



# 8N65K-MT

Power MOSFET

## 8A, 650V N-CHANNEL POWER MOSFET

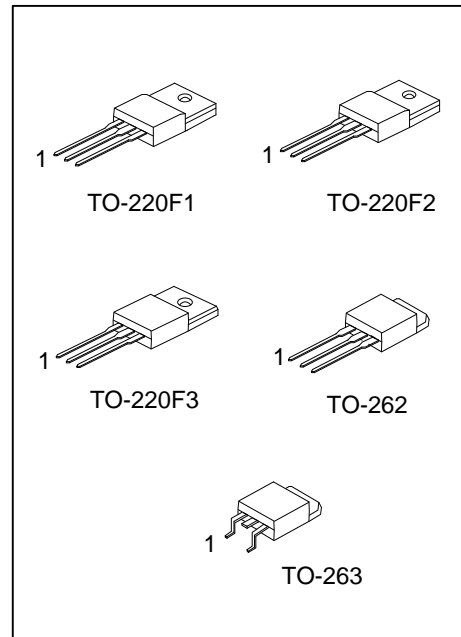
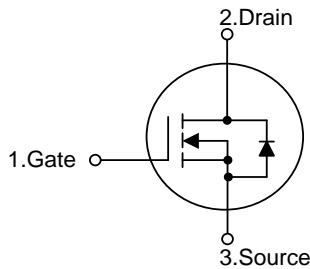
### DESCRIPTION

The UTC **8N65K-MT** is a high voltage and high current power MOSFET designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and high rugged avalanche characteristics. This power MOSFET is usually used in high speed switching applications at power supplies, PWM motor controls, high efficient DC to DC converters and bridge circuits.

### FEATURES

- \*  $R_{DS(ON)} \leq 1.3 \Omega$  @  $V_{GS}=10V, I_D=4A$
- \* Fast switching capability
- \* Avalanche energy specified
- \* Improved dv/dt capability, high ruggedness

### SYMBOL



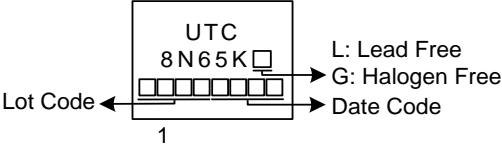
### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
8N65KL-TF1-T	8N65KG-TF1-T	TO-220F1	G	D	S	Tube
8N65KL-TF2-T	8N65KG-TF2-T	TO-220F2	G	D	S	Tube
8N65KL-TF3T-T	8N65KG-TF3T-T	TO-220F3	G	D	S	Tube
8N65KL-T2Q-T	8N65KG-T2Q-T	TO-262	G	D	S	Tube
8N65KL-TQ2-T	8N65KG-TQ2-T	TO-263	G	D	S	Tube
8N65KL-TQ2-R	8N65KG-TQ2-R	TO-263	G	D	S	Tape Reel

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

<p>8N65KG-TF1-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube (2) TF1: TO-220F1, TF2: TO-220F2, TF3T: TO-220F3 T2Q: TO-262, TQ2: TO-263 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
--	--

■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	650	V
Gate-Source Voltage		$V_{GSS}$	$\pm 30$	V
Drain Current	Continuous	$I_D$	8	A
	Pulsed (Note 2)	$I_{DM}$	32	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	350	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.5	V/ns
Power Dissipation	TO-262/TO-263	$P_D$	155	W
	TO-220F1/TO-220F2		39	W
	TO-220F3			
Junction Temperature		$T_J$	+150	$^\circ\text{C}$
Operating Temperature		$T_{OPR}$	-55 ~ +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.  $L=10.93\text{mH}$ ,  $I_{AS}=8\text{A}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$

4.  $I_{SD} \leq 8\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J=25^\circ\text{C}$

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient		$\theta_{JA}$	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-262/TO-263	$\theta_{JC}$	0.8	$^\circ\text{C}/\text{W}$
	TO-220F1/TO-220F2		3.2	$^\circ\text{C}/\text{W}$
	TO-220F3			

