

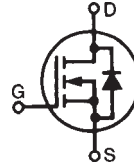
# PolarHV™ HiPerFET IXFC 16N50P

## Power MOSFET

### ISOPLUS220™

(Electrically Isolated Back Surface)

N-Channel Enhancement Mode  
Fast Intrinsic Diode  
Avalanche Rated

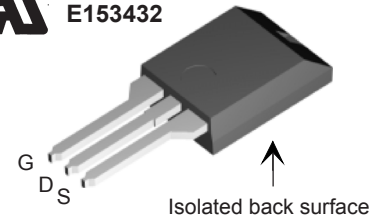


$$\begin{aligned} V_{DSS} &= 500 \text{ V} \\ I_{D25} &= 10 \text{ A} \\ R_{DS(on)} &\leq 450 \text{ m}\Omega \\ t_{rr} &\leq 200 \text{ ns} \end{aligned}$$

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

ISOPLUS220™ (IXFC)

E153432



G = Gate  
S = Source  
D = Drain

#### 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)

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$	500		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 2.5 \text{ mA}$	3.0		5.5 V
$I_{GSS}$	$V_{GS} = \pm 30 \text{ V}$ , $V_{DS} = 0 \text{ V}$			$\pm 100 \text{ nA}$
$I_{DSS}$	$V_{DS} = V_{DSS}$ $V_{GS} = 0 \text{ V}$ $T_J = 125^\circ\text{C}$			5 $\mu\text{A}$
				50 $\mu\text{A}$
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$ , $I_D = I_T$ (Note 1) Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2\%$			450 $\text{m}\Omega$

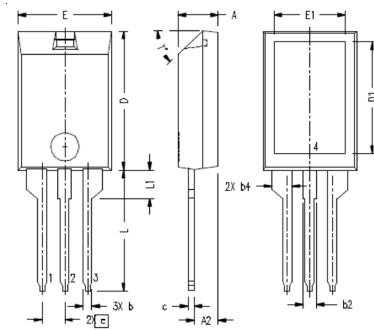
Symbol	Test Conditions	Characteristic Values		
		$(T_J = 25^\circ\text{C}$ unless otherwise specified)		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = 20\text{ V}$ ; $I_D = I_T$ , pulse test	9	16	S
$C_{iss}$	$V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$		2250	pF
$C_{oss}$			240	pF
$C_{rss}$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

### Source-Drain Diode

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

Note 1: Test Current  $I_T = 8\text{ A}$

### ISOPLUS220™ (IXFC) Outline

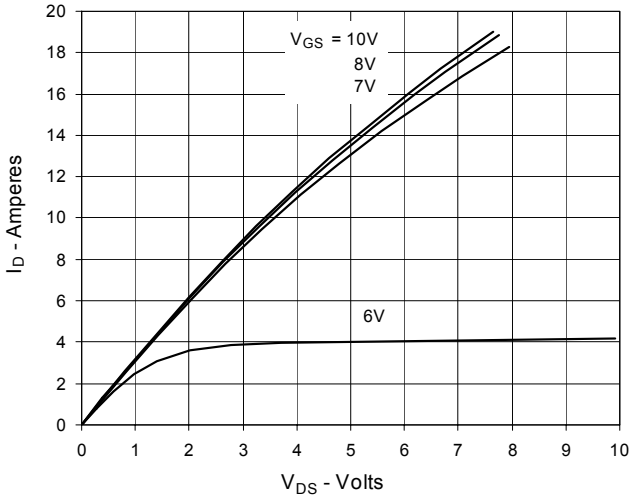


Note:  
Bottom heatsink (Pin 4) is electrically isolated from Pin 1, 2, or 3.

