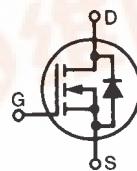




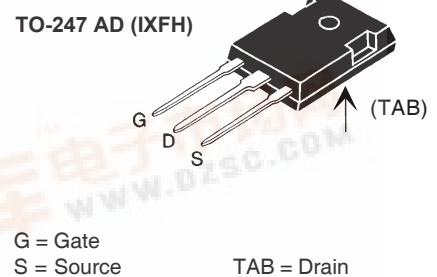
## Advanced Technical Data

# HiPerFET™ Power MOSFETs

N-Channel Enhancement Mode

Avalanche Rated, Low  $Q_g$   
Low  $R_g$ , High  $dv/dt$ , Low  $t_{rr}$ **IXFH14N100Q2**
 $V_{DSS} = 1000 \text{ V}$   
 $I_{D25} = 14 \text{ A}$   
 $R_{DS(on)} = 0.90 \Omega$ 
 $t_{rr} \leq 300 \text{ ns}$ 

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 $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$	1000		V
$V_{GS}$	Continuous	$\pm 30$		V
$V_{GSM}$	Transient	$\pm 40$		V
$I_{D25}$	$T_c = 25^\circ\text{C}$	14		A
$I_{DM}$	$T_c = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	56		A
$I_{AR}$	$T_c = 25^\circ\text{C}$	14		A
$E_{AR}$	$T_c = 25^\circ\text{C}$	50		mJ
$E_{AS}$	$T_c = 25^\circ\text{C}$	2.5		J
$dv/dt$	$I_s \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ , $R_G = 2 \Omega$	20		V/ns
$P_D$	$T_c = 25^\circ\text{C}$	500		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 (0.063 in) from case for 10 s	300		$^\circ\text{C}$
$M_d$	Mounting torque	1.13/10	Nm/lb.in.	
Weight		6		g

**Features**

- Double metal process for low gate resistance
- International standard packages
- Epoxy meet UL 94 V-0, flammability classification
- Low  $R_{DS(on)}$ , low  $Q_g$
- Avalanche energy and current rated
- Fast intrinsic rectifier

**Applications**

- DC-DC converters
- Switched-mode and resonant-mode power supplies, >500kHz switching
- DC choppers
- Pulse generation
- Laser drivers

**Advantages**

- Easy to mount
- Space savings
- High power density

Symbol	Test Conditions	Characteristic Values		
		( $T_J = 25^\circ\text{C}$ , unless otherwise specified)	min.	typ.
$V_{DSS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$	1000		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 4 \text{ mA}$	3.0		V
$I_{GSS}$	$V_{GS} = \pm 30 \text{ V}_{DC}$ , $V_{DS} = 0$		$\pm 200$	nA
$I_{DSS}$	$V_{DS} = V_{DSS}$ $V_{GS} = 0 \text{ V}$	$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	25	$\mu\text{A}$ 1 mA
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$ , $I_D = 0.5 \cdot I_{D25}$ Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2 \%$		0.90	$\Omega$

Symbol	Test Conditions	Characteristic Values		
		min.	typ.	max.
$g_{fs}$	$V_{DS} = 10 \text{ V}; I_D = 0.5 \cdot I_{D25}$ , pulse test	10	14	S
$C_{iss}$ $C_{oss}$ $C_{rss}$	$V_{GS} = 0 \text{ V}, V_{DS} = 25 \text{ V}, f = 1 \text{ MHz}$	2700	pF	
		300	pF	
		100	pF	
$t_{d(on)}$ $t_r$ $t_{d(off)}$ $t_f$	$V_{GS} = 10 \text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 2 \Omega$ (External),	12	ns	
		10	ns	
		28	ns	
		12	ns	
$Q_{g(on)}$ $Q_{gs}$ $Q_{gd}$	$V_{GS} = 10 \text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$	83	nC	
		20	nC	
		40	nC	
$R_{thJC}$			0.25	K/W
$R_{thCK}$	TO-247	0.25		K/W

