



UF3710-S

Power MOSFET

57A, 100V N-CHANNEL POWER MOSFET

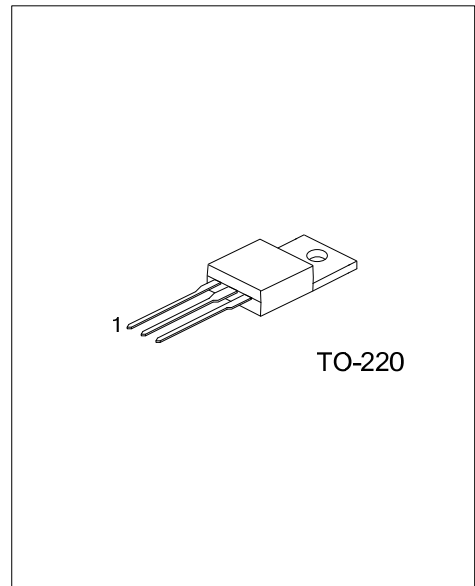
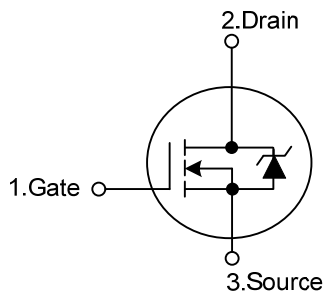
■ DESCRIPTION

The UTC **UF3710-S** uses advanced process technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.

■ FEATURES

- * $R_{DS(ON)} < 23m\Omega @ V_{GS} = 10 V$
- * Ultra low gate charge (typical 218 nC)
- * Low reverse transfer Capacitance ($C_{RSS} =$ typical 37 pF)
- * Fast switching capability
- * Avalanche energy Specified
- * Improved dv/dt capability, high ruggedness

■ SYMBOL



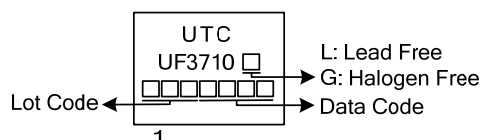
■ ORDERING INFORMATION

| Ordering Number | | Package | Pin Assignment | | | Packing |
|-----------------|---------------|---------|----------------|---|---|---------|
| Lead Free | Halogen Free | | 1 | 2 | 3 | |
| UF3710L-TA3-T | UF3710G-TA3-T | TO-220 | G | D | S | Tube |

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

| | |
|--|--|
| <p>UF3710G-TA3-T</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p> | <p>(1) T: Tube</p> <p>(2) TA3: TO-220</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p> |
|--|--|

■ MARKING



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

| PARAMETER | SYMBOL | RATINGS | UNIT |
|----------------------------|------------------------------------|------------|--------------------|
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain-Source Voltage | V_{DSS} | 100 | V |
| Drain Current | Continuous ($V_{GS}=10\text{V}$) | I_D | 57 |
| | Pulsed (Note 2) | I_{DM} | 230 |
| Avalanche Current (Note 2) | I_{AR} | 57 | A |
| Avalanche Energy | Single Pulsed (Note 3) | E_{AS} | 570 (Note 4) |
| Power Dissipation | P_D | 165 | 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. $L=0.35\text{mH}$, $I_{AS}=57\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\ \Omega$, Starting $T_J = 25^{\circ}\text{C}$
 4. This is a typical value at device destruction and represents operation outside rated limits.

