

UTC UNISONIC TECHNOLOGIES CO., LTD

6N40K-TA

Preliminary

6A, 400V N-CHANNEL POWER MOSFET

DESCRIPTION

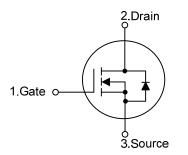
The UTC 6N40K-TA is an N-Channel enhancement mode power MOSFET using UTC's perfect planar stripe, DMOS technology to provide customers with superior switching performance and minimum on-state resistance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC 6N40K-TA is generally used in applications , such as electronic lamp ballasts based on half bridge topology and high efficiency switched mode power supplies.

FEATURES

- * R_{DS(ON)}<0.6Ω @ V_{GS}=10V, I_D=3A
- * Fast switching speed
- * Improved dv/dt capability

SYMBOL



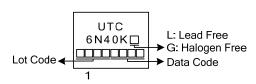
ORDERING INFORMATION

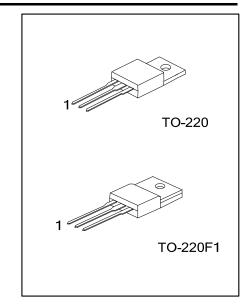
Ordering Number		Deekere	Pin Assignment			Decking	
Lead Free	Halogen Free	Package	1	2	3	Packing	
6N40KL-TA3-T	6N40KG-TA3-T	TO-220	G	D	S	Tube	
6N40KL-TF1-T	6N40KG-TF1-T	TO-220F1	G	D	S	Tube	
Nata Bin Assimute A. Osta D. Desin, O. Osta							

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

6N40K <u>L</u> - <u>TA3</u> - <u>T</u>	
(1)Packing Type	(1) T: Tube
(2)Package Type	(2) TA3: TO-220, TF1: TO-220F1
(3)Green Package	(3) L: Lead Free, G: Halogen Free and Lead Free

MARKING





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	
Avalanche Current (Note 2)		I _{AR}	6	Α	
	Continuous	I _D	6 (Note 5)	Α	
Drain Current	Pulsed (Note 2)	I _{DM}	24(Note 5)	Α	
Avalanche Energy Single Pulsed (Note 3) E _{AS} Repetitive (Note 2) E _{AR}	Single Pulsed (Note 3)	E _{AS}	240	mJ	
	8.5	mJ			
Peak Diode Recovery	eak Diode Recovery dv/dt (Note 4)		4.5	V/ns	
	TO-220	5	73	14/	
Power Dissipation	TO-220F1		38	W	
Junction Temperature	Junction Temperature		+150	°C	
Storage Temperature		T _{STG}	-55 ~ +150	°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=13.5mH, I_{AS} =6A, V_{DD} = 50V, R_G =25 Ω , Starting T_J =25°C

4. $I_{SD} \leq 6A$, di/dt $\leq 200A/\mu s$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}C$

5. Drain current limited by maximum junction temperature

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT	
Junction to Ambient	TO-220/TO-220F1	θ _{JA}	62.5	°C/W	
hursting to Open	TO-220	0	1.71	°0444	
Junction to Case	TO-220F1	θις	3.31	°C/W	



