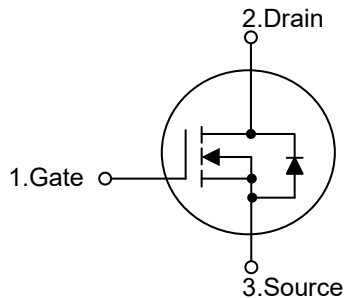


**UTZ44****Power MOSFET****50A, 55V N-CHANNEL  
POWER MOSFET****DESCRIPTION**

The UTC **UTZ44** is an N-channel mode Power MOSFET, utilize advanced processing techniques to achieve the lowest possible on-resistance per silicon area. using UTC's advanced technology to combined with the fast switching speed and ruggedized device design, provides the designer with an extremely efficient device for use in a wide variety of applications.

**FEATURES**

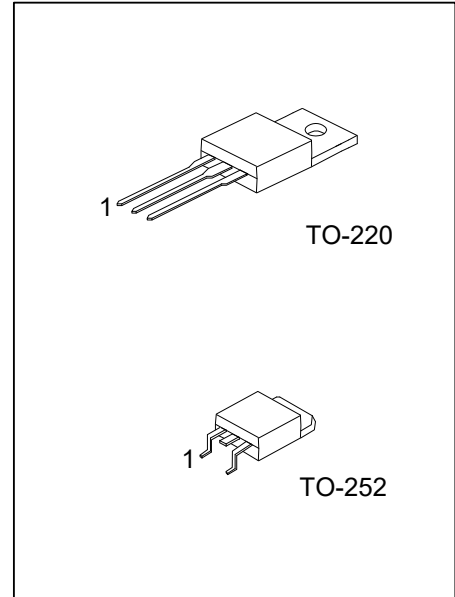
- \*  $R_{DS(ON)} \leq 14 \text{ m}\Omega$  @  $V_{GS}=10\text{V}$ ,  $I_D=25\text{A}$
- \*  $R_{DS(ON)} \leq 19 \text{ m}\Omega$  @  $V_{GS}=4.5\text{V}$ ,  $I_D=25\text{A}$
- \* High Switching Speed
- \* Improved dv/dt Capability

**SYMBOL****ORDERING INFORMATION**

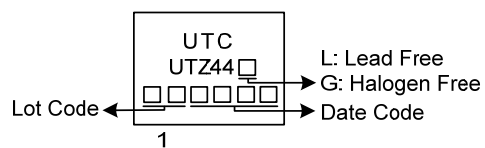
| Ordering Number |              | Package | Pin Assignment |   |   | Packing   |
|-----------------|--------------|---------|----------------|---|---|-----------|
| Lead Free       | Halogen Free |         | 1              | 2 | 3 |           |
| UTZ44L-TA3-T    | UTZ44G-TA3-T | TO-220  | G              | D | S | Tube      |
| UTZ44L-TN3-R    | UTZ44G-TN3-R | TO-252  | G              | D | S | Tape Reel |

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

|                     |  |                  |                                                |
|---------------------|--|------------------|------------------------------------------------|
| <b>UTZ44G-TA3-T</b> |  | (1)Packing Type  | (1) T: Tube, R: Tape Reel                      |
|                     |  | (2)Package Type  | (2) TA3: TO-220, TN3: TO-252                   |
|                     |  | (3)Green Package | (3) G: Halogen Free and Lead Free L: Lead Free |



## ■ MARKING



### ■ ABSOLUTE MAXIMUM RATINGS (T<sub>C</sub>=25°C, unless otherwise specified)

| PARAMETER                                |                 | SYMBOL           | RATINGS    | UNIT |
|------------------------------------------|-----------------|------------------|------------|------|
| Drain-Source Voltage                     |                 | V <sub>DSS</sub> | 55         | V    |
| Gate-Source Voltage                      |                 | V <sub>GSS</sub> | ±20        | V    |
| Drain Current                            | Continuous      | I <sub>D</sub>   | 50         | A    |
|                                          | Pulsed (Note 3) | I <sub>DM</sub>  | 100        | A    |
| Single Pulsed Avalanche Energy (Note 4)  |                 | E <sub>AS</sub>  | 65         | mJ   |
| Peak Diode Recovery dv/dt (Note 5)       |                 | dv/dt            | 2.9        | V/ns |
| Power Dissipation (T <sub>C</sub> =25°C) | TO-220          | P <sub>D</sub>   | 100        | W    |
|                                          | TO-252          |                  | 51         | W    |
| Junction Temperature                     |                 | T <sub>J</sub>   | -55 ~ +150 | °C   |
| Storage Temperature                      |                 | T <sub>STG</sub> | -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. Current limited by the package, (die current = 51 A).

