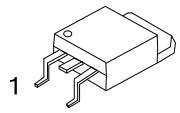
# UT30P04

**Power MOSFET**

## P-CHANNEL ENHANCEMENT MODE POWER MOSFET




TO-252

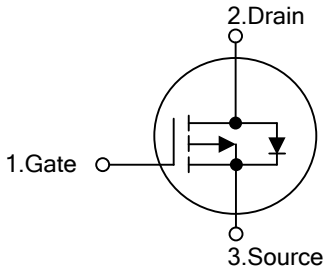
### ■ DESCRIPTION

The UTC **UT30P04** is a P-channel enhancement mode Power MOSFET, providing customers fast switching, ruggedized device design, low on-resistance and cost-effectiveness with UTC's advanced technology.

### ■ FEATURES

* Low on-Resistance
* Fast Switching Speed

### ■ SYMBOL



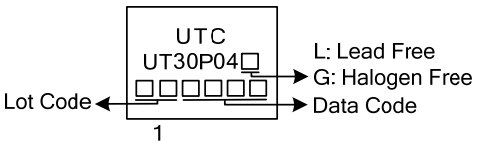

### ■ ORDERING INFORMATION

| Ordering Number | | Package | Pin Assignment | | | Packing |
|---|---|---|---|---|---|---|
| Lead Free | Halogen Free | | 1 | 2 | 3 | |
| UT30P04L-TN3-R | UT30P04G-TN3-R | TO-252 | G | D | S | Tape Reel |

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

| | |
|---|---|
| UT30P04L-TN3-R<br>(1)Packing Type<br>(2)Package Type<br>(3)Green Package | (1) R: Tape Reel<br>(2) TN3: TO-252<br>(3) L: Lead Free, G: Halogen Free and Lead Free |

### ■ MARKING



## ■ ABSOLUTE MAXIMUM RATINGS ($T_A$=25°C Unless Otherwise specified)

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | -40 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current | $T_C$=25°C | $I_D$ | -21 | A |
| | $T_C$=70°C | | -17 | A |
| Pulsed Drain Current (Note 2) | | $I_{DM}$ | -70 | A |
| Avalanche Current | | $I_{AS}$ | -27 | A |
| Avalanche Energy (Note 3) | L=0.1mH | $E_{AS}$ | 36 | mJ |
| Power Dissipation | $T_C$=25°C | $P_D$ | 30 | W |
| | $T_C$=70°C | | 20 | W |
| Operating Junction Temperature | | $T_J$ | -55~150 | °C |
| Storage Temperature | | $T_{STG}$ | -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. Pulse width limited by maximum junction temperature.
3. $V_{DD}$=-20V. Starting $T_J$=25°C.

## ■ THERMAL DATA

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---|---|---|---|
| Junction to Ambient | $\theta_{JA}$ | 40 | °C/W |
| Junction to Case | $\theta_{JC}$ | 4.1 | °C/W |

