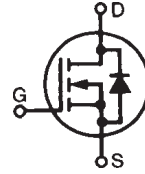


# PolarHV™ HiperFET Power MOSFET

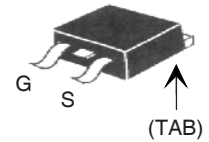
**IXFA16N50P**  
**IXFP16N50P**  
**IXFH16N50P**

N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode

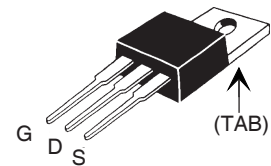


$V_{DSS} = 500V$   
 $I_{D25} = 16A$   
 $R_{DS(on)} \leq 400m\Omega$   
 $t_{rr} \leq 200ns$

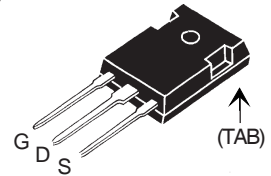
TO-263



TO-220



TO-247



G = Gate      D = Drain  
S = Source    TAB = Drain

Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ C$ to $150^\circ C$	500	V
$V_{DGR}$	$T_J = 25^\circ C$ to $150^\circ C$ $R_{GS} = 1M\Omega$	500	V
$V_{GSS}$	Continuous	$\pm 30$	V
$V_{GSM}$	Transient	$\pm 40$	V
$I_{D25}$	$T_C = 25^\circ C$	16	A
$I_{DM}$	$T_C = 25^\circ C$ , Pulse Width Limited by $T_{JM}$	35	A
$I_A$	$T_C = 25^\circ C$	16	A
$E_{AS}$	$T_C = 25^\circ C$	750	mJ
$dV/dt$	$I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ C$	10	V/ns
$P_D$	$T_C = 25^\circ C$	300	W
$T_J$		-55 ... +150	$^\circ C$
$T_{JM}$		150	$^\circ C$
$T_{stg}$		-55 ... +150	$^\circ C$
$T_L$	1.6mm (0.062 in.) from Case for 10s	300	$^\circ C$
$T_{SOLD}$	Plastic Body for 10 Seconds	260	$^\circ C$
$M_d$	Mounting Torque (TO-220 & TO-247)	1.13 / 10	Nmlb.in.
$F_c$	Mounting Force (TO-263)	10..65 / 2.2..14.6	N/lb.
<b>Weight</b>	TO-263	2.5	g
	TO-220	3.0	g
	TO-247	6.0	g

## Features

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

## Advantages

- High Power Density
- Easy to Mount
- Space Savings

## Applications

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

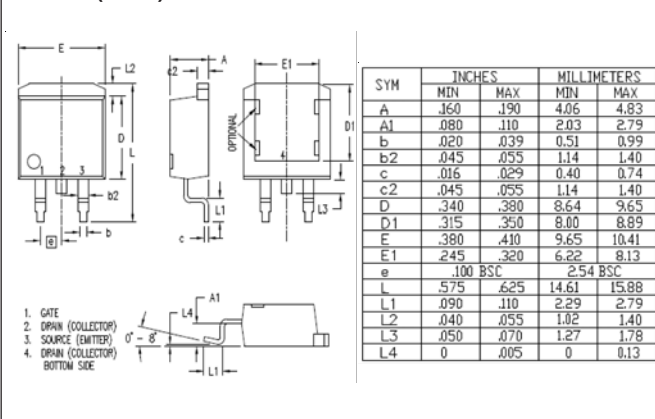
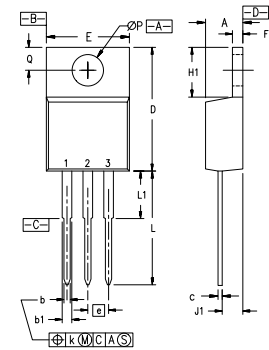
Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0V$ , $I_D = 250\mu A$	500		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 2.5mA$	3.0		5.5 V
$I_{GSS}$	$V_{GS} = \pm 30V$ , $V_{DS} = 0V$			$\pm 100$ nA
$I_{DSS}$	$V_{DS} = V_{DSS}$ , $V_{GS} = 0V$ $T_J = 125^\circ C$			15 $\mu A$ 250 $\mu A$
$R_{DS(on)}$	$V_{GS} = 10V$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1			400 m $\Omega$

