

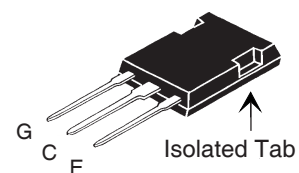
**High Voltage, High Gain
BIMOSFET™ Monolithic
Bipolar MOS Transistor**
IXBR42N170


$$V_{CES} = 1700V$$

$$I_{C90} = 32A$$

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

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_C = 25^\circ C$ to $150^\circ C$	1700	V
V_{CGR}	$T_J = 25^\circ C$ to $150^\circ C$, $R_{GE} = 1M\Omega$	1700	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ C$	57	A
I_{C90}	$T_C = 90^\circ C$	32	A
I_{CM}	$T_C = 25^\circ C$, 1ms	300	A
SSOA	$V_{GE} = 15V$, $T_{VJ} = 125^\circ C$, $R_G = 10\Omega$	$I_{CM} = 100$	A
(RBSOA)	Clamped inductive load	$V_{CES} \leq 1350$	V
P_C	$T_C = 25^\circ C$	200	W
T_J		-55 ... +150	$^\circ C$
T_{JM}		150	$^\circ C$
T_{stg}		-55 ... +150	$^\circ C$
T_L	1.6mm (0.062 in.) from case for 10s	300	$^\circ C$
T_{SOLD}	Plastic body for 10 seconds	260	$^\circ C$
F_C	Mounting force	20..120 / 4.5..27	Nm/lb.in.
V_{ISOL}	50/60 Hz, RMS	t = 1min	2500 V~
	$I_{ISOL} \leq 1mA$	t = 1s	3000 V~
Weight		5	g

 ISOPLUS247™
 E153432


G = Gate E = Emitter
C = Collector

Features

- Silicon chip on Direct-Copper Bond (DCB) substrate
- Isolated mounting surface
- 2500V electrical isolation

Advantages

- Low gate drive requirement
- High power density

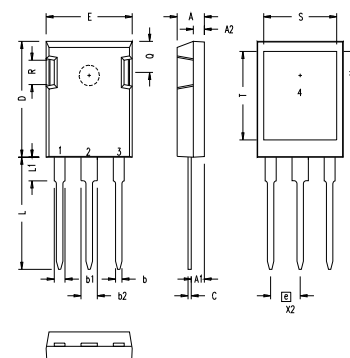
Applications:

- Switched-mode and resonant-mode power supplies
- Uninterruptible power supplies (UPS)
- Laser generator
- Capacitor discharge circuit
- AC switches

Symbol	Test Conditions ($T_J = 25^\circ C$ unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 250\mu A$, $V_{GE} = 0V$	1700		V
$V_{GE(th)}$	$I_C = 250\mu A$, $V_{CE} = V_{GE}$	2.5		5.5 V
I_{CES}	$V_{CE} = 0.8 \cdot V_{CES}$ $V_{GE} = 0V$			50 μA 1.5 mA
	$T_J = 125^\circ C$			
I_{GES}	$V_{CE} = 0V$, $V_{GE} = \pm 20V$			± 100 nA
$V_{CE(sat)}$	$I_C = 42A$, $V_{GE} = 15V$, Note 1			2.9 V
		$T_J = 125^\circ C$	2.7	V

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
g_{fS}	$I_C = 42A, V_{CE} = 10V$, Note 1	24	32	S
C_{ies}	$V_{CE} = 25V, V_{GE} = 0V, f = 1MHz$		3990	pF
C_{oes}			225	pF
C_{res}			70	pF
Q_g	$I_C = 42A, V_{GE} = 15V, V_{CE} = 0.5 \cdot V_{CES}$		188	nC
Q_{ge}			29	nC
Q_{gc}			76	nC
$t_{d(on)}$	Resistive Switching times, $T_J = 25^\circ C$ $I_C = 42A, V_{GE} = 15V$ $V_{CE} = 850V, R_G = 10\Omega$		37	ns
t_r			139	ns
$t_{d(off)}$			340	ns
t_f			665	ns
$t_{d(on)}$	Resistive Switching times, $T_J = 125^\circ C$ $I_C = 42A, V_{GE} = 15V$ $V_{CE} = 850V, R_G = 10\Omega$		36	ns
t_r			188	ns
$t_{d(off)}$			330	ns
t_f			740	ns
R_{thJC}			0.62	$^\circ C/W$
R_{thCS}		0.15		$^\circ C/W$

