



## 1N40

Preliminary

Power MOSFET

### 1A, 400V N-CHANNEL POWER MOSFET

#### DESCRIPTION

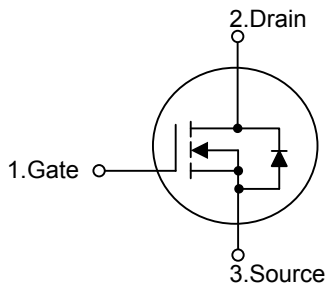
The UTC **1N40** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology is specialized in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche 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
- \*  $R_{DS(ON)}=6.8\Omega @ V_{GS}=10V$
- \* 100% avalanche tested

#### SYMBOL

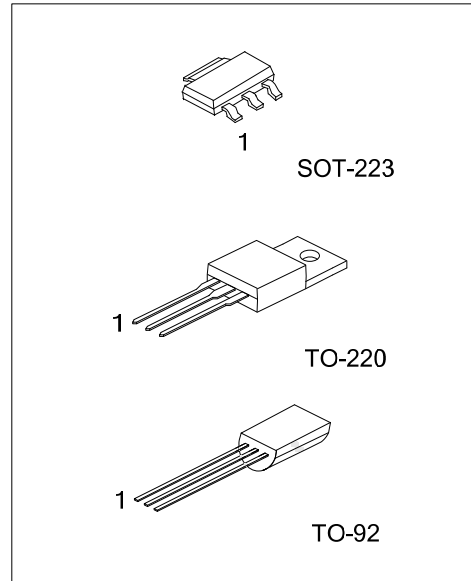


#### ORDERING INFORMATION

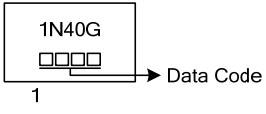
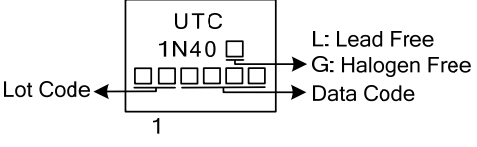
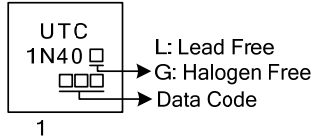
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
-	1N40G-AA3-R	SOT-223	G	D	S	Tape Reel
1N40L-TA3-T	1N40G-TA3-T	TO-220	G	D	S	Tube
1N40L-T92-B	1N40G-T92-B	TO-92	G	D	S	Tape Box
1N40L-T92-K	1N40G-T92-K	TO-92	G	D	S	Bulk

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

1N40L-AA3-R	(1)Packing Type	(1) R: Tape Reel, T: Tube, B: Tape Box, K: Bulk
	(2)Package Type	(2) AA3: SOT-223, TA3: TO-220, T92: TO-92
	(3)Green Package	(3) L: Lead Free, G: Halogen Free and Lead Free



■ MARKING

SOT-223	TO-251	TO-92
 <p>1N40G Data Code 1</p>	 <p>UTC 1N40 Lot Code Data Code 1</p> <p>L: Lead Free G: Halogen Free</p>	 <p>UTC 1N40 Data Code 1</p> <p>L: Lead Free G: Halogen Free</p>

FLYING 汎翔國際有限公司  
[www.flying1688.com](http://www.flying1688.com)

