



ABSTRACT

The BQ25720EVM and BQ25723EVM evaluation modules (EVM) are SMBus or I²C-controlled NVDC-1 buck boost charger. The input voltage range is from 3.5 V to 26 V, with a programmable output of 1–4 cells and a charge output current range of 64 mA to 8.128 A. This EVM does not include the EV2400 interface device; the EV2400 must be ordered separately to evaluate the BQ2572x EVM.

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1 Introduction

1.1 EVM Features

This EVM supports the following features:

- Evaluation module for the BQ2572x devices
- Supports 3.5- to 26-V input source
 - 3.5- to 26-V, 0- to 6-A input operating range and 1–4 cell battery configuration
 - Supports USB 2.0, USB 3.0, USB 3.1 (USB Type-C®) and USB_PD
 - Supports USB OTG with 3- to 26-V adjustable output
 - Supports Fast Role Swap (FRS) feature for USB_PD
- Narrow VDC (NVDC) power path management
 - Battery supplements the system when the adapter is fully-loaded
- 800-kHz or 1.2-MHz switching frequency for low profile inductor
- SMBus (BQ25720) or I²C (BQ25723) port for optimal system performance and status reporting
- Power and current monitor for CPU throttling
- Safety
 - Thermal shutdown
 - Input and system overvoltage protection
 - MOSFET overcurrent protection
- Supports Vmin Active Protection (VAP) mode for Intel® platform
- Charge status outputs for LED or host processor
- Maximum power tracking capability by input voltage regulation
- Test points for key signals available for testing purposes. Easy probe hook-up.
- Jumpers available. Easy-to-change connections.

1.2 General Description

The BQ2572x evaluation modules are complete charger modules for evaluating an SMBus or I²C-controlled buck boost charger using the BQ2572x devices.

The BQ2572x EVM does not include the EV2400 interface board. To evaluate the BQ2572x EVM, order an EV2400 interface board separately.

The BQ2572x is a synchronous NVDC-1 battery buck boost charge controller, offering a low component count, high efficiency solution for space-constrained, multi-chemistry battery charging applications.

The NVDC-1 configuration allows the system to be regulated at the battery voltage, but does not drop below the system minimum voltage. The system keeps operating even when the battery is completely discharged or removed. When load power exceeds the input source rating, the battery supplement mode prevents the input source from being overloaded.

The BQ2572x charges the battery from a wide range of input sources including a 5-V USB adapter to a high-voltage USB PD source and traditional adapters.

During power up, the charger sets the converter to buck, boost, or buck-boost configuration based on the input source and battery conditions. During the charging cycle, the charger automatically transits among buck, boost, and buck-boost configuration without host control.

The BQ2572x monitors adapter current, battery current, and system power. The flexibly programmed $\overline{\text{PROCHOT}}$ output goes directly to the CPU for throttle back, when needed.

For more details on register functions, see the [BQ25720 SMBus 1- to 4-Cell Narrow VDC Buck-Boost Battery Charge Controller With System Power Monitor and Processor Hot Monitor](#) and [BQ25723 I²C 1- to 4-Cell Narrow VDC Buck-Boost Battery Charge Controller With System Power Monitor and Processor Hot Monitor](#) data sheets.

Table 1-1 lists the I/O descriptions.

Table 1-1. I/O Description

Jack	Description
J1–VIN	Input: positive terminal
J1–PGND	Input: negative terminal (ground terminal)
J2–ILIM_HIZ	External converter disable
J2–CHRG_OK	CHRG_OK output
J2–ENZ_OTG	External OTG disable pin
J2–CELL_control	External battery removal control; logic high to pull the CELL pin down
J3–3V3	Onboard 3.3-V output
J3–SDA	SMBUS or I ² C SDA
J3–SCL	SMBUS or I ² C SCL
J3–GND	Ground
J4–CMPOUT	CMPOUT pin output
J4–GND	Ground
J4–CMPIN	External CMPIN pin input
J5–VBAT	Connected to battery pack output
J5–PGND	Ground
J6–VSY	Connected to system output
J6–PGND	Ground
J7–SDA	SMBUS or I ² C SDA
J7–SCL	SMBUS or I ² C SCL
J7–GND	Ground

Table 1-2 displays the controls and key parameters settings.

Table 1-2. Controls and Key Parameters Setting

Jumper	Description	Factory Setting
JP1	Bypass inrush control circuit JP1 on: bypasses input FETs Q6 and Q7 external selector JP1 off: CHRG_OK controls Q6 and Q7 external selector	Installed
JP2	Jumper on: Forward Mode Jumper off: OTG Mode	Installed
JP3	CELL setting: 1S: JP3(1-2), measure CELL pin voltage 1.5 V 2S: JP3(3-4), measure CELL pin voltage 2.4 V 3S: JP3(5-6), measure CELL pin voltage 3.3 V 4S: JP3(7-8), measure CELL pin voltage 4.5 V	2S setting: JP3(3-4)
JP4	Jumper on: Bat removal Jumper off: Cell setting by JP3	Not installed
JP6	For input current setting: Jumper on: ILIM_HIZ LOW. Jumper off: Allow pre-bias ILIM_HIZ	Not installed
JP7	VBUS source selection JP7 (1-2): VBUS pin on V _{IN} JP7 (2-3): VBUS pin on ACP	Installed: JP7(1-2)
JP8	Jumper on: Onboard LDO to drive the EVM 3V3 Jumper off: disconnect onboard LDO to drive the EVM 3V3	Installed

Table 1-3 lists the recommended operating conditions.

Table 1-3. Recommended Operating Conditions

Symbol	Description	MIN	TYP	MAX	Unit
Supply voltage, V_{IN}	Input voltage from AC adapter input	3.5	5, 9, 15, 20	26	V
Battery voltage, V_{BAT}	Voltage applied at VBAT terminal	0		19.2	V
Supply current, I_{AC}	Maximum input current from AC adapter input	0		6.4	A
Output current, I_{out}	Output current	0		8	A
Operating junction temperature range, T_J		0		125	°C

2 Test Summary

2.1 Definitions

This procedure details how to configure the BMS035 evaluation board. For the test procedure, the following naming conventions are followed. Refer to the [BMS035 schematic](#) for details.

VXXX:	External voltage supply name (VADP, VBT, VSBT)
LOADW:	External load name (LOADR, LOADI)
V(TPyyy):	Voltage at internal test point TPyyy. For example, V(TP12) means the voltage at TP12.
V(Jxx):	Voltage at jack terminal Jxx.
V(TP(XXX)):	Voltage at test point "XXX". For example, V(ACDET) means the voltage at the test point which is marked as "ACDET".
V(XXX, YYY):	Voltage across point XXX and YYY.
I(JXX(YYY)):	Current going out from the YYY terminal of jack XX.
Jxx(BBB):	Terminal or pin BBB of jack xx
Jxx ON :	Internal jumper Jxx terminals are shorted
Jxx OFF:	Internal jumper Jxx terminals are open
Jxx (-YY-) ON:	Internal jumper Jxx adjacent terminals marked as "YY" are shorted
Measure: → A,B	Check specified parameters A, B. If measured values are not within specified limits, the unit under test has failed.
Observe → A,B	Observe if A, B occurs. If they do not occur, the unit under test has failed.

[Assembly drawings](#) have locations for jumpers, test points, and individual components.

2.2 Equipment

The following list of equipment is required for fully testing the EVM:

1. Power Supplies

A power supply capable of supplying 26 V at 6 A is required. While this part can handle larger voltage and current, it is not necessary for this procedure.

2. Load #1

A 20-V, 6-A system DC electronic load and setting as constant voltage load mode.

3. Load #2

A Kepco load: BOP36-6M, DC 0 to ± 36 V, 0 to ± 6 A (or higher), or equivalent.