ISOPLUS247 (IXBR) Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b1	.075	.084	1.91	2.13
b2	.115	.123	2.92	3.12
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
E	.620	.635	15.75	16.13
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1	.150	.170	3.81	4.32
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83
S	.520	.540	13.21	13.72
T	.620	.640	15.75	16.26
U	.065	.080	1.65	2.03

- 1 - GATE
- 2 - DRAIN (COLLECTOR)
- 3 - SOURCE (EMITTER)
- 4 - NO CONNECTION

NOTE: This drawing will meet all dimensions requirement of JEDEC outline TO-247AD except screw hole.

Reverse Diode

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
V_F	$I_F = 42A, V_{GE} = 0V$			2.8 V
t_{rr}	$I_F = 21A, V_{GE} = 0V, -di_F/dt = 100A/\mu s$ $V_R = 100V$		1.32	μs
I_{RM}			36	A

Note 1: Pulse test, $t \leq 300\mu s$, duty cycle, $d \leq 2\%$.

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.

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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
	4,850,072	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 @ 25°C

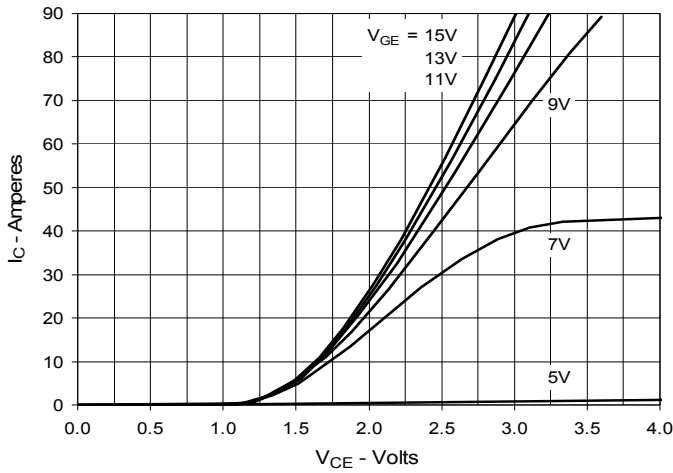


Fig. 2. Extended Output Characteristics @ 25°C

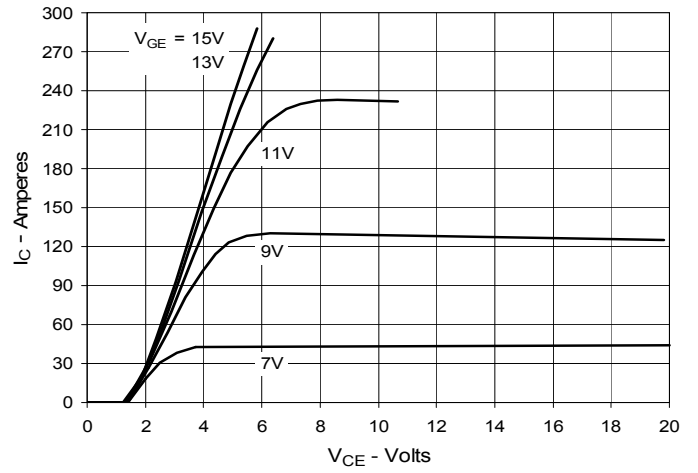