Symbol	Test Conditions (T <sub>J</sub> = 25°C Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
<b>g<sub>fs</sub></b>	V <sub>DS</sub> = 20V, I <sub>D</sub> = 0.5 • I <sub>D25</sub> , Note 1	9	16	S
<b>C<sub>iss</sub></b>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 25V, f = 1MHz		2480	pF
<b>C<sub>oss</sub></b>			237	pF
<b>C<sub>rss</sub></b>			18	pF
<b>t<sub>d(on)</sub></b>	<b>Resistive Switching Times</b> V <sub>GS</sub> = 10V, V <sub>DS</sub> = 0.5 • V <sub>DSS</sub> , I <sub>D</sub> = 0.5 • I <sub>D25</sub> R <sub>G</sub> = 10Ω (External)		23	ns
<b>t<sub>r</sub></b>			25	ns
<b>t<sub>d(off)</sub></b>			70	ns
<b>t<sub>f</sub></b>			22	ns
<b>Q<sub>g(on)</sub></b>	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 0.5 • V <sub>DSS</sub> , I <sub>D</sub> = 0.5 • I <sub>D25</sub>		43	nC
<b>Q<sub>gs</sub></b>			15	nC
<b>Q<sub>gd</sub></b>			12	nC
<b>R<sub>thJC</sub></b>				0.42 °C/W
<b>R<sub>thCH</sub></b>	(TO-220)	0.50		°C/W
	(TO-247)	0.21		°C/W

**Source-Drain Diode**

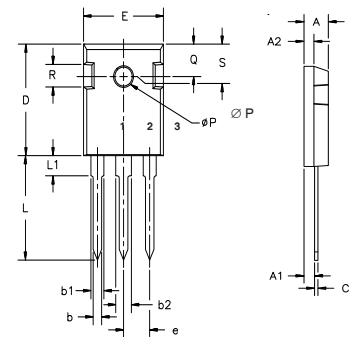
Symbol	Test Conditions (T <sub>J</sub> = 25°C Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
<b>I<sub>s</sub></b>	V <sub>GS</sub> = 0V			16 A
<b>I<sub>SM</sub></b>	Repetitive, Pulse Width Limited by T <sub>JM</sub>			64 A
<b>V<sub>SD</sub></b>	I <sub>F</sub> = I <sub>S</sub> , V <sub>GS</sub> = 0V, Note 1			1.5 V
<b>t<sub>rr</sub></b>	I <sub>F</sub> = 16A, -di/dt = 100A/μs V <sub>R</sub> = 100V, V <sub>GS</sub> = 0V		6.0	200 ns
<b>I<sub>RM</sub></b>			0.6	A
<b>Q<sub>RM</sub></b>				nC

Note 1: Pulse test, t ≤ 300μs; Duty Cycle, d ≤ 2%.

**TO-263 (IXFA) Outline**

**TO-220 (IXFP) Outline**


Pins: 1 - Gate 2 - Drain

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.170	.190	4.32	4.83
b	.025	.040	0.64	1.02
b1	.045	.065	1.15	1.65
c	.014	.022	0.35	0.56
D	.580	.630	14.73	16.00
E	.390	.420	9.91	10.66
e	.100 BSC		2.54 BSC	
F	.045	.055	1.14	1.40
H1	.230	.270	5.85	6.85
J1	.090	.110	2.29	2.79
k	0	.015	0	0.38
L	.500	.550	12.70	13.97
L1	.110	.230	2.79	5.84
ØP	.139	.161	3.53	4.08
Q	.100	.125	2.54	3.18

