



# THE DATASHEET OF IXFH9N80

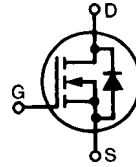


# HiPerFET™ Power MOSFETs

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

**IXFH8N80**  
**IXFH9N80**

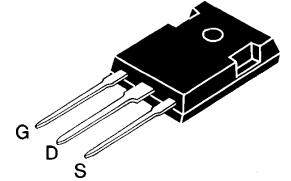
$V_{DSS}$	$I_{D25}$	$R_{DS(on)}$	$t_{rr}$
800V	8A	1.1Ω	250 ns
800V	9A	0.9Ω	250 ns



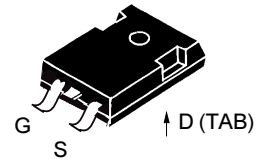
Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	800	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1\text{ M}\Omega$	800	V
$V_{GS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	8N80	8 A
		9N80	9 A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	8N80	32 A
		9N80	36 A
$I_{AR}$	$T_C = 25^\circ\text{C}$	8N80	8 A
		9N80	9 A
$E_{AR}$	$T_C = 25^\circ\text{C}$	18	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
$P_D$	$T_C = 25^\circ\text{C}$	180	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.	
<b>Weight</b>		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	$^\circ\text{C}$

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_{DSS}$	$V_{GS} = 0\text{ V}$ , $I_D = 3\text{ mA}$	800		V
	$V_{DSS}$ temperature coefficient		0.088	%/K
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 2.5\text{ mA}$	2		4.5 V
	$V_{GS(th)}$ temperature coefficient		-0.257	%/K
$I_{GSS}$	$V_{GS} = \pm 20\text{ V}_{DC}$ , $V_{DS} = 0$			$\pm 100\text{ nA}$
$I_{DSS}$	$V_{DS} = 0.8 \cdot V_{DSS}$ , $V_{GS} = 0\text{ V}$			250 $\mu\text{A}$
	$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$			1 mA
$R_{DS(on)}$	$V_{GS} = 10\text{ V}$ , $I_D = 0.5 \cdot I_{D25}$	8N80		1.1 $\Omega$
	Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $\delta \leq 2\%$	9N80		0.9 $\Omega$

TO-247 AD (IXFH)



TO-247 SMD\*



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

\*Add suffix letter "S" for surface mountable package

## 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

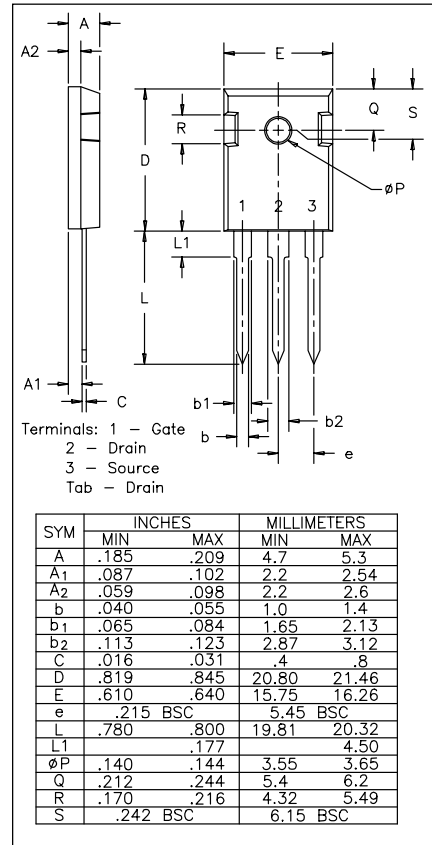
- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- AC motor control
- Temperature and lighting controls

## Advantages

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

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$g_{fs}$	$V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$ , pulse test	4	7	S
$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		2600	pF
$C_{oss}$			240	pF
$C_{rss}$			60	pF
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 4.7\ \Omega$ (External)		35	ns
$t_r$			15	ns
$t_{d(off)}$			70	ns
$t_f$			35	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$		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

