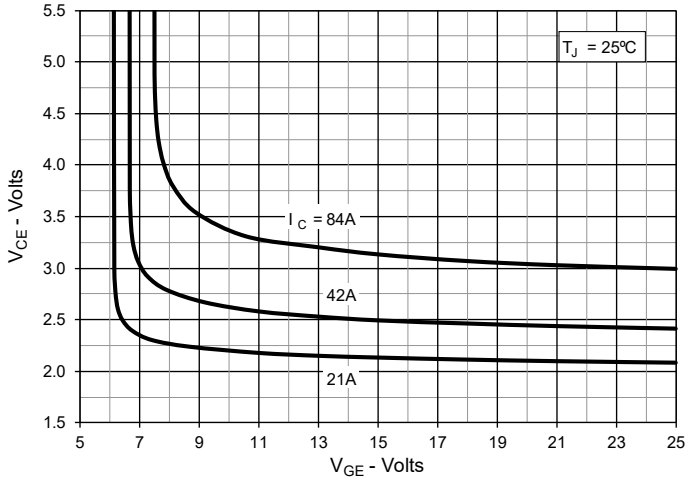

Fig. 6. Input Admittance

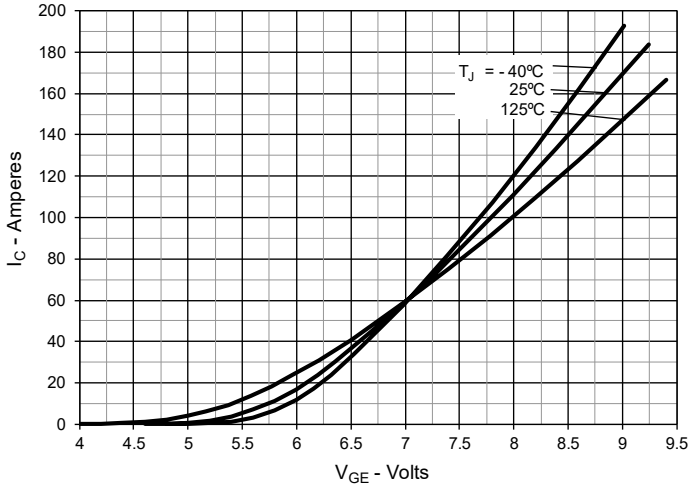

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Fig. 7. Transconductance

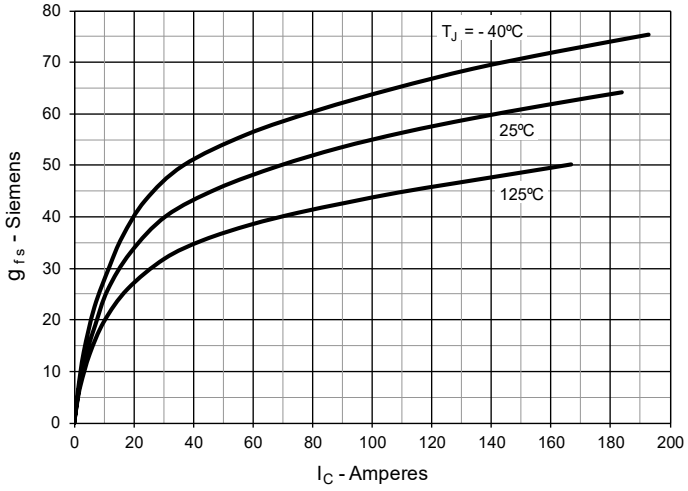


Fig. 8. Forward Voltage Drop of Intrinsic Diode

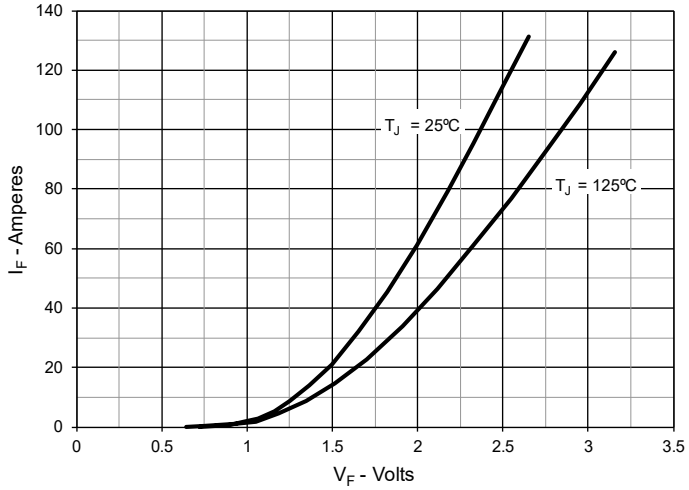


Fig. 9. Gate Charge