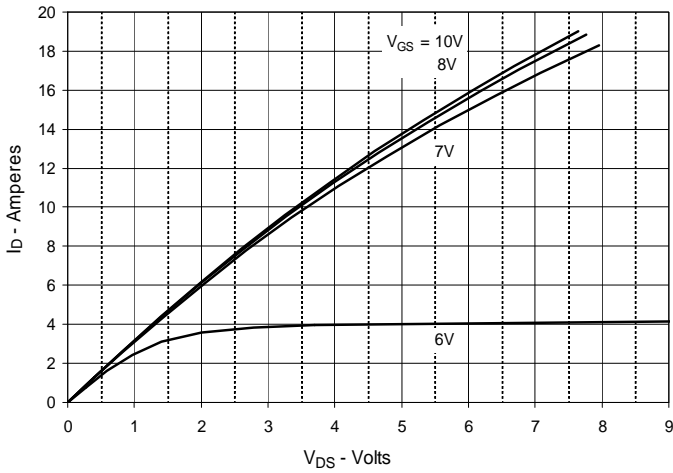
**TO-247 (IXFH) Outline**

 Terminals: 1 - Gate 2 - Drain  
3 - Source

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A <sub>1</sub>	2.2	2.54	.087	.102
A <sub>2</sub>	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b <sub>1</sub>	1.65	2.13	.065	.084
b <sub>2</sub>	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
ØP	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15	BSC	242	BSC

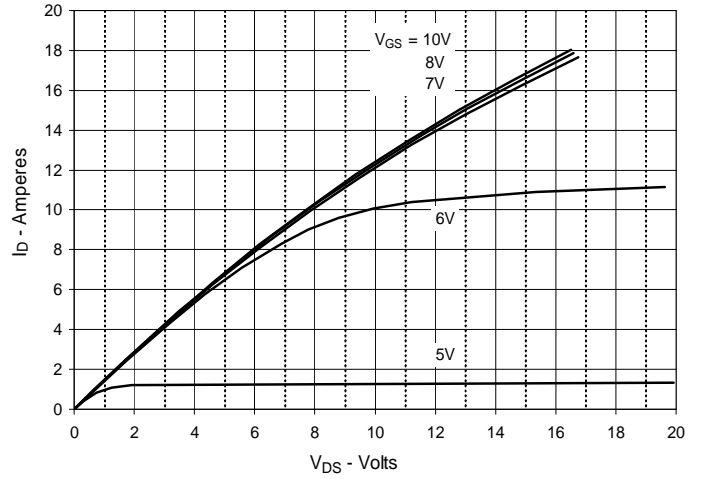
IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

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	

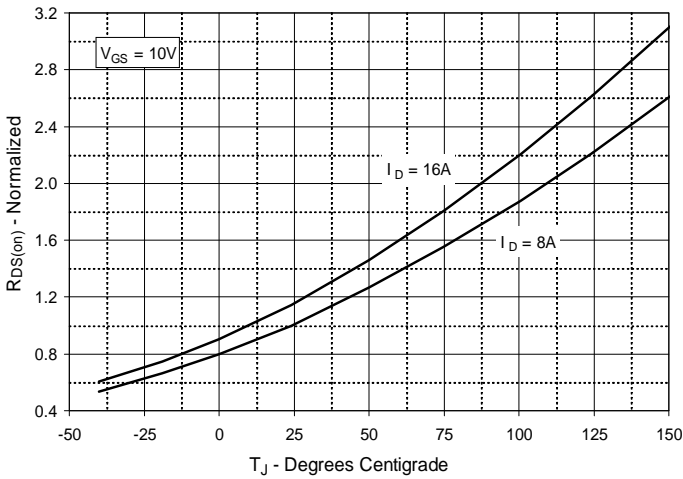
**Fig. 1. Output Characteristics @ 25°C**



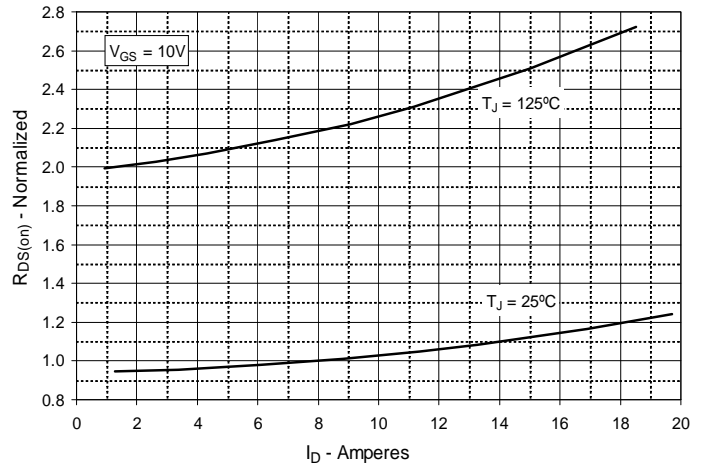
**Fig. 2. Output Characteristics @ 125°C**