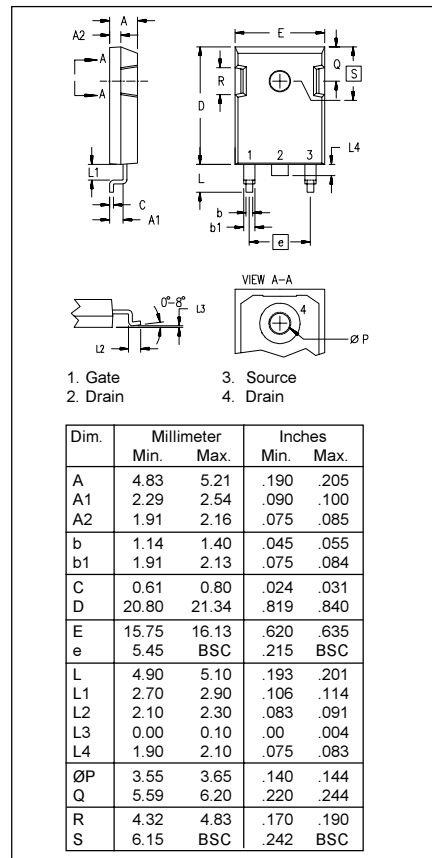
### TO-247 AD (IXFH) Outline



### Source-Drain Diode

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$I_S$	$V_{GS} = 0$	8N80 9N80		8 A 9 A
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$	8N80 9N80		32 A 36 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
		$T_J = 125^\circ\text{C}$		400 ns
$Q_{RM}$		$T_J = 25^\circ\text{C}$	0.5	$\mu\text{C}$
		$T_J = 125^\circ\text{C}$	1.0	$\mu\text{C}$
$I_{RM}$		$T_J = 25^\circ\text{C}$	7.5	A
		$T_J = 125^\circ\text{C}$	9.0	A

