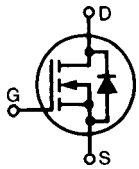
HiPerFET™ Power MOSFET

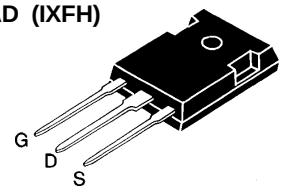
N-Channel Enhancement Mode
High dv/dt, Low t_{rr}, HDMOS™ Family

	V_{DSS}	I_{D25}	$R_{DS(on)}$	t_{rr}
IXFH/IXFM 11N80	800 V	11 A	0.95 Ω	250 ns
IXFH/IXFM 13N80	800 V	13 A	0.80 Ω	250 ns
IXFH/IXFM 14N80	800 V	14 A	0.70 Ω	250 ns
IXFH/IXFM 15N80	800 V	15 A	0.60 Ω	250 ns

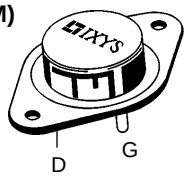
Symbol	Test Conditions		Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C		800	V
V_{DGR}	T_J = 25°C to 150°C; R_{GS} = 1 MΩ		800	V
V_{GS}	Continuous		±20	V
V_{GSM}	Transient		±30	V
I_{D25}	T_C = 25°C	11N80	11	A
		13N80	13	A
		14N80	14	A
		15N80	15	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	11N80	44	A
		13N80	52	A
		14N80	56	A
		15N80	60	A
I_{AR}	T_C = 25°C	11N80	11	A
		13N80	13	A
		14N80	14	A
		15N80	15	A
E_{AR}	T_C = 25°C		30	mJ
dv/dt	$I_S \le I_{DM}$, di/dt ≤ 100 A/µs, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$, R_G = 2 Ω		5	V/ns
P_D	T_C = 25°C		300	W
T_J			-55 ... +150	°C
T_{JM}			150	°C
T_{stg}			-55 ... +150	°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	°C



TO-247 AD (IXFH)



TO-204 AA (IXFM)



G = Gate D = Drain
S = Source TAB = Drain

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)		Characteristic Values Min.	Typ.	Max.	
V_{DSS}	V_{GS} = 0 V, I_D = 3 mA		800			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 4 mA		2.0		4.5	V
I_{GSS}	V_{GS} = ±20 V_{DC}, V_{DS} = 0				±100	nA
I_{DSS}	V_{DS} = 0.8 V_{DSS}	T_J = 25°C			250	µA
	V_{GS} = 0 V	T_J = 125°C			1	mA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = 0.5 I_{D25}	11N80			0.95	Ω
		13N80			0.80	Ω
		14N80			0.70	Ω
		15N80			0.60	Ω
	Pulse test, t ≤ 300 µs, duty cycle δ ≤ 2 %					

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

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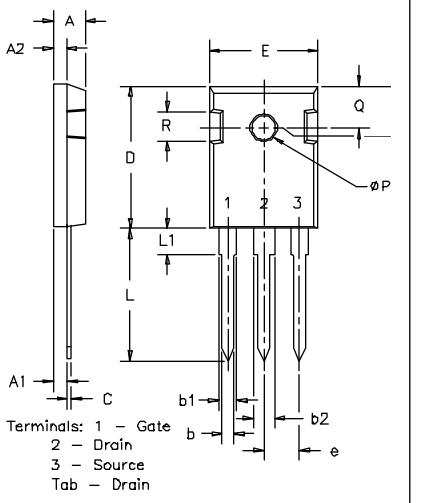
Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 10 V; I_D = 0.5 I_{D25}, pulse test	8	14		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		4200		pF
C_{oss}			360		pF
C_{rss}			100		pF
$t_{d(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25} R_G = 2 Ω (External)		20	50	ns
t_r			33	50	ns
$t_{d(off)}$			63	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}		128	155	nC
Q_{gs}			30	45	nC
Q_{gd}			55	80	nC
R_{thJC}				0.42	K/W
R_{thCK}			0.25		K/W

Source-Drain Diode

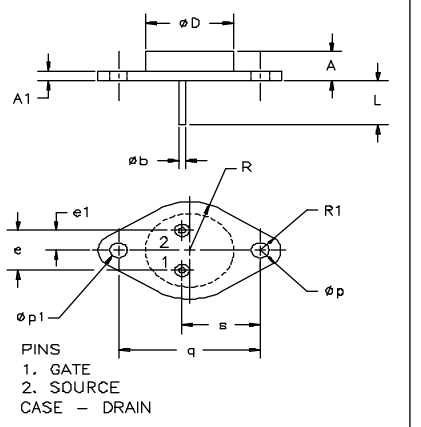
Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)		Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0	11N80			11	A
		13N80			13	A
		14N80			14	A
		15N80			15	A
I_{SM}	Repetitive pulse width limited by T_{JM}	11N80			44	A
		13N80			52	A
		14N80			56	A
		15N80			60	A
V_{SD}	I_F = I_S, V_{GS} = 0 V Pulse test, t ≤ 300 µs, duty cycle δ ≤ 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}				1		µC
I_{RM}				8.5		A

