

## X3-Class HiPerFET™ **Power MOSFET**

## IXFP72N20X3M

200V **72A**  $20m\Omega$ 

# (Electrically Isolated Tab)

N-Channel Enhancement Mode



Symbol	Test Conditions	Maximum Ratings		
V <sub>DSS</sub>	$T_J = 25^{\circ}C \text{ to } 150^{\circ}C$	200	V	
V <sub>DGR</sub>	$T_{_{\rm J}} = 25^{\circ}\text{C}$ to $150^{\circ}\text{C}$ , $R_{_{\rm GS}} = 1\text{M}\Omega$	200	V	
V <sub>GSS</sub>	Continuous	±20	V	
V <sub>GSM</sub>	Transient	±30	V	
I <sub>D25</sub>	$T_c = 25$ °C, Limited by $T_{JM}$	72	Α	
I <sub>DM</sub>	$T_{\rm C} = 25^{\circ}$ C, Pulse Width Limited by $T_{\rm JM}$	130	Α	
I <sub>A</sub>	$T_c = 25^{\circ}C$	36	Α	
E <sub>AS</sub>	$T_{c} = 25^{\circ}C$	1.2	J	
dv/dt	$I_{_{S}} \le I_{_{DM}}, V_{_{DD}} \le V_{_{DSS}}, T_{_{J}} \le 150^{\circ}C$	50	V/ns	
P <sub>D</sub>	$T_{c} = 25^{\circ}C$	36	W	
T <sub>J</sub>		-55 +150	°C	
$T_{JM}$		150	°C	
T <sub>stg</sub>		-55 +150	°C	
T <sub>L</sub>	Maximum Lead Temperature for Soldering	300	°C	
T <sub>SOLD</sub>	1.6 mm (0.062in.) from Case for 10s	260	°C	
V <sub>ISOL</sub>	50/60 Hz, 1 Minute	2500	V~	
M <sub>d</sub>	Mounting Torque	1.13 / 10	Nm/lb.in	
Weight		2.5	g	

OVERMOLDED TO-220	
$G_{D_{S}}$	Isolated Tab

G = Gate D = DrainS = Source

#### **Features**

- International Standard Package
- Plastic Overmolded Tab
- Low R<sub>DS(ON)</sub> and Q<sub>G</sub>
   Avalanche Rated
- 2500V~ Electrical Isolation
- Low Package Inductance

### **Advantages**

- High Power Density
- Easy to Mount
- Space Savings

### **Applications**

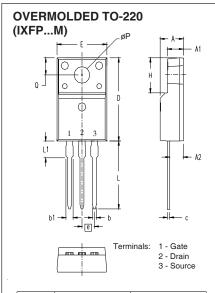
- Switch-Mode and Resonant-Mode **Power Supplies**
- DC-DC Converters
- PFC Circuits
- AC and DC Motor Drives
- Robotics and Servo Controls

SymbolTest ConditionsCharacter(T <sub>1</sub> = 25°C, Unless Otherwise Specified)Min.		teristic Values Typ.   Max.		
BV <sub>DSS</sub>	$V_{GS} = 0V, I_{D} = 250\mu A$	200		V
V <sub>GS(th)</sub>	$V_{DS} = V_{GS}$ , $I_{D} = 1.5$ mA	2.5		4.5 V
I <sub>GSS</sub>	$V_{GS} = \pm 20V, V_{DS} = 0V$			±100 nA
I <sub>DSS</sub>	$V_{DS} = V_{DSS}$ , $V_{GS} = 0V$ $T_{J} = 125^{\circ}C$			5 μA 250 μA
R <sub>DS(on)</sub>	$V_{GS} = 10V, I_{D} = 36A, Note 1$		15.7	20.0 mΩ





