



8N70K-MTQ

Preliminary

Power MOSFET

**8.0A, 700V N-CHANNEL
POWER MOSFET**

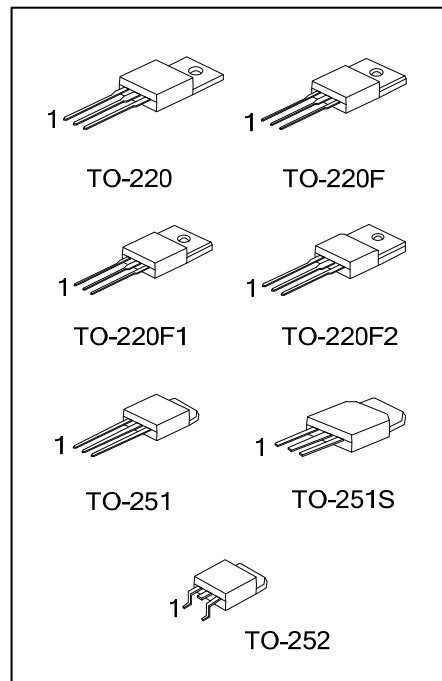
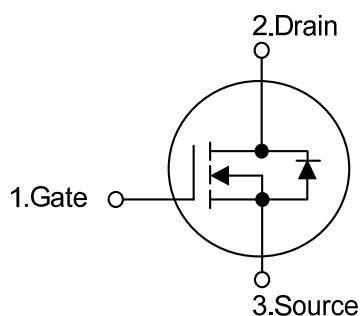
■ DESCRIPTION

The UTC **8N70K-MTQ** is a N-channel power MOSFET using UTC's advanced technology to provide the customers with minimum on-state resistance, superior switching performance and withstand high energy pulse in the avalanche and commutation mode.

■ FEATURES

- * $R_{DS(ON)} < 1.6 \Omega @ V_{GS}=10V, I_D=4.0A$
- * High switching speed

■ SYMBOL



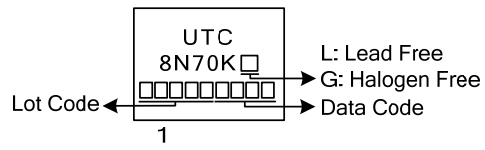
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
8N70KL-TA3-T	8N70KG-TA3-T	TO-220	G	D	S	Tube
8N70KL-TF1-T	8N70KG-TF1-T	TO-220F1	G	D	S	Tube
8N70KL-TF2-T	8N70KG-TF2-T	TO-220F2	G	D	S	Tube
8N70KL-TF3-T	8N70KG-TF3-T	TO-220F	G	D	S	Tube
8N70KL-TM3-T	8N70KG-TM3-T	TO-251	G	D	S	Tube
8N70KL-TMS-T	8N70KG-TMS-T	TO-251S	G	D	S	Tube
8N70KL-TN3-R	8N70KG-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>8N70KL-TA3-T</p>	<p>(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1, TF2: TO-220F2, TM3: TO-251, TMS: TO-251S, TN3: TO-252 (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT	
Drain-Source Voltage		V_{DSS}	700	V	
Gate-Source Voltage		V_{GSS}	± 30	V	
Drain Current	Continuous	I_D	$T_C=25^\circ\text{C}$	8	A
			$T_C=100^\circ\text{C}$	4.8	A
	Pulsed	I_{DM}	32	A	
Avalanche Current	Repetitive (Note 3)	I_{AS}	8	A	
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	256	mJ	
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.4	V/ns	
Power Dissipation ($T_C=25^\circ\text{C}$)	TO-220	P_D	148	W	
	TO-220F/TO-220F1		49	W	
	TO-220F2				
	TO-251/TO-251S TO-252		63	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. $L = 8.0 \text{ mH}$, $I_{AS} = 8.0 \text{ A}$, $V_{DD} = 50 \text{ V}$, $R_G = 25 \Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 8.0 \text{ A}$, $di/dt \leq 200 \text{ A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-220F1/TO-220F2			
	TO-251/TO-251S TO-252		110	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220	θ_{JC}	0.84	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1		2.55	$^\circ\text{C}/\text{W}$
	TO-220F2			
	TO-251/TO-251S TO-252		1.98	$^\circ\text{C}/\text{W}$

