

# PolarHV™ HiPerFET IXFR 44N80P

## Power MOSFET

Electrically Isolated Tab

N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode



$$V_{DSS} = 800 \text{ V}$$

$$I_{D25} = 25 \text{ A}$$

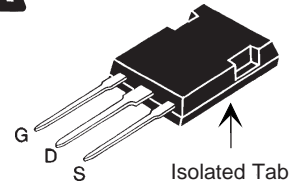
$$R_{DS(on)} \leq 200 \text{ m}\Omega$$

$$t_{rr} \leq 250 \text{ ns}$$

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
$V_{GS}$	Continuous	$\pm 30$	V
$V_{GSM}$	Transient	$\pm 40$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	25	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	100	A
$I_{AR}$	$T_C = 25^\circ\text{C}$	25	A
$E_{AR}$	$T_C = 25^\circ\text{C}$	80	mJ
$E_{AS}$	$T_C = 25^\circ\text{C}$	3.4	J
$dv/dt$	$I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ , $R_G = 10 \Omega$	10	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	300	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 seconds	260	$^\circ\text{C}$
$V_{ISOL}$	50/60 Hz, RMS, 1 minute	2500	V~
$F_C$	Mounting force	20..120 / 4.5..25	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

### Applications

- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- AC motor control

### Advantages

- Easy assembly
- Space savings
- High power density

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 800 \mu\text{A}$	800		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 8 \text{ mA}$	3.0		5.0 V
$I_{GSS}$	$V_{GS} = \pm 30 \text{ V}$ , $V_{DS} = 0 \text{ V}$			$\pm 200 \text{ nA}$
$I_{DSS}$	$V_{DS} = V_{DSS}$ $V_{GS} = 0 \text{ V}$ $T_J = 125^\circ\text{C}$			50 $\mu\text{A}$ 1.5 mA
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$ , $I_D = I_T$ , Note 1			200 m $\Omega$

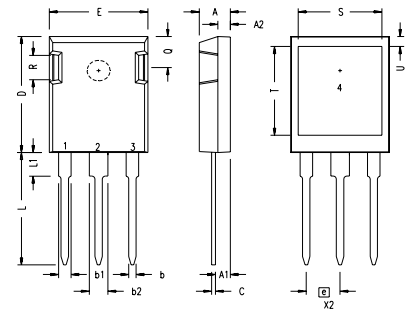
Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ unless otherwise specified)		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = 20\text{ V}; I_D = I_T$ , Note 1	27	43	S
$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		12	nF
$C_{oss}$		910	pF	
$C_{rss}$		30	pF	
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 44\text{ A}$ $R_G = 1\ \Omega$ (External)		28	ns
$t_r$		22	ns	
$t_{d(off)}$		75	ns	
$t_f$		27	ns	
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = I_T$		200	nC
$Q_{gs}$		67	nC	
$Q_{gd}$		65	nC	
$R_{thJC}$			0.42	$^\circ\text{C/W}$
$R_{thCS}$		0.15		$^\circ\text{C/W}$

### Source-Drain Diode

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ unless otherwise specified)		
		Min.	Typ.	Max.
$I_s$	$V_{GS} = 0\text{ V}$			44 A
$I_{SM}$	Repetitive			100 A
$V_{SD}$	$I_F = I_S, V_{GS} = 0\text{ V}$ , Note 1			1.5 V
$t_{rr}$	$I_F = 22\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}$			250 ns
$Q_{RM}$	$V_R = 100\text{ V}, V_{GS} = 0\text{ V}$		0.8	$\mu\text{C}$
$I_{RM}$			8.0	A

- Notes: 1. Pulse test,  $t \leq 300\ \mu\text{s}$ , duty cycle  $d \leq 2\%$ ;  
2. Test current  $I_T = 22\text{ A}$ .

