

# PolarHV™ HiPerFET IXFP7N80PM

## Power MOSFET

(Electrically Isolated Tab)

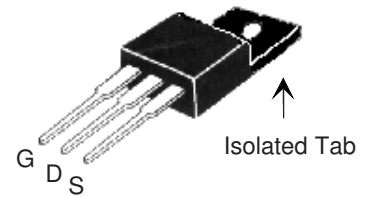
$V_{DSS} = 800 \text{ V}$   
 $I_{D25} = 3.5 \text{ A}$   
 $R_{DS(on)} \leq 1.44 \text{ } \Omega$   
 $t_{rr} \leq 250 \text{ ns}$

N-Channel Enhancement Mode  
 Avalanche Rated  
 Fast Intrinsic Diode



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
$V_{GSS}$	Continuous	$\pm 30$	V
$V_{GSM}$	Transient	$\pm 40$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	3.5	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	18	A
$I_{AR}$	$T_C = 25^\circ\text{C}$	4	A
$E_{AR}$	$T_C = 25^\circ\text{C}$	20	mJ
$E_{AS}$	$T_C = 25^\circ\text{C}$	300	mJ
$dv/dt$	$I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ , $R_G = 10 \text{ } \Omega$	10	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	50	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	$^\circ\text{C}$
$M_d$	Mounting torque	1.13/10	Nm/lb.in.
<b>Weight</b>		3.0	g

OVERMOLDED TO-220  
 (IXTP...M) OUTLINE



G = Gate      D = Drain  
 S = Source

### Features

- Plastic overmolded tab for electrical isolation
- Fast intrinsic diode
- International standard package
- 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	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 250 \text{ } \mu\text{A}$	800		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 1 \text{ mA}$	3.0		5.0 V
$I_{GSS}$	$V_{GS} = \pm 30 \text{ V}$ , $V_{DS} = 0 \text{ V}$			$\pm 100 \text{ nA}$
$I_{DSS}$	$V_{DS} = V_{DSS}$ $V_{GS} = 0 \text{ V}$			25 $\mu\text{A}$ 500 $\mu\text{A}$
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$ , $I_D = 3.5 \text{ A}$ Note 1			1.44 $\Omega$

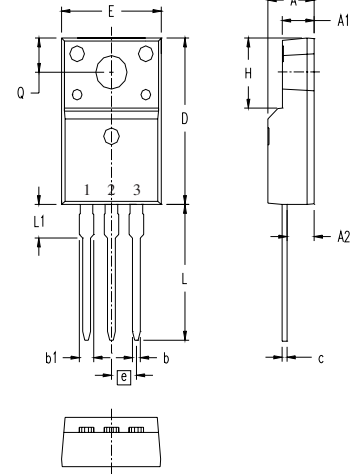
Symbol	Test Conditions	Characteristic Values		
		(T <sub>J</sub> = 25°C, unless otherwise specified)		
		Min.	Typ.	Max.
<b>g<sub>fs</sub></b>	V <sub>DS</sub> = 20 V; I <sub>D</sub> = 3.5 A, Note 1	5	9.5	S
<b>C<sub>iss</sub></b>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz		1890	pF
<b>C<sub>oss</sub></b>			133	pF
<b>C<sub>rss</sub></b>			13	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> = 4 A R <sub>G</sub> = 10 Ω (External)		28	ns
<b>t<sub>r</sub></b>			32	ns
<b>t<sub>d(off)</sub></b>			55	ns
<b>t<sub>f</sub></b>			24	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> = 6 A		32	nC
<b>Q<sub>gs</sub></b>			12	nC
<b>Q<sub>gd</sub></b>			9	nC
<b>R<sub>thJC</sub></b>				2.5 °C/W

### Source-Drain Diode

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			7 A
<b>I<sub>SM</sub></b>	Repetitive			18 A
<b>V<sub>SD</sub></b>	I <sub>F</sub> = I <sub>S</sub> , V <sub>GS</sub> = 0 V, Note 1			1.5 V
<b>t<sub>rr</sub></b>	I <sub>F</sub> = 7 A, -di/dt = 100 A/μs, V <sub>R</sub> = 100 V, V <sub>GS</sub> = 0 V			250 ns
<b>Q<sub>RM</sub></b>			0.3	μC
<b>I<sub>RM</sub></b>			3	A

