



# UT2305

**Power MOSFET**

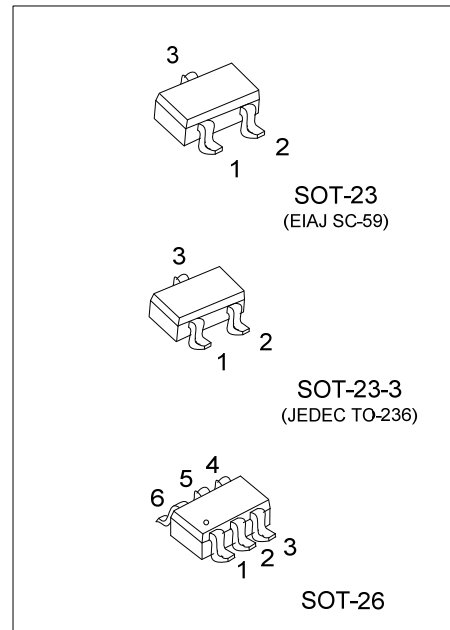
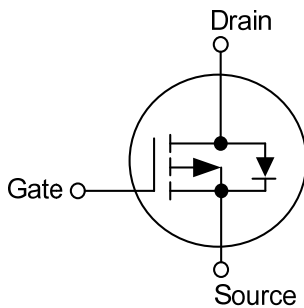
## 4.2A, 20V P-CHANNEL POWER MOSFET

■ DESCRIPTION

The UTC **UT2305** is P-channel enhancement mode power MOSFET, designed in serried ranks. With fast switching speed, low on-resistance, favorable stabilization.

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   |
|-----------------|---------------|----------|----------------|---|---|---|---|---|-----------|
| Lead Free       | Halogen Free  |          | 1              | 2 | 3 | 4 | 5 | 6 |           |
| UT2305L-AE2-R   | UT2305G-AE2-R | SOT-23-3 | G              | S | D | - | - | - | Tape Reel |
| UT2305L-AE3-R   | UT2305G-AE3-R | SOT-23   | G              | S | D | - | - | - | Tape Reel |
| UT2305L-AG6-R   | UT2305G-AG6-R | SOT-26   | D              | D | G | S | D | D | Tape Reel |

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

|  |   |
|--|---|
| <p>UT2305G-AE3-R</p> <p>(1)Packing Type<br/>(2)Package Type<br/>(3)Green Package</p> | <p>(1) R: Tape Reel<br/>(2) AE2: SOT-23-3, AE3: SOT-23, AG6: SOT-26<br/>(3) G: Halogen Free and Lead Free, L: Lead Free</p> |
|--|---|

■ MARKING

| SOT-23 / SOT-23-3 | SOT-26 |
|-------------------|--------|
|                   |        |

## ■ ABSOLUTE MAXIMUM RATINGS

| PARAMETER  | SYMBOL    | RATING     | UNITS            |
|--|-----------|------------|------------------|
| Drain-Source Voltage   | $V_{DS}$  | - 20       | V                |
| Gate-Source Voltage  | $V_{GS}$  | $\pm 12$   | V                |
| Continuous Drain Current (Note 3) ( $T_A=25^\circ\text{C}$ ) | $I_D$     | -4.2       | A                |
| Pulsed Drain Current (Note 1, 2)                             | $I_{DM}$  | -10        | A                |
| Power Dissipation ( $T_A=25^\circ\text{C}$ )                 | SOT-23-3  | 0.83       | W                |
|  | SOT-23    | 1.38       | W                |
|  | SOT-26    | 1.1        | 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 DATA

| PARAMETER                    | SYMBOL   | RATING | UNIT               |
|------------------------------|----------|--------|--------------------|
| Junction to Ambient (Note 3) | SOT-23-3 | 150    | $^\circ\text{C/W}$ |
|                              | SOT-23   | 90     | $^\circ\text{C/W}$ |
|                              | SOT-26   | 110    | $^\circ\text{C/W}$ |