### 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

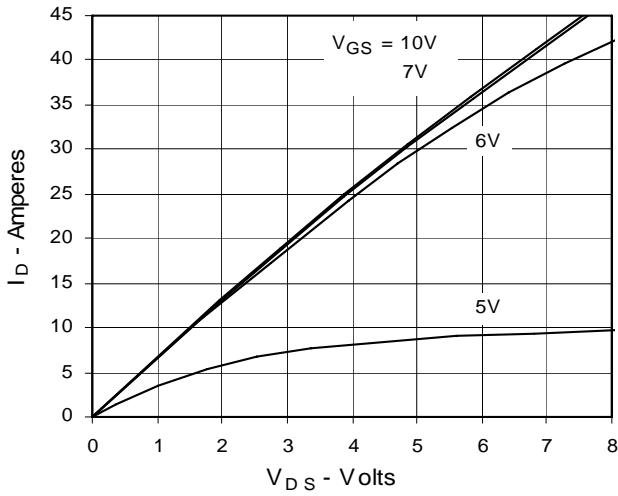
- 1 - GATE
- 2 - DRAIN (COLLECTOR)
- 3 - SOURCE (EMITTER)
- 4 - NO CONNECTION

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

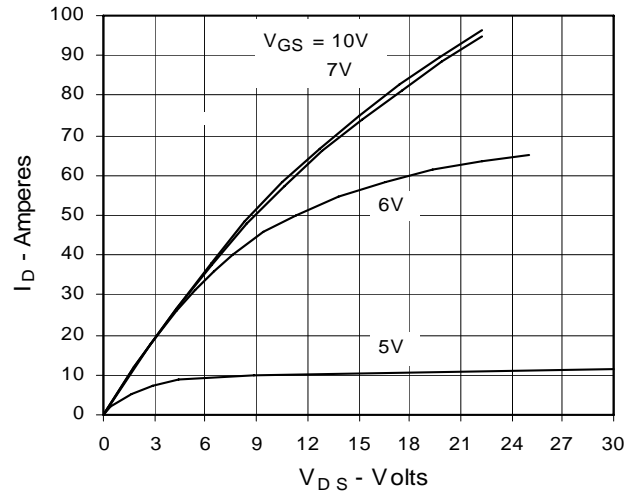
IXYS reserves the right to change limits, test conditions, and dimensions.

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	7,005,734 B2
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

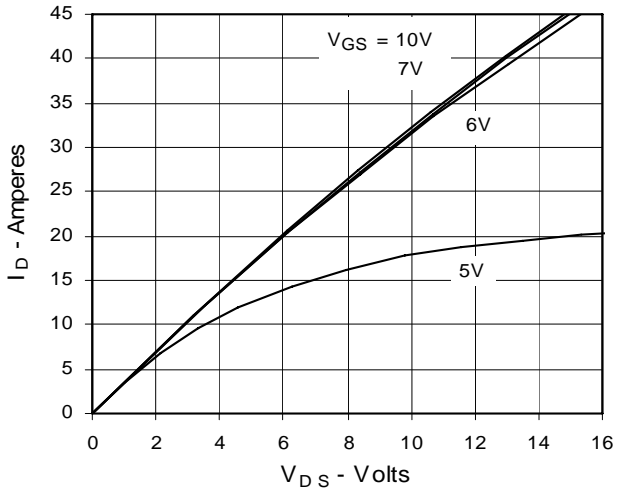
**Fig. 1. Output Characteristics @ 25°C**



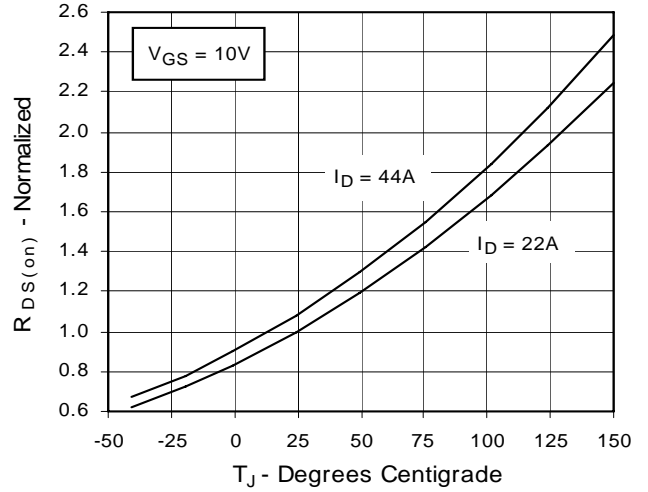
**Fig. 2. Extended Output Characteristics @ 25°C**



