



UTT30P04

Preliminary

Power MOSFET

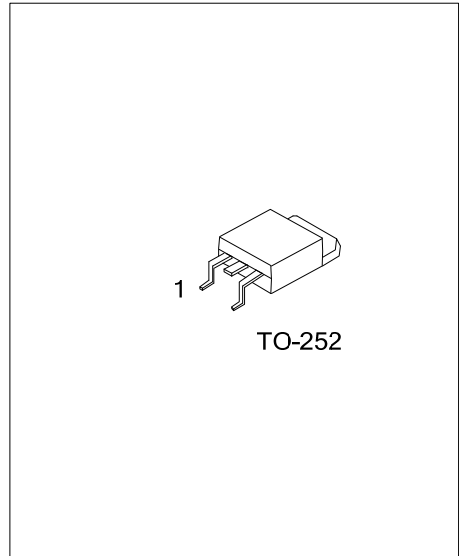
-30A, -40V P-CHANNEL POWER MOSFET

DESCRIPTION

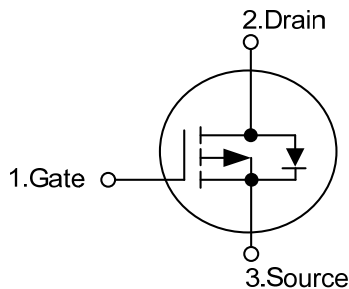
The UTC **UTT30P04** is a P-channel power MOSFET providing customers with fast switching, ruggedized device design, low on-resistance and cost-effectiveness by UTC's advanced technology.

FEATURES

- * $R_{DS(ON)} \leq 37 \text{ m}\Omega @ V_{GS}=-10\text{V}, I_D=-15\text{A}$
- * $R_{DS(ON)} \leq 52 \text{ m}\Omega @ V_{GS}=-4.5\text{V}, I_D=-15\text{A}$
- * Low on-Resistance
- * Fast Switching Speed



SYMBOL



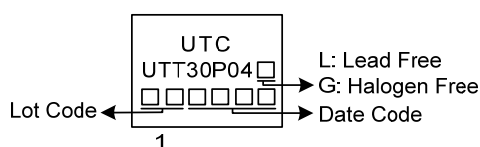
ORDERING INFORMATION

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

UTT30P04G-TN3-R 	(1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) TN3: TO-252 (3) G: Halogen Free and Lead Free, L: Lead Free
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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}	± 20	V
Drain Current	Continuous	I_D	-30
	Pulsed (Note 2)	I_{DM}	-60
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	37.5
Peak Diode Recovery dv/dt (Note 4)	dv/dt	1.1	V/nS
Power Dissipation	P_D	50	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. $L=0.1\text{mH}$, $I_{AS}=-27.3\text{A}$, $V_{DD}=-20\text{V}$, $R_G=25\Omega$, 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	θ_{JA}	110	$^\circ\text{C}/\text{W}$
Junction to Case	θ_{JC}	2.5	$^\circ\text{C}/\text{W}$

