



UTT18N20

Preliminary

POWER MOSFET

18A, 200V N-CHANNEL ENHANCEMENT MODE TRENCH POWER MOSFET

DESCRIPTION

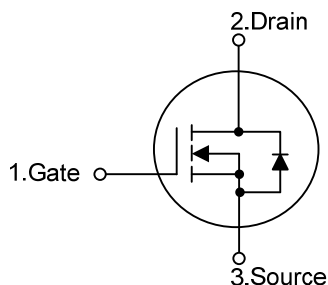
The UTC **UTT18N20** is a N-channel enhancement mode power MOSFET using UTC's advanced technology to provide customers with ideal for low voltage inverter applications.

The UTC **UTT18N20** is suitable for high efficiency synchronous rectification in SMPS, UPS, hard switched and high frequency circuits.

FEATURES

- * $R_{DS(ON)} \leq 125 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=10\text{A}$
- * High Cell Density Trench Technology
- * High Power and Current Handling Capability

SYMBOL

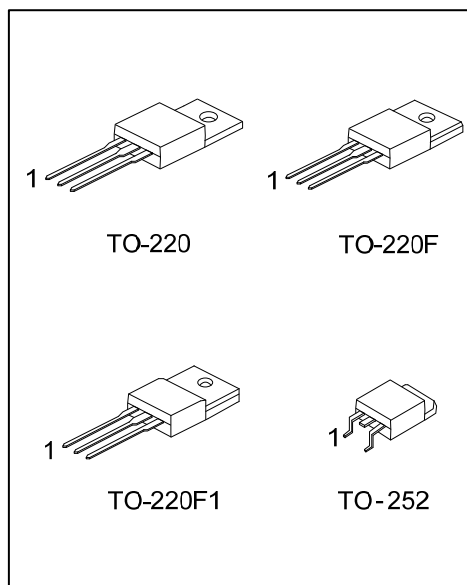


ORDERING INFORMATION

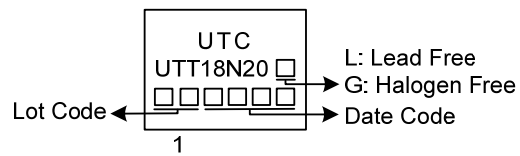
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT18N20L-TA3-T	UTT18N20G-TA3-T	TO-220	G	D	S	Tube
UTT18N20L-TF1-T	UTT18N20G-TF1-T	TO-220F1	G	D	S	Tube
UTT18N20L-TF3-T	UTT18N20G-TF3-T	TO-220F	G	D	S	Tube
UTT18N20L-TN3-R	UTT18N20G-TN3-R	TO-252	G	D	S	Tape Reel

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

UTT18N20G-TA3-T	(1)Packing Type	(1) T: Tube, R: Tape Reel
	(2)Package Type	(2) TA3: TO-220, TF1: TO-220F1, TF3: TO-220F, TN3: TO-252
	(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free



■ MARKING



■ **ABSOLUTE MAXIMUM RATINGS** ($T_C=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	200	V
Gate-Source Voltage		V_{GSS}	± 20	V
Continuous Drain Current	Continuous	I_D	18	A
Pulsed Drain Current	Pulsed (Note 2)	I_{DM}	72	A
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3	V/nS
Power Dissipation	TO-220	P_D	100	W
	TO-220F/TO-220F1		35	W
	TO-252		46	W
Junction Temperature		T_J	+150	$^{\circ}\text{C}$
Storage Temperature Range		T_{STG}	-55 ~ +150	$^{\circ}\text{C}$

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. $I_{SD} \leq 18\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DSS}$, $T_J = 25^{\circ}\text{C}$.

■ **THERMAL CHARACTERISTICS**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
	TO-220F1			
	TO-252		110	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-220	θ_{JC}	1.25	$^{\circ}\text{C}/\text{W}$
	TO-220F/TO-220F1		3.57	$^{\circ}\text{C}/\text{W}$
	TO-252		2.71	$^{\circ}\text{C}/\text{W}$

