IXYS

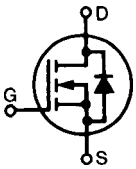
HiPerFET™ Power MOSFETs

N-Channel Enhancement Mode
High dv/dt, Low t_{rr}, HDMOS™ Family

Obsolete:
IXFM21N50
IXFM24N50

	V_{DSS}	I_{D25}	$R_{DS(on)}$
IXFH/~~IXFM~~21N50	500 V	21 A	0.25 Ω
IXFH/~~IXFM~~/IXFT24N50	500 V	24 A	0.23 Ω
IXFH/IXFT26N50	500 V	26 A	0.20 Ω

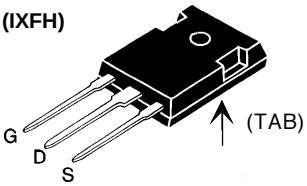
$t_{rr} \leq 250$ ns



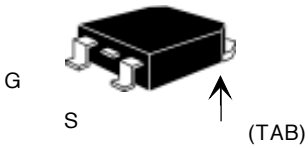
Symbol	Test Conditions		Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C		500	V
V_{DGR}	T_J = 25°C to 150°C; R_{GS} = 1 MΩ		500	V
V_{GS}	Continuous		±20	V
V_{GSM}	Transient		±30	V
I_{D25}	T_C = 25°C	21N50	21	A
		24N50	24	A
		26N50	26	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	21N50	84	A
		24N50	96	A
		26N50	104	A
I_{AR}	T_C = 25°C	21N50	21	A
		24N50	24	A
		26N50	26	A
E_{AR}	T_C = 25°C		30	mJ
dv/dt	$I_S \leq I_{DM}$, di/dt ≤ 100 A/µs, $V_{DD} \leq V_{DSS}$, $T_J \leq$ 150°C, R_G = 2 Ω		5	V/ns
P_D	T_C = 25°C		300	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
M_d	Mounting torque		1.13/10	Nm/lb.in.
Weight			TO-204 = 18 g, TO-247 = 6 g	

Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
V_{DSS}	V_{GS} = 0 V, I_D = 250 µA		500			V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 4 mA		2		4	V
I_{GSS}	V_{GS} = ±20 V_{DC}, V_{DS} = 0				±100	nA
I_{DSS}	V_{DS} = 0.8 • V_{DSS}	T_J = 25°C			200	µA
	V_{GS} = 0 V	T_J = 125°C			1	mA

TO-247 AD (IXFH)

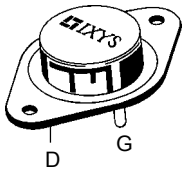


TO-268 (D3) Case Style



~~TO-204 AE (IXFM)~~

Package not available



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

Features
- International standard packages
- Low $R_{DS(on)}$ HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
  - easy to drive and to protect
- Fast intrinsic Rectifier

Applications
- DC-DC converters
- Synchronous rectification
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- AC motor control
- Temperature and lighting controls
- Low voltage relays

Advantages
- Easy to mount with 1 screw (TO-247) (isolated mounting screw hole)
- High power surface mountable package
- High power density

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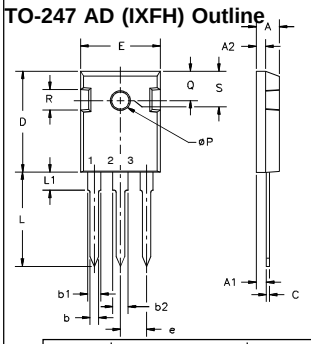
Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)		Characteristic Values Min.	Typ.	Max.	
$R_{DS(on)}$	V_{GS} = 10 V, I_D = 0.5 I_{D25}	21N50			0.25	Ω
		24N50			0.23	Ω
		26N50			0.20	Ω
	Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 %					
g_{fs}	V_{DS} = 10 V; I_D = 0.5 I_{D25}, pulse test		11	21		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz			4200		pF
C_{oss}				450		pF
C_{rss}				135		pF
$t_{d(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}			16	25	ns
t_r	R_G = 2 Ω (External)			33	45	ns
$t_{d(off)}$				65	80	ns
t_f				30	40	ns
$Q_{g(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}			135	160	nC
Q_{gs}				28	40	nC
Q_{gd}				62	85	nC
R_{thJC}					0.42	K/W
R_{thCK}	(TO-247 Case Style)			0.25		K/W