4. Meters

Six Fluke 75 multimeters, (equivalent or better) or: Three equivalent voltage meters and three equivalent current meters.

5. Computer

A computer with at least one USB port and a USB cable.

6. EV2400 Communication Kit

7. Software

Download and properly install bqStudio from <https://www.ti.com/tool/BQSTUDIO>.

2.3 Equipment Setup

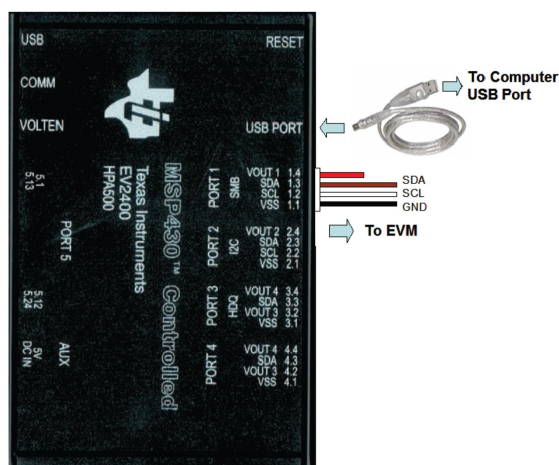
Use the following guidelines to set up the equipment:

1. Set power supply #1 for 10-V DC, 5-A current limit and then turn off the supply.
2. Connect the output of power supply #1 in series with a current meter to J1 (VIN and PGND).
3. Connect a voltage meter across J1 (VIN) and J1 (PGND).
4. Connect load #1 in series with a current meter to J6 (VSYS and PGND).
Connect a voltage meter across J6 (VSYS and PGND).
Set 1 A at the constant current mode. Turn off load #1.
5. Connect Load #2 in series with a current meter to J5 (VBAT and PGND).
Connect a voltage meter across J5 (VBAT and PGND).
Set 7 V at KEPCO load output. Turn off load #2.

Note

Add a 47- μ F capacitor on the BAT pin when testing without a real battery.

6. Connect J3 to the EV2400. Connect J3 to the SMBus PORT 1 (BQ25720) or I²C PORT 2 (BQ25723) on the EV2400. [Figure 2-1](#) shows the connections.



The picture shows the SMBus version EVM connection. If using the BQ25723EVM, move the connector to the I²C port.

Figure 2-1. EV2400 Connections

7. Install jumpers as indicated in [Table 1-2](#).

After completing these steps, the test setup for BMS035 is as shown in [Figure 2-2](#).

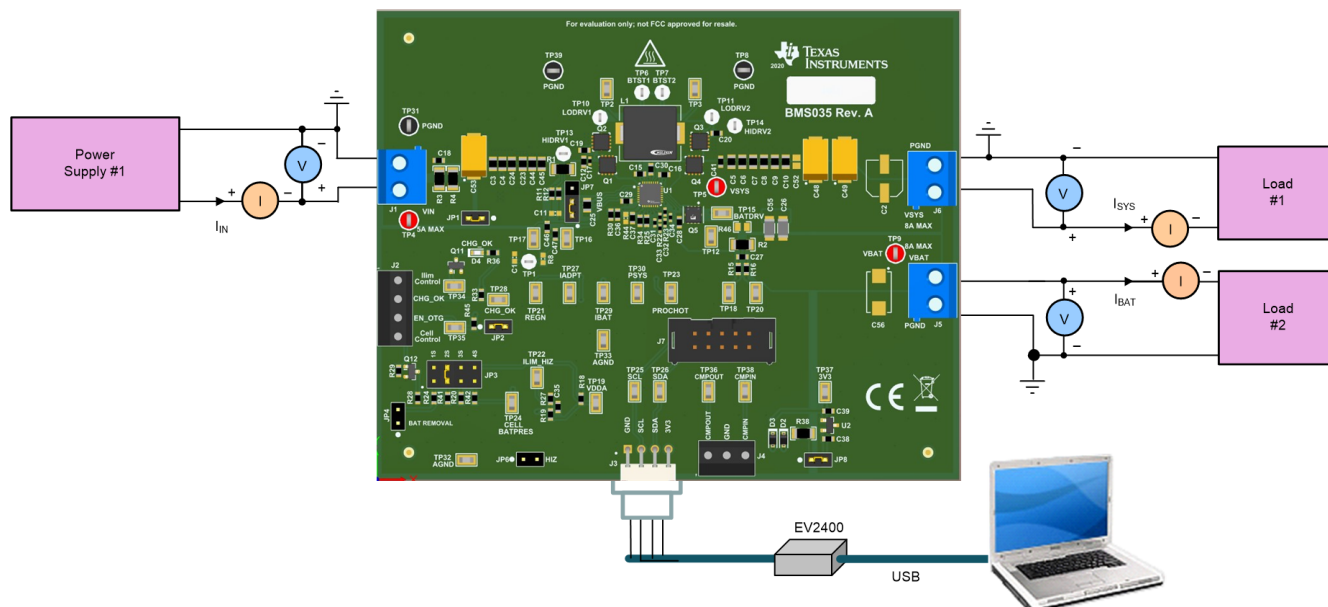
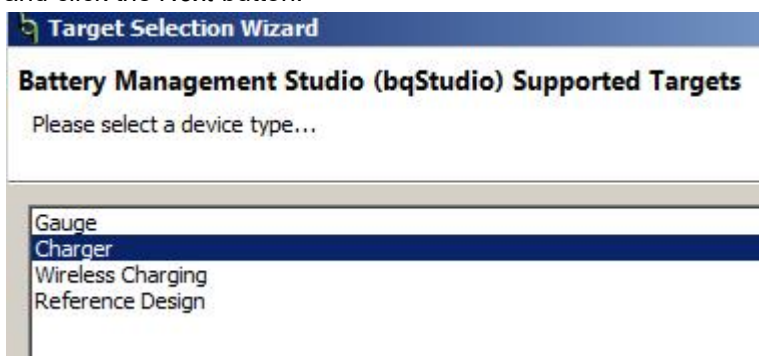


Figure 2-2. Original Test Setup for BMS035 (BQ2572x EVM)

8. Turn on the computer and power supply #1. Open the bqStudio software.
 - a. Select *Charger* and click the *Next* button.



- b. For SMBus BQ25720, select "Charger_1_00_BQ25720.bqz" on the *Select a Target Page*. For I²C BQ25723, select "Charger_1_00_BQ25723.bqz" on the *Select a Target Page*.
 - c. After selecting the target device, click the *Read Register* button and the interface in [Figure 2-3](#) is presented.

bq25720 Default View

Registers

Save Registers Load Registers Start Log Write Register **Read Register** Auto Read: OFF Update Mode Immediate Tgt Address 12(9) Device ACK OK

Register Name	Command	Current Value	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Charge Option 0	0x12	E70E	1	1	1	0	0	1	1	1	0	0	0	0	1	1	1	0
Charge Current	0x14	0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Max Charge Voltage	0x15	20D0	0	0	1	0	0	0	0	0	1	1	0	1	0	0	0	0
OTG Voltage	0x3B	09C4	0	0	0	0	1	0	0	1	1	1	0	0	0	1	0	0
OTG Current	0x3C	3C00	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0
Input Voltage	0x3D	0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min System Voltage	0x3E	4200	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
IIN_HOST	0x3F	4100	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Charger Status	0x20	8000	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prochot Status	0x21	B800	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0
IIN_DPM	0x22	4100	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
ADC VBUS and PSYS	0x23	CF00	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0
ADC IBAT	0x24	0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ADC IIN and CMPIN	0x25	0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ADC VSYS and VBAT	0x26	0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Manufacture ID	0xFE	0040	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Device ID	0xFF	00E1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1
Charge Option 1	0x30	3300	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0
Charge Option 2	0x31	00B7	0	0	0	0	0	0	0	0	1	0	1	1	0	1	1	1
Charge Option 3	0x32	0434	0	0	0	0	0	1	0	0	0	1	1	1	0	1	0	0
Prochot Option 0	0x33	4A81	0	1	0	0	1	0	1	0	1	0	0	0	0	0	0	1
Prochot Option 1	0x34	41A0	0	1	0	0	0	0	0	1	1	0	1	0	0	0	0	0
ADC Option	0x35	2000	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Charge Option 4	0x36	0048	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
Vmin Active Protection	0x37	006C	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0