Notes: 1) Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 %

### ISOLATED TO-220 (IXFP...M)



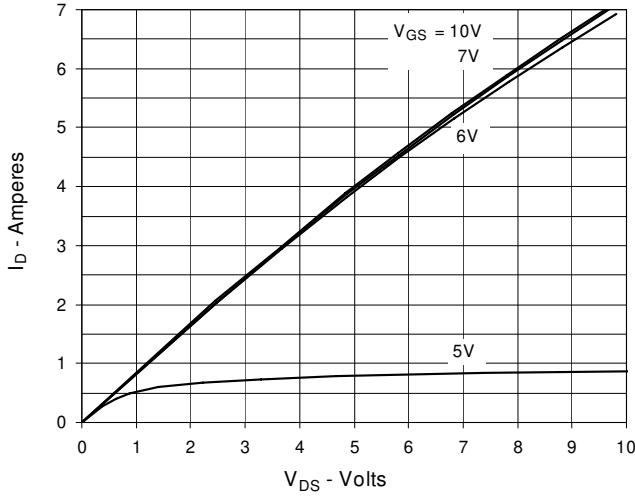
Terminals: 1 - Gate  
2 - Drain (Collector)  
3 - Source (Emitter)

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.177	.193	4.50	4.90
A1	.092	.108	2.34	2.74
A2	.101	.117	2.56	2.96
b	.028	.035	0.70	0.90
b1	.050	.058	1.27	1.47
c	.018	.024	0.45	0.60
D	.617	.633	15.67	16.07
E	.392	.408	9.96	10.36
e	.100 BSC		2.54 BSC	
H	.255	.271	6.48	6.88
L	.499	.523	12.68	13.28
L1	.119	.135	3.03	3.43
∅P	.121	.129	3.08	3.28
Q	.126	.134	3.20	3.40

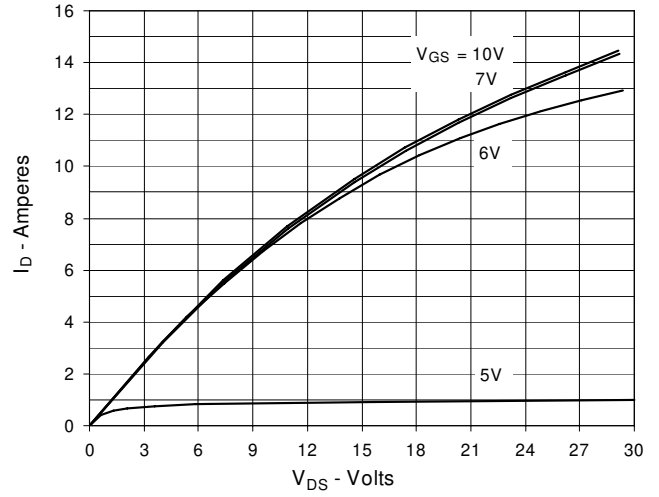
IXYS reserves the right to change limits, test conditions, and dimensions.

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	7,005,734 B2
	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

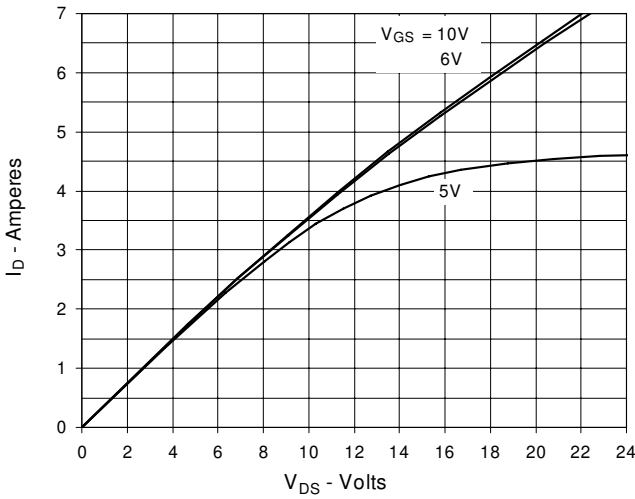
**Fig. 1. Output Characteristics @ 25°C**



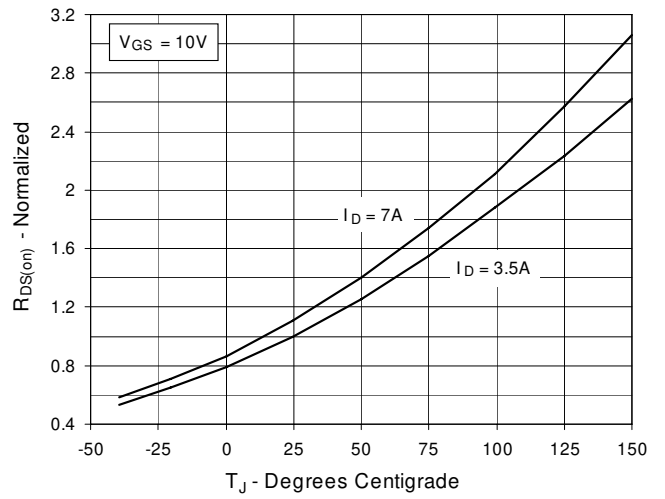
**Fig. 2. Extended Output Characteristics @ 25°C**



