



## UT2035Z

Power MOSFET

### -3.6A, -20V P-CHANNEL ENHANCEMENT MODE MOSFET

#### DESCRIPTION

The UTC **UT2035Z** is a P-channel enhancement mode MOSFET, it uses UTC's advanced technology to provide the customers with a minimum on state resistance, high switching speed and low gate charge, etc.

#### FEATURES

\* $R_{DS(ON)} < 42m\Omega$  @  $V_{GS} = -4.5V$ ,  $I_D = -4.0A$

$R_{DS(ON)} < 65m\Omega$  @  $V_{GS} = -2.5V$ ,  $I_D = -4.0A$

$R_{DS(ON)} < 82m\Omega$  @  $V_{GS} = -1.8V$ ,  $I_D = -2.0A$

\* High switching speed

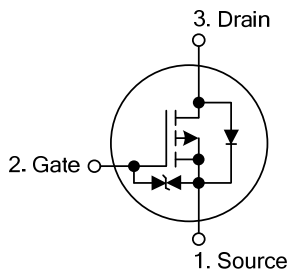
\* Low gate charge

\* Low gate threshold voltage

\* Low input capacitance

\* Low input/output leakage

#### SYMBOL



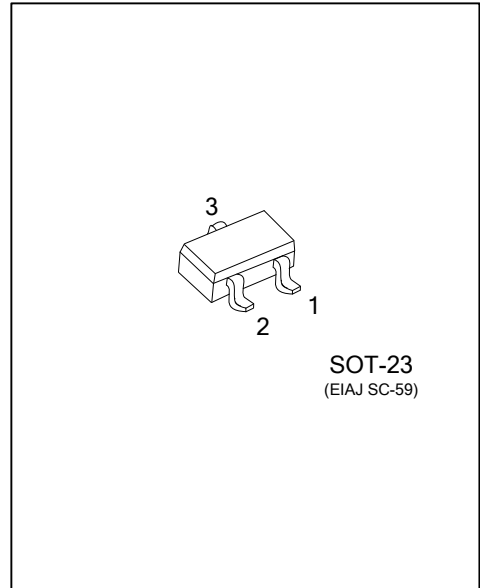
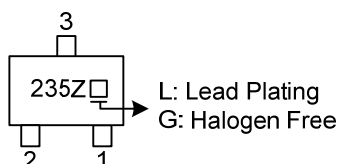
#### ORDERING INFORMATION

| Ordering Number | Package | Pin Assignment |   |   | Packing   |
|-----------------|---------|----------------|---|---|-----------|
|                 |         | 1              | 2 | 3 |           |
| UT2035ZG-AE3-R  | SOT-23  | S              | G | D | Tape Reel |

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

|                |                   |                                   |
|----------------|-------------------|-----------------------------------|
| UT2035ZG-AE3-R | (1) Packing Type  | (1) R: Tape Reel                  |
|                | (2) Package Type  | (2) AE3: SOT-23                   |
|                | (3) Green Package | (3) G: Halogen Free and Lead Free |

#### MARKING



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

| PARAMETER                  |                     |                                           | SYMBOL           | RATINGS  | UNIT |
|----------------------------|---------------------|-------------------------------------------|------------------|----------|------|
| Drain-Source Voltage       |                     |                                           | $V_{\text{DSS}}$ | -20      | V    |
| Gate-Source Voltage        |                     |                                           | $V_{\text{GSS}}$ | ±8       | V    |
| Drain Current              | Continuous (Note 2) | Steady, $T_{\text{A}}=25^{\circ}\text{C}$ | $I_{\text{D}}$   | -3.6     | A    |
|                            |                     | State, $T_{\text{A}}=70^{\circ}\text{C}$  |                  | -2.9     | A    |
|                            | Pulsed (Note 3)     |                                           | $I_{\text{DM}}$  | -24      | A    |
| Power Dissipation (Note 2) |                     |                                           | $P_{\text{D}}$   | 0.81     | W    |
| Junction Temperature       |                     |                                           | $T_{\text{J}}$   | -55~+150 | °C   |
| Storage Temperature Range  |                     |                                           | $T_{\text{STG}}$ | -55~+150 | °C   |

Notes: 1. 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.

