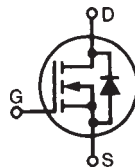


Polar™ HiPerFET™ Power MOSFET

IXFH12N90P
IXFV12N90P
IXFV12N90PS

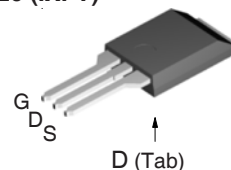
N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode



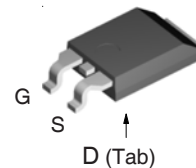
$$\begin{aligned} V_{DSS} &= 900V \\ I_{D25} &= 12A \\ R_{DS(on)} &\leq 1.0\Omega \\ t_{rr} &\leq 300ns \end{aligned}$$

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	$T_J = 25^\circ\text{C}$ to 150°C	900	V
V_{DGR}	$T_J = 25^\circ\text{C}$ to 150°C , $R_{GS} = 1M\Omega$	900	V
V_{GSS}	Continuous	± 30	V
V_{GSM}	Transient	± 40	V
I_{D25}	$T_C = 25^\circ\text{C}$	12	A
I_{DM}	$T_C = 25^\circ\text{C}$, Pulse Width Limited by T_{JM}	24	A
I_A	$T_C = 25^\circ\text{C}$	6	A
E_{AS}	$T_C = 25^\circ\text{C}$	500	mJ
dv/dt	$I_S \leq I_{DM}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ\text{C}$	15	V/ns
P_D	$T_C = 25^\circ\text{C}$	380	W
T_J		-55 ... +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		-55 ... +150	$^\circ\text{C}$
T_L	Maximum Lead Temperature for Soldering	300	$^\circ\text{C}$
T_{SOLD}	Plastic Body for 10s	260	$^\circ\text{C}$
M_d	Mounting torque (TO-247)	1.13/10	Nm/lb.in
F_C	Mounting force (PLUS220)	11..65/2.5..14.6	N/lb
Weight	TO-247	6	g
	PLUS220 types	4	g

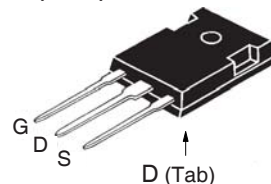
PLUS220 (IXFV)



PLUS220SMD(IXFV_S)



TO-247 (IXFH)



G = Gate D = Drain
S = Source Tab = Drain

Features

- International Standard Packages
- Avalanche Rated
- Low Package Inductance
- Fast Intrinsic Diode

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications:

- Switch-Mode and Resonant-mode Power Supplies
- DC-DC Converters
- Laser Drivers
- AC and DC Motor Drives
- Robotics and Servo Controls

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{DSS}	$V_{GS} = 0V$, $I_D = 1mA$	900		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 1mA$	3.5		6.5 V
I_{GSS}	$V_{GS} = \pm 30V$, $V_{DS} = 0V$			± 100 nA
I_{DSS}	$V_{DS} = V_{DSS}$, $V_{GS} = 0V$ $T_J = 125^\circ\text{C}$			25 μA 1 mA
$R_{DS(on)}$	$V_{GS} = 10V$, $I_D = 0.5 \cdot I_{D25}$, Note 1			1.0 Ω

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$V_{DS} = 20\text{V}$, $I_D = 0.5 \cdot I_{D25}$, Note 1	5.0	8.2	S
R_{Gi}	Gate input resistance		1.7	Ω
C_{iss}	$V_{GS} = 0\text{V}$, $V_{DS} = 25\text{V}$, $f = 1\text{MHz}$		3080	pF
C_{oss}			200	pF
C_{rss}			33	pF
$t_{d(on)}$	Resistive Switching Times $V_{GS} = 10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 0.5 \cdot I_{D25}$ $R_G = 2\Omega$ (External)		32	ns
t_r			34	ns
$t_{d(off)}$			50	ns
t_f			68	ns
$Q_{g(on)}$	$V_{GS} = 10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 0.5 \cdot I_{D25}$		56	nC
Q_{gs}			18	nC
Q_{gd}			27	nC
R_{thJC}	(TO-247, PLUS220)			0.33 $^\circ\text{C/W}$
R_{thCS}			0.25	$^\circ\text{C/W}$

