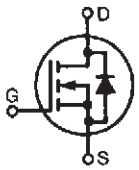
IXYS

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

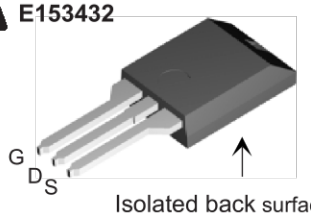
N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode



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	$I_S \le I_{DM}$, di/dt ≤100 A/μs, $V_{DD} \le V_{DSS}$, 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

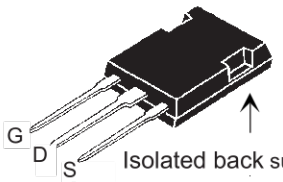
Symbol	Test Conditions (T_J = 25° C unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0 V, I_D = 250 μA	500			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 4 mA	2.5		5.0	V
I_{GSS}	V_{GS} = ± 30 V_{DC}, V_{DS} = 0			± 100	nA
I_{DSS}	$V_{DS} = V_{DSS}$			25	μA
	V_{GS} = 0 V,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

ISOPLUS220™ (IXFC)
E153432



Isolated back surface

ISOPLUS247™ (IXFR)
E153432



Isolated back surface

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

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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} R_G = 4 Ω (External)		29		ns
t_r			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

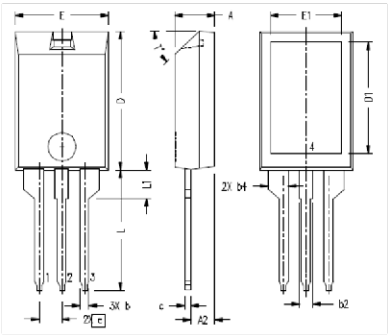
Source-Drain Diode

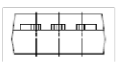
Symbol	Test Conditions (T_J = 25° C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0 V			36	A
I_{SM}	Repetitive			100	A
V_{SD}	I_F = I_S, V_{GS} = 0 V,			1.5	V
t_{rr}	I_F = 25A, -di/dt = 100 A/µs			200	ns
I_{RM}	V_R = 100 V; V_{GS} = 0 V		8		A
Q_{RM}			0.6		µC

Notes:

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

ISOPLUS220™ (IXFC) Outline



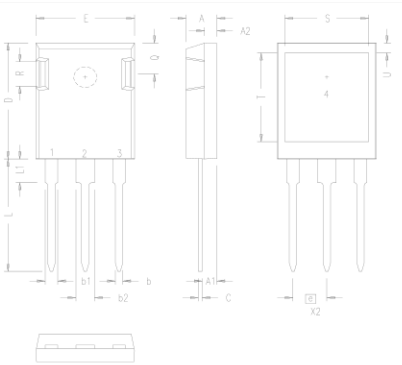


Note:
Bottom heatsink (Pin 4) is electrically isolated from Pin 1,2, or 3.

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.

IXYS reserves the right to change limits, test conditions, and dimensions.

IXYS MOSFETs and IGBTs are covered by one or moreof 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 6,710,405B2 6,710,463 6,727,585 6,759,692 6,771,478 B2

