

HiPerFET™ Power MOSFETs

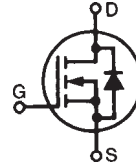
N-Channel Enhancement Mode
High dv/dt , Low t_{rr} , HDMOS™ Family

Obsolete:
IXFM10N100
IXFM12N100

~~IXFH/IXFM 10 N100~~
~~IXFH/IXFM 12 N100~~

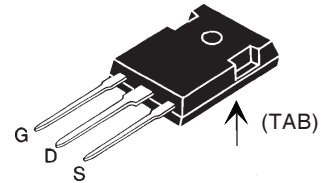
V_{DSS}	I_{D25}	$R_{DS(on)}$
1000 V	10 A	1.20 Ω
1000 V	12 A	1.05 Ω

$t_{rr} \leq 250$ ns



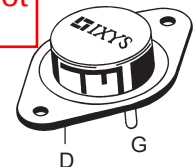
Symbol	Test Conditions	Maximum Ratings		
V_{DSS}	$T_J = 25^\circ\text{C}$ to 150°C	1000		V
V_{DGR}	$T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1$ M Ω	1000		V
V_{GS}	Continuous	± 20		V
V_{GSM}	Transient	± 30		V
I_{D25}	$T_C = 25^\circ\text{C}$	10N100	10	A
		12N100	12	A
I_{DM}	$T_C = 25^\circ\text{C}$, pulse width limited by T_{JM}	10N100	40	A
		12N100	48	A
I_{AR}	$T_C = 25^\circ\text{C}$	10N100	10	A
		12N100	12	A
E_{AR}	$T_C = 25^\circ\text{C}$	30		mJ
dv/dt	$I_S \leq I_{DM}$, $di/dt \leq 100$ A/ μs , $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ\text{C}$, $R_G = 2$ Ω	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-204 AA (IXFM)

Package not available



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

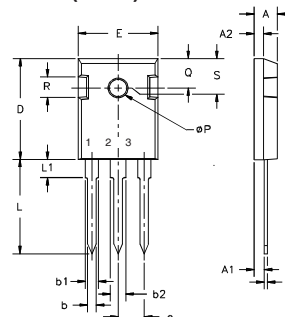
- Easy to mount with 1 screw (TO-247) (isolated mounting screw hole)
- Space savings
- High power density

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
V_{DSS}	$V_{GS} = 0$ V, $I_D = 3$ mA	1000		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 4$ mA	2.0		4.5 V
I_{GSS}	$V_{GS} = \pm 20$ V _{DC} , $V_{DS} = 0$			± 100 nA
I_{DSS}	$V_{DS} = 0.8 \cdot V_{DSS}$, $V_{GS} = 0$ V $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$			250 μA 1 mA
$R_{DS(on)}$	$V_{GS} = 10$ V, $I_D = 0.5 \cdot I_{D25}$ 10N100 12N100 Pulse test, $t \leq 300$ μs , duty cycle $d \leq 2$ %			1.20 Ω 1.05 Ω

Symbol	Test Conditions	Characteristic Values (T _J = 25°C, unless otherwise specified)			
		min.	typ.	max.	
g_{fs}	V _{DS} = 10 V; I _D = 0.5 • I _{D25} , pulse test	6	10	S	
C_{iss}	} V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		4000	pF	
C_{oss}			310	pF	
C_{rss}			70	pF	
t_{d(on)}	} V _{GS} = 10 V, V _{DS} = 0.5 • V _{DSS} , I _D = 0.5 • I _{D25} R _G = 2 Ω (External),		21	50	ns
t_r			33	50	ns
t_{d(off)}			62	100	ns
t_f			32	50	ns
Q_{g(on)}	} V _{GS} = 10 V, V _{DS} = 0.5 • V _{DSS} , I _D = 0.5 • I _{D25}		122	155	nC
Q_{gs}			30	45	nC
Q_{gd}			50	80	nC
R_{thJC}			0.25	0.42	K/W
R_{thCK}					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	10N100			10 A
		12N100			12 A
		13N100			12.5 A
I _{SM}	Repetitive; pulse width limited by T _{JM}	10N100			40 A
		12N100			48 A
		13N100			50 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

