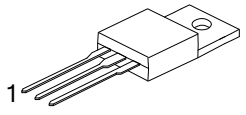
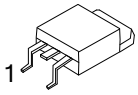
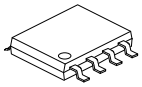
# 80A, 70V N-CHANNEL POWER MOSFET




TO-220




TO-252



SOP-8

## ■ DESCRIPTION

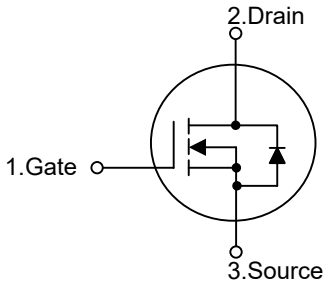
The UTC **UTT80N07H** is a N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with high switching speed and low gate charge, etc.

The UTC **UTT80N07H** applies to primary side switch, synchronous rectifier, Motor Drives, etc.

## ■ FEATURES

* $R_{DS(ON)} \leq 9.0\ m\Omega$ @ $V_{GS}$=10V, $I_D$=40A
* High Cell Density Trench Technology
* High Power and Current Handling Capability

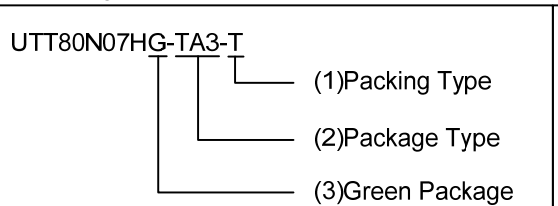
## ■ SYMBOL




## ■ ORDERING INFORMATION

| Ordering Number | | Package | Pin Assignment | | | | | | | | Packing |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lead Free | Halogen Free | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| UTT80N07HL-TA3-T | UTT80N07HG-TA3-T | TO-220 | G | D | S | - | - | - | - | - | Tube |
| UTT80N07HL-TN3-R | UTT80N07HG-TN3-R | TO-252 | G | D | S | - | - | - | - | - | Tape Reel |
| UTT80N07HL-S08-R | UTT80N07HG-S08-R | SOP-8 | S | S | S | G | D | D | D | D | Tape Reel |

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

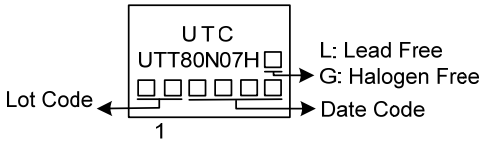
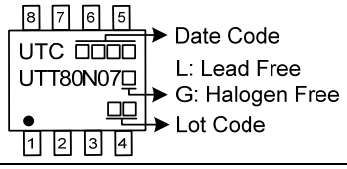



(1) T: Tube, R: Tape Reel

(2) TA3: TO-220, TN3: TO-252, S08: SOP-8

(3) G: Halogen Free and Lead Free L: Lead Free

## ■ MARKING

| TO-220 / TO-252 | SOP-8 |
|---|---|
|  |  |

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

| PARAMETER | | | SYMBOL | RATINGS | UNIT |
|---|---|---|---|---|---|
| Drain-Source Voltage | | | $V_{DSS}$ | 70 | V |
| Gate-Source Voltage | | | $V_{GSS}$ | ±20 | V |
| Drain Current | Continuous | TO-220<br>TO-252 | $I_D$ | 80 | A |
| | | SOP-8 | | 30 | A |
| | Pulsed (Note 2) | | $I_{DM}$ | 160 | A |
| Single Pulsed Avalanche Energy (Note 3) | | | $E_{AS}$ | 103 | mJ |
| Peak Diode Recovery dv/dt (Note 4) | | | dv/dt | 2.0 | V/ns |
| Power Dissipation | | TO-220 | $P_D$ | 180 | W |
| | | TO-252 | | 64 | W |
| | | SOP-8 | | 6 | 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, $I_{AS}$ = 45.4A, $V_{DD}$ = 50V, $R_G$ = 25Ω, Starting $T_J$ = 25°C.
4. $I_{SD}$ ≤ 30A, di/dt ≤ 200A/μs, $V_{DD}$ ≤ $BV_{DSS}$, Starting $T_J$ = 25°C.

