



## UTT12NN10

Power MOSFET

### 2.5A, 100V DUAL N-CHANNEL ENHANCEMENT MODE POWER MOSFET

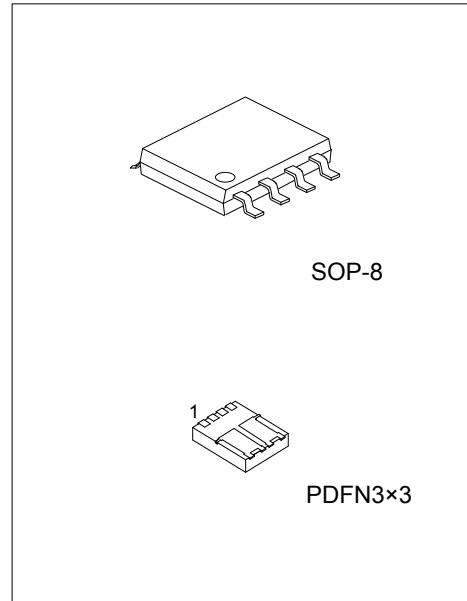
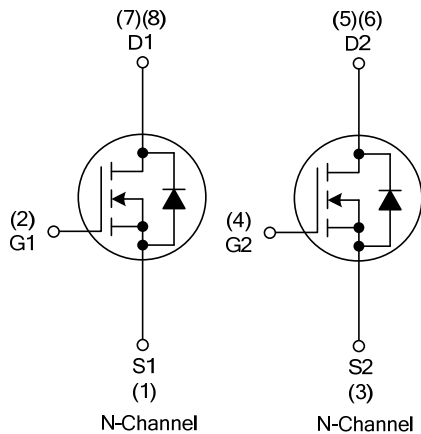
#### DESCRIPTION

The UTC **UTT12NN10** is a N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with low  $R_{DS(ON)}$  characteristic by high cell density trench technology.

#### FEATURES

- \*  $R_{DS(ON)} \leq 0.28 \Omega @ V_{GS}=10V, I_D=2.0A$
- \* Fast Switching Speed
- \* Simple Drive Requirement

#### SYMBOL



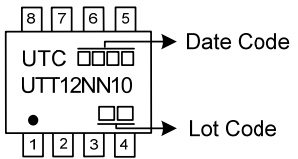
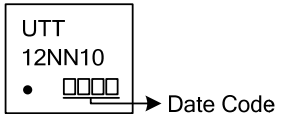
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTT12NN10L-S08-R	UTT12NN10G-S08-R	SOP-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel
UTT12NN10L-P3030-R	UTT12NN10G-P3030-R	PDFN3x3	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel

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

<p>UTT12NN10G-S08-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) S08: SOP-8, P3030: PDFN3x3</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING

SOP-8	PDFN3x3
 <p>The diagram shows an SOP-8 package with markings: 'UTC' and 'UTT12NN10' in the center. Above the package are four boxes labeled 8, 7, 6, 5, with an arrow pointing to 'Date Code'. Below the package are four boxes labeled 1, 2, 3, 4, with an arrow pointing to 'Lot Code'.</p>	 <p>The diagram shows a PDFN3x3 package with markings: 'UTT' and '12NN10' in the center. Below the package is a dot followed by four boxes, with an arrow pointing to 'Date Code'.</p>

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	100	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Drain Current	Continuous	$I_D$	2.5	A
	Pulsed (Note 2)	$I_{DM}$	10	A
Peak Diode Recovery dv/dt (Note 3)		dv/dt	2.3	V/ns
Power Dissipation	SOP-8	$P_D$	1.6	W
	PDFN3x3		2.0	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.  $I_{SD} \leq 2.0\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  $T_J = 25^{\circ}\text{C}$ .

