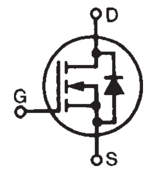
IXYS

PolarHV™ HiPerFET Power MOSFET
(Electrically Isolated Back Surface)

IXFC 36N50P
IXFR 36N50P

V_{DSS}	=	500	V
I_{D25}	=	19	A
$R_{DS(on)}$	≤	190	mΩ
t_{rr}	≤	200	ns

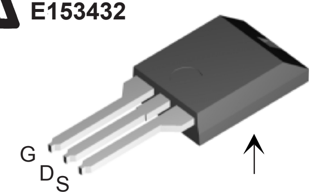
N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode



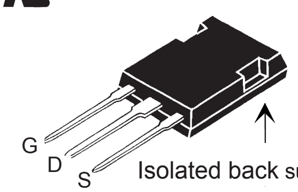
Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25° C to 150° C	500	V
V_{DGR}	T_J = 25° C to 150° C; R_{GS} = 1 MΩ	500	V
V_{GSS}	Continuous	± 30	V
V_{GSM}	Transient	± 40	V
I_{D25}	T_C = 25° C	19	A
I_{DM}	T_C = 25° C, pulse width limited by T_{JM}	100	A
I_{AR}	T_C = 25° C	36	A
E_{AR}	T_C = 25° C	50	mJ
E_{AS}	T_C = 25° C	1.5	J
dv/dt	I_S ≤ I_{DM}, di/dt ≤ 100 A/μs, V_{DD} ≤ V_{DSS}, T_J ≤ 150° C, R_G = 4 Ω	20	V/ns
P_D	T_C = 25° C	156	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
V_{ISOL}	50/60 Hz, RMS, 1 minute	2500	V~
F_C	Mounting Force (IXFC)	11..65 / 2.5..15	N/lb
	(IXFR)	20..120 / 4.5..25	N/lb
Weight	(IXFC)	3	g
	(IXFR)	5	g

Symbol	Test Conditions (T_J = 25° C unless otherwise specified)		Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0 V, I_D = 250 μA		500			V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 4 mA		2.5		5.0	V
I_{GSS}	V_{GS} = ±30 V_{DC}, V_{DS} = 0				± 100	nA
I_{DSS}	V_{DS} = V_{DSS}				25	μA
	V_{GS} = 0 V	T_J = 125° C			250	μA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = I_T				190	mΩ

ISOPLUS220™ (IXFC)
E153432



ISOPLUS247™ (IXFR)
E153432



G = Gate D = Drain
S = Source

Features
- International standard isolated packages
- UL recognized packages
- Silicon chip on Direct-Copper-Bond substrate
  - High power dissipation
  - Isolated mounting surface
  - 2500V electrical isolation
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
  - easy to drive and to protect
- Fast intrinsic diode

Advantages
- Easy to mount
- Space savings
- High power density

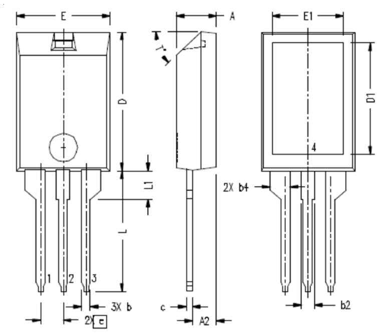
Symbol	Test Conditions	Characteristic Values ($T_J = 25°C$ unless otherwise specified) Min.	Typ.	Max.	
g_{fs}	V_{DS} = 20 V; I_D = $_T$, Note 1	23	35		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		5500		pF
C_{oss}			510		pF
C_{rss}			40		pF
$t_{d(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 I_{D25}		29		ns
t_r	R_G = 4 Ω (External)		23		ns
$t_{d(off)}$			82		ns
t_f			23		ns
$Q_{g(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS}, $I_D = I_T$		93		nC
Q_{gs}			30		nC
Q_{gd}			31		nC
R_{thJC}				0.75	°C/W
R_{thCS}	(ISOPLUS 247)		0.15		°C/W
	(ISOPLUS 220)		0.21		°C/W

