



## UTT16P10

Preliminary

Power MOSFET

### -100V, -16A P-CHANNEL POWER MOSFET

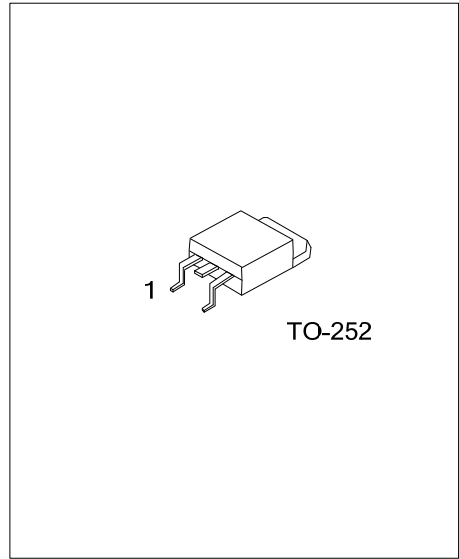
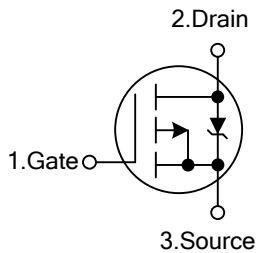
#### DESCRIPTION

The UTC **UTT16P10** is a P-channel power MOSFET using UTC's advanced technology to provide the customers with high switching speed, cost-effectiveness and a minimum on-state resistance. It can also withstand high energy in the avalanche.

#### FEATURES

- \*  $R_{DS(ON)} < 0.21\Omega$  @  $V_{GS} = -10V$ ,  $I_D = -16A$
- \* High Switching Speed

#### SYMBOL



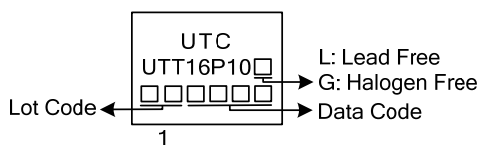
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT16P10L-TN3-R	UTT16P10G-TN3-R	TO-252	G	D	S	Tape Reel

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

UTT16P10L-TN3-R 	(1) R: Tape Reel (2) TN3: TO-252 (3) L: Lead Free, G: Halogen Free and Lead Free
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#### MARKING



■ ABSOLUTE MAXIMUM RATINGS ( $T_J=25^\circ\text{C}$ , 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, $V_{GSS}@-10\text{V}$	$T_C=25^\circ\text{C}$	$I_D$	-16	A
		$T_C=100^\circ\text{C}$		-9.8	A
	Pulsed (Note 2)		$I_{DM}$	-64	A
Avalanche Current (Note 2)			$I_{AR}$	-16	A
Avalanche Energy	Repetitive (Note 3)		$E_{AS}$	345	mJ
	Single Pulsed (Note 2)		$E_{AR}$	15	mJ
Peak Diode Recovery $dv/dt$			$dv/dt$	-5.5	V/ns
Power Dissipation ( $T_C=25^\circ\text{C}$ )			$P_D$	150	W
Junction Temperature			$T_J$	-55 ~ +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 max. junction temperature.  
 3.  $V_{DD}=-25\text{V}$ , starting  $T_J=25^\circ\text{C}$ ,  $L=2.7\text{mH}$ ,  $R_G=25\Omega$ ,  $I_{AS}=-16\text{A}$ .

■ THERMAL DATA

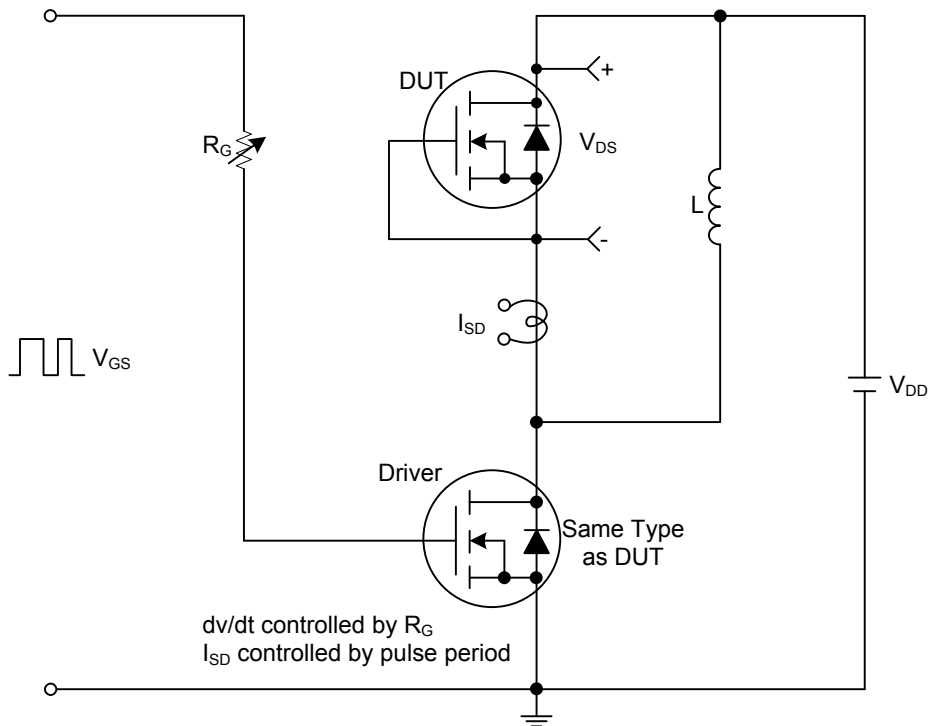
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Case	$\theta_{JC}$	1.0	$^\circ\text{C/W}$

