Texas Instruments
Analog EVM Test Procedure

TIDA-00589 (PWR664) Test Procedure

Rev. A

1 GENERAL

1.1 PURPOSE

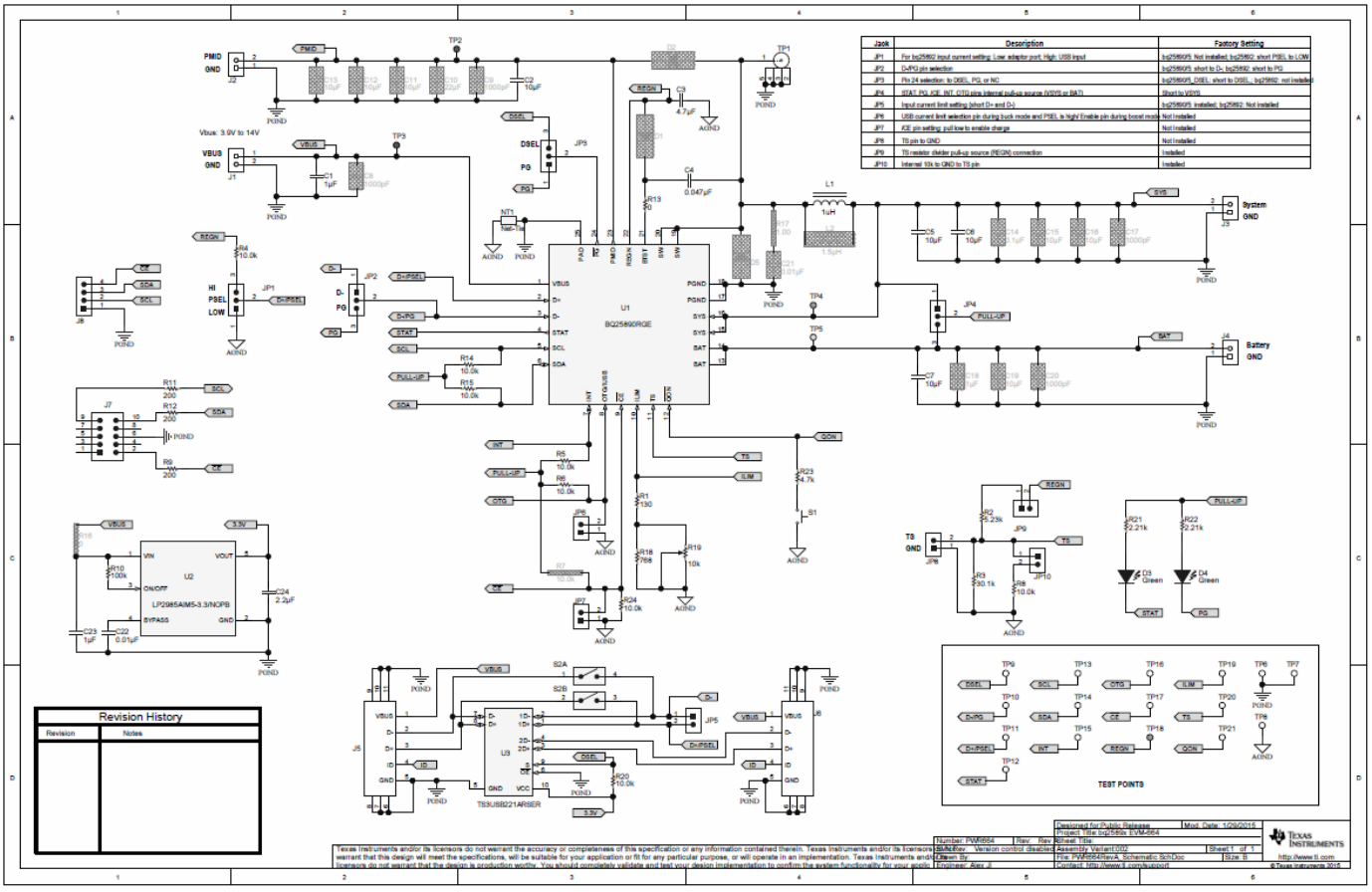
1.1.1 To provide detailed instructions for testing TIDA-00589 (PWR664 EVM) modules for the bq2589x device.

