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REVISION HISTORY

9/2019—Rev. 0 to Rev. A

Changes to General Description 1
Changes to Demonstration Board Quick Start Guide Section, Figure 2, and Figure 3 3
Deleted Evaluation Board Layout Section 4
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Changes to Figure 9 5
Changed Evaluation Board Schematic Section to Evaluation Board Schematic and Artwork Section 6
Moved Evaluation Board Schematic and Artwork Section and Figure 10; Renumbered Sequentially 6
Changes to Figure 10 6
Moved Figure 11 and Figure 12 7
Changes to Figure 11 7
Changes to Table 3 8

1/2015—Revision 0: Initial Version

DEMONSTRATION BOARD QUICK START GUIDE

This section explains how to connect the solar panel to the evaluation board and how to configure the evaluation board to start up and run.

1. Connect the 10-pin connector on the solar panel to the J3 10-pin connector on the ADP5090-2-EVALZ as shown in Figure 2.

Figure 2. ADP5090-2-EVALZ Board Hardware

2. Connect the J2_1 and J2_2, J2_9 and J2_10, and J2_11 and J2_12 jumper pairs together on the ADP5090-2-EVALZ board, as shown in Figure 3.
3. Place the system in a bright environment. Monitor the voltage on the supercapacitor using the TP3 (BATT) and TP5 (GND) test points (see Figure 3).
4. The output is available on J4_1 on the ADP5090-2-EVALZ board.

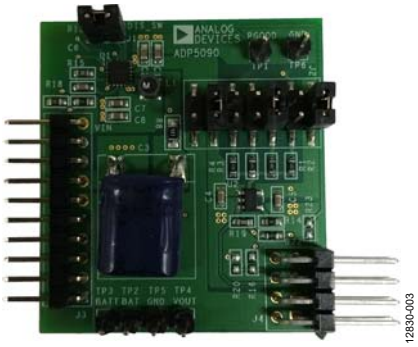

Figure 3. Jumper Setup

EVALUATION BOARD HARDWARE

POWER MANAGEMENT OF THE OUTPUT (LDO)

A low dropout (ADP161) is included on the demo board (the ADP5090-2-EVALZ evaluation board). This regulator chooses different output voltages. Table 1 shows the jumper connections and the corresponding output voltage on the ADP5090-2-EVALZ evaluation board. See the Evaluation Board Schematic and Artwork section for more details. Set the output of the demo board corresponding to each Table 1 setting as shown in Figure 4 to Figure 8.

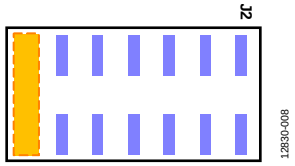

Figure 4. Jumper Position on Demonstration Board for Setting 1

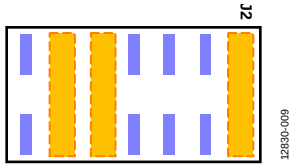

Figure 5. Jumper Position on Demonstration Board for Setting 2

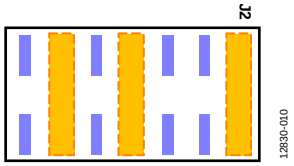

Figure 6. Jumper Position on Demonstration Board for Setting 3

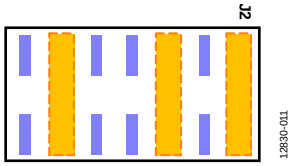

Figure 7. Jumper Position on Demonstration Board for Setting 4

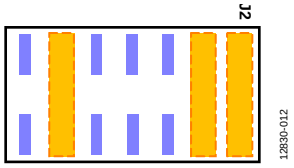

Figure 8. Jumper Position on Demonstration Board for Setting 5

Table 1. Power Management of Sensor Nodes

Setting	VOUT Pin (V)	Jumper Position
1	3.5 V (LDO bypassed)	J2_13 and J2_14 (see Figure 4)
2	2 V	J2_1 and J2_2, J2_9 and J2_10, and J2_11 and J2_12 (see Figure 5)
3	2.4 V	J2_1 and J2_2, J2_7 and J2_8, and J2_11 and J2_12 (see Figure 6)
4	3 V	J2_1 and J2_2, J2_5 and J2_6, and J2_11 and J2_12 (see Figure 7)
5	3.3 V	J2_1 and J2_2, J2_3 and J2_4, and J2_11 and J2_12 (see Figure 8)

J4 OUTPUT CONNECTOR

The J4 output connector (see Figure 9) connects the demo board to the load. As well as providing power, the connector also has other interface connections that allow more interaction between the demo board and the host microcontroller unit (MCU) on the load. The connector is directly compatible with the Analog Devices WSN demo boards. Table 2 shows the pinout of the J4 output connector and provides a brief description of the pin functions.

