

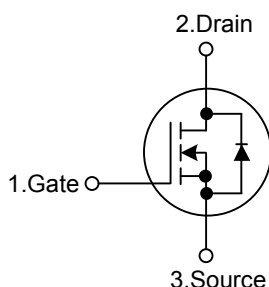
**UTT80N10H****Power MOSFET****80A, 100V N-CHANNEL  
POWER MOSFET****DESCRIPTION**

The UTC **UTT80N10H** 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 **UTT80N10H** applies to primary side switch, synchronous rectifier, Motor Drives, etc.

**FEATURES**

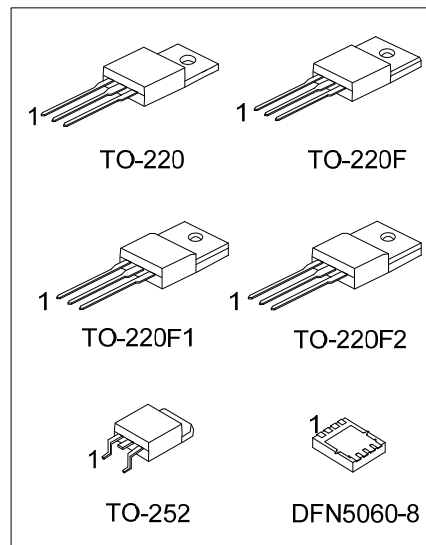
- \*  $R_{DS(ON)} \leq 14 \text{ m}\Omega$  @  $V_{GS}=10\text{V}$ ,  $I_D=40\text{A}$
- \* High Cell Density Trench Technology
- \* High Power and Current Handling Capability

**SYMBOL****ORDERING INFORMATION**

| Ordering Number       |                       | Package   | Pin Assignment |   |   |   |   |   |   |   | Packing   |
|-----------------------|-----------------------|-----------|----------------|---|---|---|---|---|---|---|-----------|
| Lead Free             | Halogen Free          |           | 1              | 2 | 3 | 4 | 5 | 6 | 7 | 8 |           |
| UTT80N10HL-TA3-T      | UTT80N10HG-TA3-T      | TO-220    | G              | D | S | - | - | - | - | - | Tube      |
| UTT80N10HL-TF1-T      | UTT80N10HG-TF1-T      | TO-220F1  | G              | D | S | - | - | - | - | - | Tube      |
| UTT80N10HL-TF2-T      | UTT80N10HG-TF2-T      | TO-220F2  | G              | D | S | - | - | - | - | - | Tube      |
| UTT80N10HL-TF3-T      | UTT80N10HG-TF3-T      | TO-220F   | G              | D | S | - | - | - | - | - | Tube      |
| UTT80N10HL-TN3-R      | UTT80N10HG-TN3-R      | TO-252    | G              | D | S | - | - | - | - | - | Tape Reel |
| UTT80N10HL-K08-5060-R | UTT80N10HG-K08-5060-R | DFN5060-8 | S              | S | S | G | D | D | D | D | Tape Reel |

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

|                                                                                                                                                                                          |  |                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div> <div>UTT80N10HG-TA3-T</div> <div> <div></div> <div></div> <div></div> </div> <div> <div>(1)Packing Type</div> <div>(2)Package Type</div> <div>(3)Green Package</div> </div> </div> |  | <p>(1) T: Tube, R: Tape Reel</p> <p>(2) TA3: TO-220, TF1: TO-220F1, TF2: TO-220F2, TF3: TO-220F, TN3: TO-252, K08-5060: DFN5060-8</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



MARKING

|                                                                                                                                       |                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| TO-220 / TO-220F / TO-220F1<br>TO-220F2 / TO-252                                                                                      | DFN5060-8                                                                           |
| <div>UTC   UTT<br/>80N10H □<br/>□ □ □ □ □<br/>1</div> <div>Lot Code ←   → Date Code</div> <div>L: Lead Free<br/>G: Halogen Free</div> | <div>UTC   UTT<br/>80N10H<br/>• □ □ □ □ □</div> <div>Lot Code ←   → Date Code</div> |