3. Repetitive rating; pulse width limited by maximum junction temperature.

4. L = 0.1mH, I<sub>AS</sub> = 36A, V<sub>DD</sub> = 30V, R<sub>G</sub> = 25Ω, Starting T<sub>J</sub> = 25°C

5. I<sub>SD</sub> ≤ 30A, di/dt ≤ 200A/μs, V<sub>DD</sub> ≤ BV<sub>DSS</sub>, Starting T<sub>J</sub> = 25°C

### ■ THERMAL DATA

| PARAMETER           |        | SYMBOL          | RATINGS     | UNIT |
|---------------------|--------|-----------------|-------------|------|
| Junction to Ambient | TO-220 | θ <sub>JA</sub> | 62          | °C/W |
|                     | TO-252 |                 | 110         | °C/W |
| Junction to Case    | TO-220 | θ <sub>JC</sub> | 1.25        | °C/W |
|                     | TO-252 |                 | 2.45 (Note) | °C/W |

Note: Device mounted on FR-4 substrate P<sub>C</sub> board, 2oz copper, with 1inch square copper plate.

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

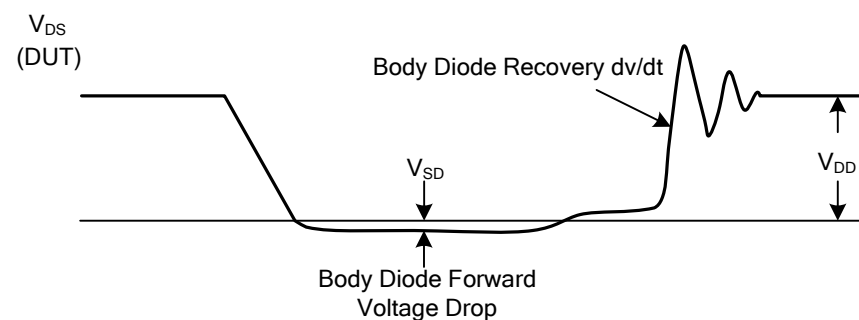
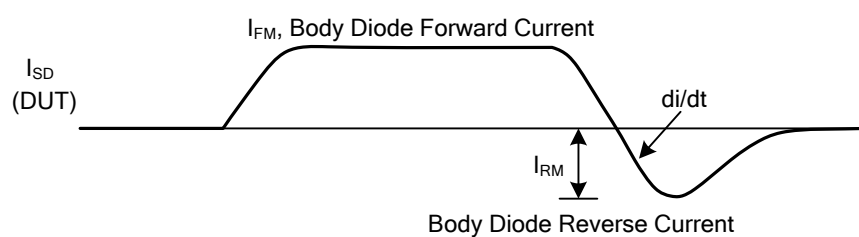
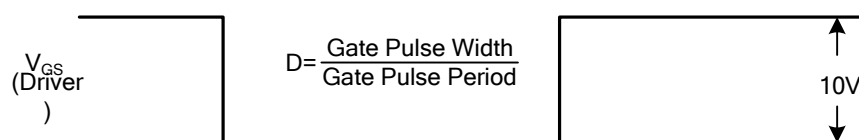
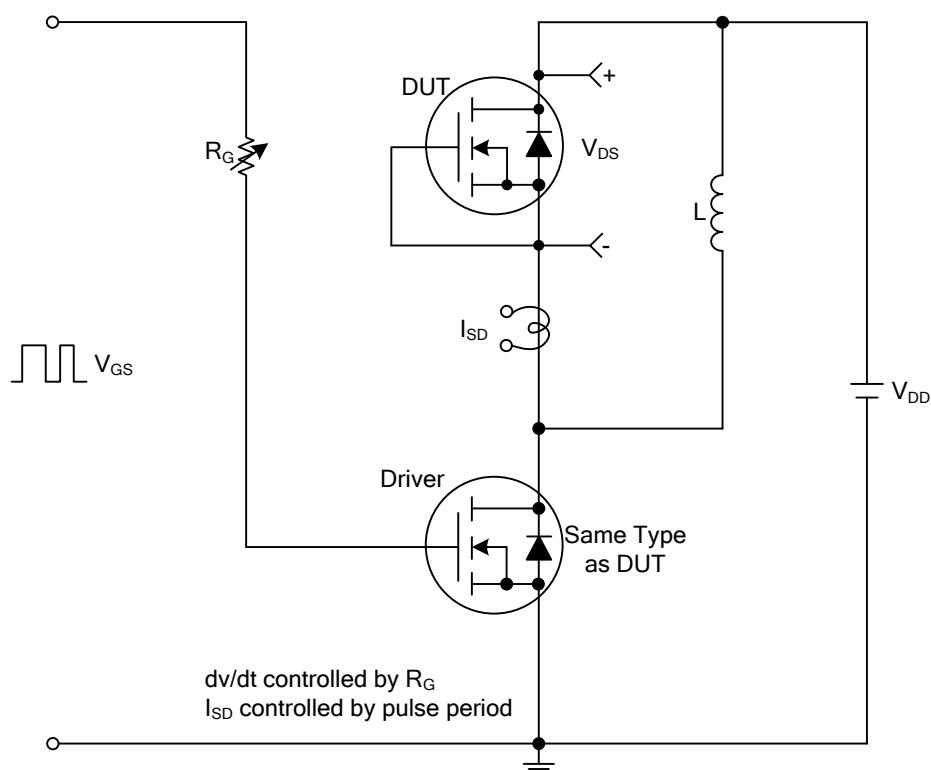
| PARAMETER                                           |         | SYMBOL              | TEST CONDITIONS                                                                                    | MIN | TYP  | MAX  | UNIT |
|-----------------------------------------------------|---------|---------------------|----------------------------------------------------------------------------------------------------|-----|------|------|------|
| OFF CHARACTERISTICS                                 |         |                     |                                                                                                    |     |      |      |      |
| Drain-Source Breakdown Voltage                      |         | BV <sub>DSS</sub>   | I <sub>D</sub> =250μA, V <sub>GS</sub> =0V                                                         | 55  |      |      | V    |
| Drain-Source Leakage Current                        |         | I <sub>DSS</sub>    | V <sub>DS</sub> =55V, V <sub>GS</sub> =0V                                                          |     |      | 10   | μA   |
| Gate- Source Leakage Current                        | Forward | I <sub>GSS</sub>    | V <sub>GS</sub> =+20V                                                                              |     |      | +100 | nA   |
|                                                     | Reverse |                     | V <sub>GS</sub> =-20V,                                                                             |     |      | -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                                           | 1.0 |      | 3.0  | V    |
| Static Drain-Source On-State Resistance<br>(Note 2) |         | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =25A                                                          |     |      | 14   | mΩ   |
|                                                     |         |                     | V <sub>GS</sub> =4.5V, I <sub>D</sub> =25A                                                         |     |      | 19   | mΩ   |
| DYNAMIC PARAMETERS                                  |         |                     |                                                                                                    |     |      |      |      |