2. Device mounted on FR-4 PCB with 2oz. Copper and test pulse width  $\leq 10\text{s}$ .

3. Repetitive rating, pulse width limited by junction temperature.

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

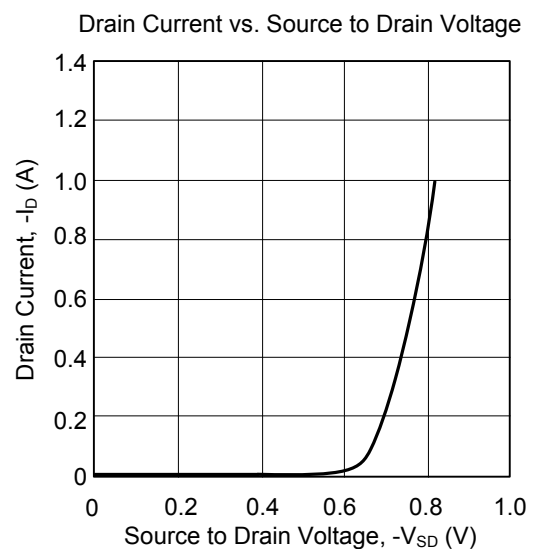
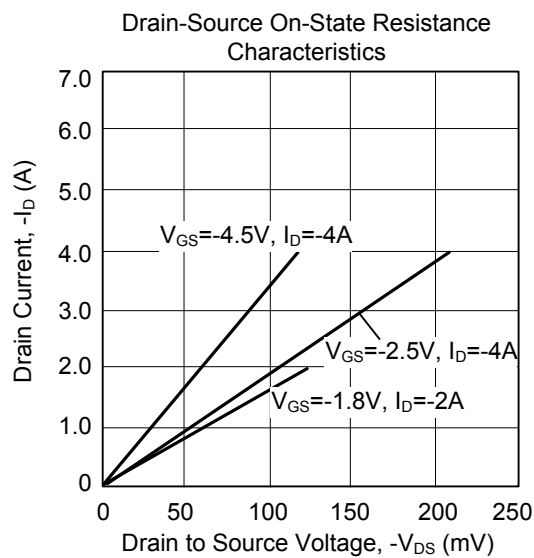
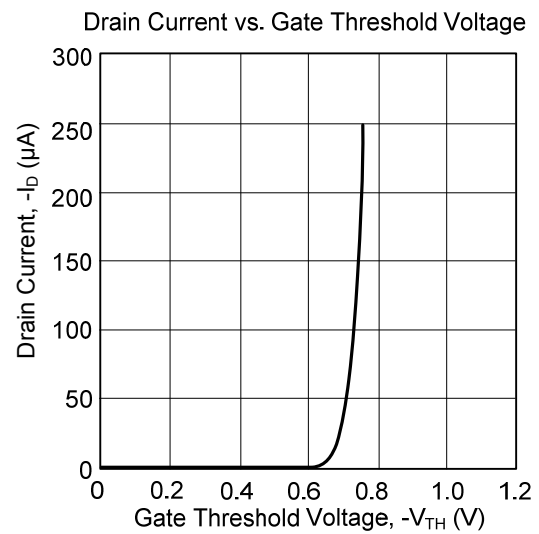
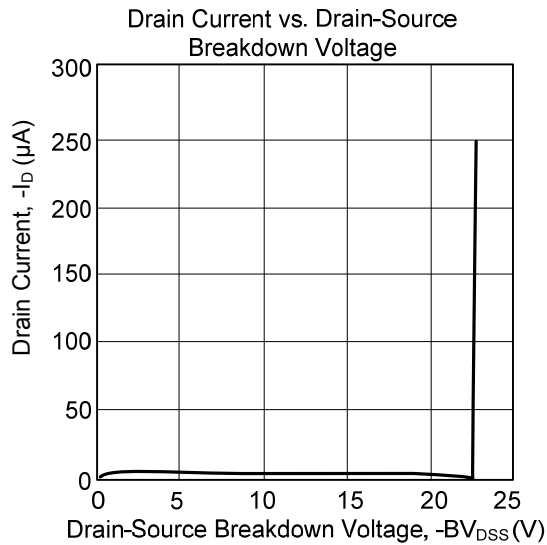
| PARAMETER           | SYMBOL               | RATINGS | UNIT                 |
|---------------------|----------------------|---------|----------------------|
| Junction to Ambient | $\theta_{\text{JA}}$ | 153.5   | $^{\circ}\text{C/W}$ |

