IXYS

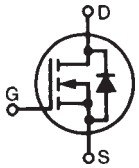
PolarHV™ HiPerFET Power MOSFET ISOPLUS220™

(Electrically Isolated Back Surface)

N-Channel Enhancement Mode
Fast Intrinsic Diode
Avalanche Rated

IXFC 22N60P

V_{DSS} = 600 V
I_{D25} = 12 A
$R_{DS(on)}$ ≤ 360 mΩ
t_{rr} ≤ 200 ns

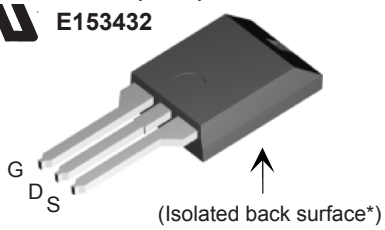


Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	600	V
V_{DGR}	T_J = 25°C to 150°C; R_{GS} = 1 MΩ	600	V
V_{GS}	Continuous	± 30	V
V_{GSM}	Tranisent	± 40	V
I_{D25}	T_C = 25°C	12	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	66	A
I_{AR}	T_C = 25°C	22	A
E_{AR}	T_C = 25°C	40	mJ
E_{AS}	T_C = 25°C	1.0	J
dv/dt	$I_S \le I_{DM}$, di/dt ≤100 A/µs, $V_{DD} \le V_{DSS}$ $T_J \le 150°C$, R_G = 4 Ω	10	V/ns
P_D	T_C = 25°C	130	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
V_{ISOL}	50/60 Hz, RMS t = 1 minute 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	600			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 4 mA	3.0		5.0	V
I_{GSS}	V_{GS} = ± 30 V_{DC}, V_{DS} = 0			±100	nA
I_{DSS}	$V_{DS} = V_{DSS}$ V_{GS} = 0 V			25	µA
	T_J = 125°C			250	µA
$R_{DS(on)}$	V_{GS} = 10 V, $I_D = I_T$, Note 1			360	mΩ

ISOPLUS220™ (IXFC)

E153432



G = Gate D = Drain
S = Source

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)

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Symbol	Test Conditions (T$_J$ = 25° C unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 20 V; I_D = I_T, Note 1	13	20		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		4000		pF
C_{oss}			320		pF
C_{rss}			22		pF
$t_{d(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS}, I_D = I_T R_G = 4 Ω (External)		20		ns
t_r			20		ns
$t_{d(off)}$			60		ns
t_f			23		ns
$Q_{g(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS}, I_D = I_T		58		nC
Q_{gs}			23		nC
Q_{gd}			20		nC
R_{thJC}				0.95	°C/W
R_{thCS}			0.21		°C/W

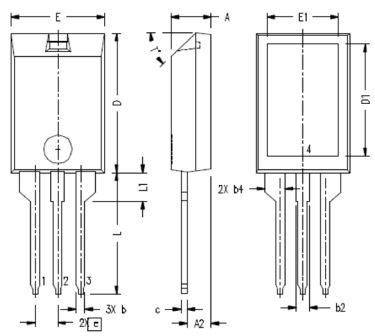
Source-Drain Diode

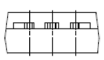
Symbol	Test Conditions (T$_J$ = 25° C unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0 V			12	A
I_{SM}	Repetitive			66	A
V_{SD}	I_F = I_S, V_{GS} = 0 V,			1.5	V
t_{rr}	I_F = 25A, -di/dt = 100 A/µs			200	ns
Q_{RM}	V_R = 100 V, V_{GS} = 0 V		1.0		µC

Notes:

