

Polar™ Power MOSFET
HiPerFET™

IXFK140N30P
IXFX140N30P

V_{DSS} = 300V
I_{D25} = 140A
R_{DS(on)} ≤ 24mΩ
t_{rr} ≤ 200ns

N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode

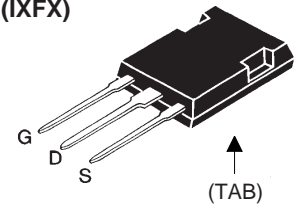


Symbol	Test Conditions	Maximum Ratings	
V _{DSS}	T _J = 25°C to 150°C	300	V
V _{DGR}	T _J = 25°C to 150°C, R _{GS} = 1MΩ	300	V
V _{GSS}	Continuous	±20	V
V _{GSM}	Transient	±30	V
I _{D25}	T _C = 25°C	140	A
I _{LRMS}	Lead Current Limit, RMS	75	A
I _{DM}	T _C = 25°C, pulse width limited by T _{JM}	300	A
I _A	T _C = 25°C	70	A
E _{AS}	T _C = 25°C	5	J
dV/dt	I _S ≤ I _{DM} , V _{DD} ≤ V _{DSS} , T _J ≤ 150°C	20	V/ns
P _D	T _C = 25°C	1040	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 force (PLUS247)	20..120/4.5..27	N/lb.
	Mounting torque (TO-264)	1.13/10	Nm/lb.in.
Weight	PLUS247	6	g
	TO-264	10	g

TO-264 (IXFK)



PLUS247 (IXFX)



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

Features

- Fast intrinsic diode
- Avalanche Rated
- Low R_{DS(ON)} and Q_G
- Low package inductance

Advantages

- Easy to mount
- Space savings
- High power density

Applications

- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- AC and DC motor control
- Uninterrupted power supplies
- High speed power switching applications

Symbol	Test Conditions (T _J = 25°C, unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
BV _{DSS}	V _{GS} = 0V, I _D = 3mA	300		V
V _{GS(th)}	V _{DS} = V _{GS} , I _D = 8mA	3.0		5.0 V
I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V			±200 nA
I _{DSS}	V _{DS} = V _{DSS} V _{GS} = 0V T _J = 125°C			25 μA 1 mA
R _{DS(on)}	V _{GS} = 10V, I _D = 0.5 • I _{D25} , Note 1	20	24	mΩ

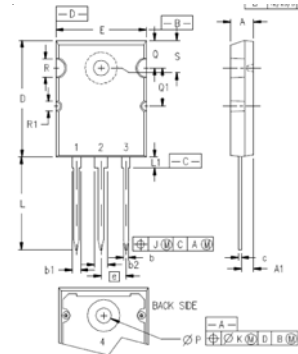
Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$V_{DS} = 20\text{V}$, $I_D = 0.5 \cdot I_{D25}$, Note 1	50	90	S
C_{iss}	$V_{GS} = 0\text{V}$, $V_{DS} = 25\text{V}$, $f = 1\text{MHz}$		14.8	nF
C_{oss}			1830	pF
C_{rss}			55	pF
$t_{d(on)}$	Resistive Switching Times $V_{GS} = 10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 0.5 \cdot I_{D25}$ $R_G = 1\Omega$ (External)		30	ns
t_r			30	ns
$t_{d(off)}$			100	ns
t_f			20	ns
$Q_{g(on)}$			185	nC
Q_{gs}	$V_{GS} = 10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 0.5 \cdot I_{D25}$		72	nC
Q_{gd}			60	nC
R_{thJC}			0.12	$^\circ\text{C/W}$
R_{thCS}		0.15		$^\circ\text{C/W}$

Source-Drain Diode

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
I_S	$V_{GS} = 0\text{V}$			140 A
I_{SM}	Repetitive, pulse width limited by T_{JM}			560 A
V_{SD}	$I_F = 70\text{A}$, $V_{GS} = 0\text{V}$, Note 1			1.3 V
t_{rr}	$I_F = 25\text{A}$, $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}$, $V_{GS} = 0\text{V}$		0.6	200 nS
Q_{RM}				μC
I_{RM}			6.0	A

