

HiPerFET™ Power MOSFET

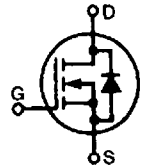
N-Channel Enhancement Mode

High dv/dt, Low t_{rr} , HDMOS™ Family

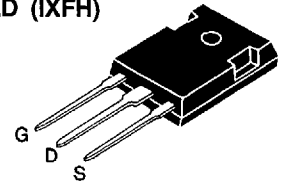
IXFH/IXFM 11N80
IXFH/IXFM 13N80
IXFH/IXFM 14N80
IXFH/IXFM 15N80

V_{DSS}	I_{D25}	$R_{DS(on)}$	t_{rr}
800 V	11 A	0.95 Ω	250 ns
800 V	13 A	0.80 Ω	250 ns
800 V	14 A	0.70 Ω	250 ns
800 V	15 A	0.60 Ω	250 ns

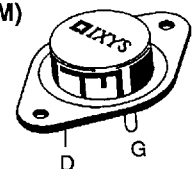
Symbol	Test Conditions	Maximum Ratings		
V_{DSS}	$T_J = 25^\circ\text{C}$ to 150°C	800		V
V_{DGR}	$T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1\text{ M}\Omega$	800		V
V_{GS}	Continuous	± 20		V
V_{GSM}	Transient	± 30		V
I_{D25}	$T_C = 25^\circ\text{C}$	11N80	11	A
		13N80	13	A
		14N80	14	A
		15N80	15	A
I_{DM}	$T_C = 25^\circ\text{C}$, pulse width limited by T_{JM}	11N80	44	A
		13N80	52	A
		14N80	56	A
		15N80	60	A
I_{AR}	$T_C = 25^\circ\text{C}$	11N80	11	A
		13N80	13	A
		14N80	14	A
		15N80	15	A
E_{AR}	$T_C = 25^\circ\text{C}$	30		mJ
dv/dt	$I_S \leq I_{DM}$, $di/dt \leq 100\text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ\text{C}$, $R_G = 2\text{ }\Omega$	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		$^\circ\text{C}$
M_d	Mounting torque	1.13/10		Nm/lb.in.
Weight		TO-204 = 18 g, TO-247 = 6 g		
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300		$^\circ\text{C}$



TO-247 AD (IXFH)



TO-204 AA (IXFM)



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 ($T_J = 25^{\circ}\text{C}$, unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
V_{DSS}	$V_{GS} = 0\text{ V}$, $I_D = 3\text{ mA}$	800		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 4\text{ mA}$	2.0		4.5 V
I_{GSS}	$V_{GS} = \pm 20\text{ V}_{DC}$, $V_{DS} = 0$			$\pm 100\text{ nA}$
I_{DSS}	$V_{DS} = 0.8\text{ V}_{DSS}$	$T_J = 25^{\circ}\text{C}$ $T_J = 125^{\circ}\text{C}$		250 μA
	$V_{GS} = 0\text{ V}$			1 mA
$R_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 0.5\text{ I}_{D25}$	11N80		0.95 Ω
		13N80		0.80 Ω
		14N80		0.70 Ω
		15N80		0.60 Ω
Pulse test, $t \leq 300\text{ }\mu\text{s}$, duty cycle $\delta \leq 2\%$				

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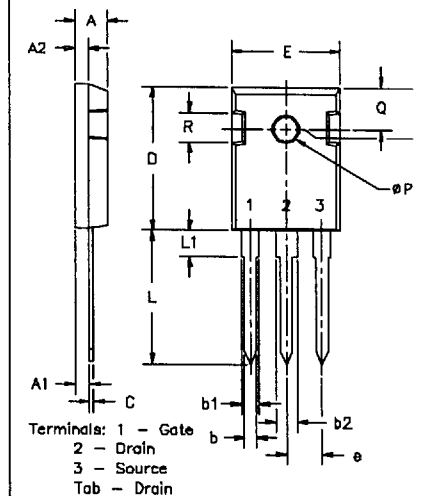
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Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		Min.	Typ.	Max.
g_{fs}	$V_{DS} = 10\text{ V}; I_D = 0.5 I_{D25}$, pulse test	8	14	S
C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		4200	pF
C_{oss}			360	pF
C_{rss}			100	pF
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$ $R_G = 2\ \Omega$ (External)		20	ns
t_r			33	ns
$t_{d(off)}$			63	ns
t_f			32	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$		128	nC
Q_{gs}			30	nC
Q_{gd}			55	nC
R_{thJC}			0.42	K/W
R_{thCK}			0.25	K/W

