

# PolarHV™ HiPerFET Power MOSFET

## IXFC 16N50P

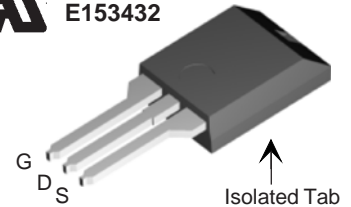
$$\begin{aligned} V_{DSS} &= 500 \text{ V} \\ I_{D25} &= 10 \text{ A} \\ R_{DS(on)} &= 450 \text{ m}\Omega \\ t_{rr} &= 200 \text{ ns} \end{aligned}$$

Electrically Isolated Tab,  
N-Channel Enhancement Mode,  
Fast Intrinsic Diode  
Avalanche Rated



Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $175^\circ\text{C}$	500	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $175^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$	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 $T_{JM}$	50	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
$P_D$	$T_C = 25^\circ\text{C}$	300	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 Plastic body for 10 s	300 250	$^\circ\text{C}$ $^\circ\text{C}$
$V_{ISOL}$	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      D = Drain  
S = Source      TAB = Drain

### Features

- Silicon chip on Direct-Copper-Bond substrate
  - High power dissipation
  - Isolated mounting surface
  - 2500V electrical isolation
- Low drain to tab capacitance (<30pF)
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
  - easy to drive and to protect

### Advantages

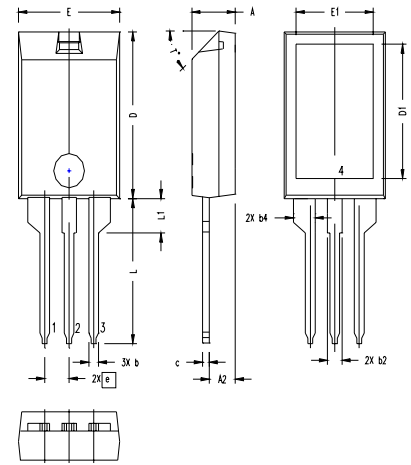
- Easy to mount
- Space savings
- High power density

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
$V_{DSS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$	500		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 1 \text{ mA}$	3.0		5.5 V
$I_{GSS}$	$V_{GS} = \pm 30 \text{ V}_{DC}$ , $V_{DS} = 0$			$\pm 100 \text{ nA}$
$I_{DSS}$	$V_{DS} = V_{DSS}$ $V_{GS} = 0 \text{ V}$ $T_J = 125^\circ\text{C}$			5 $\mu\text{A}$ 50 $\mu\text{A}$
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$ , $I_D = 0.5 I_{D25}$ Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2 \%$			450 $\text{m}\Omega$

Symbol	Test Conditions	Characteristic Values		
		(T <sub>J</sub> = 25°C, unless otherwise specified)		
		Min.	Typ.	Max.
<b>g<sub>fs</sub></b>	V <sub>DS</sub> = 20 V; I <sub>D</sub> = 0.5 I <sub>D25</sub> , pulse test	8	16	S
<b>C<sub>iss</sub></b> <b>C<sub>oss</sub></b> <b>C<sub>rss</sub></b>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz		2250	pF
			240	pF
			12	pF
<b>t<sub>d(on)</sub></b> <b>t<sub>r</sub></b> <b>t<sub>d(off)</sub></b> <b>t<sub>f</sub></b>	V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0.5 V <sub>DSS</sub> , I <sub>D</sub> = I <sub>D25</sub> R <sub>G</sub> = 18 Ω (External)		23	ns
			25	ns
			70	ns
			22	ns
<b>Q<sub>g(on)</sub></b> <b>Q<sub>gs</sub></b> <b>Q<sub>gd</sub></b>	V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0.5 V <sub>DSS</sub> , I <sub>D</sub> = 0.5 I <sub>D25</sub>		43	nC
			15	nC
			12	nC
<b>R<sub>thJC</sub></b> <b>R<sub>thCK</sub></b>	(ISOPLUS220)		0.21	1.25 K/W K/W

Symbol	Test Conditions	Characteristic Values			
		(T <sub>J</sub> = 25°C, unless otherwise specified)			
		Min.	typ.	Max.	
<b>I<sub>S</sub></b>	V <sub>GS</sub> = 0 V			16 A	
<b>I<sub>SM</sub></b>	Repetitive			35 A	
<b>V<sub>SD</sub></b>	I <sub>F</sub> = I <sub>S</sub> , V <sub>GS</sub> = 0 V, Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 %			1.5 V	
<b>t<sub>rr</sub></b> <b>I<sub>RM</sub></b> <b>Q<sub>RM</sub></b>	I <sub>F</sub> = 16 A, -di/dt = 100 A/μs V <sub>R</sub> = 100 V		130	200 ns	
				6	A
				0.6	μC

