



8N70K-MT

Power MOSFET

8.0A, 700V N-CHANNEL POWER MOSFET

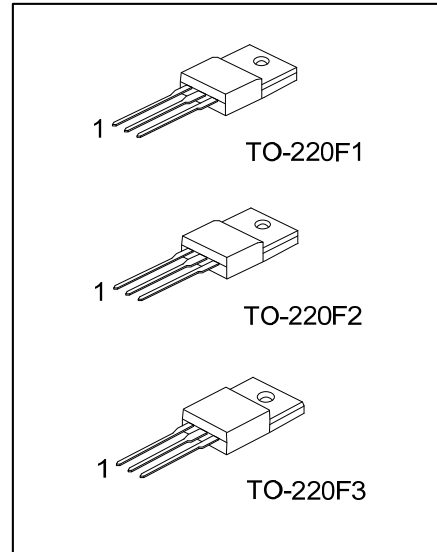
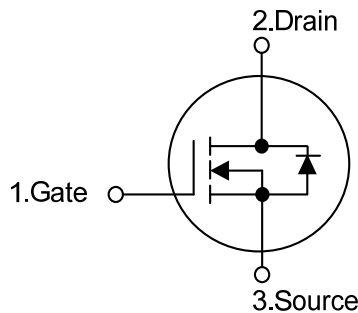
DESCRIPTION

The UTC **8N70K-MT** is an 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

- * $R_{DS(ON)} < 1.4\Omega @ V_{GS}=10V, I_D=4A$
- * High switching speed

SYMBOL



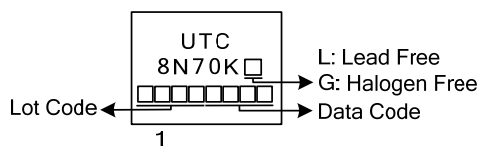
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
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-TF3T-T	8N70KG-TF3T-T	TO-220F3	G	D	S	Tube

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

<p>8N70KL-TF1-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube (2) TF1: TO220-F1, TF2: TO-220F2, TF3T: TO-220F3 (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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MARKING



■ 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 (Note 4)		I_{DM}	32	A
Avalanche Current	Repetitive (Note 3)	I_{AS}	8	A	
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	300	mJ	
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3.5	V/ns	
Junction Temperature		T_J	+150	$^\circ\text{C}$	
Power Dissipation ($T_C=25^\circ\text{C}$)		P_D	49	W	
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. $L = 9.37\text{mH}$, $I_{AS} = 8\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 8\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	θ_{JC}	2.55	$^\circ\text{C}/\text{W}$

Note: 3surface mounted on FR4 board $t \leq 10\text{sec}$.

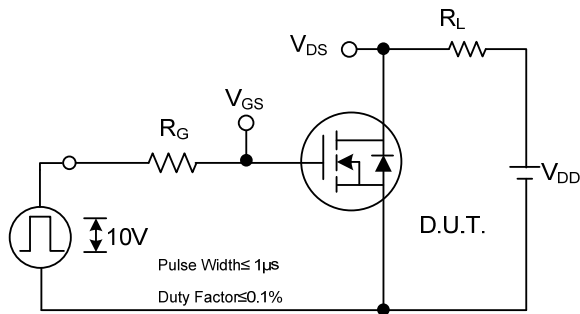
■ ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	700			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=700\text{V}$, $V_{GS}=0\text{V}$			1	μA
		$V_{DS}=560\text{V}$, $TC=125^\circ\text{C}$			100	μA
Gate-Source Leakage Current	Forward	I_{GSS}			+10	nA
	Reverse					
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	2.0		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=4\text{A}$			1.4	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1.0\text{MHz}$		1120		pF
Output Capacitance	C_{OSS}			113		pF
Reverse Transfer Capacitance	C_{RSS}			21		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{DS}=50\text{V}$, $V_{GS}=10\text{V}$, $I_D=1.3\text{A}$, $I_G=100\mu\text{A}$ (Note 1, 2)		26		nC
Gate to Source Charge	Q_{GS}			8		nC
Gate to Drain Charge	Q_{GD}			6		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=30\text{V}$, $V_{GS}=10\text{V}$, $I_D=0.5\text{A}$, $R_G=25\Omega$ (Note 1, 2)		82		ns
Rise Time	t_R			85		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			125		ns
Fall-Time	t_F			60		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	V_{SD}	$I_S=8\text{A}$, $V_{GS}=0\text{V}$			1.4	V
Reverse Recovery Time	t_{RR}	$I_S=8\text{A}$, $V_{GS}=0\text{V}$, $di/dt = 100\text{A}/\mu\text{s}$		490		ns
Reverse Recovery Charge	Q_{RR}			4.1		μC