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

| PARAMETER                               |                 | SYMBOL           | RATINGS    | UNIT               |
|-----------------------------------------|-----------------|------------------|------------|--------------------|
| Drain-Source Voltage                    |                 | $V_{\text{DSS}}$ | 100        | V                  |
| Gate-Source Voltage                     |                 | $V_{\text{GSS}}$ | $\pm 20$   | V                  |
| Drain Current                           | Continuous      | $I_{\text{D}}$   | 80         | A                  |
|                                         | Pulsed (Note 2) | $I_{\text{DM}}$  | 320        | A                  |
| Avalanche Current (Note 2)              |                 | $I_{\text{AR}}$  | 49         | A                  |
| Single Pulsed Avalanche Energy (Note 3) |                 | $E_{\text{AS}}$  | 120        | mJ                 |
| Peak Diode Recovery dv/dt (Note 4)      |                 | dv/dt            | 4.2        | V/ns               |
| Power Dissipation                       | TO-220          | $P_{\text{D}}$   | 142        | W                  |
|                                         | TO-220F         |                  | 39         | W                  |
|                                         | TO-220F1        |                  |            |                    |
|                                         | TO-220F2        |                  | 41         | W                  |
|                                         | TO-252          |                  | 62         | W                  |
|                                         | DFN5060-8       |                  | 39         | W                  |
| Junction Temperature                    |                 | $T_{\text{J}}$   | +150       | $^{\circ}\text{C}$ |
| Storage Temperature                     |                 | $T_{\text{STG}}$ | -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. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ .

3.  $L = 0.1\text{mH}$ ,  $I_{\text{AS}} = 49\text{A}$ ,  $V_{\text{DD}} = 50\text{V}$ ,  $R_{\text{G}} = 25\Omega$ , Starting  $T_{\text{J}} = 25^{\circ}\text{C}$

4.  $I_{\text{SD}} \leq 30\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{\text{DD}} \leq BV_{\text{DSS}}$ ,  $T_{\text{J}} \leq T_{\text{JMAX}}$ ,  $T_{\text{J}} = 25^{\circ}\text{C}$ .

### ■ THERMAL DATA

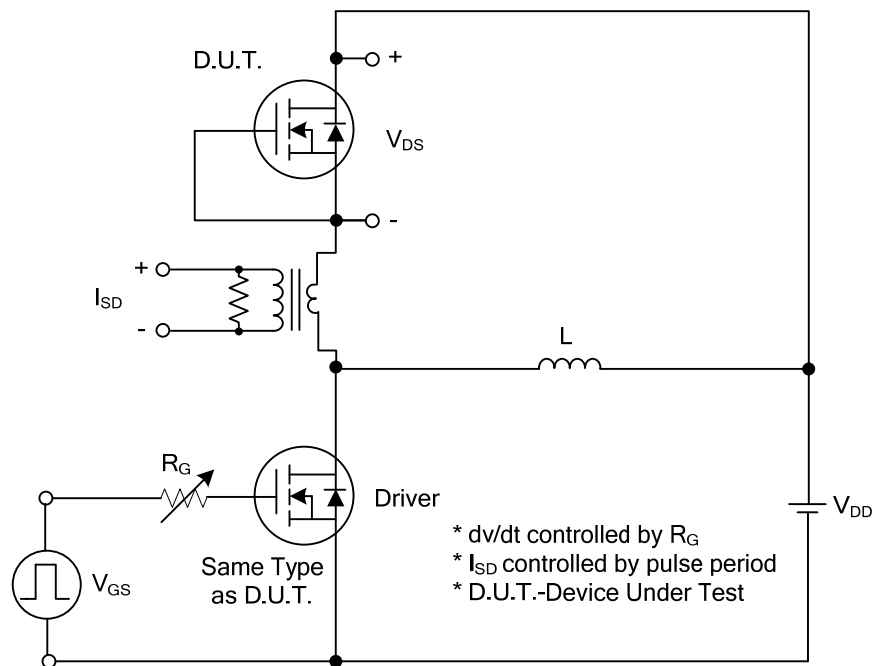
| PARAMETER           |                   | SYMBOL               | RATINGS    | UNIT                        |
|---------------------|-------------------|----------------------|------------|-----------------------------|
| Junction to Ambient | TO-220/TO-220F    | $\theta_{\text{JA}}$ | 62.5       | $^{\circ}\text{C}/\text{W}$ |
|                     | TO-220F1/TO-220F2 |                      |            |                             |
|                     | TO-252            |                      | 110        | $^{\circ}\text{C}/\text{W}$ |
|                     | DFN5060-8         |                      | 35 (Note)  | $^{\circ}\text{C}/\text{W}$ |
| Junction to Case    | TO-220            | $\theta_{\text{JC}}$ | 0.88       | $^{\circ}\text{C}/\text{W}$ |
|                     | TO-220F           |                      | 3.2        | $^{\circ}\text{C}/\text{W}$ |
|                     | TO-220F1          |                      | 3.05       | $^{\circ}\text{C}/\text{W}$ |
|                     | TO-220F2          |                      |            |                             |
|                     | TO-252            |                      | 2.01       | $^{\circ}\text{C}/\text{W}$ |
|                     | DFN5060-8         |                      | 3.2 (Note) | $^{\circ}\text{C}/\text{W}$ |

