



4N40

Preliminary

Power MOSFET

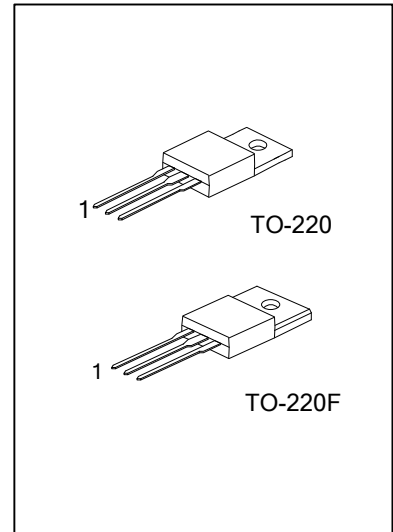
4 Amps, 400 Volts

N-CHANNEL POWER MOSFET

DESCRIPTION

The UTC **4N40** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology specializes in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

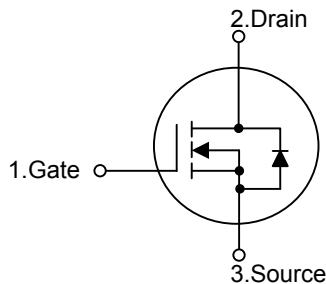
The UTC **4N40** is universally applied in electronic lamp ballast based on half bridge topology and high efficient switched mode power supply.



FEATURES

- * High switching speed
- * 4A, 400V, $R_{DS(ON)}=2.0\Omega$ @ $V_{GS}=10V$
- * 100% avalanche tested

SYMBOL



ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
4N40L-TA3-T	4N40G-TA3-T	TO-220	G	D	S	Tube
4N40L-TF3-T	4N40G-TF3-T	TO-220F	G	D	S	Tube

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

<p>4N40L-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, TF3: TO-220F</p> <p>(3) G: Halogen Free, L: Lead Free</p>
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■ ABSOLUTE MAXIMUM RATINGS ($T_C=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	400	V
Gate-Source Voltage		V_{GSS}	± 30	V
Drain Current	Continuous ($T_C=25^{\circ}\text{C}$)	I_D	4	A
	Pulsed (Note 1)	I_{DM}	8	A
Peak Diode Recovery dv/dt (Note 3)		dv/dt	4.5	V/ns
Power Dissipation	TO-220	P_D	60	W
	TO-220F		27	W
Derate above 25°C	TO-220		0.48	W/ $^{\circ}\text{C}$
	TO-220F		0.22	W/ $^{\circ}\text{C}$
Junction Temperature		T_J	+150	$^{\circ}\text{C}$
Storage Temperature Range		T_{STG}	-55~+150	$^{\circ}\text{C}$

Note: 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.

■ THERMAL DATA

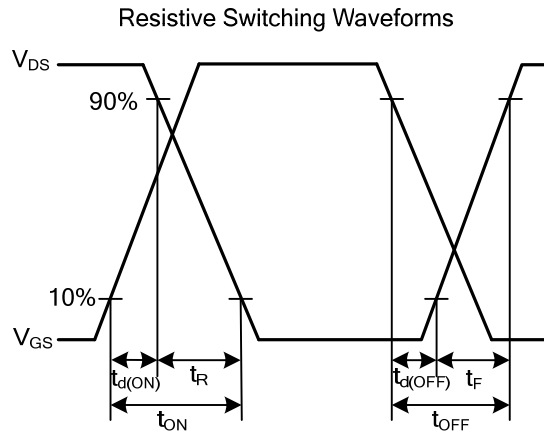
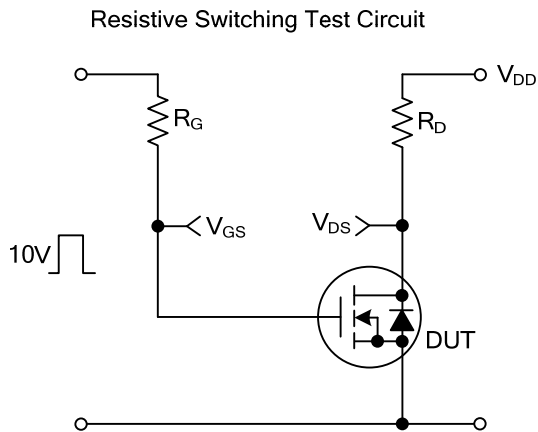
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ_{JA}	62.5	$^{\circ}\text{C/W}$
	TO-220F		62.5	
Junction to Case	TO-220	θ_{JC}	2.08	$^{\circ}\text{C/W}$
	TO-220F		4.5	

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

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	400			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =400V, V _{GS} =0V			1	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =+30V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-30V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =4A			2.0	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz			750	pF
Output Capacitance		C _{OSS}				150	pF
Reverse Transfer Capacitance		C _{RSS}				100	pF
SWITCHING PARAMETERS							
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =200V, I _D =4A, R _G =25Ω (Note 2, 3)		12	45	ns
Rise Time		t _R			42	60	ns
Turn-OFF Delay Time		t _{D(OFF)}			130	200	ns
Fall-Time		t _F			62	100	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage		V _{SD}	I _S =2A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time		t _{RR}	I _S =4A, V _{GS} =0V, dI _F /dt=100A/μs(Note 2)		800		ns

Notes: 1. Repetitive Rating: Pulse width limited by maximum junction temperature
 2. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$
 3. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS



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