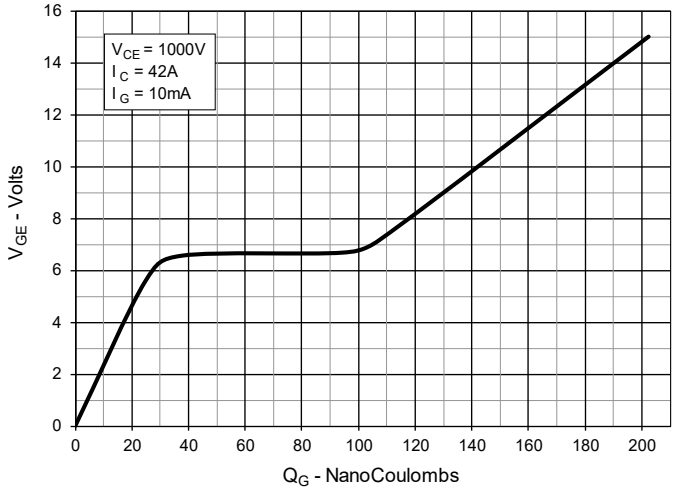


Fig. 10. Capacitance

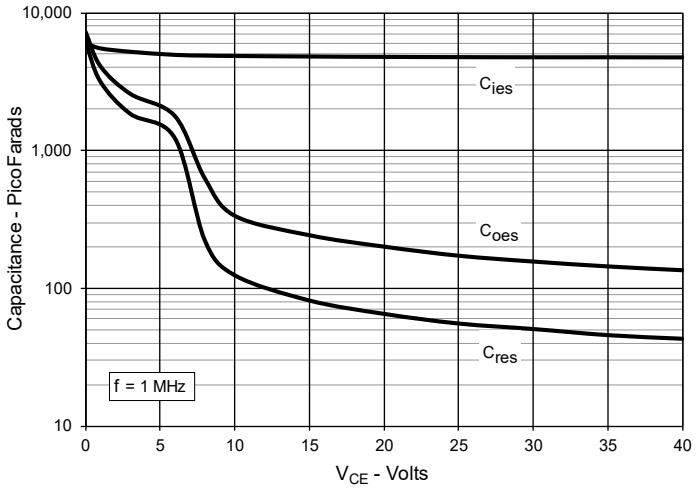


Fig. 11. Reverse-Bias Safe Operating Area

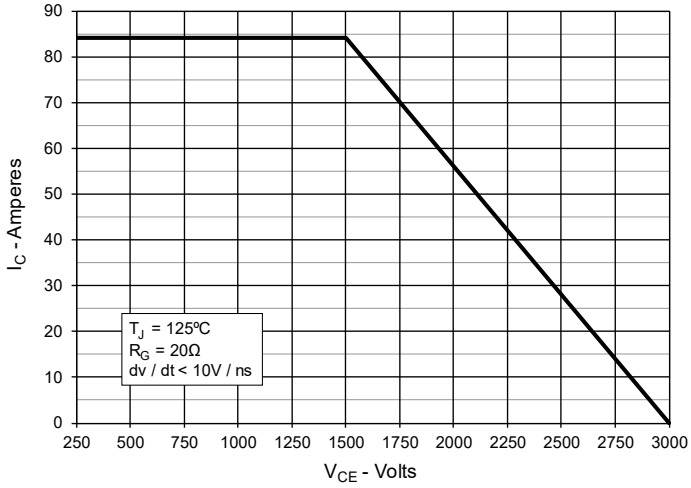
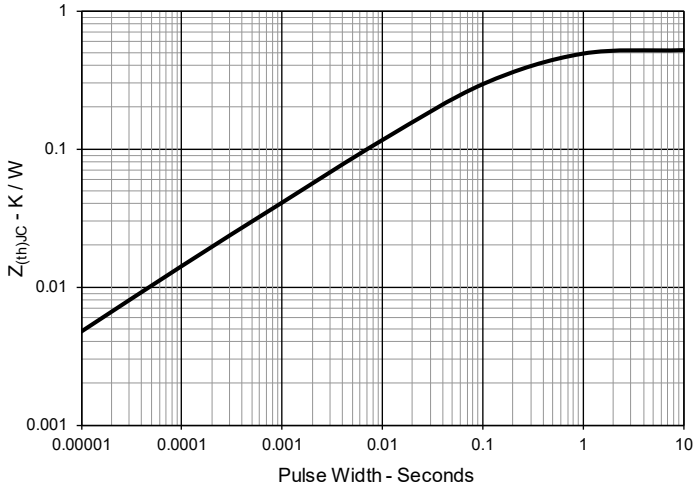


Fig. 12. Maximum Transient Thermal Impedance



Littelfuse reserves the right to change limits, test conditions and dimensions.

Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

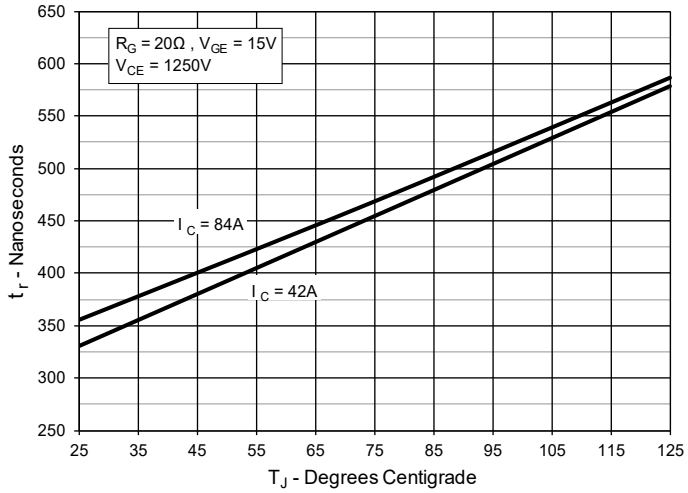


Fig. 14. Resistive Turn-on Rise Time vs. Collector Current

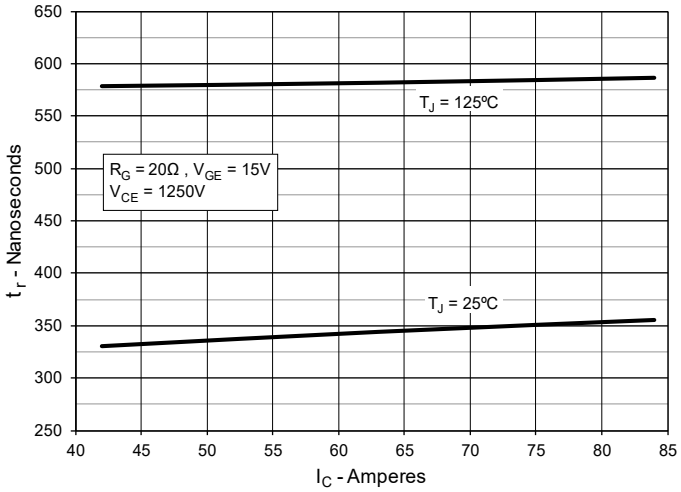


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

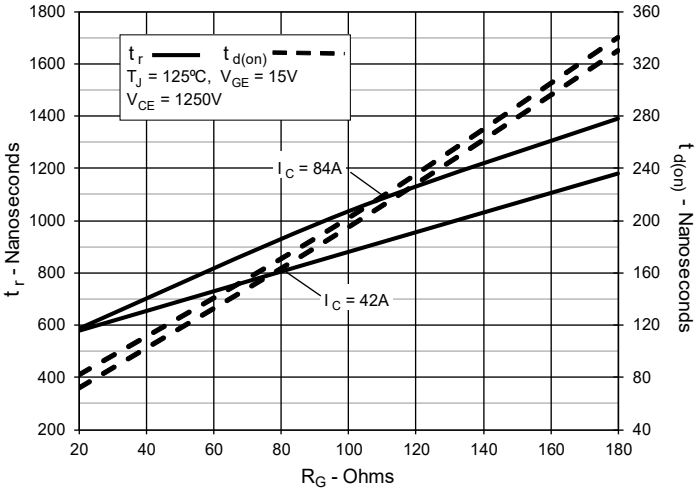


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