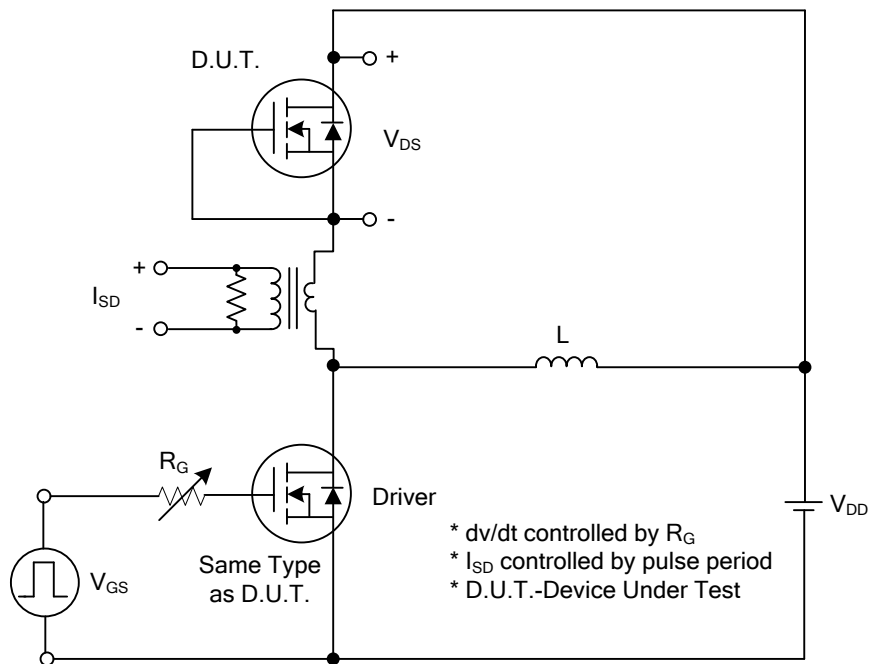
■ **ELECTRICAL CHARACTERISTICS** ( $T_J=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
<b>OFF CHARACTERISTICS</b>							
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	650			V	
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS} = 650\text{ V}, V_{GS} = 0\text{ V}$			10	$\mu\text{A}$	
Gate-Source Leakage Current	Forward	$I_{GSS}$			100	nA	
	Reverse						$V_{GS} = -30\text{ V}, V_{DS} = 0\text{ V}$
<b>ON CHARACTERISTICS</b>							
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	2.0		4.0	V	
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 4\text{ A}$			1.3	$\Omega$	
<b>DYNAMIC CHARACTERISTICS</b>							
Input Capacitance	$C_{ISS}$	$V_{DS}=25\text{ V}, V_{GS}=0\text{V}, f=1\text{MHz}$		1300		pF	
Output Capacitance	$C_{OSS}$				130		pF
Reverse Transfer Capacitance	$C_{RSS}$				6		pF
<b>SWITCHING CHARACTERISTICS</b>							
Total Gate Charge (Note 1)	$Q_G$	$V_{DS}=300\text{V}, I_D=8\text{A}, V_{GS}=10\text{V}$ $I_G=1\text{mA}$ (Note 1, 2)		32		nC	
Gate-Source Charge	$Q_{GS}$				12		nC
Gate-Drain Charge	$Q_{GD}$				7		nC
Turn-On Delay Time (Note 1)	$t_{D(ON)}$	$V_{DD}=200\text{V}, V_{DS}=10\text{V}, I_D=8\text{A},$ $R_G=25\Omega$ (Note 1, 2)		20		ns	
Turn-On Rise Time	$t_R$				17.2		ns
Turn-Off Delay Time	$t_{D(OFF)}$				86		ns
Turn-Off Fall Time	$t_F$				26		ns
<b>DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS</b>							
Maximum Continuous Drain-Source Diode Forward Current	$I_S$				8	A	
Maximum Pulsed Drain-Source Diode Forward Current	$I_{SM}$				32	A	
Drain-Source Diode Forward Voltage(Note 1)	$V_{SD}$	$V_{GS} = 0\text{ V}, I_S = 8\text{A}$			1.4	V	
Body Diode Reverse Recovery Time (Note 1)	$t_{rr}$	$V_{GS}=0\text{V}, I_S=8\text{A}$ $dI_F/dt=100\text{A}/\mu\text{s}$		360		ns	
Body Diode Reverse Recovery Charge	$Q_{rr}$				3.8		$\mu\text{C}$

