IXYS

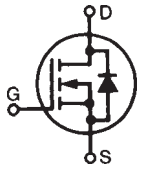
Preliminary Technical Information

Polar™ Power MOSFET
HiPerFET™

IXFK40N90P
IXFX40N90P

V_{DSS} = 900V
I_{D25} = 40A
$R_{DS(on)}$ ≤ 210mΩ
t_{rr} ≤ 300ns

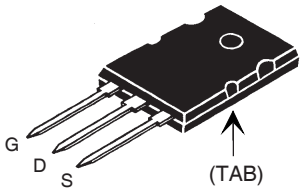
N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode



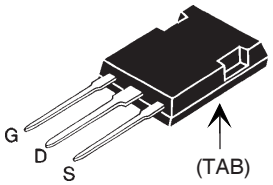
Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	900	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	900	V
V_{GSS}	Continuous	± 30	V
V_{GSM}	Transient	± 40	V
I_{D25}	T_C = 25°C	40	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	80	A
I_A	T_C = 25°C	20	A
E_{AS}	T_C = 25°C	1.5	J
dV/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$	15	V/ns
P_D	T_C = 25°C	960	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	1.6mm (0.062 in.) from case for 10s	300	°C
T_{SOLD}	Plastic body for 10s	260	°C
M_d	Mounting torque (IXFK)	1.13/10	Nm/lb.in.
F_C	Mounting force (IXFX)	20..120 /4.5..27	N/lb.
Weight	TO-264	10	g
	TO-247	6	g

Symbol	Test Conditions	Characteristic Values (T_J = 25°C unless otherwise specified)			
		Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 3mA	900			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 1mA	3.5		6.5	V
I_{GSS}	V_{GS} = ± 30V, V_{DS} = 0V			± 200	nA
I_{DSS}	$V_{DS} = V_{DSS}$			50	μA
	V_{GS} = 0V, T_J = 125°C			3.5	mA
$R_{DS(on)}$	V_{GS} = 10V, $I_D = 0.5 \bullet I_{D25}$, Note 1			210	mΩ

TO-264 (IXFK)



PLUS247 (IXFX)



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

Features

- International standard packages
- Avalanche Rated
- Low package inductance
- Fast intrinsic diode

Advantages

- Easy to mount
- Space savings
- High power density

Applications:

- Switched-mode and resonant-mode power supplies
- DC-DC Converters
- Laser Drivers
- AC and DC motor drives
- Robotics and servo controls

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Symbol	Test Conditions (T_J = 25°C unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS}= 20V, I_D = 0.5 • I_{D25}, Note 1	18	30		S
R_{Gi}	Gate input resistance		1.5		Ω
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		14		nF
C_{oss}			896		pF
C_{rss}			58		pF
$t_{d(on)}$	**Resistive Switching Times**		53		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		50		ns
$t_{d(off)}$	R_G = 1Ω (External)		77		ns
t_f			46		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		230		nC
Q_{gs}			70		nC
Q_{gd}			100		nC
R_{thJC}				0.13	°C/W
R_{thCS}			0.15		°C/W

Source-Drain Diode

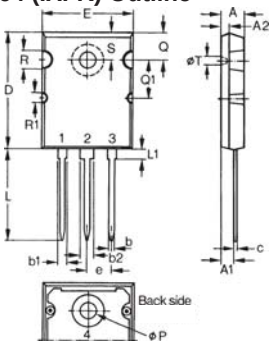
Symbol	Test Conditions (T_J = 25°C unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0V			40	A
I_{SM}	Repetitive, pulse width limited by T_{JM}			160	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.5	V
t_{rr}	I_F = 20A, -di/dt = 100A/μs			300	ns
Q_{RM}	V_R = 100V, V_{GS} = 0V		1.7		μC
I_{RM}			14		A

Note 1: Pulse test, t ≤ 300μs; duty cycle, d ≤ 2%.