Symbol Test Conditions Cha		Char	racteristic Values		
$(T_{_{\rm J}} = 25^{\circ}\text{C}, \text{ Unless Otherwise Specified})$ M		Min.	Тур.	Max	
g <sub>fs</sub>	$V_{DS} = 10V, I_{D} = 0.5 \cdot I_{D25}, Note 1$	30	48	S	
$R_{gi}$	Gate Input Resistance		2	Ω	
C <sub>iss</sub>			3780	pF	
C <sub>oss</sub>	$V_{GS} = 0V, V_{DS} = 25V, f = 1MHz$		660	pF	
C <sub>rss</sub>			1.7	pF	
	Effective Output Capacitance				
$\mathbf{C}_{o(er)}$	Energy related $\int V_{GS} = 0V$		340	pF	
$C_{o(tr)}$	Time related $\int_{DS} V_{DS}^{GS} = 0.8 \cdot V_{DSS}$		1030	pF	
t <sub>d(on)</sub>	Resistive Switching Times		23	ns	
t <sub>r</sub>	$V_{GS} = 10V, V_{DS} = 0.5 \cdot V_{DSS}, I_{D} = 0.5 \cdot I_{D25}$		28	ns	
t <sub>d(off)</sub>			78	ns	
t,	$R_{\rm G} = 10\Omega \text{ (External)}$		11	ns	
Q <sub>g(on)</sub>			55	nC	
Q <sub>qs</sub>	$V_{gs} = 10V, V_{DS} = 0.5 \cdot V_{DSS}, I_{D} = 0.5 \cdot I_{D25}$		19	nC	
Q <sub>gd</sub>			15	nC	
R <sub>thJC</sub>				3.5 °C/W	
R <sub>thCS</sub>			0.50	°C/W	



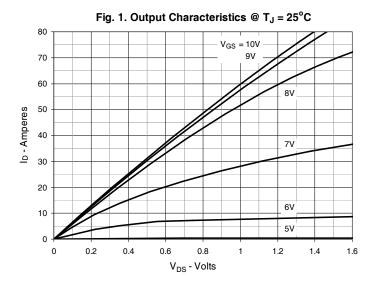
MYZ	INCHES		MILLIN	/ETERS
2114	MIN	MAX	MIN	MAX
Α	.177	.193	4.50	4.90
A1	.092	.108	2.34	2.74
A2	.101	.117	2.56	2.96
b	.028	.035	0.70	0.90
b1	.050	.058	1.27	1.47
С	.018	.024	0.45	0.60
D	.617	.633	15.67	16.07
E	.392	.408	9.96	10.36
е	.100 BSC		2.54	BSC
Н	.255	.271	6.48	6.88
L	.499	.523	12.68	13.28
L1	.119	.135	3.03	3.43
ØΡ	.121	.129	3.08	3.28
Q	.126	.134	3,20	3.40

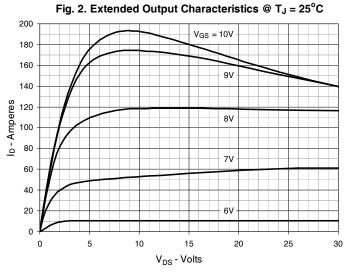
#### Source-Drain Diode

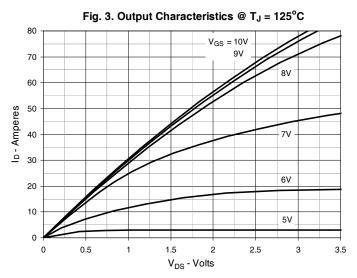
Symbol	Test Conditions	Characteristic Values			
$(T_{J} = 25^{\circ}C, l)$	Jnless Otherwise Specified)	Min.	Тур.	Max	
I <sub>s</sub>	$V_{GS} = 0V$			72	Α
sm	Repetitive, Pulse Width Limited by $T_{JM}$			288	Α
V <sub>SD</sub>	$I_F = I_S$ , $V_{GS} = 0V$ , Note 1			1.4	V
$\left. egin{array}{ll} \mathbf{t}_{rr} & \\ \mathbf{Q}_{RM} & \\ \mathbf{I}_{RM} & \end{array}  ight.  ight.$	$I_F = 36A$ , -di/dt = 100A/ $\mu$ s $V_R = 100V$		95 380 8		ns nC A

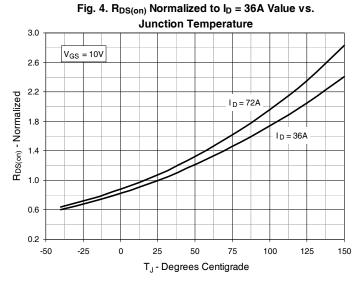
Note 1. Pulse test,  $t \le 300\mu s$ , duty cycle,  $d \le 2\%$ .

