EVM User's Guide:

BQ25176MEVM Evaluation Module

ABSTRACT

This user's guide describes the characteristics, operation, and use of the BQ25176MEVM evaluation module (EVM). This EVM is designed to help the user evaluate and test the various operating modes of the BQ25176M. This user's guide includes setup instructions for the hardware and software, a schematic diagram, a bill of materials (BOM), and PCB layout drawings for the evaluation module.

Throughout this user's guide, the abbreviations *EVM*, *BQ25176MEVM, BMS069*, and the term *evaluation module* are synonymous with the BMS069 evaluation module, unless otherwise noted.

Table of Contents

Trademarks

All trademarks are the property of their respective owners.

WARNING

Hot surface! Contact may cause burns. Do not touch!

Some components may reach high temperatures >55°C when the board is powered on. The user must not touch the board at any point during operation or immediately after operating, as high temperatures may be present.

1 Introduction

The Texas Instruments BQ25176EVM is a Li-Ion, Li-Poly and LiFePO4 chemistry battery charger IC for single cell. Charging voltage can be adjusted using external resistors on VSET. Charging current can be set from 60mA to 600mA with external resistor on ISET.

1.1 Printed Circuit Board Assembly

The BQ25176EVM PCB contains the BQ25176 IC, LDO TPS7B8133 and support circuits. This board contains several jumpers and connectors. S1 (VSET) allows selected output voltages to be programmed. R9 resistor allows a wide range of adjustment of VSET. R22 can be used to change ISET value, fast charge current. R19 can be used to adjust BIAS, battery temp sensor to simulate hot and cold fault.

1.2 I/O Descriptions

Table 1-1 lists the input and output connections available on this EVM and their respective descriptions.

Table 1-1. EVM I/O Connections

I/O Connector	Description
J1 – VIN / GND	Input voltage from external power supply, recommended 5 V. Max operating input voltage is 6.6 V, OVP trip point. Max input voltage is 30 V while in OVP.
J2 – OUT (BAT+) / GND (BAT-) / GND / BIAS	Battery connection, connect 10-kΩ resistor to BIAS or use 10 kΩ on PCB (JP6).
JP1 – VSET ADJ.	Disable R9, default is installed.
JP2 – REG / IN / OUT	Source voltage for housekeeping regulator, U2. Default Input voltage IN.
JP3 – PG (Power Good) LED	Default setting is ON.
JP4 – ISET	Sets Fast Charge Current. Fixed = 400 mA ADJ = R22 range 60 mA to 600 mA
JP5 - STAT LED	Default setting is ON.
JP6 – BIAS	Fixed=10 k.
JP7	Not used, do not install
JP8	Not used, do not install
JP9	Not used, do not install

Table 1-2 lists the S1 switch positions for VSET and their respective descriptions. Use only one postion ON, do not combine.

Table 1-2. VSET S1 Switch Positions

Position / RX / Value	Li+Voltage / Configuration
#1 / R1 / 100 kΩ	3.5V / 1-Cell LiFePO4
#2 / R2 / 82.5 kΩ	3.6V / 1-Cell LiFePO4
#3 / R3 / 61.9 kΩ	3.7V / 1-Cell LiFePO4
#4 / R4 / 35.7 kΩ	4.15V / 1-Cell Li-Ion
#5 / R5 / 27.4 kΩ	4.2V / 1-Cell Li-Ion
#6 / R6 / 24.3 kΩ	4.35V / 1-Cell Li-Ion
#7 / R7 / 18.2 kΩ	4.4V / 1-Cell Li-Ion
#8 / R8 / 0 Ω	Short Circuit – No Charge

2 Test Summary

This section describes the jumpers and connectors on the EVM as well as how to properly connect, setup, and use the BQ25176EVM. Note that the default jumper setting of headers and switches are marked with two dots to indicate the shorting jumper position. This will put the unit into a single cell Li-Ion configuration, 4.2 V at 400 mA.

2.1 Equipment

This section includes a list of supplies required to perform tests on this EVM.

