



10N65K-MT

Power MOSFET

10A, 650V N-CHANNEL POWER MOSFET

■ DESCRIPTION

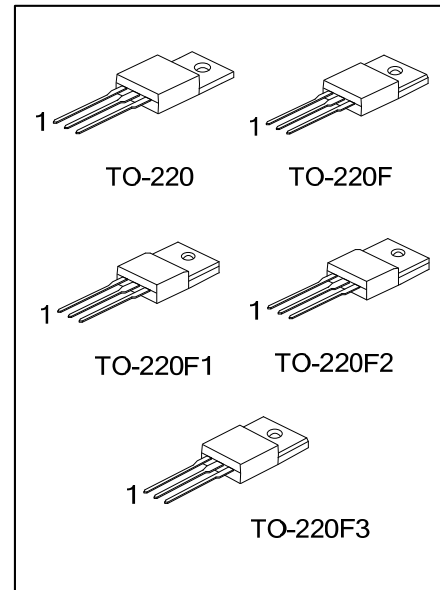
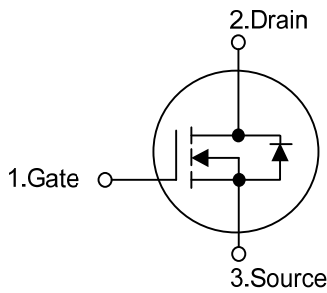
The UTC **10N65K-MT** is an N-channel Power MOSFET using UTC's advanced technology to provide customers a minimum on-state resistance and superior switching performance, etc.

The UTC **10N65K-MT** is generally applied in high efficient DC to DC converters, PWM motor controls and bridge circuits, etc.

■ FEATURES

- * $R_{DS(ON)} < 1.0\Omega$ @ $V_{GS}=10V, I_D = 5 A$
- * High Switching Speed
- * Improved dv/dt capability

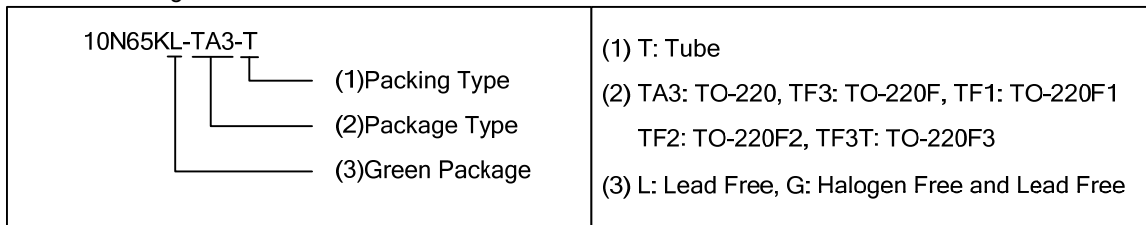
■ SYMBOL



■ ORDERING INFORMATION

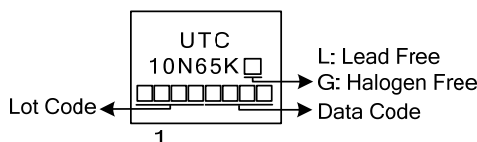
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
10N65KL-TA3-T	10N65KG-TA3-T	TO-220	G	D	S	Tube
10N65KL-TF3-T	10N65KG-TF3-T	TO-220F	G	D	S	Tube
10N65KL-TF1-T	10N65KG-TF1-T	TO-220F1	G	D	S	Tube
10N65KL-TF2-T	10N65KG-TF2-T	TO-220F2	G	D	S	Tube
10N65KL-TF3T-T	10N65KG-TF3T-T	TO-220F3	G	D	S	Tube

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



- (1) T: Tube
- (2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1
TF2: TO-220F2, TF3T: TO-220F3
- (3) L: Lead Free, G: Halogen Free and Lead Free

