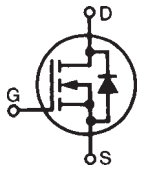
IXYS

Preliminary Technical Information

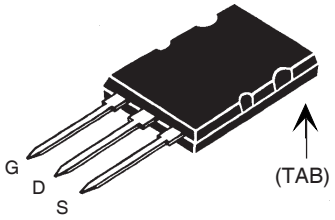
Polar™ Power MOSFET IXFB170N30P
HiPerFET™

V_{DSS} = 300V
I_{D25} = 170A
$R_{DS(on)}$ ≤ 18mΩ
t_{rr} ≤ 200ns

N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode



PLUS264™ (IXFB)



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

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	170	A
I_{LRMS}	Leads Current Limit, RMS	75	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	500	A
I_A	T_C = 25°C	85	A
E_{AS}	T_C = 25°C	5	J
dV/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$	20	V/ns
P_D	T_C = 25°C	1250	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
F_C	Mounting force	30..120/6.7..27	N/lb.
Weight		10	g

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 = 1mA	2.5		4.5	V
I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±200	nA
I_{DSS}	$V_{DS} = V_{DSS}$			25	μA
	V_{GS} = 0V, T_J = 125°C			1.5	mA
$R_{DS(on)}$	V_{GS} = 10V, $I_D = 0.5 \bullet I_{D25}$, Note 1			18	mΩ

Features

- Fast intrinsic diode
- Avalanche Rated
- Unclamped Inductive Switching (UIS) rated
- Very low R_{th} results high power dissipation
- Low $R_{DS(ON)}$ and Q_G
- Low package inductance

Advantages

- Low gate charge results in simple drive requirement
- Improved Gate, Avalanche and dynamic dv/dt ruggedness
- High power density

Applications

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

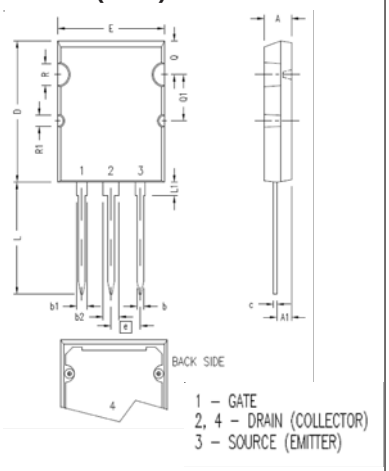
Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 10V, I_D = 60A, Note 1	57	95		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		20		nF
C_{oss}			2450		pF
C_{rss}			27		pF
$t_{d(on)}$	**Resistive Switching Times**		41		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D =0.5 • I_{D25}		29		ns
$t_{d(off)}$	R_G = 1Ω (External)		79		ns
t_f			16		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		258		nC
Q_{gs}			82		nC
Q_{gd}			78		nC
R_{thJC}				0.10	°C/W
R_{thCS}			0.13		°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			170	A
I_{SM}	Repetitive, pulse width limited by T_{JM}			500	A
V_{SD}	I_F = 85A, V_{GS} = 0V, Note 1			1.3	V
t_{rr}	I_F = 85A, -di/dt = 150A/µs			200	ns
Q_{RM}	V_R = 100V		1.85		µC
I_{RM}			21		A

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

PLUS264™ (IXFB) Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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	.215 BSC		5.46 BSC	
L	.779	.842	19.79	21.39
L1	.087	.102	2.21	2.59
Q	.240	.256	6.10	6.50
Q1	.330	.346	8.38	8.79
ØR	.155	.187	3.94	4.75
ØR1	.085	.093	2.16	2.36

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.

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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

