

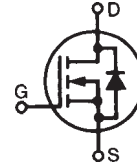
HiPerFET™ Power MOSFETs

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

IXFH/IXFM 10 N100
IXFH/IXFM 12 N100

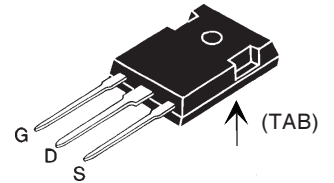
V_{DSS}	I_{D25}	$R_{DS(on)}$
1000 V	10 A	1.20 Ω
1000 V	12 A	1.05 Ω

$t_{rr} \leq 250$ ns

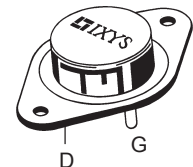


Symbol	Test Conditions	Maximum Ratings		
V_{DSS}	$T_J = 25^\circ\text{C}$ to 150°C	1000	V	
V_{DGR}	$T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1$ M Ω	1000	V	
V_{GS}	Continuous	± 20	V	
V_{GSM}	Transient	± 30	V	
I_{D25}	$T_C = 25^\circ\text{C}$	10N100 12N100	10 12	A
I_{DM}	$T_C = 25^\circ\text{C}$, pulse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



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

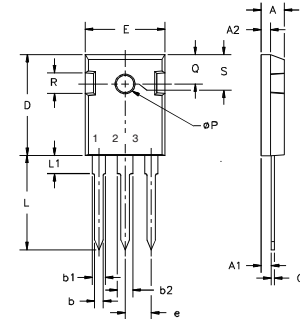
Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
V_{DSS}	$V_{GS} = 0$ V, $I_D = 3$ mA	1000		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 4$ mA	2.0		4.5 V
I_{GSS}	$V_{GS} = \pm 20$ V _{DC} , $V_{DS} = 0$			± 100 nA
I_{DSS}	$V_{DS} = 0.8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