■ THERMAL DATA

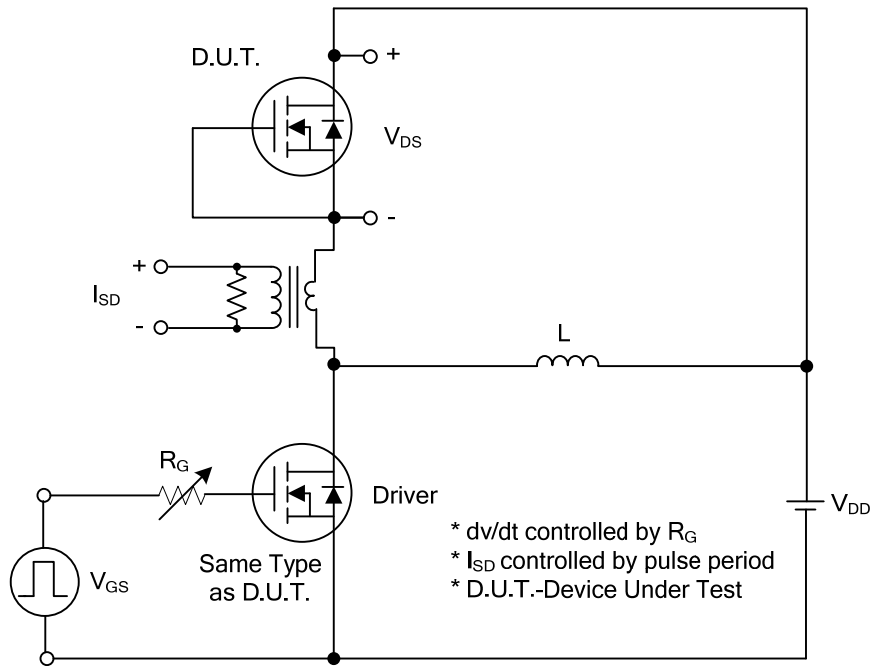
| PARAMETER | SYMBOL | RATINGS | UNIT |
|---------------------|---------------|---------|----------------------|
| Junction to Ambient | θ_{JA} | 62 | $^{\circ}\text{C/W}$ |
| Junction to Case | θ_{JC} | 0.75 | $^{\circ}\text{C/W}$ |

