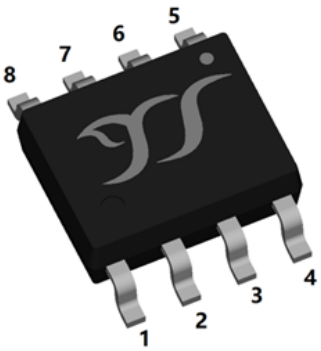
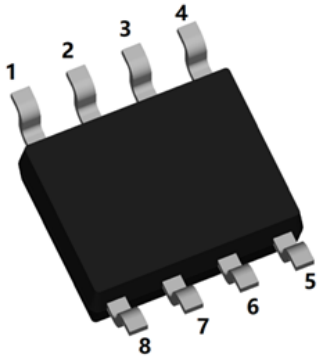
# N-Channel and P-Channel Complementary MOSFET

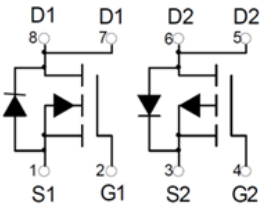


Top View



Bottom View

SOP-8




## Product Summary

### NMOS

- $V_{DS}$ 100V
- $I_D$ 5A
- $R_{DS(ON)}$( at $V_{GS}$=10V) ＜27mΩ
- $R_{DS(ON)}$( at $V_{GS}$=4.5V) ＜30mΩ

### PMOS

- $V_{DS}$ -100V
- $I_D$ -3A
- $R_{DS(ON)}$( at $V_{GS}$=-10V) ＜110mΩ
- $R_{DS(ON)}$( at $V_{GS}$=-4.5V) ＜120mΩ

## General Description

- Trench Power LV MOSFET technology
- Excellent package for heat dissipation
- Moisture Sensitivity Level 3
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

## Applications

- Load switching
- Hard switched and high frequency circuits
- Uninterruptible power supply

## ■ Absolute Maximum Ratings ($T_A$=25℃ unless otherwise noted)

| Parameter | | Symbol | NMOS | PMOS | Unit |
|---|---|---|---|---|---|
| Drain-source Voltage | | $V_{DS}$ | 100 | -100 | V |
| Gate-source Voltage | | $V_{GS}$ | ±20 | ±20 | V |
| Drain Current | $T_A$=25℃ | $I_D$ | 5 | -3 | A |
| | $T_A$=100℃ | | 3.2 | -1.9 | |
| Pulsed Drain Current [A] | | $I_{DM}$ | 30 | 25 | A |
| Total Power Dissipation [B] | $T_A$=25℃ | $P_D$ | 1.5 | 1.3 | W |
| | $T_A$=100℃ | | 0.6 | 0.5 | |
| Junction and Storage Temperature Range | | $T_J$ ,$T_{STG}$ | -55～+150 | -55～+150 | ℃ |

## ■Thermal resistance

| Parameter | | Symbol | NMOS | | PMOS | | Units |
|---|---|---|---|---|---|---|---|
| | | | Typ | Max | Typ | Max | |
| Thermal Resistance Junction-to-Ambient [C] | Steady-State | $R_{\theta JA}$ | 70 | 85 | 75 | 90 | ℃/W |

## ■ Ordering Information (Example)

| PREFERED P/N | PACKING CODE | Marking | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---|---|---|---|---|---|---|
| YJS03NP10A | F2 | Q03NP10A | 4000 | 8000 | 64000 | 13“ reel |

## ■ NMOS Electrical Characteristics ($T_J$=25℃ unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Static Parameter** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$= 0V, $I_D$=250μA | 100 | - | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=100V, $V_{GS}$=0V | - | - | 1 | μA |
| | | $V_{DS}$=100V, $V_{GS}$=0V, Tj=150℃ | - | - | 100 | |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$= ±20V, $V_{DS}$=0V | - | - | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$= $V_{GS}$, $I_D$=250μA | 1 | 1.8 | 2.5 | V |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}$=10V, $I_D$=5A | - | 21 | 27 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=2A | - | 24 | 30 | |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=5A,$V_{GS}$=0V | - | 0.8 | 1.2 | V |
| Gate resistance | $R_G$ | f=1MHz, Open drain | - | 1.1 | - | Ω |
| Maximum Body-Diode Continuous Current | $I_S$ | | - | - | 5 | A |
| **Dynamic Parameters** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=50V, $V_{GS}$=0V, f=1MHz | - | 1170 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 370 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 15 | - | |
| **Switching Parameters** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{GS}$=10V, $V_{DS}$=50V, $I_D$=5A | - | 16 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 5.6 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 2.4 | - | |
| Reverse Recovery Charge | $Q_{rr}$ | $I_F$=5A, di/dt=100A/us | - | 42 | - | nC |
| Reverse Recovery Time | $t_{rr}$ | | - | 39.8 | - | ns |
| Turn-on Delay Time | $t_{D(on)}$ | $V_{GS}$=10V, $V_{DD}$=50V, $I_D$=5A $R_{GEN}$=2.2Ω | - | 39.2 | - | ns |
| Turn-on Rise Time | $t_r$ | | - | 11 | - | |
| Turn-off Delay Time | $t_{D(off)}$ | | - | 53.2 | - | |
| Turn-off fall Time | $t_f$ | | - | 15.8 | - | |

