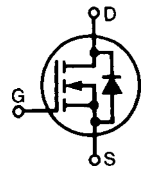
IXYS

Preliminary Data Sheet

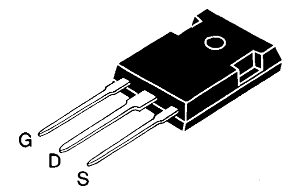
HiPerFET™ Power MOSFETs

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

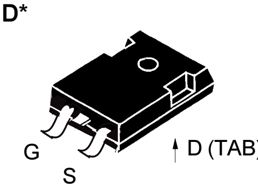
	V_{DSS}	I_{D25}	$R_{DS(on)}$	t_{rr}
IXFH8N80	800V	8A	1.1Ω	250 ns
IXFH9N80	800V	9A	0.9Ω	250 ns



TO-247 AD (IXFH)



TO-247 SMD*



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

*Add suffix letter "S" for surface mountable package

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	8N80	8	A
		9N80	9	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	8N80	32	A
		9N80	36	A
I_{AR}	T_C = 25°C	8N80	8	A
		9N80	9	A
E_{AR}	T_C = 25°C		18	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		180	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

Characteristic Values (T_J = 25°C, unless otherwise specified)

Symbol	Test Conditions			min.	typ.	max.	
V_{DSS}	V_{GS} = 0 V, I_D = 3 mA			800			V
	V_{DSS} temperature coefficient				0.088		%/K
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 2.5 mA			2		4.5	V
	$V_{GS(th)}$ temperature coefficient				-0.257		%/K
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}		8N80			1.1	Ω
	Pulse test, t ≤ 300 µs, duty cycle δ ≤ 2%		9N80			0.9	Ω

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

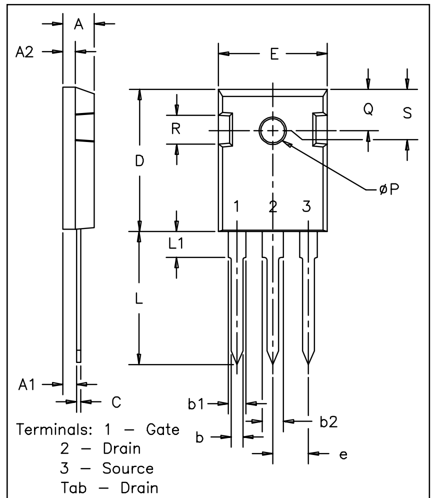
- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- AC motor control
- Temperature and lighting controls

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°C, unless otherwise specified) min.	typ.	max.	
g_{fs}	V_{DS} = 10 V; I_D = 0.5 • I_{D25}, pulse test	4	7		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		2600		pF
C_{oss}			240		pF
C_{rss}			60		pF
$t_{d(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		35		ns
t_r	R_G = 4.7 Ω (External)		15		ns
$t_{d(off)}$			70		ns
t_f			35		ns
$Q_{g(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		85	130	nC
Q_{gs}			15	30	nC
Q_{gd}			40	70	nC
R_{thJC}				0.7	K/W
R_{thCK}			0.25		K/W

TO-247 AD (IXFH) Outline

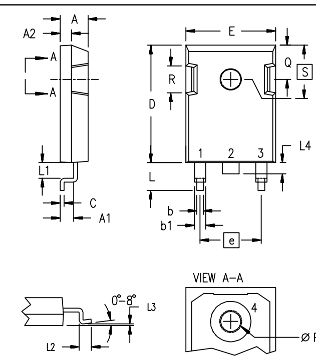


SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.185	.209	4.7	5.3
A1	.087	.102	2.2	2.54
A2	.059	.098	2.2	2.6
b	.040	.055	1.0	1.4
b1	.065	.084	1.65	2.13
b2	.113	.123	2.87	3.12
C	.016	.031	.4	.8
D	.819	.845	20.80	21.46
E	.610	.640	15.75	16.26
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1		.177		4.50
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	

Source-Drain Diode

Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
I_S	V_{GS} = 0		8N80		8	A
			9N80		9	A
I_{SM}	Repetitive; pulse width limited by T_{JM}		8N80		32	A
			9N80		36	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}	$I_F = I_S$	T_J = 25°C			250	ns
	-di/dt = 100 A/µs,	T_J = 125°C			400	ns
Q_{RM}	V_R = 100 V	T_J = 25°C		0.5		µC
		T_J = 125°C		1.0		µC
I_{RM}		T_J = 25°C		7.5		A
		T_J = 125°C		9.0		A

