

# HiPerFET™ Power MOSFETs

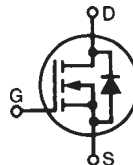
N-Channel Enhancement Mode  
High dv/dt, Low  $t_{rr}$ , HDMOS™ Family

**Obsolete:**  
**IXFM10N100**  
**IXFM12N100**

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

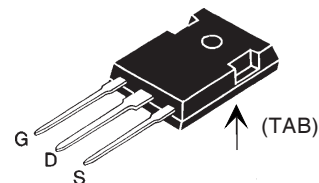
$V_{DSS}$	$I_{D25}$	$R_{DS(on)}$
1000 V	10 A	1.20 $\Omega$
1000 V	12 A	1.05 $\Omega$

$t_{rr} \leq 250$  ns



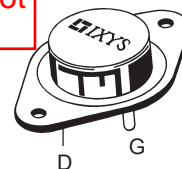
Symbol	Test Conditions	Maximum Ratings		
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	1000	V	
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1$ M $\Omega$	1000	V	
$V_{GS}$	Continuous	$\pm 20$	V	
$V_{GSM}$	Transient	$\pm 30$	V	
$I_{D25}$	$T_C = 25^\circ\text{C}$	10N100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

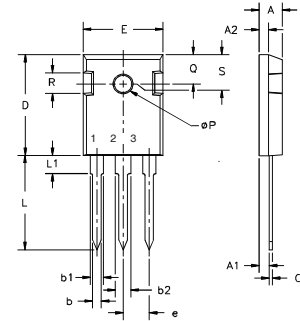
### Advantages

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

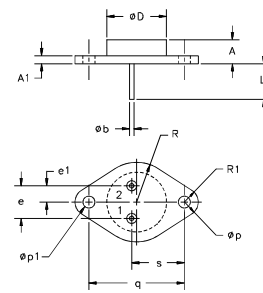
Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_{DSS}$	$V_{GS} = 0$ V, $I_D = 3$ mA	1000		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 4$ mA	2.0		4.5 V
$I_{GSS}$	$V_{GS} = \pm 20$ V <sub>DC</sub> , $V_{DS} = 0$			$\pm 100$ nA
$I_{DSS}$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

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	pF
$C_{oss}$			310	pF
$C_{rss}$			70	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
$R_{thJC}$			0.42	K/W
$R_{thCK}$			0.25	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	$\mu\text{C}$
		$T_J = 125^\circ\text{C}$	2	$\mu\text{C}$
$I_{RM}$		$T_J = 25^\circ\text{C}$	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 <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
∅P	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 <sub>1</sub>		3.42		.135
∅b	.97	1.09	.038	.043
∅D		22.22		.875
e	10.67	11.17	.420	.440
e <sub>1</sub>	5.21	5.71	.205	.225
L	7.93		.312	
∅p	3.84	4.19	.151	.165
∅p <sub>1</sub>	3.84	4.19	.151	.165
q	30.15	BSC	1.187	BSC
R		13.33		.525
R <sub>1</sub>		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