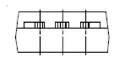
Source-Drain Diode

Symbol	Test Conditions	Characteristic Values ($T_J = 25°C$, unless otherwise specified) Min.	Typ.	Max.	
I_S	V_{GS} = 0 V			36	A
I_{SM}	Repetitive			100	A
V_{SD}	$I_F = I_S$, V_{GS} = 0 V,			1.5	V
t_{rr}	I_F = 25A, -di/dt = 100 A/µs			200	ns
I_{RM}	V_R = 100 V; V_{GS} = 0 V		8		A
Q_{RM}			0.6		µC

Notes:
1. Pulse test, t ≤300 µs, duty cycle d≤ 2 %;
2. Test current I_T = 18A.

ISOPLUS220™ (IXFC) Outline



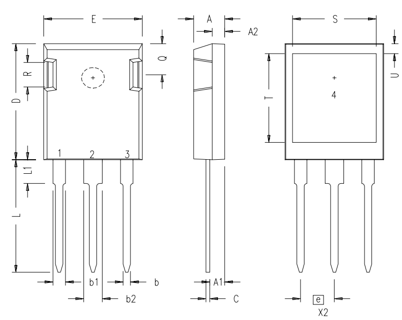


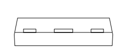
Note:
Bottom heatsink (Pin 4) is electrically isolated from Pin 1,2, or 3.

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.157	.197	4.00	5.00
A2	.098	.118	2.50	3.00
b	.035	.051	0.90	1.30
b2	.049	.065	1.25	1.65
b4	.093	.100	2.35	2.55
c	.028	.039	0.70	1.00
D	.591	.630	15.00	16.00
D1	.472	.512	12.00	13.00
E	.394	.433	10.00	11.00
E1	.295	.335	7.50	8.50
e	.100 BASIC		2.55 BASIC	
L	.512	.571	13.00	14.50
L1	.118	.138	3.00	3.50
T°			42.5°	47.5°

Ref: IXYS CO 0177 R0

ISOPLUS247 Outline





SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b1	.075	.084	1.91	2.13
b2	.115	.123	2.92	3.12
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
E	.620	.635	15.75	16.13
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1	.150	.170	3.81	4.32
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83
S	.520	.540	13.21	13.72
T	.620	.640	15.75	16.26
U	.065	.080	1.65	2.03

1 – GATE
2 – DRAIN (COLLECTOR)
3 – SOURCE (EMITTER)
4 – NO CONNECTION

NOTE: This drawing will meet all dimensions requirement of JEDEC outline TO-247AD except screw hole.

