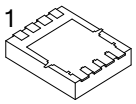
# UTT100N07

**Power MOSFET**

## 100A, 65V N-CHANNEL POWER MOSFET




DFN5060-8

## ■ DESCRIPTION

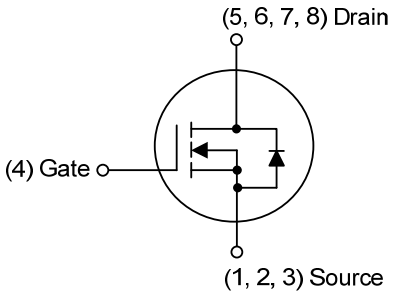
UTC **UTT100N07** is a N-Channel enhancement mode power field effect transistors are using trench DMOS technology.

This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

## ■ FEATURES

* $R_{DS(ON)}$ ≤ 2.8 mΩ @ $V_{GS}$=10V, $I_D$=20A
  $R_{DS(ON)}$ ≤ 5.4 mΩ @ $V_{GS}$=4.5V, $I_D$=10A
* Improved dv/dt capability
* Fast switching
* 100% EAS Guaranteed

## ■ SYMBOL




## ■ ORDERING INFORMATION

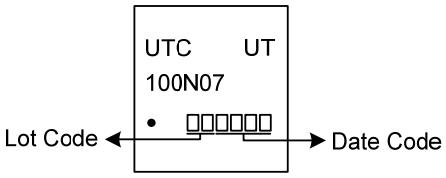
| Ordering Number | | Package | Pin Assignment | | | | | | | | Packing |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lead Free | Halogen Free | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| UTT100N07L-K08-5060-R | UTT100N07G-K08-5060-R | DFN5060-8 | S | S | S | G | D | D | D | D | Tape Reel |

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

UTT100N07G-K08-5060-R

| | |
|---|---|
| (1)Packing Type | (1) R: Tape Reel |
| (2)Package Type | (2) K08-5060: DFN5060-8 |
| (3)Green Package | (3) G: Halogen Free and Lead Free, L: Lead Free |

## ■ MARKING



## ■ ABSOLUTE MAXIMUM RATINGS ($T_C$ = 25°C, unless otherwise specified)

| PARAMETER | | | SYMBOL | RATINGS | UNIT |
|---|---|---|---|---|---|
| Drain-Source Voltage | | | $V_{DSS}$ | 65 | V |
| Gate-Source Voltage | | | $V_{GSS}$ | +20 / -12 | V |
| Drain Current | Continuous | $T_C$=25°C | $I_D$ | 100 | A |
| | | $T_C$=100°C | | 63 | A |
| | Pulsed (Note 2) | | $I_{DM}$ | 400 | A |
| Avalanche Energy (Note 3) | | Single Pulsed | $E_{AS}$ | 245 | mJ |
| Power Dissipation | | | $P_D$ | 142 | W |
| Junction Temperature | | | $T_J$ | +150 | °C |
| Storage Temperature | | | $T_{STG}$ | -55 ~ +150 | °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=0.1mH, $I_{AS}$=70A, $V_{DD}$=25V, $R_G$=25 Ω, Starting $T_J$ = 25°C.
4. $I_{SD}$≤3.0A, di/dt≤200A/μs, $V_{DD}$≤$BV_{DSS}$, Starting $T_J$=25°C.

