

TPS22914/15EVM-078 2A Load Switch IC

The TPS22914/15EVM-078 evaluation module (EVM) allows the user to connect power to and control the 4-pin YFP package load switch. Parameters such as the On-Resistance, rise time and output pull-down resistance can be easily evaluated. [Table 1](#) lists a short description of the TPS22914/15 load switch performance specifications; for additional details on load switch performance, application notes, and the datasheet see www.ti.com/loadswitch.

Table 1. TPS22914/15 Rise Time, Output Current Rating, Enable, and Output Discharge Characteristics

EVM	Device	Rise Time Typical	V _{IN} (V)	Maximum Continuous Current	Enable (ON Pin)	Quick Output Discharge
HVL078-001	TPS22915B	60µs	3.3	2A	Active High	Yes
HVL078-002	TPS22914B	60µs	3.3	2A	Active High	No
HVL078-003	TPS22915C	1000µs	3.3	2A	Active High	Yes
HVL078-004	TPS22914C	1000µs	3.3	2A	Active High	No

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1 Introduction

1.1 Description

The TPS22914/15EVM is a two sided PCB containing the TPS22914/15 load switch device. The VIN and VOUT connections to the device and the PCB layout routing are capable of handling high continuous currents and provide a low resistance pathway into and out of the device under test. Test point connections allow the EVM User to control the device with user defined test conditions and make accurate R_{ON} measurements.

1.2 Features

- VIN input voltage range: 1.05 V to 5.5 V.
- EVM allows access to the VIN, VOUT, GND, and ON pin of the *TPS22914/15 Load Switch Device*.
- On board C_{IN} and C_{OUT} capacitors.
- 2 A max continuous current operation.
- 24 mm² Load Switch solution size sampled on this EVM.

2 Electrical Performance

Refer to the datasheet [SLVSCO0](#) for detailed electrical characteristics of the TPS22914/15.

