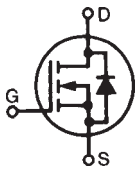
IXYS

PolarHV™ HiPerFET Power MOSFETs

N-Channel Enhancement Mode
Fast Intrinsic Diode
Avalanche Rated

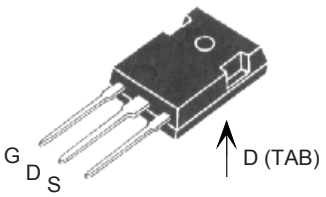
IXFH 22N60P
IXFV 22N60P
IXFV 22N60PS

V_{DSS} = 600 V
I_{D25} = 22 A
$R_{DS(on)}$ ≤ 350 mΩ
t_{rr} ≤ 200 ns

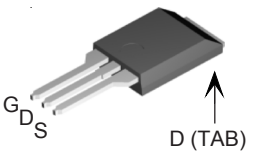


Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	600	V
V_{DGR}	T_J = 25°C to 150°C; R_{GS} = 1 MΩ	600	V
V_{GS}	Continuous	±30	V
V_{GSM}	Tranisent	±40	V
I_{D25}	T_C = 25°C	22	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	66	A
I_{AR}	T_C = 25°C	22	A
E_{AR}	T_C = 25°C	40	mJ
E_{AS}	T_C = 25°C	1.0	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	400	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
T_{SOLD}	Plastic body for 10 s	260	°C
M_d	Mounting torque (TO-247)	1.13/10	Nm/lb.in.
F_C	Mounting Force (PLUS220)	11..65/2.5..15	Nm/lb.
Weight	TO-247	6	g
	PLUS220 & PLUS220SMD	4	g

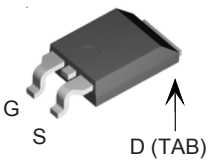
TO-247 (IXFH)



PLUS220 (IXFV)



PLUS220SMD (IXFV...S)



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

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	600			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 4 mA	3.0		5.5	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, $I_D = 0.5\ I_{D25}$ Pulse test, t ≤300 μs, duty cycle d ≤ 2 %			350	mΩ

Features
- Fast intrinsic diode
- Unclamped Inductive Switching (UIS) rated
- International standard packages
- Low package inductance
  - easy to drive and to protect

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

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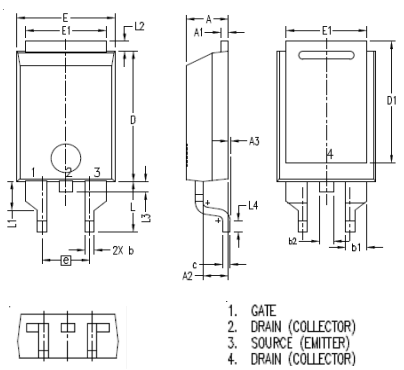
Symbol	Test Conditions (T$_J$ = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 20 V; I_D = 0.5 I_{D25}, pulse test	15	20		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		3600		pF
C_{oss}			305		pF
C_{rss}			38		pF
$t_{d(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS}, I_D = I_{D25} R_G = 4 Ω (External)		20		ns
t_r			20		ns
$t_{d(off)}$			60		ns
t_f			23		ns
$Q_{g(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}		58		nC
Q_{gs}			20		nC
Q_{gd}			22		nC
R_{thJC}				0.31	°C/W
R_{thCS}			0.21		°C/W

Source-Drain Diode

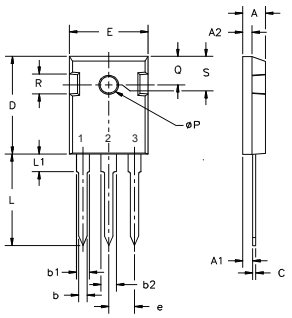
Symbol	Test Conditions (T$_J$ = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0 V			22	A
I_{SM}	Repetitive			66	A
V_{SD}	I_F = I_S, V_{GS} = 0 V, Pulse test, t ≤300 μs, duty cycle d≤ 2 %			1.5	V
t_{rr}	I_F = 26A -di/dt = 100 A/μs V_R = 100V, V_{GS} = 0 V			200	ns
Q_{RM}			1.0		μC

