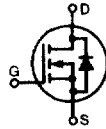


# HiPerFET™ Power MOSFETs

**IXFH/IXFM 35N30**  
**IXFH40N30**  
**IXFM40N30**

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



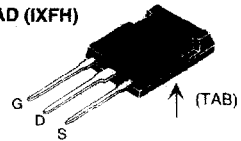
$V_{DSS}$	$I_{D25}$	$R_{DS(on)}$
300 V	35 A	100 mΩ
300 V	40 A	85 mΩ
300 V	40 A	88 mΩ

$t_{rr} \leq 200$  ns

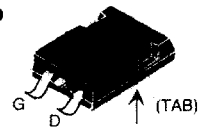
Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	300	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1\text{ M}\Omega$	300	V
$V_{GS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	35N30: 35 40N30: 40	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	35N30: 140 40N30: 160	A
$I_{AR}$	$T_C = 25^\circ\text{C}$	35N30: 35 40N30: 40	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	

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_{DSS}$	$V_{GS} = 0\text{ V}$ , $I_D = 250\ \mu\text{A}$	300		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 4\text{ mA}$	2		V
$I_{GSS}$	$V_{GS} = \pm 20\text{ V}_{DC}$ , $V_{DS} = 0$			$\pm 100$ nA
$I_{DSS}$	$V_{GS} = 0.8 \cdot V_{DSS}$ , $T_J = 25^\circ\text{C}$ $V_{GS} = 0\text{ V}$ , $T_J = 125^\circ\text{C}$			200 $\mu\text{A}$ 1 mA
$R_{DS(on)}$	$V_{GS} = 10\text{ V}$ , $I_D = 0.5 I_{D25}$	35N30 FH40N30 FM40N30		0.100 $\Omega$ 0.085 $\Omega$ 0.088 $\Omega$
	Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$			

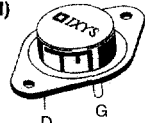
TO-247 AD (IXFH)



TO-247 SMD  
("S" Suffix)  
(Note 1)



TO-204 AE (IXFM)



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)
- Space savings
- High power density



IXFH 35N30 D1FH 40N30  
IXFM 35A30 D1FM 40A30

Symbol	Test Conditions	Characteristic Values ( $T_j = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$g_{fs}$	$V_{DS} = 10\text{ V}; I_D = 0.5 I_{D25}$ , pulse test	22	25	S
$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	4800		pF
$C_{oss}$		745		pF
$C_{rss}$		280		pF
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 I_{D25}$ $R_G = 2\ \Omega$ (External)	20	30	ns
$t_r$		60	90	ns
$t_{d(off)}$		75	100	ns
$t_f$		45	90	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 I_{D25}$	177	200	nC
$Q_{gs}$		28	50	nC
$Q_{gd}$		78	105	nC
$R_{th(j-c)}$			0.42	K/W
$R_{th(c-k)}$		0.25		K/W

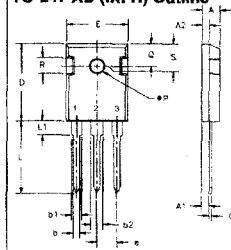
Symbol	Test Conditions	Characteristic Values ( $T_j = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$I_s$	$V_{GS} = 0\text{ V}$	35N30 40N30		35 A 40 A
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$	35N30 40N30		140 A 160 A
$V_{SD}$	$I_f = I_S, V_{GS} = 0\text{ V},$ Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$			1.5 V
$t_{tr}$	$I_f = I_S, -di/dt = 100\text{ A}/\mu\text{s},$ $V_R = 100\text{ V}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$		200 ns 350 ns

Note 1: Add "S" suffix for TO-247 SMD package option (ex: IXFH40N30S)

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.83	5.21	.190	.205
A1	2.29	2.54	.090	.100
A2	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b1	1.19	2.13	.075	.084
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	5.45 BSC		.215 BSC	
L	4.90	5.10	.193	.201
L1	2.70	2.90	.106	.114
L2	2.10	2.30	.083	.091
L3	0.00	0.10	.000	.004
L4	1.90	2.10	.075	.083
ØP	3.55	3.65	.140	.144
Q	5.89	6.20	.220	.244
R	4.32	4.83	.170	.190
S	6.15 BSC		.242 BSC	

Note: All metal surfaces solder plated.

TO-247 AD (IXFH) Outline

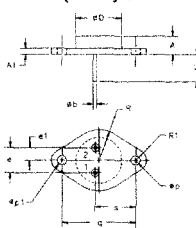


Terminals:  
1 - Gate  
2 - Drain  
3 - Source  
Tab - Drain

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A <sub>1</sub>	2.2	2.54	.087	.102
A <sub>2</sub>	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b <sub>1</sub>	1.65	2.13	.065	.084
b <sub>2</sub>	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	

C1

TO-204 AE (IXFM) Outline



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

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	8.4	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