| Input Capacitance                                   |         | C <sub>ISS</sub>    | V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1.0MHz                                                |     | 2315 |      | pF   |
| Output Capacitance                                  |         | C <sub>OSS</sub>    |                                                                                                    |     | 181  |      | pF   |
| Reverse Transfer Capacitance                        |         | C <sub>RSS</sub>    |                                                                                                    |     | 144  |      | pF   |
| SWITCHING PARAMETERS                                |         |                     |                                                                                                    |     |      |      |      |
| Total Gate Charge                                   |         | Q <sub>G</sub>      | V <sub>DS</sub> =48V, V <sub>GS</sub> =10V, I <sub>D</sub> =50A<br>I <sub>G</sub> =1mA (Note1,2)   |     | 56   |      | nC   |
| Gate to Source Charge                               |         | Q <sub>GS</sub>     |                                                                                                    |     | 8.4  |      | nC   |
| Gate to Drain Charge                                |         | Q <sub>GD</sub>     |                                                                                                    |     | 13.8 |      | nC   |
| Turn-ON Delay Time                                  |         | t <sub>D(ON)</sub>  | V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =50A,<br>R <sub>G</sub> =3.3Ω (Note1,2) |     | 9    |      | ns   |
| Rise Time                                           |         | t <sub>R</sub>      |                                                                                                    |     | 18   |      | ns   |
| Turn-OFF Delay Time                                 |         | t <sub>D(OFF)</sub> |                                                                                                    |     | 54   |      | ns   |
| Fall-Time                                           |         | t <sub>F</sub>      |                                                                                                    |     | 28   |      | ns   |
| SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS      |         |                     |                                                                                                    |     |      |      |      |
| Drain-Source Diode Forward Voltage                  |         | V <sub>SD</sub>     | I <sub>S</sub> =50A, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C(Note 2)                             |     |      | 1.5  | V    |
| Body Diode Reverse Recovery Time                    |         | t <sub>rr</sub>     | I <sub>F</sub> =30A, dI/dt=100A/μs, T <sub>J</sub> =25°C                                           |     | 60   |      | ns   |
| Body Diode Reverse Recovery Charge                  |         | Q <sub>rr</sub>     |                                                                                                    |     | 40   |      | nC   |