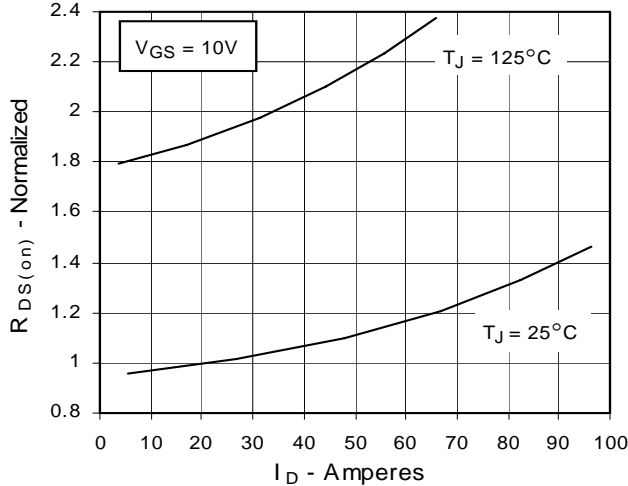
**Fig. 3. Output Characteristics @ 125°C**



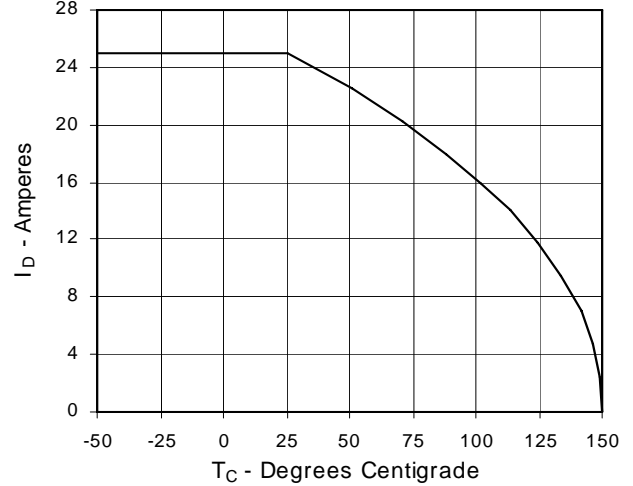
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 22A$  Value vs. Junction Temperature**



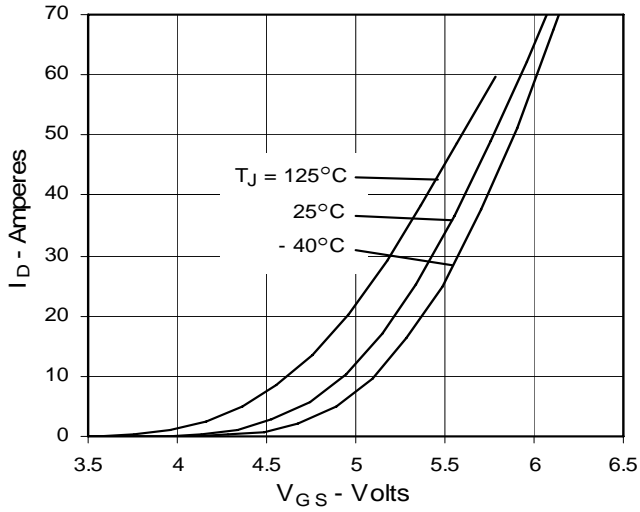
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 22A$  Value vs. Drain Current**



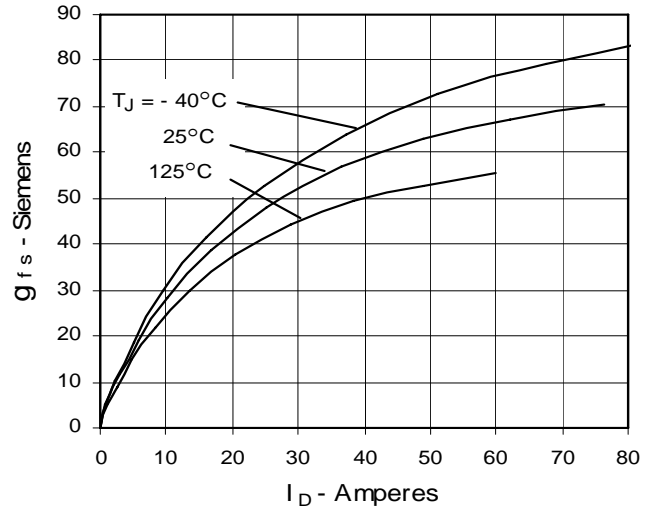
**Fig. 6. Drain Current vs. Case Temperature**