## ■ PMOS Electrical Characteristics ($T_J$=25℃ unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Static Parameter** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$= 0V, $I_D$=-250μA | -100 | - | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=-100V, $V_{GS}$=0V | - | - | -1 | μA |
| | | $V_{DS}$=-100V, $V_{GS}$=0V, Tj=150℃ | - | - | -100 | |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$= ±20V, $V_{DS}$=0V | - | - | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$= $V_{GS}$, $I_D$=-250μA | -1 | -1.7 | -2.5 | V |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}$=-10V, $I_D$=-3A | - | 85 | 110 | mΩ |
| | | $V_{GS}$=-4.5V, $I_D$=-2A | - | 95 | 120 | |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=-3A, $V_{GS}$=0V | - | -0.9 | -1.2 | V |
| Gate resistance | $R_G$ | f=1MHz, Open drain | - | 9 | - | Ω |
| Maximum Body-Diode Continuous Current | $I_S$ | | - | - | -3 | A |
| **Dynamic Parameters** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=-50V, $V_{GS}$=0V, f=1MHz | - | 1050 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 110 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 10 | - | |
| **Switching Parameters** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{GS}$=-10V, $V_{DS}$=-50V, $I_D$=-3A | - | 20.1 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 3.9 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 4.3 | - | |
| Reverse Recovery Charge | $Q_{rr}$ | $I_F$=-3A, di/dt=100A/us | - | 140 | - | nC |
| Reverse Recovery Time | $t_{rr}$ | | - | 70 | - | ns |
| Turn-on Delay Time | $t_{D(on)}$ | $V_{GS}$=-10V, $V_{DD}$=-50V, $I_D$=-3A $R_{GEN}$=2.2Ω | - | 10 | - | ns |
| Turn-on Rise Time | $t_r$ | | - | 30 | - | |
| Turn-off Delay Time | $t_{D(off)}$ | | - | 77 | - | |
| Turn-off fall Time | $t_f$ | | - | 81 | - | |

A. Repetitive rating; pulse width limited by max. junction temperature.
B. $P_d$ is based on max. junction temperature, using junction-case thermal resistance.
C. The value of $R_{\theta JA}$ is measured with the device mounted on the minimum recommend pad size, in the still air environment with $T_A$ =25℃. The maximum allowed junction temperature of 150℃. The value in any given application depends on the user's specific board design.

