



# UTF3055

*Power MOSFET*

## N-CHANNEL ENHANCEMENT MODE POWER MOSFET

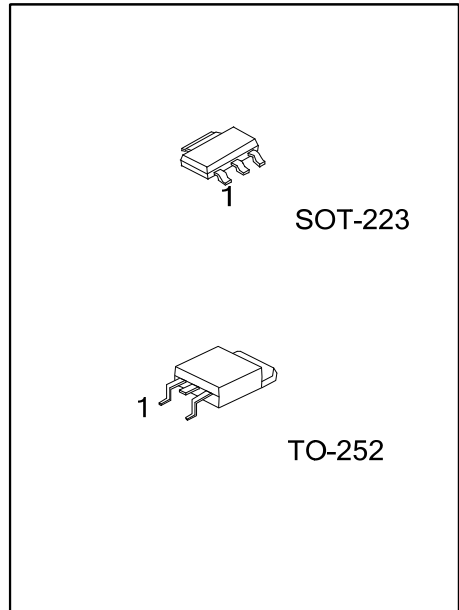
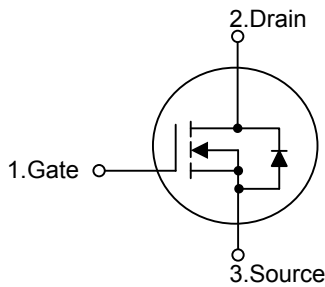
■ DESCRIPTION

As an N-channel enhancement mode power MOSFET, the UTC **UTF3055** is designed for low voltage, high speed switching applications in power supplies, converters and power motor controls and bridge circuits.

■ FEATURES

\*  $R_{DS(ON)} < 110 \text{ m}\Omega$  @  $V_{GS} = 10V$

■ SYMBOL



■ ORDERING INFORMATION

| Ordering Number |                | Package | Pin Assignment |   |   | Packing   |
|-----------------|----------------|---------|----------------|---|---|-----------|
| Lead Free       | Halogen Free   |         | 1              | 2 | 3 |           |
| UTF3055L-AA3-R  | UTF3055G-AA3-R | SOT-223 | G              | D | S | Tape Reel |
| UTF3055L-TN3-R  | UTF3055G-TN3-R | TO-252  | G              | D | S | Tape Reel |

|   |  |
|---|--|
| <p>UTF3055L-AA3-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Lead Free</p> | <p>(1) R: Tape Reel</p> <p>(2) AA3: SOT-223, TN3: TO-252</p> <p>(3) G: Halogen Free, L:Lead Free</p> |
|---|--|

■ ABSOLUTE MAXIMUM RATINGS (T<sub>C</sub> = 25°C, unless otherwise noted)

| PARAMETER  | SYMBOL           | RATINGS    | UNIT  |
|--|------------------|------------|-------|
| Drain Source Voltage                               | V <sub>DSS</sub> | 60         | V     |
| Drain Gate Voltage (R <sub>GS</sub> = 10MΩ )       | V <sub>DGR</sub> | 60         | V     |
| Gate Source Voltage                                | V <sub>GSS</sub> | ±20        | V     |
|  |                  | ±30        | V     |
| Continuous Drain Current (T <sub>a</sub> = 25°C)   | I <sub>D</sub>   | 3.0        | A     |
| Pulsed Drain Current (t <sub>p</sub> ≤ 10 μs)      | I <sub>DM</sub>  | 9.0        | A     |
| Single Pulsed Avalanche Energy (Note 2)            | E <sub>AS</sub>  | 74         | mJ    |
| Power Dissipation (T <sub>a</sub> = 25°C) (Note 3) | P <sub>D</sub>   | SOT-223    | 0.83  |
|  |                  | TO-252     | 1.136 |
| Derate above 25°C                                  | P <sub>D</sub>   | SOT-223    | 14    |
|  |                  | TO-252     | 20    |
| Junction Temperature                               | T <sub>J</sub>   | 175        | °C    |
| Strong Temperature                                 | T <sub>STG</sub> | -55 ~ +175 | °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. T<sub>J</sub> = 25°C, V<sub>DD</sub> = 25V, V<sub>GS</sub> = 10V, I<sub>L</sub> = 7.0A, L = 3.0mH, V<sub>DS</sub> = 60V

