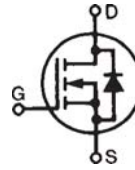


## HiPerFET™ Power MOSFET Q2-Class

## IXFL70N60Q2

(Electrically Isolated Tab)

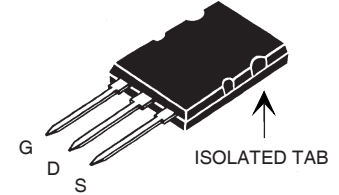


N-Channel Enhancement Mode  
Avalanche Rated, Low  $Q_g$ , Low Intrinsic  $R_g$   
High  $dV/dt$ , Low  $t_{rr}$

$$\begin{aligned} V_{DSS} &= 600V \\ I_{D25} &= 37A \\ R_{DS(on)} &\leq 92m\Omega \\ t_{rr} &\leq 250ns \end{aligned}$$

| Symbol     | Test Conditions                                                    | Maximum Ratings |            |
|------------|--------------------------------------------------------------------|-----------------|------------|
| $V_{DSS}$  | $T_J = 25^\circ C$ to $150^\circ C$                                | 600             | V          |
| $V_{DGR}$  | $T_J = 25^\circ C$ to $150^\circ C$ , $R_{GS} = 1M\Omega$          | 600             | V          |
| $V_{GSS}$  | Continuous                                                         | $\pm 30$        | V          |
| $V_{GSM}$  | Transient                                                          | $\pm 40$        | V          |
| $I_{D25}$  | $T_C = 25^\circ C$                                                 | 37              | A          |
| $I_{DM}$   | $T_C = 25^\circ C$ , Pulse Width Limited by $T_{JM}$               | 280             | A          |
| $I_A$      | $T_C = 25^\circ C$                                                 | 35              | A          |
| $E_{AS}$   | $T_C = 25^\circ C$                                                 | 5               | J          |
| $dV/dt$    | $I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ C$ | 20              | V/ns       |
| $P_D$      | $T_C = 25^\circ C$                                                 | 360             | W          |
| $T_J$      |                                                                    | -55 ... +150    | $^\circ C$ |
| $T_{JM}$   |                                                                    | 150             | $^\circ C$ |
| $T_{stg}$  |                                                                    | -55 ... +150    | $^\circ C$ |
| $T_L$      | 1.6 mm (0.063 in.) from Case for 10s                               | 300             | $^\circ C$ |
| $T_{SOLD}$ | Plastic body for 10s                                               | 260             | $^\circ C$ |
| $F_C$      | Mounting Force                                                     | 40..120 / 9..27 | N/lb.      |
| $V_{ISOL}$ | 50/60 Hz, RMS $t = 1$ min<br>$I_{ISOL} \leq 1$ mA $t = 1$ s        | 2500<br>3000    | V~<br>V~   |
| Weight     |                                                                    | 8               | g          |

ISOPLUS264



G = Gate D = Drain  
S = Source

### Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 2500V Electrical Isolation
- Fast Intrinsic Diode
- Avalanche Rated
- Low  $Q_g$
- Low Package Inductance

### Advantages

- High Power Density
- Easy to Mount
- Space Savings

### Applications

- DC-DC Converters
- Battery Chargers
- Switched-Mode and Resonant-Mode Power Supplies
- DC Choppers
- Temperature and Lighting Controls

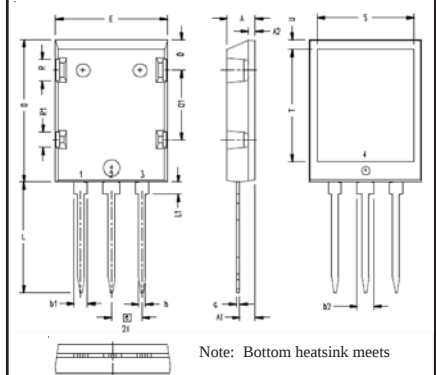
| Symbol       | Test Conditions<br>( $T_J = 25^\circ C$ , Unless Otherwise Specified) | Characteristic Values |      |                     |
|--------------|-----------------------------------------------------------------------|-----------------------|------|---------------------|
|              |                                                                       | Min.                  | Typ. | Max.                |
| $BV_{DSS}$   | $V_{GS} = 0$ V, $I_D = 1$ mA                                          | 600                   |      | V                   |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 8$ mA                                      | 3.0                   |      | 5.5 V               |
| $I_{GSS}$    | $V_{GS} = \pm 30$ V, $V_{DS} = 0$ V                                   |                       |      | $\pm 200$ nA        |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0$ V                                   |                       |      | 100 $\mu A$<br>5 mA |
| $R_{DS(on)}$ | $V_{GS} = 10$ V, $I_D = 35$ A, Note 1                                 |                       |      | 92 m $\Omega$       |

