



15N10

Power MOSFET

14.7A, 100V (D-S) N-CHANNEL POWER MOSFET

■ DESCRIPTION

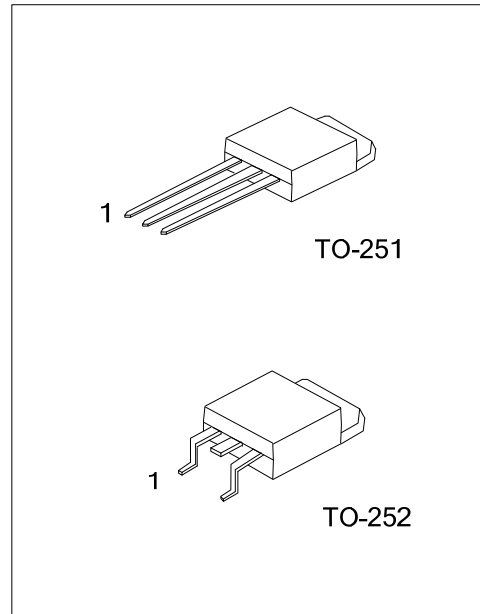
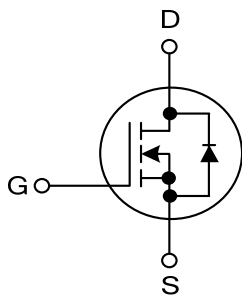
The UTC **15N10** is an N-Channel enhancement MOSFET, it uses UTC's advanced technology to provide customers with a minimum on-state resistance, high switching speed and low gate charge.

The UTC **15N10** is suitable for high efficiency switching DC/DC converter, LCD display inverter and load switch.

■ FEATURES

- * $R_{DS(ON)}=0.08\Omega$ @ $V_{GS}=10V, I_D=8A$
- * Low gate charge (Typ=24nC)
- * Low C_{RSS} (Typ=23pF)
- * High switching speed

■ SYMBOL



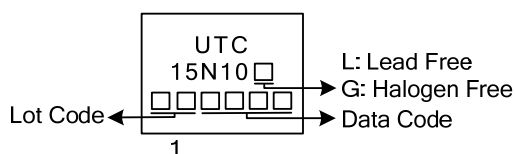
■ ORDERING INFORMATION

| Ordering Number | | Package | Pin Assignment | | | Packing |
|-----------------|--------------|---------|----------------|---|---|-----------|
| Lead Free | Halogen Free | | 1 | 2 | 3 | |
| 15N10L-TM3-T | 15N10G-TM3-T | TO-251 | G | D | S | Tube |
| 15N10L-TN3-R | 15N10G-TN3-R | TO-252 | G | D | S | Tape Reel |

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

| | |
|--|--|
| <p>15N10L-TM3-T</p> <ul style="list-style-type: none"> (1)Packing Type (2)Package Type (3)Green Package | <ul style="list-style-type: none"> (1) T: Tube, R: Tape Reel (2) TM3: TO-251, TN3: TO-252 (3) L: Lead Free, G: Halogen Free and Lead Free |
|--|--|

■ MARKING



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

| PARAMETER | | SYMBOL | RATINGS | UNIT | |
|--------------------------------|------------|-----------|---|------------------|---|
| Drain-Source Voltage | | V_{DSS} | 100 | V | |
| Gate-Source Voltage | | V_{GSS} | ± 20 | V | |
| Drain Current | Continuous | I_D | $T_C=25^\circ\text{C}, T_J=150^\circ\text{C}$ | 14.7 | A |
| | | | $T_C=70^\circ\text{C}, T_J=150^\circ\text{C}$ | 13.6 | A |
| | Pulsed | I_{DM} | 59 | A | |
| Power Dissipation | | P_D | $T_C=25^\circ\text{C}$ | 34.7 | W |
| | | | $T_C=70^\circ\text{C}$ | 22.2 | W |
| Operating Junction Temperature | | T_J | -55 ~ +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 CHARACTERISTICS ($T_A=25^\circ\text{C}$, unless otherwise noted)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|-------------------------|---------------|---------|--------------------|
| Junction to Case (Note) | θ_{JC} | 3.6 | $^\circ\text{C/W}$ |

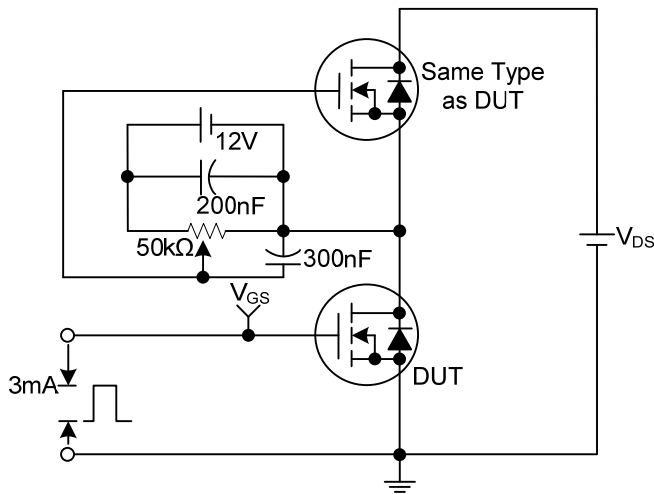
Note: The device mounted on 1in² FR4 board with 2 oz copper.

■ ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$, unless otherwise specified)

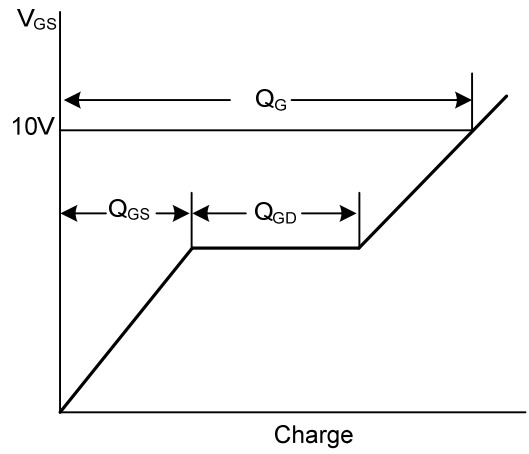
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--|--------------|---|---|-----|------|---------------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $I_D=250\mu\text{A}, V_{GS}=0\text{V}$ | 100 | | | V |
| Drain-Source Leakage Current | I_{DSS} | $V_{DS}=80\text{V}, V_{GS}=0\text{V}$ | | | 1 | μA |
| Gate-Source Leakage Current | I_{GSS} | $V_{GS}=+20\text{V}, V_{DS}=0\text{V}$ | | | +100 | nA |
| | | $V_{GS}=-20\text{V}, V_{DS}=0\text{V}$ | | | -100 | nA |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}=V_{GS}, I_D=250\mu\text{A}$ | 1.0 | | 3.0 | V |
| Drain-Source On-State Resistance (Note) | $R_{DS(ON)}$ | $V_{GS}=10\text{V}, I_D=8\text{A}$ | | 80 | 100 | m Ω |
| DYNAMIC PARAMETERS | | | | | | |
| Input Capacitance | C_{ISS} | $V_{GS}=0\text{V}, V_{DS}=15\text{V}, f=1\text{MHz}$ | | 890 | | pF |
| Output Capacitance | C_{OSS} | | | 58 | | pF |
| Reverse Transfer Capacitance | C_{RSS} | | | 23 | | pF |
| SWITCHING PARAMETERS | | | | | | |
| Total Gate Charge | Q_G | $V_{GS}=10\text{V}, V_{DS}=80\text{V}, I_D=10\text{A}$ | | 24 | | nC |
| Total Gate Charge | Q_G | $V_{GS}=4.5\text{V}, V_{DS}=80\text{V}, I_D=10\text{A}$ | | 13 | | nC |
| Gate to Source Charge | Q_{GS} | | | 4.6 | | nC |
| Gate to Drain Charge | Q_{GD} | | | 7.6 | | nC |
| Gate-Resistance | R_G | | $V_{DS}=0\text{V}, V_{GS}=0\text{V}, f=1\text{MHz}$ | | 0.9 | |
| Turn-ON Delay Time | $t_{D(ON)}$ | $V_{DS}=50\text{V}, R_L=5\Omega, V_{GEN}=10\text{V}, R_G=1\Omega$ | | 14 | | ns |
| Rise Time | t_R | | | 33 | | ns |
| Turn-OFF Delay Time | $t_{D(OFF)}$ | | | 39 | | ns |
| Fall-Time | t_F | | | 5 | | ns |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS | | | | | | |
| Drain-Source Diode Forward Voltage | V_{SD} | $I_S=8\text{A}, V_{GS}=0\text{V}$ | | 0.9 | 1.2 | V |

Note: Pulse test: pulse width $\leq 300\mu\text{s}$, duty cycles $\leq 2\%$, Guaranteed by design, not subject to production testing.