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
I_S	$V_{GS} = 0\text{V}$			12 A
I_{SM}	Repetitive, pulse width limited by T_{JM}			48 A
V_{SD}	$I_F = I_S$, $V_{GS} = 0\text{V}$, Note 1			1.5 V
t_{rr}	$I_F = 6\text{A}$, $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}$, $V_{GS} = 0\text{V}$			300 ns
Q_{RM}			0.9	μC
I_{RM}			7.8	A

Note 1: Pulse test, $t \leq 300\mu\text{s}$; duty cycle, $d \leq 2\%$.

PLUS220 Outline

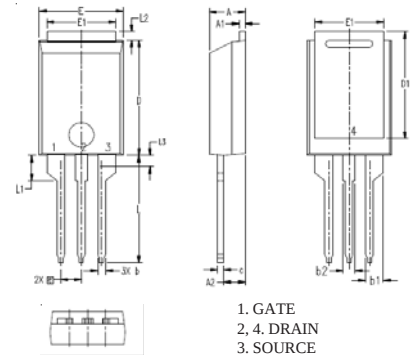


Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

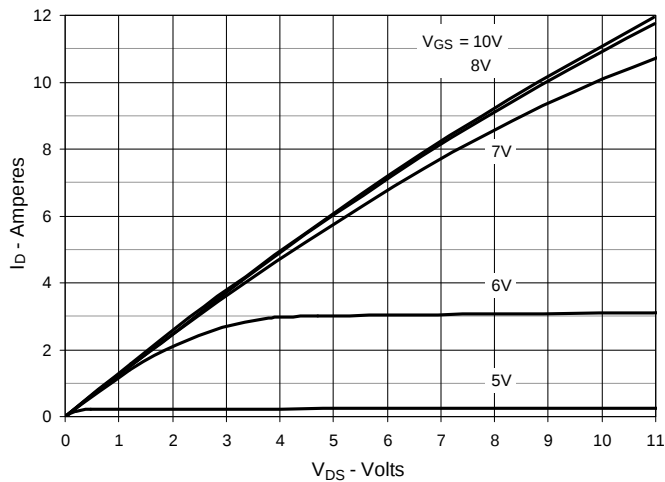


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

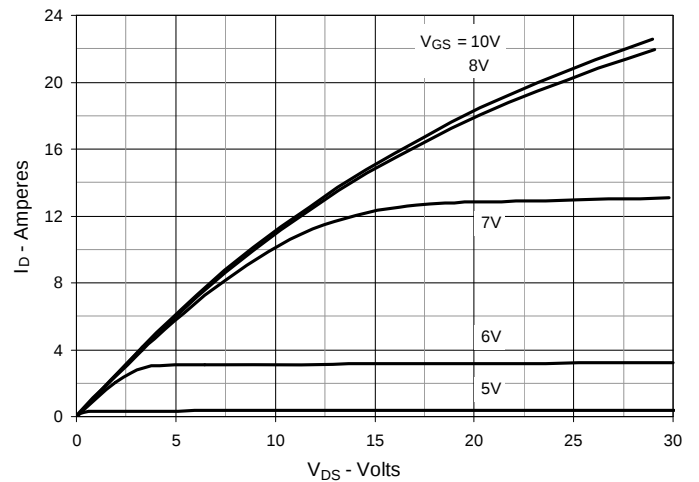


Fig. 3. Output Characteristics @ $T_J = 125^\circ\text{C}$

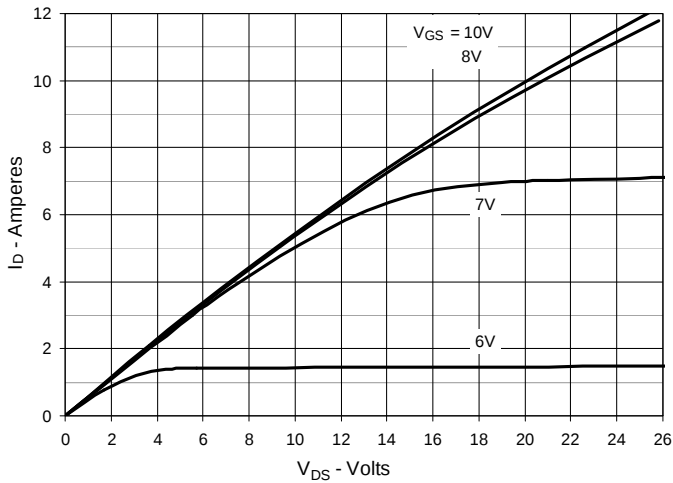


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 6\text{A}$ Value vs. Junction Temperature

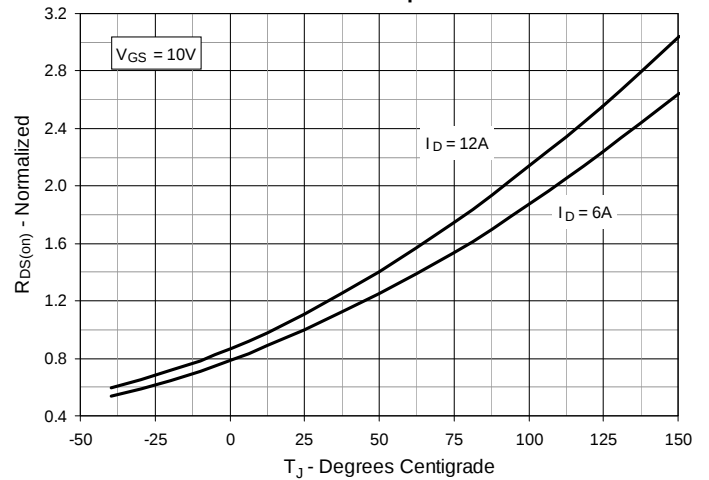


Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 6\text{A}$ Value vs. Drain Current

