

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

IXBX50N360HV



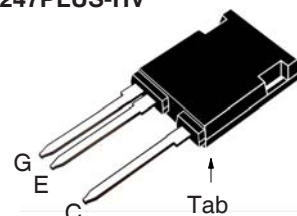
$$V_{CES} = 3600V$$

$$I_{C110} = 50A$$

$$V_{CE(sat)} \leq 2.9V$$

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ C$ to $150^\circ C$	3600	V
V_{CGR}	$T_J = 25^\circ C$ to $150^\circ C$, $R_{GE} = 1M\Omega$	3600	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ C$	125	A
I_{C110}	$T_C = 110^\circ C$	50	A
I_{CM}	$T_C = 25^\circ C$, 1ms	420	A
SSOA (RBSOA)	$V_{GE} = 15V$, $T_{VJ} = 125^\circ C$, $R_G = 5\Omega$ Clamped Inductive Load	$I_{CM} = 200$ $0.8 \cdot V_{CES}$	A V
T_{SC} (SCSOA)	$V_{GE} = 15V$, $T_J = 125^\circ C$, $R_G = 10\Omega$, $V_{CE} = 1500V$, Non-Repetitive	10	μs
P_C	$T_C = 25^\circ C$	660	W
T_J		- 55 ... +150	$^\circ C$
T_{JM}		150	$^\circ C$
T_{stg}		- 55 ... +150	$^\circ C$
T_L	Maximum Lead Temperature for Soldering	300	$^\circ C$
T_{SOLD}	Plastic Body for 10s	260	$^\circ C$
F_C	Mounting Force	20..120/4.5..27	N/lb
Weight		6	g

TO-247PLUS-HV



G = Gate
C = Collector

E = Emitter
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

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

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$I_C = 50\text{A}, V_{CE} = 10\text{V}, \text{Note 1}$	24	40	S
C_{ies}	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		3990	pF
C_{oes}			195	pF
C_{res}			100	pF
$Q_{g(on)}$	$I_C = 50\text{A}, V_{GE} = 15\text{V}, V_{CE} = 1000\text{V}$		210	nC
Q_{ge}			27	nC
Q_{gc}			77	nC
$t_{d(on)}$	Resistive load, $T_J = 25^\circ\text{C}$ $I_C = 50\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 960\text{V}, R_G = 5\Omega$		46	ns
t_r			420	ns
$t_{d(off)}$			205	ns
t_f			1750	ns
$t_{d(on)}$	Resistive load, $T_J = 125^\circ\text{C}$ $I_C = 50\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 960\text{V}, R_G = 5\Omega$		44	ns
t_r			845	ns
$t_{d(off)}$			210	ns
t_f			1670	ns
R_{thJC}				0.19 $^\circ\text{C/W}$
R_{thCS}		0.15		$^\circ\text{C/W}$

Reverse Diode

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
V_F	$I_F = 50\text{A}, V_{GE} = 0\text{V}, \text{Note 1}$			3.0 V
t_{rr}	$I_F = 25\text{A}, V_{GE} = 0\text{V}, -di_F/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}, V_{GE} = 0\text{V}$		1.7	μs
I_{RM}			48	A
Q_{RM}			40	μC

Notes:

1. Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.
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	4,931,844	5,049,961	5,237,481	6,162,665	6,404,065 B1	6,683,344	6,727,585	7,005,734 B2	7,157,338B2
	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	