PLUS220SMD (IXFV_S) Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETER MIN	MILLIMETER MAX
A	.169	.185	4.30	4.70
A1	.028	.035	0.70	0.90
A2	.098	.118	2.50	3.00
A3	.000	.010	0.00	0.25
b	.035	.047	0.90	1.20
b1	.080	.095	2.03	2.41
b2	.054	.064	1.37	1.63
c	.028	.035	0.70	0.90
D	.551	.591	14.00	15.00
D1	.512	.539	13.00	13.70
E	.394	.433	10.00	11.00
E1	.331	.346	8.40	8.80
e	.200BSC		5.08 BSC	
L	.209	.228	5.30	5.80
L1	.118	.138	3.00	3.50
L2	.035	.051	0.90	1.30
L3	.047	.059	1.20	1.50
L4	.039	.059	1.00	1.50

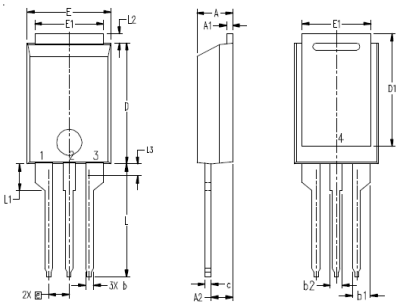
TO-247 AD (IXFH) Outline



Terminals: 1 - Gate 2 - Drain
3 - Source Tab - Drain

Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	4.7	5.3	.185	.209
A_1	2.2	2.54	.087	.102
A_2	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b_1	1.65	2.13	.065	.084
b_2	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
∅P	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15 BSC		242 BSC	

PLUS220 (IXFV) Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETER MIN	MILLIMETER MAX
A	.169	.185	4.30	4.70
A1	.028	.035	0.70	0.90
A2	.098	.118	2.50	3.00
b	.035	.047	0.90	1.20
b1	.080	.095	2.03	2.41
b2	.054	.064	1.37	1.63
c	.028	.035	0.70	0.90
D	.551	.591	14.00	15.00
D1	.512	.539	13.00	13.70
E	.394	.433	10.00	11.00
E1	.331	.346	8.40	8.80
e	.100 BSC		2.54 BSC	
L	.512	.551	13.00	14.00
L1	.118	.138	3.00	3.50
L2	.035	.051	0.90	1.30
L3	.047	.059	1.20	1.50

