

UTC UNISONIC TECHNOLOGIES CO., LTD

12N40

Preliminary

12A, 400V N-CHANNEL **POWER MOSFET**

DESCRIPTION

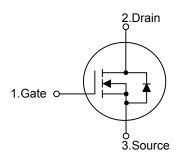
The UTC 12N40 is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology specializes in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC 12N40 is universally applied in electronic lamp ballast based on half bridge topology and high efficient switched mode power supply.

FEATURES

- * R_{DS(ON)}=0.47Ω @ V_{GS}=10V
- * High switching speed
- * 100% avalanche tested

SYMBOL

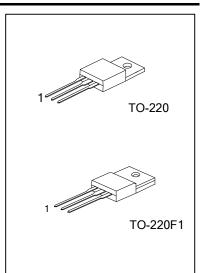


ORDERING INFORMATION

Ordering Number		Deekage	Pin Assignment			Deaking	
Lead Free	Halogen Free	Package	1	2	3	Packing	
12N40L-TA3-T	12N40G-TA3-T	TO-220	G	D	S	Tube	
12N40L-TF1-T	12N40G-TF1-T	TO-220F1	G	D	S	Tube	
Natas Din Assignments C. Cata D. Drain C. Causa							

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

12N40L-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 (Tc=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)	Ι _D	12	А
	Pulsed (Note 2)	I _{DM}	48	А
Single Pulsed Avalanche Energy		E _{AS}	474	mJ
	TO-220		192	W
Power Dissipation	TO-220F1	P	42	W
Denote above 05%0	TO-220	PD	1.53	W/°C
Derate above 25°C	TO-220F1		0.33	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

THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT	
Junction to Ambient		θ _{JA}	62.5	°C/W	
Junction to Case	TO-220	0	0.65	°C/W	
	TO-220F1	$\theta_{\rm JC}$	3.0		

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

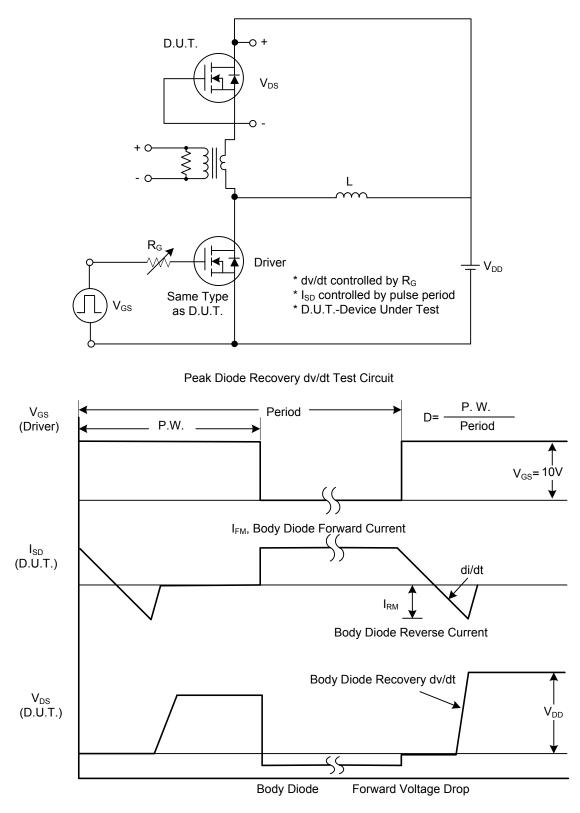
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PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	400			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =400V, V _{GS} =0V			1	μA
Gate- Source Leakage Current	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 =12A		0.34	0.47	Ω
DYNAMIC PARAMETERS							
Input Capacitance		CISS	V _{GS} =0V, V _{DS} =25V, f=1.0MHz			3000	рF
Output Capacitance		C _{oss}				900	рF
Reverse Transfer Capacitance		C _{RSS}				400	рF
SWITCHING PARAMETERS							
Turn-ON Delay Time		t _{D(ON)}			30	50	ns
Rise Time		t _R	V_{DD} =200V, I_{D} =12A, R_{G} =25 Ω		105	150	ns
Turn-OFF Delay Time		t _{D(OFF)}	(Note 1, 2)		480	750	ns
Fall-Time]		140	200	ns
SOURCE- DRAIN DIODE RATI	NGS AND	CHARACTER	RISTICS				
Drain-Source Diode Forward Voltage		V _{SD}	I _S =12A, V _{GS} =0V			1.4	V
Maximum Body-Diode Continuous Current		ls				12	Α
Maximum Body-Diode Pulsed Current		I _{SM}				48	Α
Netee: 1 Dules Test Dules wid		B () ()	2 %/				

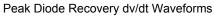
Notes: 1. Pulse Test: Pulse width \leq 300µs, Duty cycle \leq 2%

2. Essentially independent of operating temperature



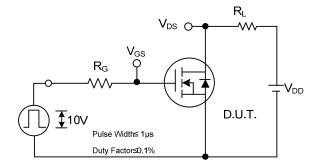
TEST CIRCUITS AND WAVEFORMS



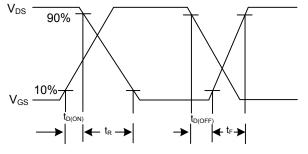




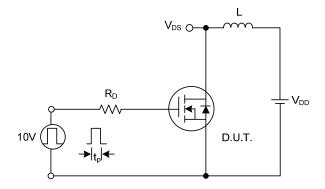
TEST CIRCUITS AND WAVEFORMS (Cont.)



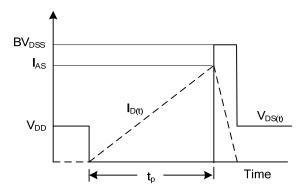
Switching Test Circuit



Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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