



UTT2N25

Preliminary

Power MOSFET

2A, 250V N-CHANNEL POWER MOSFET

DESCRIPTION

The UTC **UTT2N25** is a N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology allows a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

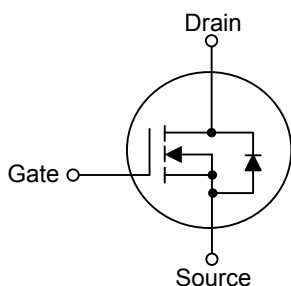
The UTC **UTT2N25** is generally applied in high efficiency switch mode power supplies.

FEATURES

* $R_{DS(ON)} \leq 1.0 \Omega$ @ $V_{GS}=10V$, $I_D=1.0A$

* High Switching Speed

SYMBOL



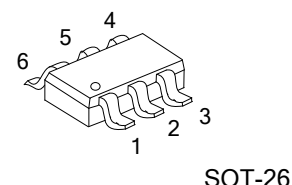
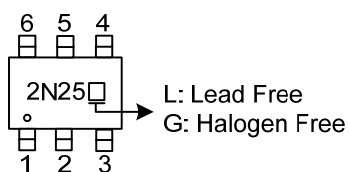
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment						Packing
Lead Free	Halogen Free		1	2	3	4	5	6	
UTT2N25L-AG6-R	UTT2N25G-AG6-R	SOT-26	D	D	G	S	D	D	Tape Reel

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

UTT2N25G-AG6-R 		(1) Packing Type (2) Package Type (3) Green Package	(1) R: Tape Reel (2) AG6: SOT-26 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING



SOT-26

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	250	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	Continuous	I_D	2	A
	Pulsed (Note 2)	I_{DM}	4	A
Peak Diode Recovery dv/dt (Note 3)		dv/dt	3.41	V/ns
Power Dissipation		P_D	1.56	W
Junction Temperature		T_J	+150	$^\circ\text{C}$
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. $I_{SD} \leq 2.0\text{A}$, $di/dt \leq 250\text{A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	240	$^\circ\text{C}/\text{W}$
Junction to Case	θ_{JC}	80 (Note)	$^\circ\text{C}/\text{W}$

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

■ 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}	V _{GS} =0V, I _D =250μA	250			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =250V, 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	2.0		4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =1.0A			1.0	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1MHz		580		pF
Output Capacitance		C _{OSS}			42		pF
Reverse Transfer Capacitance		C _{RSS}			30		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =100V, V _{GS} =10V, I _D =2.0A, I _D =1mA (Note 1, 2)		15.6		pF
Gateource Charge		Q _{GS}			5.4		pF
Gate-Drain Charge		Q _{GD}			3.2		pF
Turn-ON Delay Time (Note 1)		t _{D(ON)}	V _{DD} =100V, V _{GS} =10V, I _D =2.0A, R _G =25Ω (Note 1, 2)		8		ns
Rise Time		t _R			16.9		ns
Turn-OFF Delay Time		t _{D(OFF)}			26.6		ns
Fall-Time		t _F			24		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I _S				2	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				4	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =2.0A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time (Note 1)		t _{rr}	I _S =2.0A, V _{GS} =0V,		67		ns
Body Diode Reverse Recovery Charge		Q _{rr}	dl _F /dt=100A/μs		260		nC

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

2. Essentially independent of operating temperature.

D.U.T.

V_{DS}

I_{SD}

L

V_{DD}

R_G

Driver

V_{GS}

Same Type as D.U.T.

- * dv/dt controlled by R_G
- * I_{SD} controlled by pulse period
- * D.U.T.-Device Under Test

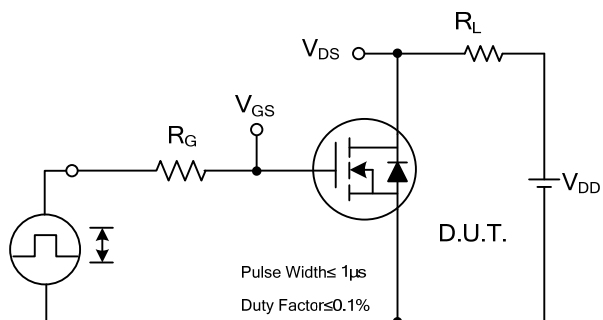
Timing diagram for a MOSFET switching a load inductor. The diagram shows three waveforms: V_{GS} (Driver), I_{SD} (D.U.T.), and V_{DS} (D.U.T.).

