



11N50K-MT

Preliminary

Power MOSFET

**11A, 500V N-CHANNEL
POWER MOSFET**

■ DESCRIPTION

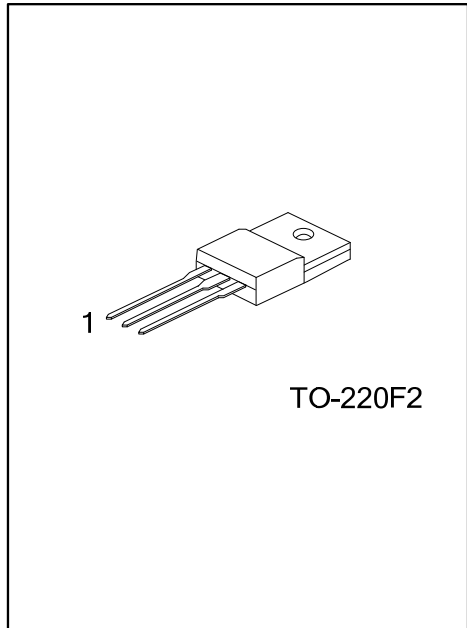
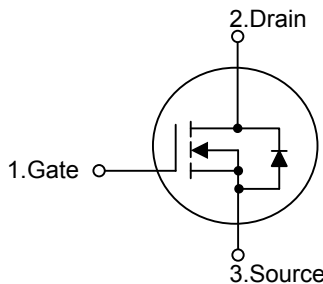
The **UTC 11N50K-MT** is a N-channel enhancement mode power MOSFET. It uses UTC advanced planar stripe, DMOS technology to provide customers perfect switching performance, minimal on-state resistance. It also can withstand high energy pulse in the avalanche and commutation mode.

The **UTC 11N50K-MT** is universally applied in electronic lamp ballasts based on half bridge topology, high efficiency switched mode power supplies, active power factor correction, etc.

■ FEATURES

- * $R_{DS(ON)} < 0.55\Omega @ V_{GS} = 10V, I_D = 5.5A$
- * Fast Switching
- * With 100% Avalanche Tested

■ SYMBOL



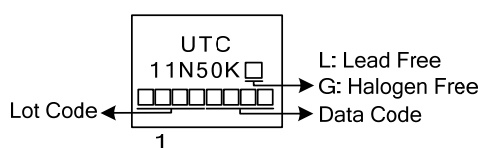
■ ORDERING INFORMATION

| Ordering Number | | Package | Pin Assignment | | | Packing |
|-----------------|---------------|----------|----------------|---|---|---------|
| Lead Free | Halogen Free | | 1 | 2 | 3 | |
| 11N50KL-TF2-T | 11N50KG-TF2-T | TO-220F2 | G | D | S | Tube |

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

| | |
|--|--|
| <p>11N50KL-TF2-T</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p> | <p>(1) T: Tube (2) TF2: TO-220F2 (3) L: Lead Free, G: Halogen Free and Lead Free</p> |
|--|--|

■ MARKING



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

| PARAMETER | SYMBOL | RATINGS | UNIT |
|--|-----------|-------------------------|------------------|
| Drain to Source Voltage | V_{DSS} | 500 | V |
| Gate to Source Voltage | V_{GSS} | ± 30 | V |
| Continuous Drain Current | I_D | $T_C=25^\circ\text{C}$ | 11 (Note 2) |
| | | $T_C=100^\circ\text{C}$ | 7 (Note 2) |
| Pulsed Drain Current (Note 3) | I_{DM} | 44 (Note 2) | A |
| Single Pulsed Avalanche Energy(Note 4) | E_{AS} | 500 | mJ |
| Peak Diode Recovery dv/dt (Note 5) | dv/dt | 4.5 | V/ns |
| 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. Drain current limited by maximum junction temperature
3. Repetitive Rating : Pulse width limited by maximum junction temperature
4. $L=8.26\text{mH}$, $I_{AS}=11\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$
5. $I_{SD}\leq 11\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$