TO-247 SMD Outline



1. Gate
2. Drain
3. Source
4. Drain

Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	4.83	5.21	.190	.205
A1	2.29	2.54	.090	.100
A2	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b1	1.91	2.13	.075	.084
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	5.45	BSC	.215	BSC
L	4.90	5.10	.193	.201
L1	2.70	2.90	.106	.114
L2	2.10	2.30	.083	.091
L3	0.00	0.10	.00	.004
L4	1.90	2.10	.075	.083
ØP	3.55	3.65	.140	.144
Q	5.59	6.20	.220	.244
R	4.32	4.83	.170	.190
S	6.15	BSC	.242	BSC

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

Figure 1. Output Characteristics at 25°C

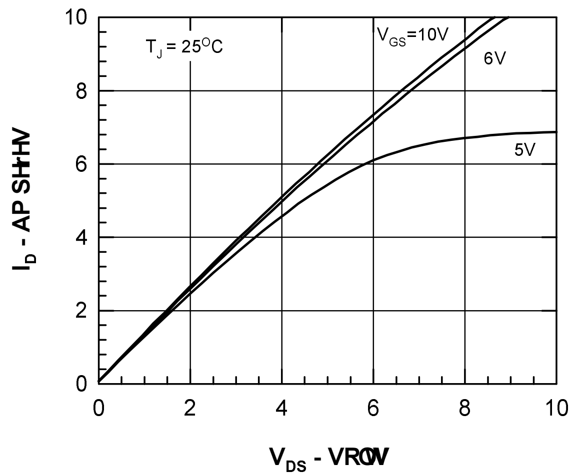


Figure 2. Output Characteristics at 125°C

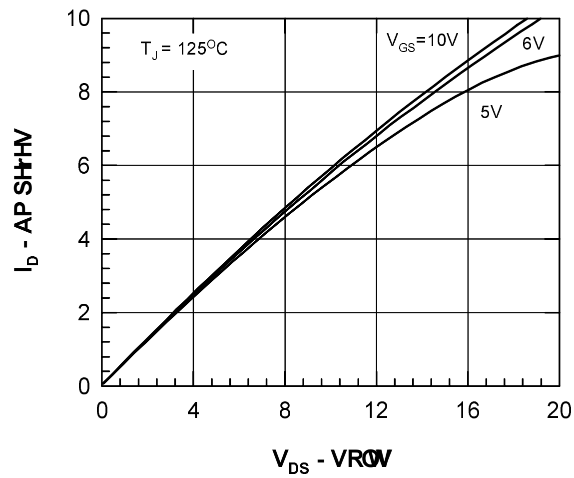


Figure 3. $R_{DS(on)}$ normalized to 15A/25°C vs. I_D

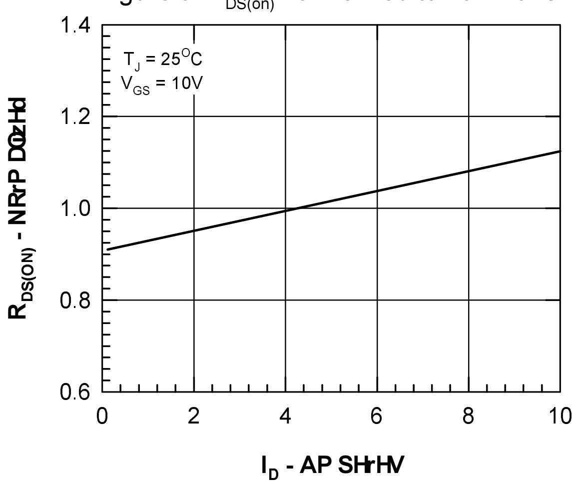


Figure 4. $R_{DS(on)}$ normalized to 15A/25°C vs. T_J

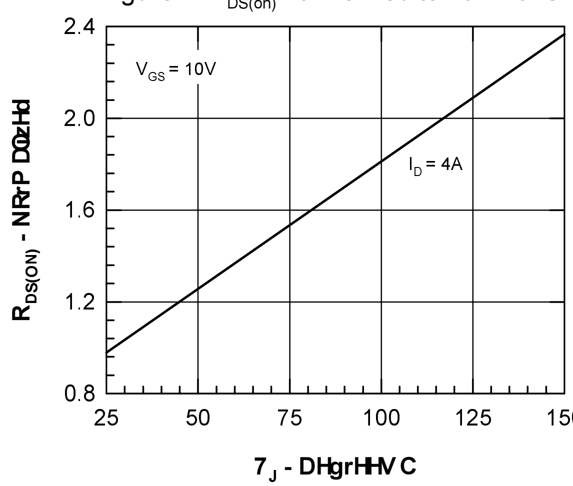


Figure 5. Drain Current vs. Case Temperature

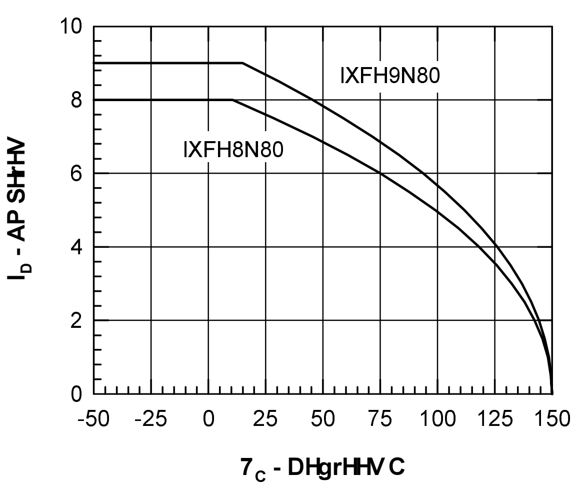


Figure 6. Admittance Curves