## ■ THERMAL DATA

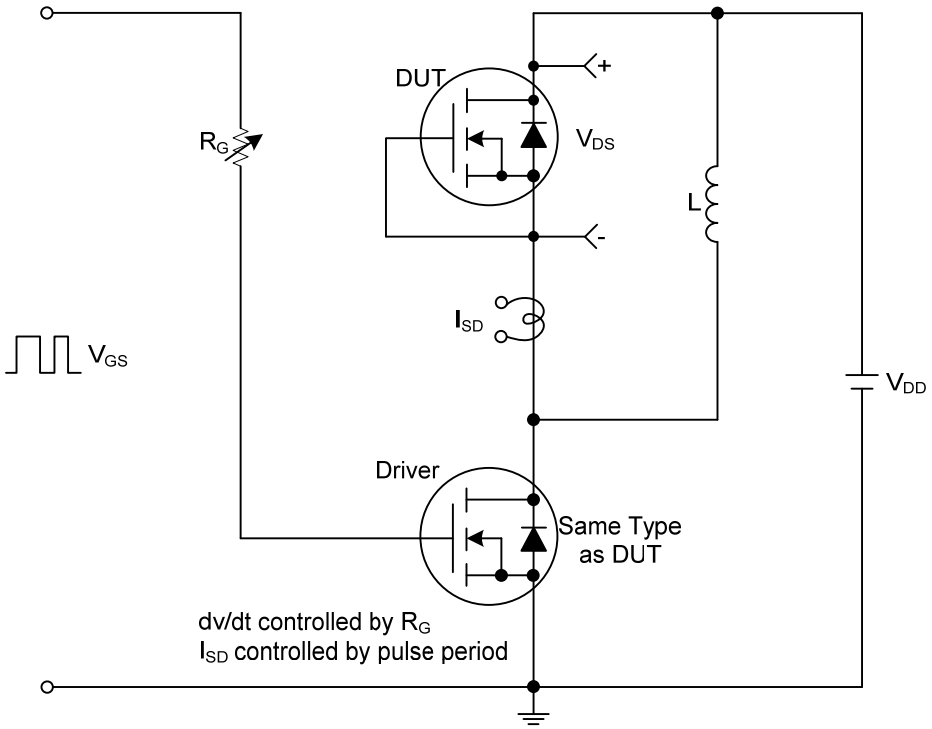
| PARAMETER | SYMBOL | RATINGS | UNIT |
|---|---|---|---|
| Junction to Ambient | $\theta_{JA}$ | 62 | °C/W |
| Junction to Case | $\theta_{JC}$ | 0.88 | °C/W |

