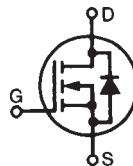


# PolarHV™ Power MOSFET

## IXTA4N80P IXTP4N80P

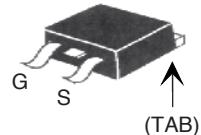
$V_{DSS}$  = 800 V  
 $I_{D25}$  = 3.6 A  
 $R_{DS(on)}$  ≤ 3.4 Ω

N-Channel Enhancement Mode  
Avalanche Rated

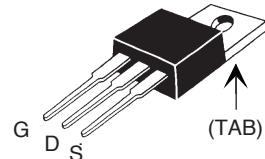


Symbol	Test Conditions	Maximum Ratings		
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	800	V	
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$	800	V	
$V_{GSS}$	Continuous	$\pm 30$	V	
$V_{GSM}$	Transient	$\pm 40$	V	
$I_{D25}$	$T_c = 25^\circ\text{C}$	3.6	A	
$I_{DM}$	$T_c = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	8	A	
$I_{AR}$	$T_c = 25^\circ\text{C}$	2	A	
$E_{AR}$	$T_c = 25^\circ\text{C}$	20	mJ	
$E_{AS}$	$T_c = 25^\circ\text{C}$	250	mJ	
$dv/dt$	$I_s \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ , $R_G = 18 \Omega$	10	V/ns	
$P_D$	$T_c = 25^\circ\text{C}$	100	W	
$T_J$		-55 ... +150	°C	
$T_{JM}$		150	°C	
$T_{stg}$		-55 ... +150	°C	
$T_L$	1.6 mm (0.062 in.) from case for 10 s	300	°C	
$T_{SOLD}$	Plastic body for 10 s	260	°C	
$M_d$	Mounting torque (TO-220)	1.13/10	Nm/lb.in.	
Weight	TO-220	4	g	
	TO-263	3	g	

### TO-263 (IXTA)



### TO-220 (IXTP)



G = Gate  
S = Source  
TAB = Drain

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
( $T_J = 25^\circ\text{C}$ , unless otherwise specified)				
$BV_{DSS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$	800		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 100 \mu\text{A}$	3.0		5.5 V
$I_{GSS}$	$V_{GS} = \pm 30 \text{ V}$ , $V_{DS} = 0 \text{ V}$		$\pm 100$	nA
$I_{DSS}$	$V_{DS} = V_{DSS}$ $V_{GS} = 0 \text{ V}$		5 150	$\mu\text{A}$
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$ , $I_D = 0.5 I_{D25}$ Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2 \%$		3.4	Ω

### Features

- International standard packages
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
  - easy to drive and to protect

### Advantages

- Easy to mount
- Space savings
- High power density

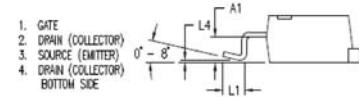
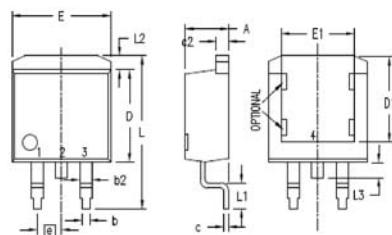
Symbol	Test Conditions	Characteristic Values			
		(T <sub>j</sub> = 25°C, unless otherwise specified)	Min.	Typ.	Max.
<b>g<sub>fs</sub></b>	V <sub>DS</sub> = 10 V; I <sub>D</sub> = 0.5 I <sub>D25</sub> , pulse test	2.5	4.0	S	
<b>C<sub>iss</sub></b>		750		pF	
<b>C<sub>oss</sub></b>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz	70		pF	
<b>C<sub>rss</sub></b>		6.3		pF	
<b>t<sub>d(on)</sub></b>		22		ns	
<b>t<sub>r</sub></b>	V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0.5 V <sub>DSS</sub> , I <sub>D</sub> = 0.5 I <sub>D25</sub>	24		ns	
<b>t<sub>d(off)</sub></b>	R <sub>G</sub> = 18 Ω (External)	60		ns	
<b>t<sub>f</sub></b>		29		ns	
<b>Q<sub>g(on)</sub></b>		14.2		nC	
<b>Q<sub>gs</sub></b>	V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0.5 V <sub>DSS</sub> , I <sub>D</sub> = 0.5 I <sub>D25</sub>	4.8		nC	
<b>Q<sub>gd</sub></b>		4.8		nC	
<b>R<sub>thJC</sub></b>			1.25	°C/W	
<b>R<sub>thCS</sub></b>	(TO-220)		0.25	°C/W	