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

| PARAMETER                               |         | SYMBOL              | TEST CONDITIONS                                                                                               | MIN  | TYP             | MAX                                       | UNIT |
|-----------------------------------------|---------|---------------------|---------------------------------------------------------------------------------------------------------------|------|-----------------|-------------------------------------------|------|
| OFF CHARACTERISTICS (Note 1)            |         |                     |                                                                                                               |      |                 |                                           |      |
| Drain-Source Breakdown Voltage          |         | BV <sub>DSS</sub>   | I <sub>D</sub> =-250μA, V <sub>GS</sub> =0V                                                                   | -20  |                 |                                           | V    |
| Drain-Source Leakage Current            |         | I <sub>DSS</sub>    | V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V                                                                    |      |                 | -1.0                                      | μA   |
| Gate-Source Leakage Current             | Forward | I <sub>GSS</sub>    | V <sub>GS</sub> =+8V, V <sub>DS</sub> =0V                                                                     |      |                 | +10                                       | μA   |
|                                         | Reverse |                     | V <sub>GS</sub> =-8V, V <sub>DS</sub> =0V                                                                     |      |                 | -10                                       | μA   |
| ON CHARACTERISTICS (Note 1)             |         |                     |                                                                                                               |      |                 |                                           |      |
| Gate Threshold Voltage                  |         | V <sub>GS(TH)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA                                                     | -0.4 | -0.7            | -1.0                                      | V    |
| Static Drain-Source On-State Resistance |         | R <sub>DS(ON)</sub> | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-4.0A                                                                 |      | 30              | 42                                        | mΩ   |
|                                         |         |                     | V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-4.0A                                                                 |      | 50              | 65                                        | mΩ   |
|                                         |         |                     | V <sub>GS</sub> =-1.8V, I <sub>D</sub> =-2.0A                                                                 |      | 61              | 82                                        | mΩ   |
|                                         |         |                     | Forward Transfer Admittance                                                                                   |      | Y <sub>FS</sub> | V <sub>DS</sub> =-5V, I <sub>D</sub> =-4A |      |
| Diode Forward Voltage                   |         | V <sub>SD</sub>     | V <sub>GS</sub> =0V, I <sub>S</sub> =-1A                                                                      |      | -0.7            | -1.0                                      | V    |
| DYNAMIC PARAMETERS                      |         |                     |                                                                                                               |      |                 |                                           |      |
| Input Capacitance                       |         | C <sub>ISS</sub>    | V <sub>GS</sub> =0V, V <sub>DS</sub> =-10V, f=1.0MHz                                                          |      | 1610            |                                           | pF   |
| Output Capacitance                      |         | C <sub>OSS</sub>    |                                                                                                               |      | 157             |                                           | pF   |
| Reverse Transfer Capacitance            |         | C <sub>RSS</sub>    |                                                                                                               |      | 145             |                                           | pF   |
| SWITCHING PARAMETERS                    |         |                     |                                                                                                               |      |                 |                                           |      |
| Total Gate Charge                       |         | Q <sub>G</sub>      | V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-10V, I <sub>D</sub> =-4A                                            |      | 15.4            |                                           | nC   |
| Gate to Source Charge                   |         | Q <sub>GS</sub>     |                                                                                                               |      | 2.5             |                                           | nC   |
| Gate to Drain Charge                    |         | Q <sub>GD</sub>     |                                                                                                               |      | 3.3             |                                           | nC   |
| Gate Resistance                         |         | R <sub>G</sub>      | V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz                                                              |      | 9.45            |                                           | Ω    |
| Turn-ON Delay Time                      |         | t <sub>D(ON)</sub>  | V <sub>DS</sub> =-10V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-1A, R <sub>G</sub> =6.0Ω, R <sub>L</sub> =10Ω |      | 16.8            |                                           | ns   |
| Rise Time                               |         | t <sub>R</sub>      |                                                                                                               |      | 12.4            |                                           | ns   |
| Turn-OFF Delay Time                     |         | t <sub>D(OFF)</sub> |                                                                                                               |      | 94.1            |                                           | ns   |
| Fall-Time                               |         | t <sub>F</sub>      |                                                                                                               |      | 42.4            |                                           | ns   |

Note: Short duration pulse test used to minimize self-heating effect.

# TYPICAL CHARACTERISTICS



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