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

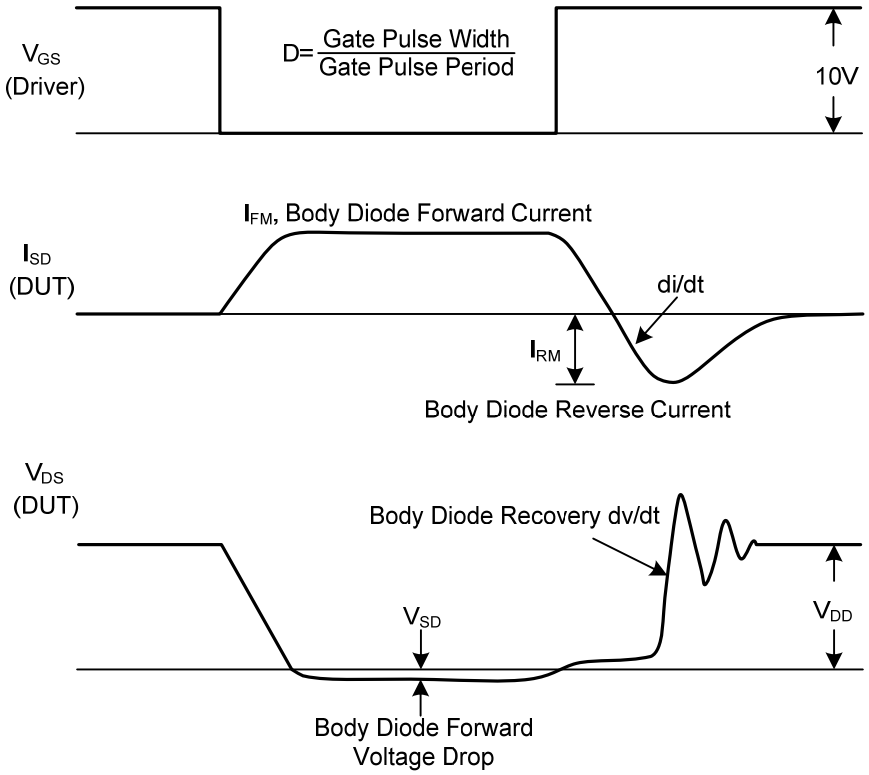
| PARAMETER | | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | | |
| Drain-Source Breakdown Voltage | | $BV_{DSS}$ | $I_D$=250μA, $V_{GS}$=0V | 65 | | | V |
| Drain-Source Leakage Current | | $I_{DSS}$ | $V_{DS}$=60V, $V_{GS}$=0V | | | 1 | μA |
| | | | $V_{DS}$=48V, $V_{GS}$=0V | | | 10 | μA |
| Gate-Source Leakage Current | Forward | $I_{GSS}$ | $V_{GS}$=+20V, $V_{DS}$=0V | | | +100 | nA |
| | Reverse | | $V_{GS}$=-20V, $V_{DS}$=0V | | | -100 | nA |
| **ON CHARACTERISTICS** | | | | | | | |
| Gate Threshold Voltage | | $V_{GS(TH)}$ | $V_{DS}$=$V_{GS}$, $I_D$=250μA | 1.0 | 1.6 | 2.5 | V |
| Static Drain-Source On-State Resistance | | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=20A | | 2.3 | 2.8 | mΩ |
| | | | $V_{GS}$=4.5V, $I_D$=10A | | 4.2 | 5.4 | mΩ |
| **DYNAMIC PARAMETERS** | | | | | | | |
| Input Capacitance | | $C_{ISS}$ | $V_{GS}$=0V, $V_{DS}$=25V, f=1.0MHz | | 4780 | 9500 | pF |
| Output Capacitance | | $C_{OSS}$ | | | 1365 | 2700 | pF |
| Reverse Transfer Capacitance | | $C_{RSS}$ | | | 51 | 102 | pF |
| **SWITCHING PARAMETERS** | | | | | | | |
| Total Gate Charge (Note 1) | | $Q_G$ | $V_{DS}$=48V, $V_{GS}$=10V, $I_D$=10A | | 59 | 120 | nC |
| Gate to Source Charge | | $Q_{GS}$ | | | 10.4 | 20 | nC |
| Gate to Drain Charge | | $Q_{GD}$ | | | 19.6 | 38 | nC |
| Turn-on Delay Time (Note 1) | | $t_{D(ON)}$ | $V_{DS}$=30V, $V_{GS}$=10V, $I_D$=6.0A, $R_G$=1.0Ω | | 22 | 44 | ns |
| Rise Time | | $t_R$ | | | 14 | 28 | ns |
| Turn-off Delay Time | | $t_{D(OFF)}$ | | | 40 | 80 | ns |
| Fall-Time | | $t_F$ | | | 20 | 40 | ns |
| **SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS** | | | | | | | |
| Maximum Body-Diode Continuous Current | | $I_S$ | | | | 100 | A |
| Maximum Body-Diode Pulsed Current | | $I_{SM}$ | | | | 200 | A |
| Drain-Source Diode Forward Voltage (Note 1) | | $V_{SD}$ | $I_S$=1.0A, $V_{GS}$=0V | | | 1.0 | V |

Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle≤2%.
2. Essentially independent of operating temperature.

