



8N65K-MT

Power MOSFET

8A, 650V N-CHANNEL POWER MOSFET

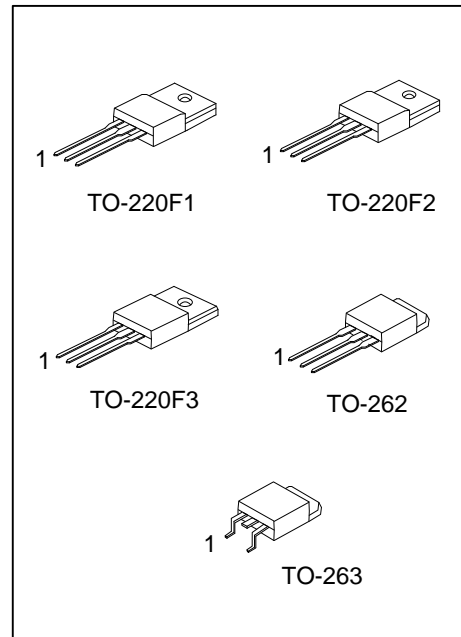
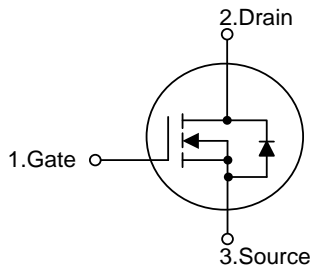
DESCRIPTION

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



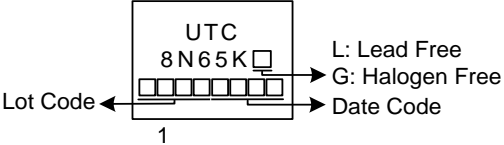
ORDERING INFORMATION

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) 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>
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MARKING



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■ **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}	± 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		θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-262/TO-263	θ_{JC}	0.8	$^\circ\text{C}/\text{W}$
	TO-220F1/TO-220F2		3.2	$^\circ\text{C}/\text{W}$
	TO-220F3			

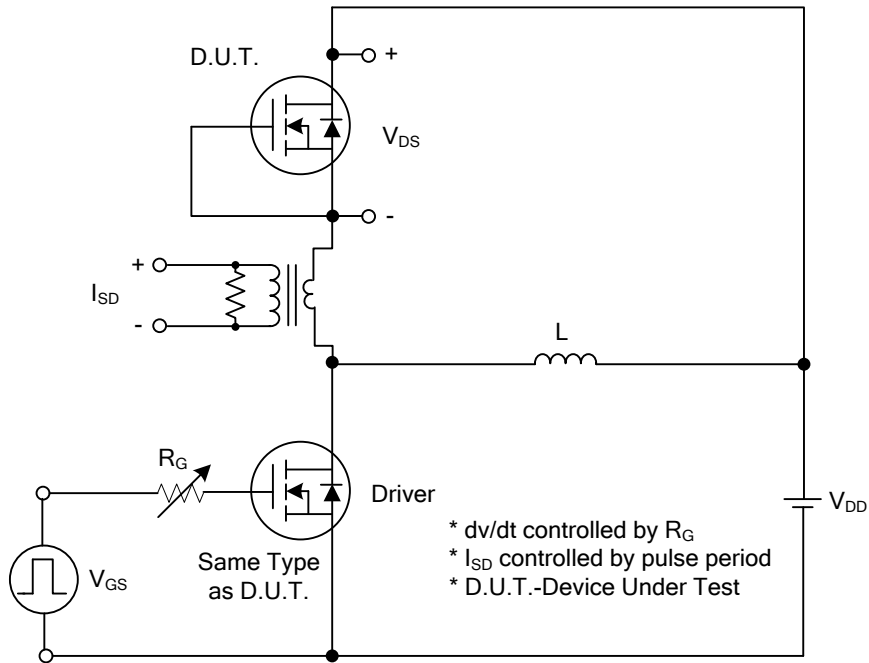
■ **ELECTRICAL CHARACTERISTICS** ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
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	μA
Gate-Source Leakage Current	Forward	I_{GSS}			100	nA
	Reverse					
ON CHARACTERISTICS						
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	Ω
DYNAMIC CHARACTERISTICS						
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
SWITCHING CHARACTERISTICS						
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
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
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		μC

