



**8N70**

*Power MOSFET*

**8A, 700V N-CHANNEL  
POWER MOSFET**

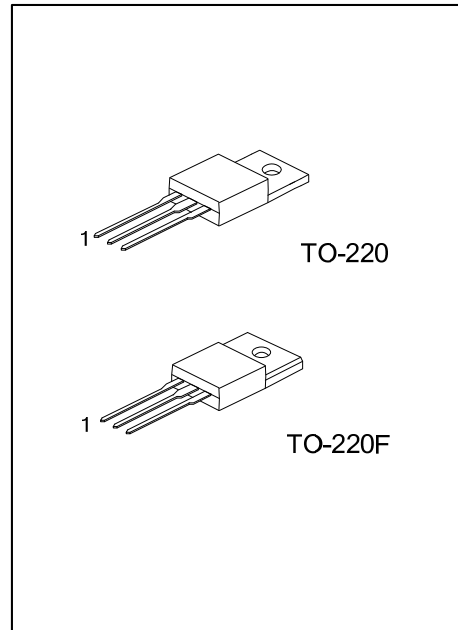
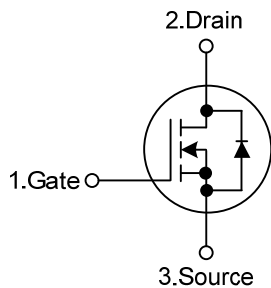
■ DESCRIPTION

The UTC **8N70** 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
- \* Low Gate Charge (typical 32nC)
- \* Low  $C_{RSS}$  (typical 13.7pF)

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
8N70L-TA3-T	8N70G-TA3-T	TO-220	G	D	S	Tube
8N70L-TF3-T	8N70G-TF3-T	TO-220F	G	D	S	Tube

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

<p>8N70L-TA3-T</p>	<p>(1) T: Tube (2) TA3: TO-220, TF3: TO-220F (3) G: Halogen Free, L: Lead Free</p>
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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		$V_{GSS}$	$\pm 30$	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 2)	$I_{AR}$	8	A	
	Repetitive (Note 3)	$I_{AS}$	8	A	
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	266	mJ	
	Repetitive (Note 2)	$E_{AR}$	11.6	mJ	
Power Dissipation ( $T_C=25^\circ\text{C}$ )	TO-220	$P_D$	147	W	
	TO-220F		40		
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.  $L = 7.74\text{mH}$ ,  $I_{AS} = 8\text{A}$ ,  $V_{DD} = 50\text{V}$ ,  $R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$
4. Limited by maximum junction temperature

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		$\theta_{JA}$	62.5	$^\circ\text{C/W}$
Junction to Case	TO-220	$\theta_{JC}$	0.85	$^\circ\text{C/W}$
	TO-220F		3.1	

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

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

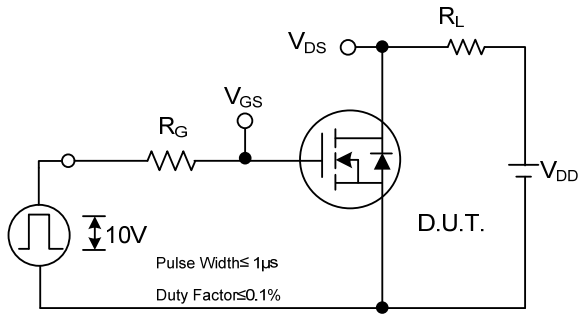
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>							
Drain-Source Breakdown Voltage		$BV_{DSS}$	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	700			V
Drain-Source Leakage Current		$I_{DSS}$	$V_{DS}=700\text{V}$ , $V_{GS}=0\text{V}$			1	$\mu\text{A}$
Gate-Source Leakage Current	Forward	$I_{GSS}$	$V_{GS}=+30\text{V}$ , $V_{DS}=0\text{V}$			+10	nA
	Reverse		$V_{GS}=-30\text{V}$ , $V_{DS}=0\text{V}$			-10	nA
<b>ON CHARACTERISTICS</b>							
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		$R_{DS(ON)}$	$V_{GS}=10\text{V}$ , $I_D=4\text{A}$		1.2	1.4	$\Omega$
<b>DYNAMIC PARAMETERS</b>							
Input Capacitance		$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=25\text{V}$ , $f=1.0\text{MHz}$		2006		pF
Output Capacitance		$C_{OSS}$			148		pF
Reverse Transfer Capacitance		$C_{RSS}$			13.7		pF

■ ELECTRICAL CHARACTERISTICS(Cont.)