3 Schematic

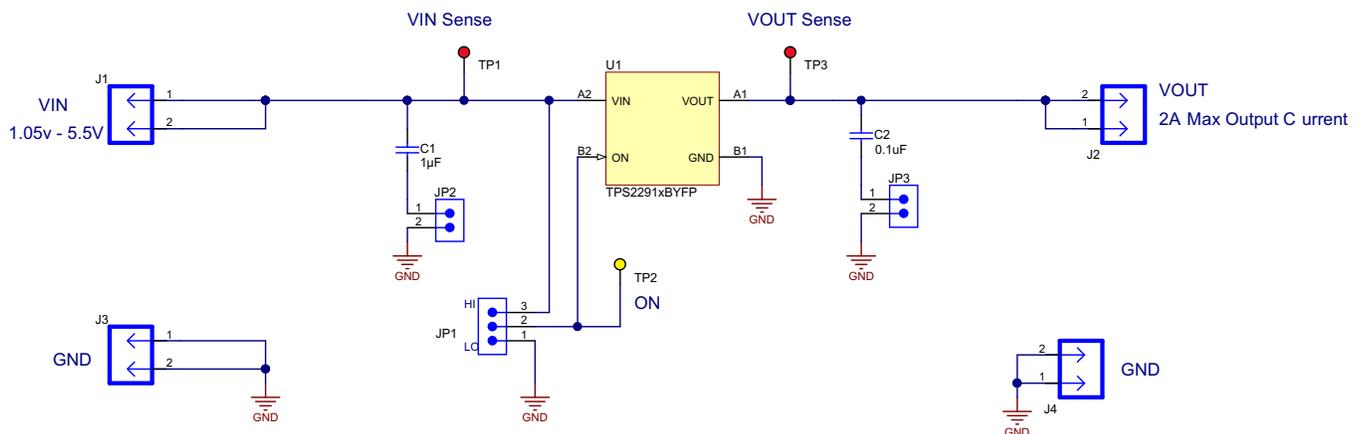


Figure 1. TPS22914/15EVM-078 Schematic

4 Layout

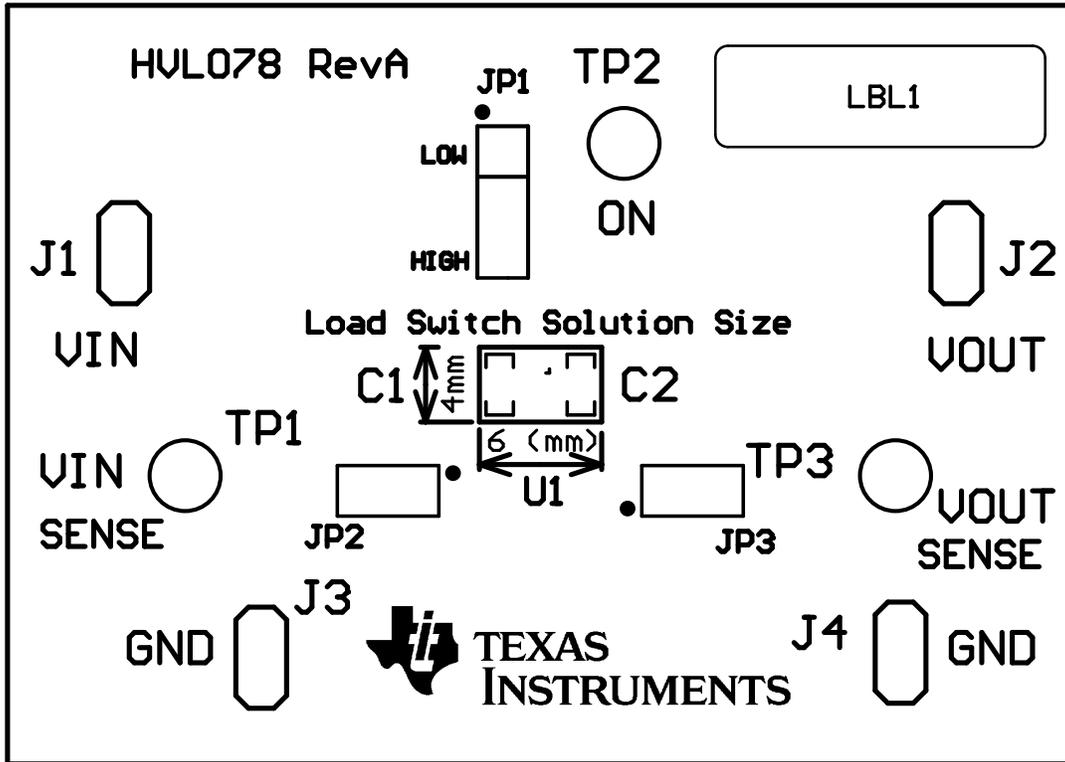


Figure 2. TPS22914/15EVM-078 Top Assembly

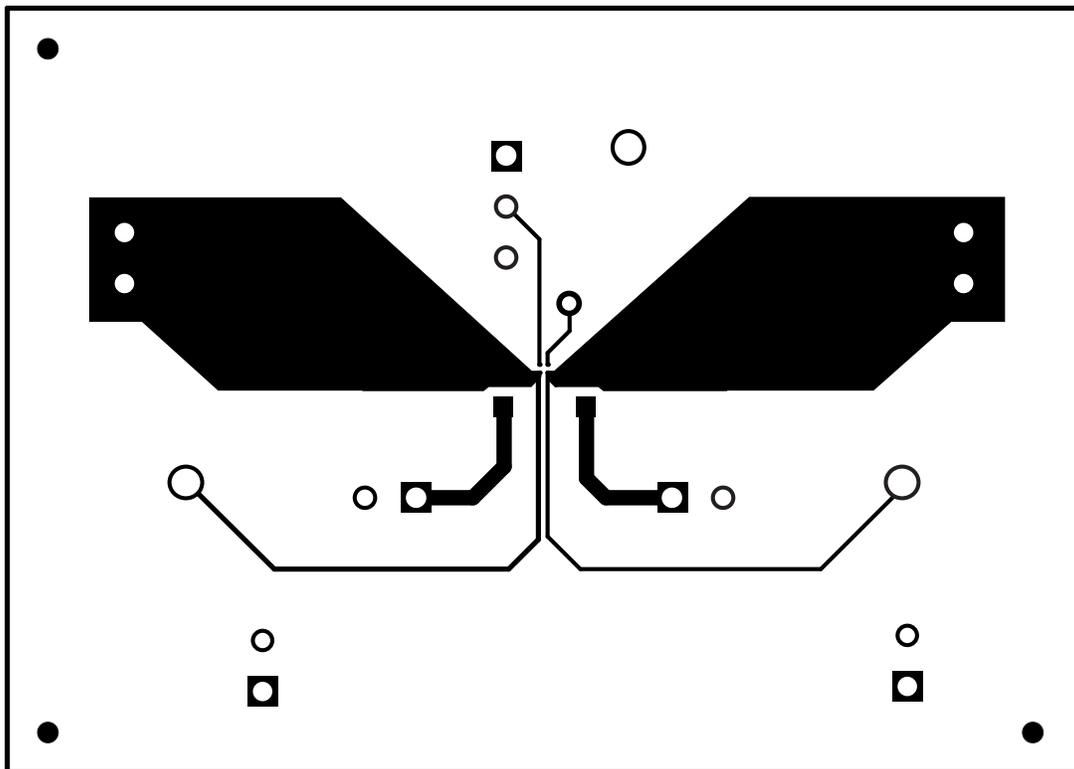


Figure 3. TPS22914/15EVM-078 Top Layout

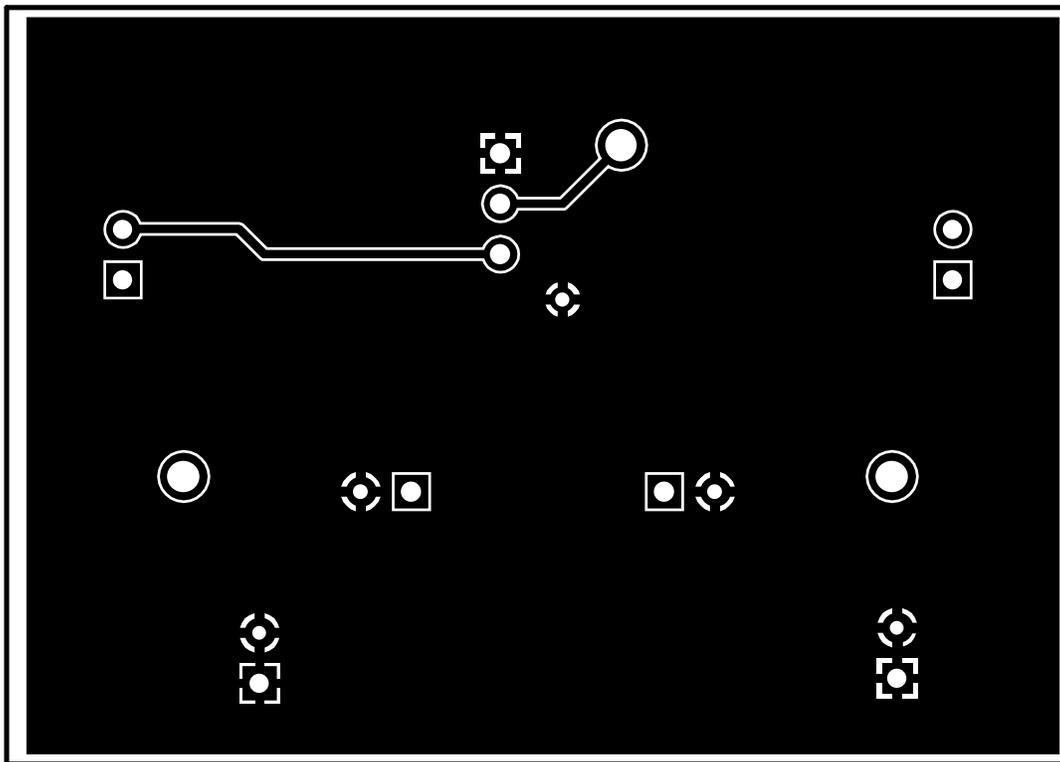


Figure 4. TPS22914/15EVM-078 Bottom Layout

4.1 Setup

This section describes the jumpers and connectors on the EVM as well as how to properly connect, set up, and use the EVM.

4.1.1 J1 – Input Connection

This is the connection for the leads from the input source. Connect the positive lead to J1-1 or 2 (+) terminals and the negative lead to J3-1 or 2 (-) terminals (GND).

4.1.2 J2 – Output Connection

This is the connection for the output of the EVM. Connect the positive lead to J2-1 or 2 (+) terminals and the negative lead to J4-1 or 2 (-) terminals (GND).