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

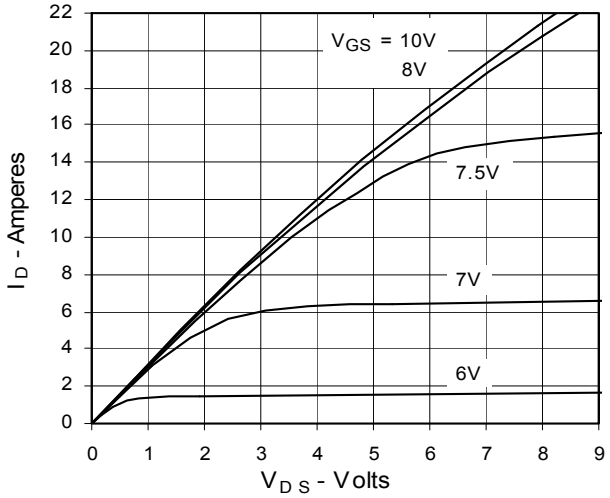


Fig. 2. Extended Output Characteristics @ 25°C

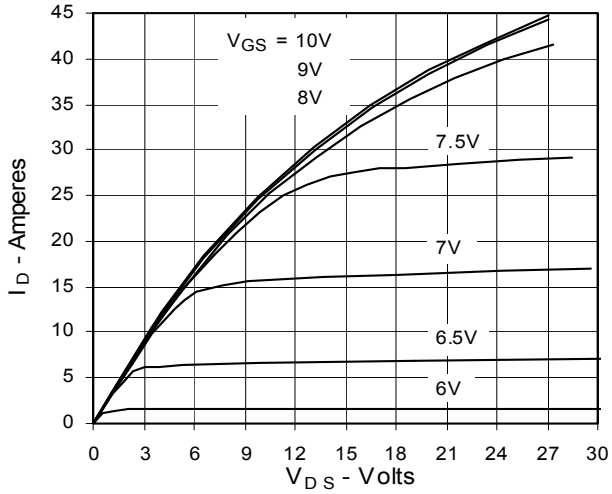


Fig. 3. Output Characteristics @ 125°C

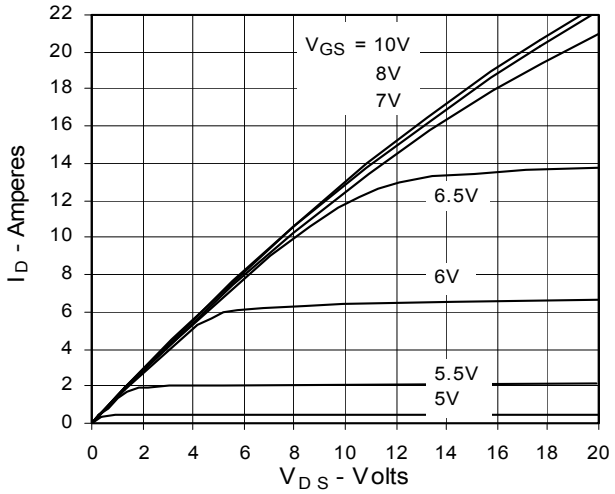


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 11A Value vs. Junction Temperature

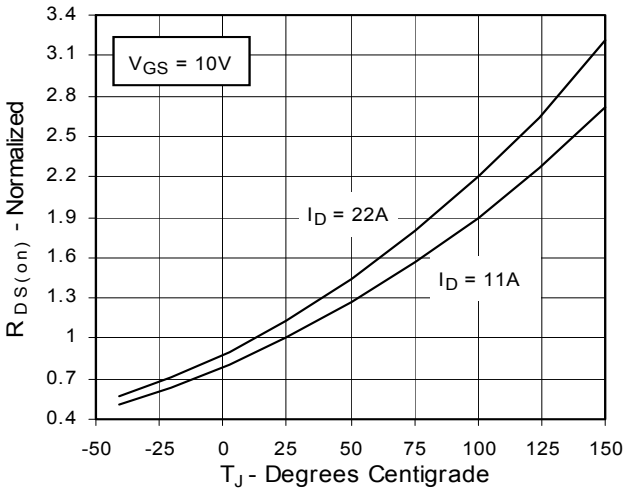


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 11A Value vs. Drain Current

