



UT50N03

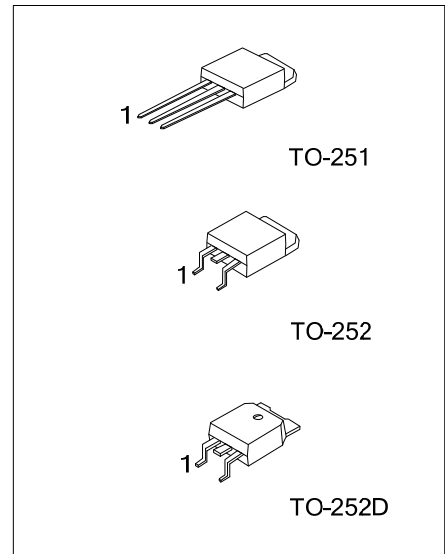
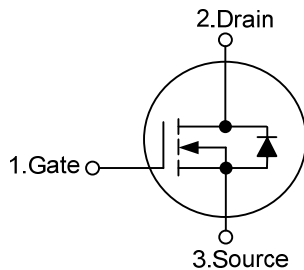
Power MOSFET

50A, 30V N-CHANNEL POWER MOSFET

■ **FEATURES**

- * $R_{DS(ON)} < 14\text{ m}\Omega$ @ $V_{GS} = 10\text{ V}$, $I_D = 30\text{ A}$
- * Low capacitance
- * Optimized gate charge
- * Fast switching capability
- * Avalanche energy specified

■ **SYMBOL**



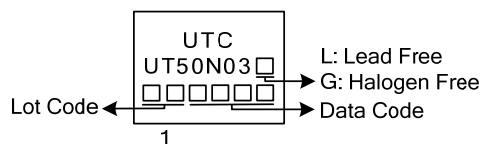
■ **ORDERING INFORMATION**

| Ordering Number | | Package | Pin Assignment | | | Packing |
|-----------------|----------------|---------|----------------|---|---|-----------|
| Lead Free | Halogen Free | | 1 | 2 | 3 | |
| UT50N03L-TM3-T | UT50N03G-TM3-T | TO-251 | G | D | S | Tube |
| UT50N03L-TN3-R | UT50N03G-TN3-R | TO-252 | G | D | S | Tape Reel |
| UT50N03L-TND-R | UT50N03G-TND-R | TO-252D | G | D | S | Tape Reel |

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

| | |
|---|---|
| <p>UT50N03L-TM3-T</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p> | <p>(1) T: Tube, R: Tape Reel (2) TM3: TO-251, TN3: TO-252, TND: TO-252D (3) L: Lead Free, G: Halogen Free and Lead Free</p> |
|---|---|

■ **MARKING**



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

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---|-----------|------------|------------------|
| Drain-Source Voltage | V_{DSS} | 30 | V |
| Gate-Source Voltage | V_{GSS} | ± 20 | V |
| Continuous Drain Current | I_D | 50 | A |
| Pulsed Drain Current (Note 2) | I_{DM} | 180 | A |
| Single Pulsed Avalanche Energy (Note 3) | E_{AS} | 45 | mJ |
| Power Dissipation | P_D | 50 | W |
| Junction Temperature | T_J | +150 | $^\circ\text{C}$ |
| Storage Temperature | T_{STG} | -55 ~ +150 | $^\circ\text{C}$ |

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. Repetitive Rating: Pulse width limited by maximum junction temperature.

3. $L = 0.1\text{mH}$, $I_{AS} = 30\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$.

