

UTC UNISONIC TECHNOLOGIES CO., LTD

7N65K

Preliminary

7.4A, 650V N-CHANNEL POWER MOSFET

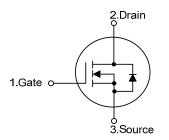
DESCRIPTION

The UT C 7N65K is a high voltag e po wer MOSF ET and is designed to have better ch aracteristics, such as fast sw itching time, low gate charge, low on-state resistance and have a high rugged av alanche ch aracteristics. This power MOSFET is usually used at hig h spee d s witching a pplications in s witching po wer supplies and adaptors.

FEATURES

- $* R_{DS(ON)} < 1.4\Omega @V_{GS} = 10 V$
- * Ultra low gate charge (typical 29 nC)
- * Low reverse transfer Capacitance (C_{RSS} = typical 16pF)
- * Fast switching capability
- * Avalanche energy tested
- * Improved dv/dt capability, high ruggedness

SYMBOL

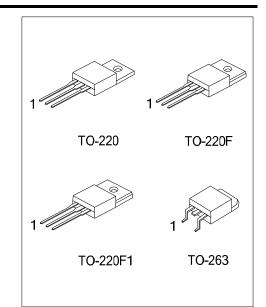


ORDERING INFORMATION

Ordering Nu	Deelvere	Pin	Assignm	Deaking			
Lead Free	Halogen Free	Package	1	2	3	Packing	
7N65KL-TA3-T 7N65	KG-TA3-T	TO-220	G	D	S	Tube	
7N65KL-TF3-T 7N65	KG-TF3-T	TO-220F	G	D	S	Tube	
7N65KL-TF1-T 7N65	KG-TF1-T	TO-220F1	G	D	S	Tube	
7N65KL-TQ2-T 7N65	KG-TQ2-T	TO-263	G	D	S	Tube	
7N65KL-TQ2-R 7N65	KG-TQ2-R	TO-263	G	D	S	Tape Reel	

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

7N65KL-TA3-T (1)Packing Type (2)Package Type (3)Lead Free	 (1) T: Tube, R: Tape Reel (2) TA3: TO-220 ,TF3: TO-220F, TF1: TO-220F1, TQ2: TO-263 (3) L: Lead Free, G: Halogen Free
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ABSOLUTE MAXIMUM RATINGS (T_c = 25°C, unless otherwise specified)

PARAMETER SYMBOL			RATINGS	UNIT
Drain-Source Voltage		V _{DSS} 650		V
Gate-Source Voltage		V _{GSS} ±30		V
Avalanche Current (No	ote 2)	I _{AR} 7.4		А
Drain Current	Continuous I	_D 7.4		А
Drain Current	Pulsed (Note 2)	I _{DM} 29.6		А
	Single Pulsed (Note 3)	E _{AS} 200		mJ
Avalanche Energy	Repetitive (Note 2)	E _{AR} 14.2		mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
	TO-220		142 W	
Power Dissipation	TO-220F/TO-220F1 48	PD		W
	TO-263 50			W
Junction Temperature		T _J +	150	°C
Storage Temperature		T _{STG}	-55 ~ +150	

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 = 8.16mH, I_{AS} = 7A, V_{DD} = 50V, R_G = 25 Ω , Starting T_J = 25°C
- $I_{SD} \le 7.4A$, di/dt $\le 200A/\mu s$, $V_{DD} \le BV_{DSS}$, Starting $T_J = 25^{\circ}C$

THERMAL DATA

4.

PARAMETER SYMBOL			RATINGS	UNIT
Junction to Ambient		θ _{JA}	62.5	°C/W
	TO-220		0.88 °C/W	
Junction to Case	TO-220F/TO-220F1 2.6	θ _{JC}		°C/W
	TO-263		2.5	°C/W



