# IXYS

# HiPerFET™ Power Module

**VMO 60-05F**

$V_{DSS}$ = 500 V
$I_{D25}$ = 60 A
$R_{DS(on)}$ = 65 mΩ

High dv/dt, Low $t_{rr}$, HDMOS™ Family

Preliminary Data



**TO-240 AA**
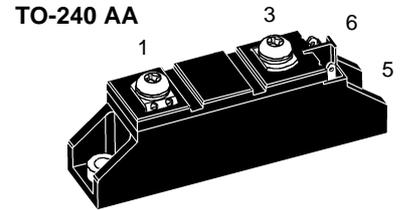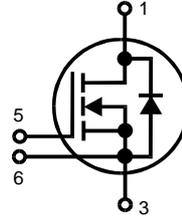
1 = Drain       3 = Source
5 = Gate        6 = Kelvin Source

| Symbol | Conditions | Maximum Ratings | |
|---|---|---|---|
| $V_{DSS}$ | $T_J$ = 25°C to 150°C | 500 | V |
| $V_{DGR}$ | $T_J$ = 25°C to 150°C; $R_{GS}$ = 10 kΩ | 500 | V |
| $V_{GS}$ | Continuous | ±20 | V |
| $V_{GSM}$ | Transient | ±30 | V |
| $I_{D25}$ | $T_C$ = 25°C | 60 | A |
| $I_{D100}$ | $T_C$ = 100°C | 37 | A |
| $I_{DM}$ | $T_C$ = 25°C, $t_p$ = 10 µs, pulse width limited by $T_{JM}$ | 240 | A |
| $P_{tot}$ | $T_C$ = 25°C | 590 | W |
| $T_J$ | | -40 ... +150 | °C |
| $T_{JM}$ | | 150 | °C |
| $T_{stg}$ | | -40 ... +125 | °C |
| $V_{ISOL}$ | 50/60 Hz,      t = 1 min | 3000 | V~ |
| | $I_{ISOL} \leq 1$ mA,    t = 1 s | 3600 | V~ |
| $M_d$ | Mounting torque(M5 or 10-32 UNF) | 2.5-4.0/22-35 | Nm/lb.in. |
| | Terminal connection torque (M5) | 2.5-4.0/22-35 | Nm/lb.in. |
| **Weight** | Typical including screws | 90 | g |

| Symbol | Conditions | min. | typ. | max. | |
|---|---|---|---|---|---|
| $V_{DSS}$ | $V_{GS}$ = 0 V | 500 | | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D$ = 24 mA | 2 | | 4 | V |
| $I_{GSS}$ | $V_{GS}$ = ±20 V DC, $V_{DS}$ = 0 | | | 500 | nA |
| $I_{DSS}$ | $V_{DS} = V_{DSS}$,       $V_{GS}$ = 0 V, $T_J$ =   25°C | | | 600 | µA |
| | $V_{DS} = 0.8 \cdot V_{DSS}$,  $V_{GS}$ = 0 V, $T_J$ = 125°C | | | 3 | mA |
| $R_{DS(on)}$ | $V_{GS}$ = 10 V, $I_D = 0.5 \cdot I_{D25}$ Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 % | | 65 | 75 | mΩ |

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

Data per MOSFET unless otherwise stated.

**Features**

- International standard package
- Direct copper bonded $Al_2O_3$ ceramic base plate
- Isolation voltage 3600 V~
- Low $R_{DS(on)}$ HDMOS™ process

**Applications**

- Switched-mode and resonant-mode power supplies
- Uninterruptible power supplies (UPS)
- DC servo and robot drives
- DC choppers

**Advantages**

- Easy to mount with two screws
- Space and weight savings
- High power density
- Low losses

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

943

| Symbol | Conditions | Characteristic Values $(T_J = 25°C$, unless otherwise specified) | | | |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| $g_{fs}$ | $V_{DS} = 10\ V$; $I_D = 0.5 \cdot I_{D25}$ pulsed | 30 | 60 | | S |
| $C_{iss}$ | | | 12.6 | | nF |
| $C_{oss}$ | $V_{GS} = 0\ V$, $V_{DS} = 25\ V$, $f = 1\ MHz$ | | 1.35 | | nF |
| $C_{rss}$ | | | 0.405 | | nF |
| $t_{d(on)}$ | | | 50 | | ns |
| $t_r$ | $V_{GS} = 10\ V$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 0.5 \cdot I_{D25}$ | | 45 | | ns |
| $t_{d(off)}$ | $R_G = 1\ \Omega$ (External), resistive load | | 250 | | ns |
| $t_f$ | | | 30 | | ns |
| $Q_g$ | | | 405 | | nC |
| $Q_{gs}$ | $V_{GS} = 10\ V$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 0.5 \cdot I_{D25}$ | | 90 | | nC |
| $Q_{gd}$ | | | 180 | | nC |
| $R_{thJC}$ | | | | 0.21 | K/W |
| $R_{thCH}$ | heatsink compound applied | | 0.2 | | K/W |
| $d_S$ | Creepage distance on surface | 12.7 | | | mm |
| $d_A$ | Strike distance through air | 9.6 | | | mm |
| $a$ | Allowable acceleration | | | 50 | m/s$^2$ |

### Dimensions in mm (1 mm = 0.0394")



### Source-Drain Diode
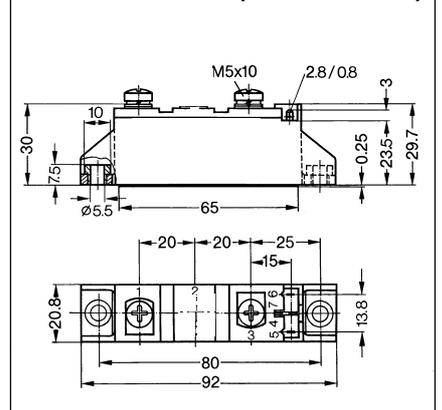
| Symbol | Conditions | Characteristic Values $(T_J = 25°C$, unless otherwise specified) | | |
|---|---|---|---|---|
| | | min. | typ. | max. |
| $I_S$ | $V_{GS} = 0\ V$ | | | 60 A |
| $I_{SM}$ | Repetitive; pulse width limited by $T_{JM}$ | | | 240 A |
| $V_{SD}$ | $I_F = I_S$; $V_{GS} = 0\ V$, Pulse test, $t \leq 300\ \mu s$, duty cycle $d \leq 2\%$ | | | 1.5 V |
| $t_{rr}$ | $I_F = I_S$, $-di/dt = 100\ A/\mu s$, $V_{DS} = 100\ V$, $V_{GS} = 0\ V$ | | | 250 ns |