PRELIMINARY TECHNICAL INFORMATION

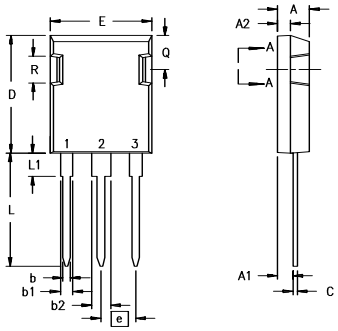
The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

TO-264 (IXFK) Outline



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.82	5.13	.190	.202
A1	2.54	2.89	.100	.114
A2	2.00	2.10	.079	.083
b	1.12	1.42	.044	.056
b1	2.39	2.69	.094	.106
b2	2.90	3.09	.114	.122
c	0.53	0.83	.021	.033
D	25.91	26.16	1.020	1.030
E	19.81	19.96	.780	.786
e	5.46 BSC		.215 BSC	
J	0.00	0.25	.000	.010
K	0.00	0.25	.000	.010
L	20.32	20.83	.800	.820
L1	2.29	2.59	.090	.102
P	3.17	3.66	.125	.144
Q	6.07	6.27	.239	.247
Q1	8.38	8.69	.330	.342
R	3.81	4.32	.150	.170
R1	1.78	2.29	.070	.090
S	6.04	6.30	.238	.248
T	1.57	1.83	.062	.072

PLUS 247™ (IXFX) Outline



Terminals: 1 - Gate
2 - Drain (Collector)
3 - Source (Emitter)
4 - Drain (Collector)

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.83	5.21	.190	.205
A_1	2.29	2.54	.090	.100
A_2	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b_1	1.91	2.13	.075	.084
b_2	2.92	3.12	.115	.123
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	5.45 BSC		.215 BSC	
L	19.81	20.32	.780	.800
L1	3.81	4.32	.150	.170
Q	5.59	6.20	.220	0.244
R	4.32	4.83	.170	.190

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 4,850,072 4,881,106 4,931,844 5,017,508 5,034,796 5,049,961 5,063,307 5,187,117 5,237,481 5,381,025 5,486,715 6,162,665 6,259,123 B1 6,306,728 B1 6,404,065 B1 6,534,343 6,583,505 6,683,344 6,710,405 B2 6,710,463 6,727,585 6,759,692 6,771,478 B2 7,005,734 B2 7,063,975 B2 7,071,537 7,157,338B2

