

**8NK95Z**

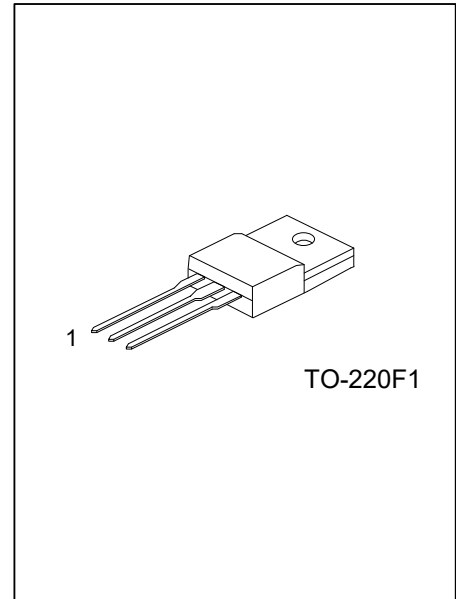
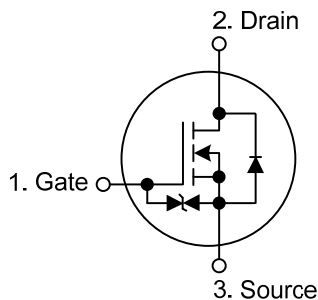
Preliminary

**POWER MOSFET****8.0A, 950V N-CHANNEL  
POWER MOSFET****DESCRIPTION**

The UTC **8NK95Z** is a silicon N-channel MOSFET, it uses UTC's advanced technology to provide the customers with a minimum on state resistance, high switching speed and low gate charge.

**FEATURES**

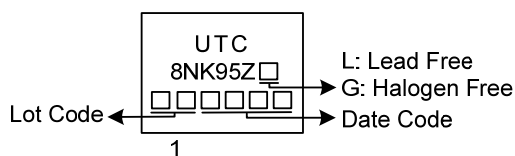
- \*  $R_{DS(ON)} \leq 1.8 \Omega$  @  $V_{GS}=10V$ ,  $I_D=4.0A$
- \* High switching speed
- \* Low input capacitance
- \* With ESD protection

**SYMBOL****ORDERING INFORMATION**

| Ordering Number |               | Package  | Pin Assignment |   |   | Packing |
|-----------------|---------------|----------|----------------|---|---|---------|
| Lead Free       | Halogen Free  |          | 1              | 2 | 3 |         |
| 8NK95ZL-TF1-T   | 8NK95ZG-TF1-T | TO-220F1 | G              | D | S | Tube    |

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

|                      |  |                  |                                                 |
|----------------------|--|------------------|-------------------------------------------------|
| <b>8NK95ZG-TF1-T</b> |  | (1)Packing Type  | (1) T: Tube                                     |
|                      |  | (2)Package Type  | (2) TF1: TO-220F1                               |
|                      |  | (3)Green Package | (3) G: Halogen Free and Lead Free, L: Lead Free |

**MARKING**

■ **ABSOLUTE MAXIMUM RATING** ( $T_C=25^{\circ}\text{C}$  unless otherwise specified)

| PARAMETER                            | SYMBOL                 | RATINGS    | UNIT               |
|--------------------------------------|------------------------|------------|--------------------|
| Drain-Source Voltage                 | $V_{DSS}$              | 950        | V                  |
| Gate-Source Voltage                  | $V_{GSS}$              | $\pm 20$   | V                  |
| Drain Current                        | DC                     | $I_D$      | 8                  |
|                                      | Pulsed (Note 2)        | $I_{DM}$   | 24                 |
| Avalanche Energy                     | Single Pulsed (Note 3) | $E_{AS}$   | 882                |
| Peak Diode Recovery $dv/dt$ (Note 4) | $dv/dt$                | 1.25       | V/ns               |
| Power Dissipation                    | $P_D$                  | 39         | W                  |
| Junction Temperature                 | $T_J$                  | +150       | $^{\circ}\text{C}$ |
| Storage Temperature Range            | $T_{STG}$              | -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.  $L=100\text{mH}$ ,  $I_{AS} = 4.2\text{A}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ , 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 DATA**

| PARAMETER           | SYMBOL        | RATINGS | UNIT                        |
|---------------------|---------------|---------|-----------------------------|
| Junction to Ambient | $\theta_{JA}$ | 62.5    | $^{\circ}\text{C}/\text{W}$ |
| Junction to Case    | $\theta_{JC}$ | 3.21    | $^{\circ}\text{C}/\text{W}$ |

