



### -60 V, -27.5 A P-CHANNEL POWER MOSFET

#### DESCRIPTION

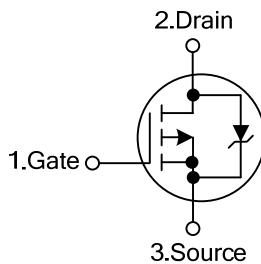
The UTC **UTT25P06** is a P-channel power MOSFET using UTC's advanced technology to provide the customers with high switching speed and a minimum on-state resistance, and it can also withstand high energy in the avalanche.

This UTC **UTT25P06** is suitable for power supplies, converters, PWM motor controls and bridge circuits, etc.

#### FEATURES

- \*  $V_{DS} = -60V$
- \*  $I_D = -27.5A$
- \*  $R_{DS(ON)} = 0.065\Omega @ V_{GS} = -10V, I_D = -12.5A$ ;  
 $R_{DS(ON)} = 0.070\Omega @ V_{GS} = -10V, I_D = -25A$
- \* High Switching Speed

#### SYMBOL

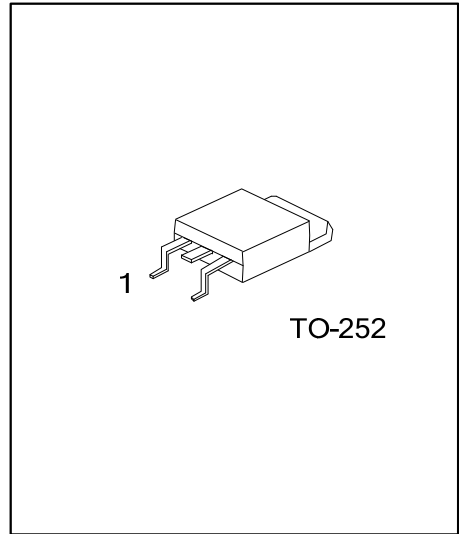


#### ORDERING INFORMATION

| Ordering Number |                 | Package | Pin Assignment |   |   | Packing   |
|-----------------|-----------------|---------|----------------|---|---|-----------|
| Lead Free       | Halogen Free    |         | 1              | 2 | 3 |           |
| UTT25P06L-TN3-R | UTT25P06G-TN3-R | TO-252  | G              | D | S | Tape Reel |

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

|                 |                  |                                   |
|-----------------|------------------|-----------------------------------|
| UTT25P06L-TN3-R | (1) Packing Type | (1) R: Tape Reel                  |
|                 | (2) Package Type | (2) TN3: TO-252                   |
|                 | (3) Lead Free    | (3) G: Halogen Free, L: Lead Free |



# ■ **ABSOLUTE MAXIMUM RATINGS** ( $T_J=25^{\circ}\text{C}$ , unless otherwise noted)

| PARAMETER  |   | SYMBOL    | RATINGS  | UNIT               |
|--|---|-----------|----------|--------------------|
| Drain-Source Voltage   |   | $V_{DSS}$ | -60      | V                  |
| Gate-Source Voltage  | Continuous                                | $V_{GS}$  | $\pm 15$ | V                  |
|  | Non-Repetitive ( $t_P \leq 10\text{ms}$ ) | $V_{GSM}$ | $\pm 20$ | V                  |
| Drain Current  | Continuous @ $T_A=25^{\circ}\text{C}$     | $I_D$     | 27.5     | A                  |
|  | Pulsed ( $t_P \leq 10\mu\text{s}$ )       | $I_{DM}$  | 80       | A                  |
| Power Dissipation  | @ $T_A=25^{\circ}\text{C}$                | $P_D$     | 120      | W                  |
| Avalanche Energy<br>( $V_{DD}=25\text{V}$ , $V_{GS}=10\text{V}$ , $I_{L(PK)}=20\text{A}$ , $L=3\text{mH}$ , $R_G=25\Omega$ ) |   | $E_{AS}$  | 600      | mJ                 |
| Junction Temperature   |   | $T_J$     | +175     | $^{\circ}\text{C}$ |
| Storage Temperature  |   | $T_{STG}$ | -55~+175 | $^{\circ}\text{C}$ |

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. When surface mounted to an FR4 board using 1" pad size (Cu Area 1.127 in<sup>2</sup>).