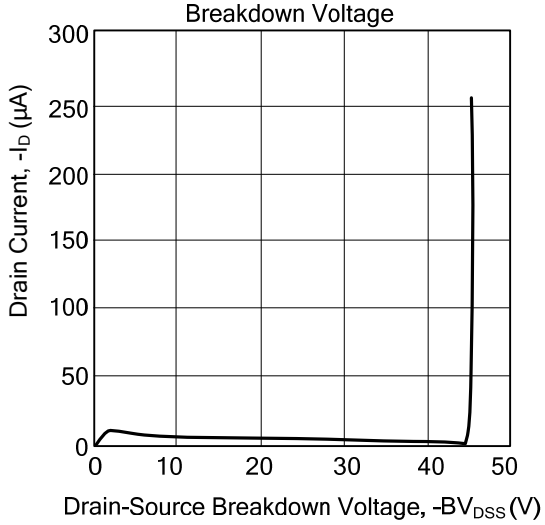
## ■ ELECTRICAL CHARACTERISTICS ($T_J$ =25°C, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $I_D$=-250μA, $V_{GS}$=0V | -40 | | | V |
| Drain-Source Leakage Current | $I_{DSS}$ | $V_{DS}$=-32V, $V_{GS}$=0V | | | 1 | μA |
| | | $V_{DS}$=-30V, $V_{GS}$=0V, $T_J$=125°C | | | 10 | |
| Gate- Source Leakage Current | $I_{GSS}$ | $V_{DS}$=0V, $V_{GS}$=±20V | | | ±250 | nA |
| On-State Drain Current (Note 1) | $I_{D(ON)}$ | $V_{DS}$=-5V, $V_{GS}$=-10V | -70 | | | A |
| **ON CHARACTERISTICS** | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}$=$V_{GS}$, $I_D$=-250μA | -1 | -2.5 | -3 | V |
| Static Drain-Source On-State Resistance (Note 1) | $R_{DS(ON)}$ | $V_{GS}$=-5V, $I_D$=-8A | | 65 | 73 | mΩ |
| | | $V_{GS}$=-7V, $I_D$=-8A | | 35 | 50 | |
| | | $V_{GS}$=-10V, $I_D$=-10A | | 30 | 40 | |
| Forward Transconductance (Note 1) | $g_{FS}$ | $V_{DS}$=-10V, $I_D$=-10A | | 20 | | S |
| Gate Resistance | $R_g$ | $V_{GS}$=0V, $V_{DS}$=0V, f=1.0MHz | | 4.95 | | Ω |
| **DYNAMIC PARAMETERS** | | | | | | |
| Input Capacitance | $C_{ISS}$ | $V_{GS}$=0V, $V_{DS}$=-20V, f=1.0MHz | | 1090 | | pF |
| Output Capacitance | $C_{OSS}$ | | | 175 | | |
| Reverse Transfer Capacitance | $C_{RSS}$ | | | 91 | | |
| **GATE CHARGE** (Note 2) | | | | | | |
| Total Gate Charge | $Q_G$ ($V_{GS}$=-10V) | $V_{DS}$=0.5$V_{(BR)DSS}$, $I_D$=-18A | | 17 | | nC |
| | $Q_G$ ($V_{GS}$=-4.5V) | | | 8.5 | | |
| Gate to Source Charge | $Q_{GS}$ | | | 5.5 | | |
| Gate to Drain Charge | $Q_{GD}$ | | | 3 | | |
| **SWITCHING PARAMETERS** (Note 2) | | | | | | |
| Turn-ON Delay Time | $t_{D(ON)}$ | $V_{GS}$=-10V, $V_{DS}$=-20V, $I_D$≈-10A, $R_{GS}$=6Ω, $R_L$=2Ω | | 6 | | ns |
| Rise Time | $t_R$ | | | 16 | | ns |
| Turn-OFF Delay Time | $t_{D(OFF)}$ | | | 26 | | ns |
| Fall-Time | $t_F$ | | | 10 | | ns |
| **SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS** | | | | | | |
| Continuous Current | $I_S$ | | | | -21 | A |
| Drain-Source Diode Forward Voltage [1] | $V_{SD}$ | $I_F$=-10A, $V_{GS}$=0V | | | -1.2 | V |
| Reverse Recovery Time | $t_{RR}$ | $I_F$=-10A, $dI_F/dt$=100A/μs | | 15.5 | | ns |
| Reverse Recovery Charge | $Q_{RR}$ | | | 7.9 | | nC |

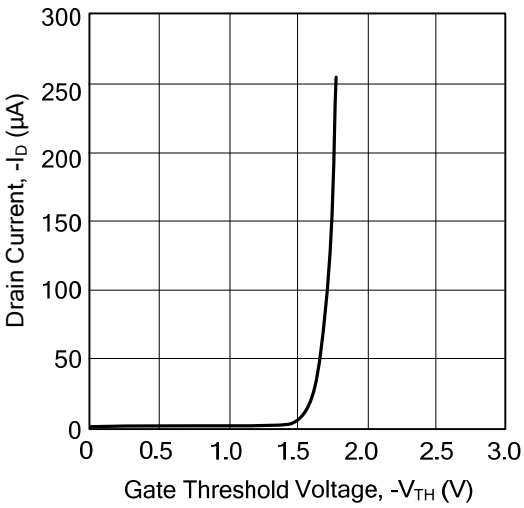
Notes: 1. Pulsde test: Pulse width ≤ 300μsec, duty cycle ≤ 2%.
2. Independent of operating temperature.

## ■ TYPICAL CHARACTERISTICS

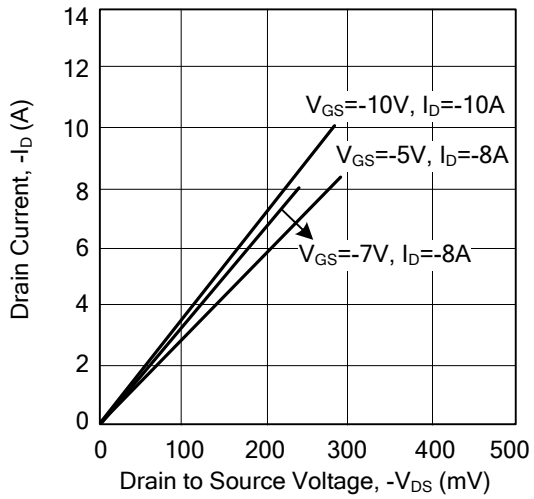
Drain Current vs. Drain-Source Breakdown Voltage




Drain Current vs. Gate Threshold Voltage




Drain-Source On-State Resistance Characteristics




Drain Current vs. Source to Drain Voltage