Source-Drain Diode — Characteristic Values (T_J = 25°C, unless otherwise specified)

Symbol	Test Conditions		Min.	Typ.	Max.	
I_S	V_{GS} = 0 V	21N50			21	A
		24N50			24	A
		26N50			26	A
I_{SM}	Repetitive; pulse width limited by T_{JM}	21N50			84	A
		24N50			96	A
		26N50			104	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}	$I_F = I_S$, -di/dt = 100 A/µs, V_R = 100 V	T_J = 25°C			250	ns
		T_J = 125°C			400	ns
Q_{RM}		T_J = 25°C		1		µC
		T_J = 125°C		2		µC
I_{RM}		T_J = 25°C		10		A
		T_J = 125°C		15		A

Note 1: Add "S" suffix for TO-247 SMD package option (ex: IXFH24N50S)

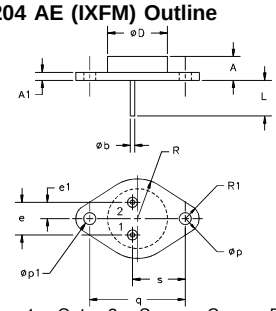
TO-247 AD (IXFH) Outline



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

Dim.	Millimeter Min.	Max.	Inches Min.	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
ØP	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

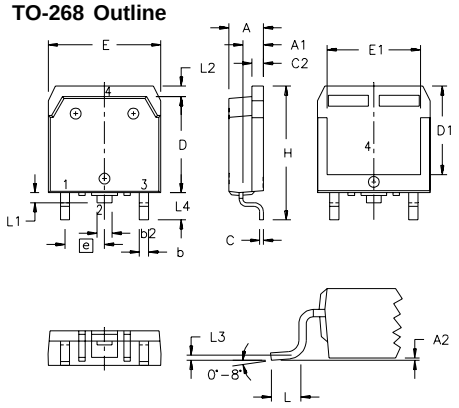
TO-204 AE (IXFM) Outline



Pins: 1 - Gate, 2 - Source, Case - Drain

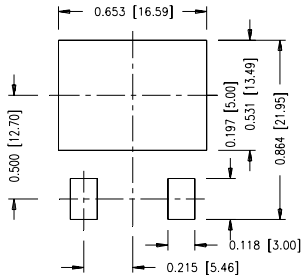
Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	6.4	11.4	.250	.450
A1	1.53	3.42	.060	.135
Øb	1.45	1.60	.057	.063
ØD		22.22		.875
e	10.67	11.17	.420	.440
e1	5.21	5.71	.205	.225
L	11.18	12.19	.440	.480
Øp	3.84	4.19	.151	.165
Øp1	3.84	4.19	.151	.165
q	30.15	BSC	1.187	BSC
R	12.58	13.33	.495	.525
R1	3.33	4.77	.131	.188
s	16.64	17.14	.655	.675

TO-268 Outline



SYM	INCHES MIN	MAX	MILLIMETERS MIN	MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b2	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.094	.106	2.40	2.70
L1	.047	.055	1.20	1.40
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10

Min. Recommended Footprint



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 4,881,106 5,017,508 5,049,961 5,187,117 5,486,715 4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025