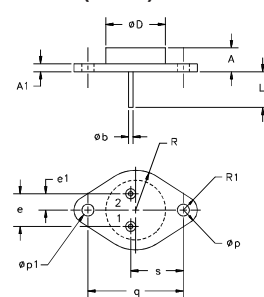
TO-247 AD (IXFH) Outline



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

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A 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

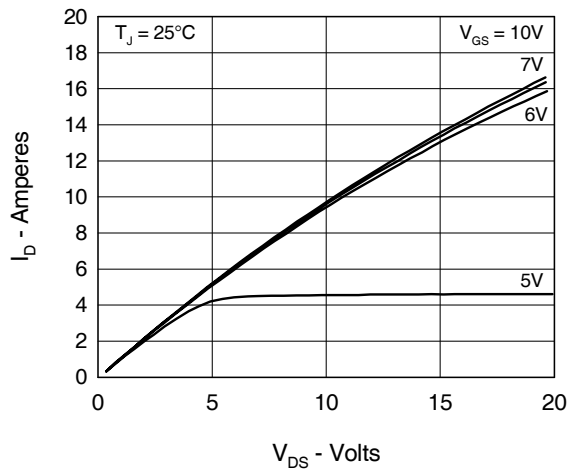
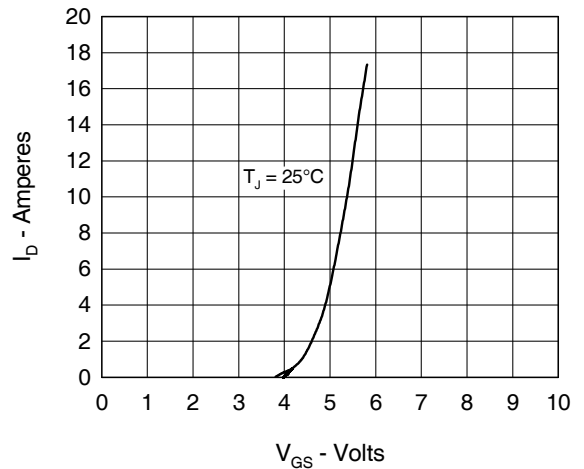
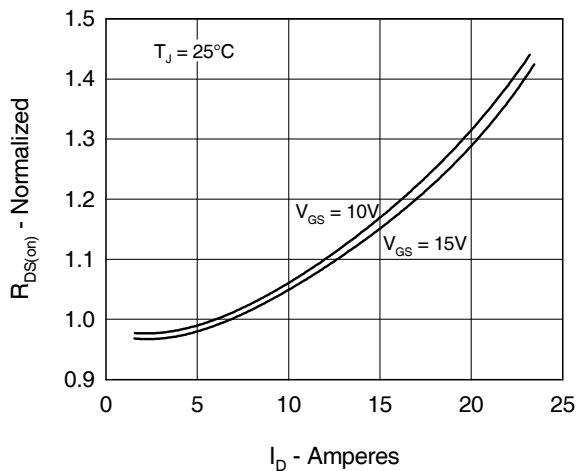
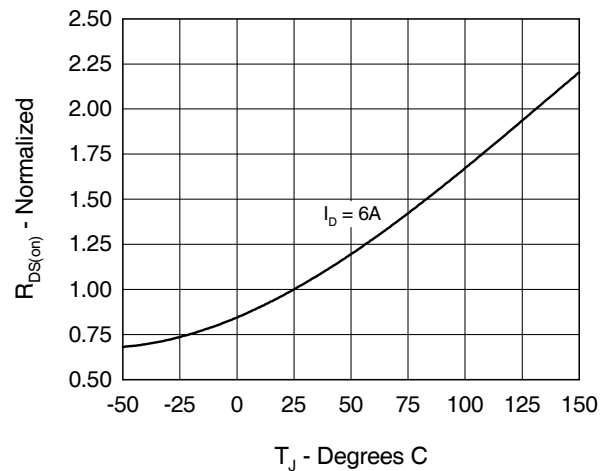
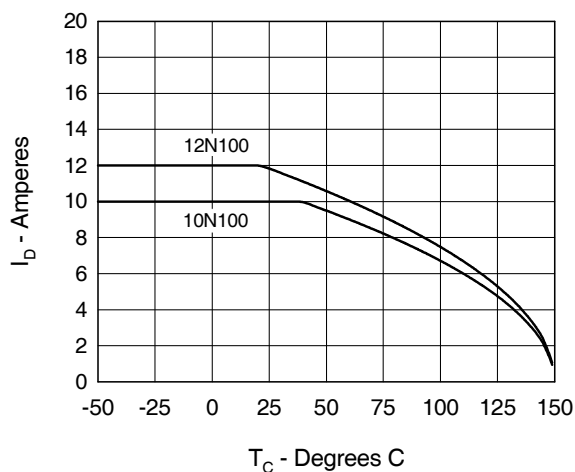
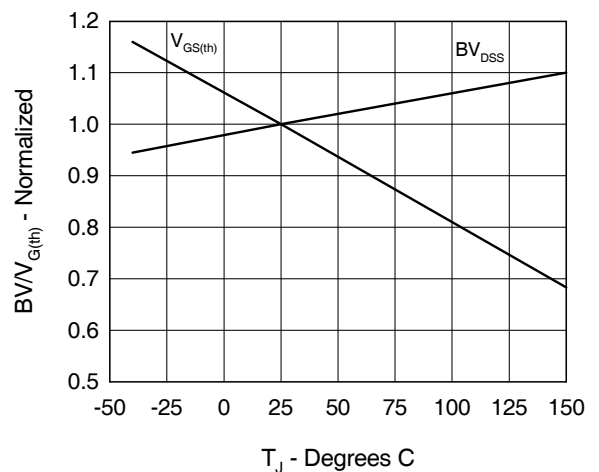
TO-204 AA (IXFM) Outline