Fig. 1. Output Characteristics @ 25°C

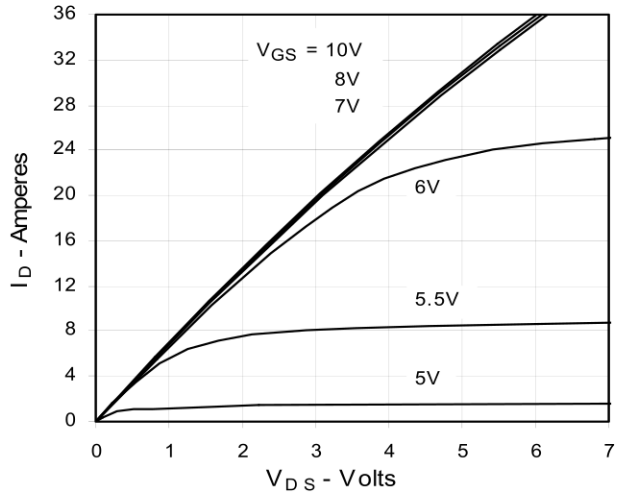


Fig. 2. Extended Output Characteristics @ 25°C

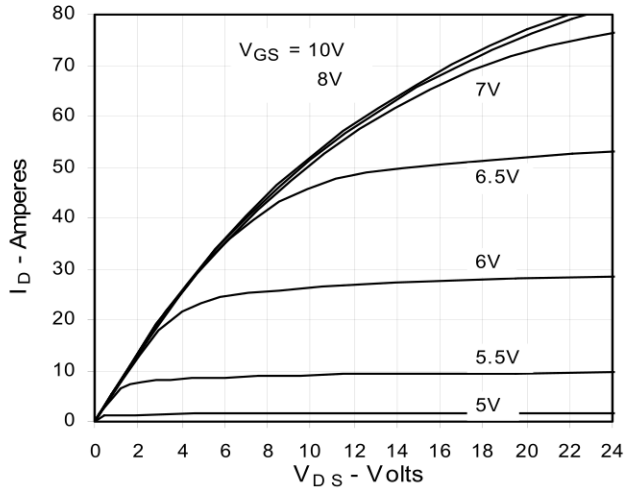


Fig. 3. Output Characteristics @ 125°C

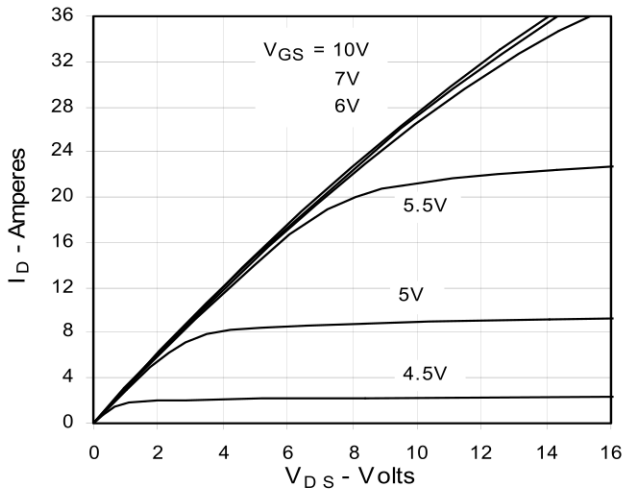


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 18A Value vs. Junction Temperature

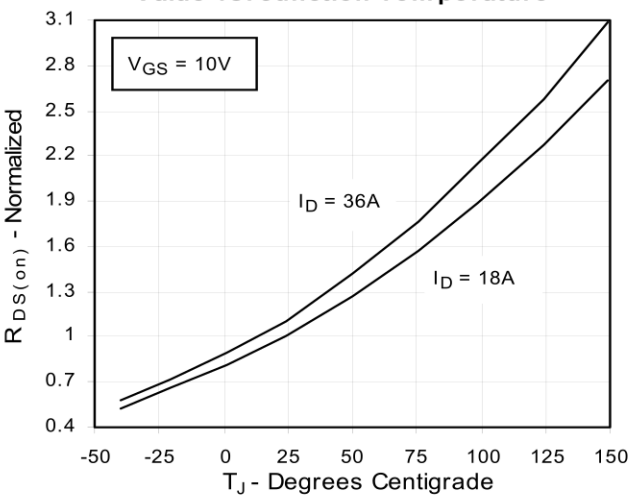


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 18A Value vs. Drain Current

