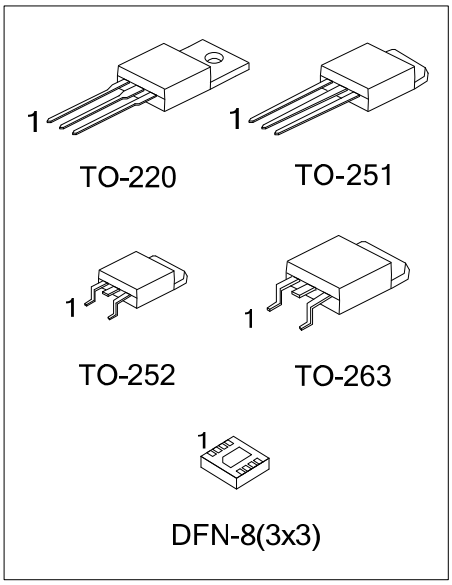
# UT40N03T

**Power MOSFET**

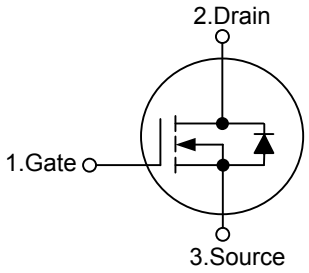
## 30V, 28A N-CHANNEL ENHANCEMENT MODE POWER MOSFET




### ■ FEATURES

* $R_{DS(ON)}$ < 25mΩ @$V_{GS}$ = 10 V
* Low capacitance
* Optimized gate charge
* Fast switching capability
* Avalanche energy specified

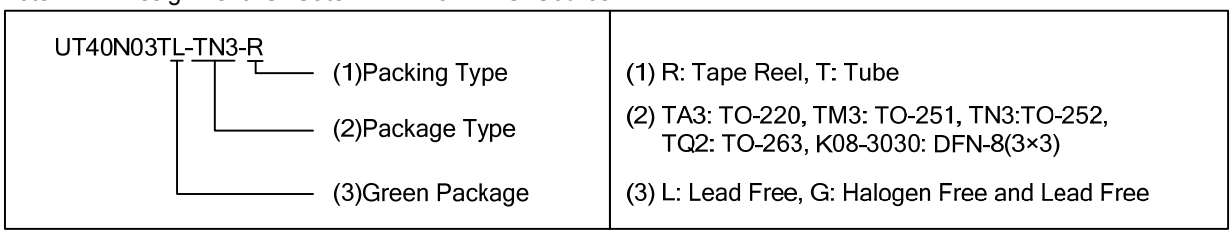
### ■ SYMBOL



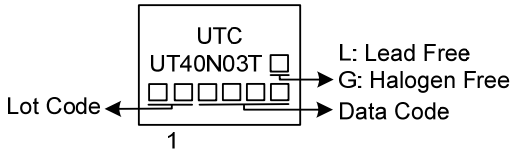
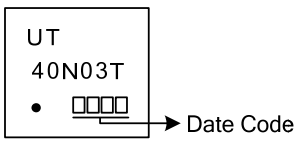

### ■ ORDERING INFORMATION

| Ordering Number | | Package | Pin Assignment | | | | | | | | Packing |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lead Free | Halogen Free | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| UT40N03TL-TA3-T | UT40N03TG-TA3-T | TO-220 | G | D | S | - | - | - | - | - | Tube |
| UT40N03TL-TM3-T | UT40N03TG-TM3-T | TO-251 | G | D | S | - | - | - | - | - | Tube |
| UT40N03TL-TN3-R | UT40N03TG-TN3-R | TO-252 | G | D | S | - | - | - | - | - | Tape Reel |
| UT40N03TL-TQ2-R | UT40N03TG-TQ2-R | TO-263 | G | D | S | - | - | - | - | - | Tape Reel |
| UT40N03TL-TQ2-T | UT40N03TG-TQ2-T | TO-263 | G | D | S | - | - | - | - | - | Tube |
| - | UT40N03TG-K08-3030-R | DFN-8(3×3) | S | S | S | G | D | D | D | D | Tape Reel |

