



### DUAL POWER MOSFET (N-CHANNEL/P-CHANNEL)

#### DESCRIPTION

The UTC **UTT30NP30** is a dual power MOSFET. it uses UTC's advanced technology to provide customers with a minimum on-state resistance, low capacitance and low gate charge, etc.

The UTC **UTT30NP30** is suitable for CPU Power Delivery and DC-DC Converters, etc.

#### FEATURES

\* N-Channel: 30A, 20V

$R_{DS(on)} < 15m\Omega$  @  $V_{GS}=10V$ ,  $I_D=30A$

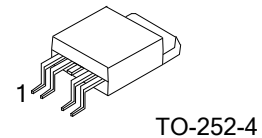
$R_{DS(on)} < 18m\Omega$  @  $V_{GS}=4.5V$ ,  $I_D=30A$

P-Channel: -30A, -25V

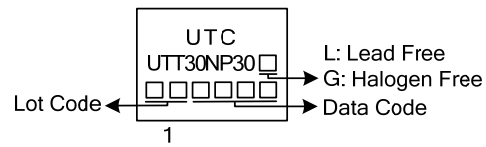
$R_{DS(on)} < 25m\Omega$  @  $V_{GS}= -10V$ ,  $I_D= -30A$

$R_{DS(on)} < 24m\Omega$  @  $V_{GS}= -4.5V$ ,  $I_D= -30A$

\* Low capacitance



### ■ MARKING



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

| PARAMETER                 |               |                          | SYMBOL    | RATINGS       |           | UNIT               |
|---------------------------|---------------|--------------------------|-----------|---------------|-----------|--------------------|
|                           |               |                          |           | N-CHANNEL     | P-CHANNEL |                    |
| Drain-Source Voltage      |               |                          | $V_{DSS}$ | 20            | -25       | V                  |
| Gate-Source Voltage       |               |                          | $V_{GSS}$ | $\pm 8$       | $\pm 20$  | V                  |
| Drain Current             | Continuous    | $T_A=25^{\circ}\text{C}$ | $I_D$     | 30            | -30       | A                  |
|                           | Pulsed (Note) |                          | $I_{DM}$  | 120           | -120      | A                  |
| Power Dissipation         |               |                          | $P_D$     | 3.1           |           | W                  |
| Junction Temperature      |               |                          | $T_J$     | $-55\sim+150$ |           | $^{\circ}\text{C}$ |
| Storage Temperature Range |               |                          | $T_{STG}$ | $-55\sim+150$ |           | $^{\circ}\text{C}$ |

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        | RATINGS | UNIT                 |
|---------------------|---------------|---------|----------------------|
| Junction to Ambient | $\theta_{JA}$ | 40      | $^{\circ}\text{C/W}$ |

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

**N-channel**

| PARAMETER                                           |         | SYMBOL              | TEST CONDITIONS                                                                        | MIN | TYP  | MAX  | UNIT |
|-----------------------------------------------------|---------|---------------------|----------------------------------------------------------------------------------------|-----|------|------|------|
| OFF CHARACTERISTICS                                 |         |                     |                                                                                        |     |      |      |      |
| Drain-Source Breakdown Voltage                      |         | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA                                             | 20  |      |      | V    |
| Drain-Source Leakage Current                        |         | I <sub>DSS</sub>    | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C                        |     |      | 1.0  | μA   |
| Gate-Source Leakage Current                         | Forward | I <sub>GSS</sub>    | V <sub>GS</sub> =+8V, V <sub>GS</sub> =0V                                              |     |      | +100 | nA   |
|                                                     | Reverse |                     | V <sub>GS</sub> =-8V, V <sub>GS</sub> =0V                                              |     |      | -100 | nA   |
| ON CHARACTERISTICS                                  |         |                     |                                                                                        |     |      |      |      |
| Gate Threshold Voltage                              |         | V <sub>GS(TH)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                               | 0.5 |      | 1.2  | V    |
| Static Drain-Source On-State Resistance<br>(Note 2) |         | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =30A                                              |     |      | 15   | mΩ   |
|                                                     |         |                     | V <sub>GS</sub> =4.5V, I <sub>D</sub> =30A                                             |     |      | 18   | mΩ   |
| DYNAMIC PARAMETERS                                  |         |                     |                                                                                        |     |      |      |      |
| Input Capacitance                                   |         | C <sub>ISS</sub>    | V <sub>GS</sub> =0V, V <sub>DS</sub> =20V, f=1.0MHz                                    |     | 1500 |      | pF   |
| Output Capacitance                                  |         | C <sub>OSS</sub>    |                                                                                        |     | 260  |      | pF   |
| Reverse Transfer Capacitance                        |         | C <sub>RSS</sub>    |                                                                                        |     | 260  |      | pF   |
| SWITCHING PARAMETERS                                |         |                     |                                                                                        |     |      |      |      |
| Total Gate Charge (Note 2)                          |         | Q <sub>G</sub>      | V <sub>GS</sub> =10V, V <sub>DS</sub> =16V, I <sub>D</sub> =30A                        |     | 160  | 170  | nC   |
| Gate to Source Charge                               |         | Q <sub>GS</sub>     |                                                                                        |     | 5.5  |      | nC   |
| Gate to Drain Charge                                |         | Q <sub>GD</sub>     |                                                                                        |     | 10.5 |      | nC   |
| Turn-ON Delay Time (Note 2)                         |         | t <sub>D(ON)</sub>  | V <sub>DS</sub> =10V, I <sub>D</sub> =1A<br>V <sub>GS</sub> =10V, R <sub>G</sub> =3.3Ω |     | 31   | 38   | nS   |
| Rise Time                                           |         | t <sub>R</sub>      |                                                                                        |     | 57   | 62   | nS   |
| Turn-OFF Delay Time                                 |         | t <sub>D(OFF)</sub> |                                                                                        |     | 458  | 510  | nS   |
| Fall-Time                                           |         | t <sub>F</sub>      |                                                                                        |     | 234  | 270  | nS   |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS     |         |                     |                                                                                        |     |      |      |      |
| Drain-Source Diode Forward Voltage(Note 2)          |         | V <sub>SD</sub>     | I <sub>SD</sub> =30A                                                                   |     | 0.9  | 1.25 | V    |