1. Battery simulator such as Keithley 2400 or equilvalent. Or a single-cell battery.
2. Power supply, 5-V 1-A input. Note that unit can operate up to 6.6-V input.
3. Voltage meter and current meter.

2.2 Cautions

To prevent possible damage to battery under test verify that charging conditions of the cell are not exceeded. Check max charge voltage and current.

Power dissipation of the device can be exceeded with too high an input to output voltage drop and current. Thermal regulation begins reducing current at 125 °C, at 150 °C device will shut off.

Device can get hot during high input-to-output voltage drop and high current conditions. Use caution when handling the board.

2.3 Test Instructions

In order for this EVM to operate properly, the following components must be connected and properly configured.

1. Set input power supply to 5 V and Battery Simulator to 3.6 V with compliance to support 800 mA. Turn off Supply and Battery Simulator.
2. Connect input voltages to J1 and Battery Simulator to J2 on the EVM.
3. Configure all EVM jumpers to factory setting, refer to table below.
4. Turn on all supplies and loads
    a. 5-V Input supply current limit should be greater than 500 mA
    b. Out voltage should be 3.6 V and charge current 400 mA
    c. LED D1 and D2 will be ON
5. Simulate battery completing charge by increasing Battery Simulator voltage to 4.2 V
    a. Current will decrease to 0 mA
    b. LED D2 will switch to OFF.

Table 2-1. Jumper Factory Setting

I/O Connector	Factory Setting
JP1	Installed
JP2	IN
JP3	Installed
JP4	Fixed
JP5	Installed
JP6	Fixed
JP7	N/A
JP8	N/A
JP9	N/A
S1	Position 5 (4.2-V Li-Ion)
S2	N/A

Note: IN, ON, Fixed are positions of a 3 pin header. If it is a 2 pin header then it is installed or not installed.

3 Board Layout, Schematic, and Bill of Materials

3.1 Board Layout

The board layout is shown in Figure 3-1 to Figure 3-7.