## ■ TEST CIRCUITS AND WAVEFORMS



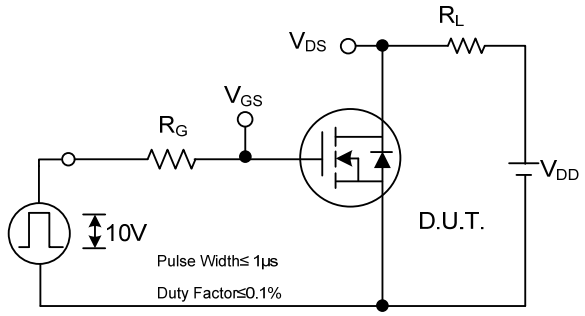

**Peak Diode Recovery dv/dt Test Circuit**



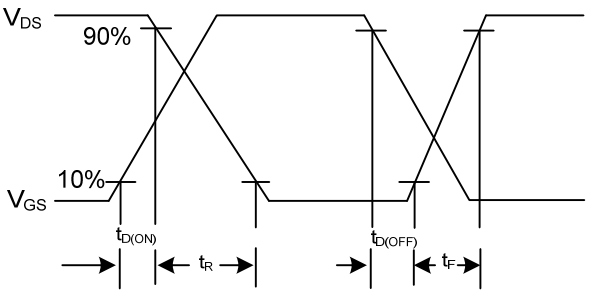

Peak Diode Recovery dv/dt Test Circuit and Waveforms

**Peak Diode Recovery dv/dt Waveforms**

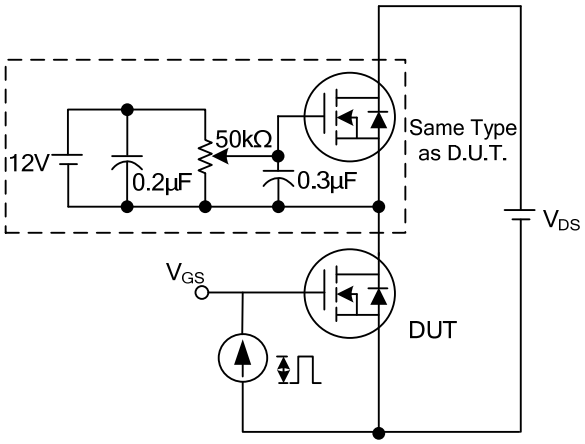
## ■ TEST CIRCUITS AND WAVEFORMS



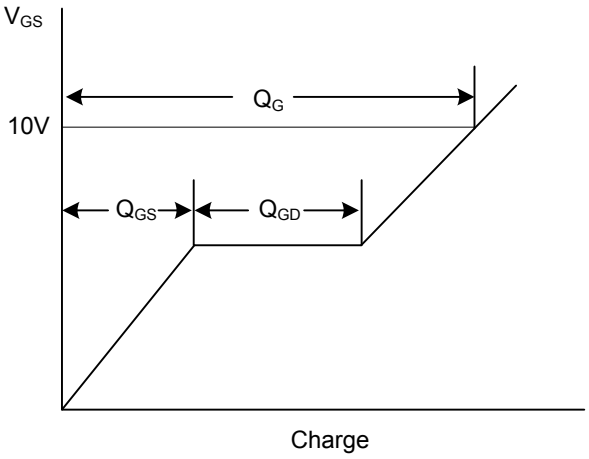

**Switching Test Circuit**



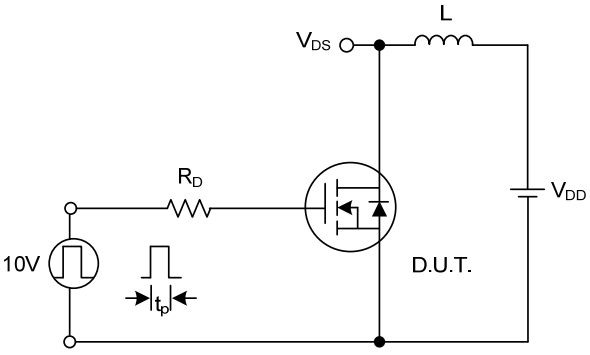

**Switching Waveforms**



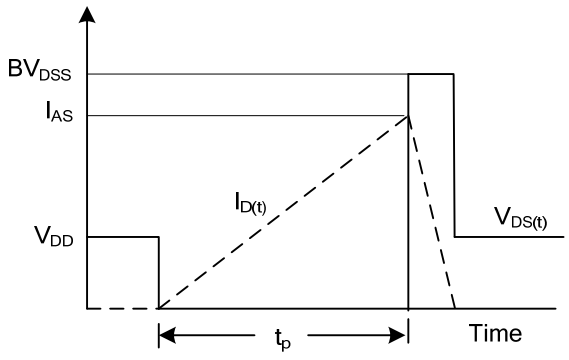