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOP-8	$\theta_{JA}$	78	$^{\circ}\text{C}/\text{W}$
	PDFN3x3		62.5	$^{\circ}\text{C}/\text{W}$

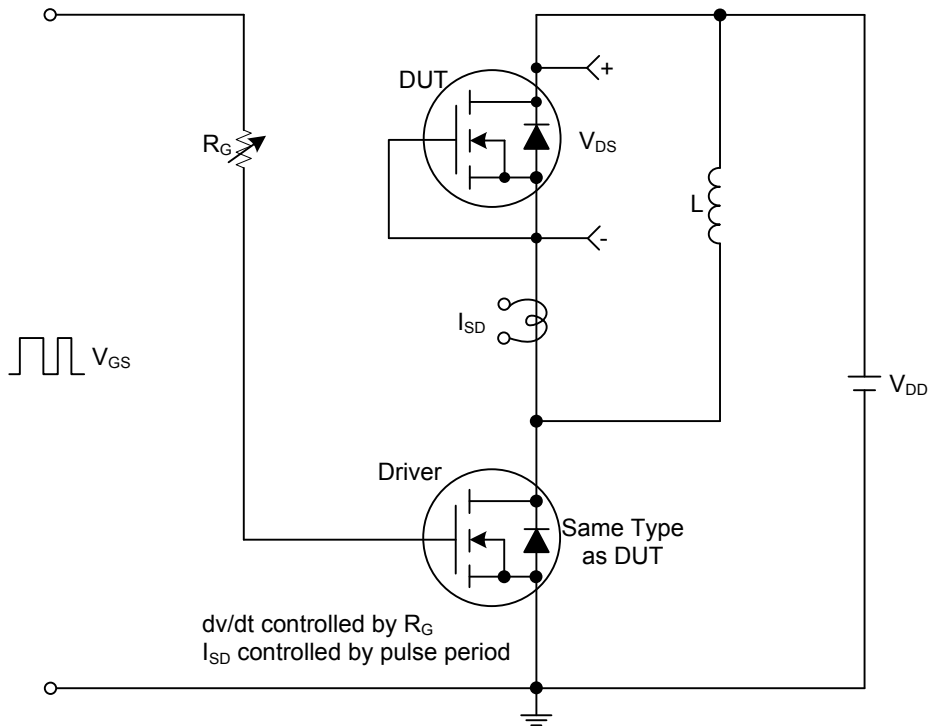
Note: Device mounted on FR-4 substrate  $P_C$  board, 2oz copper, with 1inch square copper plate.

