UNISONIC TECHNOLOGIES CO., LTD

10N70K Power MOSFET

10A, 700V N-CHANNEL POWER MOSFET

■ DESCRIPTION

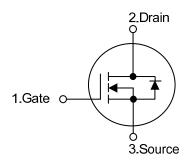
The UTC **10N70K** is an N-channel Power MOSFET using UTC's advanced technology to provide customers a minimum on-state resistance and superior switching performance, etc.

The UTC **10N70K** is generally applied in high efficient DC to DC converters, PWM motor controls and bridge circuits, etc.

■ FEATURES

- * $R_{DS(ON)} \le 1.2 \Omega @ V_{GS} = 10V, I_D = 5.0A$
- * Low Gate Charge (Typical 44nC)
- * Low C_{RSS} (typical 10 pF)
- * High Switching Speed
- * Improved dv/dt capability

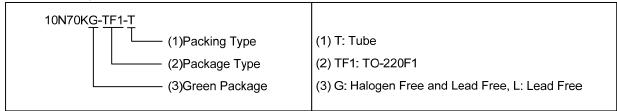
SYMBOL



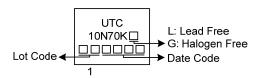
ORDERING INFORMATION

Ordering Number		Dookses	Pin Assignment			Daakina	
Lead Free	Halogen Free	Package	1	2	3	Packing	
10N70KL-TF1-T	10N70KG-TF1-T	TO-220F1	G	D	S	Tube	

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



■ MARKING



1 TO-220F1

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10N70K

■ ABSOLUTE MAXIMUM RATINGS (T_C = 25°C unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT	
Drain-Source Voltage		V _{DSS}	700	V	
Gate-Source Voltage		V_{GSS}	±30	V	
Avalanche Current (Note 2)		I _{AR}	10	Α	
Drain Current	Continuous	I _D	10	Α	
	Pulsed (Note 2)	I _{DM}	38	Α	
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	150	mJ	
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns	
Power Dissipation		P _D	50	W	
Junction Temperature		TJ	+150	°C	
Operating Temperature		T _{OPR}	-55 ~ + 150	°C	
Storage Temperature		T _{STG}	-55 ~ +150	°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 = 3mH, I_{AS} = 10A, V_{DD} = 50V, R_G = 25 Ω Starting T_J = 25°C
- 4. $I_{SD} \le 9.5A$, di/dt $\le 200A/\mu s$, $V_{DD} \le BV_{DSS}$, Starting $T_J = 25^{\circ}C$

■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	θ_{JA}	62.5	°C/W
Junction to Case	θ_{JC}	2.5	°C/W

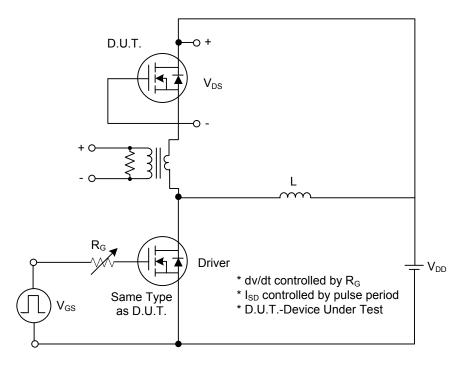
■ **ELECTRICAL CHARACTERISTICS**(T_C=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS		,		L			ı
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} = 0V, I _D = 250μA	700			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} = 700V, V _{GS} = 0V			1	μA
Onto Course London Course	Forward	1000	$V_{GS} = 30 \text{ V}, V_{DS} = 0 \text{ V}$			100	nA
Gate-Source Leakage Current	Reverse		$V_{GS} = -30 \text{ V}, V_{DS} = 0 \text{ V}$			-100	nA
Breakdown Voltage Temperature		$\Delta BV_{DSS}/\Delta T_{J}$	I _D =250μA, Referenced to 25°C		0.7		V/°C
Coefficient			I _D -250μA, Referenced to 25 C		0.7		V/ C
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)}	$V_{GS} = 10V, I_D = 5.0A$		1.0	1.2	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}			1150	1712	pF
Output Capacitance	Output Capacitance		V _{DS} =25V, V _{GS} =0V, f=1.0 MHz		108	125	pF
Reverse Transfer Capacitance	Reverse Transfer Capacitance				10	13	pF
SWITCHING CHARACTERISTICS	S						
Total Gate Charge Gate-Source Charge		Q_{G}	V _{DS} =520V, I _D =10A, V _{GS} =10V (Note 1, 2)		95	110	nC
		Q_GS			8		nC
Gate-Drain Charge		Q_{GD}	(Note 1, 2)		14		nC
Turn-On Delay Time	n-On Delay Time				90	100	ns
Turn-On Rise Time		t _R	V_{DD} =325V, I_{D} =10A, R_{G} =25 Ω		30	90	ns
Turn-Off Delay Time	Turn-Off Delay Time		(Note 1, 2)		210	300	ns
Turn-Off Fall Time		t _F			46	105	ns
DRAIN-SOURCE DIODE CHARA	CTERISTI	CS AND MA	XIMUM RATINGS		ā.		
Maximum Continuous Drain-Source	e Diode					10	Α
Forward Current		I _S				10	А
Maximum Pulsed Drain-Source Di	ode	I _{SM}				38	Α
Forward Current						30	^
Drain-Source Diode Forward Voltage		V_{SD}	$V_{GS} = 0 \text{ V}, I_{S} = 10 \text{A}$			1.4	V
Reverse Recovery Time		t _{rr}	$V_{GS} = 0 \text{ V}, I_{S} = 10\text{A},$		420		ns
Reverse Recovery Charge		Q _{rr}	dI _F / dt = 100 A/μs (Note 1)		4.2		μC