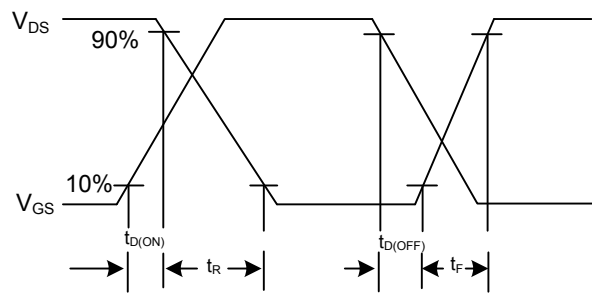
Notes: 1. Essentially independent of operating temperature.

2. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

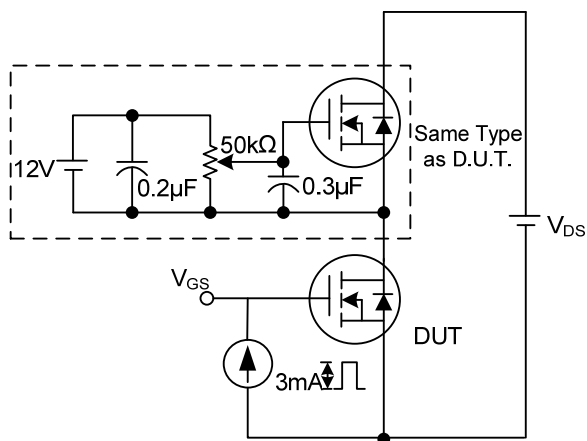
TEST CIRCUITS AND WAVEFORMS



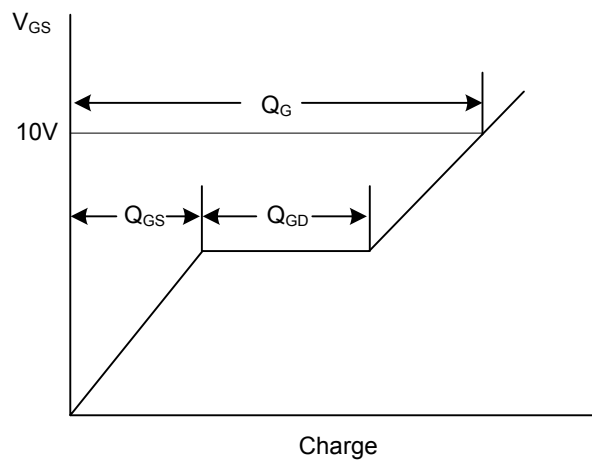
Switching Test Circuit



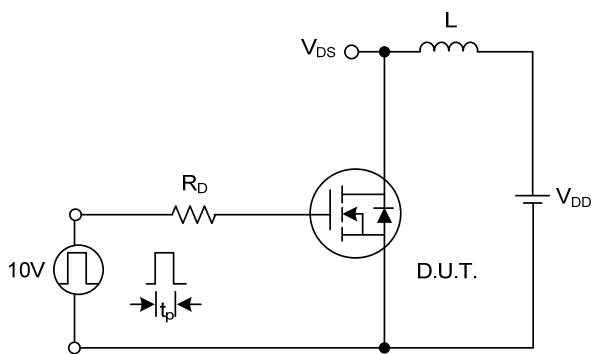
