



**UT2P02**

Preliminary

**Power MOSFET**

**-2.0A, -20V P-CHANNEL  
POWER MOSFET**

■ DESCRIPTION

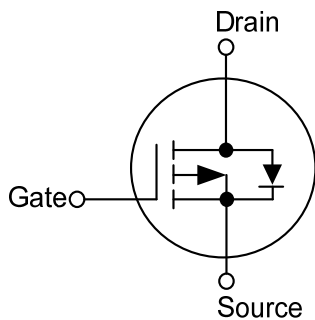
The UTC **UT2P02** is a P-channel MOSFET, it uses UTC's advanced technology to provide the customers with a minimum on state resistance and low gate charge, etc.

The UTC **UT2P02** is suitable for load switch and battery protection applications.

■ FEATURES

- \*  $R_{DS(ON)} \leq 170 \text{ m}\Omega$  @  $V_{GS}=-4.5\text{V}$ ,  $I_D=-1.0\text{A}$
- $R_{DS(ON)} \leq 300 \text{ m}\Omega$  @  $V_{GS}=-2.5\text{V}$ ,  $I_D=-0.5\text{A}$
- \* Improved dv/dt capability
- \* Fast switching

■ SYMBOL

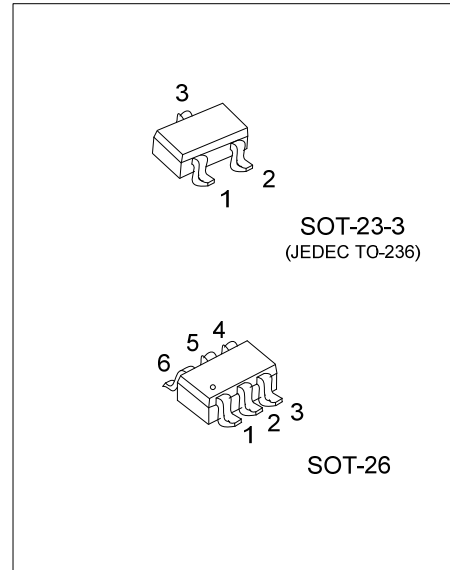


■ ORDERING INFORMATION

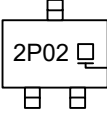
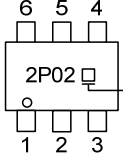
Ordering Number		Package	Pin Assignment						Packing
Lead Free	Halogen Free		1	2	3	4	5	6	
UT2P02L-AE2-R	UT2P02G-AE2-R	SOT-23-3	G	S	D	-	-	-	Tape Reel
UT2P02L-AG6-R	UT2P02G-AG6-R	SOT-26	D	D	G	S	D	D	Tape Reel

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

<p>UT2P02G-AE2-R</p>	<p>(1) R: Tape Reel</p> <p>(2) AE2: SOT-23-3, AG6: SOT-26</p> <p>(3) G: Halogen Free and Lead Free, K: Lead Free</p>
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### MARKING

SOT-23-3	SOT-26
 <p>A schematic diagram of a SOT-23-3 package. It is a rectangular component with three leads: one on the top, one on the left, and one on the bottom. The marking '2P02' is shown on the top surface. An arrow points from the marking to the text 'L: Lead Free' and 'G: Halogen Free'.</p>	 <p>A schematic diagram of a SOT-26 package. It is a rectangular component with six leads: three on the top (labeled 6, 5, 4) and three on the bottom (labeled 1, 2, 3). The marking '2P02' is shown on the top surface. An arrow points from the marking to the text 'L: Lead Free' and 'G: Halogen Free'.</p>

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	-20	V
Gate-Source Voltage		$V_{GSS}$	$\pm 12$	V
Drain Current	Continuous	$I_D$	-2	A
	Pulsed (Note 2)	$I_{DM}$	-8	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	2	mJ
Power Dissipation	SOT-23-3	$P_D$	0.4	W
	SOT-26		0.5	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.  $L = 0.1\text{mH}$ ,  $I_{AS} = -6.35\text{A}$ ,  $V_{DD} = -15\text{V}$ ,  $R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient (Note 3)	SOT-23-3	$\theta_{JA}$	312	$^\circ\text{C/W}$
	SOT-26		250	$^\circ\text{C/W}$

