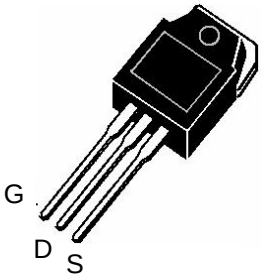
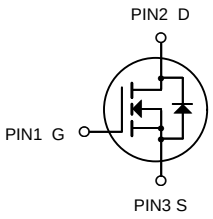
## Description

The FQA24N50 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.




**TO-3P**
**(TO-3PN)**




N-Channel MOSFET

## General Features

$V_{DS}$ =500V,$I_D$ =28A

$R_{DS(ON)}$ < 180mΩ @ $V_{GS}$=10V

## Application

High efficiency switch mode power supplies

Power factor correction

Electronic lamp ballast

## Package Marking and Ordering Information

| Product ID | Pack | Brand | Units Tube |
|---|---|---|---|
| FQA24N50 | TO-3P(TO-3PN) | HXY MOSFET | 30 |

## Absolute Maximum Ratings@$T_j$=25°C(unless otherwise specified)

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| VDS | Drain-Source Voltage | 500 | V |
| VGS | Gate-Source Voltage | ±20 | V |
| $I_D$@$T_C$=25°C | Drain Current | 28 | A |
| IDM | Pulsed Drain Current[1] | 112 | A |
| $P_D$@$T_C$=25°C | Total Power Dissipation | 312.5 | W |
| TSTG | Storage Temperature Range | -55 to 150 | °C |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | °C |

## Electrical Characteristics ($T_C$=25°C unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage (Note 1) | $BV_{DSS}$ | $V_{GS}$=0V $I_D$=250μA | 500 | - | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=500V,$V_{GS}$=0V | - | - | 1 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V,$V_{DS}$=0V | - | - | ±100 | nA |
| **On Characteristics** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=250μA | 2.0 | - | 4.0 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=14A | - | 150 | 180 | mΩ |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=40V,$I_D$=14A | - | 25 | - | S |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{lss}$ | $V_{DS}$=25V,$V_{GS}$=0V, F=1.0MHz | - | 4500 | - | PF |
| Output Capacitance | $C_{oss}$ | | - | 320 | - | PF |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 20 | - | PF |
| **Switching Characteristics** | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$=400V,$I_D$=28A $R_G$=10 Ω (Note 2) | - | 40 | - | nS |
| Turn-on Rise Time | $t_r$ | | - | 70 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 170 | - | nS |
| Turn-Off Fall Time | $t_f$ | | - | 55 | - | nS |
| Total Gate Charge | $Q_g$ | $V_{DS}$=400V,$I_D$=28A, $V_{GS}$=10V (Note 2) | - | 110 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 15 | - | nC |
| Gate-Drain Charge | $Q_{gd}$ | | - | 40 | - | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| Diode Forward Voltage | $V_{SD}$ | $V_{GS}$=0V,$I_S$=14A | - | | 1.4 | V |
| Diode Forward Current (Note 2) | $I_S$ | | - | - | 28 | A |

