

UTC UNISONIC TECHNOLOGIES CO., LTD

1N40

Preliminary

1 Amps, 400 Volts **N-CHANNEL POWER MOSFET**

DESCRIPTION

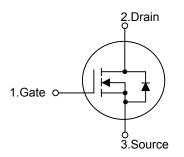
The UTC 1N40 is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology is specialized in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche 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

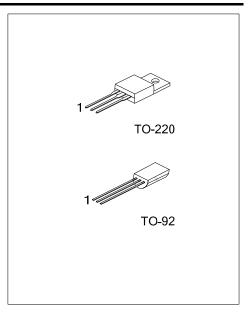
- * High switching speed
- * 1.4A, 400V, R_{DS(ON)}=5.8Ω @ V_{GS}=10V
- * 100% avalanche tested

SYMBOL



ORDERING INFORMATION

Ordering Number		Dookaga	Pin Assignment			Deaking	
Lead Free	Halogen Free	Package	1	2	3	Packing	
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-		TO-92	G	D	S	Tape Reel	
Note: Pin Assignment: G: Gate D: Drain S: Source							
	 (1)Packing Type (2)Package Type (3)Lead Free 	(1) T: Tube, B: (2) TA3: TO-22 (3) G: Halogen	0, T92: T	O-92	·	be Reel	



Preliminary

■ **ABSOLUTE MAXIMUM RATINGS** (T_c=25°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°	Continuous (T _C =25°C)		1.4	А
	Pulsed (Note 1)	Pulsed (Note 1)		5.6	А
Avalanche Current (Note 1)		I _{AR}	1.4	А	
Avalanche Energy	Single Pulsed (Note	Single Pulsed (Note 2)		85	mJ
	Repetitive (Note 1	Repetitive (Note 1		2.5	mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	4.5	V/ns	
		TO-220		25	W
Power Dissipation		TO-92		2.5	W
	Derete above 25°C	TO-220		0.2	W/°C
	Derate above 25°C	TO-92		0.02	W/°C
Junction Temperature			TJ	+150	°C
Storage Temperature Range		T _{STG}	-55~+150	°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	
lunction to Ambiant	TO-220	0	62.5	°C/W	
Junction to Ambient	TO-92	θ _{JA}	140		
lunction to Coop	TO-220	θ _{JC}	5.0	°C/W	
Junction to Case	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				V
Breakdown Voltage Temperature Coefficient		$\triangle BV_{DSS} / \triangle T_J$	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} , Ι _D =250μΑ	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			4.0	5.5	nC
Gate to Source Charge		Q _{GS}	V _{GS} =10V, V _{DS} =320V, I _D =1.8A (Note 4, 5)		1.1		nC
Gate to Drain Charge		Q _{GD}	(Note 4, 5)		2.1		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =200V, I _D =1.8A, R _G =25Ω		7	25	ns
Rise Time		t _R			30	70	ns
Turn-OFF Delay Time		t _{D(OFF)}	(Note 4, 5)		7	25	ns
Fall-Time		t _F			25	60	ns
SOURCE- DRAIN DIODE RATI	NGS AND	CHARACTERI	STICS				
Maximum Body-Diode Continuous Current		Is				1.4	Α
Maximum Body-Diode Pulsed Current		I _{SM}				5.6	Α
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 = 25 Ω , Starting T_J = 25°C

3. $I_{SD} \le 1.8A$, di/dt $\le 200A/\mu s$, $V_{DD} \le BV_{DSS}$, Starting $T_J = 25^{\circ}C$

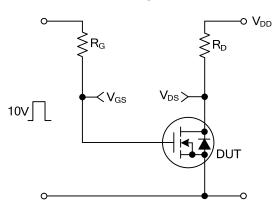
4. Pulse Test: Pulse width \leq 300µs, Duty cycle \leq 2%

5. Essentially independent of operating temperature

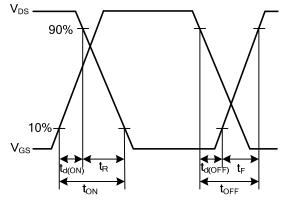


TEST CIRCUITS AND WAVEFORMS

Resistive Switching Test Circuit



Resistive Switching Waveforms



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