



**UTT38N08**

**POWER MOSFET**

**38A, 80V N-CHANNEL  
POWER MOSFET**

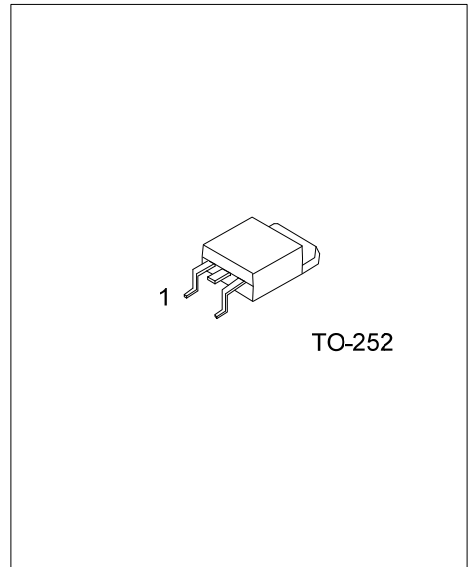
■ **DESCRIPTION**

The UTC **UTT38N08** is a N-channel mode power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance, low gate charge and high switching speed.

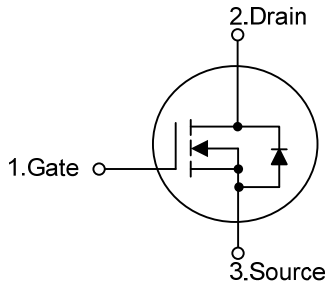
The UTC **UTT38N08** is suitable for high voltage synchronous rectifier and DC/DC converters, etc.

■ **FEATURES**

- \*  $R_{DS(ON)} \leq 35m\Omega @ V_{GS}=10V, I_D=19A$
- $R_{DS(ON)} \leq 60m\Omega @ V_{GS}=4.5V, I_D=19A$
- \* High Switching Speed
- \* High Cell Density Trench Technology



■ **SYMBOL**



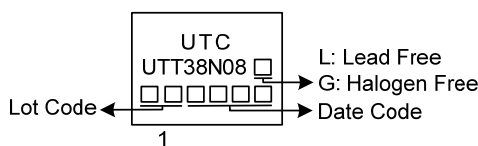
■ **ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT38N08L-TN3-R	UTT38N08G-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>UTT38N08G-TN3-R</p>	<p>(1) R: Tape Reel</p> <p>(2) TN3: TO-252</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ **MARKING**



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	80	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Drain Current	Continuous	$I_D$	38	A
	Pulsed (Note 2)	$I_{DM}$	76	A
Avalanche Energy (Note 3)	Single Pulsed (Note 3)	$E_{AS}$	160	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3.3	V/nS
Power Dissipation		$P_D$	110	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.  $L=10\text{mH}$ ,  $I_{AS}=5.7\text{A}$ ,  $V_{DD}=25\text{V}$ ,  $R_G=25\Omega$ , Starting  $T_J=25^{\circ}\text{C}$

4.  $I_{SD} \leq 30\text{A}$ ,  $di/dt \leq 100\text{A}/\mu\text{s}$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  $T_J \leq 25^{\circ}\text{C}$

■ THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	110	$^{\circ}\text{C}/\text{W}$
Junction to Case	$\theta_{JC}$	1.136 (Note)	$^{\circ}\text{C}/\text{W}$