Switching Waveforms



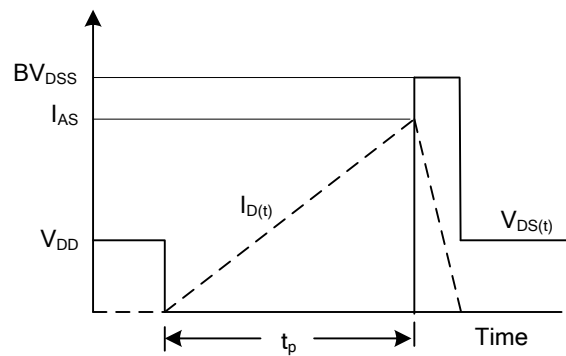
Gate Charge Test Circuit



Gate Charge Waveform

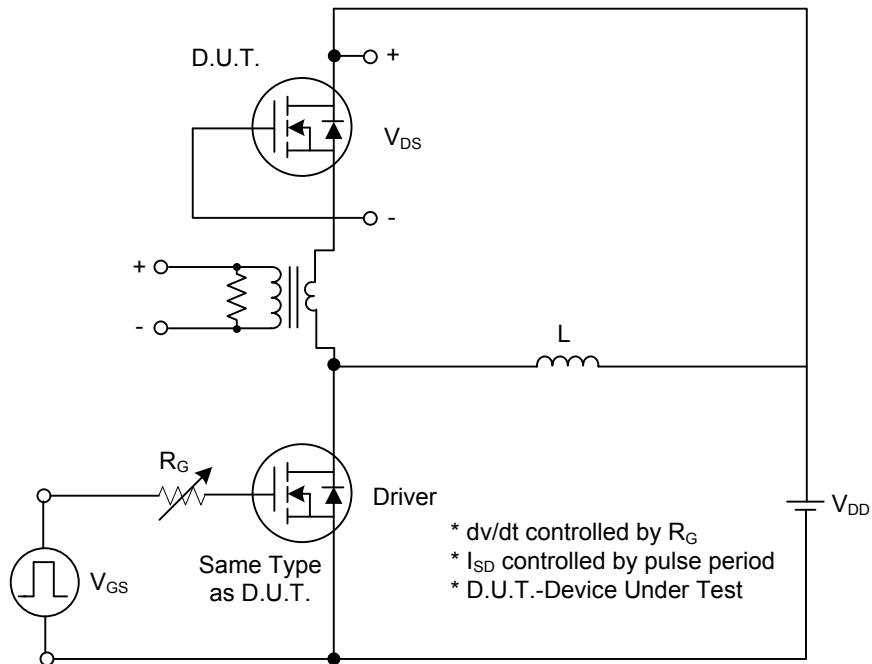


Unclamped Inductive Switching Test Circuit

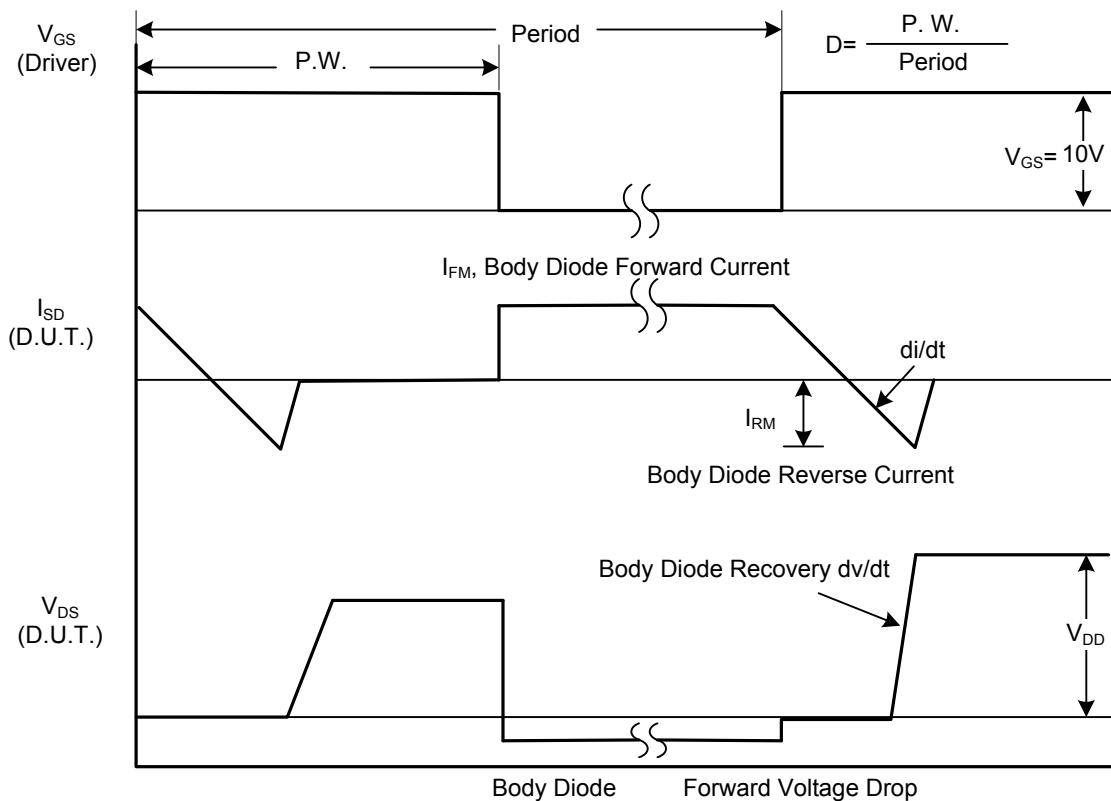


Unclamped Inductive Switching Waveforms

TEST CIRCUITS AND WAVEFORMS(Cont.)

