

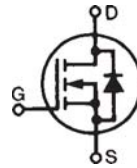
# HiPerFET™

## Power MOSFETs

### Q2-Class

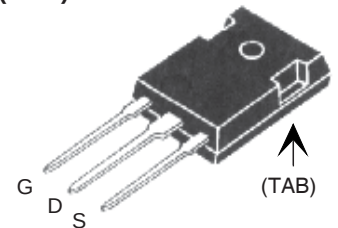
## IXFH14N100Q2

N-Channel Enhancement Mode  
Avalanche Rated, High dv/dt, Low  $Q_g$   
Low intrinsic  $R_g$ , low  $t_{rr}$



$$\begin{aligned} V_{DSS} &= 1000V \\ I_{D25} &= 14A \\ R_{DS(on)} &\leq 950m\Omega \\ t_{rr} &\leq 300ns \end{aligned}$$

TO-247 (IXFH)



G = Gate  
S = Source

D = Drain  
TAB = Drain

| 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 $150^\circ\text{C}$ , $R_{GS} = 1M\Omega$    | 1000            | V                |
| $V_{GSS}$ | 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                |
| $I_A$     | $T_C = 25^\circ\text{C}$                                                 | 14              | A                |
| $E_{AS}$  | $T_C = 25^\circ\text{C}$                                                 | 2.5             | J                |
| dV/dt     | $I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ | 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    | $^\circ\text{C}$ |
| $T_L$     | 1.6mm (0.063 in) from case for 10s                                       | 300             | $^\circ\text{C}$ |
| $M_d$     | Mounting torque                                                          | 1.13/10         | Nm/lb.in.        |
| Weight    |                                                                          | 6               | g                |

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) | Characteristic Values |      |                          |
|--------------|-----------------------------------------------------------------------------|-----------------------|------|--------------------------|
|              |                                                                             | Min.                  | Typ. | Max.                     |
| $V_{DSS}$    | $V_{GS} = 0V$ , $I_D = 250\mu\text{A}$                                      | 1000                  |      | V                        |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 4mA$                                             | 3.0                   |      | 5.5 V                    |
| $I_{GSS}$    | $V_{GS} = \pm 30V$ , $V_{DS} = 0V$                                          |                       |      | $\pm 200$ nA             |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$<br>$V_{GS} = 0V$<br>$T_J = 125^\circ\text{C}$            |                       |      | 25 $\mu\text{A}$<br>1 mA |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1                         |                       |      | 950 m $\Omega$           |

### Features

- Double metal process for low gate resistance
- International standard package
- Epoxy meet UL 94 V-0, flammability classification
- 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

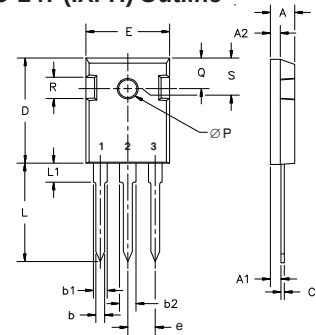
| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified)                                                           | Characteristic Values |      |                         |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|-------------------------|
|              |                                                                                                                                       | Min.                  | Typ. | Max.                    |
| $g_{fs}$     | $V_{DS} = 10\text{V}, I_D = 0.5 \cdot I_{D25}$ , Note 1                                                                               | 15                    | 28   | S                       |
| $C_{iss}$    | $V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$                                                                            |                       | 2800 | pF                      |
| $C_{oss}$    |                                                                                                                                       |                       | 287  | pF                      |
| $C_{rss}$    |                                                                                                                                       |                       | 100  | pF                      |
| $t_{d(on)}$  | Resistive Switching Times<br>$V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$<br>$R_G = 2\Omega$ (External) |                       | 12   | ns                      |
| $t_r$        |                                                                                                                                       |                       | 10   | ns                      |
| $t_{d(off)}$ |                                                                                                                                       |                       | 28   | ns                      |
| $t_f$        |                                                                                                                                       |                       | 12   | ns                      |
| $Q_{g(on)}$  | $V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$                                                            |                       | 83   | nC                      |
| $Q_{gs}$     |                                                                                                                                       |                       | 20   | nC                      |
| $Q_{gd}$     |                                                                                                                                       |                       | 40   | nC                      |
| $R_{thJC}$   |                                                                                                                                       |                       |      | 0.25 $^\circ\text{C/W}$ |
| $R_{thCK}$   |                                                                                                                                       | 0.21                  |      | $^\circ\text{C/W}$      |