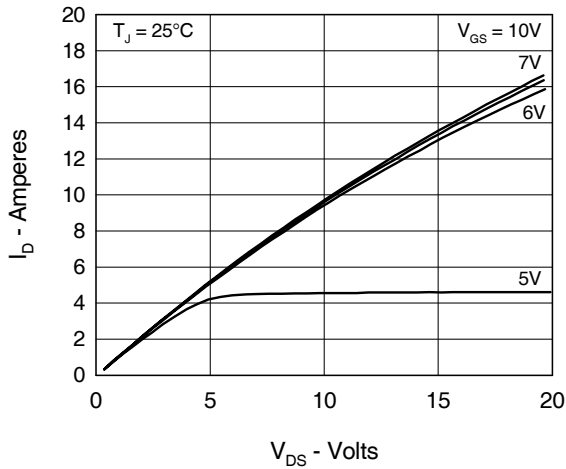


Fig. 2 Input Admittance

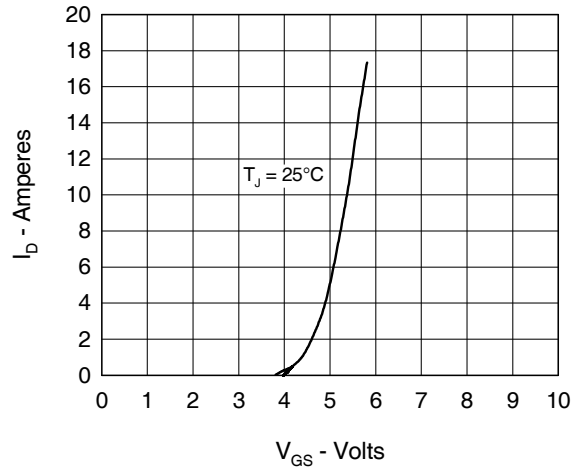


Fig. 3  $R_{DS(on)}$  vs. Drain Current

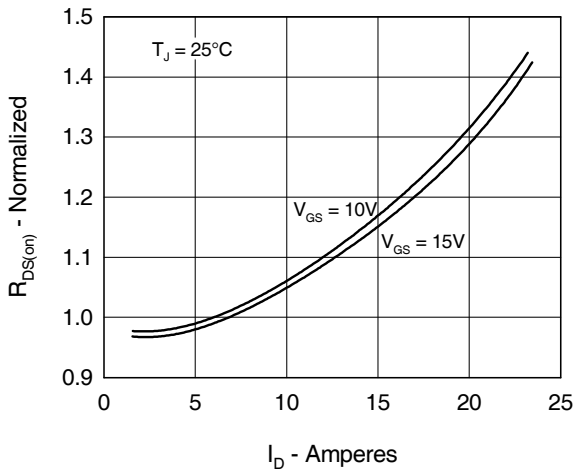


Fig. 4 Temperature Dependence of Drain to Source Resistance

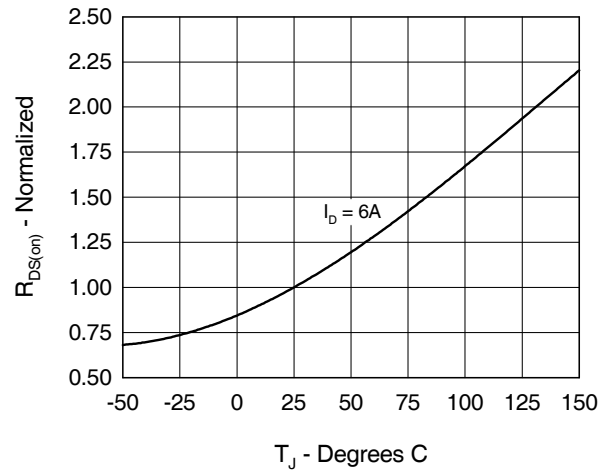


Fig. 5 Drain Current vs. Case Temperature

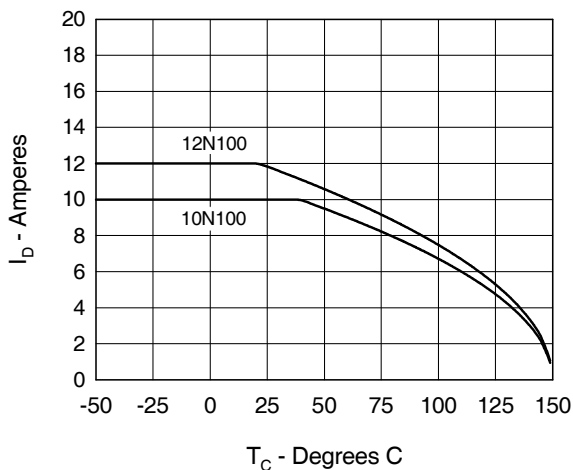


Fig. 6 Temperature Dependence of Breakdown and Threshold Voltage