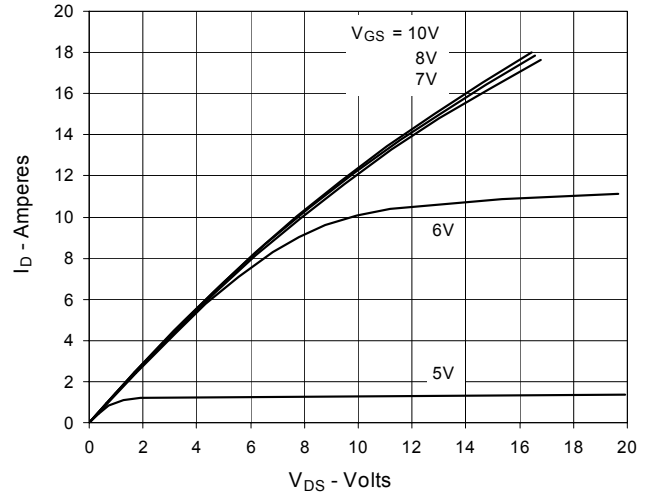
SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.157	.197	4.00	5.00
A2	.098	.118	2.50	3.00
b	.035	.051	0.90	1.30
b2	.049	.065	1.25	1.65
b4	.093	.100	2.35	2.55
c	.028	.039	0.70	1.00
D	.591	.630	15.00	16.00
D1	.472	.512	12.00	13.00
E	.394	.433	10.00	11.00
E1	.295	.335	7.50	8.50
e	.100 BASIC		2.55 BASIC	
L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

Ref: IXYS CO 0177 R0

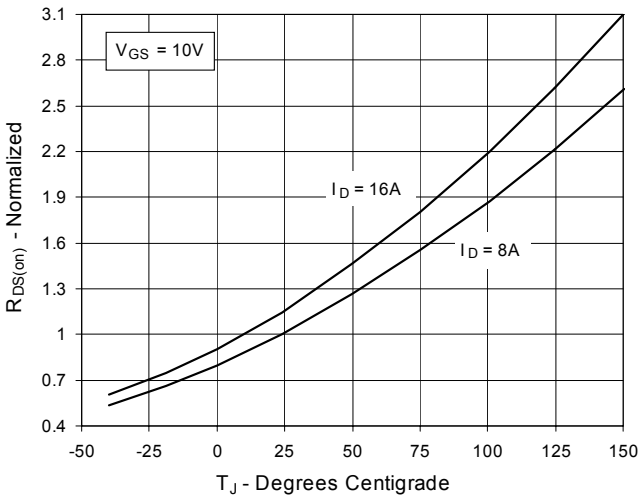
**Fig. 1. Output Characteristics @ 25°C**



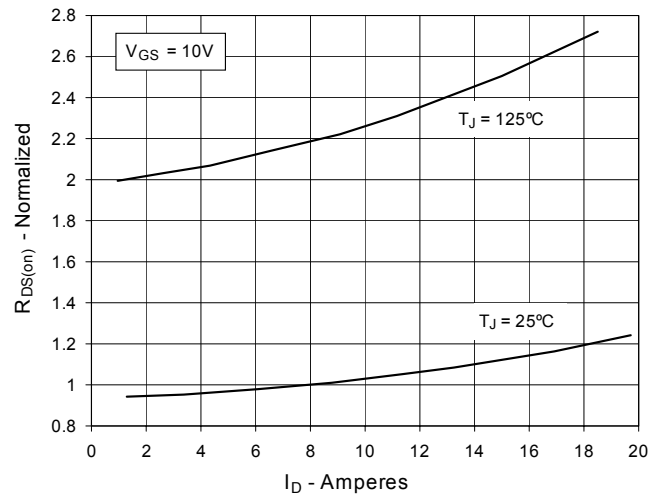
**Fig. 2. Output Characteristics @ 125°C**