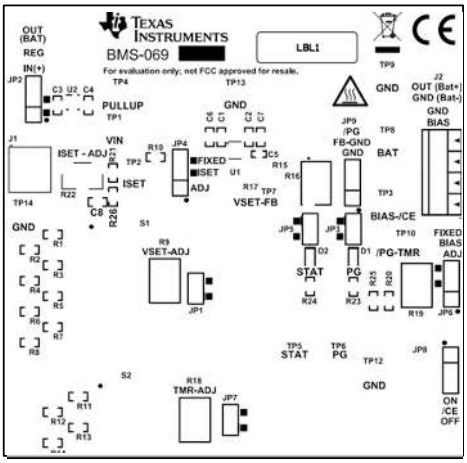


Figure 3-1. Top Overlay

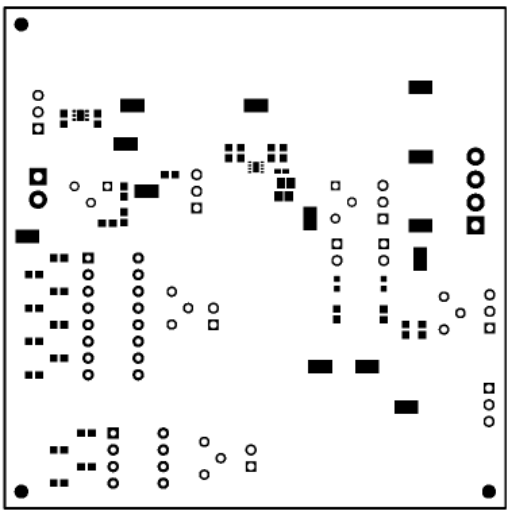


Figure 3-2. Top Solder

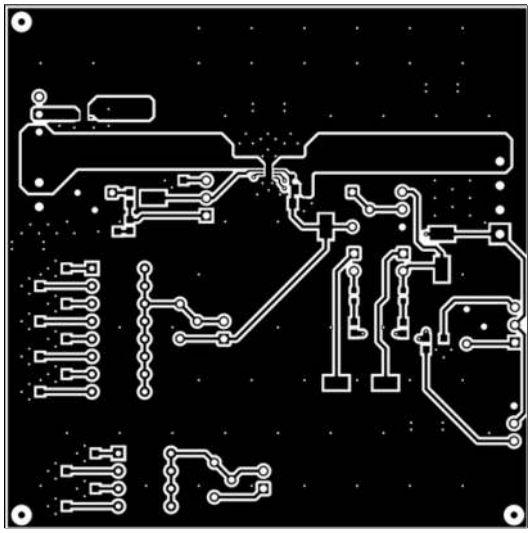


Figure 3-3. Top Layer

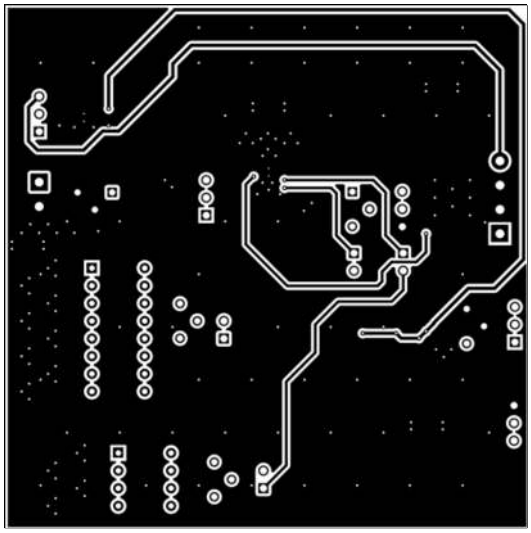


Figure 3-4. Bottom Layer

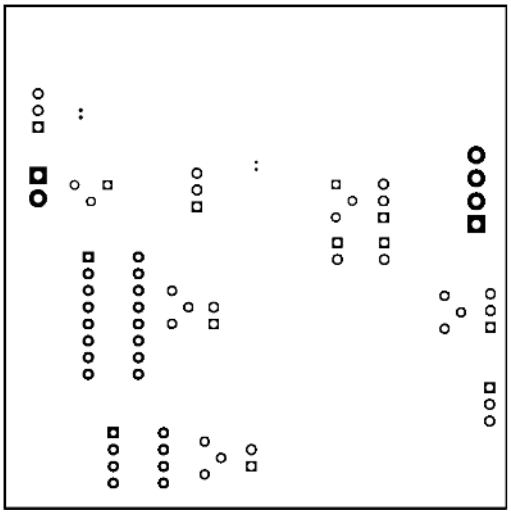


Figure 3-5. Bottom Solder

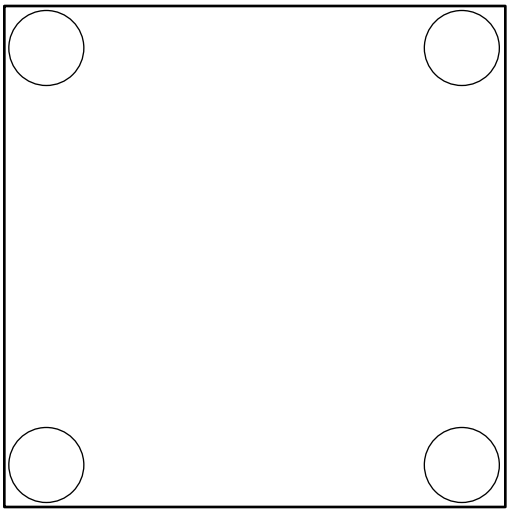
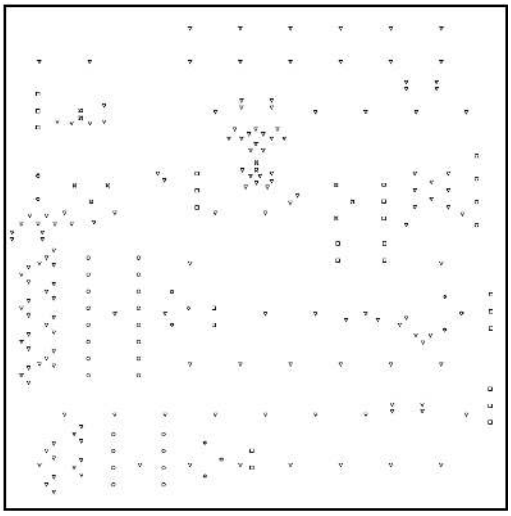