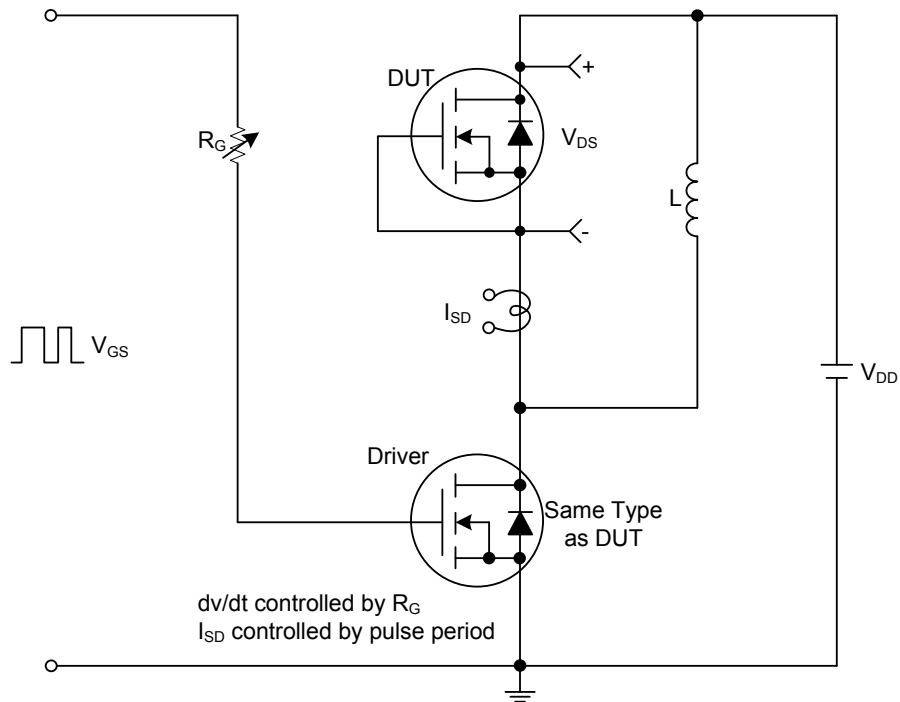
■ **ELECTRICAL CHARACTERISTICS** ($T_J = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250uA, V _{GS} =0V	200			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =200V, V _{GS} =0V			10	μA
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 =250μA	1.0		3.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =10A			140	mΩ
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =4.5V, I _D =10A			150	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		2580		pF
Output Capacitance		C _{OSS}			128		pF
Reverse Transfer Capacitance		C _{RSS}			66		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =160V, V _{GS} =10V, I _D =18A, (Note 1, 2)		77		nC
Gate to Source Charge		Q _{GS}			12		nC
Gate to Drain Charge		Q _{GD}			18		nC
Turn-on Delay Time (Note 1)		t _{D(ON)}	V _{DS} =100V, V _{GS} =10V, I _D =18A, R _G =3.3Ω (Note 1, 2)		12		ns
Rise Time		t _R			18		ns
Turn-off Delay Time		t _{D(OFF)}			42		ns
Fall-Time		t _F			22		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				18	A
Maximum Body-Diode Pulsed Current		I _{SM}				72	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =20A, V _{GS} =0V			1.2	V
Reverse recovery time (Note 1)		t _{rr}	I _S =18A, V _{GS} =0V,		120		ns
Reverse recovery charge		Q _{rr}	dl _F /dt = 100A/μs		450		nC

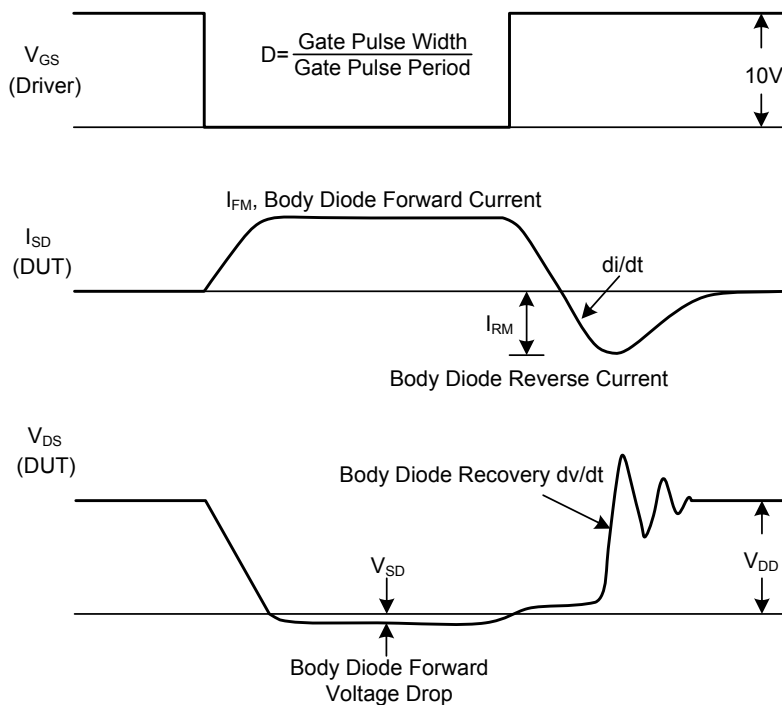
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



