



**UTT30P04**

Preliminary

*Power MOSFET*

**-21A, -40V P-CHANNEL  
POWER MOSFET**

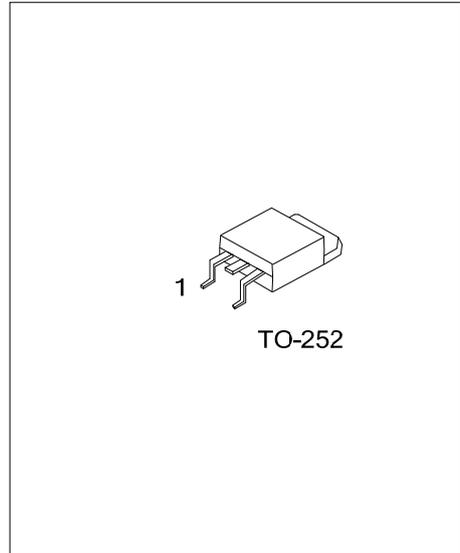
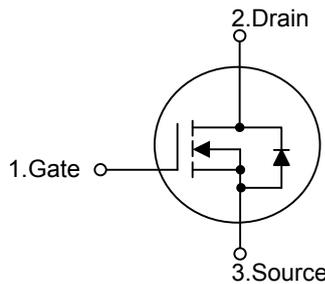
■ DESCRIPTION

The UTC **UTT30P04** is a P-channel power MOSFET providing customers with fast switching, ruggedized device design, low on-resistance and cost-effectiveness by UTC's advanced technology.

■ FEATURES

- \* Low on-Resistance
- \* Fast Switching Speed

■ SYMBOL



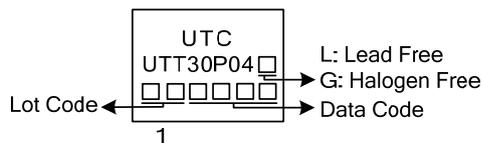
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT30P04L-TN3-R	UTT30P04G-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>UTT30P04L-TN3-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) TN3: TO-252</p> <p>(3) L: Lead Free, G: Halogen Free and 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		$V_{DSS}$	-40	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Drain Current	Continuous	$I_D$	-21	A
	Pulsed (Note 2)	$I_{DM}$	-70	A
Avalanche Current (Note 2)		$I_{AS}$	-27	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	36	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4	V/nS
Power Dissipation		$P_D$	30	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.  $L=0.1\text{mH}$ ,  $I_{AS}=31\text{A}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$

4.  $I_{SD}\leq 30\text{A}$ ,  $di/dt\leq 200\text{A}/\mu\text{s}$ ,  $V_{DD}\leq BV_{DSS}$ , starting  $T_J=25^\circ\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	40	$^\circ\text{C}/\text{W}$
Junction to Case	$\theta_{JC}$	4.1	$^\circ\text{C}/\text{W}$