Figure 3-6. Bottom Overlay



Symbol	Count	Hole Size	Plated	Hole Type	Drill Layer Pair	Via/Pad	Pad Shape
⊠	4	7.87mil (0.200mm)	PTH	Round	Layer 1 - Top Layer - Layer 2 - Bottom Layer	Via	Rounded
▽	159	12.00mil (0.305mm)	PTH	Round	Layer 1 - Top Layer - Layer 2 - Bottom Layer	Via	Rounded
○	24	31.00mil (0.787mm)	PTH	Round	Layer 1 - Top Layer - Layer 2 - Bottom Layer	Pad	(Mixed)
☼	9	35.43mil (0.900mm)	PTH	Round	Layer 1 - Top Layer - Layer 2 - Bottom Layer	Pad	Rounded
⊠	6	35.43mil (0.900mm)	PTH	Round	Layer 1 - Top Layer - Layer 2 - Bottom Layer	Pad	(Mixed)
□	23	40.00mil (1.016mm)	PTH	Round	Layer 1 - Top Layer - Layer 2 - Bottom Layer	Pad	(Mixed)
◌	6	50.00mil (1.270mm)	PTH	Round	Layer 1 - Top Layer - Layer 2 - Bottom Layer	Pad	(Mixed)
	231 Total						

Figure 3-7. Drill Drawing

3.2 Schematic

The BQ25176EVM schematic is shown in Figure 3-8.