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

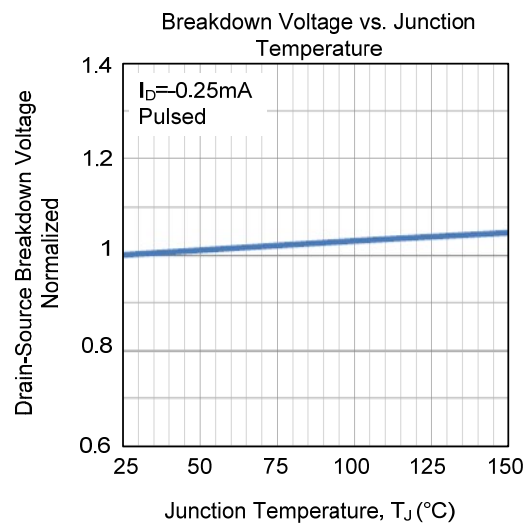
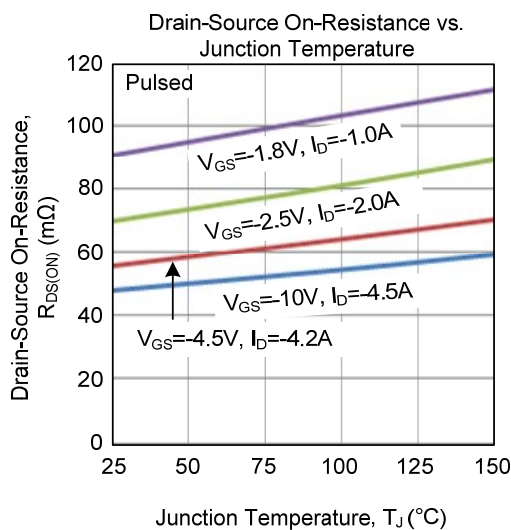
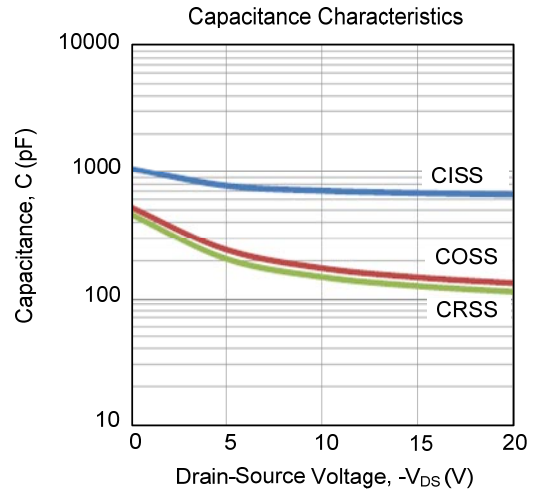
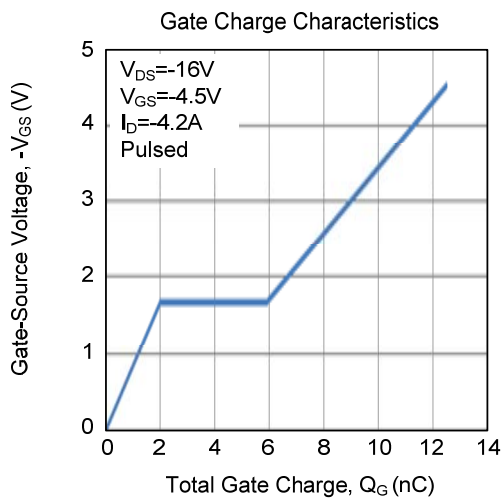
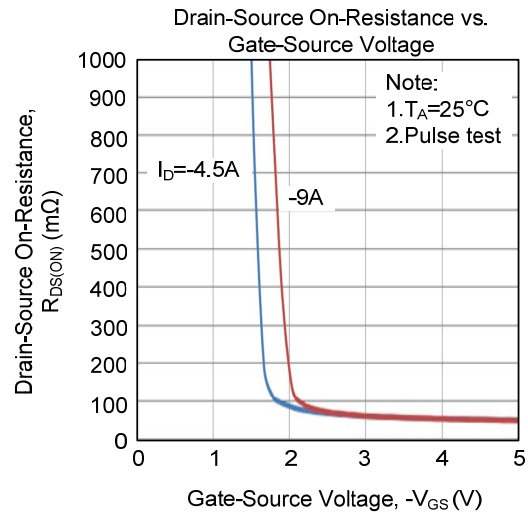
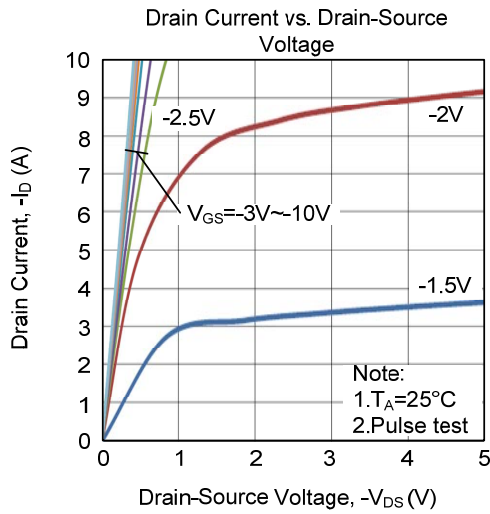
## ■ ELECTRICAL CHARACTERISTICS ( $T_J=25^\circ\text{C}$ , unless otherwise specified)