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

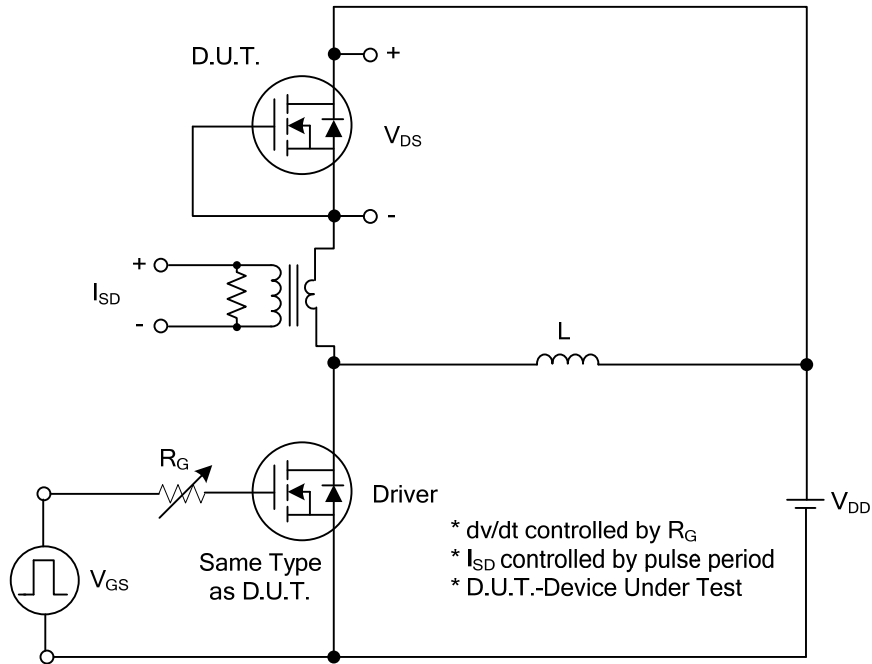
■ ELECTRICAL CHARACTERISTICS ( $T_J=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	80			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=80\text{V}$ , $V_{GS}=0\text{V}$			10	$\mu\text{A}$
Gate-Source Leakage Current		Forward			+100	nA
		Reverse			-100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	1.0		3.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$ , $I_D=19\text{A}$			35	m $\Omega$
		$V_{GS}=4.5\text{V}$ , $I_D=19\text{A}$			60	m $\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=25\text{V}$ , $f=1.0\text{MHz}$		2100		pF
Output Capacitance	$C_{OSS}$			138		pF
Reverse Transfer Capacitance	$C_{RSS}$			103		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge (Note 1)	$Q_G$	$V_{DS}=50\text{V}$ , $V_{GS}=10\text{V}$ , $I_D=1.3\text{A}$ $I_G=1\text{mA}$ (Note 1, 2)		760		nC
Gate to Source Charge	$Q_{GS}$			8		nC
Gate to Drain Charge	$Q_{GD}$			8		nC
Turn-on Delay Time (Note 1)	$t_{D(ON)}$	$V_{DS}=30\text{V}$ , $V_{GS}=10\text{V}$ , $I_D=0.5\text{A}$ , $R_G=25\Omega$ (Note 1, 2)		50		ns
Rise Time	$t_R$			48		ns
Turn-off Delay Time	$t_{D(OFF)}$			490		ns
Fall-Time	$t_F$			115		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	$I_S$				38	A
Maximum Body-Diode Pulsed Current	$I_{SM}$				76	A
Drain-Source Diode Forward Voltage (Note 1)	$V_{SD}$	$I_S=38\text{A}$ , $V_{GS}=0\text{V}$			1.4	V
Reverse Recovery Time (Note 1)	$t_{rr}$	$I_S=30\text{A}$ , $V_{GS}=0\text{V}$ ,		54		nS
Reverse Recovery Charge	$Q_{rr}$	$di/dt=100\text{A}/\mu\text{s}$		77		nC

