# P-Channel Enhancement Mode Field Effect Transistor

## Product Summary

| | |
|---|---|
| $V_{DS}$ | -30 V |
| $I_D$ | -5.5 A |
| $R_{DS(ON)}$( at $V_{GS}$=-10V) | ＜41 m |
| $R_{DS(ON)}$( at $V_{GS}$=-4.5V) | ＜59 m |

## General Description

Trench Power LV MOSFET technology
High density cell design for Low RDS(ON)
High Speed switching

Epoxy Meets UL 94 V-0 Flammability Rating
Halogen Free

## Applications

Battery protection
Load switch
Power management

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

| Parameter | | Symbol | Limit | Unit |
|---|---|---|---|---|
| Drain-source Voltage | | $V_{DS}$ | -30 | V |
| Gate-source Voltage | | $V_{GS}$ | ±20 | V |
| Drain Current | $T_A$=25℃ | $I_D$ | -5.5 | A |
| | $T_A$=100℃ | | -3.5 | |
| Pulsed Drain Current [A] | | $I_{DM}$ | -30 | A |
| Total Power Dissipation [B] | $T_A$=25℃ | $P_D$ | 2.5 | W |
| | $T_A$=100℃ | | 1 | |
| Junction and Storage Temperature Range | | $T_J$ ,$T_{STG}$ | -55～+150 | ℃ |

**Thermal resistance**

| Parameter | | Symbol | Typ | Max | Units |
|---|---|---|---|---|---|
| Thermal Resistance Junction-to-Ambient [C] | Steady-State | R | 40 | 50 | ℃/W |

**Ordering Information** (Example)

| PREFERED P/N | PACKING CODE | Marking | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---|---|---|---|---|---|---|
| YJS9435B | F2 | Q9435B | 4000 | 8000 | 64000 | |

**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, $I_D$=- | -30 | - | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=-30V, $V_{GS}$=0V | - | - | -1 | |
| | | $V_{DS}$=-30V, $V_{GS}$=0V, Tj=150℃ | - | - | -100 | |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$= ±20V, $V_{DS}$=0V | - | - | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$= $V_{GS}$, $I_D$=- | -1.0 | -1.5 | -2.4 | V |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}$=-10V, $I_D$=-5.5A | - | 30 | 41 | |
| | | $V_{GS}$=-4.5V, $I_D$=-3.5A | - | 46 | 59 | |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=-5.5A, $V_{GS}$=0V | - | -0.9 | -1.3 | V |
| Gate resistance | $R_G$ | f=1MHz | - | 20 | - | |
| Maximum Body-Diode Continuous Current | $I_S$ | | - | - | -5.5 | A |
| **Dynamic Parameters** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=-15V, $V_{GS}$=0V, f=1MHz | - | 490 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 75 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 60 | - | |
| **Switching Parameters** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{GS}$=-10V, $V_{DS}$=-15V, $I_D$=-5.5A | - | 9 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 1.7 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 2.3 | - | |
| Reverse Recovery Charge | $Q_{rr}$ | $I_F$=-5.5A, di/dt=100A/us | - | 12 | - | nC |
| Reverse Recovery Time | $t_{rr}$ | | - | 32 | - | ns |
| Turn-on Delay Time | $t_{D(on)}$ | $V_{GS}$=-10V, $V_{DD}$=-15V, ID=-5.5A $R_{GEN}$=2.5 | - | 9 | - | ns |
| Turn-on Rise Time | $t_r$ | | - | 3 | - | |
| Turn-off Delay Time | $t_{D(off)}$ | | - | 29 | - | |
| Turn-off fall Time | $t_f$ | | - | 15 | - | |

A. Repetitive rating; pulse width limited by max. junction temperature.
B. $P_d$ is based on max. junction temperature, using junction-case and junction-ambient thermal resistance.
C. The value of R is measured with the device mounted on 1 $in^2$ FR-4 board with 2oz. Copper, 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.