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

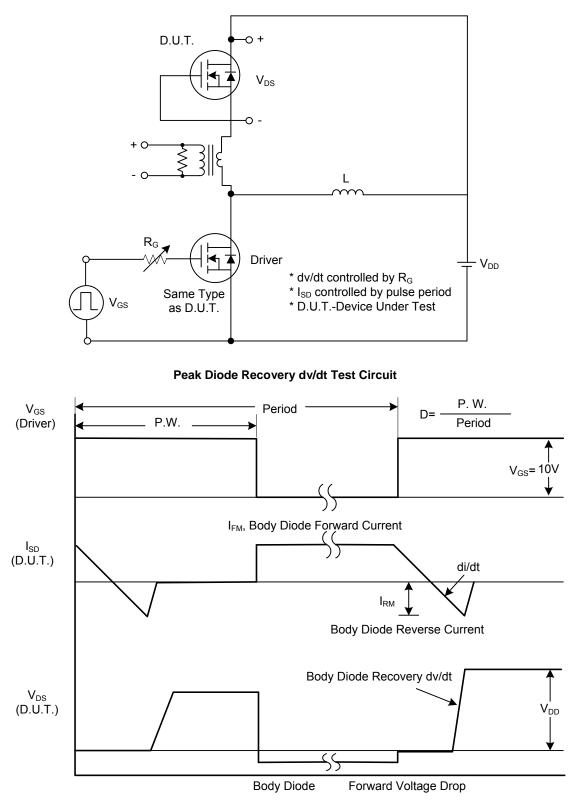
PARAMETER SYMBOL			TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} = 0V, I _D = 250µA 650				V
Drain-Source Leakage Current		I _{DSS} V	_{DS} = 650V, V _{GS} = 0V			1	μA
Gate- Source Leakage Current	Forward		$V_{GS} = 30V, V_{DS} = 0V$			100	nA
	Reverse V		$_{\rm GS}$ = -30V, $V_{\rm DS}$ = 0V			-100	nA
Breakdown Voltage Temperature Coefficient		$\triangle BV_{DSS} / \triangle T_J$	I _D =250µA,Referenced to 25°C		0.67		V/°C
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	2.5		4.5	V
Static Drain-Source On-State Res	sistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 3.7A		1.1	1.4	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance	· · ·					1400	pF
Output Capacitance			V _{DS} =25V, V _{GS} =0V, f=1.0 MHz			180	рF
Reverse Transfer Capacitance		C _{RSS}			16	21	рF
SWITCHING CHARACTERISTIC	S						
Turn-On Delay Time		t _{D(ON)}				70	ns
Turn-On Rise Time		t _R	V _{DD} =325V, I _D =7.4A		80	170	ns
Turn-Off Delay Time Turn-Off Fall Time		t _{D(OFF)}	R _G =25Ω (Note 1, 2)			140	ns
		t _F			50	130	ns
SWITCHING CHARACTERISTIC	S	_					
Total Gate Charge	Total Gate Charge		V _{DS} =520V, I _D =7.4A		29	38	nC
Gate-Source Charge		Q_{GS}	V _{DS} =520V, I _D =7.4A V _{GS} =10 V (Note 1, 2)		7		nC
Gate-Drain Charge		Q_{GD}	$V_{GS} = 10$ V (Note 1, 2)	14	.5		nC
DRAIN-SOURCE DIODE CHARA	CTERISTIC	CS AND MAXI	MUM RATINGS				
Drain-Source Diode Forward Volta	age	V _{SD}	$V_{GS} = 0V, I_{S} = 7.4 A$			1.4	V
Maximum Continuous Drain-Source Diode						74	^
Forward Current		I _S				7.4	A
Maximum Pulsed Drain-Source Diode						29.6	Δ
Forward Current		I _{SM}				29.0	A
Reverse Recovery Time		t _{rr}	V _{GS} = 0V, I _S = 7.4 A		320		ns
Reverse Recovery Charge		Q _{RR}	dl _F / dt = 100A/µs (Note 1)	2.4	4		μC
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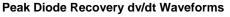
Notes: 1. Pulse Test: Pulse width \leq 300µs, Duty cycle \leq 2%

2. Essentially independent of operating temperature



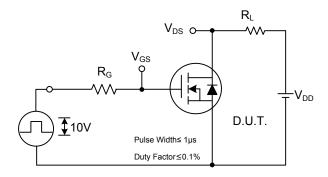
TEST CIRCUITS AND WAVEFORMS



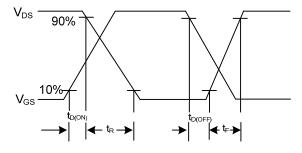




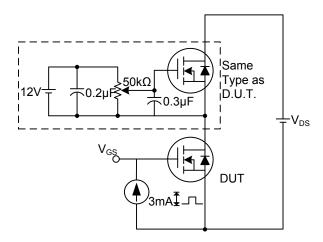
TEST CIRCUITS AND WAVEFORMS (Cont.)



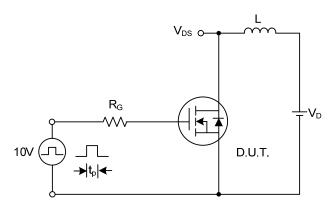
Switching Test Circuit



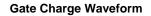
Switching Waveforms

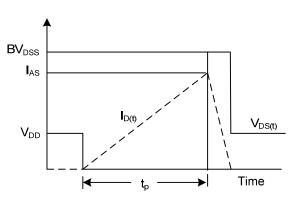


Gate Charge Test Circuit



Unclamped Inductive Switching Test Circuit





Unclamped Inductive Switching Waveforms



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