■ THERMAL DATA

| PARAMETER | SYMBOL | RATING | UNIT |
|---------------------|---------------|--------|---------------------------|
| Junction to Ambient | θ_{JA} | 62.5 | $^\circ\text{C}/\text{W}$ |
| Junction to Case | θ_{JC} | 2.5 | $^\circ\text{C}/\text{W}$ |

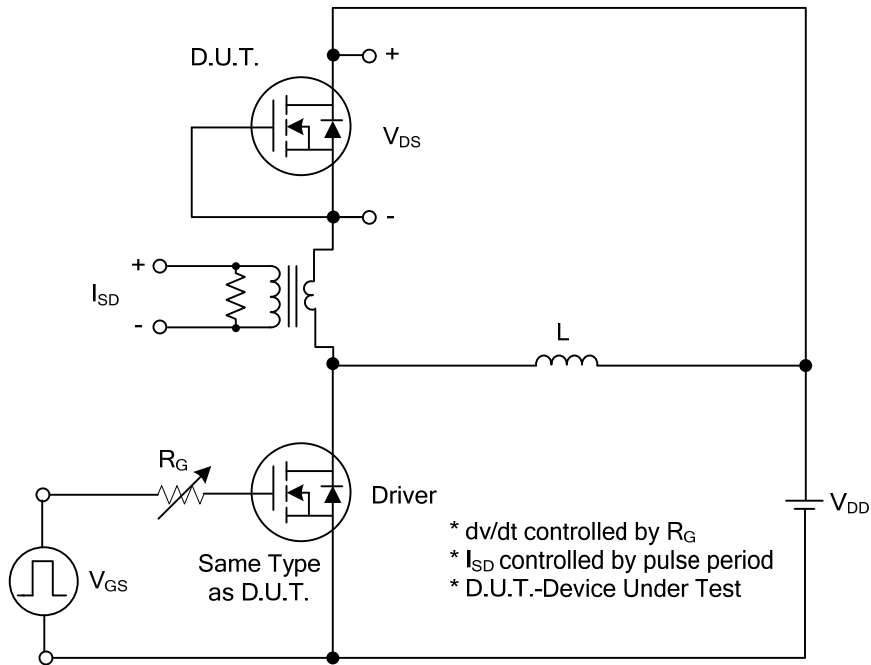
■ ELECTRICAL CHARACTERISTICS ($T_C=25^\circ\text{C}$, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--|------------------------------|--|-----|------|-----------|---------------------------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0\text{V}$, $I_D=250\mu\text{A}$ | 500 | | | V |
| Breakdown Voltage Temperature Coefficient | $\Delta BV_{DSS}/\Delta T_J$ | $I_D=250\mu\text{A}$, Referenced to 25°C | | 0.5 | | $\text{V}/^\circ\text{C}$ |
| Drain-Source Leakage Current | I_{DSS} | $V_{DS}=500\text{V}$, $V_{GS}=0\text{V}$ | | | 10 | μA |
| | | $V_{DS}=500\text{V}$, $T_J=125^\circ\text{C}$ | | | 100 | μA |
| Gate-Source Leakage Current | I_{GSS} | $V_{DS}=0\text{V}$, $V_{GS}=\pm 30\text{V}$ | | | ± 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 |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}=10\text{V}$, $I_D=5.5\text{A}$ | | 0.43 | 0.55 | Ω |
| DYNAMIC PARAMETERS | | | | | | |
| Input Capacitance | C_{ISS} | $V_{DS}=25\text{V}$, $V_{GS}=0\text{V}$, $f=1.0\text{MHz}$ | | 1100 | 1500 | pF |
| Output Capacitance | C_{OSS} | | | 150 | 200 | pF |
| Reverse Transfer Capacitance | C_{RSS} | | | 9 | 20 | pF |
| SWITCHING PARAMETERS | | | | | | |
| Total Gate Charge | Q_G | $V_{DS}=50\text{V}$, $V_{GS}=10\text{V}$, $I_D=1.3\text{A}$ (Note 1, 2) | | 33 | 45 | nC |
| Gate-Source Charge | Q_{GS} | | | 9 | | nC |
| Gate-Drain Charge | Q_{GD} | | | 9 | | nC |
| Turn-ON Delay Time | $t_{D(ON)}$ | $V_{DD}=30\text{V}$, $I_D=0.5\text{A}$, $R_G=25\Omega$ (Note 1, 2) | | 65 | 80 | ns |
| Turn-ON Rise Time | t_R | | | 100 | 150 | ns |
| Turn-OFF Delay Time | $t_{D(OFF)}$ | | | 160 | 250 | ns |
| Turn-OFF Fall Time | t_F | | | 100 | 160 | ns |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS | | | | | | |
| Maximum Body-Diode Continuous Current | I_S | | | | 11 | A |
| Maximum Body-Diode Pulsed Current | I_{SM} | | | | 44 | A |
| Drain-Source Diode Forward Voltage | V_{SD} | $I_S=11\text{A}$, $V_{GS}=0\text{V}$ | | | 1.4 | V |

