



UT2309

Power MOSFET

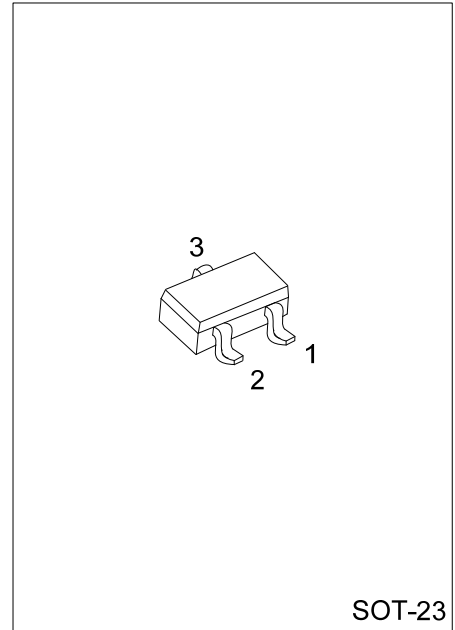
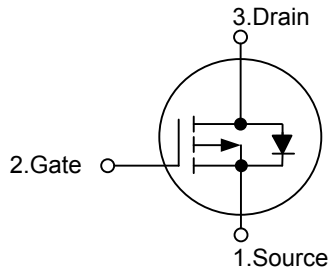
P-CHANNEL ENHANCEMENT MODE

DESCRIPTION

The **UT2309** 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



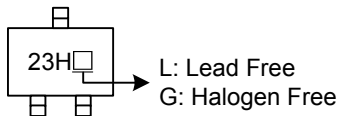
SOT-23

ORDERING INFORMATION

| Ordering Number | | Package | Pin Assignment | | | Packing |
|-----------------|---------------|---------|----------------|---|---|-----------|
| Lead Free | Halogen Free | | 1 | 2 | 3 | |
| UT2309L-AE3-R | UT2309G-AE3-R | SOT-23 | S | G | D | Tape Reel |

| | | |
|----------------------|---|---|
| <p>UT2309L-AE3-R</p> | <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Lead Plating</p> | <p>(1) R: Tape Reel</p> <p>(2) AE3: SOT-23</p> <p>(3) G: Halogen Free, L: Lead Free</p> |
|----------------------|---|---|

MARKING



■ ABSOLUTE MAXIMUM RATINGS

| PARAMETER | SYMBOL | RATINGS | UNIT |
|-----------------------------------|-----------|------------|-------------|
| Drain-Source Voltage | V_{DSS} | -30 | V |
| Gate-Source Voltage | V_{GSS} | ± 20 | V |
| Continuous Drain Current (Note 3) | I_D | -3.7 | A |
| Pulsed Drain Current (Note 1, 2) | I_{DM} | -12 | A |
| Total Power Dissipation | P_D | 1.38 | W |
| Junction Temperature | T_J | +150 | $^{\circ}C$ |
| Storage Temperature | T_{STG} | -55 ~ +150 | $^{\circ}C$ |