| PARAMETER  | SYMBOL                       | TEST CONDITIONS   | MIN  | TYP  | MAX       | UNIT                      |
|--|------------------------------|---|------|------|-----------|---------------------------|
| <b>OFF CHARACTERISTICS</b>                             |                              |   |      |      |           |                           |
| Drain-Source Breakdown Voltage                         | $BV_{DSS}$                   | $V_{GS}=0V, I_D=-250\mu\text{A}$                                      | -20  |      |           | V                         |
| Drain-Source Leakage Current                           | $I_{DSS}$                    | $V_{DS}=-20V, V_{GS}=0V$  |      |      | -1        | $\mu\text{A}$             |
| Gate-Source Leakage Current                            | $I_{GSS}$                    | $V_{GS}=\pm 12V, V_{DS}=0V$   |      |      | $\pm 100$ | nA                        |
| Breakdown Voltage Temperature Coefficient              | $\Delta BV_{DSS}/\Delta T_J$ | Reference to $25^\circ\text{C}, I_D=-1\text{mA}$                      |      | -0.1 |           | $\text{V}/^\circ\text{C}$ |
| <b>ON CHARACTERISTICS</b>                              |                              |   |      |      |           |                           |
| Gate Threshold Voltage                                 | $V_{GS(TH)}$                 | $V_{DS}=V_{GS}, I_D=-250\mu\text{A}$                                  | -0.5 |      | -1.2      | V                         |
| Drain-Source On-State Resistance (Note 2)              | $R_{DS(ON)}$                 | $V_{GS}=-10V, I_D=-4.5\text{A}$                                       |      |      | 53        | $\text{m}\Omega$          |
|  |                              | $V_{GS}=-4.5V, I_D=-4.2\text{A}$                                      |      |      | 65        | $\text{m}\Omega$          |
|  |                              | $V_{GS}=-2.5V, I_D=-2.0\text{A}$                                      |      |      | 100       | $\text{m}\Omega$          |
|  |                              | $V_{GS}=-1.8V, I_D=-1.0\text{A}$                                      |      |      | 250       | $\text{m}\Omega$          |
| <b>DYNAMIC CHARACTERISTICS</b>                         |                              |   |      |      |           |                           |
| Input Capacitance                                      | $C_{ISS}$                    | $V_{GS}=0V, V_{DS}=-15V, f=1\text{MHz}$                               |      | 670  |           | pF                        |
| Output Capacitance                                     | $C_{OSS}$                    |   |      | 145  |           | pF                        |
| Reverse Transfer Capacitance                           | $C_{RSS}$                    |   |      | 130  |           | pF                        |
| <b>SWITCHING CHARACTERISTICS</b>                       |                              |   |      |      |           |                           |
| Total Gate Charge (Note 2)                             | $Q_G$                        | $V_{DS}=-16V, V_{GS}=-4.5V, I_D=-4.2\text{A}$                         |      | 12.5 |           | nC                        |
| Gate-Source Charge                                     | $Q_{GS}$                     |   |      | 2    |           | nC                        |
| Gate-Drain Charge                                      | $Q_{GD}$                     |   |      | 3.9  |           | nC                        |
| Turn-ON Delay Time (Note 2)                            | $t_{D(ON)}$                  | $V_{DS}=-15V, V_{GS}=-10V, I_D=-1\text{A}, R_G=6\Omega, R_D=15\Omega$ |      | 3.2  |           | ns                        |
| Turn-ON Rise Time                                      | $t_R$                        |   |      | 16.5 |           | ns                        |
| Turn-OFF Delay Time                                    | $t_{D(OFF)}$                 |   |      | 41   |           | ns                        |
| Turn-OFF Fall Time                                     | $t_F$                        |   |      | 35.5 |           | ns                        |
| <b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b> |                              |   |      |      |           |                           |
| Drain-Source Diode Forward Voltage(Note2)              | $V_{SD}$                     | $V_{GS}=0V, I_S=-1.2\text{A}$   |      |      | -1.2      | V                         |
| Reverse Recovery Time                                  | $t_{rr}$                     | $V_{GS}=0V, I_S=-4.2\text{A},$  |      | 16.5 |           | ns                        |
| Reverse Recovery Charge                                | $Q_{rr}$                     | $dI/dt=100\text{A}/\mu\text{s}$                                       |      | 1.74 |           | $\mu\text{C}$             |