■ THERMAL DATA

| PARAMETER | SYMBOL | RATINGS | UNIT |
|------------------------------|---------------|---------|--------------------|
| Junction to Ambient (Note 3) | θ_{JA} | 71.4 | $^\circ\text{C/W}$ |
| Junction to Case | θ_{JC} | 3.0 | $^\circ\text{C/W}$ |

Note: Surface-mounted on FR4 board using 1 sq in pad, 1 oz Cu

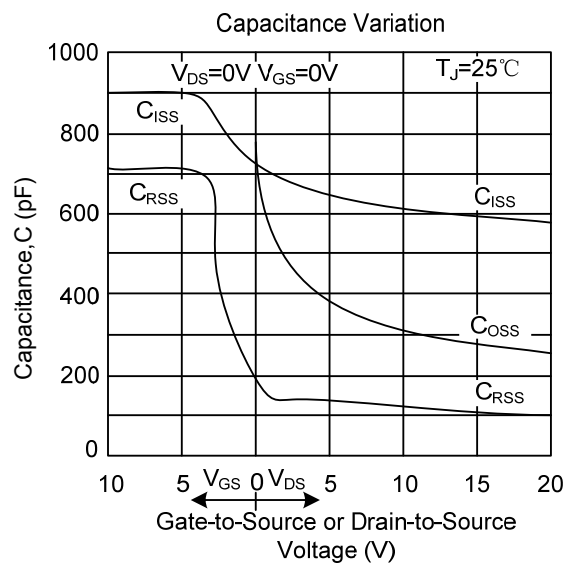
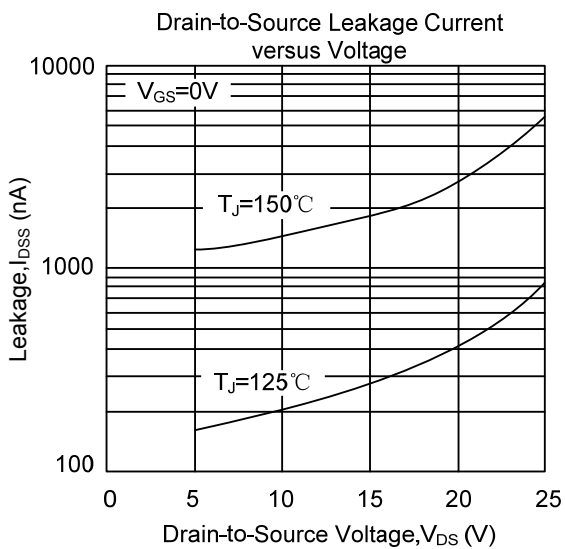
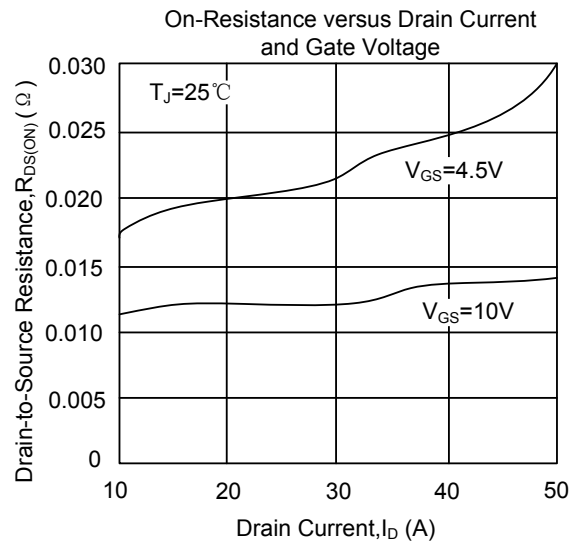
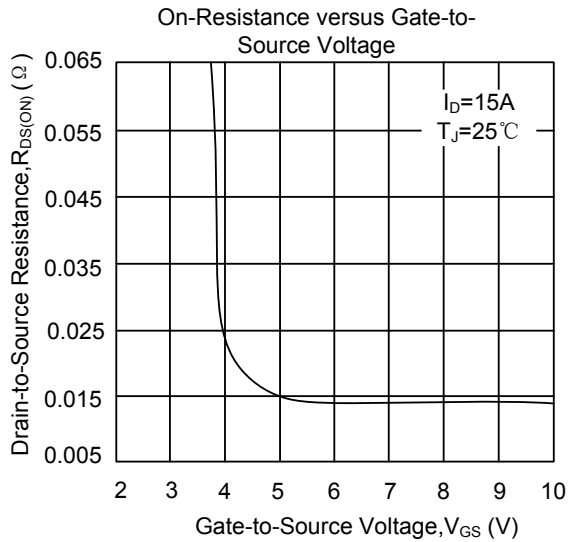
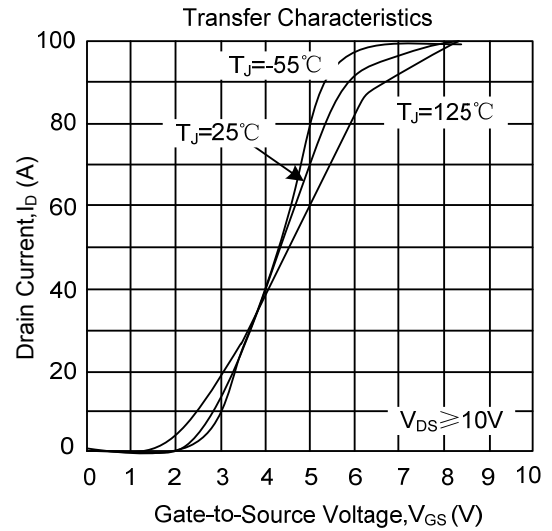
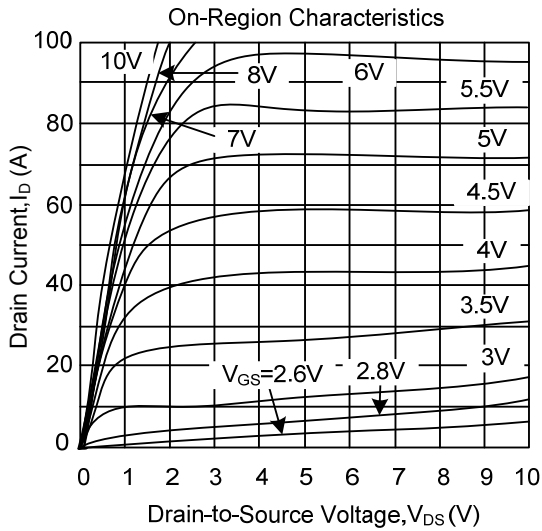
■ ELECTRICAL CHARACTERISTICS (T_J = 25°C, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--|---------------------|---|-----------------------|------|------|------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} = 0V, I _D = 250 μA | 30 | | | V |
| Drain-Source Leakage Current | I _{DSS} | V _{DS} = 20V, V _{GS} = 0V | | | 1.5 | μA |
| Gate-Source Leakage Current | I _{GSS} | V _{DS} = 0V, V _{GS} = ±20V | | | ±100 | nA |
| ON CHARACTERISTICS | | | | | | |
| Gate-Threshold Voltage | V _{GS(TH)} | V _{DS} = V _{GS} , I _D = 250 μA | 1.0 | 1.7 | 2.0 | V |
| Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} = 11.5V | I _D = 30 A | 12 | | mΩ |
| | | | I _D = 15 A | 11.7 | | mΩ |
| | | V _{GS} = 10 V | I _D = 30 A | 12.5 | 14 | mΩ |
| | | | I _D = 15 A | 21 | 23 | mΩ |
| DYNAMIC PARAMETERS | | | | | | |
| Input Capacitance | C _{ISS} | V _{DS} = 12V, V _{GS} = 0V, f = 1MHz | | 610 | 750 | pF |