Table 2. J4 Output Connector

Pin No.	Mnemonic	Description
1	VOUT	Output voltage supply from the demo board to the load
2	PGOOD	PGOOD output signal from the ADP5090
3	GND	Ground
4	DIS_SW	DIS_SW input signal to the ADP5090
5	BATT	Supercapacitor voltage (for battery monitoring)
6	EN	Enable LDO
7	BACK_UP	Backup voltage (for battery monitoring)
8	NC	No connect

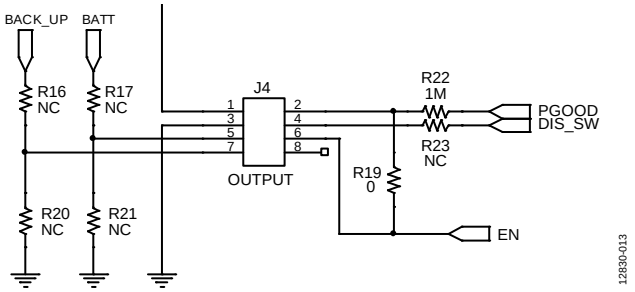

Figure 9. J4 Output Connector

A detailed description of each J4 output connector pin is as follows:

- The VOUT pin (Pin 1) is the output voltage that the demo board delivers to the load.
- The ADP5090 has a programmable PGOOD signal. When the PGOOD threshold is reached, the ADP5090 sets the PGOOD pin (Pin 2) high. The pin is connected to the host MCU GPIO input. See the ADP5090 data sheet for more information on this function.
- The GND pin (Pin 3) is the ground connection for the ADP5090.
- Connect the DIS_SW pin (Pin 4) to the host MCU GPIO output. If the host MCU requires the ADP5090 to temporarily halt the switching regulator function, set this pin high. See the ADP5090 data sheet for more detailed information on this function.
- Connect the BATT pin (Pin 5) to the analog input of the host MCU to monitor the voltage on the supercapacitor of the ADP5090 demo board (ADP5090-2-EVALZ). Populating Resistor R17 and Resistor R21 creates a resistor divider for cases where the MCU analog input range is lower than the supercapacitor voltage.
- The EN pin (Pin 6) is the enable control signal for the ADP161 LDO regulator on the ADP5090 demo board (ADP5090-2-EVALZ). Connect this pin to the host MCU GPIO output to enable or disable the ADP161.
- Connect the BACK_UP pin (Pin 7) to the analog input of the host MCU to monitor the voltage on the supercapacitor of the ADP5090 demo board (ADP5090-2-EVALZ). Populating Resistor R16 and Resistor R20 creates a resistor divider for cases where the MCU analog input range is lower than the supercapacitor voltage.
- The NC pin (Pin 8) is the no connect pin. Do not use this pin.