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

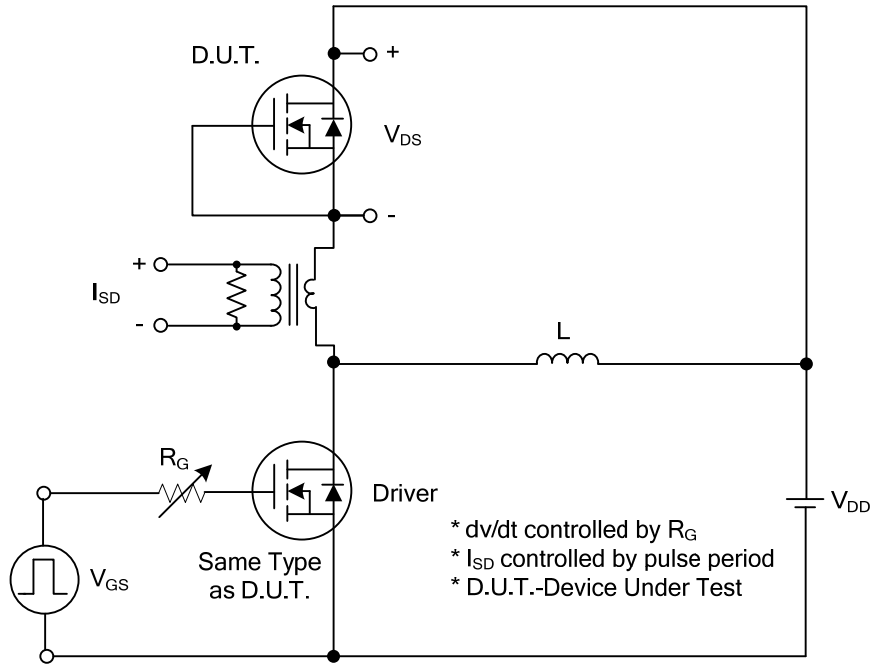
■ ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
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}	$V_{DS} = -40\text{V}$, $V_{GS} = 0\text{V}$			-1	μA
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	nA
ON CHARACTERISTICS						
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)	$R_{DS(ON)}$	$V_{GS} = -10\text{V}$, $I_D = -15\text{A}$			37	$\text{m}\Omega$
		$V_{GS} = -4.5\text{V}$, $I_D = -15\text{A}$			52	$\text{m}\Omega$
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS} = 0\text{V}$, $V_{DS} = -20\text{V}$, $f = 1.0\text{MHz}$		1107.3		pF
Output Capacitance	C_{OSS}			158		pF
Reverse Transfer Capacitance	C_{RSS}			135		pF
SWITCHING PARAMETERS (Note 2)						
Total Gate Charge (Note 1)	Q_G	$V_{DS} = -32\text{V}$, $V_{GS} = -10\text{V}$, $I_D = -30\text{A}$, $I_G = -1\text{mA}$ (Note 1, 2)		30		nC
Gate to Source Charge	Q_{GS}			3.4		nC
Gate to Drain Charge	Q_{GD}			10.4		nC
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$	$V_{DS} = -15\text{V}$, $V_{GS} = -10\text{V}$, $I_D = -30\text{A}$, $R_{GS} = 6.0\Omega$ (Note 1, 2)		6.9		ns
Rise Time	t_R			16.5		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			41.8		ns
Fall-Time	t_F			28.3		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				-30	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				-60	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}	$I_F = -30\text{A}$, $V_{GS} = 0\text{V}$		73		ns
Reverse Recovery Charge	Q_{rr}	$di_F/dt = 100\text{A}/\mu\text{s}$		212		nC

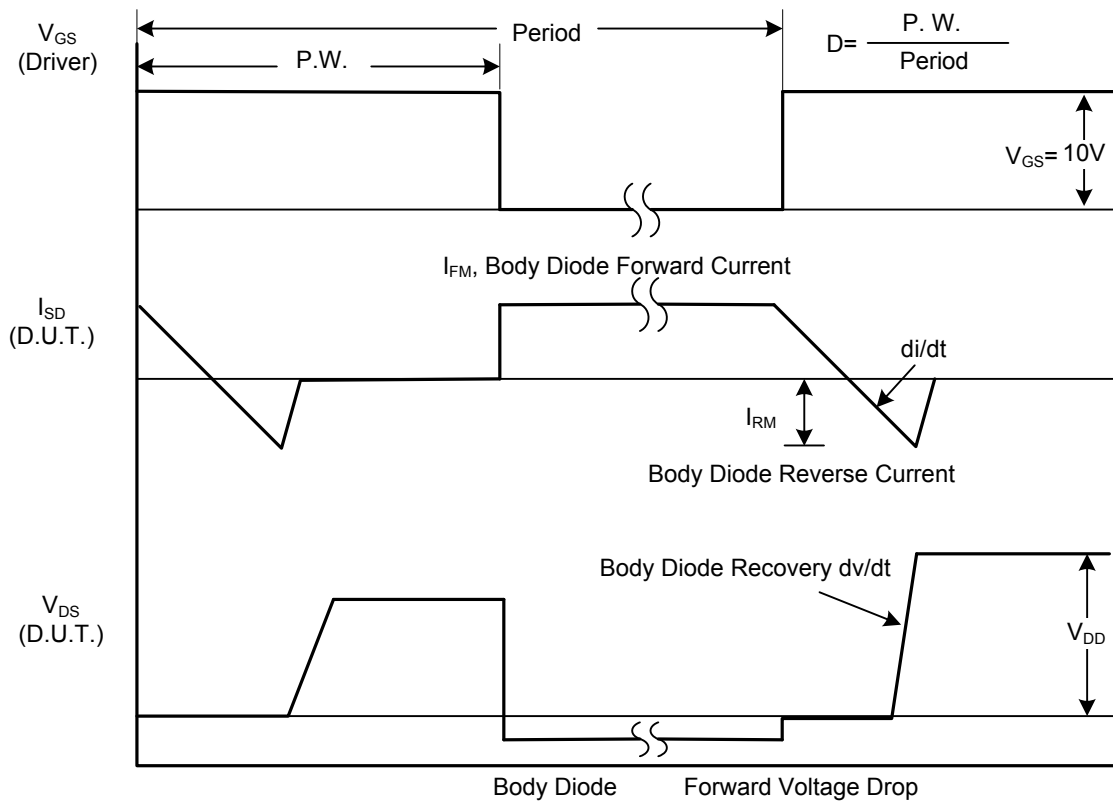
Notes: 1. Pulse Test : Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

