

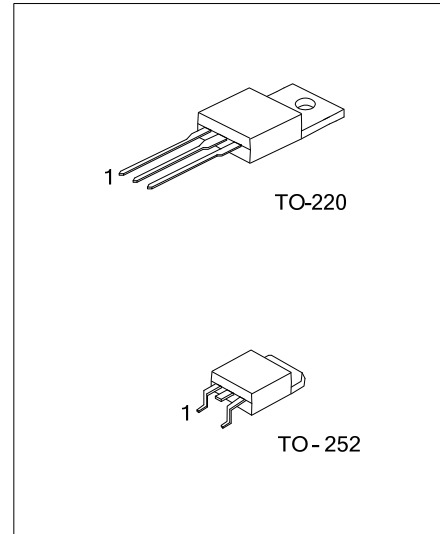
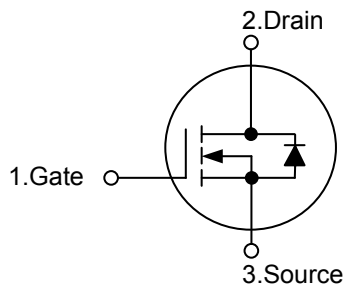
**UTT50N06H****Power MOSFET****53A, 60V N-CHANNEL FAST SWITCHING MOSFET****DESCRIPTION**

The UTC **UTT50N06H** is a N-Channel MOSFET, it uses UTC's advanced technology to provide customers with a minimum on-state resistance, high switching speed and low gate charge.

The UTC **UTT50N06H** is suitable for application in networking DC-DC power system and LCD/LED back light, etc.

**FEATURES**

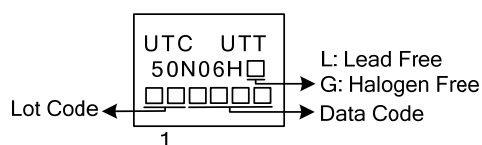
- \*  $R_{DS(ON)} < 12\text{ m}\Omega$  @  $V_{GS} = 10\text{V}$ ,  $I_D = 8.0\text{A}$
- \* Low gate charge
- \* High switching speed

**SYMBOL****ORDERING INFORMATION**

| Ordering Number  |                  | Package | Pin Assignment |   |   | Packing   |
|------------------|------------------|---------|----------------|---|---|-----------|
| Lead Free        | Halogen Free     |         | 1              | 2 | 3 |           |
| UTT50N06HL-TA3-T | UTT50N06HG-TA3-T | TO-220  | G              | D | S | Tube      |
| UTT50N06HL-TN3-R | UTT50N06HG-TN3-R | TO-252  | G              | D | S | Tape Reel |

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

|                                                                               |                                                                                                |
|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| UTT50N06HL-TA3-T<br>(1) Packing Type<br>(2) Package Type<br>(3) Green Package | (1) T: Tube<br>(2) TA3: TO-220, TN3: TO-252<br>(3) L: Lead Free, G: Halogen Free and Lead Free |
|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|

**MARKING**

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

| PARAMETER                            |                        | SYMBOL    | RATINGS    | UNIT             |
|--------------------------------------|------------------------|-----------|------------|------------------|
| Drain-Source Voltage                 |                        | $V_{DSS}$ | 60         | V                |
| Gate-Source Voltage                  |                        | $V_{GSS}$ | $\pm 20$   | V                |
| Drain Current                        | Continuous             | $I_D$     | 53         | A                |
|                                      | Pulsed (Note 2)        | $I_{DM}$  | 212        | A                |
| Avalanche Current (Note 2)           |                        | $I_{AR}$  | 10         | A                |
| Avalanche Energy                     | Single Pulsed (Note 3) | $E_{AS}$  | 92         | mJ               |
| Peak Diode Recovery $dv/dt$ (Note 4) |                        | $dv/dt$   | 3.3        | V/ns             |
| Power Dissipation (Note 4)           | TO-220                 | $P_D$     | 136        | W                |
|                                      | TO-252                 |           | 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. Repetitive Rating: Pulse width limited by maximum junction temperature.

