



8N70

Preliminary

Power MOSFET

8A, 700V N-CHANNEL POWER MOSFET

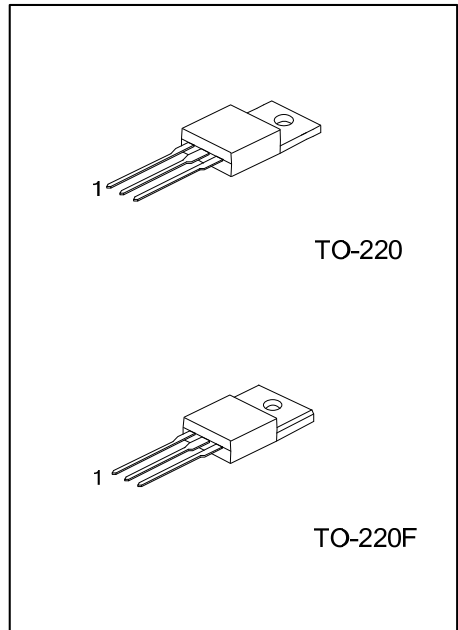
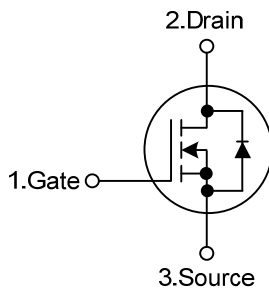
DESCRIPTION

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

8N70L-TA3-T (1)Packing Type (2)Package Type (3)Lead Free	(1) T: Tube (2) TA3: TO-220, TF3: TO-220F (3) G: Halogen Free, L: Lead Free
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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	$T_C=25^{\circ}\text{C}$	I_D	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}	230	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		49	
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		θ_{JA}	62.5	$^{\circ}\text{C/W}$
Junction to Case	TO-220	θ_{JC}	0.85	$^{\circ}\text{C/W}$
	TO-220F		2.55	

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

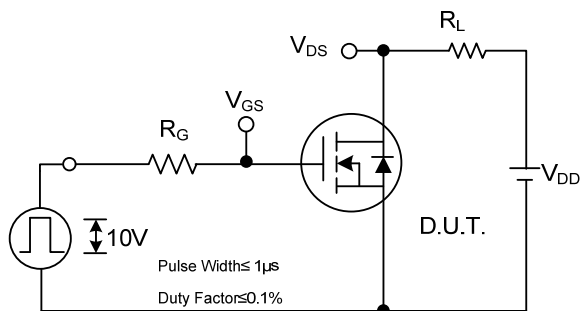
■ ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	$I_D=250\mu A, V_{GS}=0V$	700			V
Drain-Source Leakage Current		I_{DSS}	$V_{DS}=700V, V_{GS}=0V$			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	$V_{GS}=+30V, V_{DS}=0V$			+10	nA
	Reverse		$V_{GS}=-30V, V_{DS}=0V$			-10	nA
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		$R_{DS(ON)}$	$V_{GS}=10V, I_D=4A$		1.2	1.4	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	$V_{GS}=0V, V_{DS}=25V, f=1.0MHz$		1600		pF
Output Capacitance		C_{OSS}			124		pF
Reverse Transfer Capacitance		C_{RSS}			13.7		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	$V_{GS}=10V, V_{DS}=560V, I_D=8A$ (Note 1, 2)		112		nC
Gate to Source Charge		Q_{GS}			38		nC
Gate to Drain Charge		Q_{GD}			33		nC
Turn-ON Delay Time		$t_{D(ON)}$	$V_{DD}=300V, I_D=10A, R_G=25\Omega,$ $V_{GS}=10V$ (Note 1, 2)		95		ns
Rise Time		t_R			115		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			166		ns
Fall-Time		t_F			80		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}	$I_S=8A, V_{GS}=0V$			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		μC

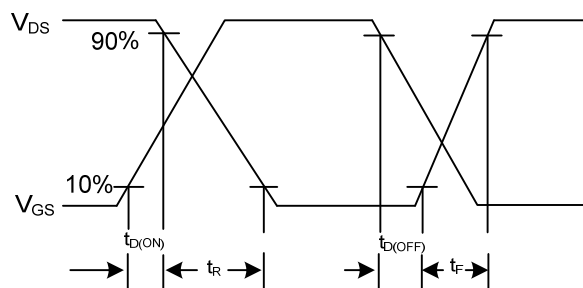
Notes: 1. Essentially independent of operating temperature.

