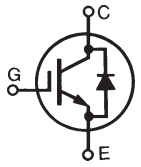
IXYS

Advance Technical Information

BiMOSFET™ Monolithic Bipolar MOS Transistor High Voltage, High Frequency

IXBX50N360HV

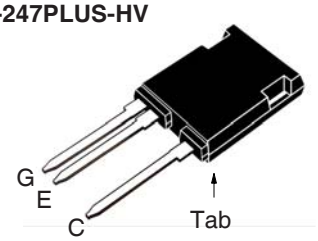
V_{CES} = 3600V
I_{C110} = 50A
$V_{CE(sat)}$ ≤ 2.9V



Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	3600	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	3600	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	T_C = 25°C	125	A
I_{C110}	T_C = 110°C	50	A
I_{CM}	T_C = 25°C, 1ms	420	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 5Ω Clamped Inductive Load	I_{CM} = 200 0.8 • V_{CES}	A V
T_{SC} (SCSOA)	V_{GE} = 15V, T_J = 125°C, R_G = 10Ω, V_{CE} = 1500V, Non-Repetitive	10	μs
P_C	T_C = 25°C	660	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
Weight		6	g

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250μA, V_{GE} = 0V	3600			V
$V_{GE(th)}$	I_C = 250μA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = 0.8 • V_{CES}, V_{GE} = 0V			25	μA
	Note 2, T_J = 125°C			1	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ± 20V			±200	nA
$V_{CE(SAT)}$	I_C = 50A, V_{GE} = 15V, Note 1		2.4	2.9	V
	T_J = 125°C		3.0		V

TO-247PLUS-HV



G = Gate E = Emitter
C = Collector Tab = Collector

Features

- High Blocking Voltage
- High Voltage Package
- Low Conduction Losses

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- Uninterruptible Power Supplies (UPS)
- Switch-Mode and Resonant-Mode Power Supplies
- Capacitor Discharge Circuits
- Laser Generators

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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	24	40		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		3990		pF
C_{oes}			195		pF
C_{res}			100		pF
$Q_{g(on)}$	I_C = 50A, V_{GE} = 15V, V_{CE} = 1000V		210		nC
Q_{ge}			27		nC
Q_{gc}			77		nC
$t_{d(on)}$	**Resistive load, T_J = 25°C**		46		ns
t_r	I_C = 50A, V_{GE} = 15V		420		ns
$t_{d(off)}$	V_{CE} = 960V, R_G = 5Ω		205		ns
t_f			1750		ns
$t_{d(on)}$	**Resistive load, T_J = 125°C**		44		ns
t_r	I_C = 50A, V_{GE} = 15V		845		ns
$t_{d(off)}$	V_{CE} = 960V, R_G = 5Ω		210		ns
t_f			1670		ns
R_{thJC}				0.19	°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 = 50A, V_{GE} = 0V, Note 1			3.0	V
t_{rr}	I_F = 25A, V_{GE} = 0V, $-di_F/dt$ = 100A/µs		1.7		µs
I_{RM}	V_R = 100V, V_{GE} = 0V		48		A
Q_{RM}			40		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.

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.

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

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,860,072 4,881,106 4,931,844 5,017,508 5,034,796 5,049,961 5,063,307 5,187,117 5,237,481 5,381,025 5,486,715 6,162,665 6,259,123 B1 6,306,728 B1 6,404,065 B1 6,534,343 6,583,505 6,683,344 6,710,405 B2 6,710,463 6,727,585 6,759,692 6,771,478 B2 7,005,734 B2 7,063,975 B2 7,071,537 7,157,338B2