Fig. 1 Output Characteristics

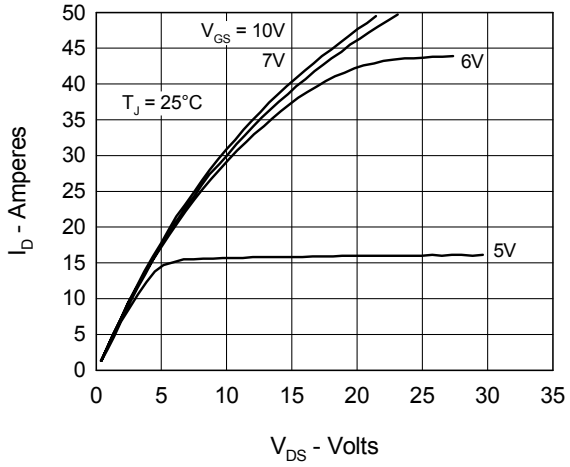


Fig. 2 Input Admittance

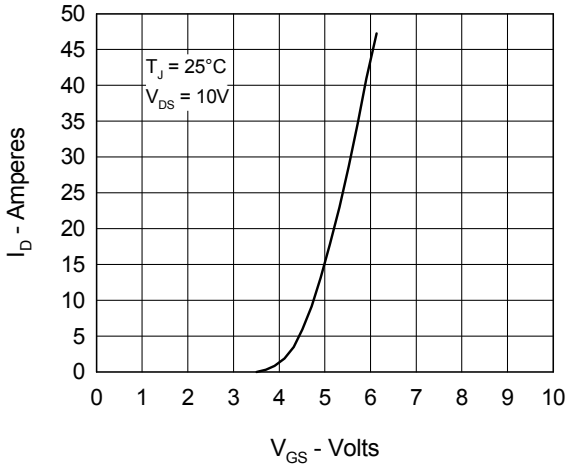


Fig. 3 $R_{DS(on)}$ vs. Drain Current

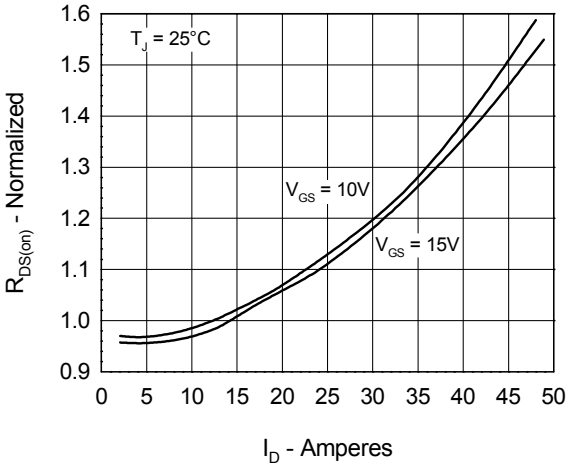


Fig. 4 Temperature Dependence of Drain to Source Resistance

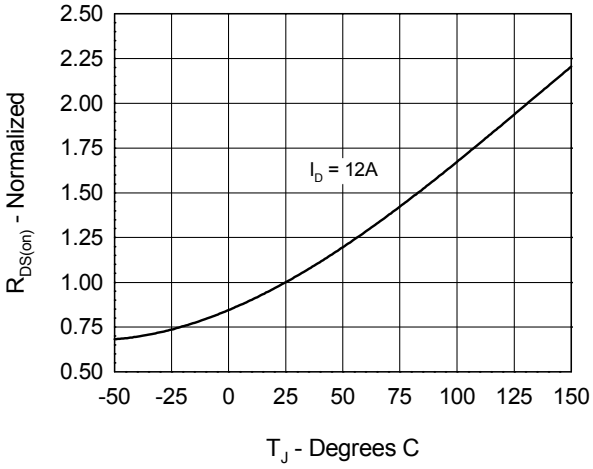


Fig. 5 Drain Current vs. Case Temperature

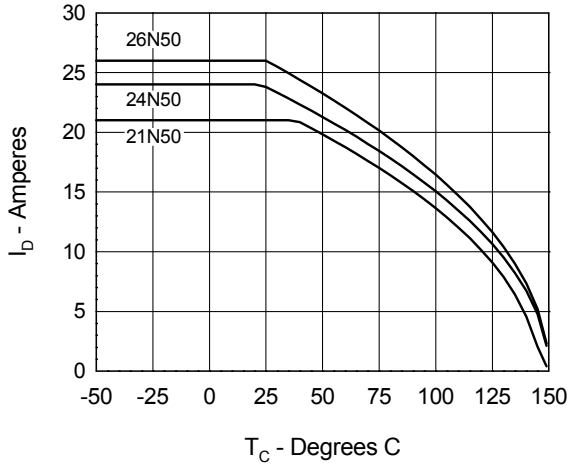


Fig. 6 Temperature Dependence of Breakdown and Threshold Voltage

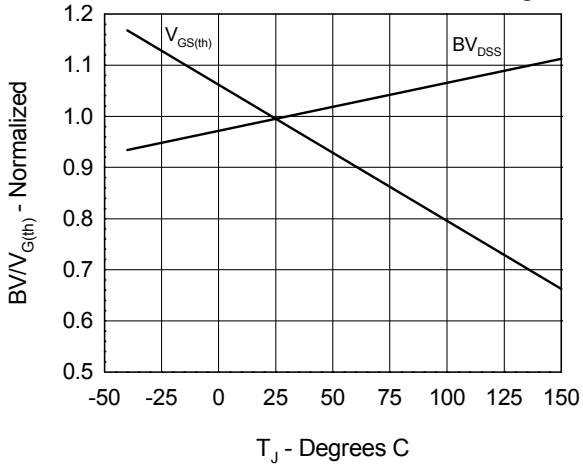


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Fig.7 Gate Charge Characteristic Curve