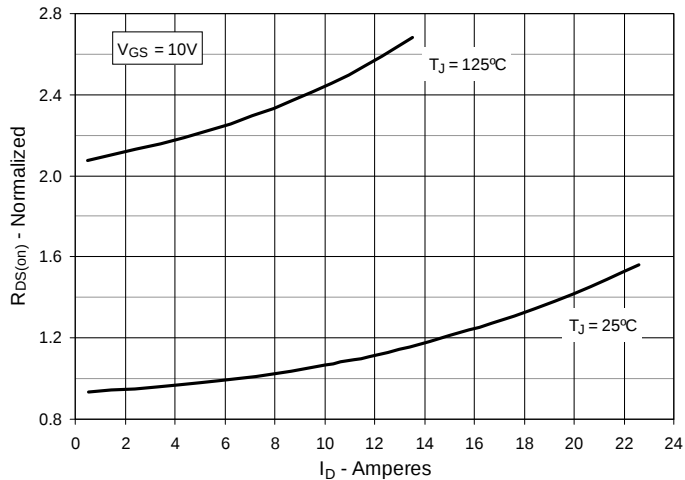


Fig. 6. Maximum Drain Current vs. Case Temperature

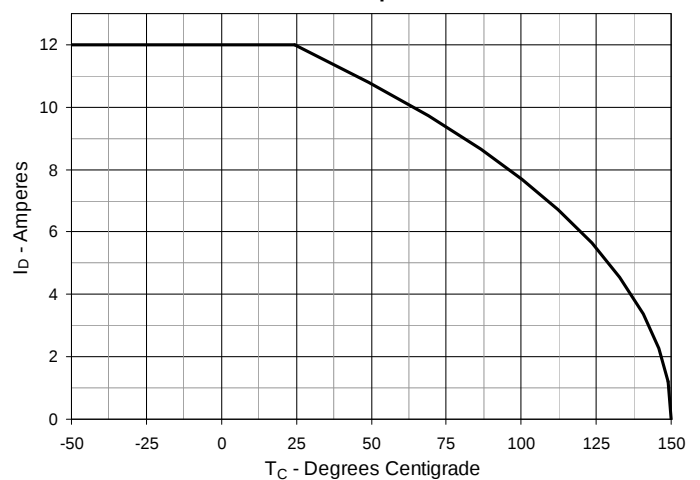
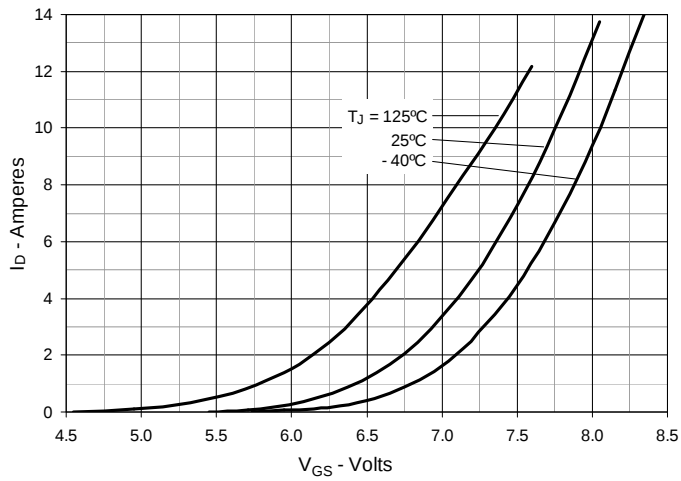
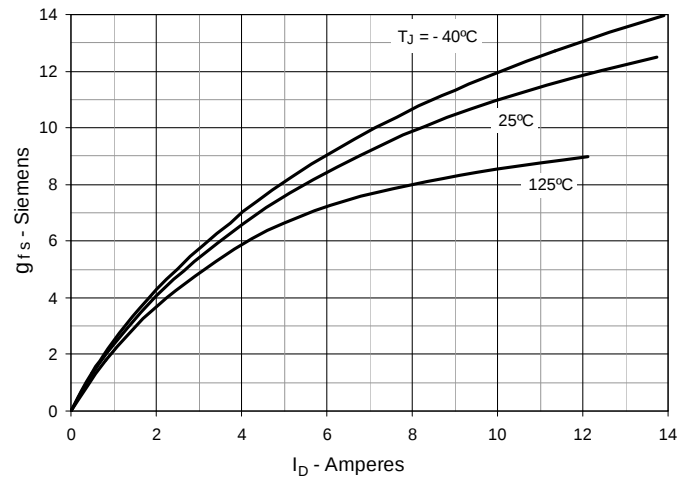
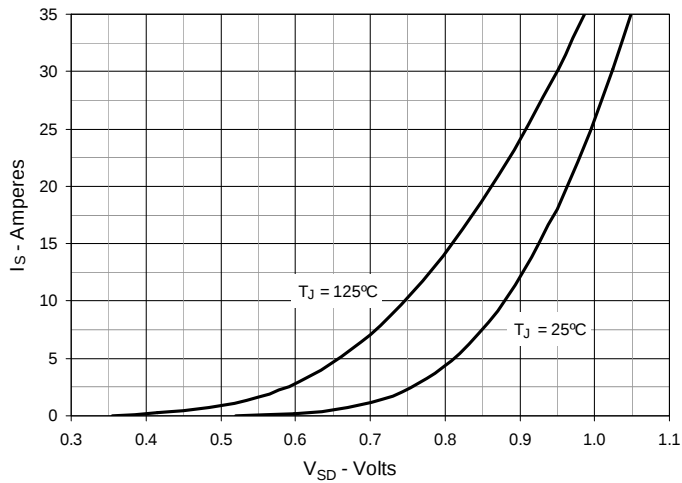
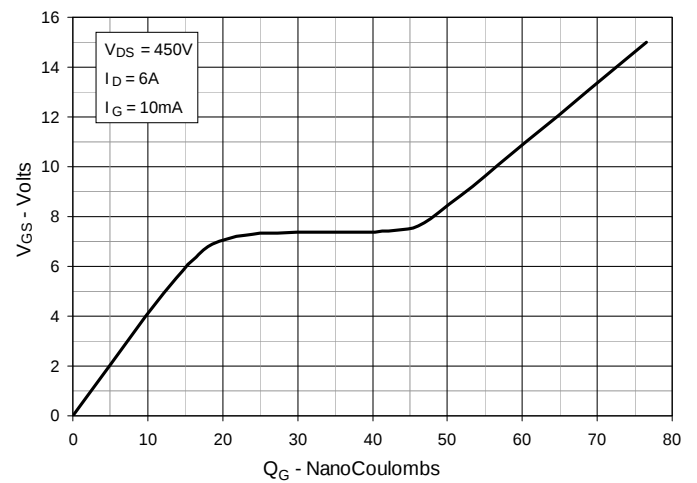