Fig. 3. Output Characteristics @ 125°C

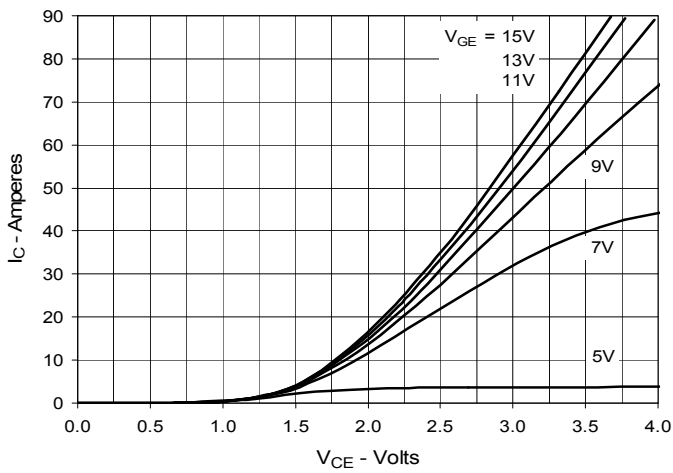


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

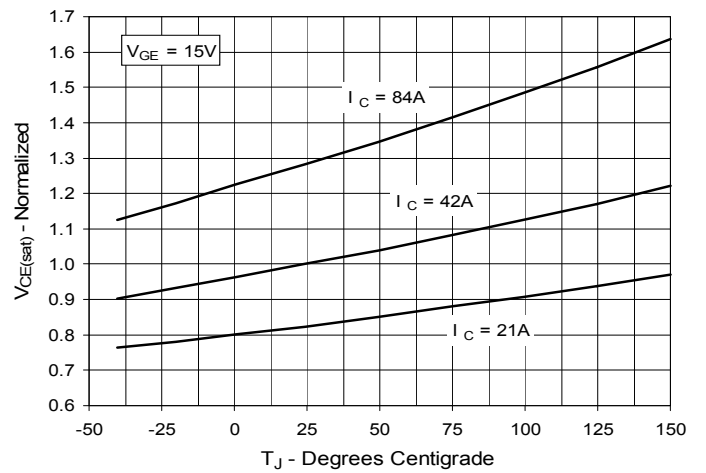


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

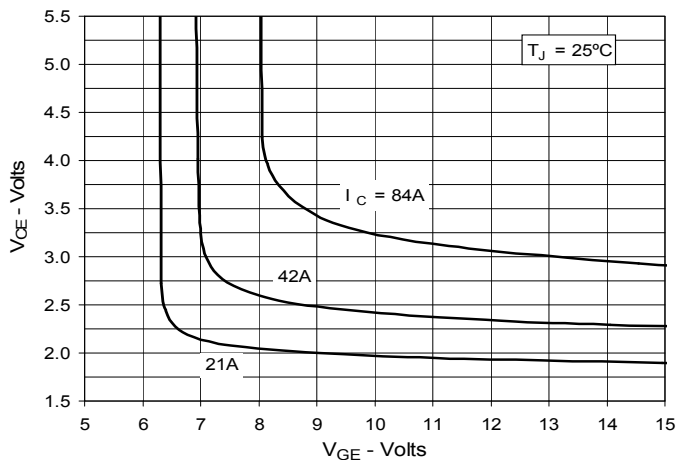


Fig. 6. Input Admittance

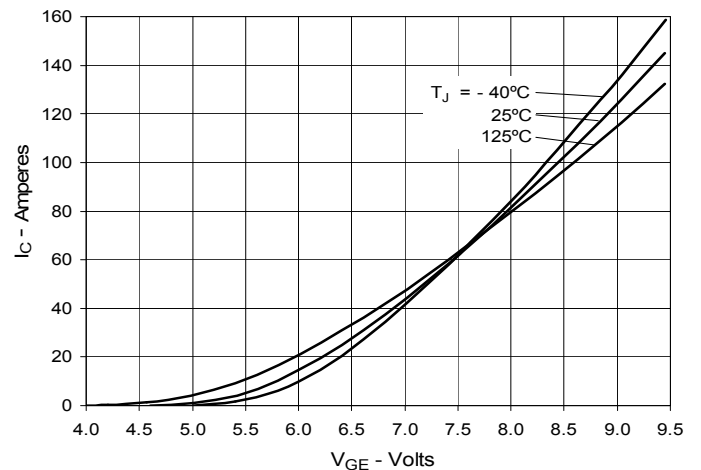


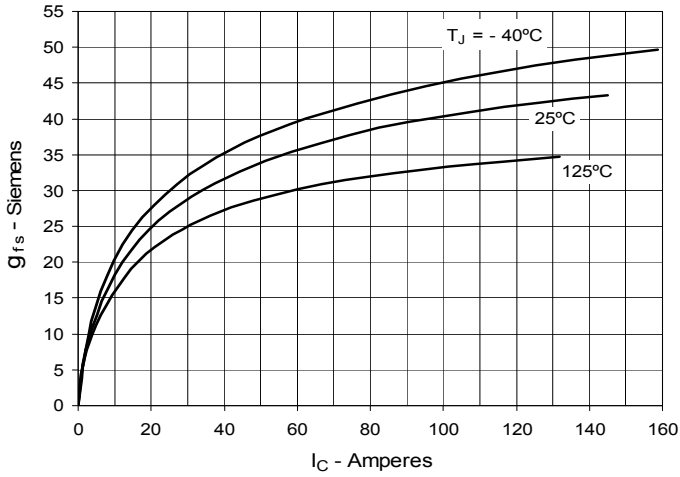
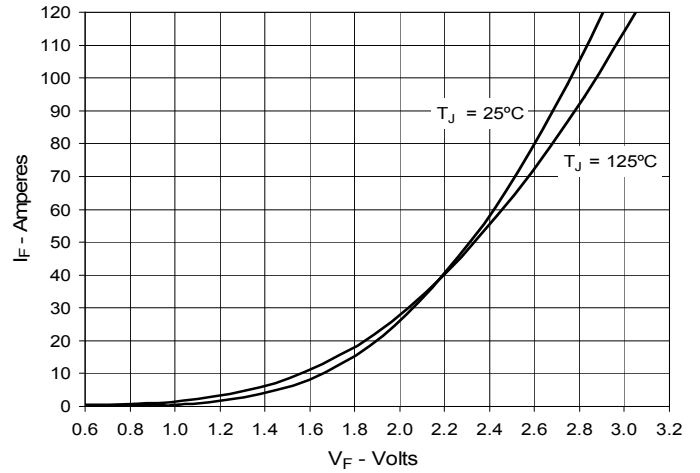
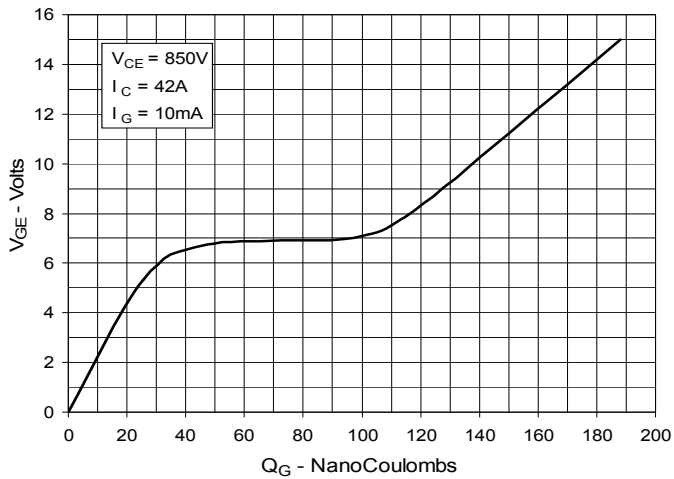
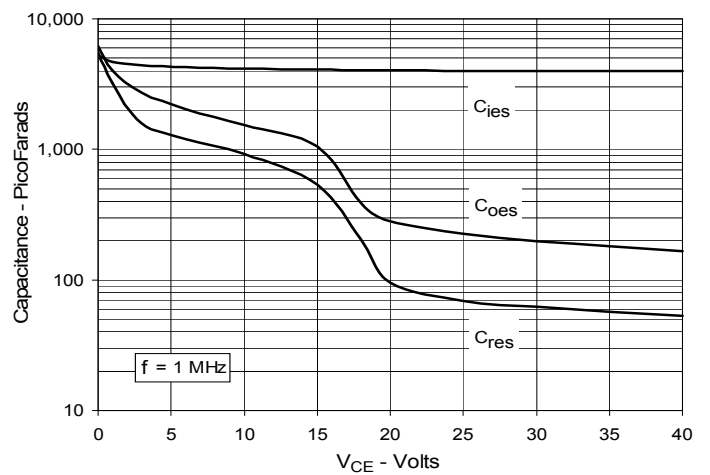
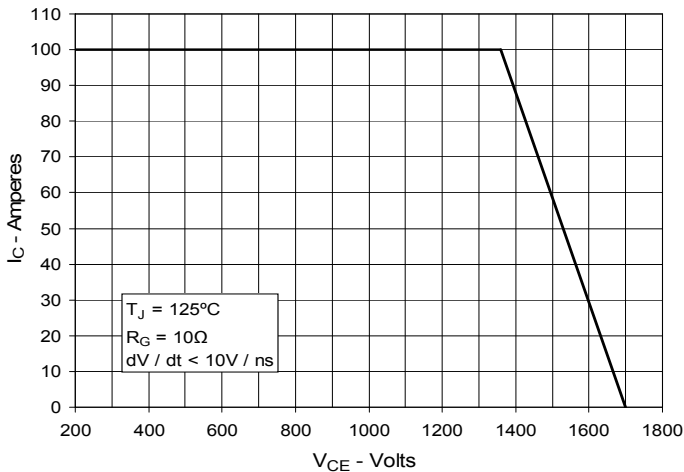
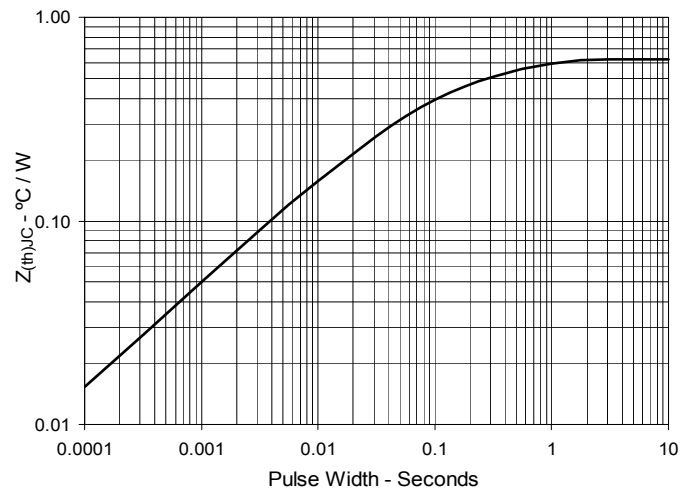
Fig. 7. Transconductance