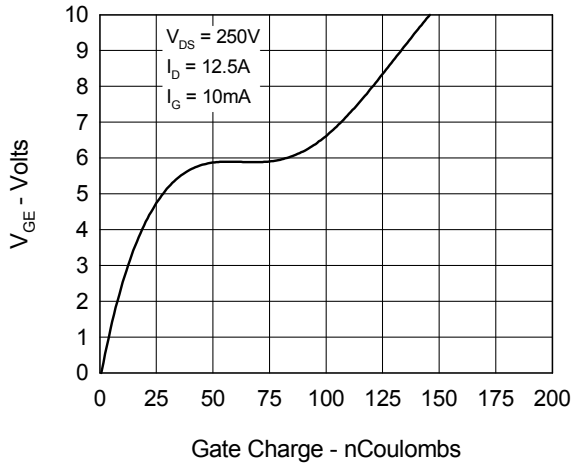


Fig.8 Forward Bias Safe Operating Area

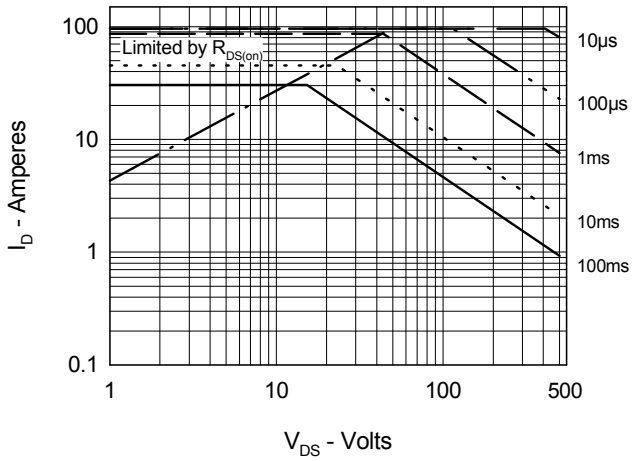


Fig.9 Capacitance Curves

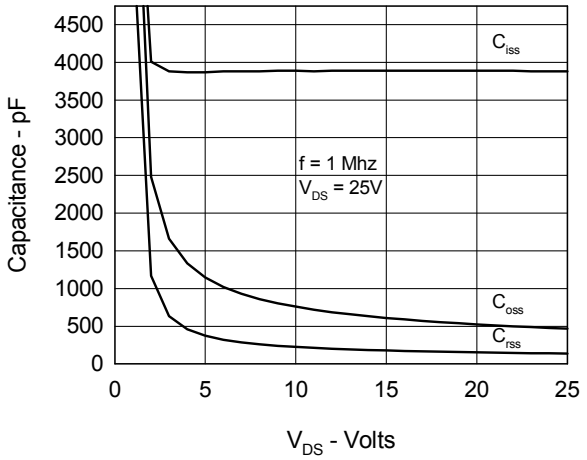


