



UT2304

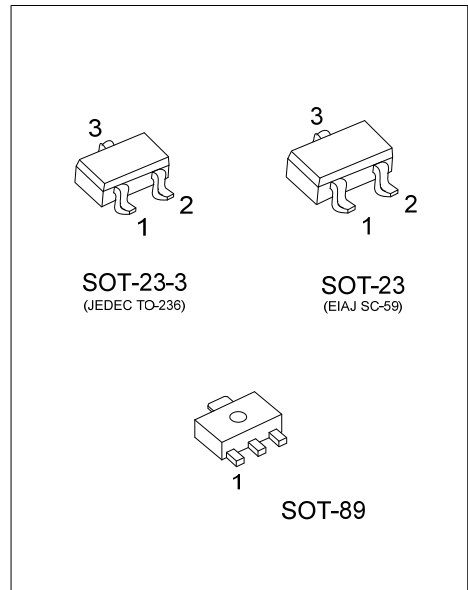
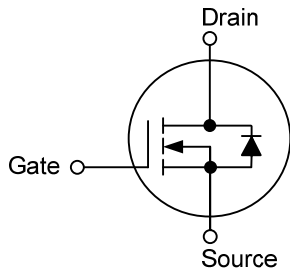
Power MOSFET

N-CHANNEL ENHANCEMENT MODE

■ DESCRIPTION

The **UT2304** is an N-Channel Power MOSFET that can achieve the lowest possible on-resistance, extremely and cost- effectiveness device by using advanced trench technology.

■ SYMBOL



■ ORDERING INFORMATION

| Ordering Number | | Package | Pin Assignment | | | Packing |
|-----------------|---------------|----------|----------------|---|---|-----------|
| Lead Free | Halogen Free | | 1 | 2 | 3 | |
| UT2304L-AB3-R | UT2304G-AB3-R | SOT-89 | G | D | S | Tape Reel |
| UT2304L-AE2-R | UT2304G-AE2-R | SOT-23-3 | G | S | D | Tape Reel |
| UT2304L-AE3-R | UT2304G-AE3-R | SOT-23 | G | S | D | Tape Reel |

Note: Pin Assignment: G: Gate S: Source D: Drain

| | |
|----------------------|---|
| <p>UT2304G-AB3-R</p> | <p>(1) R: Tape Reel</p> <p>(2) AB3: SOT-89, AE2: SOT-23-3, AE3: SOT-23</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p> |
|----------------------|---|

■ MARKING

| SOT-23 / SOT-23-3 | SOT-89 |
|-------------------|--------|
| | |

■ ABSOLUTE MAXIMUM RATINGS ($T_A=25^{\circ}\text{C}$, unless otherwise specified)

| PARAMETER | SYMBOL | RATING | UNITS |
|-----------------------------------|-----------|------------|--------------------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current (Note 3) | I_D | 2.5 | A |
| Pulsed Drain Current (Note 1, 2) | I_{DM} | 10 | A |
| Power Dissipation | P_D | 1.4 | W |
| Junction Temperature | T_J | +150 | $^{\circ}\text{C}$ |
| Storage Temperature | T_{STG} | -55 ~ +150 | $^{\circ}\text{C}$ |

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 CHARACTERISTICS

| PARAMETER | SYMBOL | RATING | UNIT |
|---------------------|---------------|--------|-----------------------------|
| Junction to Ambient | θ_{JA} | 90 | $^{\circ}\text{C}/\text{W}$ |