TO-247 AD (IXFH) Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.185	.209	4.7	5.3
A_1	.087	.102	2.2	2.54
A_2	.059	.098	2.2	2.6
b	.040	.055	1.0	1.4
b_1	.065	.084	1.65	2.13
b_2	.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
øP	.140	.144	3.55	3.65
Q	.212	.244	5.4	6.2
R	.170	.216	4.32	5.49
S	.242 BSC		6.15 BSC	

TO-204 AA (IXFM) Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.250	.450	6.4	11.4
A1		.135		3.42
øb	.038	.043	.97	1.09
øD		.875		22.22
e	.420	.440	10.67	11.17
e1	.205	.225	5.21	5.71
L	.312		7.93	
øp	.151	.165	3.84	4.19
øp1	.151	.165	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

Fig.1. Output Characteristics

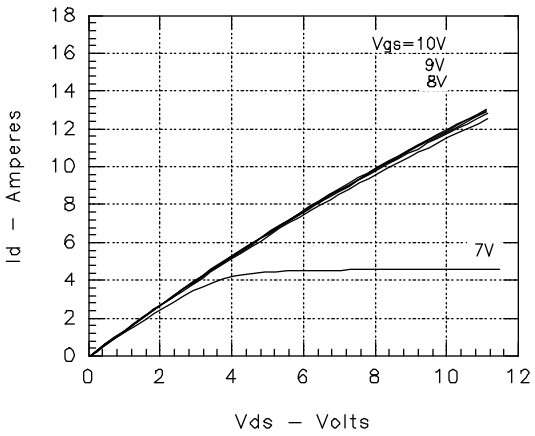


Fig. 2. Input Admittance

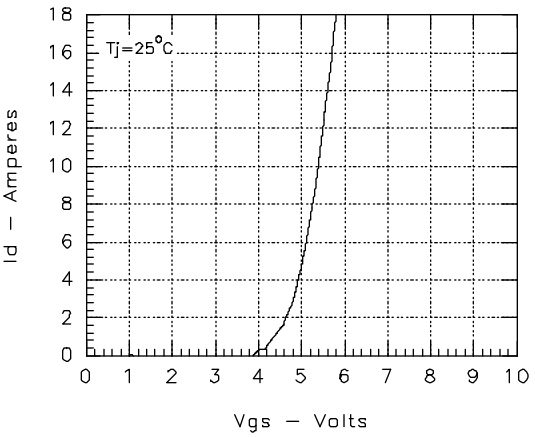


