



8N65K-MTQ

Power MOSFET

8A, 650V N-CHANNEL POWER MOSFET

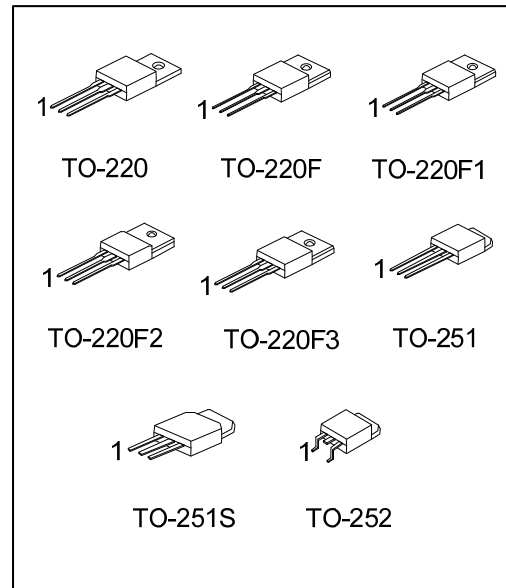
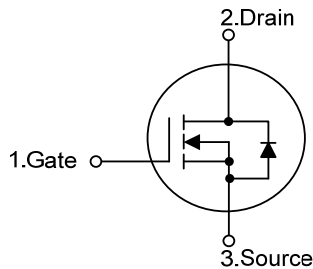
■ DESCRIPTION

The UTC **8N65K-MTQ** 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

- * $R_{DS(ON)} < 1.3 \Omega @ V_{GS} = 10 V, I_D = 4 A$
- * 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-TA3-T	8N65KG-TA3-T	TO-220	G	D	S	Tube
8N65KL-TF3-T	8N65KG-TF3-T	TO-220F	G	D	S	Tube
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-TM3-T	8N65KG-TM3-T	TO-251	G	D	S	Tube
8N65KL-TMS-T	8N65KG-TMS-T	TO-251S	G	D	S	Tube
8N65KL-TN3-R	8N65KG-TN3-R	TO-252	G	D	S	Tape Reel

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

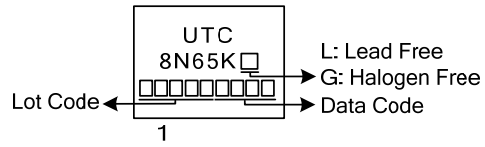
<p>8N65KL-TA3-T</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1, TF2: TO-220F2, TF3T: TO-220F3, TM3: TO-251, TMS: TO-251S, TN3: TO-252 (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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8N65K-MTQ

Power MOSFET

■ 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}	± 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	4.5	V/ns
Power Dissipation	TO-220	P_D	147	W
	TO-220F/TO-220F1		48	W
	TO-220F2/TO-220F3			
	TO-251/TO-251S TO-252		62	W
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 T_J

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

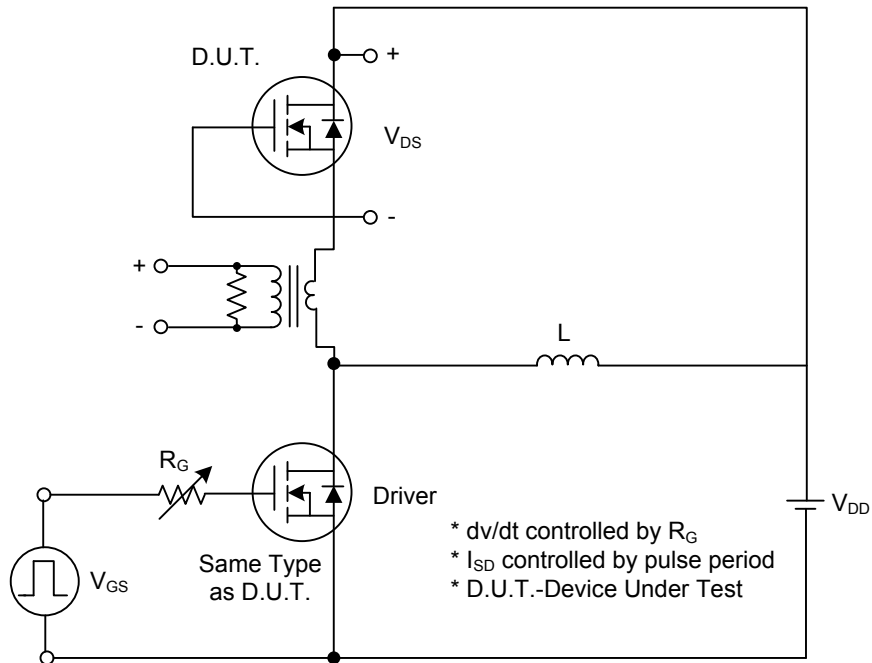
PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient		θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220	θ_{JC}	0.85	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1		2.6	$^\circ\text{C}/\text{W}$
	TO-220F2/TO-220F3			
	TO-251/TO-251S TO-252		2.0	$^\circ\text{C}/\text{W}$