### Notes:

**1.** Repetitive Rating: Pulse width limited by maximum junction temperature.

**2.** Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

## Typical Electrical

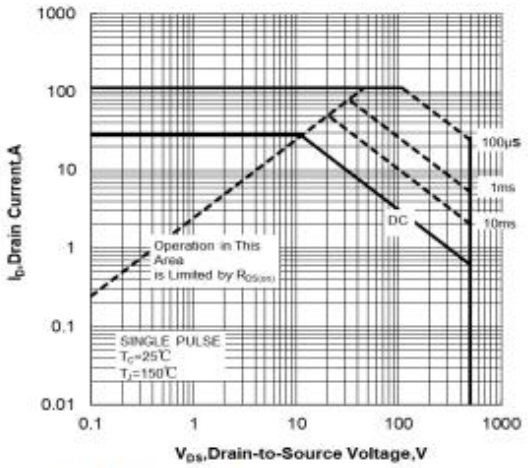



Figure 1 Maximum Forward Bias Safe Operating Area

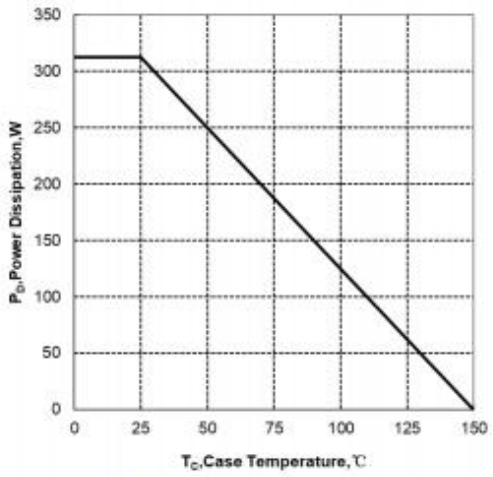



Figure 2 Maximum Power dissipation vs Case Temperature

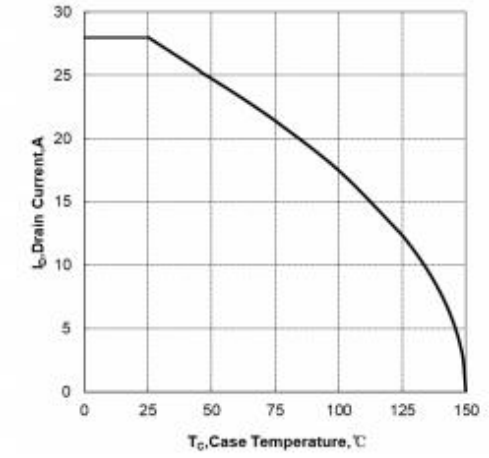



Figure 3 Maximum Continuous Drain Current vs Case Temperature

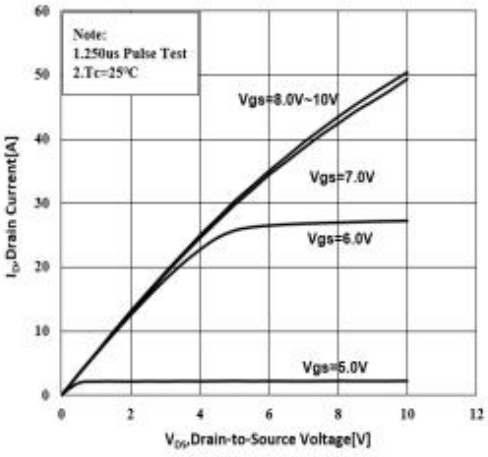



Figure 4 Typical Output Characteristics

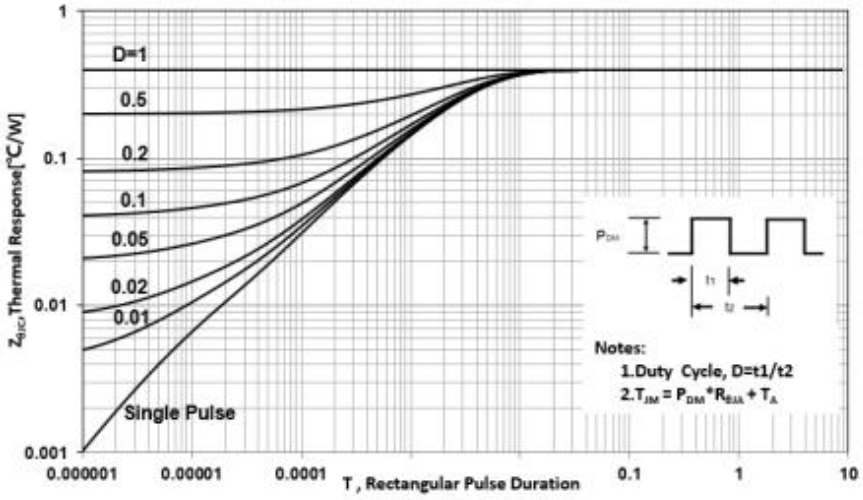



Figure 5 Maximum Effective Thermal Impedance , Junction to Case

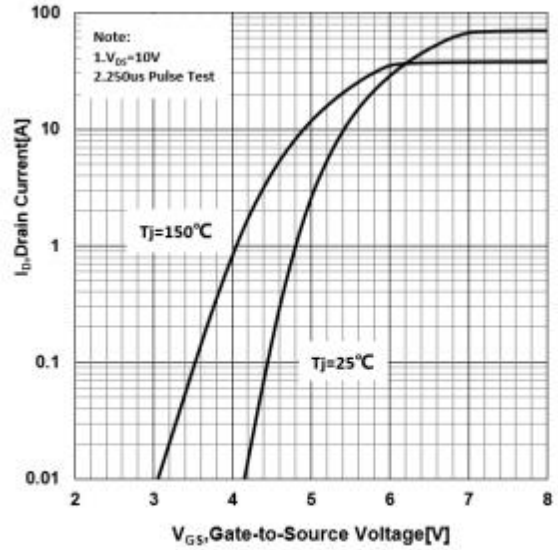



