

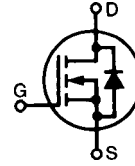
HiPerFET™ Power MOSFETs

IXFH/IXFM42N20
IXFH/IXFM/IXFT50N20
IXFH/IXFT58N20

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

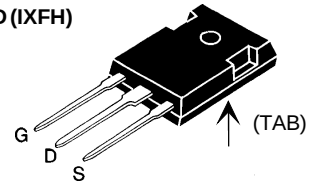
V_{DSS}	I_{D25}	$R_{DS(on)}$
200 V	42 A	60mΩ
200 V	50 A	45mΩ
200 V	58 A	40mΩ

$$t_{rr} \leq 200 \text{ ns}$$

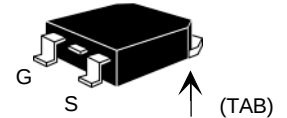


Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	$T_J = 25^\circ\text{C}$ to 150°C	200	V
V_{DGR}	$T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1 \text{ M}\Omega$	200	V
V_{GS}	Continuous	± 20	V
V_{GSM}	Transient	± 30	V
I_{D25}	$T_C = 25^\circ\text{C}$	42N20	42 A
		50N20	50 A
		58N20	58 A
I_{DM}	$T_C = 25^\circ\text{C}$, pulse width limited by T_{JM}	42N20	168 A
		50N20	200 A
		58N20	232 A
I_{AR}	$T_C = 25^\circ\text{C}$	42N20	42 A
		50N20	50 A
		58N20	58 A
E_{AR}	$T_C = 25^\circ\text{C}$	30	mJ
dv/dt	$I_S \leq I_{DM}$, $di/dt \leq 100 \text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ\text{C}$, $R_G = 2 \Omega$	5	V/ns
P_D	$T_C = 25^\circ\text{C}$	300	W
T_J		-55 ... +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		-55 ... +150	$^\circ\text{C}$
T_L	1.6 mm (0.062 in.) from case for 10 s	300	$^\circ\text{C}$
M_d	Mounting torque	1.13/10	Nm/lb.in.
Weight		TO-204 = 18 g, TO-247 = 6 g	

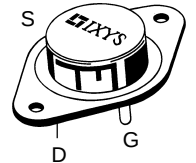
TO-247 AD (IXFH)



TO-268 (D3) Case Style



TO-204 AE (IXFM)



G = Gate,
S = Source,

D = Drain,
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

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
V_{DSS}	$V_{GS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$	200		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 4 \text{ mA}$	2		V
I_{GSS}	$V_{GS} = \pm 20 \text{ V}_{DC}$, $V_{DS} = 0$			$\pm 100 \text{ nA}$
I_{DSS}	$V_{DS} = 0.8 \cdot V_{DSS}$	$T_J = 25^\circ\text{C}$		200 μA
	$V_{GS} = 0 \text{ V}$	$T_J = 125^\circ\text{C}$		1 mA

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

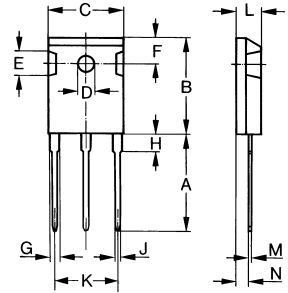
91522H (2/98)

Symbol	Test Conditions	Characteristic Values		
	(T _J = 25°C, unless otherwise specified)	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} R _G = 1 Ω (External)		18	ns
t _r			15	ns
t _{d(off)}			72	ns
t _f			16	ns
Q _{g(on)}	V _{GS} = 10 V, V _{DS} = 0.5 V _{DSS} , I _D = 0.5 I _{D25}		190	nC
Q _{gs}			35	nC
Q _{gd}			95	nC
R _{thJC}	(TO-247 and TO-204 Case styles)		0.42	K/W
R _{thCK}			0.25	K/W

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; pulse width limited by T _{JM}	42N20		168 A
		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

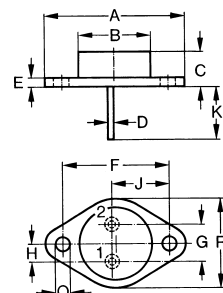
TO-268AA (D ³ PAK)		Dim.	Millimeter	Inches
			Min. Max.	Min. Max.
		A	4.9 5.1	.193 .201
		A ₁	2.7 2.9	.106 .114
		A ₂	.02 .25	.001 .010
		b	1.15 1.45	.045 .057
		b ₂	1.9 2.1	.75 .83
		C	.4 .65	.016 .026
		D	13.80 14.00	.543 .551
		E	15.85 16.05	.624 .632
		E ₁	13.3 13.6	.524 .535
		e	5.45 BSC	.215 BSC
		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	Inches
	Min. Max.	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	Inches
	Min. Max.	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