6N40K-TA

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Power MOSFET

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

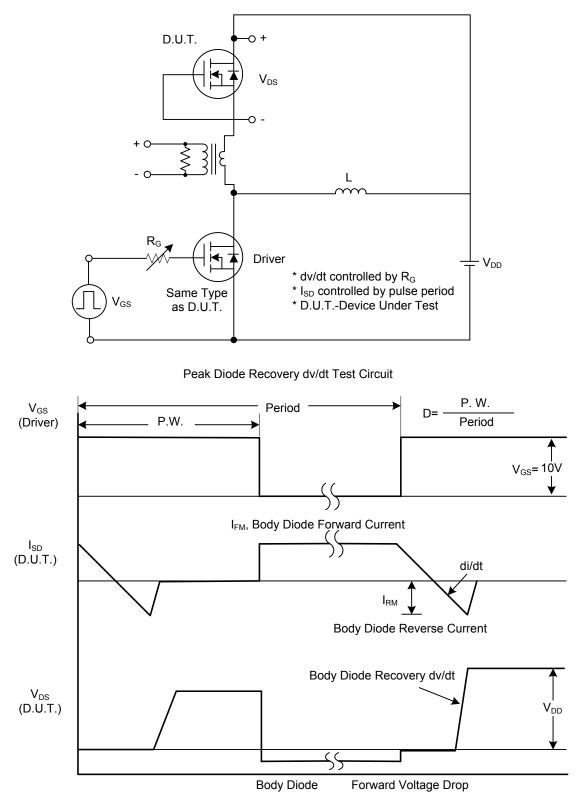
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250µA	400		V	
Breakdown Voltage Temperature (۲ Voltage Temperature Coefficient ک		I _D =250µA, Referenced to 25°C		0.54		V/°C
Drain-Source Leakage Current		I _{DSS}	V _{DS} =400V, V _{GS} =0V V _{DS} =320V, T _J =125°C			1 10	μA μA
Gate-Source Leakage Current	-Source Leakage Current		V _{DS} =0V ,V _{GS} =+30V			+100	nA
	Reverse	I _{GSS}	V _{DS} =0V ,V _{GS} =-30V			-100	nA
ON CHARACTERISTICS				1			
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250µA	2.0		4.0	V
Drain-Source On-State Resistance	ain-Source On-State Resistance		V _{GS} =10V, I _D =3A			0.6	Ω
DYNAMIC PARAMETERS				-			
nput Capacitance		CISS			490		pF
Output Capacitance		Coss	V _{DS} =25V,V _{GS} =0V,f=1.0MHz		95		pF
Reverse Transfer Capacitance		C _{RSS}			8.4		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_{G}			65		nC
Gate-Source Charge		Q _{GS}	$V_{DS}=50V, V_{GS}=10V, I_D=1.3A$ (Note 1,2)		6.2		nC
Gate-Drain Charge		Q _{GD}		V, V _{GS} =10V, I _D =1.3A 2) 65 6.2 8.8			nC
Turn-ON Delay Time		t _{D(ON)}			60		ns
Turn-ON Delay Time Turn-ON Rise Time		t _R	V _{DD} =30V, I _D =0.5A, R _G =25Ω		65		ns
Turn-OFF Delay Time		t _{D(OFF)}	V _{GS} =10V (Note 1,2)		105		ns
Turn-OFF Fall Time		t⊨			44		ns
SOURCE- DRAIN DIODE RATING	S AND C	HARACTERI	STICS				
Maximum Body-Diode Continuous	Current	ls				6	Α
Maximum Body-Diode Pulsed Current		I _{SM}				24	Α
Drain-Source Diode Forward Voltage		V _{SD}	I _S =6A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Tin	ne	t _{rr}	V _{GS} =0V, I _S =6A, V _R =50V		300		ns
Body Diode Reverse Recovery Ch	Q _{RR}	dI _F /dt=100A/µs (Note 1)		1.75		μC	
Notos: 1 Pulso Tost : Pulso width	4 000		00/				

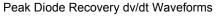
Notes: 1. Pulse Test : Pulse width \leq 300µs, Duty cycle \leq 2%

2. Essentially independent of operating temperature



TEST CIRCUITS AND WAVEFORMS

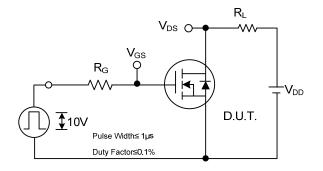


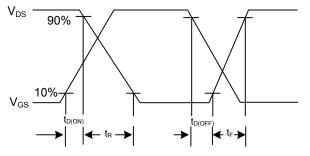




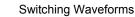
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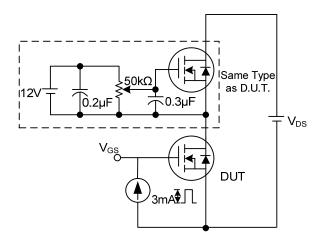
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



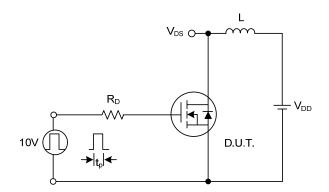


Switching Test Circuit



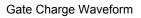


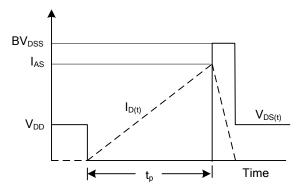
Gate Charge Test Circuit



Unclamped Inductive Switching Test Circuit

 V_{GS} 10V Q_{G} Q_{GD} Q_{GD} Charge





Unclamped Inductive Switching Waveforms



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