

UTC UNISONIC TECHNOLOGIES CO., LTD

Preliminary

3 A, 400 V N-CHANNEL **POWER MOSFET**

DESCRIPTION

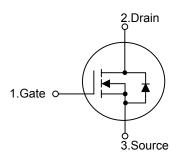
The UTC 3N40 is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology specializes in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC 3N40 is universally applied in electronic lamp ballast based on half bridge topology and high efficient switched mode power supply.

FEATURES

- * V_{DS}= 400V
- * I_D = 3A
- * $R_{DS(ON)}$ =1.6 Ω @ V_{GS}=10V
- * High switching speed
- * 100% avalanche tested

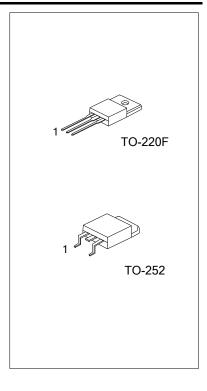
SYMBOL



ORDERING INFORMATION

	Ordering	Deckage	Pin Assignment			Deaking		
	Lead Free	Halogen Free	Package	1	2	3	Packing	
	3N40L-TF3-T	3N40G-TF3-T	TO-220F	G	D	S	Tube	
	3N40L-TN3-R	3N40G-TN3-R	TO-252	G	D	S	Tape Reel	
Note: Pin Assignment: G: Gate D: Drain S: Source								
	3N40L-TF3-T			Tape Re	el			

—— (2)Package Type	(2) TF3: TO-220F, TN3: TO-252
—— (3)Lead Free	(3) G: Halogen Free, L: Lead Free



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°C	C) I _D	3	А
	Pulsed (Note 2)	I _{DM}	12	А
Avalanaha Enarav	Single Pulsed (Note	3) E _{AS}	290	mJ
Avalanche Energy	Repetitive (Note 2)	E _{AR}	3	mJ
Power Dissipation	TO-220F		25	W
Power Dissipation	TO-252		50	W
Derate above 25°C	TO-220F		0.2	W/°C
Derate above 25 C	TO-252		0.4	W/°C
Junction Temperature		TJ	+150	°C
Storage Temperature		T _{STG}	-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=56mH, I_{AS}=3.0 A, V_{DD}=50V, R_G=25 Ω , Starting T_J = 25°C

THERMAL DATA

PARAMETE	R	SYMBOL	RATINGS	UNIT	
lunction to Ambient	TO-220F	0	62.5	°C/W	
Junction to Ambient	TO-252	Αιθ	110		
lunction to Coop	TO-220F	0	4.9	°C/W	
Junction to Case	TO-252	θ _{JC}	2.5		



■ ELECTRICAL CHARACTERISTICS (T_c=25°C, unless otherwise specified)

