

UTC UNISONIC TECHNOLOGIES CO., LTD

6N50

Preliminary

6A, 500V N-CHANNEL **POWER MOSFET**

DESCRIPTION

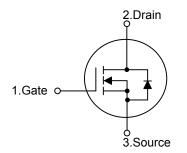
The UTC 6N50 is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology allows a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC 6N50 is generally applied in high efficiency switch mode power supplies, active power factor correction and electronic lamp ballasts based on half bridge topology.

FEATURES

- * V_{DS} = 500V
- * I_D = 6A
- * $R_{DS(ON)}$ =1.15 Ω @ V_{GS}=10V
- * High Switching Speed
- * 100% Avalanche Tested

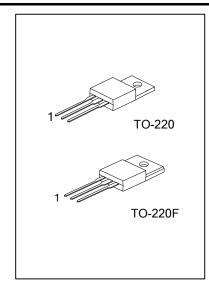
SYMBOL



ORDERING INFORMATION

	Ordering Number		Deekage	Pin Assignment			Decking
	Lead Free	Halogen Free	Package	1	2	3	Packing
	6N50L-TA3-T	6N50G-TA3-T	TO-220	G	D	S	Tube
	6N50L-TF3-T	6N50G-TF3-T	TO-220F	G	D	S	Tube
Note:	Note: Pin Assignment: G: Gate D: Drain S: Source						

6N50L-TA3-T	(1) T: Tube
(2)Package Type	(2) TA3: TO-220 ,TF3: TO-220F
(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}	500	V
Gate-Source Voltage		V _{GSS} ±30			V
Ducia Ourrent	Continuous (T _C =25°C)		I _D	6 (Note 2)	А
Drain Current Pulsed (Note 3)			I _{DM}	24 (Note 2)	А
Avalanche Current (No	ote 3)		I _{AR}	6	Α
Avelopebo Eporav	Single Pulsed (Note 4)		E _{AS}	270	mJ
Avalanche Energy	Repetitive (Note 5)	Repetitive (Note 5)		20	xe 2) A A A 0 mJ 0 mJ V/ns W
Peak Diode Recovery dv/dt (Note 5)			dv/dt	4.5	V/ns
TO-2		0-220		89	10/
Power Dissipation (T _C	(=25 C) T(O-220F	P	31	vv
Po TO-220		PD	0.71		
Derate above 25°C	ТС	O-220F		±30 V 6 (Note 2) A 24 (Note 2) A 6 A 270 mJ 20 mJ 4.5 V/ns 89 W 0.71 W/°C +150 °C	VV/ C
Junction Temperature			TJ	+150	С°
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. Drain current limited by maximum junction temperature

- 3. Repetitive Rating: Pulse width limited by maximum junction temperature
- 4. L =13mH, I_{AS} = 6A, V_{DD} = 50V, R_G = 25 Ω , Starting T_J = 25°C
- 5. $I_{SD} \le 6A$, di/dt $\le 200A/\mu s$, $V_{DD} \le BV_{DSS}$, Starting $T_J = 25^{\circ}C$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT		
lunction to Ambient	TO-220	0	62.5	°C/W	
Junction to Ambient	TO-220F	θ _{JA}	62.5		
lunation to Coop	TO-220	θ_{JC}	1.4	°C/W	
Junction to Case	TO-220F		4.0	C/W	