## Source-Drain Diode

| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) | Characteristic Values |      |               |
|----------|-----------------------------------------------------------------------------|-----------------------|------|---------------|
|          |                                                                             | Min.                  | Typ. | Max.          |
| $I_S$    | $V_{GS} = 0\text{V}$                                                        |                       |      | 14 A          |
| $I_{SM}$ | Repetitive, pulse width limited by $T_{JM}$                                 |                       |      | 56 A          |
| $V_{SD}$ | $I_F = I_S, V_{GS} = 0\text{V}$ , Note 1                                    |                       |      | 1.5 V         |
| $t_{rr}$ | $I_F = 25\text{A}, -di/dt = 100\text{A}/\mu\text{s}, V_R = 100\text{V}$     |                       |      | 300 ns        |
| $Q_{RM}$ |                                                                             |                       | 0.8  | $\mu\text{C}$ |
| $I_{RM}$ |                                                                             |                       | 7    | A             |

Notes: 1. Pulse test,  $t \leq 300\mu\text{s}$ ; duty cycle,  $d \leq 2\%$ .

## TO-247 (IXFH) Outline



Terminals: 1 - Gate 2 - Drain

| Dim.           | Millimeter |       | Inches |       |
|----------------|------------|-------|--------|-------|
|                | Min.       | Max.  | Min.   | 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  |

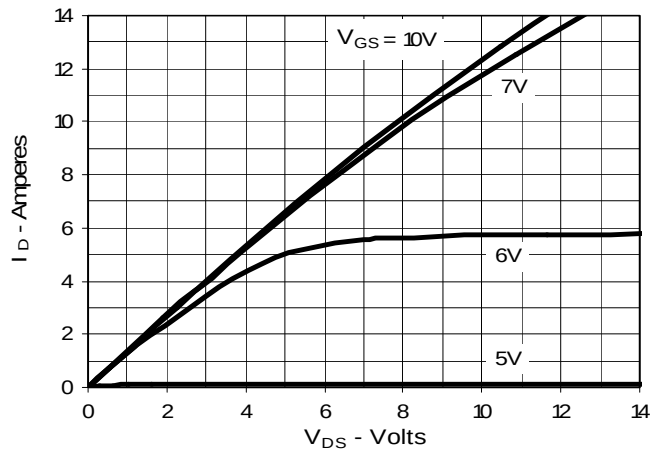
## PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

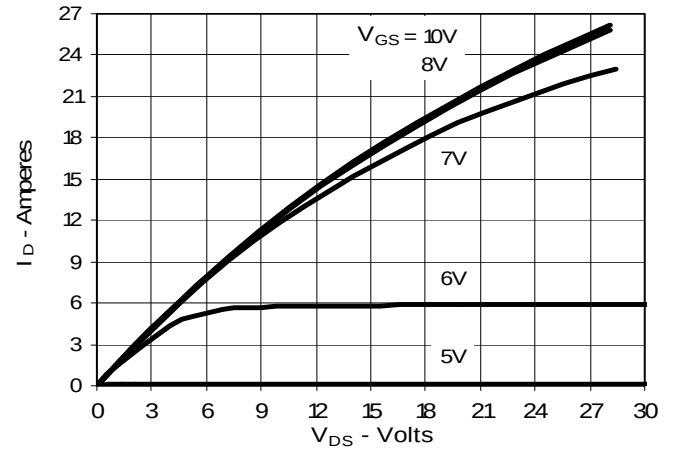
IXYS reserves the right to change limits, test conditions, and dimensions.

|                                                                                  |           |           |           |           |              |              |              |              |              |              |
|----------------------------------------------------------------------------------|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|--------------|
| IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: | 4,835,592 | 4,931,844 | 5,049,961 | 5,237,481 | 6,162,665    | 6,404,065 B1 | 6,683,344    | 6,727,585    | 7,005,734 B2 | 7,157,338 B2 |
|                                                                                  | 4,850,072 | 5,017,508 | 5,063,307 | 5,381,025 | 6,259,123 B1 | 6,534,343    | 6,710,405 B2 | 6,759,692    | 7,063,975 B2 |              |
|                                                                                  | 4,881,106 | 5,034,796 | 5,187,117 | 5,486,715 | 6,306,728 B1 | 6,583,505    | 6,710,463    | 6,771,478 B2 | 7,071,537    |              |