Fig. 1. Output Characteristics @ 25ºC

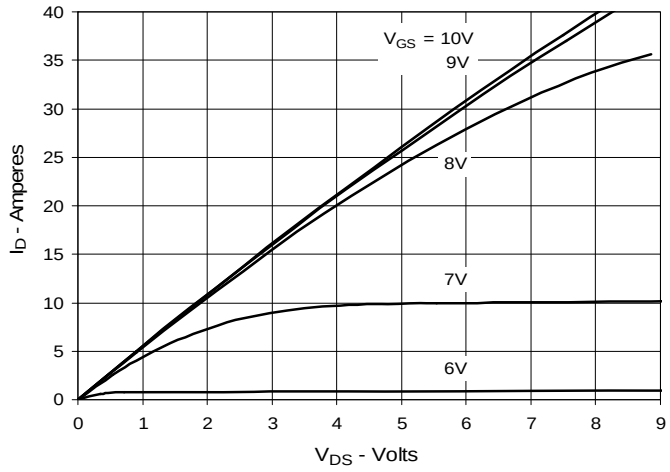


Fig. 2. Extended Output Characteristics @ 25ºC

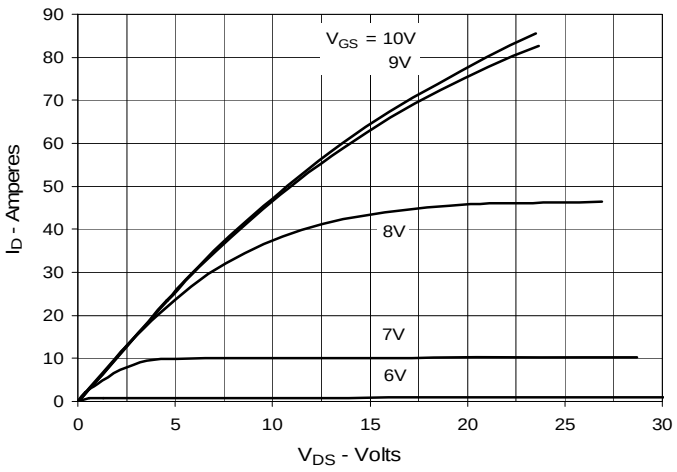


Fig. 3. Output Characteristics @ 125ºC

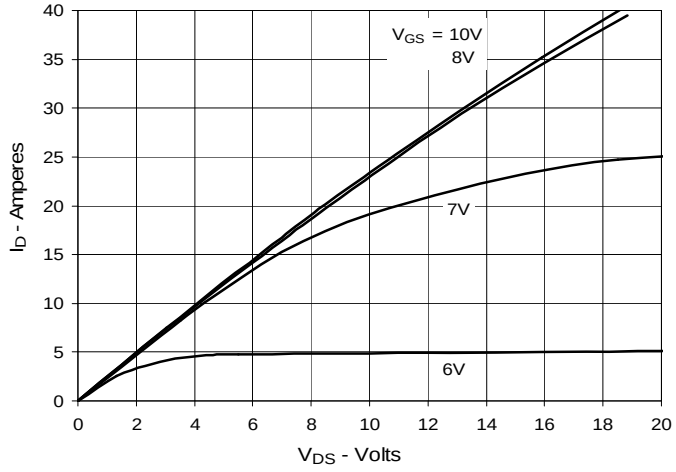


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 20A Value vs. Junction Temperature

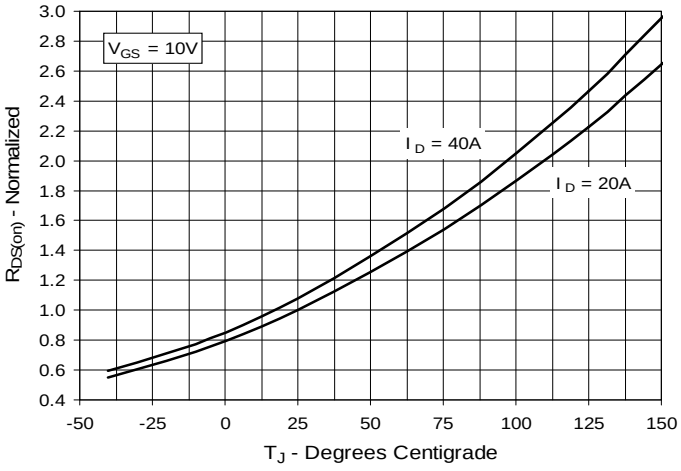


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 20A Value vs. Drain Current