Charge Option 0
☒ EN_LWPPWR
WDTMR_ADJ 175 seconds
☐ IIN_DPM_AUTO_DISABLE
☐ OTG_ON_CHRGOK
☒ EN_OOA
PWM_FREQ 800kHz
☒ DIS_STRGRV
☐ EN_CMP_LATCH
☐ SYS_UVP_ENZ
☐ EN_LEARN
IADPT Gain 20X
IDCHG Gain 16X
☒ EN_LDO
☒ EN_IIN_DPM
☐ CHRG_INHIBIT

Figure 2-3. Main Window of the BQ2572x Evaluation Software

2.4 Procedure

2.4.1 Charge Function

Use the following for charge function settings:

1. Make sure the [Equipment Setup](#) steps are followed.
2. Set the *Tgt Address* to 12(9) for BQ25720 or D6(6B) for BQ25723.
3. Write "020E" to charge option 0 register 0x12H (BQ25720) or 0x00H (BQ25723).
Measure → $V(J1(V_{IN})) = 10\text{ V} \pm 0.5\text{ V}$
Measure → $V(TP28(CHRG_OK)) = 3\text{ V to }4.5\text{ V}$
Measure → $V(TP21(REGN)) = 6\text{ V} \pm 1\text{ V}$
Measure → $V(TP22(ILIM_HIZ)) = 2.2\text{ V}$
4. Write "0800" to charge current 0x14H (BQ25720) or 0x02H (BQ25723).
Turn on load #1.
Measure → $V(J6(SYS)) = 8.4\text{ V} \pm 0.5\text{ V}$
5. Turn on LOAD #2 (VBAT Load).
Measure → $V(J5(VBAT)) = 7\text{ V} \pm 0.5\text{ V}$
Measure → $I(J5(VBAT)) = 2\text{ A} \pm 0.5\text{ V}$

2.4.2 OTG Function

Use the following for OTG function settings:

1. Connect a 7-V power supply to the VBAT load.
Remove the V_{IN} power supply from J1. (The connection must be physically removed from the board).
2. Write "20D0" to the *Charge Voltage Register*.
3. Write "09C4" to the OTG voltage register.
4. Write "4000" to the OTG current registers.
5. Remove JP2 to enable the OTG function.
6. Select *EN_OTG* in *Charge Option 3*.
Measure → $V(J1(V_{IN})) = 5\text{ V} \pm 1\text{ V}$

bq25720 Default View

Registers

Register Name	Command	Current Value	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Charge Option 0	0x12	E70E	1	1	1	0	0	1	1	1	0	0	0	0	1	1	1	0
Charge Current	0x14	0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Max Charge Voltage	0x15	20D0	0	0	1	0	0	0	0	1	1	0	1	0	0	0	0	0
OTG Voltage	0x3B	09C4	0	0	0	0	1	0	0	1	1	0	0	0	0	1	0	0
OTG Current	0x3C	3C00	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0
Input Voltage	0x3D	0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min System Voltage	0x3E	4200	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
IIN_HOST	0x3F	4100	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Charger Status	0x20	8000	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prochot Status	0x21	B800	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0
IIN_DPM	0x22	4100	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
ADC VBUS and PSYS	0x23	CF00	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0
ADC IBAT	0x24	0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ADC IIN and CMPIN	0x25	0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ADC VSYS and VBAT	0x26	0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Manufacture ID	0xFE	0040	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Device ID	0xFF	00E1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1
Charge Option 1	0x30	3300	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0
Charge Option 2	0x31	00B7	0	0	0	0	0	0	0	0	1	0	1	1	0	1	1	1
Charge Option 3	0x32	1434	0	0	0	0	1	0	1	0	0	0	1	1	0	1	0	0
Prochot Option 0	0x33	4A81	0	1	0	0	1	0	1	0	1	0	0	0	0	0	0	1
Prochot Option 1	0x34	41A0	0	1	0	0	0	0	0	1	1	0	1	0	0	0	0	0
ADC Option	0x35	2000	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Charge Option 4	0x36	0048	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
Vmin Active Protection	0x37	006C	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0

Charge Option 3

☐ EN_HIZ

☐ RESET_REG

☐ RESET_VINDPM

☒ EN_OTG

☐ EN_ICO_MODE

☒ EN_PORT_CTRL

☐ EN_VSYS_MIN_SOFT_SR

☐ EN_OTG_BIGCAP

☐ BATFET_ENZ

☐ EN_VBUS_VAP

☒ OTG_VAP_MODE

IL_AVG 15 A

☒ CMP_EN

BATFETOFF_HIZ BATFET on in HIZ

PSYS_OTG_IDCHG PSYS = PBAT - PVBUS

Figure 2-4. EN_OTG

3 Bill of Materials, Board Layout, and Schematics

This section contains the EVM BOM, board layout images and schematics.

3.1 Bill of Materials

Table 3-1 lists the BQ2572x EVM bill of materials.