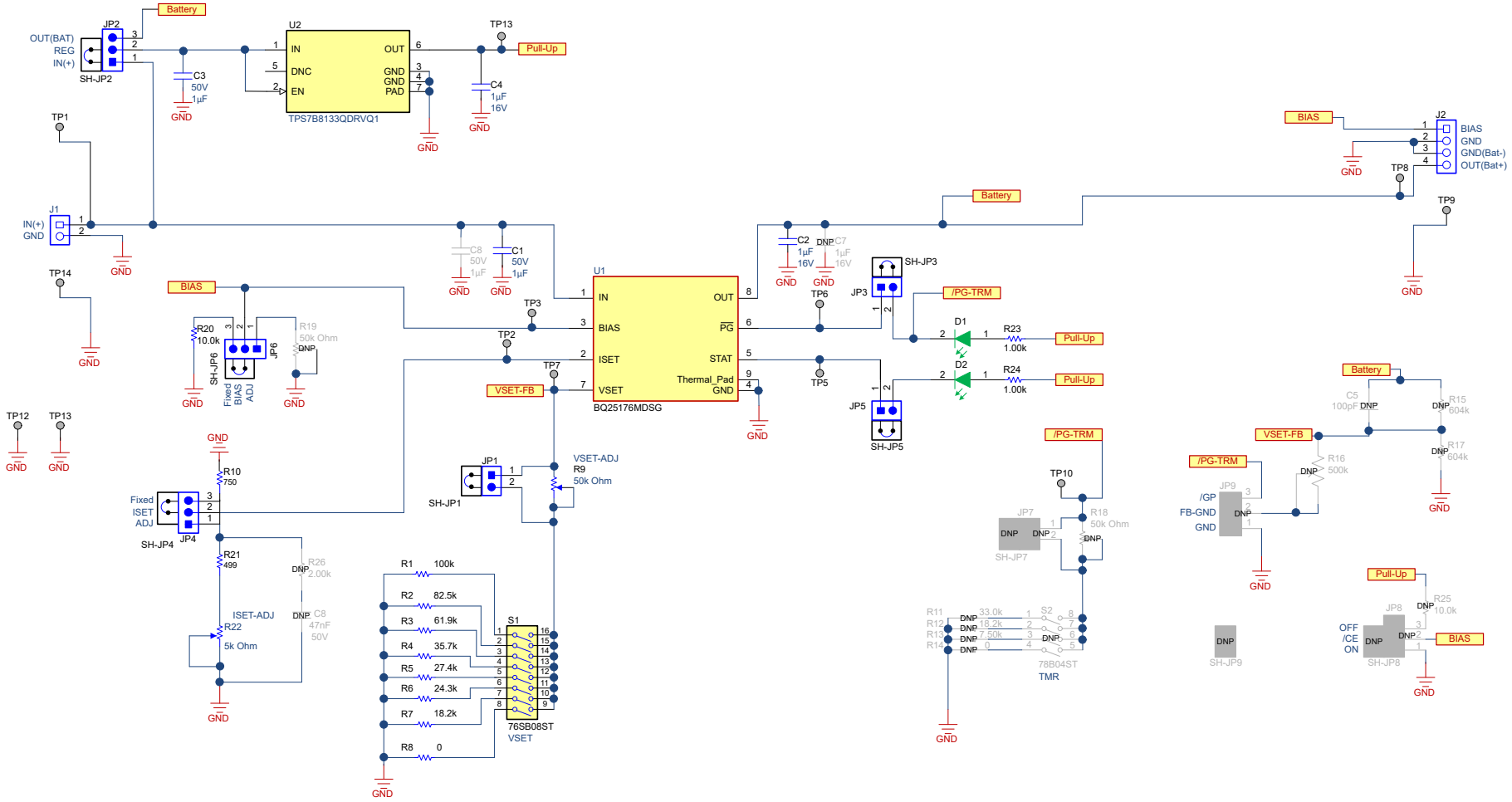


Figure 3-8. BQ25176EVM Schematic

3.3 Bill of Materials

The bill of materials is shown in the following table.

Table 3-1. Bill of Materials

Fitted	Description	Designator	PartNumber	Quantity	Manufacturer	PackageReference	Value	Alternate Manufacturer	Alternate PartNumber
Fitted	Printed Circuit Board	!PCB?	BMS069	1	Any				
Fitted	CAP, CERM, 1 µF, 50 V,+/- 20%, X5R, AEC-Q200 Grade 3, 0603	C1, C3	GRT188R61H105ME13D	2	MuRata	0603	1uF		
Fitted	CAP, CERM, 1 uF, 16 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0603	C2, C4	GCM188R71C105KA64D	2	MuRata	0603	1uF		
Fitted	LED, Green, SMD	D1, D2	LTST-C193TGKT-5A	2	Lite-On	Body1.6x0.8mm	Green		
Fitted	Bumpon, Hemisphere, 0.44 X 0.20, Clear	H1, H2, H3, H4	SJ-5303 (CLEAR)	4	3M	Transparent Bumpon			
Fitted	Terminal Block, 3.5mm Pitch, 2x1, TH	J1	ED555/2DS	1	On-Shore Technology	7.0x8.2x6.5mm			
Fitted	Terminal Block, 3.5mm Pitch, 4x1, TH	J2	ED555/4DS	1	On-Shore Technology	14x8.2x6.5mm			
Fitted	Header, 100mil, 2x1, Tin, TH	JP1, JP3, JP5	PEC02SAAN	3	Sullins Connector Solutions	Header, 2 PIN, 100mil, Tin			
Fitted	Header, 100mil, 3x1, Tin, TH	JP2, JP4, JP6	PEC03SAAN	3	Sullins Connector Solutions	Header, 3 PIN, 100mil, Tin			
Fitted	Thermal Transfer Printable Labels, 0.650" W x 0.200" H - 10,000 per roll	LBL1	THT-14-423-10	1	Brady	PCB Label 0.650 x 0.200 inch			
Fitted	RES, 100 k, 1%, 0.1 W, 0603	R1	RC0603FR-07100KL	1	Yageo	0603	100k		
Fitted	82.5k	R2	RC0603FR-0782K5L	1	Yageo	0603	18.2 kOhms		
Fitted	RES 61.9K OHM 1% 1/10W 0603	R3	RC0603FR-0761K9L	1	Yageo	0603	61.9k		
Fitted	35.7kΩ ±1% 0.063W, 1/16W Chip Resistor 0603 (1608 Metric) Moisture Resistant Thin Film	R4	RN731JTTD3572F10	1	KOA Speer Electronics Inc	0603	35.7k		
Fitted	27.4kΩ ±1% 0.063W, 1/16W Chip Resistor 0603 (1608 Metric) Moisture Resistant Thin Film	R5	RN731JTTD2742F50	1	KOA Speer Electronics Inc	0603	27.4k		

