



10N65K-MT

Power MOSFET

10A, 650V N-CHANNEL POWER MOSFET

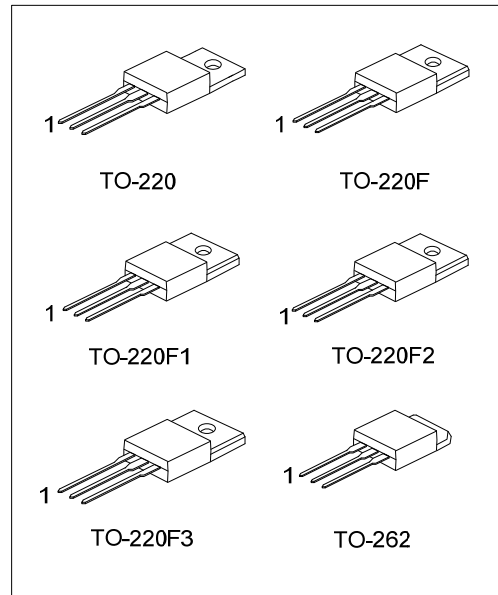
DESCRIPTION

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.

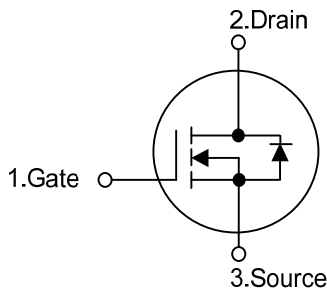
The UTC **10N65K-MT** is generally applied in high efficient DC to DC converters, PWM motor controls and bridge circuits, etc.

FEATURES

- * $R_{DS(ON)} < 0.82\Omega$ @ $V_{GS}=10V, I_D = 5.0A$
- * High Switching Speed
- * Improved dv/dt capability



SYMBOL



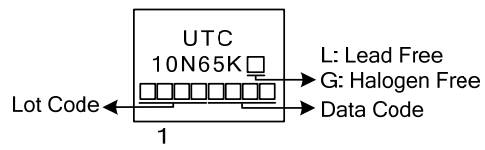
ORDERING INFORMATION

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
10N65KL-T2Q-T	10N65KG-T2Q-T	TO-262	G	D	S	Tube

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 (2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1 TF2: TO-220F2, TF3T: TO-220F3, T2Q: TO-262 (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 specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	650	V
Gate-Source Voltage		V_{GSS}	± 30	V
Drain Current	Continuous	I_D	10	A
	Pulsed (Note 2)	I_{DM}	40	A
Avalanche Current (Note 2)		I_{AR}	7.4	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	274	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.7	V/ns
Power Dissipation	TO-220/TO-262	P_D	156	W
	TO-220F/TO-220F1		50	W
	TO-220F3			
	TO-220F2		48	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. $L=10\text{mH}$, $I_{AS}=7.4\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\ \Omega$, 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

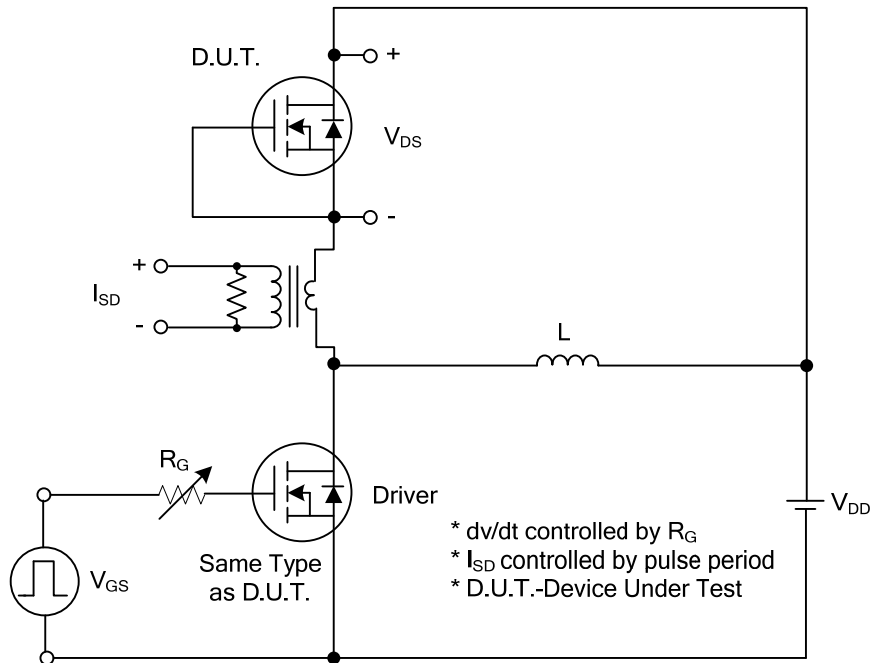
PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient		θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220/TO-262	θ_{JC}	0.8	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1		2.5	$^\circ\text{C}/\text{W}$
	TO-220F3			
	TO-220F2		2.6	$^\circ\text{C}/\text{W}$

