

# Polar™ Power MOSFET

## HiPerFET™

# IXFR20N120P

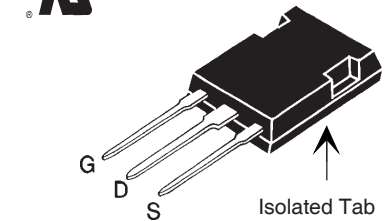
N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode



$V_{DSS} = 1200V$   
 $I_{D25} = 13A$   
 $R_{DS(on)} \leq 630m\Omega$   
 $t_{rr} \leq 300ns$

Symbol	Test Conditions	Maximum Ratings	
		Value	Unit
$V_{DSS}$	$T_J = 25^\circ C$ to $150^\circ C$	1200	V
$V_{DGR}$	$T_J = 25^\circ C$ to $150^\circ C$ , $R_{GS} = 1M\Omega$	1200	V
$V_{GSS}$	Continuous	$\pm 30$	V
$V_{GSM}$	Transient	$\pm 40$	V
$I_{D25}$	$T_C = 25^\circ C$	13	A
$I_{DM}$	$T_C = 25^\circ C$ , pulse width limited by $T_{JM}$	50	A
$I_A$	$T_C = 25^\circ C$	10	A
$E_{AS}$	$T_C = 25^\circ C$	1	J
$dV/dt$	$I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ C$	15	V/ns
$P_D$	$T_C = 25^\circ C$	290	W
$T_J$		-55 ... +150	$^\circ C$
$T_{JM}$		150	$^\circ C$
$T_{stg}$		-55 ... +150	$^\circ C$
$T_L$	Maximum lead temperature for soldering	300	$^\circ C$
$T_{SOLD}$	Plastic body for 10s	260	$^\circ C$
$V_{ISOL}$	50/60 Hz, RMS, 1 minute	2500	V~
$F_C$	Mounting force	20..120/4.5..27	N/lb.
<b>Weight</b>		5	g

ISOPLUS247 (IXFR)  
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(<30pF)
- Low  $R_{DS(on)}$  HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Fast intrinsic Rectifier

### Advantages

- Easy assembly
- Space savings
- High power density

### Applications:

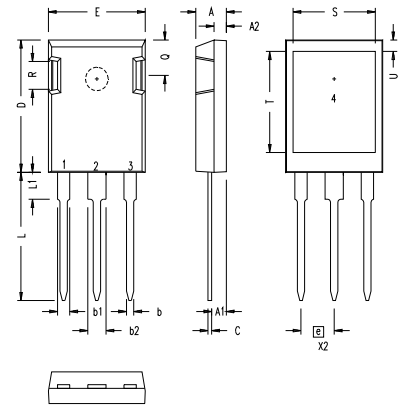
- High Voltage Switched-mode and resonant-mode power supplies
- High Voltage Pulse Power Applications
- High Voltage Discharge circuits in Lasers Pulsers, Spark Igniters, RF Generators
- High Voltage DC-DC converters
- High Voltage DC-AC inverters

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0V$ , $I_D = 1mA$	1200		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 1mA$	3.5		6.5 V
$I_{GSS}$	$V_{GS} = \pm 30V$ , $V_{DS} = 0V$			$\pm 200$ nA
$I_{DSS}$	$V_{DS} = V_{DSS}$ $V_{GS} = 0V$ $T_J = 125^\circ C$			25 $\mu A$ 5 mA
$R_{DS(on)}$	$V_{GS} = 10V$ , $I_D = 10A$ , Note 1			630 m $\Omega$

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = 20\text{V}, I_D = 10\text{A}$ , Note 1	10	16	S
$C_{iss}$	$V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$		11.1	nF
$C_{oss}$			600	pF
$C_{rss}$			60	pF
$R_{Gi}$	Gate input resistance		1.60	$\Omega$
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 10\text{A}$ $R_G = 1\Omega$ (External)		49	ns
$t_r$			45	ns
$t_{d(off)}$			72	ns
$t_f$			70	ns
$Q_{g(on)}$	$V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 10\text{A}$		193	nC
$Q_{gs}$			74	nC
$Q_{gd}$			85	nC
$R_{thJC}$			0.43	$^\circ\text{C}/\text{W}$
$R_{thCS}$		0.15		$^\circ\text{C}/\text{W}$

Source-Drain Diode		Characteristic Values		
$T_J = 25^\circ\text{C}$ unless otherwise specified)		Min.	Typ.	Max.
$I_S$	$V_{GS} = 0\text{V}$			20 A
$I_{SM}$	Repetitive, pulse width limited by $T_{JM}$			80 A
$V_{SD}$	$I_F = I_S, V_{GS} = 0\text{V}$ , Note 1			1.5 V
$t_{rr}$	$I_F = 10\text{A}, -di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}, V_{GS} = 0\text{V}$			300 ns
$Q_{RM}$			0.84	$\mu\text{C}$
$I_{RM}$			9	A

