

8N40

# **UTC** UNISONIC TECHNOLOGIES CO., LTD

Preliminary

## **Power MOSFET**

## **N-CHANNEL** 8A, 400V **POWER MOSFET**

#### DESCRIPTION

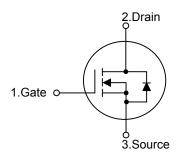
The UTC 8N40 is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology specializes in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC 8N40 is universally applied in electronic lamp ballast based on half bridge topology and high efficient switched mode power supply.

#### **FEATURES**

- \* R<sub>DS(ON)</sub>=0.82Ω @ V<sub>GS</sub>=10V
- \* High switching speed
- \* 100% avalanche tested

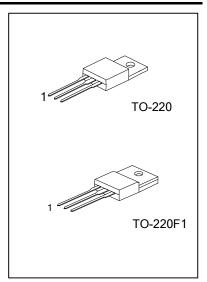
#### **SYMBOL**



#### **ORDERING INFORMATION**

	Ordering Number		Deekege	Pin Assignment			Deaking	
	Lead Free	Halogen Free	Free Package		2	3	Packing	
	8N40L-TA3-T	8N40G-TA3-T	TO-220	G	D	S	Tube	
	8N40L-TF1-T	8N40G-TF1-T	TO-220F1	G	D	S	Tube	
Note: Pin Assignment: G: Gate D: Drain S: Source								

N40L-TA3-T	(1) T: Tube
(2)Package Type	(2) TA3: TO-220, TF1: TO-220F1
(3)Lead Free	(3) G: Halogen Free, L: Lead Free



### ■ ABSOLUTE MAXIMUM RATINGS (T<sub>c</sub>=25°C, unless otherwise specified)

PARA	AMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V <sub>DSS</sub>	400	V
Gate-Source Voltage		V <sub>GSS</sub>	±30	V
	Continuous (T <sub>C</sub> =25°C)	I <sub>D</sub>	8	А
Drain Current	Pulsed (Note 2)	I <sub>DM</sub>	32	А
Avelopebo Eporav	Single Pulsed (Note 3)	E <sub>AS</sub>	320	mJ
Avalanche Energy	Repetitive (Note 2)	E <sub>AR</sub>	2.5	mJ
Dewer Dissinction	TO-220		104	W
Power Dissipation	TO-220F1		39	W
Derate above 25°C TO-220 TO-220F1		PD	0.832	W/°C
			0.312	W/°C
Junction Temperature		TJ	+150	°C
Storage Temperature		T <sub>STG</sub>	-55~+150	°C

Note: 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 = 10mH, I\_{AS} = 8A, V\_DD = 50V, R\_G = 25 $\Omega$ , Starting T\_J = 25°C

## THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220 / TO-220F1	$\theta_{JA}$	62.5	°C/W
lunation to Case	TO-220	0	1.2	°C 1.4/
Junction to Case	TO-220F1	θ <sub>JC</sub>	3.18	°C/W