Fig.10 Source Current vs. Source to Drain Voltage

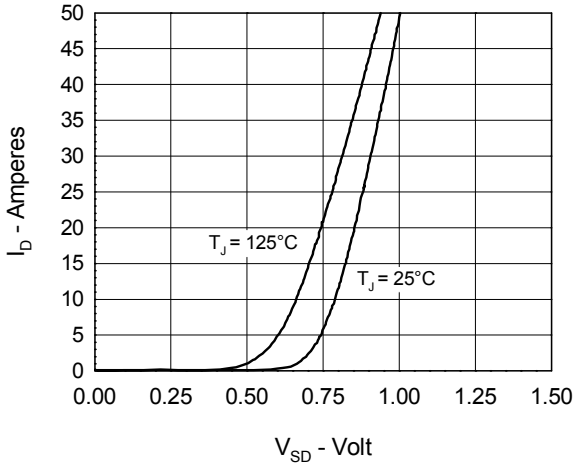
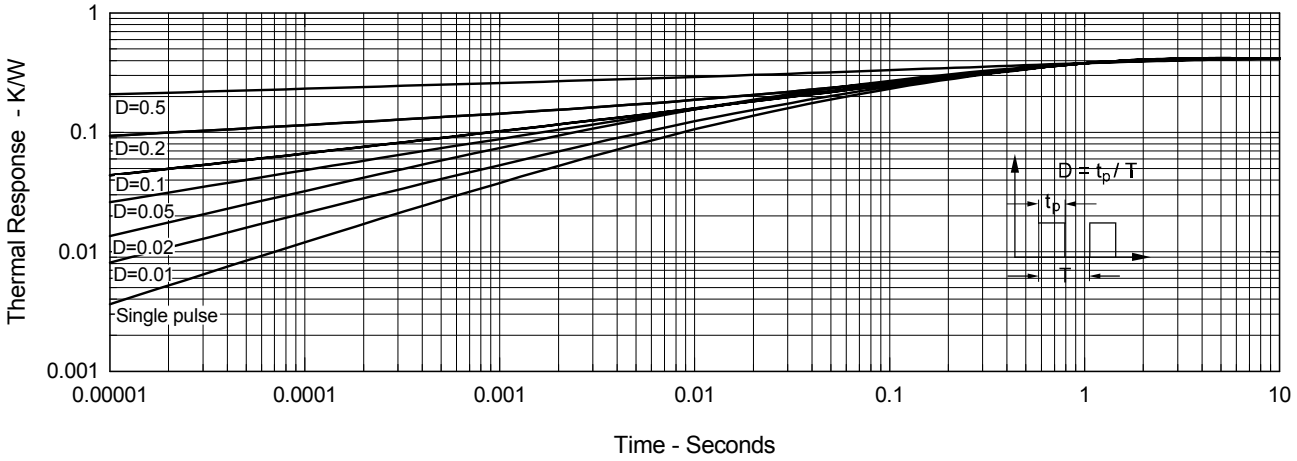


Fig.11 Transient Thermal Impedance



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