PAC5285EVK1

PAC5285 Evaluation Kit

Introduction

Qorvo's PAC5285EVK1 development platform is a complete hardware solution enabling users not only to evaluate the fully integrated PAC5285 device, but also develop motor drive applications revolving around this powerful and versatile ARM® Cortex®-M0 based microcontroller. The module contains a PAC5285 Power Application Controller® (MCU) and all the necessary circuitry to properly energize the MCU and its internal peripherals once power is applied.

To aid in the application development, the PAC5285EVK1 offers access to each and every one of the PAC5285 device's signals by means of a series of male header connectors.

The PAC5285EVK1 also contains access to an external USB to UART module. This enables users to connect the evaluation module to a PC computer through a conventional Virtual COM Port which can then be used in the communication efforts by taking advantage of the PAC5285's UART interface. Graphical User Interface (GUI) software suites can be employed to externally control a variety of application's features.

Finally, the PAC5285EVK1 module gives access to the PAC5285's SWD port allowing users to both program the application into the device's FLASH memory, as well as debug the application in real time. The provided 4 pin connector is compatible with a decent variety of SWD based debugger/programmer modules, widely available.

Qorvo's PAC5285EVK1 Reference Design Module consists of the following:

- PAC5285EVK1 User Manual
- Altium Schematics
- Bill Of Materials
- Altium Layout

PAC5285EVK1 Module

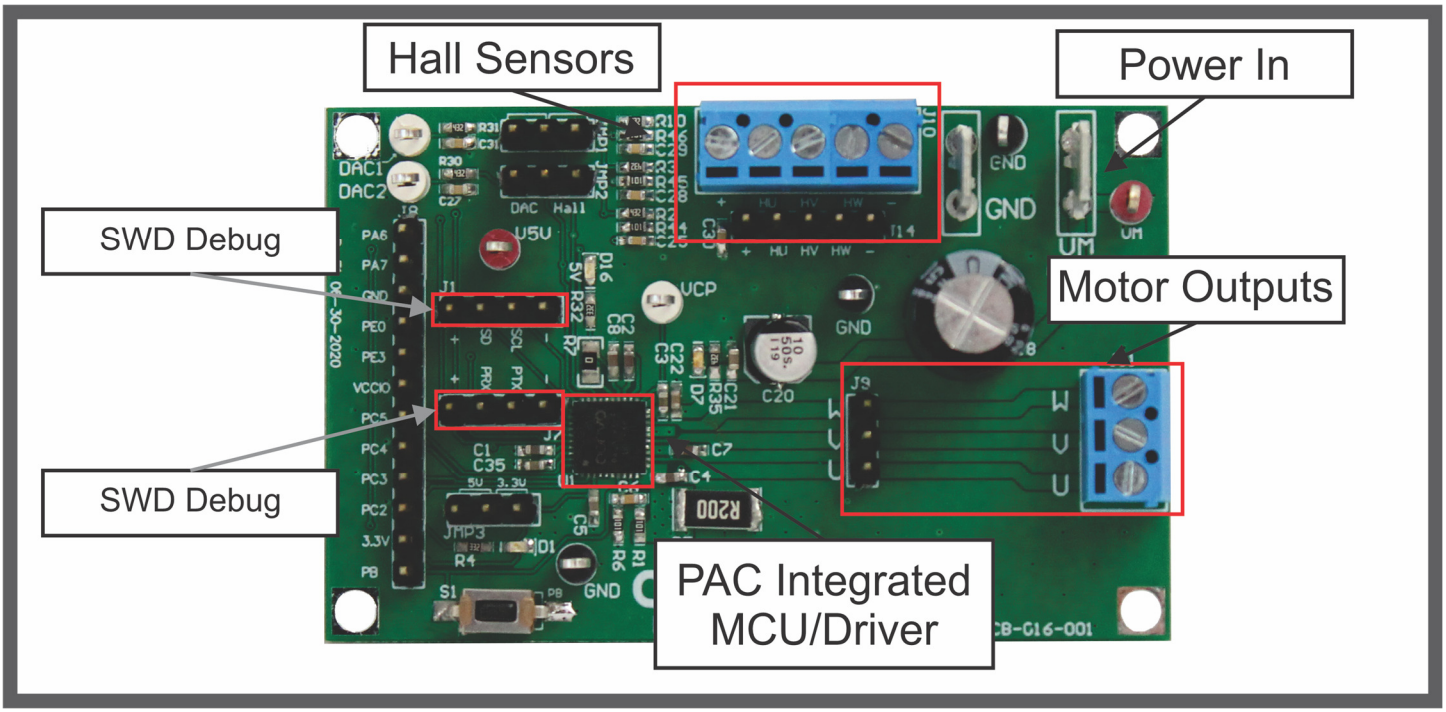

Figure 1: PAC5285EVK1 Block Diagram

Solution Benefits:

