IXYS

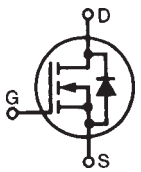
PolarHV™ HiPerFET Power MOSFET ISOPLUS220™

(Electrically Isolated Back Surface)

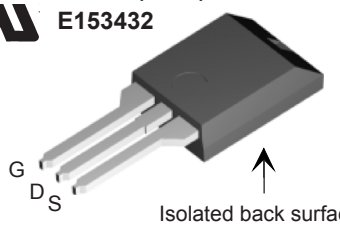
IXFC 16N50P

V_{DSS} = 500 V
I_{D25} = 10 A
$R_{DS(on)}$ ≤ 450 mΩ
t_{rr} ≤ 200 ns

N-Channel Enhancement Mode
Fast Intrinsic Diode
Avalanche Rated



ISOPLUS220™ (IXFC)
E153432



G = Gate D = Drain
S = Source

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25° C to 150° C	500	V
V_{DGR}	T_J = 25° C to 150° C; R_{GS} = 1 MΩ	500	V
V_{GS}	Continuous	± 30	V
V_{GSM}	Transient	± 40	V
I_{D25}	T_C = 25° C	10	A
I_{DM}	T_C = 25° C, pulse width limited by T_{JM}	35	A
I_{AR}	T_C = 25° C	10	A
E_{AR}	T_C = 25° C	25	mJ
E_{AS}	T_C = 25° C	750	mJ
dv/dt	$I_S \le I_{DM}$, di/dt ≤100 A/μs, $V_{DD} \le V_{DSS}$, T_J ≤150° C, R_G = 10 Ω	10	V/ns
P_D	T_C = 25° C	125	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	1.6 mm (0.062 in.) from case for 10 s	300	°C
T_{SOLD}	Plastic body for 10 s	260	°C
V_{ISOL}	50/60 Hz, RMS, t = 1, leads-to-tab	2500	V~
F_C	Mounting Force	11..65/2.5..15	N/lb
Weight		2	g

Symbol	Test Conditions (T_J = 25° C unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0 V, I_D = 250 μA	500			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 2.5 mA	3.0		5.5	V
I_{GSS}	V_{GS} = ±30 V, V_{DS} = 0 V			±100	nA
I_{DSS}	$V_{DS} = V_{DSS}$, V_{GS} = 0 V			5	μA
	T_J = 125° C			50	μA
$R_{DS(on)}$	V_{GS} = 10 V, $I_D = I_{T,}$ (Note 1) Pulse test, t ≤300 μs, duty cycle d ≤ 2 %			450	mΩ

Features

- Silicon chip on Direct-Copper-Bond substrate
  - High power dissipation
  - Isolated mounting surface
  - 2500V electrical isolation
- Low drain to tab capacitance(<35pF)
- Low $R_{DS(on)}$ HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Fast intrinsic Rectifier

Applications

- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- AC motor control

Advantages

- Easy assembly: no screws, or isolation foils required
- Space savings
- High power density
- Low collector capacitance to ground (low EMI)

© 2006 IXYS All rights reserved

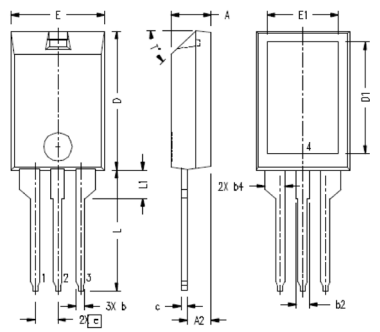
Symbol	Test Conditions	Characteristic Values (T_J = 25° C unless otherwise specified) Min.	Typ.	Max.	
g_{fs}	V_{DS}= 20 V; I_D = I_T, pulse test	9	16		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		2250		pF
C_{oss}			240		pF
C_{rss}			12		pF
$t_{d(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS}, I_D = I_T R_G = 10 Ω (External)		23		ns
t_r			25		ns
$t_{d(off)}$			70		ns
t_f			22		ns
$Q_{g(on)}$	V_{GS}= 10 V, V_{DS} = 0.5 V_{DSS}, I_D = I_T		43		nC
Q_{gs}			15		nC
Q_{gd}			12		nC
R_{thJC}				1.0	°C/W
R_{thCS}			0.21		°C/W