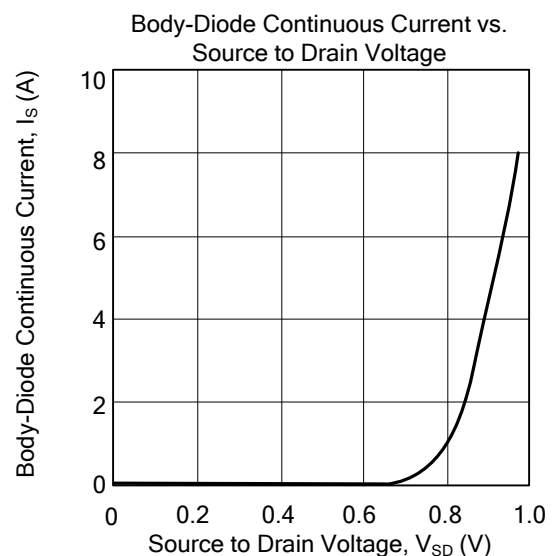
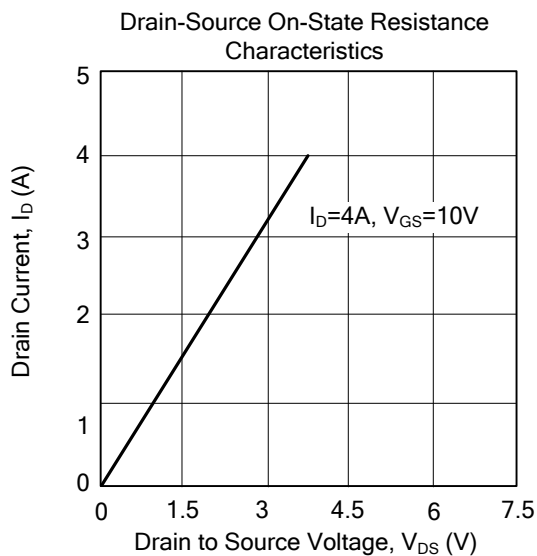
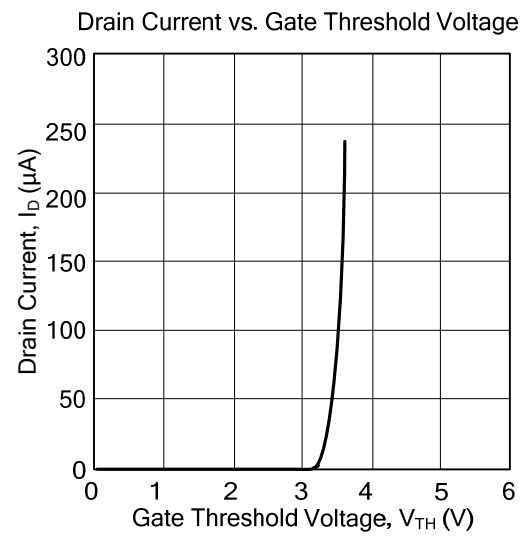
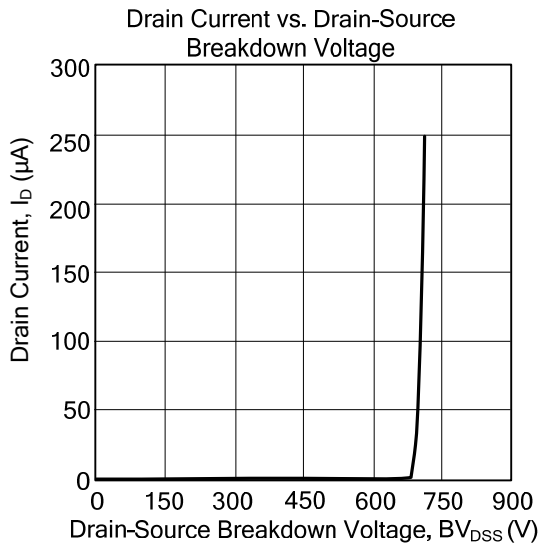


Peak Diode Recovery dv/dt Test Circuit



Peak Diode Recovery dv/dt Waveforms

TYPICAL CHARACTERISTICS



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