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

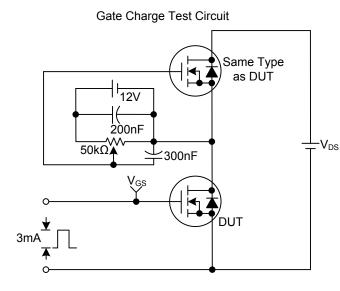
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V				V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =500V, V _{GS} =0V			10	μA
Cate Source Lookage Current Forward		V _{GS} =+30V, V _{DS} =0V			+100	nA
Gate- Source 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 =250µA	2.0		4.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =3A		0.95	1.15	Ω
DYNAMIC PARAMETERS						
Input Capacitance	CISS			720	960	рF
Output Capacitance	C _{OSS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		85	115	pF
Reverse Transfer Capacitance	C _{RSS}			6.3	10	рF
SWITCHING PARAMETERS						
Total Gate Charge	Q_{G}	V _{GS} =10V, V _{DS} =400V, I _D =6A		15	20	nC
Gate to Source Charge	Q_{GS}			4.5		nC
Gate to Drain Charge	Q_{GD}			6		nC
Turn-ON Delay Time	t _{D(ON)}			17	45	ns
Rise Time	t _R	V _{DD} =250V, I _D =6A, R _G =25Ω (Note 1, 2)		30	70	ns
Turn-OFF Delay Time	t _{D(OFF)}			35	80	ns
Fall-Time	t _F			20	50	ns
SOURCE- DRAIN DIODE RATINGS AND	CHARACTER	ISTICS				
Maximum Body-Diode Continuous Current	ls				6	Α
Maximum Body-Diode Pulsed Current	I _{SM}				24	А
Drain-Source Diode Forward Voltage	V _{SD}	I _S =6A, V _{GS} =0V			1.5	V
Body Diode Reverse Recovery Time	t _{RR}	I _S =6A, V _{GS} =0V, dI _F /dt=100A/µs		85		ns
Body Diode Reverse Recovery Charge	Q _{RR}	(Note 1)		0.15		μC
Notos: 1 Dulas Test: Dulas width < 200us		00/				-

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

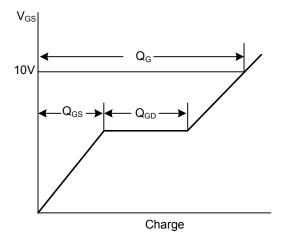
2. Essentially independent of operating temperature



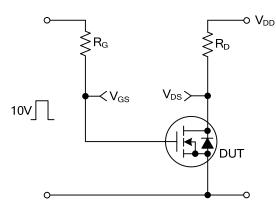
■ TEST CIRCUITS AND WAVEFORMS



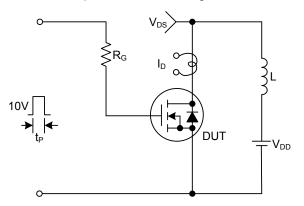
Gate Charge Waveforms



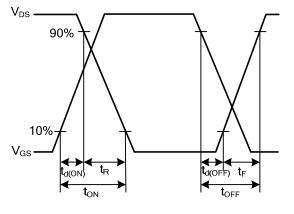
Resistive Switching Test Circuit



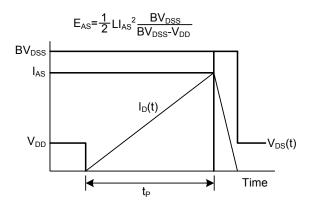
Unclamped Inductive Switching Test Circuit



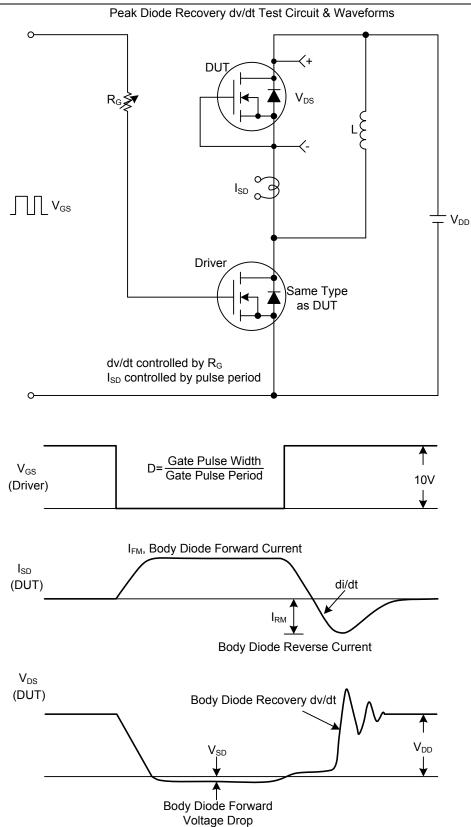
Resistive Switching Waveforms



Unclamped Inductive Switching Waveforms









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