



## 10N65K-MTQ

Power MOSFET

### 10A, 650V N-CHANNEL POWER MOSFET

#### DESCRIPTION

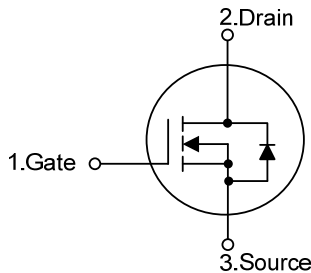
The UTC **10N65K-MTQ** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers planar stripe and DMOS technology. This technology allows a minimum on-state resistance, superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **10N65K-MTQ** is generally applied in high efficiency switch mode power supplies, active power factor correction and electronic lamp ballasts based on half bridge topology.

#### FEATURES

- \*  $R_{DS(ON)} < 1.3\Omega @ V_{GS}=10V, I_D=5.0A$
- \* High Switching Speed
- \* Improved dv/dt Capability
- \* 100% Avalanche Tested

#### SYMBOL

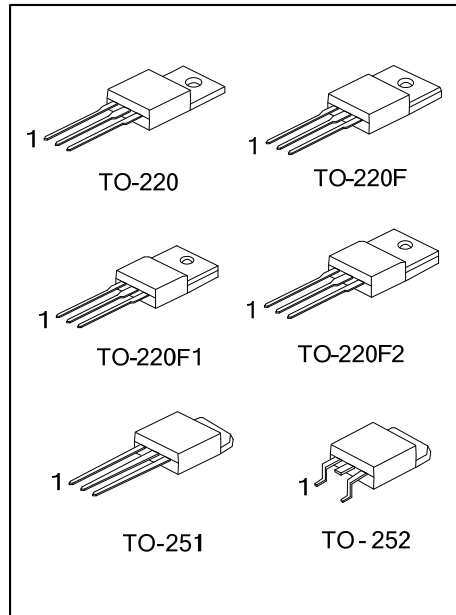


#### ORDERING INFORMATION

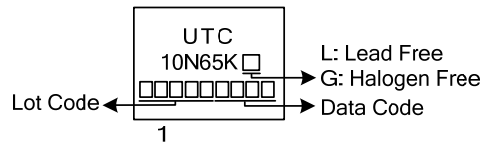
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
10N65KL-TA3-T	10N65KG-TA3-T	TO-220	G	D	S	Tube
10N65KL-TF1-T	10N65KG-TF1-T	TO-220F1	G	D	S	Tube
10N65KL-TF2-T	10N65KG-TF2-T	TO-220F2	G	D	S	Tube
10N65KL-TF3-T	10N65KG-TF3-T	TO-220F	G	D	S	Tube
10N65KL-TM3-T	10N65KG-TM3-T	TO-251	G	D	S	Tube
10N65KL-TN3-R	10N65KG-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>10N65KL-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, TM3: TO-251, TN3: TO-252 (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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■ MARKING



■ ABSOLUTE MAXIMUM RATINGS ( $T_c=25^\circ\text{C}$ , unless otherwise noted)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	650	V
Gate-Source Voltage		$V_{GSS}$	$\pm 30$	V
Drain Current	Continuous ( $T_c=25^\circ\text{C}$ )	$I_D$	10	A
	Pulsed (Note 2)	$I_{DM}$	36	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	575	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.7	V/ns
Power Dissipation	TO-220	$P_D$	156	W
	TO-220F/TO-220F1		47	W
	TO-220F2			
	TO-251/TO-252		52	W
Junction Temperature		$T_J$	+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.  $L = 11.5\text{mH}$ ,  $I_{AS} = 10\text{A}$ ,  $V_{DD} = 50\text{V}$ ,  $R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$

4.  $I_{SD} \leq 10\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J = 25^\circ\text{C}$

