

HiPerFET™ Power MOSFETs

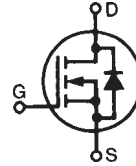
N-Channel Enhancement Mode
High dv/dt , Low t_{rr} , HDMOS™ Family

Obsolete:
IXFM10N100
IXFM12N100

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

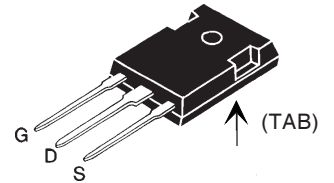
V_{DSS}	I_{D25}	$R_{DS(on)}$
1000 V	10 A	1.20 Ω
1000 V	12 A	1.05 Ω

$t_{rr} \leq 250$ ns



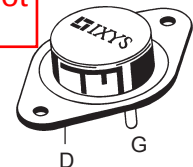
Symbol	Test Conditions	Maximum Ratings		
V_{DSS}	$T_J = 25^\circ\text{C}$ to 150°C	1000		V
V_{DGR}	$T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1\text{ M}\Omega$	1000		V
V_{GS}	Continuous	± 20		V
V_{GSM}	Transient	± 30		V
I_{D25}	$T_C = 25^\circ\text{C}$	10N100	10	A
		12N100	12	A
I_{DM}	$T_C = 25^\circ\text{C}$, 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	$I_S \leq I_{DM}$, $di/dt \leq 100\text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ\text{C}$, $R_G = 2\ \Omega$	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-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

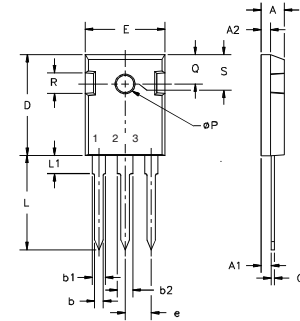
- Easy to mount with 1 screw (TO-247) (isolated mounting screw hole)
- Space savings
- High power density

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

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
g_{fs}	$V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$, pulse test	6	10	S
C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	4000	310	pF
C_{oss}				pF
C_{rss}				pF
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 2\ \Omega$ (External),	21	50	ns
t_r		33	50	ns
$t_{d(off)}$		62	100	ns
t_f		32	50	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$	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 ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
Symbol	Test Conditions	min.	typ.	max.
I_S	$V_{GS} = 0\text{ V}$	10N100 12N100 13N100		10 A 12 A 12.5 A
I_{SM}	Repetitive; pulse width limited by T_{JM}	10N100 12N100 13N100		40 A 48 A 50 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_{rr}	$I_F = I_S$ $-di/dt = 100\text{ A}/\mu\text{s}$, $V_R = 100\text{ V}$	$T_J = 25^\circ\text{C}$		250 ns
		$T_J = 125^\circ\text{C}$		400 ns
Q_{RM}		$T_J = 25^\circ\text{C}$	1	μC
		$T_J = 125^\circ\text{C}$	2	μC
I_{RM}		$T_J = 25^\circ\text{C}$	10	A
		$T_J = 125^\circ\text{C}$	15	A

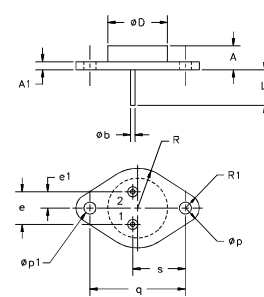
TO-247 AD (IXFH) Outline



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
A ₁		3.42		.135
Øb	.97	1.09	.038	.043
ØD		22.22		.875
e	10.67	11.17	.420	.440
e ₁	5.21	5.71	.205	.225
L	7.93		.312	
Øp	3.84	4.19	.151	.165
Øp ₁	3.84	4.19	.151	.165
q	30.15	BSC	1.187	BSC
R		13.33		.525
R ₁		4.77		.188
s	16.64	17.14	.655	.675