3. When surface mounted to an FR4 board using 1" pad size, 1 oz.(Cu. Area 1.127 sq in ).

■ THERMAL DATA

| PARAMETER                  | SYMBOL          | RATINGS | UNIT |
|----------------------------|-----------------|---------|------|
| Junction to Ambient (Note) | θ <sub>JA</sub> | SOT-223 | 150  |
|                            |                 | TO-252  | 110  |

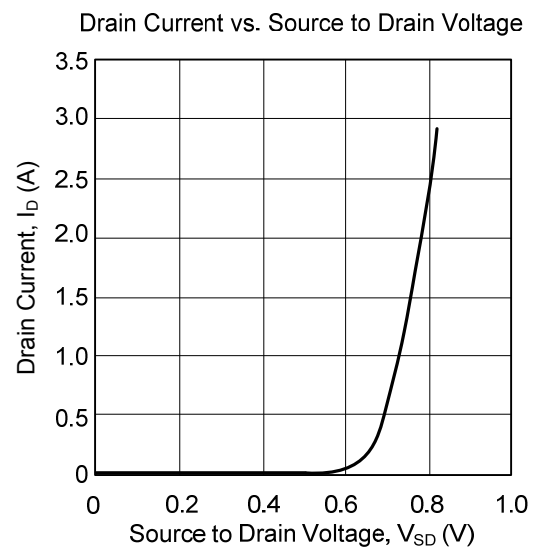
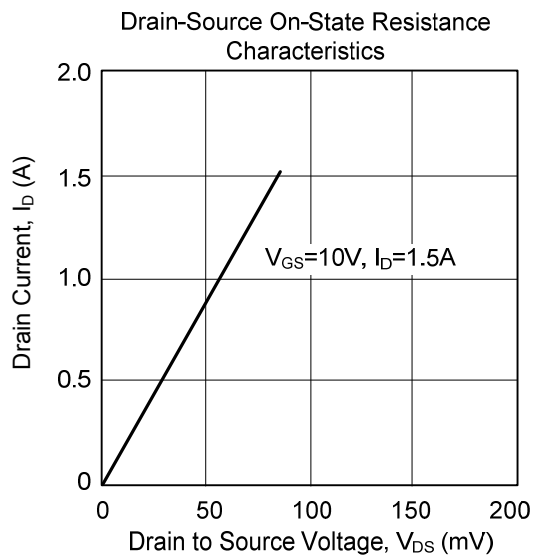
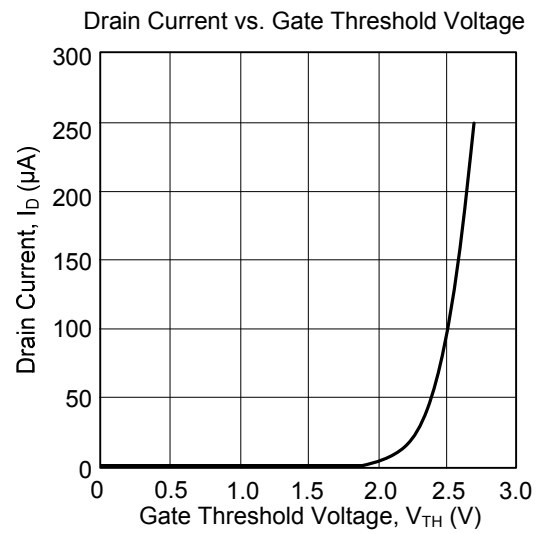
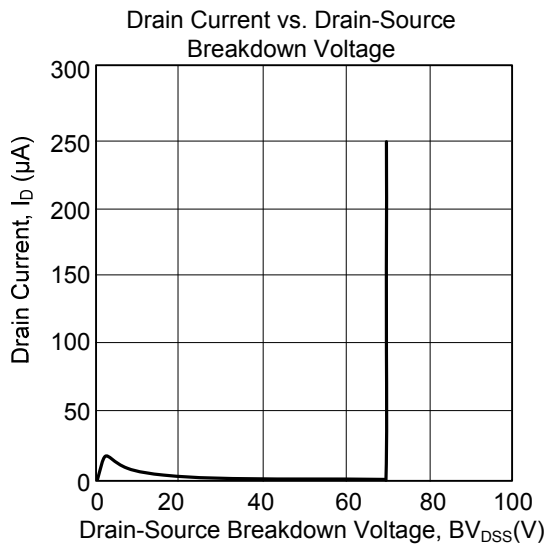
Note: When surface mounted to an FR4 board using 1" pad size, 1 oz.(Cu. Area 1.127 sq in ).