| Output Capacitance | C _{OSS} | | | 300 | | pF |
| Reverse Transfer Capacitance | C _{RSS} | | | 125 | | pF |
| SWITCHING PARAMETERS | | | | | | |
| Turn-ON Delay Time | t _{D(ON)} | V _{GS} = 4.5 V, V _{DS} = 15 V, I _D = 30 A, R _G = 3.0Ω | | 8.2 | | ns |
| Turn-ON Rise Time | t _R | | | 9.6 | | ns |
| Turn-OFF Delay Time | t _{D(OFF)} | | | 11.2 | | ns |
| Turn-OFF Fall-Time | t _F | | | 6.8 | | ns |
| Turn-ON Delay Time | t _{D(ON)} | V _{GS} = 11.5 V, V _{DS} = 15 V, I _D = 30 A, R _G = 3.0Ω | | 5.0 | | ns |
| Turn-ON Rise Time | t _R | | | 84 | | ns |
| Turn-OFF Delay Time | t _{D(OFF)} | | | 15 | | ns |
| Turn-OFF Fall-Time | t _F | | | 4.0 | | ns |
| Total Gate Charge | Q _G | V _{DS} = 15V, V _{GS} = 4.5V, I _D = 30 A | | 6.0 | 10 | nC |
| Gate-to-Source Charge | Q _{GS} | | | 1.9 | | nC |
| Gate-to-Drain Charge | Q _{GD} | | | 3.7 | | nC |
| Total Gate Charge | Q _G | V _{DS} = 15V, V _{GS} = 11.5V, I _D = 30 A | | 15 | | nC |
| Gate-to-Source Charge | Q _{GS} | | | 1.9 | | nC |
| Gate-to-Drain Charge | Q _{GD} | | | 3.9 | | nC |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS | | | | | | |
| Drain-Source Diode Forward Voltage | V _{SD} | I _S = 30 A, V _{GS} = 0V | | 0.85 | 1.1 | V |
| Maximum Continuous Drain-Source Diode Forward Current | I _S | | | | 45 | A |
| Reverse Recovery Time | t _{rr} | I _S = 30 A, V _{GS} = 0 V, | | 24 | | ns |
| Reverse Recovery Charge | Q _{RR} | dI / dt = 100 A/μs | | 14 | | nC |