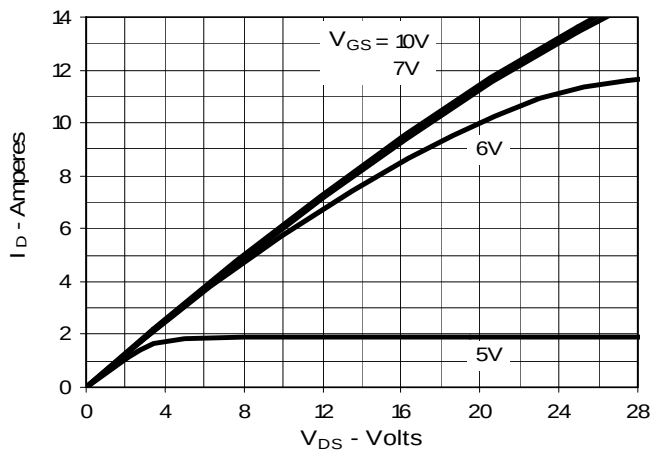
**Fig. 1. Output Characteristics**  
@ 25°C



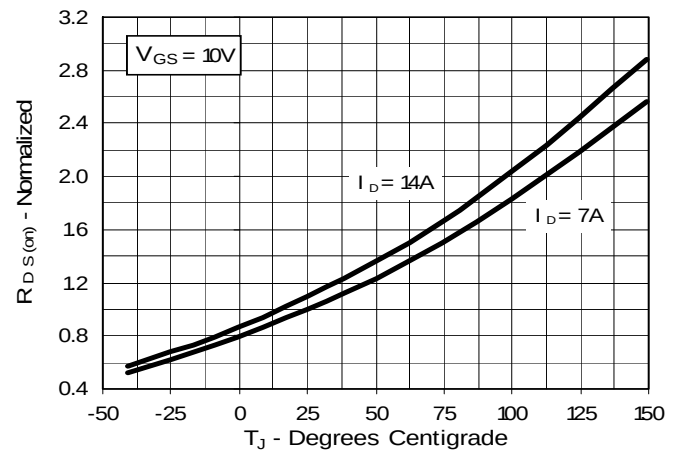
**Fig. 2. Extended Output Characteristics**  
@ 25°C



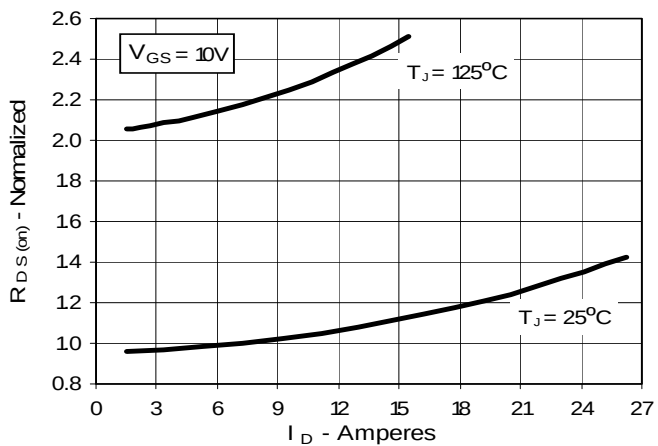
**Fig. 3. Output Characteristics**  
@ 125°C



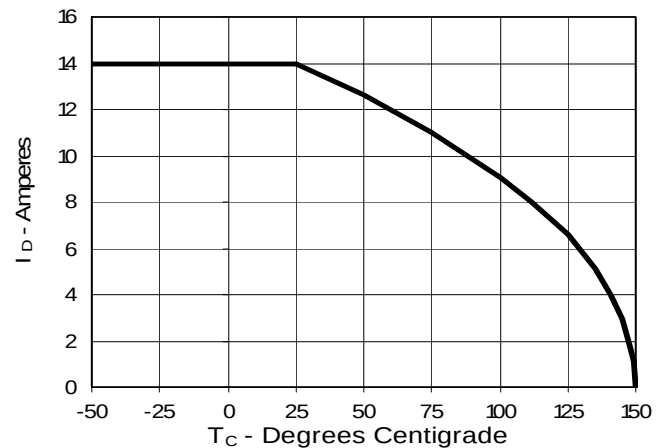
**Fig. 4.  $R_{DS(on)}$  Normalized to 0.5  $I_{D25}$  Value vs. Junction Temperature**