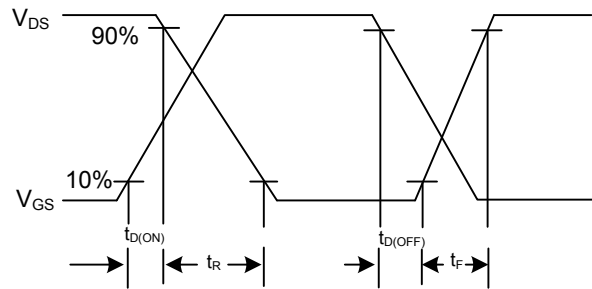
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	$Q_G$	$V_{GS}=10V, V_{DS}=560V, I_D=8A$ (Note 1, 2)		32		nC
Gate to Source Charge	$Q_{GS}$			9		nC
Gate to Drain Charge	$Q_{GD}$			8		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=300V, I_D=10A, R_G=25\Omega,$ $V_{GS}=10V$ (Note 1, 2)		23		ns
Rise Time	$t_R$			69		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			144		ns
Fall-Time	$t_F$			77		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
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	$V_{SD}$	$I_S=8A, V_{GS}=0V$			1.4	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_S=8A, V_{GS}=0V, di_F/dt=100A/\mu s$		420		ns
Body Diode Reverse Recovery Charge	$Q_{RR}$				4.2	

