IXYS

HiPerFET™ Power MOSFETs

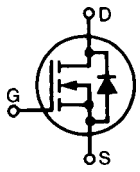
IXFH/~~IXFM~~42N20
IXFH/~~IXFM~~/IXFT50N20
IXFH/IXFT58N20

V_{DSS}	I_{D25}	$R_{DS(on)}$
200 V	42 A	60mΩ
200 V	50 A	45mΩ
200 V	58 A	40mΩ

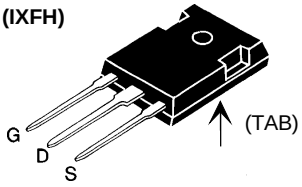
$t_{rr} \leq$ 200 ns

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

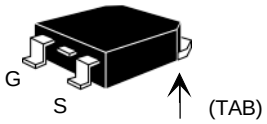
Obsolete:
IXFM42N20
IXFM50N20



TO-247 AD (IXFH)

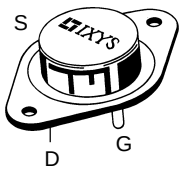


TO-268 (D3) Case Style



~~**TO-204 AE (IXFM)**~~

Package unavailable



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

Symbol	Test Conditions		Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C		200	V
V_{DGR}	T_J = 25°C to 150°C; R_{GS} = 1 MΩ		200	V
V_{GS}	Continuous		±20	V
V_{GSM}	Transient		±30	V
I_{D25}	T_C = 25°C	42N20	42	A
		50N20	50	A
		58N20	58	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	42N20	168	A
		50N20	200	A
		58N20	232	A
I_{AR}	T_C = 25°C	42N20	42	A
		50N20	50	A
		58N20	58	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		200			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

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

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

91522H (2/98)

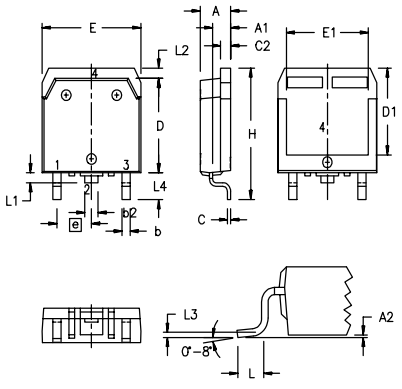
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Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)		Characteristic Values Min.	Typ.	Max.	
$R_{DS(on)}$	V_{GS} = 10 V, I_D = 0.5 I_{D25}	42N20			0.060	Ω
		50N20			0.045	Ω
		58N20			0.040	Ω
	Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 %					
g_{fs}	V_{DS} = 10 V; I_D = 0.5 I_{D25}, pulse test		20	32		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz			4400		pF
C_{oss}				800		pF
C_{rss}				285		pF
$t_{d(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}			18	25	ns
t_r				15	20	ns
$t_{d(off)}$	R_G = 1 Ω (External)			72	90	ns
t_f				16	25	ns
$Q_{g(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}			190	220	nC
Q_{gs}				35	50	nC
Q_{gd}				95	110	nC
R_{thJC}					0.42	K/W
R_{thCK}	(TO-247 and TO-204 Case styles)			0.25		K/W

Source-Drain Diode

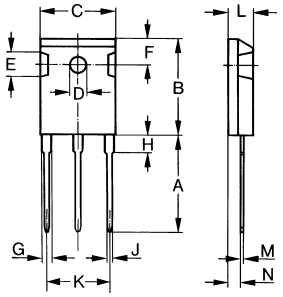
Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) Min.	Typ.	Max.	
I_S	V_{GS} = 0 V	42N20			42	A
		50N20			50	A
		58N20			58	A
I_{SM}	Repetitive;	42N20			168	A
	pulse width limited by T_{JM}	50N20			200	A
		58N20			232	A
V_{SD}	I_F = I_S, V_{GS} = 0 V, Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 %				1.5	V
t_{rr}	I_F = 25A, -di/dt = 100 A/μs, V_R = 100 V	T_J = 25°C			200	ns
		T_J = 125°C			300	ns
Q_{RM}		T_J = 25°C		1.5		μC
		T_J = 125°C		2.6		μC
I_{RM}		T_J = 25°C		19		A
		T_J = 125°C		23		A

TO-268AA (D³ PAK)