## ■ NMOS Typical Electrical and Thermal Characteristics Diagrams

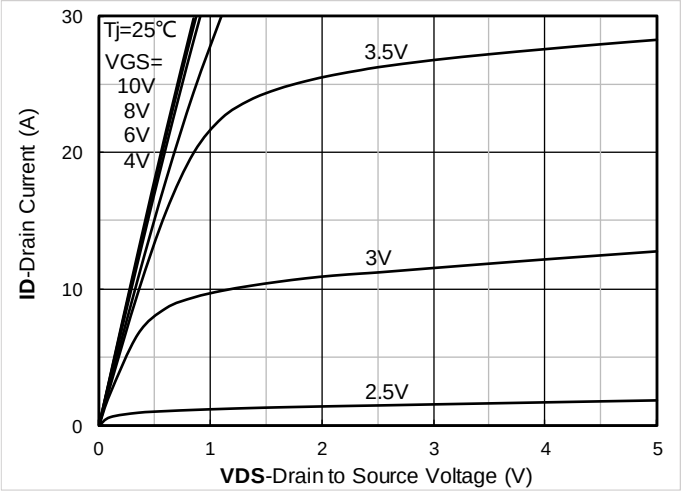



Figure 1. Output Characteristics

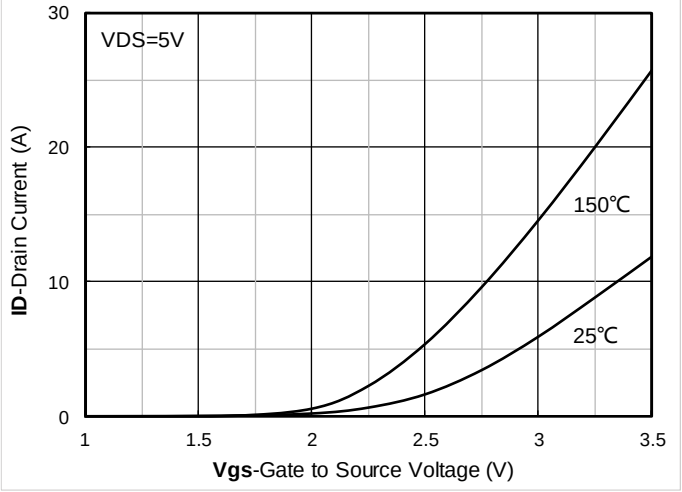



Figure 2. Transfer Characteristics

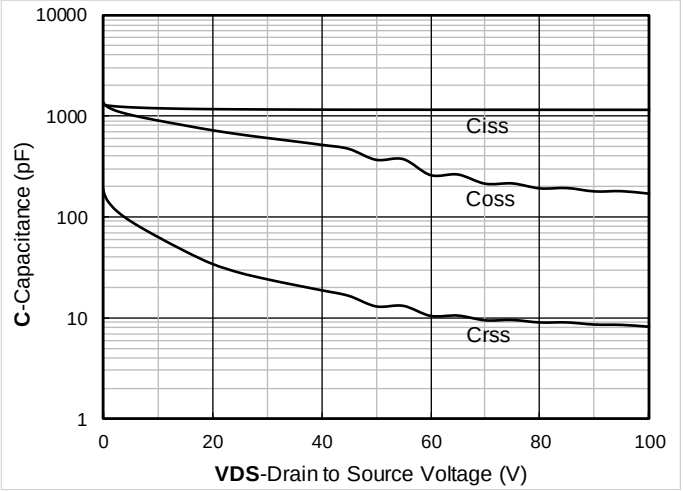



Figure 3. Capacitance Characteristics

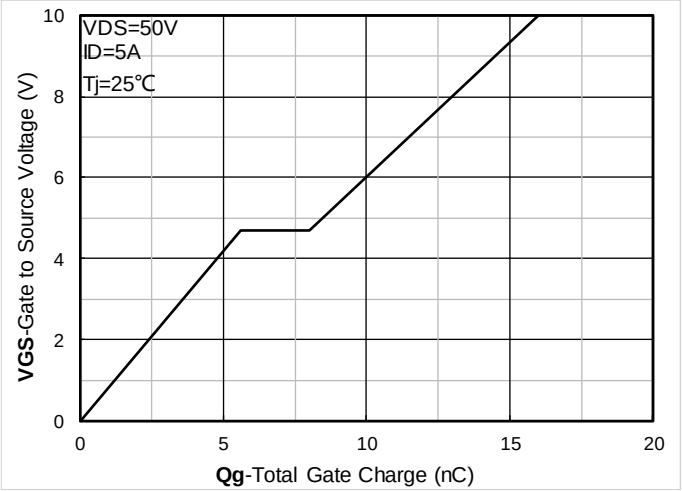



Figure 4. Gate Charge

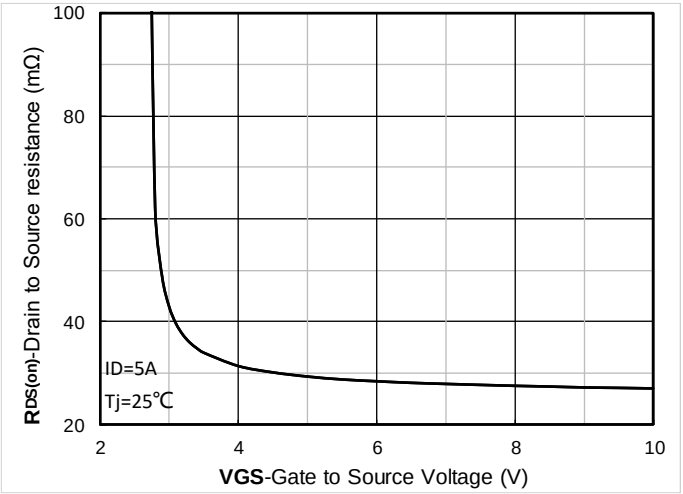



Figure 5. On-Resistance vs Gate to Source Voltage

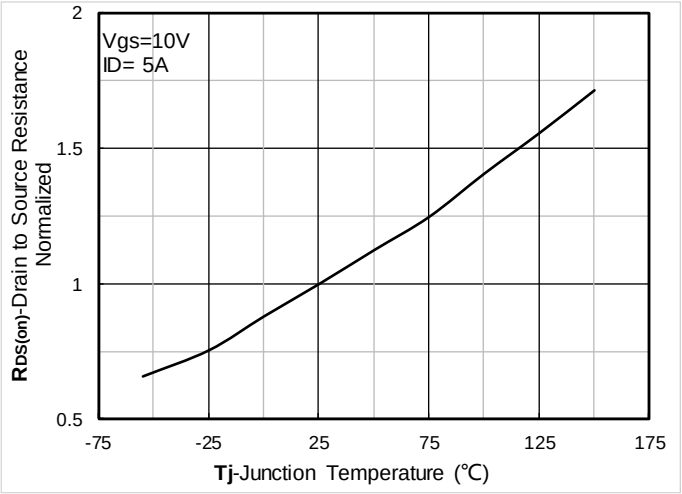



Figure 6. Normalized On-Resistan

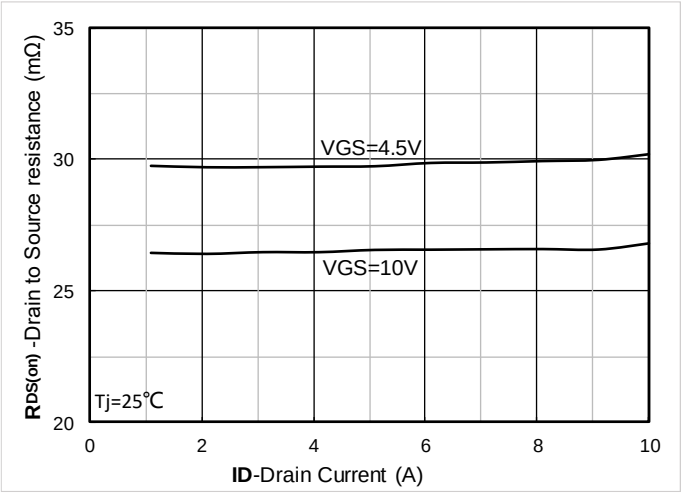



Figure 7. $R_{DS(on)}$ VS Drain Current

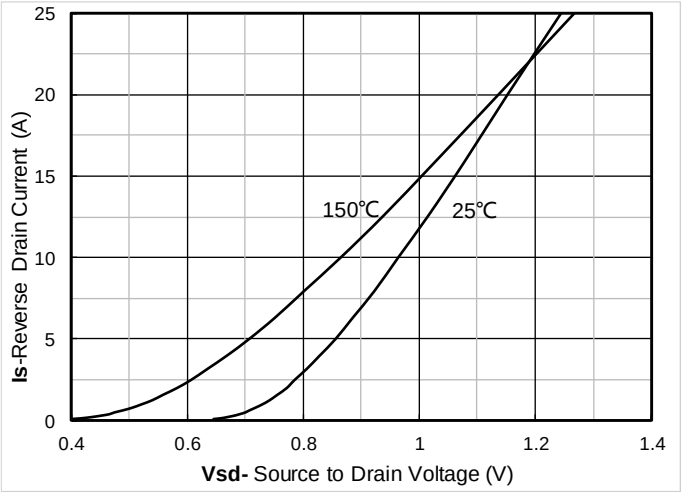