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

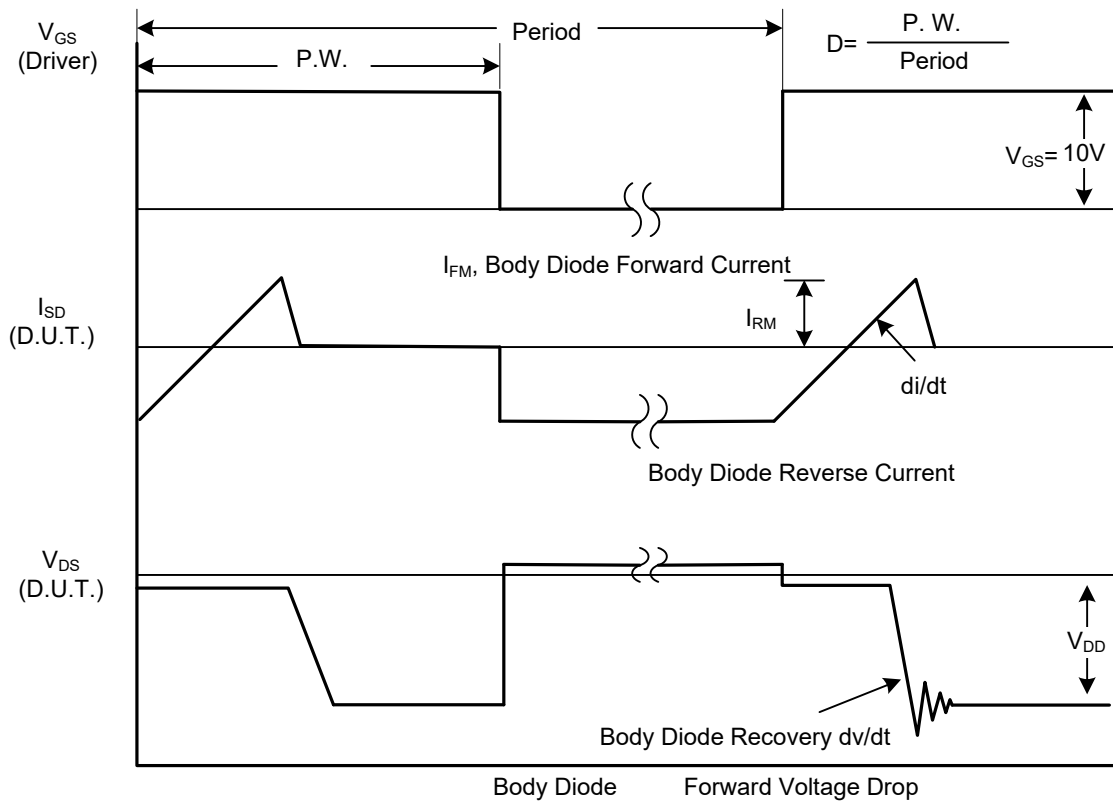
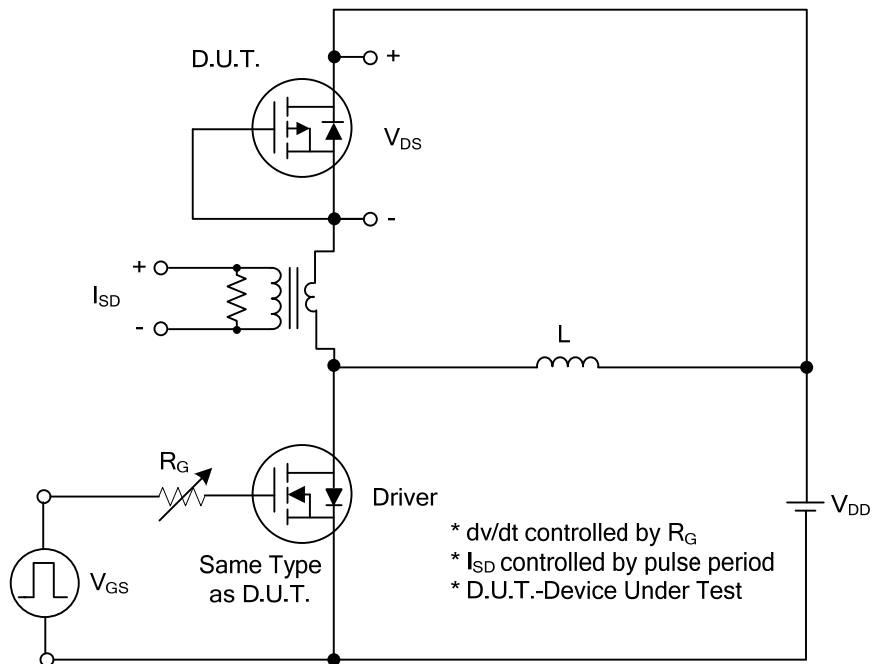
■ ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>STATIC PARAMETERS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D = -250\mu\text{A}$ , $V_{GS} = 0\text{V}$	-20			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -20\text{V}$ , $V_{GS} = 0\text{V}$			-1	$\mu\text{A}$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS} = \pm 12\text{V}$ , $V_{DS} = 0\text{V}$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS} = V_{GS}$ , $I_D = -250\mu\text{A}$	-0.5		-1.25	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS} = -4.5\text{V}$ , $I_D = -1.0\text{A}$			170	m $\Omega$
		$V_{GS} = -2.5\text{V}$ , $I_D = -0.5\text{A}$			300	m $\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS} = 0\text{V}$ , $V_{DS} = -5\text{V}$ , $f = 1.0\text{MHz}$		250		pF
Output Capacitance	$C_{OSS}$				78	pF
Reverse Transfer Capacitance	$C_{RSS}$				60	pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge	$Q_G$	$V_{DS} = -16\text{V}$ , $V_{GS} = -4.5\text{V}$ , $I_D = -2.0\text{A}$ (Note 1, 2)		5.1		nC
Gate to Source Charge	$Q_{GS}$				1.2	nC
Gate to Drain Charge	$Q_{GD}$				1.26	nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DS} = -10\text{V}$ , $V_{GS} = -4.5\text{V}$ , $I_D = -2.0\text{A}$ , $R_G = 6\Omega$ (Note 1, 2)		3.6		ns
Turn-ON Rise Time	$t_R$				18	ns
Turn-OFF Delay Time	$t_{D(OFF)}$				44	ns
Turn-OFF Fall-Time	$t_F$				35	ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	$I_S$				-2	A
Maximum Body-Diode Pulsed Current	$I_{SM}$				-8	A
Diode Forward Voltage	$V_{SD}$	$I_S = -2.0\text{A}$ , $V_{GS} = 0\text{V}$			-1.2	V