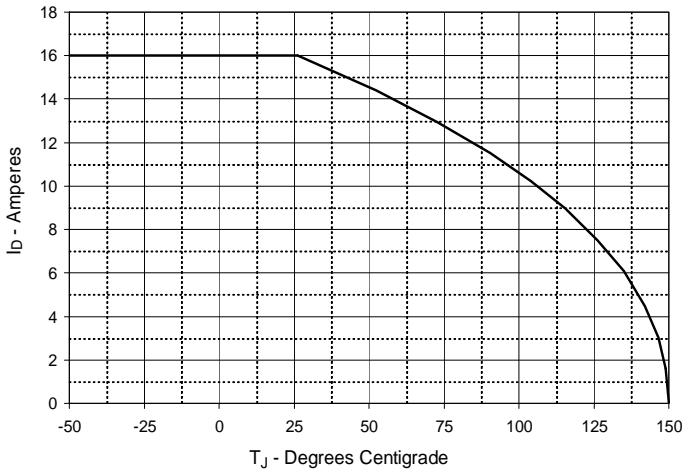
**Fig. 3. RDS(on) Normalized to ID = 8A Value vs. Junction Temperature**



**Fig. 4. RDS(on) Normalized to ID = 8A Value vs. Drain Current**



**Fig. 5. Maximum Drain Current vs. Case Temperature**



**Fig. 6. Input Admittance**

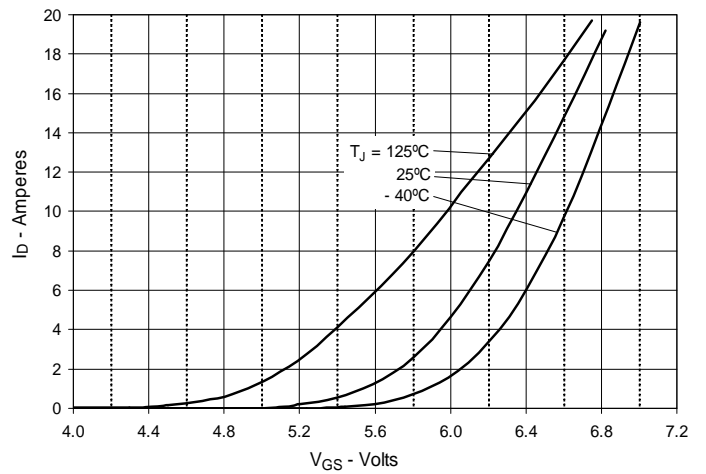


Fig. 7. Transconductance

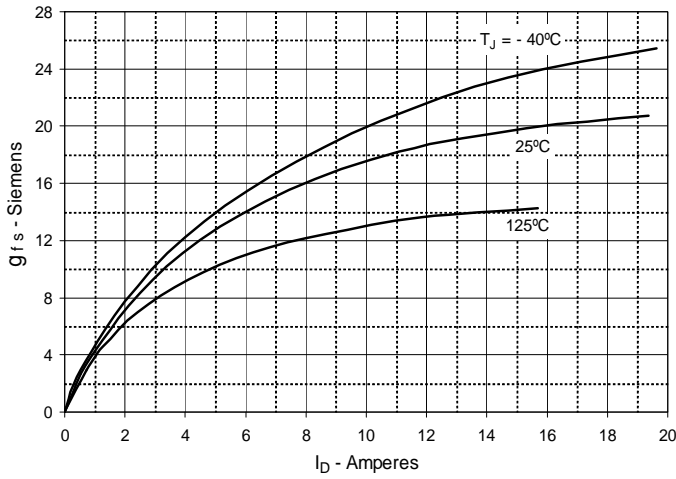


