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[IXFC12N80P](#)

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## Advance Technical Information

# PolarHV™ HiPerFET IXFC 12N80P

## Power MOSFET

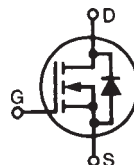
### ISOPLUS220™

(Electrically Isolated Back Surface)

N-Channel Enhancement Mode

Fast Intrinsic Diode

Avalanche Rated



$$V_{DSS} = 800 \text{ V}$$

$$I_{D25} = 7 \text{ A}$$

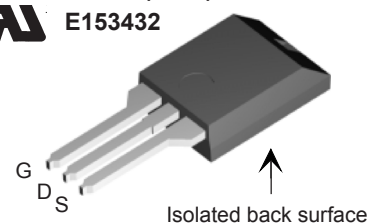
$$R_{DS(on)} \leq 0.93 \text{ m}\Omega$$

$$t_{rr} \leq 250 \text{ ns}$$

Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	800	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$	800	V
$V_{GS}$	Continuous	$\pm 30$	V
$V_{GSM}$	Transient	$\pm 40$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	7	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	36	A
$I_{AR}$	$T_C = 25^\circ\text{C}$	6	A
$E_{AR}$	$T_C = 25^\circ\text{C}$	30	mJ
$E_{AS}$	$T_C = 25^\circ\text{C}$	1.0	J
$dv/dt$	$I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ , $R_G = 10 \Omega$	10	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	120	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  
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)

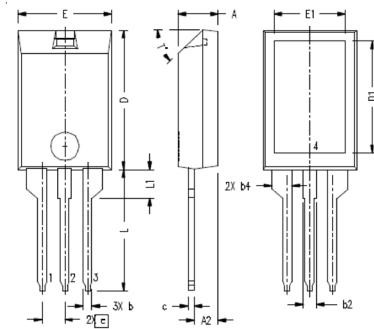
Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$	800		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 2.5 \text{ mA}$	3.0		5.5 V
$I_{GSS}$	$V_{GS} = \pm 30 \text{ V}$ , $V_{DS} = 0 \text{ V}$			$\pm 100 \text{ nA}$
$I_{DSS}$	$V_{DS} = V_{DSS}$ $V_{GS} = 0 \text{ V}$ $T_J = 125^\circ\text{C}$			25 $\mu\text{A}$ 750 $\mu\text{A}$
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$ , $I_D = I_T$ (Note 1) Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2\%$			0.93 $\text{m}\Omega$

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> = I <sub>T</sub> , pulse test	12	18	S
<b>C<sub>iss</sub></b>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz		2800	pF
<b>C<sub>oss</sub></b>			210	pF
<b>C<sub>rss</sub></b>			19	pF
<b>t<sub>d(on)</sub></b>	V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0.5 V <sub>DSS</sub> , I <sub>D</sub> = I <sub>T</sub> R <sub>G</sub> = 10 Ω (External)		21	ns
<b>t<sub>r</sub></b>			22	ns
<b>t<sub>d(off)</sub></b>			62	ns
<b>t<sub>f</sub></b>			22	ns
<b>Q<sub>g(on)</sub></b>	V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0.5 V <sub>DSS</sub> , I <sub>D</sub> = I <sub>T</sub>		51	nC
<b>Q<sub>gs</sub></b>			13	nC
<b>Q<sub>gd</sub></b>			19	nC
<b>R<sub>thJC</sub></b>			1.05	°C/W
<b>R<sub>thCS</sub></b>		0.21		°C/W

Source-Drain Diode		Characteristic Values (T <sub>J</sub> = 25° C unless otherwise specified)		
Symbol	Test Conditions	Min.	Typ.	Max.
<b>I<sub>S</sub></b>	V <sub>GS</sub> = 0 V			12 A
<b>I<sub>SM</sub></b>	Repetitive			36 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>	I <sub>F</sub> = 12 A, -di/dt = 100 A/μs V <sub>R</sub> = 100 V, V <sub>GS</sub> = 0 V			250 ns
<b>I<sub>RM</sub></b>			7	A
<b>Q<sub>RM</sub></b>			0.7	μC

Note 1: Test Current I<sub>T</sub> = 6 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

**ADVANCE TECHNICAL INFORMATION**

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated objective result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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IXYS MOSFETs and IGBTs are covered by	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
one or more of the following U.S. patents:	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