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

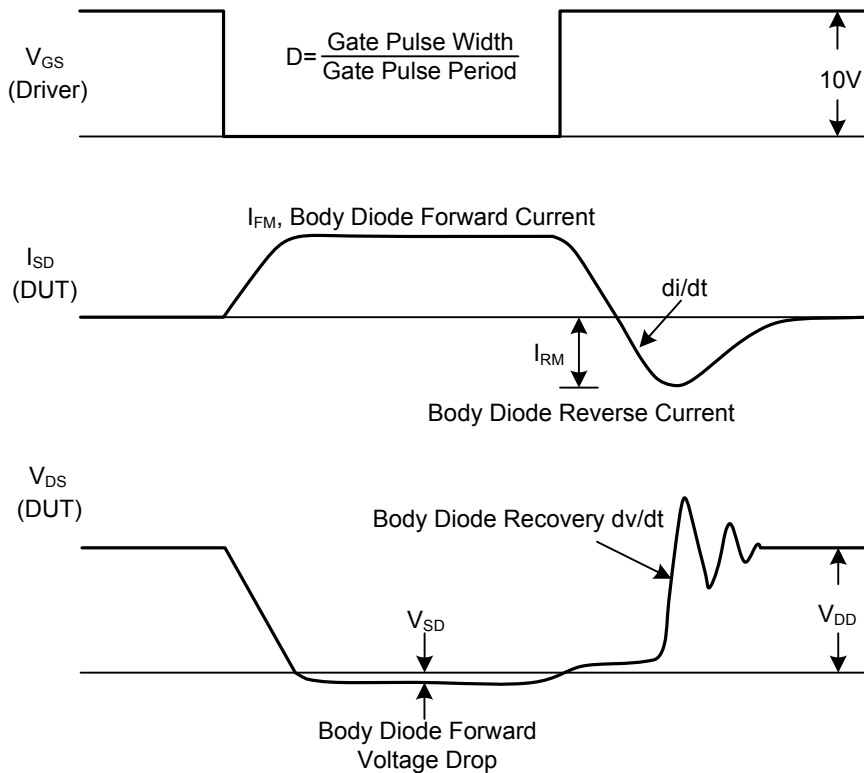
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
<b>OFF CHARACTERISTICS</b>								
Drain-Source Breakdown Voltage		$BV_{DSS}$	$V_{GS}=0\text{V}$ , $I_D=250\mu\text{A}$	100			V	
Drain-Source Leakage Current		$I_{DSS}$	$V_{DS}=100\text{V}$ , $V_{GS}=0\text{V}$			1	$\mu\text{A}$	
Gate-Source Leakage Current	Forward	$I_{GSS}$	$V_{DS}=0\text{V}$ , $V_{GS}=20\text{V}$			100	nA	
	Reverse		$V_{DS}=0\text{V}$ , $V_{GS}=-20\text{V}$			-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	
Drain-Source On-State Resistance		$R_{DS(ON)}$	$V_{GS}=10\text{V}$ , $I_D=2.0\text{A}$			0.28	$\Omega$	
<b>DYNAMIC PARAMETERS</b>								
Input Capacitance		$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=25\text{V}$ , $f=1.0\text{MHz}$		400		pF	
Output Capacitance		$C_{OSS}$				33		pF
Reverse Transfer Capacitance		$C_{RSS}$				26		pF
<b>SWITCHING PARAMETERS</b>								
Total Gate Charge (Note 1)		$Q_G$	$V_{DS}=50\text{V}$ , $V_{GS}=10\text{V}$ , $I_D=1.3\text{A}$ , $I_D=100\mu\text{A}$ (Note 1, 2)		40		nC	
Gate-Source Charge		$Q_{GS}$			2.0		nC	
Gate-Drain Charge		$Q_{GD}$			3.0		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)		29		ns	
Turn-ON Rise Time		$t_R$			26		ns	
Turn-OFF Delay Time		$t_{D(OFF)}$			165		ns	
Turn-OFF Fall Time		$t_F$			37		ns	
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>								
Maximum Body-Diode Continuous Current		$I_S$				2.5	A	
Maximum Body-Diode Pulsed Current		$I_{SM}$				10	A	
Drain-Source Diode Forward Voltage (Note 1)		$V_{SD}$	$I_S=1.5\text{A}$ , $V_{GS}=0\text{V}$			1.3	V	
Body Diode Reverse Recovery Time (Note 1)		$t_{rr}$	$I_S=2.0\text{A}$ , $V_{GS}=0\text{V}$ ,		210		ns	
Body Diode Reverse Recovery Charge		$Q_{rr}$	$di_F/dt=50\text{A}/\mu\text{s}$		170		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



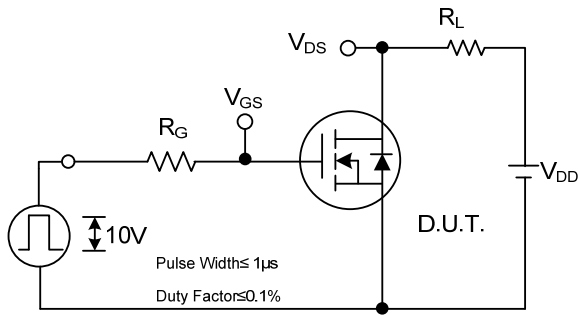
Peak Diode Recovery dv/dt Test Circuit



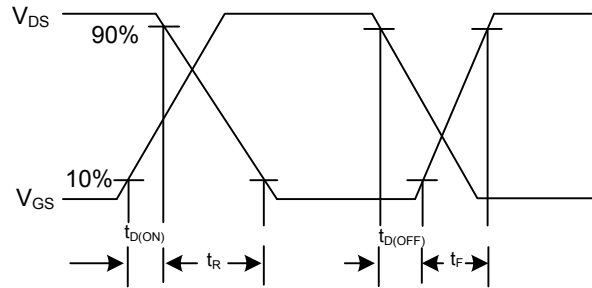
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