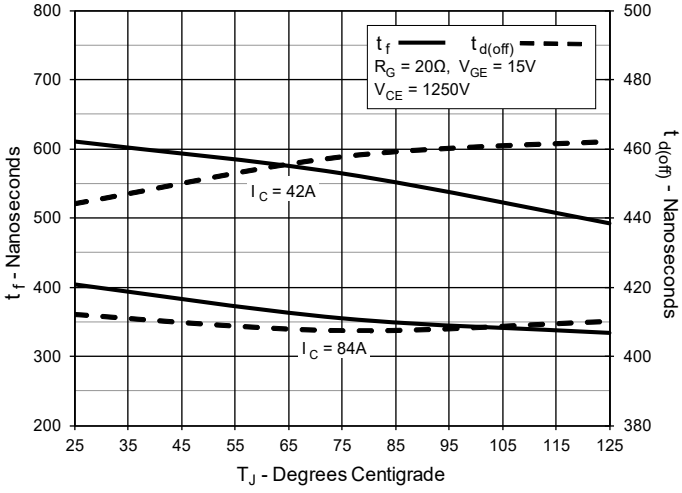


Fig. 17. Resistive Turn-off Switching Times vs. Collector Current

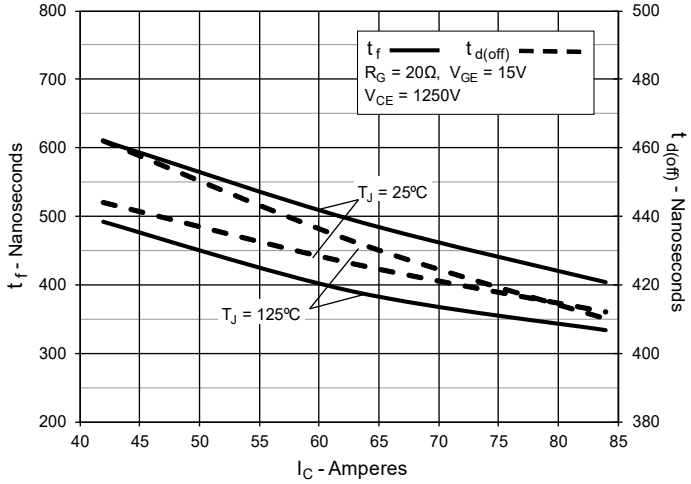


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance

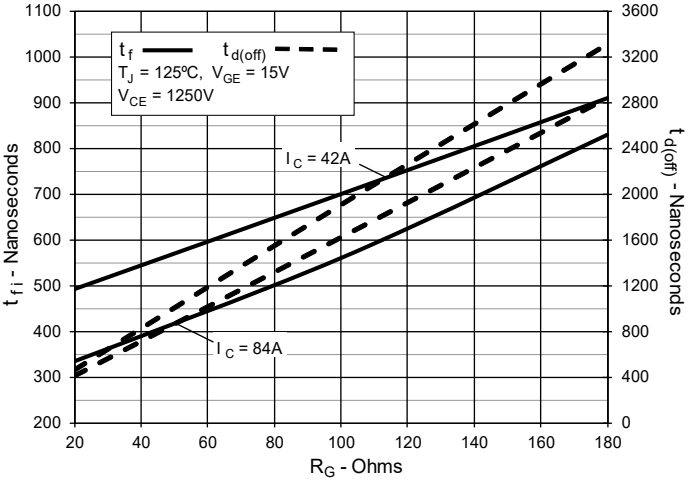


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Fig. 19. Forward-Bias Safe Operating Area @ T_C = 25ºC