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

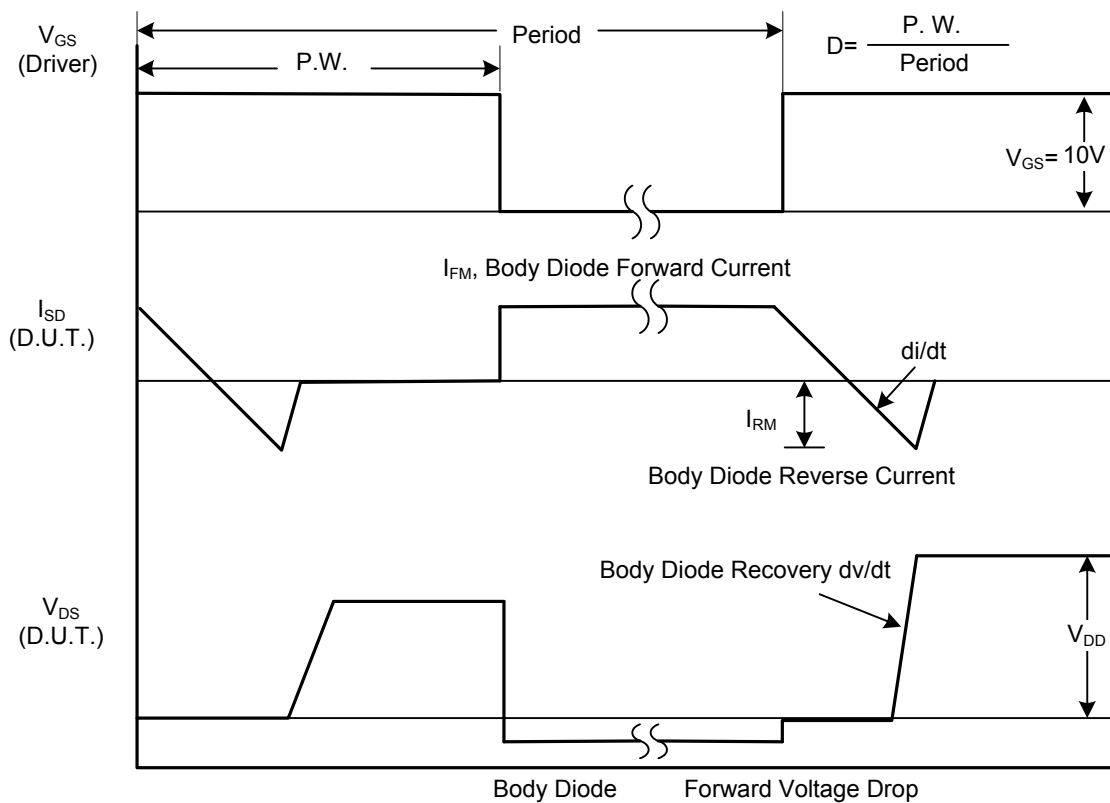
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	650			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = 650V, V_{GS} = 0V$			1	μA
Gate-Source Leakage Current	Forward	$V_{GS} = 30V, V_{DS} = 0V$			100	nA
	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	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 5.0A$			0.82	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	$V_{DS}=25V, V_{GS}=0V, f=1.0\text{ MHz}$		750		pF
Output Capacitance	C_{OSS}			130		pF
Reverse Transfer Capacitance	C_{RSS}			9		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge (Note 1)	Q_G	$V_{DS}=50V, I_D=1.3A, V_{GS}=10V$ $I_G=100\mu A$ (Note1, 2)		30		nC
Gate to Source Charge	Q_{GS}			9		nC
Gate to Drain Charge	Q_{GD}			8		nC
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$	$V_{DD}=30V, I_D=0.5A, R_G=25\Omega,$ $V_{GS}=0V$ (Note1, 2)		65		ns
Rise Time	t_R			80		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			200		ns
Fall-Time	t_F			90		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				10	A
Maximum Body-Diode Pulsed Current	I_{SM}				40	A
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	$V_{GS} = 0V, I_S = 10A$			1.4	V
Body Diode Reverse Recovery Time (Note 1)	t_{rr}	$V_{GS}=0V, I_S=10A,$ $dI_F/dt=100A/\mu s$ (Note1)		510		ns
Body Diode Reverse Recovery Charge	Q_{rr}				4.7	

