DA914x Evaluation Board

This document describes the DA914x-30 evaluation board. It provides the basic information for configuring and using the EVB.

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1. Terms and Definitions

EVB	Customer evaluation board
OTP	One-time programming
PCB	Printed circuit board
PMIC	Power management integrated circuit
PSU	Power supply unit

2. References

[1] DA9141-A, DA9142-A Datasheets (for automotive applications), Renesas

[2] DA9141, DA9142 Datasheet (for standard applications), Renesas

[3] DA914x Customer Evaluation Board Schematic DA9140-30-A1_sch.pdf, Renesas

[4] DA914x PCB Layout Recommendations, Application Note, Renesas

[5] DA914x Quick Guide EVB, Renesas

Note 1 References are for the latest published version, unless otherwise indicated.

3. Introduction

This guide helps to get started with the DA9140 Customer Evaluation Board (EVB).

Renesas' DA9141 and DA9142 devices are power management ICs with integrated power FETs, see DA9141-A, DA9142-A Datasheets (for automotive applications) [1] and DA9141, DA9142 Datasheet (for standard applications) [2]. DA9141 is a single channel, quad-phase buck converter capable of driving up to 40 A loads, while the DA9142 is a dual-phase buck converter capable of driving up to 20 A loads.

4. Evaluation Board Hardware

The DA9140-30-A evaluation board enables evaluation of the DA9141 PMIC.

Figure 1. DA9140-30 Customer Evaluation Board

The details of the design reference can be obtained from the DA914x Customer Evaluation Board Schematic [3].

4.1 Quick Start

This guide helps to get started with the DA9140 Customer Evaluation Board (EVB).

Before using the EVB it is recommended to verify that the four banana plugs are properly tightened (1.5 N.m max. recommended), as they can come loose during shipping.

The floor plan of the EVB in Figure 2 helps to locate the input and output plugs as well as the jumper default positions.

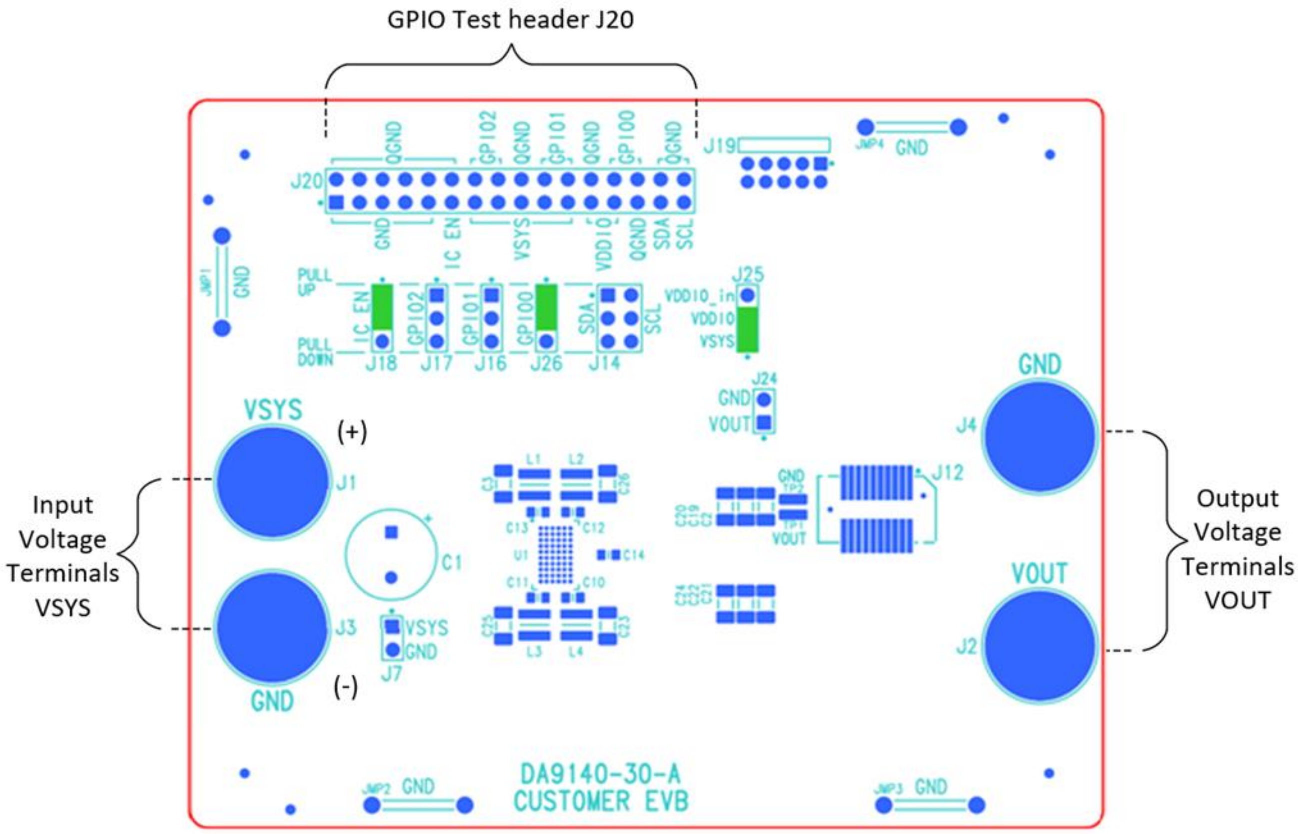

Figure 2. DA9140-30 Jumpers and Headers Location

The default jumper positions from the table below are highlighted green in Figure 2 above.

