

# PolarHV™ HiPerFET IXFP 3N50PM

## Power MOSFET

(Electrically Isolated Tab)

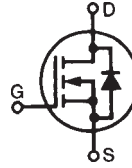
$$V_{DSS} = 500 \text{ V}$$

$$I_{D25} = 2.7 \text{ A}$$

$$R_{DS(on)} \leq 2.0 \text{ } \Omega$$

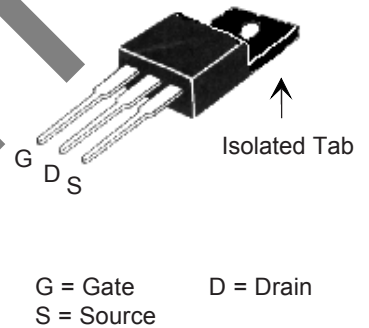
$$t_{rr} \leq 200 \text{ ns}$$

N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode



Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	500	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$	500	V
$V_{GSS}$	Continuous	$\pm 30$	V
$V_{GSM}$	Transient	$\pm 40$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	2.7	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	8	A
$I_{AR}$	$T_C = 25^\circ\text{C}$	3	A
$E_{AR}$	$T_C = 25^\circ\text{C}$	10	mJ
$E_{AS}$	$T_C = 25^\circ\text{C}$	100	mJ
$dv/dt$	$I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ , $R_G = 50 \text{ } \Omega$	10	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	36	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.
Weight		4	g

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



### 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

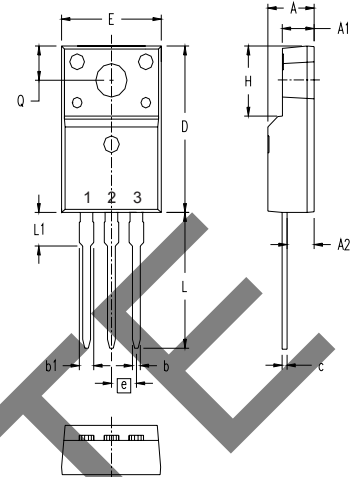
Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 250 \text{ } \mu\text{A}$	500		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250 \text{ } \mu\text{A}$	3.0		5.5 V
$I_{GSS}$	$V_{GS} = \pm 30 \text{ V}_{DC}$ , $V_{DS} = 0$			$\pm 100 \text{ nA}$
$I_{DSS}$	$V_{DS} = V_{DSS}$ $V_{GS} = 0 \text{ V}$ $T_J = 125^\circ\text{C}$			5 $\mu\text{A}$ 200 $\mu\text{A}$
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$ , $I_D = 1.8 \text{ A}$ Note 1			2.0 $\Omega$

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = 10\text{ V}; I_D = 1.8\text{ A}$ , Note 1		3.5	S
$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		409	pF
$C_{oss}$			48	pF
$C_{rss}$			6.1	pF
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 3.6\text{ A}$ $R_G = 50\ \Omega$ (External)		25	ns
$t_r$			28	ns
$t_{d(off)}$			63	ns
$t_f$			29	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 1.8$		9.3	nC
$Q_{gs}$			3.3	nC
$Q_{gd}$			3.4	nC
$R_{thJC}$			3.5	$^\circ\text{C/W}$

**Source-Drain Diode**

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ unless otherwise specified)		
		Min.	Typ.	Max.
$I_S$	$V_{GS} = 0\text{ V}$			3.6 A
$I_{SM}$	Repetitive			5 A
$V_{SD}$	$I_F = I_S, V_{GS} = 0\text{ V}$ , Note 1			1.5 V
$t_{rr}$	$I_F = 3.6\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 100\text{ V}, V_{GS} = 0\text{ V}$			200 ns
$Q_{RM}$			0.1	$\mu\text{C}$
$I_{RM}$			0.5	A

- Notes:
- 1) Pulse test,  $t \leq 300\ \mu\text{s}$ , duty cycle  $d \leq 2\%$
  - 2) Test current  $I_T = 2.5\text{ A}$

**ISOLATED TO-220 (IXTP...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
$\varnothing P$	.121	.129	3.08	3.28
Q	.126	.134	3.20	3.40

**PRELIMINARY TECHNICAL INFORMATION**

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. 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
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	6,710,405B2	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	6,771,478 B2