Fig. 1. Output Characteristics @ 25°C

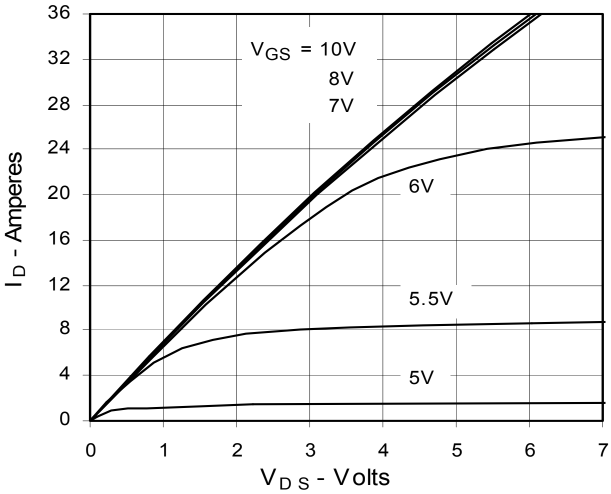


Fig. 2. Extended Output Characteristics @ 25°C

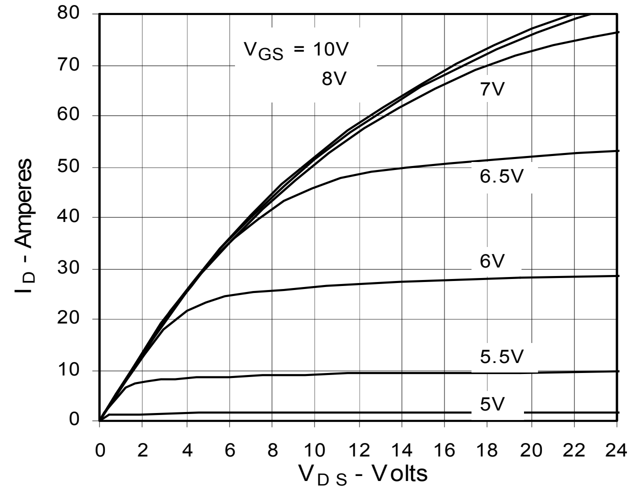


Fig. 3. Output Characteristics @ 125°C

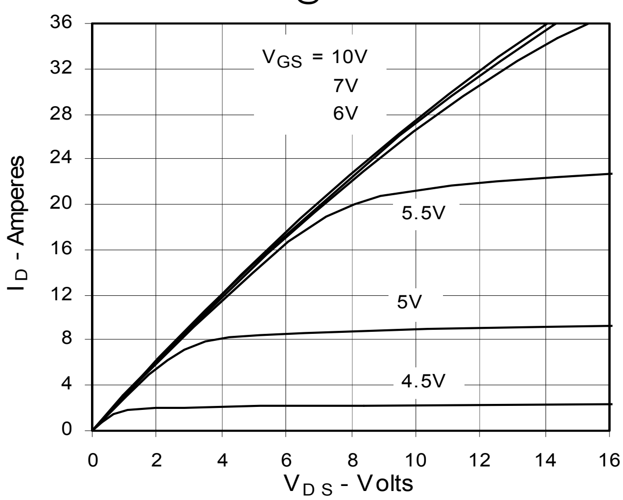


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 18A Value vs. Junction Temperature

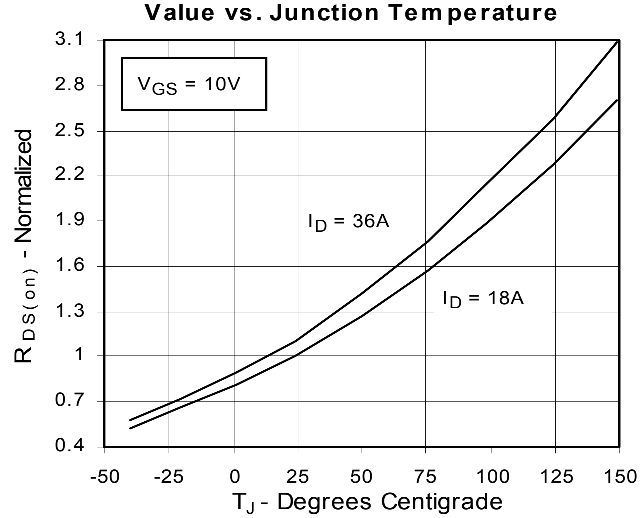


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 18A Value vs. Drain Current

