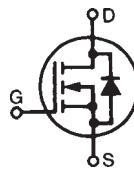
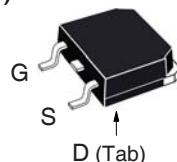
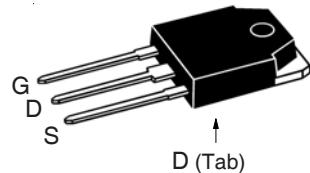
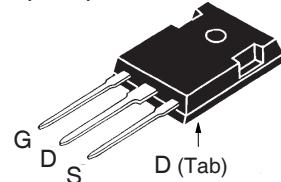


**Polar3™ HiperFET™
Power MOSFETs**
**IXFT50N50P3
IXFQ50N50P3
IXFH50N50P3**
 **V_{DSS} = 500V
 I_{D25} = 50A
 $R_{DS(on)}$ ≤ 120mΩ**

N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Rectifier

**TO-268 (IXFT)****TO-3P (IXFQ)****TO-247 (IXFH)**

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

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	$T_J = 25^\circ\text{C}$ to 150°C	500	V
V_{DGR}	$T_J = 25^\circ\text{C}$ to 150°C , $R_{GS} = 1\text{M}\Omega$	500	V
V_{GSS}	Continuous	± 30	V
V_{GSM}	Transient	± 40	V
I_{D25}	$T_C = 25^\circ\text{C}$	50	A
I_{DM}	$T_C = 25^\circ\text{C}$, Pulse Width Limited by T_{JM}	150	A
I_A	$T_C = 25^\circ\text{C}$	25	A
E_{AS}	$T_C = 25^\circ\text{C}$	500	mJ
dv/dt	$I_S \leq I_{DM}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ\text{C}$	35	V/ns
P_D	$T_C = 25^\circ\text{C}$	960	W
T_J		-55 ... +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		-55 ... +150	$^\circ\text{C}$
T_L	1.6mm (0.062in.) from Case for 10s	300	$^\circ\text{C}$
T_{sold}	Plastic Body for 10 seconds	260	$^\circ\text{C}$
M_d	Mounting Torque (TO-247 & TO-3P)	1.13 / 10	Nm/lb.in.
Weight	TO-268 TO-3P TO-247	4.0 5.5 6.0	g

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{DSS}	$V_{GS} = 0\text{V}$, $I_D = 1\text{mA}$	500		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 4\text{mA}$	3.0		5.0 V
I_{GSS}	$V_{GS} = \pm 30\text{V}$, $V_{DS} = 0\text{V}$			± 100 nA
I_{DSS}	$V_{DS} = V_{DSS}$, $V_{GS} = 0\text{V}$ $T_J = 125^\circ\text{C}$			25 μA 1.5 mA
$R_{DS(on)}$	$V_{GS} = 10\text{V}$, $I_D = 0.5 \cdot I_{D25}$, Note 1			120 mΩ

Features

- Fast Intrinsic Rectifier
- Avalanche Rated
- Low $R_{DS(on)}$ and Q_G
- Low Package Inductance

Advantages

- High Power Density
- Easy to Mount
- Space Savings

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.
g_{fs}	$V_{DS} = 20\text{V}$, $I_D = 0.5 \cdot I_{D25}$, Note 1	27	45	S
C_{iss}		4335		pF
C_{oss}	$V_{GS} = 0\text{V}$, $V_{DS} = 25\text{V}$, $f = 1\text{MHz}$	540		pF
C_{rss}		12		pF
R_{Gi}	Gate Input Resistance	1.4		Ω
$t_{d(on)}$		25		ns
t_r		8		ns
$t_{d(off)}$	$V_{GS} = 10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 0.5 \cdot I_{D25}$	53		ns
t_f	$R_G = 2\Omega$ (External)	10		ns
$Q_{g(on)}$		85		nC
Q_{gs}	$V_{GS} = 10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 0.5 \cdot I_{D25}$	21		nC
Q_{gd}		30		nC
R_{thJC}			0.13	$^\circ\text{C}/\text{W}$
R_{thCS}	(TO-247 & TO-3P)	0.25		$^\circ\text{C}/\text{W}$