### Source-Drain Diode

**Characteristic Values**  
(T<sub>j</sub> = 25°C, unless otherwise specified)

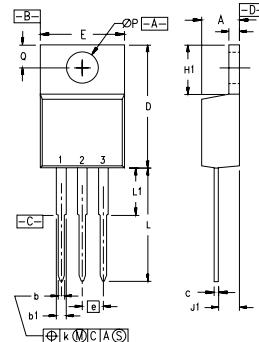
Symbol	Test Conditions	Min.	Typ.	Max.
I <sub>s</sub>	V <sub>GS</sub> = 0 V			3.5 A
I <sub>SM</sub>	Repetitive			8 A
V <sub>SD</sub>	I <sub>F</sub> = I <sub>S</sub> , V <sub>GS</sub> = 0 V			1.5 V
t <sub>rr</sub>	I <sub>F</sub> = 3.5 A, -di/dt = 100 A/μs, Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 %	560		ns

### TO-263 (IXTA) Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.360	.390	9.06	4.83
A1	.080	.110	2.03	2.79
b	.020	.039	0.51	0.99
b2	.045	.055	1.14	1.40
c	.016	.029	0.40	0.74
c2	.045	.055	1.14	1.40
D	.340	.380	8.64	9.65
D1	.315	.350	8.00	8.89
E	.380	.410	9.65	10.41
E1	.245	.320	6.22	8.13
e	.100	BSC	2.54	BSC
L	.575	.625	14.61	15.88
L1	.090	.110	2.29	2.79
L2	.040	.055	1.02	1.40
L3	.050	.070	1.27	1.78
L4	0	.005	0	0.13

### TO-220 (IXTP) Outline



Pins: 1 - Gate      2 - Drain  
3 - Source      4 - 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

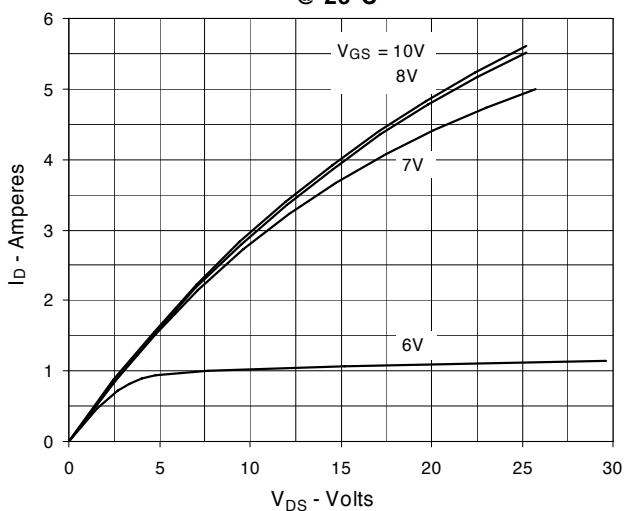
### ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

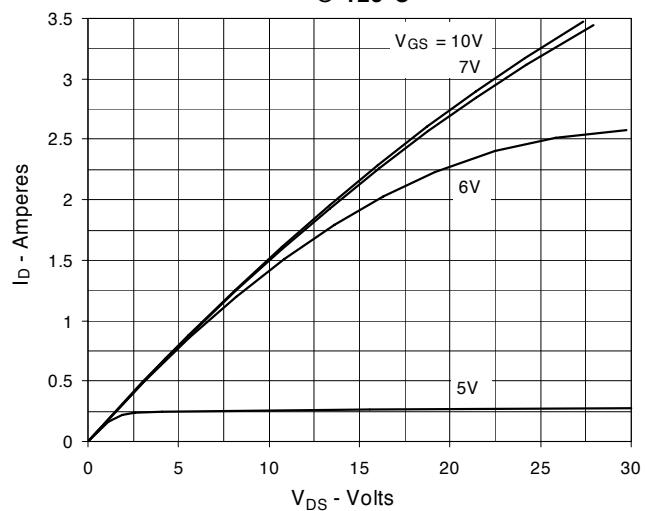
IXYS reserves the right to change limits, test conditions, and dimensions.