Table 3-1. BQ2572x EVM Bill of Materials

Designator	Qty	Value	Description	Package Reference	Part Number	Manufacturer
PCB1	1		Printed Circuit Board		BMS035	Any
C3, C4, C23, C24, C44, C45	6	10uF	CAP, CERM, 10 uF, 35 V, $\pm 10\%$, X5R, 0805	805	GRM21BR6YA106KE43L	MuRata
C5, C6, C7, C8, C9, C10, C21	7	10uF	CAP, CERM, 10 uF, 25 V, $\pm 10\%$, X5R, 0805	805	GRM21BR61E106KA73L	MuRata
C12, C41	2	0.01uF	CAP, CERM, 0.01 uF, 50 V, $\pm 10\%$, X7R, 0603	603	GRM188R71H103KA01D	MuRata
C15, C16	2	0.047uF	CAP, CERM, 0.047 uF, 25 V, $\pm 10\%$, X7R, 0603	603	GRM188R71E473KA01D	MuRata
C17	1	1000pF	CAP, CERM, 1000 pF, 50 V, $\pm 5\%$, C0G/NP0, 0402	402	C1005NP01H102J050BA	TDK
C18, C28, C29	3	1uF	CAP, CERM, 1 uF, 35 V, $\pm 10\%$, X7R, AEC-Q200 Grade 1, 0603	603	CGA3E1X7R1V105K080AE	TDK
C19, C20	2	150pF	CAP, CERM, 150 pF, 50 V, $\pm 5\%$, C0G/NP0, 0603	603	C0603C151J5GACTU	Kemet
C22, C27, C38, C39	4	0.1uF	CAP, CERM, 0.1 uF, 50 V, $\pm 10\%$, X7R, 0603	603	C1608X7R1H104K080AA	TDK
C25	1	0.47uF	CAP, CERM, 0.47 uF, 50 V, $\pm 10\%$, X7R, 0805	805	C2012X7R1H474K125AB	TDK
C26, C55	2	10uF	CAP, CERM, 10 uF, 25 V, $\pm 10\%$, X7R, 1206	1206	GRM31CR71E106KA12L	MuRata
C30	1	2.2uF	CAP, CERM, 2.2 uF, 35 V, $\pm 10\%$, X5R, 0603	603	GRM188R6YA225KA12D	MuRata
C31	1	33pF	CAP, CERM, 33 pF, 50 V, $\pm 5\%$, C0G/NP0, 0402	402	GRM1555C1H330JA01D	MuRata
C32	1	1200pF	CAP, CERM, 1200 pF, 50 V, $\pm 10\%$, X7R, 0402	402	GRM155R71H122KA01D	MuRata
C33	1	3300pF	CAP, CERM, 3300 pF, 50 V, $\pm 10\%$, X7R, 0402	402	GRM155R71H332KA01D	MuRata
C34	1	15pF	CAP, CERM, 15 pF, 50 V, $\pm 5\%$, C0G/NP0, 0402	402	GRM1555C1H150JA01D	MuRata
C35, C36, C37	3	100pF	CAP, CERM, 100 pF, 50 V, $\pm 5\%$, C0G/NP0, 0603	603	C0603C101J5GAC	Kemet
C46, C47	2	0.033uF	CAP, CERM, 0.033 uF, 50 V, $\pm 10\%$, X7R, 0603	603	GRM188R71H333KA61D	MuRata
C48, C49, C53	3	33uF	CAP, TA, 33 uF, 35 V, $\pm 20\%$, 0.065 ohm, SMD	7343-31	T521D336M035ATE065	Kemet
D2, D3	2	30V	Diode, Schottky, 30 V, 0.2 A, SOD-323	SOD-323	BAT54HT1G	ON Semiconductor
D4	1	Green	LED, Green, SMD	1.6x0.8x0.8mm	LTST-C190GKT	Lite-On
H1, H2, H3, H4	4		Bumpon, Hemisphere, 0.44 X 0.20, Clear	Transparent Bumpon	SJ-5303 (CLEAR)	3M
J1, J5, J6	3		Terminal Block, 5.08 mm, 2x1, Brass, TH	2x1 5.08 mm Terminal Block	ED120/2DS	On-Shore Technology
J2	1		Terminal Block, 3.5mm Pitch, 4x1, TH	14x8.2x6.5mm	ED555/4DS	On-Shore Technology
J3	1		Connector Header Through Hole, Right Angle 4 position 0.100" (2.54mm)	HDR4	22053041	Molex
J4	1		Terminal Block, 3.5mm Pitch, 3x1, TH	10.5x8.2x6.5mm	ED555/3DS	On-Shore Technology
J7	1		Header (shrouded), 100mil, 5x2, High-Temperature, Gold, TH	5x2 Shrouded header	N2510-6002-RB	3M
JP1, JP2, JP4, JP6, JP8	5		Header, 100mil, 2x1, Gold, TH	Header, 2x1, 100mil	5-146261-1	TE Connectivity
JP3	1		Header, 100mil, 4x2, Gold, TH	4x2 Header	TSW-104-07-G-D	Samtec
JP7	1		Header, 100mil, 3x1, Tin, TH	Header, 3 PIN, 100mil, Tin	PEC03SAAN	Sullins Connector Solutions
L1	1		2.2uH Shielded Wirewound Inductor 13A 9mOhm Max 10x10x3mm	SMT_IND_11MM2_10MM1	BMRHDY1010302R2MA1	Chilisin Electronics
LBL1	1		Thermal Transfer Printable Labels, 0.650" W x 0.200" H - 10,000 per roll	PCB Label 0.650 x 0.200 inch	THT-14-423-10	Brady
Q1, Q2, Q3, Q4	4	30V	MOSFET, N-CH, 30 V, 12 A, DNH0008A (VSONP-8)	DNH0008A	CSD17578Q3A	Texas Instruments
Q5	1		MOSFET P-CH 30V 3X3 DFN	DFN8	AONR21307	Alpha & Omega Semiconductor
Q6, Q7	2	-30V	MOSFET, P-CH, -30 V, -8.5 A, AEC-Q101, 8-PowerVDFN	8-PowerVDFN	DMP3035SFG-7	Diodes Inc.
Q9	1	50 V	Transistor, NPN/PNP Pair, 50 V, 0.05 A, SC-74R	SC-74R	DCX124EK-7-F	Diodes Inc.
Q10, Q11, Q12	3	60V	MOSFET, N-CH, 60 V, 0.26 A, SOT-23	SOT-23	2N7002ET1G	ON Semiconductor
R1, R2	2	0.01	RES, 0.01, 1%, 1 W, 1206	1206	WSLP1206R0100FEA	Vishay-Dale
R3, R4	2	3.9	RES, 3.9, 5%, 0.25 W, AEC-Q200 Grade 0, 1206	1206	CRCW12063R90JNEA	Vishay-Dale
R7, R24, R29	3	300k	RES, 300 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	603	CRCW0603300KFKEA	Vishay-Dale
R9, R28	2	100k	RES, 100 k, 1%, 0.1 W, 0603	603	RC0603FR-07100KL	Yageo

Table 3-1. BQ2572x EVM Bill of Materials (continued)