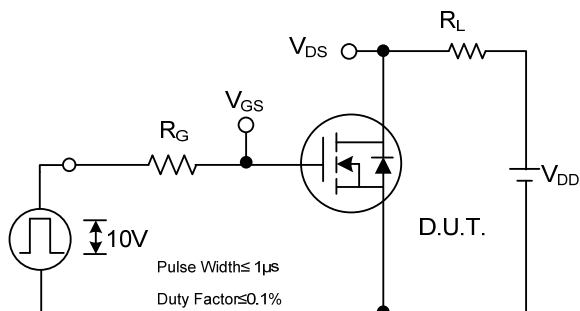
Peak Diode Recovery dv/dt Test Circuit



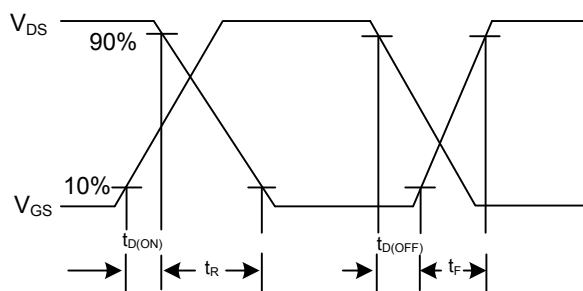
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

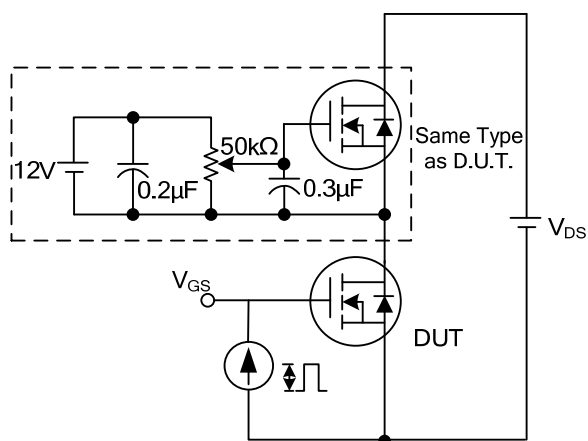
■ TEST CIRCUITS AND WAVEFORMS



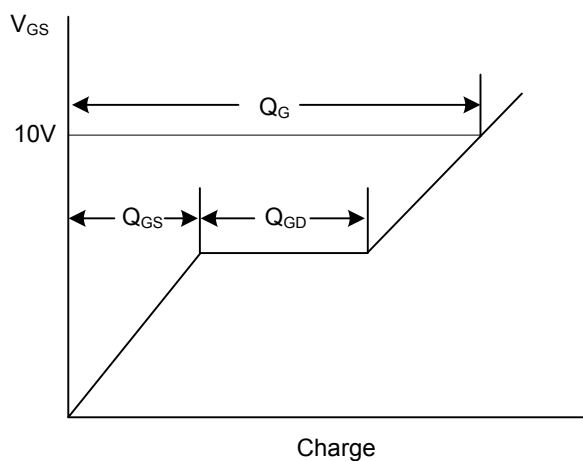
Switching Test Circuit



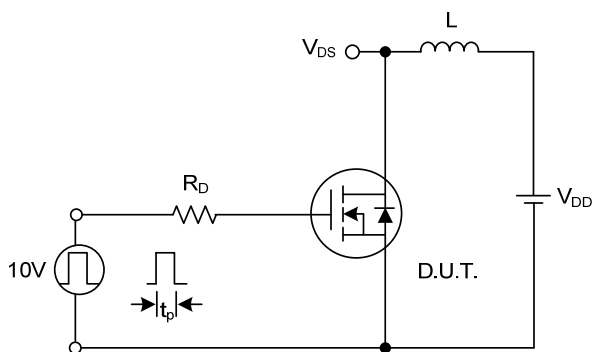
Switching Waveforms



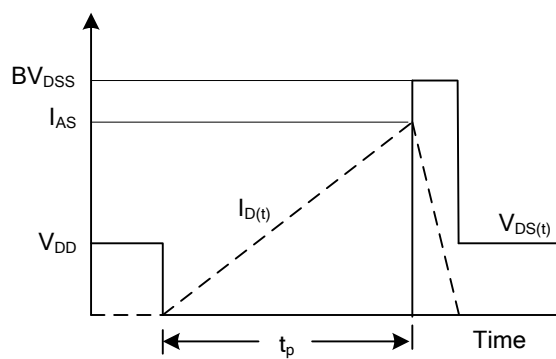
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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