■ THERMAL DATA

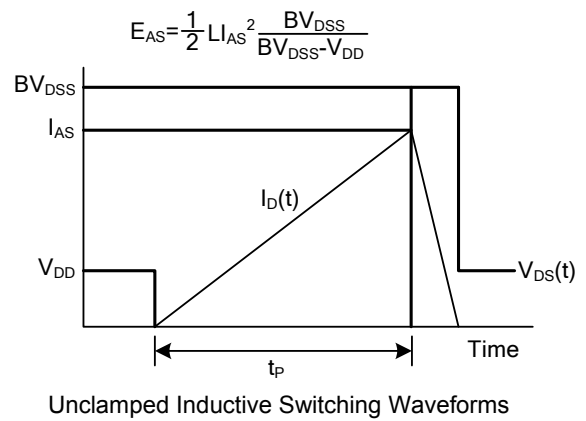
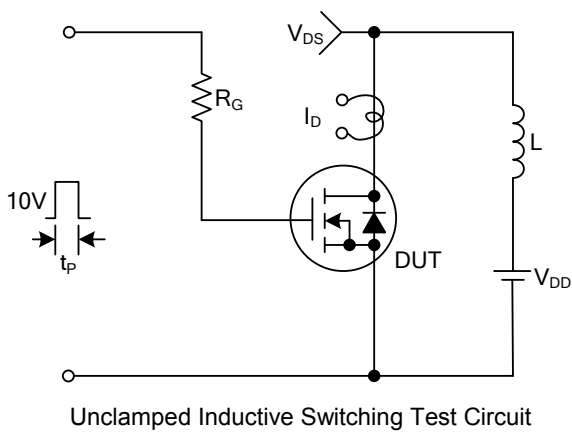
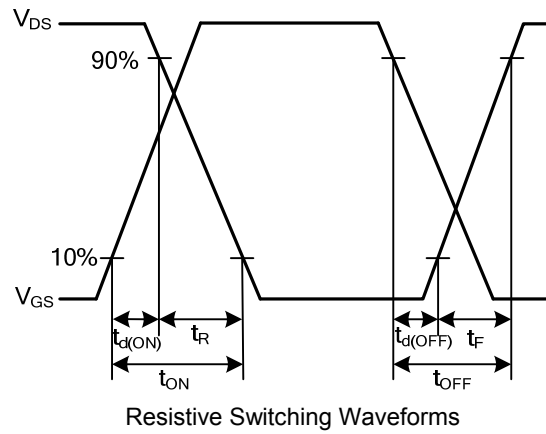
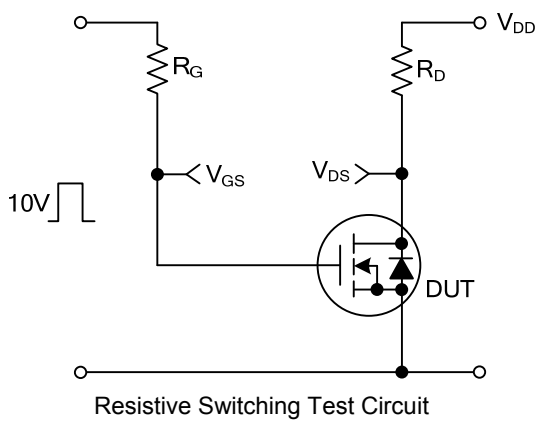
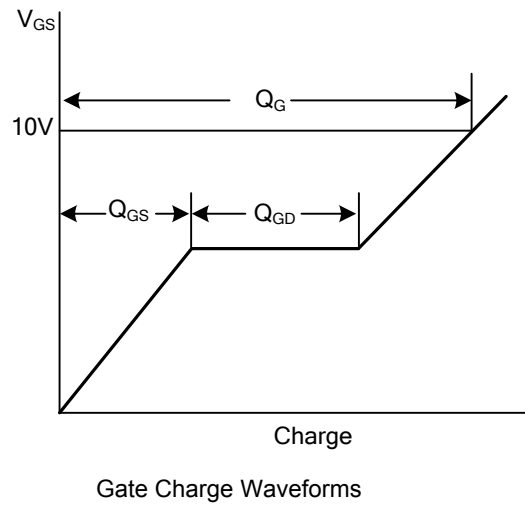
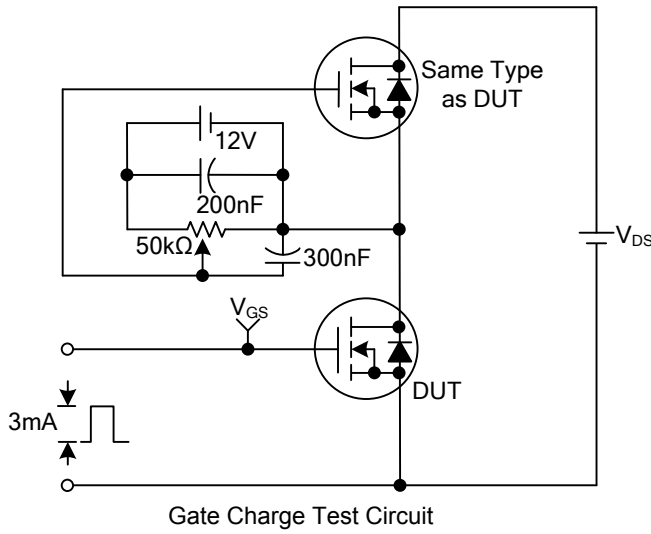
PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220/TO-220F	$\theta_{JA}$	62.5	$^\circ\text{C}/\text{W}$
	TO-220F1/TO-220F2			
	TO-251/TO-252		110	
Junction to Case	TO-220	$\theta_{JC}$	0.8	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1		2.62	
	TO-220F2			
	TO-251/TO-252		2.4	