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

TEST CIRCUITS AND WAVEFORMS

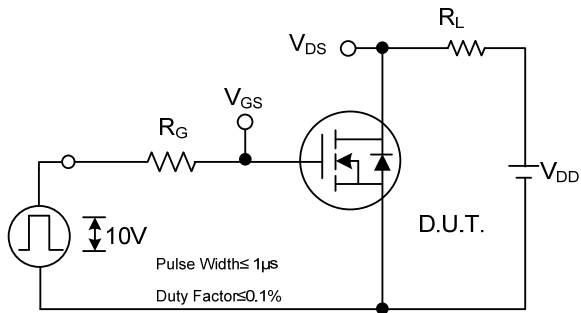


Peak Diode Recovery dv/dt Test Circuit

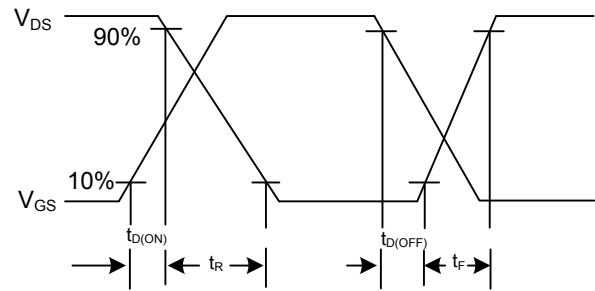


Peak Diode Recovery dv/dt Waveforms

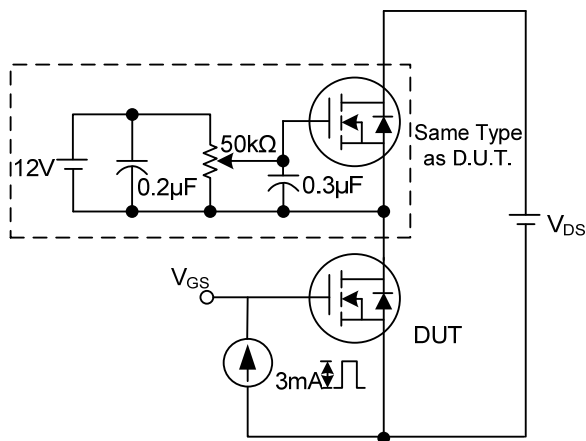
TEST CIRCUITS AND WAVEFORMS (Cont.)



