EVM User's Guide: DRV81315-Q1EVM DRV81325-Q1EVM

DRV813xx-Q1 Evaluation Modules

Description

The DRV813xx-Q1 evaluation modules (EVMs) allow for evaluation of the DRV81315-Q1 and DRV81325-Q1 devices. The EVMs have been programmed to work out of the box and begin driving loads right away. The EVMs showcase selected packages of low-side switch drivers with low $R_{DS(on)}$ of approximately 100mΩ. The EVMs also support the connection of sense resistors on each individual half bridge, enabling current sensing at system level for applications needing current control.

Get Started

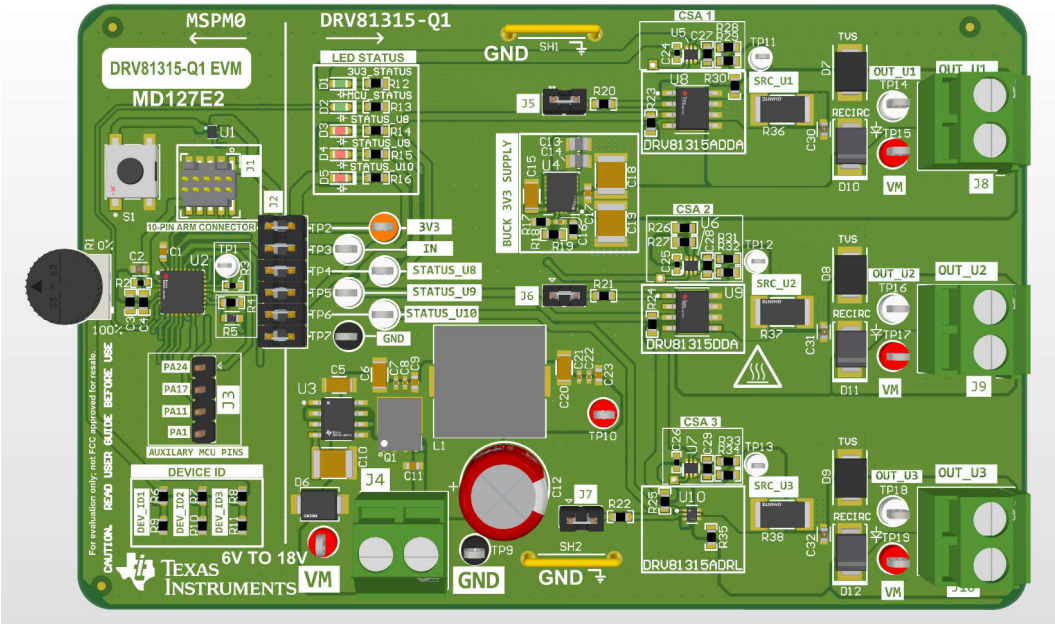
1. Order the EVM.
   a. DRV81315-Q1EVM
   b. DRV81325-Q1EVM
2. Connect external power supply.
3. Connect loads to the output and apply the inputs.

Features

- Onboard 3.3V LDO for digital voltage supply
- Main signal header with removable shunts to disconnect main signals going to the load driver IC from the MCU
- Onboard potentiometer to control input PWM
- Onboard jumpers to connect and disconnect each driver
- Contains three packages for easier evaluation
- Onboard current amplifier to measure the load current

Applications

- Transmission control units
- Lighting
- Engine management
- Battery management system
- Seating and roofing application



DRV81315-Q1EVM

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1 Evaluation Module Overview

1.1 Introduction

The DRV81315-Q1 and DRV81325-Q1 family of devices consist of low-side switches with the following features:

- DRV81315-Q1: This device provides a single protected low-side switch with a low $R_{DS(on)}$ of 100mΩ. The device can be controlled by means of a GPIO interface. The switch is protected against overcurrent, overtemperature and output overvoltage protection which can also be used for inductive load demagnetization. A faults report is available as an open drain STATUS output. The DRV81315-Q1 also supports an open-load/short to GND detection diagnostic in the off state and is reported on the STATUS pin.
- DRV81325-Q1: This device provides two low-side switches with a low $R_{DS(on)}$ of 120mΩ. The device can be controlled by means of a parallel interface. Each channel is protected against overcurrent, overtemperature and output overvoltage protection for inductive load demagnetization. A faults report is available per each channel as an open drain STATUS output.

This document is provided with the DRV81315-Q1 and DRV81325-Q1 evaluation modules (EVM) as a supplement to the DRV81315-Q1 and DRV81325-Q1 datasheets. This EVM user's guide covers EVM hardware setup instructions, GUI installation, and usage instructions.

1.2 Kit Contents

Table 1-1 lists the contents of the EVM kit. Contact the nearest Texas Instruments Product Information Center if any component is missing.

Table 1-1. Kit Contents

ITEM	QUANTITY
One of DRV81315-Q1EVM, or DRV81325-Q1EVM	1

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1.3 Specification

The DRV813xx-Q1EVM is preprogrammed with firmware for evaluation. A 10-pin connector is available onboard if the user wants to reflash the onboard MCU (MSPM0G3507) with customer firmware. A buck converter supplies a 3.3V rail to power the MCU from the VM supply voltage. The J2 signal header uses removable shunts to pass the signals from the MCU to the motor driver. Remove any of these shunts to easily jump in external control signals to the driver. Connect an external motor power supply with an operating range of the device to the J4 screw terminal . The DRV813xx-Q1EVM supports 3V to 5.5V input supply voltage and 6V to 18V output load voltage ranges.

1.4 Device Information

The DRV81315-Q1 and DRV81325-Q1 provide single channel and dual channel protected low-side switches respectively with integrated output overvoltage protection for inductive load demagnetization. The channels are protected against overcurrent and overtemperature. A Faults report is available per each channel as an open drain STATUS output on the DRV813xxA-Q1 variants. The devices are available in different packages which are utilized on the EVMs.

The documents in Table 1-2 provide information regarding the Texas Instruments integrated circuits used in the assembly of the EVM. This user's guide is available from the TI web site under literature number SLVUDT6. Any letter appended to the literature number corresponds to the document revision that is current at the time of the writing of this document. Newer revisions are available from the TI web site at www.ti.com, or call the Texas Instruments Literature Response Center at (800) 477-8924 or the Product Information Center at (972) 644-5580. When ordering, identify the document by both title and literature number.

Table 1-2. Related Device Documentation

Description	Datasheet
Main MSPM0 MCU	MSPM0G3507
Low-Side Switches	DRV81315-Q1 DRV81325-Q1
Buck Convertor	TPSM365R3