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 6,710,405 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

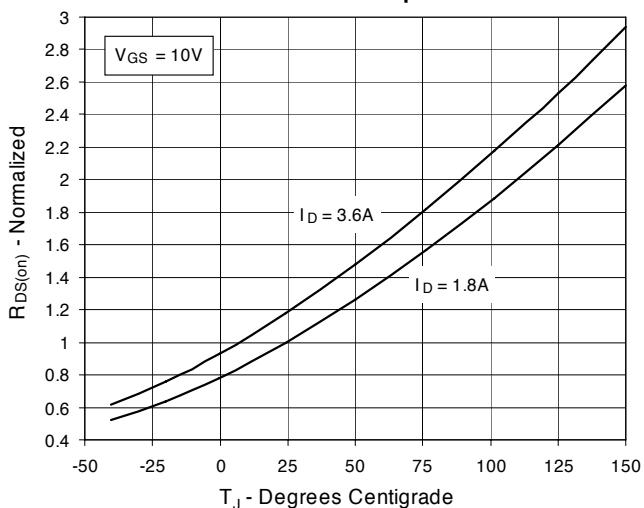
**Fig. 1. Extended Output Characteristics  
@ 25°C**



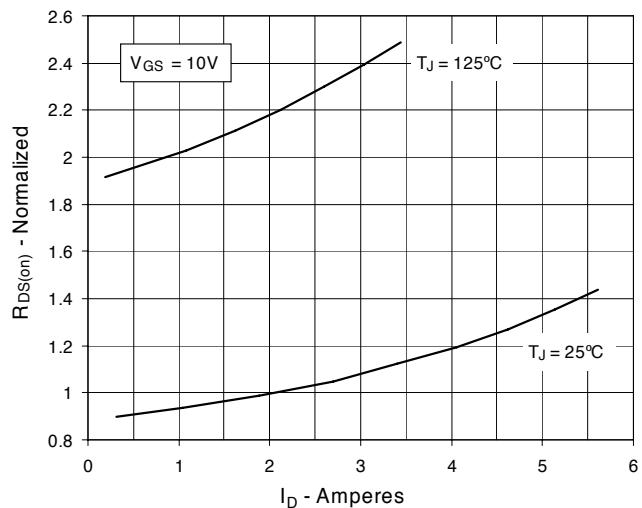
**Fig. 2. Output Characteristics  
@ 125°C**



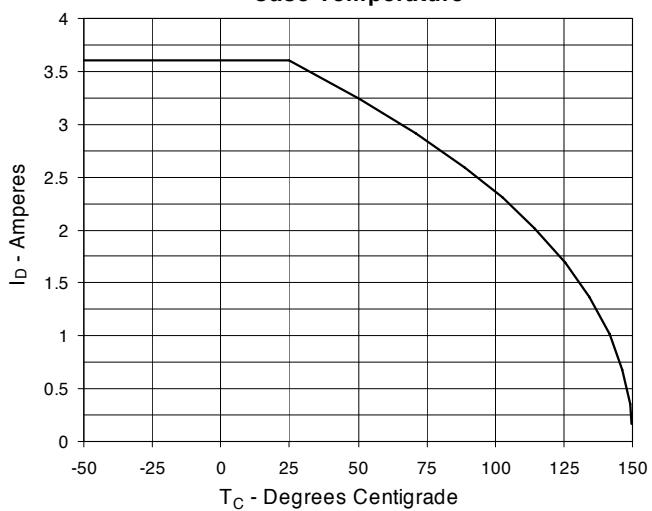
**Fig. 3.  $R_{DS(on)}$  Normalized to  $I_D = 2A$  Value  
vs. Junction Temperature**