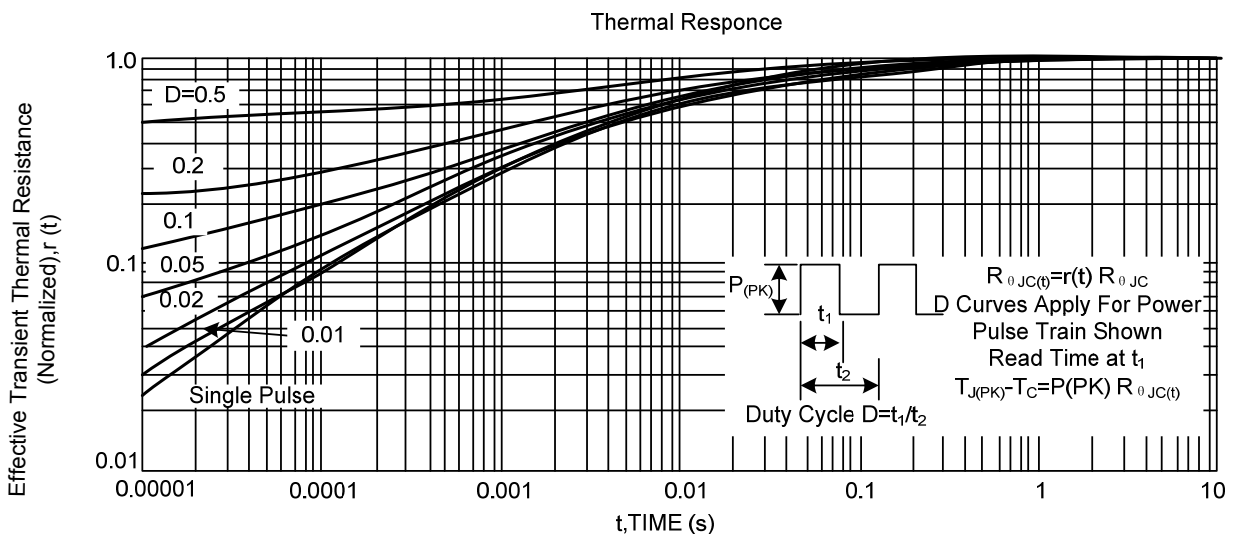
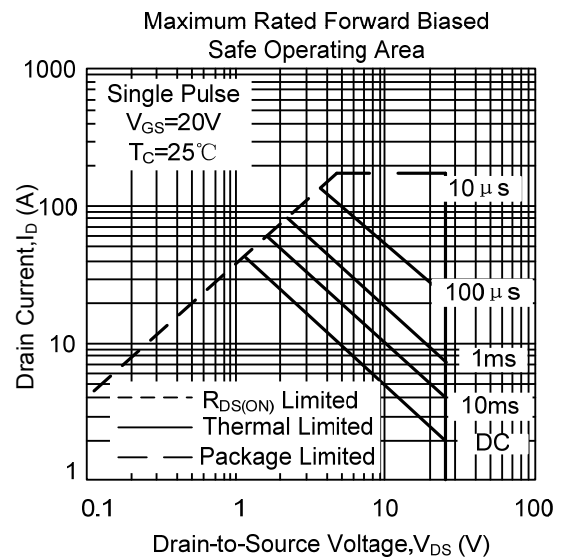
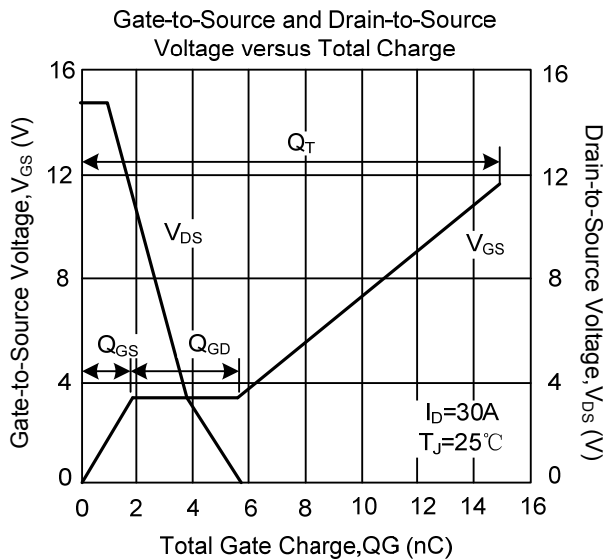
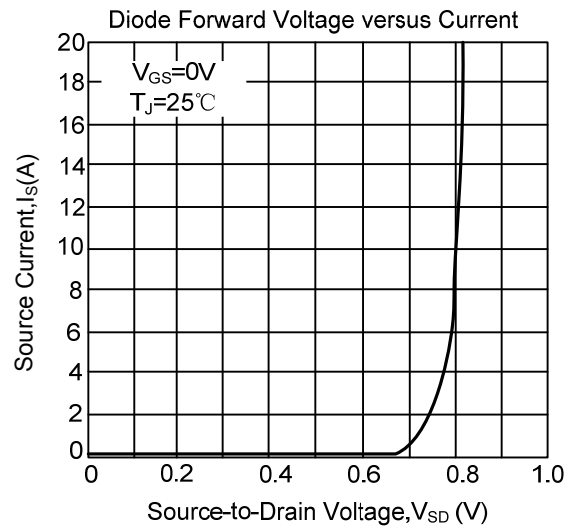
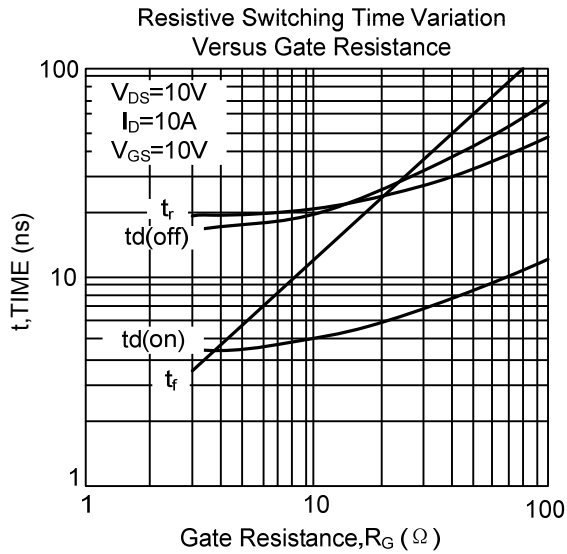
Notes: 1. Pulse width limited by T_{J(MAX)}

2. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycles ≤ 2%

TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS(Cont.)



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