Fig. 1. Output Characteristics @ T_J = 25ºC

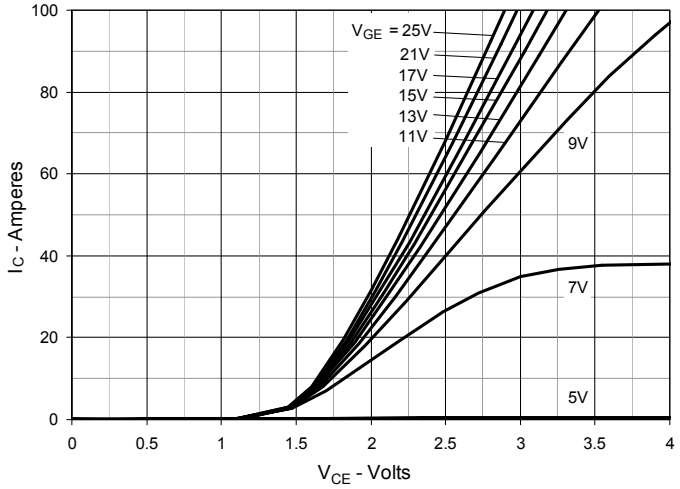


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

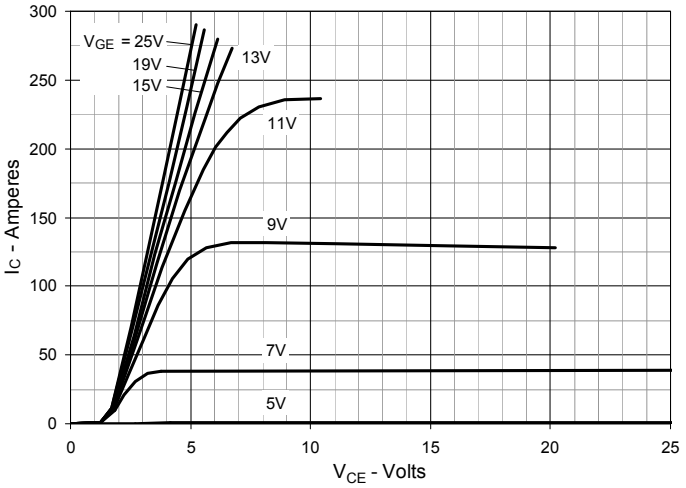


Fig. 3. Output Characteristics @ T_J = 125ºC

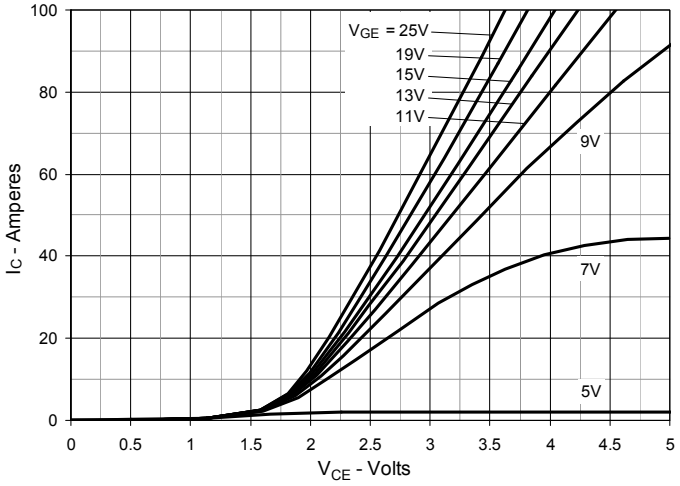


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

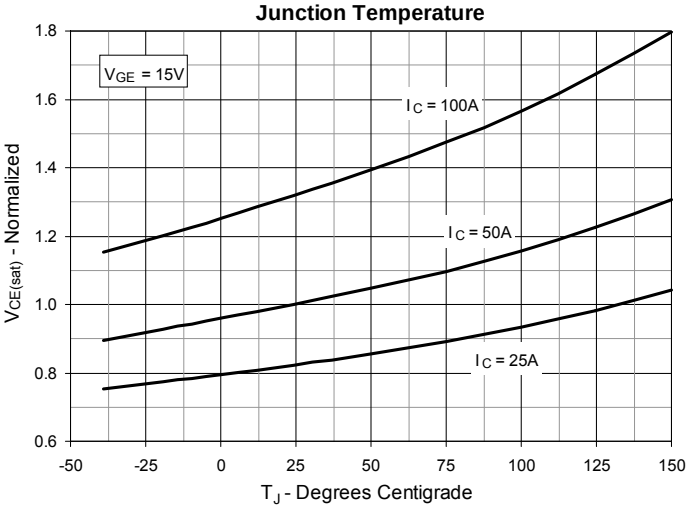


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

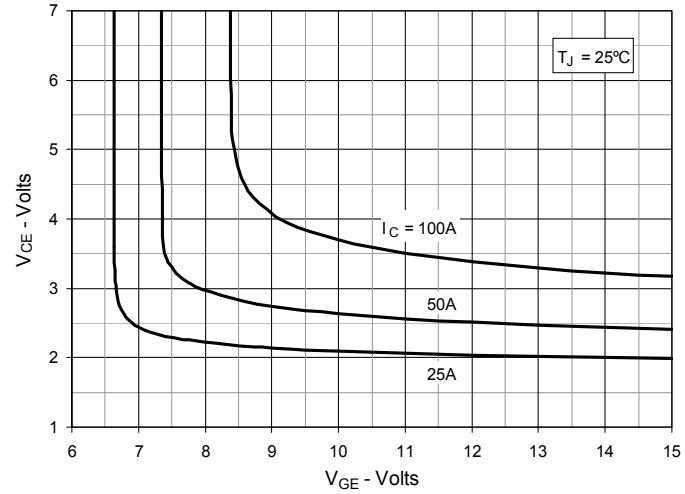
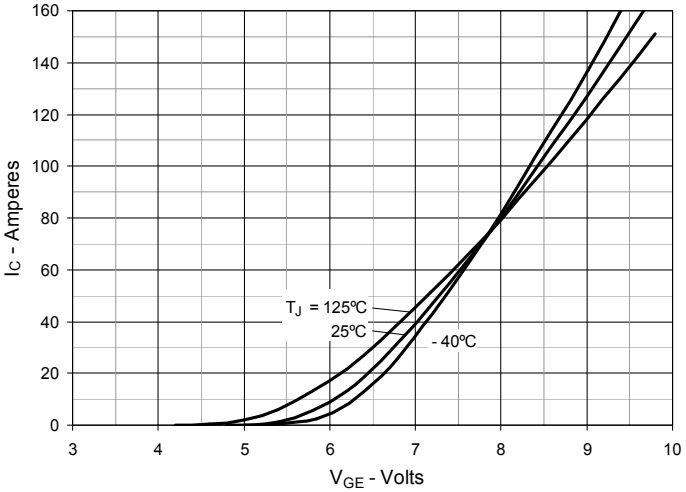