3.  $L=0.1\text{mH}$ ,  $I_{AS}=10\text{A}$ ,  $V_{DD}=25\text{V}$ ,  $R_G=25\ \Omega$ , Starting  $T_J = 25^\circ\text{C}$

4.  $I_{SD}\leq 8.0\text{A}$ ,  $di/dt\leq 200\text{A}/\mu\text{s}$ ,  $V_{DD}\leq BV_{DSS}$ , Starting  $T_J = 25^\circ\text{C}$

### ■ THERMAL CHARACTERISTICS

| PARAMETER           |        | SYMBOL        | RATINGS | UNIT               |
|---------------------|--------|---------------|---------|--------------------|
| Junction to Ambient | TO-220 | $\theta_{JA}$ | 62.5    | $^\circ\text{C/W}$ |
|                     | TO-252 |               | 110     | $^\circ\text{C/W}$ |
| Junction to Case    | TO-220 | $\theta_{JC}$ | 4.46    | $^\circ\text{C/W}$ |
|                     | TO-252 |               | 2.5     | $^\circ\text{C/W}$ |

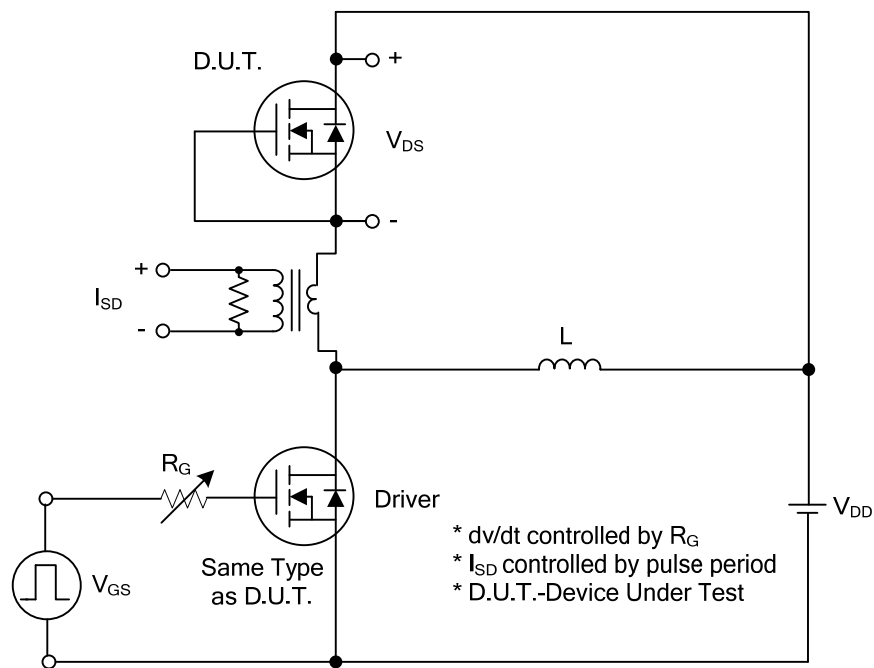
### ■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C, unless otherwise specified)

| 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                                                | 60  |      |      | V    |
| Drain-Source Leakage Current                    |         | I <sub>DSS</sub>    | V <sub>DS</sub> =60V, 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                                  | 1.5 |      | 3.5  | V    |
| Static Drain-Source On-State Resistance         |         | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =8.0A                                                |     |      | 12   | mΩ   |
| DYNAMIC PARAMETERS                              |         |                     |                                                                                           |     |      |      |      |
| Input Capacitance                               |         | C <sub>ISS</sub>    | V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1.0MHz                                       |     | 2185 |      | pF   |
| Output Capacitance                              |         | C <sub>OSS</sub>    |                                                                                           |     | 208  |      | pF   |
| Reverse Transfer Capacitance                    |         | C <sub>RSS</sub>    |                                                                                           |     | 180  |      | pF   |
| SWITCHING PARAMETERS                            |         |                     |                                                                                           |     |      |      |      |
| Total Gate Charge (Note 1)                      |         | Q <sub>G</sub>      | V <sub>DS</sub> =50V, I <sub>D</sub> =1.3A, V <sub>GS</sub> =10V<br>I <sub>G</sub> =100μA |     | 165  |      | nC   |
| Gate to Source Charge                           |         | Q <sub>GS</sub>     |                                                                                           |     | 11   |      | nC   |
| Gate to Drain Charge                            |         | Q <sub>GD</sub>     |                                                                                           |     | 26.5 |      | nC   |
| Turn-ON Delay Time (Note 1)                     |         | t <sub>D(ON)</sub>  | V <sub>DD</sub> =30V, I <sub>D</sub> =0.5A, R <sub>G</sub> =25Ω,<br>V <sub>GS</sub> =0V   |     | 75   |      | ns   |
| Rise Time                                       |         | t <sub>R</sub>      |                                                                                           |     | 100  |      | ns   |
| Turn-OFF Delay Time                             |         | t <sub>D(OFF)</sub> |                                                                                           |     | 585  |      | ns   |
| Fall-Time                                       |         | t <sub>F</sub>      |                                                                                           |     | 195  |      | ns   |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS |         |                     |                                                                                           |     |      |      |      |
| Maximum Body-Diode Continuous Current           |         | I <sub>S</sub>      |                                                                                           |     |      | 53   | A    |
| Maximum Body-Diode Pulsed Current               |         | I <sub>SM</sub>     |                                                                                           |     |      | 212  | A    |
| Drain-Source Diode Forward Voltage (Note 1)     |         | V <sub>SD</sub>     | I <sub>S</sub> =8.0A, V <sub>GS</sub> =0V                                                 |     |      | 1.2  | V    |
| Body Diode Reverse Recovery Time (Note 1)       |         | t <sub>rr</sub>     | I <sub>S</sub> =8.0A, V <sub>GS</sub> =0V,                                                |     | 42   |      | nS   |
| Body Diode Reverse Recovery Charge              |         | Q <sub>rr</sub>     | dl <sub>F</sub> /dt=100A/μs                                                               |     | 45   |      | nC   |