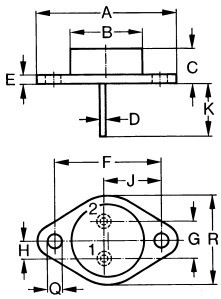
Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.9	5.1	.193	.201
A_1	2.7	2.9	.106	.114
A_2	.02	.25	.001	.010
b	1.15	1.45	.045	.057
b_2	1.9	2.1	.75	.83
C	.4	.65	.016	.026
D	13.80	14.00	.543	.551
E	15.85	16.05	.624	.632
E_1	13.3	13.6	.524	.535
e	5.45 BSC		.215 BSC	
H	18.70	19.10	.736	.752
L	2.40	2.70	.094	.106
L1	1.20	1.40	.047	.055
L2	1.00	1.15	.039	.045
L3	0.25 BSC		.010 BSC	
L4	3.80	4.10	.150	.161

TO-247 AD (IXFH) Outline



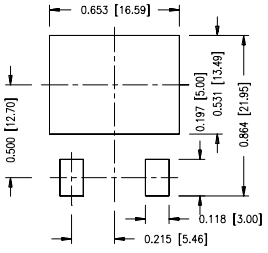
Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	19.81	20.32	0.780	0.800
B	20.80	21.46	0.819	0.845
C	15.75	16.26	0.610	0.640
D	3.55	3.65	0.140	0.144
E	4.32	5.49	0.170	0.216
F	5.4	6.2	0.212	0.244
G	1.65	2.13	0.065	0.084
H	-	4.5	-	0.177
J	1.0	1.4	0.040	0.055
K	10.8	11.0	0.426	0.433
L	4.7	5.3	0.185	0.209
M	0.4	0.8	0.016	0.031
N	1.5	2.49	0.087	0.102

TO-204 AE (IXFM) Outline



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	38.61	39.12	1.520	1.540
B	-	22.22	-	0.875
C	6.40	11.40	0.252	0.449
D	1.45	1.60	0.057	0.063
E	1.52	3.43	0.060	0.135
F	30.15	BSC	1.187	BSC
G	10.67	11.17	0.420	0.440
H	5.21	5.71	0.205	0.225
J	16.64	17.14	0.655	0.675
K	11.18	12.19	0.440	0.480
Q	3.84	4.19	0.151	0.165
R	25.16	26.66	0.991	1.050

Min. Recommended Footprint



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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