Table 3-1. Bill of Materials (continued)

Fitted	Description	Designator	PartNumber	Quantity	Manufacturer	PackageReference	Value	Alternate Manufacturer	Alternate PartNumber
Fitted	RES 24.3K OHM 1% 1/10W 0603	R6	RC0603FR-0724K3L	1	Yageo	0603	24.3k		
Fitted	18.2kΩ ±1% 0.063W, 1/16W Chip Resistor 0603 (1608 Metric) Moisture Resistant Thin Film	R7	RN731JTTD1822F10	1	KOA Speer Electronics Inc	0603	18.2k		
Fitted	RES, 0, 5%, 0.1 W, 0603	R8	RC0603JR-070RL	1	Yageo	0603	0		
Fitted	Trimmer Potentiometer, Lead Sealed Type Multiturn PV37 Series, TH	R9	PV37W503C01B00	1	Bourns	6.71x4.5mm	50k Ohm		
Fitted	RES, 750, 1%, 0.1 W, 0603	R10	RC0603FR-07750RL	1	Yageo	0603	750		
Fitted	RES, 10.0 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	R20	CRCW060310K0FKEA	1	Vishay-Dale	0603	10.0k		
Fitted	RES, 499, 1%, 0.1 W, 0603	R21	CRCW0603499RFKEAC	1	Vishay-Dale	0603	499		
Fitted	Trimmer Potentiometer, Lead Sealed Type Multiturn PV37 Series, TH	R22	PV37W502C01B00	1	Bourns	6.71x4.5mm	5k Ohm		
Fitted	RES, 1.00 k, 1%, 0.1 W, 0603	R23, R24	RC0603FR-071KL	2	Yageo	0603	1.00k		
Fitted	Switch, SPST 8Pos, Rocker, TH	S1	76SB08ST	1	Grayhill	9.65X8X22.4mm			
Fitted	Shunt, 100mil, Gold plated, Black	SH-JP1, SH-JP2, SH-JP3, SH-JP4, SH-JP5, SH-JP6, SH-JP7	SNT-100-BK-G	7	Samtec	Shunt	1x2	3M	969102-0000-DA
Fitted	Test Lead clips and hooks, SMT	TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP12, TP13, TP14	S1751-46	13	Harwin	Test Point, Body 3.25x1.65mm			
Fitted	0.8A, 1-Cell, linear battery charger with continual charge mode for harvesting applications	U1	BQ25176MDSG	1	Texas Instruments	WSON8			
Fitted	Automotive 150-mA high-voltage ultra-low-IQ low-dropout (LDO) linear regulator, DRV0006A (WSON-6)	U2	TPS7B8133QDRVRQ1	1	Texas Instruments	DRV0006A		Texas Instruments	
Not Fitted	CAP, CERM, 100 pF, 50 V, +/-1%, C0G/NP0, 0402	C5	04025A101FAT2A	0	AVX	0402	100pF		

Table 3-1. Bill of Materials (continued)