■ ELECTRICAL CHARACTERISTICS (T<sub>c</sub>=25°C, unless otherwise noted)

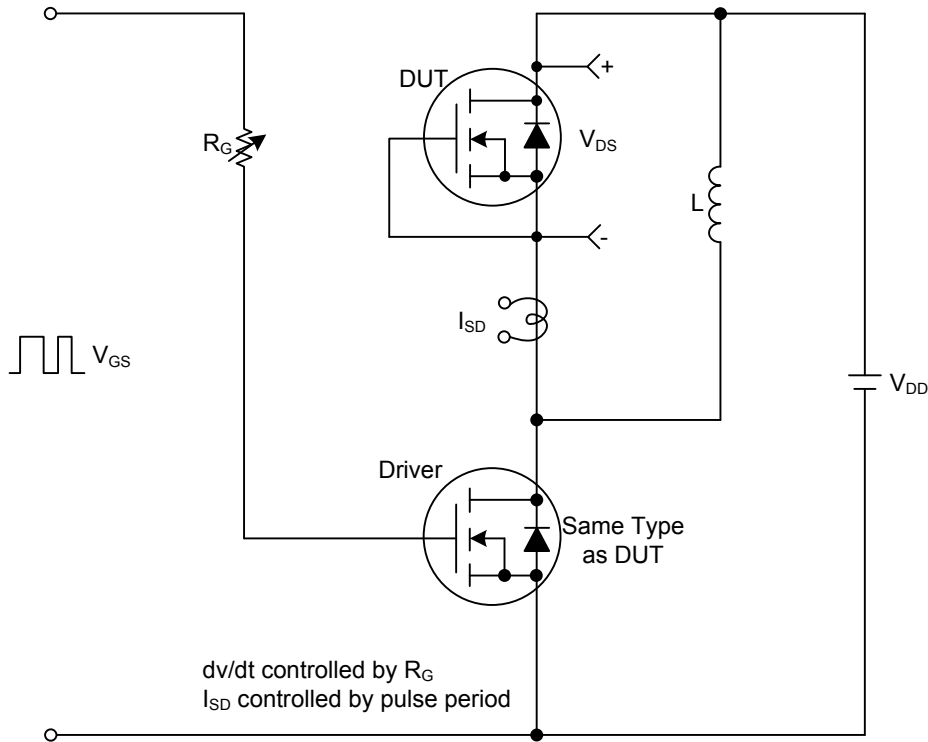
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	650			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =650V, V <sub>GS</sub> =0V			1	μA
Gate- Source Leakage Current	Forward	I <sub>GSS</sub>			+100	nA
	Reverse				-100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =5.0A			1.3	Ω
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1.0MHz		1100		pF
Output Capacitance	C <sub>OSS</sub>			125		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			7		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge (Note 1)	Q <sub>G</sub>	V <sub>DS</sub> =50V, V <sub>GS</sub> =10V, I <sub>D</sub> =1.3A , I <sub>G</sub> =100μA (Note 1, 2)		145		nC
Gate to Source Charge	Q <sub>GS</sub>			10		nC
Gate to Drain Charge	Q <sub>GD</sub>			12		nC
Turn-ON Delay Time (Note 1)	t <sub>D(ON)</sub>	V <sub>DD</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =0.5A, R <sub>G</sub> =25Ω (Note 1, 2)		60		ns
Rise Time	t <sub>R</sub>			64		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			185		ns
Fall-Time	t <sub>F</sub>			50		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	I <sub>S</sub>				10	A
Maximum Body-Diode Pulsed Current	I <sub>SM</sub>				40	A
Drain-Source Diode Forward Voltage (Note 1)	V <sub>SD</sub>	I <sub>S</sub> =10A, V <sub>GS</sub> =0V			1.4	V
Reverse Recovery Time (Note 1)	t <sub>rr</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 10A, dI <sub>F</sub> /dt = 100 A/μs		570		ns
Reverse Recovery Charge (Note 1)	Q <sub>rr</sub>			4.8		μC