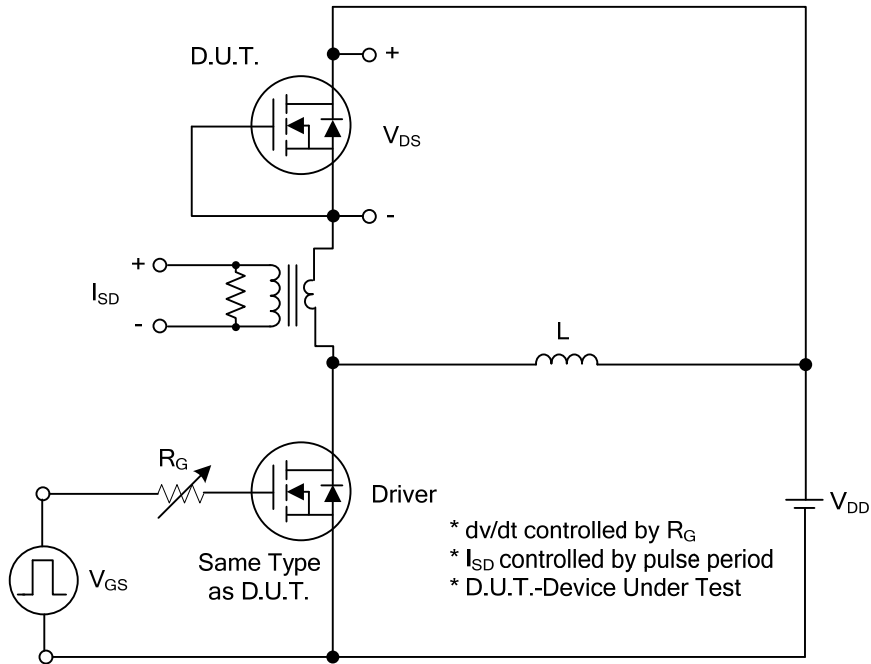
■ ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	700			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =700V, V _{GS} =0V			1	μA
		V _{DS} =560V, T _C =125°C			100	μA
Gate-Source Leakage Current	Forward	I _{GSS}				
	Reverse					
		V _{GS} =+30V, V _{DS} =0V			+10	nA
		V _{GS} =-30V, V _{DS} =0V			-10	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =4.0A			1.6	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		860		pF
Output Capacitance	C _{OSS}			85		pF
Reverse Transfer Capacitance	C _{RSS}			5		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q _G	V _{DS} =50V, V _{GS} =10V, I _D =1.3A I _G =100 μA (Note 1, 2)		56		nC
Gate to Source Charge	Q _{GS}			8		nC
Gate to Drain Charge	Q _{GD}			10		nC
Turn-ON Delay Time (Note 1)	t _{D(ON)}	V _{DD} =30V, V _{GS} =10V, I _D =0.5A, R _G =25Ω (Note 1, 2)		62		ns
Rise Time	t _R			48		ns
Turn-OFF Delay Time	t _{D(OFF)}			120		ns
Fall-Time	t _F			36		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I _S	Integral reverse diode in the MOSFET			8	A
Maximum Body-Diode Pulsed Current	I _{SM}				32	A
Drain-Source Diode Forward Voltage (Note 1)	V _{SD}	I _S =8A, V _{GS} =0V			1.4	V
Reverse Recovery Time (Note 1)	t _{rr}	V _{GS} =0V, I _S = 8A, di/dt = 100A/μs		530		ns
Reverse Recovery Charge	Q _{rr}			4		μC