### ISOPLUS247 (IXFR) Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b1	.075	.084	1.91	2.13
b2	.115	.123	2.92	3.12
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
E	.620	.635	15.75	16.13
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1	.150	.170	3.81	4.32
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83
S	.520	.540	13.21	13.72
T	.620	.640	15.75	16.26
U	.065	.080	1.65	2.03

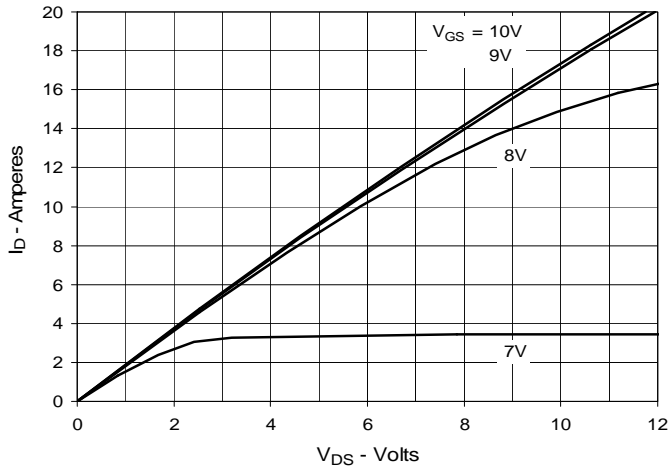
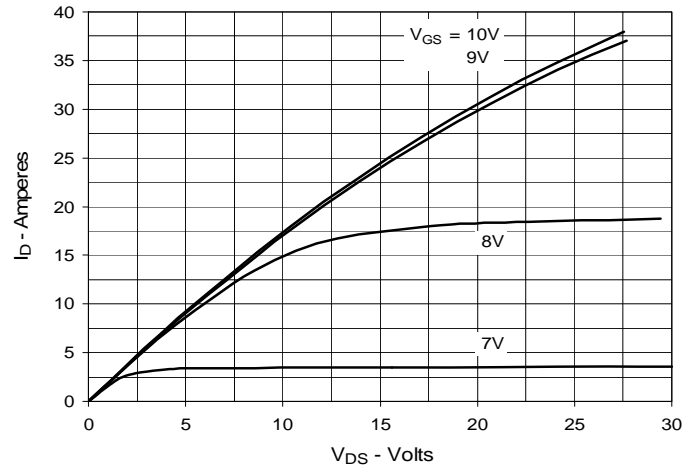
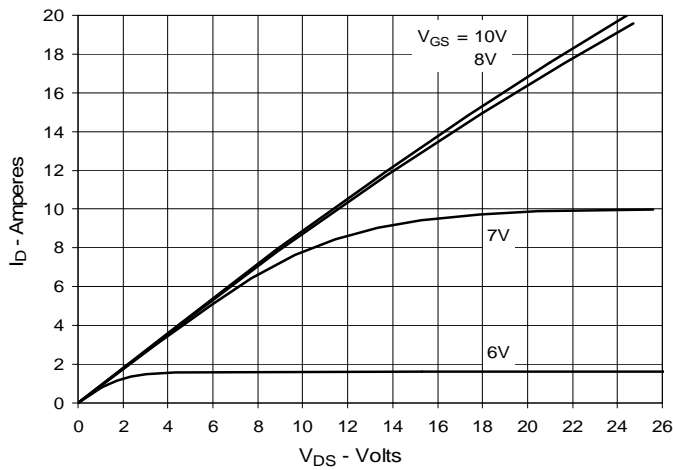
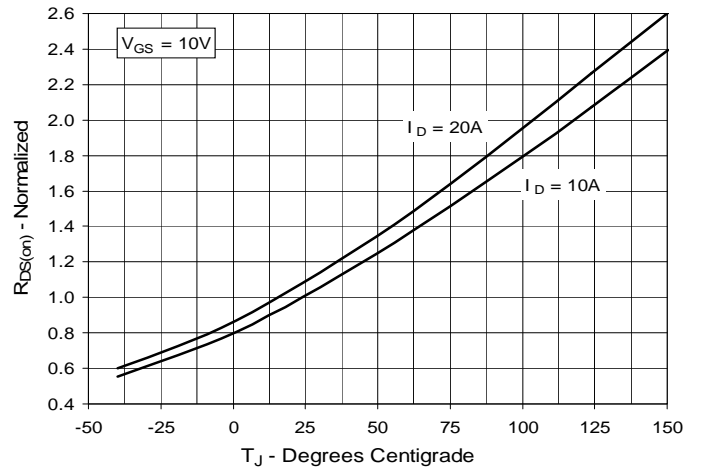
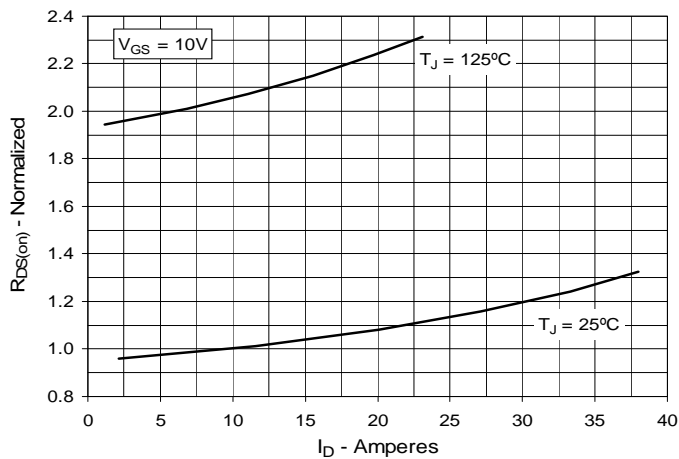
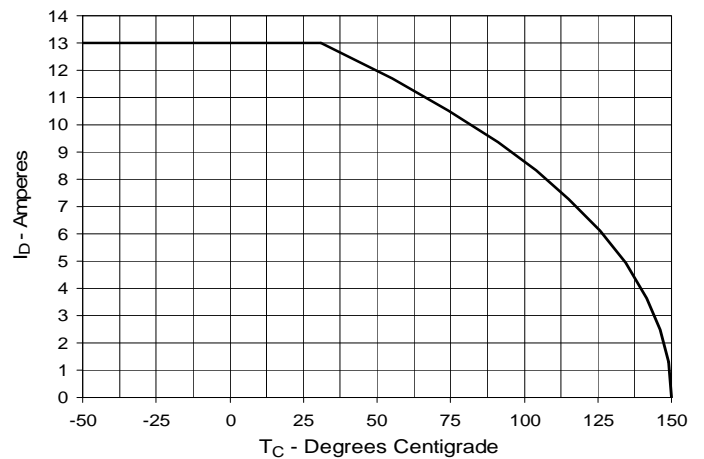
- 1 - GATE
- 2 - DRAIN (COLLECTOR)
- 3 - SOURCE (EMITTER)
- 4 - NO CONNECTION