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2 Hardware

2.1 Headers and Test Points Information

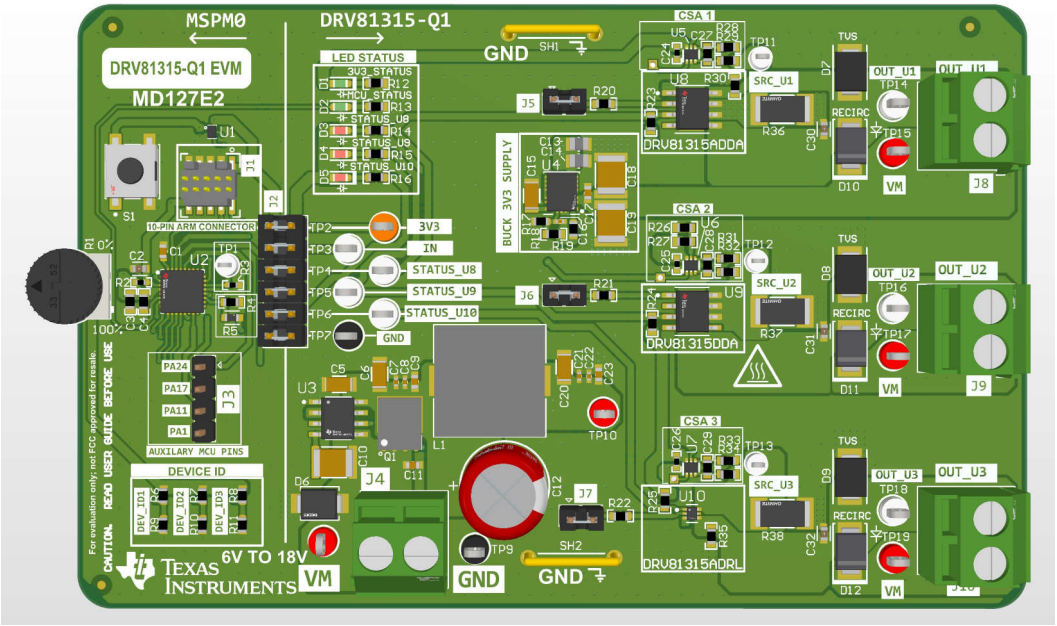


Figure 2-1. DRV81315-Q1EVM (MD127-001) Top View

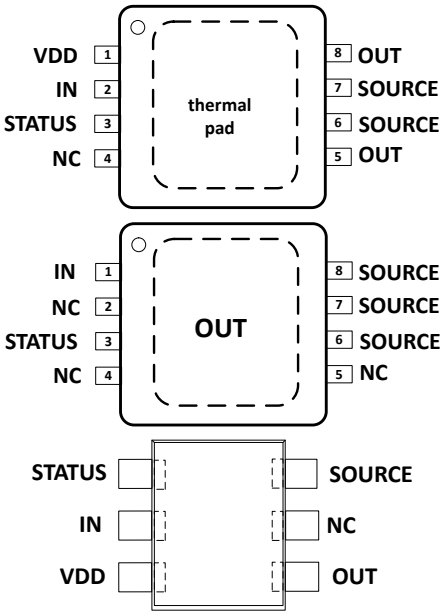


Figure 2-2. DRV81315-Q1 Packages Top Views. Top to Bottom: DRV81315AQDDARQ1, DRV81315QDDARQ1, DRV81315AQDRLRQ1

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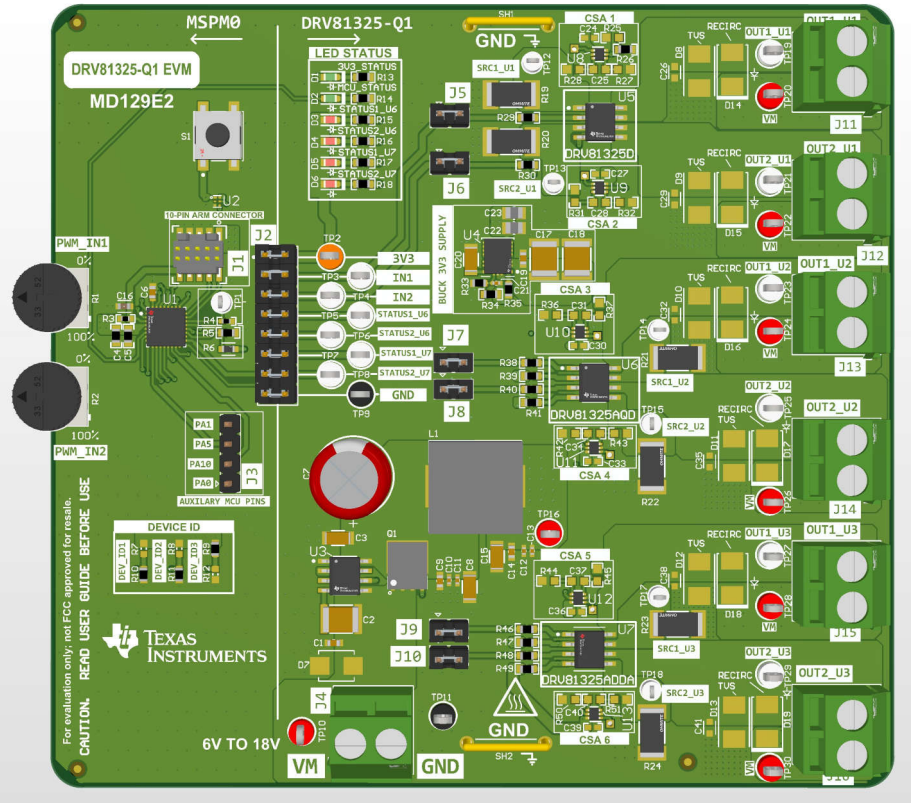


Figure 2-3. DRV81325-Q1EVM (MD129-001) Top View

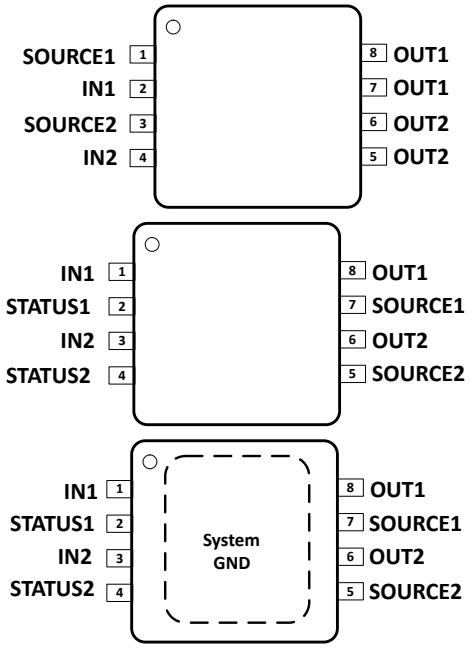


Figure 2-4. DRV81325-Q1 Packages Top Views, Top to Bottom: DRV81325QDRQ1, DRV81325AQDRQ1, DRV81325AQDDARQ1

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CAUTION

Hot surface temperature. The EVM can have high surface temperatures marked by the FIRE triangular symbol on the EVM. Avoid touching the marked hot surface area when driving high currents to prevent potential burn damage.

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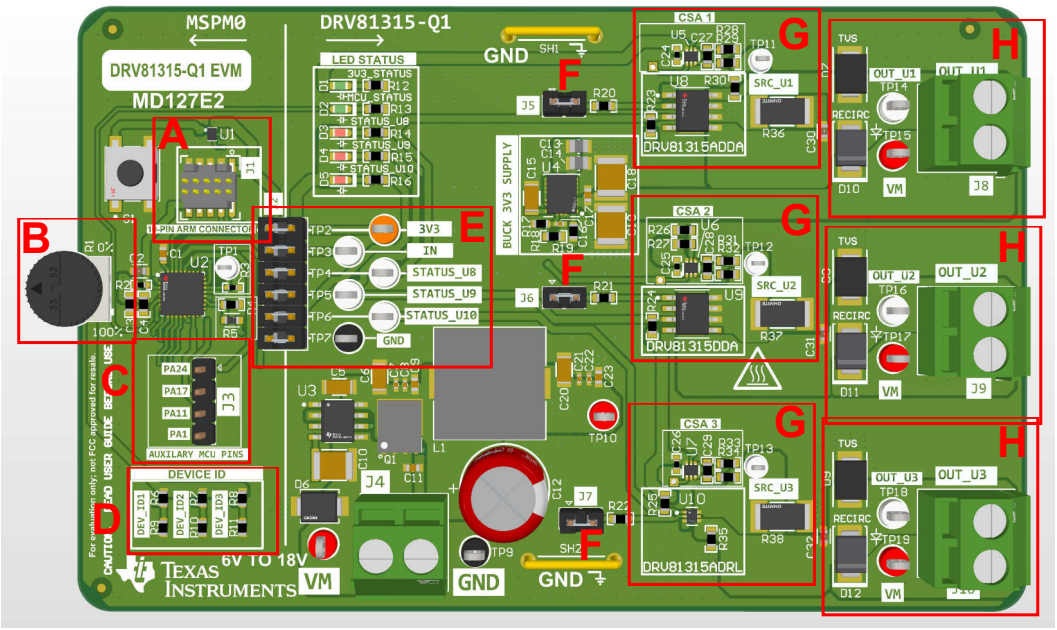


Figure 2-5. DRV81315-Q1EVM Header and Test Point Information

Table 2-1. Header and Test Point Description - DRV81315-Q1EVM

Component Label	Description
A	10-pin programming header. Use to flash new firmware to the MCU.
B	Input potentiometer.
C	Auxiliary MCU pins for future improvement.
D	EVM variant ID for firmware identification: • DRV81315-Q1EVM: 000b • DRV81325-Q1EVM: 100b
E	Main signal header: • **3V3**: 3.3V from BUCK 3V3 Supply. • **IN**: HW interface channel input from R1 potentiometer. • **STATUS_U8**: Status pin of DRV81315AQDDARQ1 device. • **STATUS_U9**: Status pin of DRV81315QDDARQ1 device. • **STATUS_U10**: Status pin of DRV81315AQDRLRQ1 device • **GND**: GND test point.
F	J5-J7 jumper to connect IN input to DRV81315-Q1 drivers.
G	DRV81315AQDDA / DRV81315QDDA / DRV81315AQDRL driver components with current source amplifier components.
H	DRV81315AQDDARQ1, DRV81315QDDARQ1, DRV81315AQDRLRQ1 driver output connectors.
I	VM power input. The pin supplies the Buck converter to provide 3.3V and also provide high-side supply voltage for output connectors.