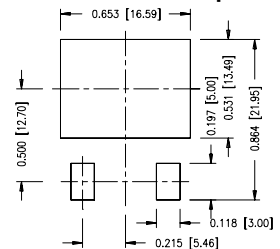


Fig. 1 Output Characteristics

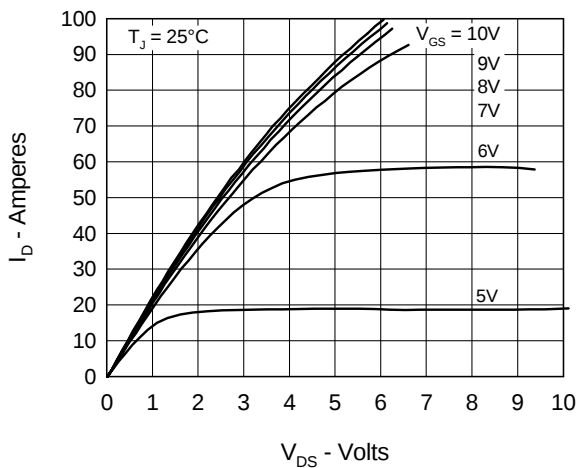


Fig. 2 Input Admittance

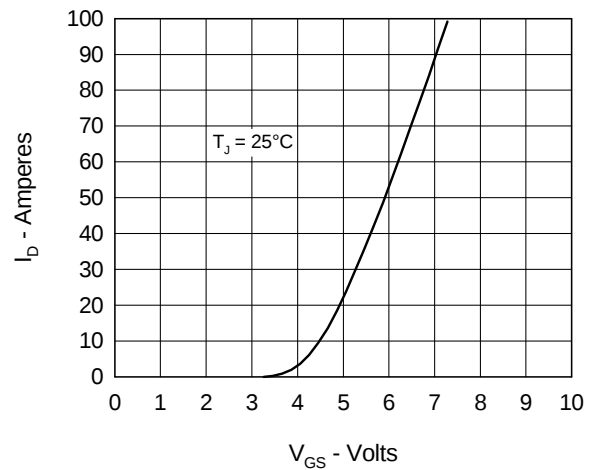
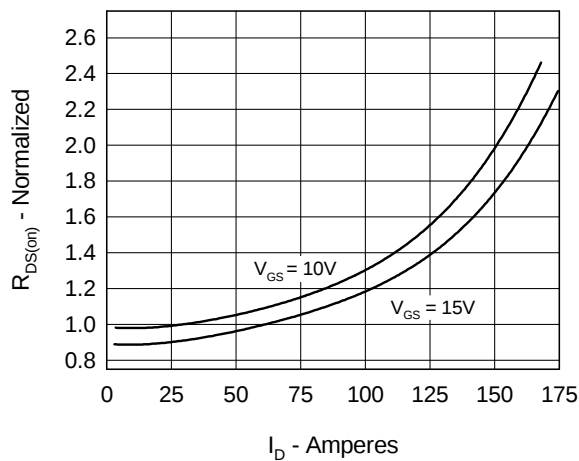