- Ideal for Low Voltage (Nominal 12V – up to 40V Abs Max) general purpose power applications and controllers.
- Single-IC PAC5285 fully integrated tri phase inverter with ADC inputs, I2C, UART, SPI and GPIO.
- Two PWM DAC's for general purpose real time debugging (optional use).
- Hall Sensor Interface for sensored applications.
- Current and Voltage sensing for sensorless applications.
- Schematics, BOM, Layout drawings available

The following sections provide information about the hardware features of Active-Semi's PAC5285EVK1 turnkey solution.

PAC5285EVK1 Resources

Pinout and Signal Connectivity

The following diagram shows the male header pinout for the PAC5285EVK1 Reference Design module, as seen from above:

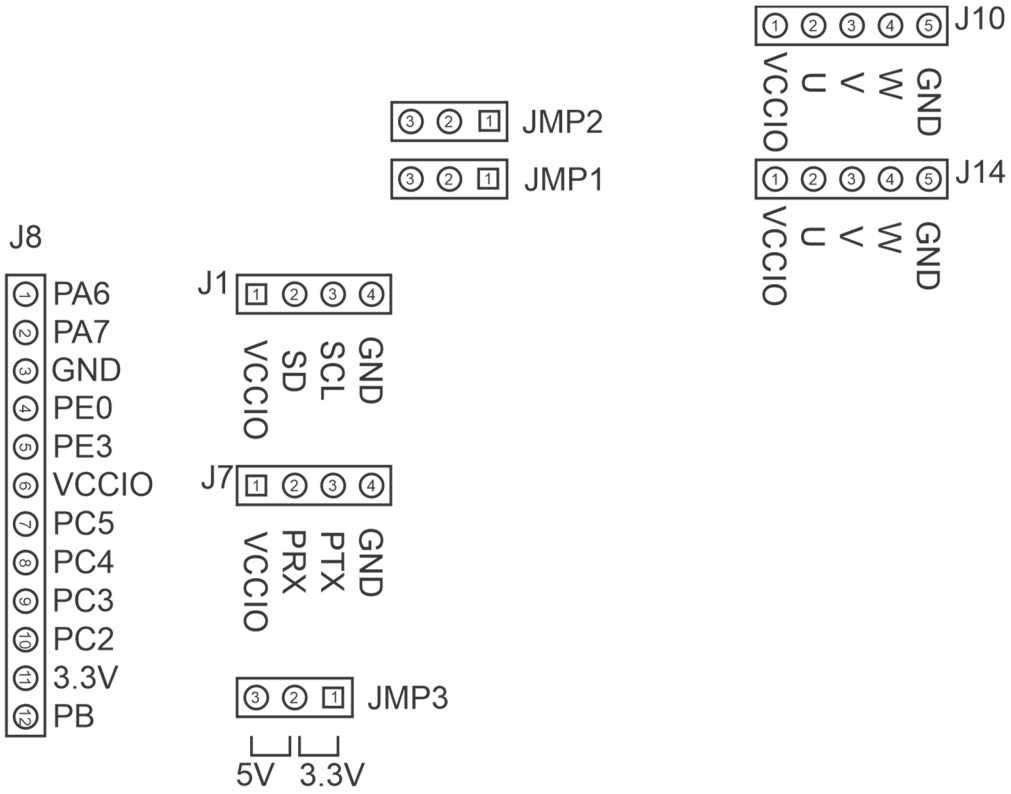

Figure 2 PAC5285EVK1 Headers and Test Stakes Pinout

Power Input

A DC voltage must be supplied to power up the PAC5285EVK1 reference design module. Said voltage can be applied at the VM and GND spade connectors. Voltage to the PAC5285EVK1 evaluation module should not exceed 40 VDC (Abs Max).