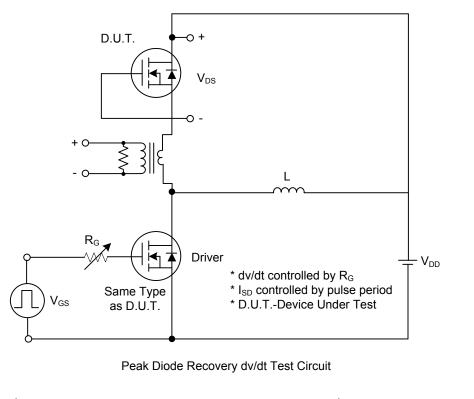
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltag	е	BV _{DSS}	I _D =250μA, V _{GS} =0V	400			V
reakdown Voltage Temperature Coefficient		$\triangle BV_{DSS} / \triangle T_J$	Reference to 25°C, I _D =250µA		0.38		V/°C
Drain-Source Leakage Current		I _{DSS}	V _{DS} =400V, V _{GS} =0V			10	μA
Gate- Source Leakage Current	Forward		V _{GS} =+30V, V _{DS} =0V			+100	nA
Gate- Source Leakage Current	Reverse	I _{GSS}	V _{GS} =-30V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	$V_{DS}=V_{GS}$, $I_{D}=250\mu A$	3.0		5.0	V
Static Drain-Source On-State Re	esistance	R _{DS(ON)}	V _{GS} =10V, I _D =1.5A		1.27	1.6	Ω
DYNAMIC PARAMETERS				÷			-
Input Capacitance		C _{ISS}			350	460	pF
Output Capacitance		Coss	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		60	80	pF
Reverse Transfer Capacitance		C _{RSS}			7	9	pF
SWITCHING PARAMETERS				÷			-
Total Gate Charge		Q_{G}			10	13	nC
Gate to Source Charge		Q_{GS}	V _{GS} =10V, V _{DS} =320V, I _D =3A		3.0		nC
Gate to Drain Charge		Q_{GD}	(Note 1, 2)	0.38		nC	
Turn-ON Delay Time		t _{D(ON)}			12	30	ns
Rise Time		t _R	V_{DD} =200V, I_{D} =3A, R_{G} =25 Ω		60	130	ns
Turn-OFF Delay Time		t _{D(OFF)}	(Note 1, 2)		20	50	ns
Fall-Time		t⊧			30	70	ns
SOURCE- DRAIN DIODE RATI	NGS AND CI	HARACTERIS	TICS				
Maximum Body-Diode Continuo	us Current	Is				3.0	Α
Maximum Body-Diode Pulsed C	urrent	I _{SM}				12	Α
Drain-Source Diode Forward Vo	ltage	V _{SD}	I _S =3A, V _{GS} =0V			1.5	V
Body Diode Reverse Recovery 1	Time	t _{RR}	I _S =3A, V _{GS} =0V, dI _F /dt=100A/µs 1		190		ns
Body Diode Reverse Recovery (Charge	Q _{RR}	(Note 1)		1.0		μC
		•				•	· · ·

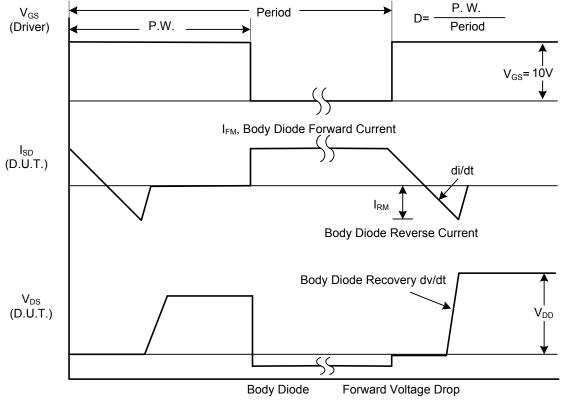
Notes: 1. Pulse Test: Pulse width \leq 300µs, Duty cycle \leq 2%

2. Essentially independent of operating temperature



TEST CIRCUITS AND WAVEFORMS

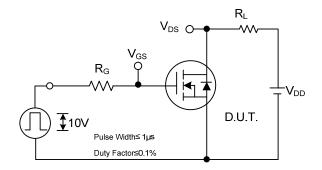




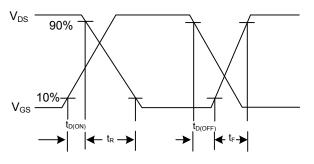
Peak Diode Recovery dv/dt Waveforms



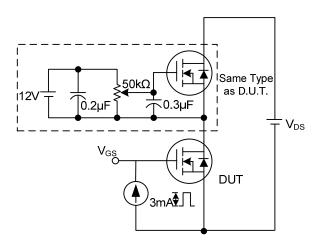
TEST CIRCUITS AND WAVEFORMS (Cont.)



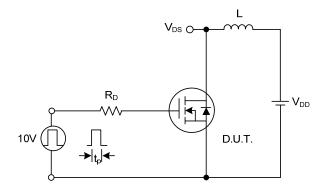




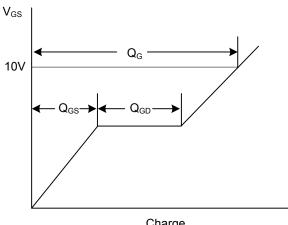
Switching Waveforms



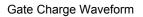
Gate Charge Test Circuit

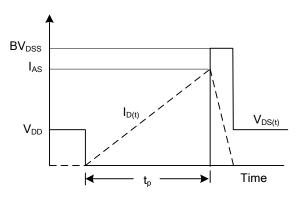


Unclamped Inductive Switching Test Circuit



Charge





Unclamped Inductive Switching 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.