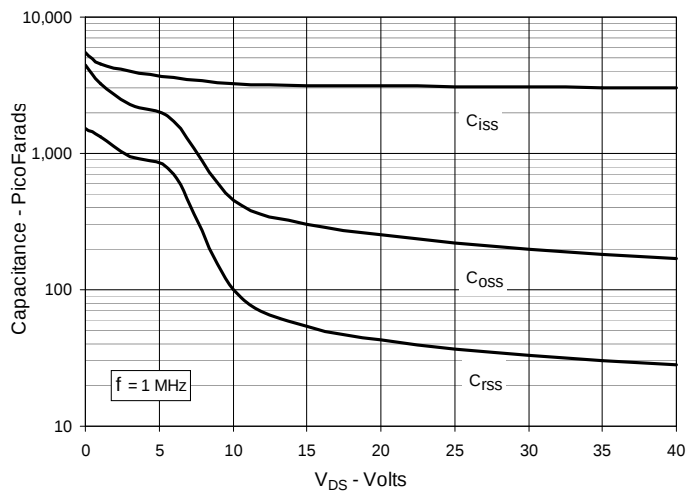
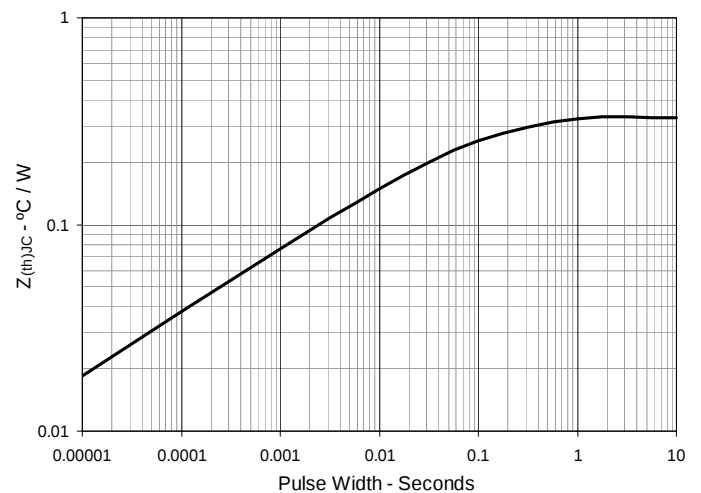


Fig. 7. Input Admittance

Fig. 8. Transconductance

Fig. 9. Forward Voltage Drop of Intrinsic Diode

Fig. 10. Gate Charge

Fig. 11. Capacitance

Fig. 12. Maximum Transient Thermal Impedance




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