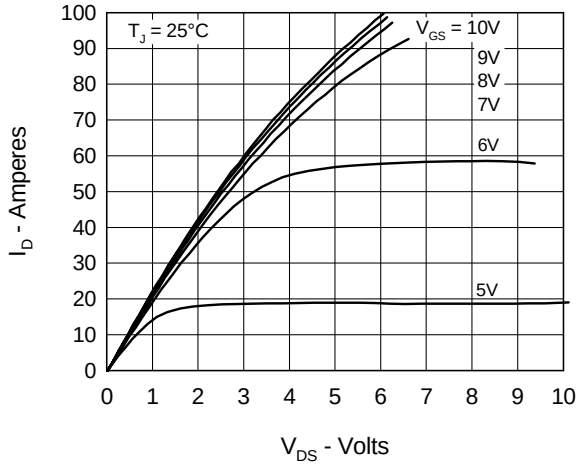


Fig. 2 Input Admittance

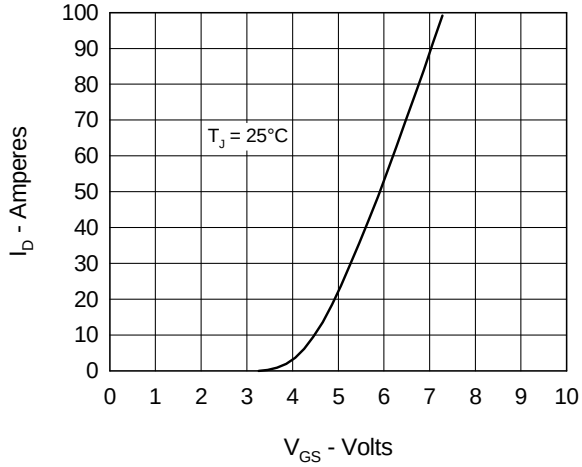


Fig. 3 $R_{DS(on)}$ vs. Drain Current

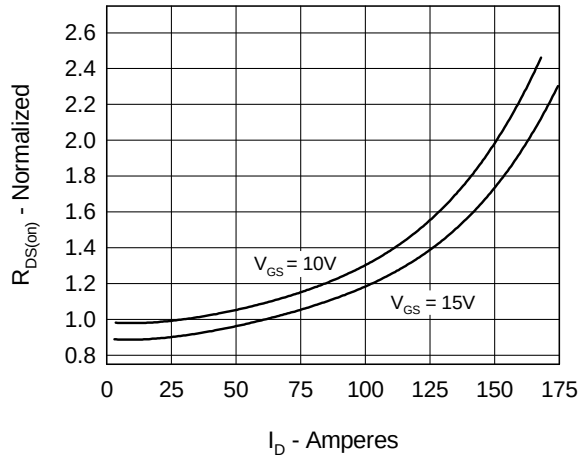


Fig. 4 Temperature Dependence of Drain to Source Resistance

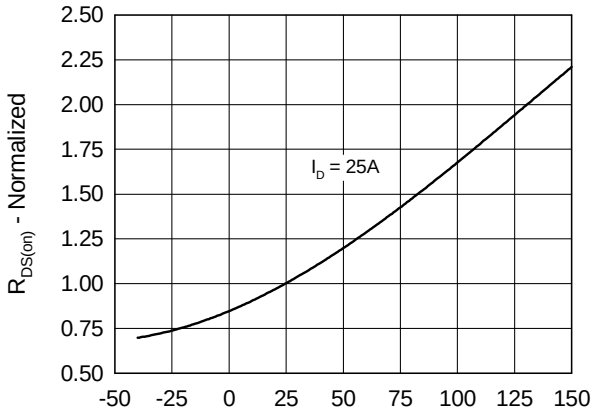


Fig. 5 Drain Current vs. Case Temperature

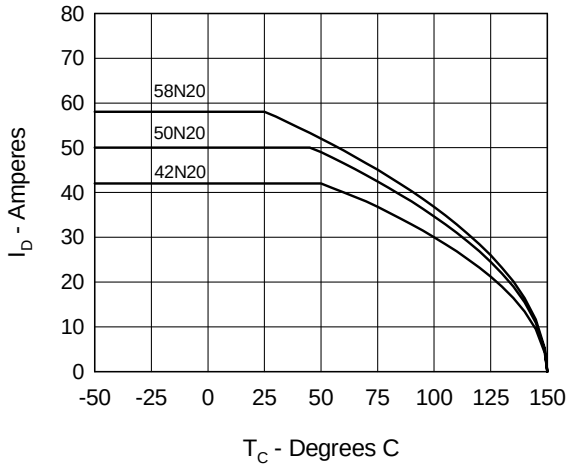
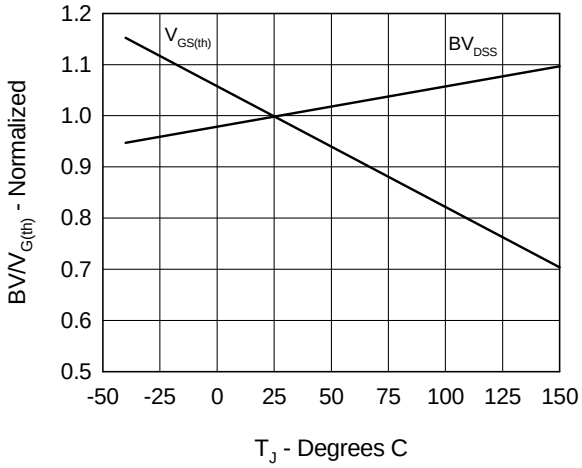


Fig. 6 Temperature Dependence of Breakdown and Threshold Voltage



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Fig.7 Gate Charge Characteristic Curve