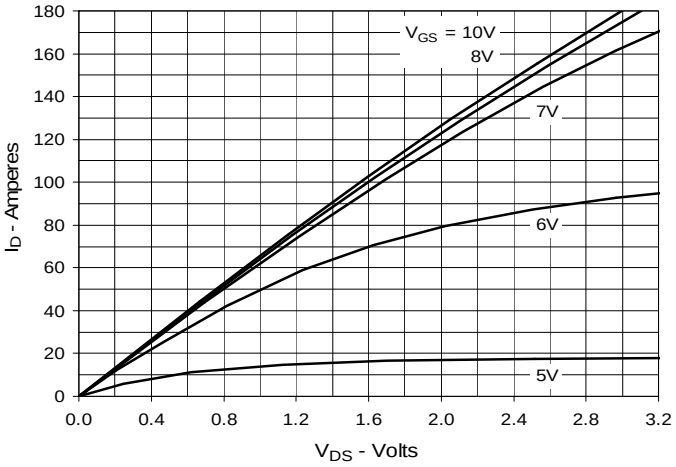

Fig. 2. Extended Output Characteristics @ 25ºC

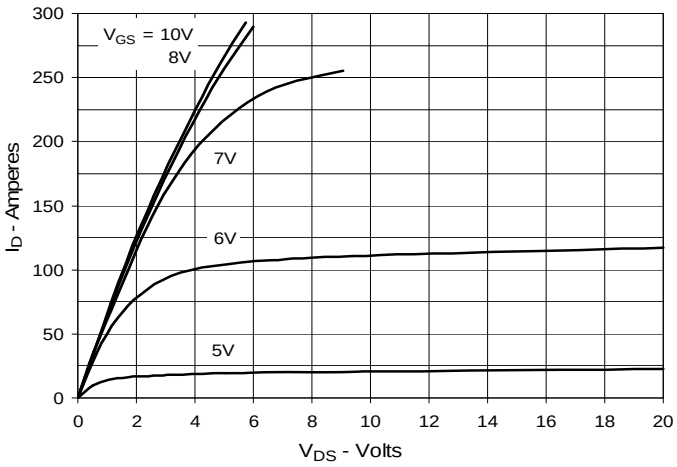

Fig. 3. Output Characteristics @ 125ºC

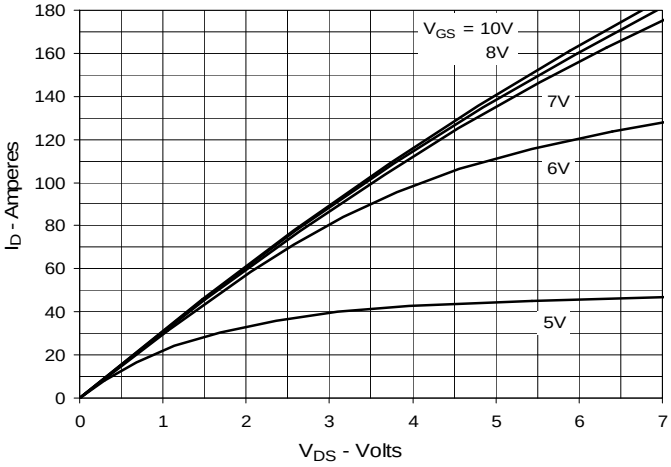

Fig. 4. $R_{DS(on)}$ Normalized to I_D = 85A Value vs. Junction Temperature

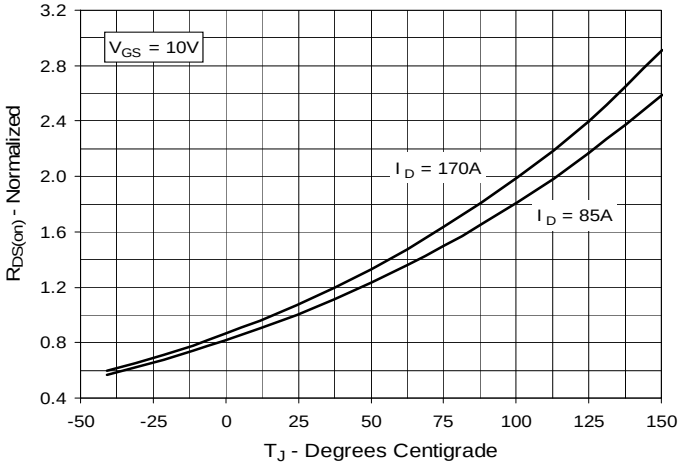