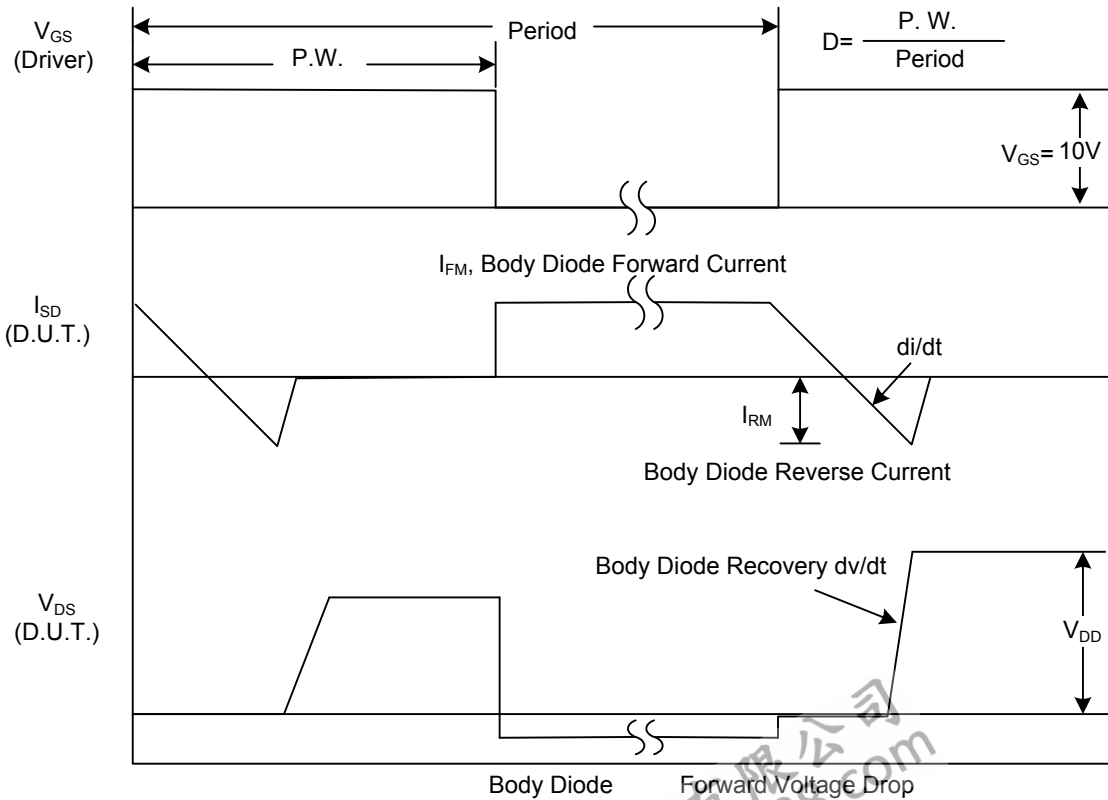
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