Fig. 3. Rds(on) vs. Drain Current

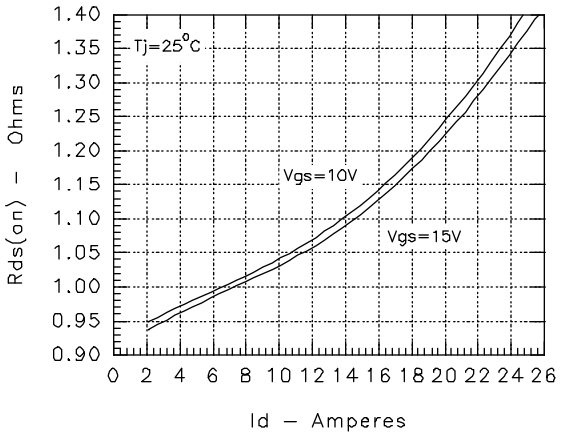


Fig. 4. Temperature Dependence of Drain to Source Resistance

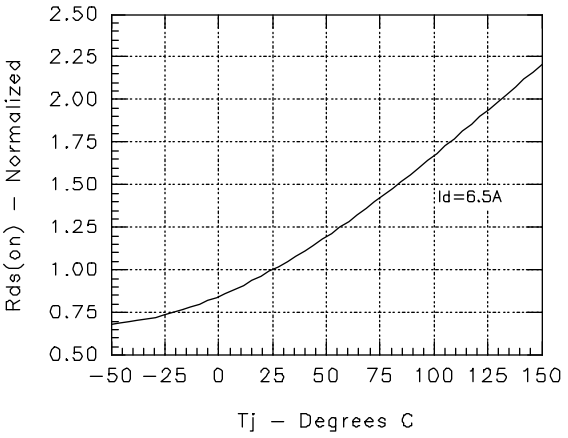


Fig. 5. Drain Current vs. Case Temperature

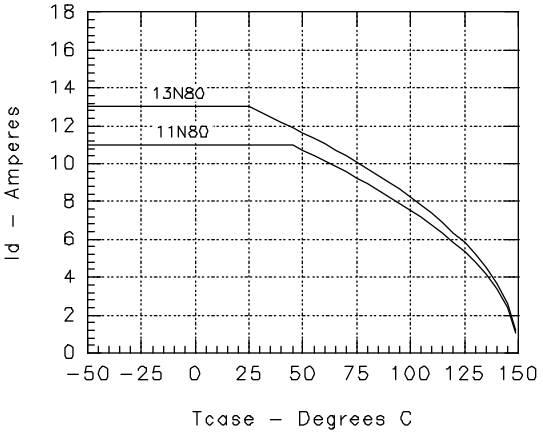


Fig. 6. Temperature Dependence of Breakdown Voltage and Threshold Voltage

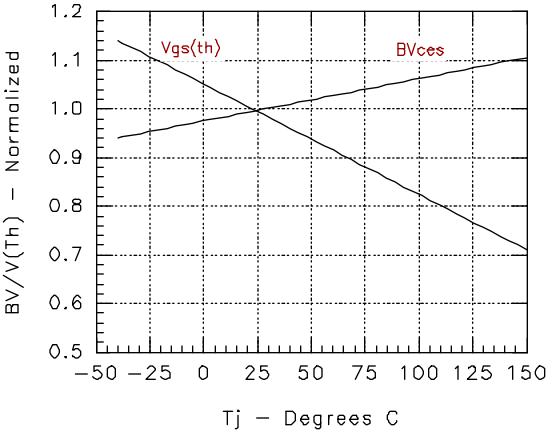


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Fig. 7. Gate Charge

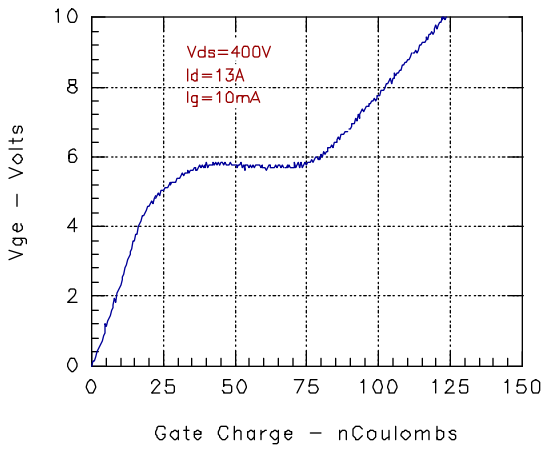

Fig. 8. Forward Bias Safe Operating Area

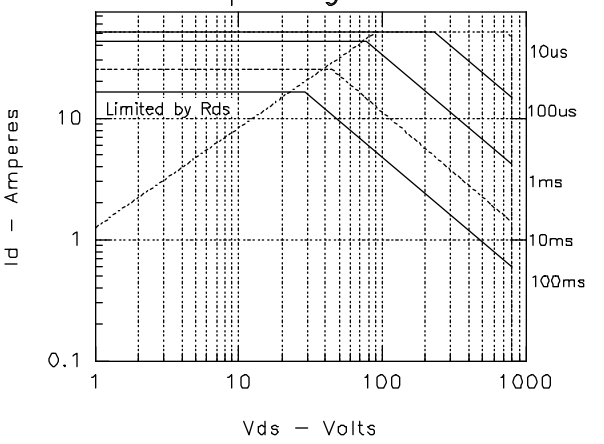

Fig. 9. Capacitance Curves

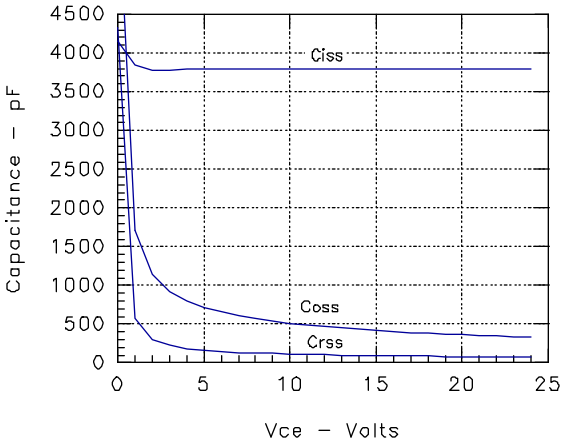

Fig. 10. Source Current vs. Source to Drain Voltage

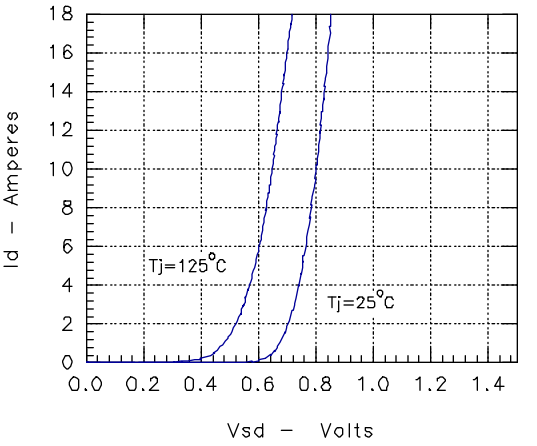

Fig. 11. Transient Thermal Impedance