The PAC5285EVK1 is optimized to operate with 12VDC to 14VDC nominal voltage sources. When the input voltage (VM) goes above 5.5 VDC, the system's internal regulators are powered up and the device exits UVLO protection. At this time all subsystems, including the analog front-end, and microcontroller, are functional.

LED's

When an operational voltage is applied, LED D16 will light up. This is the LED which notifies VSYS (5V) rail is up and running. VCC33 (for analog circuitry), VCCIO (for GPIO) and the 1.8V (for CPU core) regulators will also be operating at this point in time. Module is ready for use.

Also, a general purpose LED has been provided as a PC2 resource which the user can use for different debugging functions.

The following table shows the provided LED and its associated diagnostic function.

LED	Description
D1	General Purpose LED (connected to PC2)
D16	VSYS (5V). Light up when the PAC5285 device is successfully powered up by VM.

VCCIO Jumper (JMP3)

PAC5285's VCCIO rail needs to be driven externally through either the VSYS (5V) or the VCC33 (3.3V) linear regulator output. JMP3 determines which source is employed. A shunt must be placed on one of the two positions as per the table below. VCCIO is the rail utilized to power up all GPIO resources (PORTA/B/D/E).

JMP3	Description
JMP3 1:2	VCCIO = VCC33 (3.3V)
JMP3 2:3	VCCIO = VSYS (5V)

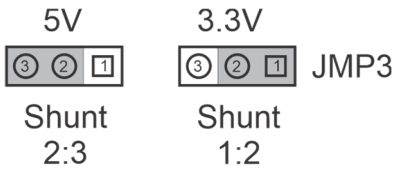

Figure VCCIO Jumper Selection

SWD Debugging

Connector J1 offers access to the PAC5285 SWD port lines.

J1 Pin	Terminal	Description
1	+	VCCIO (3.3V)
2	SD	SWD Serial Data (PF1)
3	CL	SWD Serial Clock (PF0)
4	-	GND (System Ground)

Serial Communications

Connector J7 offers access to the PAC5285 UART port lines.

J7 Pin	Terminal	Description
1	+	VCCIO (default is 5V)
2	RX	MCU Receive Line (PE3)
3	TX	MCU Transmit Line (PE2)
4	-	GND (System Ground)

Hall Sensor / DAC Interface

Terminal Block J10 offers access to the PAC5285 resources on PORTA and PORTE utilized for hall sensor based commutation. PORTA resources can be alternatively utilized as PWM DAC outputs for in real time debugging. Jumpers JMP1/2 are used to select the preferred function.

NOTE: 2 pin shunts must be placed on the JMP1/2 in order for the respective PORTA resources to be made available.

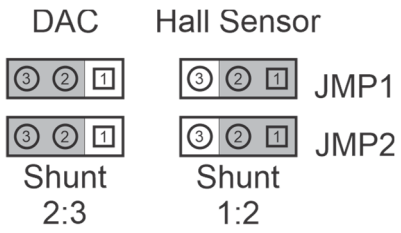

Figure 4 DAC / Hall Sensor Jumper Selection

Jumper JMP1/2	Description
1:2	Hall Sensor Functionality
2:3	DAC Functionality

NOTE: J10/J14 functionality is only available when jumpers JMP1/2 have been shunted on the Hall Sensor respective position.

J10/J14 Pin	Terminal	Description
1	+	VCCIO (3.3V)
2	Hall Sensor U	PORTA6
3	Hall Sensor V	PORTA7
4	Hall Sensor W	PORTE0
5	GND	GND (System Ground)

NOTE: Test stakes DAC1/2 are only available when jumpers JMP1/2 have been shunted on the DAC respective position

Test Stake	Description
DAC 1	PORTA6
DAC 2	PORTA7

PAC5285EVK1 SETUP

The setup for the PAC5285EVK1 evaluation module requires up to four simple connections.

1. Connect the 3 Phase BLDC/PMSM motor via 3 pin header J9 or terminal block connector J11.
2. If Serial Communications are desired, connect the USB to UART module 4 pin header J7.
3. For debugging/programming, connect a suitable USB SWD module to J1 by using a standard 4 wire cable.
4. Connect the regulated DC voltage power source via spade connectors VM and GND.
5. **NOTE**: Once rectified input voltage goes above 5.5VDC, the PAC5285's Multi Mode Power Manager will be engaged and the VSYS (5V) regulator will be enabled. This event will result in LED D16 lighting up.