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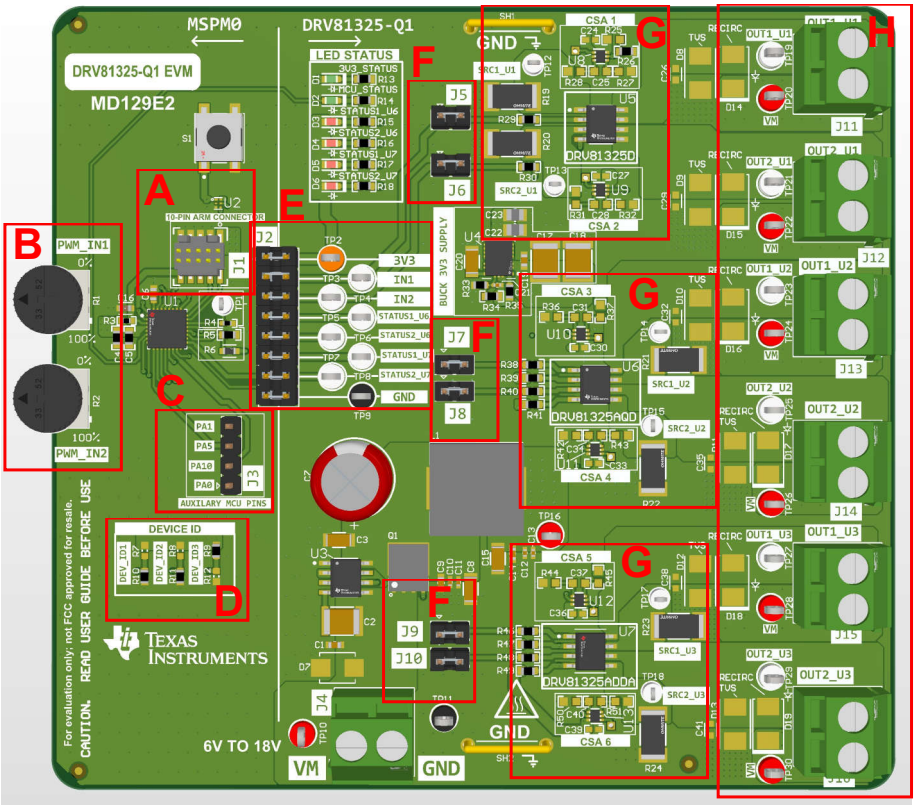


Figure 2-6. DRV81325-Q1EVM Header and Test Point Information

Table 2-2. Header and Test Point Description - DRV81325-Q1EVM

Component Label	Description
A	10-pin programming header. Use to flash new firmware to the MCU.
B	Input1 and Input2 potentiometer
C	Auxiliary MCU pins for future improvement.
D	EVM variant ID for firmware identification: • DRV81315-Q1EVM: 000b • DRV81325-Q1EVM: 100b
E	Main signal header: • **3V3**: 3.3V from BUCK 3V3 Supply. • **IN1**: HW interface channel input from R1 potentiometer. • **IN2**: HW interface channel input from R2 potentiometer. • **STATUS1_U6**: Status1 pin of DRV81325AQDRQ1 device. • **STATUS2_U6**: Status2 pin of DRV81325AQDRQ1 device. • **STATUS1_U7**: Status1 pin of DRV81325AQDDARQ1 device.. • **STATUS2_U7**: Status2 pin of DRV81325AQDDARQ1 device. • **GND**: GND test point.
F	J5-J10 jumper to connect IN1 and IN2 inputs to DRV81325-Q1 drivers.
G	DRV81325QD/ DRV81325AQD / DRV81325AQDDA driver components with current source amplifier components..
H	DRV81325QDRQ1, DRV81325AQDRQ1, DRV81325AQDDARQ1 driver outputs connectors.
I	VM power input. The pin supplies the Buck converter to provide 3.3V and also provide high-side supply voltage for output connectors.

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2.2 LED and Connector Information