### TO-247 SMD Outline



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

Figure 1. Output Characteristics at 25°C

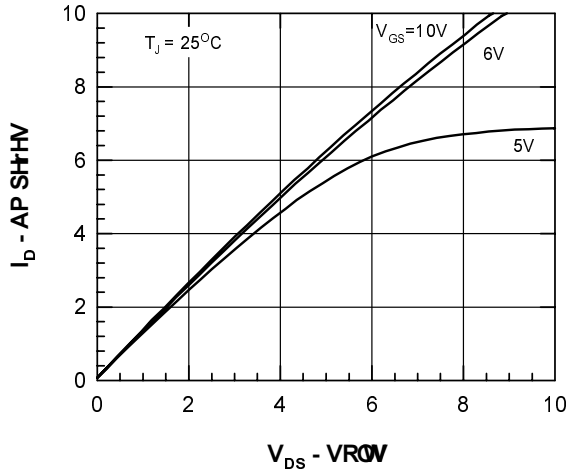


Figure 2. Output Characteristics at 125°C

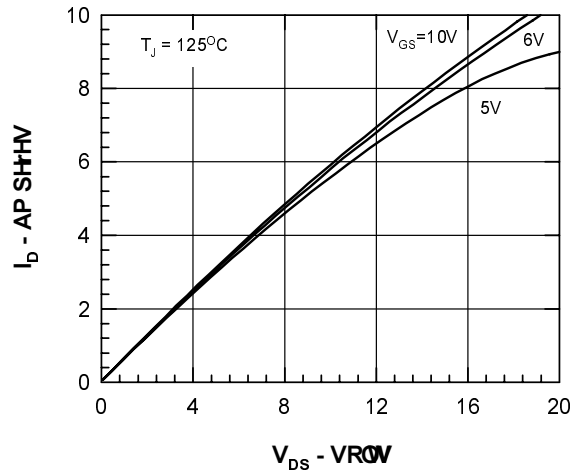


Figure 3.  $R_{DS(on)}$  normalized to 15A/25°C vs.  $I_D$

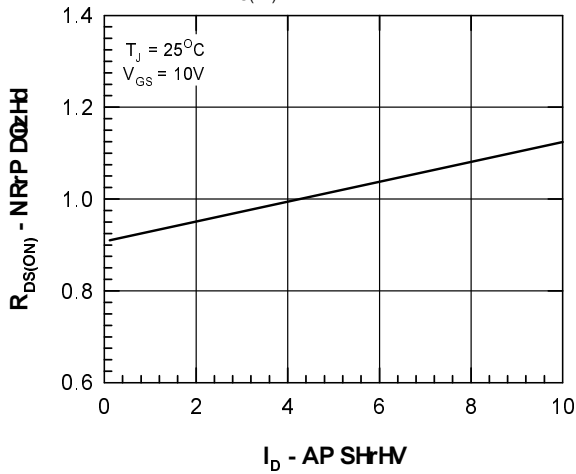


Figure 4.  $R_{DS(on)}$  normalized to 15A/25°C vs.  $T_J$

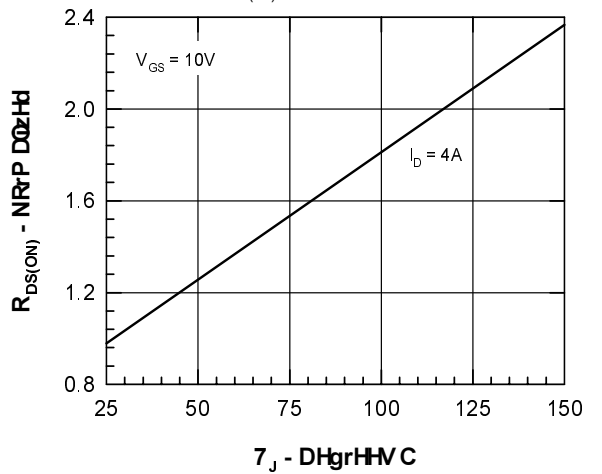


Figure 5. Drain Current vs. Case Temperature

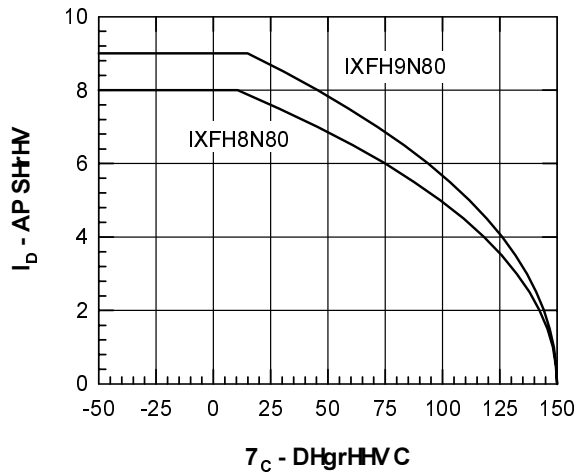