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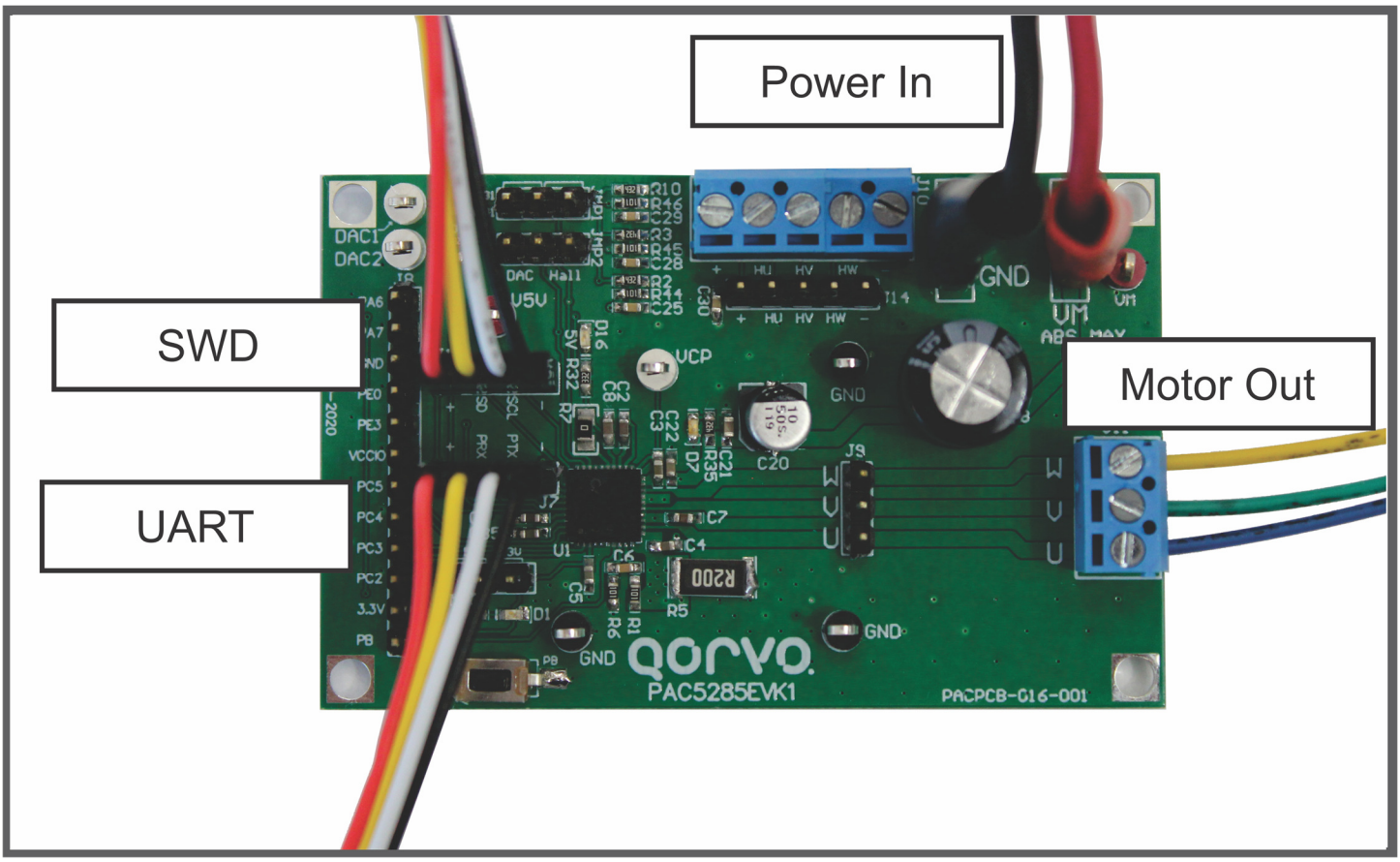

Figure 5: PAC5285EVK1 Evaluation Module Connections

Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations:

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