4.1.3 JP1 – ON

This is the enable input for the device. A shorting jumper must be installed on JP3 in either the High or Low position. The TPS22914/15 is active High. ON must not be left floating. An external enable source can be applied to the EVM by removing the shunt and connecting a signal to TP2. Refer to the datasheet for proper ON and OFF voltage level settings. A switching signal may also be used and connected at this point.

4.1.4 TP1 - VIN Sense, TP3 - VOUT Sense

These two connections are used when very accurate measurements of the input or output are required. RON measurements should be made using these sense connections when measuring the voltage drop from VIN to VOUT to calculate the resistance.

4.1.5 JP2 - Input Capacitor

During normal operation a shorting jumper is placed on JP2 this connects C1 capacitor from the input of the device to ground. Refer to the Applications Section of the Datasheet for additional information on selecting the input capacitor.

4.1.6 JP3 - Output Capacitor

During normal operation a shorting jumper is placed on JP3 this connects C2 capacitor from the output of the device to ground. Refer to the Applications Section of the Datasheet for additional information on selecting the output capacitor.

4.1.7 J3-J4 – GND

These are connections to GND.

5 Operation

Connect the positive input of the VIN power supply to VIN at J1. Connect the negative lead of the power supply to GND at J3. The input voltage range of the TPS22914/15EVM-078 is 1.05 V to 5.5 V.

External output loads can be applied to the switch by using J2 VOUT and J4 GND. The TPS22914/15EVM-078 is rated for a maximum continuous current of 2A. Configure JP1 as required. JP1 must be installed for proper operation. When the ON pin is asserted high, the output of the TPS22914/15 will be enabled.

6 Test Configurations

6.1 On-Resistance (RON) Test Setup

Figure 5 shows a typical setup for measuring On-Resistance. The voltage drop across the switch is measured using the sense connections then divided by the current into the load yielding the R_{ON} resistance.

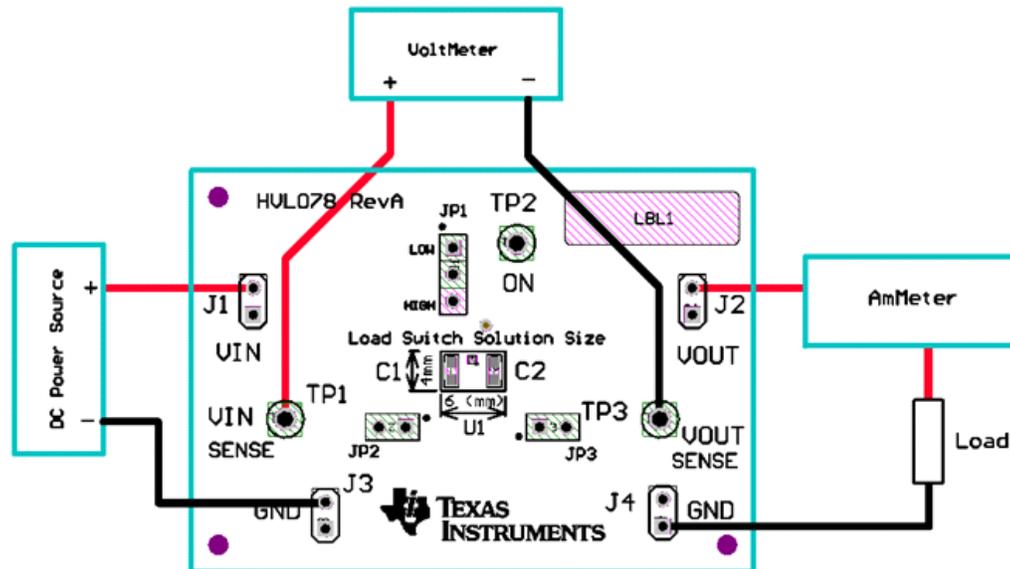


Figure 5. R_{ON} Setup

6.2 Slew Rate Test Setup

Figure 6 shows a test setup for measuring the Slew Rate of the Load Switch. Apply a square wave to the ON pin of the switch using a function generator and apply a voltage to the VIN terminal using a power supply. Observe waveform at VOUT with a scope to measure the slew rate and rise time of the switch with a given input voltage.