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

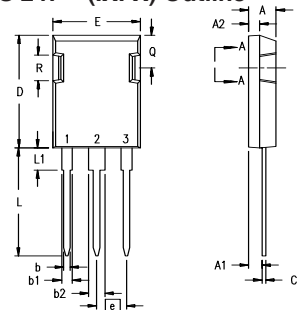
TO-264 (IXFK) Outline



- 1 - GATE
2, 4 - DRAIN (COLLECTOR)
3 - SOURCE (EMITTER)

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.209	4.70	5.31
A1	.102	.118	2.59	3.00
b	.037	.055	0.94	1.40
b1	.087	.102	2.21	2.59
b2	.110	.126	2.79	3.20
c	.017	.029	0.43	0.74
D	1.007	1.047	25.58	26.59
E	.760	.799	19.30	20.29
e	.215BSC		5.46 BSC	
J	.000	.010	0.00	0.25
K	.000	.010	0.00	0.25
L	.779	.842	19.79	21.39
L1	.087	.102	2.21	2.59
$\varnothing P$	.122	.138	3.10	3.51
Q	.240	.256	6.10	6.50
Q1	.330	.346	8.38	8.79
$\varnothing R$	.155	.187	3.94	4.75
$\varnothing R1$	.085	.093	2.16	2.36
S	.243	.253	6.17	6.43

PLUS 247™ (IXFX) Outline



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

Dim.	Millimeter		Inches	
	Min.	Max.	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	4,931,844	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

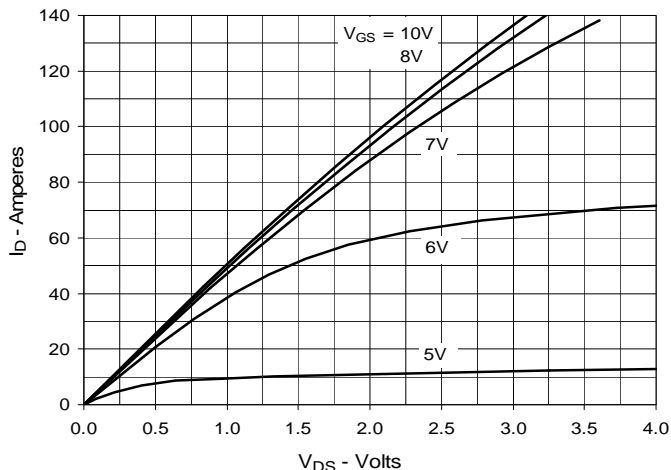


Fig. 2. Extended Output Characteristics @ 25°C

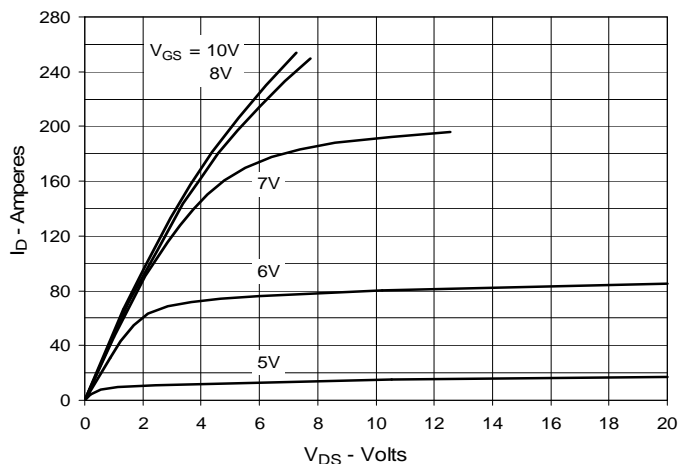


Fig. 3. Output Characteristics @ 125°C

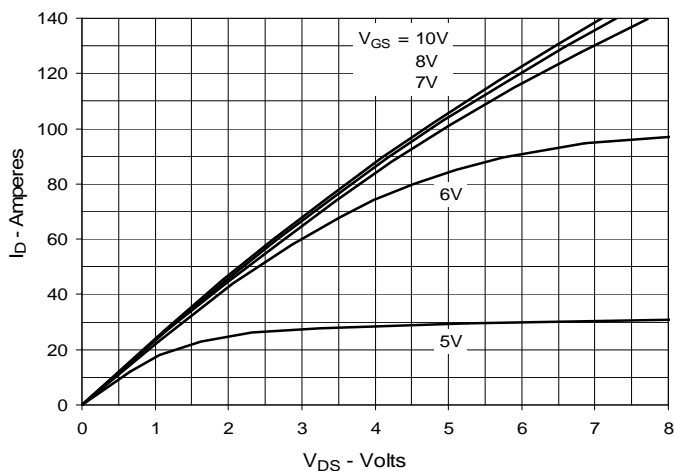


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 70A$ Value vs. Junction Temperature