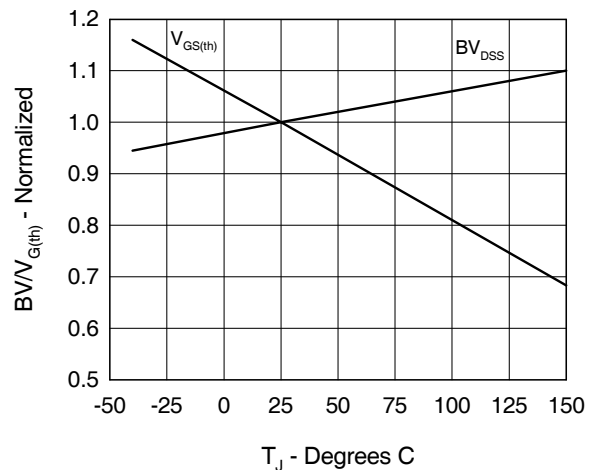


Fig.7 Gate Charge Characteristic Curve

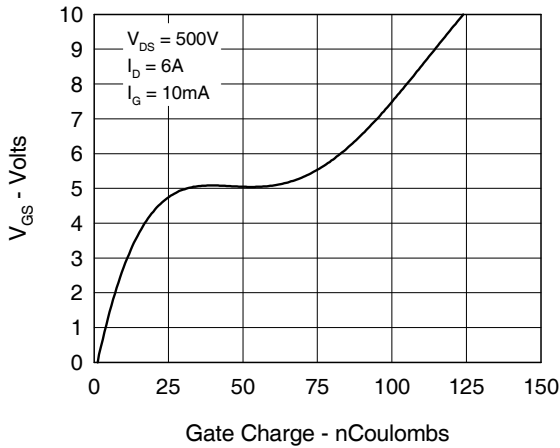


Fig.8 Capacitance Curves

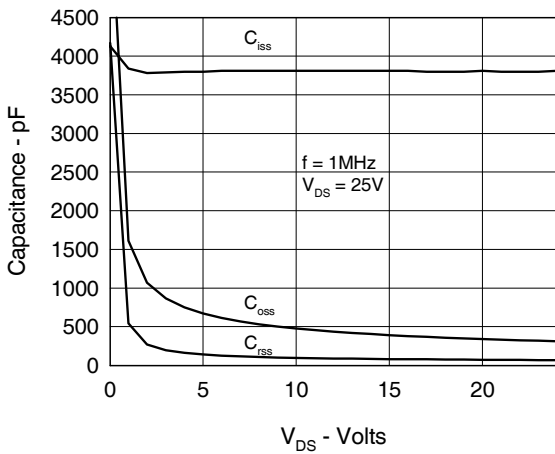


Fig.9 Source Current vs. Source to Drain Voltage

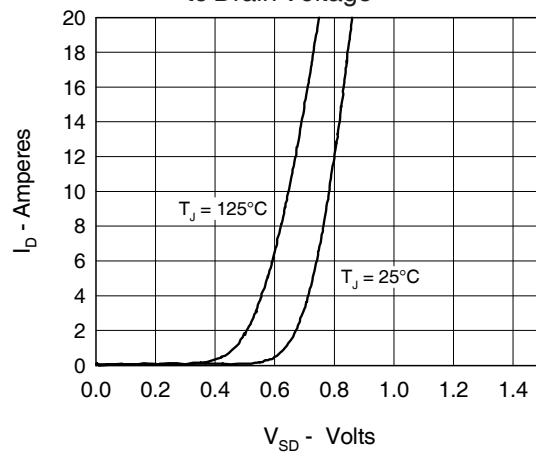
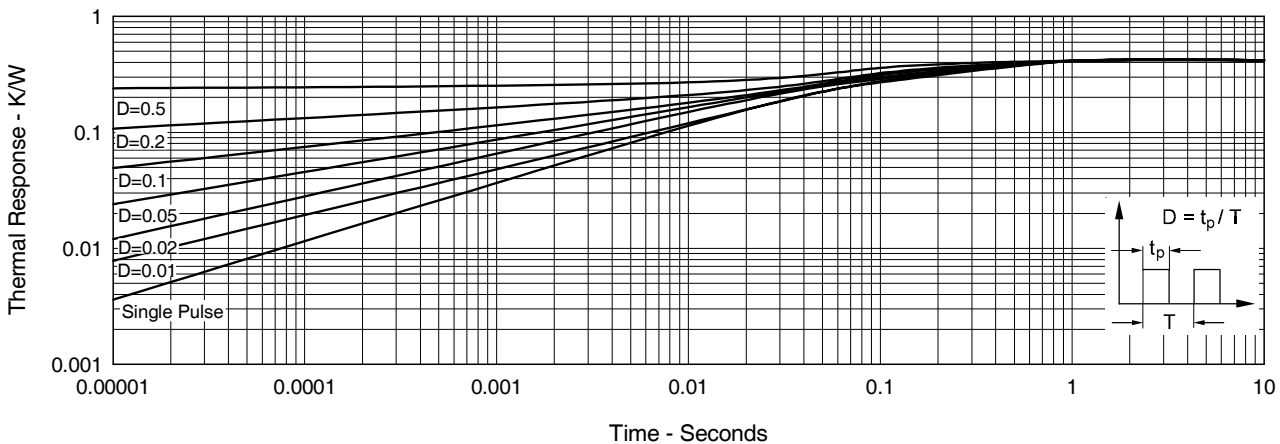


Fig.10 Transient Thermal Impedance



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