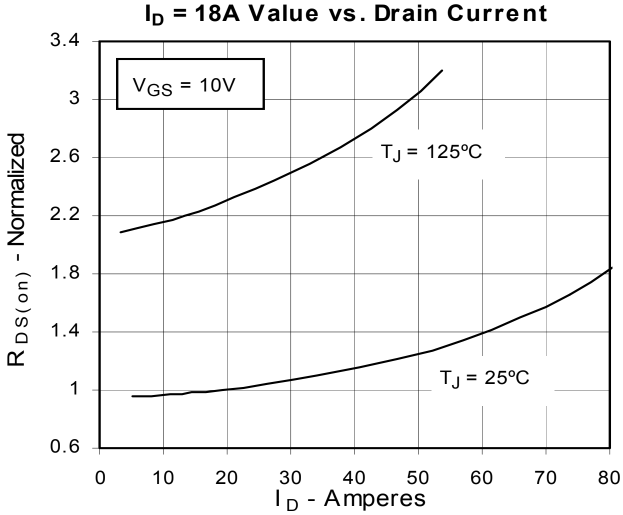


Fig. 6. Drain Current vs. Case Temperature

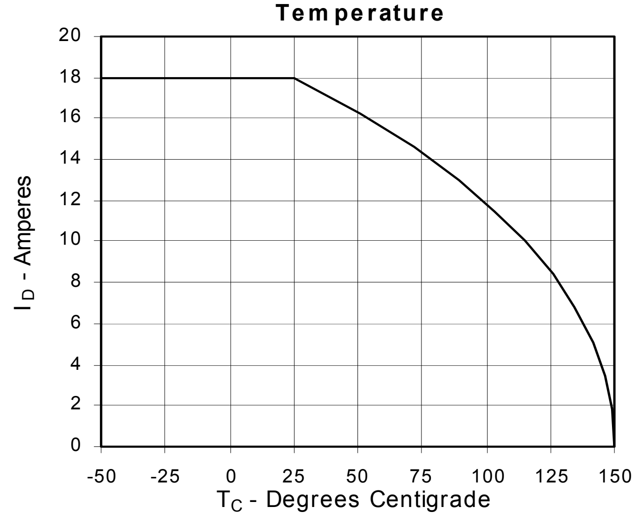


Fig. 7. Input Admittance

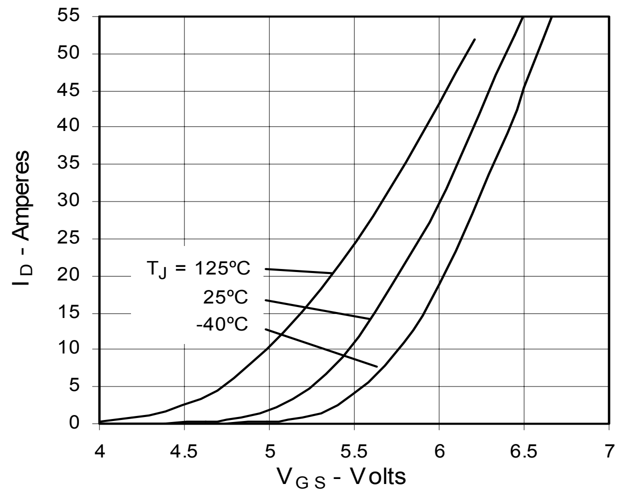


Fig. 8. Transconductance

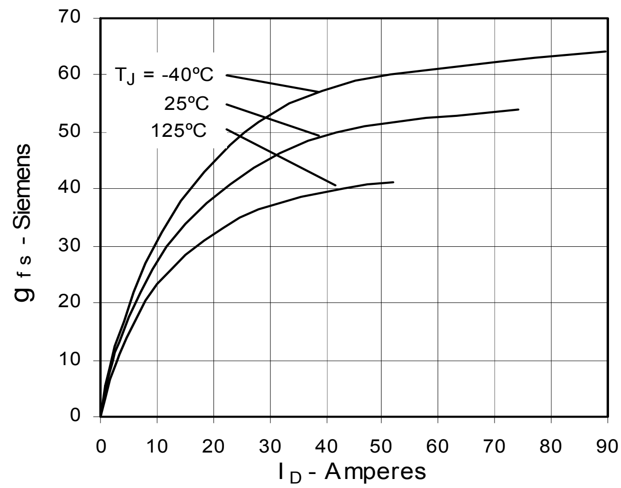


Fig. 9. Source Current vs. Source-To-Drain Voltage