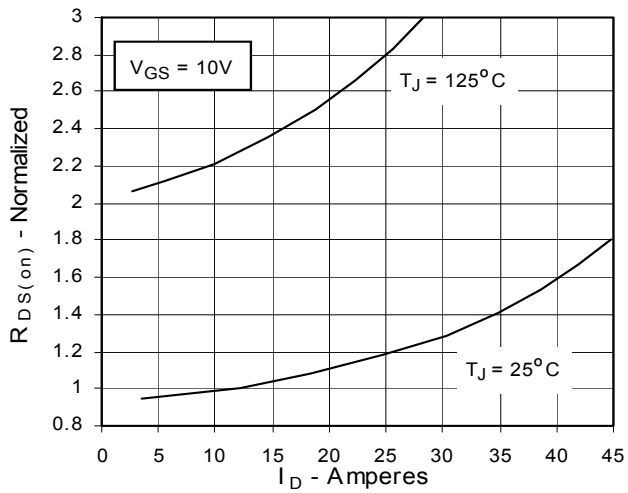


Fig. 6. Drain Current vs. Case Temperature

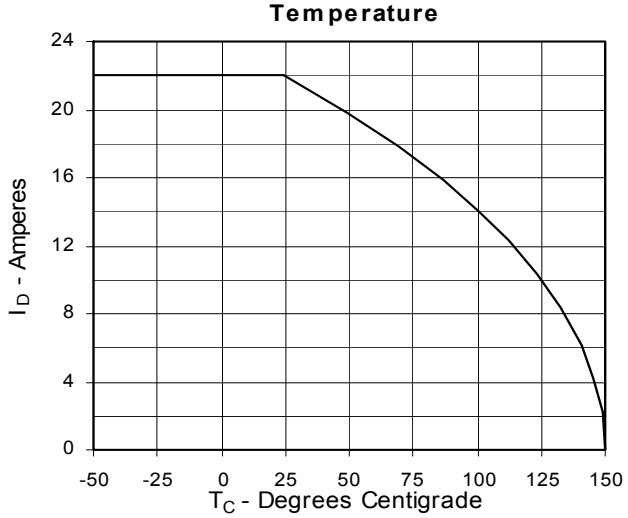


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Fig. 7. Input Admittance

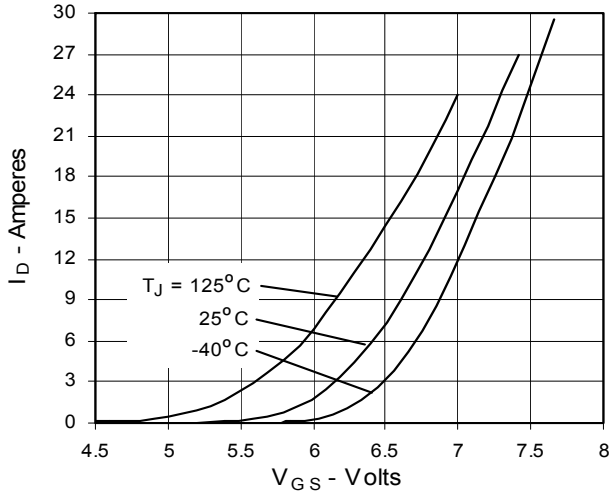

Fig. 8. Transconductance

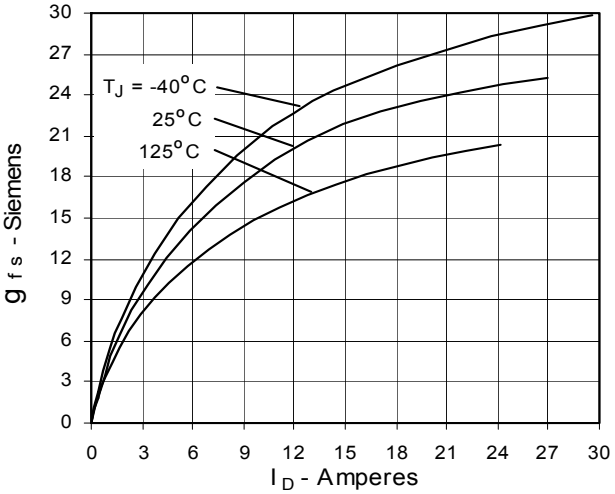

Fig. 9. Source Current vs. Source-To-Drain Voltage

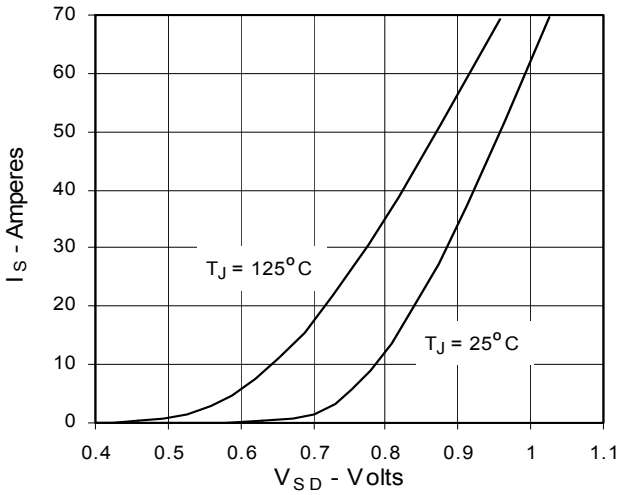