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                                                                 | Characteristic Values |      |                         |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|-------------------------|
|              |                                                                                                                                             | Min.                  | Typ. | Max.                    |
| $g_{fs}$     | $V_{DS} = 10\text{V}$ , $I_D = 35\text{A}$ , Note 1                                                                                         | 36                    | 50   | S                       |
| $C_{iss}$    | $V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$                                                                            |                       | 12   | nF                      |
| $C_{oss}$    |                                                                                                                                             |                       | 1340 | pF                      |
| $C_{rss}$    |                                                                                                                                             |                       | 345  | pF                      |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 35\text{A}$<br>$R_G = 1\Omega$ (External) |                       | 26   | ns                      |
| $t_r$        |                                                                                                                                             |                       | 25   | ns                      |
| $t_{d(off)}$ |                                                                                                                                             |                       | 60   | ns                      |
| $t_f$        |                                                                                                                                             |                       | 12   | ns                      |
| $Q_{g(on)}$  | $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 35\text{A}$                                                                   |                       | 265  | nC                      |
| $Q_{gs}$     |                                                                                                                                             |                       | 57   | nC                      |
| $Q_{gd}$     |                                                                                                                                             |                       | 120  | nC                      |
| $R_{thJC}$   |                                                                                                                                             |                       |      | 0.35 $^\circ\text{C/W}$ |
| $R_{thCS}$   |                                                                                                                                             | 0.15                  |      | $^\circ\text{C/W}$      |

## Source-Drain Diode

| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                              | Characteristic Values |      |               |
|----------|----------------------------------------------------------------------------------------------------------|-----------------------|------|---------------|
|          |                                                                                                          | Min.                  | Typ. | Max.          |
| $I_S$    | $V_{GS} = 0\text{V}$                                                                                     |                       |      | 70 A          |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$                                                              |                       |      | 280 A         |
| $V_{SD}$ | $I_F = I_S$ , $V_{GS} = 0\text{V}$ , Note 1                                                              |                       |      | 1.5 V         |
| $t_{rr}$ | $I_F = 25\text{A}$ , $V_{GS} = 0\text{V}$<br>$-di/dt = 100\text{ A}/\mu\text{s}$<br>$V_R = 100\text{ V}$ |                       |      | 250 ns        |
| $Q_{RM}$ |                                                                                                          |                       | 1.2  | $\mu\text{C}$ |
| $I_{RM}$ |                                                                                                          |                       | 8.0  | A             |

## ISOPLUS264™ (IXFL) Outline



| SYM | INCHES   |       | MILLIMETERS |       |
|-----|----------|-------|-------------|-------|
|     | MIN      | MAX   | MIN         | MAX   |
| A   | .190     | .205  | 4.83        | 5.21  |
| A1  | .102     | .118  | 2.59        | 3.00  |
| A2  | .046     | .055  | 1.17        | 1.40  |
| b   | .045     | .055  | 1.14        | 1.40  |
| b1  | .087     | .102  | 2.21        | 2.59  |
| b2  | .111     | .126  | 2.82        | 3.20  |
| c   | .020     | .029  | 0.51        | 0.74  |
| D   | 1.020    | 1.040 | 25.91       | 26.42 |
| E   | .770     | .789  | 19.56       | 20.09 |
| e   | .215 BSC |       | 5.46 BSC    |       |
| L   | .780     | .820  | 19.81       | 20.83 |
| L1  | .080     | .102  | 2.03        | 2.59  |
| Q   | .210     | .235  | 5.33        | 5.97  |
| Q1  | .490     | .513  | 12.45       | 13.03 |
| R   | .150     | .180  | 3.81        | 4.57  |
| R1  | .100     | .130  | 2.54        | 3.30  |
| S   | .668     | .690  | 16.97       | 17.53 |
| T   | .801     | .821  | 20.34       | 20.85 |
| U   | .065     | .080  | 1.65        | 2.03  |