## ■Typical Electrical and Thermal Characteristics Diagrams

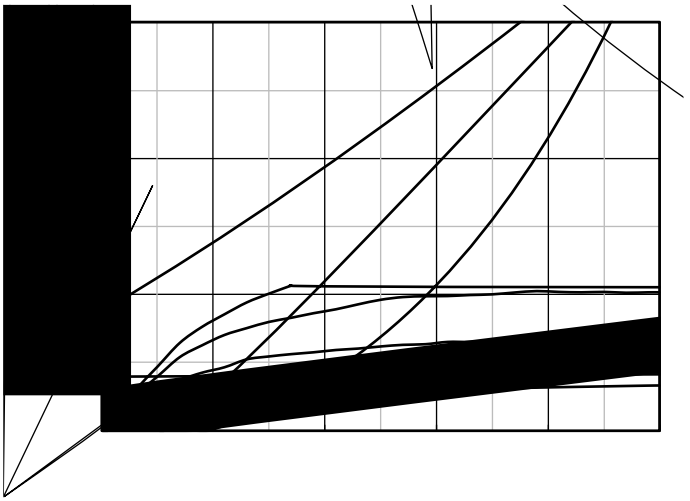


Figure 1. Output Characteristics

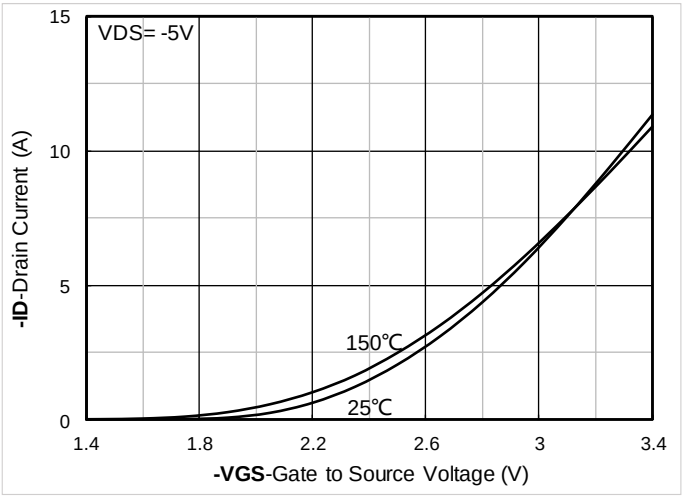



Figure 2. Transfer Characteristics

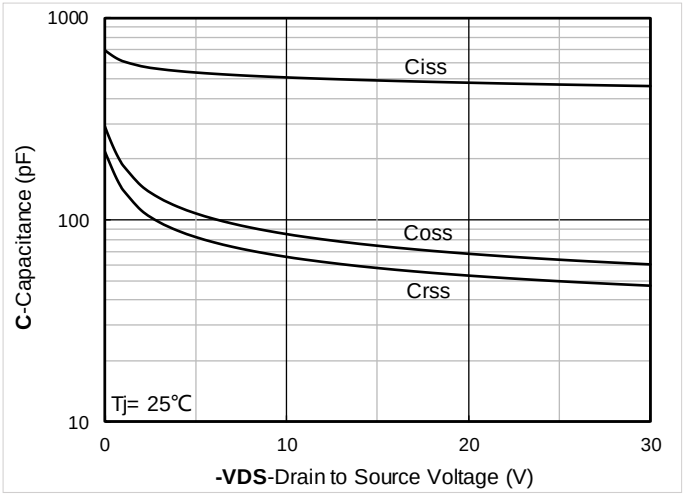



Figure 3. Capacitance Characteristics