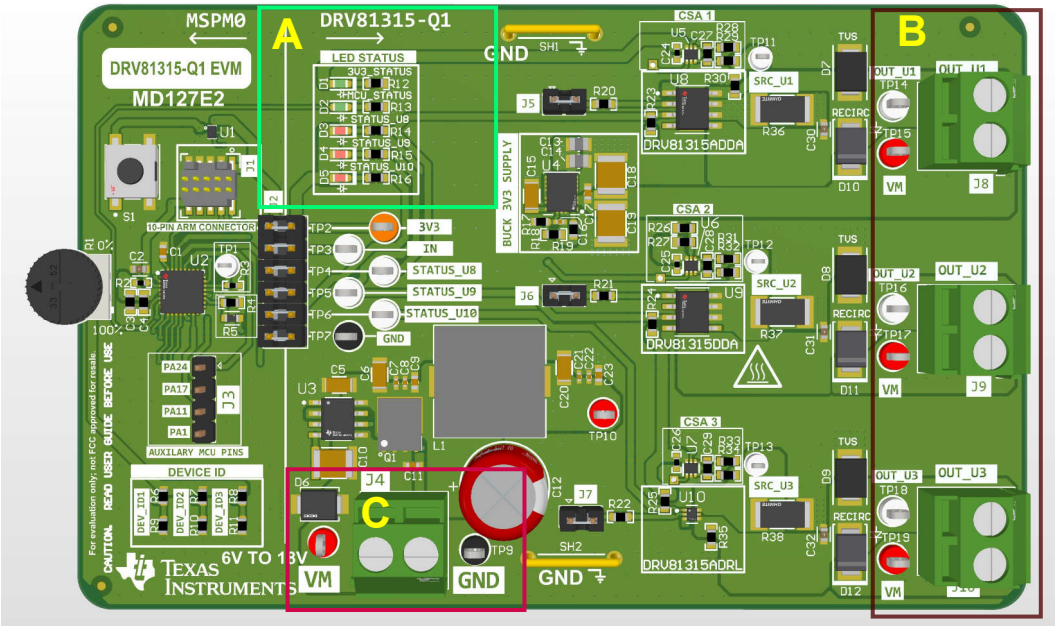


Figure 2-7. DRV81315-Q1 EVM LED and Connector

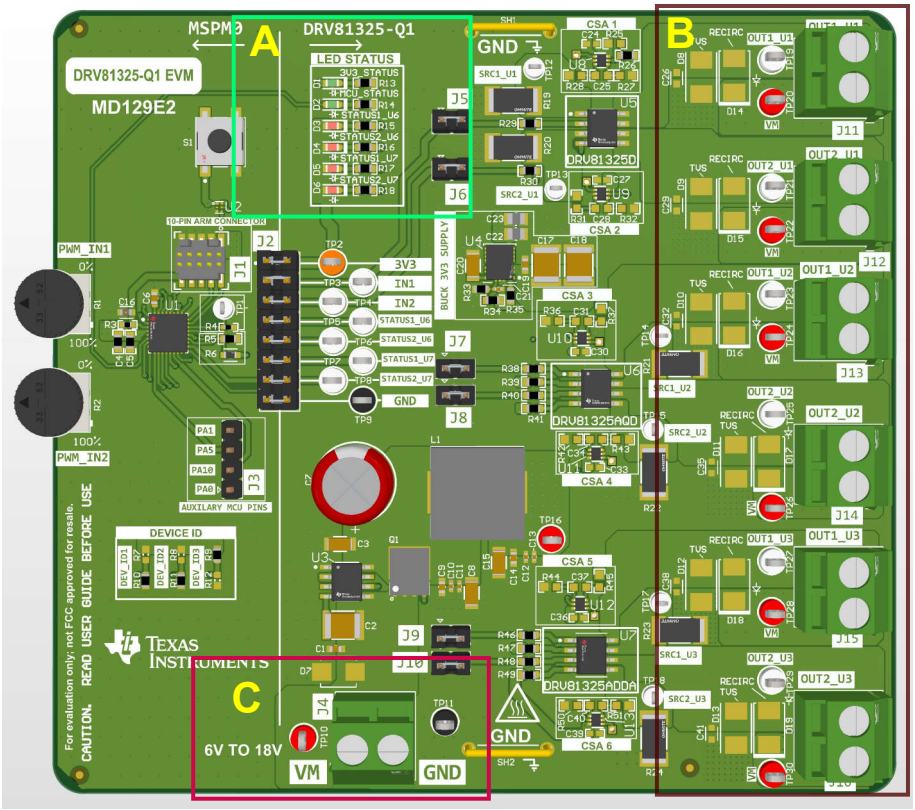


Figure 2-8. DRV81325-Q1 EVM LED and Connector

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Table 2-3. LED and Connectors Description

Component Label	Description
A	LED indicators: • **3V3 STATUS: OFF** when 3.3V is not active. **ON** when 3.3V is active. • **MCU_STATUS:** LED toggles at a rate of around 1s when MCU is active. Unplug and reconnect the EVM to the computer if this stops flashing. • **STATUSx_Ux: OFF** device operates normally. **ON** overtemperature, overcurrent protection triggered.
B	DRV813xx-Q1 driver output connectors.
C	Input power supply connector. Power cables can be connected directly to the screw terminals or clipped to the test points on either side of the connector.

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2.3 Hardware Setup

The EVM hardware is designed and kitted to simplify setup and begin driving loads. The EVM comes with the jumpers placed at the appropriate locations in the headers. Descriptions of the jumpers, also called shunts, are listed in Table 2-1 and Table 2-2.

To utilize the EVM follow these steps:

1. Set the potentiometer to 0% and shunt the related input PWM jumpers for each driver (J5 to J7 in DRV81315-Q1EVM and J5 to J10 in DRV81325-Q1EVM).
2. Connect power supply (less than 18V) to the power connector. Turn ON power supply. LED D1 (3.3V) must be solid ON and LED D2 (MCU STATUS) needs to be toggling ON/OFF at 1s intervals.
3. Connect load to the appropriate output connectors.
4. Set up is now complete. See Figure 2-9 for setup image.

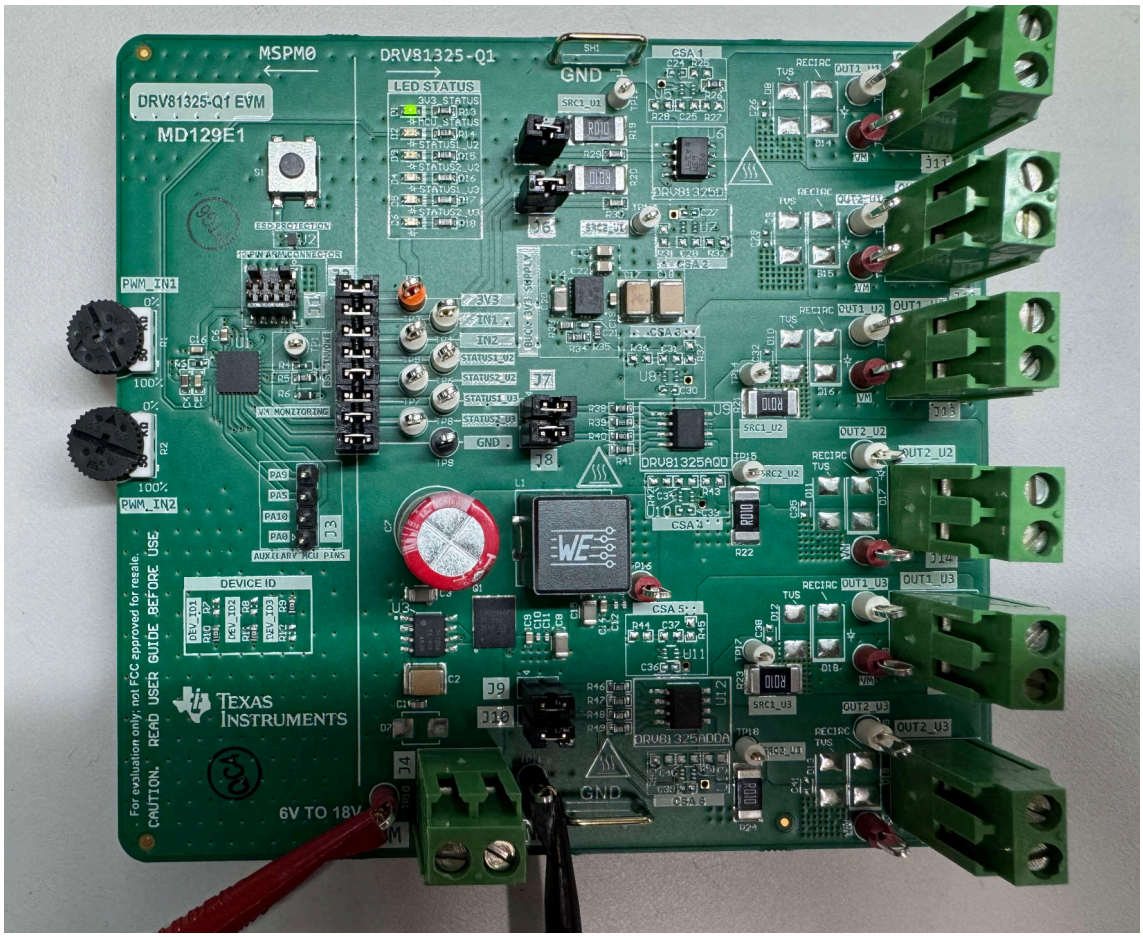


Figure 2-9. Hardware Setup

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3 Hardware Design Files

The schematics, bill of materials (BOM), PCB layout, and 3D model STEP file for each EVM can be downloaded on the respective product folder page under the *Design Files* section.

- https://www.ti.com/tool/DRV81315-Q1EVM#design-files
- https://www.ti.com/tool/DRV81325-Q1EVM#design-files

3.1 Schematics

Figure 3-1 shows the schematics for the DRV81315-Q1EVM. See the schematics of other devices by downloading the *Hardware Design Files* from any EVM tool folder under the *Design Files* section. DRV81315-Q1EVM Hardware Files.zip for DRV81315-Q1EVM and DRV81325-Q1EVM Hardware Files.zip for DRV81325-Q1EVM.