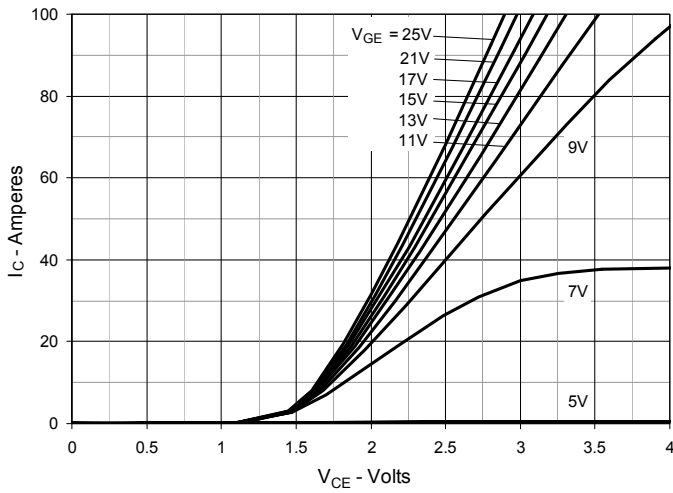
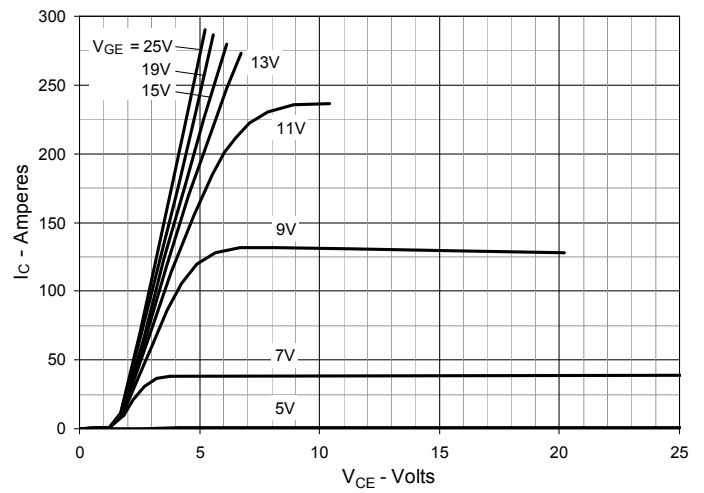
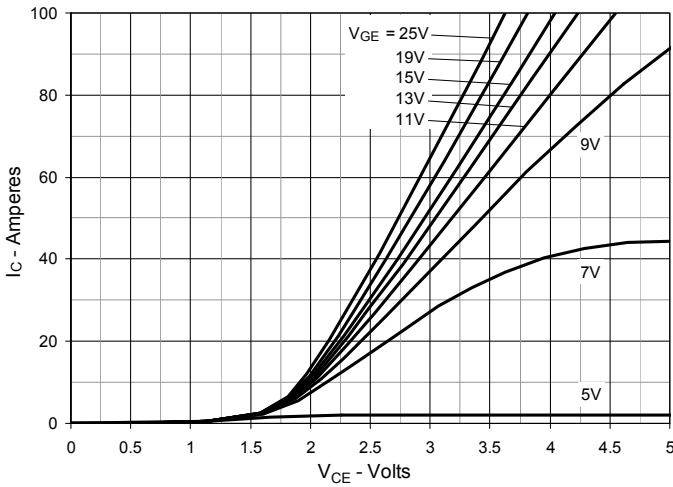
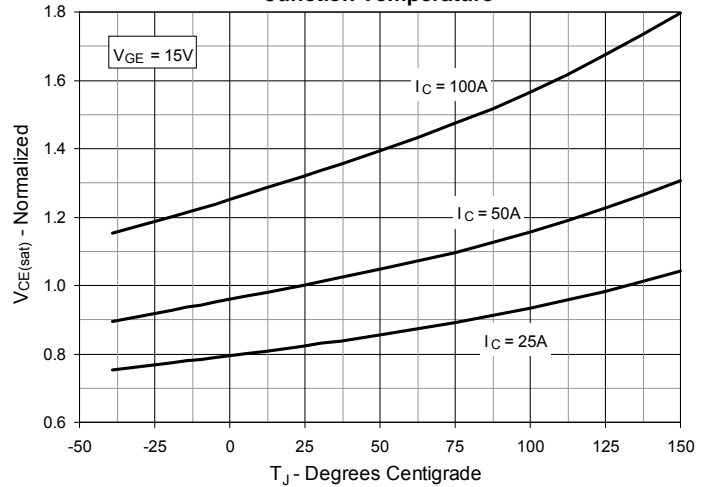
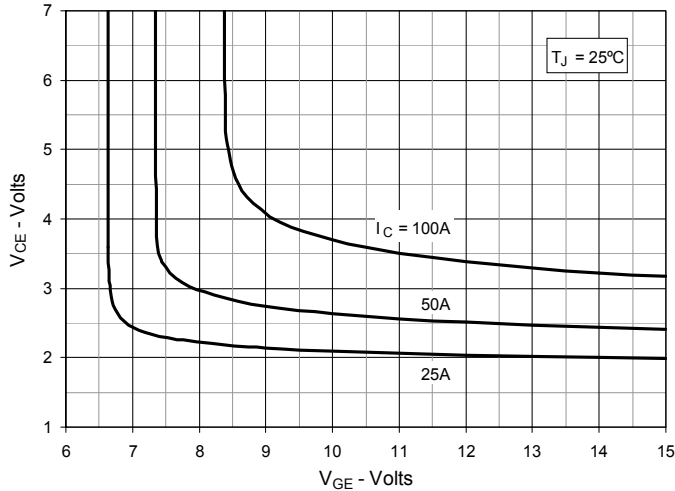
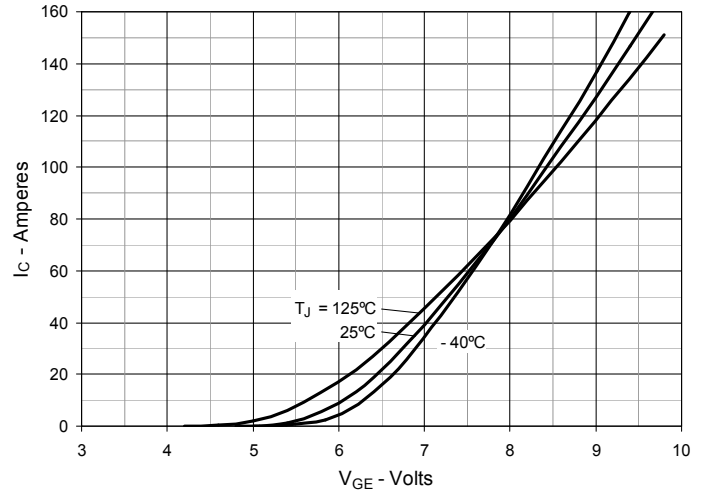
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