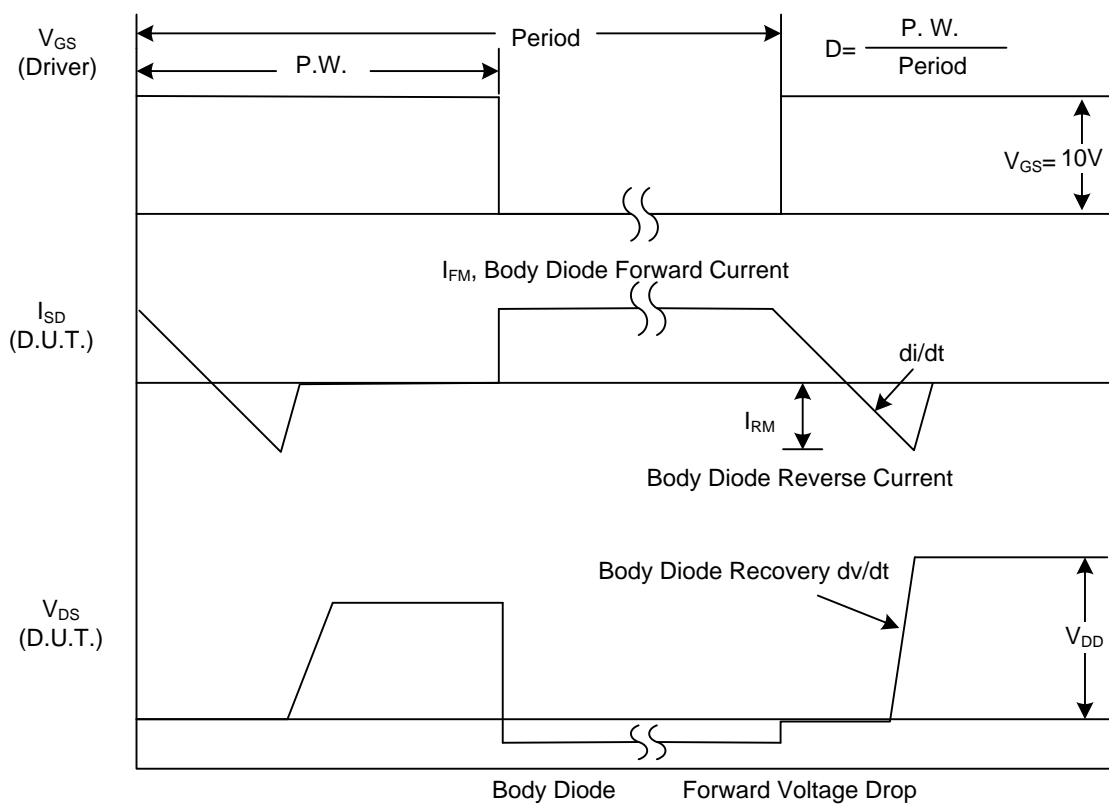
Notes: 1. Pulse Test: Pulse width  $\leq 300\ \mu\text{s}$ , Duty cycle  $\leq 2\%$