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

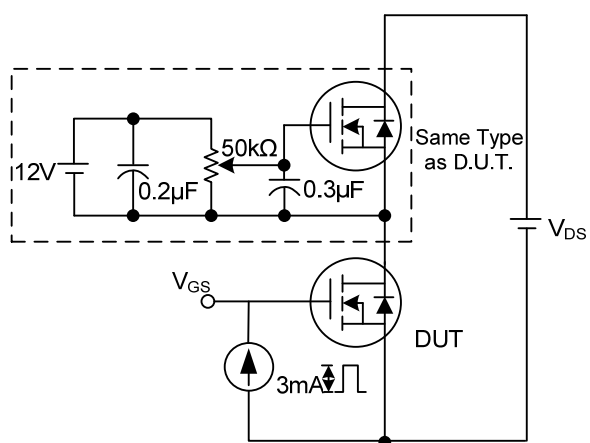
■ TEST CIRCUITS AND WAVEFORMS



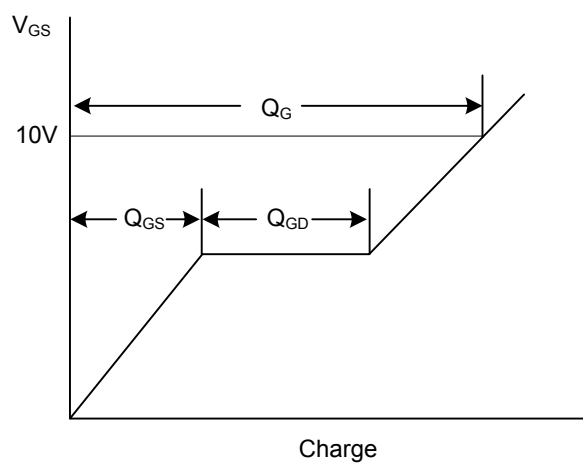
Switching Test Circuit



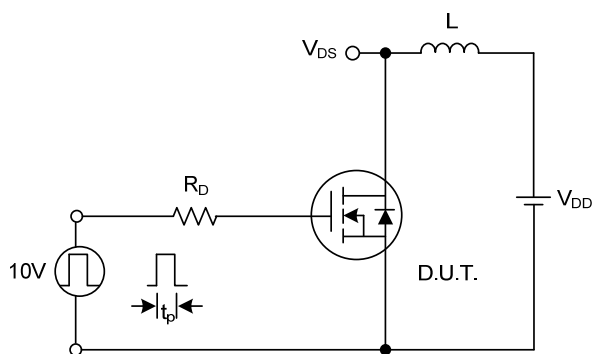
Switching Waveforms