**TO-247 AD (IXFH) Outline**

The diagram shows the physical outline of the TO-247 package. It features a central vertical lead with three horizontal leads extending from it. The top lead is labeled 'A' and has a tab labeled 'C'. The middle lead is labeled 'B'. The bottom lead is labeled 'E'. The left side of the package has two leads labeled 'A1' and 'A2'. The right side has a lead labeled 'D'. The top lead has a lead labeled 'S'. The middle lead has a lead labeled 'P'. The bottom lead has a lead labeled 'R'. The top lead also has a lead labeled 'L1'. The middle lead has a lead labeled 'L'. The bottom lead has a lead labeled 'b1', 'b2', and 'b'. A dimension 'e' is shown between the bottom lead and the middle lead. A dimension 'L1' is shown between the middle lead and the top lead. A dimension 'L' is shown between the bottom lead and the top lead. A dimension 'b1' is shown between the bottom lead and the middle lead. A dimension 'b2' is shown between the middle lead and the top lead. A dimension 'b' is shown between the bottom lead and the top lead. A dimension 'A' is shown between the top lead and the middle lead. A dimension 'A1' is shown between the middle lead and the bottom lead. A dimension 'A2' is shown between the top lead and the bottom lead. A dimension 'D' is shown between the bottom lead and the middle lead. A dimension 'P' is shown between the middle lead and the top lead. A dimension 'R' is shown between the top lead and the middle lead. A dimension 'S' is shown between the middle lead and the top lead.

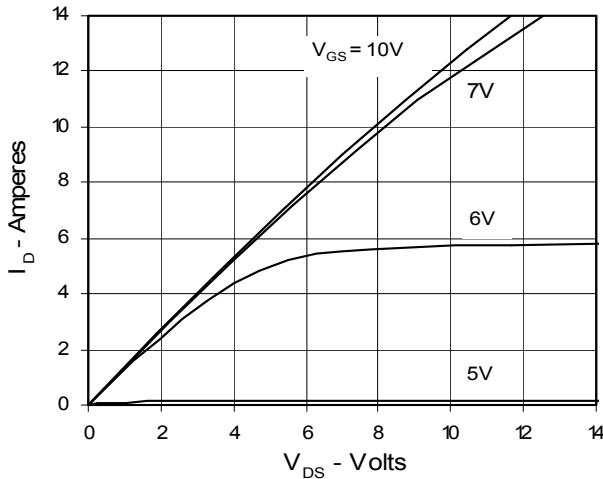
Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	4.7	5.3	.185	.209
A <sub>1</sub>	2.2	2.54	.087	.102
A <sub>2</sub>	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b <sub>1</sub>	1.65	2.13	.065	.084
b <sub>2</sub>	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
ØP	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

**Source-Drain Diode**

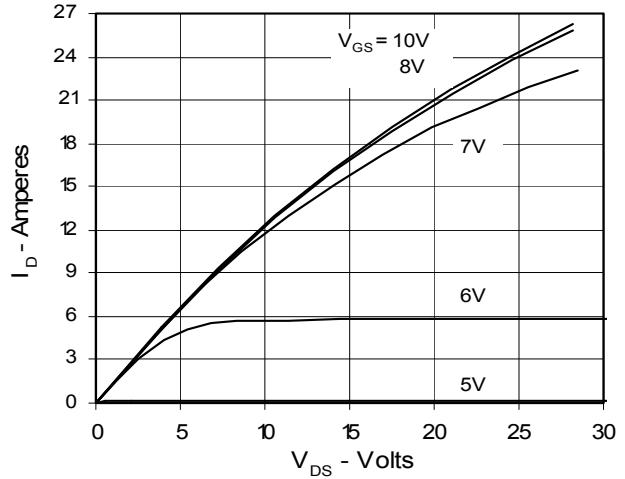
Characteristic Values  
( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

Symbol	Test Conditions	min.	typ.	max.
$I_s$	$V_{GS} = 0 \text{ V}$		14	A
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$		56	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
$t_{rr}$ $Q_{RM}$ $I_{RM}$	$I_F = I_s, -di/dt = 100 \text{ A}/\mu\text{s}, V_R = 100 \text{ V}$	0.8	300	ns
		7	$\mu\text{C}$	A

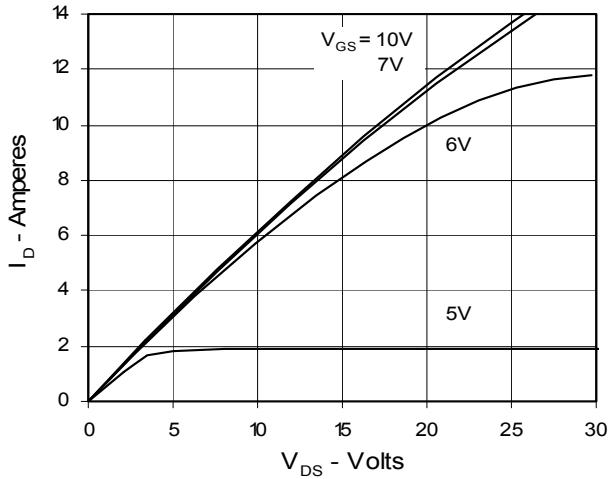
**Fig. 1. Output Characteristics  
@ 25 Deg. C**