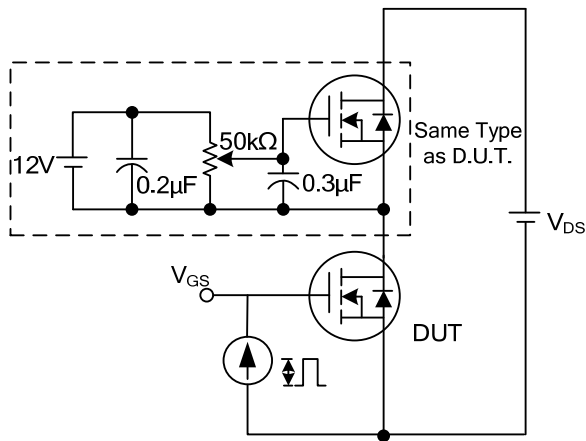
## TEST CIRCUITS AND WAVEFORMS



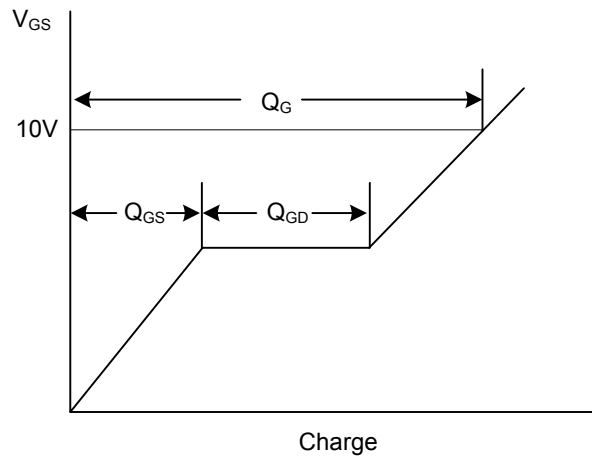
**Switching Test Circuit**



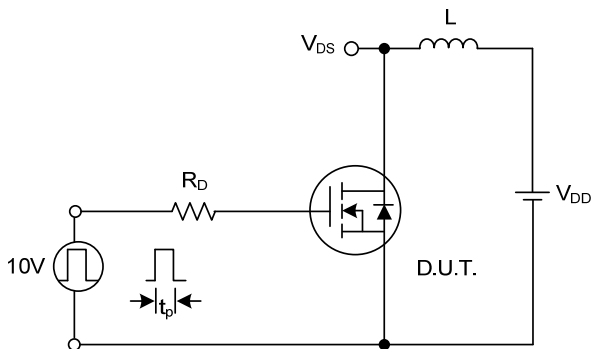
**Switching Waveforms**



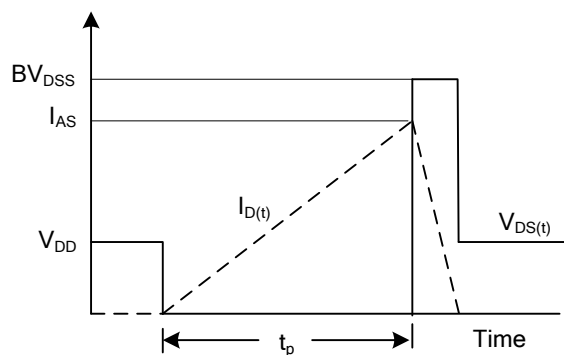
**Gate Charge Test Circuit**



**Gate Charge Waveform**



**Unclamped Inductive Switching Test Circuit**



**Unclamped Inductive Switching Waveforms**

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