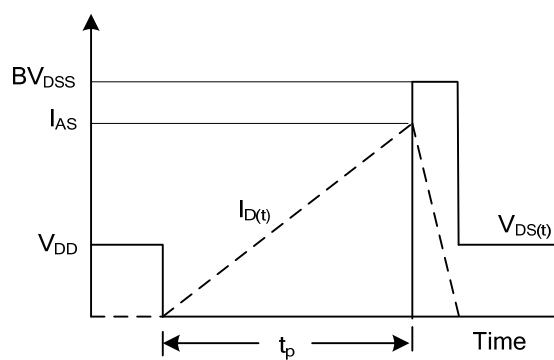
Gate Charge Test Circuit



Gate Charge Waveform

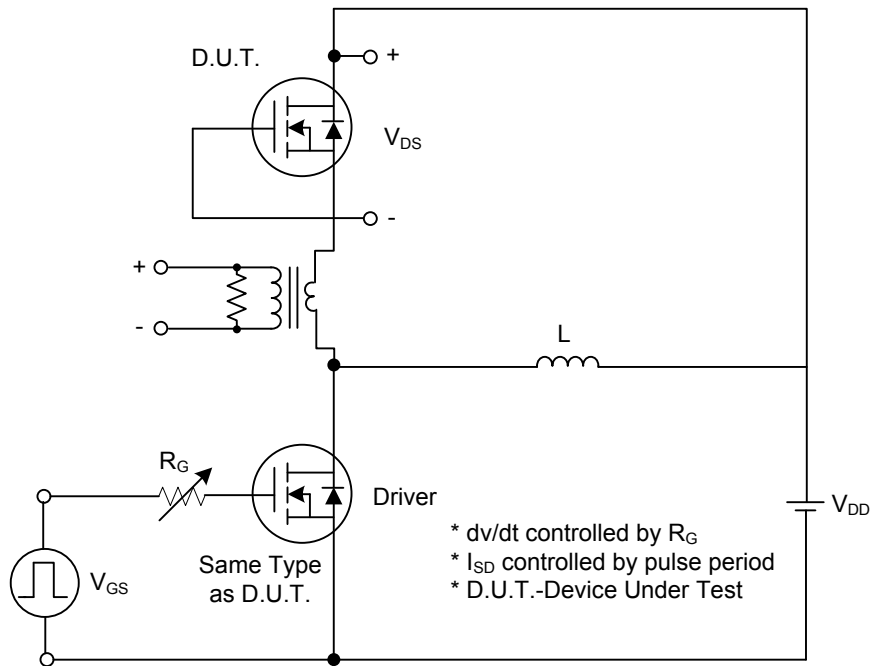


Unclamped Inductive Switching Test Circuit

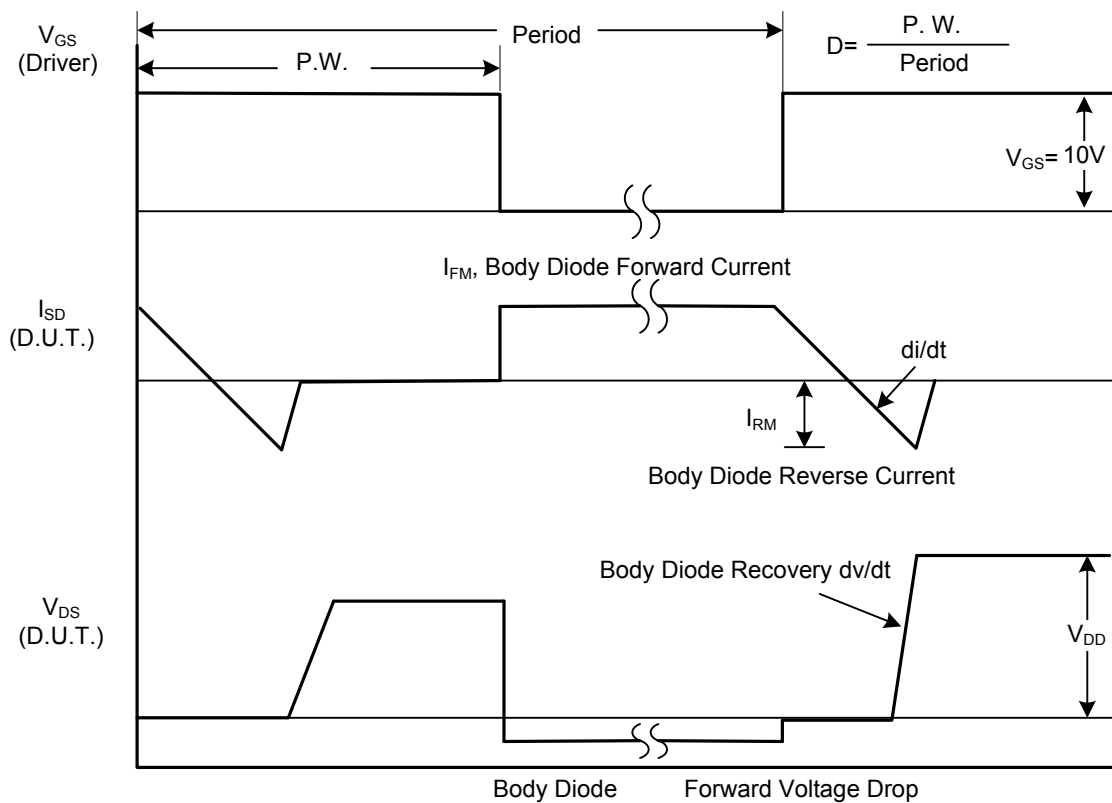


Unclamped Inductive Switching Waveforms

■ TEST CIRCUITS AND WAVEFORMS(Cont.)

