

UNISONIC TECHNOLOGIES CO., LTD

UT120N03 Preliminary Power MOSFET

120A, 30V N-CHANNEL POWER MOSFET

■ DESCRIPTION

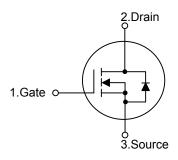
The UTC **UT120N03** is a N-channel power MOSFET using UTC's advanced trench technology to provide customers with a minimum on-state resistance and superior switching performance.

The UTC **UT120N03** is generally applied in DC to DC convertors or synchronous rectifications.

■ FEATURES

- * I_D = 120A
- * V_{DS}=30V
- * $R_{DS(ON)}$ =3.8 $m\Omega$ @ V_{GS} =10V
- * Low Gate Charge (Typical 54nC)
- * Fast Switching
- * 100% Avalanche Tested
- * High Power and Current Handling Capability

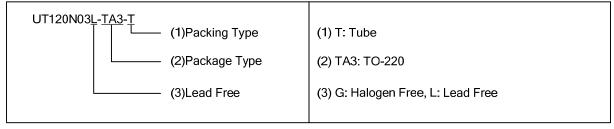
■ SYMBOL

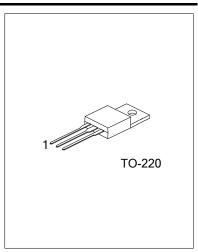


ORDERING INFORMATION

Ordering Number		Dookogo	Pin Assignment			Dooking	
Lead Free	Halogen Free	Package	1	2	3	Packing	
UT120N03L-TA3-T	UT120N03G-TA3-T	TO-220	G	D	S	Tube	

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





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

PARAMETER		SYMBOL	RATINGS	UNIT	
Drain-Source Voltage		V_{DSS}	30	V	
Gate-Source Voltage		V_{GSS}	±20	V	
Drain Current	Continuous	I _D	120	Α	
	Pulsed (Note 2)	I _{DM}	480	Α	
Single Pulsed Avalanche Energy (Note 3)		E _{AS}	240	mJ	
Peak Diode Recovery dv/dt (Note 4)		dv/dt	6.0	V/ns	
Power Dissipation (T _C =25°C)		P_D	125	W	
Junction Temperature		T_J	+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
- 3. L = 0.61mH, I_{AS} = 28A, V_{DD} = 27V, R_G = 25 Ω , Starting T_J = 25 $^{\circ}$ C
- 4. $I_{SD} \le 80A$, di/dt $\le 200A/\mu s$, $V_{DD} \le BV_{DSS}$, Starting $T_J = 25^{\circ}C$
- 5. Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 100A.

■ THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	°C/W
Junction to Case	θ.ic	1	°C/W