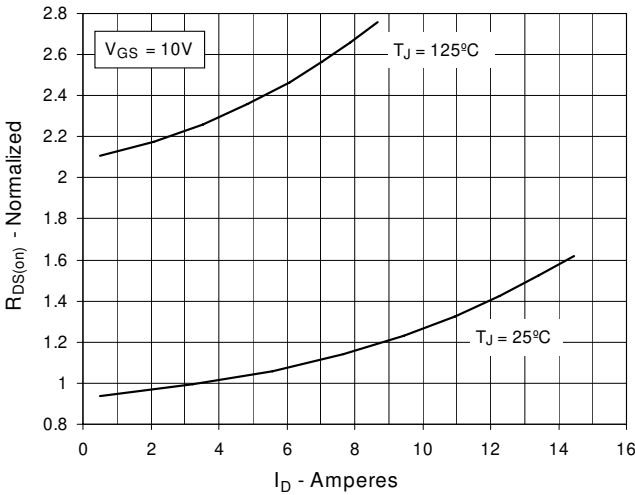
**Fig. 3. Output Characteristics @ 125°C**



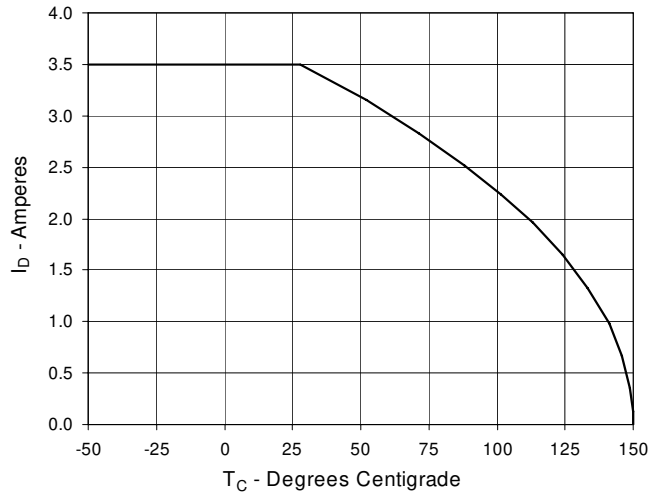
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 3.5A$  Value vs. Junction Temperature**



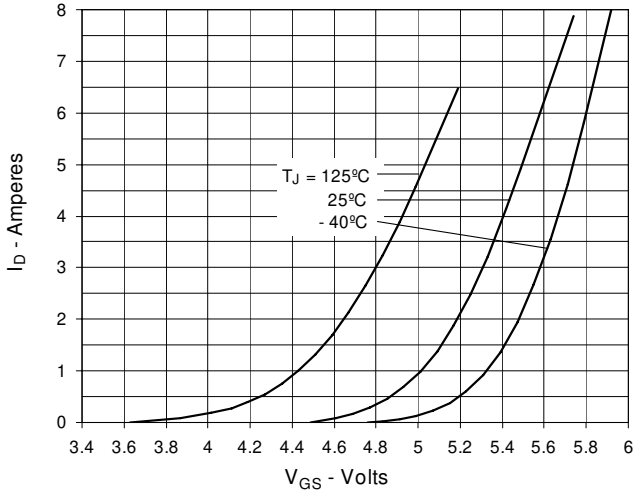
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 3.5A$  Value vs. Drain Current**



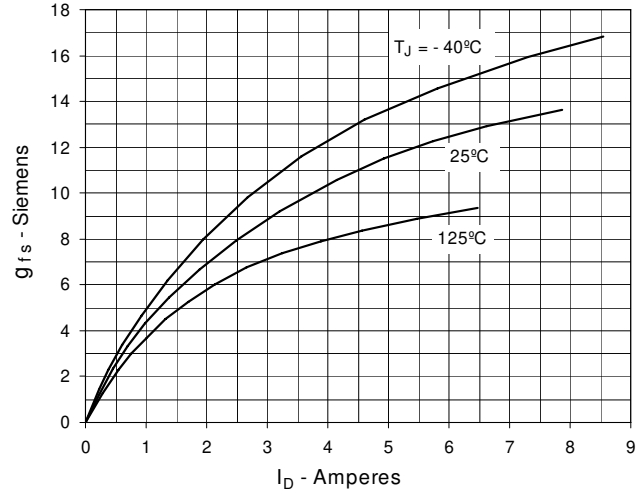
**Fig. 6. Maximum Drain Current vs. Case Temperature**