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

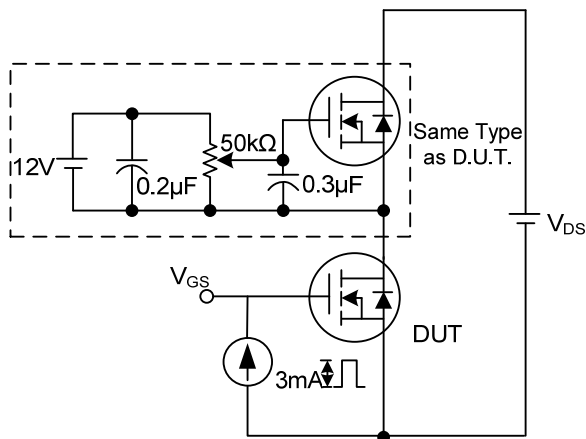
■ TEST CIRCUITS AND WAVEFORMS



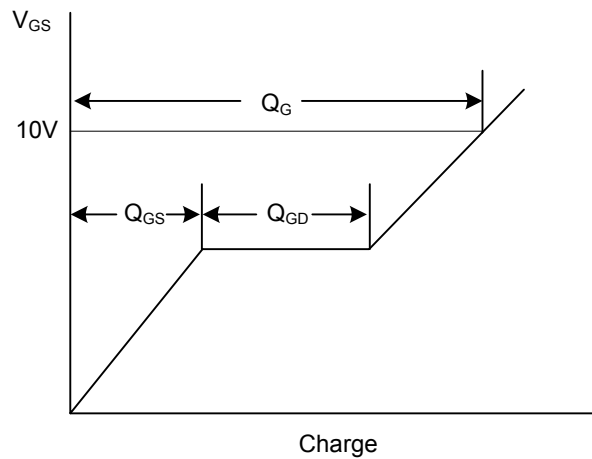
Switching Test Circuit



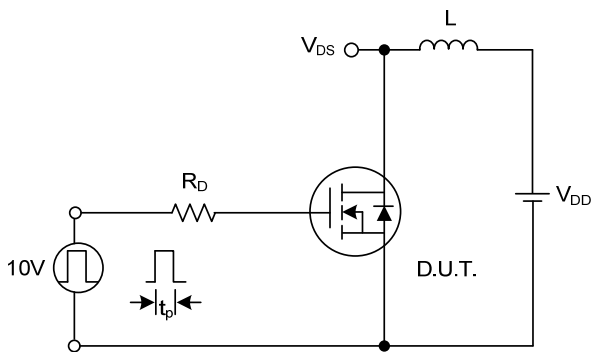
Switching Waveforms



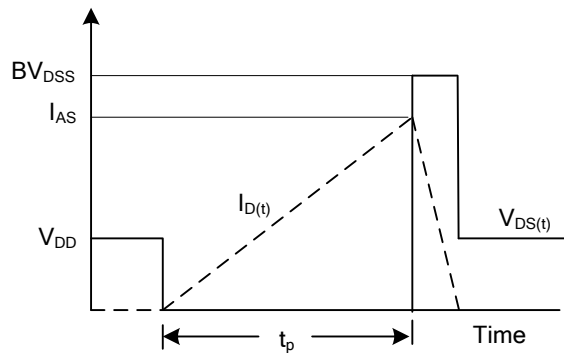
Gate Charge Test Circuit



Gate Charge Waveform

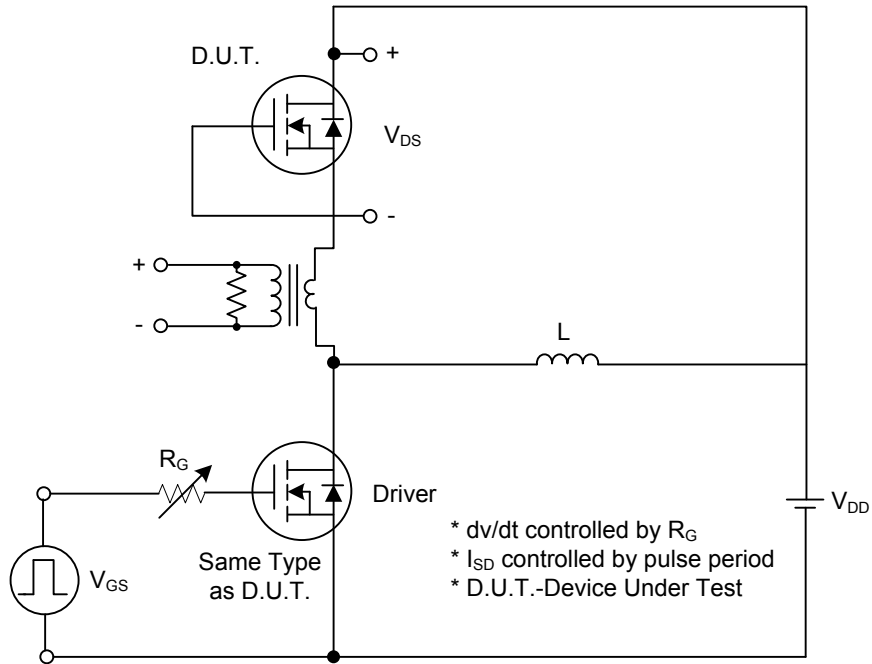


Unclamped Inductive Switching Test Circuit

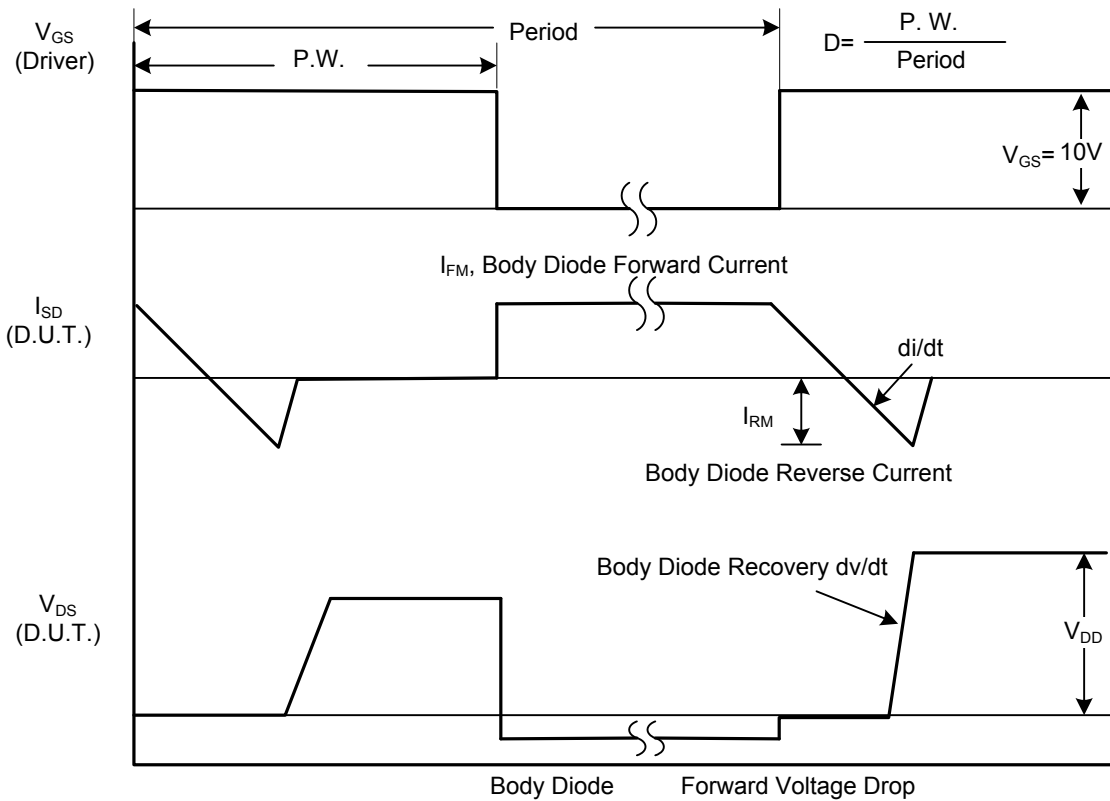


Unclamped Inductive Switching Waveforms

■ TEST CIRCUITS AND WAVEFORMS(Cont.)