Table 1. Jumpers and Headers Overview

Connection	Description	Information	Location
J18	IC_EN	Jumper fitted to pull-up position	Left of EVB
J25	VSYS - VDDIO	Jumper fitted to VDDIO - VSYS position	Right of EVB
J1	VSYS	Supply from PSU, 3.3 V - 20 A recommended	Left of EVB
J3	GND		
J7	VSYS sense	PSU remote sensing	Left of EVB
J2	VOUT	Buck converter output	Right of EVB
J4	GND		
J24	VOUT sensing	For probing or eLoad remote sensing	Middle of EVB

4.2 Using the Evaluation Board

The DA9141 buck converter delivers a load current of 25 A continuous. For powering the EVB at VSYS/J1 (+) and GND/J3 (-) it is recommended to use a PSU which can deliver at least 10 A at 3.3 V with Kelvin-sensing capability. The voltage sensing can be connected to the sense terminal J7 (VSYS and GND) which is used by the PSU to compensate the voltage drop at the VSYS/GND wires at higher buck loads. At the buck output plugs VOUT/J2 (+) and GND/J4 (-) an electronic load can be connected. The terminal J24 can be used to sense VOUT close to the output pins of the buck.

4.2.1 Recommendations for Specific Measurements

The following describes how to perform typical buck measurements using the EVB.

- Efficiency Measurement
  - Power supply: Use a PSU with 4-wire / Kelvin-sensing capability as described in section 4.2. Try to use short wires to connect the PSU to VSYS/GND. For higher loads, the impedance of a wire can be reduced by connecting two wires in parallel.
  - Input current measurement: Consider the voltage drop at the internal shunt resistor of an ammeter. A big voltage drop at such series resistor in the VSYS rail could prevent the buck to start-up properly. In this case it is recommended to use an external shunt resistor of example 10 mΩ, measure the voltage drop at it and calculate the current flowing through it / into the EVB.
  - Loading the buck: Consider the voltage drop at the wires connected to VOUT/GND. In case an eLoad is used prefer to use it in 4-wire mode with voltage sensing connected to terminal J24.
- Load Transient Measurement
  - Please follow the recommendation for the efficiency measurements described above.
  - The blade connector J12 can be used to connect a pulse load to the EVB. It offers a low-inductive connection between the buck output and a connected pulse load. It consists of two multi-contact pin rows and is compatible with the thickness of a standard double layer PCB.
  - The test header TP1/VOUT and TP2/GND or J24 can be used to measure the buck load transient response close to the output capacitors. Using a differential probe together with an oscilloscope to measure the buck response improves the signal quality by reducing common mode noise. Consider the bandwidth settings of the probe and the scope channel.

Note: Consider cooling of the EVB in case the buck load can get higher than 10 A. Fit the heatsink to the device if supplied with the package.

4.3 Jumper Configuration

Table 2 provides information about the jumpers and headers available on the EVB.

Table 2. Jumpers and Headers Configuration

Connection	Description	Information	Location
JMP1 to JMP4	GND points	Available for grounding scope probes	Each corner of EVB
J1	VSYS	Supply from PSU, 3.3 V – 20 A recommended	Left of EVB
J3	GND		
J2	VOUT	Buck converter output	Right of EVB
J4	GND		
J20	GPIO header	Available for probing	Top of EVB
J16, J17, J26	GPIO0, 1, 2 pull-up, pull-down jumpers	GPIO input configuration	Below J20
J18	IC_EN	Jumper fitted to pull-up position	Below J20
J25	VDDIO - Vdd rail for GPIOs	Jumper fitted to VDDIO - VSYS position	Right of EVB
J7	VSYS sense	PSU remote sensing	Below C1
J12	VOUT - GND	VOUT blade connector	Right of EVB
J24	VOUT sense	For probing or eLoad remote sensing	Below J25
TP1 - TP2	VOUT - GND	For VOUT probing	Left of J12
J19	I²C dongle header	For internal use	Top of EVB

4.4 OTP Specific Configuration

Table 3 describes some of the DA914x standard configurations. Additional OTP variants are available upon request.

Table 3. OTP Variant Description

OTP	VOUT A	VOUT B	GPIO0	GPIO1	GPIO2
-08	0.80 V	0.85 V	Input: Buck Output enable	Input: VOUT A/B select	Output: PG (Power Good)
-09	0.90 V	0.95 V	Input: Buck Output enable	Input: VOUT A/B select	Output: PG (Power Good)
-10	1.00 V	1.05 V	Input: Buck Output enable	Input: VOUT A/B select	Output: PG (Power Good)

Further information can be found on the web site general-purpose-power-management-ics-pmics

5. Revision History

Revision	Date	Description
01.11	Sep 09, 2025	Converted to new template
01.10	Feb 15, 2023	Updated website links
01.00	Feb 04, 2022	First version.

Status Definitions

Status	Definition
DRAFT	The content of this document is under review and subject to formal approval, which may result in modifications or additions.
APPROVED or unmarked	The content of this document has been approved for publication.

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