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

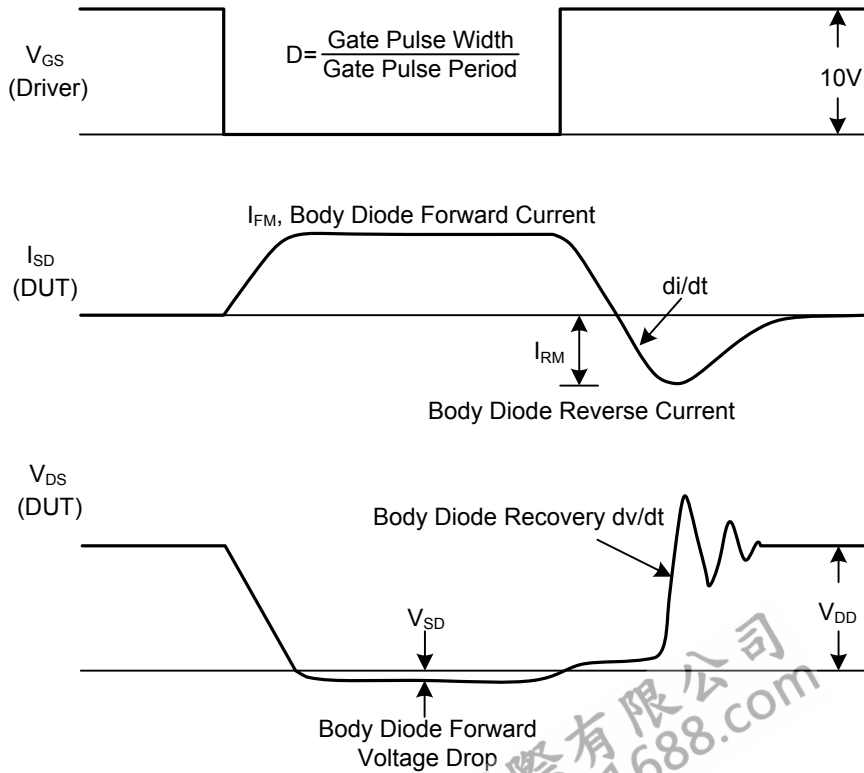
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>							
Drain-Source Breakdown Voltage		$BV_{DSS}$	$I_D=-250\mu\text{A}$ , $V_{GS}=0\text{V}$	-100			V
Breakdown Voltage Temperature Coefficient		$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $I_D=-1\text{mA}$		-0.1		$\text{V}/^\circ\text{C}$
Drain-Source Leakage Current		$I_{DSS}$	$V_{DS}=-100\text{V}$ , $V_{GS}=0\text{V}$ ,			-25	$\mu\text{A}$
			$V_{DS}=-80\text{V}$ , $V_{GS}=0\text{V}$ , $T_J=150^\circ\text{C}$			-100	$\mu\text{A}$
Gate- Source Leakage Current	Forward	$I_{GSS}$	$V_{GS}=+20\text{V}$			+100	nA
	Reverse		$V_{GS}=-20\text{V}$			-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
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	$V_{GS}=-10\text{V}$ , $I_D=-16\text{A}$ (Note 2)			0.21	$\Omega$
<b>DYNAMIC PARAMETERS</b>							
Input Capacitance		$C_{ISS}$	$V_{DS}=-25\text{V}$ , $V_{GS}=0\text{V}$ , $f=1.0\text{MHz}$		1180	1900	pF
Output Capacitance		$C_{OSS}$			250		pF
Reverse Transfer Capacitance		$C_{RSS}$			75		pF
<b>SWITCHING PARAMETERS</b>							
Total Gate Charge		$Q_G$	$V_{DS}=-80\text{V}$ , $V_{GS}=-10\text{V}$ , $I_D=-16\text{A}$ ,		37	60	nC
Gate to Source Charge		$Q_{GS}$			5		nC
Gate to Drain ("Miller") Charge		$Q_{GD}$			15		nC
Turn-ON Delay Time		$t_{D(ON)}$	$V_{DD}=-50\text{V}$ , $I_D=-16\text{A}$ , $R_G=9.1\Omega$ , $R_D=2.4\Omega$		11		ns
Rise Time		$t_R$			25		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			56		ns
Fall-Time		$t_F$			36		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>							
Maximum Body-Diode Continuous Current		$I_S$				-16	A
Maximum Body-Diode Pulsed Current		$I_{SM}$	(Note 1)			-64	A
Drain-Source Diode Forward Voltage		$V_{SD}$	$I_S=-16\text{A}$ , $V_{GS}=0\text{V}$ (Note 2)			-1.3	V

- Notes: 1. Pulse test; pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
 2. Repetitive rating; pulse width limited by max. junction temperature.