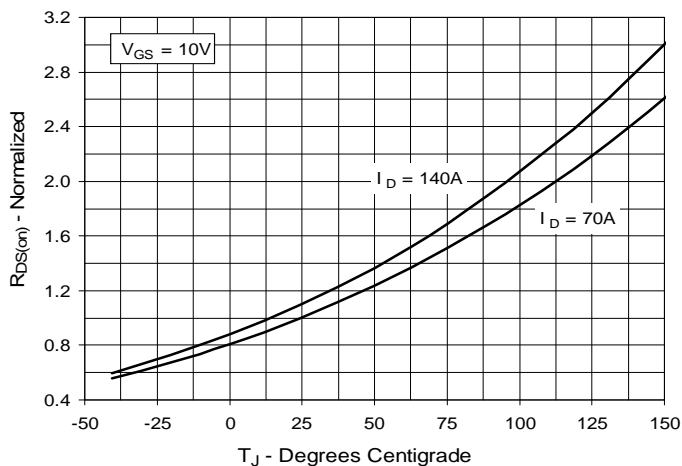


Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 70A$ Value vs. Drain Current

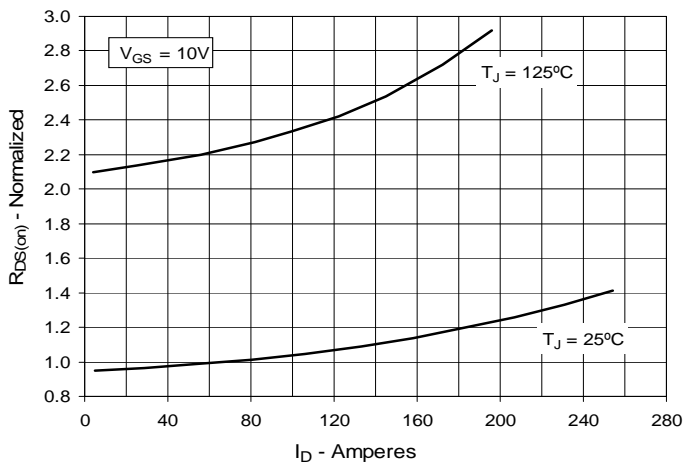


Fig. 6. Maximum Drain Current vs. Case Temperature

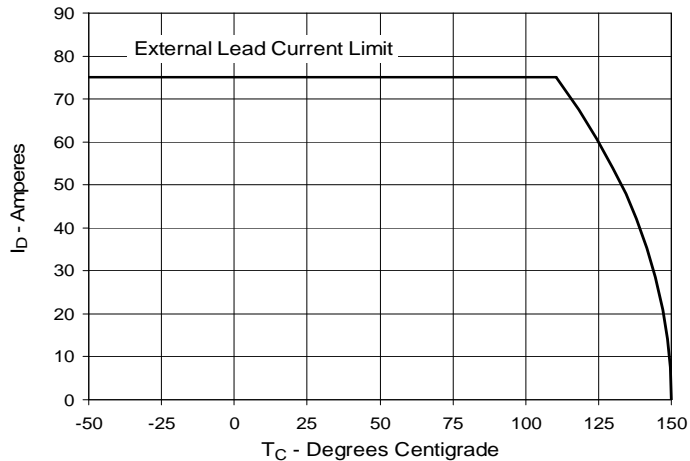


Fig. 7. Input Admittance