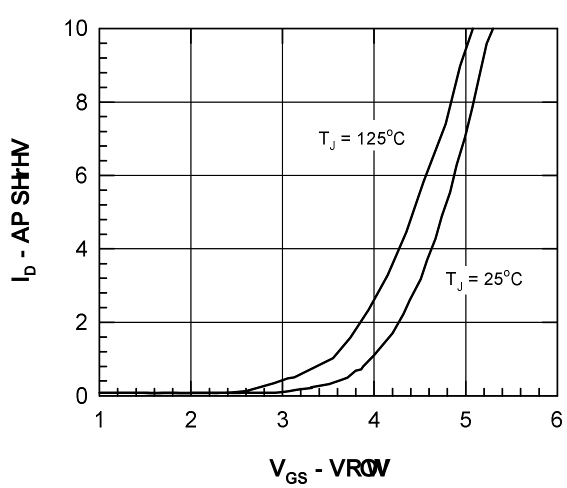


Figure 7. Gate Charge

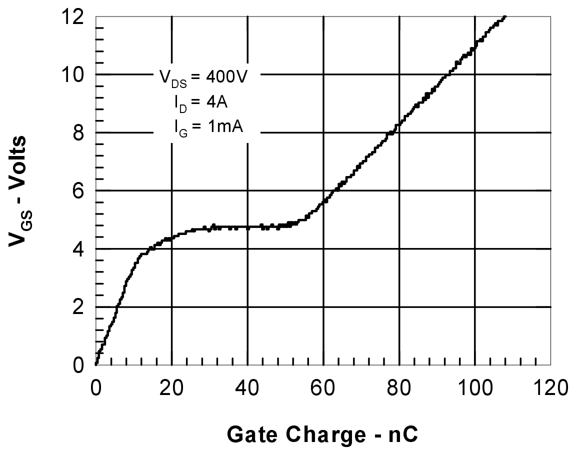


Figure 8. Capacitance Curves

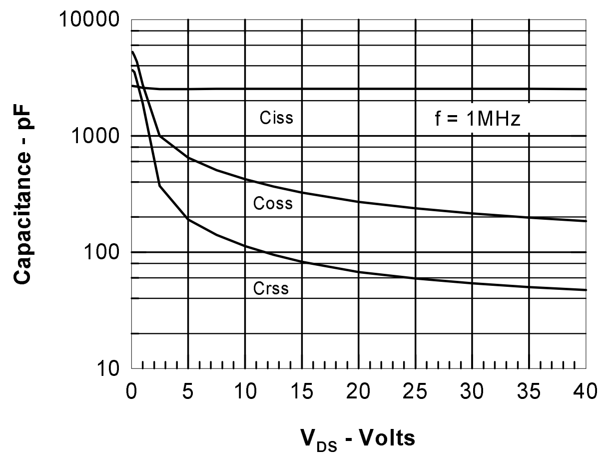


Figure 9. Forward Voltage Drop of the Intrinsic Diode

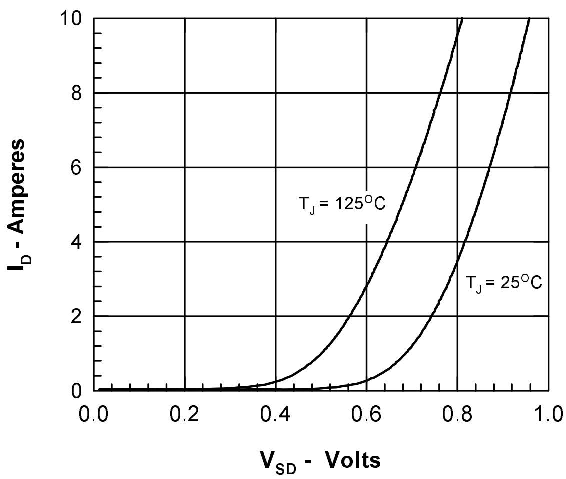


Figure10. Forward Bias Safe Operating Area

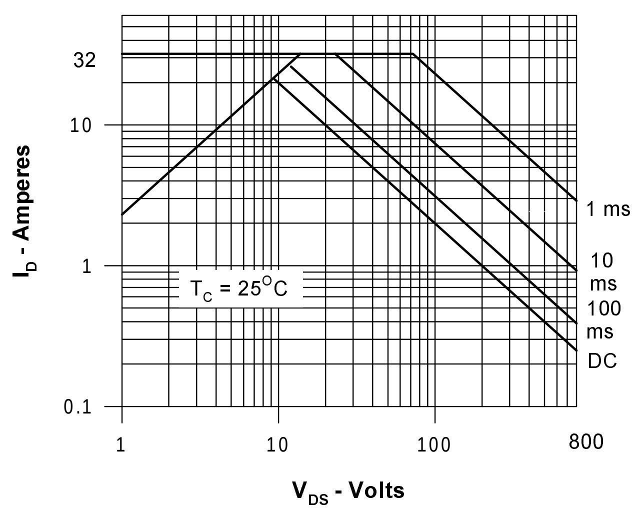
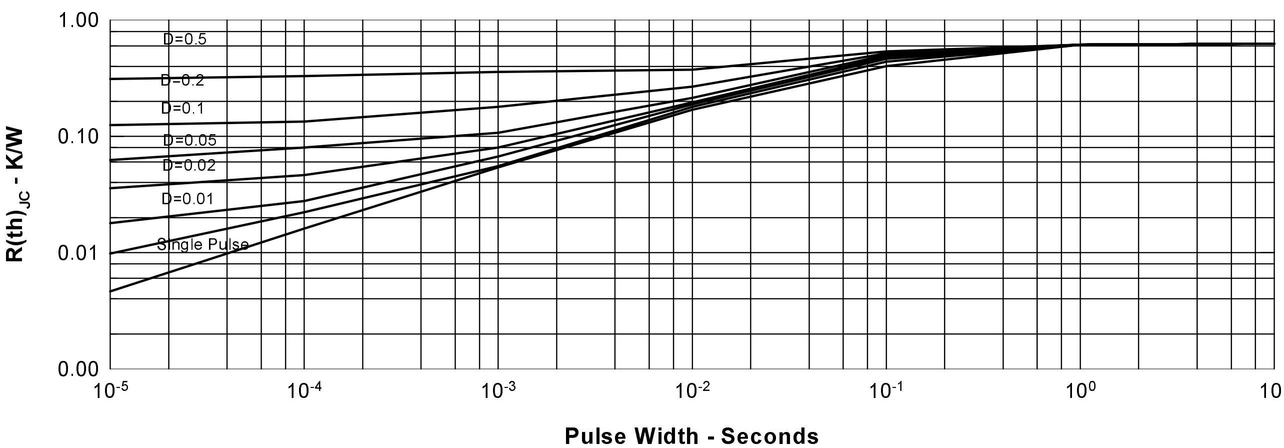


Figure 11. Transient Thermal Resistance



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