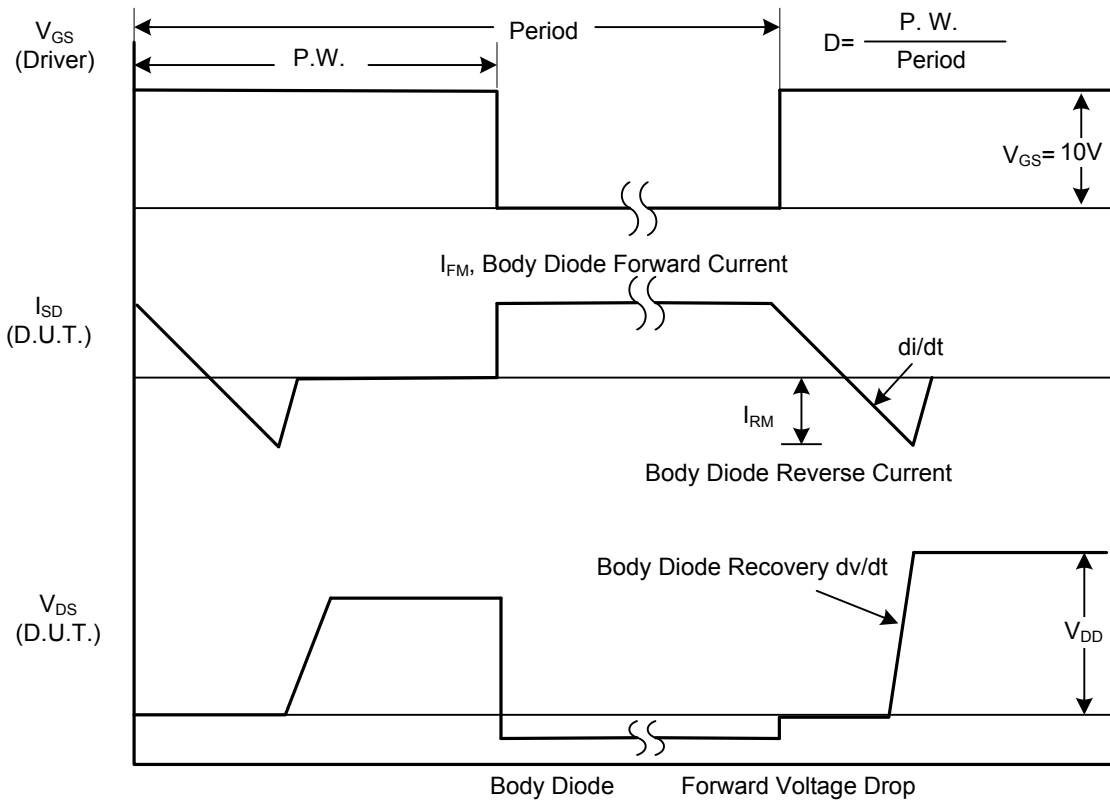
Notes: 1. Pulse Test : Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ .