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




### ■ MARKING

| TO-220 / TO-251 / TO-252 / TO-263 | DFN-8(3×3) |
|---|---|
|  |  |

## ■ ABSOLUTE MAXIMUM RATINGS

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DSS}$ | 30 | V |
| Gate-Source Voltage | | $V_{GSS}$ | ±25 | V |
| Continuous Drain Current | | $I_D$ | 28 | A |
| Pulsed Drain Current | | $I_{DM}$ | 95 | A |
| Total Power Dissipation | TO-220/TO-263 | $P_D$ | 31.25 | W |
| | TO-251/ TO-252<br>DFN-8(3×3) | | 41 | |
| Junction Temperature | | $T_J$ | +150 | °C |
| Storage Temperature | | $T_{STG}$ | -55 ~ +150 | °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 | TO-220/TO-263 | $\theta_{JA}$ | 62 | °C/W |
| | TO-251/ TO-252 | | 60 | |
| | DFN-8(3×3) | | 65 | |
| Junction to Case | TO-220/TO-263 | $\theta_{JC}$ | 4 | °C/W |
| | TO-251/ TO-252<br>DFN-8(3×3) | | 3 | |

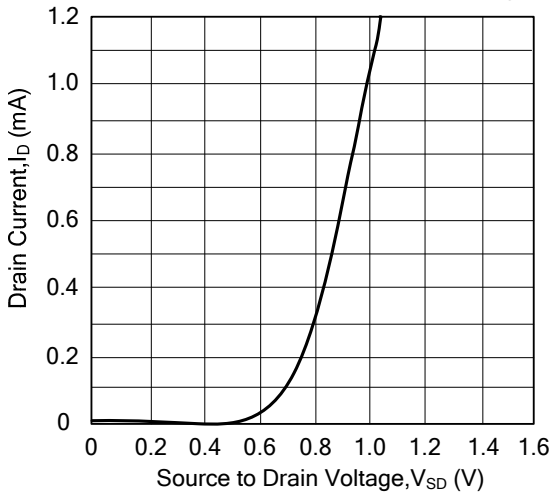
## ■ ELECTRICAL CHARACTERISTICS ($T_J$ =25°C, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$ =0 V, $I_D$ =250μA | 30 | | | V |
| Drain-Source Leakage Current | $I_{DSS}$ | $V_{DS}$=30V,$V_{GS}$ =0V,$T_J$ =25°C | | | 1 | μA |
| Gate-Source Leakage Current | $I_{GSS}$ | $V_{GS}$ = ±25 V | | | ±100 | nA |
| Breakdown Voltage Temperature Coefficient | $\Delta BV_{DSS}/\Delta T_J$ | Reference to 25°C, $I_D$=1mA | | 0.032 | | V/°C |
| **ON CHARACTERISTICS** | | | | | | |
| Gate-Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}$ =$V_{GS}$, $I_D$ =250 μA | 1 | | 3 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}$ =10 V, $I_D$ =18 A | | | 25 | mΩ |
| | | $V_{GS}$ =4.5 V, $I_D$ =14 A | | | 45 | |
| **DYNAMIC PARAMETERS** | | | | | | |
| Input Capacitance | $C_{ISS}$ | $V_{DS}$=25V, $V_{GS}$ =0V, f=1.0MHz | | 655 | | pF |
| Output Capacitance | $C_{OSS}$ | | | 145 | | |
| Reverse Transfer Capacitance | $C_{RSS}$ | | | 95 | | |
| **SWITCHING PARAMETERS** | | | | | | |
| Turn-ON Delay Time | $t_{D(ON)}$ | $V_{GS}$=10V,$V_{DS}$=15V, $R_D$=0.83Ω, $I_D$ =18 A, $R_G$ =3.3 Ω | | 6 | | ns |
| Turn-ON Rise Time | $t_R$ | | | 62 | | |
| Turn-OFF Delay Time | $t_{D(OFF)}$ | | | 16 | | |
| Turn-OFF Fall-Time | $t_F$ | | | 4.4 | | |
| Total Gate Charge | $Q_G$ | $V_{DS}$ =20V, $V_{GS}$ =4.5V, $I_D$ =18A | | 8.8 | | nC |
| Gate-Source Charge | $Q_{GS}$ | | | 2.5 | | |
| Gate-Drain Charge | $Q_{GD}$ | | | 5.8 | | |
| **SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS** | | | | | | |
| Drain-Source Diode Forward Voltage | $V_{SD}$ | $I_S$=28 A, $V_{GS}$=0V | | | 1.3 | V |
| Maximum Continuous Drain-Source Diode Forward Current | $I_S$ | $V_D$=$V_G$=0V , $V_S$=1.3V | | | 28 | A |
| Maximum Pulsed Drain-Source Diode Forward Current | $I_{SM}$ | | | | 95 | A |