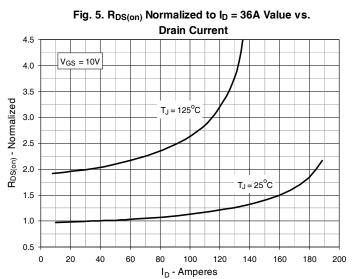












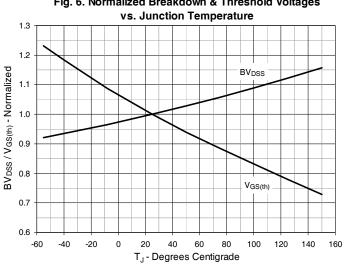
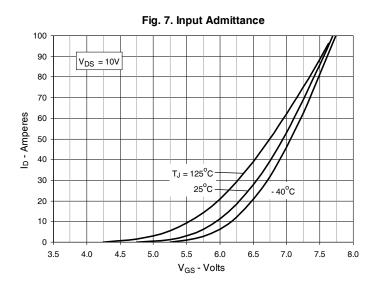
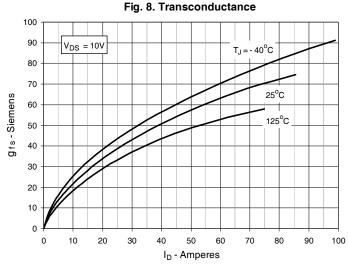
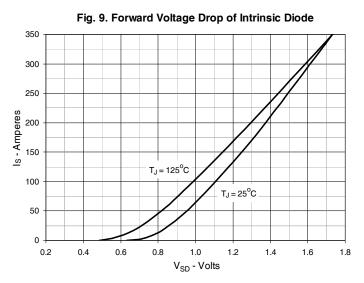


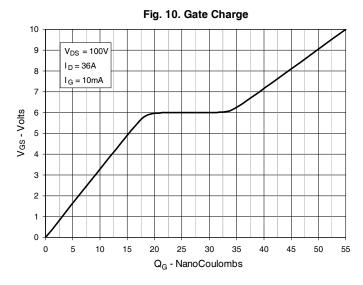
Fig. 6. Normalized Breakdown & Threshold Voltages

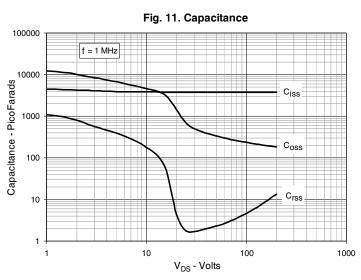


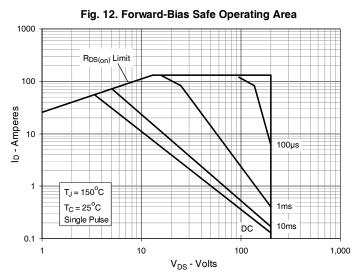




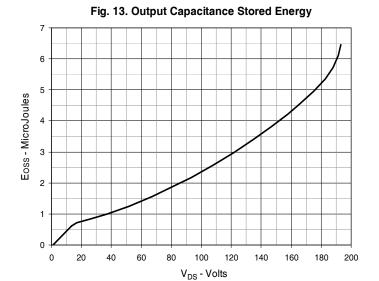


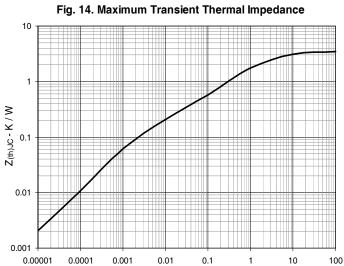






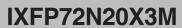
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Pulse Width - Seconds

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