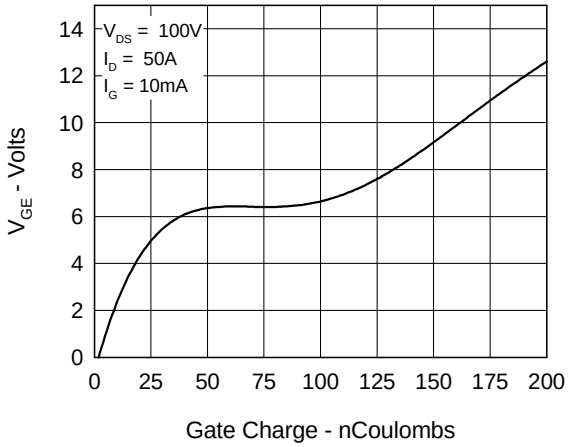


Fig.8 Forward Bias Safe Operating Area

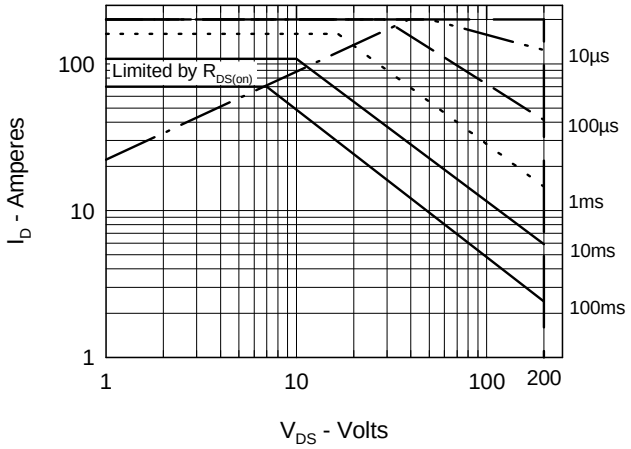


Fig.9 Capacitance Curves

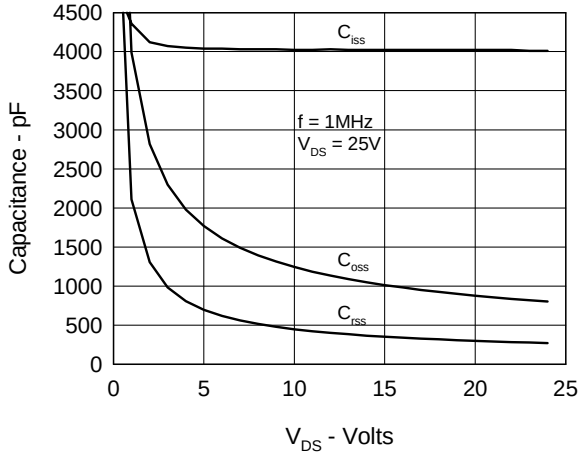


Fig.10 Source Current vs. Source to Drain Voltage

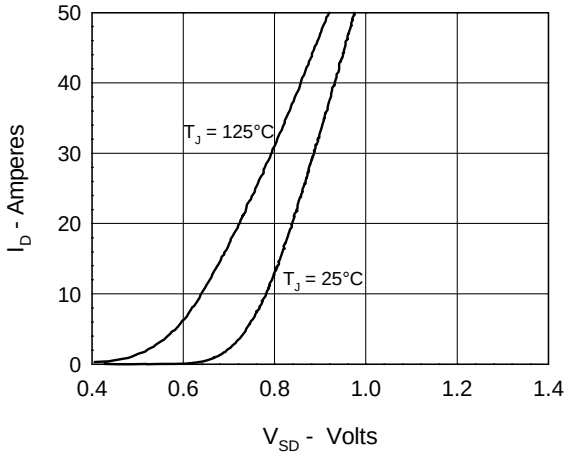
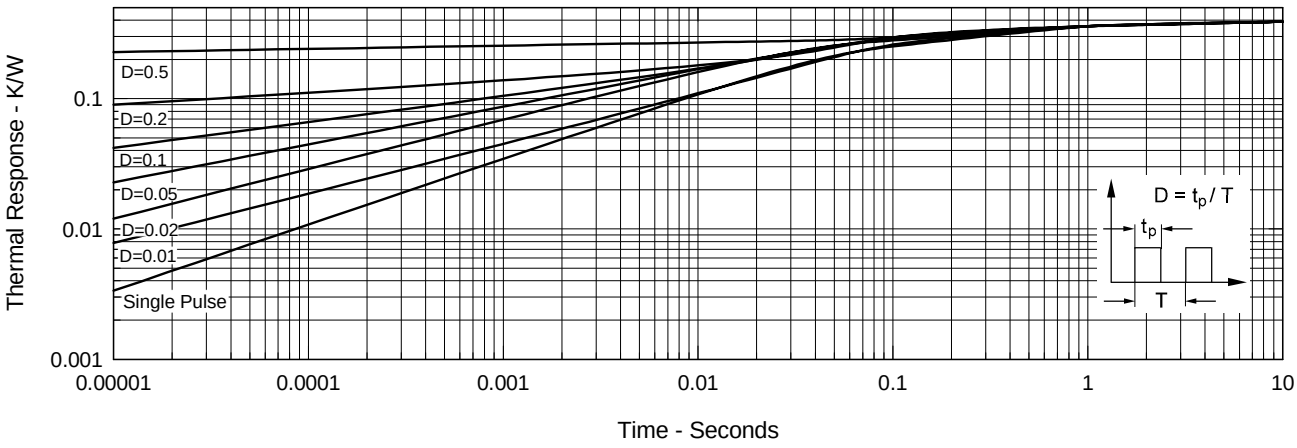


Fig.11 Transient Thermal Impedance



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