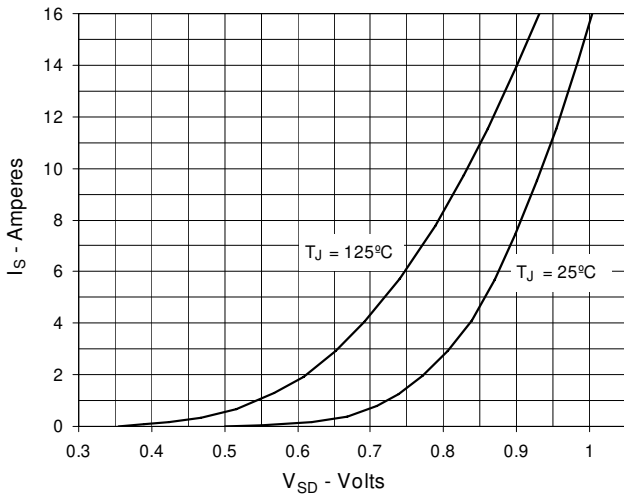
**Fig. 7. Input Admittance**



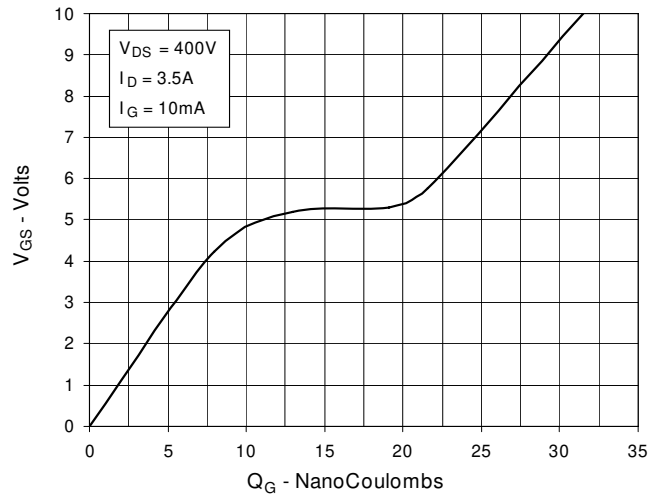
**Fig. 8. Transconductance**



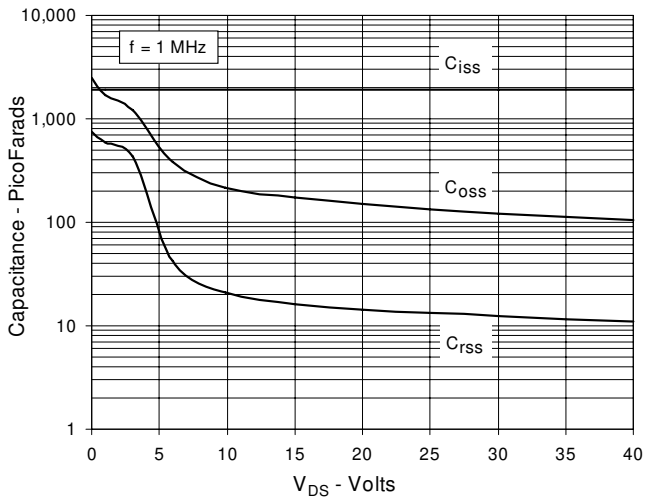
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



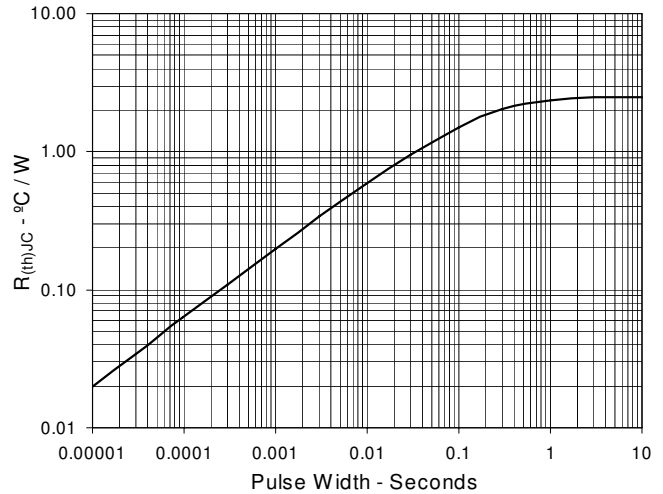
**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



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





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