Pins 1 - Gate 2 - Source
 Case - Drain

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	6.4	11.4	.250	.450
A1		3.42		.135
Øb	.97	1.09	.038	.043
ØD		22.22		.875
e	10.67	11.17	.420	.440
e1	5.21	5.71	.205	.225
L	7.93		.312	
Øp	3.84	4.19	.151	.165
Øp1	3.84	4.19	.151	.165
q	30.15	BSC	1.187	BSC
R		13.33		.525
R1		4.77		.188
s	16.64	17.14	.655	.675

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

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


$V_{DS} = 500V$
 $I_D = 6A$
 $I_G = 10mA$

Gate Charge (nC)	V _{GS} (Volts)
0	0
25	5
50	5
75	6
100	7.5
125	10

Capacitance - pF

C_{iss}

$f = 1\text{MHz}$
 $V_{DS} = 25\text{V}$

C_{oss}

C_{rss}

V_{DS} - Volts

The graph shows the drain current I_D in Amperes on the y-axis (0 to 20) versus the drain-source voltage V_{SD} in Volts on the x-axis (0.0 to 1.4). Two curves are plotted: one for $T_J = 25^\circ\text{C}$ and one for $T_J = 125^\circ\text{C}$. The $T_J = 125^\circ\text{C}$ curve is to the left of the $T_J = 25^\circ\text{C}$ curve, indicating a lower pinch-off voltage at higher temperature.

V_{SD} (Volts)	I_D (Amperes) at $T_J = 25^\circ\text{C}$	I_D (Amperes) at $T_J = 125^\circ\text{C}$
0.0	0.0	0.0
0.2	0.0	0.0
0.4	0.0	0.0
0.5	0.5	0.0
0.6	3.0	0.5
0.7	10.0	3.0
0.8	18.0	10.0

This graph shows the thermal response of a device over time for different duty cycles. The y-axis represents Thermal Response in K/W on a logarithmic scale from 0.001 to 1. The x-axis represents Time in Seconds on a logarithmic scale from 0.00001 to 10. Curves are plotted for duty cycles $D = 0.5, 0.2, 0.1, 0.05, 0.02, 0.01$, and a 'Single Pulse' case. An inset diagram illustrates the duty cycle $D = t_p / T$, where t_p is the pulse width and T is the period.

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	6,306,728B1	6,259,123B1	6,306,728B1
	4,850,072	4,931,844	5,034,796	5,063,307	5,237,481	5,381,025	6,404,065B1	6,162,665	6,534,343 6,583,505



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