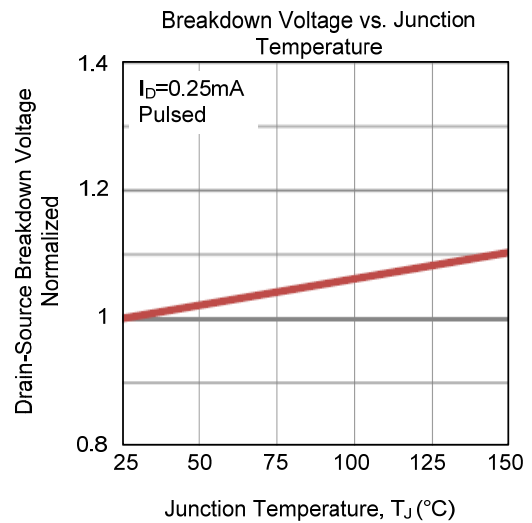
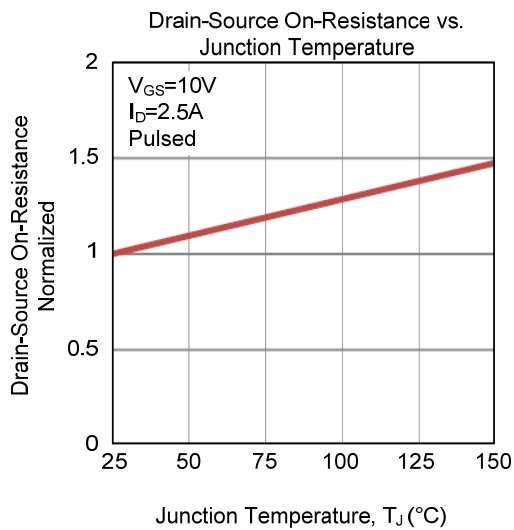
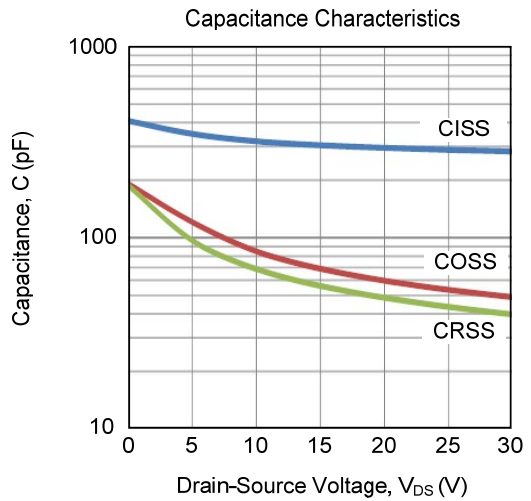
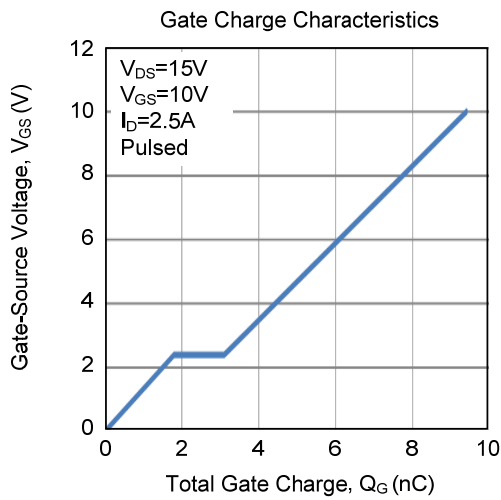
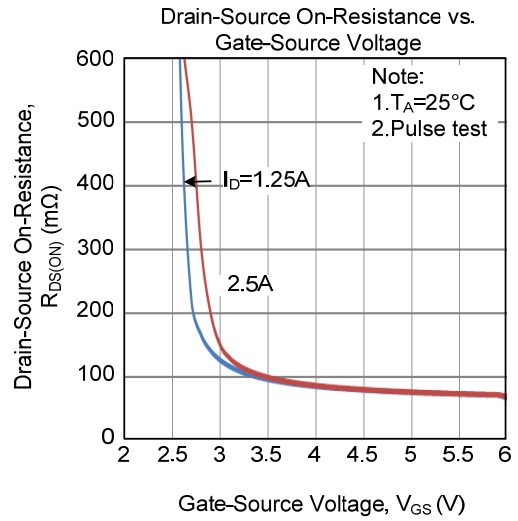
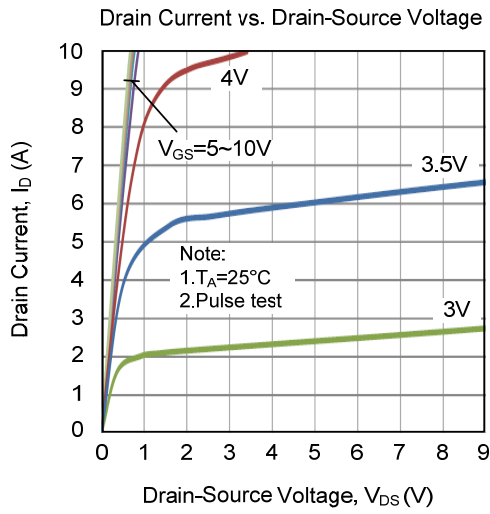
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