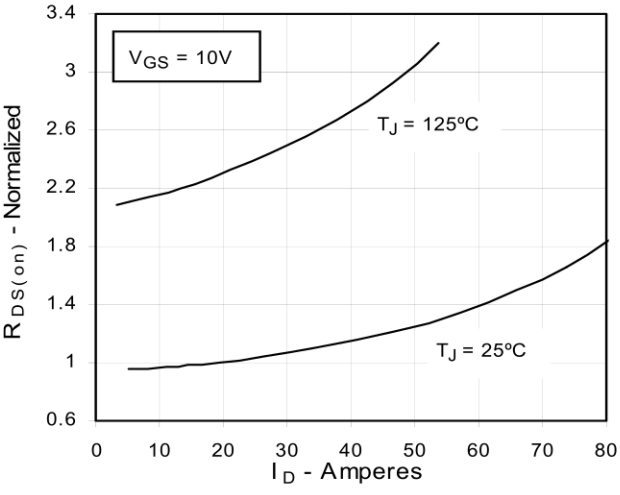


Fig. 6. Drain Current vs. Case Temperature

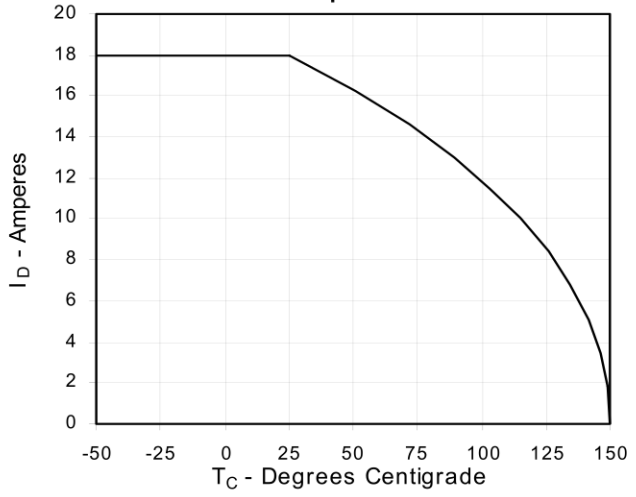


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Fig. 7. Input Admittance

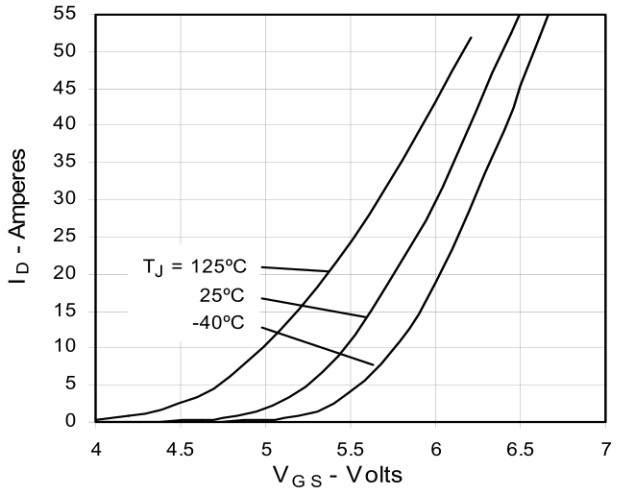

Fig. 8. Transconductance

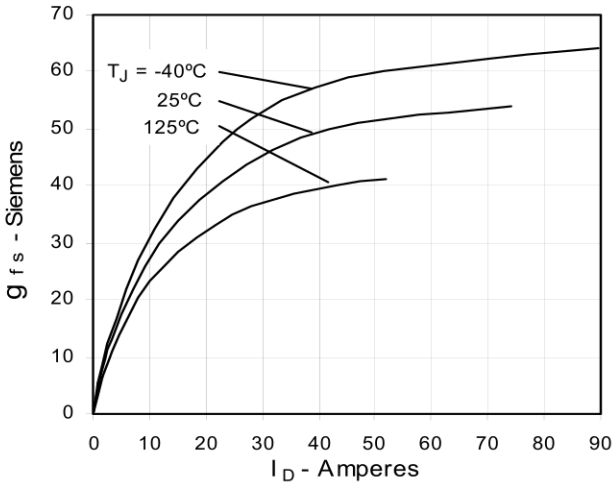

Fig. 9. Source Current vs. Source-To-Drain Voltage

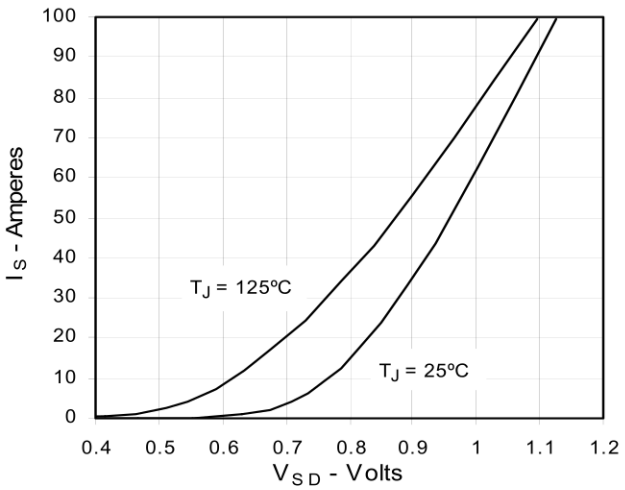