1.2 SCOPE

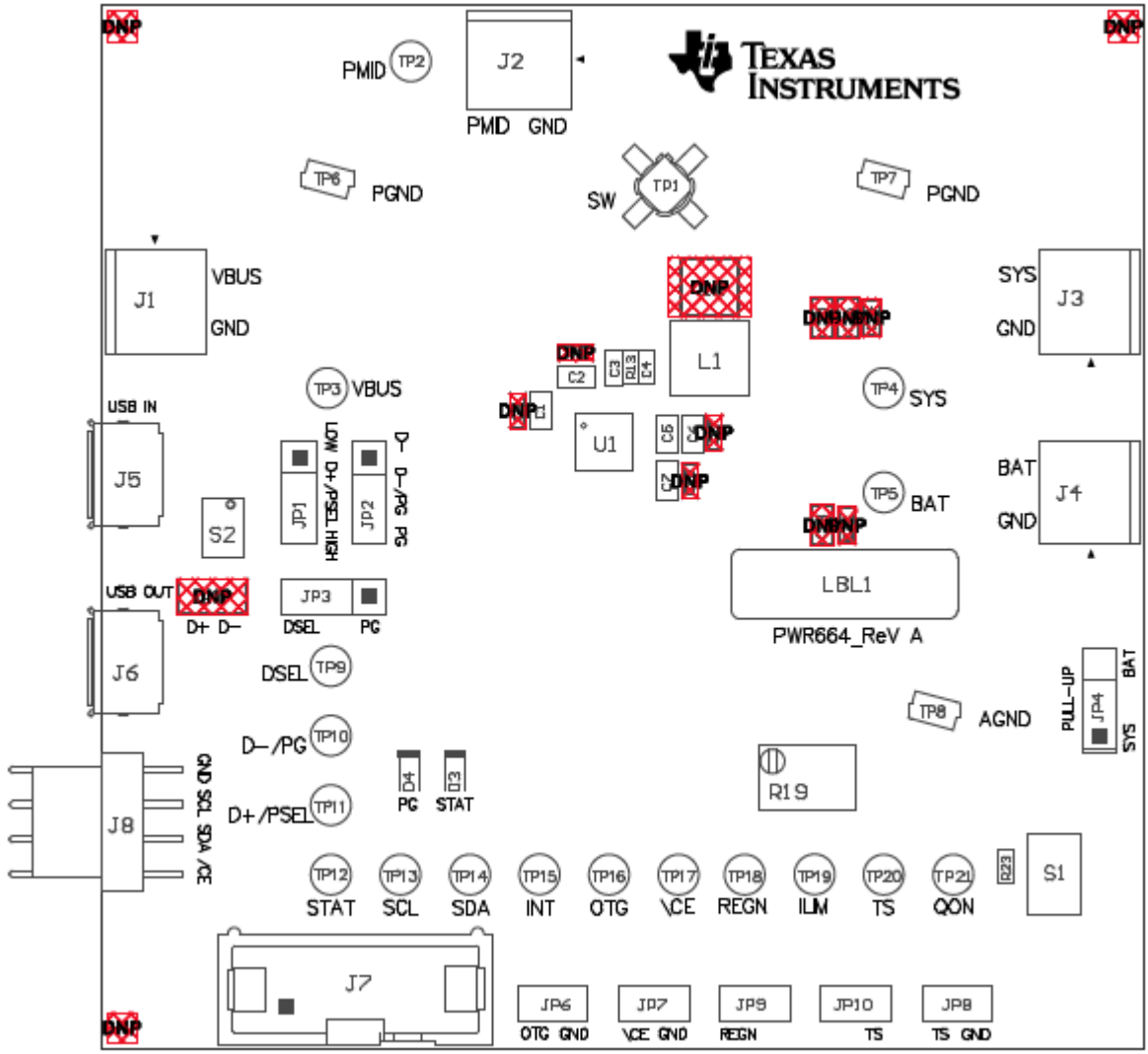
1.2.1 Covers complete instructions for testing TIDA-00589 (PWR664)