Fig. 6. Input Admittance



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Fig. 7. Transconductance

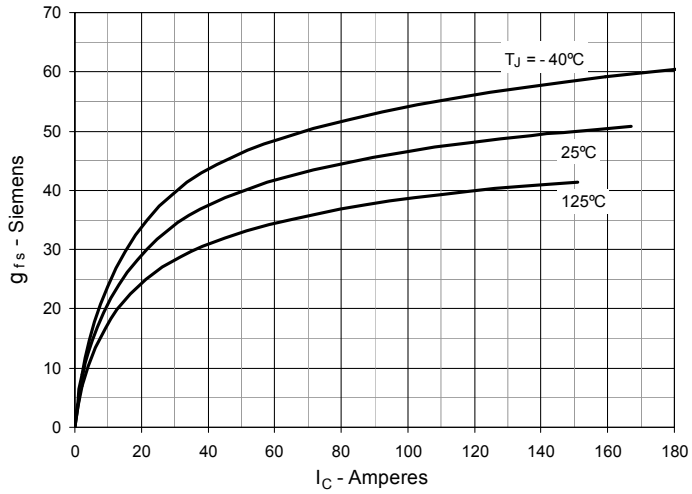


Fig. 8. Gate Charge

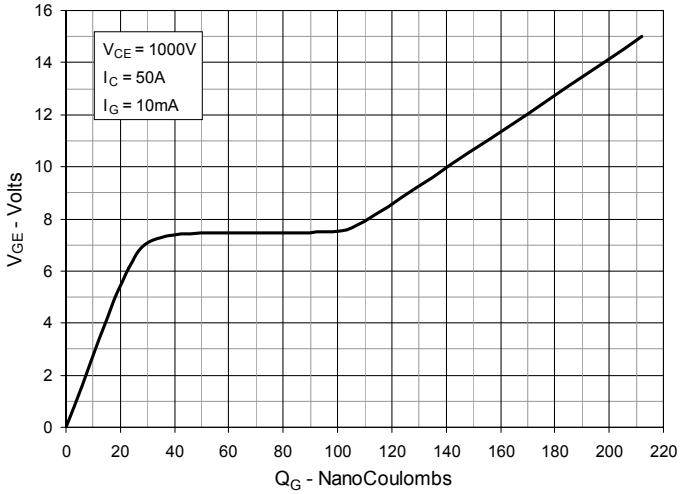


Fig. 9. Forward Voltage Drop of Intrinsic Diode