3. When surface mounted to an FR4 board using the minimum recommended pad size (Cu Area 0.412 in<sup>2</sup>).

# ■ **THERMAL CHARACTERISTICS**

| PARAMETER           | SYMBOL        | RATINGS       | UNIT                 |
|---------------------|---------------|---------------|----------------------|
| Junction to Ambient | $\theta_{JA}$ | 46.8 (Note 2) | $^{\circ}\text{C/W}$ |
|                     |               | 63.2 (Note 3) |                      |
| Junction to Case    | $\theta_{JC}$ | 1.25          | $^{\circ}\text{C/W}$ |

# **ELECTRICAL CHARACTERISTICS** ( $T_C=25^{\circ}\text{C}$ , unless otherwise noted)

| PARAMETER  |         | SYMBOL              | TEST CONDITIONS  | MIN  | TYP   | MAX   | UNIT  |
|--|---------|---------------------|--|------|-------|-------|-------|
| OFF CHARACTERISTICS                                      |         |                     |  |      |       |       |       |
| Drain-Source Breakdown Voltage (Note 1)                  |         | BV <sub>DSS</sub>   | I <sub>D</sub> =-250μA, V <sub>GS</sub> =0V  | -60  |       |       | V     |
|  |         |                     | Positive Temperature Coefficient   |      | 64    |       | mV/°C |
| Drain-Source Leakage Current                             |         | I <sub>DSS</sub>    | V <sub>GS</sub> =0V, V <sub>DS</sub> =-60V, T <sub>J</sub> =25°C                         |      |       | -10   | μA    |
|  |         |                     | V <sub>GS</sub> =0V, V <sub>DS</sub> =-60V, T <sub>J</sub> =150°C                        |      |       | -100  |       |
| Gate- Source Leakage Current                             | Forward | I <sub>GSS</sub>    | V <sub>GS</sub> =+15V, V <sub>DS</sub> =0V   |      |       | +100  | nA    |
|  | Reverse |                     | V <sub>GS</sub> =-15V, V <sub>DS</sub> =0V   |      |       | -100  | nA    |
| 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                                | -2.0 | -2.8  | -4.0  | V     |
|  |         |                     | Negative Threshold Temperature Coefficient   |      | 6.2   |       | mV/°C |
| Static Drain-Source On-State Resistance                  |         | R <sub>DS(ON)</sub> | V <sub>GS</sub> =-10V, I <sub>D</sub> =-12.5A  |      | 0.065 | 0.075 | Ω     |
|  |         |                     | V <sub>GS</sub> =-10V, I <sub>D</sub> =-25A  |      | 0.070 | 0.082 |       |
| DYNAMIC PARAMETERS                                       |         |                     |  |      |       |       |       |
| Input Capacitance  |         | C <sub>ISS</sub>    | V <sub>GS</sub> =0V, V <sub>DS</sub> =-25V, f=1.0MHz                                     |      | 1200  | 1680  | pF    |
| Output Capacitance                                       |         | C <sub>OSS</sub>    |  |      | 345   | 480   | pF    |
| Reverse Transfer Capacitance                             |         | C <sub>RSS</sub>    |  |      | 90    | 180   | pF    |
| SWITCHING PARAMETERS (Note 1, 2)                         |         |                     |  |      |       |       |       |
| Total Gate Charge  |         | Q <sub>G</sub>      | V <sub>GS</sub> =-10V, V <sub>DS</sub> =-48V, I <sub>D</sub> =-25A                       |      | 33    | 50    | nC    |
| Gate to Source Charge                                    |         | Q <sub>GS</sub>     |  |      | 6.5   |       | nC    |
| Gate to Drain Charge                                     |         | Q <sub>GD</sub>     |  |      | 15    |       | nC    |
| Turn-ON Delay Time                                       |         | t <sub>D(ON)</sub>  | V <sub>DD</sub> =-30V, I <sub>D</sub> =-25A, V <sub>GS</sub> =-10V, R <sub>G</sub> =9.1Ω |      | 14    | 24    | ns    |
| Rise Time  |         | t <sub>R</sub>      |  |      | 72    | 118   | ns    |
| Turn-OFF Delay Time                                      |         | t <sub>D(OFF)</sub> |  |      | 43    | 68    | ns    |
| Fall-Time  |         | t <sub>F</sub>      |  |      | 190   | 320   | ns    |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS (Note 3) |         |                     |  |      |       |       |       |
| Drain-Source Diode Forward Voltage                       |         | V <sub>SD</sub>     | I <sub>S</sub> =-25A, V <sub>GS</sub> =0V  |      | -1.8  | -2.5  | V     |
|  |         |                     | I <sub>S</sub> =-25 A, V <sub>GS</sub> =0V, T <sub>J</sub> =150°C                        |      | -1.4  |       |       |
| Body Diode Reverse Recovery Time                         |         | t <sub>RR</sub>     | I <sub>S</sub> =-25A, V <sub>GS</sub> =0V, dI <sub>S</sub> /dt=100A/μs                   |      | 70    |       | ns    |
| Body Diode Reverse Recovery Charge                       |         | Q <sub>RR</sub>     |  |      | 0.2   |       | μC    |

Notes: 1. Indicates Pulse Test: Pulse Width $\leq 300\mu\text{s}$ , Duty Cycles $\leq 2\%$ .

2. Switching characteristics are independent of operating junction temperatures.

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.