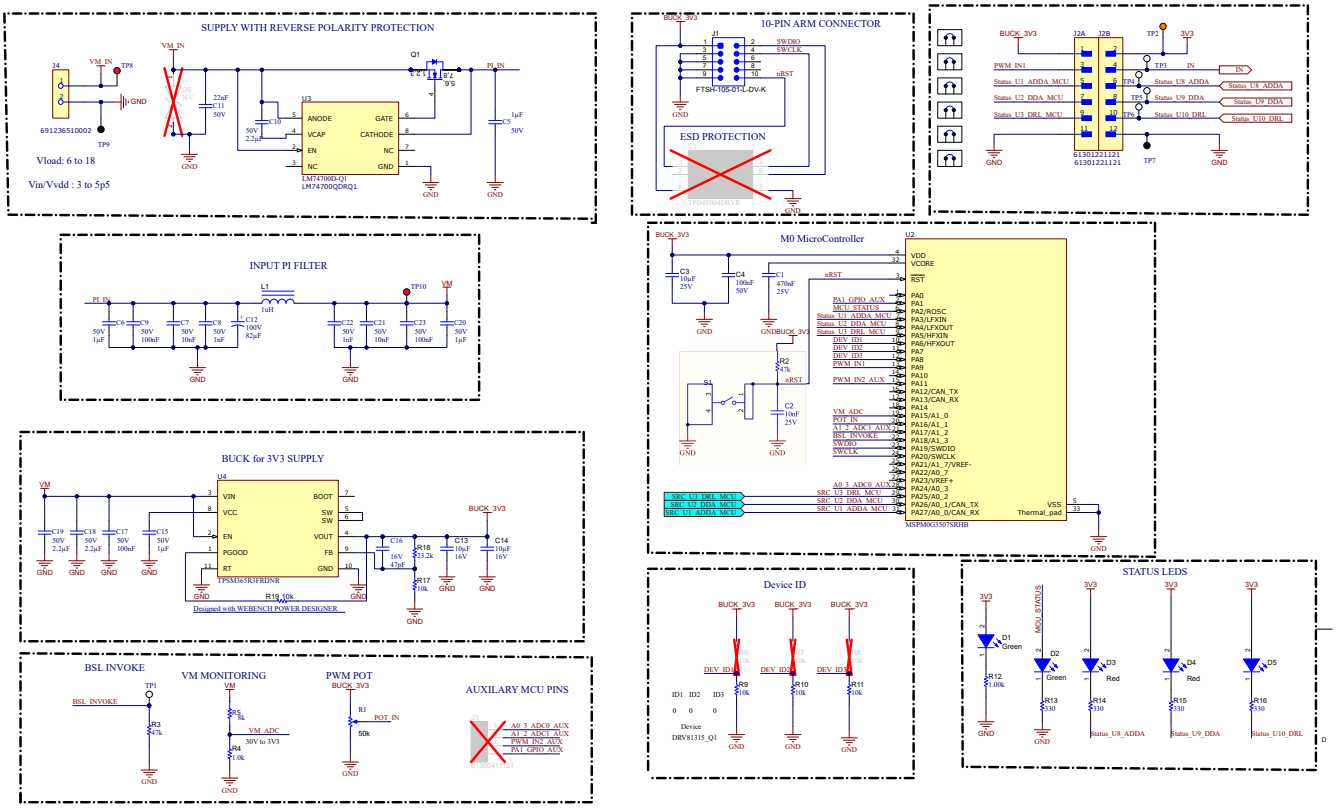


Figure 3-1. Input Power Supply Components and MSPM0G3507 Controller

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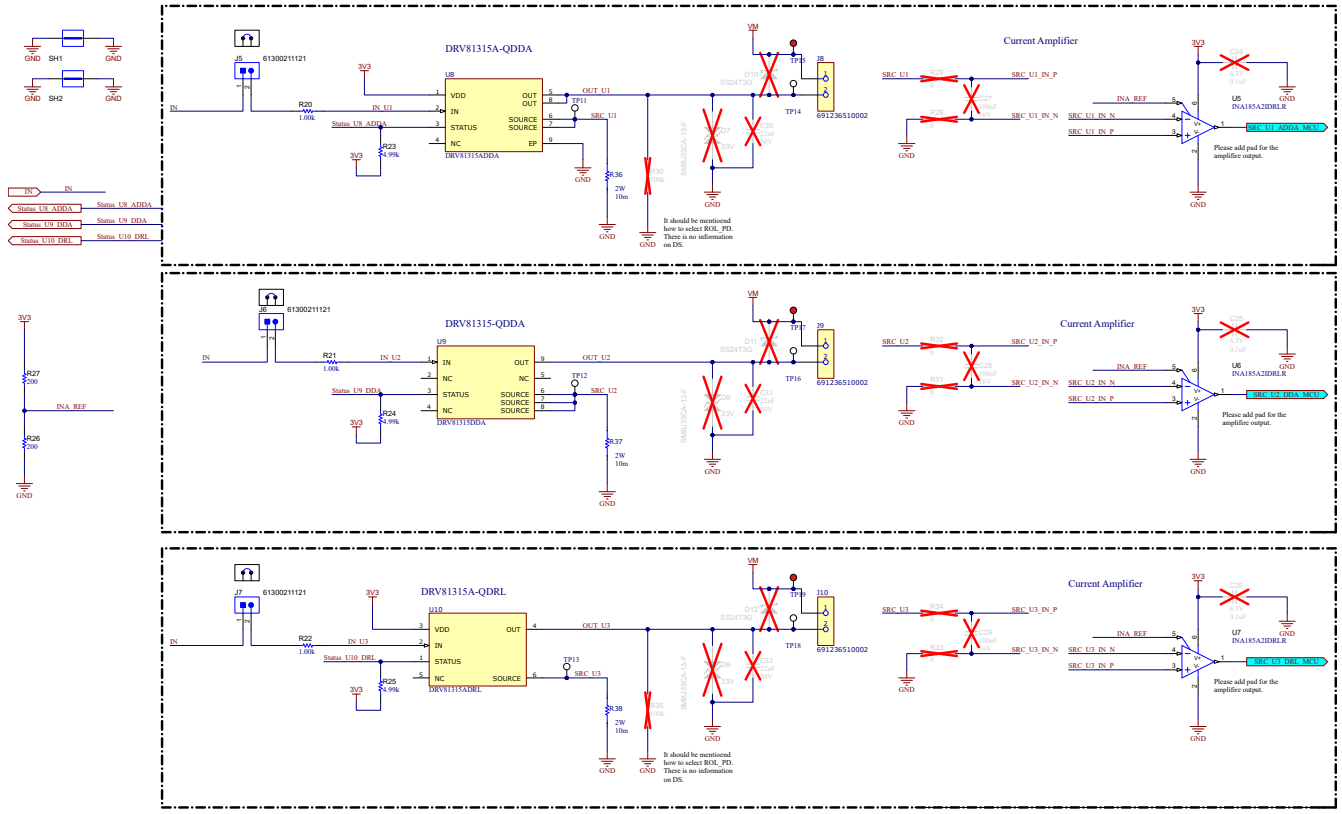


Figure 3-2. DRV81315-Q1 Drivers Configuration

3.2 PCB Layout

Figure 3-3 through Figure 3-6 show the PCB layers of the EVM. The Altium source files can be downloaded in the aforementioned *Hardware Design Files* for a given EVM.