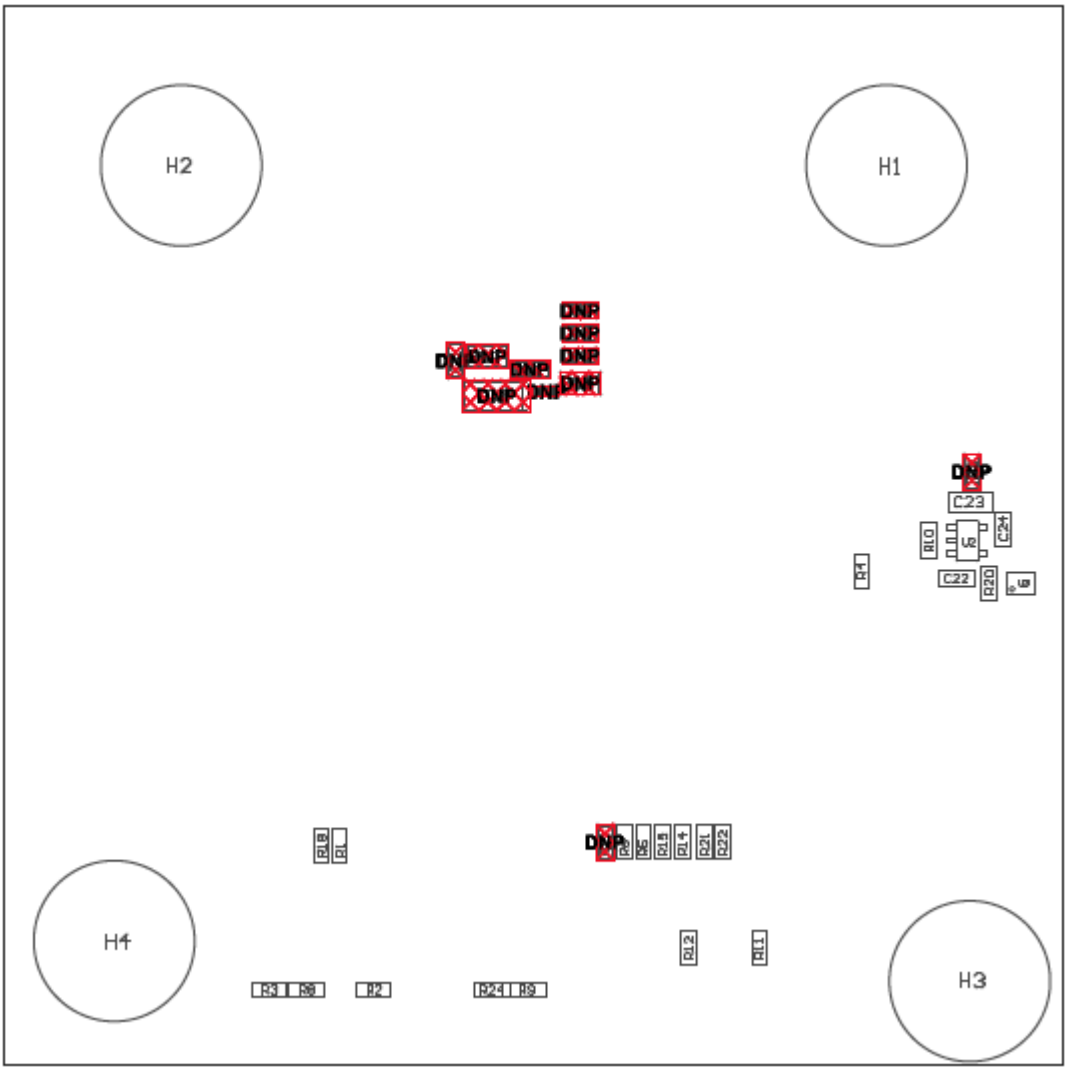
1.3 REFERENCE DOCUMENTATION

1.3.1 Schematic TIDA-00589 (PWR664)



1.3.2 Assembly DWG TIDA-00589 (PWR664)





2 SAFETY

- Safety Glasses are to be worn.
- This test must be performed by qualified personnel trained in electronics theory and understand the risks and hazards of the assembly to be tested.
- ESD precautions must be followed while handling electronic assemblies while performing this test.
- Precautions should be observed to avoid touching areas of the assembly that may get hot or present a shock hazard during testing.

3 QUALITY

- Test data or reports shall be made available upon request by Texas Instruments.

4 APPAREL

- Electrostatic smock
- Electrostatic Gloves or finger cots
- Safety Glasses
- Ground ESD wrist strap.

5 EQUIPMENT

5.1 Power Supplies

Power supply #1 (PS#1): a power supply capable of supplying 5 V at 1 A is required. While this part can handle larger voltage and current, it is not necessary for this procedure.

5.2 Load #1 (4-Quadrant Supply, Constant Voltage < 4.5 V)

A 0–20 V/0–5 A, > 30-W system, DC electronic load and setting as constant voltage load mode.
Or:
Kepco load: BOP 20–5M, DC 0 to ±20 V, 0 to ±5 A (or higher)

5.3 Load#2 – Use with Boost Mode

PMID to GND load, 10 Ω, 5 W or greater