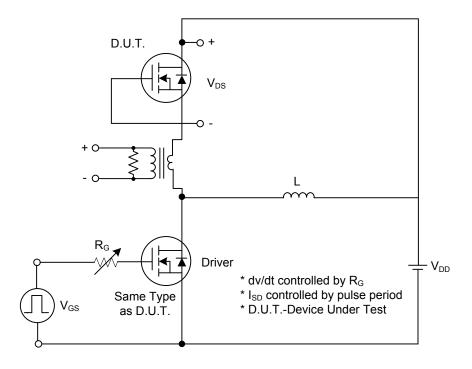
■ ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS		•		•			
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V, T _C =25°C	30			V
Breakdown Voltage Temperature Coefficient		△BV _{DSS} /△T _J	Reference to 25°C, I _D =250µA				mV/°C
Drain-Source Leakage Current		I _{DSS}	V _{DS} =30V, V _{GS} =0V			1	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =+20V, V _{DS} =0V		0.02	100	nA
ON CHARACTERISTICS	Reverse		V _{GS} =-20V, V _{DS} =0V		-0.02	-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 =35A			3.8	mΩ
		25(5.1)	V _{GS} =4.5V, I _D =35A			6.4	mΩ
DYNAMIC PARAMETERS		T					
Input Capacitance		C _{ISS}			2990		pF
Output Capacitance		Coss	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		585		pF
Reverse Transfer Capacitance		C _{RSS}			340		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_{G}	\\ _5\\ \\ _45\\ _35A		54	72	nC
Gate to Source Charge		Q_{GS}	V_{GS} =5V, V_{DS} =15V, I_{D} =35A		8.0		nC
Gate to Drain Charge		Q_{GD}	(Note 1, 2)		10		nC
Turn-ON Delay Time		t _{D(ON)}			9		ns
Rise Time		t _R	V_{DD} =15V, I_{D} =35A, R_{G} =4.7 Ω ,		96		ns
Turn-OFF Delay Time		t _{D(OFF)}	V _{GS} =5V (Note 1, 2)		47		ns
Fall-Time		t _F	1		37		ns
Gate Resistance		R_g			2.0		Ω
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage		V_{SD}	I _S =120A, V _{GS} =0V			1.25	V
Maximum Body-Diode Continuous Current		Is				120	Α
Maximum Body-Diode Pulsed Current		I _{SM}				480	Α

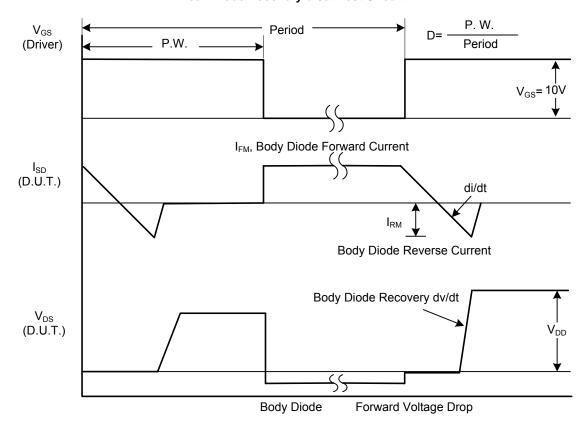
Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

^{2.} Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

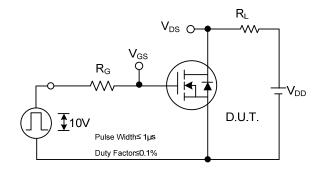


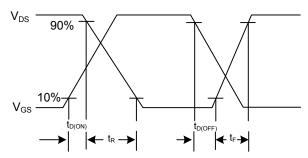
Peak Diode Recovery dv/dt Test Circuit



Peak Diode Recovery dv/dt Waveforms

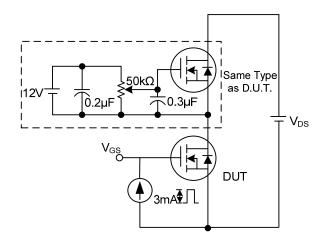
■ TEST CIRCUITS AND WAVEFORMS (Cont.)

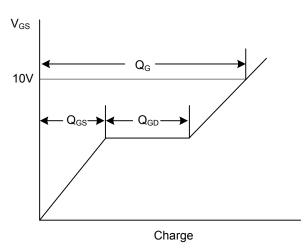




Switching Test Circuit

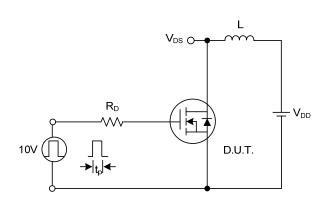
Switching Waveforms

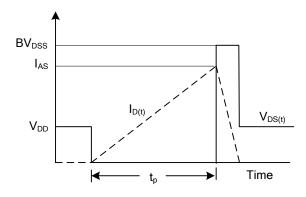




Gate Charge Test Circuit

Gate Charge Waveform





Unclamped Inductive Switching Test Circuit

Unclamped Inductive Switching Waveforms



Power MOSFET