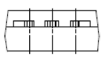
Source-Drain Diode

Symbol	Test Conditions	Characteristic Values (T_J = 25° C unless otherwise specified) Min.	Typ.	Max.	
I_S	V_{GS} = 0 V			16	A
I_{SM}	Repetitive			40	A
V_{SD}	I_F = I_S, V_{GS} = 0 V, Pulse test, t ≤300 µs, duty cycle d≤ 2 %			1.5	V
t_{rr}	I_F = 16 A, -di/dt = 100 A/µs			200	ns
I_{RM}	V_R = 100 V, V_{GS} = 0 V		6		A
Q_{RM}			0.6		µC

Note 1: Test Current I_T = 8 A

ISOPLUS220™ (IXFC) Outline





Note:
Bottom heatsink (Pin 4) is electrically isolated from Pin 1,2, or 3.

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.157	.197	4.00	5.00
A2	.098	.118	2.50	3.00
b	.035	.051	0.90	1.30
b2	.049	.065	1.25	1.65
b4	.093	.100	2.35	2.55
c	.028	.039	0.70	1.00
D	.591	.630	15.00	16.00
D1	.472	.512	12.00	13.00
E	.394	.433	10.00	11.00
E1	.295	.335	7.50	8.50
e	.100 BASIC		2.55 BASIC	
L	.512	.571	13.00	14.50
L1	.118	.138	3.00	3.50
T°			42.5°	47.5°

Ref: IXYS CO 0177 R0

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

IXYS MOSFETs and IGBTs are covered by one or moreof the following U.S. patents: 4,835,592 4,850,072 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 6,710,405B2 6,710,463 6,727,585 6,759,692 6,771,478 B2