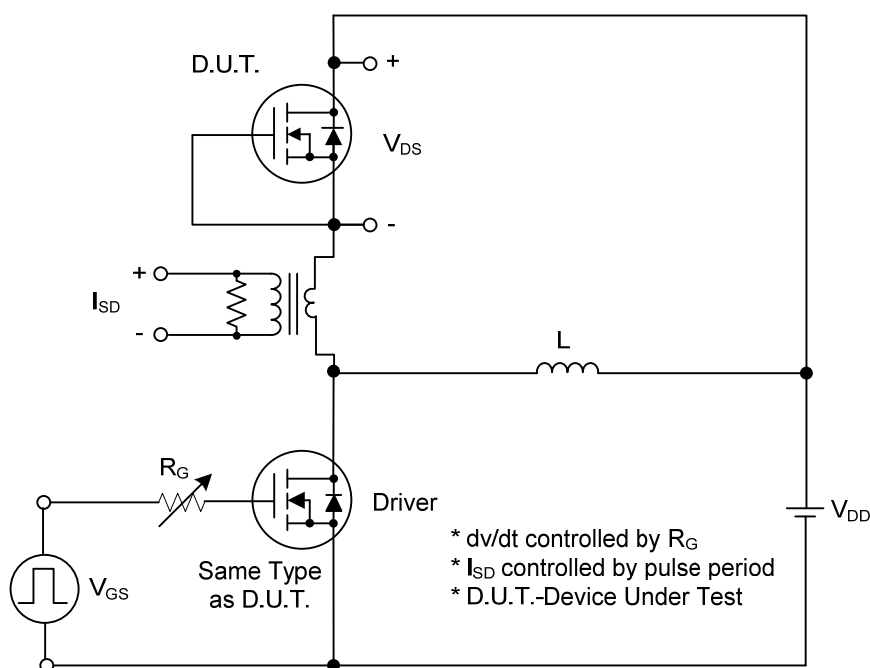
■ ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C unless otherwise specified)

| PARAMETER                                             |         | SYMBOL              | TEST CONDITIONS                                                                                       | MIN | TYP  | MAX | UNIT |
|-------------------------------------------------------|---------|---------------------|-------------------------------------------------------------------------------------------------------|-----|------|-----|------|
| OFF CHARACTERISTICS                                   |         |                     |                                                                                                       |     |      |     |      |
| Drain-Source Breakdown Voltage                        |         | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA                                                            | 950 |      |     | V    |
| Drain-Source Leakage Current                          |         | I <sub>DSS</sub>    | V <sub>DS</sub> =950V, V <sub>GS</sub> =0V                                                            |     |      | 10  | μA   |
| Gate-Source Leakage Current                           | Forward | I <sub>GSS</sub>    | V <sub>GS</sub> =+20V, V <sub>DS</sub> =0V                                                            |     |      | +10 | μA   |
|                                                       | Reverse |                     | V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V                                                            |     |      | -10 | μA   |
| ON CHARACTERISTICS                                    |         |                     |                                                                                                       |     |      |     |      |
| Gate Threshold Voltage                                |         | V <sub>GS(TH)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                              | 3.0 |      | 5.0 | V    |
| Static Drain-Source On-State Resistance               |         | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =4.0A                                                            |     |      | 1.8 | Ω    |
| DYNAMIC PARAMETERS                                    |         |                     |                                                                                                       |     |      |     |      |
| Input Capacitance                                     |         | C <sub>ISS</sub>    | V <sub>GS</sub> =0V, V <sub>DS</sub> =50V, f=1.0MHz                                                   |     | 2014 |     | pF   |
| Output Capacitance                                    |         | C <sub>OSS</sub>    |                                                                                                       |     | 104  |     | pF   |
| Reverse Transfer Capacitance                          |         | C <sub>RSS</sub>    |                                                                                                       |     | 13   |     | pF   |
| SWITCHING PARAMETERS                                  |         |                     |                                                                                                       |     |      |     |      |
| Total Gate Charge                                     |         | Q <sub>G</sub>      | V <sub>DS</sub> =760V, V <sub>GS</sub> =10V, I <sub>D</sub> =8.0A<br>(Note 1, 2)                      |     | 67   |     | nC   |
| Gate to Source Charge                                 |         | Q <sub>GS</sub>     |                                                                                                       |     | 24.3 |     | nC   |
| Gate to Drain Charge                                  |         | Q <sub>GD</sub>     |                                                                                                       |     | 19.2 |     | nC   |
| Turn-ON Delay Time                                    |         | t <sub>D(ON)</sub>  | V <sub>DD</sub> =100V, V <sub>GS</sub> =10V, I <sub>D</sub> =8.0A,<br>R <sub>G</sub> =25Ω (Note 1, 2) |     | 37   |     | ns   |
| Rise Time                                             |         | t <sub>R</sub>      |                                                                                                       |     | 22   |     | ns   |
| Turn-OFF Delay Time                                   |         | t <sub>D(OFF)</sub> |                                                                                                       |     | 129  |     | ns   |
| Fall-Time                                             |         | t <sub>F</sub>      |                                                                                                       |     | 53.4 |     | ns   |
| SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS        |         |                     |                                                                                                       |     |      |     |      |
| Maximum Continuous Drain-Source Diode Forward Current |         | I <sub>S</sub>      |                                                                                                       |     |      | 8   | A    |
| Maximum Pulsed Drain-Source Diode Forward Current     |         | I <sub>SM</sub>     |                                                                                                       |     |      | 24  | A    |
| Diode Forward Voltage                                 |         | V <sub>SD</sub>     | I <sub>F</sub> =8.0A, V <sub>GS</sub> =0V                                                             |     |      | 1.4 | V    |
| Reverse Recovery Time                                 |         | t <sub>rr</sub>     | I <sub>S</sub> =8.0A, V <sub>GS</sub> =0V,                                                            |     | 965  |     | ns   |
| Reverse Recovery Charge (Note 1)                      |         | Q <sub>rr</sub>     | dI <sub>F</sub> /dt = 100 A/μs                                                                        |     | 7.8  |     | uC   |