Source-Drain Diode

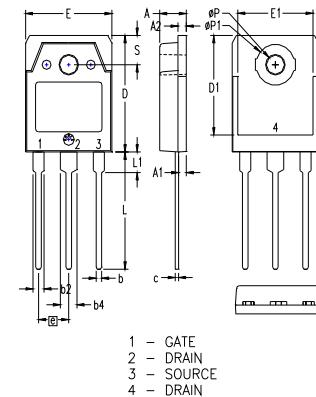
Symbol	Test Conditions ($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
I_s	$V_{GS} = 0\text{V}$		50	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}		200	A
V_{SD}	$I_F = I_s$, $V_{GS} = 0\text{V}$, Note 1		1.4	V
t_{rr}		250	ns	
I_{RM}	$I_F = 25\text{A}$, $-di/dt = 100\text{A}/\mu\text{s}$	12		A
Q_{RM}	$V_R = 100\text{V}$, $V_{GS} = 0\text{V}$	880		nC

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

TO-268 Outline		SYM	INCHES		MILLIMETERS	
			MIN	MAX	MIN	MAX
		A	.193	.201	4.90	5.10
		A1	.106	.114	2.70	2.90
		A2	.001	.010	0.02	0.25
		b	.045	.057	1.15	1.45
		b2	.075	.083	1.90	2.10
		C	.016	.026	0.40	0.65
		C2	.057	.063	1.45	1.60
		D	.543	.551	13.80	14.00
		D1	.488	.500	12.40	12.70
		E	.624	.632	15.85	16.05
		E1	.524	.535	13.30	13.60
		e	.215	BSC	5.45	BSC
		H	.736	.752	18.70	19.10
		L	.094	.106	2.40	2.70
		L1	.047	.055	1.20	1.40
		L2	.039	.045	1.00	1.15
		L3	.010	BSC	0.25	BSC
		L4	.150	.161	3.80	4.10

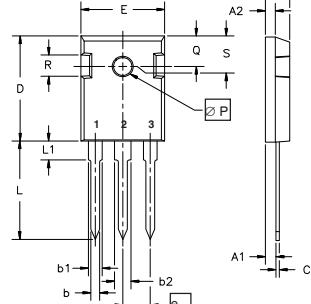
Terminals: 1 - Gate 2,4 - Drain
3 - Source

TO-3P Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.193	4.70	4.90
A1	.051	.059	1.30	1.50
A2	.057	.065	1.45	1.65
b	.035	.045	0.90	1.15
b2	.075	.087	1.90	2.20
b4	.114	.126	2.90	3.20
c	.022	.031	0.55	0.80
D	.780	.799	19.80	20.30
D1	.665	.677	16.90	17.20
E	.610	.622	15.50	15.80
E1	.531	.539	13.50	13.70
e	.215	BSC	5.45	BSC
L	.779	.795	19.80	20.20
L1	.134	.142	3.40	3.60
ØP	.126	.134	3.20	3.40
ØP1	.272	.280	6.90	7.10
S	.193	.201	4.90	5.10

TO-247 Outline



Terminals: 1 - Gate 2 - Drain

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.7	5.3	.185	.209
A ₁	2.2	2.54	.087	.102
A ₂	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b ₁	1.65	2.13	.065	.084
b ₂	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

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 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 4,860,072 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