Ref: IXYS CO 0128

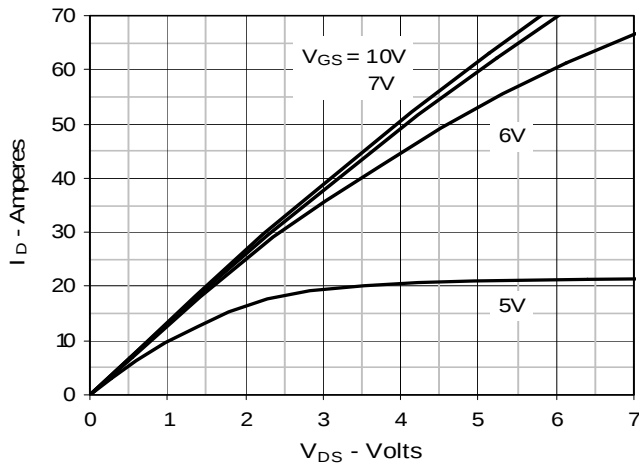
Note: 1. Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .

IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

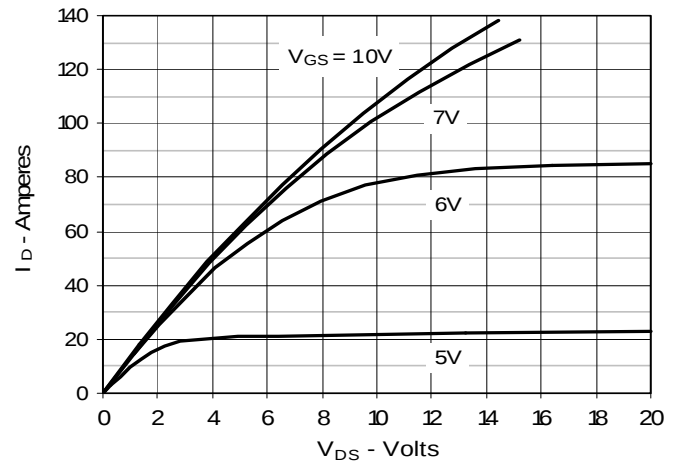
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

|           |           |           |           |              |              |              |              |              |             |
|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| 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 | 7,157,338B2 |
| 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    |             |

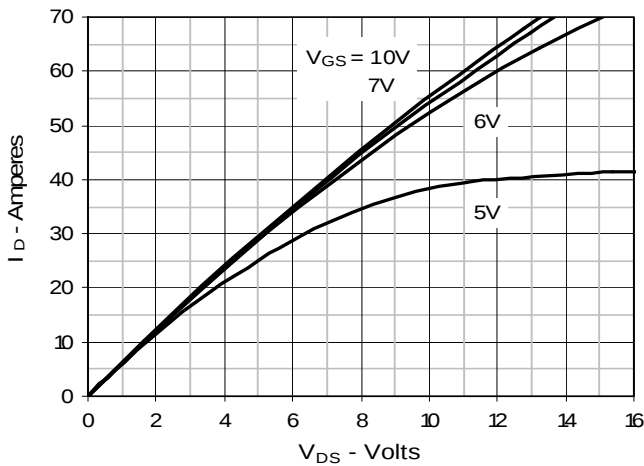
**Fig. 1. Output Characteristics**  
@ 25°C



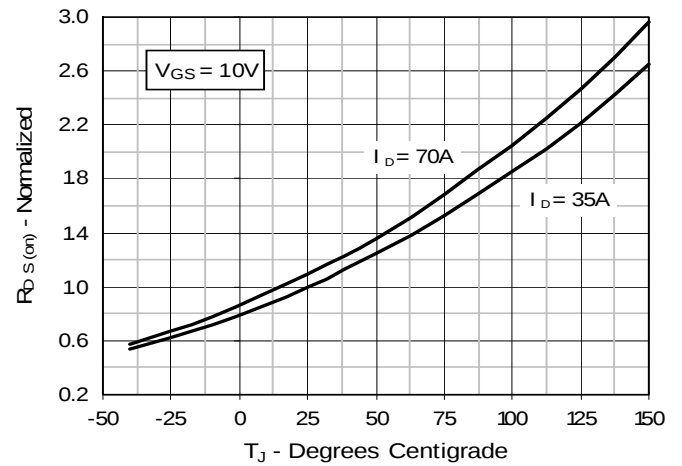
**Fig. 2. Extended Output Characteristics**  
@ 25°C