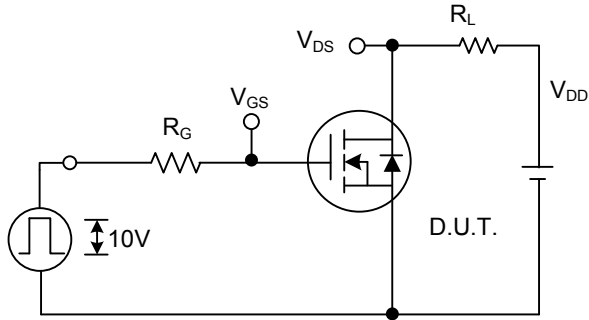


Peak Diode Recovery dv/dt Test Circuit

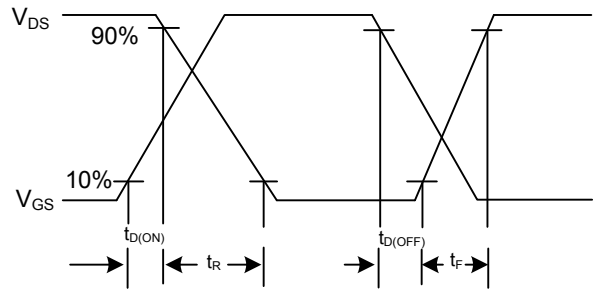


Peak Diode Recovery dv/dt Waveforms

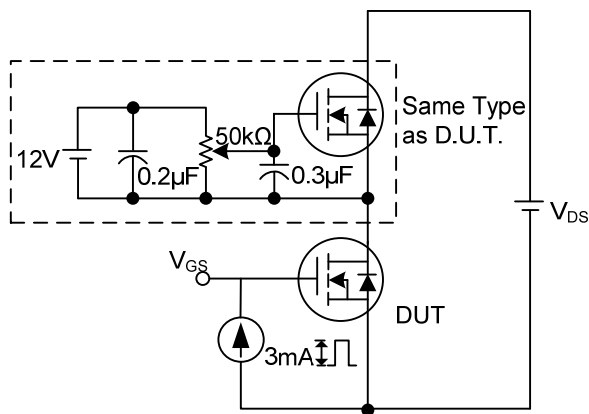
TEST CIRCUITS AND WAVEFORMS (Cont.)



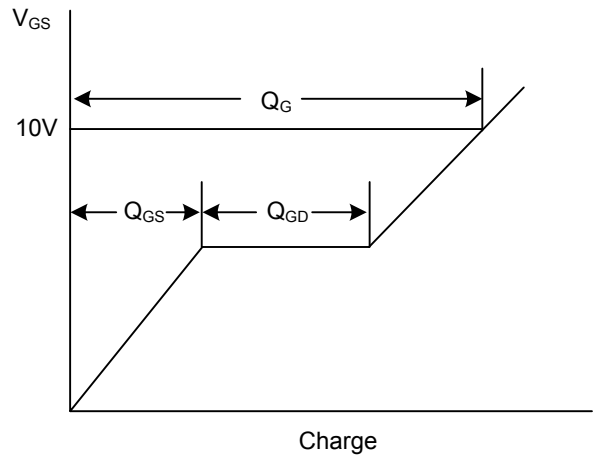
Switching Test Circuit



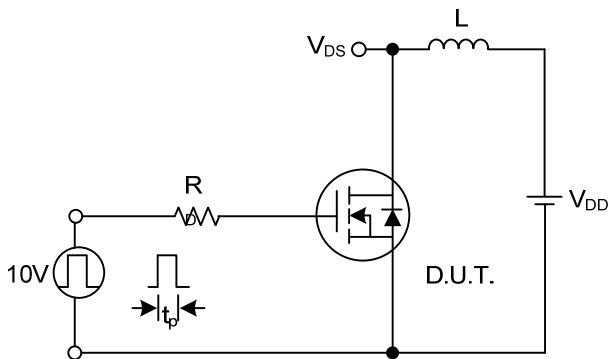
Switching Waveforms



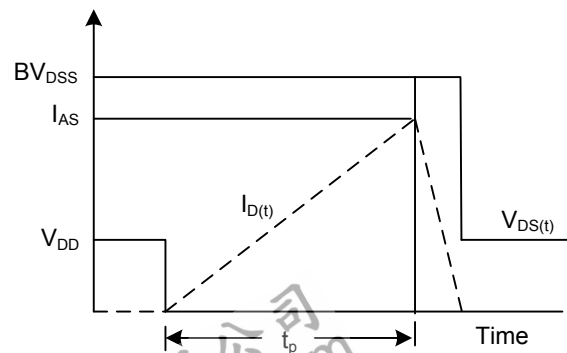
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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