5.4 Meters

Six Fluke 75 multimeters, (equivalent or better)
Or:
Four equivalent voltage meters and two equivalent current meters. The current meters must be capable of measuring 5 A+ current.

5.5 Computer

A computer with at least one USB port and a USB cable. The bq2589xEVM evaluation software must be properly installed.

5.6 USB-to-GPIO Communication Kit (EV2300/2400 USB-Based PC Interface Board)

5.7 Software

Double click the “Battery Management Studio-1.3.20_Build2-Setup” installation file, follow the installation steps. The software supports the Windows™ XP and Windows 7 operating systems.

6 EQUIPMENT SETUP

1. Set PS#1 for 5-V DC, 1-A current limit and then turn off the supply.
2. Connect the output of PS#1 in series with a current meter (multimeter) to J1 (VBUS and GND).
3. Connect a voltage meter across TP3 (VBUS) and TP6 (PGND).
4. Turn on the Load, set to constant voltage mode and output to 2.5 V. Turn off (disable) Load. Connect Load in series with a current meter (multimeter), ground side, to J4 (BAT+ and GND) as shown in Figure 2.

5. Connect a voltage meter across J4 (BAT+ and GND).
6. Connect the EV2300/2400 USB interface board to the computer with a USB cable and from I2C port to J8 with the 4-pin cable. The connections are shown in Figure 1.