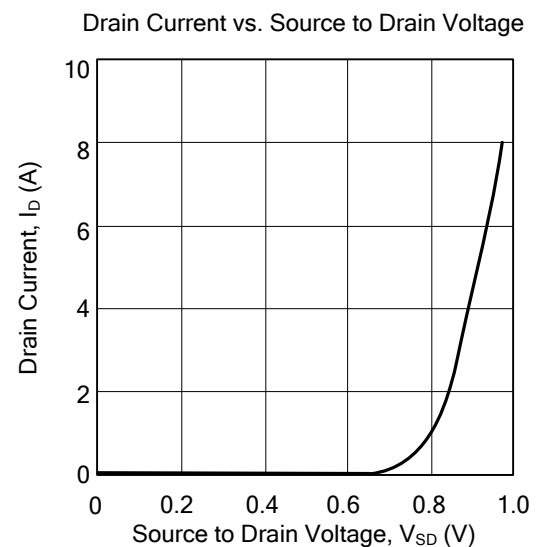
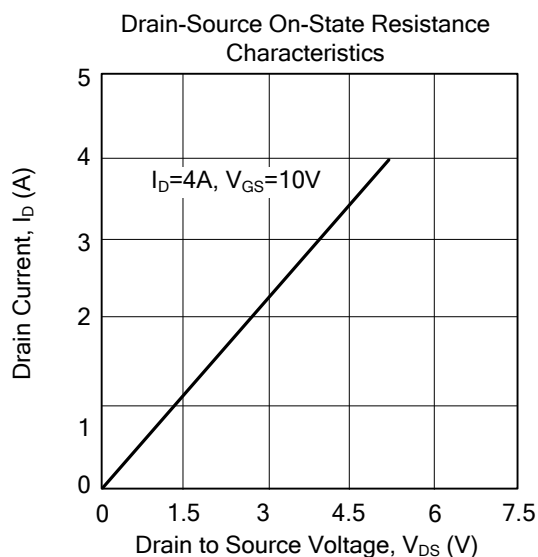
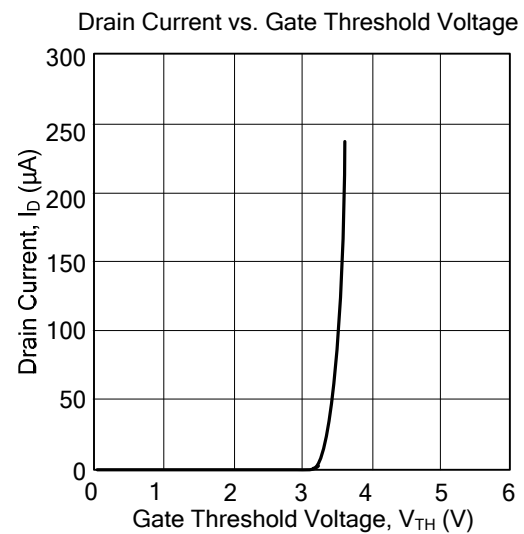
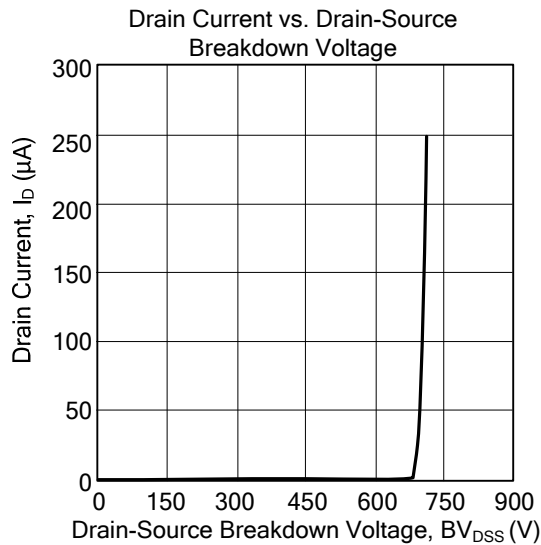


Peak Diode Recovery dv/dt Test Circuit



Peak Diode Recovery dv/dt Waveforms

TYPICAL CHARACTERISTICS



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