## ■ ELECTRICAL CHARACTERISTICS (T<sub>c</sub>=25°C, unless otherwise specified)

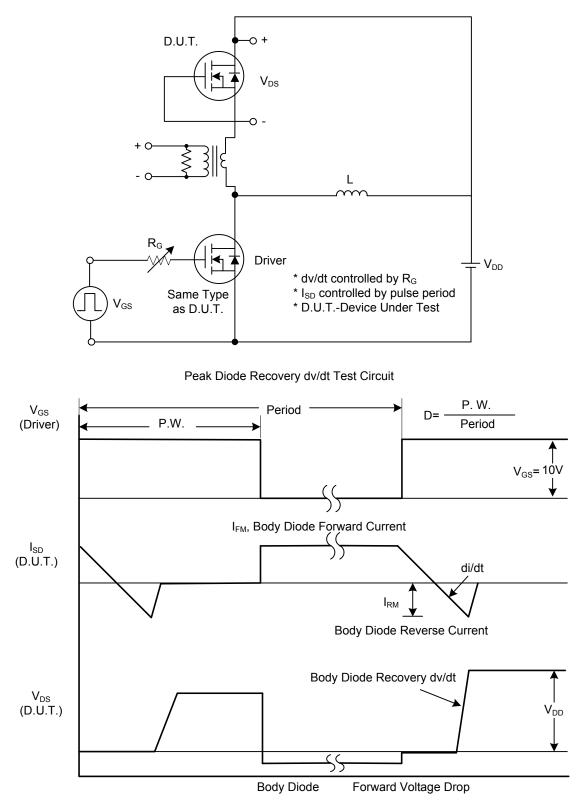
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV <sub>DSS</sub>	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	400			V
Breakdown Voltage Temperature Coefficient		$\triangle BV_{DSS} / \triangle T_J$	Reference to 25°C, I <sub>D</sub> =250µA		0.4		V/°C
Drain-Source Leakage Current		I <sub>DSS</sub>	V <sub>DS</sub> =400V, V <sub>GS</sub> =0V			10	μA
Cata, Sauraa Laakaga Currant	Forward	- I <sub>GSS</sub>	V <sub>GS</sub> =+30V, V <sub>DS</sub> =0V			+100	nA
Gate- Source Leakage Current	Reverse		V <sub>GS</sub> =-30V, V <sub>DS</sub> =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250µA	2.0		4.0	V
Static Drain-Source On-State Resistance		R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =4A		0.68	0.82	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1.0MHz			1600	рF
Output Capacitance		C <sub>OSS</sub>				450	рF
Reverse Transfer Capacitance		C <sub>RSS</sub>	]			150	рF
SWITCHING PARAMETERS						_	
Total Gate Charge		$Q_{G}$				60	nC
Gate to Source Charge		Q <sub>GS</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =320V, I <sub>D</sub> =8A				nC
Gate to Drain Charge		Q <sub>GD</sub>	(Note 1, 2)				nC
Turn-ON Delay Time		t <sub>D(ON)</sub>				35	ns
Rise Time		t <sub>R</sub>	V <sub>DD</sub> =200V, I <sub>D</sub> =8A, R <sub>G</sub> =25Ω			15	ns
Turn-OFF Delay Time		t <sub>D(OFF)</sub>	(Note 1, 2)			90	ns
Fall-Time		t <sub>F</sub>				35	ns
SOURCE- DRAIN DIODE RATII	NGS AND CI	HARACTERIS	TICS				
Maximum Body-Diode Continuous Current		Is				8	Α
Maximum Body-Diode Pulsed Co		I <sub>SM</sub>				32	Α
Drain-Source Diode Forward Vol	Itage	V <sub>SD</sub>	I <sub>S</sub> =8A, V <sub>GS</sub> =0V			1.9	V
	-	•	•				

Notes: 1. Pulse Test: Pulse width  $\leq$  300µs, Duty cycle  $\leq$  2%

2. Essentially independent of operating temperature



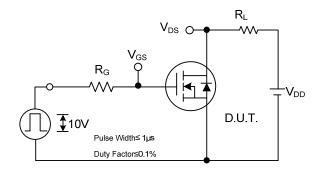
## TEST CIRCUITS AND WAVEFORMS



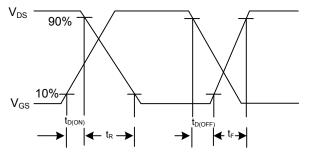
Peak Diode Recovery dv/dt Waveforms



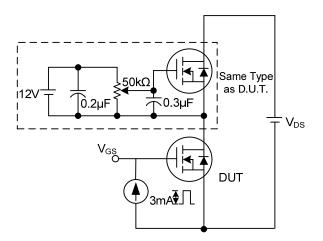
## TEST CIRCUITS AND WAVEFORMS (Cont.)



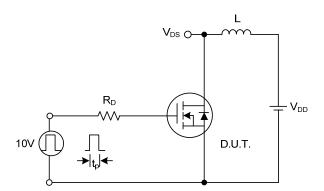
Switching Test Circuit



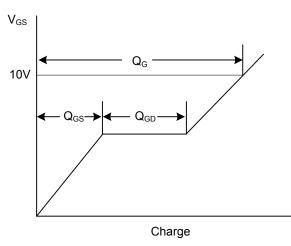
Switching Waveforms



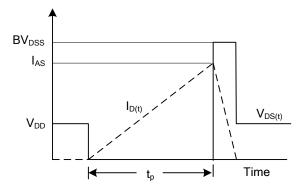
Gate Charge Test Circuit



Unclamped Inductive Switching Test Circuit







Unclamped Inductive Switching Waveforms



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