### ISOPLUS220 Outline



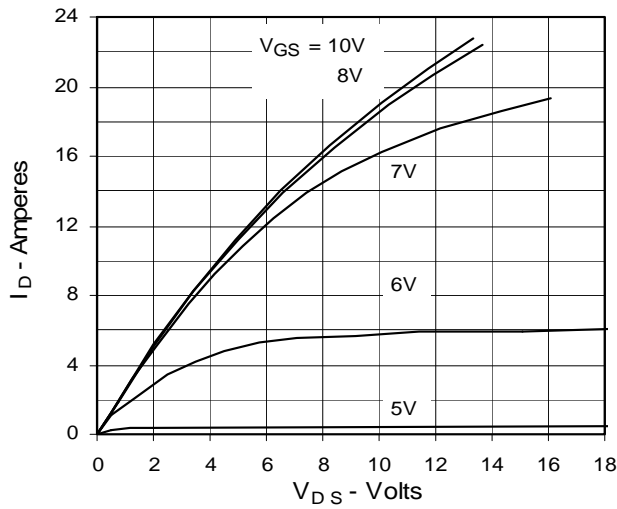
SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.157	.197	4.00	5.00
A2	.098	.118	2.50	3.00
b	.035	.051	0.90	1.30
b2	.049	.065	1.25	1.65
b4	.093	.100	2.35	2.55
c	.028	.039	0.70	1.00
D	.591	.630	15.00	16.00
D1	.472	.512	12.00	13.00
E	.394	.433	10.00	11.00
E1	.295	.335	7.50	8.50
e	.100 BASIC		2.55 BASIC	
L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

- NOTE:  
 1. Bottom heatsink (Pin 4) is electrically isolated from Pin 1, 2, or 3.  
 2. This drawing will meet dimensional requirement of JEDEC SS Product Outline TO-273 except D and D1 dimension.

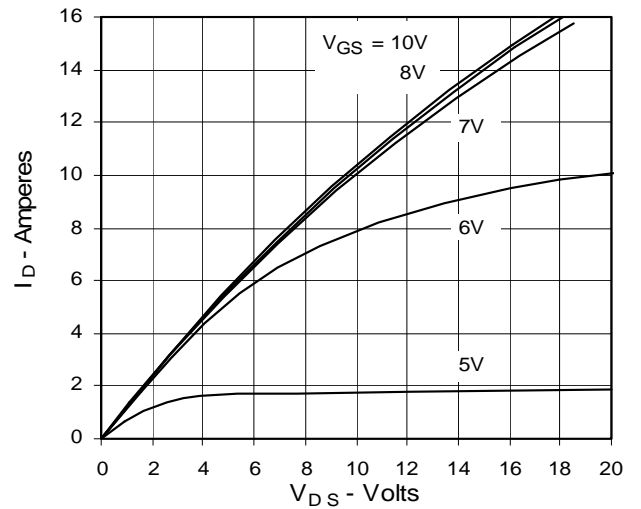
IXYS reserves the right to change limits, test conditions, and dimensions.

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
	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
	4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	

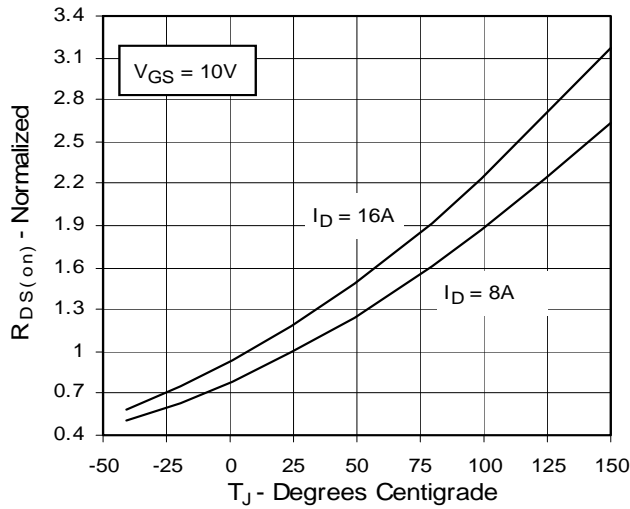
**Fig. 1. Output Characteristics @ 25°C**