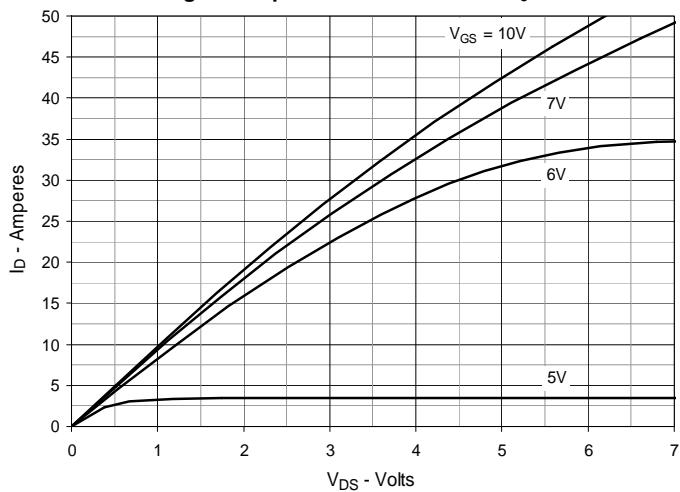
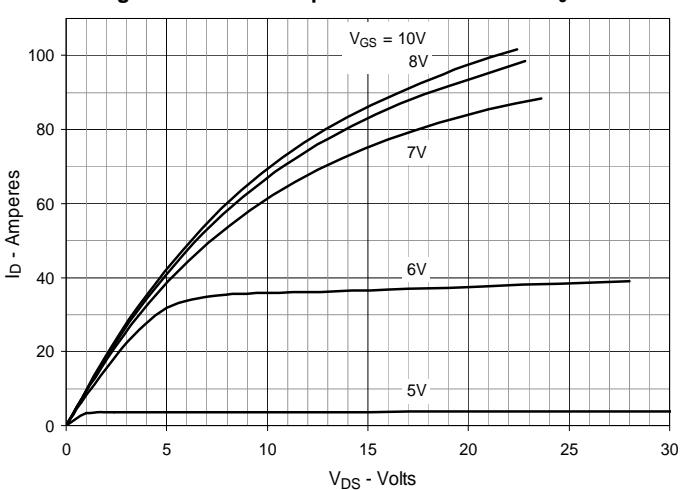
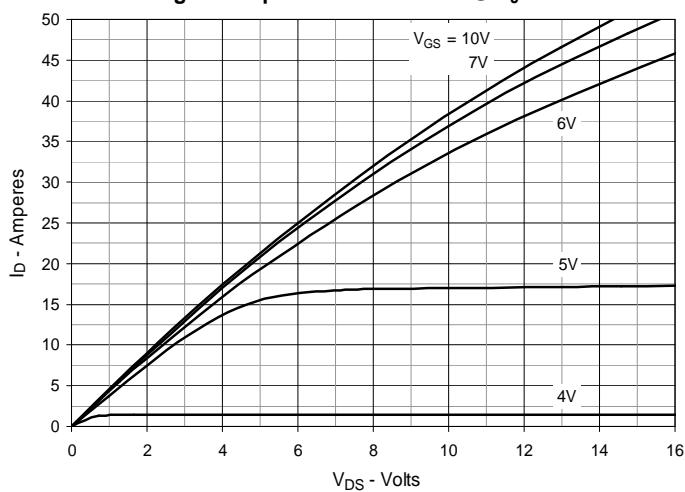
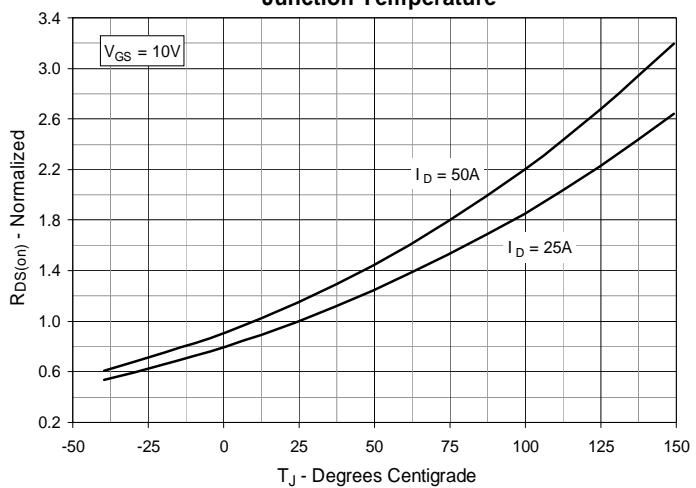
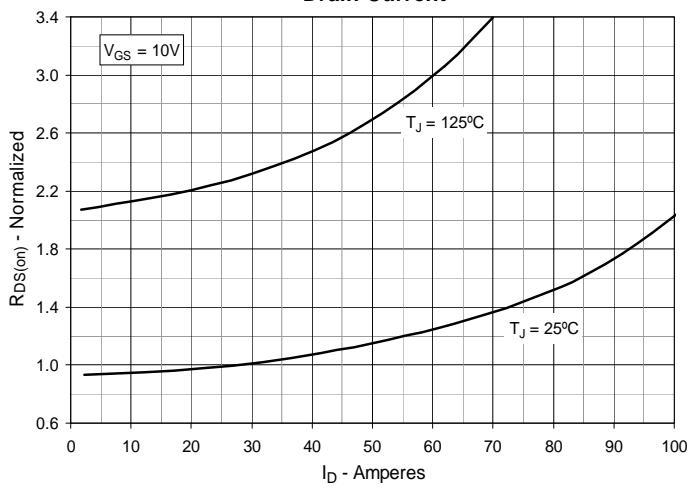
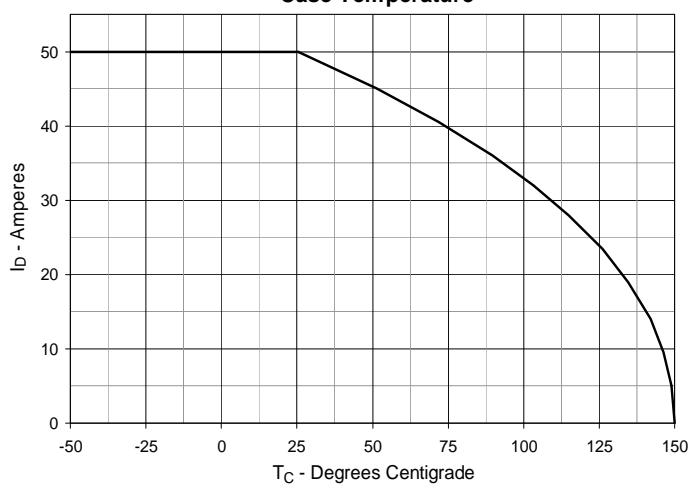
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