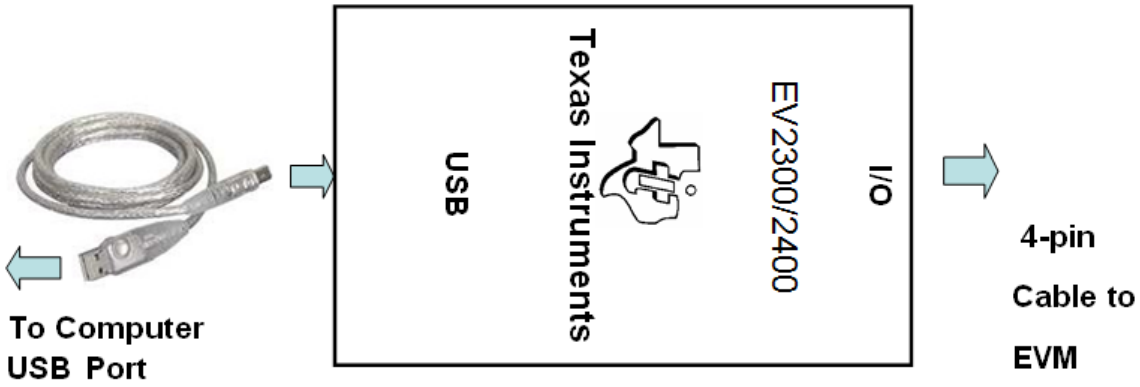


Figure 1. Connections of the EV2300/2400

7. Install shunts as shown in Table 1.

Table 1. Jumper Connections

Jack	Description	Factory Setting
JP1	For bq25892 input current setting: Low: adaptor port; High: USB input	bq25890/5: Not installed; bq25892: short PSEL to LOW
JP2	D-/PG pin selection	bq25890/5: short to D-; bq25892: short to PG
JP3	Pin 24 selection: to DSEL, PG, or NC	bq25890/5_DSEL: short to DSEL; bq25892: not installed
JP4	STAT, PG, /CE, INT, OTG pins internal pull-up source (VSYS or BAT)	Short to VSYS
JP5	D+/D- connections for input current limit setting:	bq25890/5: installed; bq25892: Not installed
JP6	USB current limit selection pin during buck mode and PSEL is high/ Enable pin during boost mode	Not installed
JP7	/CE pin setting: pull low to enable the charge	Not Installed
JP8	TS pin to GND	Not Installed
JP9	TS resistor divider pull-up source (REGN) connection	Installed
JP10	Internal 10k to GND to TS pin	Installed

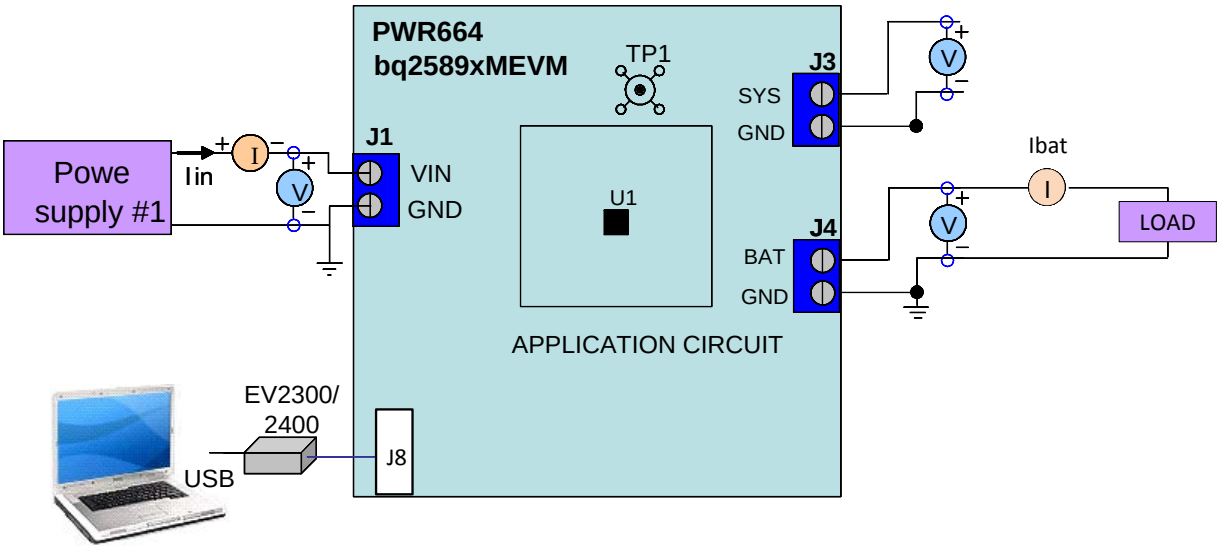


Figure 2. Original Test Setup for TIDA-00589 (**PWR664 - bq2589x EVM)**

8. Turn on the computer. Launch the bq2589x evaluation software. The main window of the bq2589x software is shown in Figure 3.