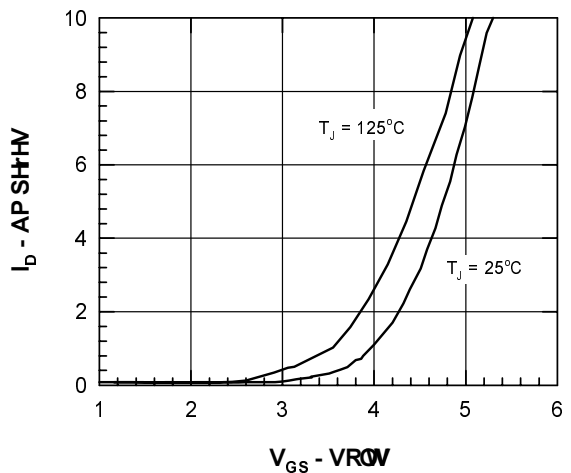
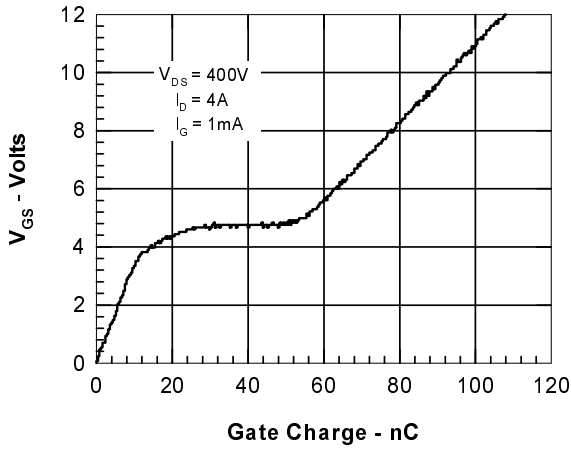
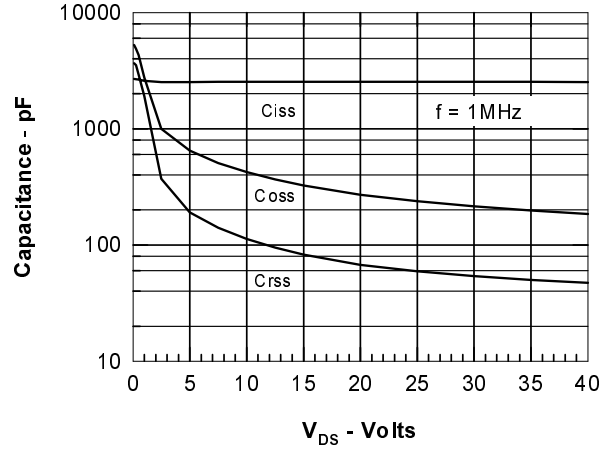
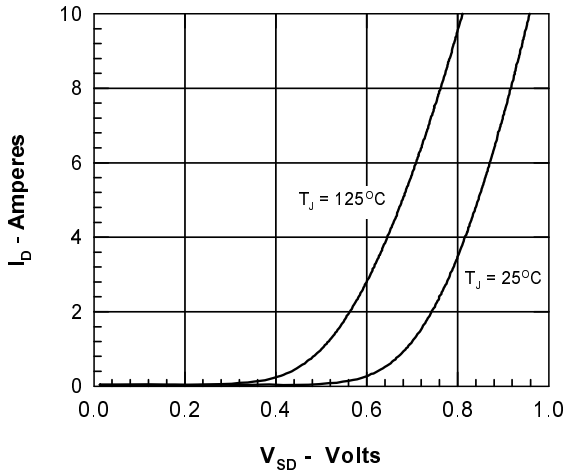
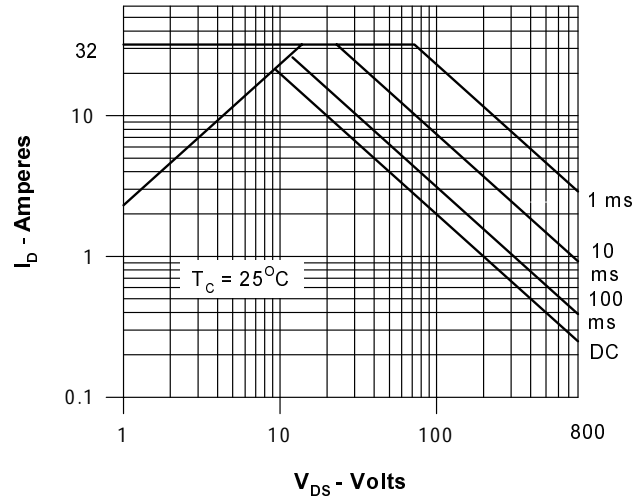
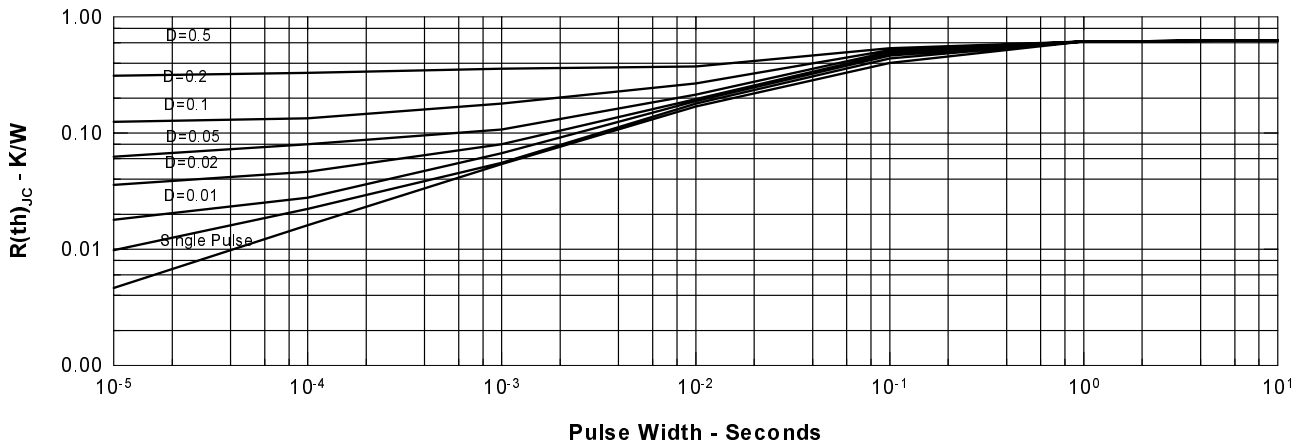


Figure 6. Admittance Curves



**Figure 7. Gate Charge**

**Figure 8. Capacitance Curves**

**Figure 9. Forward Voltage Drop of the Intrinsic Diode**

**Figure 10. Forward Bias Safe Operating Area**

**Figure 11. Transient Thermal Resistance**


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