Fig. 5. $R_{DS(on)}$ Normalized to I_D = 85A Value vs. Drain Current

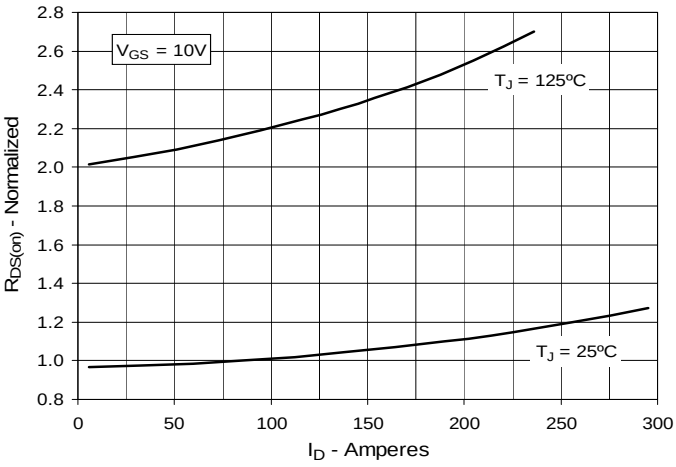

Fig. 6. Maximum Drain Current vs. Case Temperature

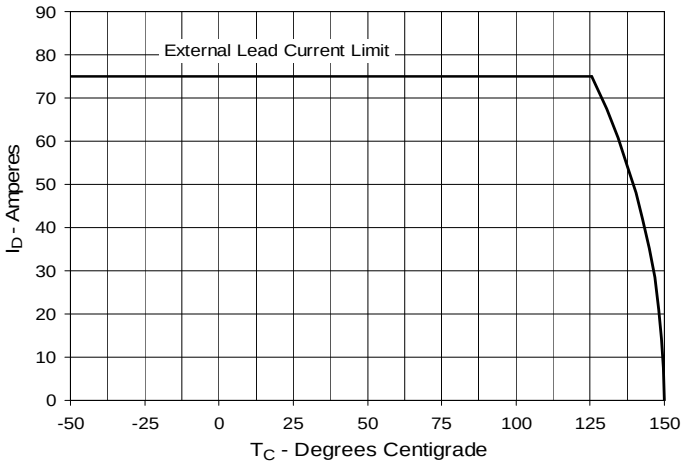

Fig. 7. Input Admittance

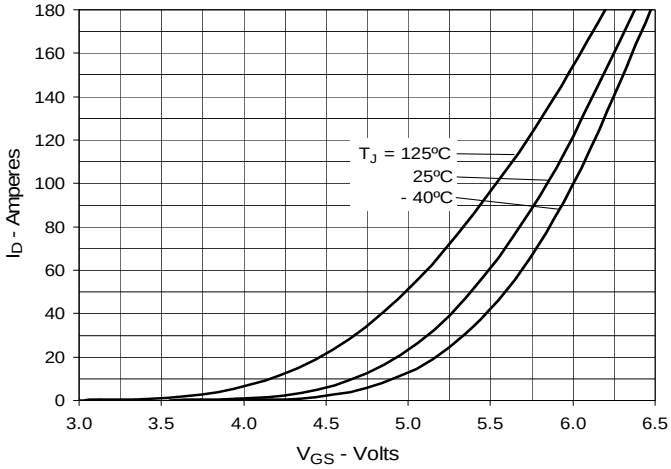

Fig. 8. Transconductance

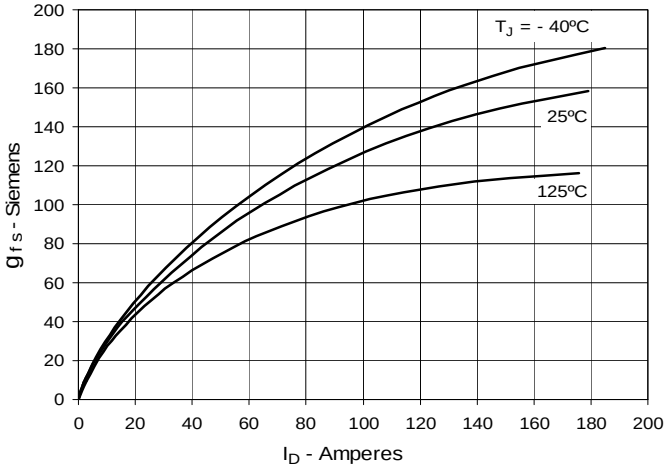