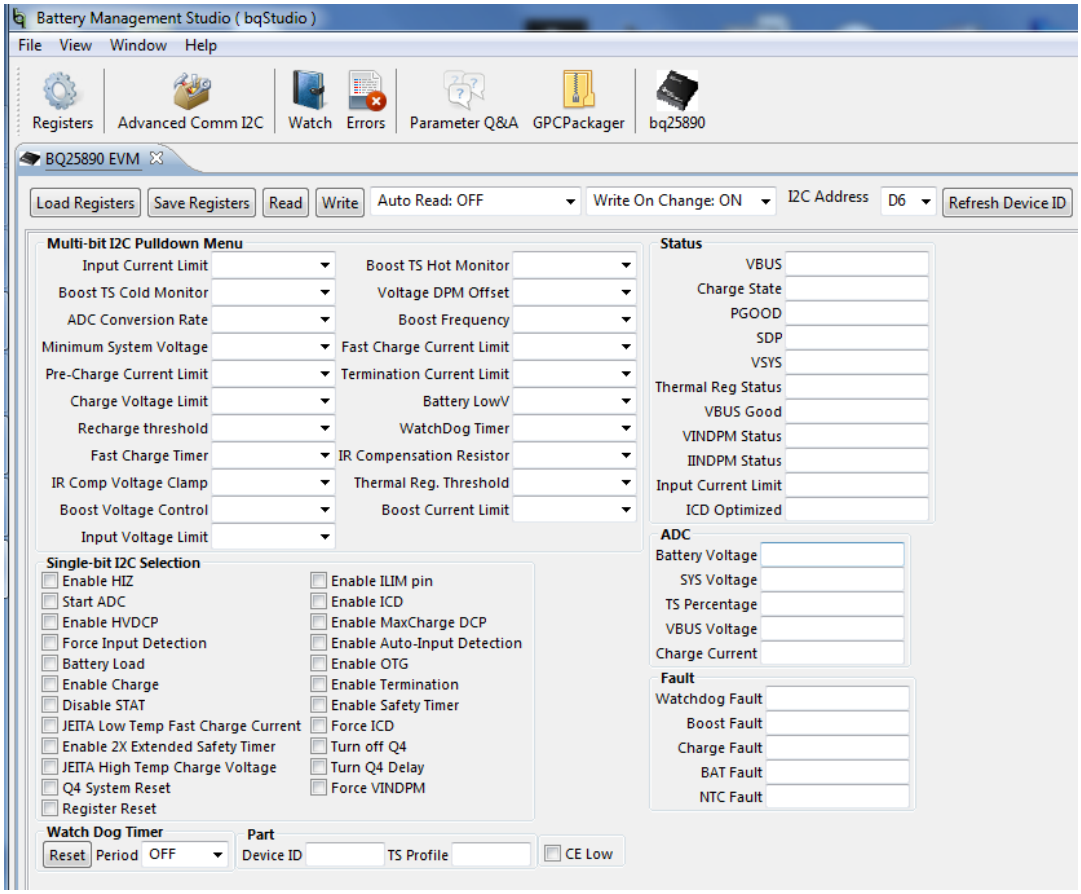
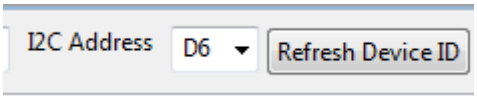


