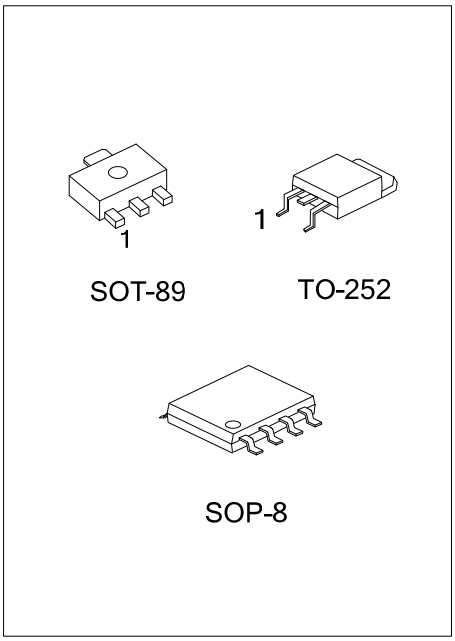
# UT9435

**Power MOSFET**

## P-CHANNEL ENHANCEMENT MODE

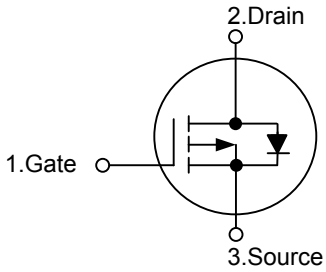



Lead-free: UT9435L
Halogen-free: UT9435G

### ■ DESCRIPTION

The **UT9435** is P-Channel Power MOSFET, designed with high density cell with fast switching speed, ultra low on-resistance, and excellent thermal and electrical capabilities.
Used in commercial and industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

### ■ SYMBOL

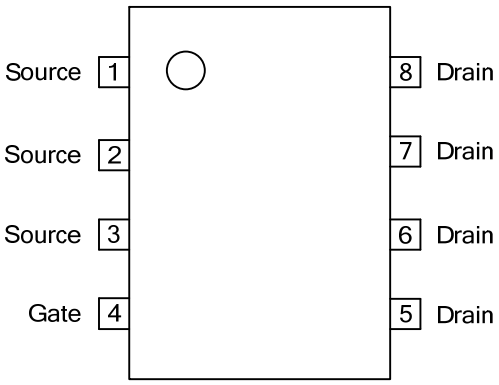



### ■ ORDERING INFORMATION

| Ordering Number | | | Package | Pin Assignment | | | | | | | | Packing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Normal | Lead Free Plating | Halogen Free | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| UT9435-AB3-R | UT9435L-AB3-R | UT9435G-AB3-R | SOT-89 | G | D | S | - | - | - | - | - | Tape Reel |
| UT9435-TN3-R | UT9435L-TN3-R | UT9435G-TN3-R | TO-252 | G | D | S | - | - | - | - | - | Tape Reel |
| UT9435-S08-R | UT9435L-S08-R | UT9435G-S08-R | SOP-8 | S | S | S | G | D | D | D | D | Tape Reel |

| | |
|---|---|
| UT9435L-AB3-R<br>(1)Packing Type<br>(2)Package Type<br>(3)Lead Plating | (1) R: Tape Reel<br>(2) AB3: SOT-89, TN3: TO-252, SO8: SOP-8<br>(3) G: Halogen Free, L: Lead Free, Blank: Pb/Sn |

## ■ PIN CONFIGURATION



## ■ ABSOLUTE MAXIMUM RATINGS ($T_A$=25℃)

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DSS}$ | -30 | V |
| Gate-Source Voltage | | $V_{GSS}$ | ±20 | V |
| Continuous Drain Current | | $I_D$ | -4.2 | A |
| Pulsed Drain Current (Note 1, 2) | | $I_{DM}$ | -20 | A |
| Power Dissipation ($T_a$=25℃) | SOT-89 | $P_D$ | 1.25 | W |
| | SOP-8 | | 2.5 | |
| Power Dissipation ($T_c$=25℃) | TO-252 | $P_D$ | 12.5 | W |
| Junction Temperature | | $T_J$ | +150 | °C |
| Storage Temperature | | $T_{STG}$ | -55 ~ +150 | °C |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

## ■ THERMAL DATA

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---|---|---|---|---|
| Junction to Ambient (Note 3) | SOT-89 | $\theta_{JA}$ | 100 | °C/W |
| | TO-252 | | 110 | |
| | SOP-8 | | 50 | |