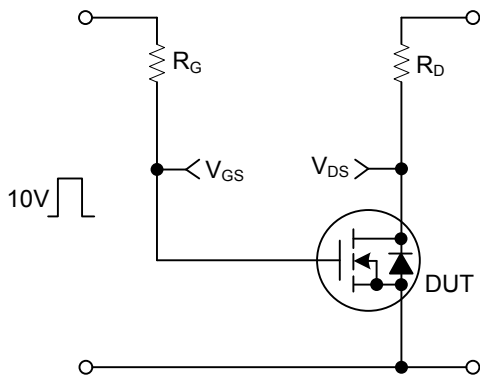
■ TEST CIRCUITS AND WAVEFORMS



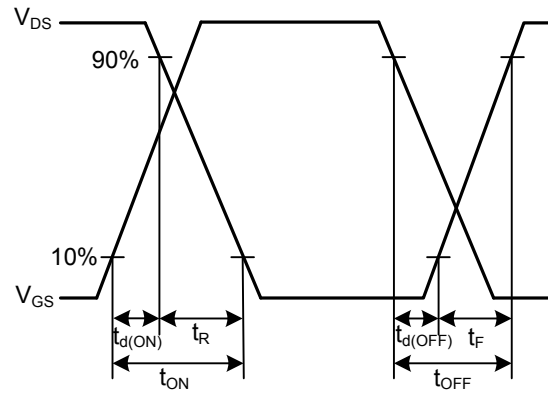
Gate Charge Test Circuit



Gate Charge Waveforms

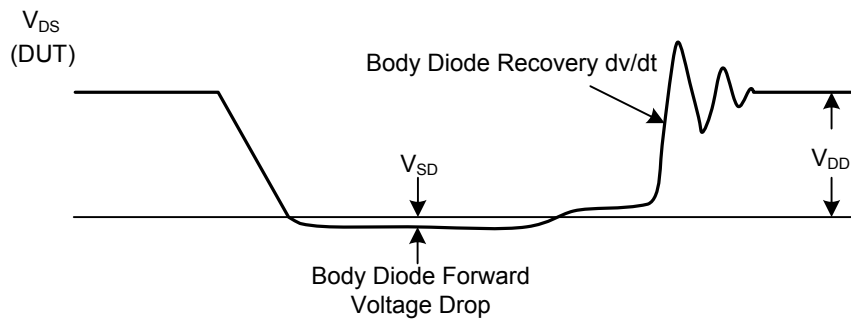
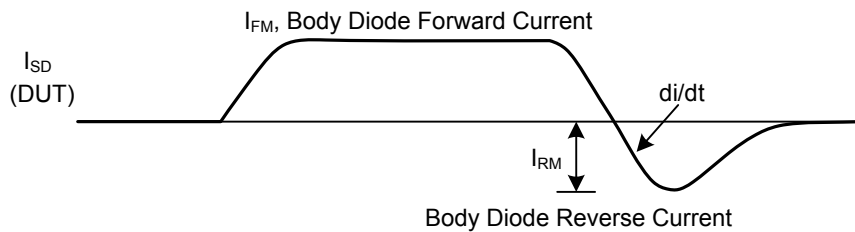
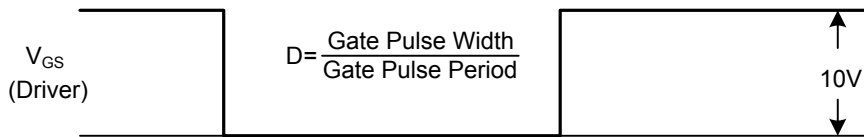
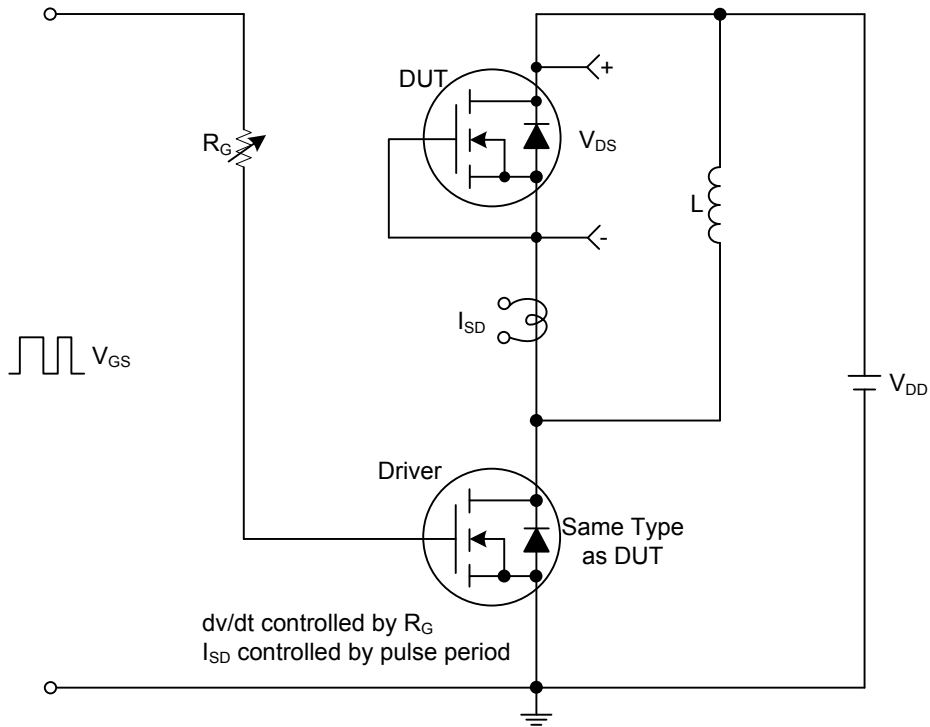