Min. Recommended Footprint

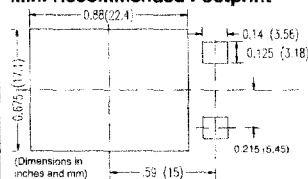


Fig. 1 Output Characteristics

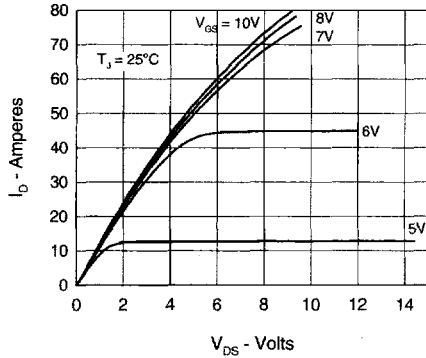


Fig. 2 Input Admittance

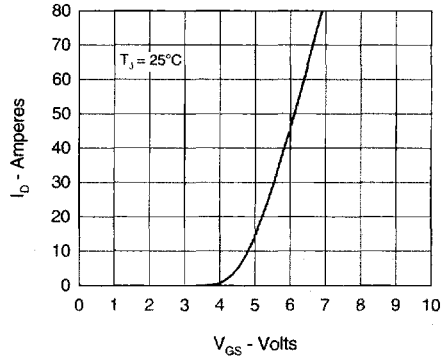


Fig. 3  $R_{DS(on)}$  vs. Drain Current

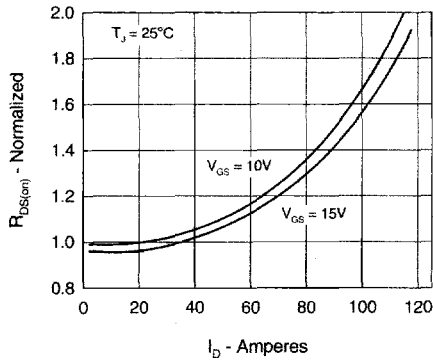


Fig. 4 Temperature Dependence of Drain to Source Resistance

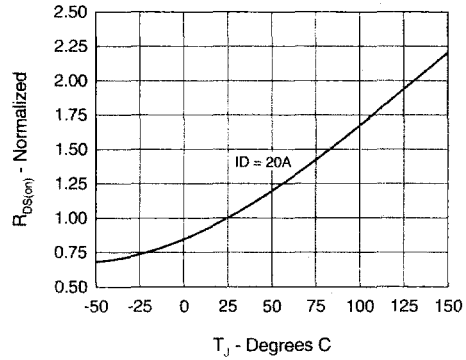


Fig. 5 Drain Current vs. Case Temperature

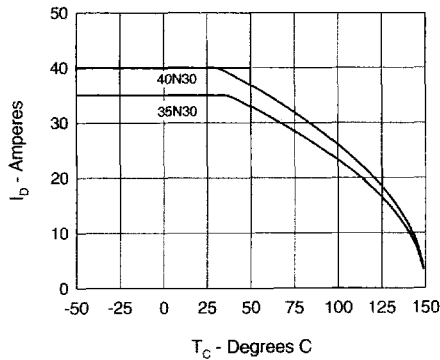


Fig. 6 Temperature Dependence of Breakdown and Threshold Voltage

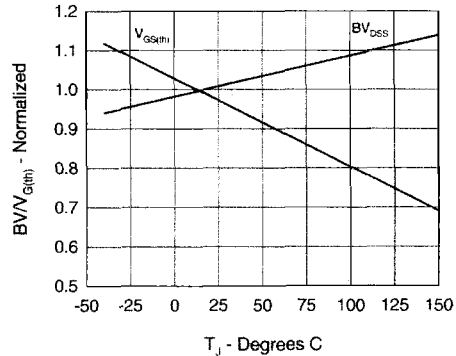


Fig.7 Gate Charge Characteristic Curve

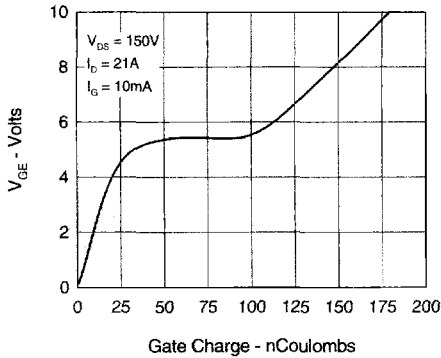
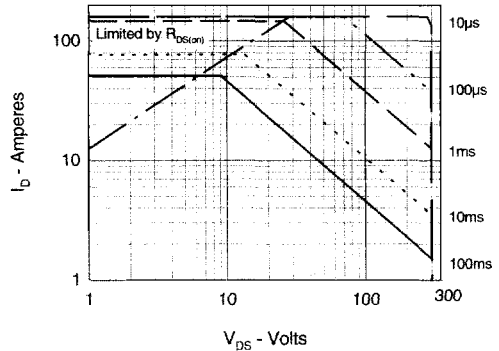


Fig.8 Forward Bias Safe Operating Area



C1

Fig.9 Capacitance Curves

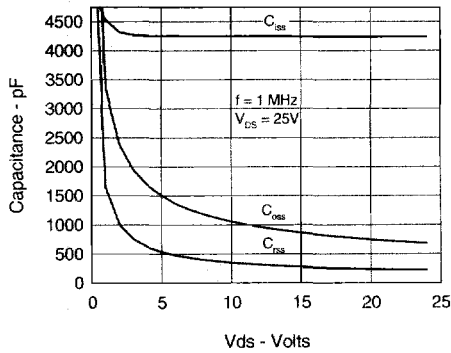


Fig.10 Source Current vs. Source to Drain Voltage

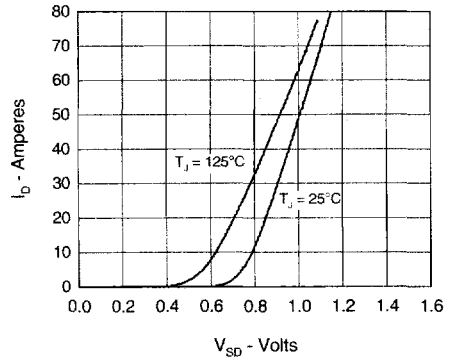


Fig.11 Transient Thermal Impedance