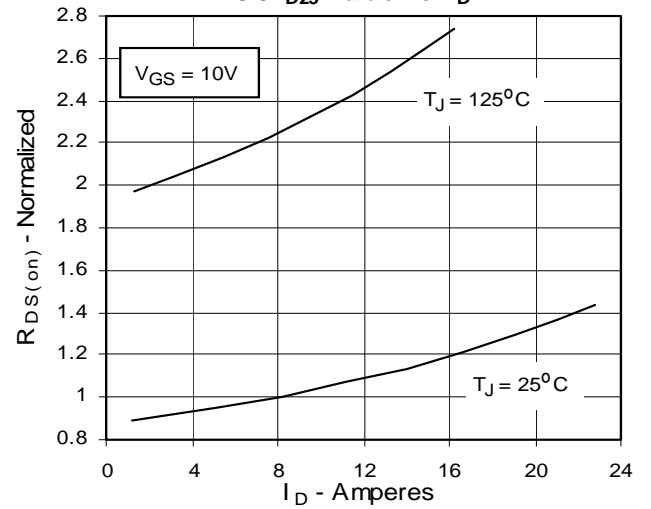
**Fig. 2. Output Characteristics @ 125°C**



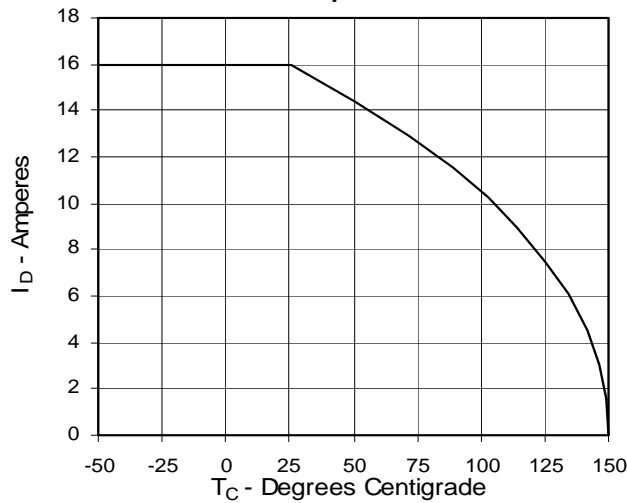
**Fig. 3.  $R_{DS(on)}$  Normalized to 0.5  $I_{D25}$  Value vs. Junction Temperature**



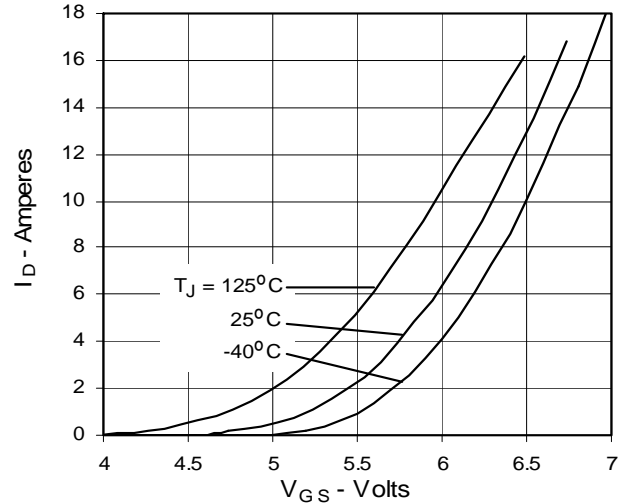
**Fig. 4.  $R_{DS(on)}$  Normalized to 0.5  $I_{D25}$  Value vs.  $I_D$**



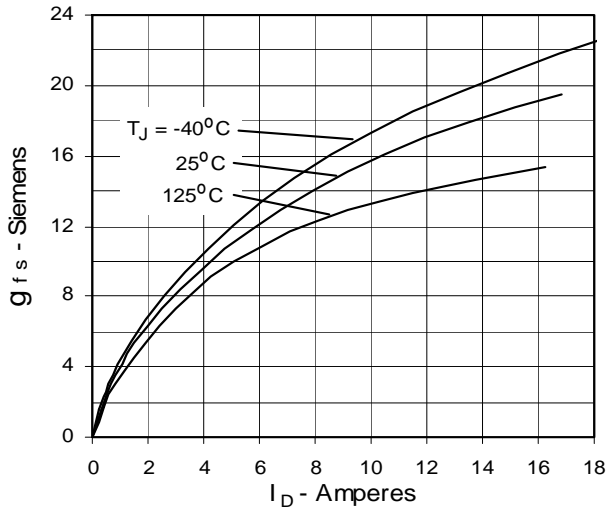
**Fig. 5. Drain Current vs. Case Temperature**