Designator	Qty	Value	Description	Package Reference	Part Number	Manufacturer
R10, R38	2	10	RES, 10.0, 1%, 0.25 W, AEC-Q200 Grade 0, 1206	1206	ERJ-8ENF10R0V	Panasonic
R11, R12	2	4.99	RES, 4.99, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	603	CRCW06034R99FKEA	Vishay-Dale
R13	1	1	RES, 1.0, 5%, 0.125 W, AEC-Q200 Grade 0, 0805	805	CRCW08051R00JNEA	Vishay-Dale
R14	1	20k	RES, 20 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	603	CRCW060320K0JNEA	Vishay-Dale
R15, R16, R18	3	10	RES, 10, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	603	CRCW060310R0JNEA	Vishay-Dale
R17, R25, R32, R33, R35, R39, R45	7	10.0k	RES, 10.0 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	603	CRCW060310K0FKEA	Vishay-Dale
R19	1	383k	RES, 383 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	603	CRCW0603383KFKEA	Vishay-Dale
R20	1	82k	RES, 82 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	603	CRCW060382K0JNEA	Vishay-Dale
R22	1	16.9k	RES, 16.9 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	402	CRCW040216K9FKED	Vishay-Dale
R23	1	10.0k	RES, 10.0 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	402	CRCW040210K0FKED	Vishay-Dale
R27	1	220k	RES, 220 k, 1%, 0.1 W, 0603	603	RC0603FR-07220KL	Yageo
R30	1	137k	RES, 137 k, 1%, 0.1 W, 0603	603	RC0603FR-07137KL	Yageo
R34	1	30.1k	RES, 30.1 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	603	CRCW060330K1FKEA	Vishay-Dale
R36	1	2.00k	RES, 2.00 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	603	CRCW06032K00FKEA	Vishay-Dale
R40	1	2.0Meg	RES, 2.0 M, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	603	CRCW06032M00JNEA	Vishay-Dale
R41	1	150k	RES, 150 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	603	CRCW0603150KJNEA	Vishay-Dale
R42	1	33k	RES, 33 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	603	CRCW060333K0JNEA	Vishay-Dale
SH-JP1, SH-JP2, SH-JP3, SH-JP7, SH-JP8	5	1x2	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
TP1, TP6, TP7, TP10, TP11, TP13, TP14	7	White	Test Point, Miniature, White, TH	White Miniature Testpoint	5002	Keystone
TP2, TP3, TP12, TP15, TP16, TP17, TP18, TP19, TP20, TP21, TP22, TP23, TP24, TP25, TP26, TP27, TP28, TP29, TP30, TP32, TP33, TP34, TP35, TP36, TP37, TP38	26	SMT	Test Point, Miniature, SMT	Testpoint_Keystone_Miniature	5015	Keystone
TP4, TP5, TP9	3		Test Point, Multipurpose, Red, TH	Red Multipurpose Testpoint	5010	Keystone
TP8, TP31, TP39	3		Test Point, Multipurpose, Black, TH	Black Multipurpose Testpoint	5011	Keystone
U1	1		SMBus/I2C, 1-4 Cell Narrow VDC Buck-Boost Battery Charge Controller With System Power Monitor and Processor Hot Monitor	WQFN32	BQ25720RSN for BQ25720EVM; BQ25723RSN for BQ25723EVM	Texas Instruments
U2	1		100 mA, Quasi Low-Dropout Linear Voltage Regulator, 3-pin SOT-23, Pb-Free	DBZ0003A	LM3480IM3-3.3/NOPB	Texas Instruments
Z1	1	26V	Diode, TVS, Bi, 26 V, 42.1 Vc, 400 W, 9.5 A, SMA (non-polarized)	SMA (non-polarized)	SMAJ26CA	Littelfuse
C1	0	15pF	CAP, CERM, 15 pF, 50 V, $\pm 5\%$, C0G/NP0, 0603	603	C0603C150J5GACTU	Kemet
C2	0	47uF	CAP, Aluminum Polymer, 47 uF, 25 V, $\pm 20\%$, 0.03 ohm, F61 SMD	F61	25SVPF47M	Panasonic
C11	0	0.01uF	CAP, CERM, 0.01 uF, 50 V, $\pm 10\%$, X7R, 0603	603	GRM188R71H103KA01D	MuRata
C13, C14	0	330pF	CAP, CERM, 330 pF, 50 V, $\pm 10\%$, X7R, 0603	603	GRM188R71H331KA01D	MuRata
C40, C51, C52	0	10uF	CAP, CERM, 10 uF, 25 V, $\pm 10\%$, X5R, 0805	805	GRM21BR61E106KA73L	MuRata
C42, C43	0	10uF	CAP, CERM, 10 uF, 35 V, $\pm 10\%$, X5R, 0805	805	GRM21BR6YA106KE43L	MuRata
C50, C54, C56	0	33uF	CAP, TA, 33 uF, 35 V, $\pm 20\%$, 0.065 ohm, SMD	7343-31	T521D336M035ATE065	Kemet
C57	0	0.068uF	CAP, CERM, 0.068 uF, 50 V, $\pm 10\%$, X7R, AEC-Q200 Grade 1, 0402	402	CGA2B3X7R1H683K050BB	TDK
C58, C59	0	0.018uF	CAP, CERM, 0.018 uF, 50 V, $\pm 10\%$, X7R, 0603	603	GRM188R71H183KA01D	MuRata
D1	0	20V	Diode, Schottky, 20 V, 2 A, SMA	SMA	B220A-13-F	Diodes Inc.
FID1, FID2, FID3, FID4, FID5, FID6	0		Fiducial mark. There is nothing to buy or mount.	N/A	N/A	N/A
R5, R6	0	56	RES, 56, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	603	CRCW060356R0JNEA	Vishay-Dale
R8	0	0	RES, 0, 5%, 0.1 W, 0603	603	RC0603JR-070RL	Yageo
R31	0	100	RES, 100, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	603	CRCW0603100RFKEA	Vishay-Dale
R37	0	10.0k	RES, 10.0 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	603	CRCW060310K0FKEA	Vishay-Dale
R43, R46	0	0	RES, 0, 1%, 0.5 W, 0805	805	5106	Keystone
R44	0	100k	RES, 100 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	603	CRCW0603100KFKEA	Vishay-Dale
SH-JP4, SH-JP6	0	1x2	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec

3.2 Board Assembly Layout

Figure 3-1 through Figure 3-6 illustrate the board assembly and layout images.