TEST CIRCUITS AND WAVEFORMS



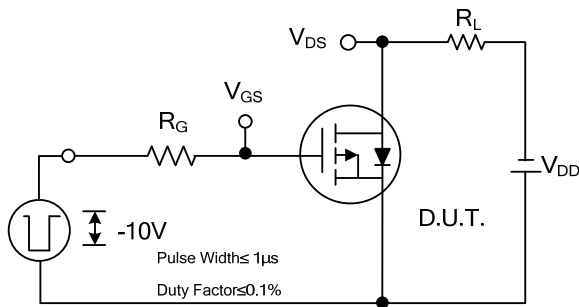
Peak Diode Recovery dv/dt Test Circuit



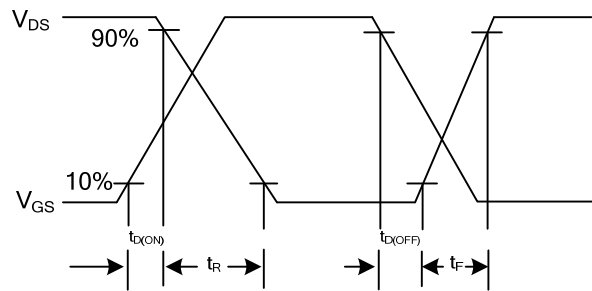
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

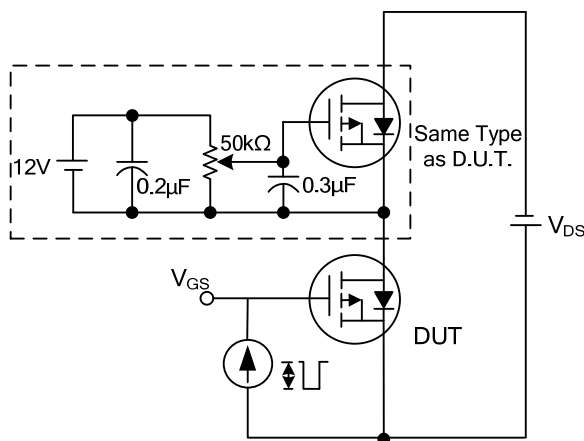
TEST CIRCUITS AND WAVEFORMS



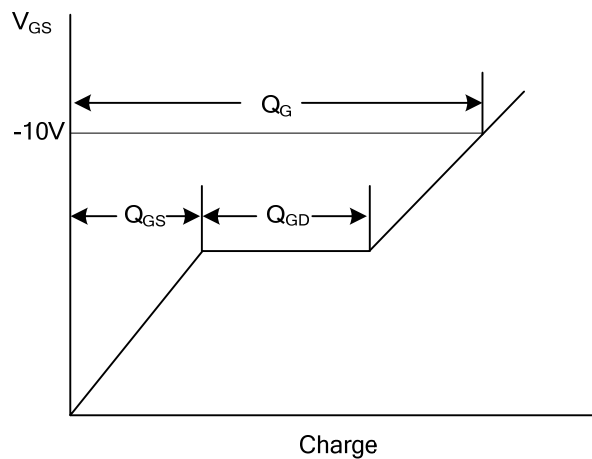
Switching Test Circuit



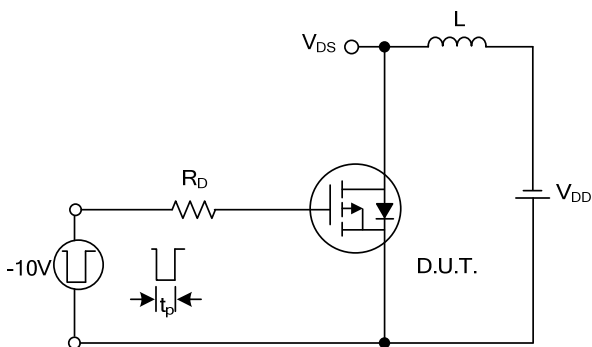
Switching Waveforms



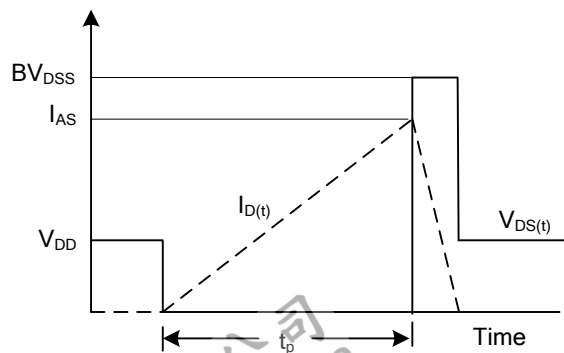
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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