Source-Drain Diode

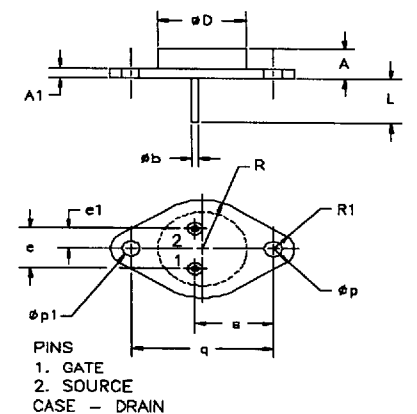
Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		Min.	Typ.	Max.
I_S	$V_{GS} = 0$	11N80 13N80 14N80 15N80		11 A 13 A 14 A 15 A
I_{SM}	Repetitive pulse width limited by T_{JM}	11N80 13N80 14N80 15N80		44 A 52 A 56 A 60 A
V_{SD}	$I_F = I_S, V_{GS} = 0\text{ V}$ Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $\delta \leq 2\%$			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
Q_{RM}		$T_J = 125^\circ\text{C}$		400 ns
I_{RM}			1 8.5	μC A

TO-247 AD (IXFH) Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.209	4.7	5.3
A1	.087	.102	2.2	2.54
A2	.059	.098	2.2	2.6
b	.040	.055	1.0	1.4
b1	.065	.084	1.65	2.13
b2	.113	.123	2.87	3.12
C	.016	.031	.4	.8
D	.819	.845	20.80	21.46
E	.610	.640	15.75	16.26
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1		.177		4.50
Q	.140	.144	3.55	3.65
R	.212	.244	5.4	6.2
S	.170	.216	4.32	5.49
	.242 BSC		6.15 BSC	

TO-204 AA (IXFM) Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.250	.450	6.4	11.4
A1		.135		3.42
b	.038	.043	.97	1.09
D		.875		22.22
e	.420	.440	10.67	11.17
e1	.205	.225	5.21	5.71
L	.312		7.93	
p	.151	.165	3.84	4.19
p1	.151	.185	3.84	4.19
q	1.187 BSC		30.15 BSC	
R		.525		13.33
R1		.188		4.77
s	.655	.675	16.64	17.14

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

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
4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025

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Fig.1. Output Characteristics