**Gate Charge Test Circuit**




**Gate Charge Waveform**




**Unclamped Inductive Switching Test Circuit**




**Unclamped Inductive Switching Waveforms**

## ■ TYPICAL CHARACTERISTICS

Fig.1 Continuous Drain Current vs. Case Temperature

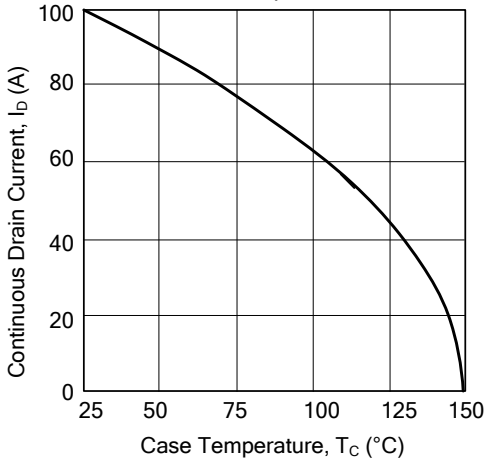



Fig.2 Normalized $R_{DSON}$ vs. Junction Temperature

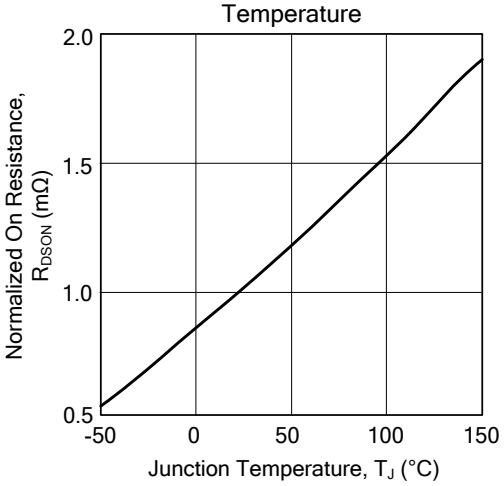



Fig.3 Normalized $V_{th}$ vs. Junction Temperature

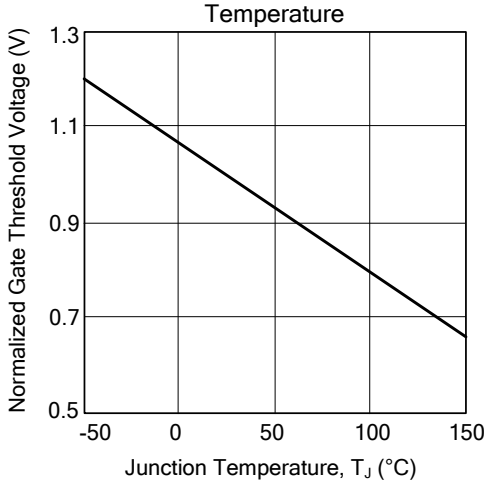



Fig.4 Gate Charge Waveform

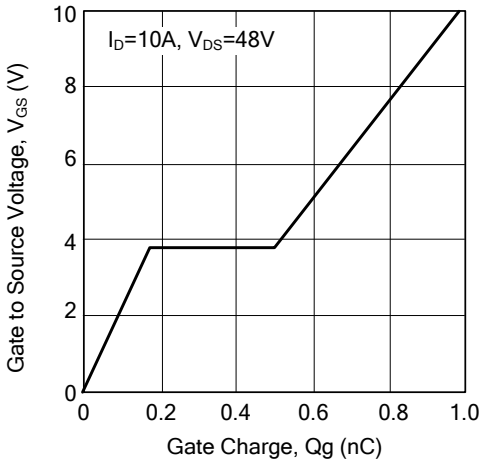



Fig.5 Normalized Transient Impedance

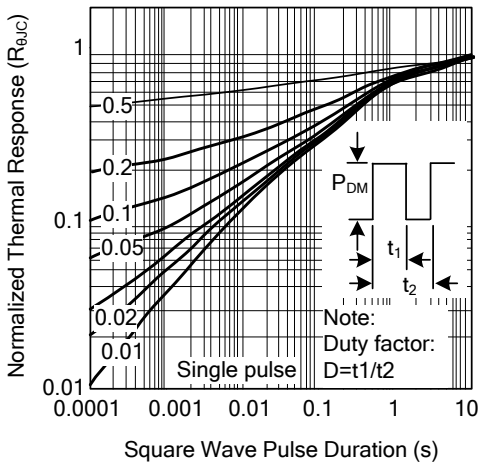



Fig.6 Maximum Safe Operation Area