## ■ THERMAL DATA

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---|---|---|---|---|
| Junction to Ambient | TO-220 | $\theta_{JA}$ | 62.5 | °C/W |
| | TO-252 | | 110 | °C/W |
| | SOP-8 | | 125 | °C/W |
| Junction to Case | TO-220 | $\theta_{JC}$ | 0.69 | °C/W |
| | TO-252 | | 1.95 (Note) | °C/W |
| | SOP-8 | | 20.8 (Note) | °C/W |

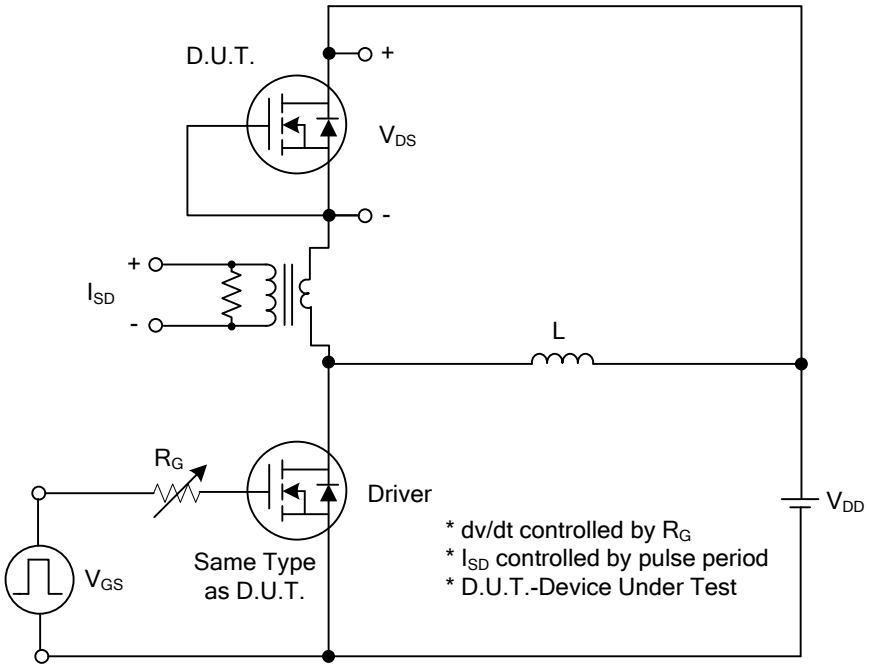
Note: The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.