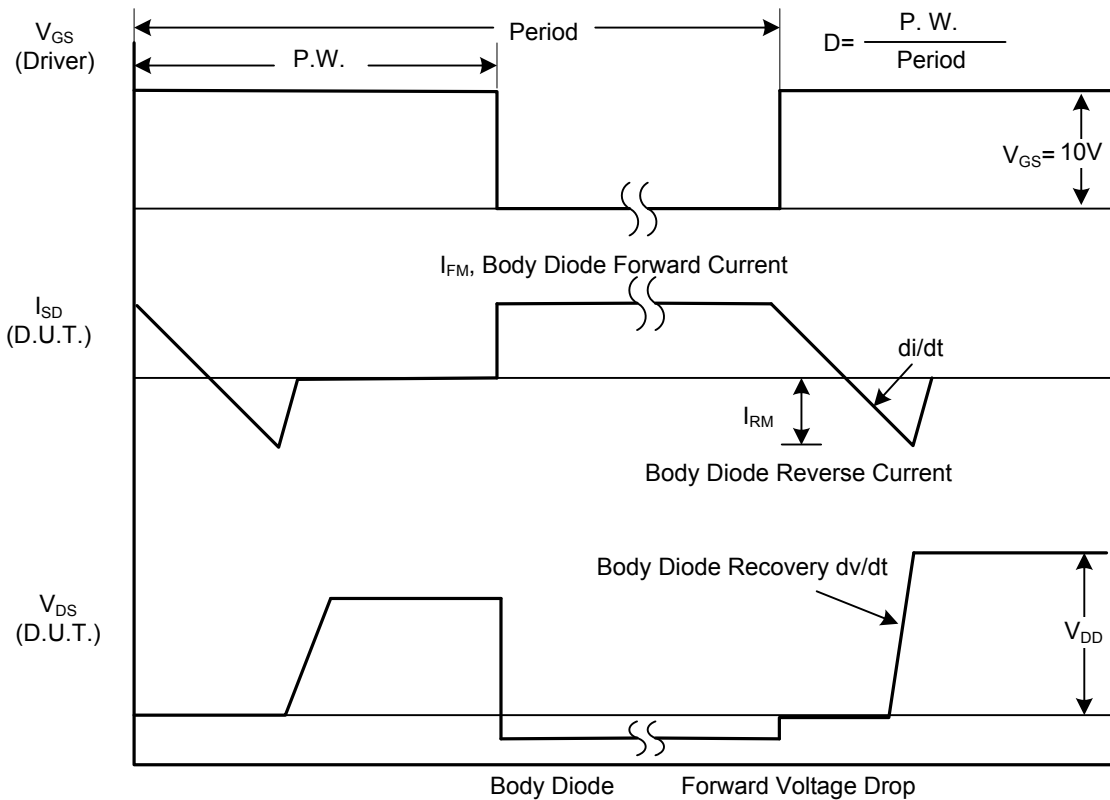
Notes: 1. Pulse Test : Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