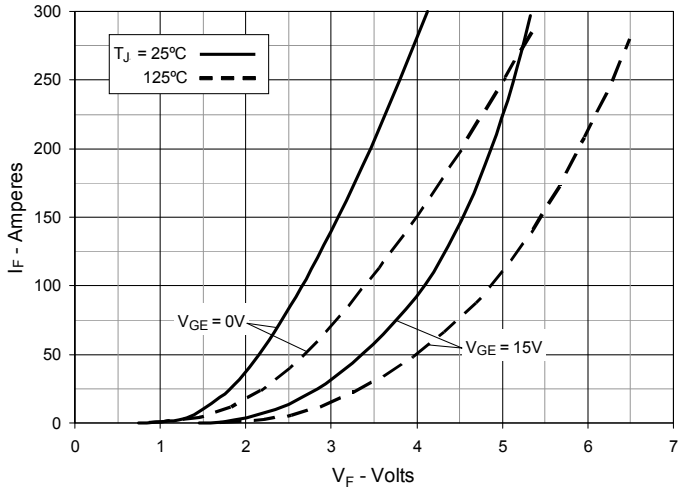


Fig. 10. Capacitance

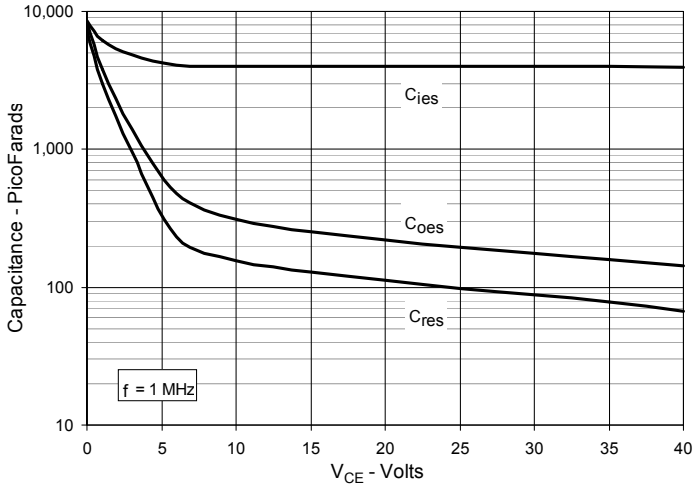


Fig. 11. Reverse-Bias Safe Operating Area

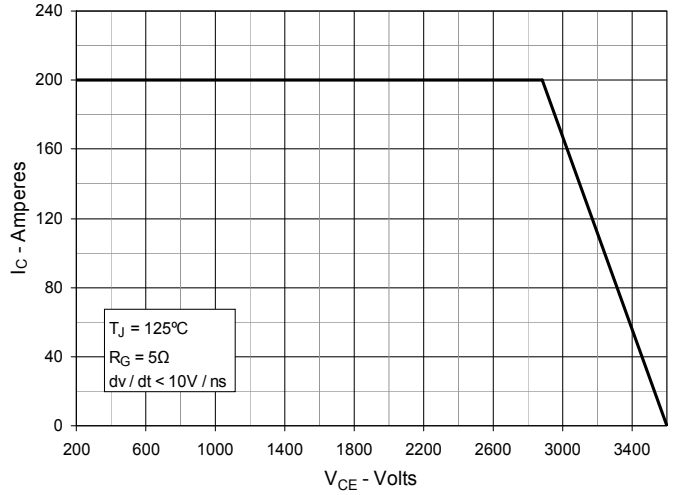
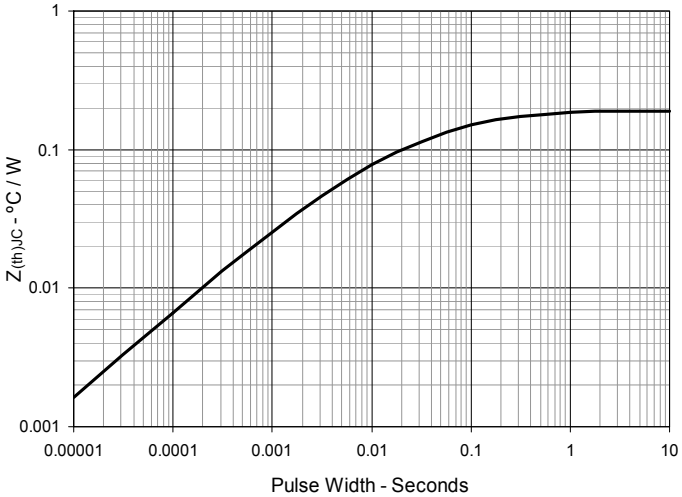