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

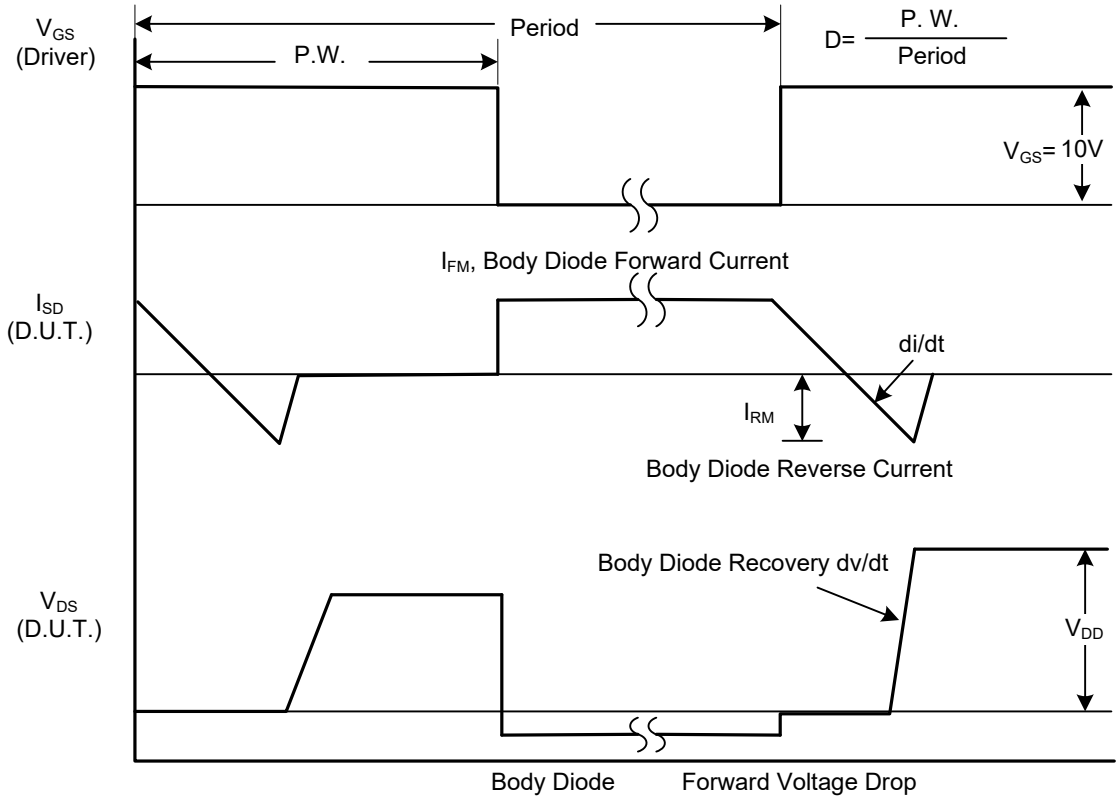
| PARAMETER | | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | | |
| Drain-Source Breakdown Voltage | | $BV_{DSS}$ | $I_D$=250μA, $V_{GS}$=0V | 70 | | | V |
| Drain-Source Leakage Current | | $I_{DSS}$ | $V_{DS}$=70V, $V_{GS}$=0V | | | 1 | 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 | 2.0 | | 4.0 | V |
| Static Drain-Source On-State Resistance | | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=40A | | | 9.0 | mΩ |
| **DYNAMIC PARAMETERS** | | | | | | | |
| Input Capacitance | | $C_{ISS}$ | $V_{DS}$=25V, $V_{GS}$=0V, f=1.0MHz | | 3640 | | pF |
| Output Capacitance | | $C_{OSS}$ | | | 418 | | pF |
| Reverse Transfer Capacitance | | $C_{RSS}$ | | | 364 | | pF |
| **SWITCHING PARAMETERS** | | | | | | | |
| Total Gate Charge | | $Q_G$ | $V_{DS}$=35V, $V_{GS}$=10V, $I_D$=80A | | 144 | | nC |
| Gate to Source Charge | | $Q_{GS}$ | | | 26 | | nC |
| Gate to Drain Charge | | $Q_{GD}$ | | | 58 | | nC |
| Turn-ON Delay Time | | $t_{D(ON)}$ | $V_{DD}$=35V, $V_{GS}$=10V, $I_D$=80A, $R_G$ =3Ω (Note 2) | | 16 | | ns |
| Rise Time | | $t_R$ | | | 21 | | ns |
| Turn-OFF Delay Time | | $t_{D(OFF)}$ | | | 54 | | ns |
| Fall-Time | | $t_F$ | | | 24 | | ns |
| **SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS** | | | | | | | |
| Maximum Body-Diode Continuous Current | | $I_S$ | | | | 80 | A |
| Maximum Body-Diode Pulsed Current | | $I_{SM}$ | | | | 160 | A |
| Drain-Source Diode Forward Voltage | | $V_{SD}$ | $I_{SD}$=80A | | | 1.25 | V |
| Body Diode Reverse Recovery Time | | $t_{rr}$ | $I_S$=30A, dI/dt=100A/μs | | 42 | | ns |
| Body Diode Reverse Recovery Charge | | $Q_{rr}$ | | | 43 | | nC |