Figure 6 Typical Transfer Characteristics

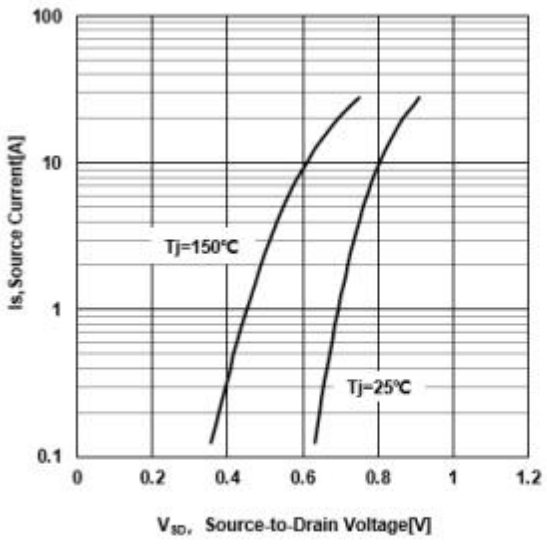



Figure 7 Typical Body Diode Transfer Characteristics

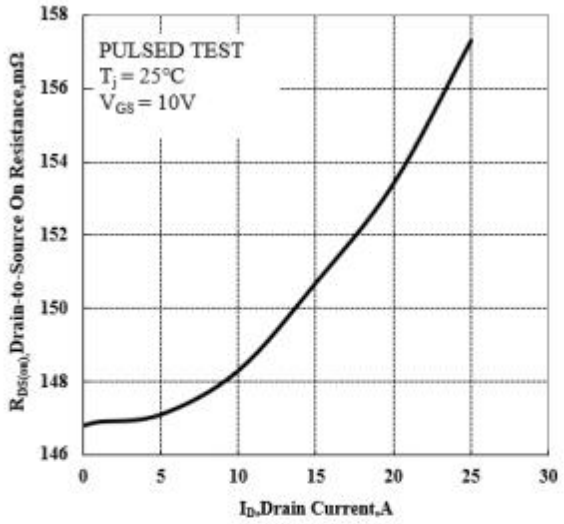



Figure 8 Typical Drain to Source ON Resistance vs Drain Current

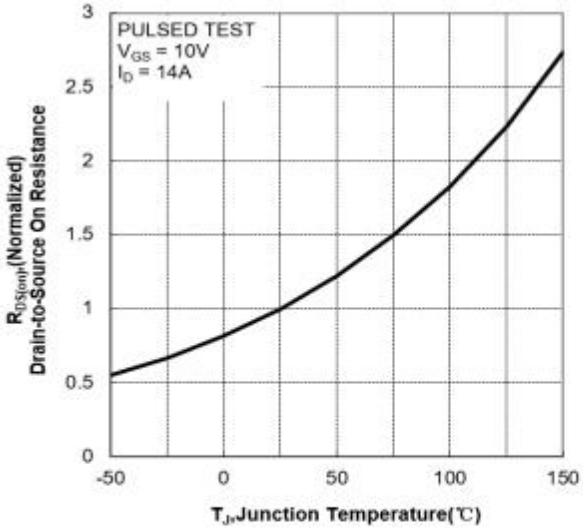



Figure 9 Typical Drian to Source on Resistance vs Junction Temperature

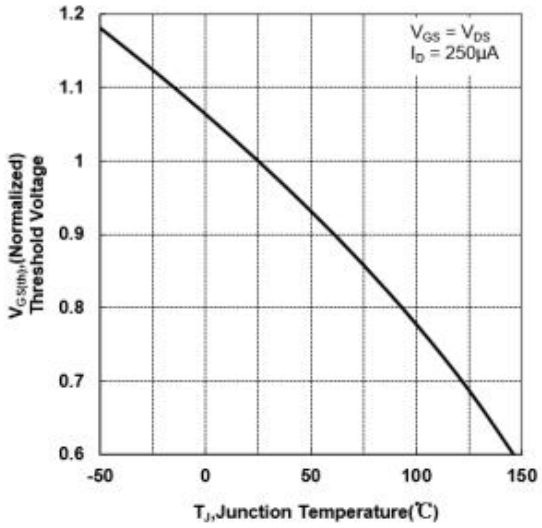



Figure 10 Typical Theshold Voltage vs Junction Temperature

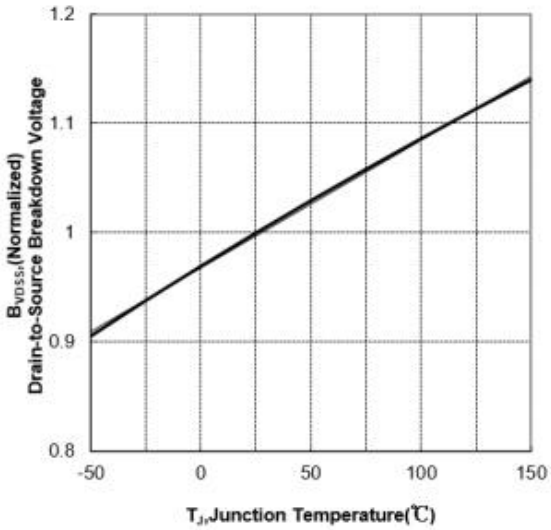



Figure 11 Typical Breakdown Voltage vs Junction Temperature

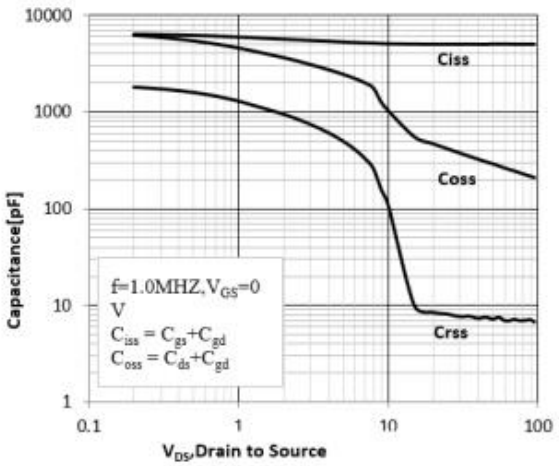



Figure 12 Typical Capacitance vs Drain to Source Voltage

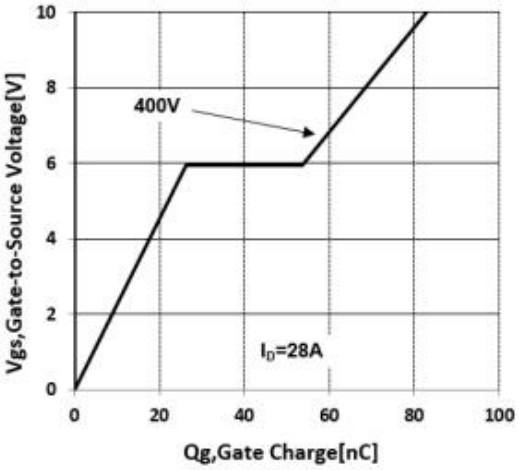
