



## 9A, 700V N-CHANNEL POWER MOSFET

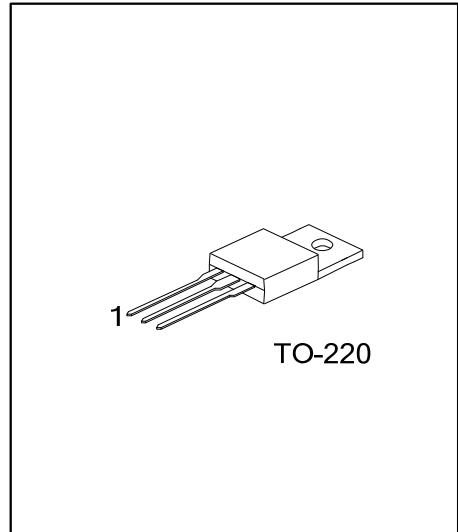
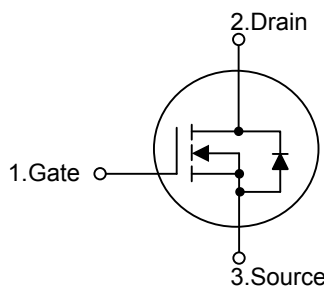
### DESCRIPTION

The **UTC 9N70** is a high voltage and high current power MOSFET designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and a high rugged avalanche characteristics. This power MOSFET is usually used at DC-DC, AC-DC converters for power applications.

### FEATURES

- \*  $R_{DS(ON)} = 1.3\Omega @ V_{GS} = 10V$
- \* Low gate charge ( typical 44 nC)
- \* Low Crss ( typical 10 pF)
- \* High switching Speed
- \* 100% avalanche tested
- \* Improved dv/dt capability

### SYMBOL



### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
9N70L-TA3-T	9N70G-TA3-T	TO-220	G	D	S	Tube

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

<p>9N70L-TA3-T</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Lead Free</p>	<p>(1) T: Tube</p> <p>(2) TA3: TO-220</p> <p>(3) G: Halogen Free, L: Lead Free</p>
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■ ABSOLUTE MAXIMUM RATINGS

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			$V_{DSS}$	700	V
Gate-Source Voltage			$V_{GSS}$	$\pm 30$	V
Drain Current	Continuous $V_{GS} @ 10V$	$T_C=25^\circ C$	$I_D$	9	A
		$T_C=100^\circ C$		5	A
	Pulsed (Note 2)		$I_{DM}$	40	A
Avalanche Current			$I_{AR}$	9	A
Avalanche Energy	Single Pulsed (Note 3)		$E_{AS}$	305	mJ
	Repetitive		$E_{AR}$	9	mJ
Power Dissipation ( $T_C=25^\circ C$ )			$P_D$	156	W
Linear Derating Factor				1.25	W/ $^\circ C$
Junction Temperature			$T_J$	+150	$^\circ C$
Storage Temperature			$T_{STG}$	-55~+150	$^\circ C$

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. Pulse width limited by safe operating area.

3. Starting  $T_J=25^\circ C$ ,  $V_{DD}=50V$ ,  $L=6.8mH$ ,  $R_G=25\Omega$ ,  $I_{AS}=9A$ .

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	62	$^\circ C/W$
Junction to Case	$\theta_{JC}$	0.8	$^\circ C/W$

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=1\text{mA}$ , $V_{GS}=0\text{V}$	700			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $I_D=1\text{mA}$		0.6		$V/^\circ\text{C}$
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=700\text{V}$ , $V_{GS}=0\text{V}$ , $T_J=25^\circ\text{C}$			10	$\mu\text{A}$
Gate- Source Leakage Current	Forward	$I_{GSS}$ $V_{GS}=+30\text{V}$ $V_{GS}=-30\text{V}$			+100	nA
	Reverse				-100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	2		4	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$ , $I_D=4.5\text{A}$		1.1	1.25	$\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=25\text{V}$ , $f=1.0\text{MHz}$		2660		pF
Output Capacitance	$C_{OSS}$			170		pF
Reverse Transfer Capacitance	$C_{RSS}$			10		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge (Note 2)	$Q_G$	$V_{GS}=10\text{V}$ , $V_{DS}=560\text{V}$ , $I_D=9\text{A}$		44		nC
Gate to Source Charge	$Q_{GS}$			11		nC
Gate to Drain Charge	$Q_{GD}$			12		nC
Turn-ON Delay Time (Note 2)	$t_{D(ON)}$	$V_{DD}=350\text{V}$ , $I_D=9\text{A}$ , $R_G=10\Omega$ , $V_{GS}=10\text{V}$ , $R_D=38\Omega$		19		ns
Rise Time	$t_R$			21		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			56		ns
Fall-Time	$t_F$			24		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	$I_S$	$V_D=V_G=0\text{V}$ , $V_S=1.5\text{V}$			9	A
Maximum Body-Diode Pulsed Current (Note 1)	$I_{SM}$				40	A
Drain-Source Diode Forward Voltage (Note 2)	$V_{SD}$	$I_S=9\text{A}$ , $V_{GS}=0\text{V}$ , $T_J=25^\circ\text{C}$			1.5	V

- Notes: 1. Pulse width limited by safe operating area.  
2. Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .

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