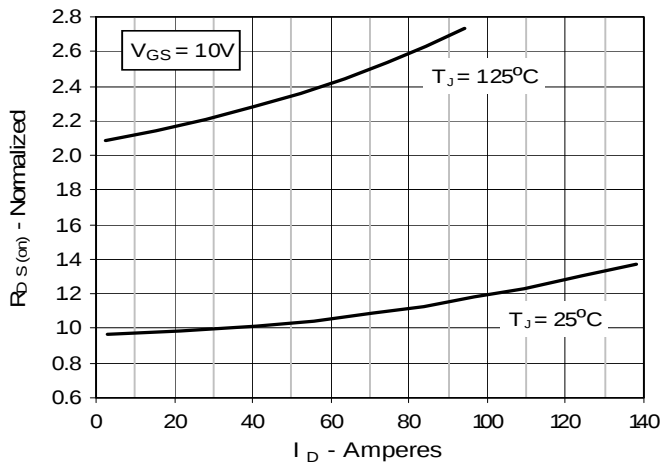
**Fig. 3. Output Characteristics**  
@ 125°C



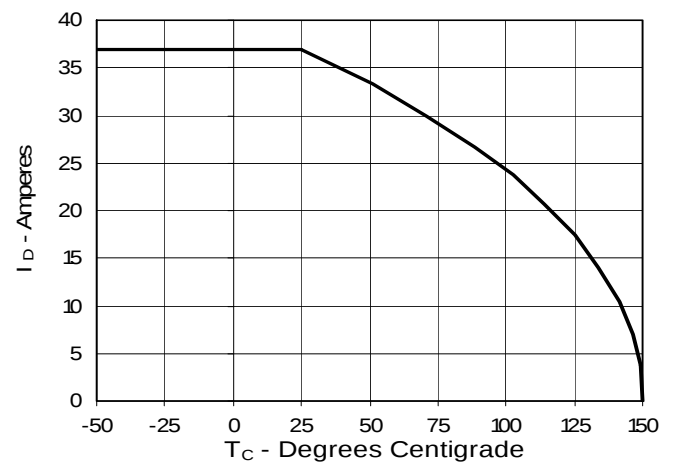
**Fig. 4.  $R_{DS(on)}$  Normalized to 0.5  $I_{D25}$  Value vs. Junction Temperature**



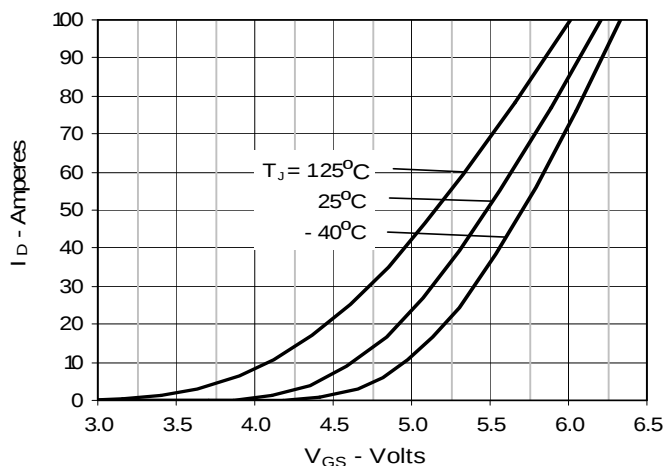
**Fig. 5.  $R_{DS(on)}$  Normalized to 0.5  $I_{D25}$  Value vs.  $I_D$**