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

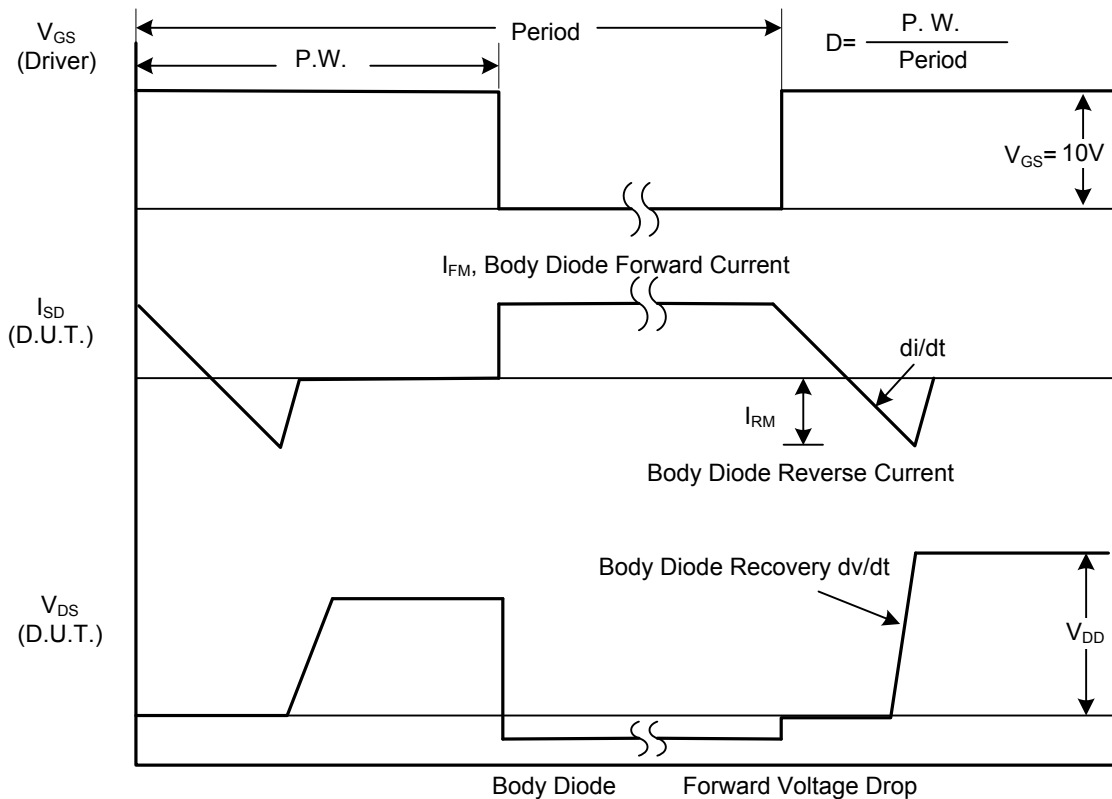
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--|--------------|--|-----|------|-----------|---------------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0\text{V}$, $I_D=250\ \mu\text{A}$ | 100 | | | V |
| Drain-Source Leakage Current | I_{DSS} | $V_{DS}=100\text{V}$, $V_{GS}=0\text{V}$ | | | 25 | μA |
| Gate-Source Leakage Current | I_{GSS} | $V_{GS}=\pm 20\text{V}$, $V_{DS}=0\text{V}$ | | | ± 100 | nA |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}=V_{GS}$, $I_D=250\ \mu\text{A}$ | 2.0 | | 4.0 | V |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}=10\text{V}$, $I_D=28\text{A}$ (Note) | | | 23 | m Ω |
| DYNAMIC PARAMETERS | | | | | | |
| Input Capacitance | C_{ISS} | $V_{DS}=25\text{V}$, $V_{GS}=0\text{V}$, $f=1\text{MHz}$ | | 3384 | | pF |
| Output Capacitance | C_{OSS} | | | 380 | | pF |
| Reverse Transfer Capacitance | C_{RSS} | | | 37 | | pF |
| SWITCHING PARAMETERS | | | | | | |
| Total Gate Charge | Q_G | $V_{DS}=50\text{V}$, $I_D=1.3\text{A}$, $V_{GS}=10\text{V}$ | | 218 | | nC |
| Gate Source Charge | Q_{GS} | | | 15 | | nC |
| Gate Drain Charge | Q_{GD} | | | 19 | | nC |
| Turn-ON Delay Time | $t_{D(ON)}$ | $V_{DD}=30\text{V}$, $I_D=0.5\text{A}$, $R_G=25\ \Omega$ $V_{GS}=10\text{V}$ (Note) | | 72 | | ns |
| Turn-ON Rise Time | t_R | | | 69 | | ns |
| Turn-OFF Delay Time | $t_{D(OFF)}$ | | | 1000 | | ns |
| Turn-OFF Fall-Time | t_F | | | 165 | | ns |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS | | | | | | |
| Maximum Continuous Drain-Source Diode Forward Current | I_S | MOSFET symbol showing the integral reverse P-N junction diode. | | | 57 | A |
| Maximum Pulsed Drain-Source Diode Forward Current | I_{SM} | | | | 230 | A |
| Diode Forward Voltage | V_{SD} | $I_S=57\text{A}$, $V_{GS}=0\text{V}$ (Note) | | | 1.2 | V |
| Body Diode Reverse Recovery Time | t_{rr} | $I_F=28\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$ (Note) | | 80 | | ns |
| Body Diode Reverse Recovery Charge | Q_{rr} | | | 277 | | nC |

Note: Pulse width $\leq 400\ \mu\text{s}$; duty cycle $\leq 2\%$.