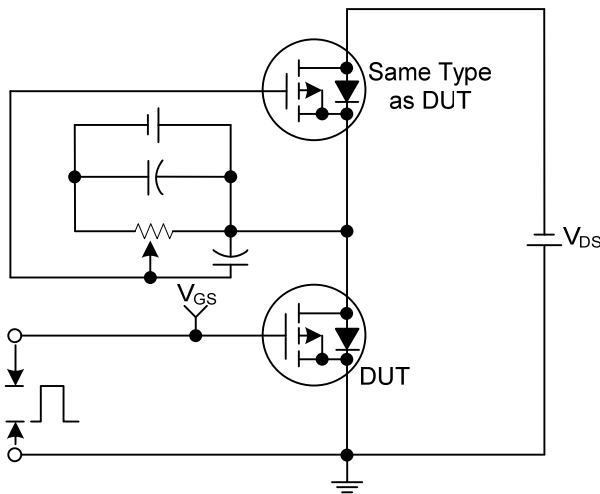
Notes: 1. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ .

2. Essentially independent of operating temperature.

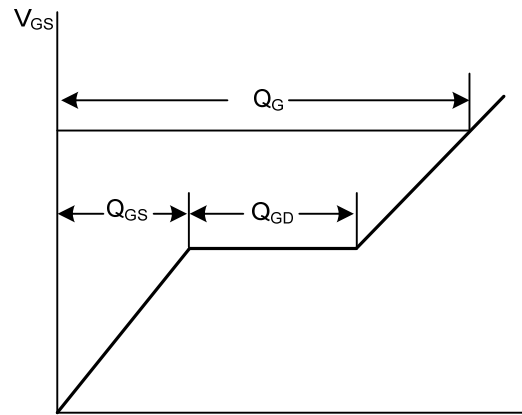
■ TEST CIRCUITS AND WAVEFORMS



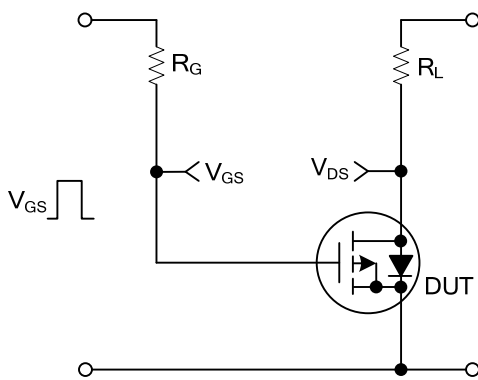
■ TEST CIRCUITS AND WAVEFORMS



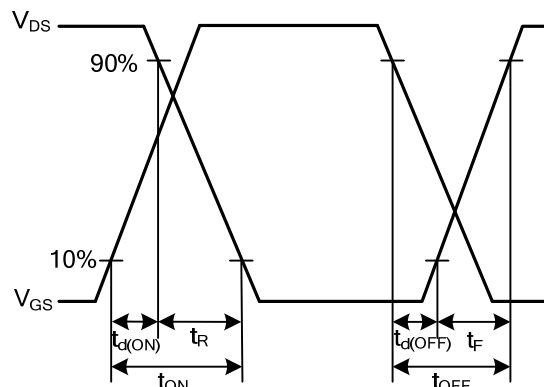
Gate Charge Test Circuit



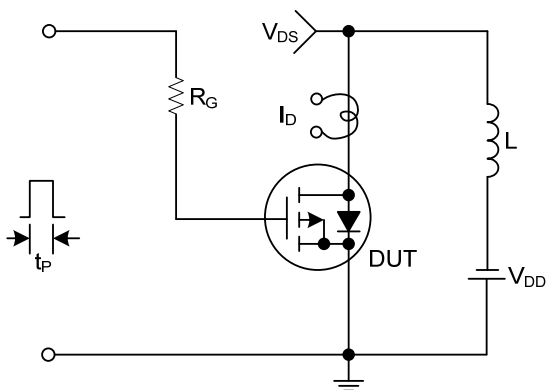
Gate Charge Waveforms



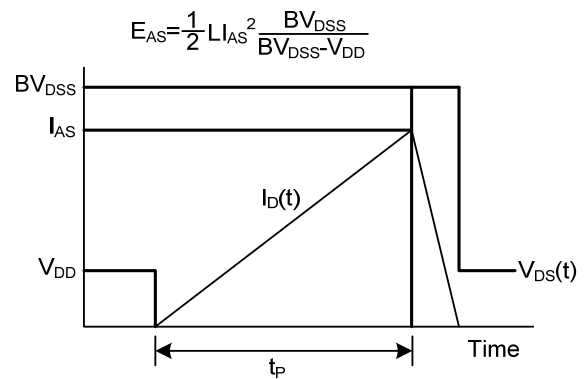
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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