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

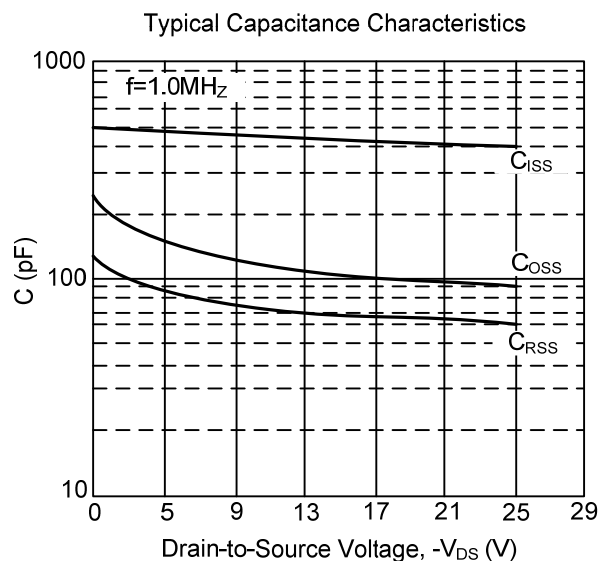
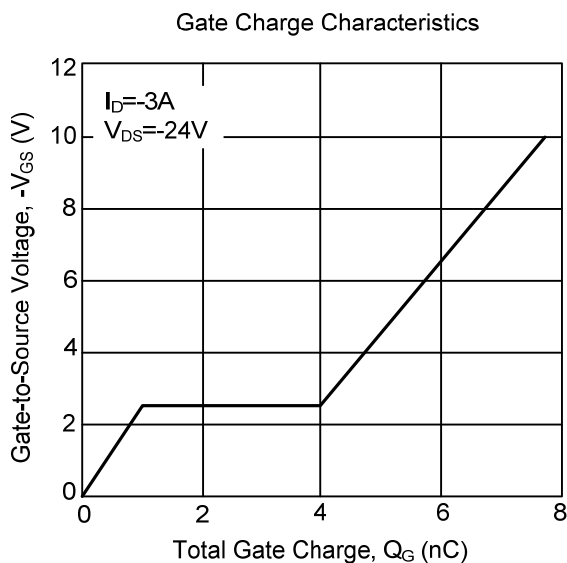
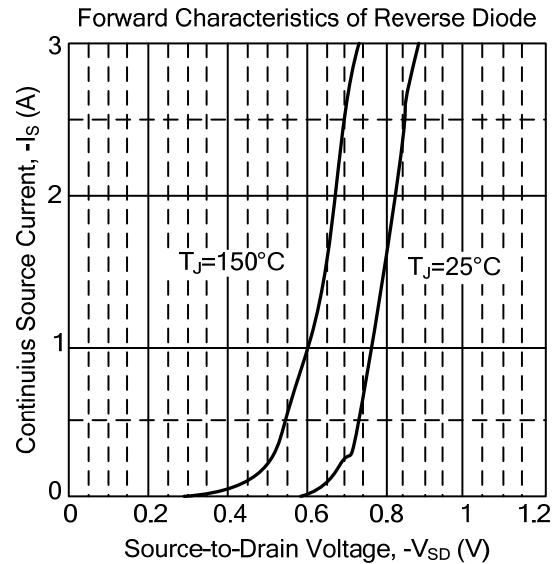
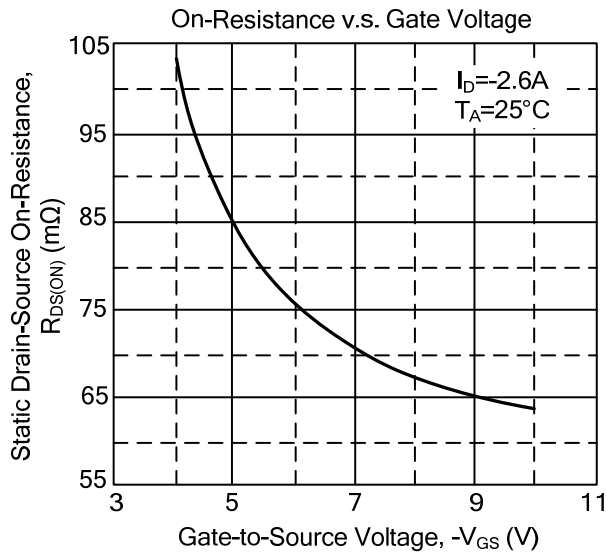
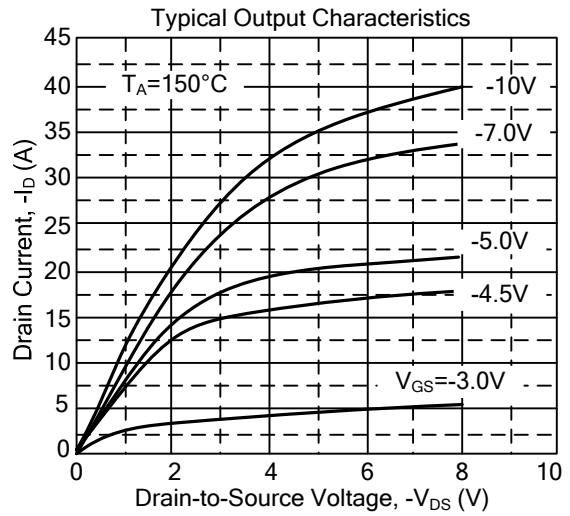
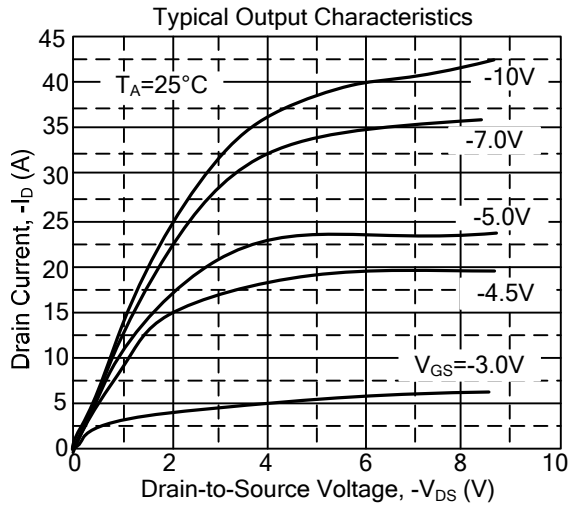
| PARAMETER | SYMBOL | MIN | TYP | MAX | UNIT |
|------------------------------|---------------|-----|-----|-----|---------------|
| Junction to Ambient (Note 3) | θ_{JA} | | | 90 | $^{\circ}C/W$ |