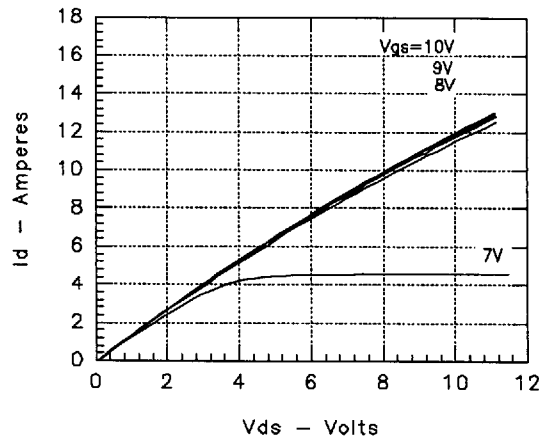


Fig. 2. Input Admittance

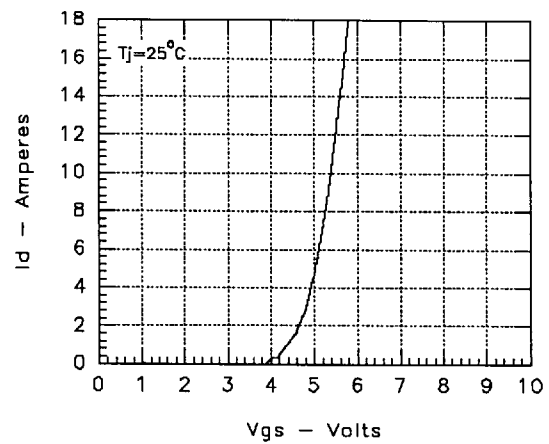


Fig. 3. Rds(on) vs. Drain Current

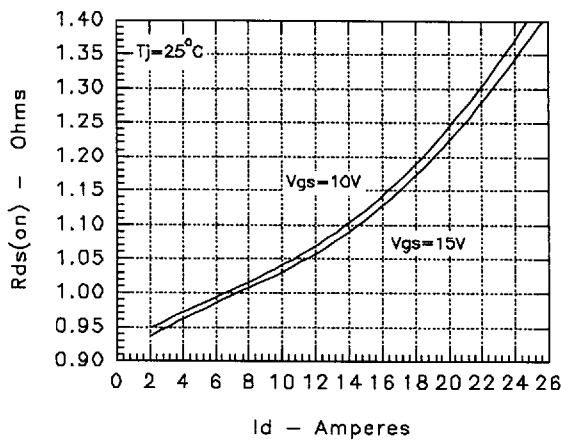


Fig. 4. Temperature Dependence of Drain to Source Resistance

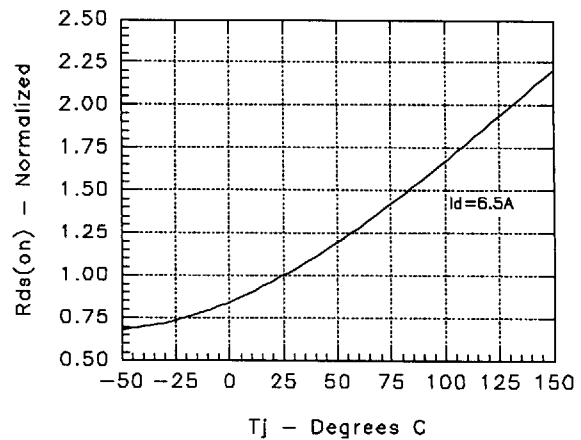


Fig. 5. Drain Current vs. Case Temperature

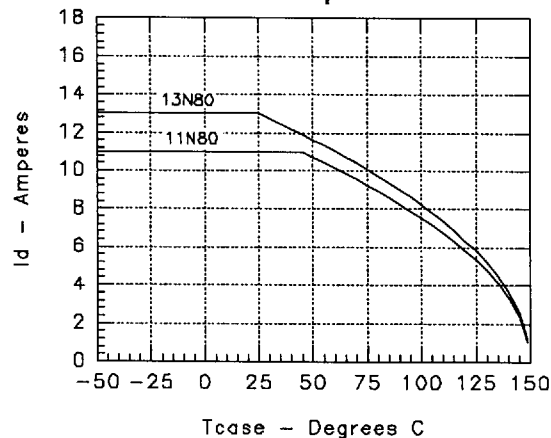
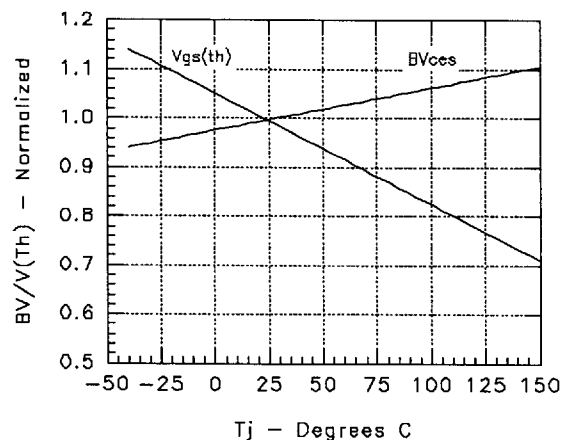