Fig. 12. Maximum Transient Thermal Impedance



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

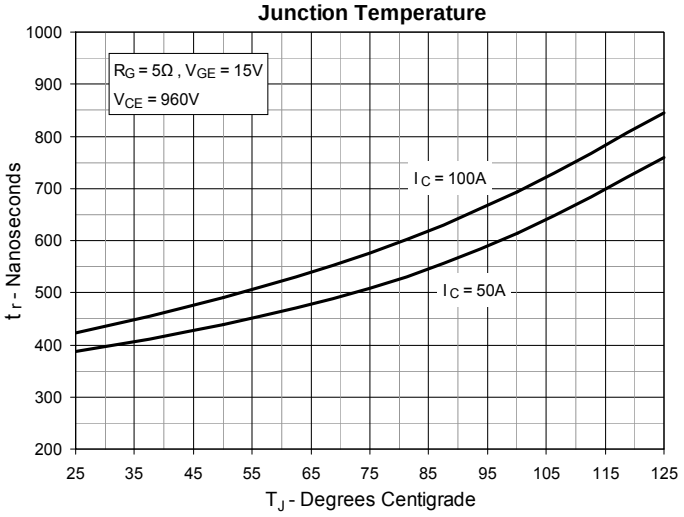


Fig. 14. Resistive Turn-on Rise Time vs. Collector Current

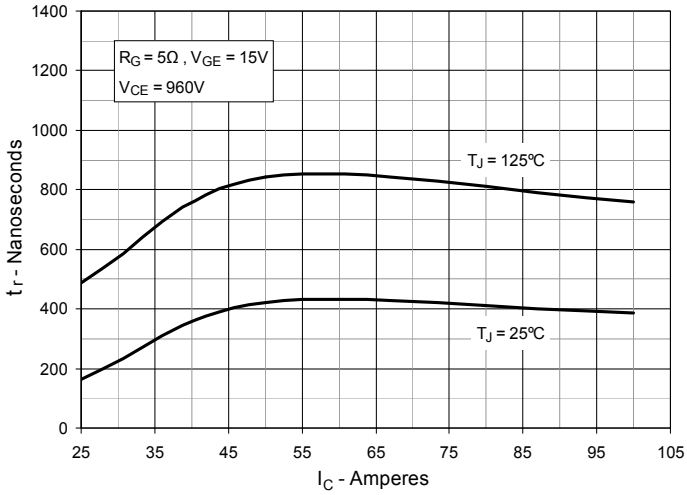


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