Figure 8. Forward characteristics of reverse diode

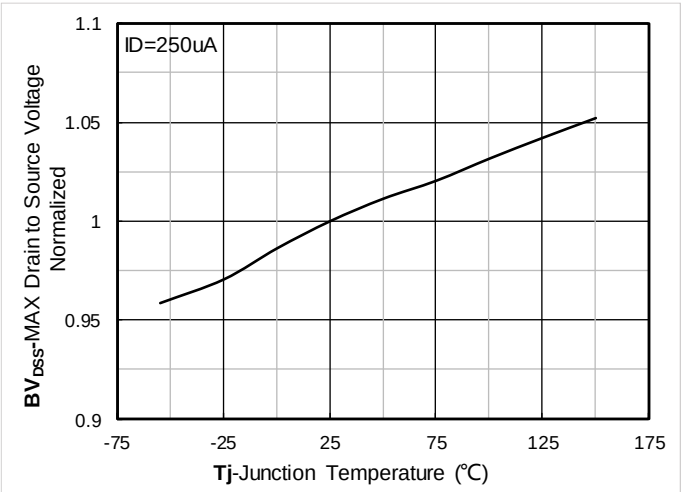



Figure 9. Normalized breakdown voltage

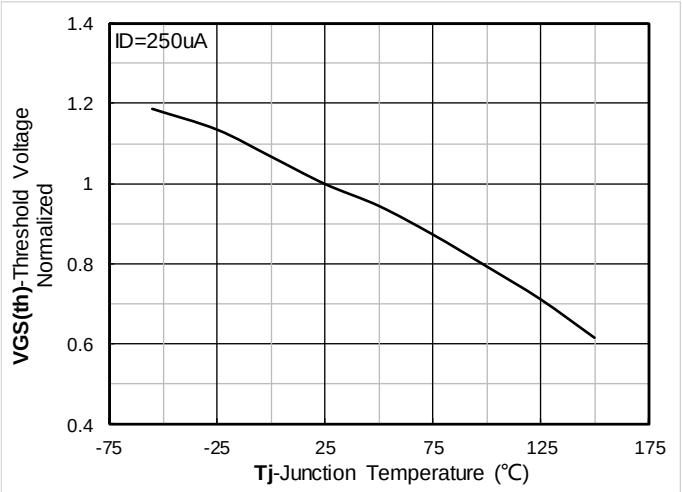



Figure 10. Normalized Threshold voltage

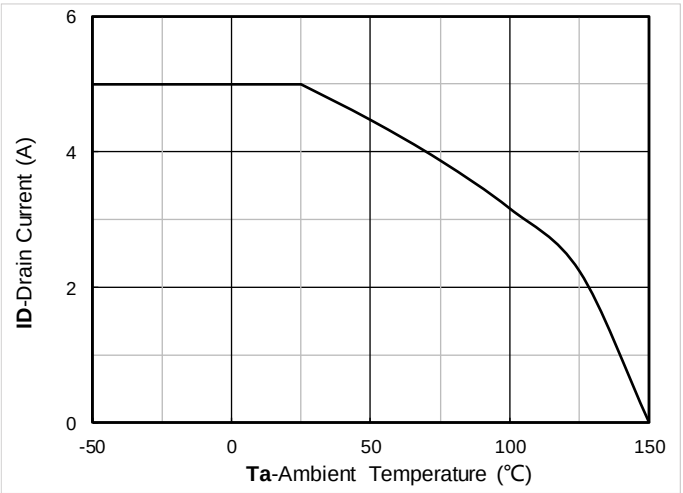



Figure 11. Current dissipation

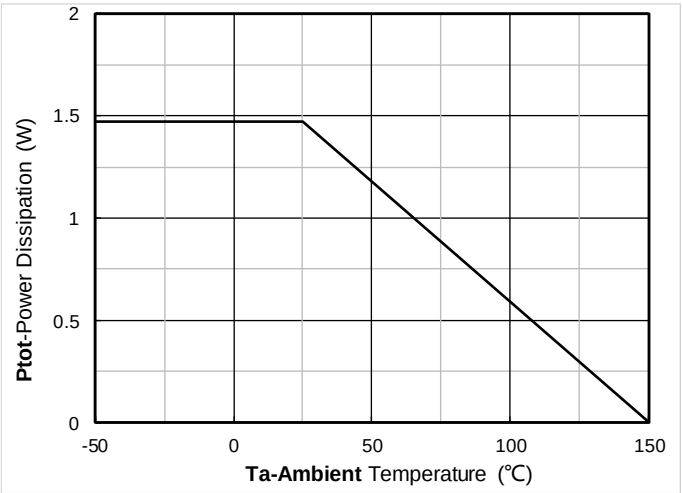



Figure 12. Power dissipation

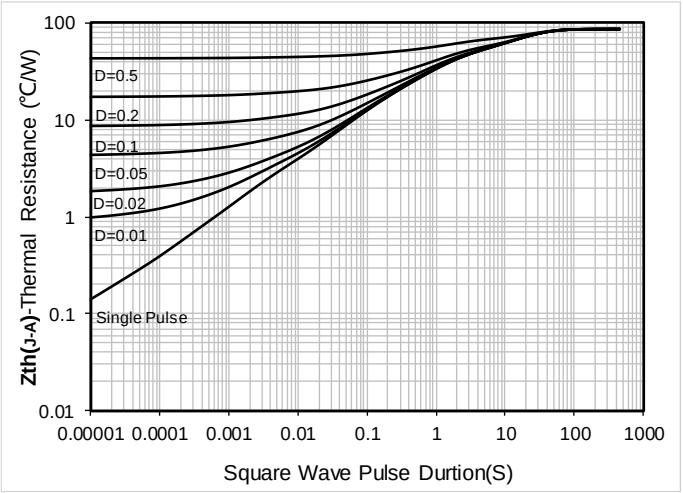



Figure 13. Maximum Transient Thermal Impedance

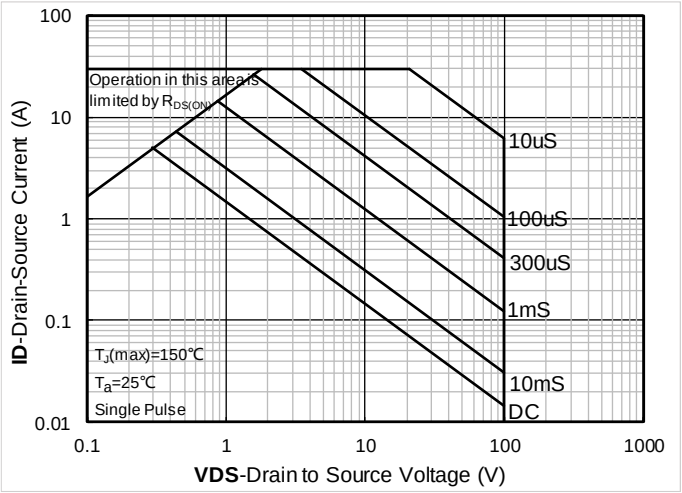



Figure 14. Safe Operation Area

## ■ PMOS Typical Electrical and Thermal Characteristics Diagrams

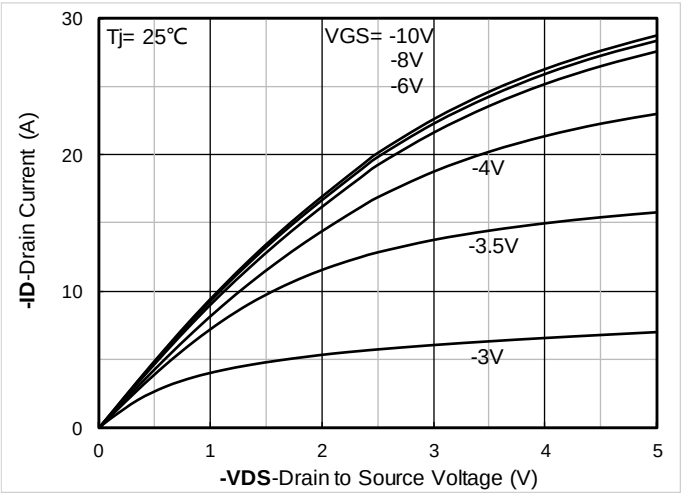



Figure 1. Output Characteristics

