



## UTT50N25

Preliminary

Power MOSFET

### 50A, 250V N-CHANNEL POWER MOSFET

#### DESCRIPTION

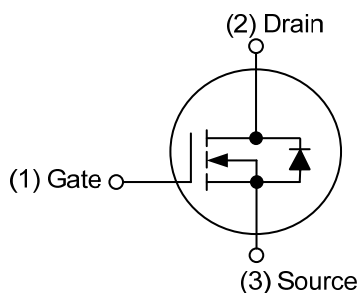
The UTC **UTT50N25** is an N-channel power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance and superior switching performance.

The UTC **UTT50N25** is generally applied in low power switching mode power appliances and electronic ballast.

#### FEATURES

- \*  $R_{DS(ON)} \leq 50 \text{ m}\Omega$  @  $V_{GS}=10\text{V}$ ,  $I_D=25\text{A}$
- \* High Switching Speed
- \* Improved dv/dt capability

#### SYMBOL



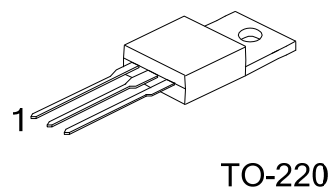
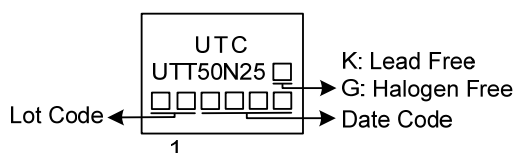
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT50N25L-TA3-T	UTT50N25G-TA3-T	TO-220	G	D	S	Tube

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

UTT50N25G-TA3-T		(1) Packing Type	(1) T: Tube
		(2) Package Type	(2) TA3: TO-220
		(3) Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

#### MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	250	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Continuous Drain Current	Continuous	$I_D$	50	A
Pulsed Drain Current	Pulsed (Note 2)	$I_{DM}$	100	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	19	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	8.1	V/ns
Power Dissipation		$P_D$	130	W
Junction Temperature		$T_J$	+150	$^{\circ}\text{C}$
Operation and Storage Temperature		$T_{STG}$	-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.  $L=0.1\text{mH}$ ,  $I_{AS}=19.7\text{A}$ ,  $V_{DD}=25\text{V}$ ,  $R_G=20\Omega$ , Starting  $T_J=25^{\circ}\text{C}$ .

4.  $I_{SD} \leq 30\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J = 25^{\circ}\text{C}$ .

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient		$\theta_{JA}$	62.5	$^{\circ}\text{C}/\text{W}$
Junction to Case		$\theta_{JC}$	0.96	$^{\circ}\text{C}/\text{W}$

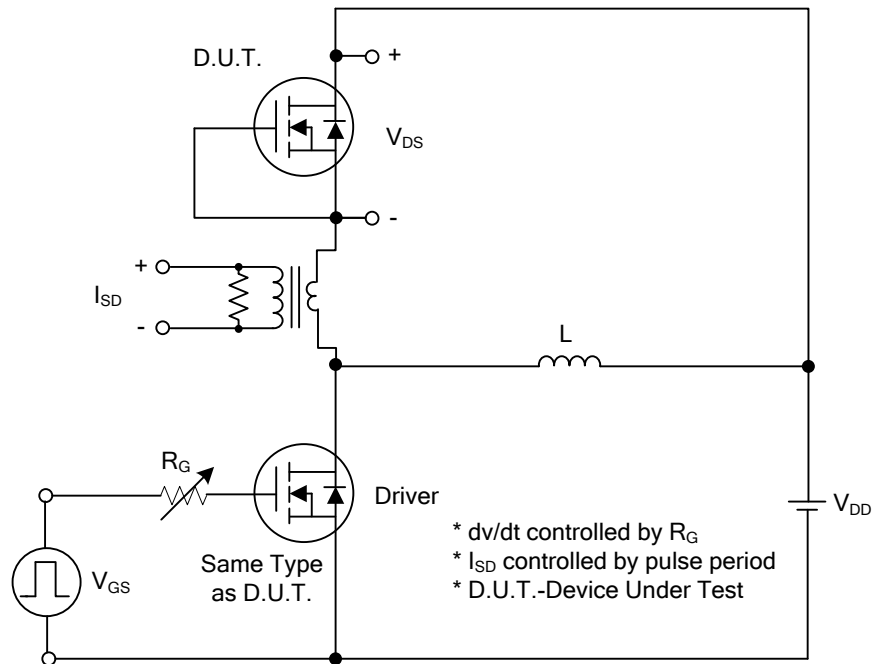
■ ELECTRICAL CHARACTERISTICS ( $T_C=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	250			V
Drain-Source Leakage Current		I <sub>DSS</sub>	V <sub>DS</sub> =250V, V <sub>GS</sub> =0V			1	μA
Gate-Source Leakage Current	Forward	I <sub>GSS</sub>	V <sub>GS</sub> =20V, V <sub>DS</sub> =0V			100	nA
	Reverse		V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =25A			50	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1MHz		8280		pF
Output Capacitance		C <sub>OSS</sub>			386		pF
Reverse Transfer Capacitance		C <sub>RSS</sub>			235		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge		Q <sub>G</sub>	V <sub>DS</sub> =200V, V <sub>GS</sub> =10V, I <sub>D</sub> =50A I <sub>G</sub> =1mA (Note1,2)		170		nC
Gate-Source Charge		Q <sub>GS</sub>			58		nC
Gate-Drain Charge		Q <sub>GD</sub>			40		nC
Turn-On Delay Time		t <sub>D(ON)</sub>	V <sub>DS</sub> =100V, V <sub>GS</sub> =10V, I <sub>D</sub> =50A, R <sub>G</sub> =3.3Ω (Note1,2)		32		ns
Turn-On Rise Time		t <sub>R</sub>			22		ns
Turn-Off Delay Time		t <sub>D(OFF)</sub>			78		ns
Turn-Off Fall Time		t <sub>F</sub>			30		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Maximum Continuous Drain-Source Diode Forward Current		I <sub>S</sub>				50	A
Maximum Pulsed Drain-Source Diode Forward Current		I <sub>SM</sub>				100	A
Drain-Source Diode Forward Voltage		V <sub>SD</sub>	I <sub>S</sub> =50A, V <sub>GS</sub> =0V			1.5	V
Body Diode Reverse Recovery Time		t <sub>rr</sub>	I <sub>S</sub> =30A, V <sub>GS</sub> =0V,		204		ns
Body Diode Reverse Recovery Charge		Q <sub>rr</sub>	dI <sub>S</sub> /dt=100A/μs		1.5		μC