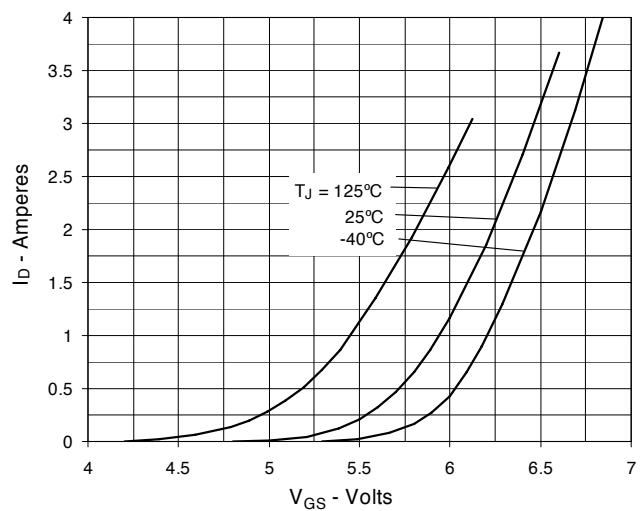
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 2A$  Value  
vs. Drain Current**

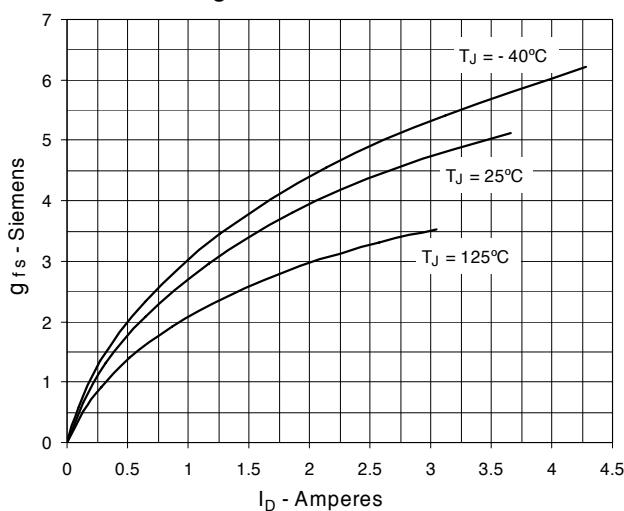
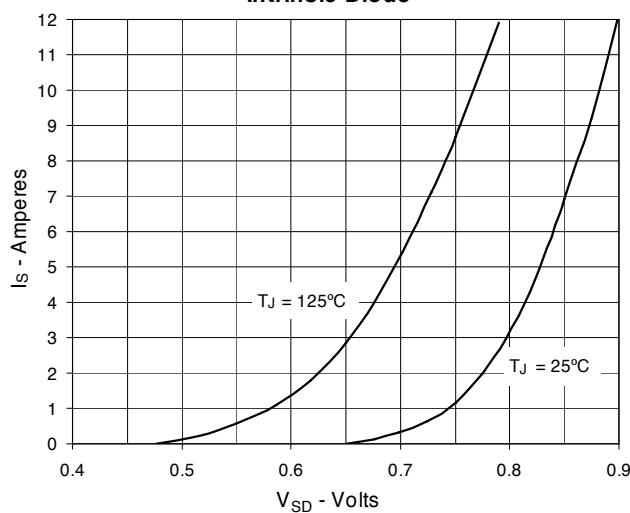
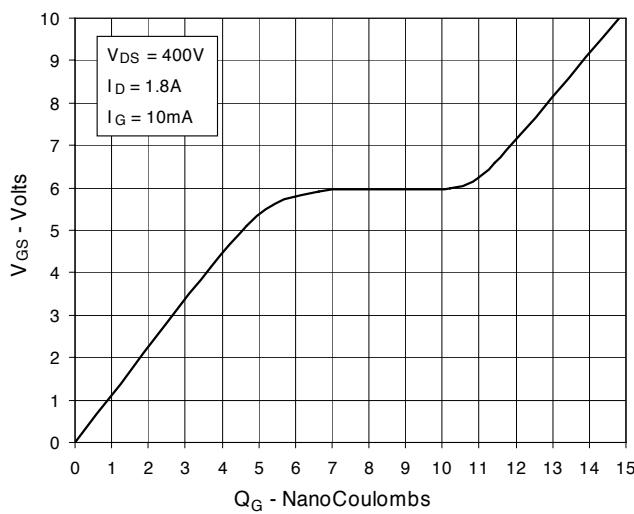
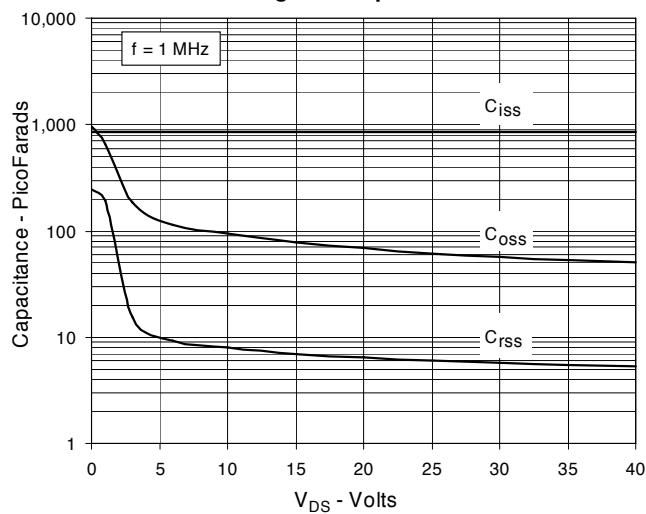
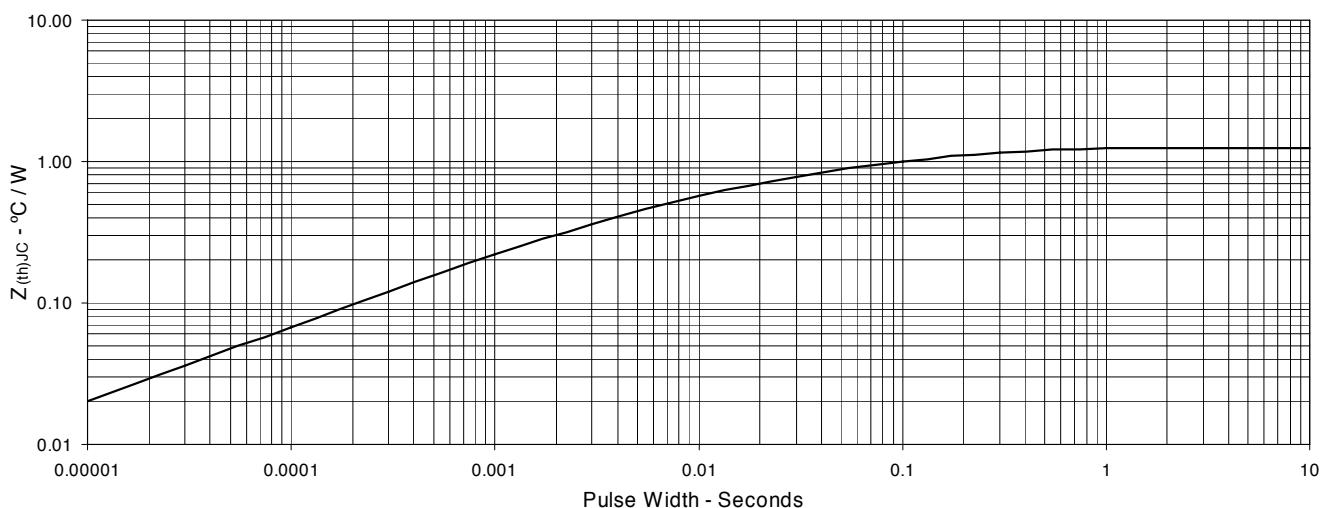


**Fig. 5. Maximum Drain Current vs.  
Case Temperature**



**Fig. 6. Input Admittance**



**Fig. 7. Transconductance**

**Fig. 8. Forward Voltage Drop of Intrinsic Diode**

**Fig. 9. Gate Charge**

**Fig. 10. Capacitance**

**Fig. 11. Maximum Transient Thermal Impedance**




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