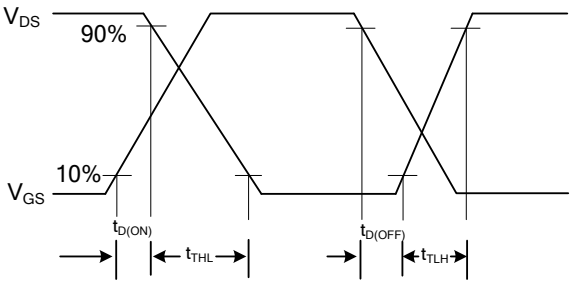
Notes: 1. Pulse width limited by $T_{J(MAX)}$.
2. Pulse width ≤ 300us, duty cycle ≤ 2%.

## ■ TYPICAL CHARACTERISTICS

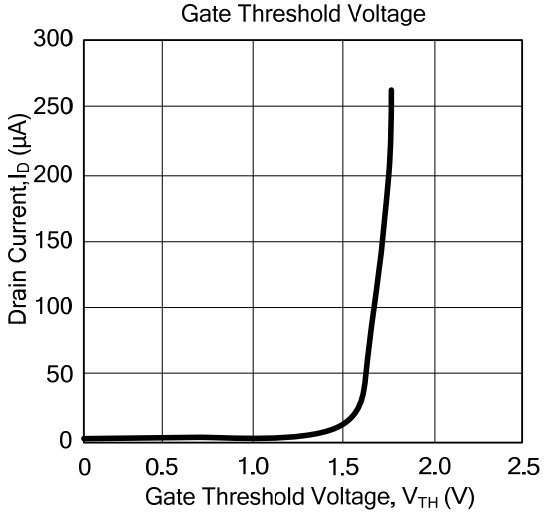
Drain Current vs. Source to Drain Voltage



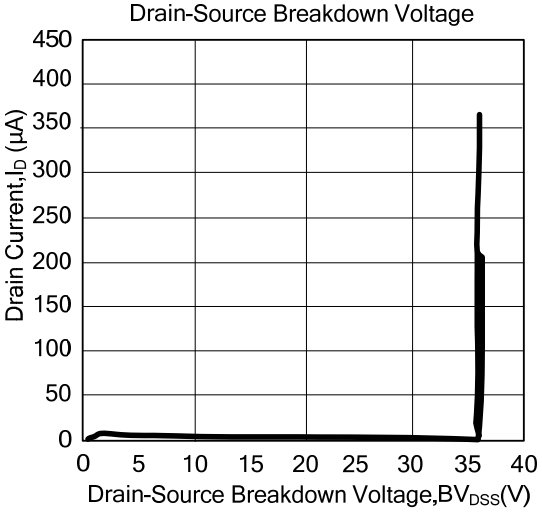

Switching Time Waveforms




Drain Current vs.
Gate Threshold Voltage




Drain Current vs.
Drain-Source Breakdown Voltage




Drain-Source On-State
Resistance Characteristics