EVALUATION BOARD SCHEMATIC AND ARTWORK

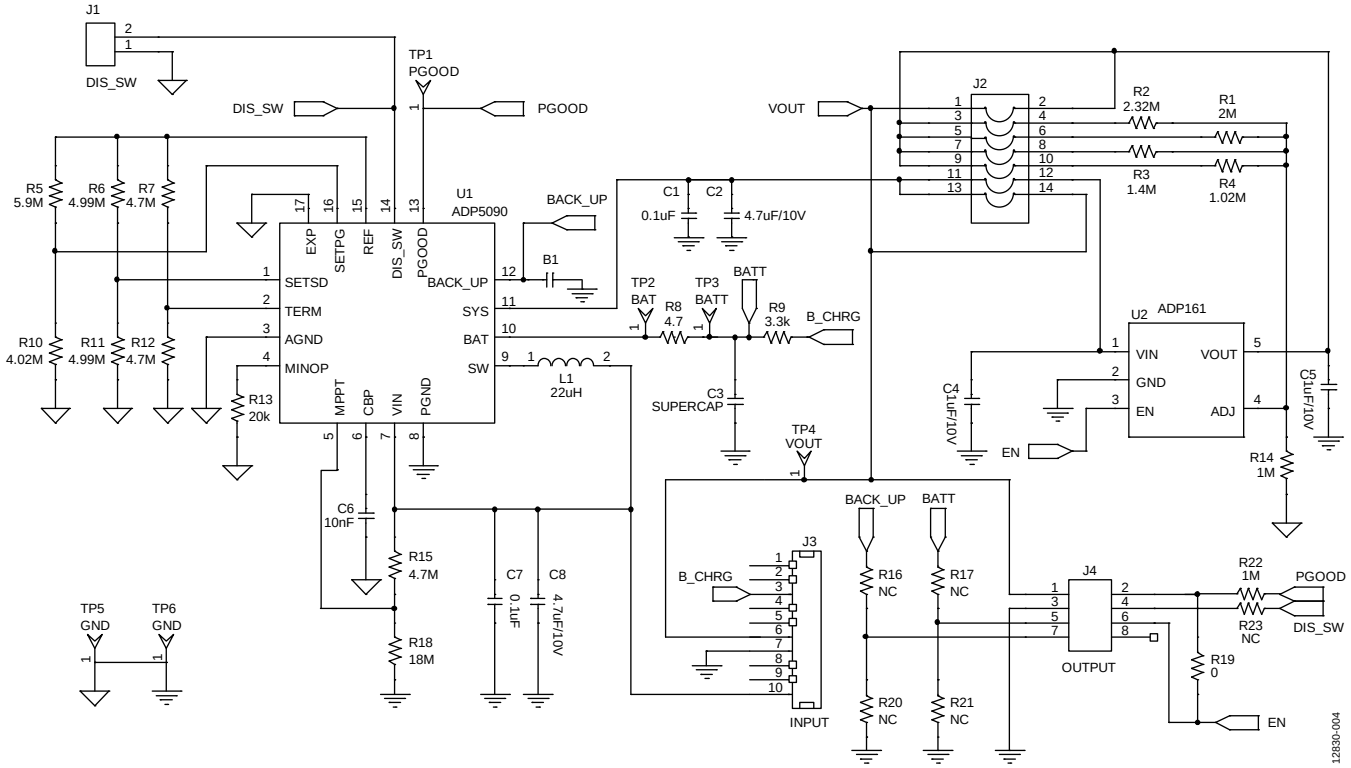

Figure 10. ADP5090-2-EVALZ Evaluation Board

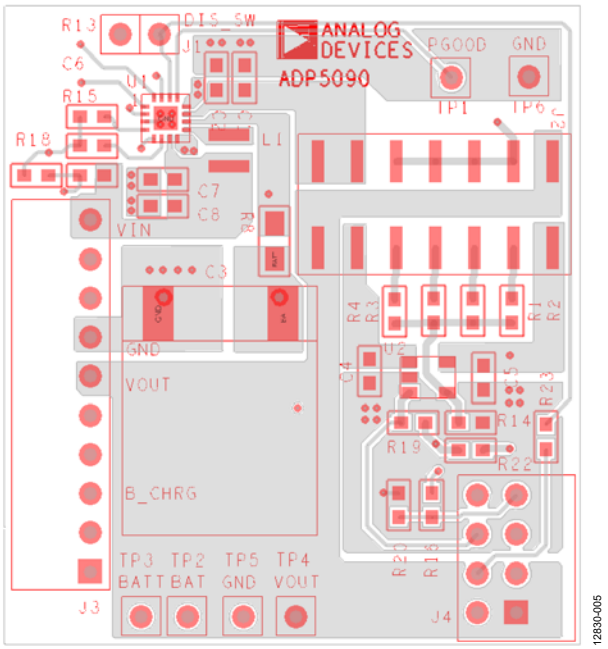

Figure 11. ADP5090-2-EVALZ Evaluation Board Top Assembly

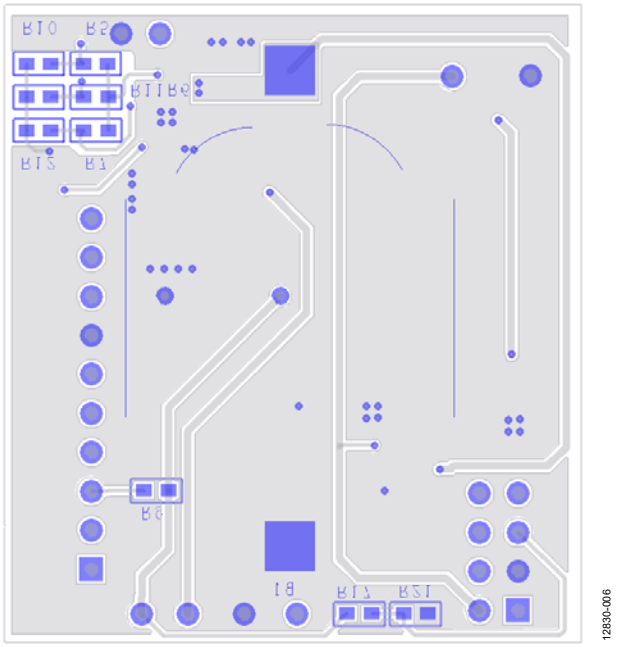

Figure 12. ADP5090-2-EVALZ Evaluation Board Bottom Assembly

BILL OF MATERIALS

Table 3. Bill of Materials

Quantity	Reference	Description	Part Number	Vendor
1	B1	CR2032 holder	BC2032-F1	Memory Protection Devices
2	C1, C7	0.1 µF capacitors, C0603	GRM188R71H104KA93	Murata
2	C2, C8	4.7 µF, 10 V capacitors, C0603	GRM21BR61A475KA73	Murata
1	C3	Supercapacitor, 12 × 12	PB-5R0H104-R	Cooper Bussmann
2	C4, C5	1 µF,10 V capacitors, C0603	GRM185R61A105KE36	Murata
1	C6	10 nF capacitor, C0603	GRM188R71H103KA01	Murata
1	J1	DIS_SW jumper, SIP2	61304011121	Würth Elektronik
1	J2	VOUT jumper, SIP14_dual	61001421121	Würth Elektronik
1	J3	INPUT jumper, SIP10_BtoB	61301011021	Würth Elektronik
1	J4	OUTPUT jumper, SIP8_2rows	61300821021	Würth Elektronik
1	J5	INPUT1 jumper, PV_INPUT	Not applicable	Alta Devices
1	J6	GND jumper, SIP3	61304011121	Würth Elektronik
1	J7	OUTPUT jumper, SIP10	613010143121	Würth Elektronik
1	J8	VIN jumper, SIP3	61304011121	Würth Elektronik
1	J9	INPUT2 jumper, PV_INPUT	Not Applicable	Alta Devices
1	L1	22 µH inductor, 3 × 3	EPL3015-223ML, 744025220	Coilcraft®, Würth Elektronik
1	R1	2 MΩ resistor, R0603	CRCW06032M00FKEA	Vishay Dale