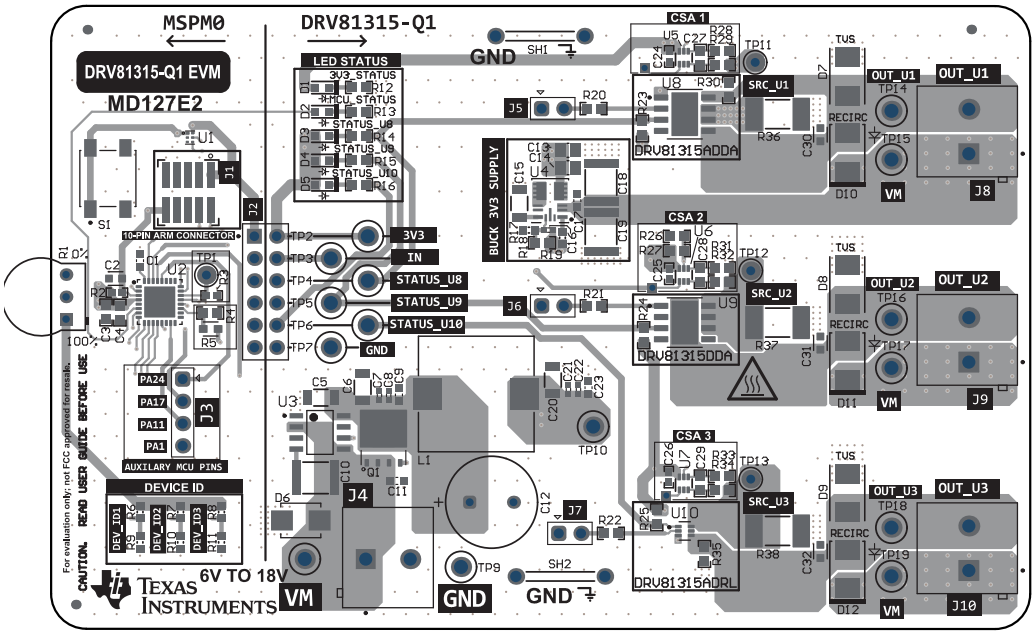


Figure 3-3. Top View

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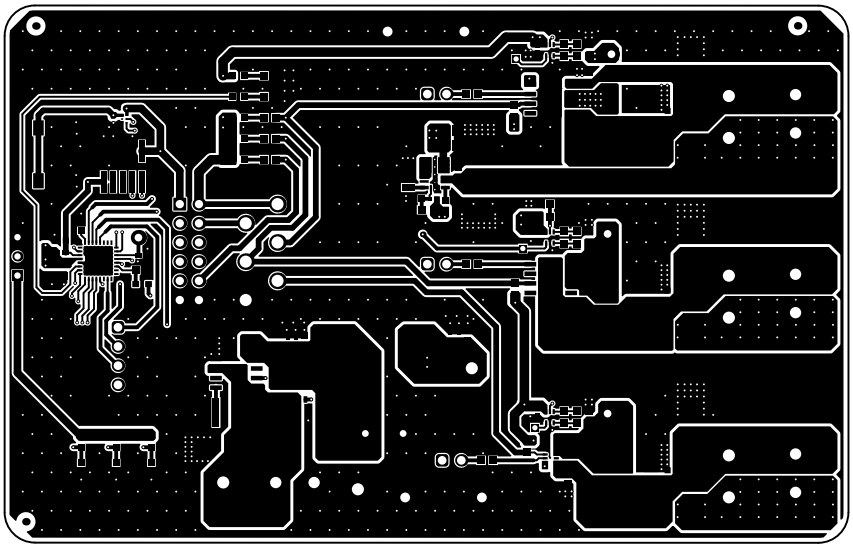


Figure 3-4. Top Layer

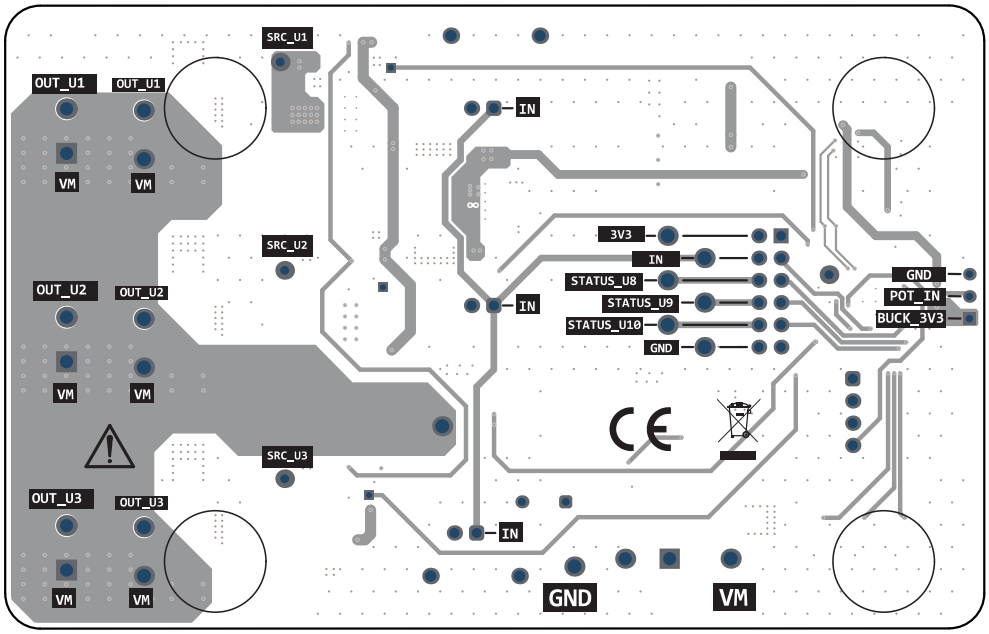


Figure 3-5. Bottom View

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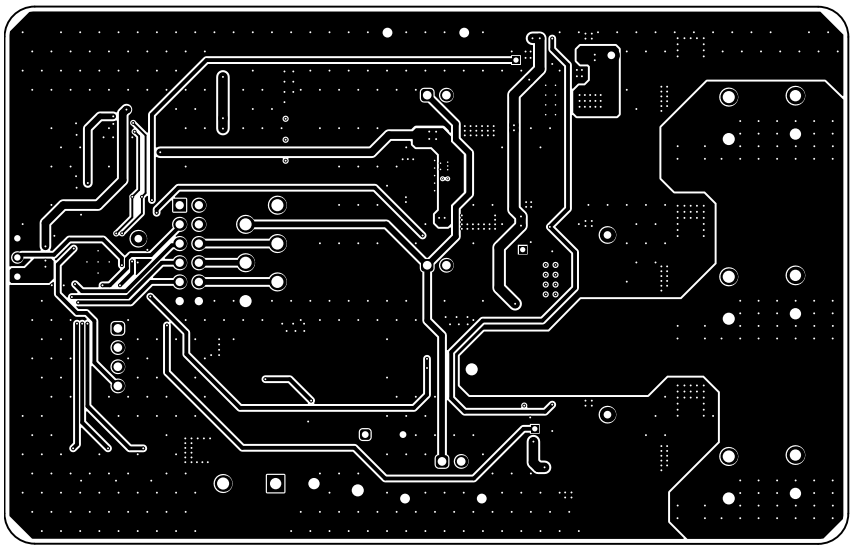


Figure 3-6. Bottom Layer

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3.3 Bill of Materials (BOM)

Table 3-1 provides the parts list for DRV81315-Q1EVM. Other EVMs have similar BOMs that can be accessed in the aforementioned *Hardware Design Files*.

Table 3-1. Bill of Materials (DRV81315-Q1EVM)

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
!PCB1	1		Printed Circuit Board		MD127-001	Any
C1	1	470nF	WCAP-CSGP Multilayer Ceramic Chip Capacitor, General Purpose, size 0603, X7R Class II, 470nF, 25VDC	0603	885012206075R	Wurth Elektronik
C2	1	10nF	10000 pF ±10% 25V Ceramic Capacitor X7R 0603 (1608 Metric)	0603	885012206065	Wurth Electronics
C3	1	10µF	CAP, CERM, 10 µF, 25 V,± 10%, X5R, 0603	0603	GRM188R61E106KA73D	MuRata
C4	1	0.1µF	CAP, CERM, 0.1 µF, 50 V, ± 10%, X7R, 0603	0603	885012206095	Wurth Elektronik
C5, C6, C15, C20	4	1µF	WCAP-CSGP Multilayer Ceramic Chip Capacitor, General Purpose, size 1206, X7R, 1µF, 50VDC	1206	885012208093	Wurth Elektronik
C7, C21	2	10nF	WCAP-CSGP Multilayer Ceramic Chip Capacitor, General Purpose, size 0402, X7R, 10nF, 50VDC	0402	885012205067	Wurth Elektronik
C8, C22	2	1nF	WCAP-CSGP Multilayer Ceramic Chip Capacitor, General Purpose, size 0402, X7R, 1nF, 50VDC	0402	885012205061	Wurth Elektronik
C9, C17, C23	3	100nF	WCAP-CSGP Multilayer Ceramic Chip Capacitor, General Purpose, size 0603, X7R, 100nF, 50VDC	0603	885012206095	Wurth Elektronik
C10, C18, C19	3	2.2µF	WCAP-CSGP Multilayer Ceramic Chip Capacitor, General Purpose, size 1812, X7R, 2.2µF, 50VDC	18012	885012210032	Wurth Elektronik
C11	1	22nF	WCAP-CSGP Multilayer Ceramic Chip Capacitor, General Purpose, size 0603, X7R, 22nF, 50VDC	0603	885012206091	Wurth Elektronik

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Table 3-1. Bill of Materials (DRV81315-Q1EVM) (continued)