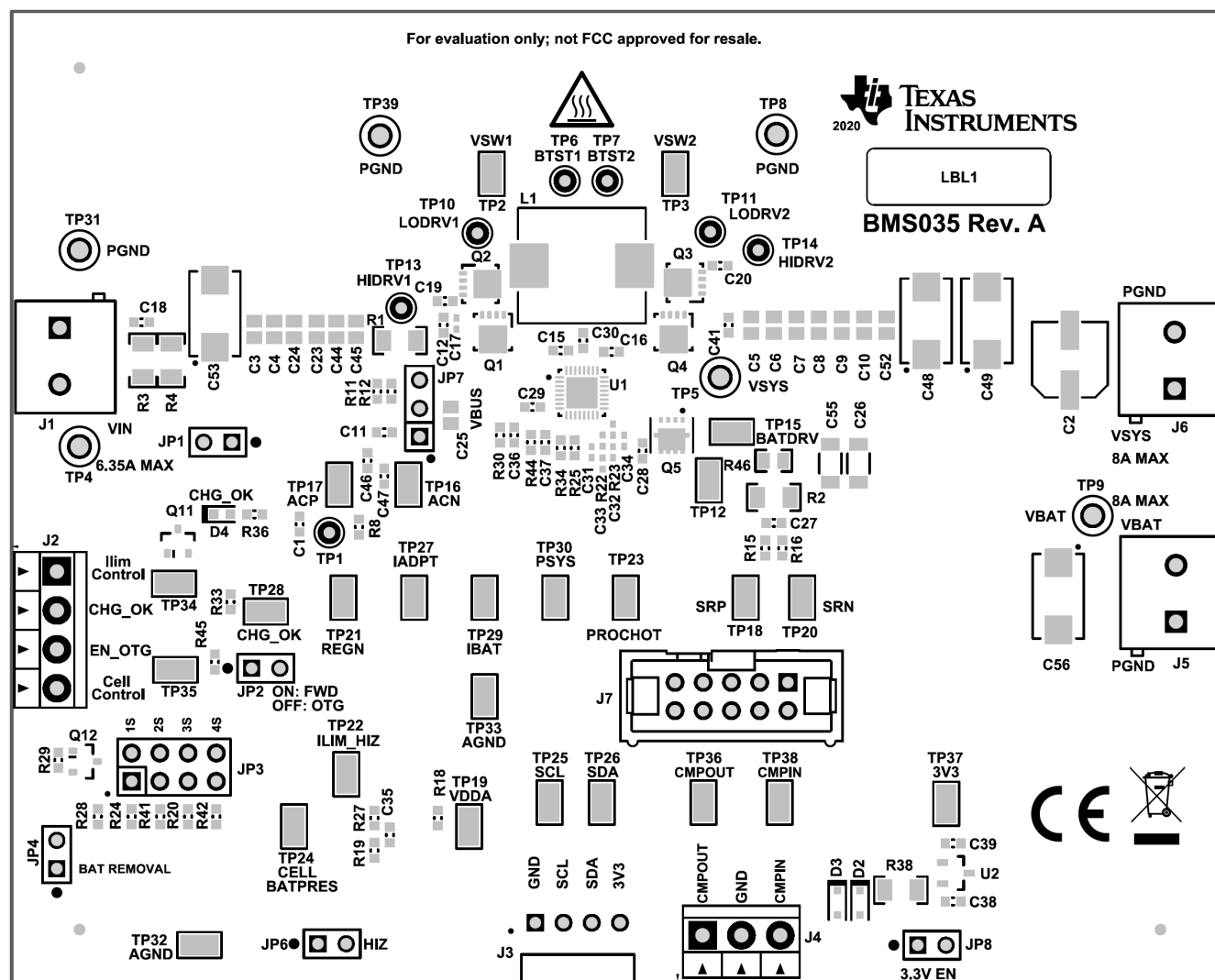


Figure 3-1. Top Assembly

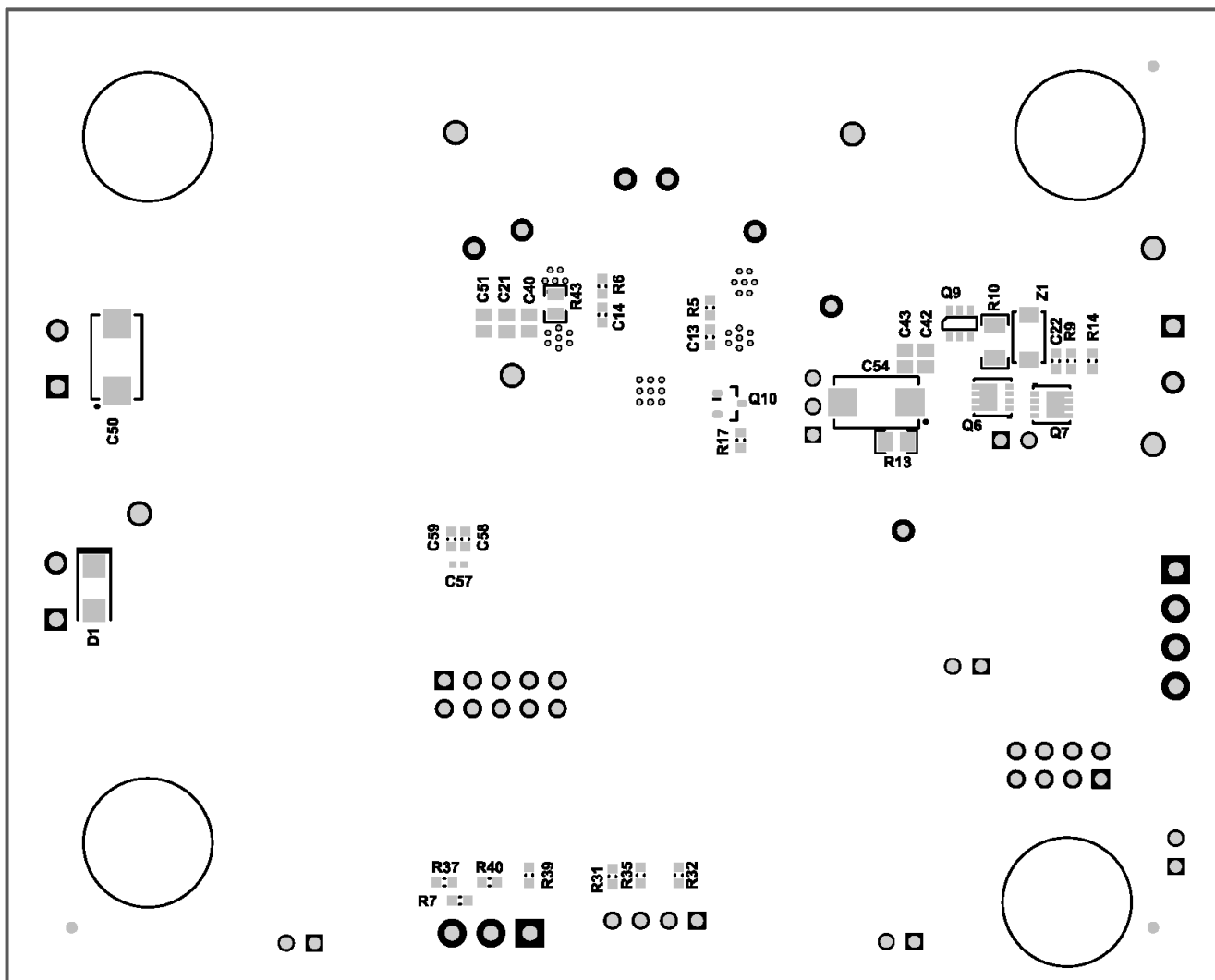


Figure 3-2. Bottom Assembly

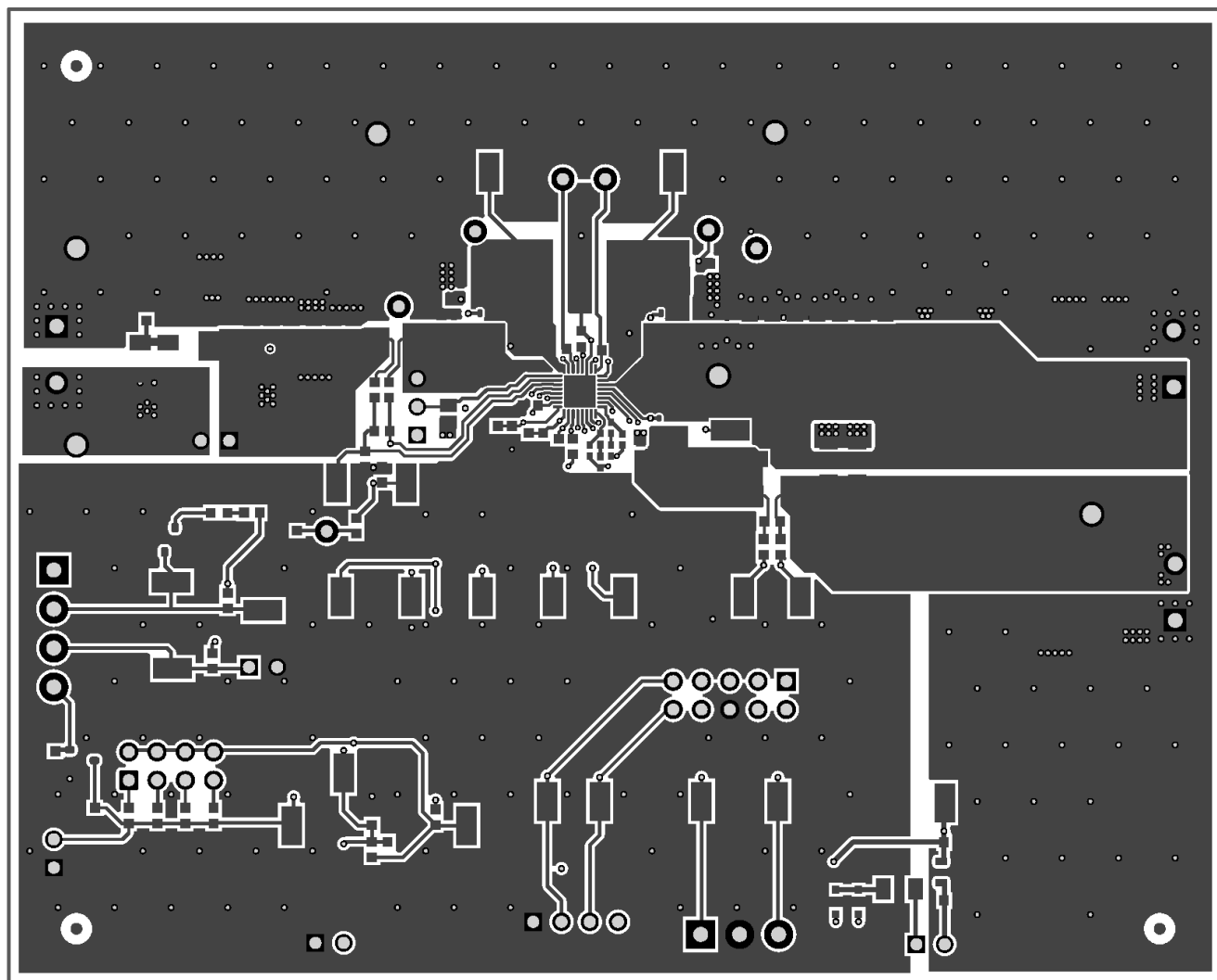


Figure 3-3. PCB Layer 1