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 $I_D = 25\text{A}$ Value vs. Junction Temperature

Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 25\text{A}$ Value vs. Drain Current

Fig. 6. Maximum Drain Current vs. Case Temperature


Fig. 7. Input Admittance

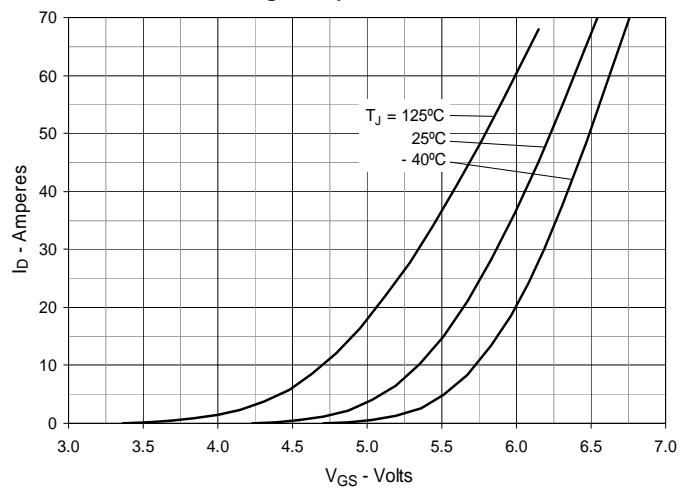


Fig. 8. Transconductance

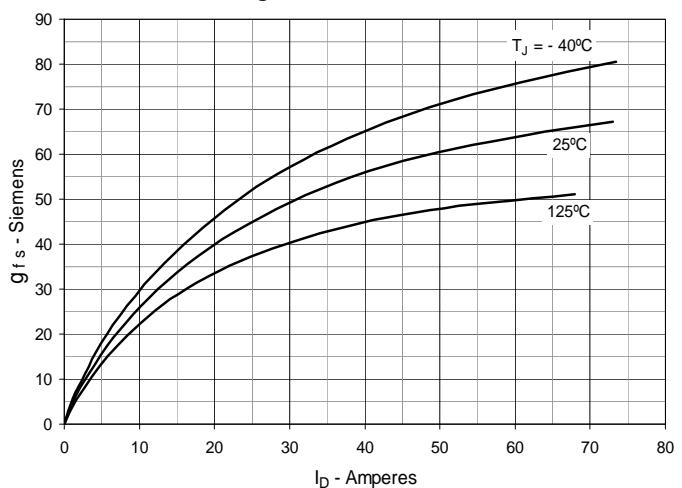