Fig. 1. Output Characteristics @ 25ºC

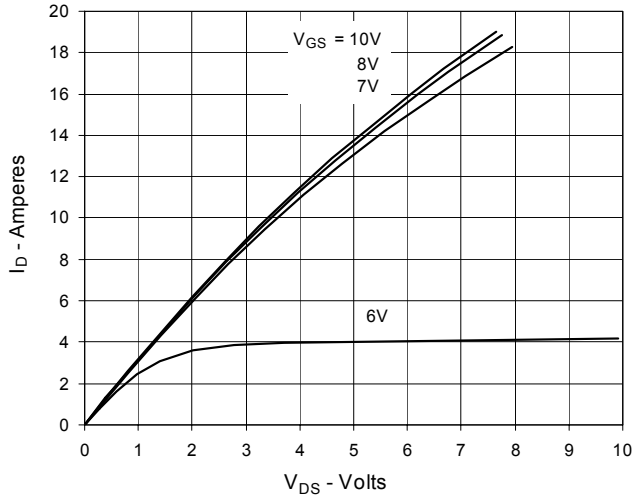


Fig. 2. Output Characteristics @ 125ºC

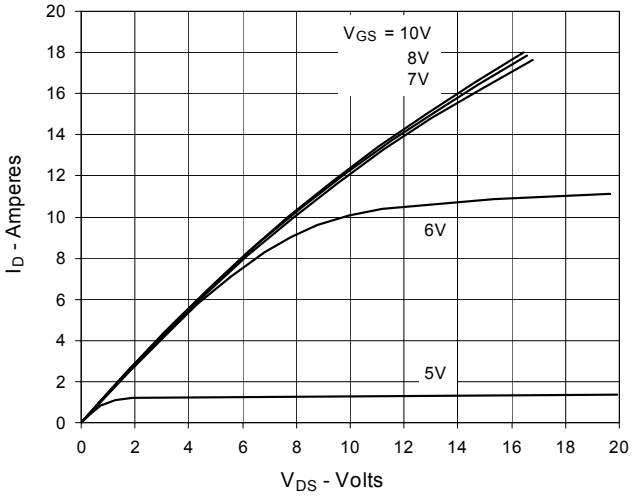


Fig. 3. $R_{DS(on)}$ Normalized to I_D = 8A vs. Junction Temperature

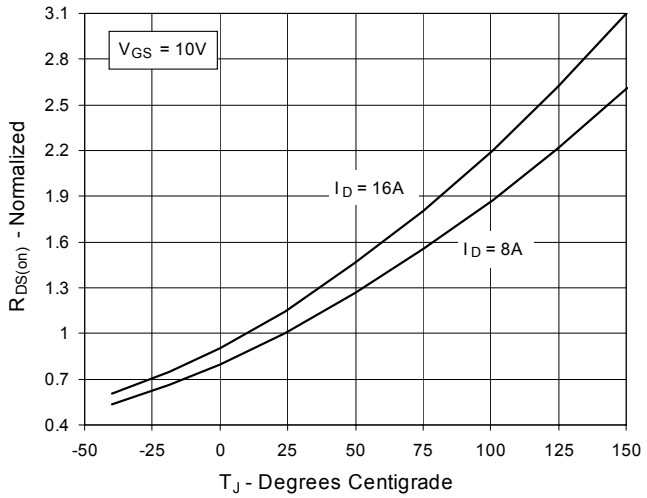


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 8A vs. Drain Current

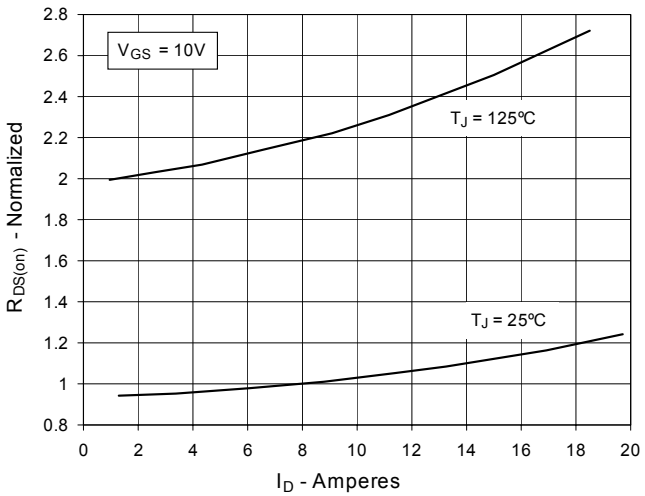


Fig. 5. Maximum Drain Current vs. Case Temperature

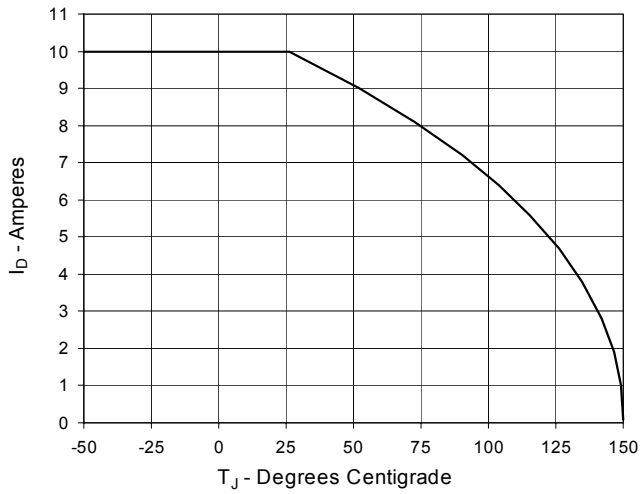
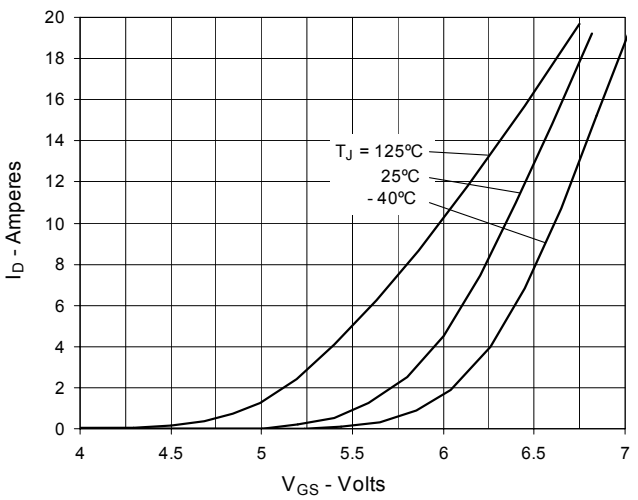