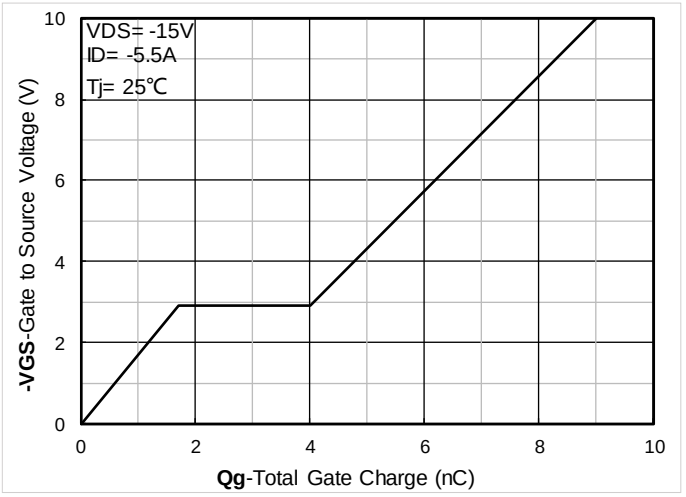



Figure 4. Gate Charge

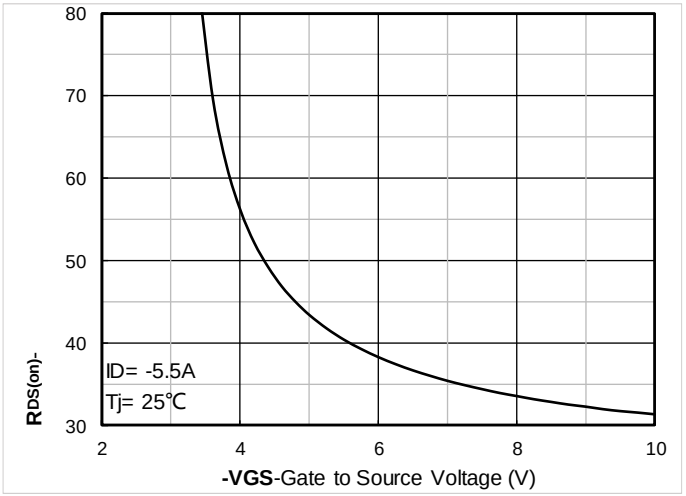



Figure 5. On-Resistance vs Gate to Source Voltage

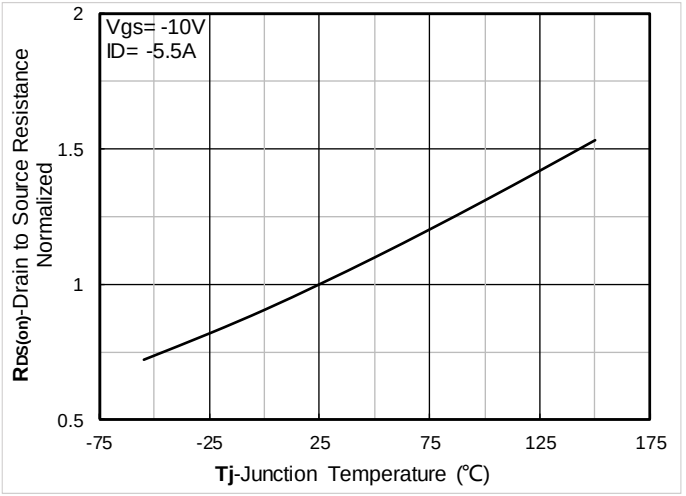



Figure 6. Normalized On-Resistance

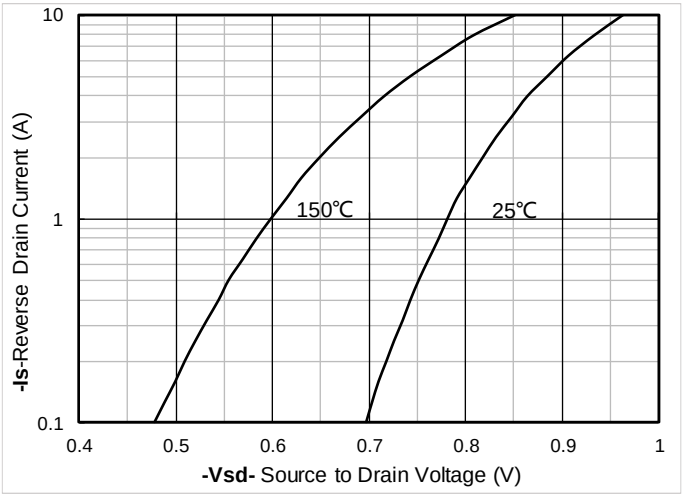
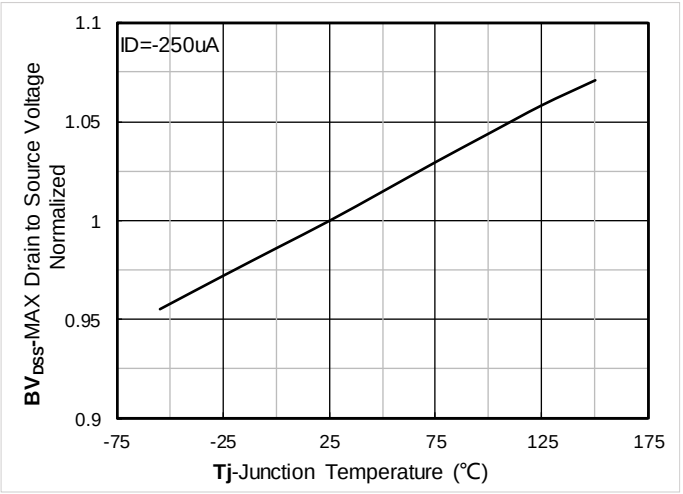