Note: The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.

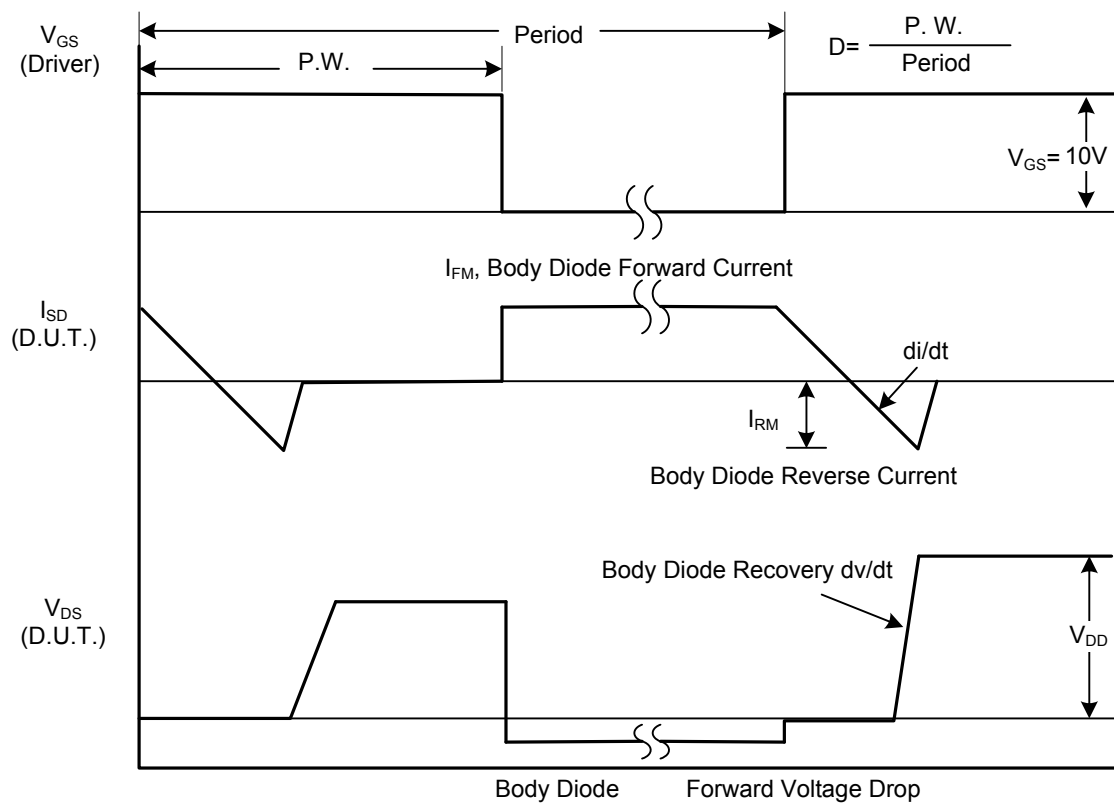
### ■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub>=25°C, unless otherwise specified)

