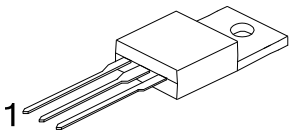
50A, 250V N-CHANNEL POWER MOSFET



TO-220

■ DESCRIPTION

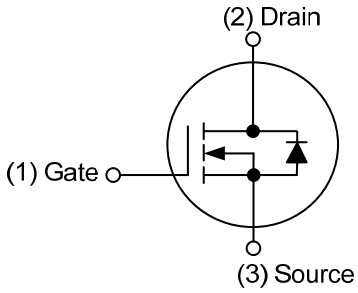
The UTC **UTT50N25** is an N-channel power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance and superior switching performance.

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

■ FEATURES

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

■ SYMBOL



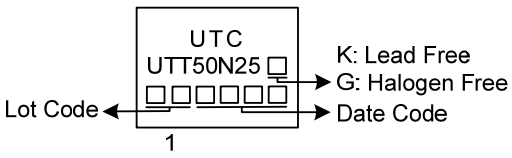
■ ORDERING INFORMATION

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°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	250	V
Gate-Source Voltage		V_{GSS}	±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	°C
Operation and 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=0.1mH, I_{AS}=19.7A, V_{DD}=25V, R_G=20Ω, Starting T_J=25°C.
4. I_{SD} ≤ 30A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C.

■ THERMAL DATA

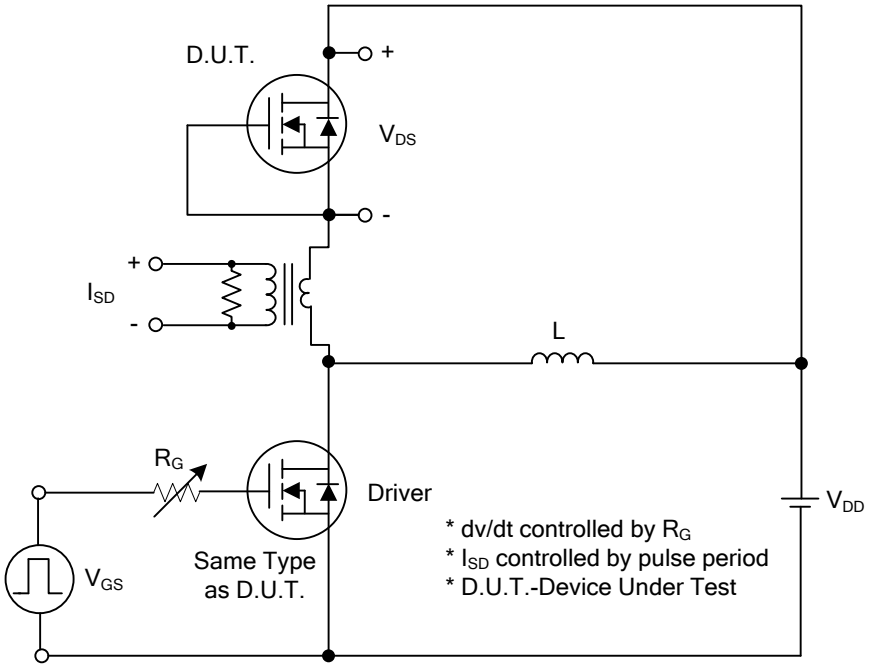
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	°C/W
Junction to Case	θ_{JC}	0.96	°C/W