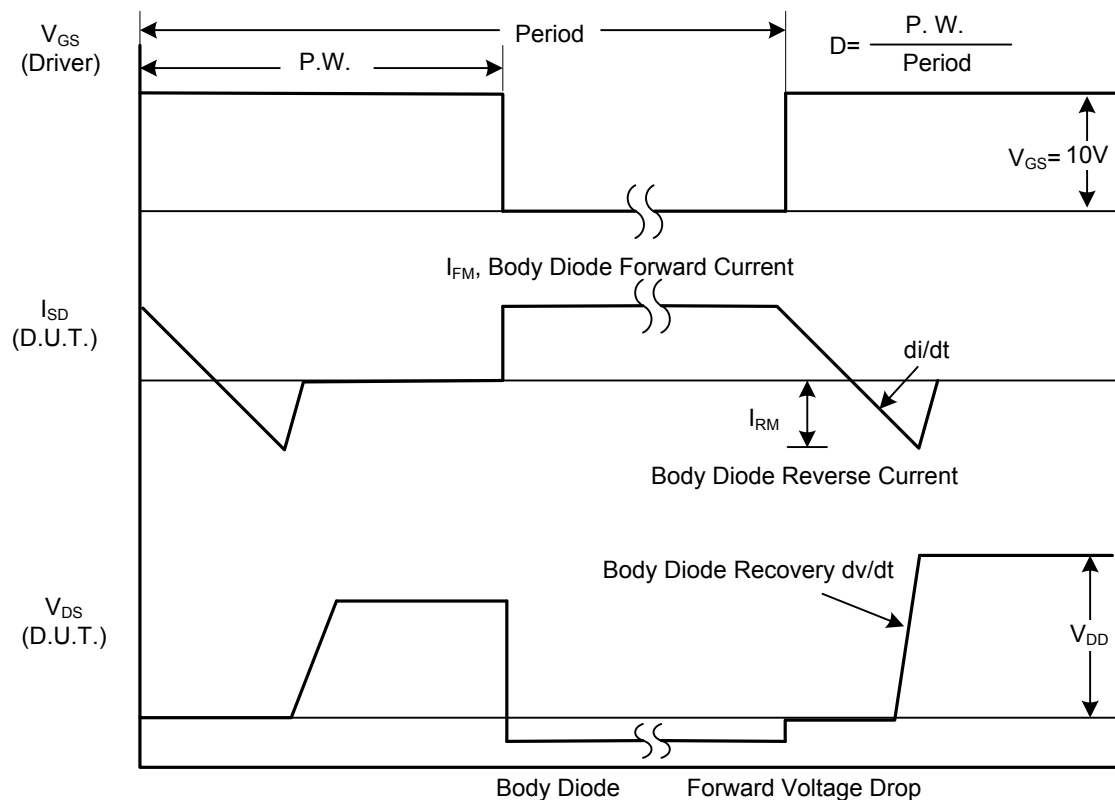
Notes: 1. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