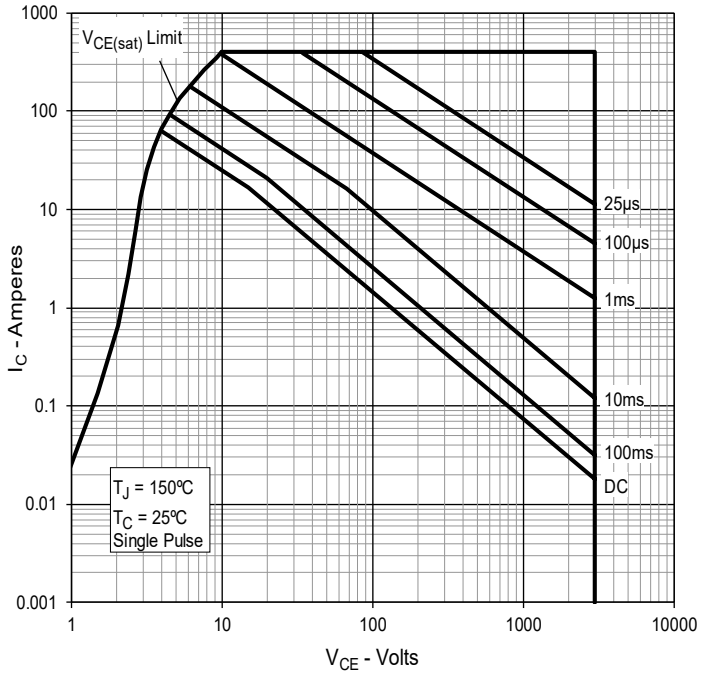
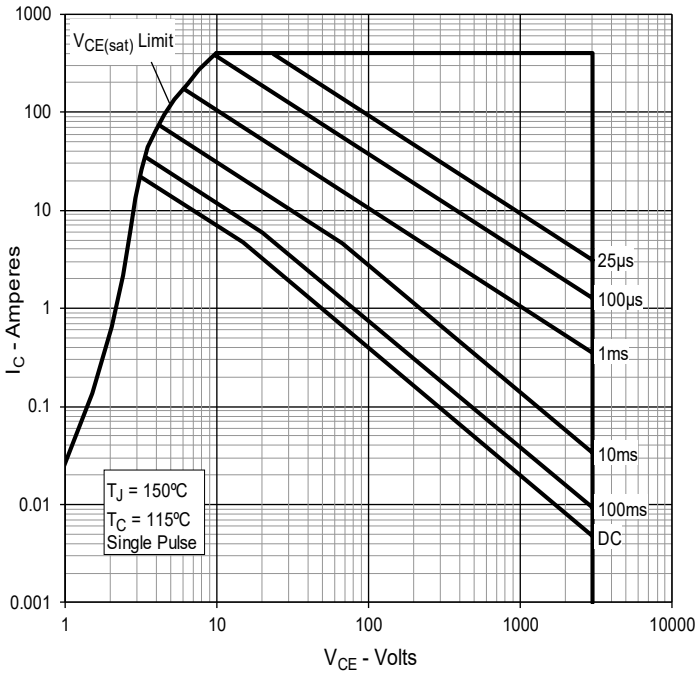


Fig. 20. Forward-Bias Safe Operating Area @ T_C = 115ºC



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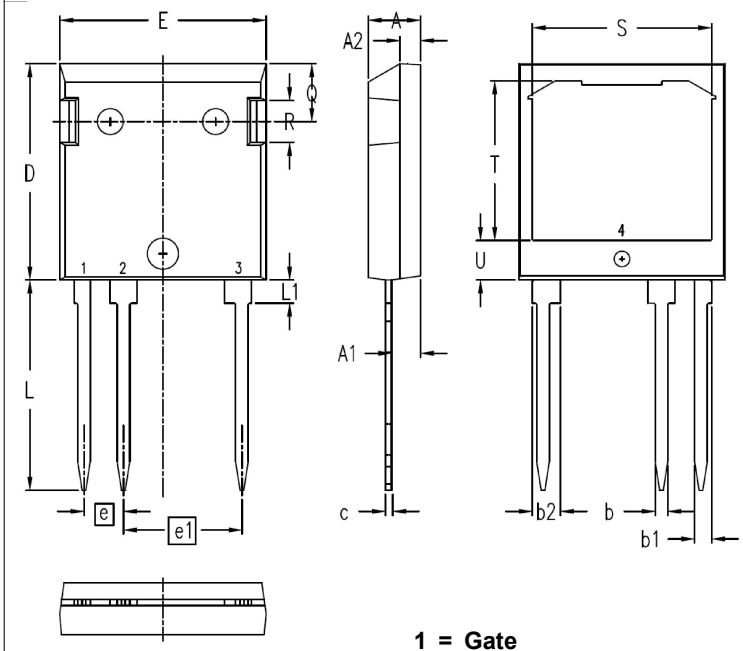
ISOPLUS i4-Pak Outline



1 = Gate
2 = Emitter
3,4 = Colector

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.075	.083	1.90	2.10
b	.047	.055	1.20	1.40
b1	.061	.069	1.55	1.75
b2	.087	.094	2.20	2.40
c	.020	.029	0.51	0.74
D	.819	.846	20.80	21.50
E	.768	.799	19.50	20.30
e	.150 BSC		3.81 BSC	
e1	.450 BSC		11.43 BSC	
L	.780	.838	19.80	21.30
L1	.083	.094	2.10	2.40
Q	.213	.236	5.40	6.00
R	.157	.169	4.00	4.30
S	.673	.685	17.10	17.40
T	.602	.614	15.30	15.60
U	.142	.154	3.60	3.90

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