



9A, 700V N-CHANNEL POWER MOSFET

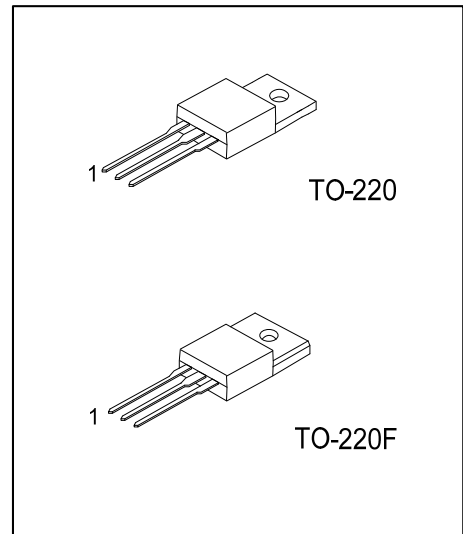
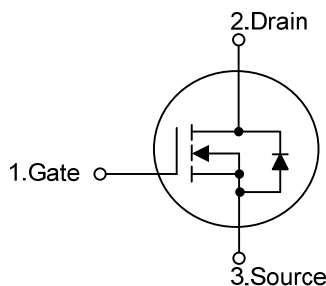
DESCRIPTION

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 C_{rss} (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
9N70L-TF3-T	9N70G-TF3-T	TO-220F	G	D	S	Tube

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

9N70L-TA3-T	(1)Packing Type	(1) T: Tube
	(2)Package Type	(2) TA3: TO-220, TF3: TO-220F
	(3)Lead Free	(3) L: Lead Free, G: Halogen Free

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V _{DSS}	700	V
Gate-Source Voltage			V _{GSS}	±30	V
Drain Current	Continuous	T _C =25°C	I _D	9	A
	V _{GS} @ 10V	T _C =100°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°C)		TO-220	P _D	156	W
		TO-220F		44	
Linear Derating Factor				1.25	W/°C
Junction Temperature			T _J	+150	°C
Storage Temperature			T _{STG}	-55~+150	°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 $T_J=25^\circ\text{C}$, $V_{DD}=50\text{V}$, $L=6.8\text{mH}$, $R_G=25\Omega$, $I_{AS}=9\text{A}$.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ_{JA}	62	$^\circ\text{C/W}$
	TO-220F		62.5	
Junction to Case	TO-220	θ_{JC}	0.8	$^\circ\text{C/W}$
	TO-220F		2.86	

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

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =1mA, V _{GS} =0V	700			V
Breakdown Voltage Temperature Coefficient		ΔBV _{DSS} /ΔT _J	Reference to 25°C, I _D =1mA		0.6		V/°C
Drain-Source Leakage Current		I _{DSS}	V _{DS} =700V, V _{GS} =0V, T _J =25°C			10	μA
			V _{DS} =560V, V _{GS} =0V, T _J =125°C			100	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =+30V			+100	nA
	Reverse		V _{GS} =-30V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2		4	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =4.5A		1.1	1.25	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		1500		pF
Output Capacitance		C _{OSS}			130		pF
Reverse Transfer Capacitance		C _{RSS}			10		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 2)		Q _G	V _{GS} =10V, V _{DS} =560V, I _D =9A		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} =350V, I _D =9A, R _G =10Ω, V _{GS} =10V, R _D =38 Ω		19		ns
Rise Time		t _R			21		ns
Turn-OFF Delay Time		t _{D(OFF)}			56		ns
Fall-Time		t _F			24		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S	V _D =V _G =0V, V _S =1.5V			9	A
Maximum Body-Diode Pulsed Current (Note 1)		I _{SM}				40	A
Drain-Source Diode Forward Voltage (Note 2)		V _{SD}	I _S =9A, V _{GS} =0V, T _J = 25°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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