■ ELECTRICAL CHARACTERISTICS (T_C = 25°C, unless otherwise specified)

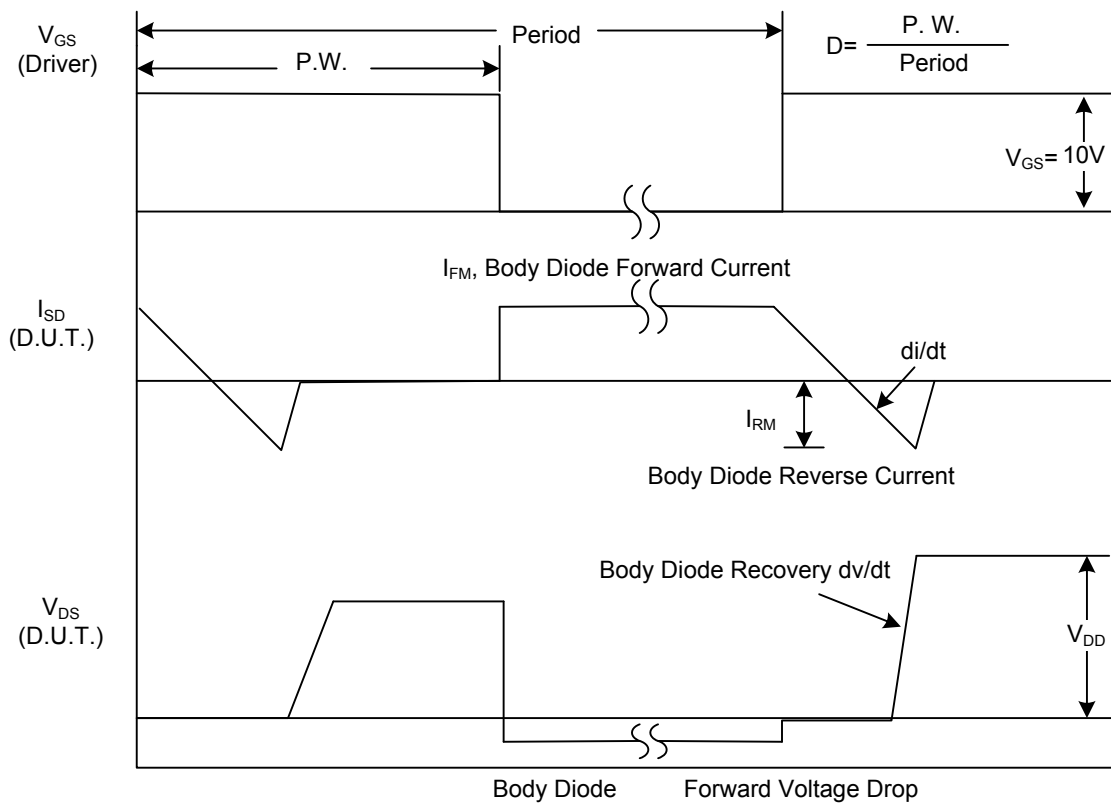
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0 V, I _D = 250 μA	650			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} = 650 V, V _{GS} = 0 V			10	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} = 30 V, V _{DS} = 0 V			100	nA
		V _{GS} = -30 V, V _{DS} = 0 V			-100	nA
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	I _D = 250 μA, Referenced to 25°C		0.7		V/°C
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} = V _{GS} , I _D = 250 μA	2.0		4.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} = 10 V, I _D = 4 A			1.4	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{DS} = 25 V, V _{GS} = 0 V, f = 1 MHz		875	1000	pF
Output Capacitance	C _{OSS}			88	120	pF
Reverse Transfer Capacitance	C _{RSS}			8	25	pF
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q _G	V _{DS} = 50 V, V _{GS} = 10 V, I _D = 1.3 A I _G = 100 μA (Note 1, 2)		23		nC
Gate-Source Charge	Q _{GS}			7.5		nC
Gate-Drain Charge	Q _{GD}			5		nC
Turn-On Delay Time	t _{D(ON)}	V _{DD} = 30 V, V _{GS} = 10 V, I _D = 0.5 A, R _G = 25 Ω (Note 1, 2)		52	60	ns
Turn-On Rise Time	t _R			68	80	ns
Turn-Off Delay Time	t _{D(OFF)}			110	130	ns
Turn-Off Fall Time	t _F			55	70	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	V _{SD}	V _{GS} = 0 V, I _S = 8 A			1.4	V