Fig. 3. Output Characteristics @ $T_J = 125^\circ\text{C}$

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


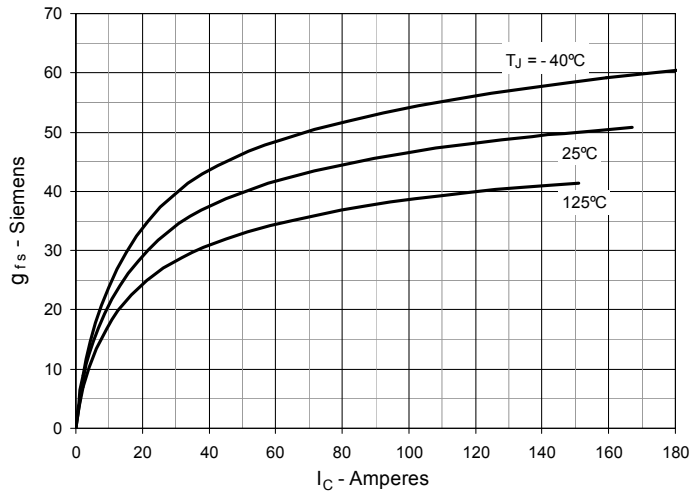
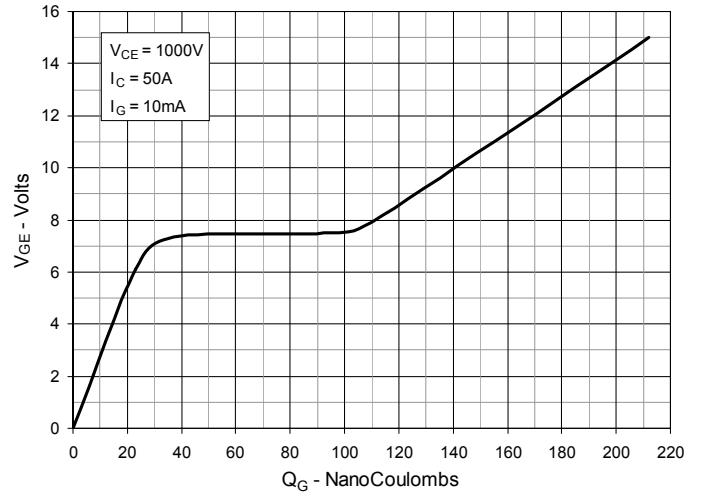