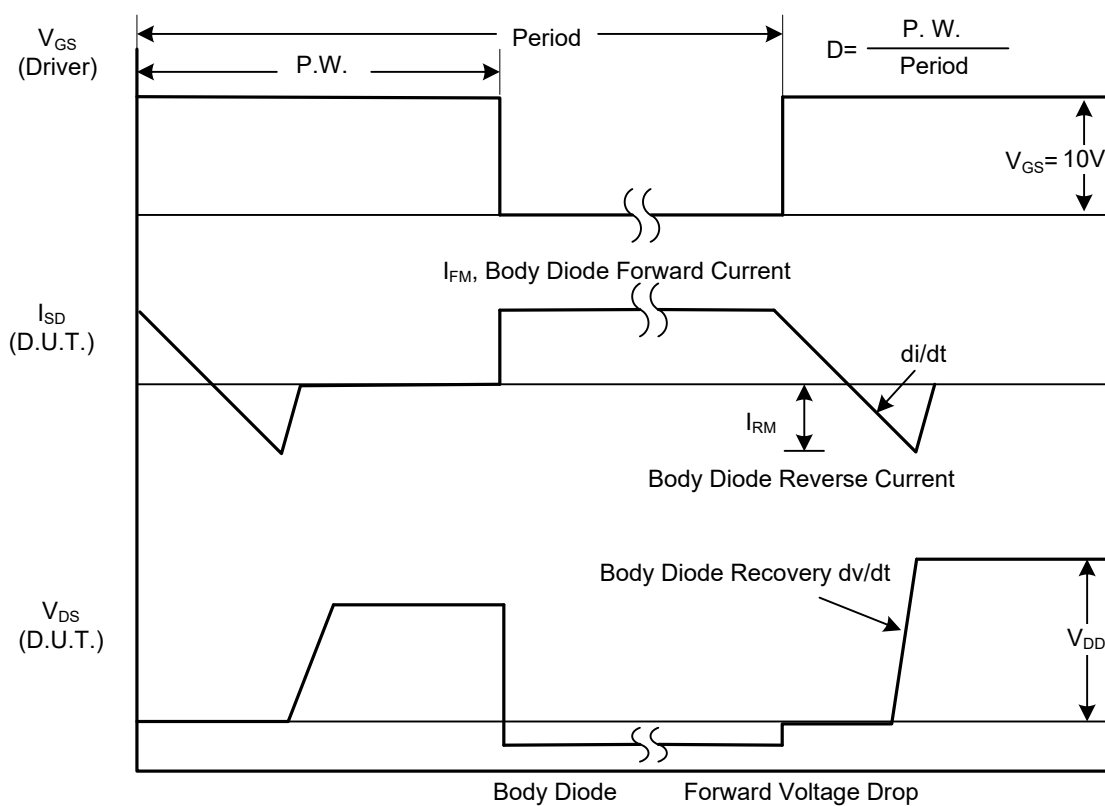
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