Notes: 1. Pulse Test: Pulse width ≤ 300 μs, Duty cycle ≤ 2%
 2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

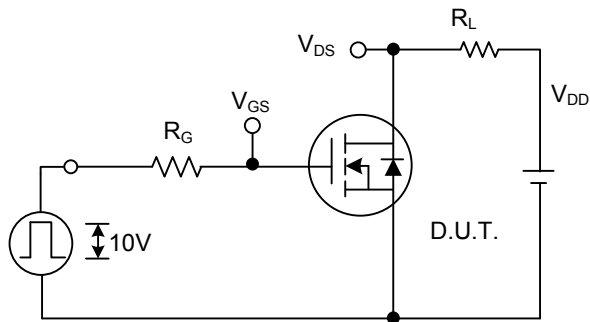


Peak Diode Recovery dv/dt Test Circuit

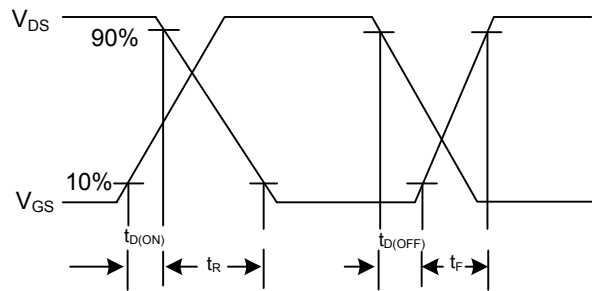


Peak Diode Recovery dv/dt Waveforms

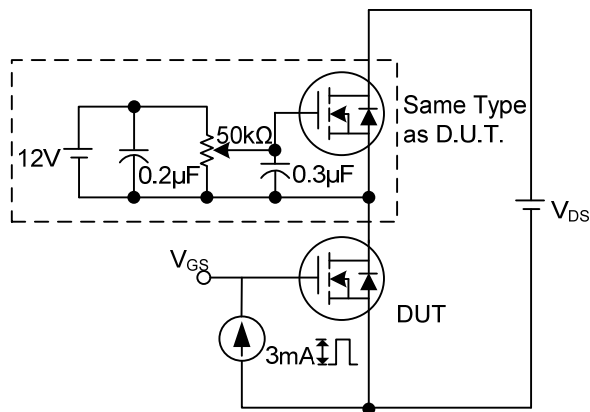
TEST CIRCUITS AND WAVEFORMS (Cont.)



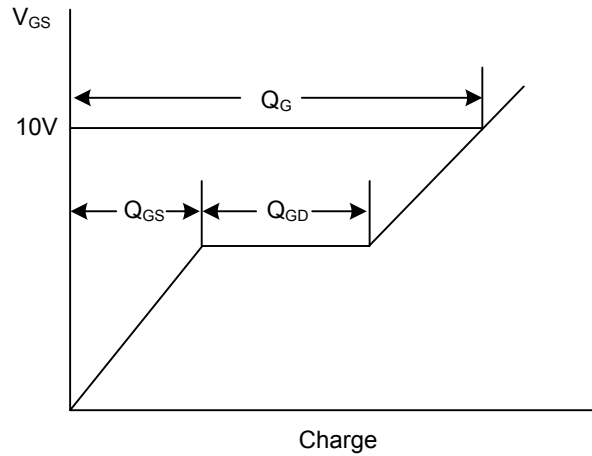
Switching Test Circuit



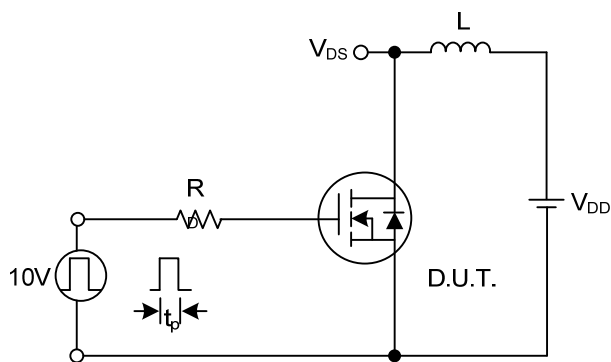
Switching Waveforms



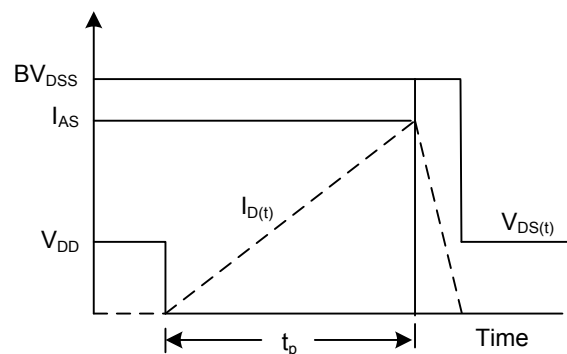
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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