| PARAMETER                                       |         | SYMBOL              | TEST CONDITIONS                                                                         | MIN | TYP  | MAX  | UNIT |
|-------------------------------------------------|---------|---------------------|-----------------------------------------------------------------------------------------|-----|------|------|------|
| OFF CHARACTERISTICS                             |         |                     |                                                                                         |     |      |      |      |
| Drain-Source Breakdown Voltage                  |         | BV <sub>DSS</sub>   | I <sub>D</sub> =250μA, V <sub>GS</sub> =0V                                              | 100 |      |      | V    |
| Drain-Source Leakage Current                    |         | I <sub>DSS</sub>    | V <sub>DS</sub> =80V, V <sub>GS</sub> =0V                                               |     |      | 1    | μA   |
| Gate-Source Leakage Current                     | Forward | I <sub>GSS</sub>    | V <sub>GS</sub> =+20V, V <sub>DS</sub> =0V                                              |     |      | +100 | nA   |
|                                                 | Reverse |                     | V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V                                              |     |      | -100 | nA   |
| ON CHARACTERISTICS                              |         |                     |                                                                                         |     |      |      |      |
| Gate Threshold Voltage                          |         | V <sub>GS(TH)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                | 2.0 |      | 4.0  | V    |
| Static Drain-Source On-State Resistance         |         | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =40A                                               |     | 12   | 14   | mΩ   |
| DYNAMIC PARAMETERS                              |         |                     |                                                                                         |     |      |      |      |
| Input Capacitance                               |         | C <sub>ISS</sub>    | V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHz                                     |     | 2750 |      | pF   |
| Output Capacitance                              |         | C <sub>OSS</sub>    |                                                                                         |     | 270  |      | pF   |
| Reverse Transfer Capacitance                    |         | C <sub>RSS</sub>    |                                                                                         |     | 90   |      | pF   |
| SWITCHING PARAMETERS                            |         |                     |                                                                                         |     |      |      |      |
| Total Gate Charge                               |         | Q <sub>G</sub>      | V <sub>DS</sub> =50V, V <sub>GS</sub> =10V, I <sub>D</sub> =1.3A, I <sub>G</sub> =100μA |     | 175  |      | nC   |
| Gate to Source Charge                           |         | Q <sub>GS</sub>     |                                                                                         |     | 25   |      | nC   |
| Gate to Drain Charge                            |         | Q <sub>GD</sub>     |                                                                                         |     | 12   |      | nC   |
| Turn-ON Delay Time                              |         | t <sub>D(ON)</sub>  | V <sub>DD</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =0.5A, R <sub>G</sub> =25Ω   |     | 135  |      | ns   |
| Rise Time                                       |         | t <sub>R</sub>      |                                                                                         |     | 80   |      | ns   |
| Turn-OFF Delay Time                             |         | t <sub>D(OFF)</sub> |                                                                                         |     | 250  |      | ns   |
| Fall-Time                                       |         | t <sub>F</sub>      |                                                                                         |     | 70   |      | ns   |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS |         |                     |                                                                                         |     |      |      |      |
| Maximum Body-Diode Continuous Current           |         | I <sub>S</sub>      |                                                                                         |     |      | 80   | A    |
| Maximum Body-Diode Pulsed Current               |         | I <sub>SM</sub>     |                                                                                         |     |      | 320  | A    |
| Drain-Source Diode Forward Voltage              |         | V <sub>SD</sub>     | I <sub>SD</sub> =80A                                                                    |     |      | 1.25 | V    |
| Body Diode Reverse Recovery Time                |         | t <sub>rr</sub>     | I <sub>S</sub> =30A, dI/dt=100A/μs                                                      |     | 40   |      | ns   |
| Body Diode Reverse Recovery Charge              |         | Q <sub>rr</sub>     |                                                                                         |     | 40   |      | nC   |