Fig. 10. Gate Charge

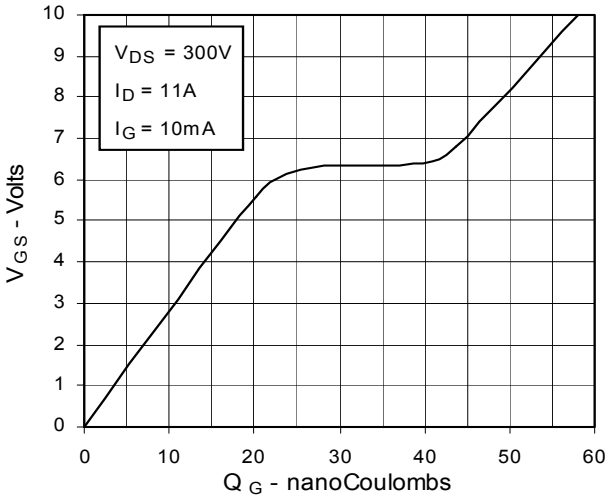

Fig. 11. Capacitance

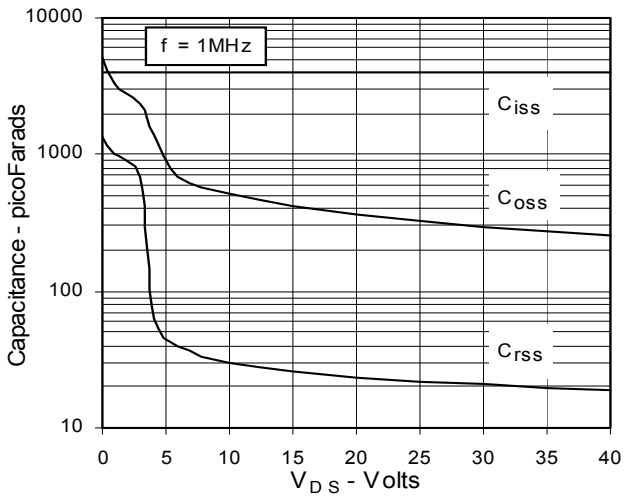

Fig. 12. Forward-Bias Safe Operating Area

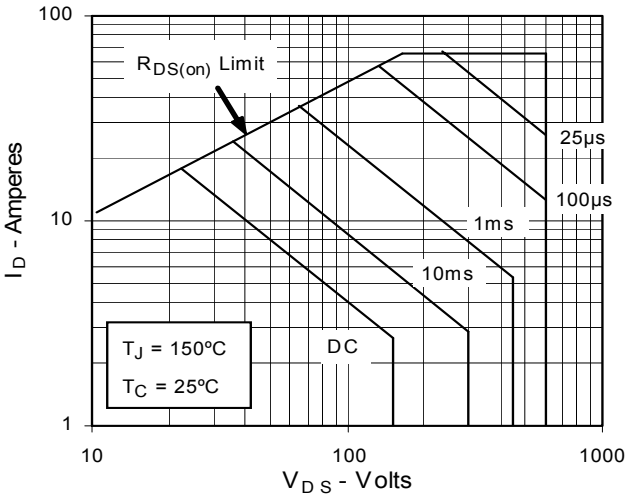

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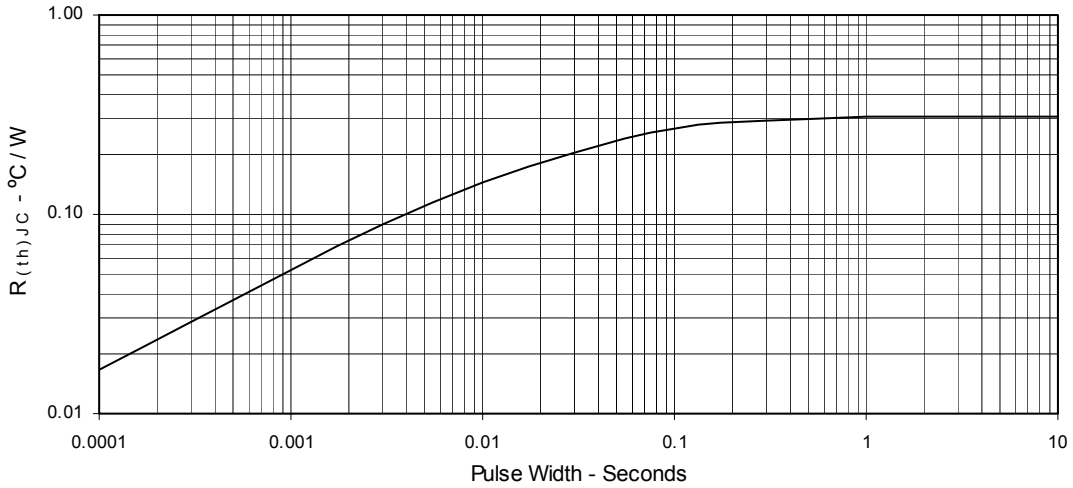
Fig. 13. Maximum Transient Thermal Resistance



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