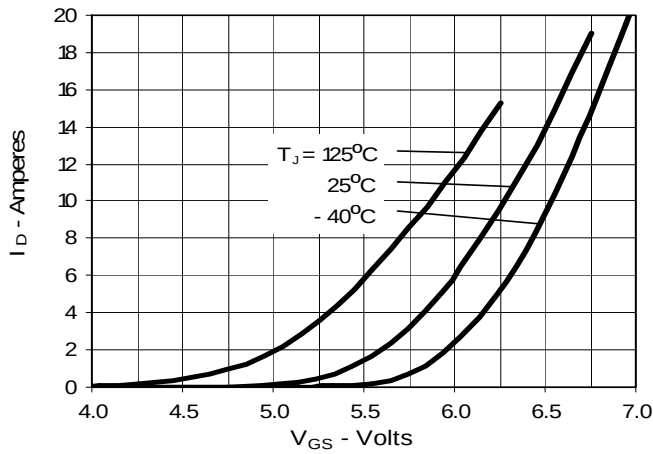
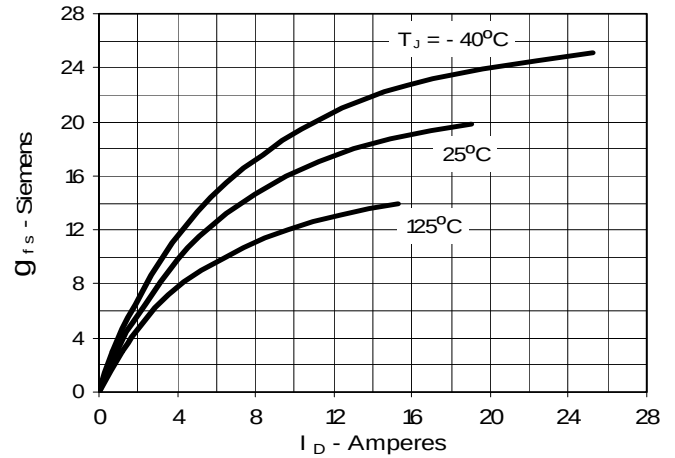
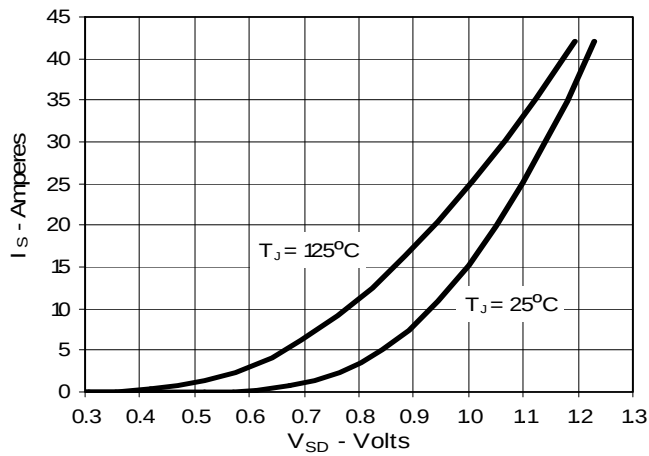
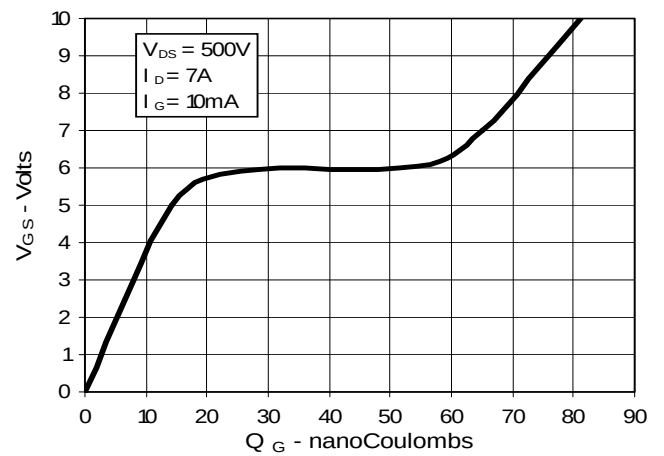
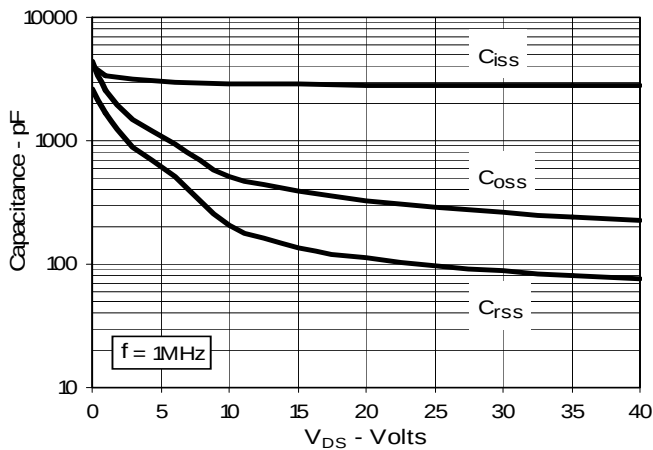


**Fig. 5.  $R_{DS(on)}$  Normalized to 0.5  $I_{D25}$  Value vs.  $I_D$**



**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 Impedance**




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