## ■ TEST CIRCUITS AND WAVEFORMS

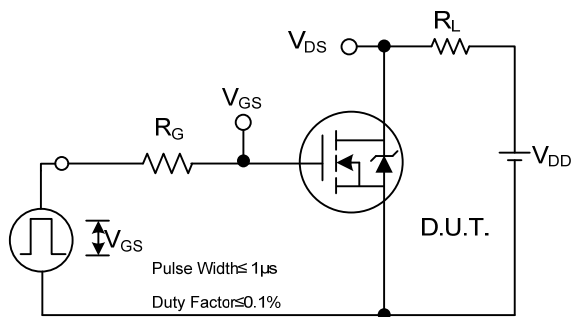


Peak Diode Recovery  $dv/dt$  Test Circuit

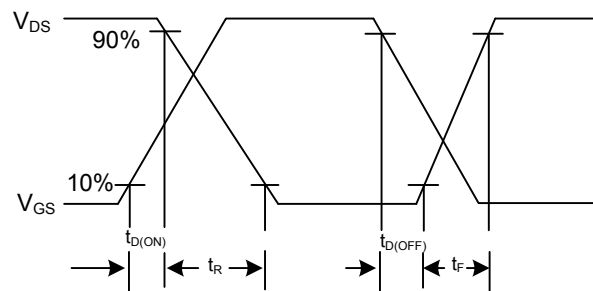


Peak Diode Recovery  $dv/dt$  Waveforms

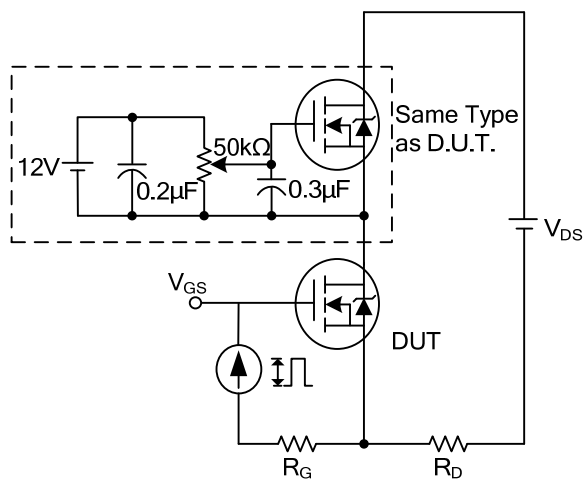
### ■ TEST CIRCUITS AND WAVEFORMS(Cont.)



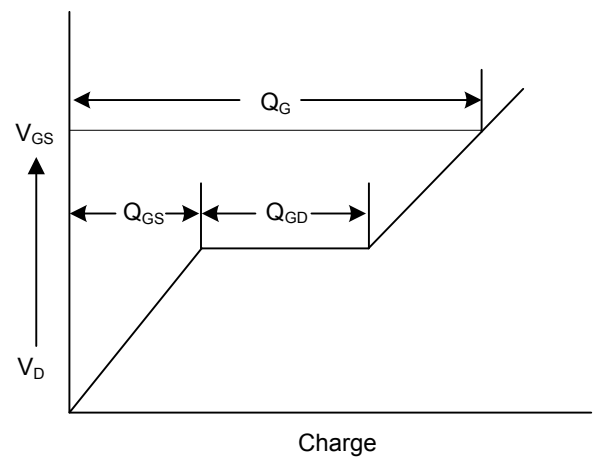
Switching Test Circuit



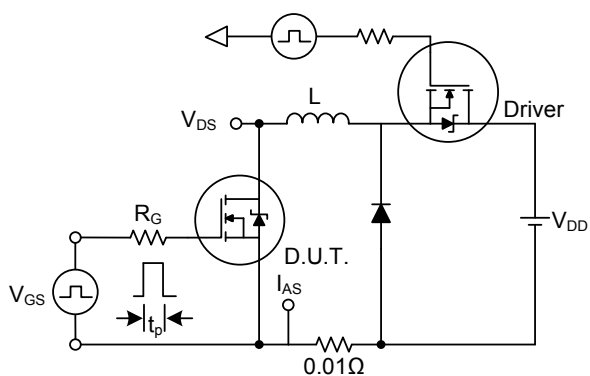
Switching Waveforms



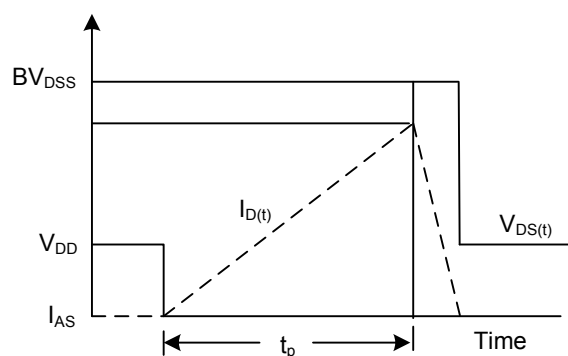
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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