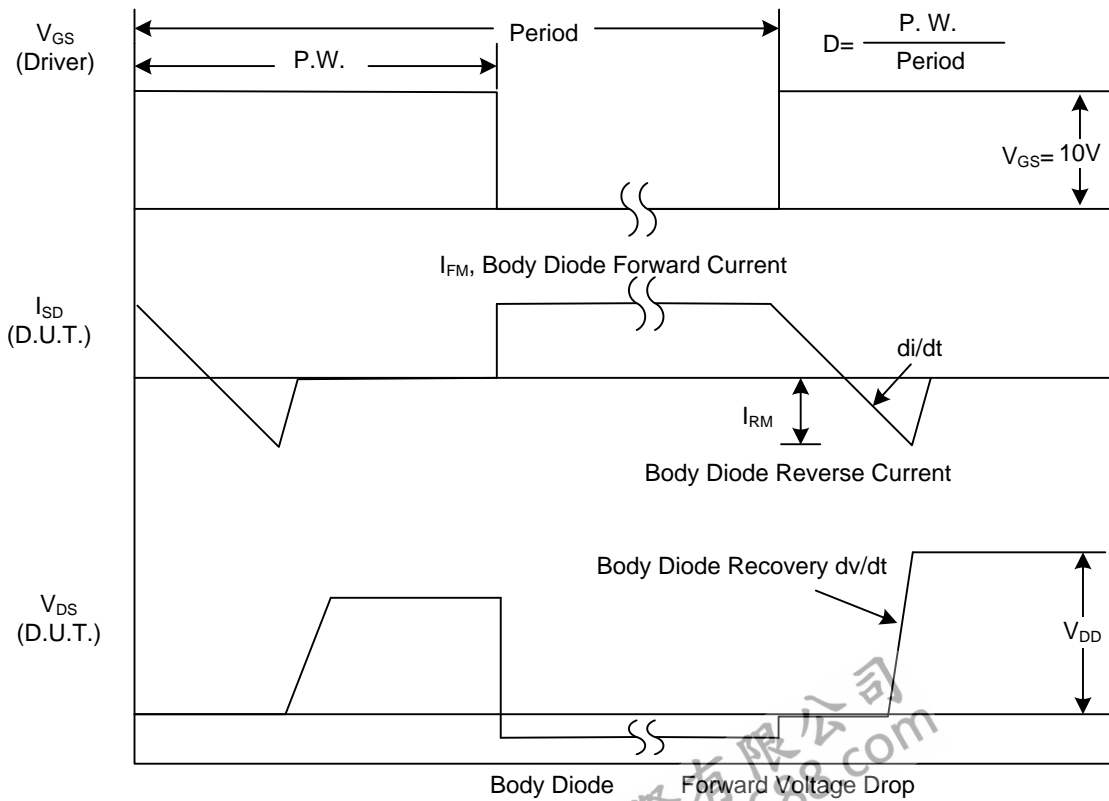
Notes: 1. Pulse Test: Pulse width $\leq 300\ \mu\text{s}$, Duty cycle $\leq 2\%$

