

3N50Z

UNISONIC TECHNOLOGIES CO., LTD

Preliminary

Power MOSFET

3.0A, 500V N-CHANNEL POWER MOSFET

DESCRIPTION

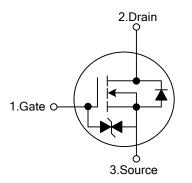
The UTC **3N50Z** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology allows a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **3N50Z** is generally applied in high efficiency switch mode power supplies, active power factor correction and electronic lamp ballasts based on half bridge topology.

FEATURES

- * $R_{DS(ON)}$ < 3.2 Ω @ V_{GS} =10V, I_D =1.5A
- * High Switching Speed
- * 100% Avalanche Tested

SYMBOL

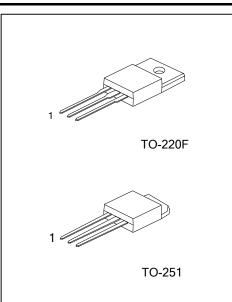


ORDERING INFORMATION

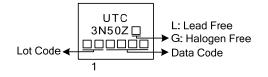
Ordering Number		Pin Assignment			Deaking	
Halogen Free	гаскауе	1	2	3	Packing	
3N50ZG-TF3-T	TO-220F	G	D	S	Tube	
3N50ZG-TM3-T	TO-251	G	D	S	Tube	
	Halogen Free 3N50ZG-TF3-T	Halogen Free Package 3N50ZG-TF3-T TO-220F	Halogen Free Package 3N50ZG-TF3-T TO-220F	Halogen FreePackage123N50ZG-TF3-TTO-220FGD	Halogen FreePackage1233N50ZG-TF3-TTO-220FGDS	

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

3N50ZL- <u>TF3-</u> T (1))Packing Type	(1) T: Tube
(2))Package Type	(2) TF3: TO-220F, TM3: TO-251
(3))Green Package	(3) L: Lead Free, G: Halogen Free and Lead Free



MARKING





■ ABSOLUTE MAXIMUM RATINGS (Tc=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	500	V
Gate-Source Voltage	ate-Source Voltage		±30	V
Desire Oursent	Continuous (T _C =25°C)	Ι _D	3 (Note 5)	А
Drain Current	Pulsed (Note 2)	I _{DM}	12 (Note 5)	А
Avalanche Current (Note 2)		I _{AR} 3		А
	Single Pulsed (Note 3)	E _{AS}	200	mJ
Avalanche Energy	Repetitive (Note 4)	E _{AR}	6.2	mJ
Peak Diode Recovery dv/dt (I	Note 4)	dv/dt	4.5	
Power Dissipation (T _C =25°C) $\frac{\text{TO-220F}}{\text{TO-251}}$ P _D	TO-220F	Р	25	W
	PD	50	W	
Junction Temperature		TJ	T _J +150	
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 = 40mH, I_{AS} = 3A, V_DD = 50V, R_G = 25 Ω , Starting T_J = 25 $^\circ\text{C}$

4. I_{SD} \leq 3A, di/dt \leq 200A/\mu s, V_{DD} \leq BV_{DSS}, Starting T_J = 25°C

5. Drain current limited by maximum junction temperature.

THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220F	θ _{JA}	62.5	°C/W
	TO-251		110	°C/W
Junction to Case	TO-220F	θ _{JC}	4.9	°C/W
	TO-251		2.5	°C/W