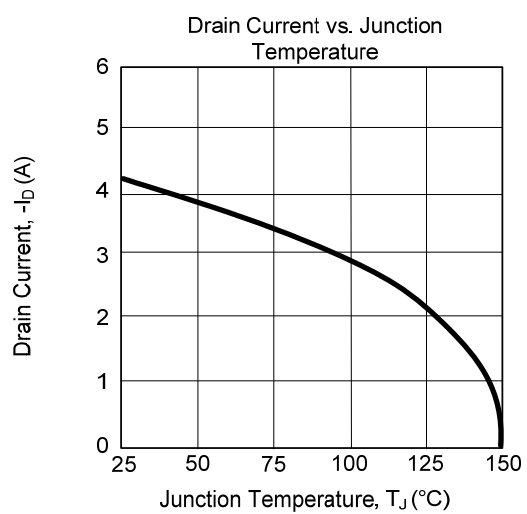
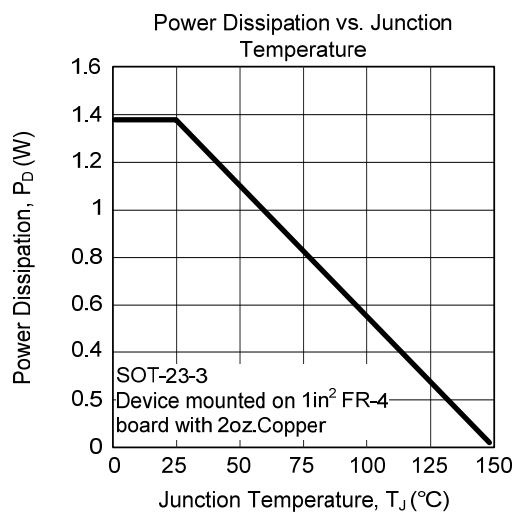
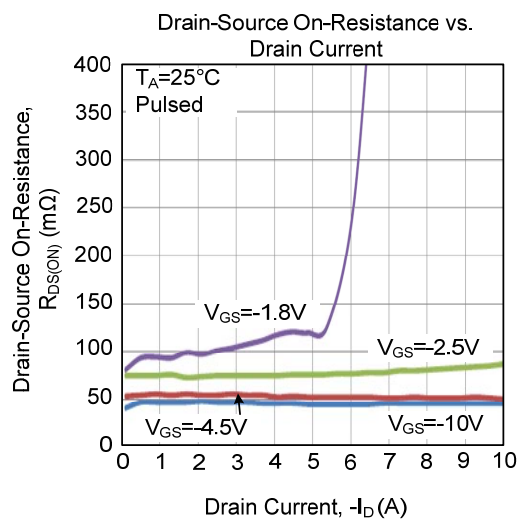
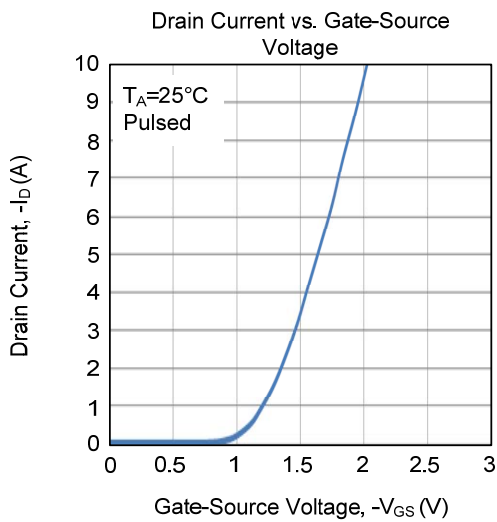
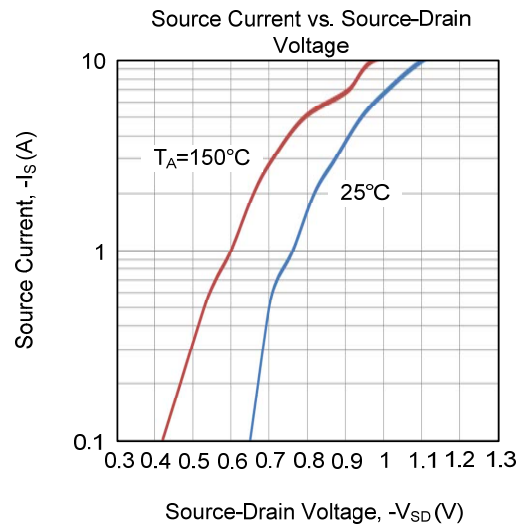
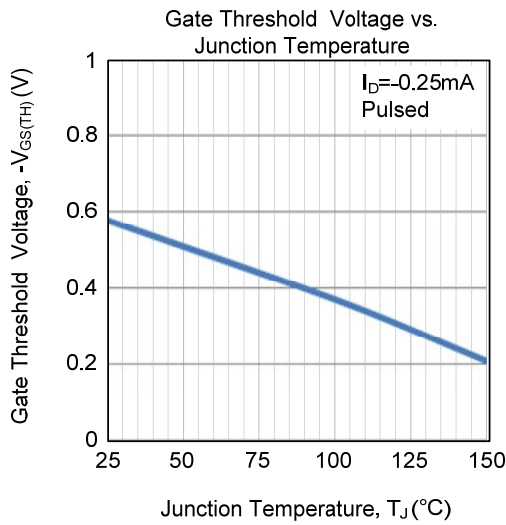
Notes: 1. Repetitive rating, pulse width limited by junction temperature.

2. Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .

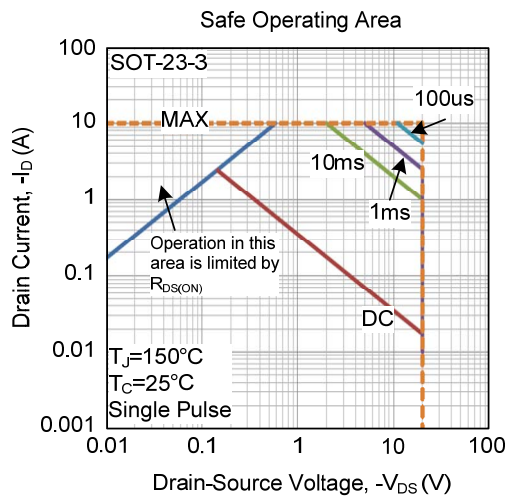
■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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