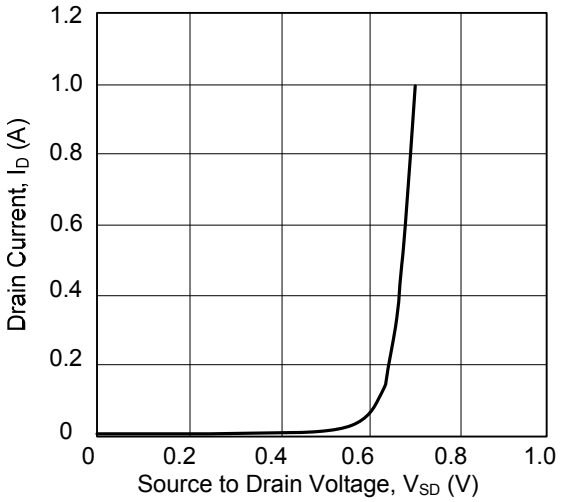
## ■ ELECTRICAL CHARACTERISTICS ($T_J$ =25°C, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$ =0 V, $I_D$ =-250 uA | -30 | | | V |
| Drain-Source Leakage Current | $I_{DSS}$ | $V_{DS}$=-30V, $V_{GS}$=0V | | | -1 | uA |
| Gate-Source Leakage Current | $I_{GSS}$ | $V_{GS}$= ±20V | | | ±100 | nA |
| Breakdown Voltage Temperature Coefficient | $\Delta BV_{DSS}/\Delta T_J$ | Reference to 25℃, $I_D$=-1mA | | -0.1 | | V/℃ |
| **ON CHARACTERISTICS** | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}$=$V_{GS}$, $I_D$=-250uA | -1 | | -3 | V |
| Static Drain-Source On-Resistance (Note 2) | $R_{DS(ON)}$ | $V_{GS}$=-10V, $I_D$=-4A | | | 50 | mΩ |
| | | $V_{GS}$=-4.5V, $I_D$=-2A | | | 90 | mΩ |
| **DYNAMIC CHARACTERISTICS** | | | | | | |
| Input Capacitance | $C_{ISS}$ | $V_{GS}$=0V,$V_{DS}$=-25V,f=1.0MHz | | 520 | 830 | pF |
| Output Capacitance | $C_{OSS}$ | | | 180 | | pF |
| Reverse Transfer Capacitance | $C_{RSS}$ | | | 130 | | pF |
| **SWITCHING CHARACTERISTICS** | | | | | | |
| Total Gate Charge (Note 2) | $Q_G$ | $V_{DS}$=-25V, $V_{GS}$=-4.5V, $I_D$=-4A | | 10 | 16 | nC |
| Gate-Source Charge | $Q_{GS}$ | | | 2 | | nC |
| Gate-Drain Charge | $Q_{GD}$ | | | 6 | | nC |
| Turn-ON Delay Time (Note 2) | $t_{D(ON)}$ | $V_{DS}$=-15V,$I_D$=-1A, $R_G$=3.3Ω, $V_{GS}$=-10V,$R_D$=15Ω | | 10 | 48 | ns |
| Turn-ON Rise Time | $t_R$ | | | 7 | 40 | ns |
| Turn-OFF Delay Time | $t_{D(OFF)}$ | | | 26 | 292 | ns |
| Turn-OFF Fall Time | $t_F$ | | | 14 | 112 | ns |
| **SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS** | | | | | | |
| Drain-Source Diode Forward Voltage | $V_{SD}$ | $I_S$=-1A, $V_{GS}$=0V | | | -1.3 | V |
| Reverse Recovery Time | $t_{RR}$ | $I_S$=-4A, $V_{GS}$=0V, dI/dt=-100A/μs | | 30 | | ns |
| Reverse Recovery Charge | $Q_{RR}$ | | | 24 | | nC |

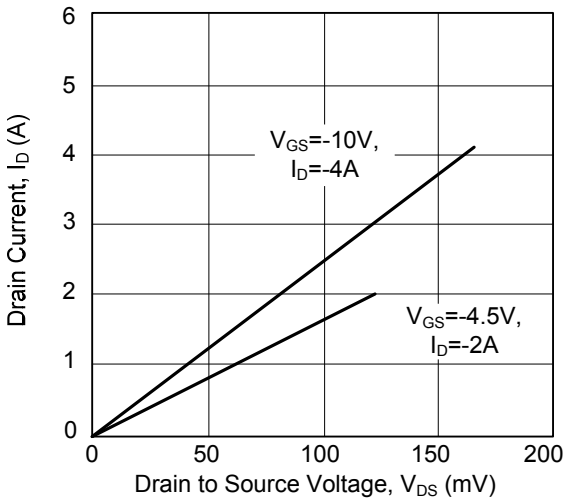
Notes: 1. Pulse width limited by $T_{J(MAX)}$
2. Pulse width ≤300μs , duty cycle ≤2%.
3. Surface mounted on 1 in $^2$ copper pad of FR4 board, t≤10s.

## ■ TYPICAL CHARACTERISTICS

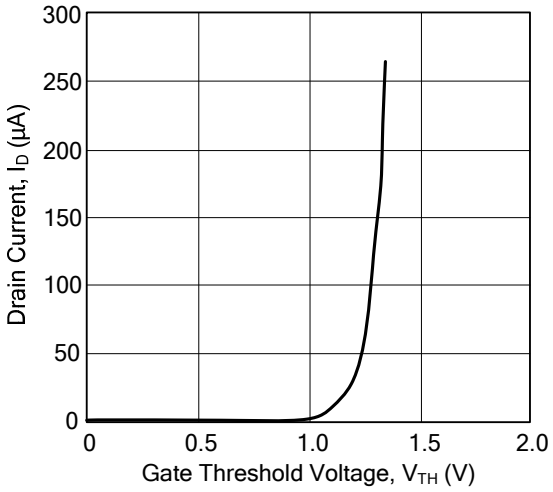
Drain Current vs. Source to Drain Voltage




Drain-Source On-State Resistance Characteristics




Drain Current vs. Gate Threshold Voltage




Drain Current vs.
Drain-Source Breakdown Voltage