Fig. 9. Forward Voltage Drop of Intrinsic Diode

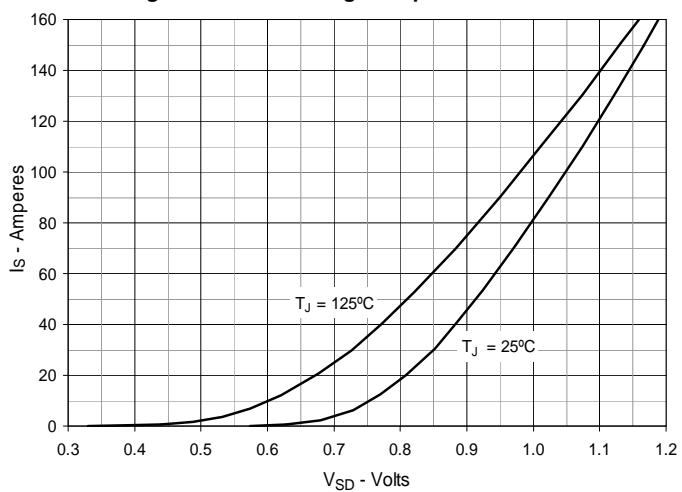


Fig. 10. Gate Charge

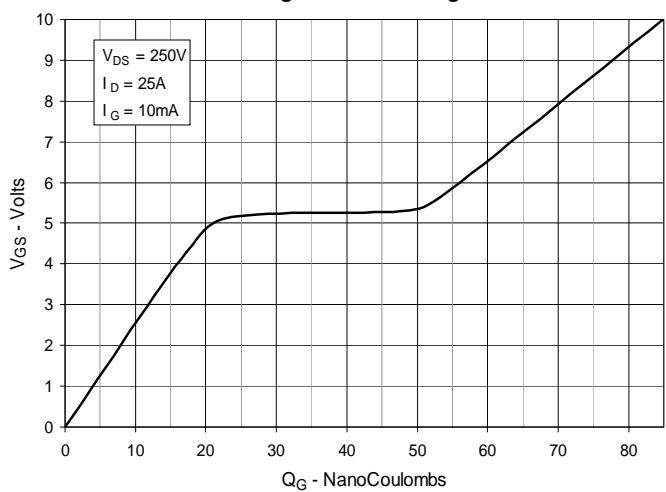


Fig. 11. Capacitance

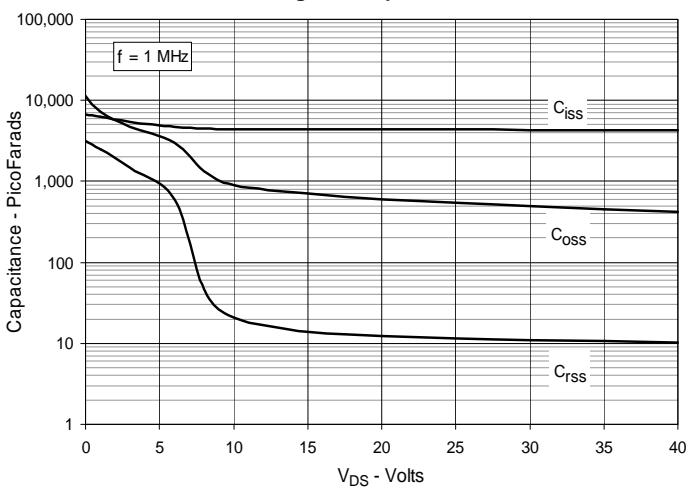


Fig. 12. Forward-Bias Safe Operating Area

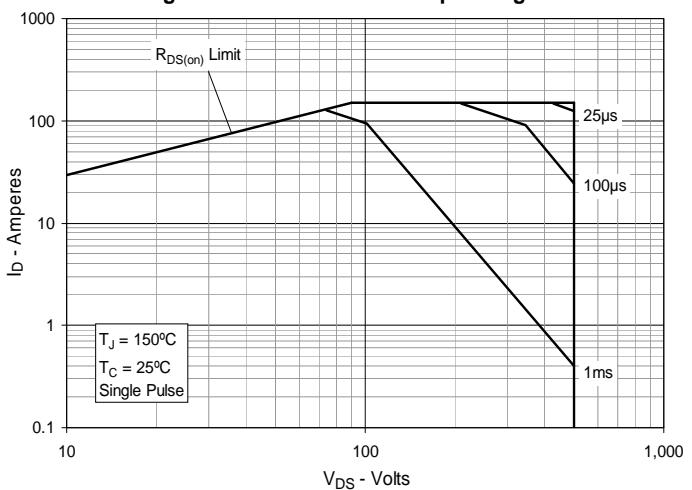


Fig. 13. Maximum Transient Thermal Impedance