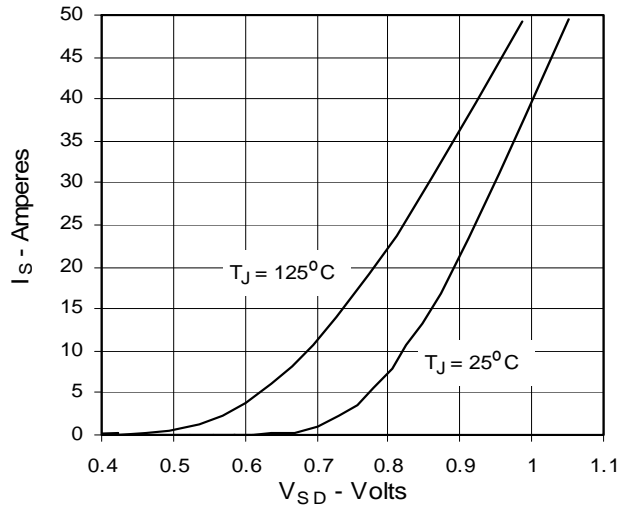
**Fig. 6. Input Admittance**



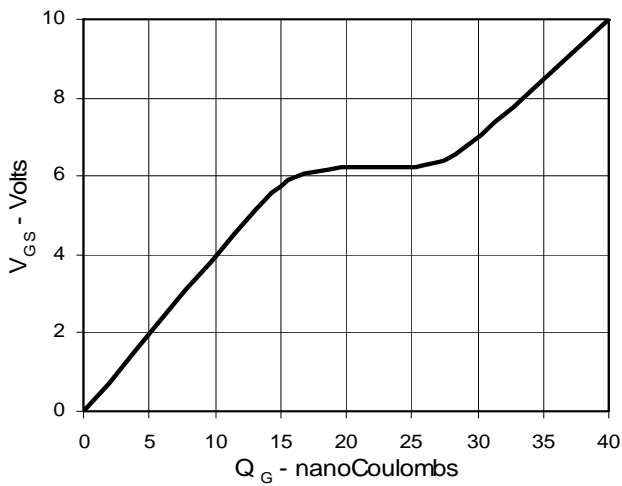
**Fig. 7. Transconductance**



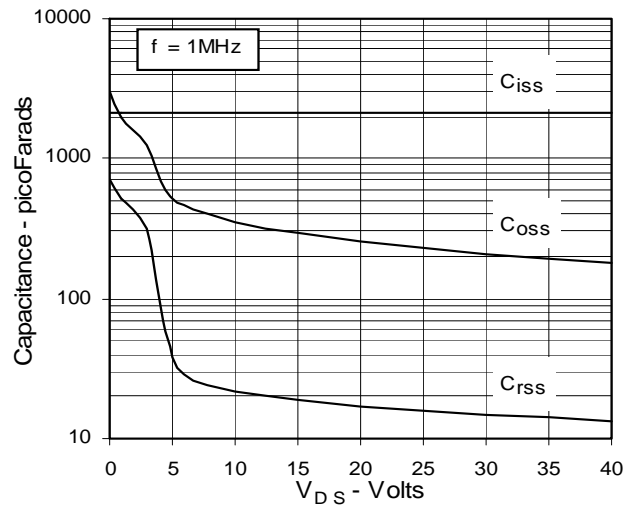
**Fig. 8. Source Current vs. Source-To-Drain Voltage**



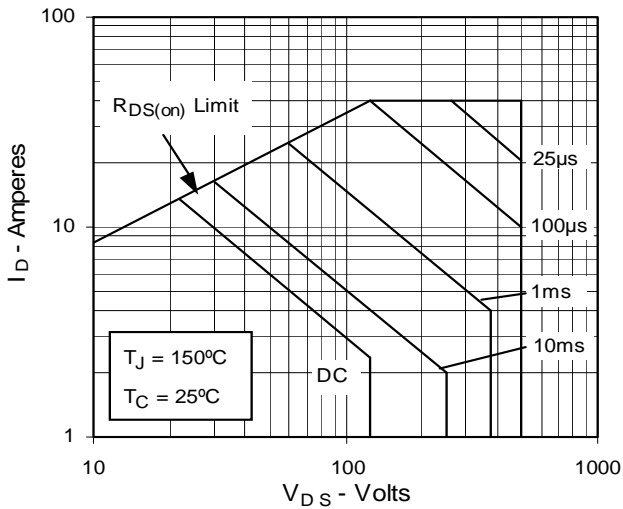
**Fig. 10. Gate Charge**



**Fig. 10. Capacitance**



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



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