■ TEST CIRCUITS AND WAVEFORMS

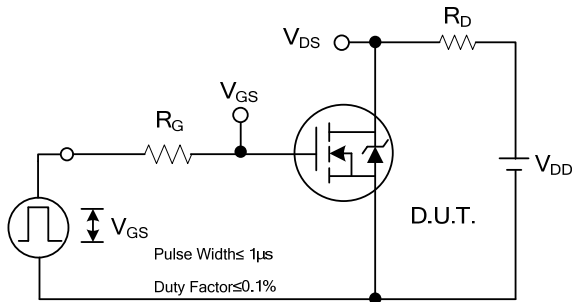


Peak Diode Recovery dv/dt Test Circuit

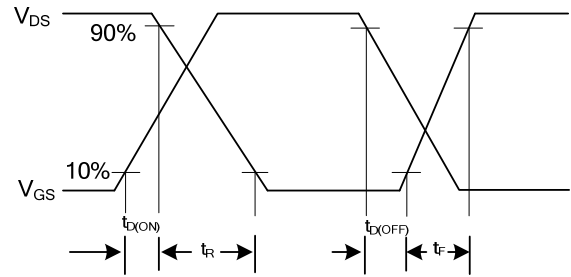


Peak Diode Recovery dv/dt Waveforms

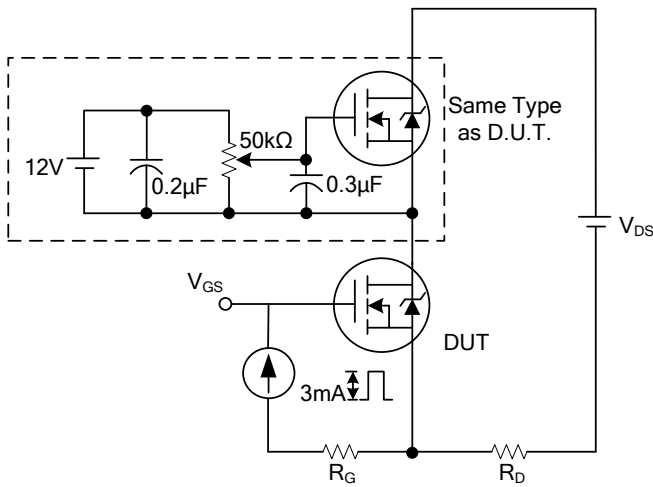
TEST CIRCUITS AND WAVEFORMS (Cont.)