2. Essentially independent of operating temperature

## ■ TEST CIRCUITS AND WAVEFORMS

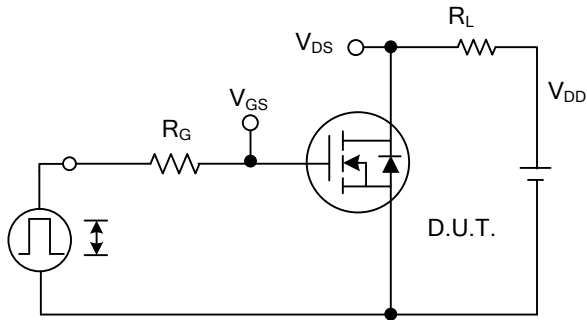


Peak Diode Recovery  $dv/dt$  Test Circuit

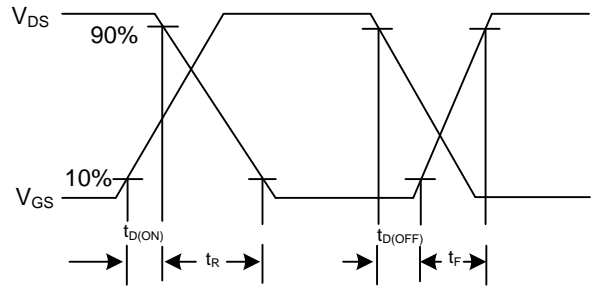


Peak Diode Recovery  $dv/dt$  Waveforms

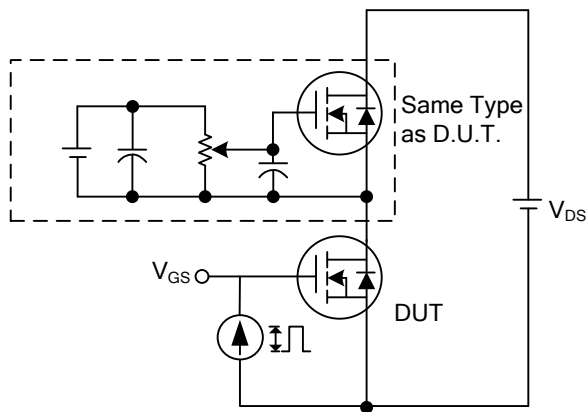
## TEST CIRCUITS AND WAVEFORM



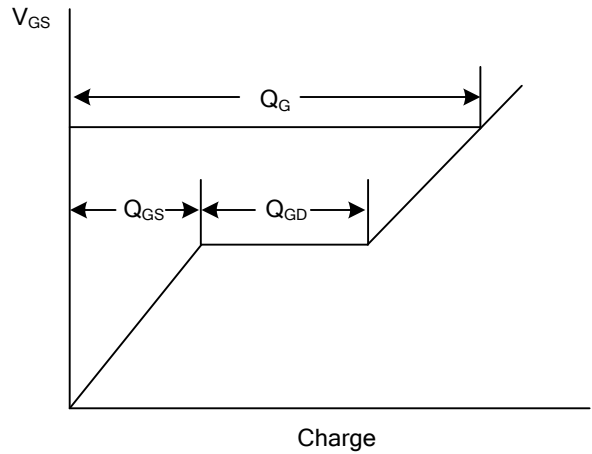
Switching Test Circuit



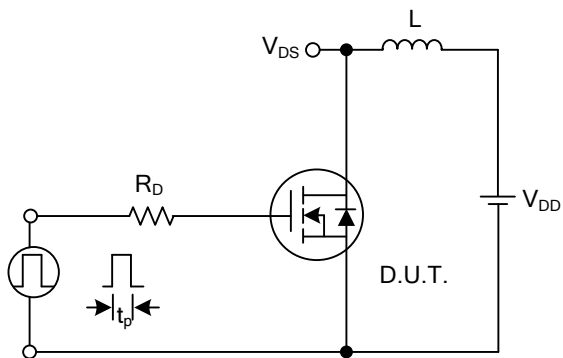
Switching Waveforms



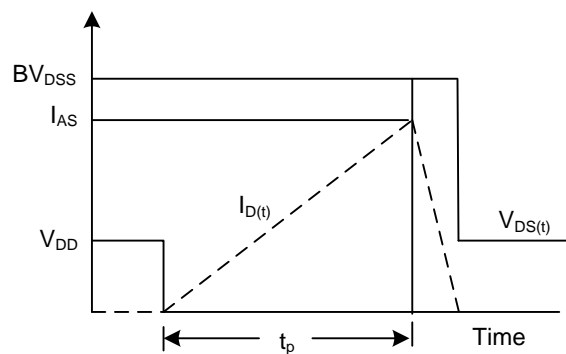
Gate Charge Test Circuit



Gate Charge Waveform

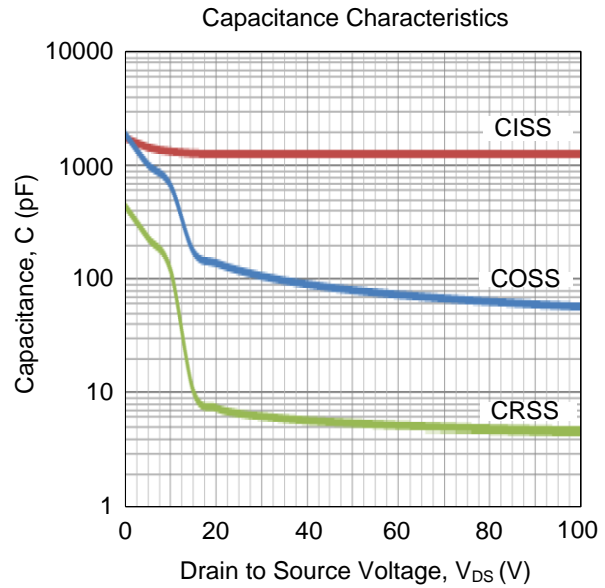
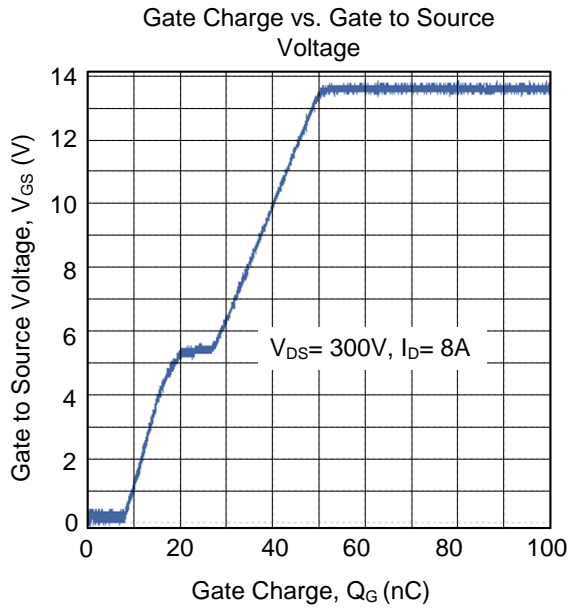


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

## ■ TYPICAL CHARACTERISTICS



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.