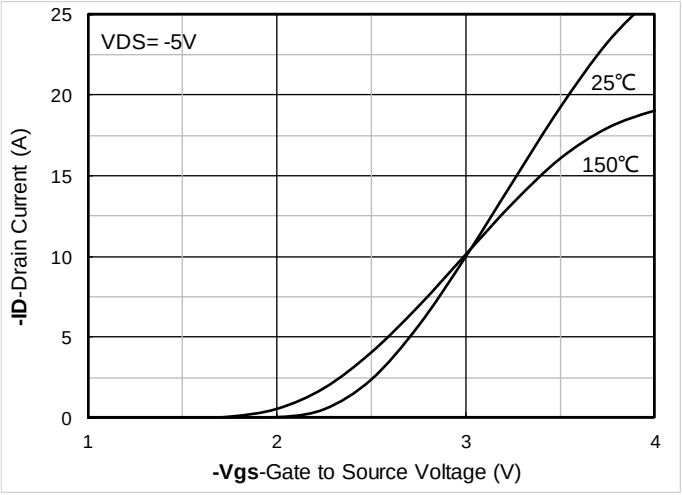



Figure 2. Transfer Characteristics

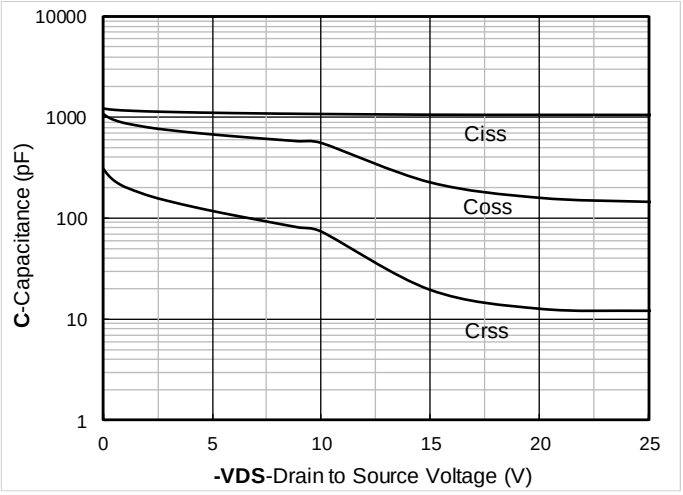



Figure 3. Capacitance Characteristics

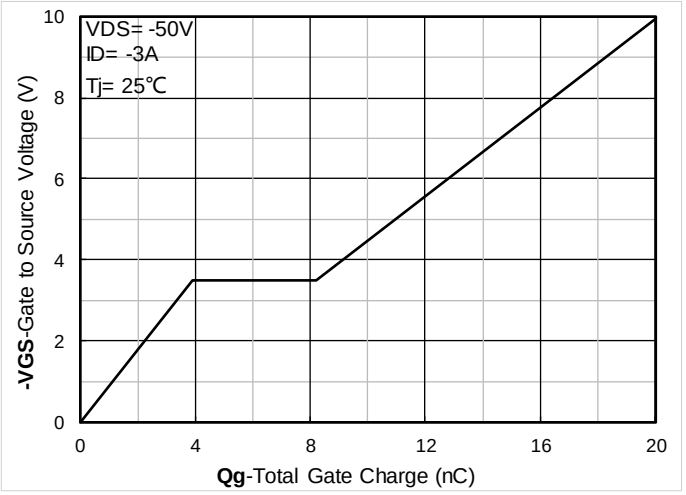



Figure 4. Gate Charge

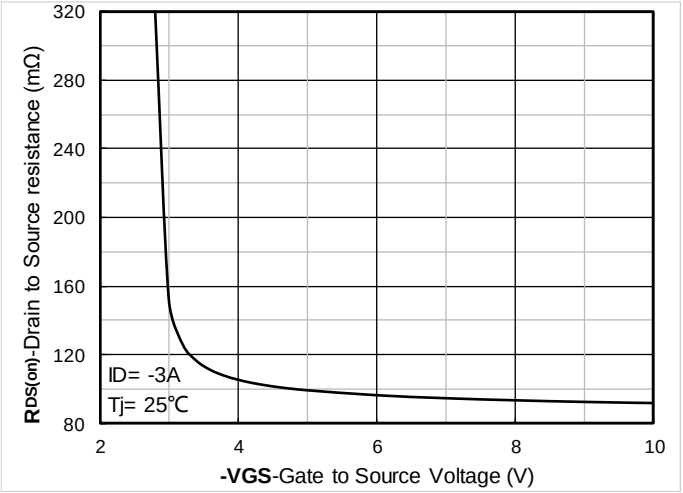



Figure 5. On-Resistance vs Gate to Source Voltage

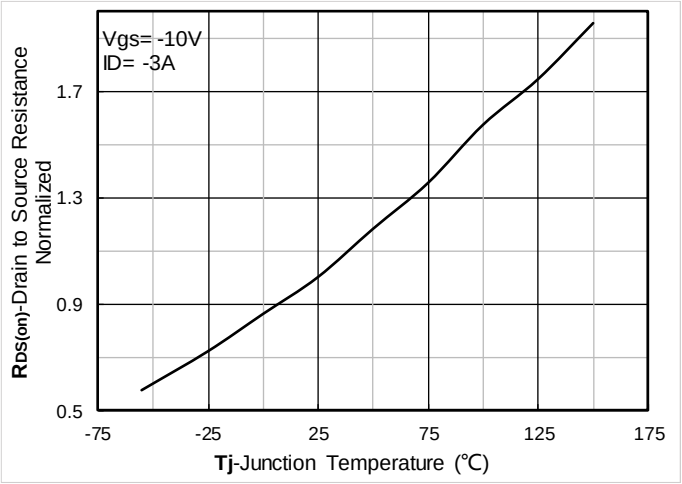



Figure 6. Normalized On-Resistance

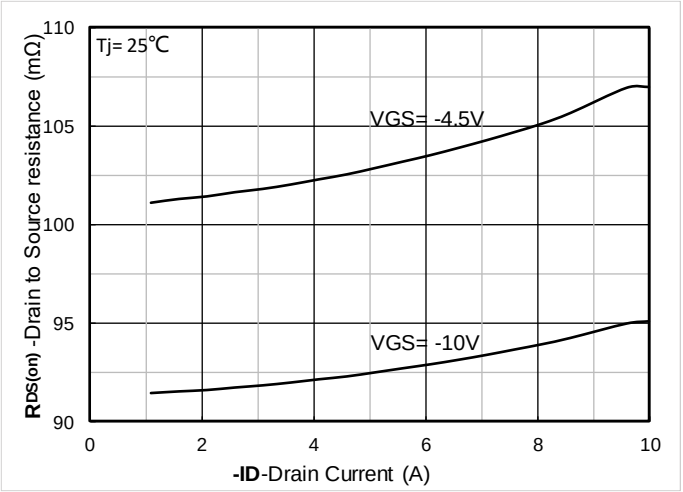



Figure 7. $R_{DS(on)}$ VS Drain Current

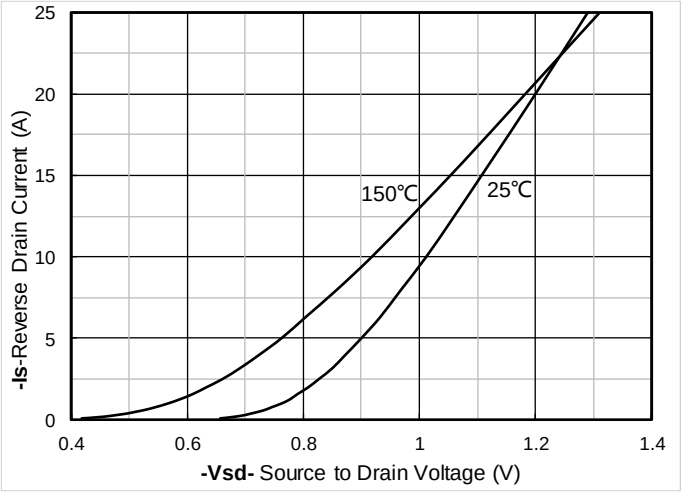



Figure 8. Forward characteristics of reverse diode

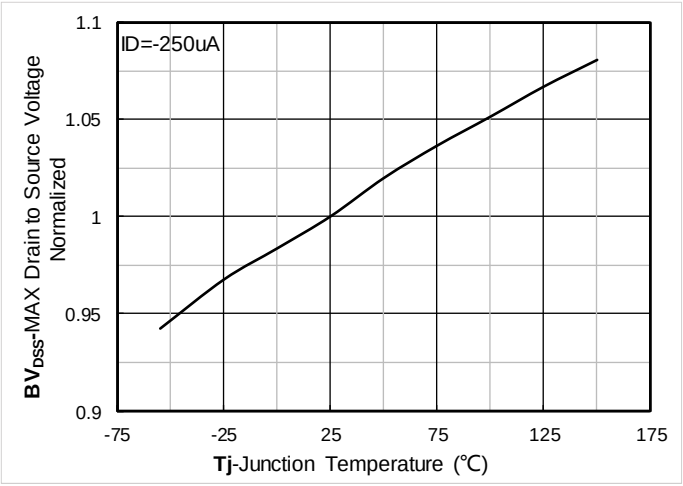



Figure 9. Normalized breakdown voltage