Fig. 8. Forward Voltage Drop of Intrinsic Diode

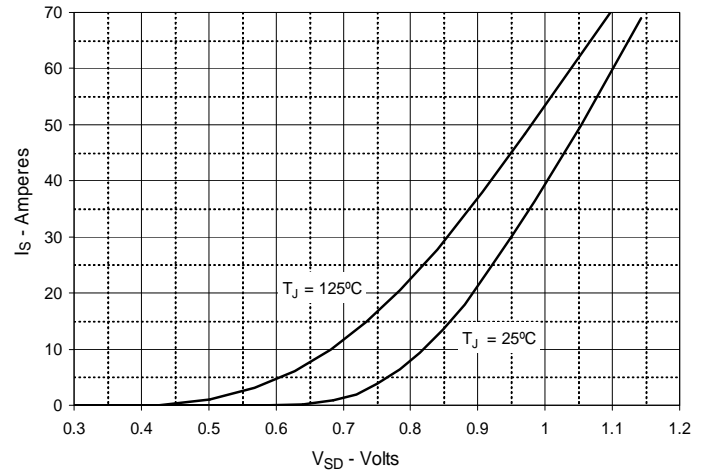


Fig. 9. Gate Charge

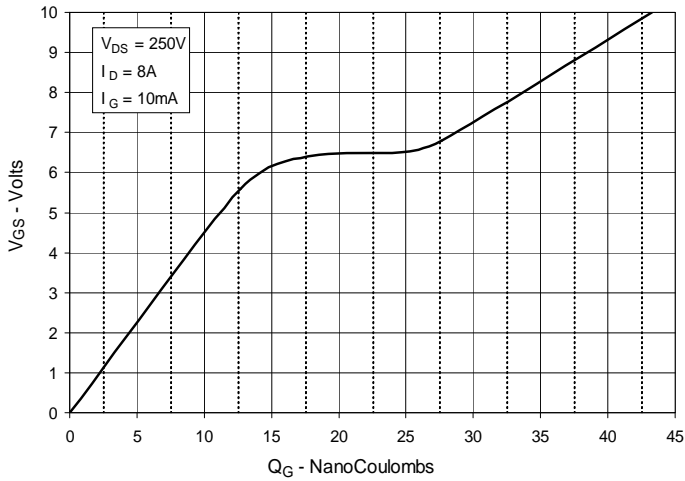


Fig. 10. Capacitance

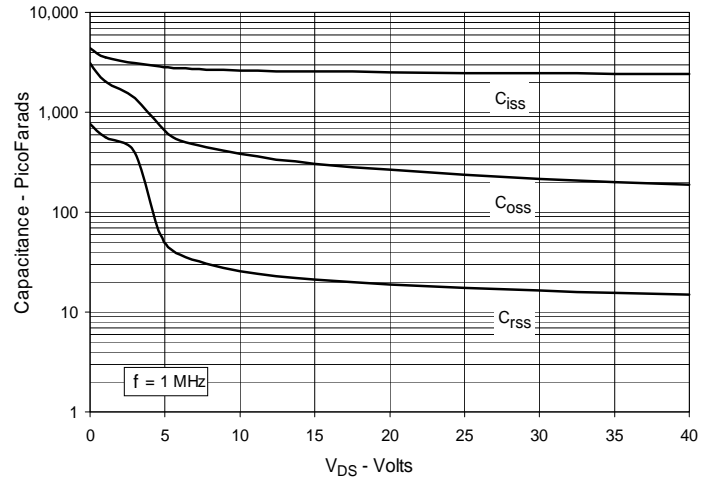


Fig. 11. Forward-Bias Safe Operating Area

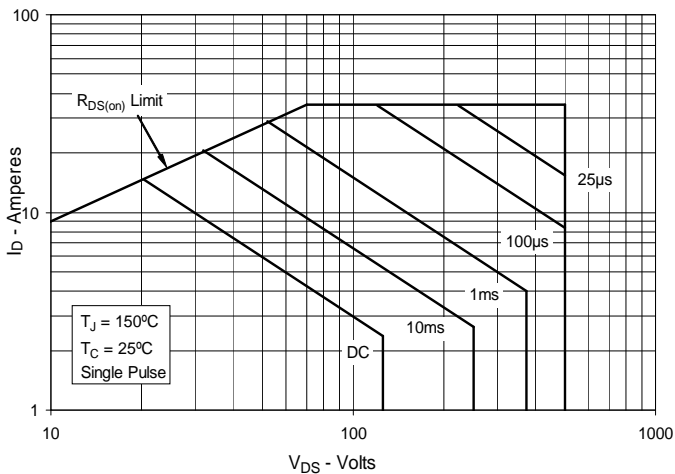


Fig. 12. Maximum Transient Thermal Impedance