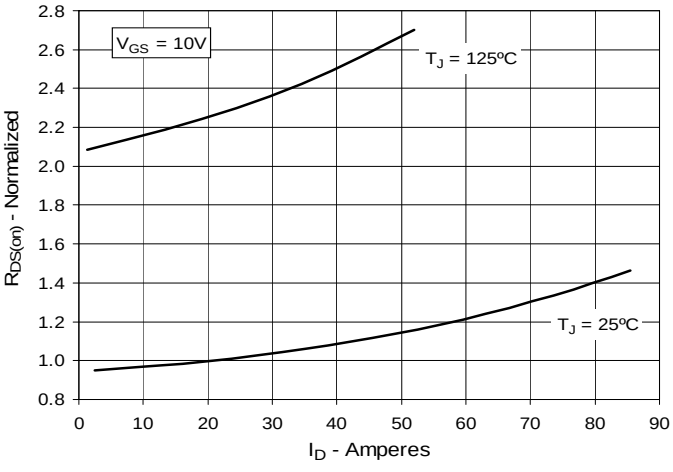
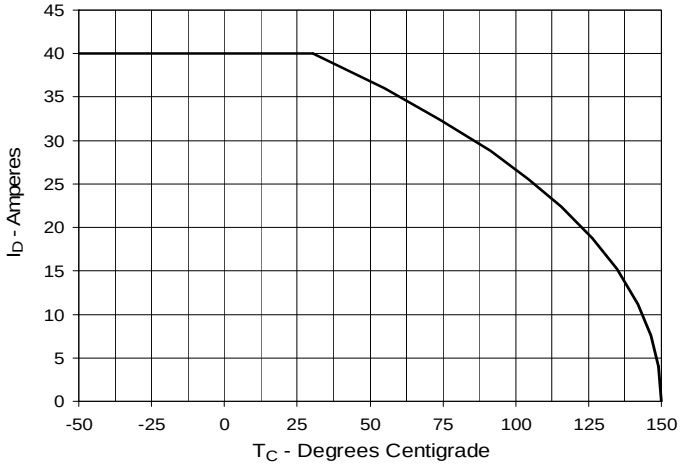