Fig. 9. Forward Voltage Drop of Intrinsic Diode

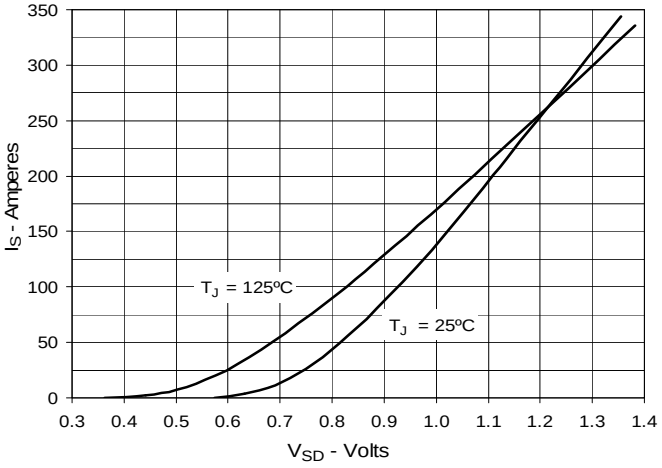

Fig. 10. Gate Charge

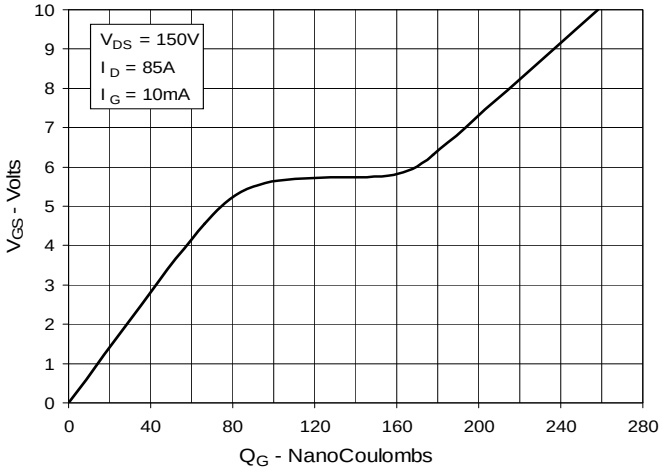

Fig. 11. Capacitance

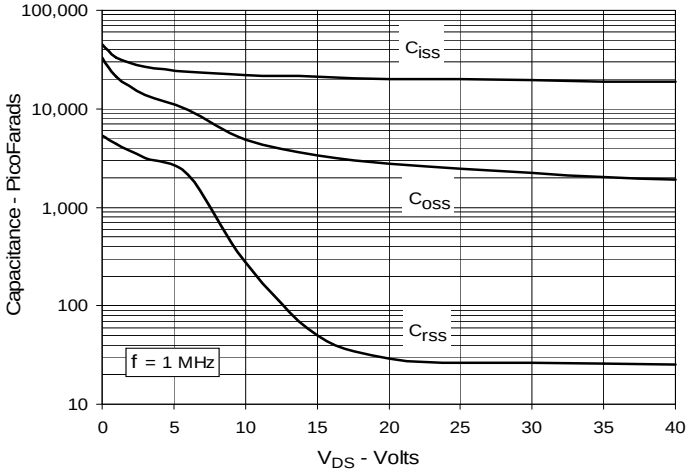

Fig. 12. Forward-Bias Safe Operating Area

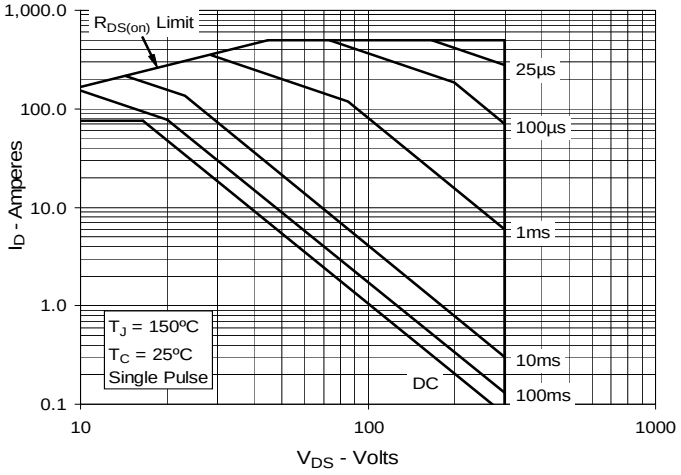

Fig. 12. Maximum Transient Thermal Impedance