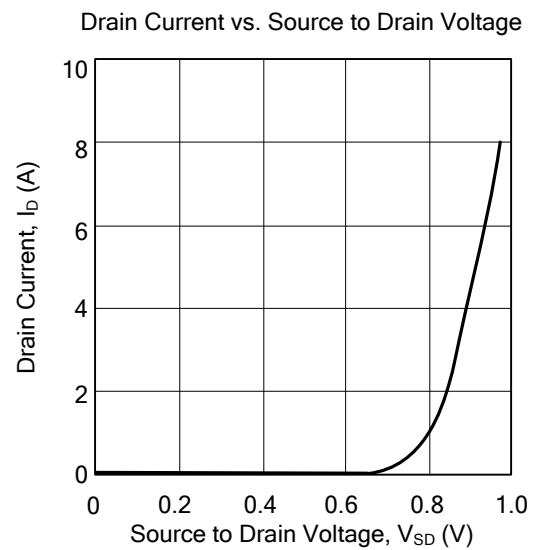
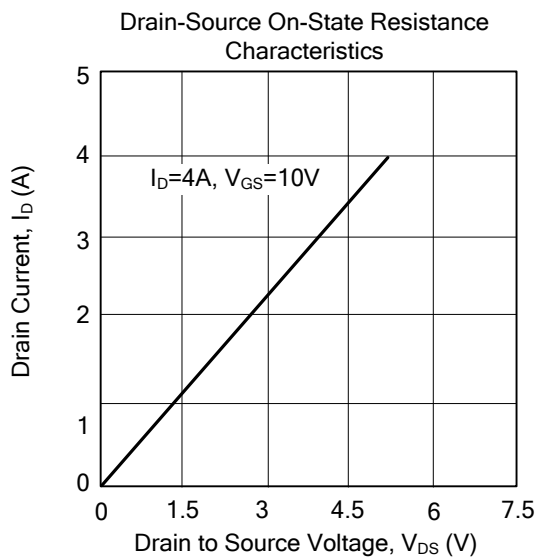
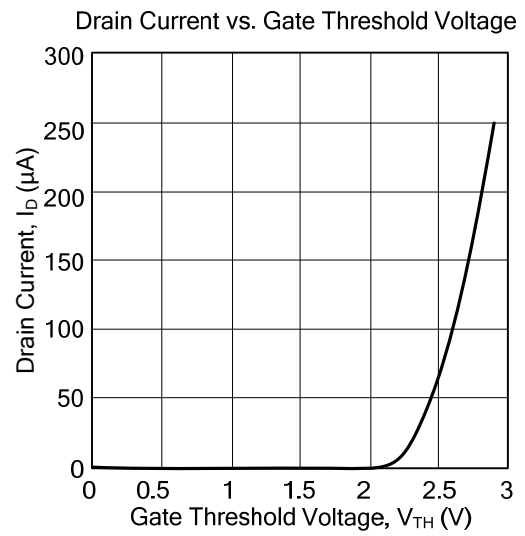
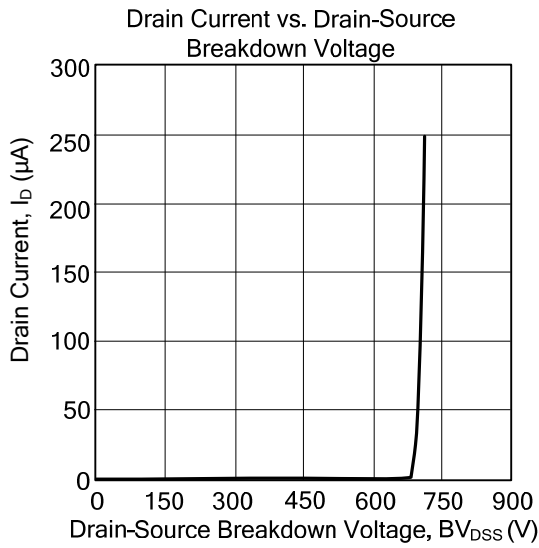


Peak Diode Recovery  $dv/dt$  Test Circuit



Peak Diode Recovery  $dv/dt$  Waveforms

## TYPICAL CHARACTERISTICS



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