■ 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
Avalanche Current (Note 2)		I_{AR}	10	A
Drain Current	Continuous	I_D	10	A
	Pulsed (Note 2)	I_{DM}	38	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	400	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation	TO-220	P_D	156	W
	TO-220F/TO-220F1		50	W
	TO-220F3		48	W
	TO-220F2			
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. $L=8\text{mH}$, $I_{AS}=10\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\ \Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 9.5\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

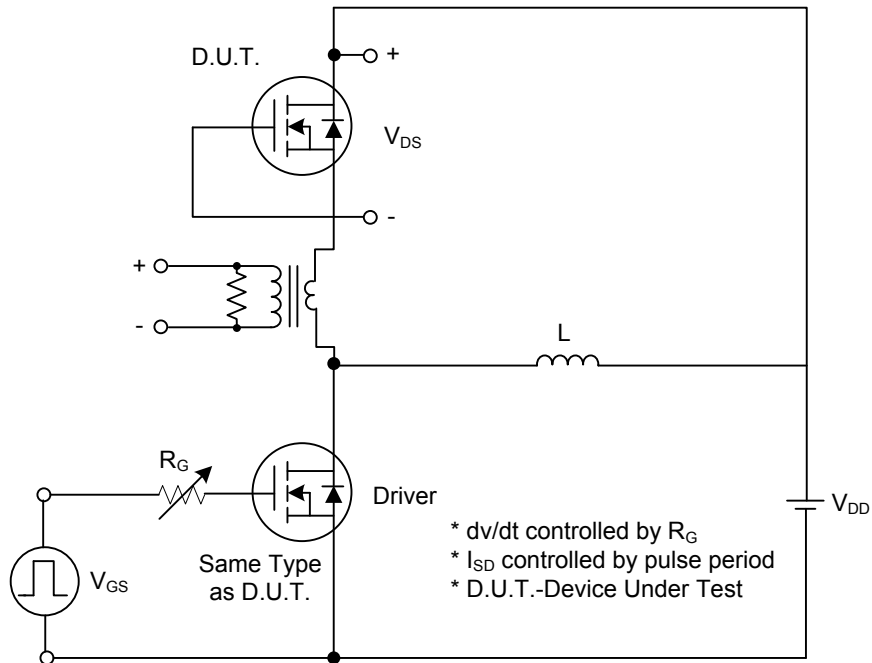
PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient		θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220	θ_{JC}	0.8	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1		2.5	$^\circ\text{C}/\text{W}$
	TO-220F3			
	TO-220F2		2.6	$^\circ\text{C}/\text{W}$