2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

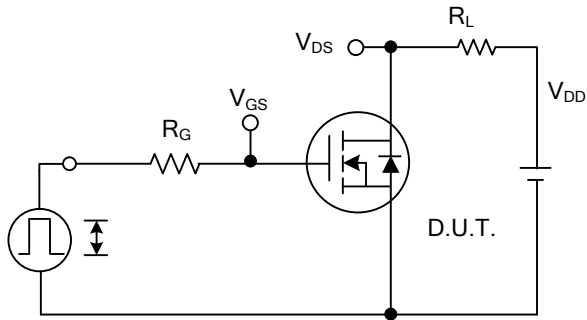


Peak Diode Recovery dv/dt Test Circuit

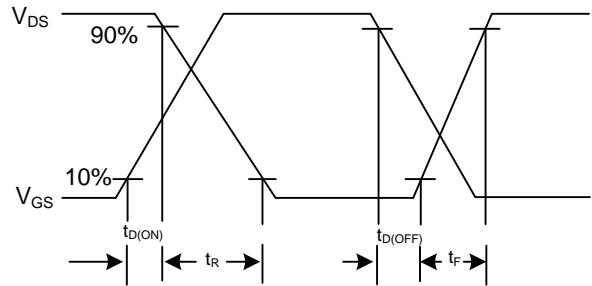


Peak Diode Recovery dv/dt Waveforms

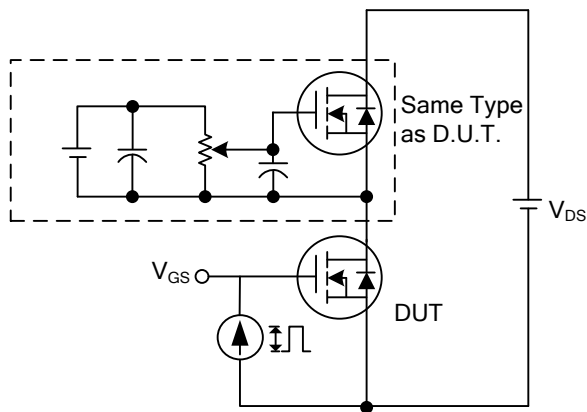
TEST CIRCUITS AND WAVEFORM



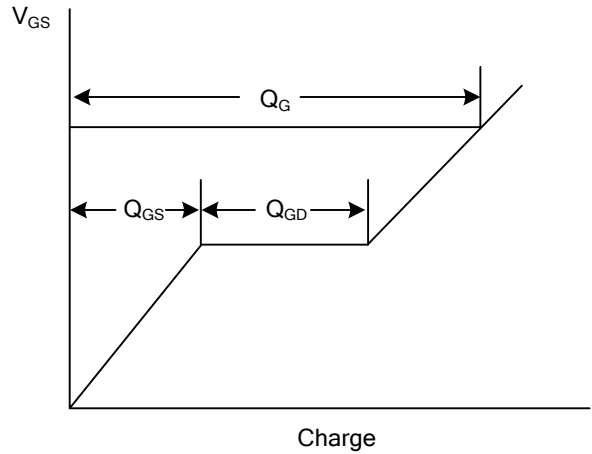
Switching Test Circuit



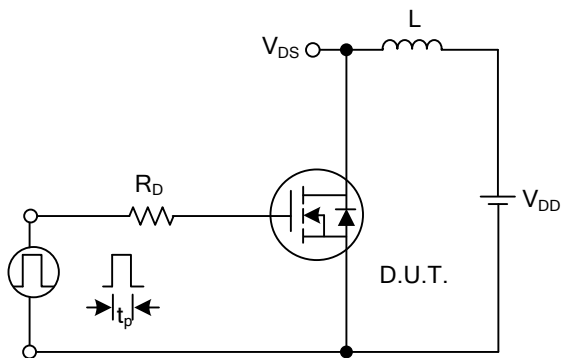
Switching Waveforms



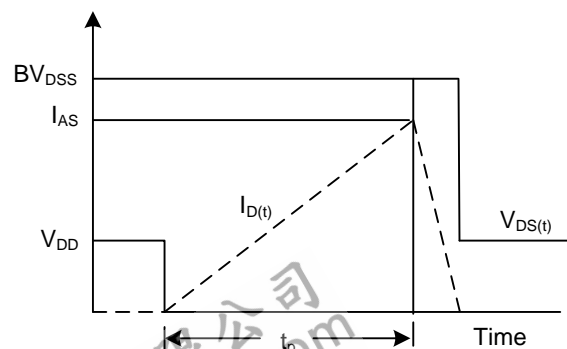
Gate Charge Test Circuit



Gate Charge Waveform

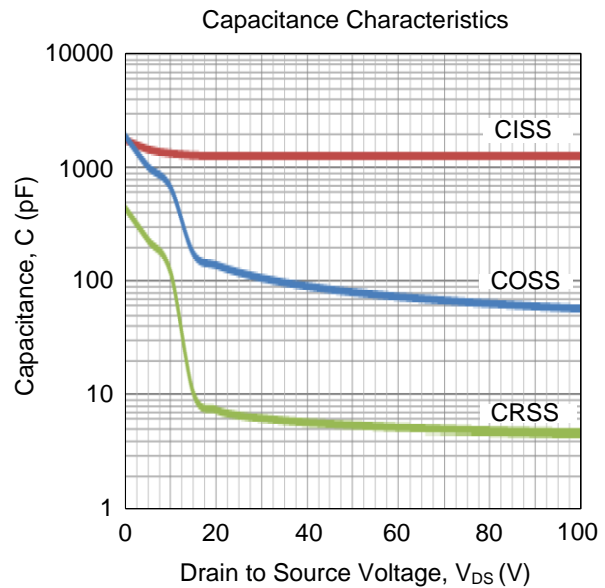
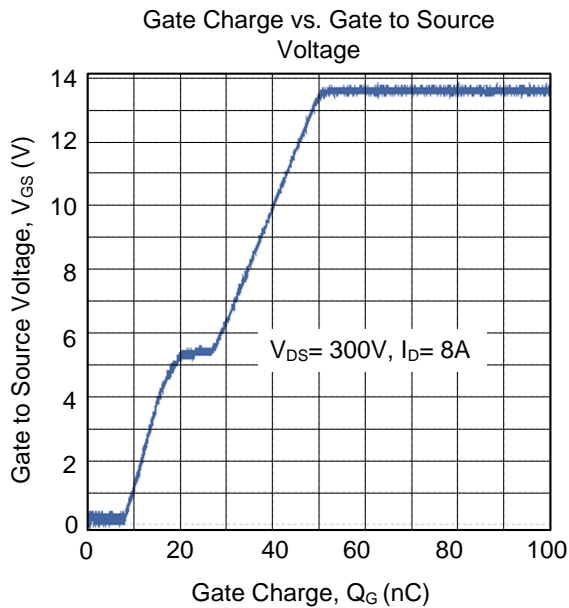


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS



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