■ ELECTRICAL CHARACTERISTICS ($T_J = 25^{\circ}C$, unless otherwise specified)

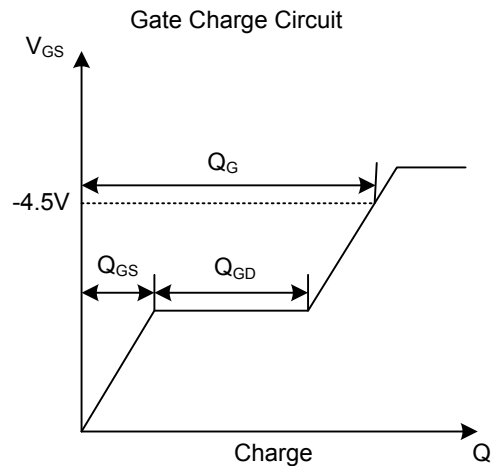
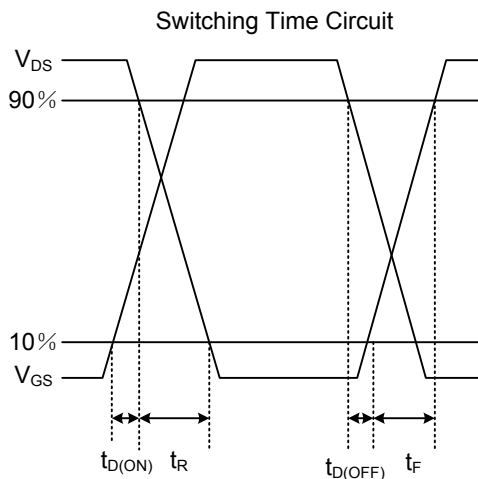
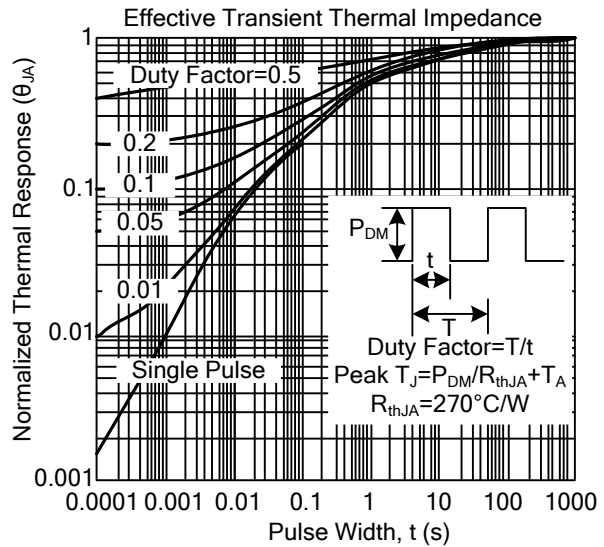
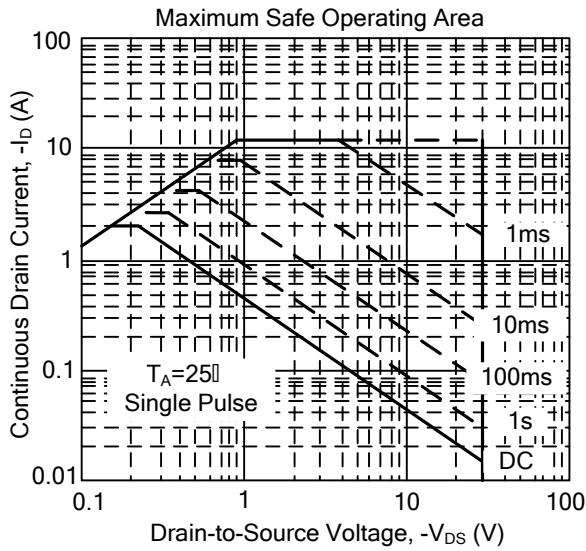
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--|------------------------------|--|-----|-------|------|---------------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=-250\mu A$ | -30 | | | V |
| Drain-Source Leakage Current | I_{DSS} | $V_{DS}=-30V, V_{GS}=0V$ | | | -0.5 | μA |
| Gate-Source Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | | | 5 | nA |
| Breakdown Voltage Temperature Coefficient | $\Delta BV_{DSS}/\Delta T_J$ | Reference to $25^{\circ}C, I_D=-1mA$ | | -0.02 | | $V/^{\circ}C$ |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -1 | | -3 | V |
| Static Drain-Source On-Resistance (Note 2) | $R_{DS(ON)}$ | $V_{GS}=-10V, I_D=-5A$ | | | 65 | $m\Omega$ |
| | | $V_{GS}=-4.5V, I_D=-5A$ | | | 85 | $m\Omega$ |
| DYNAMIC CHARACTERISTICS | | | | | | |
| Input Capacitance | C_{ISS} | $V_{GS}=0V, V_{DS}=-25V, f=1.0MHz$ | | 412 | 660 | pF |
| Output Capacitance | C_{OSS} | | | 91 | | pF |
| Reverse Transfer Capacitance | C_{RSS} | | | 62 | | pF |
| SWITCHING CHARACTERISTICS | | | | | | |
| Turn-ON Delay Time (Note 2) | $t_{D(ON)}$ | $V_{DS}=-15V, I_D=-1A, R_G=3.3\Omega, V_{GS}=-10V, R_D=15\Omega$ | | 8 | | ns |
| Turn-ON Rise Time | t_R | | | 5 | | ns |
| Turn-OFF Delay Time | $t_{D(OFF)}$ | | | 20 | | ns |
| Turn-OFF Fall Time | t_F | | | 7 | | ns |
| Total Gate Charge (Note 2) | Q_G | $V_{DS}=-24V, V_{GS}=-4.5V, I_D=-3A$ | | 5 | 8 | nC |
| Gate-Source Charge | Q_{GS} | | | 1 | | nC |
| Gate-Drain Charge | Q_{GD} | | | 3 | | nC |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS | | | | | | |
| Forward On Voltage | V_{SD} | $I_S=-1A, V_{GS}=0V$ | | -0.76 | -1.2 | V |
| Reverse Recovery Time | t_{RR} | $I_S=-3A, V_{GS}=0V,$ | | 20 | | ns |
| Reverse Recovery Charge | Q_{RR} | $di/dt=-100A/\mu s$ | | 15 | | nC |

Notes: 1. Pulse width limited by $T_{J(MAX)}$
 2. Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 3. Surface mounted on 1 in² copper pad of FR4 board.

TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS(Cont.)



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