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

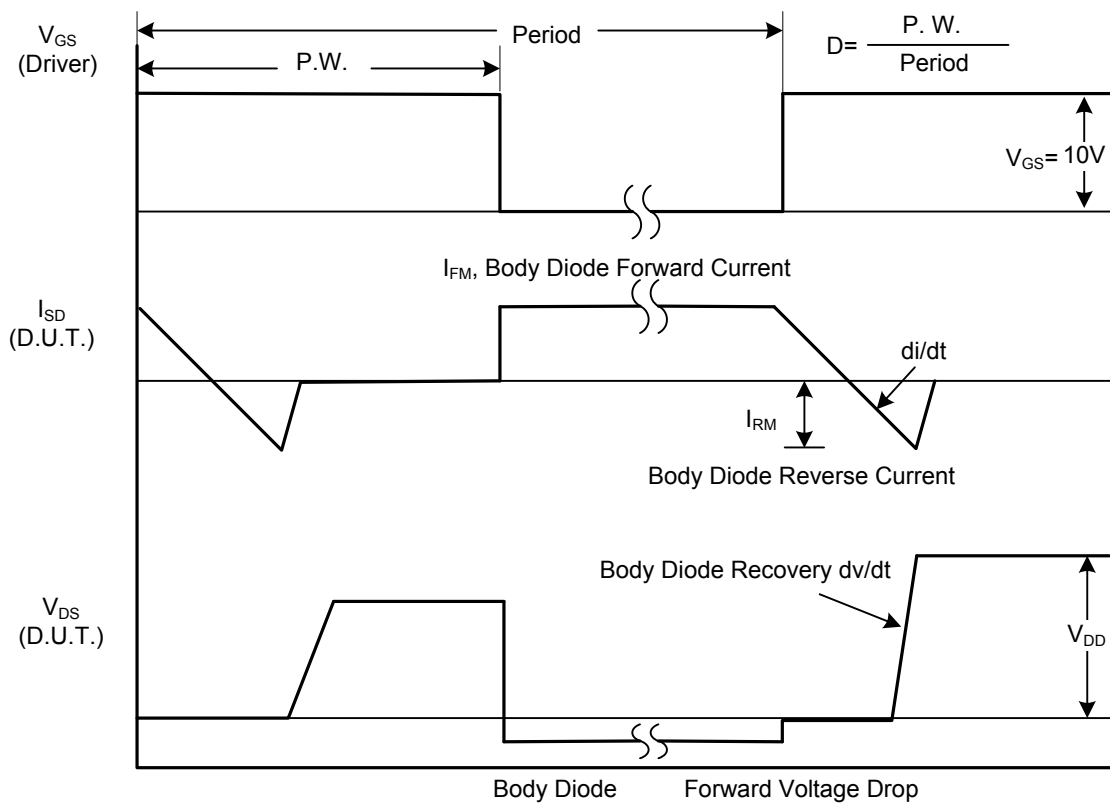
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	650			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = 650V, V_{GS} = 0V$			1	μA
Gate-Source Leakage Current	Forward	$V_{GS} = 30V, V_{DS} = 0V$			100	nA
	Reverse		$V_{GS} = -30V, V_{DS} = 0V$			-100
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 5A$			1.0	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	$V_{DS}=25V, V_{GS}=0V, f=1.0\text{ MHz}$		750	1500	pF
Output Capacitance	C_{OSS}			130	180	pF
Reverse Transfer Capacitance	C_{RSS}			9	20	pF
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{D(ON)}$	$V_{DD}=30V, I_D=0.5A,$ $R_G=25\Omega$ (Note 1, 2)		65	80	ns
Turn-On Rise Time	t_R			80	150	ns
Turn-Off Delay Time	$t_{D(OFF)}$			200	260	ns
Turn-Off Fall Time	t_F			90	150	ns
Total Gate Charge	Q_G	$V_{DS}=50V, I_D=1.3A,$ $V_{GS}=10V$ (Note 1, 2)		30	50	nC
Gate-Source Charge	Q_{GS}			9		nC
Gate-Drain Charge	Q_{GD}			8		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS} = 0V, I_S = 10A$			1.4	V
Maximum Continuous Drain-Source Diode Forward Current	I_S				10	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				38	A

Note: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$
 2. Essentially independent of operating temperature.