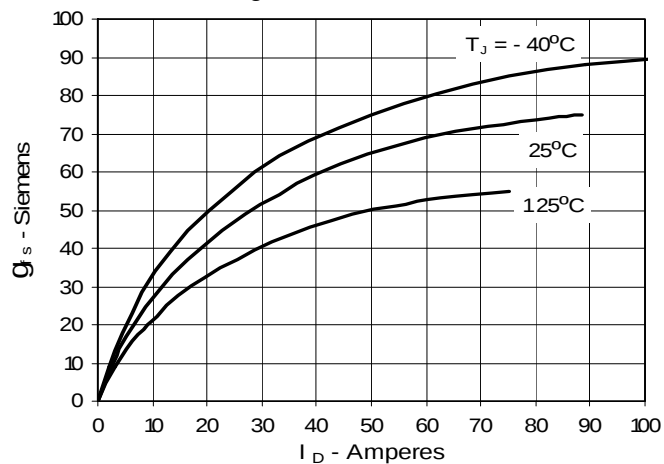
**Fig. 6. Drain Current vs. Case Temperature**



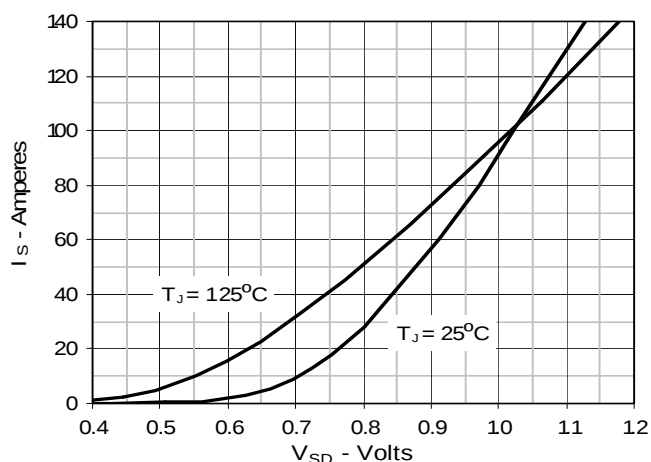
**Fig. 7. Input Admittance**



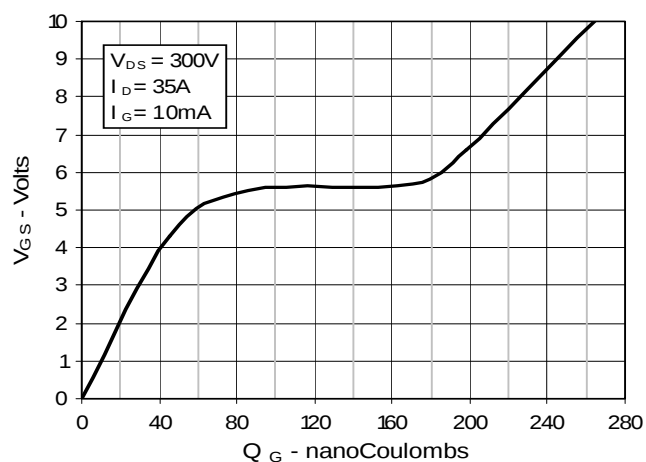
**Fig. 8. Transconductance**



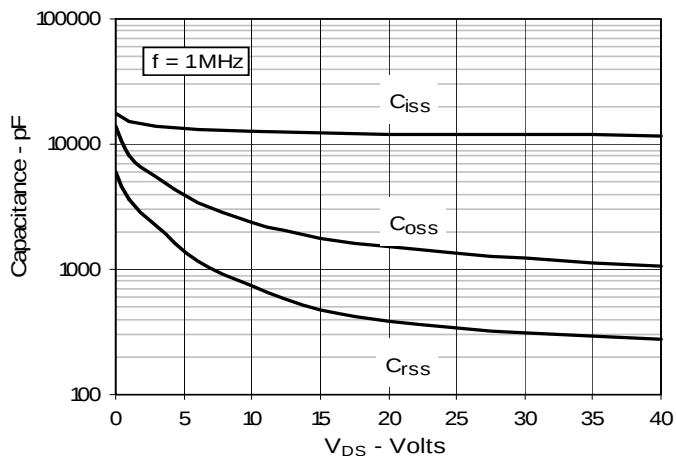
**Fig. 9. Source Current vs. Source-To-Drain Voltage**



**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



**Fig. 12. Maximum Transient Thermal Impedance**