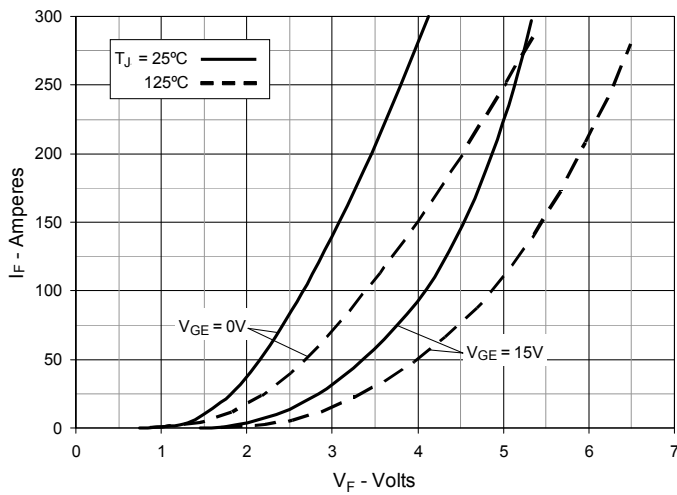
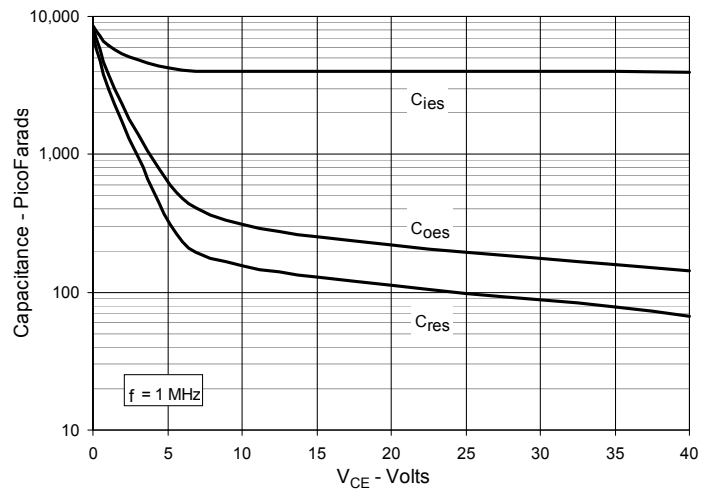
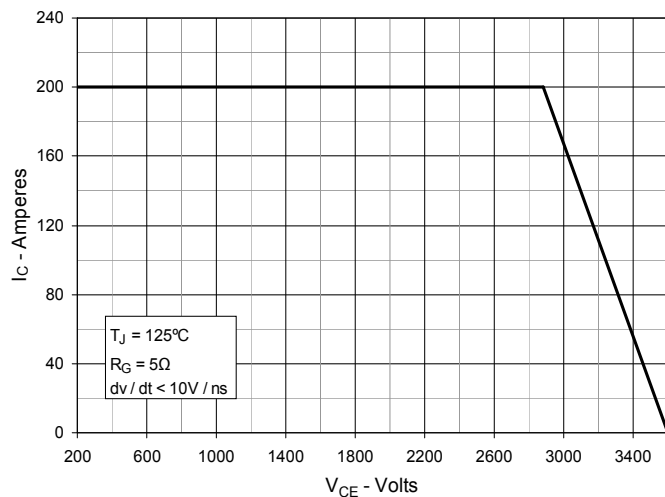
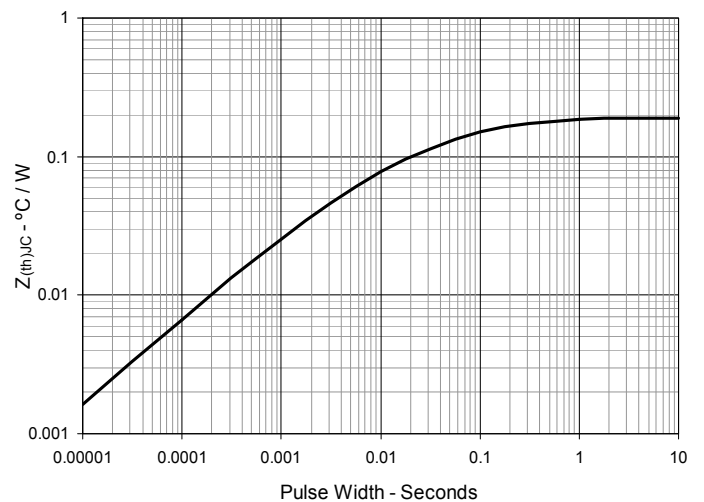
Fig. 7. Transconductance