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

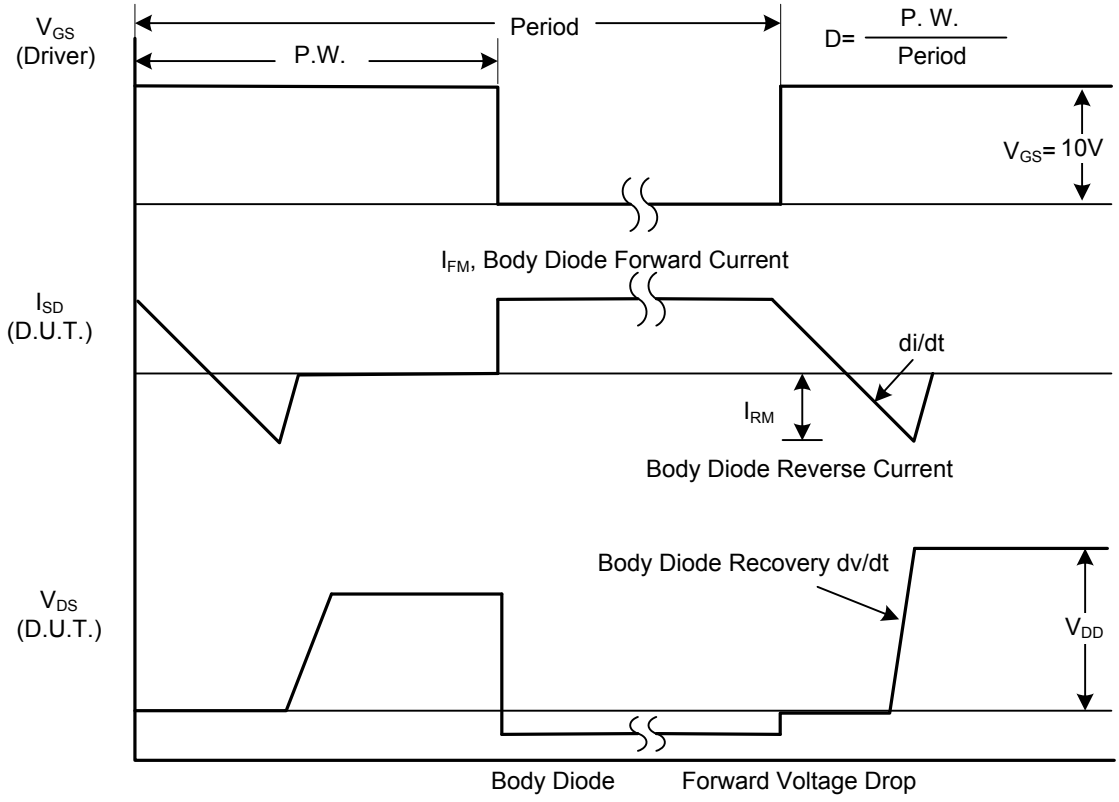
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250μA	250			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=250V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=20V, V_{DS}=0V			100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=25A			50	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1MHz		8280		pF
Output Capacitance		C_{OSS}			386		pF
Reverse Transfer Capacitance		C_{RSS}			235		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge		Q_G	V_{DS}=200V, V_{GS}=10V, I_D=50A I_G=1mA (Note1,2)		170		nC
Gate-Source Charge		Q_{GS}			58		nC
Gate-Drain Charge		Q_{GD}			40		nC
Turn-On Delay Time		$t_{D(ON)}$	V_{DS}=100V, V_{GS}=10V, I_D=50A, R_G=3.3Ω (Note1,2)		32		ns
Turn-On Rise Time		t_R			22		ns
Turn-Off Delay Time		$t_{D(OFF)}$			78		ns
Turn-Off Fall Time		t_F			30		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Maximum Continuous Drain-Source Diode Forward Current		I_S				50	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}				100	A
Drain-Source Diode Forward Voltage		V_{SD}	I_S=50A, V_{GS}=0V			1.5	V
Body Diode Reverse Recovery Time		t_{rr}	I_S=30A, V_{GS}=0V, dI_S/dt=100A/μs		204		ns
Body Diode Reverse Recovery Charge		Q_{rr}			1.5		μC