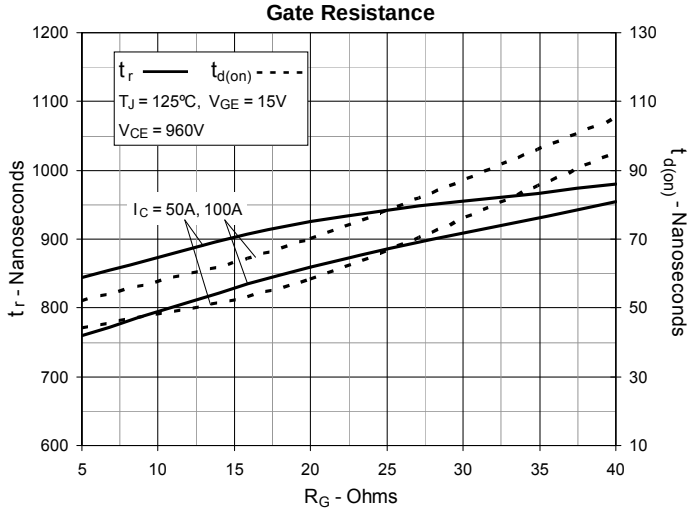


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

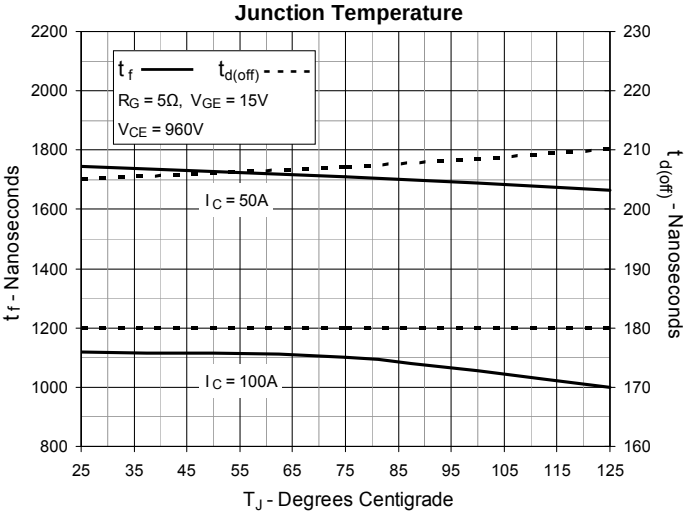


Fig. 17. Resistive Turn-off Switching Times vs. Collector Current

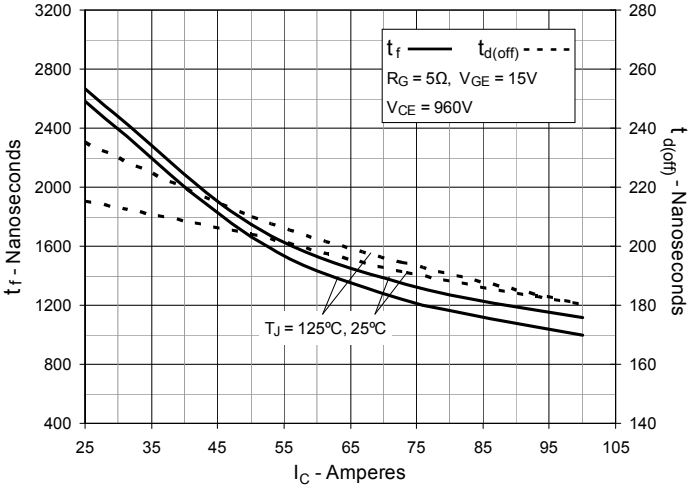
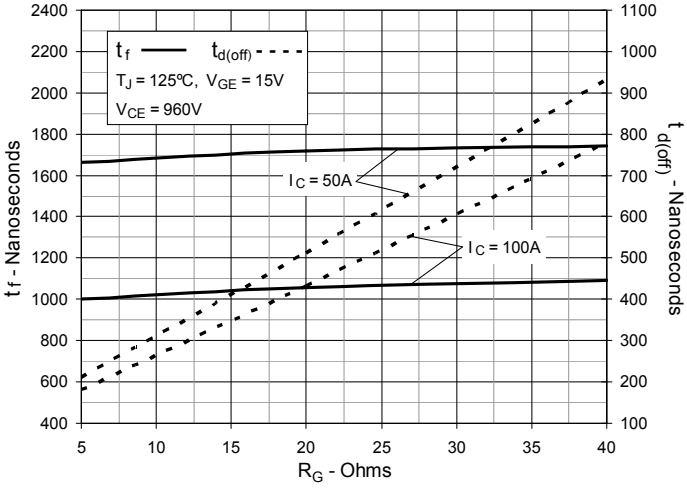