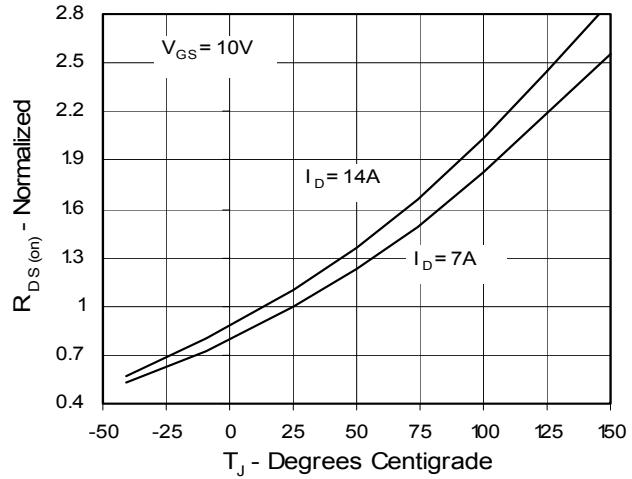
**Fig. 2. Extended Output Characteristics  
@ 25 deg. C**



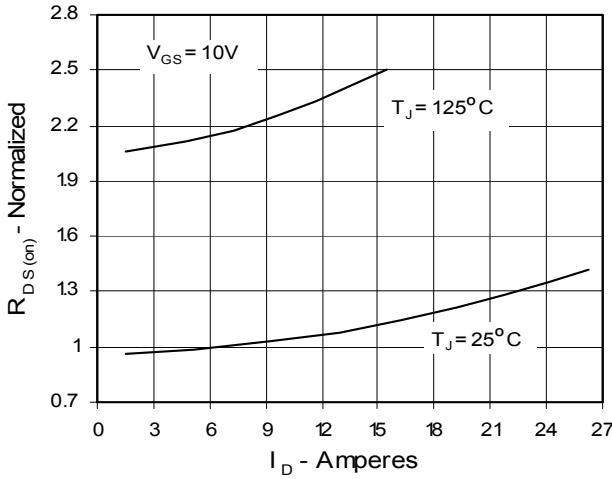
**Fig. 3. Output Characteristics  
@ 125 Deg. C**



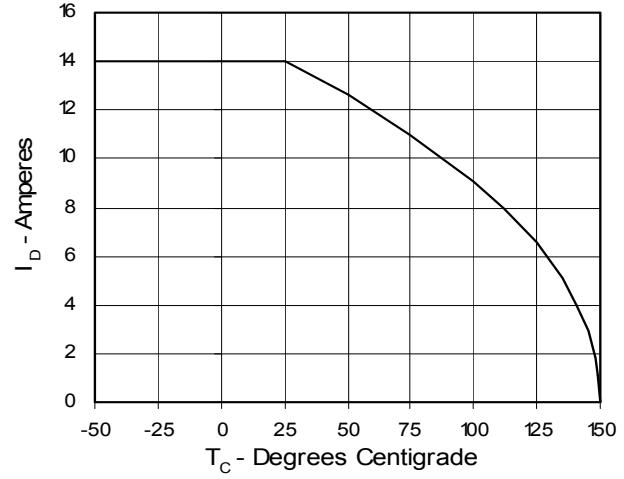
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_{D25}$  Value vs.  
Junction Temperature**