Notes: 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

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

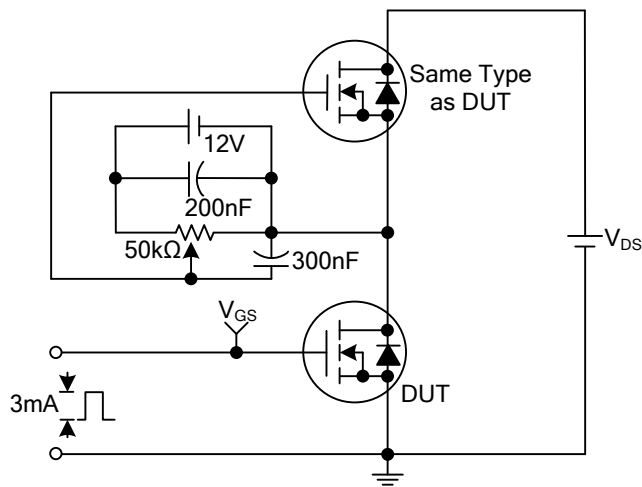
## ■ TEST CIRCUITS AND WAVEFORMS

Peak Diode Recovery dv/dt Test Circuit & Waveforms

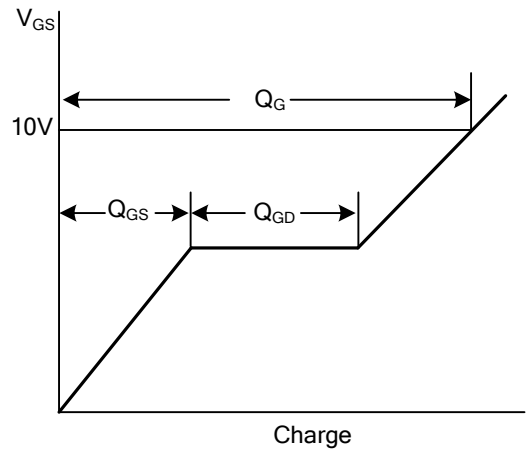


## ■ TEST CIRCUITS AND WAVEFORMS

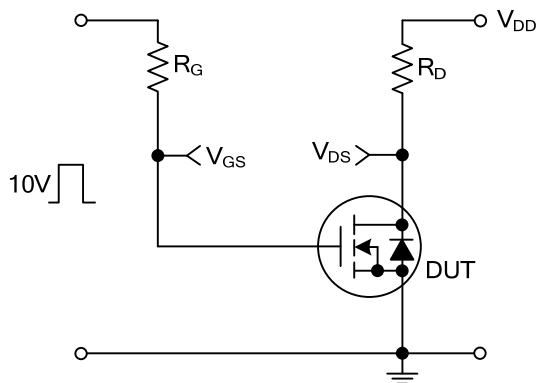
Gate Charge Test Circuit



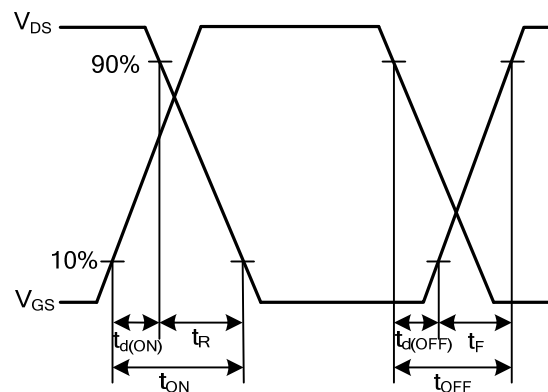
Gate Charge Waveforms



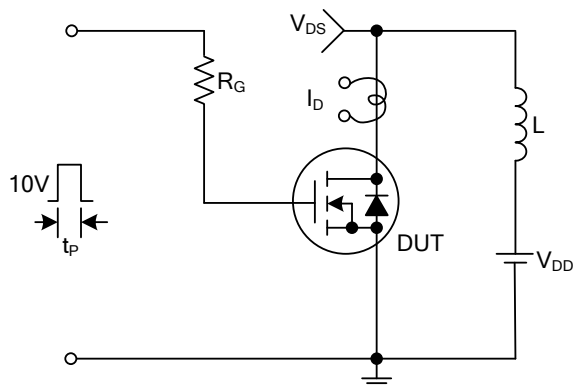
Resistive Switching Test Circuit



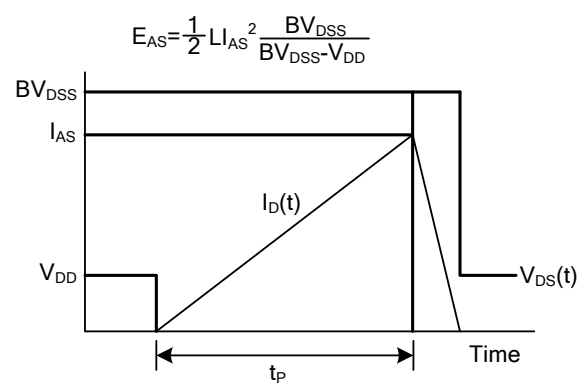
Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



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