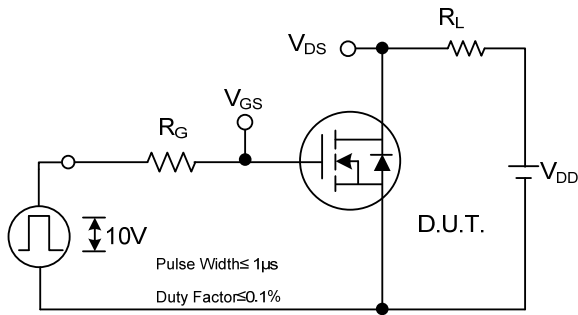


Peak Diode Recovery dv/dt Test Circuit

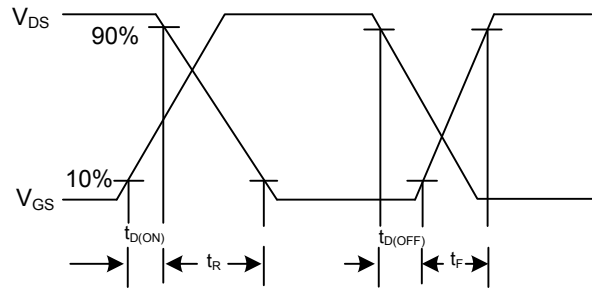


Peak Diode Recovery dv/dt Waveforms

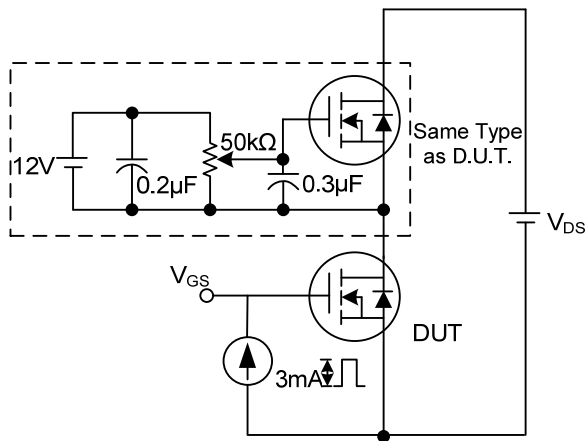
■ TEST CIRCUITS AND WAVEFORMS



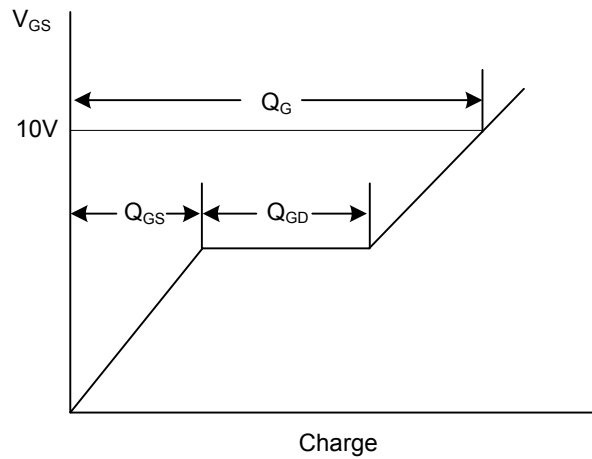
Switching Test Circuit



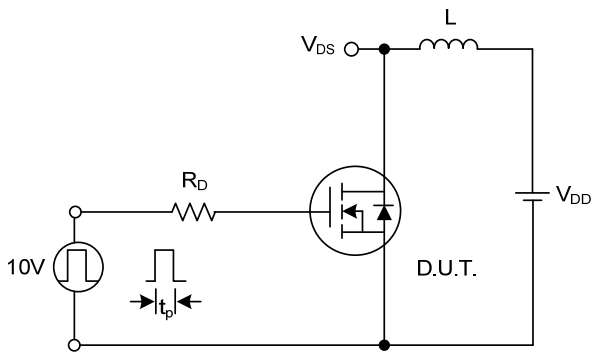
Switching Waveforms



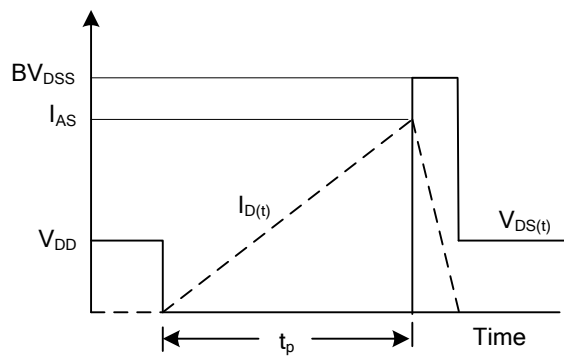
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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