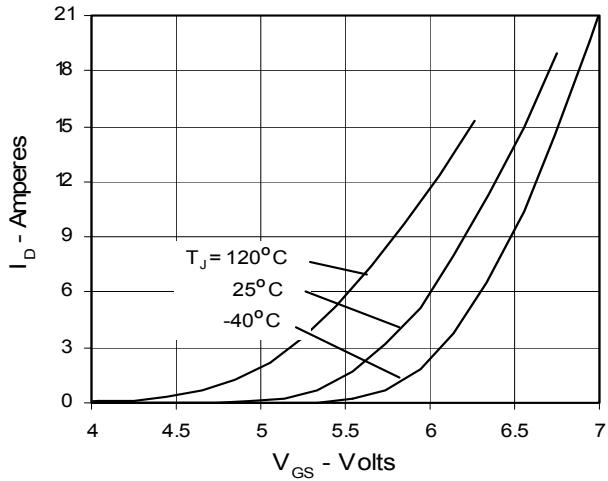
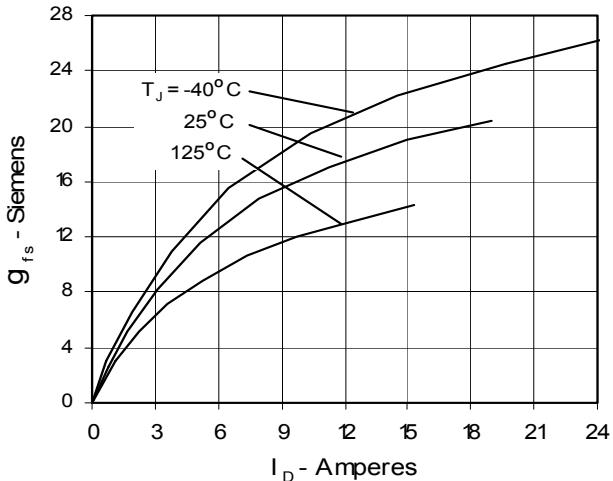
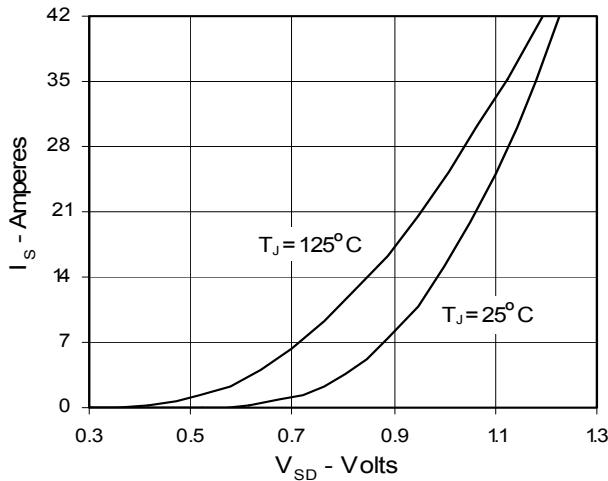
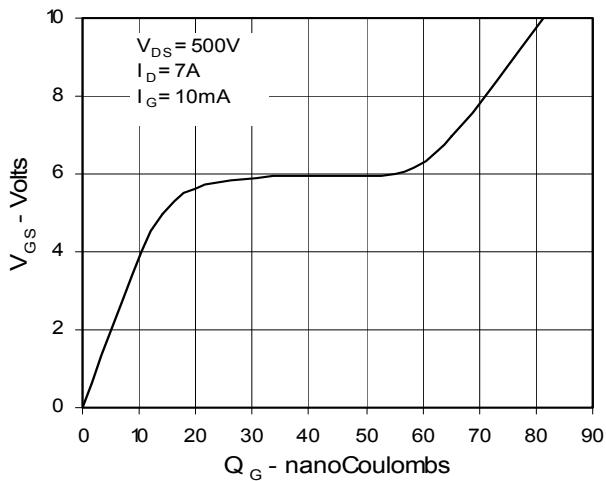
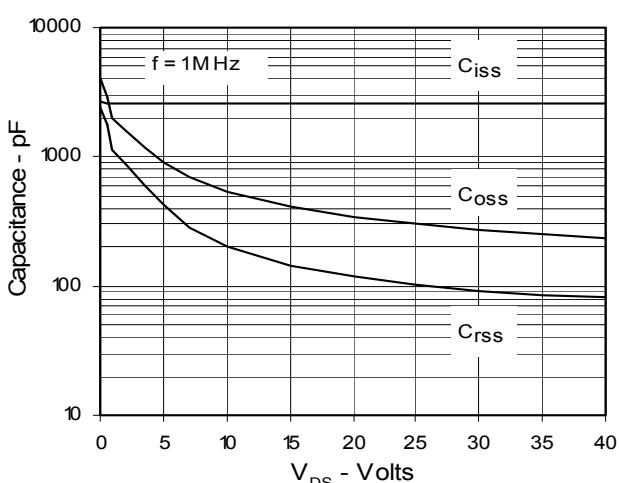


**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_{D25}$   
Value vs.  $I_D$**



**Fig. 6. Drain Current vs. Case  
Temperature**



**Fig. 7. Input Admittance**

**Fig. 8. Transconductance**

**Fig. 9. Source Current vs. Source-To-Drain Voltage**

**Fig. 10. Gate Charge**

**Fig. 11. Capacitance**

**Fig. 12. Maximum Transient Thermal Resistance**