Fig. 6. Temperature Dependence of Breakdown Voltage and Threshold Voltage



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Fig. 7. Gate Charge

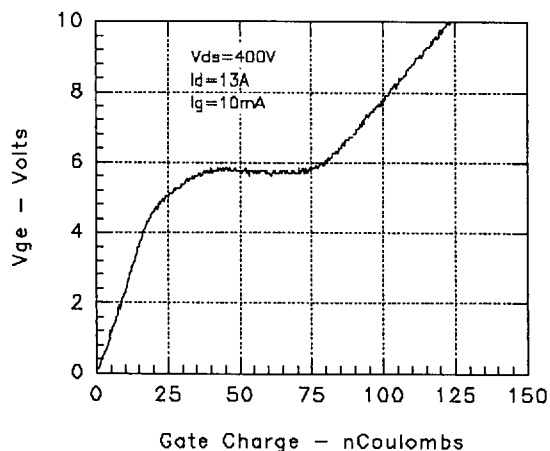


Fig. 8. Forward Bias Safe Operating Area

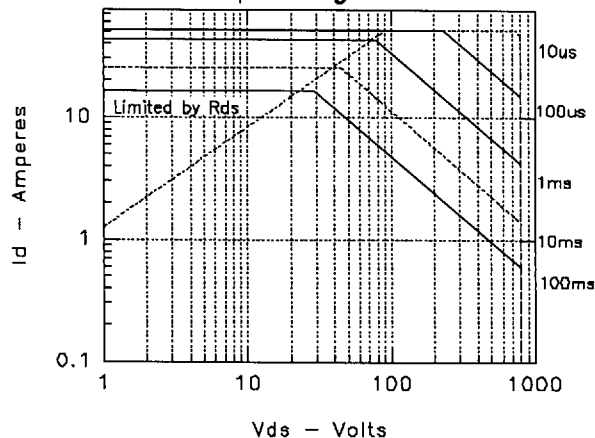


Fig. 9. Capacitance Curves

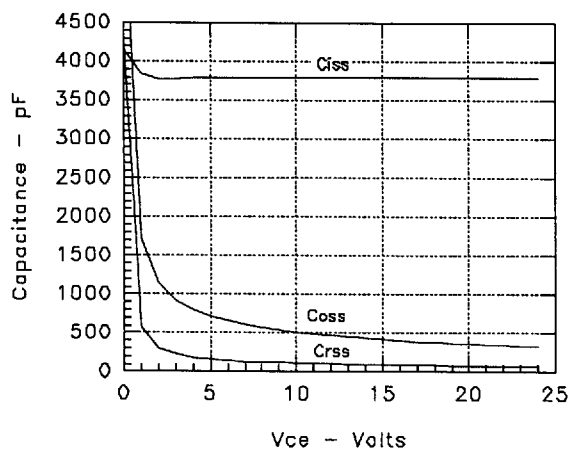


Fig. 10. Source Current vs. Source to Drain Voltage

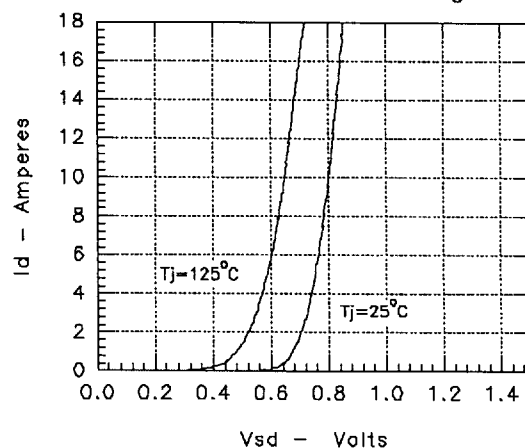
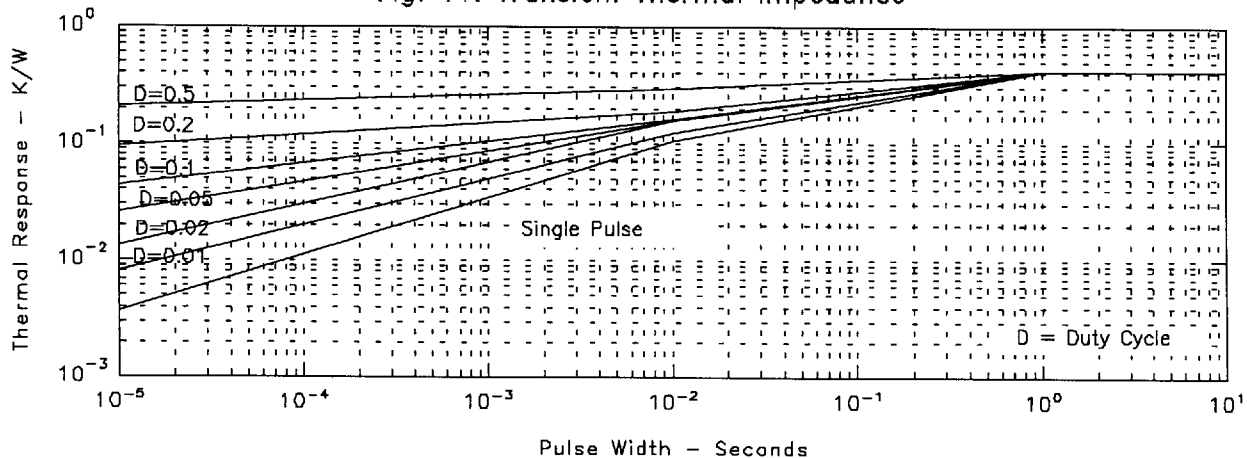


Fig. 11. Transient Thermal Impedance



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