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


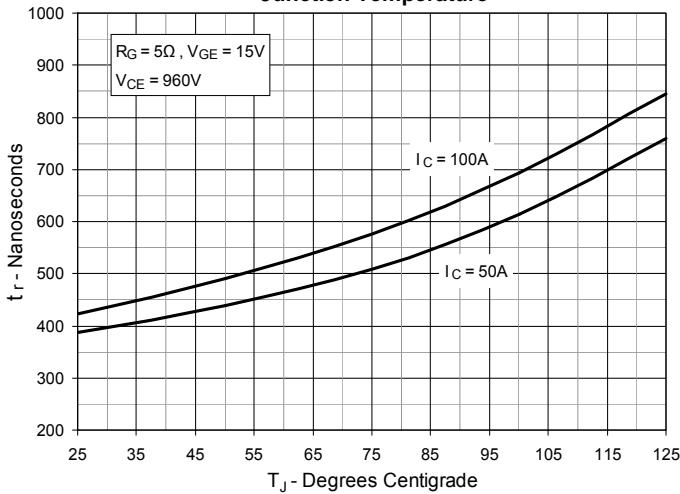
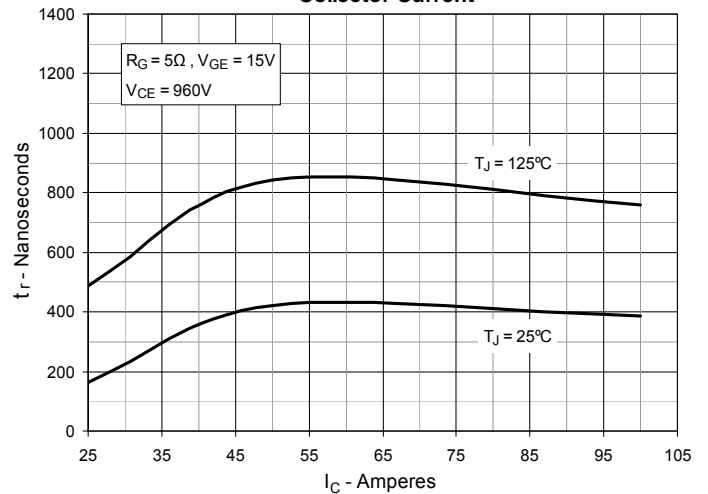
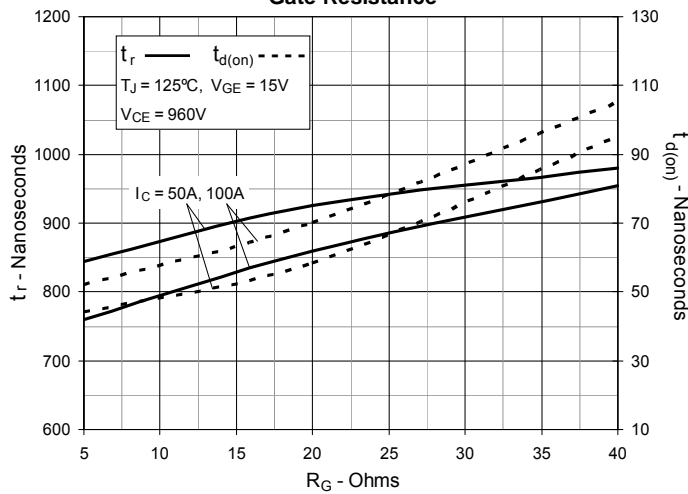
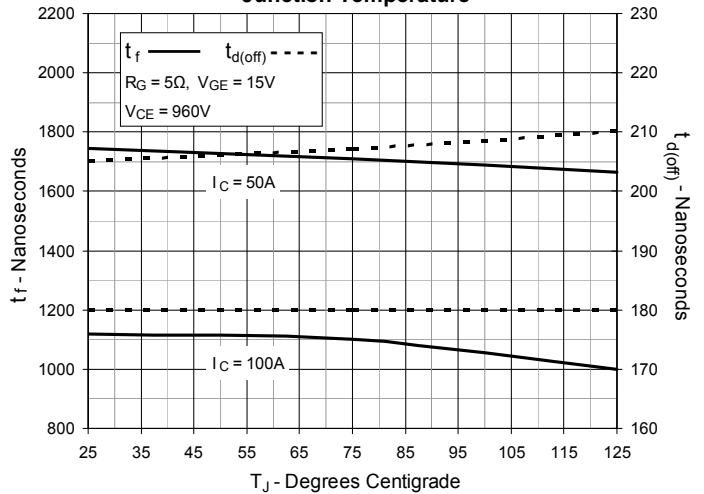
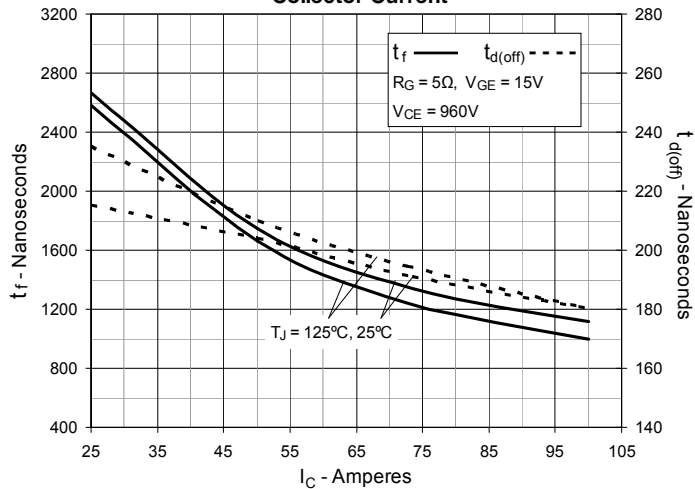
