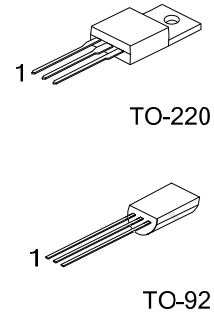


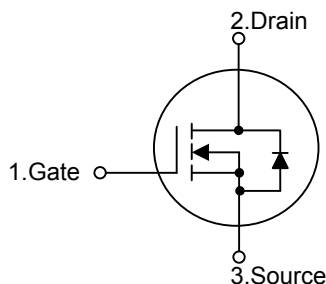
**1N40****Preliminary****Power MOSFET****1 Amps, 400 Volts
N-CHANNEL POWER MOSFET****DESCRIPTION**

The UTC **1N40** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology is specialized 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 **1N40** is universally applied in electronic lamp ballast based on half bridge topology and high efficient switched mode power supply.

**FEATURES**

- * High switching speed
- * 1.4A, 400V, $R_{DS(ON)}=5.8\Omega$ @ $V_{GS}=10V$
- * 100% avalanche tested

SYMBOL**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
1N40L-TA3-T	1N40G-TA3-T	TO-220	G	D	S	Tube
1N40L-T92-B	1N40G-T92-B	TO-92	G	D	S	Tape Box
1N40L-T92-K	1N40G-T92-K	TO-92	G	D	S	Bulk
1N40L-T92-TR	1N40G-T92-TR	TO-92	G	D	S	Tape Reel

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

1N40L-TA3-T	(1)Packing Type	(1) T: Tube, B: Tape Box, K: Bulk, TR: Tape Reel
	(2)Package Type	(2) TA3: TO-220, T92: TO-92
	(3)Lead Free	(3) G: Halogen Free, L: Lead Free

■ 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	1.4	A
	Pulsed (Note 1)	I_{DM}	5.6	A
Avalanche Current (Note 1)		I_{AR}	1.4	A
Avalanche Energy	Single Pulsed (Note 2)	E_{AS}	85	mJ
	Repetitive (Note 1)	E_{AR}	2.5	mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	4.5	V/ns
Power Dissipation	TO-220	P_D	25	W
	TO-92		2.5	W
	Derate above 25°C		0.2	W/ $^{\circ}\text{C}$
	TO-92		0.02	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	$^{\circ}\text{C}/\text{W}$
	TO-92		140	
Junction to Case	TO-220	θ_{JC}	5.0	$^{\circ}\text{C}/\text{W}$
	TO-92		50	

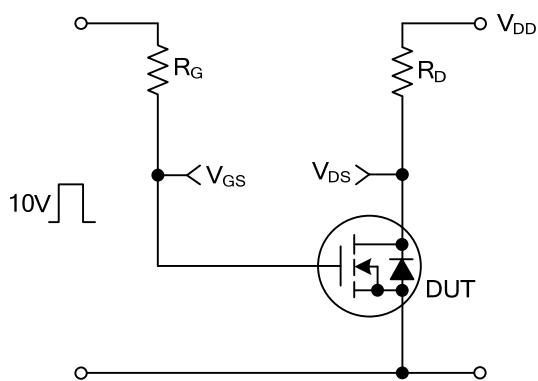
■ ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise noted)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	400			V
Breakdown Voltage Temperature Coefficient		ΔBV _{DSS} /ΔT _J	Reference to 25°C, I _D =250μA		0.4		V/°C
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 =0.7A		4.5	5.8	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		115	150	pF
Output Capacitance		C _{OSS}			20	30	pF
Reverse Transfer Capacitance		C _{RSS}			3	4	pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{GS} =10V, V _{DS} =320V, I _D =1.8A (Note 4, 5)		4.0	5.5	nC
Gate to Source Charge		Q _{GS}			1.1		nC
Gate to Drain Charge		Q _{GD}			2.1		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =200V, I _D =1.8A, R _G =25Ω (Note 4, 5)		7	25	ns
Rise Time		t _R			30	70	ns
Turn-OFF Delay Time		t _{D(OFF)}			7	25	ns
Fall-Time		t _F			25	60	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				1.4	A
Maximum Body-Diode Pulsed Current		I _{SM}				5.6	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =1.4A, V _{GS} =0V			1.5	V
Body Diode Reverse Recovery Time		t _{RR}	I _S =1.8A, V _{GS} =0V, dI _F /dt=100A/μs		160		ns
Body Diode Reverse Recovery Charge		Q _{RR}	(Note 4)		0.4		μC

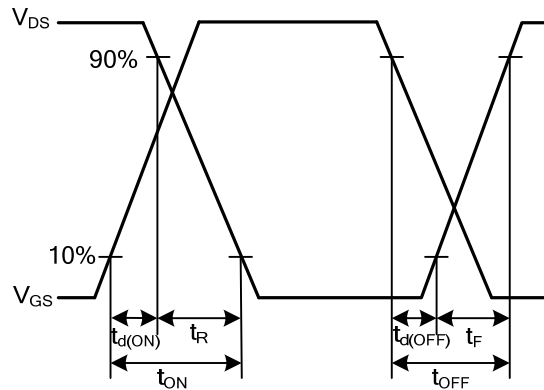
- Notes: 1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. L = 75mH, I_{AS} = 1.4A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 1.8A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C
4. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%
5. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

Resistive Switching Test Circuit



Resistive Switching Waveforms



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