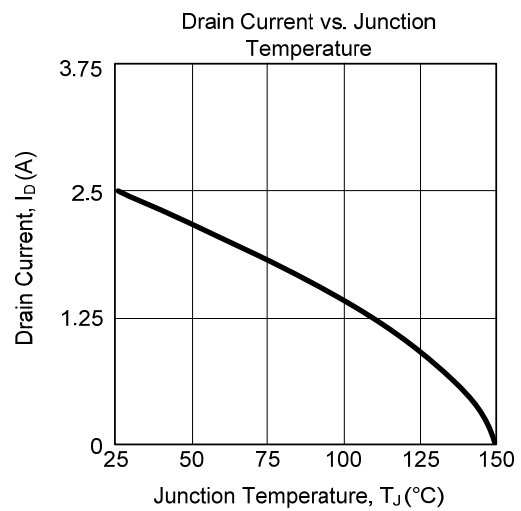
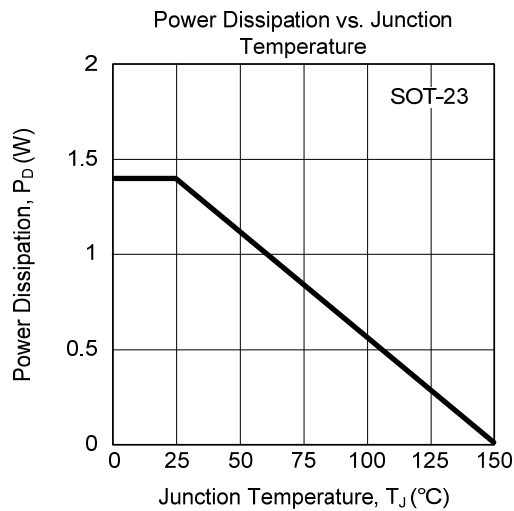
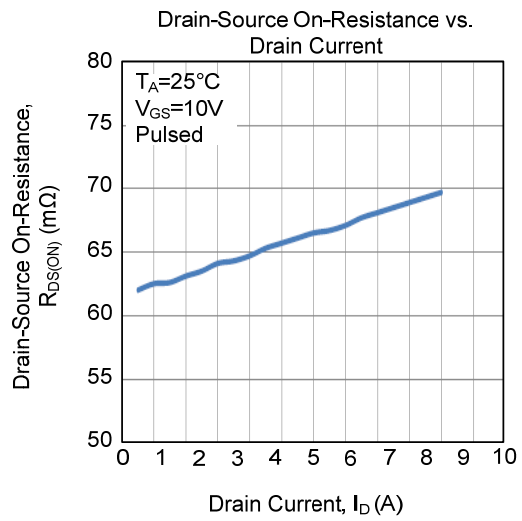
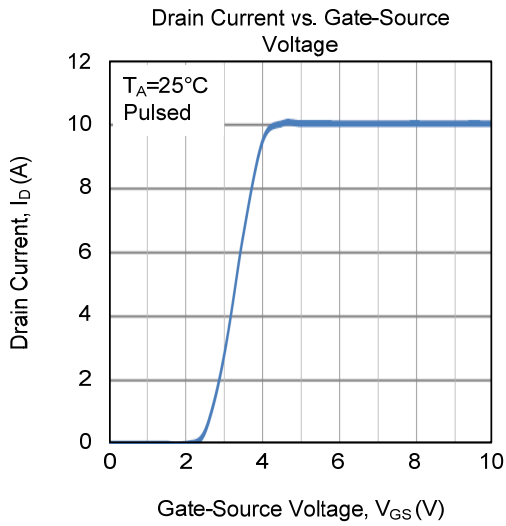
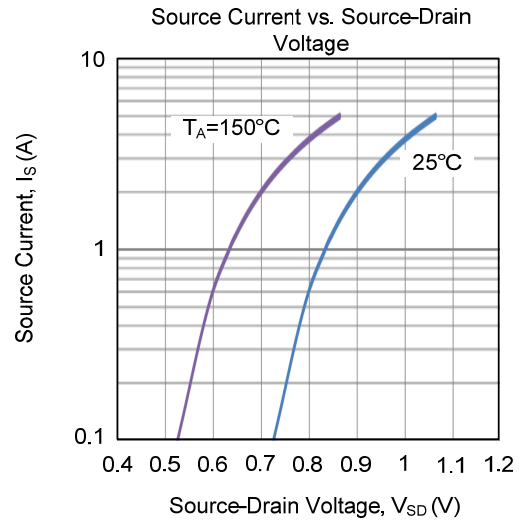
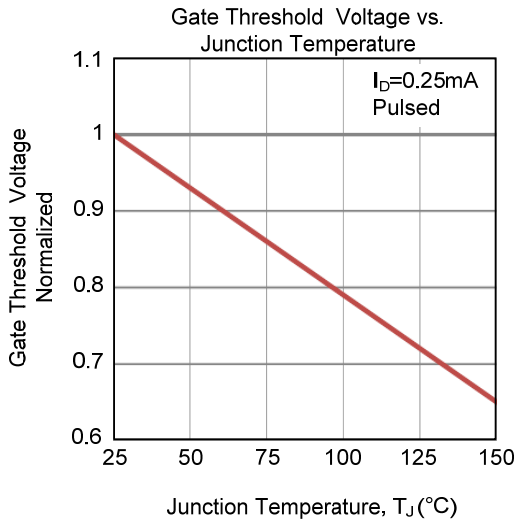
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|--------------|--|-----|-----|-----------|---------------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0\text{V}, I_D=250\mu\text{A}$ | 30 | | | V |
| Drain-Source Leakage Current | I_{DSS} | $V_{DS}=30\text{V}, V_{GS}=0\text{V}$ | | | 1 | μA |
| Gate-Source Leakage Current | I_{GSS} | $V_{GS}=\pm 20\text{V}, V_{DS}=0\text{V}$ | | | ± 100 | nA |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}=V_{GS}, I_D=250\mu\text{A}$ | 1.0 | | 3.0 | V |
| Static Drain-Source On-State Resistance (Note 2) | $R_{DS(ON)}$ | $V_{GS}=10\text{V}, I_D=2.5\text{A}$ | | | 117 | m Ω |
| | | $V_{GS}=4.5\text{V}, I_D=2\text{A}$ | | | 190 | m Ω |
| DYNAMIC CHARACTERISTICS | | | | | | |
| Input Capacitance | C_{ISS} | $V_{GS}=0\text{V}, V_{DS}=25\text{V}, f=1.0\text{MHz}$ | | 280 | | pF |