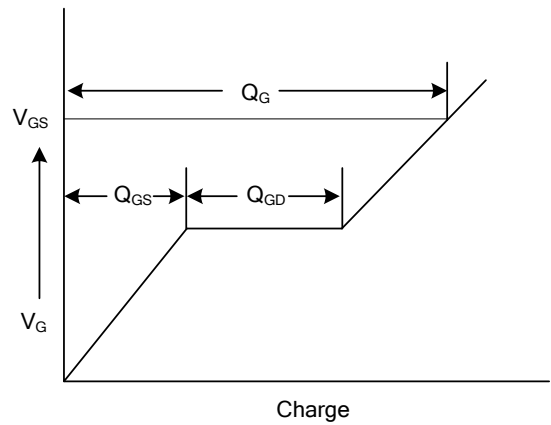
Switching Test Circuit



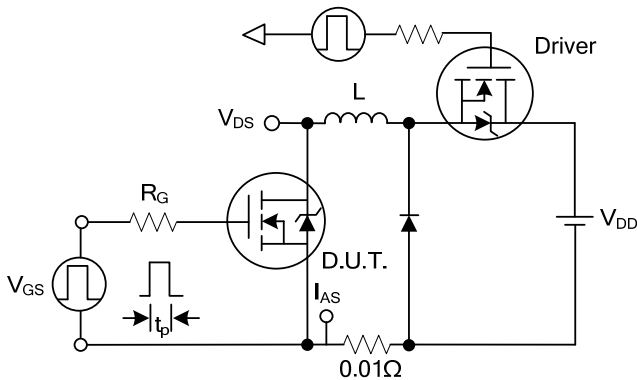
Switching Waveforms



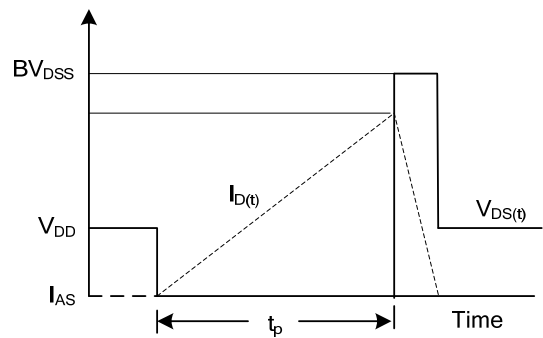
Gate Charge Test Circuit



Gate Charge Waveform

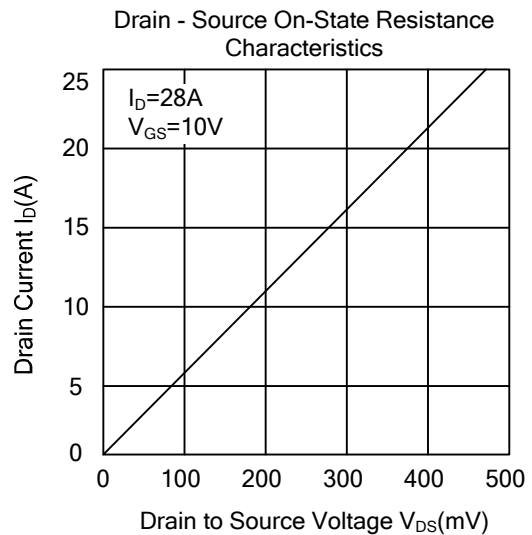
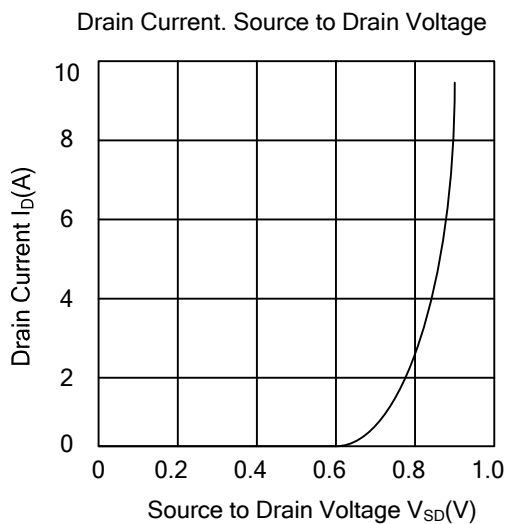
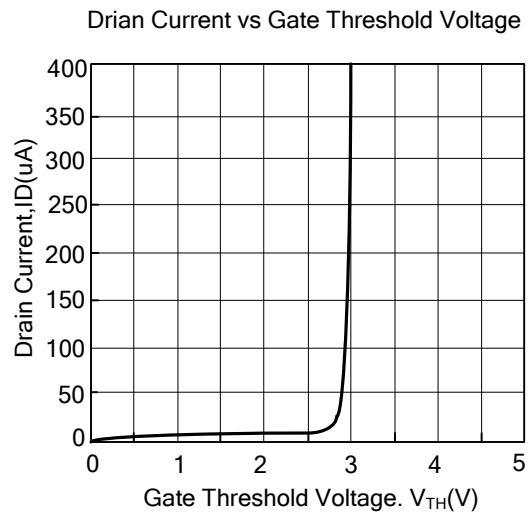
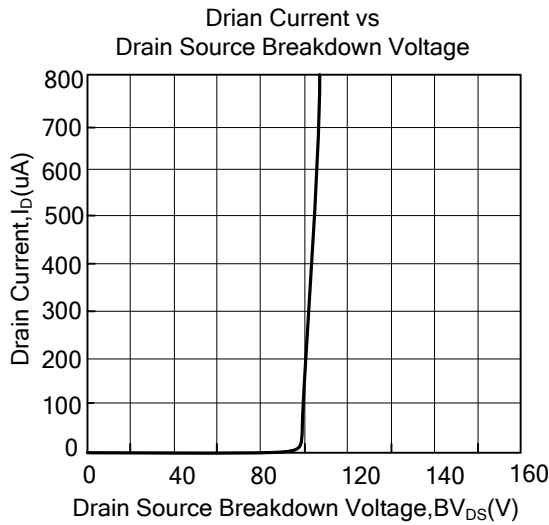


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS



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