1. Pulse test, t ≤300 µs, duty cycle d≤ 2 %;
2. Test current I_T = 11A.

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 @ 25°C

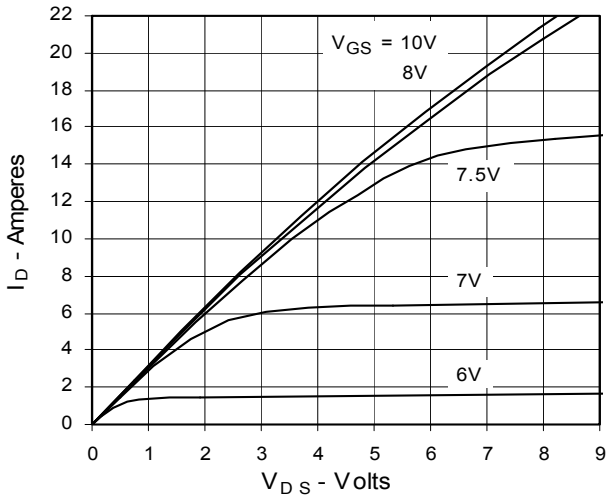


Fig. 2. Extended Output Characteristics @ 25°C

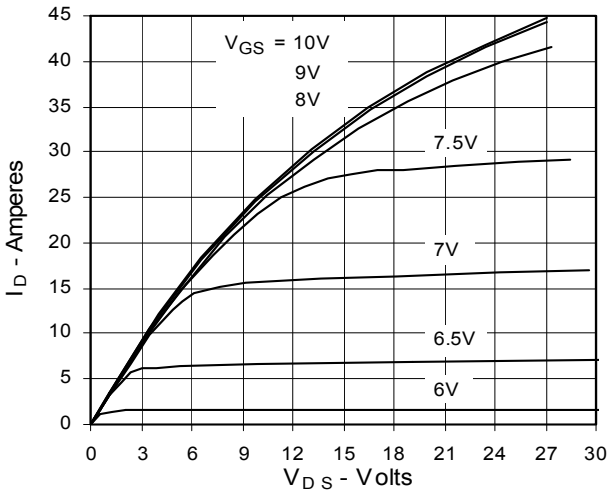


Fig. 3. Output Characteristics @ 125°C

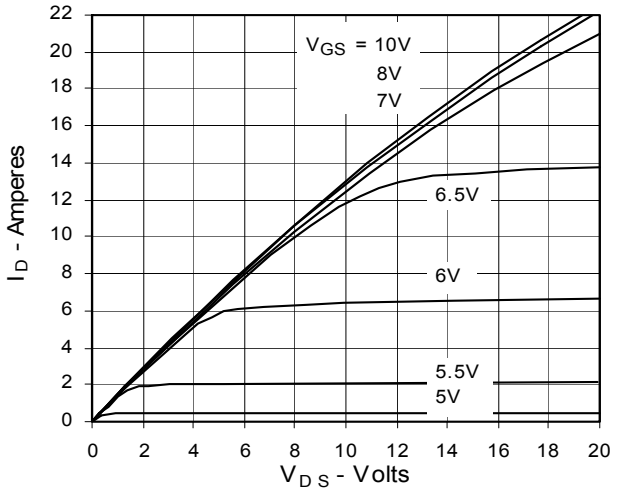


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 11A Value vs. Junction Temperature

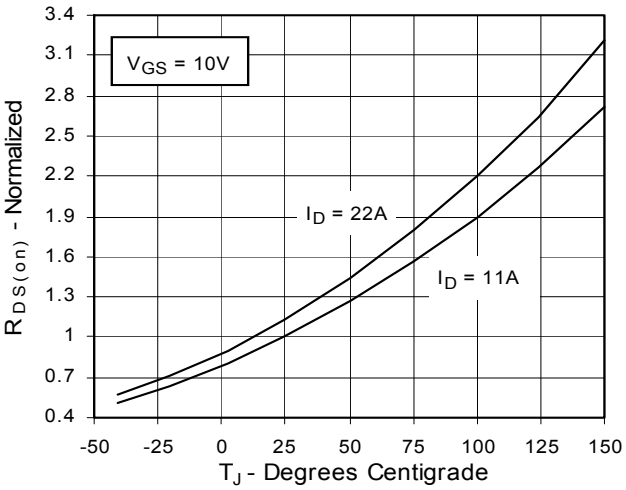


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 11A Value vs. Drain Current

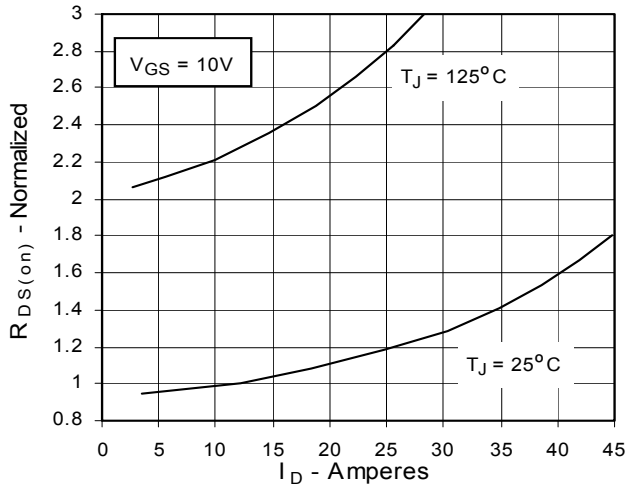
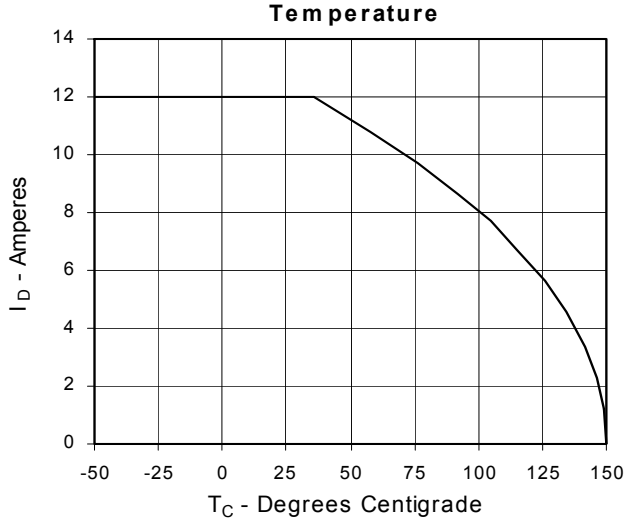