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

■ TEST CIRCUITS AND WAVEFORMS

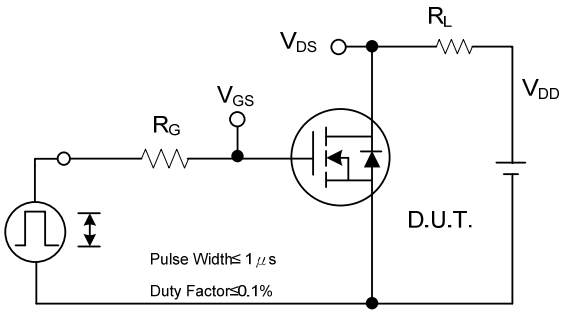


Fig. 2A Switching Test Circuit

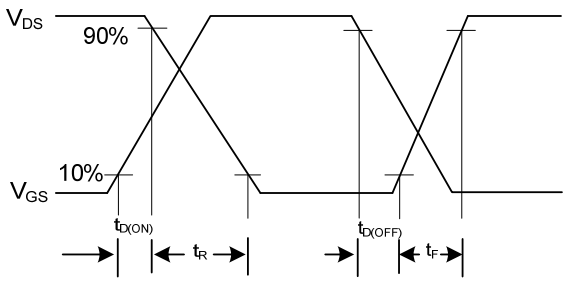


Fig. 2B Switching Waveforms

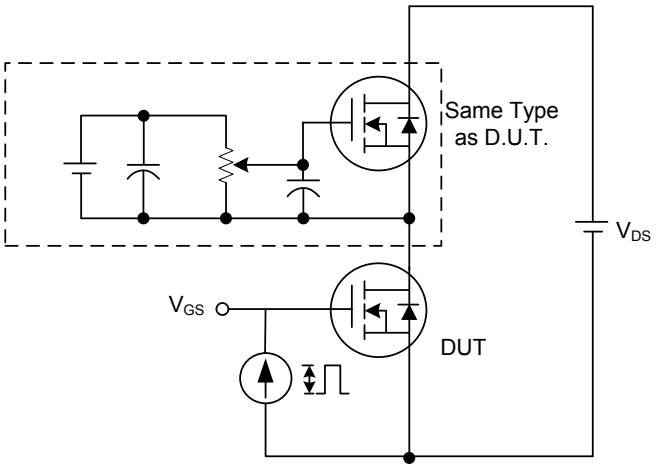


Fig. 3A Gate Charge Test Circuit

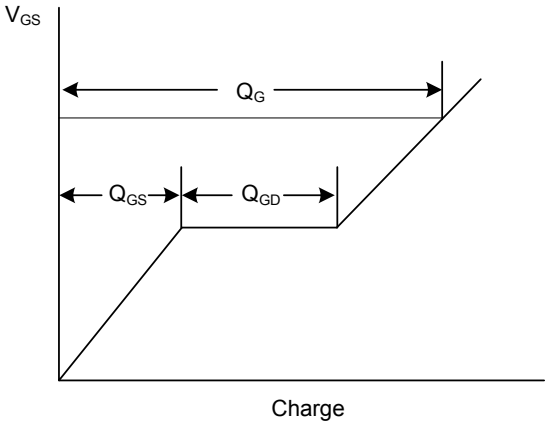


Fig. 3B Gate Charge Waveform

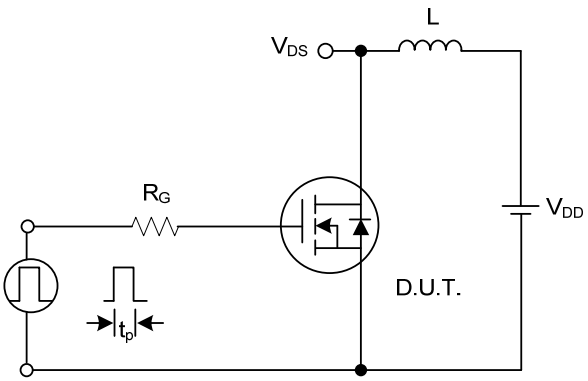


Fig. 4A Unclamped Inductive Switching Test Circuit

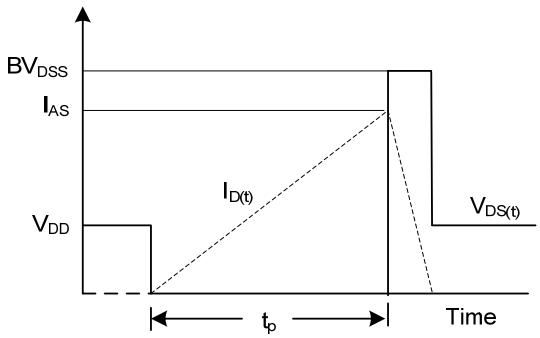


Fig. 4B Unclamped Inductive Switching Waveforms