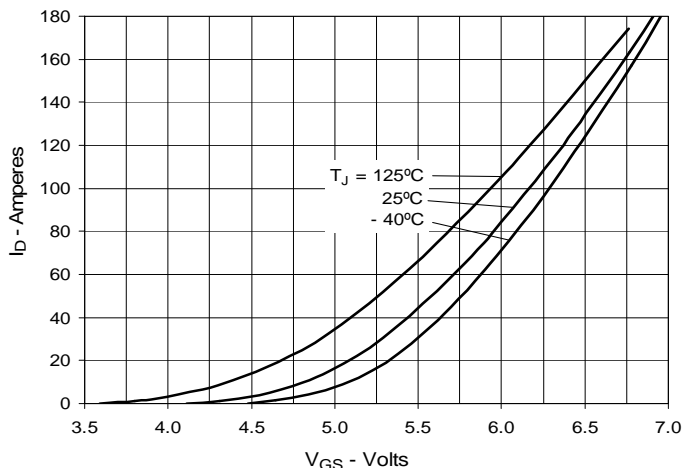


Fig. 8. Transconductance

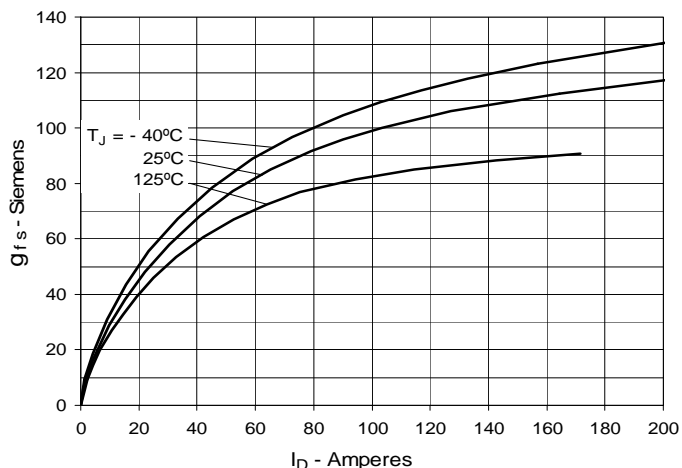


Fig. 9. Forward Voltage Drop of Intrinsic Diode

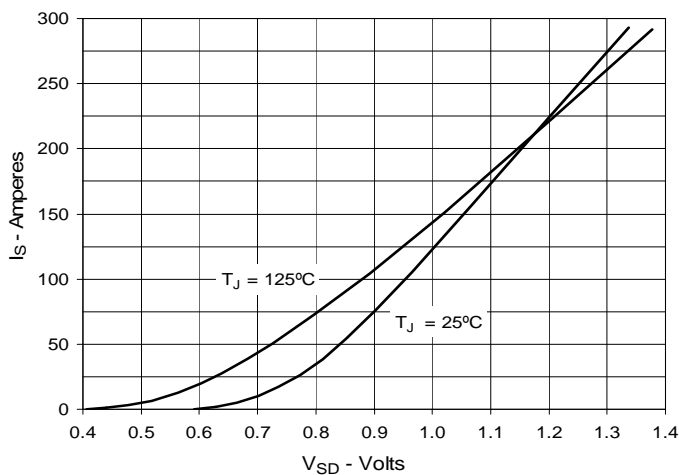


Fig. 10. Gate Charge

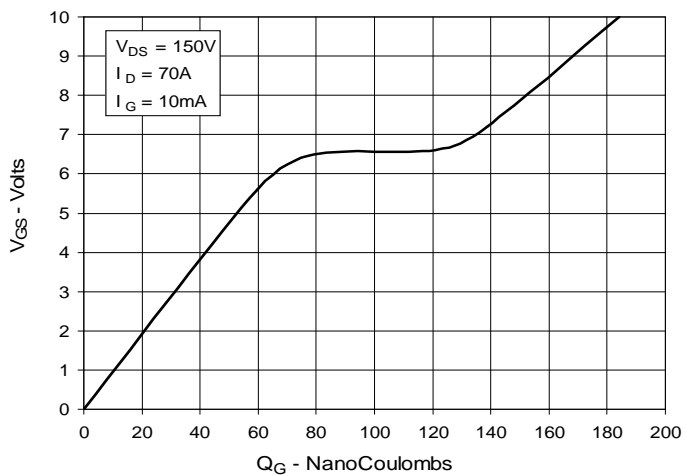