Fig. 6. Drain Current vs. Case Temperature



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Fig. 7. Input Admittance

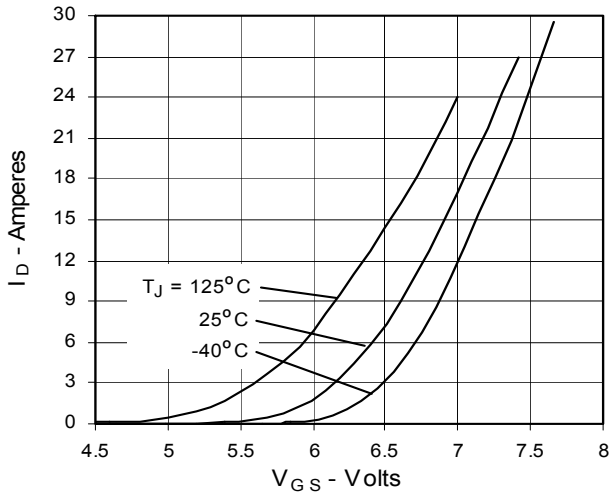


Fig. 8. Transconductance

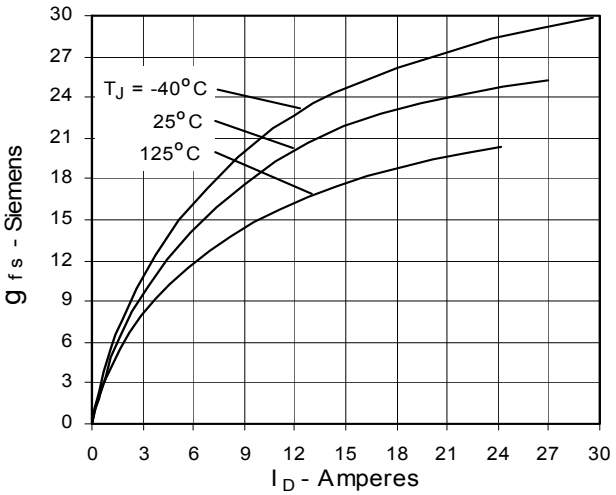


Fig. 9. Source Current vs. Source-To-Drain Voltage

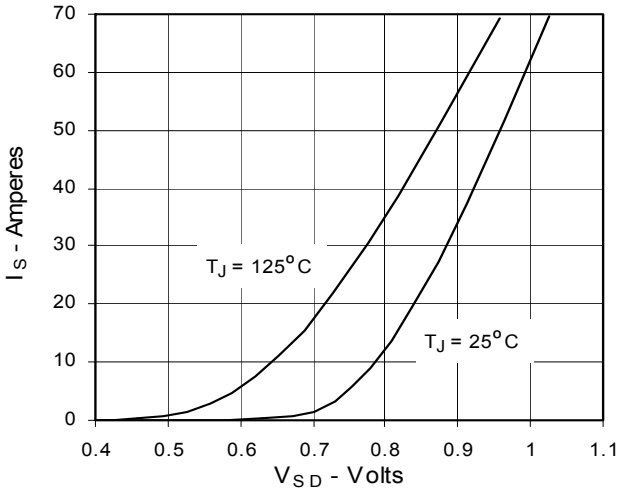


Fig. 10. Gate Charge