2. Essentially independent of operating temperature.

## TEST CIRCUITS AND WAVEFORMS

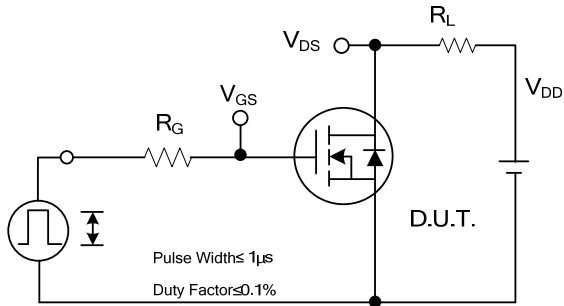


**Peak Diode Recovery dv/dt Test Circuit**

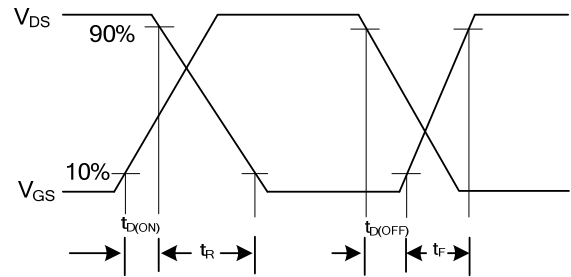


**Peak Diode Recovery dv/dt Waveforms**

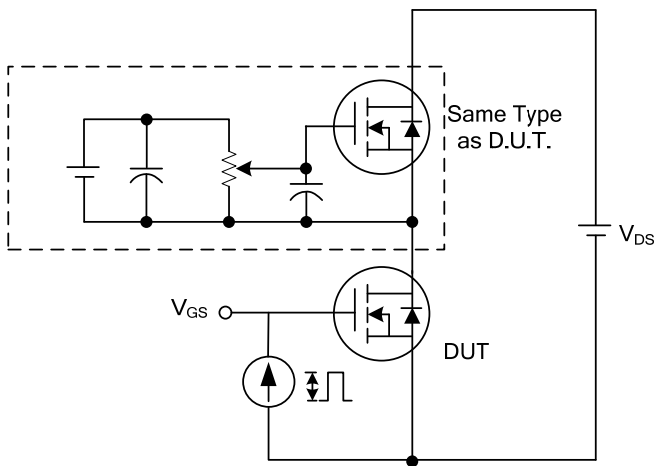
## TEST CIRCUITS AND WAVEFORMS



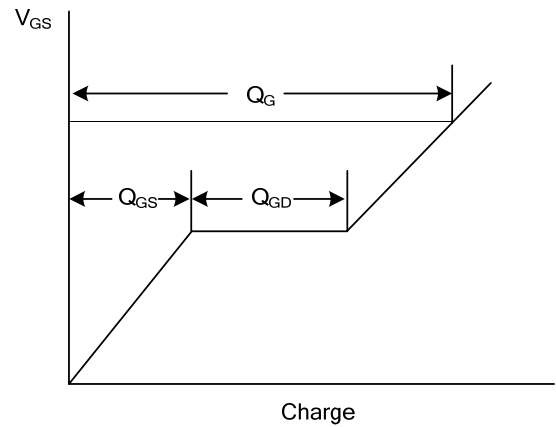
**Switching Test Circuit**



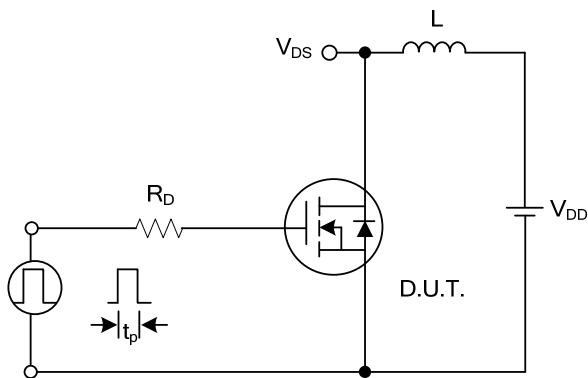
**Switching Waveforms**



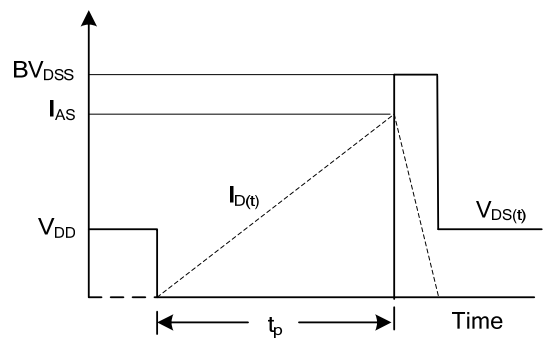
**Gate Charge Test Circuit**



**Gate Charge Waveform**

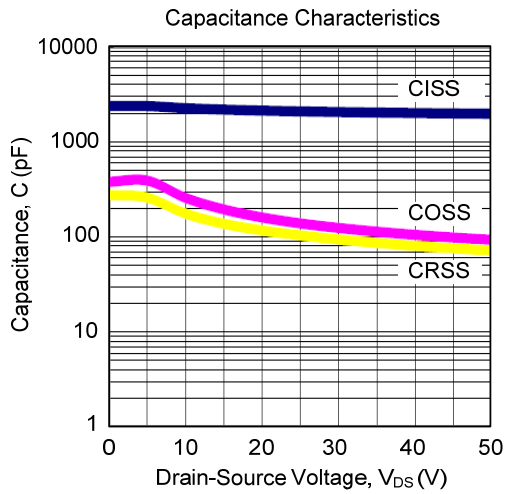


**Unclamped Inductive Switching Test Circuit**



**Unclamped Inductive Switching Waveforms**

■ TYPICAL CHARACTERISTICS



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