Fig. 10. Gate Charge

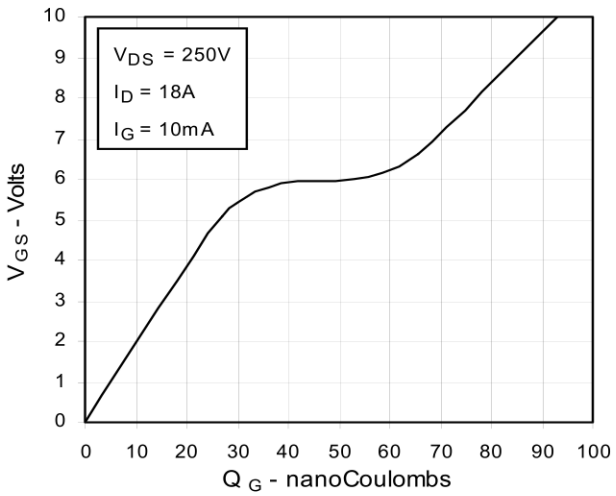

Fig. 11. Capacitance

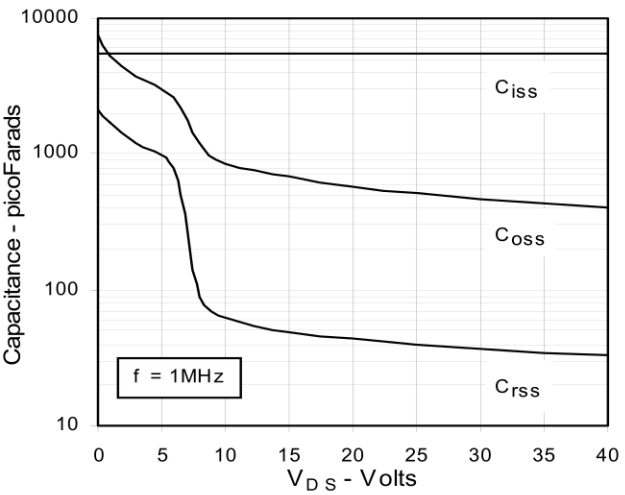

Fig. 12. Forward-Bias Safe Operating Area

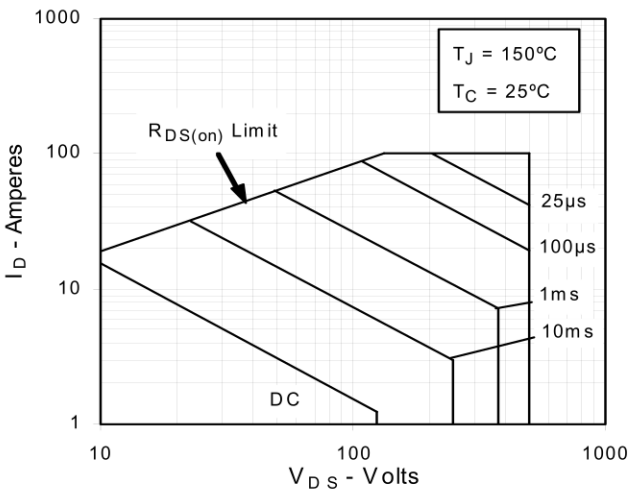

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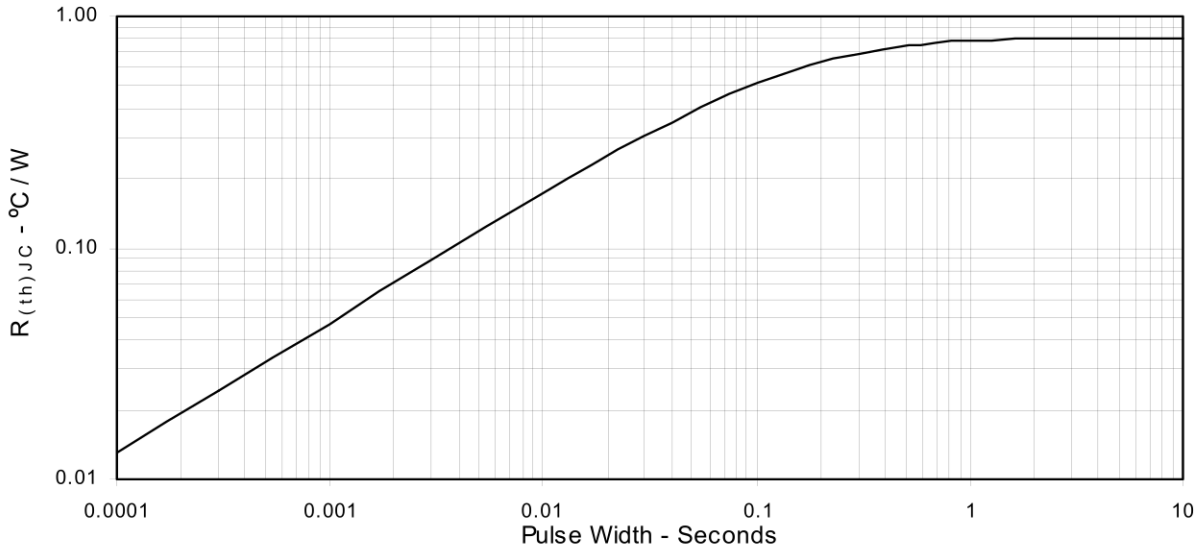
Fig. 13. Maximum Transient Thermal Resistance



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