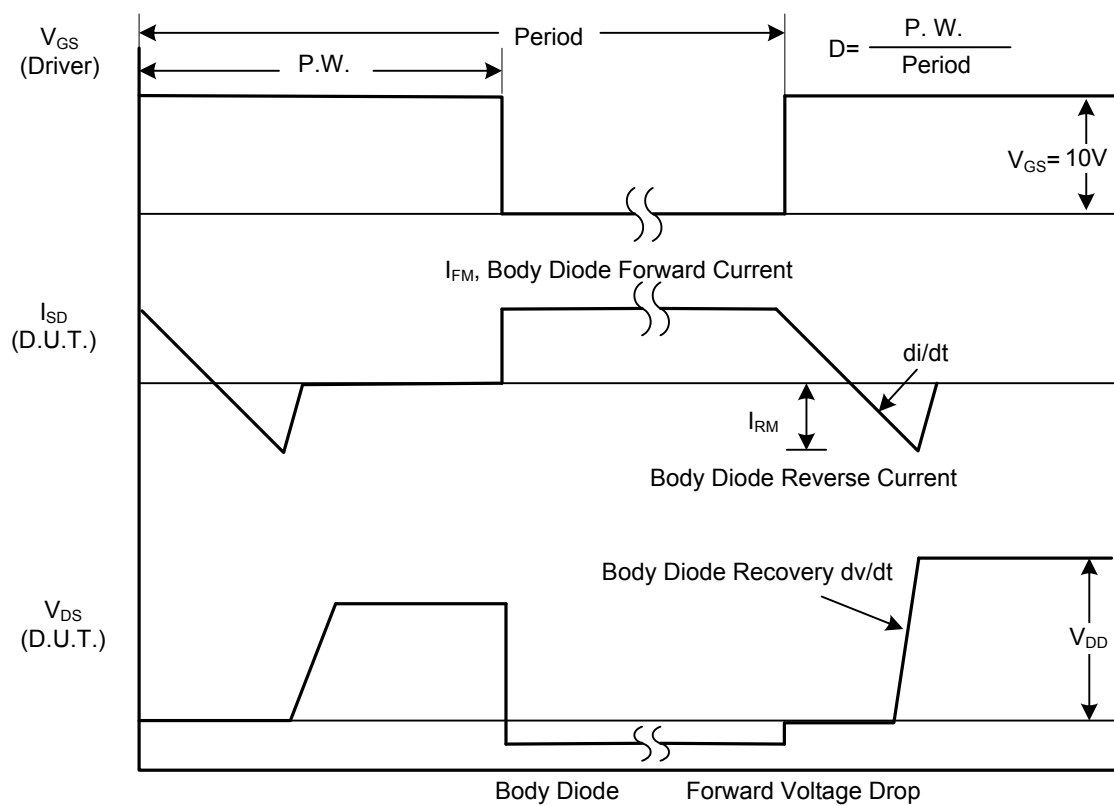
Notes: 1. The data tested by pulsed, pulse width≤300μs, duty cycles≤2%.