Fig. 11. Capacitance

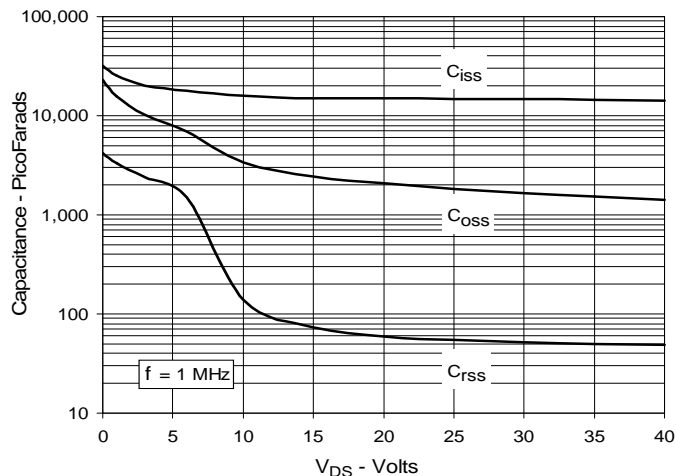


Fig. 12. Forward-Bias Safe Operating Area

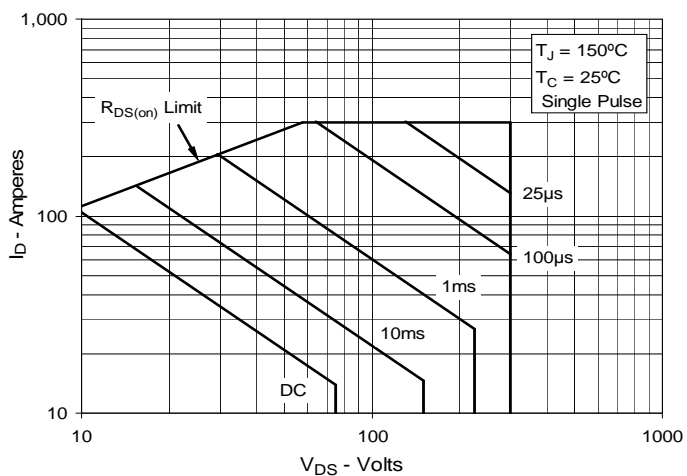
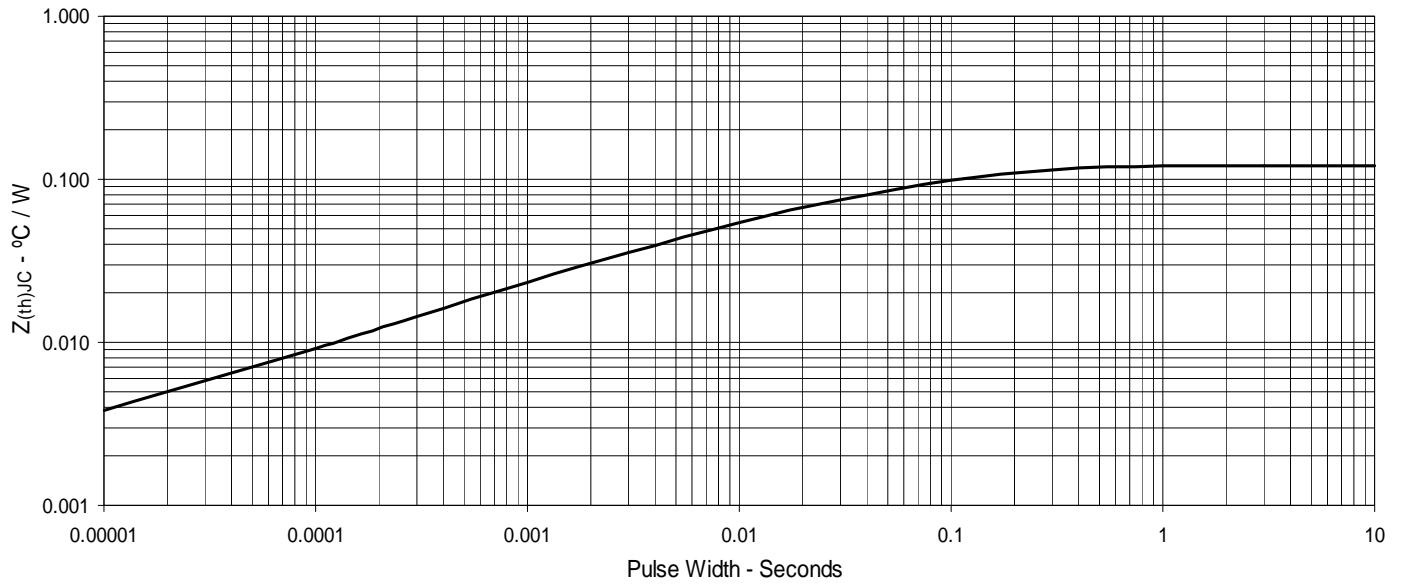


Fig. 13. Maximum Transient Thermal Impedance





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