Figure 7. $R_{DS(on)}$ VS Drain Current

Figure 8. Forward characteristics of reverse diode



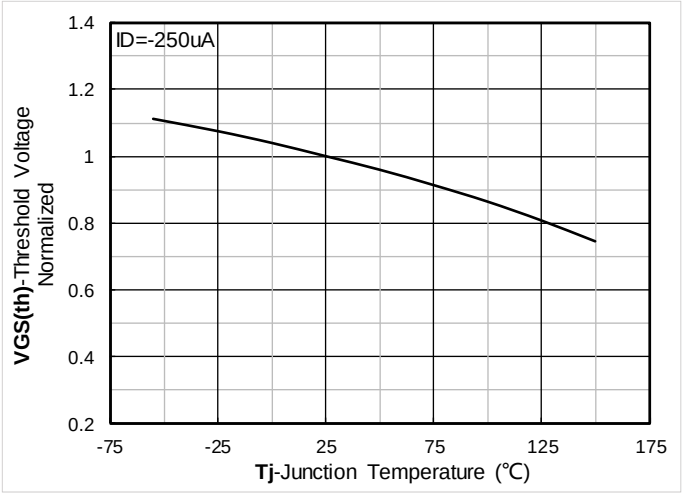
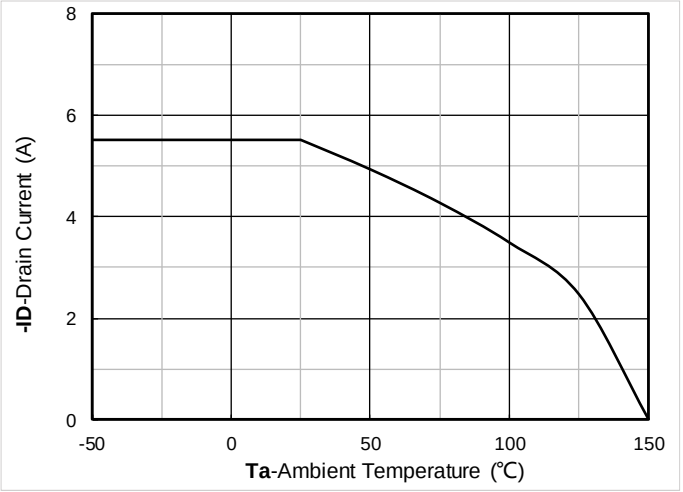




Figure 9. Normalized breakdown voltage

Figure 10. Normalized Threshold voltage



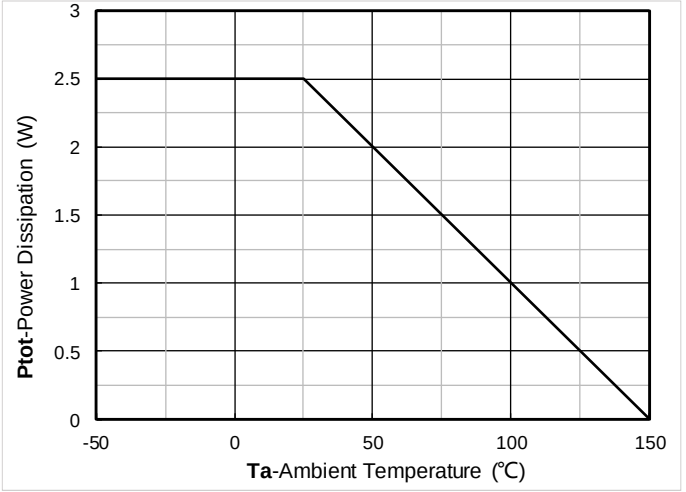




Figure 11. Current dissipation

Figure 12. Power dissipation

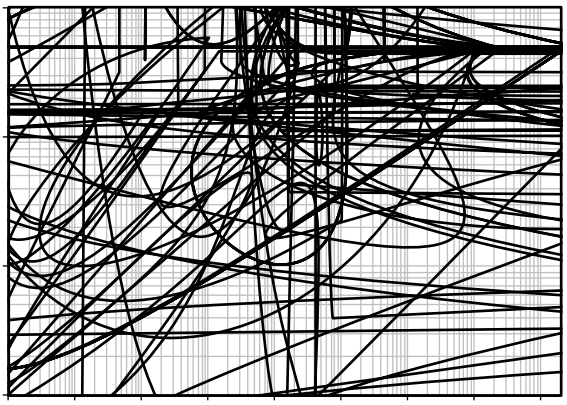


Figure 13. Maximum Transient Thermal Impedance

Figure 14. Safe Operation Area

## SOP-8 Package information



## Disclaimer

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