Fig. 6. Input Admittance



© 2006 IXYS All rights reserved

Fig. 7. Transconductance

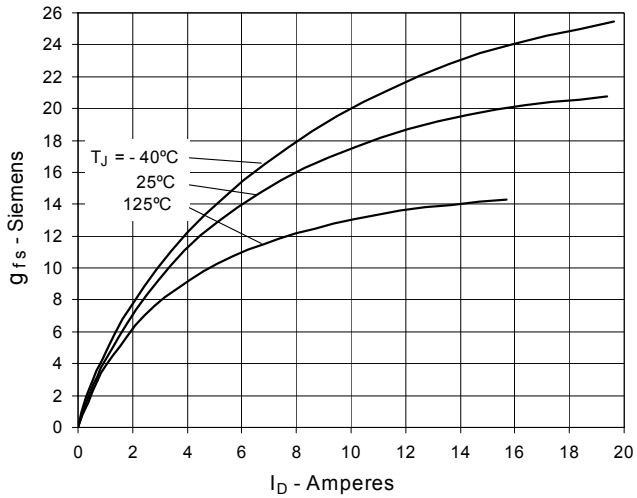


Fig. 8. Forward Voltage Drop of Intrinsic Diode

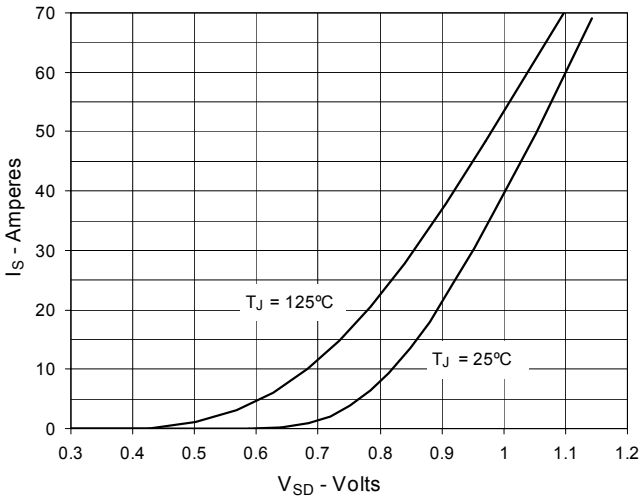


Fig. 9. Gate Charge

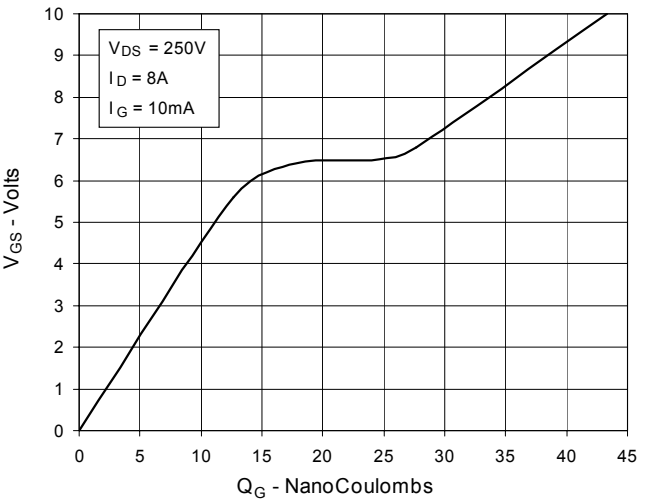