Fig. 8. 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


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



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



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

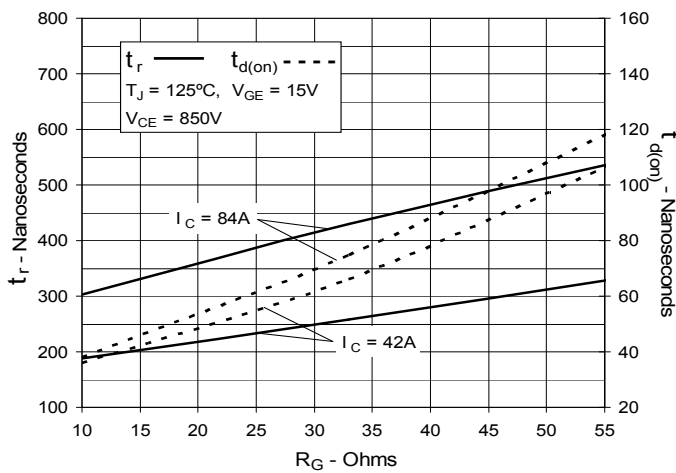


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

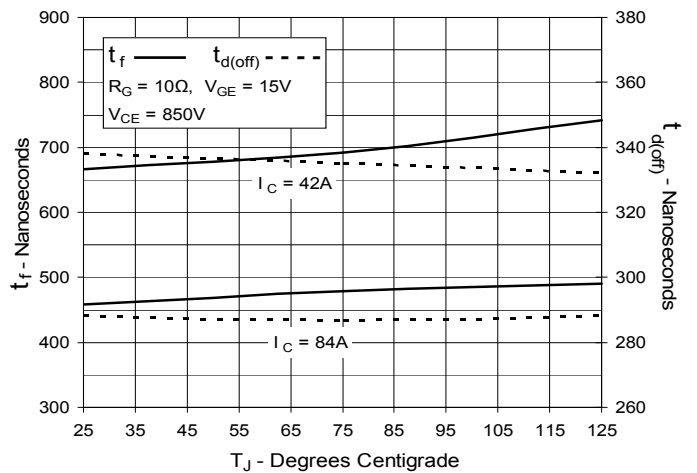


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current



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





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