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

| PARAMETER                               | SYMBOL       | TEST CONDITIONS  | MIN | TYP  | MAX       | UNIT                 |                      |
|---|--------------|--|-----|------|-----------|----------------------|----------------------|
| <b>OFF CHARACTERISTICS</b>              |              |  |     |      |           |                      |                      |
| Drain Source Breakdown Voltage (Note 1) | $BV_{DSS}$   | $V_{GS} = 0V, I_D = 250\mu A$                                      | 60  | 68   |           | V                    |                      |
| Temperature Coefficient (Positive)      |              |  |     | 66   |           | mV/ $^\circ\text{C}$ |                      |
| Drain-Source Leakage Current            | $I_{DSS}$    | $V_{GS} = 0V, V_{DS} = 60V$  |     |      | 1.0       | $\mu A$              |                      |
| Gate-Source Leakage Current             | $I_{GSS}$    | $V_{GS} = \pm 20V, V_{DS} = 0V$                                    |     |      | $\pm 100$ | nA                   |                      |
| <b>ON CHARACTERISTICS (Note 1)</b>      |              |  |     |      |           |                      |                      |
| Gate Threshold Voltage                  | $V_{GS(TH)}$ | $V_{GS} = V_{DS}, I_D = 250\mu A$                                  | 2.0 | 3.0  | 4.0       | V                    |                      |
| Temperature Coefficient (Negative)      |              |  |     |      | 6.6       |                      | mV/ $^\circ\text{C}$ |
| Static Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS} = 10V, I_D = 1.5A$   |     | 88   | 110       | m $\Omega$           |                      |
| Static Drain-to-Source On-Resistance    | $V_{DS(ON)}$ | $V_{GS} = 10V, I_D = 3A$   |     | 0.27 | 0.40      | V                    |                      |
| Forward Transconductance                | $g_{FS}$     | $V_{DS} = 8.0V, I_D = 1.7A$  |     | 3.2  |           | M                    |                      |
| <b>DYNAMIC PARAMETERS</b>               |              |  |     |      |           |                      |                      |
| Input Capacitance                       | $C_{ISS}$    | $V_{GS} = 0V, V_{DS} = 25V, f = 1.0\text{MHz}$                     |     | 324  | 455       | pF                   |                      |
| Output Capacitance                      | $C_{OSS}$    |  |     |      | 35        | 50                   | pF                   |
| Reverse Transfer Capacitance            | $C_{RSS}$    |  |     |      | 110       | 155                  | pF                   |
| <b>SWITCHING PARAMETERS (Note 2)</b>    |              |  |     |      |           |                      |                      |
| Turn-ON Delay Time                      | $t_{D(ON)}$  | $V_{GS} = 10V, V_{DD} = 30V, I_D = 3.0A, R_G = 9.1\Omega$ (Note 1) |     | 9.4  | 20        | ns                   |                      |
| Turn-ON Rise Time                       | $t_R$        |  |     |      | 14        | 30                   | ns                   |
| Turn-OFF Delay Time                     | $t_{D(OFF)}$ |  |     |      | 21        | 45                   | ns                   |
| Turn-OFF Fall-Time                      | $t_F$        |  |     |      | 13        | 30                   | ns                   |
| Total Gate Charge                       | $Q_G$        | $V_{GS} = 10V, V_{DS} = 48V, I_D = 3.0A$ (Note 1)                  |     | 10.6 | 22        | nC                   |                      |
| Gate-Source Charge                      | $Q_{GS}$     |  |     |      | 1.9       |                      | nC                   |
| Gate-Drain Charge                       | $Q_{GD}$     |  |     |      | 4.2       |                      | nC                   |
| Diode Forward Voltage                   | $V_{SD}$     | $V_{GS} = 0V, I_S = 3.0A$  |     | 0.89 | 1.0       | V                    |                      |
| Body Diode Reverse Recovery Time        | $t_{RR}$     | $V_{GS} = 0V, I_S = 3.0A, di/dt = 100 A/\mu s$ (Note 1)            |     | 30   |           | ns                   |                      |
|   | $t_A$        |  |     | 22   |           | ns                   |                      |
|   | $t_B$        |  |     | 8.6  |           | ns                   |                      |
| Body Diode Reverse Recovery Charge      | $Q_{RR}$     |  |     | 0.04 |           | nC                   |                      |

Note: 1. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2.0\%$ .  
 2. Switching characteristics are independent of operating junction temperatures.

## ■ TYPICAL CHARACTERISTICS



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