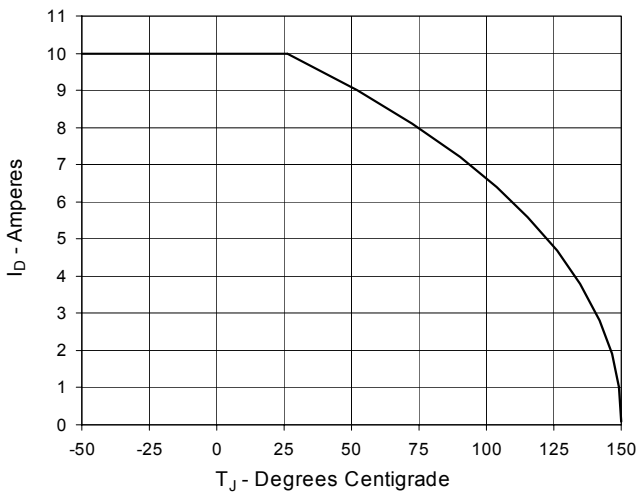
**Fig. 3.  $R_{DS(on)}$  Normalized to  $I_D = 8A$  vs. Junction Temperature**



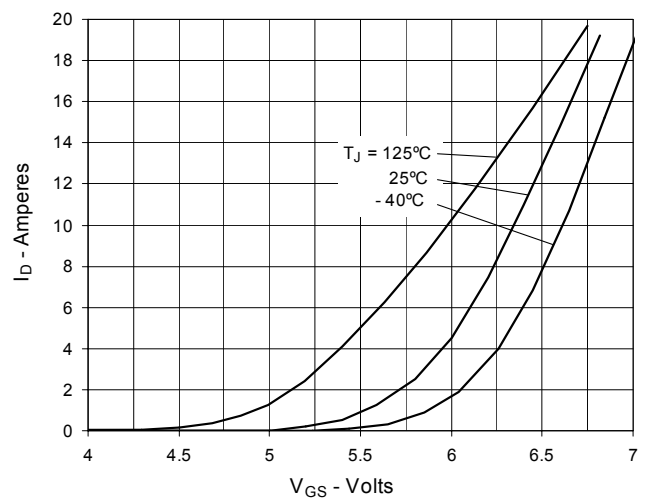
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 8A$  vs. Drain Current**



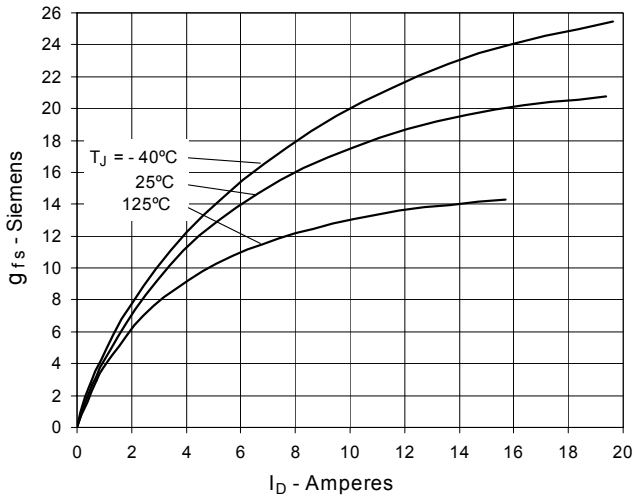
**Fig. 5. Maximum Drain Current vs. Case Temperature**