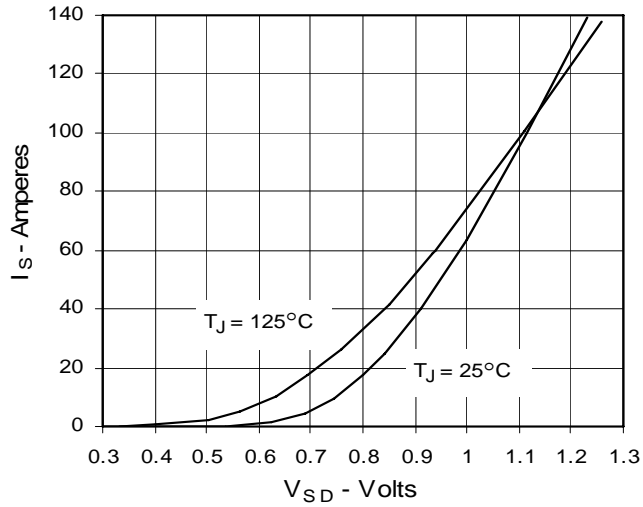
**Fig. 7. Input Admittance**



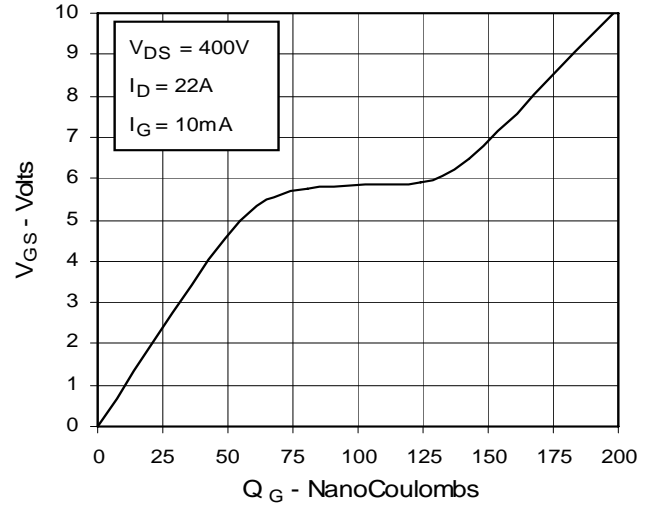
**Fig. 8. Transconductance**



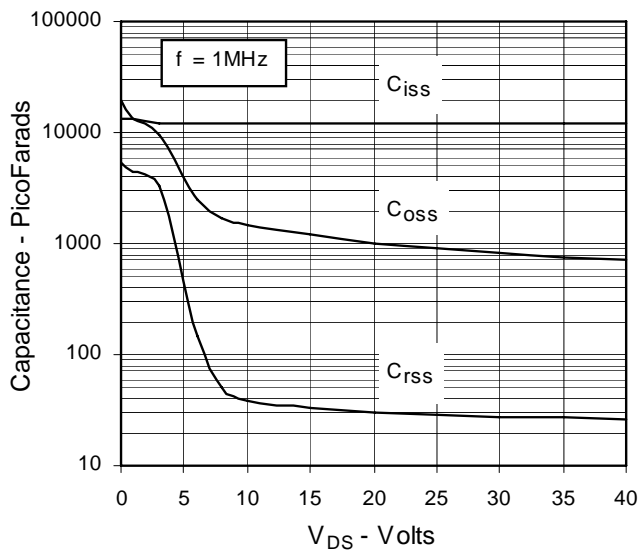
**Fig. 9. Source Current vs. Source-To-Drain Voltage**



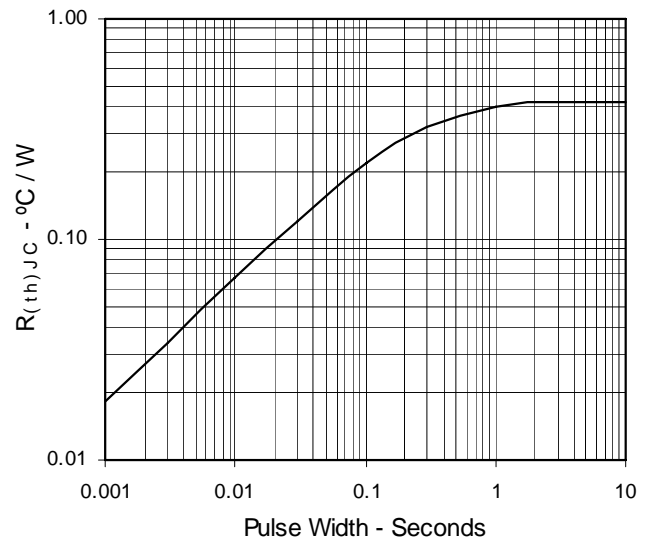
**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



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





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