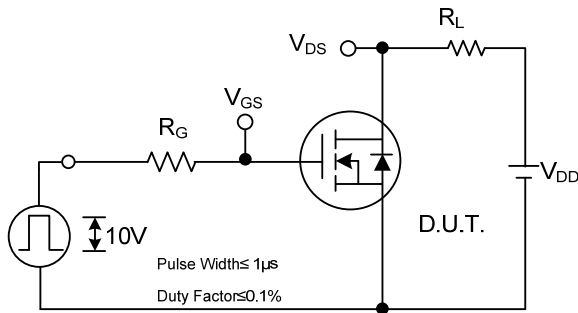


Peak Diode Recovery dv/dt Test Circuit

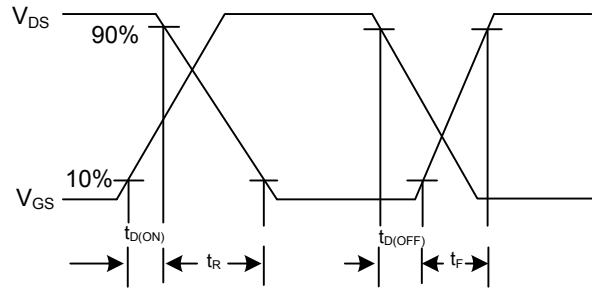


Peak Diode Recovery dv/dt Waveforms

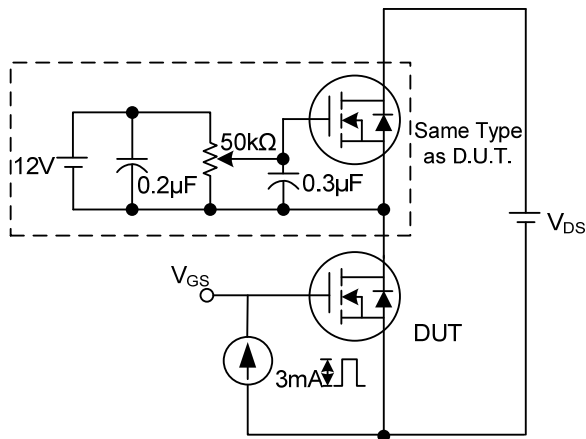
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



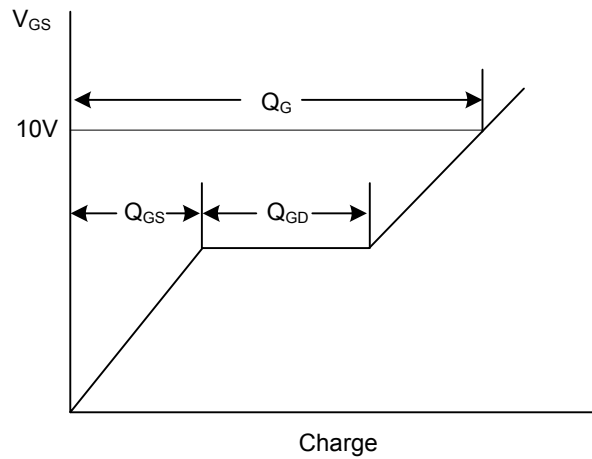
Switching Test Circuit



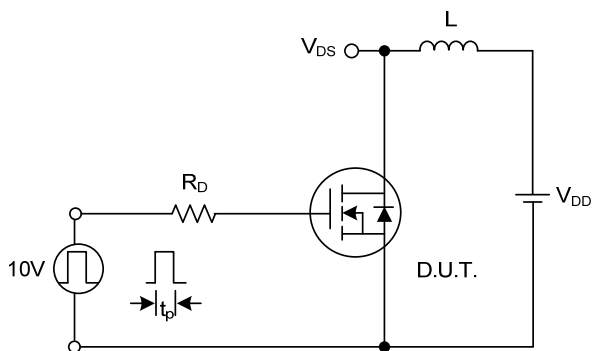
Switching Waveforms



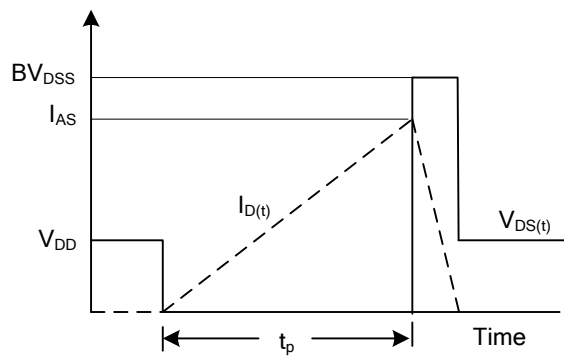
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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