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

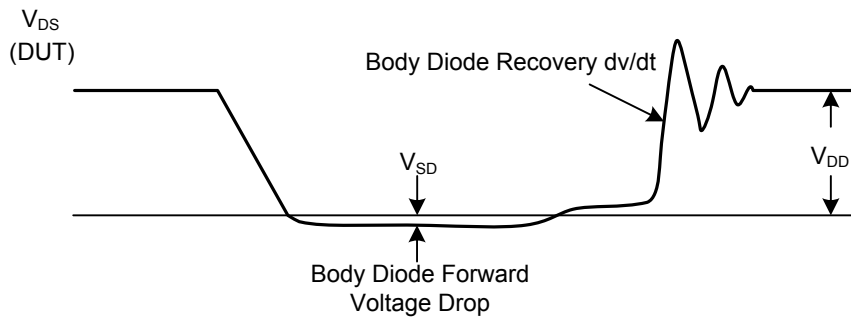
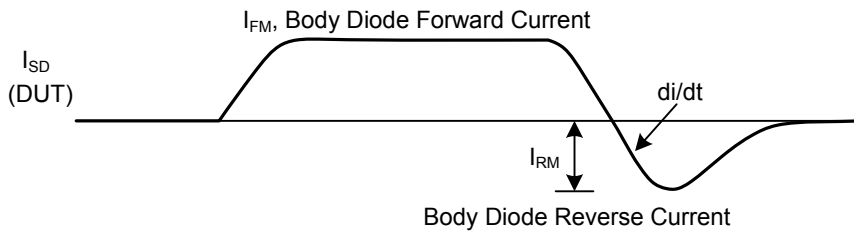
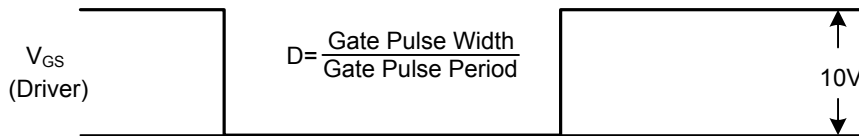
## TEST CIRCUITS AND WAVEFORMS



■ TEST CIRCUITS AND WAVEFORMS(Cont.)



Peak Diode Recovery dv/dt Test Circuit & Waveforms



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