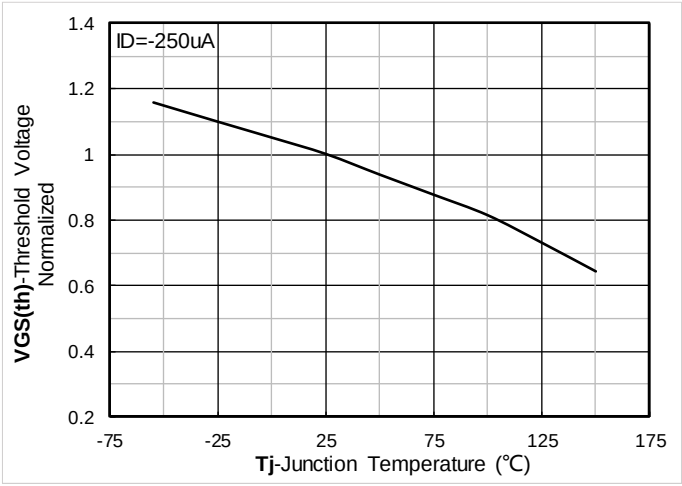



Figure 10. Normalized Threshold voltage

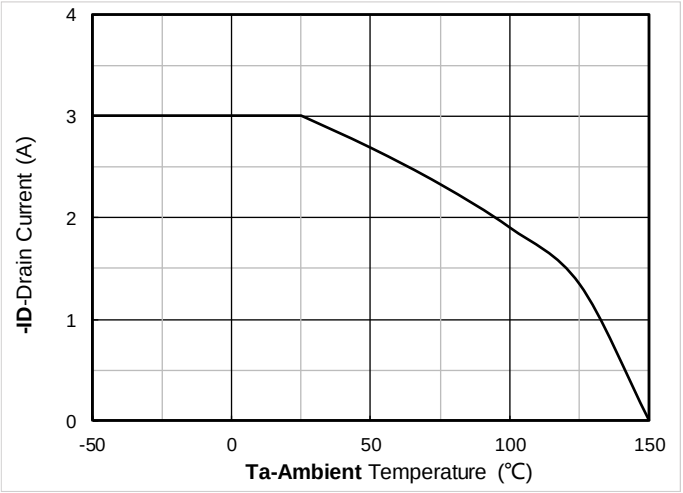



Figure 11. Current dissipation

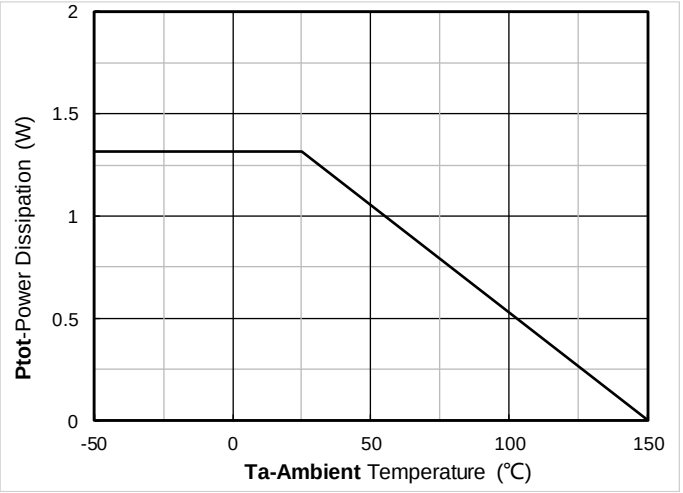



Figure 12. Power dissipation

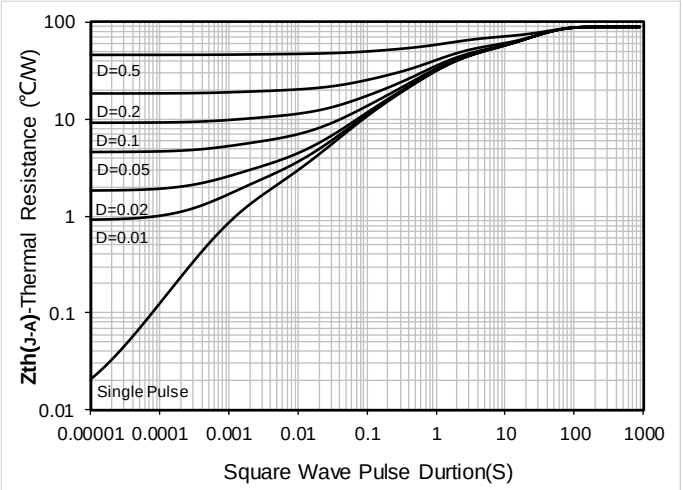



Figure 13. Maximum Transient Thermal Impedance

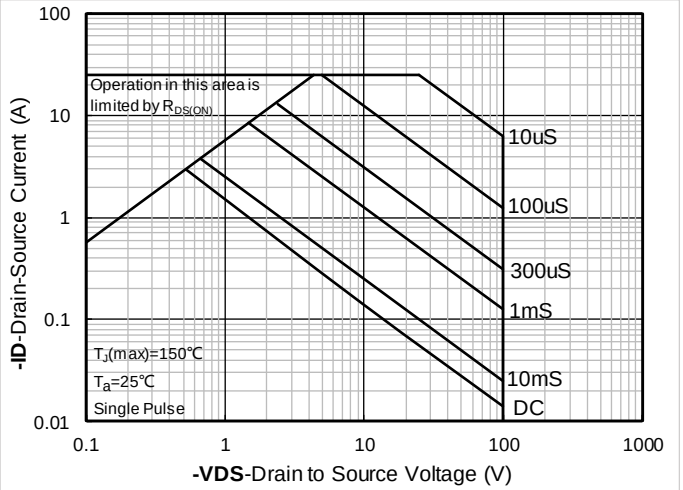
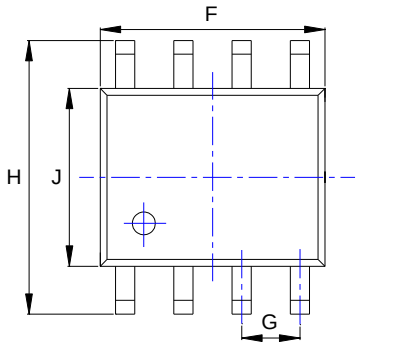
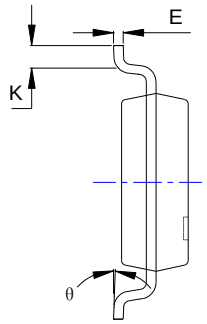



Figure 14. Safe Operation Area

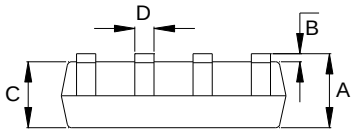
## ■ SOP-8 Package information



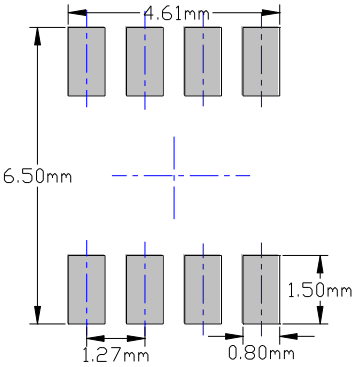

TOP VIEW




SIDE VIEW




SIDE VIEW




Suggested Solder Pad Layout

| DIMENSIONS | | | | |