■ 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		$V_{GSS}$	$\pm 30$	V
Drain Current	Continuous ( $T_C=25^\circ\text{C}$ )	$I_D$	1.4	A
	Pulsed (Note 2)	$I_{DM}$	5.6	A
Avalanche Current (Note 2)		$I_{AR}$	1.4	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	85	mJ
	Repetitive (Note 2)	$E_{AR}$	2.5	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation	SOT-223	$P_D$	1	W
	TO-220		25	W
	TO-92		2.5	W
Derate above $25^\circ\text{C}$	SOT-223		125	W/ $^\circ\text{C}$
	TO-220		0.2	W/ $^\circ\text{C}$
	TO-92		0.02	W/ $^\circ\text{C}$
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.  $L = 75\text{mH}$ ,  $I_{AS} = 1.4\text{A}$ ,  $V_{DD} = 50\text{V}$ ,  $R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$   
 4.  $I_{SD} \leq 1.8\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	$\theta_{JA}$	150	$^\circ\text{C}/\text{W}$
	TO-220		62.5	
	TO-92		140	
Junction to Case	SOT-223	$\theta_{JC}$	125	$^\circ\text{C}/\text{W}$
	TO-220		5.0	
	TO-92		50	

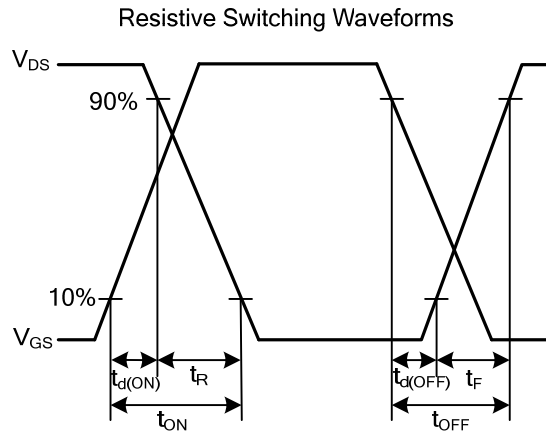
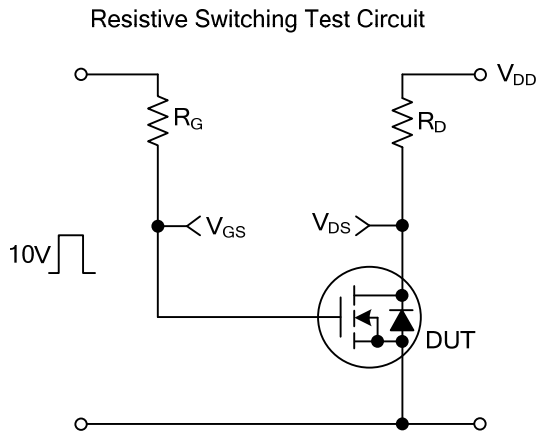
■ ELECTRICAL CHARACTERISTICS ( $T_c=25^\circ\text{C}$ , unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	400			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $I_D=250\mu\text{A}$		0.4		$\text{V}/^\circ\text{C}$
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=400\text{V}$ , $V_{GS}=0\text{V}$			1	$\mu\text{A}$
Gate- Source Leakage Current	Forward	$V_{GS}=+30\text{V}$ , $V_{DS}=0\text{V}$			+100	nA
	Reverse		$V_{GS}=-30\text{V}$ , $V_{DS}=0\text{V}$			-100
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	2.0		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$ , $I_D=0.7\text{A}$		4.5	6.8	$\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=25\text{V}$ , $f=1.0\text{MHz}$		115	150	pF
Output Capacitance	$C_{OSS}$			20	30	pF
Reverse Transfer Capacitance	$C_{RSS}$			3	4	pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	$Q_G$	$V_{GS}=10\text{V}$ , $V_{DS}=320\text{V}$ , $I_D=1.8\text{A}$ (Note 1, 2)		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	$t_{D(ON)}$	$V_{DD}=200\text{V}$ , $I_D=1.8\text{A}$ , $R_G=25\Omega$ (Note 1, 2)		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
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
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	$V_{SD}$	$I_S=1.4\text{A}$ , $V_{GS}=0\text{V}$			1.5	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_S=1.8\text{A}$ , $V_{GS}=0\text{V}$ , $dI_F/dt=100\text{A}/\mu\text{s}$		160		ns
Body Diode Reverse Recovery Charge	$Q_{RR}$	(Note 1)		0.4		$\mu\text{C}$

Notes: 1. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ .

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.