## ■ TEST CIRCUITS AND WAVEFORMS

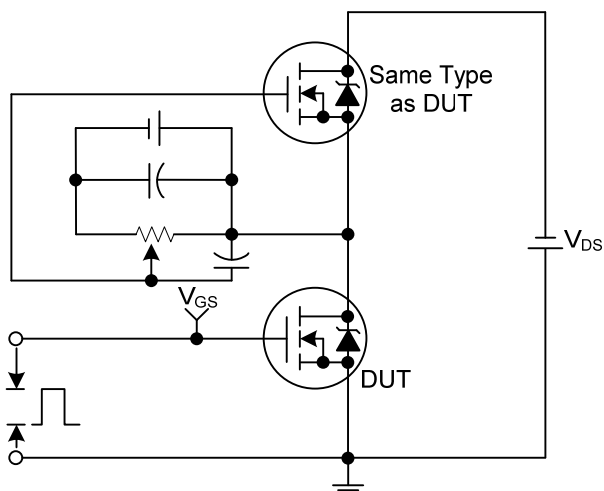


Peak Diode Recovery  $dv/dt$  Test Circuit

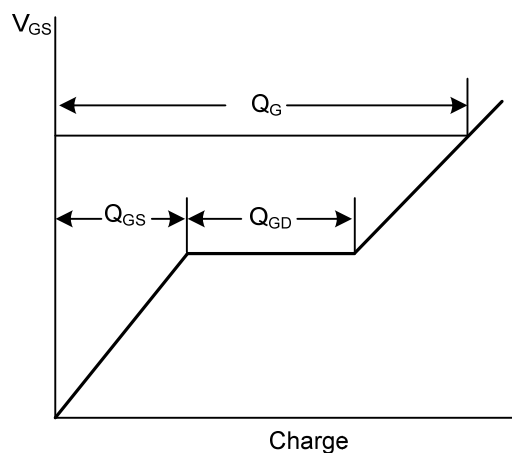


Peak Diode Recovery  $dv/dt$  Waveforms

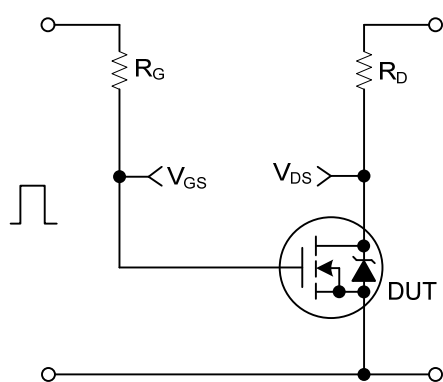
## ■ TEST CIRCUITS AND WAVEFORMS



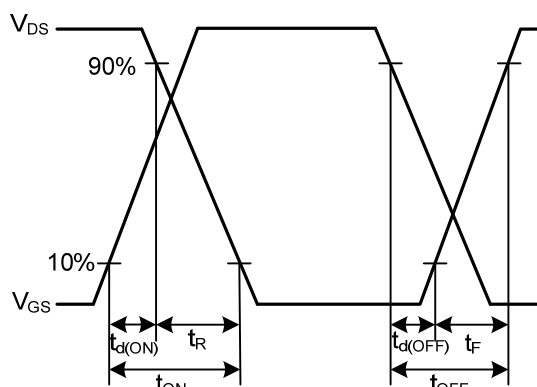
Gate Charge Test Circuit



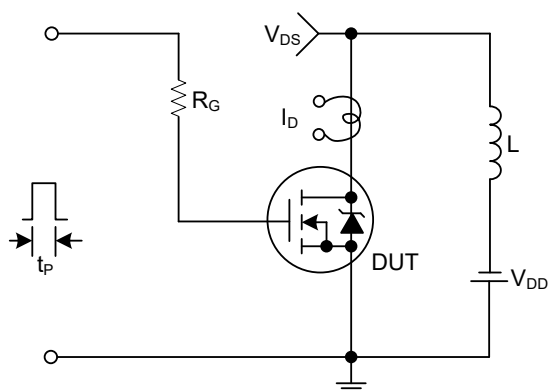
Gate Charge Waveforms



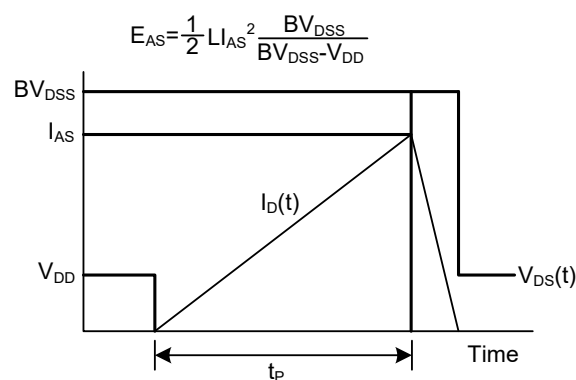
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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