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

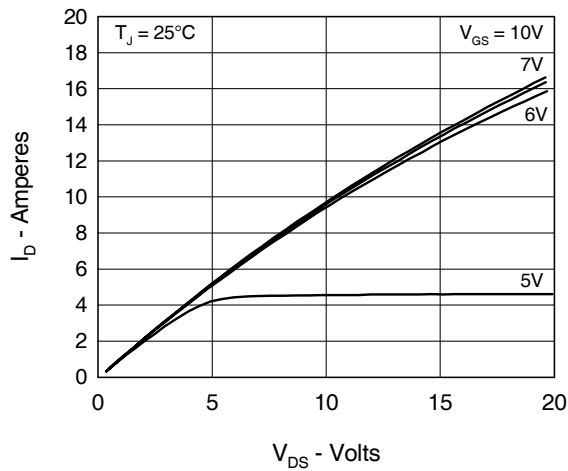
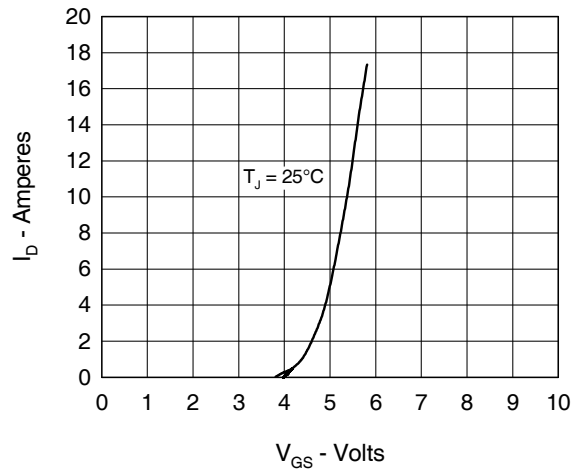
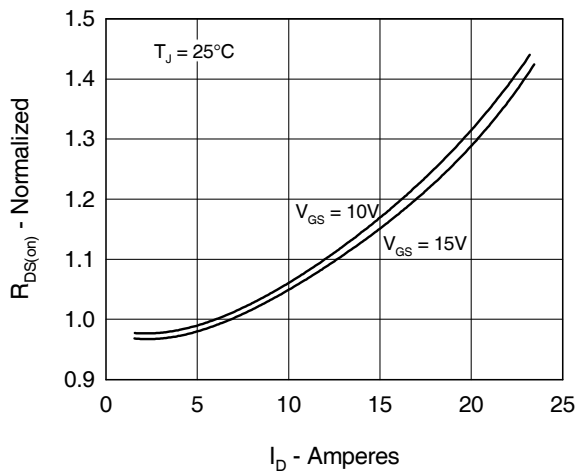
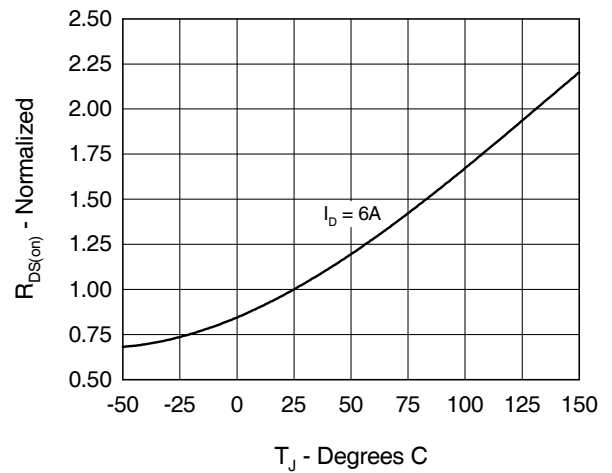
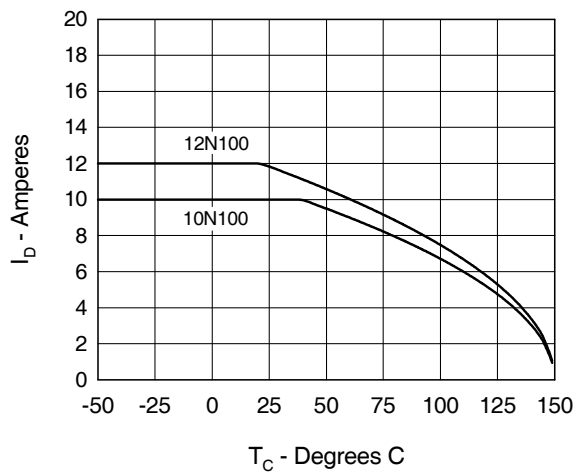
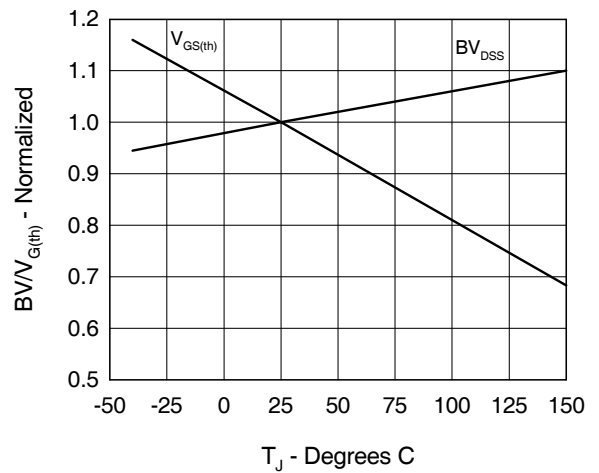
Fig. 1 Output Characteristics