## ■ ELECTRICAL CHARACTERISTICS(Cont.)

## P-Channel

| PARAMETER                                           |         | SYMBOL       | TEST CONDITIONS                                             | MIN | TYP  | MAX  | UNIT       |
|-----------------------------------------------------|---------|--------------|-------------------------------------------------------------|-----|------|------|------------|
| OFF CHARACTERISTICS                                 |         |              |                                                             |     |      |      |            |
| Drain-Source Breakdown Voltage                      |         | $BV_{DSS}$   | $V_{GS}=0V, I_D=-250\mu A$                                  | -25 |      |      | V          |
| Drain-Source Leakage Current                        |         | $I_{DSS}$    | $V_{DS}=-24V, V_{GS}=0V, T_J=25^{\circ}C$                   |     |      | -1.0 | $\mu A$    |
| Gate-Source Leakage Current                         | Forward | $I_{GSS}$    | $V_{GS}=+25V, V_{GS}=0V$                                    |     |      | +100 | nA         |
|                                                     | Reverse |              | $V_{GS}=-25V, V_{GS}=0V$                                    |     |      | -100 | nA         |
| ON CHARACTERISTICS                                  |         |              |                                                             |     |      |      |            |
| Gate Threshold Voltage                              |         | $V_{GS(TH)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$                              | -1  | -1.5 | -3   | V          |
| Static Drain-Source On-State Resistance<br>(Note 2) |         | $R_{DS(ON)}$ | $V_{GS}=-10V, I_D=-30A$                                     |     |      | 25   | m $\Omega$ |
|                                                     |         |              | $V_{GS}=-4.5V, I_D=-30A$                                    |     |      | 34   | m $\Omega$ |
| DYNAMIC PARAMETERS                                  |         |              |                                                             |     |      |      |            |
| Input Capacitance                                   |         | $C_{ISS}$    | $V_{GS}=0V, V_{DS}=-15V, f=1.0MHz$                          |     | 1500 |      | pF         |
| Output Capacitance                                  |         | $C_{OSS}$    |                                                             |     | 270  |      | pF         |
| Reverse Transfer Capacitance                        |         | $C_{RSS}$    |                                                             |     | 230  |      | pF         |
| SWITCHING PARAMETERS                                |         |              |                                                             |     |      |      |            |
| Total Gate Charge (Note 2)                          |         | $Q_G$        | $V_{GS}=-10V, V_{DS}=-20V, I_D=-30A$                        |     | 140  | 160  | nC         |
| Gate to Source Charge                               |         | $Q_{GS}$     |                                                             |     | 5.4  |      | nC         |
| Gate to Drain Charge                                |         | $Q_{GD}$     |                                                             |     | 8.7  |      | nC         |
| Turn-ON Delay Time (Note 2)                         |         | $t_{D(ON)}$  | $V_{DS}= -12.5V, I_D= -1A$<br>$V_{GS}= -10V, R_G=3.3\Omega$ |     | 34   | 42   | nS         |
| Rise Time                                           |         | $t_R$        |                                                             |     | 42   | 48   | nS         |
| Turn-OFF Delay Time                                 |         | $t_{D(OFF)}$ |                                                             |     | 308  | 330  | nS         |
| Fall-Time                                           |         | $t_F$        |                                                             |     | 173  | 220  | nS         |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS     |         |              |                                                             |     |      |      |            |
| Drain-Source Diode Forward Voltage(Note 2)          |         | $V_{SD}$     | $I_S= -30A$                                                 |     |      | -1.2 | V          |

Notes: 1. Pulse Test: Pulse width limited by Max. junction temperature.

2. N-CH, P-CH are same, mounted on 2oz FR4 board  $t \leq 10s$ .

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