1	R2	2.32 MΩ resistor, R0603	CRCW06032M320FKEA	Vishay Dale
1	R3	1.4 MΩ resistor, R0603	CRCW06031M40FKEA	Vishay Dale
1	R4	1.02 MΩ resistor, R0603	CRCW06031M02FKEA	Vishay Dale
1	R5	5.9 MΩ resistor, R0603	CRCW06035M90FKEA	Vishay Dale
2	R6, R11	4.99 MΩ resistors, R0603	CRCW06034M99FKEA	Vishay Dale
3	R7, R12, R15	4.7 MΩ resistors, R0603	CRCW06034M70FKEA	Vishay Dale
1	R8	4.7 Ω resistor, R0805	CRCW08054R70JNEAIF	Vishay Dale
1	R9	3.3 kΩ resistor, R0603	CRCW06033K3FKEA	Vishay Dale
1	R10	4.02 MΩ resistor, R0603	CRCW06034M02FKEA	Vishay Dale
1	R13	20 kΩ resistor, R0603	CRCW060320K0FKEA	Vishay Dale
2	R14, R22	1 MΩ resistors, R0603	CRCW06031M00FKEA	Vishay Dale
5	R16, R17, R20, R21, R23	NC (no connect) resistors, R0603	Not Applicable	Not Applicable
1	R18	18 MΩ resistor, R0603	RK73B1JTTD186J	KOA
1	R19	0 Ω resistor, R0603	CRCW06030000FKEA	Vishay Dale
1	TP1	PGOOD test point, SIP1	61304011121	Würth Elektronik
1	TP2	BAT test point, SIP1	61304011121	Würth Elektronik
1	TP3	BATT test point, SIP1	61304011121	Würth Elektronik
1	TP4	VOUT test points, SIP1	61304011121	Würth Elektronik
2	TP5, TP6	GND test points, SIP1	61304011121	Würth Elektronik
1	U1	ADP5090 16-lead LFCSP	ADP5090ACPZ-1-R7	Analog Devices
1	U2	ADP161 5-lead SOT-23	ADP161AUJZ-R7	Analog Devices

NOTES

ESD Caution

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

ANALOG DEVICES

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