|---|---|---|---|---|
| SYMBOL | INCHES | | Millimeter | |
| | MIN. | MAX. | MIN. | MAX. |
| A | 0.053 | 0.069 | 1.350 | 1.750 |
| B | 0.004 | 0.010 | 0.100 | 0.250 |
| C | 0.053 | 0.061 | 1.350 | 1.550 |
| D | 0.013 | 0.020 | 0.330 | 0.510 |
| E | 0.007 | 0.010 | 0.170 | 0.250 |
| F | 0.189 | 0.197 | 4.800 | 5.000 |
| G | 0.050BSC | | 1.270BSC | |
| H | 0.228 | 0.244 | 5.800 | 6.200 |
| J | 0.150 | 0.157 | 3.800 | 4.000 |
| K | 0.016 | 0.050 | 0.400 | 1.270 |
| θ | 0° | 8° | 0° | 8° |

Note:
1.Controlling dimension:in millimeters.
2.General tolerance:+/-0.05mm.
3.The pad layout is for reference purposes only.

## Disclaimer

The information presented in this document is for reference only. Yangzhou Yangjie Electronic Technology Co., Ltd. reserves the right to make changes without notice for the specification of the products displayed herein to improve reliability, function or design or otherwise.

The product listed herein is designed to be used with ordinary electronic equipment or devices, and not designed to be used with equipment or devices which require high level of reliability and the malfunction of with would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), Yangjie or anyone on its behalf, assumes no responsibility or liability for any damages resulting from such improper use of sale.

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