- V_{GS} (Driver): A square wave with pulse width (P.W.) and period (Period). The duty cycle is $D = \frac{P.W.}{Period}$. The peak voltage is $V_{GS} = 10V$.
- I_{SD} (D.U.T.): The source-drain current. It shows forward current I_{FM} (Body Diode Forward Current) during the pulse and reverse current I_{RM} (Body Diode Reverse Current) during the recovery phase. The slope of the reverse current is labeled di/dt .
- V_{DS} (D.U.T.): The drain-source voltage. It shows the voltage drop during the pulse and the recovery dv/dt during the off-time. The peak voltage is V_{DD} .

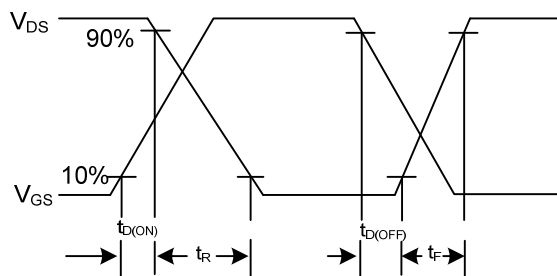
The diagram also indicates the Body Diode Forward Voltage Drop and the Body Diode Recovery dv/dt .

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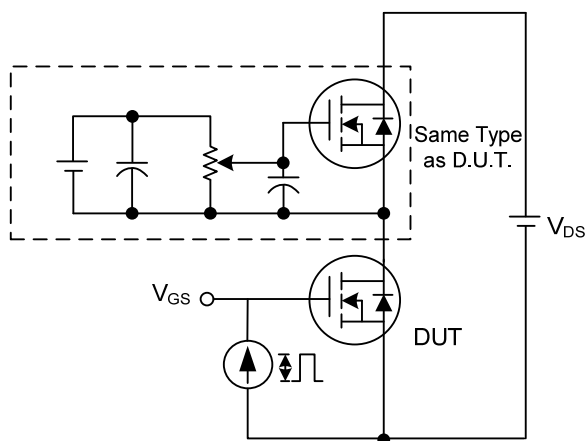
■ TEST CIRCUITS AND WAVEFORMS



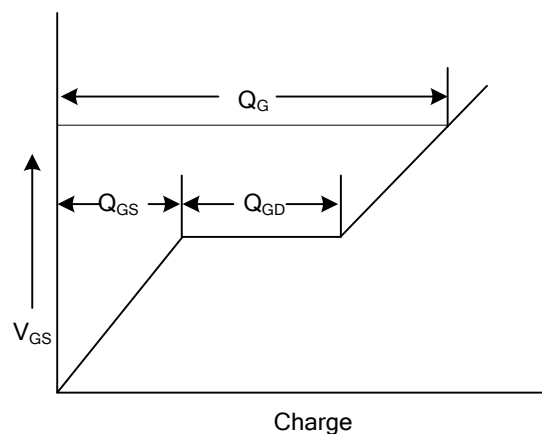
Switching Test Circuit



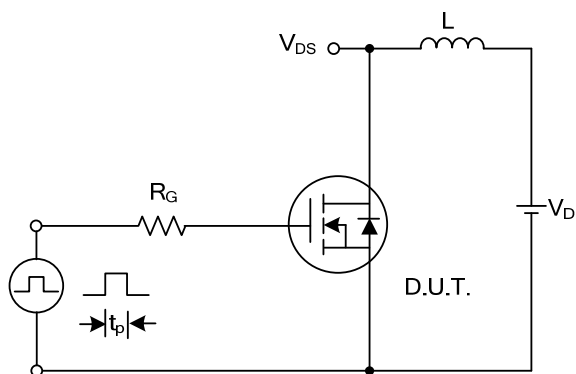
Switching Waveforms



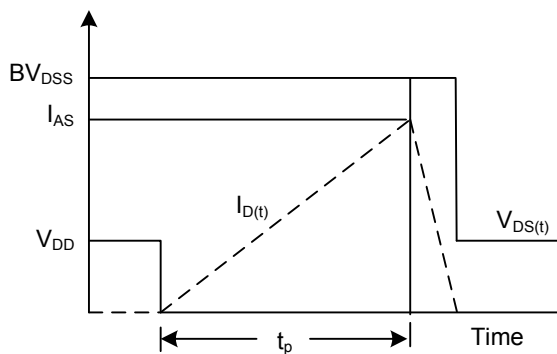
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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