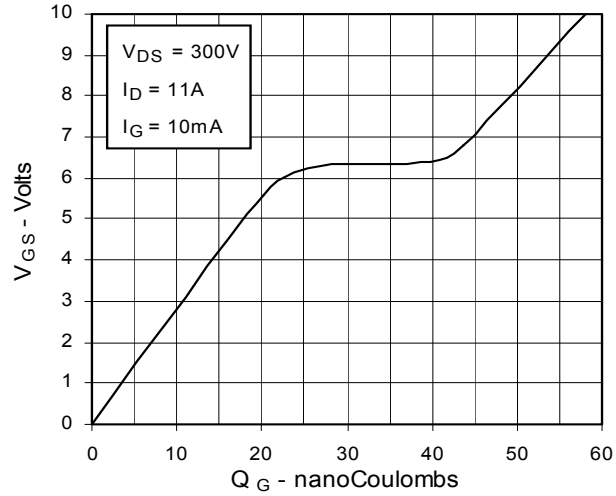


Fig. 11. Capacitance

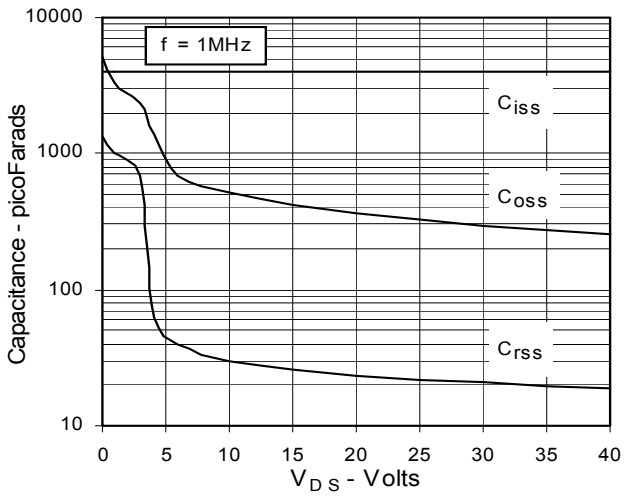
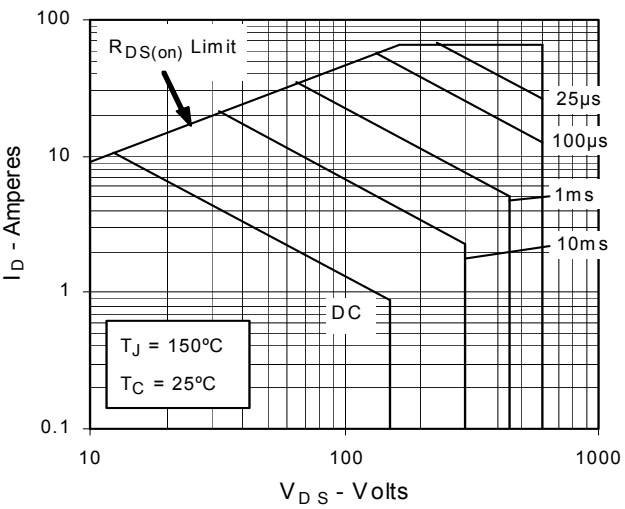
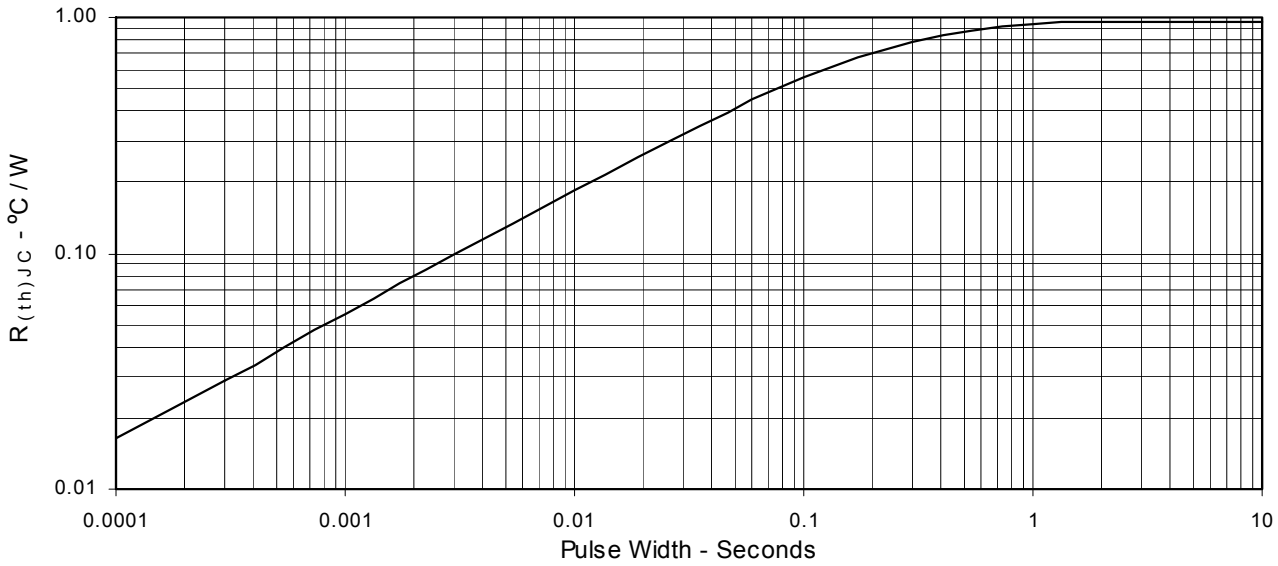


Fig. 12. Forward-Bias Safe Operating Area



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Fig. 13. Maximum Transient Thermal Resistance



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