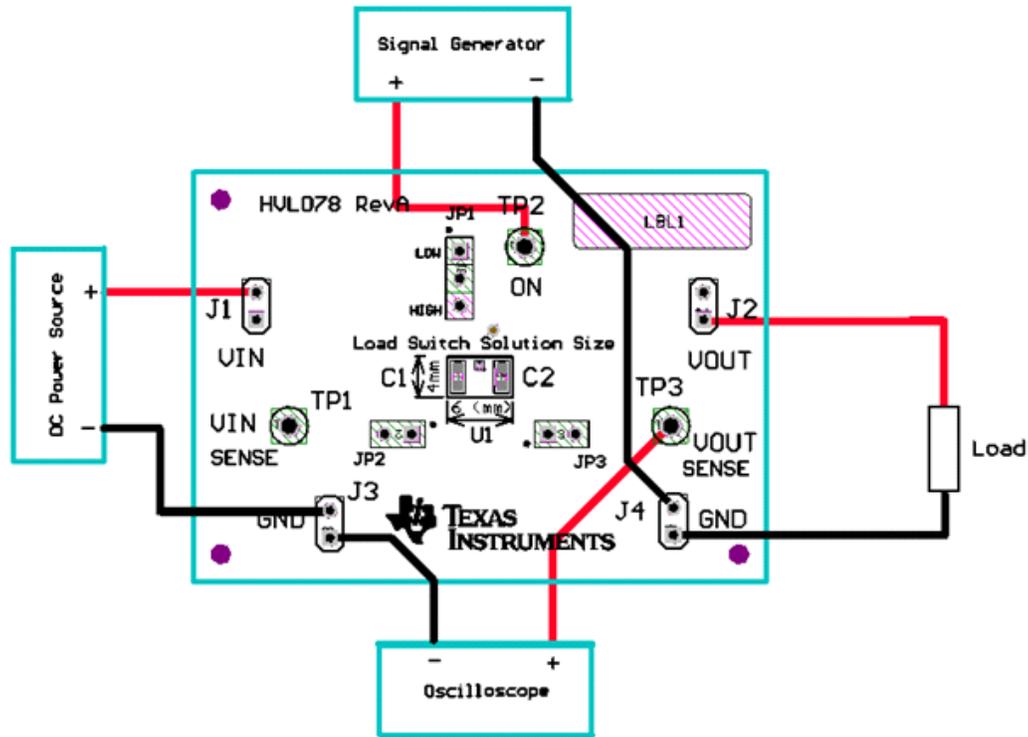


Figure 6. Slew Rate Setup

6.3 VOUT Slew Rate Example

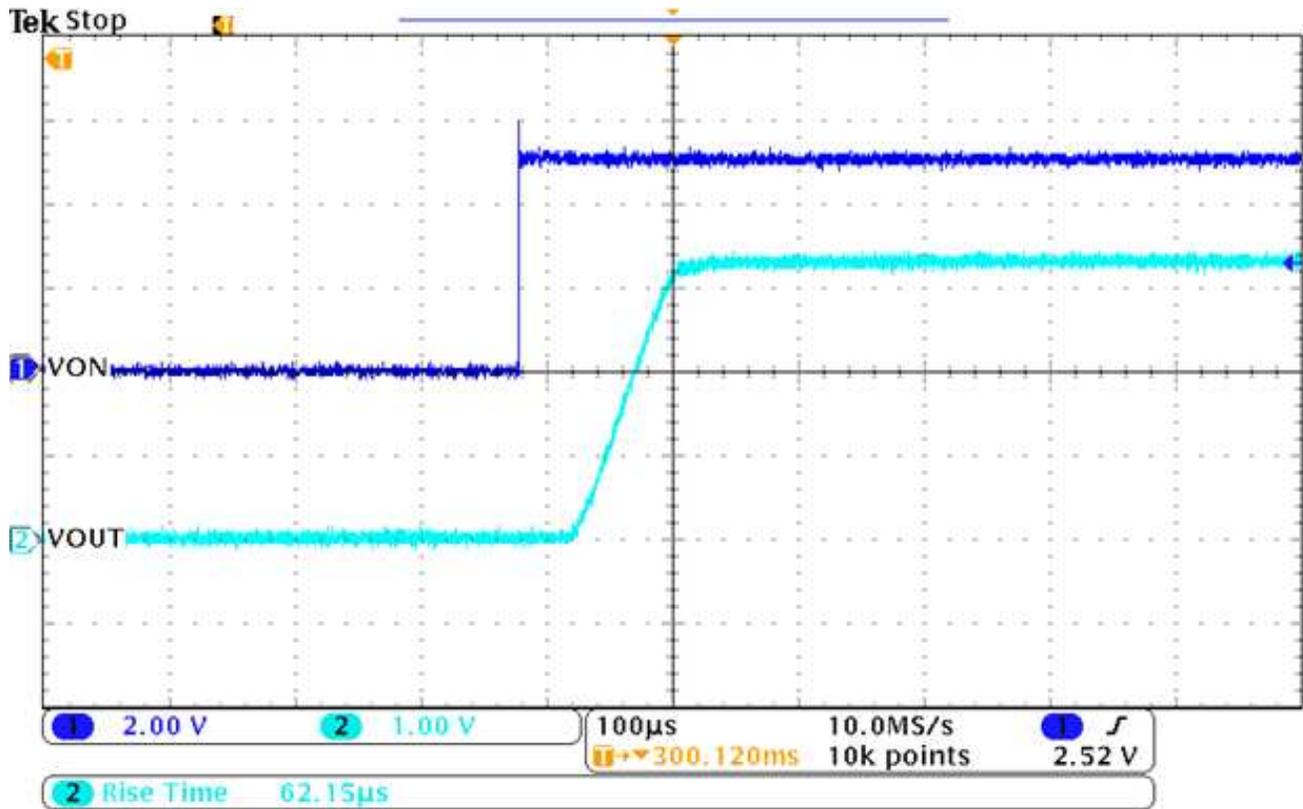


Figure 7. TPS22914/15 Vout t_R Example ($V_{IN} = 3.3V$, $R_L = 10\Omega$)

7 Bill of Materials (BOM)
Table 2. Bill of Materials TPS22914/15EVM

Qty	Designator	Value	Description	Package Reference	Manufacturer	Part Number
1	IPCB1		Printed Circuit Board		Any	HVL078
1	C1	1uF	CAP, CERM, 1uF, 25V, +/-10%, X7R, 0603	0603	MuRata	GRM188R71E105KA12D
1	C2	0.1uF	CAP, CERM, 0.1uF, 100V, +/-10%, X7R, 0603	0603	MuRata	GRM188R72A104KA35D
4	J1, J2, J3, J4	PEC02S AAN	Header, Male 2-pin, 100mil spacing,	0.100 inch x 2	Sullins	PEC02SAAN
1	JP1		Header, 100mil, 3x1, Tin plated, TH	Header, 3 PIN, 100mil, Tin	Sullins Connector Solutions	PEC03SAAN
2	JP2, JP3		Header, 100mil, 2x1, Tin plated, TH	Header, 2 PIN, 100mil, Tin	Sullins Connector Solutions	PEC02SAAN
1	LBL1		Thermal Transfer Printable Labels, 0.650" W x 0.200" H - 10,000 per roll	PCB Label 0.650"H x 0.200"W	Brady	THT-14-423-10