TEST CIRCUITS AND WAVEFORMS

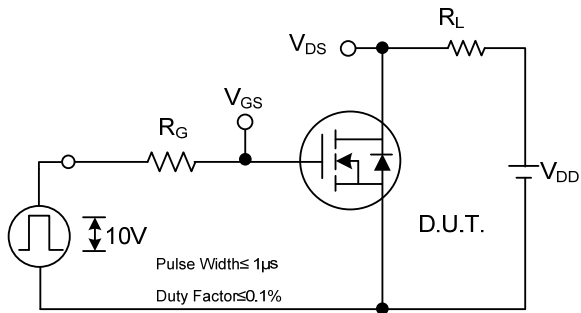


Peak Diode Recovery dv/dt Test Circuit

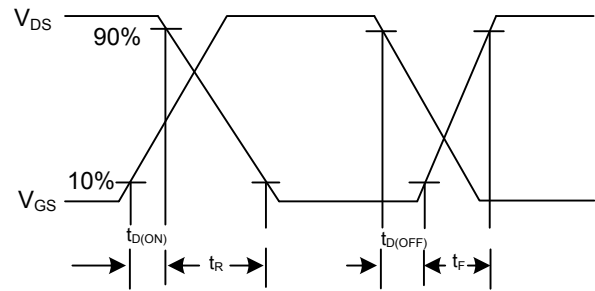


Peak Diode Recovery dv/dt Waveforms

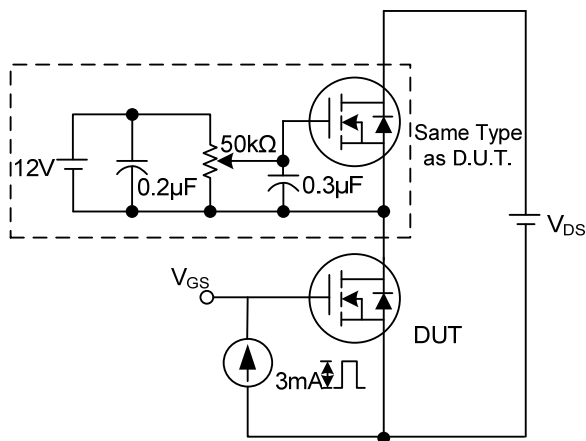
TEST CIRCUITS AND WAVEFORMS (Cont.)