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance



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

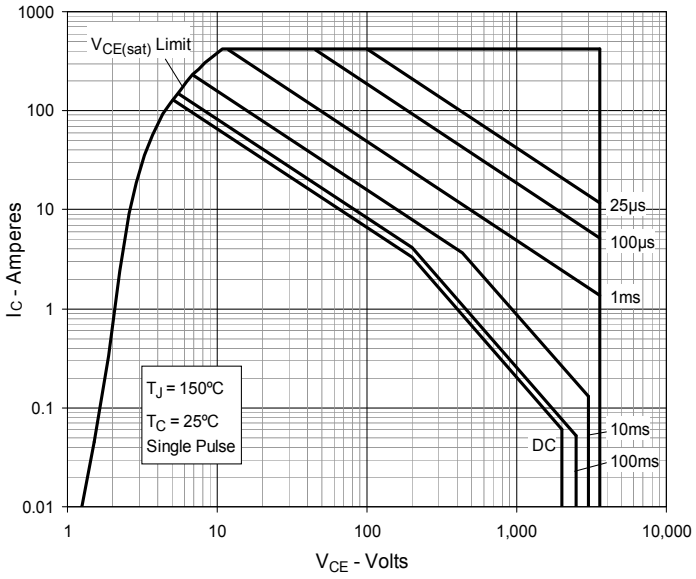
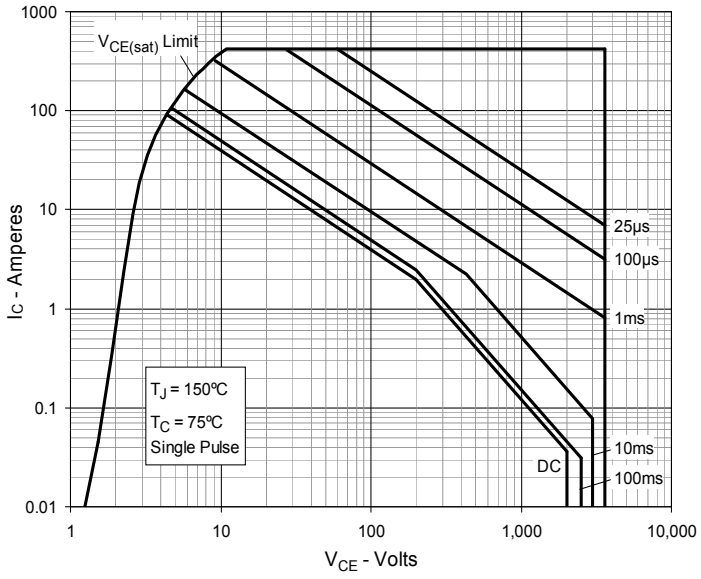
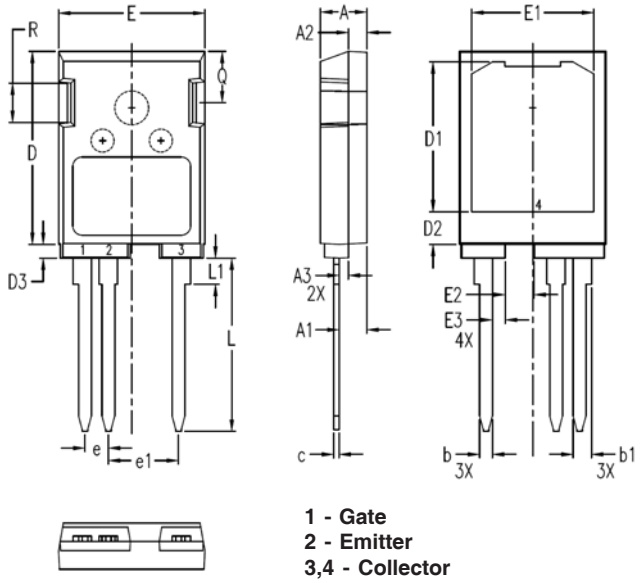


Fig. 20. Forward-Bias Safe Operating Area @ T_C = 75ºC



TO-247PLUS-HV Outline



1 - Gate
2 - Emitter
3,4 - Collector

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.193	.201	4.90	5.10
A1	.114	.122	2.90	3.10
A2	.075	.083	1.90	2.10
A3	.035	.043	0.90	1.10
b	.053	.059	1.35	1.50
b1	.075	.083	1.90	2.10
c	.022	.030	0.55	0.75
D	.819	.843	20.80	21.40
D1	.638	.646	16.20	16.40
D2	.134	.146	3.40	3.70
D3	.055	.063	1.40	1.60
E	.622	.638	15.80	16.20
E1	.520	.528	13.20	13.40
E2	.118	.126	3.00	3.20
E3	.051	.059	1.30	1.50
e	.100 BSC		2.54 BSC	
e1	.300 BSC		7.62 BSC	
L	.732	.748	18.60	19.00
L1	.106	.118	2.70	3.00
Q	.216	.224	5.50	5.70
R	.165	.169	4.20	4.30

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