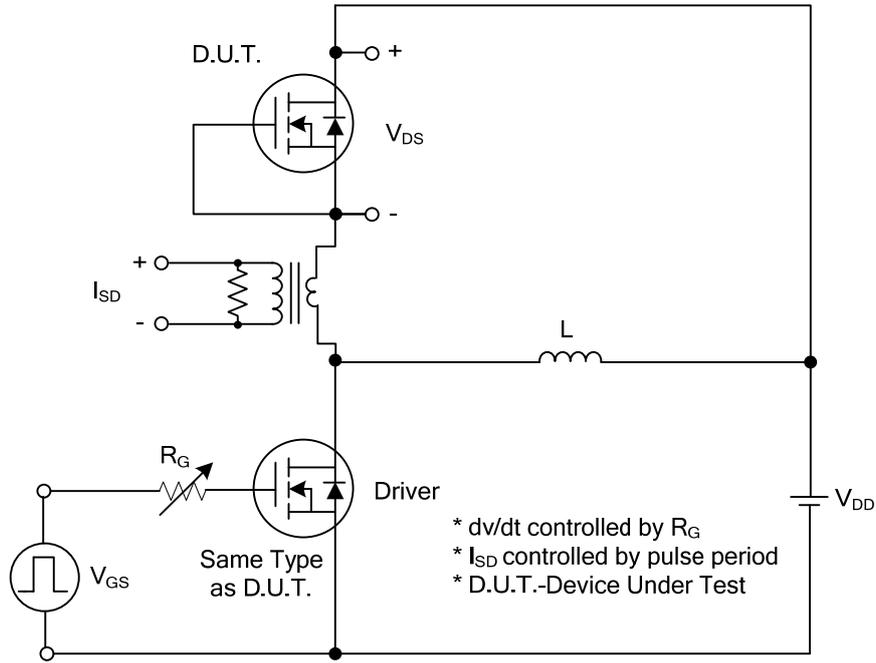
■ ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D = -250\mu\text{A}$ , $V_{GS} = 0\text{V}$	-40			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS} = -32\text{V}$ , $V_{GS} = 0\text{V}$			1	$\mu\text{A}$
Gate- Source Leakage Current	$I_{GSS}$	$V_{DS} = 0\text{V}$ , $V_{GS} = +20\text{V}$			+250	nA
		$V_{DS} = 0\text{V}$ , $V_{GS} = -20\text{V}$			-250	
<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 (Note 1)	$R_{DS(ON)}$	$V_{GS} = -5\text{V}$ , $I_D = -8\text{A}$			73	$\text{m}\Omega$
		$V_{GS} = -7\text{V}$ , $I_D = -8\text{A}$			50	$\text{m}\Omega$
		$V_{GS} = -10\text{V}$ , $I_D = -10\text{A}$			40	$\text{m}\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS} = 0\text{V}$ , $V_{DS} = -20\text{V}$ , $f = 1.0\text{MHz}$		1090		pF
Output Capacitance	$C_{OSS}$			175		
Reverse Transfer Capacitance	$C_{RSS}$			91		
<b>SWITCHING PARAMETERS (Note 2)</b>						
Total Gate Charge (Note 1)	$(V_{GS} = -10\text{V})$	$Q_G$	$V_{DS} = -20\text{V}$ , $I_D = -18\text{A}$		17	nC
	$(V_{GS} = -4.5\text{V})$	$Q_G$			8.5	
Gate to Source Charge	$Q_{GS}$			5.5		
Gate to Drain Charge	$Q_{GD}$			3		
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$			6	ns	
Rise Time	$t_R$	$V_{GS} = -10\text{V}$ , $V_{DS} = -20\text{V}$ , $I_D \approx -10\text{A}$ , $R_{GS} = 6\Omega$ , $R_L = 2\Omega$		16	ns	
Turn-OFF Delay Time	$t_{D(OFF)}$			26	ns	
Fall-Time	$t_F$			10	ns	
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Continuous Current	$I_S$				-21	A
Drain-Source Diode Forward Voltage (Note 1)	$V_{SD}$	$I_F = -10\text{A}$ , $V_{GS} = 0\text{V}$			-1.2	V
Reverse Recovery Time (Note 1)	$t_{rr}$	$I_F = -10\text{A}$ , $V_{GS} = 0\text{V}$		15.5		ns
Reverse Recovery Charge	$Q_{rr}$	$di_F/dt = 100\text{A}/\mu\text{s}$		7.9		nC

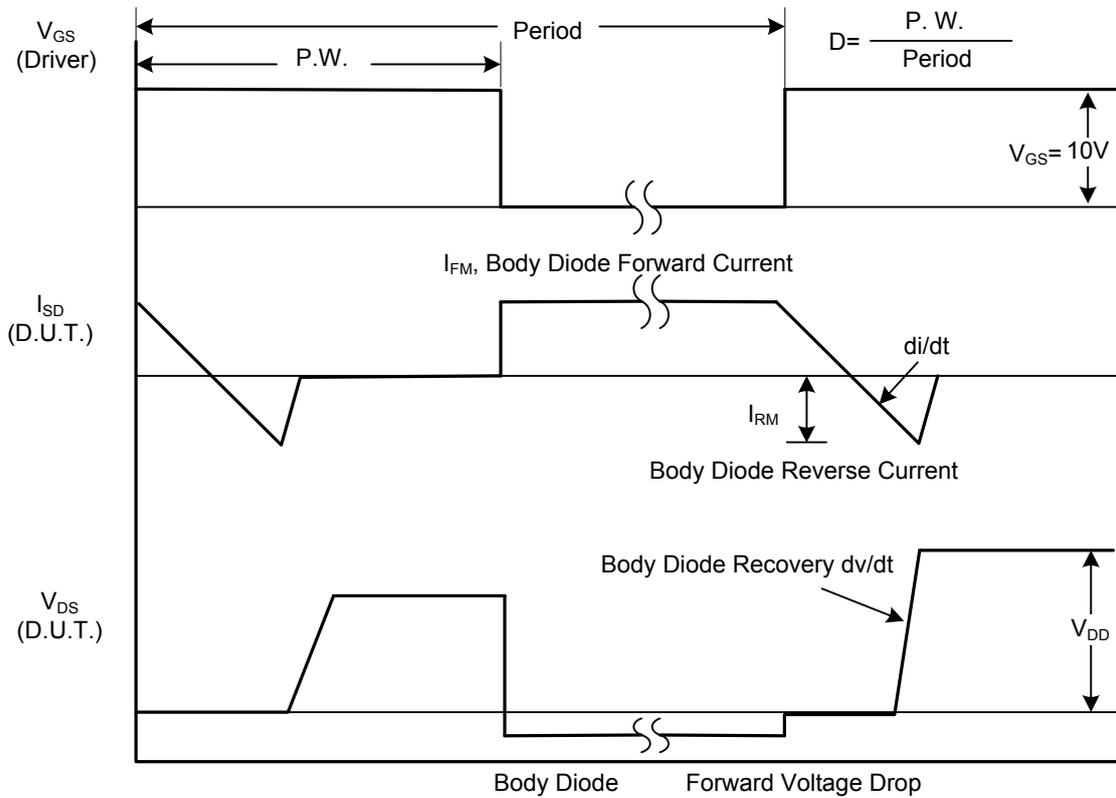
Notes: 1. Pulse Test : Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ .

2. Independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

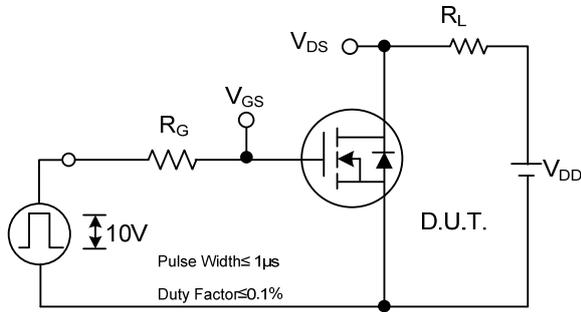


Peak Diode Recovery dv/dt Test Circuit

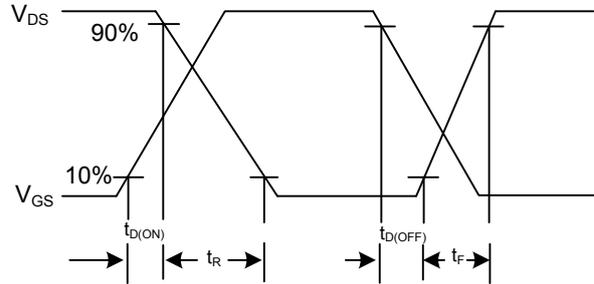


Peak Diode Recovery dv/dt Waveforms

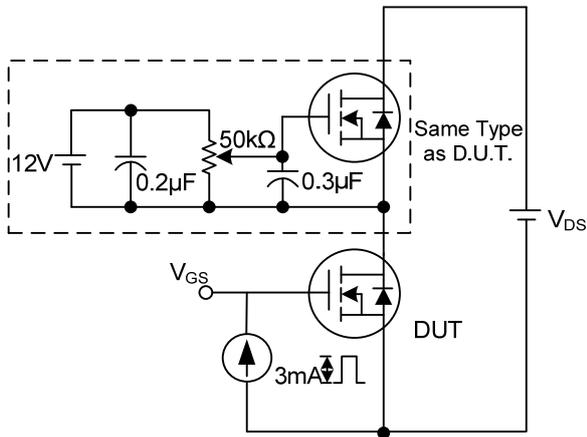
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



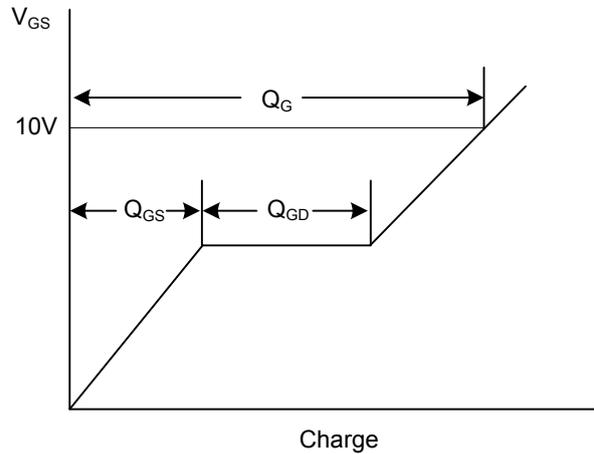
Switching Test Circuit



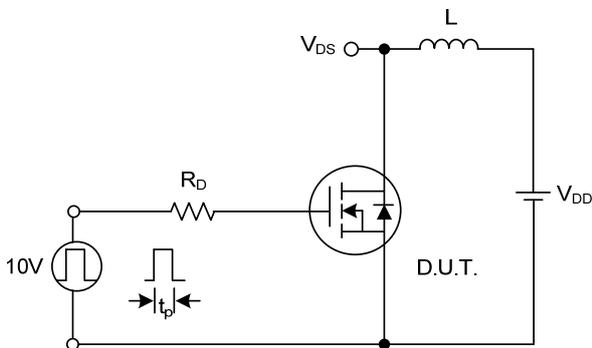
Switching Waveforms



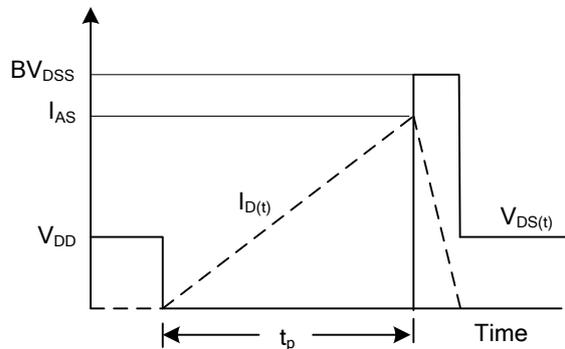
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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