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

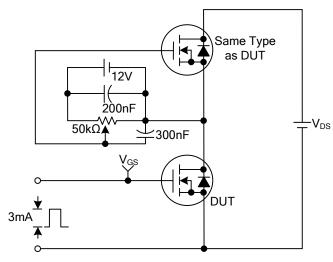
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PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	500			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =500V, V _{GS} =0V			1	μA
Gate- Source Leakage Current	- 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 =1.5A		2.2	3.2	Ω
DYNAMIC PARAMETERS					-	
Input Capacitance	C _{ISS}			280	365	pF
Output Capacitance	Coss	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		50	65	pF
Reverse Transfer Capacitance				8.5	11	pF
SWITCHING PARAMETERS					-	
Total Gate Charge	Q_{G}			10	13	nC
Gate to Source Charge	Q_{GS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		1.5		nC
Gate to Drain Charge	Q_{GD}	(Note 1, 2)		5.5		nC
Turn-ON Delay Time	t _{D(ON)}			10	30	ns
Rise Time	t _R	V_{DD} =250V, I_D =3A, R_G =25 Ω		25	60	ns
Turn-OFF Delay Time	t _{D(OFF)}	(Note 1, 2)		35	80	ns
Fall-Time	t _F			25	60	ns
SOURCE- DRAIN DIODE RATINGS AND (HARACTERI	STICS		_		
Maximum Body-Diode Continuous Current	ls				3	Α
Maximum Body-Diode Pulsed Current	I _{SM}				12	Α
Drain-Source Diode Forward Voltage	V _{SD}	I _S =3A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time	t _{rr}	I _S =3A, V _{GS} =0V,		170		ns
Body Diode Reverse Recovery Charge	Qrr	dI _F /dt=100A/µs (Note 1)		0.7		μC
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Notes: 1. Pulse Test: Pulse width \leq 300µs, Duty cycle \leq 2%.

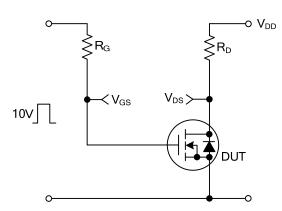
2. Essentially independent of operating temperature.



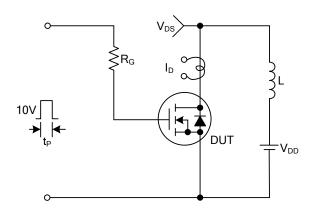
TEST CIRCUITS AND WAVEFORMS



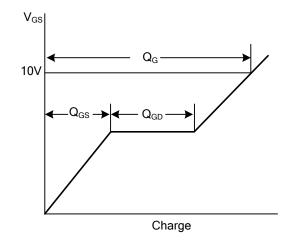
Gate Charge Test Circuit



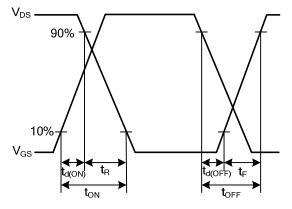
Resistive Switching Test Circuit



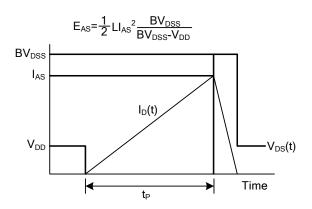
Unclamped Inductive Switching Test Circuit



Gate Charge Waveforms



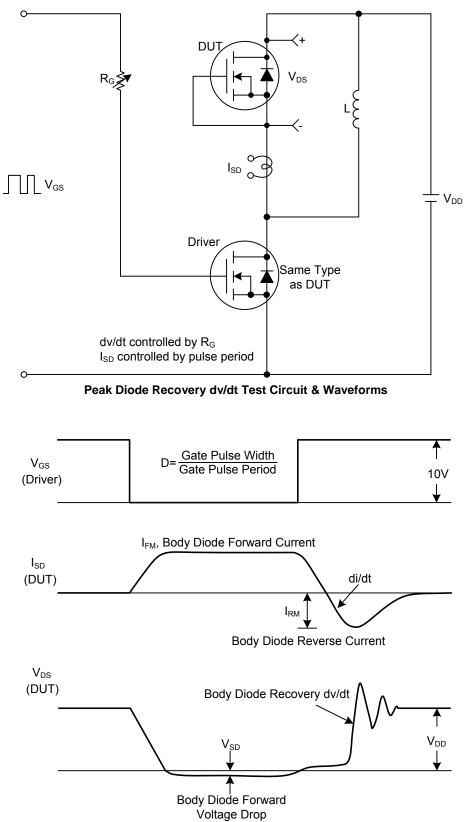
Resistive Switching Waveforms



Unclamped Inductive Switching Waveforms



TEST CIRCUITS AND WAVEFORMS(Cont.)



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