Fig. 3 $R_{DS(on)}$ vs. Drain Current


Fig. 4 Temperature Dependence of Drain to Source Resistance

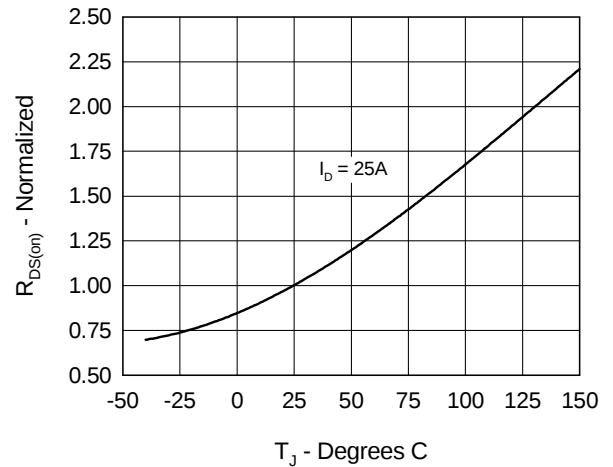


Fig. 5 Drain Current vs. Case Temperature

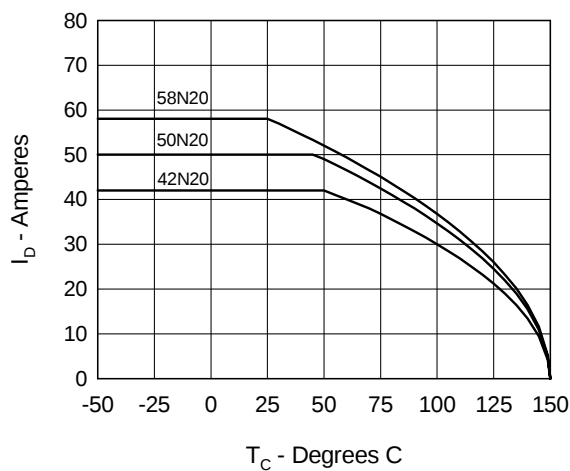


Fig. 6 Temperature Dependence of Breakdown and Threshold Voltage

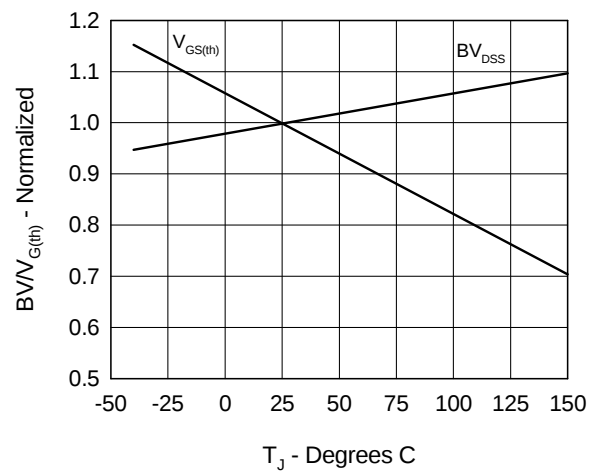


Fig.7 Gate Charge Characteristic Curve

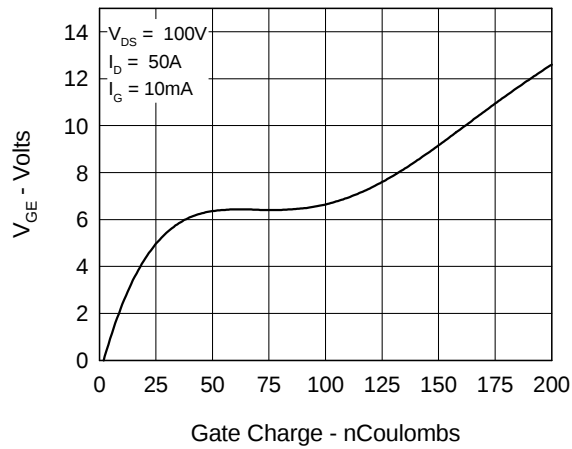


Fig.8 Forward Bias Safe Operating Area

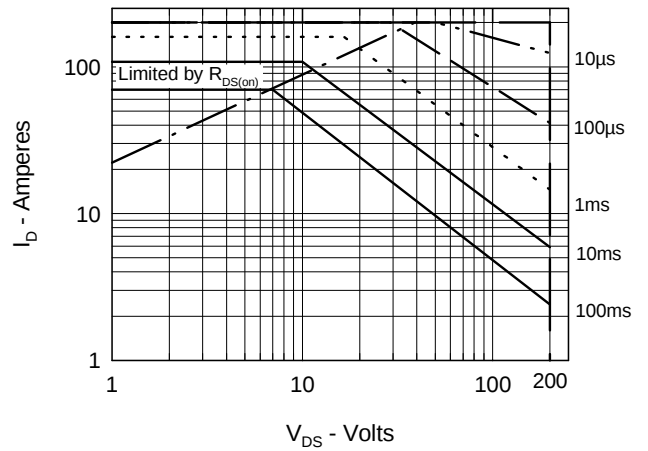


Fig.9 Capacitance Curves

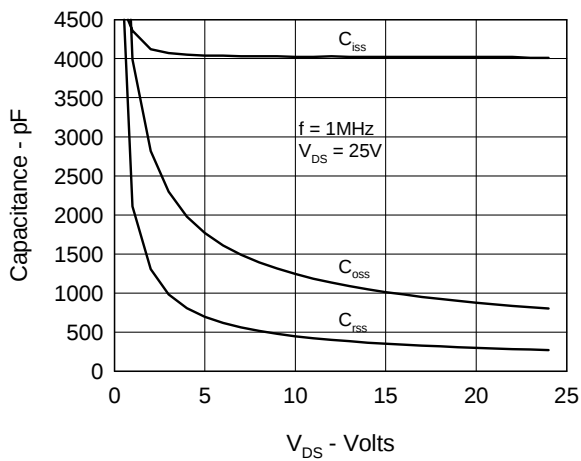


Fig.10 Source Current vs. Source to Drain Voltage

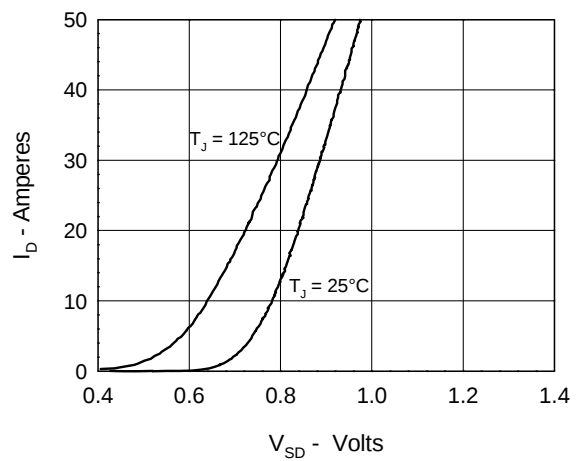


Fig.11 Transient Thermal Impedance

