

UNISONIC TECHNOLOGIES CO., LTD

UT120N08 Preliminary Power MOSFET

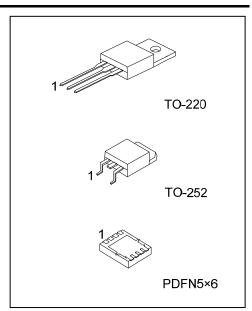
120A, 80V N-CHANNEL POWER MOSFET

■ DESCRIPTION

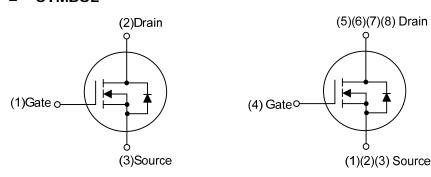
The **UTC UT120N08** is a high voltage and high current power MOSFET, designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in power supplies, PWM motor controls, high efficient AC to DC converters and bridge circuits.

■ FEATURES

- * $R_{DS(ON)} \le 9.0 \text{ m}\Omega$ @ $V_{GS}=10V$, $I_{D}=20A$ $R_{DS(ON)} \le 11 \text{ m}\Omega$ @ $V_{GS}=4.5V$, $I_{D}=20A$
- * Fast switching
- * 100% avalanche tested
- * Improved dv/dt capability



■ SYMBOL



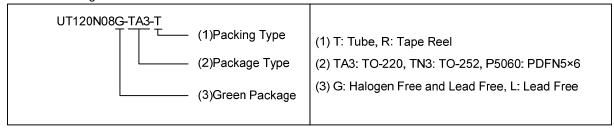
TO-220/TO-252

PDFN5×6

■ ORDERING INFORMATION

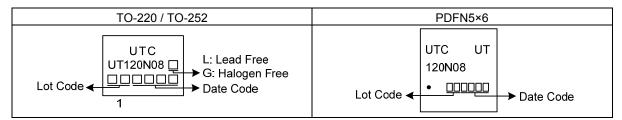
Ordering Number		Dookogo	Pin Assignment							Dooking	
Lead Free	Halogen Free	Package	1	2	3	4	5	6	7	8	Packing
UT120N08L-TA3-T	UT120N08G-TA3-T	TO-220	G	D	S	-	ı	-	ı	ı	Tube
UT120N08L-TN3-R	UT120N08G-TN3-R	TO-252	G	D	S	-	ı	-	ı	ı	Tape Reel
UT120N08L-P5060-R	UT120N08G-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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



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■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT	
Drain-Source Voltage		V_{DSS}	80	V	
Gate-Source Voltage		V_{GSS}	±20	V	
Drain Current	Continuous	I_{D}	120	Α	
	Pulsed	I_{DM}	240	Α	
Avalanche Energy Single Pulsed (Note 3)		E _{AS}	107	mJ	
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.6	V/ns	
Power Dissipation	TO-220		156	W	
	TO-252	P_{D}	64	W	
	PDFN5×6		56	W	
Junction Temperature		TJ	+150	°C	
Storage Temperature Range		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=0.1mH, I_{AS} =46.4A, V_{DD} =50V, R_{G} =25 Ω , Starting T_{J} = 25 $^{\circ}$ C
- 4. $I_{SD} \le 30A$, di/dt $\le 200A/\mu s$, $V_{DD} \le BV_{DSS}$, Starting $T_J = 25^{\circ}C$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT		
Junction to Ambient	TO-220		62.5			
	TO-252	θ _{JA}	110	°C/W		
	PDFN5×6		65 (Note)			
Junction to Case	TO-220		0.8			
	TO-252	θ_{JC}	1.95 (Note)	°C/W		
	PDFN5×6		2.23 (Note)			

Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

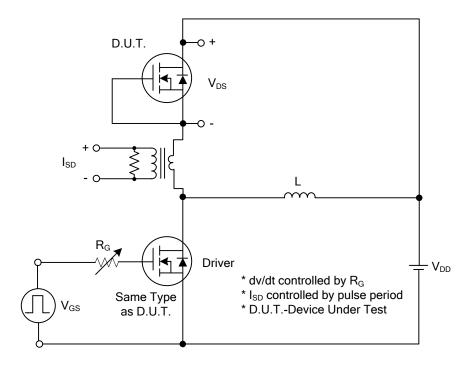
■ **ELECTRICAL CHARACTERISTICS** (T_C =25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT		
OFF CHARACTERISTICS									
Drain-Source Breakdown Voltage		BV_{DSS}	$I_D=250\mu A, V_{GS}=0V$	80			V		
Drain-Source Leakage Current		I_{DSS}	V_{DS} =80V, V_{GS} =0V			10	μΑ		
Gate-Source Leakage Current	Forward	- I _{GSS}	V _{GS} =+20V, V _{DS} =0V			+100	nA		
	Reverse		V _{GS} =-20V, V _{DS} =0V			-100	nA		
ON CHARACTERISTICS									
Gate Threshold Voltage		$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu A$	1.0		3.0	V		
Static Drain-Source On-State Resistance		R _{DS(ON)}	V_{GS} =10V, I_D =20A			9.0	mΩ		
			V_{GS} =4.5V, I_D =20A			11	mΩ		
DYNAMIC PARAMETERS									
Input Capacitance		C_{ISS}			3720		pF		
Output Capacitance		Coss	V_{GS} =0V, V_{DS} =25V, f=1.0MHz		320		pF		
Reverse Transfer Capacitance		C_{RSS}			280		pF		
SWITCHING PARAMETERS									
Total Gate Charge (Note 1)		Q_G	V _{DS} =64V, V _{GS} =4.5V, I _D =120A,		60		nC		
Gate to Source Charge		Q_{GS}	I _G =1mA (Note 1, 2)		13		nC		
Gate to Drain Charge		Q_GD	IG-IIIA (Note 1, 2)		32		nC		
Turn-ON Delay Time (Note 1)		t _{D(ON)}			14		ns		
Rise Time		t_R	V_{DD} =40V, V_{GS} =10V, I_{D} =120A,		20		ns		
Turn-OFF Delay Time		$t_{D(OFF)}$	$R_G = 3.3\Omega$ (Note 1, 2)		74		ns		
Fall-Time		t_{F}			32		ns		
SOURCE- DRAIN DIODE RATING	S AND CHA	RACTERISTI	cs						
Maximum Continuous Drain-Source Diode		Is				120	Α		
Forward Current						120	А		
Maximum Pulsed Drain-Source Diode Forward		I _{SM}				240	Α		
Current		ISM				240	^		
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I _S =120A, V _{GS} =0V			1.4	V		
Reverse Recovery Time (Note 1)		t _{rr}	I _S =30A,V _{GS} =0V, dI/dt=100A/µs		50		ns		
Reverse Recovery Charge		Q_{rr}	15-30A, VGS-0V, αι/αι-100A/μS		100		nC		

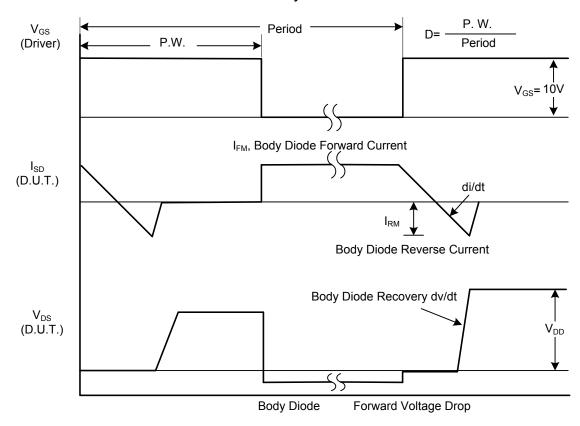
Notes: 1. Pulse Test: Pulse width ≤ 300µs, Duty cycle≤2%.

^{2.} Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

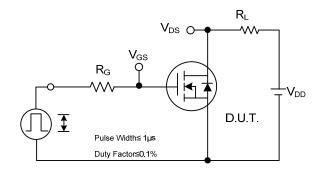


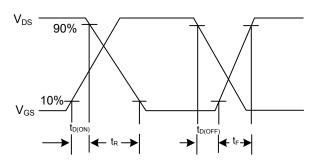
Peak Diode Recovery dv/dt Test Circuit



Peak Diode Recovery dv/dt Waveforms

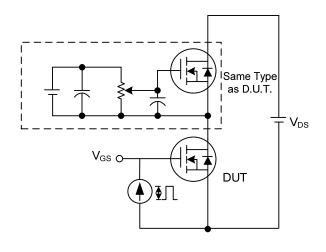
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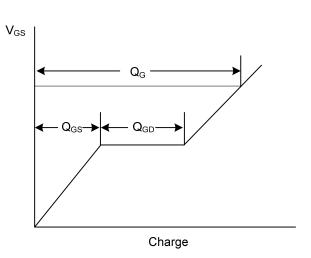




Switching Test Circuit

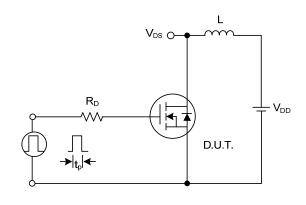
Switching Waveforms

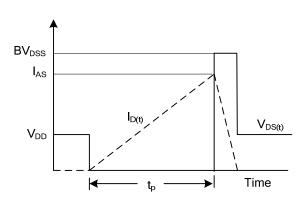




Gate Charge Test Circuit

Gate Charge Waveform





Unclamped Inductive Switching Test Circuit

Unclamped Inductive Switching Waveforms

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