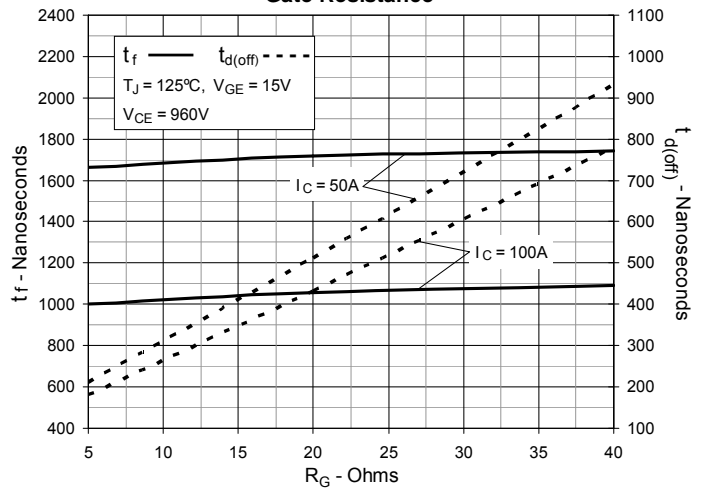
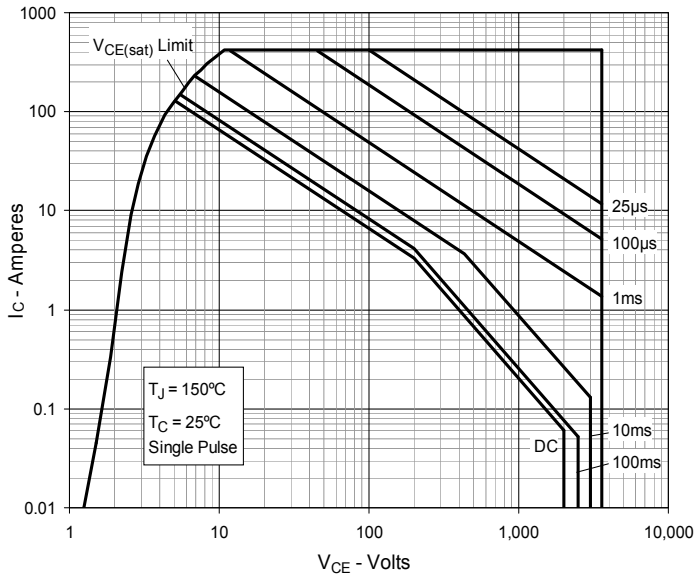
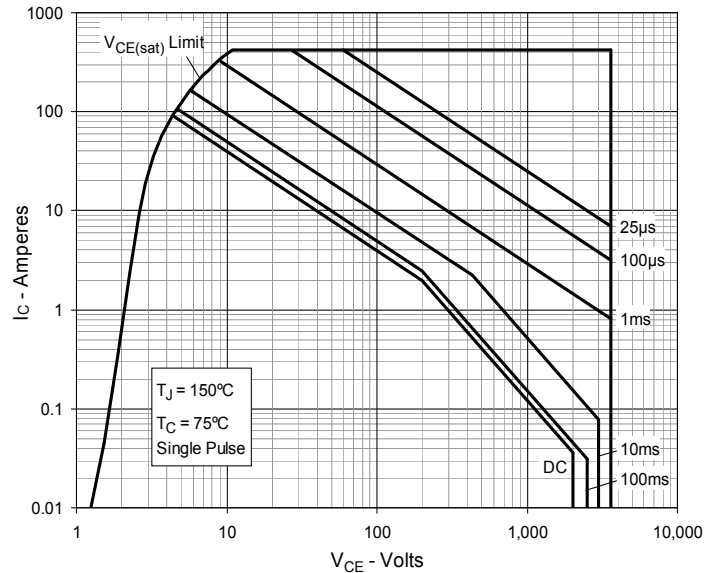
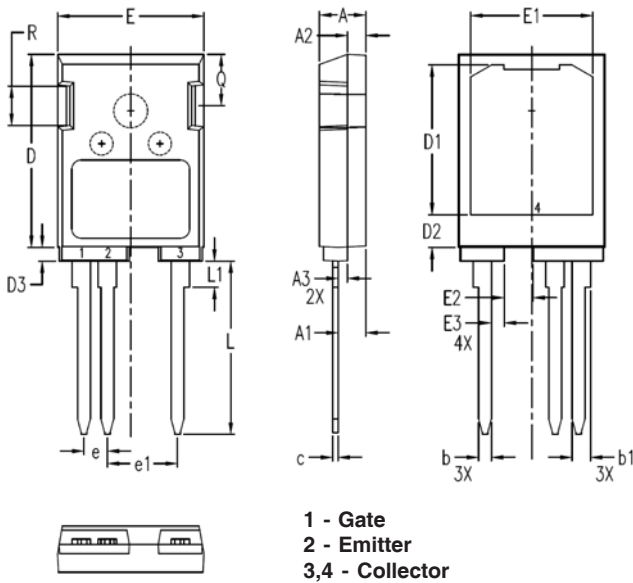
Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

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


Fig. 19. Forward-Bias Safe Operating Area @ $T_C = 25^\circ\text{C}$

Fig. 20. Forward-Bias Safe Operating Area @ $T_C = 75^\circ\text{C}$

TO-247PLUS-HV Outline


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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