Fig. 6. Maximum Drain Current vs. Case Temperature



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Fig. 7. Input Admittance

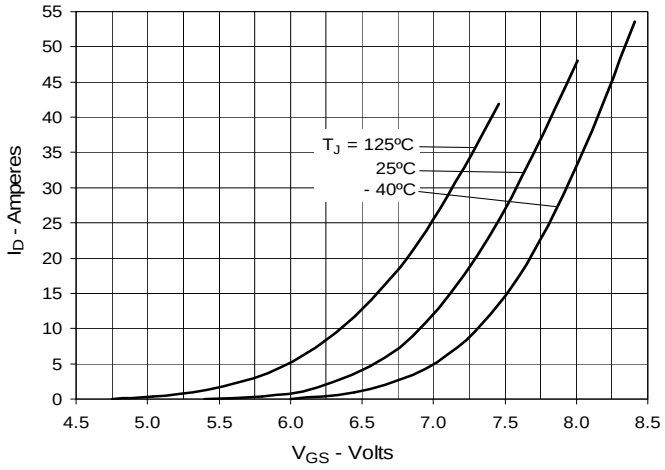


Fig. 8. Transconductance

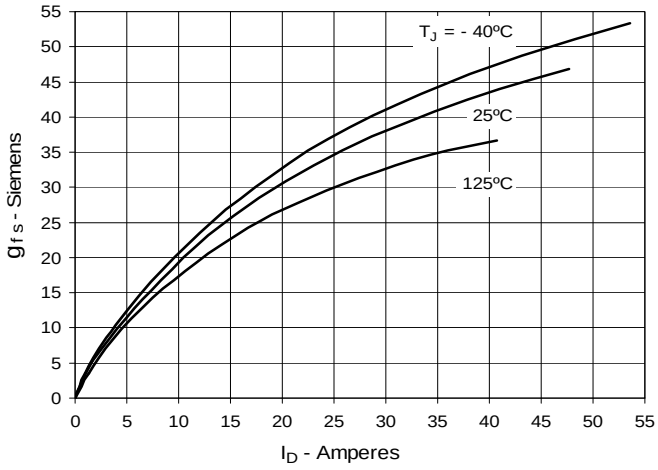


Fig. 9. Forward Voltage Drop of Intrinsic Diode

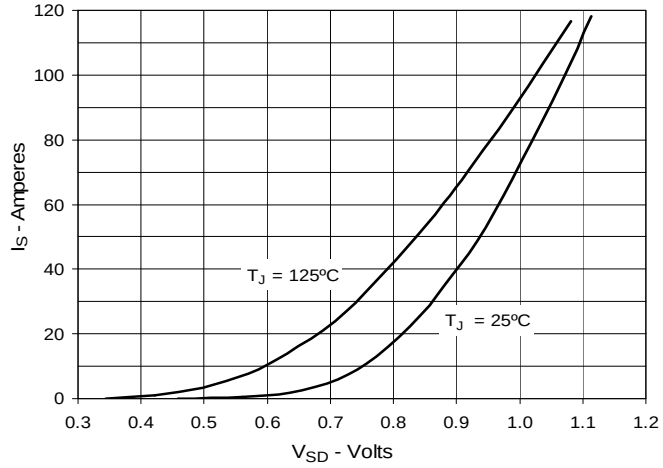


Fig. 10. Gate Charge

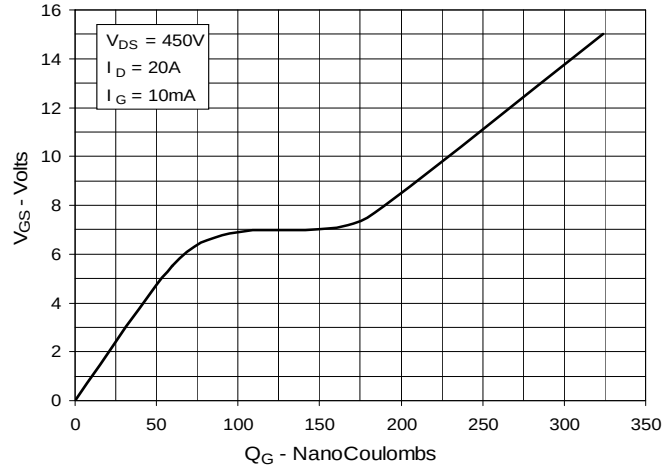


Fig. 11. Capacitance

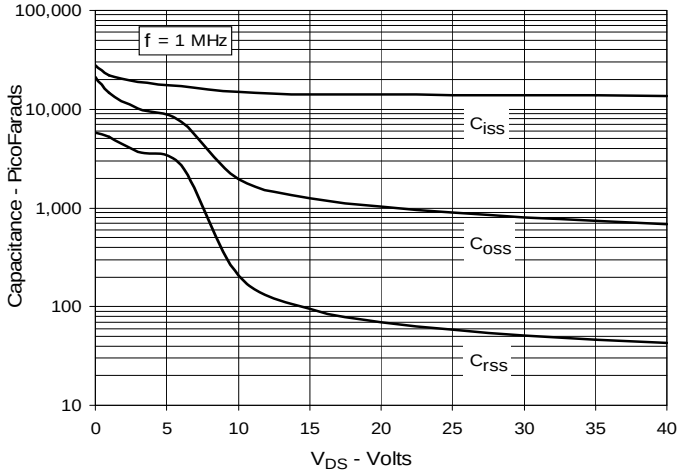
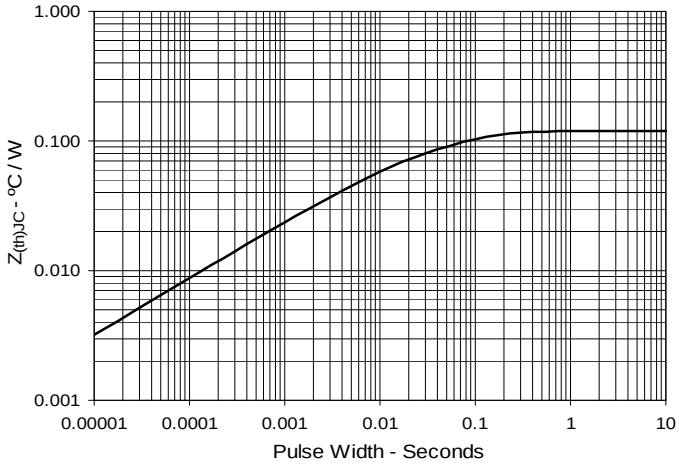


Fig. 12. Maximum Transient Thermal Impedance



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