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
C12	1	82µF	WCAP-ATUL Aluminum Electrolytic Capacitor, Radial, THT, D10 × H20mm, 82µF, 100V	10mm diam x 20mm height	860040875004	Wurth Elektronik
C13, C14	2	10µF	CAP, CERM, 10µF, 16 V, ± 20%, X5R, 0805	0805	885012107014	Wurth Elektronik
C16	1	47pF	WCAP-CSGP Multilayer Ceramic Chip Capacitor, General Purpose, size 0402, NP0, 47pF, 16VDC	0402	885012005029	Wurth Elektronik
D1, D2	2	Green	LED, Green, SMD	LED_0603	150060VS75000	Wurth Elektronik
D3, D4	2	Red	LED, Red, SMD	LED_0603	150060RS75000	Wurth Elektronik
D5	1		LED, Red, SMD	LED_0603	150060RS75000	Wurth Elektronik
FID1, FID2, FID3	3		Fiducial mark. There is nothing to buy or mount.	N/A	N/A	N/A
H1, H2, H3, H4	4		Bumpon, Hemisphere, 0.44 X 0.20, Clear	Transparent Bumpon	SJ-5303 (CLEAR)	3M
J1	1		Header(Shrouded), 1.27mm, 5x2, Gold, SMT	Header(Shrouded), 1.27mm, 5x2, SMT	FTSH-105-01-L-DV-K	Samtec®
J2	1		THT Vertical Pin Header WR-PHD, Pitch 2.54 mm, Dual Row, 12 pins	HDR12	61301221121	Wurth Electronics
J4, J8, J9, J10	4		2 Position Wire to Board Terminal Block Horizontal with Board 0.200" (5.08mm) Through Hole	HHR2	6.91237E+11	Wurth Electronics
J5, J6, J7	3		Header, 2.54 mm, 2x1, Gold, TH	Header, 2.54mm, 2x1, TH	61300211121	Wurth Elektronik
L1	1	1uH	Inductor, Shielded Drum Core, Powdered Iron, 1 uH, 15 A, 0.0027 ohm, SMD	Inductor, 12.6x3.3x12.6mm	74437377010	Wurth Elektronik
Q1	1	80V	MOSFET, N-CH, 80 V, 100 A, DNK0008A (VSON-CLIP-8)	DNK0008A	CSD19502Q5B	Texas Instruments
R1	1	50k	Trimming Potentiometer, 50K, 0.5W, TH	9.53x8.89mm	3352T-1-503LF	Bourns
R2, R3	2	47k	RES, 47 k, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW040247K0JNED	Vishay®-Dale

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Table 3-1. Bill of Materials (DRV81315-Q1EVM) (continued)

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
R4	1	1.0k	RES, 1.0 k, 5%, 0.1 W, 0603	0603	RC0603JR-071KL	Yageo
R5	1	8k	8 kOhms ±0.1% 0.1W, 1/10W Chip Resistor 0603 (1608 Metric) Thin Film	0603	RT0603BRE078KL	Yageo®
R9, R10, R11, R17, R19	5	10k	RES, 10 k, 5%, 0.1 W, 0603	0603	RC0603JR-0710KL	Yageo
R12, R20, R21, R22	4	1.00k	RES, 1.00 k, 1%, 0.1 W, 0603	0603	RC0603FR-071KL	Yageo
R13, R14, R15, R16	4	330	RES, 330, 5%, 0.1 W, 0603	0603	RC0603JR-07330RL	Yageo
R18	1	23.2k	RES, 23.2 k, 1%, 0.1 W, 0603	0603	RC0603FR-0723K2L	Yageo
R23, R24, R25	3	4.99k	RES, 4.99 k, 1%, 0.1 W, 0603	0603	RC0603FR-074K99L	Yageo
R26, R27	2	200	RES, 200, 1%, 0.1 W, 0603	0603	RC0603FR-07200RL	Yageo
R36, R37, R38	3	10m	10 mOhms ±0.5% 2W Chip Resistor 2512 (6432 Metric) Automotive AEC-Q200, Current Sense, Moisture Resistant Metal Film	2512	PCS2512DR0100ET	Ohmite
S1	1		Tactile Switch SPST-NO Top Actuated Surface Mount	SMT_SW_6MM2_6MM2	430481025816	Wurth Electronics
SH1, SH2	2		1mm Uninsulated Shorting Plug, 10.16mm spacing, TH	Shorting Plug, 10.16mm spacing, TH	D3082-05	Harwin®
SH1-J2, SH2-J2, SH3-J2, SH4-J2, SH5-J2, SH6-J2, SH-J5, SH-J6, SH-J7	9		Shunt, 2.54mm, Gold, Black	Shunt, 2.54mm, Black	60900213421	Wurth Elektronik
TP1, TP11, TP12, TP13	4		Test Point, Miniature, White, TH	White Miniature Testpoint	5002	Keystone Electronics®
TP2	1		Test Point, Multipurpose, Orange, TH	Orange Multipurpose Testpoint	5013	Keystone
TP3, TP4, TP5, TP6, TP14, TP16, TP18	7		Test Point, Multipurpose, White, TH	White Multipurpose Testpoint	5012	Keystone Electronics
TP7, TP9	2		Test Point, Multipurpose, Black, TH	Black Multipurpose Testpoint	5011	Keystone Electronics

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Table 3-1. Bill of Materials (DRV81315-Q1EVM) (continued)

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
TP8, TP10, TP15, TP17, TP19	5		Test Point, Multipurpose, Red, TH	Red Multipurpose Testpoint	5010	Keystone Electronics
U2	1		Mixed-Signal Microcontrollers with CAN-FD Interface, VQFN32	VQFN32	MSPM0G3507SRHB	Texas Instruments
U3	1		LM74700QDRQ1	SOIC8	LM74700QDRQ1	Texas Instruments
U4	1		3-V to 65-V Input, 1-V to 13-V Output, 600-mA Synchronous Buck Converter Power Module in a HotRod QFN Package	QFN-FCMOD11	TPSM365R3FRDNR	Texas Instruments
U5, U6, U7	3		Bidirectional, Precision Low- and High-Side Voltage Output, Current-Sense Amplifier, DRL0006A (SOT-5X3-6)	DRL0006A	INA185A2IDRLR	Texas Instruments
U8	1		Protected Low-Side Switch, HSOIC8	HSOIC8	DRV81315ADDA	Texas Instruments
U9	1		Protected Low-Side Switch, HSOIC8	HSOIC8	DRV81315DDA	Texas Instruments
U10	1		Protected Low-Side Switch, SOT563	SOT6	DRV81315ADRL	Texas Instruments
C24, C25, C26	0	0.1µF	CAP, CERM, 0.1 µF, 6.3 V, ± 20%, X5R, 0402	0402	885012105001	Wurth Elektronik
C27, C28, C29	0	0.1µF	CAP, CERM, 0.1 µF, 16 V, ± 10%, X7R, 0603	0603	885012206046	Wurth Elektronik
C30, C31, C32	0	22nF	0.022 µF ±10% 50V Ceramic Capacitor X7R 0603 (1608 Metric)	0603	885012206091	Wurth Electronics
D6	0		58.1V Clamp 10.3A Ipp Tvs Diode Surface Mount SMB	SMB	SMBJ36CA-13-F	Diodes Inc
D7, D8, D9	0	33V	Diode, TVS, Bi, 33 V, SMB	SMB	SMBJ33CA-13-F	Diodes Inc.
D10, D11, D12	0	40V	Diode, Schottky, 40 V, 2 A, AEC-Q101, SMB	SMB	SS24T3G	ON Semiconductor
J3	0		Header, 2.54 mm, 4x1, Gold, TH	Header, 2.54mm, 4x1, TH	61300411121	Wurth Elektronik
R6, R7, R8	0	10k	RES, 10 k, 5%, 0.1 W, 0603	0603	RC0603JR-0710KL	Yageo

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Table 3-1. Bill of Materials (DRV81315-Q1EVM) (continued)

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
R28, R29, R31, R32, R33, R34	0	0	RES, 0, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	ERJ-3GEY0R00V	Panasonic®
R30, R35	0	100k	RES, 100 k, 1%, 0.1 W, 0603	0603	RC0603FR-07100KL	Yageo
U1	0		ESD-Protection Array for High-Speed Data Interfaces, 4 Channels, -40 to +85C°, 6-pin SON (DRY), Green (RoHS & no Sb/Br)	DRY0006A	TPD4E004DRYR	Texas Instruments

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5 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision * (May 2026) to Revision A (October 2026)	Page
• Updated *Description* section to remove mentions of erroneous parts and replaced with DRV81315-Q1 and DRV81325-Q1 GPNs	1

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1. *Delivery:* TI delivers TI evaluation boards, kits, or modules, including any accompanying demonstration software, components, and/or documentation which may be provided together or separately (collectively, an “EVM” or “EVMs”) to the User (“User”) in accordance with the terms set forth herein. User's acceptance of the EVM is expressly subject to the following terms.