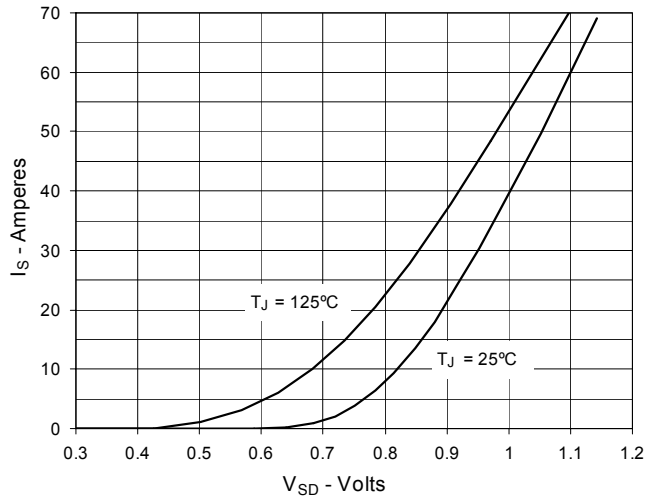
**Fig. 6. Input Admittance**



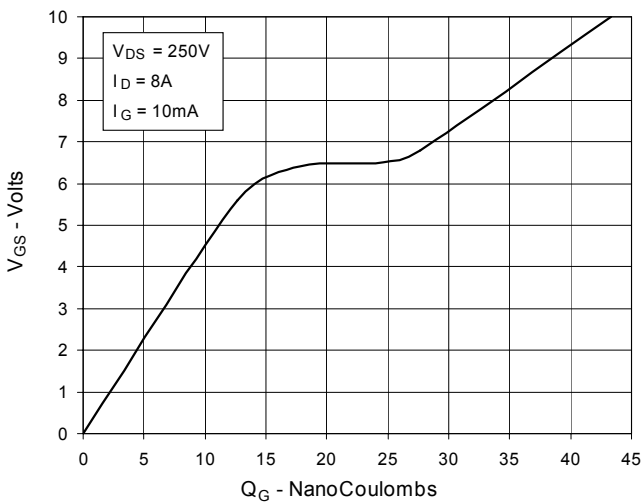
**Fig. 7. Transconductance**



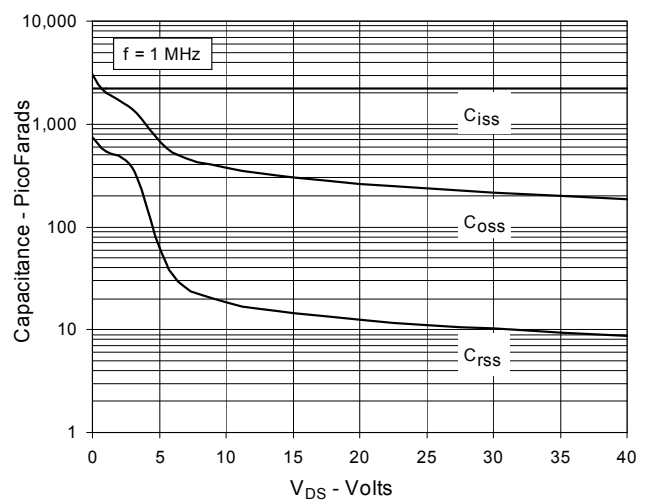
**Fig. 8. Forward Voltage Drop of Intrinsic Diode**



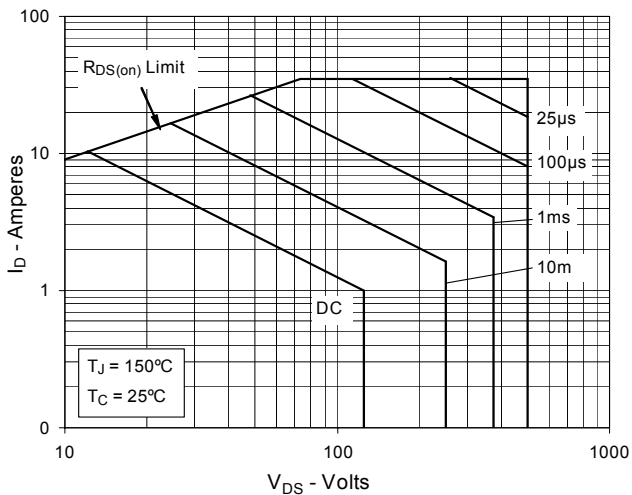
**Fig. 9. Gate Charge**



**Fig. 10. Capacitance**



**Fig. 11. Forward-Bias Safe Operating Area**



**Fig. 12. Maximum Transient Thermal Resistance**