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

## ■ TEST CIRCUITS AND WAVEFORMS

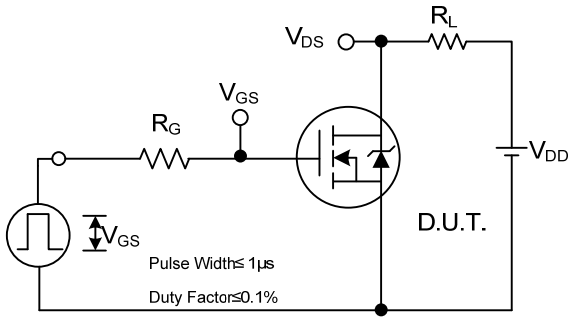



**Peak Diode Recovery dv/dt Test Circuit**

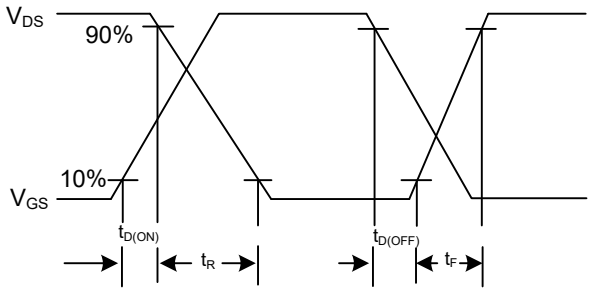



**Peak Diode Recovery dv/dt Waveforms**

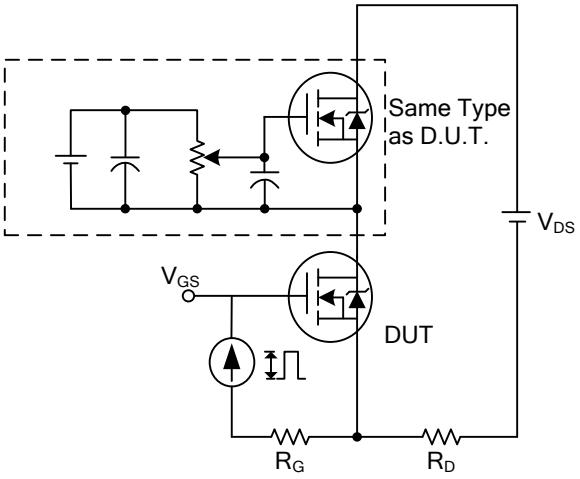
## ■ TEST CIRCUITS AND WAVEFORMS



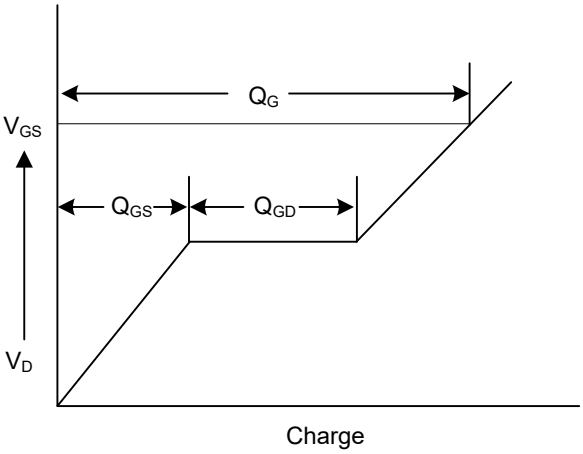

Switching Test Circuit



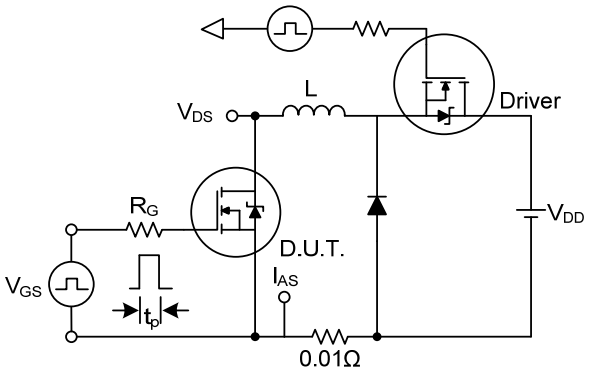

Switching Waveforms



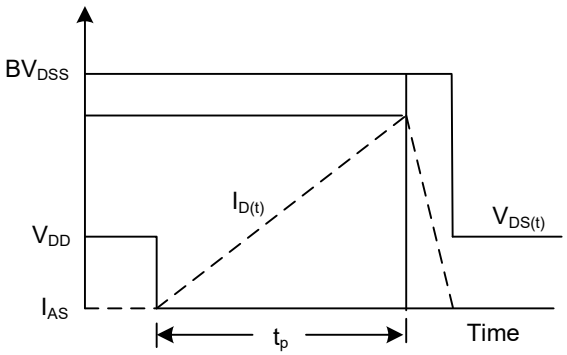

Gate Charge Test Circuit




Gate Charge Waveform




Unclamped Inductive Switching Test Circuit




Unclamped Inductive Switching Waveforms