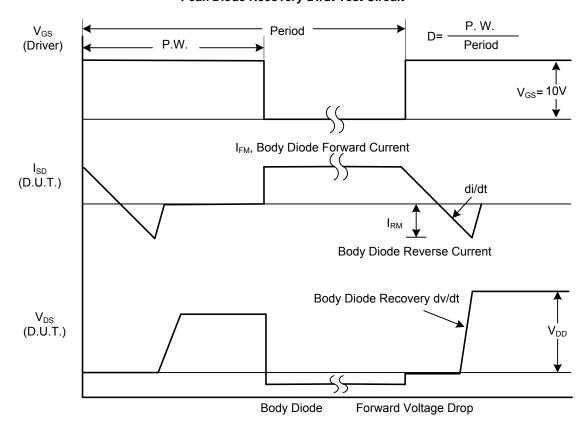
Notes: 1. Pulse Test : Pulse width ≤300µs, Duty cycle ≤2%.

^{2.} Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

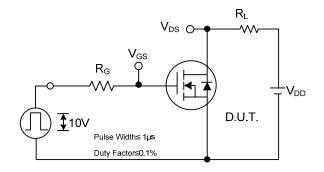


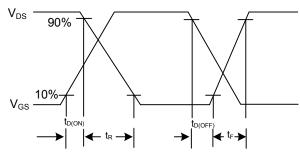
Peak Diode Recovery dv/dt Test Circuit



Peak Diode Recovery dv/dt Waveforms

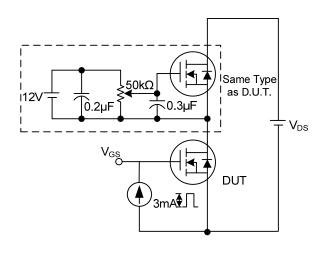
■ TEST CIRCUITS AND WAVEFORMS (Cont.)

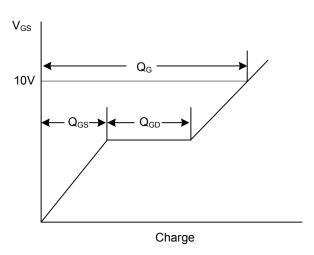




Switching Test Circuit

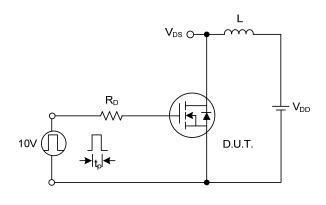
Switching Waveforms

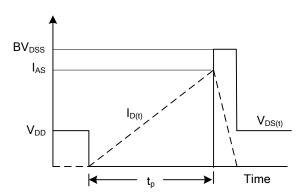




Gate Charge Test Circuit

Gate Charge Waveform

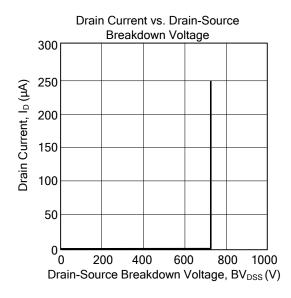


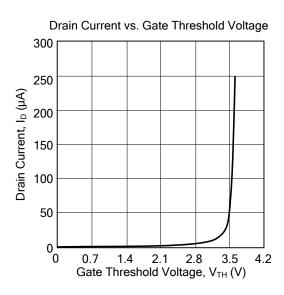


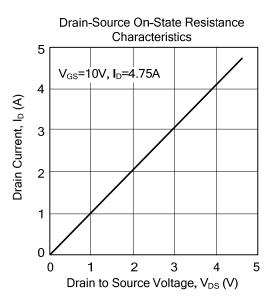
Unclamped Inductive Switching Test Circuit

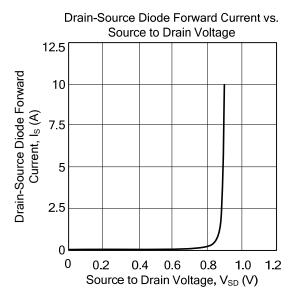
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS









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