2. Essentially independent of operating temperature.

### ■ TEST CIRCUITS AND WAVEFORMS



**Peak Diode Recovery  $dv/dt$  Test Circuit**



**Peak Diode Recovery  $dv/dt$  Waveforms**

## ■ TEST CIRCUITS AND WAVEFORMS

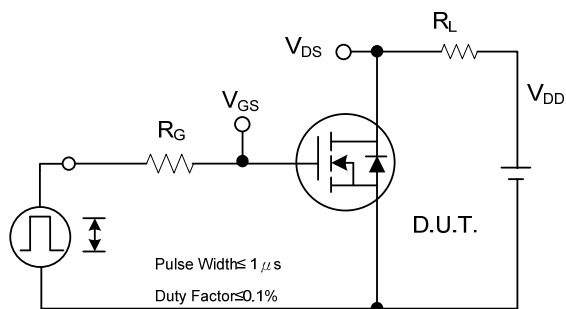


Fig. 2A Switching Test Circuit

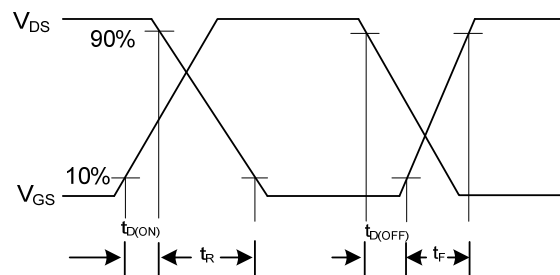


Fig. 2B Switching Waveforms

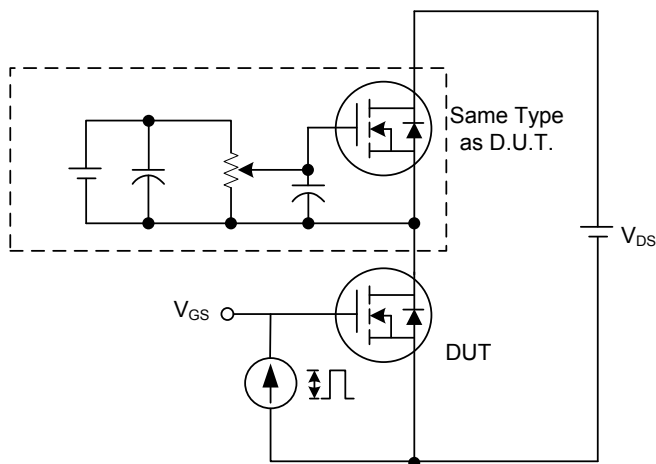


Fig. 3A Gate Charge Test Circuit

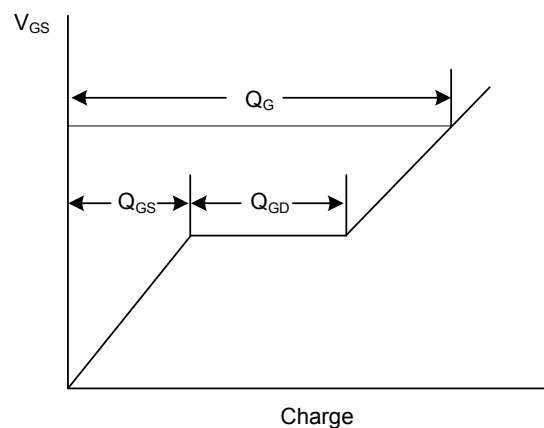


Fig. 3B Gate Charge Waveform

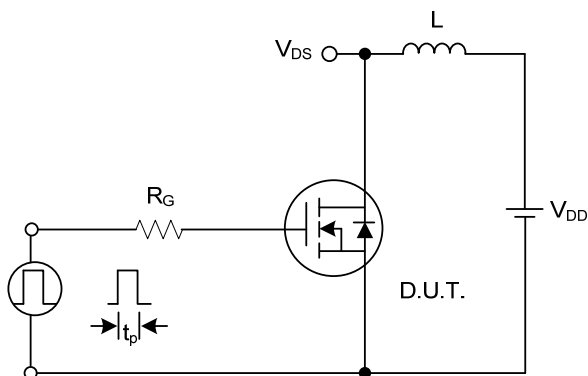


Fig. 4A Unclamped Inductive Switching Test Circuit

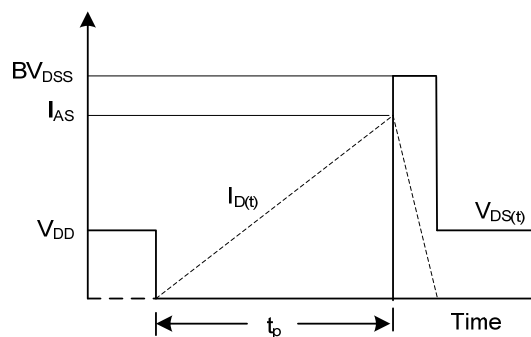


Fig. 4B Unclamped Inductive Switching Waveforms

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