   1.1 EVMs are intended solely for product or software developers for use in a research and development setting to facilitate feasibility evaluation, experimentation, or scientific analysis of TI semiconductors products. EVMs have no direct function and are not finished products. EVMs shall not be directly or indirectly assembled as a part or subassembly in any finished product. For clarification, any software or software tools provided with the EVM (“Software”) shall not be subject to the terms and conditions set forth herein but rather shall be subject to the applicable terms that accompany such Software

   1.2 EVMs are not intended for consumer or household use. EVMs may not be sold, sublicensed, leased, rented, loaned, assigned, or otherwise distributed for commercial purposes by Users, in whole or in part, or used in any finished product or production system.

2 *Limited Warranty and Related Remedies/Disclaimers*:

   2.1 These terms do not apply to Software. The warranty, if any, for Software is covered in the applicable Software License Agreement.

   2.2 TI warrants that the TI EVM will conform to TI's published specifications for ninety (90) days after the date TI delivers such EVM to User. Notwithstanding the foregoing, TI shall not be liable for a nonconforming EVM if (a) the nonconformity was caused by neglect, misuse or mistreatment by an entity other than TI, including improper installation or testing, or for any EVMs that have been altered or modified in any way by an entity other than TI, (b) the nonconformity resulted from User's design, specifications or instructions for such EVMs or improper system design, or (c) User has not paid on time. Testing and other quality control techniques are used to the extent TI deems necessary. TI does not test all parameters of each EVM. User's claims against TI under this Section 2 are void if User fails to notify TI of any apparent defects in the EVMs within ten (10) business days after delivery, or of any hidden defects with ten (10) business days after the defect has been detected.

   2.3 TI's sole liability shall be at its option to repair or replace EVMs that fail to conform to the warranty set forth above, or credit User's account for such EVM. TI's liability under this warranty shall be limited to EVMs that are returned during the warranty period to the address designated by TI and that are determined by TI not to conform to such warranty. If TI elects to repair or replace such EVM, TI shall have a reasonable time to repair such EVM or provide replacements. Repaired EVMs shall be warranted for the remainder of the original warranty period. Replaced EVMs shall be warranted for a new full ninety (90) day warranty period.

WARNING

Evaluation Kits are intended solely for use by technically qualified, professional electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems, and subsystems.

User shall operate the Evaluation Kit within TI’s recommended guidelines and any applicable legal or environmental requirements as well as reasonable and customary safeguards. Failure to set up and/or operate the Evaluation Kit within TI’s recommended guidelines may result in personal injury or death or property damage. Proper set up entails following TI’s instructions for electrical ratings of interface circuits such as input, output and electrical loads.

NOTE:

EXPOSURE TO ELECTROSTATIC DISCHARGE (ESD) MAY CAUSE DEGREDATION OR FAILURE OF THE EVALUATION KIT; TI RECOMMENDS STORAGE OF THE EVALUATION KIT IN A PROTECTIVE ESD BAG.

3 *Regulatory Notices:*

3.1 *United States*

3.1.1 *Notice applicable to EVMs not FCC-Approved:*

FCC NOTICE: This kit is designed to allow product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and software developers to write software applications for use with the end product. This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of this chapter, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.

3.1.2 *For EVMs annotated as FCC – FEDERAL COMMUNICATIONS COMMISSION Part 15 Compliant:*

CAUTION

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Interference Statement for Class A EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Interference Statement for Class B EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- *Reorient or relocate the receiving antenna.*
- *Increase the separation between the equipment and receiver.*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- *Consult the dealer or an experienced radio/TV technician for help.*

3.2 *Canada*

3.2.1 *For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210 or RSS-247*

Concerning EVMs Including Radio Transmitters:

This device complies with Industry Canada license-exempt RSSs. Operation is subject to the following two conditions:

(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Concernant les EVMs avec appareils radio:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Concerning EVMs Including Detachable Antennas:

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur

3.3 *Japan*

3.3.1 *Notice for EVMs delivered in Japan:* Please see http://www.tij.co.jp/lsds/ti_ja/general/eStore/notice_01.page 日本国内に輸入される評価用キット、ボードについては、次のところをご覧ください。

https://www.ti.com/ja-jp/legal/notice-for-evaluation-kits-delivered-in-japan.html

3.3.2 *Notice for Users of EVMs Considered "Radio Frequency Products" in Japan:* EVMs entering Japan may not be certified by TI as conforming to Technical Regulations of Radio Law of Japan.

If User uses EVMs in Japan, not certified to Technical Regulations of Radio Law of Japan, User is required to follow the instructions set forth by Radio Law of Japan, which includes, but is not limited to, the instructions below with respect to EVMs (which for the avoidance of doubt are stated strictly for convenience and should be verified by User):

1. Use EVMs in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on Sub-section 1.1 of Article 6 of the Ministry's Rule for Enforcement of Radio Law of Japan,
2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.

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2. 実験局の免許を取得後ご使用いただく。
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3.4 *European Union*

3.4.1 *For EVMs subject to EU Directive 2014/30/EU (Electromagnetic Compatibility Directive)*:

This is a class A product intended for use in environments other than domestic environments that are connected to a low-voltage power-supply network that supplies buildings used for domestic purposes. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

4 *EVM Use Restrictions and Warnings:*

4.1 EVMS ARE NOT FOR USE IN FUNCTIONAL SAFETY AND/OR SAFETY CRITICAL EVALUATIONS, INCLUDING BUT NOT LIMITED TO EVALUATIONS OF LIFE SUPPORT APPLICATIONS.

4.2 User must read and apply the user guide and other available documentation provided by TI regarding the EVM prior to handling or using the EVM, including without limitation any warning or restriction notices. The notices contain important safety information related to, for example, temperatures and voltages.

4.3 *Safety-Related Warnings and Restrictions:*

4.3.1 User shall operate the EVM within TI's recommended specifications and environmental considerations stated in the user guide, other available documentation provided by TI, and any other applicable requirements and employ reasonable and customary safeguards. Exceeding the specified performance ratings and specifications (including but not limited to input and output voltage, current, power, and environmental ranges) for the EVM may cause personal injury or death, or property damage. If there are questions concerning performance ratings and specifications, User should contact a TI field representative prior to connecting interface electronics including input power and intended loads. Any loads applied outside of the specified output range may also result in unintended and/or inaccurate operation and/or possible permanent damage to the EVM and/or interface electronics. Please consult the EVM user guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative. During normal operation, even with the inputs and outputs kept within the specified allowable ranges, some circuit components may have elevated case temperatures. These components include but are not limited to linear regulators, switching transistors, pass transistors, current sense resistors, and heat sinks, which can be identified using the information in the associated documentation. When working with the EVM, please be aware that the EVM may become very warm.

4.3.2 EVMs are intended solely for use by technically qualified, professional electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems, and subsystems. User assumes all responsibility and liability for proper and safe handling and use of the EVM by User or its employees, affiliates, contractors or designees. User assumes all responsibility and liability to ensure that any interfaces (electronic and/or mechanical) between the EVM and any human body are designed with suitable isolation and means to safely limit accessible leakage currents to minimize the risk of electrical shock hazard. User assumes all responsibility and liability for any improper or unsafe handling or use of the EVM by User or its employees, affiliates, contractors or designees.

4.4 User assumes all responsibility and liability to determine whether the EVM is subject to any applicable international, federal, state, or local laws and regulations related to User's handling and use of the EVM and, if applicable, User assumes all responsibility and liability for compliance in all respects with such laws and regulations. User assumes all responsibility and liability for proper disposal and recycling of the EVM consistent with all applicable international, federal, state, and local requirements.

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