Fig. 10. Capacitance

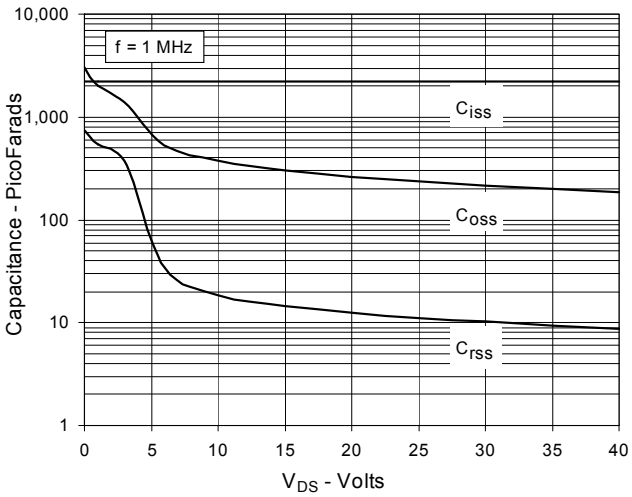


Fig. 11. Forward-Bias Safe Operating Area

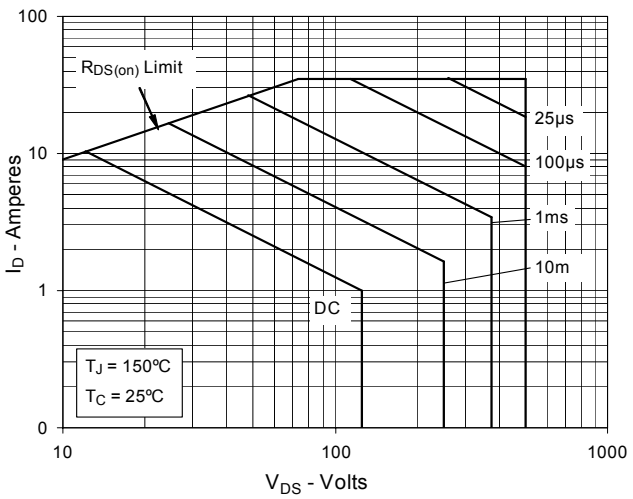
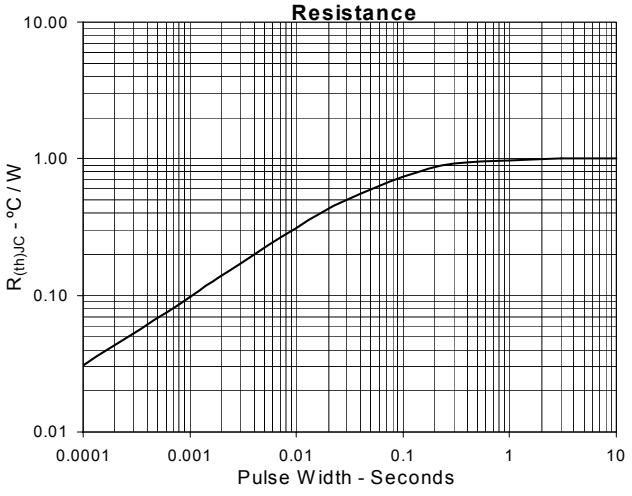


Fig. 12. Maximum Transient Thermal Resistance



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