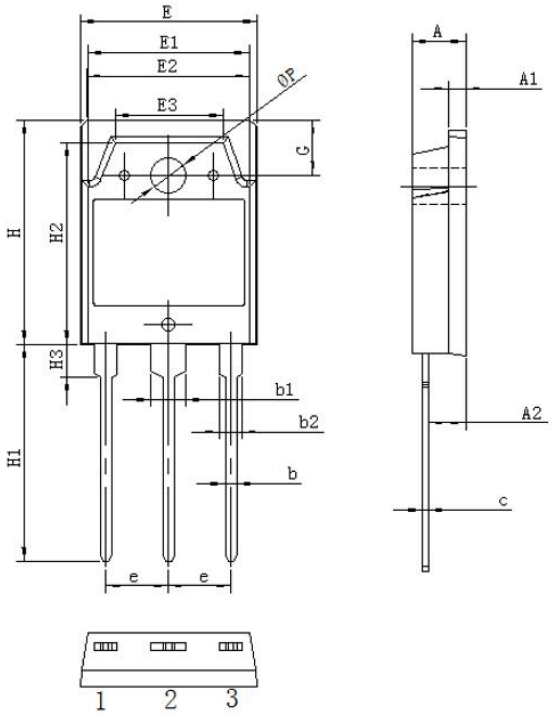



Figure 13 Typical Gate Charge vs Gate to Source Voltage

## Package Information

### TO-3P(TO-3PN)




| Symbol | 单位 mm | | |
|---|---|---|---|
| | Min | Nom | Max |
| A | 4.60 | 4.80 | 5.00 |
| A1 | 1.3 | 1.5 | 1.7 |
| A2 | 1.20 | 1.40 | 1.60 |
| b | 0.80 | 1.0 | 1.20 |
| b1 | 2.90 | 3.10 | 3.30 |
| b2 | 1.90 | 2.10 | 2.30 |
| c | 0.50 | 0.60 | 0.70 |
| e | 5.25 | 5.45 | 5.65 |
| E | 15.2 | 15.6 | 16.0 |
| E1 | 13.2 | 13.4 | 13.6 |
| E2 | 13.1 | 13.3 | 13.5 |
| E3 | 9.1 | 9.3 | 9.5 |
| H | 19.8 | 20.0 | 20.2 |
| H1 | 20.1 | 20.3 | 20.5 |
| H2 | 18.5 | 18.7 | 18.9 |
| H3 | 3.2 | 3.5 | 3.8 |
| G | 4.8 | 5.0 | 5.2 |
| ΦP | 3.00 | 3.20 | 3.40 |

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