Resistive Switching Test Circuit



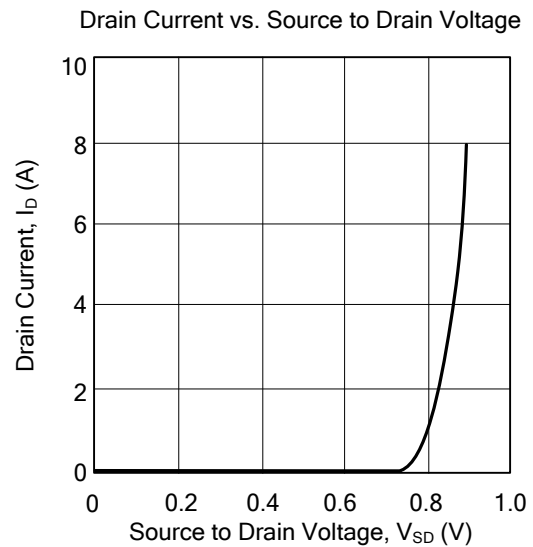
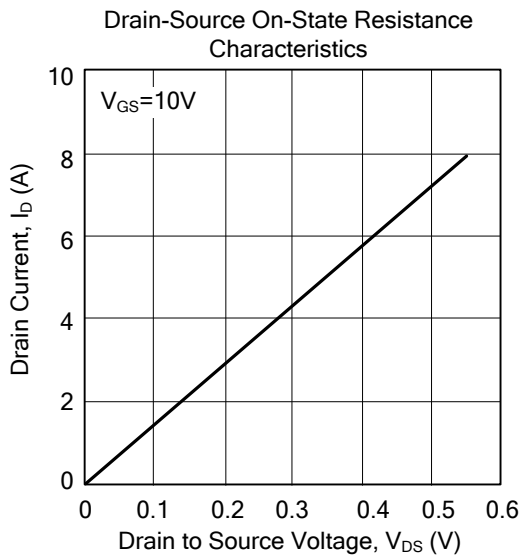
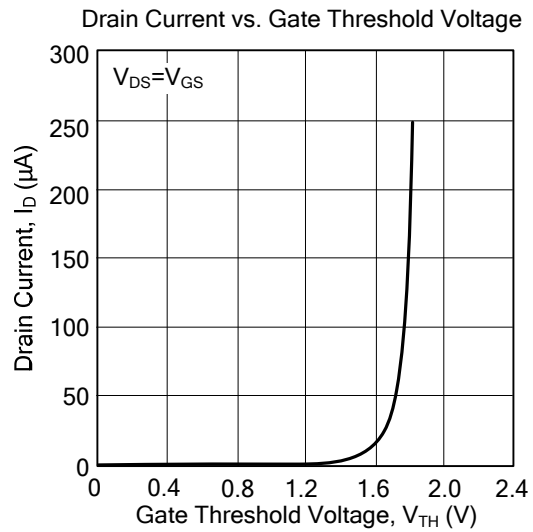
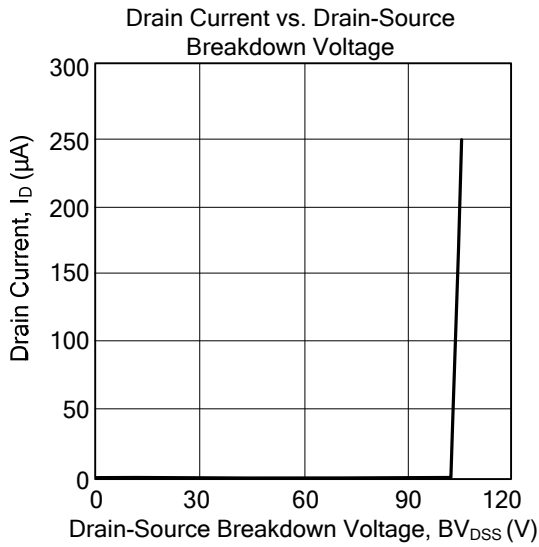
Resistive Switching Waveforms

■ TEST CIRCUITS AND WAVEFORMS



Peak Diode Recovery dv/dt Test Circuit and Waveforms

■ TYPICAL CHARACTERISTICS



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