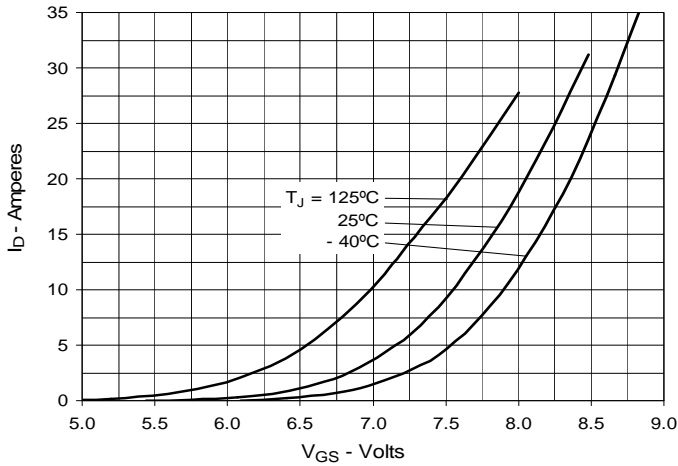
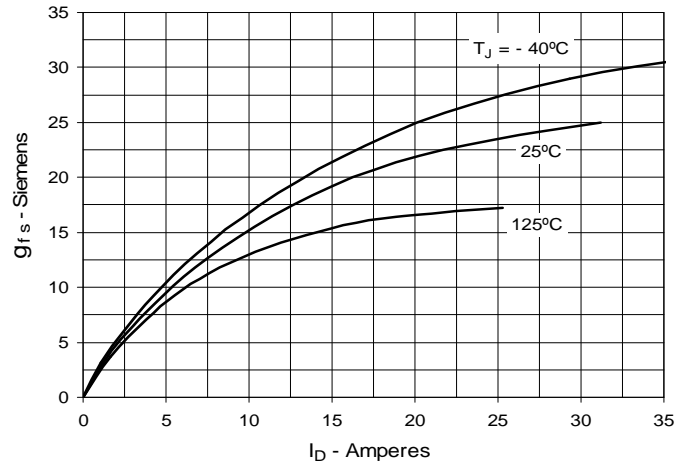
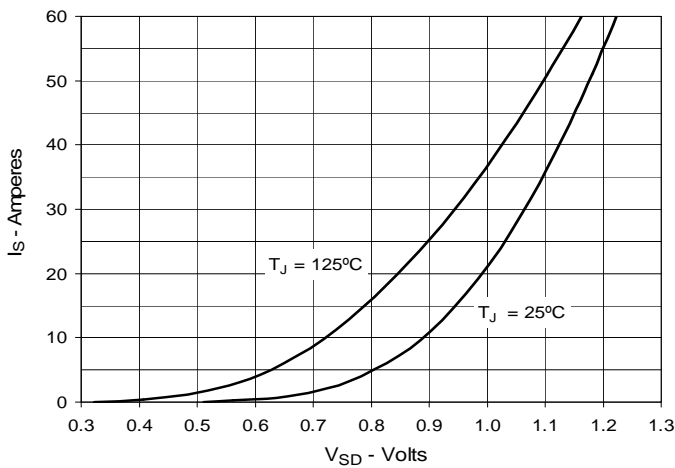
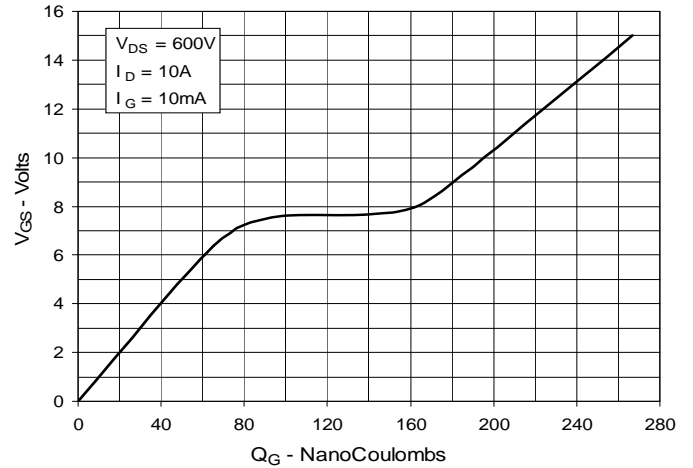
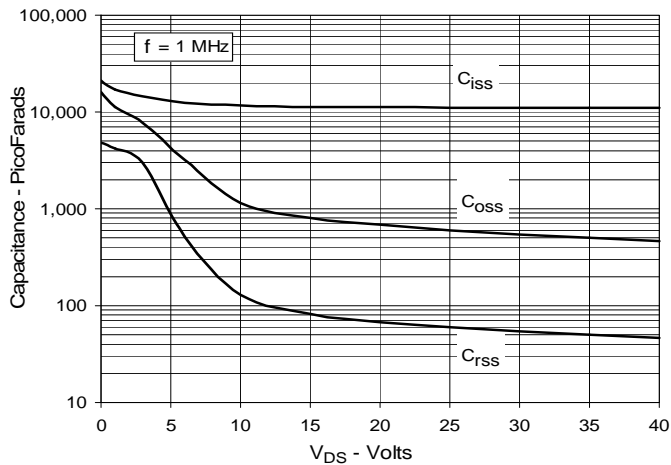
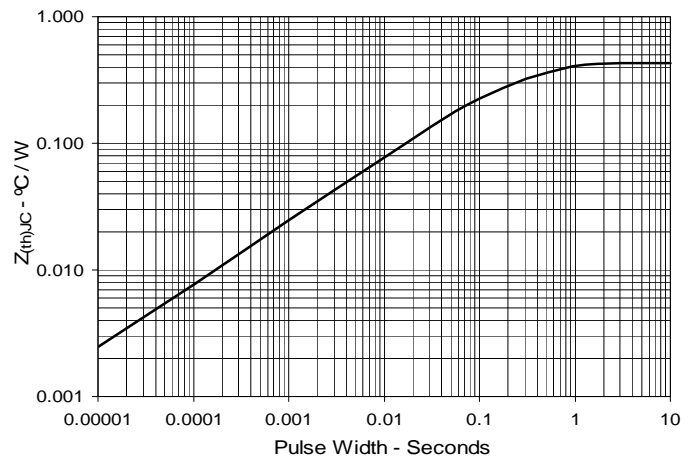
NOTE: This drawing will meet all dimensions requirement of JEDEC outline TO-247AD except screw hole.

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

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	7,157,338B2
	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  $I_D = 10\text{A}$  Value vs. Junction Temperature**

**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 10\text{A}$  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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