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

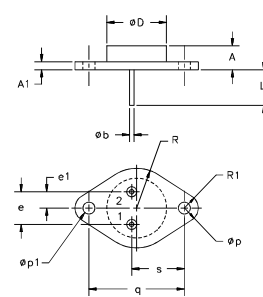
TO-247 AD (IXFH) Outline



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

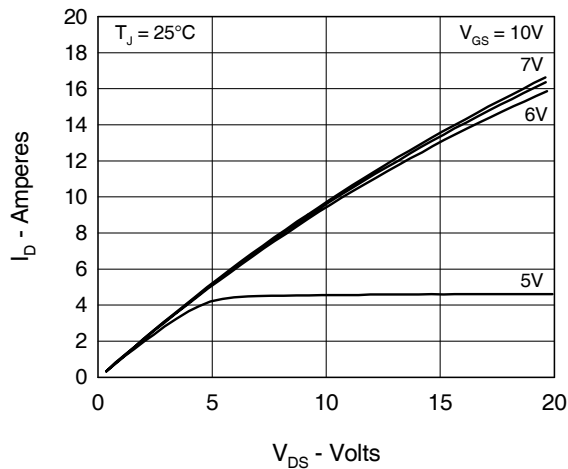
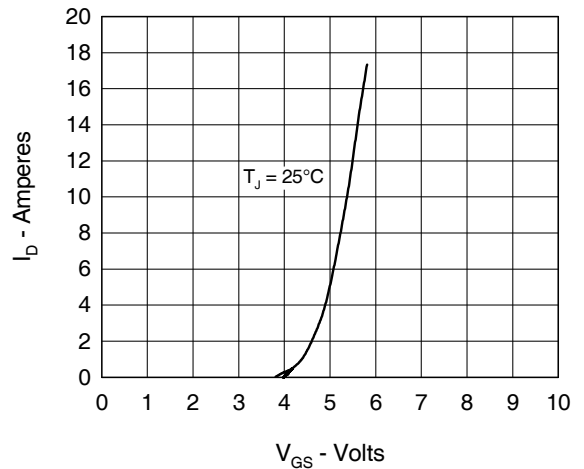
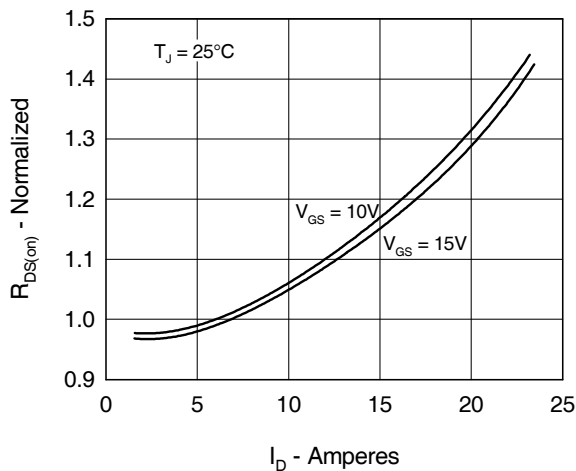
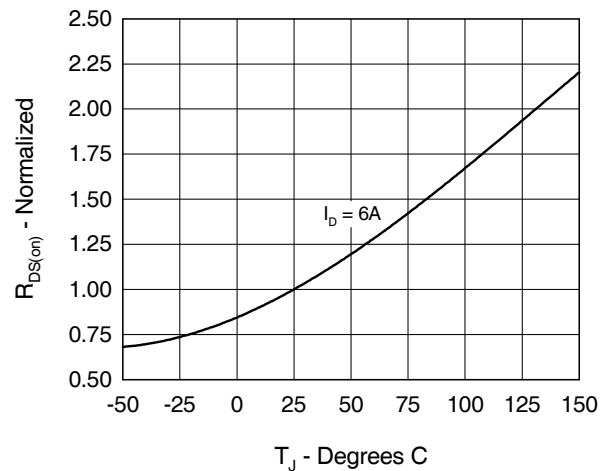
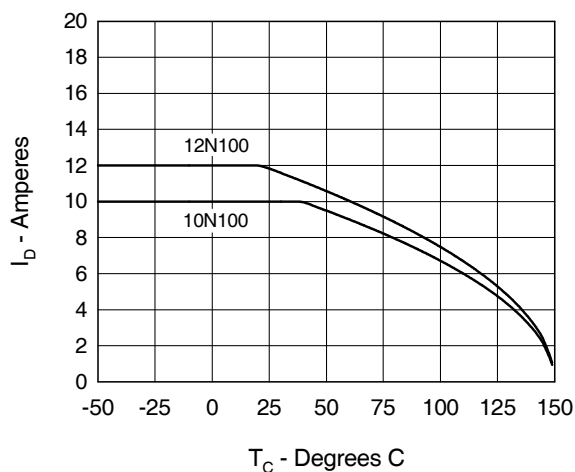
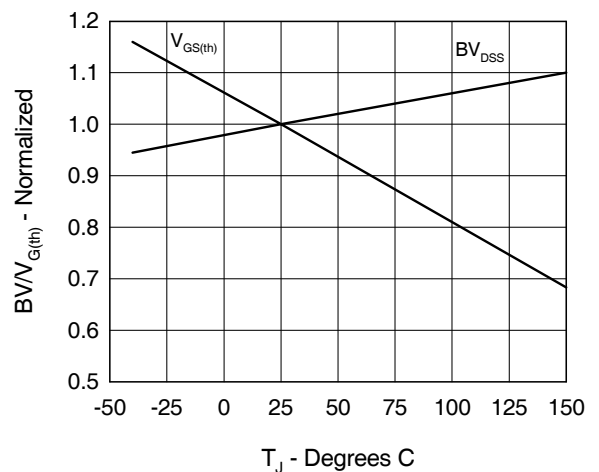


Pins 1 - Gate 2 - Source
 Case - Drain

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.

IXYS MOSFETs and IGBTs are covered by one or more	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
of the following U.S. patents:	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

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 $T_J = 125^\circ\text{C}$ and one for $T_J = 25^\circ\text{C}$. Both curves show a sharp increase in current as the voltage increases, with the 125°C curve shifted to the left of the 25°C curve.

This graph shows the thermal response of a device over time for different duty cycles. The y-axis is Thermal Response in K/W (log scale, 0.001 to 1). The x-axis is Time in Seconds (log scale, 0.00001 to 10). Curves are shown for D=0.5, 0.2, 0.1, 0.05, 0.02, 0.01, and a Single Pulse. An inset diagram shows a pulse train with period T and pulse width t_p, with the formula $D = t_p / T$.

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