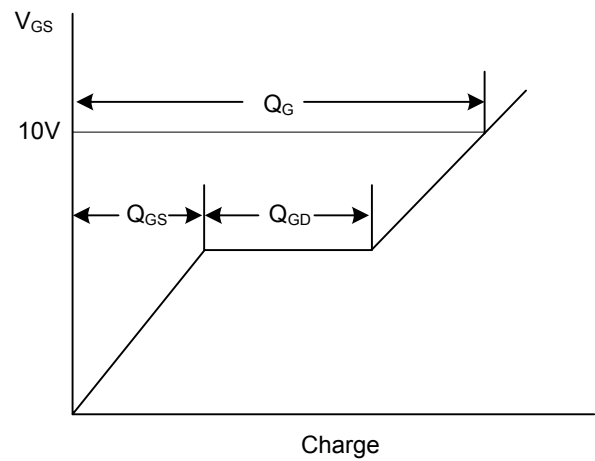
Switching Test Circuit



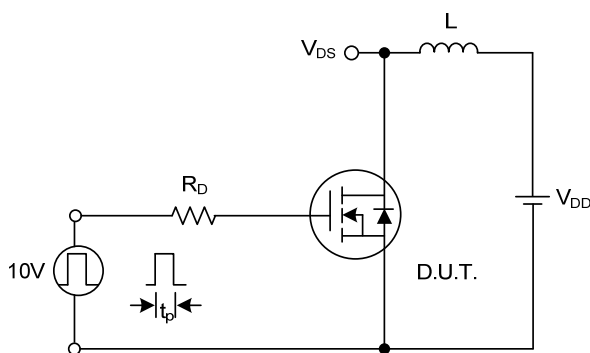
Switching Waveforms



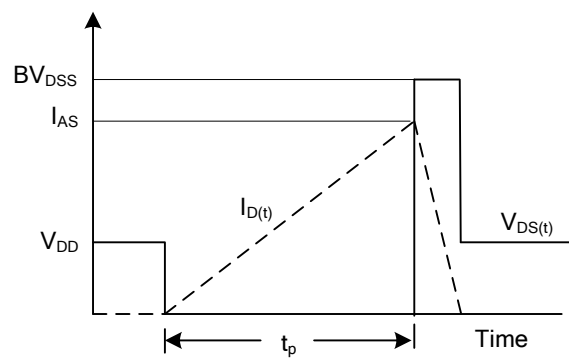
Gate Charge Test Circuit



Gate Charge Waveform

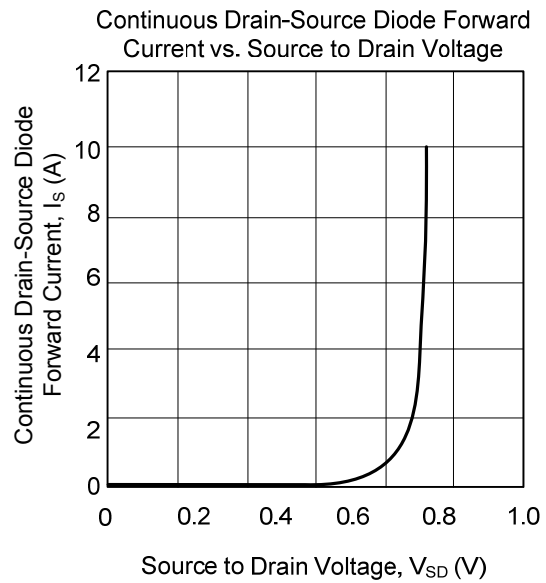
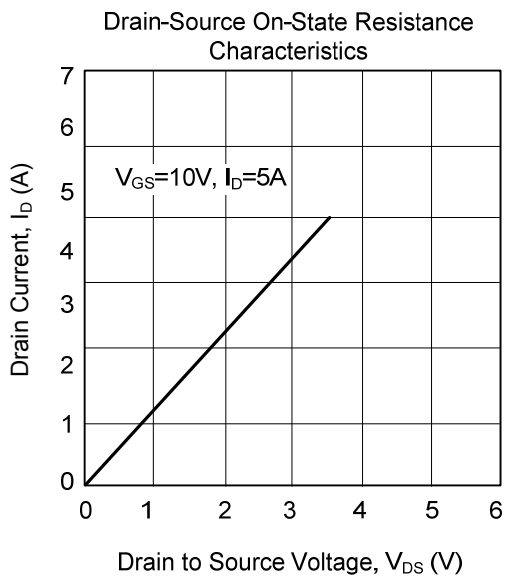
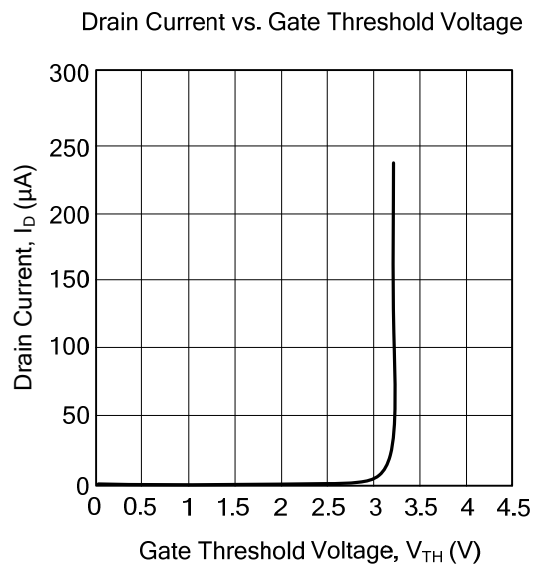
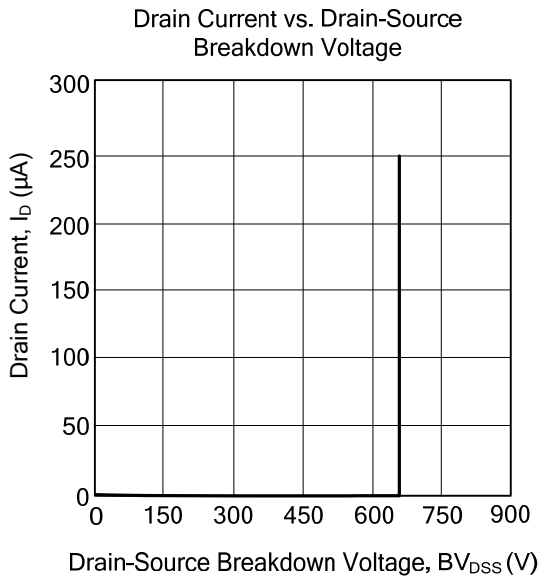


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS



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