2. The power dissipation is limited by 150°C junction temperature.

## ■ TEST CIRCUITS AND WAVEFORMS

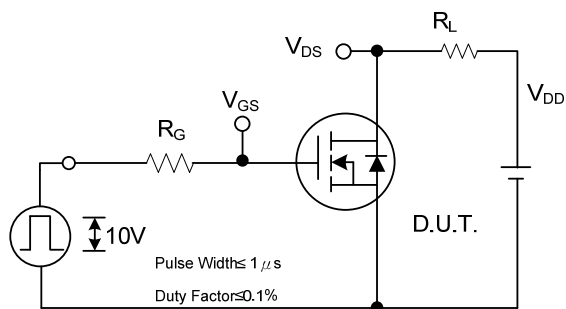


Peak Diode Recovery dv/dt Test Circuit

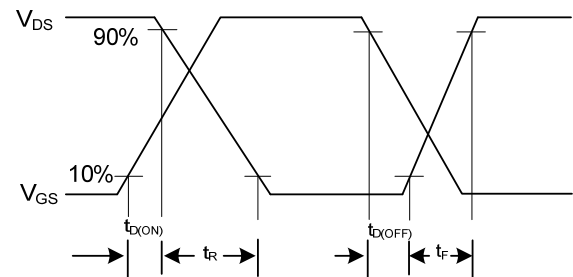


Peak Diode Recovery dv/dt Waveforms

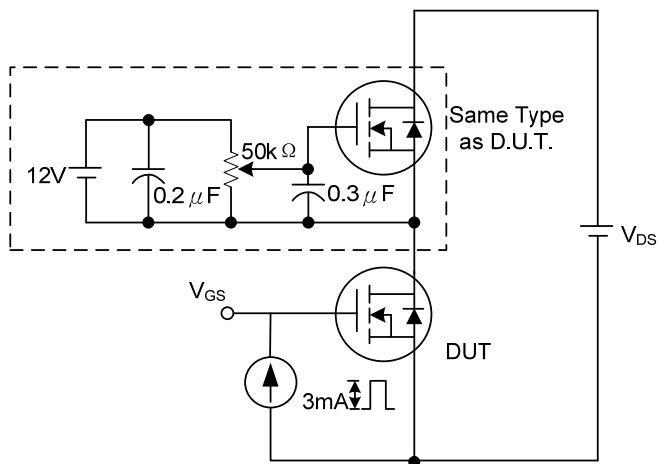
### ■ TEST CIRCUITS AND WAVEFORMS (Cont.)



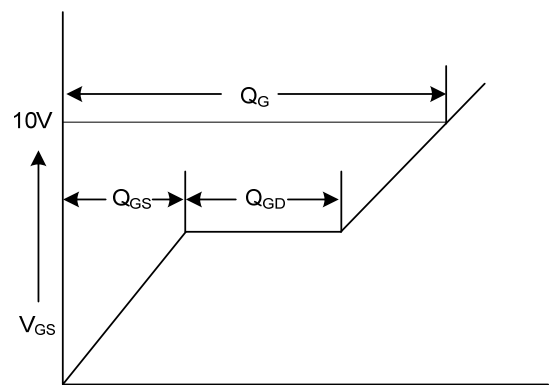
Switching Test Circuit



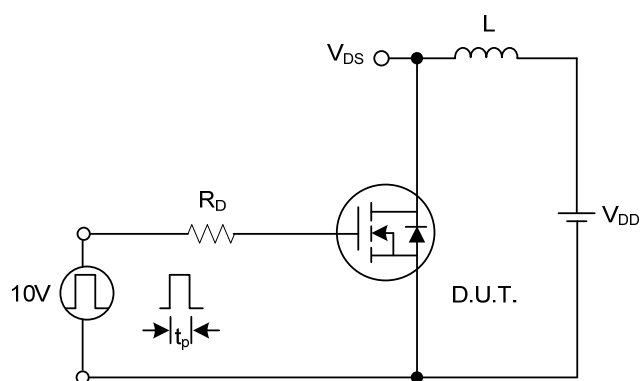
Switching Waveforms



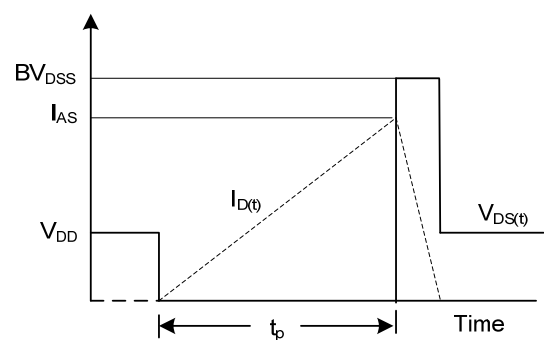
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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