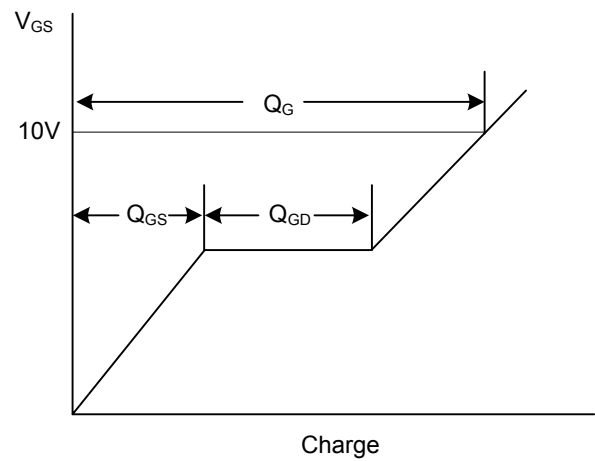
Switching Test Circuit



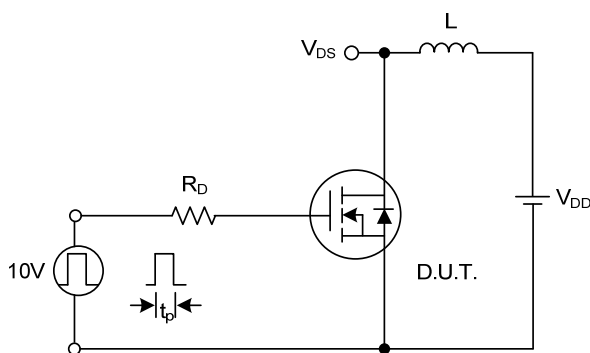
Switching Waveforms



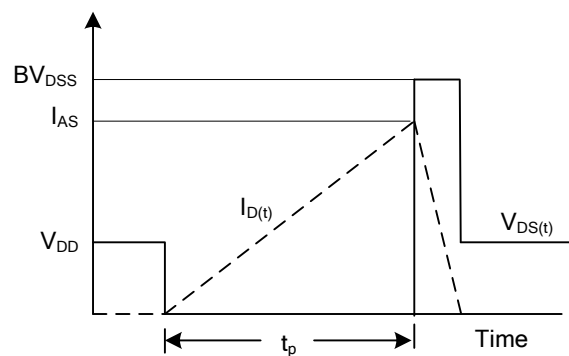
Gate Charge Test Circuit



Gate Charge Waveform

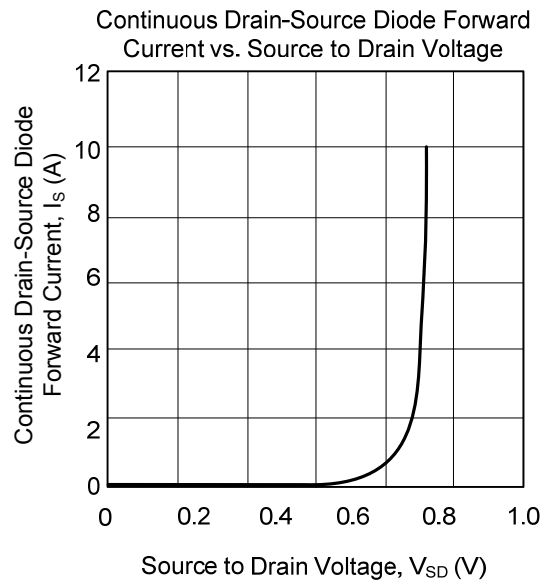
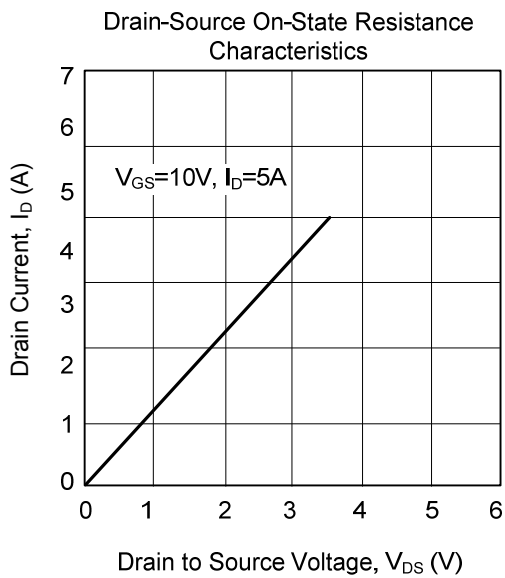
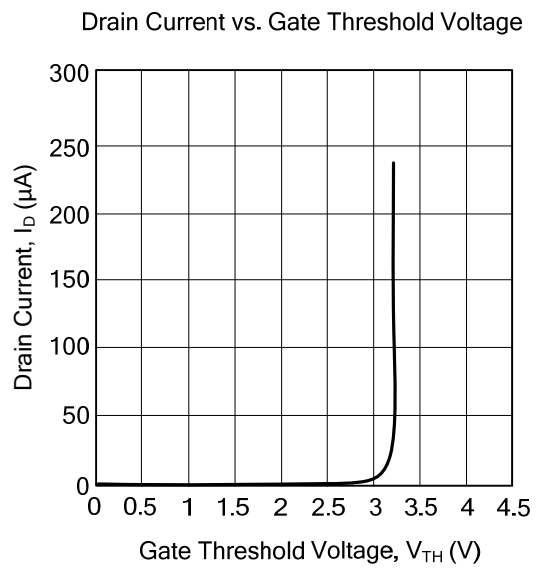
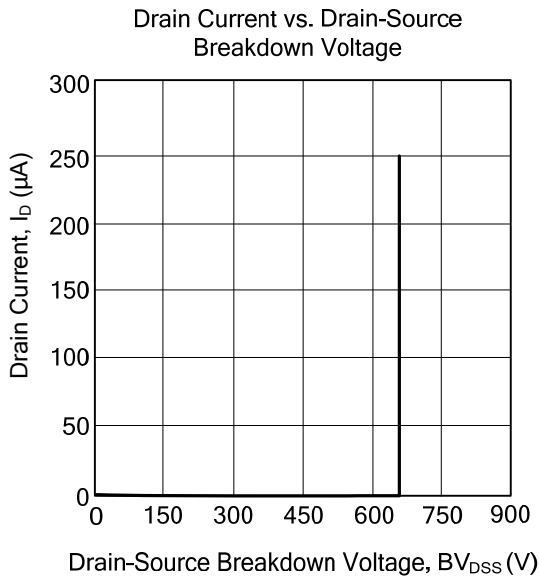


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS



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