Fitted	Description	Designator	PartNumber	Quantity	Manufacturer	PackageReference	Value	Alternate Manufacturer	Alternate PartNumber
Not Fitted	CAP, CERM, 1 µF, 50 V,+/- 20%, X5R, AEC-Q200 Grade 3, 0603	C6	GRT188R61H105ME13D	0	MuRata	0603	1uF		
Not Fitted	CAP, CERM, 1 uF, 16 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0603	C7	GCM188R71C105KA64D	0	MuRata	0603	1uF		
Not Fitted	CAP, CERM, 0.047 uF, 50 V, +/- 10%, X7R, 0603	C8	C1608X7R1H473K080AA	0	MuRata	0603	0.047uF		
Not Fitted	Fiducial mark. There is nothing to buy or mount.	FID1, FID2, FID3	N/A	0	N/A	N/A			
Not Fitted	Header, 100mil, 2x1, Tin, TH	JP7	PEC02SAAN	0	Sullins Connector Solutions	Header, 2 PIN, 100mil, Tin			
Not Fitted	Header, 100mil, 3x1, Tin, TH	JP8, JP9	PEC03SAAN	0	Sullins Connector Solutions	Header, 3 PIN, 100mil, Tin			
Not Fitted	RES, 33.0 k, 1%, 0.1 W, 0603	R11	RC0603FR-0733KL	0	Yageo	0603	33.0k		
Not Fitted	RES, 18.2 k, 1%, 0.1 W, 0603	R12	RC0603FR-0718K2L	0	Yageo	0603	18.2k		
Not Fitted	RES, 7.50 k, 1%, 0.1 W, 0603	R13	RC0603FR-077K5L	0	Yageo	0603	7.50k		
Not Fitted	RES, 0, 5%, 0.1 W, 0603	R14	RC0603JR-070RL	0	Yageo	0603	0		
Not Fitted	RES, 604 k, 0.1%, 0.125 W, 0805	R15, R17	RT0805BRD07604KL	0	Yageo America	0805	604k		
Not Fitted	500 kOhms 0.25W, 1/4W PC Pins Through Hole Trimmer Potentiometer Cermet 12 Turn Top Adjustment	R16	PV37W504C01B00	0	Bourns	PTH_3			
Not Fitted	Trimmer Potentiometer, Lead Sealed Type Multiturn PV37 Series, TH	R18	PV37W503C01B00	0	Bourns	6.71x4.5mm	50k Ohm		
Not Fitted	RES, 10.0 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	R25	CRCW060310K0FKEA	0	Vishay-Dale	0603	10.0k		
Not Fitted	RES, 2.00 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	R26	CRCW06032K00FKEA	0	Vishay-Dale	0603	2.00k		
Not Fitted	DIP Switch, SPST 4Pos, Slide, TH	S2	78B04ST	0	Grayhill	DIP Switch, 4 Pos			
Not Fitted	Shunt, 100mil, Gold plated, Black	SH-JP8, SH-JP9	SNT-100-BK-G	0	Samtec	Shunt	1x2	3M	969102-0000-DA

Unless otherwise noted in the Alternate PartNumber and/or Alternate Manufacturer columns, all parts may be substituted with equivalents.

4 Revision History

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

DATE	REVISION	NOTES
December 2022	*	Initial Release

STANDARD TERMS FOR EVALUATION MODULES

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。
http://www.tij.co.jp/lsds/ti_ja/general/eStore/notice_01.page

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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1. 電波法施行規則第6条第1項第1号に基づく平成18年3月28日総務省告示第173号で定められた電波暗室等の試験設備でご使用いただく。
2. 実験局の免許を取得後ご使用いただく。
3. 技術基準適合証明を取得後ご使用いただく。

なお、本製品は、上記の「ご使用にあたっての注意」を譲渡先、移転先に通知しない限り、譲渡、移転できないものとします。
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3.3.3 *Notice for EVMs for Power Line Communication:* Please see http://www.tij.co.jp/lsds/ti_ja/general/eStore/notice_02.page
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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.

5. *Accuracy of Information:* To the extent TI provides information on the availability and function of EVMs, TI attempts to be as accurate as possible. However, TI does not warrant the accuracy of EVM descriptions, EVM availability or other information on its websites as accurate, complete, reliable, current, or error-free.

6. *Disclaimers:*

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