3	SH-J1, SH-J2, SH-J3	1x2	Shunt, 100mil, Gold plated, Black	Shunt	3M, alternate: Samtec	969102-0000-DA, alternate: SNT-100-BK-G
2	TP1, TP3	Red	Test Point, Multipurpose, Red, TH	Red Multipurpose Testpoint	Keystone	5010
1	TP2	Yellow	Test Point, Multipurpose, Yellow, TH	Yellow Multipurpose Testpoint	Keystone	5014
1	U1		Single Channel Ultra-Low Resistnace Load Switch	YFP0004ABAB	Texas Instruments	TPS22915BYFP
1	U1		Single Channel Ultra-Low Resistnace Load Switch	YFP0004ABAB	Texas Instruments	TPS22914BYFP
1	U1		Single Channel Ultra-Low Resistnace Load Switch	YFP0004ABAB	Texas Instruments	TPS22915CYFP
1	U1		Single Channel Ultra-Low Resistnace Load Switch	YFP0004ABAB	Texas Instruments	TPS22914CYFP
0	FID1, FID2, FID3		Fiducial mark. There is nothing to buy or mount.	Fiducial	N/A	N/A

Revision History**Changes from A Revision (July 2014) to B Revision****Page**

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- Added TPS22914C and TPS22915C to document. 1
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