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


Fig.7 Gate Charge Characteristic Curve

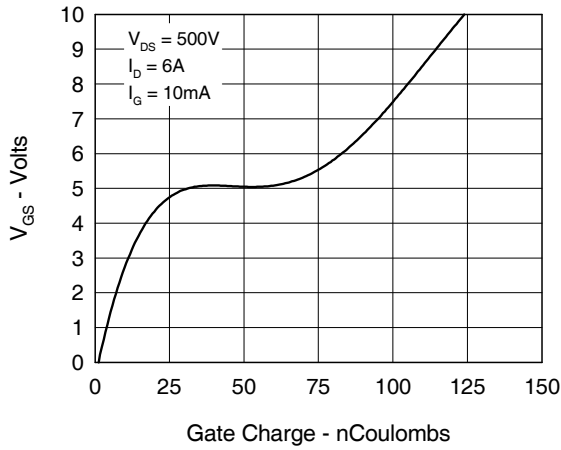


Fig.8 Capacitance Curves

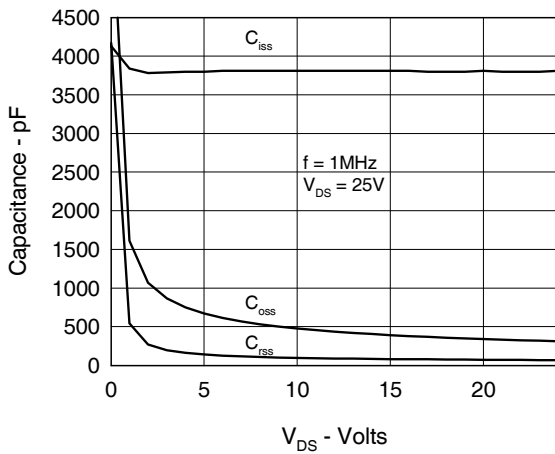


Fig.9 Source Current vs. Source to Drain Voltage

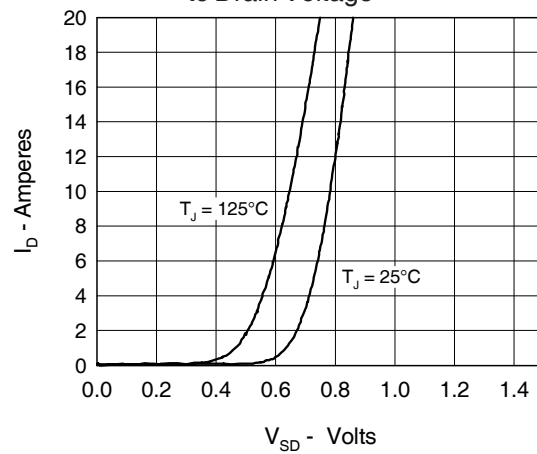
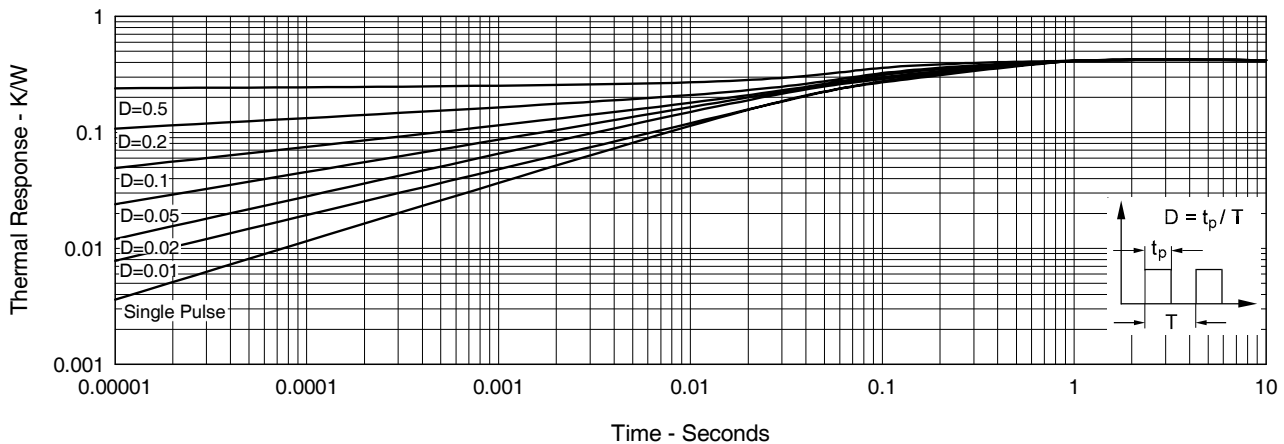


Fig.10 Transient Thermal Impedance



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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 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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