| Output Capacitance | C_{OSS} | | | 53 | | pF |
| Reverse Transfer Capacitance | C_{RSS} | | | 43 | | pF |
| SWITCHING CHARACTERISTICS | | | | | | |
| Total Gate Charge (Note 2) | Q_G | $V_{DS}=15\text{V}, V_{GS}=10\text{V}, I_D=2.5\text{A}$ | | 9.4 | | nC |
| Gate-Source Charge | Q_{GS} | | | 1.8 | | nC |
| Gate-Drain Charge | Q_{GD} | | | 1.3 | | nC |
| Turn-ON Delay Time (Note 2) | $t_{D(ON)}$ | $V_{DS}=15\text{V}, V_{GS}=10\text{V}, I_D=2.5\text{A}, R_G=3.3\Omega, R_D=15\Omega$ | | 3.2 | | ns |
| Turn-ON Rise Time | t_R | | | 15 | | ns |
| Turn-OFF Delay Time | $t_{D(OFF)}$ | | | 13 | | ns |
| Turn-OFF Fall Time | t_F | | | 6.5 | | ns |
| SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS | | | | | | |
| Forward On Voltage (Note 2) | V_{SD} | $V_{GS}=0\text{V}, I_S=1.2\text{A}$ | | | 1.2 | V |

Notes: 1. Repetitive rating, pulse width limited by junction temperature.
2. Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

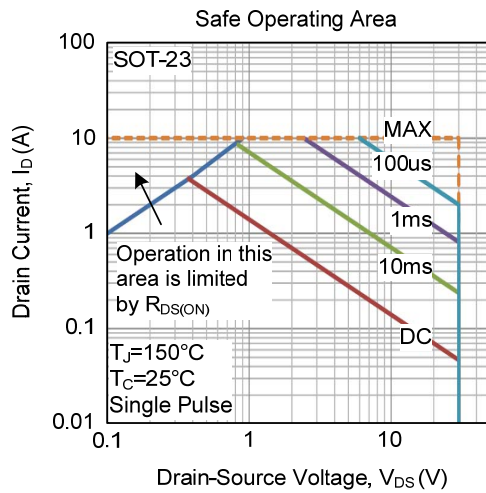
■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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