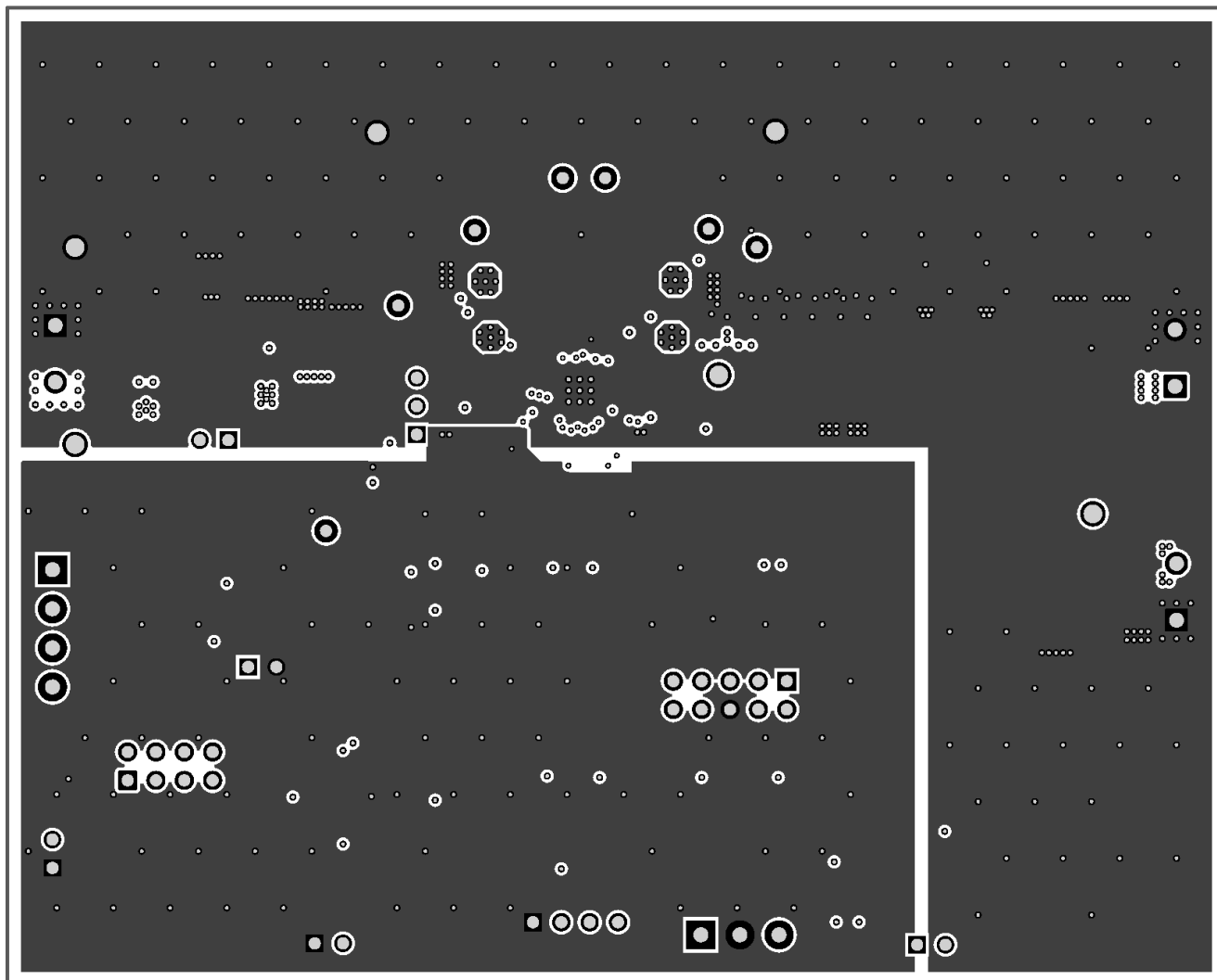


Figure 3-4. PCB Layer 2

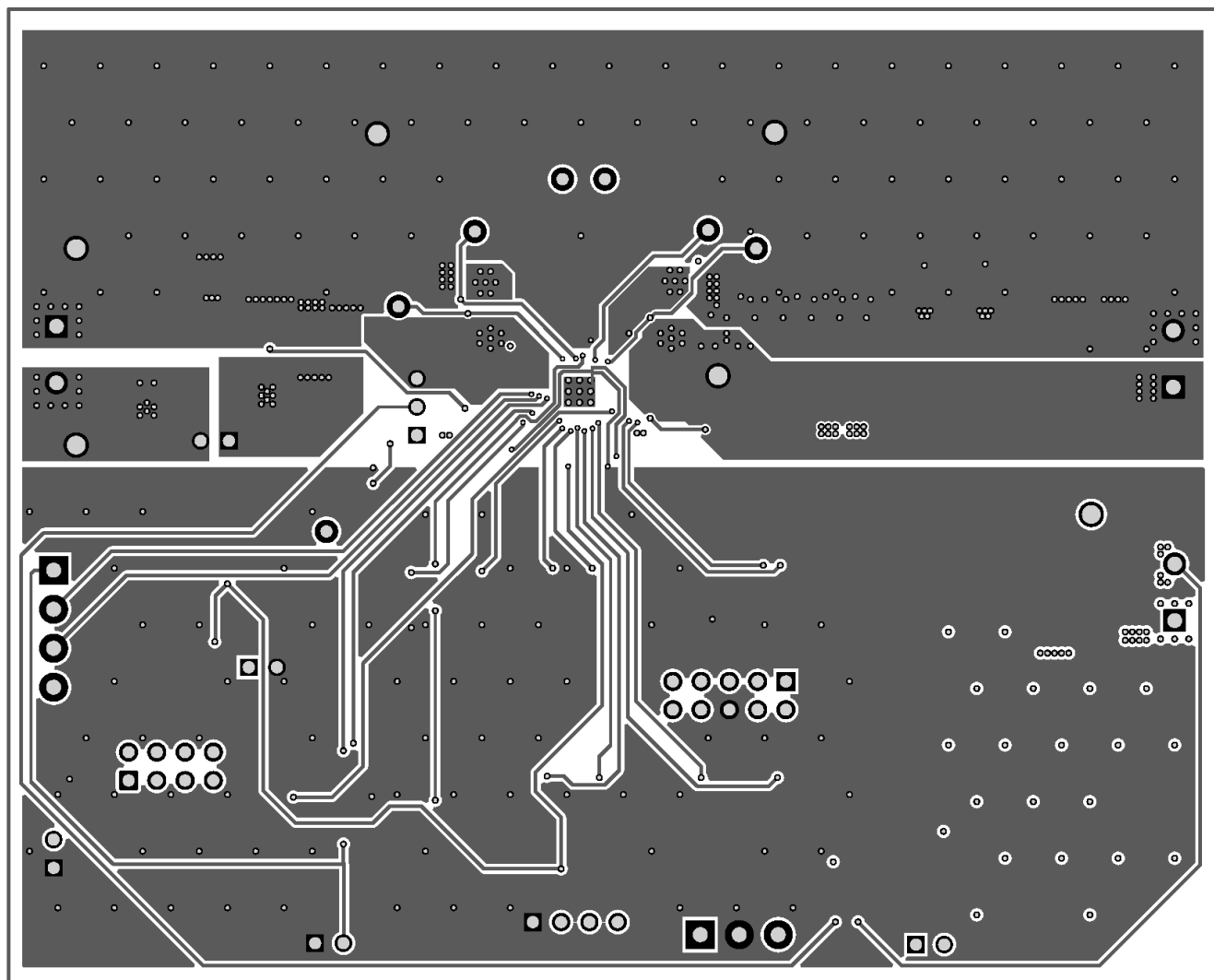


Figure 3-5. PCB Layer 3

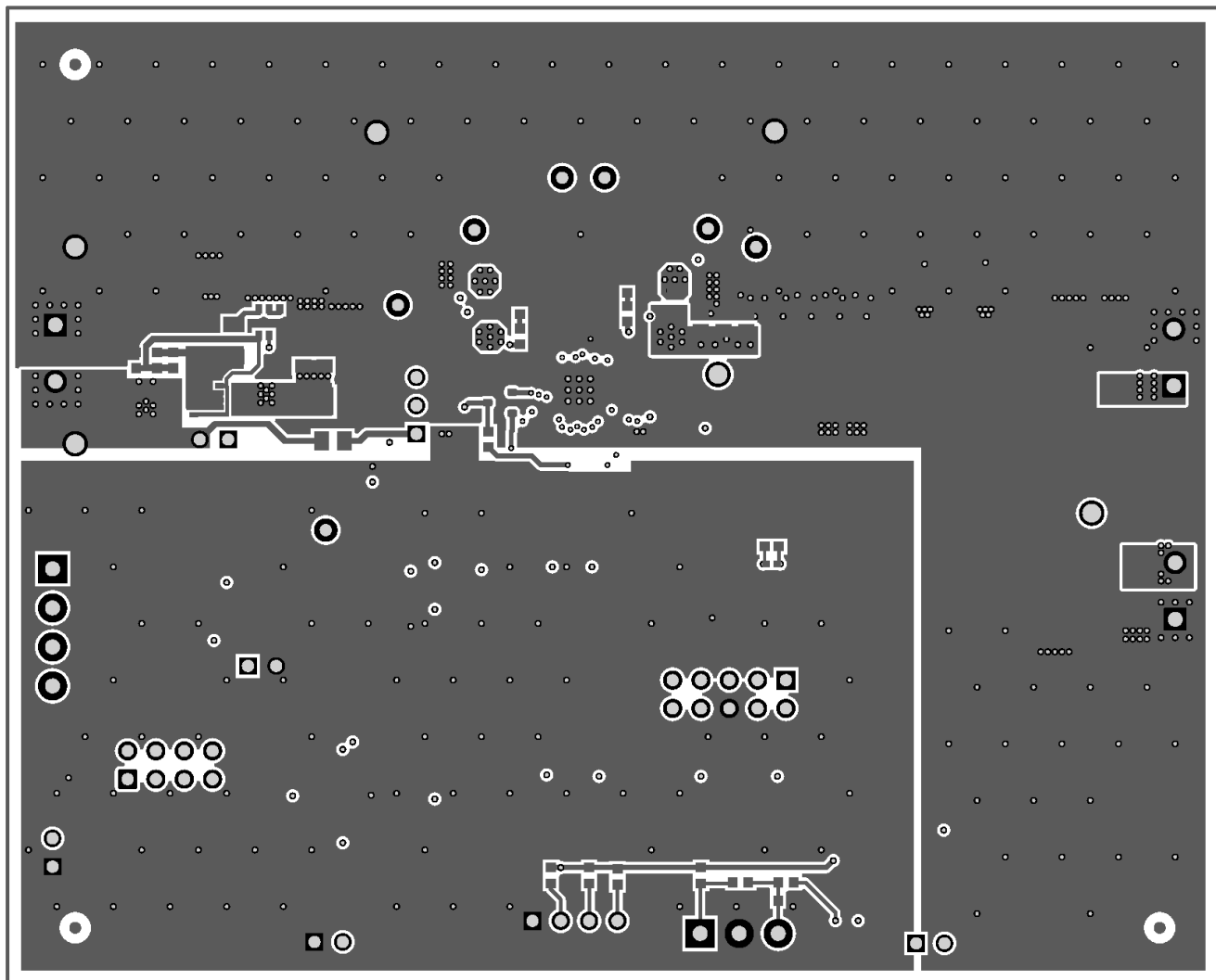
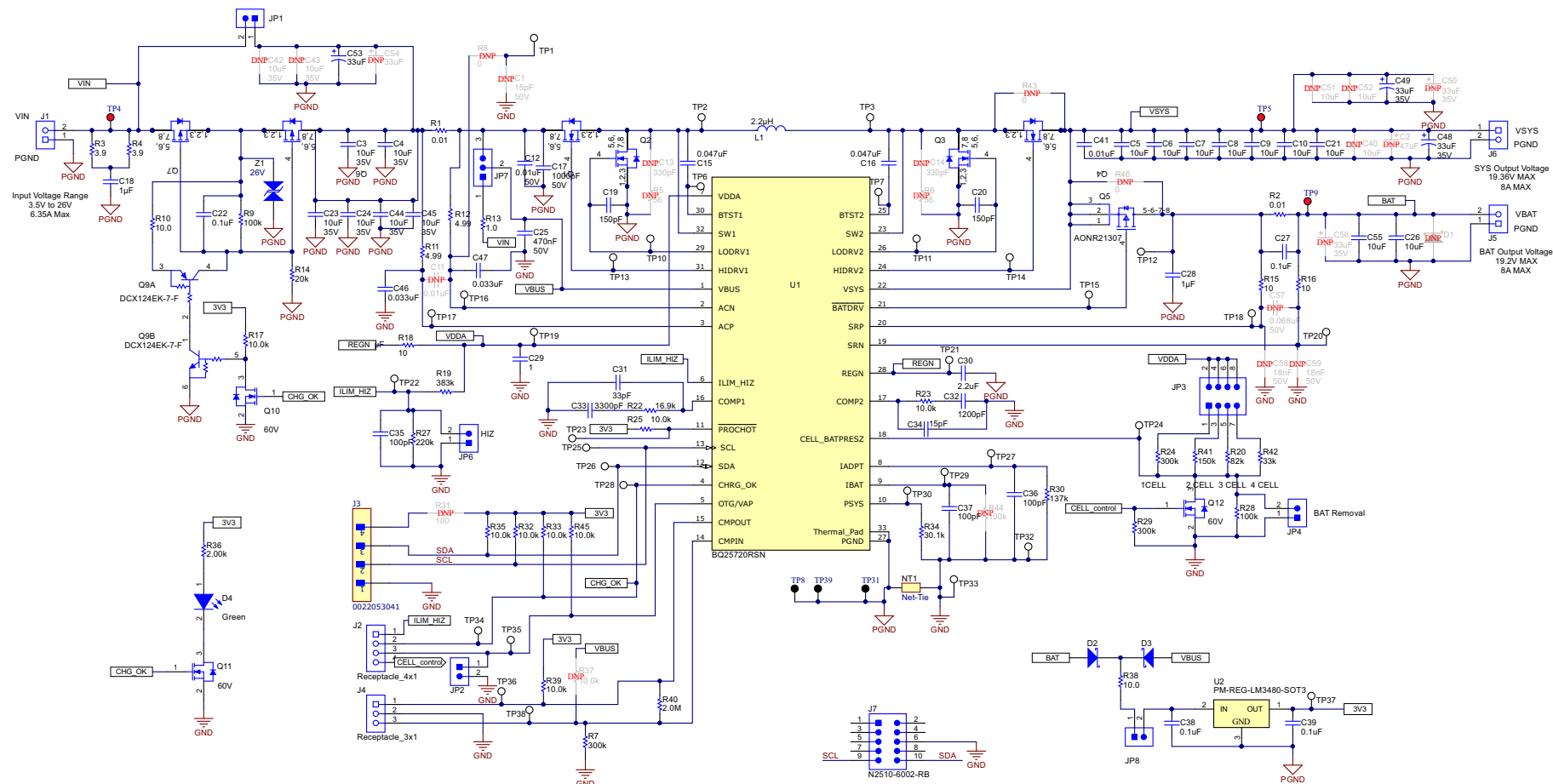


Figure 3-6. PCB Layer 4

3.3 Schematic

Figure 3-7 shows the EVM schematic.



U1 is BQ25720 for BQ25720EVM, while BQ25723 for BQ25723EVM.

Figure 3-7. BQ2572x EVM Schematic

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