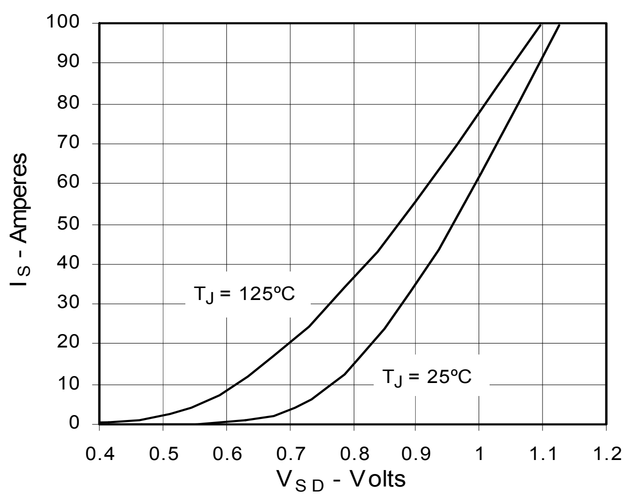


Fig. 10. Gate Charge

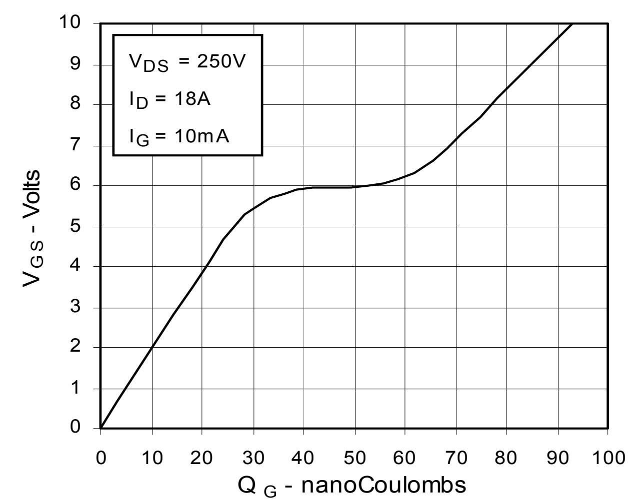


Fig. 11. Capacitance

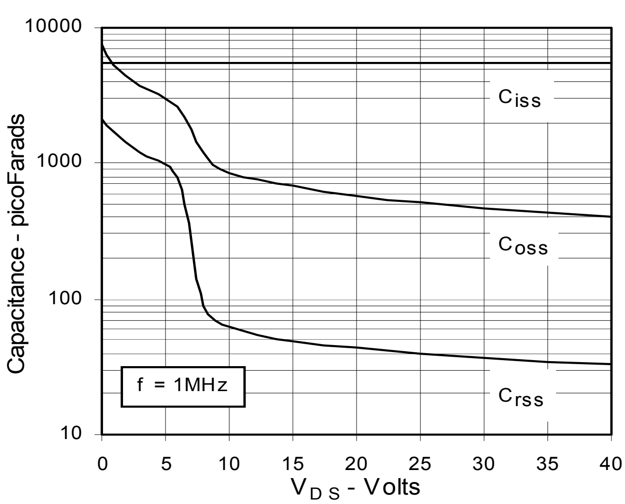


Fig. 12. Forward-Bias Safe Operating Area

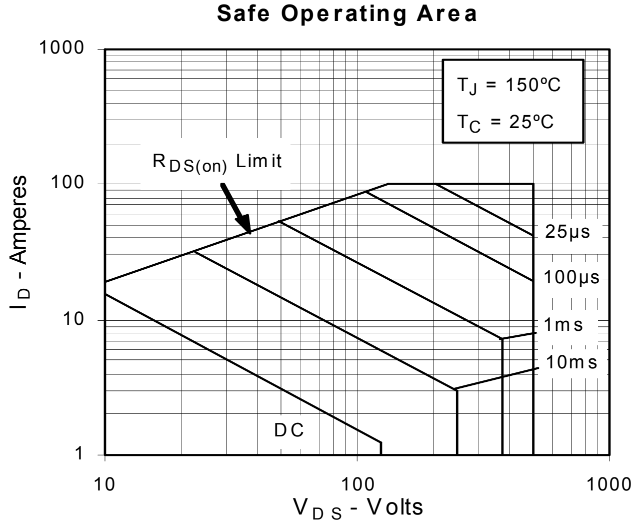


Fig. 13. Maximum Transient Thermal Resistance