Figure 3. Main Window of the TIDA-00589 (bq2589x) Evaluation Software

7 PROCEDURE

7.1 Communication Verification

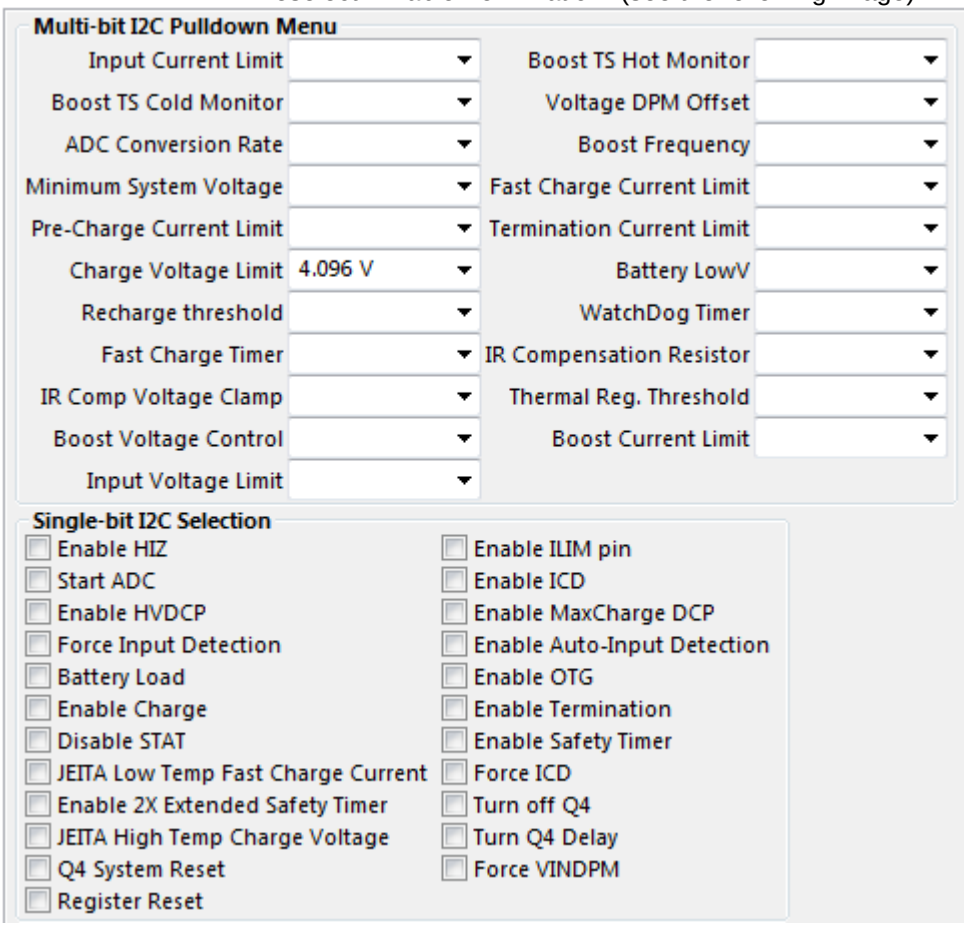
7.1.1 In the EVM software specify device “I2C Address” as D6 for bq25892, and D4 for bq24890/5



7.1.2 Click the **Read** button

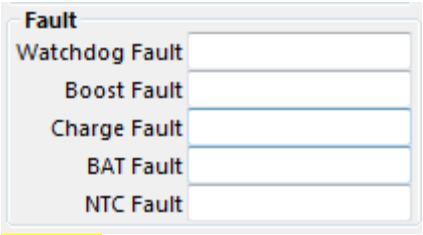
7.1.3 In the EVM Software, make the following changes as necessary:

- Select “*Disabled*” for the “W*atchdog Timer ”*
- Set “*Input Voltage Limit”* to 4.2
- Set “*Input Current Limit*” to 500 mA
- Set “*Charge Voltage Limit*” to 4.208 V
- Set “*Fast Charge Current*” ICHG to 512 mA
- Set “*Pre-Charge Current*” to 256 mA
- Deselect “*Enable Termination*” (see the following image)



7.1.4 Click the Read button twice

- Observe → Everything ‘normal’ at *FAULT* box



- Observe → D3 (STAT) is on
- Observe → D4 (/PG) is on

7.2 Charger Mode Verification

7.2.1 Enable Load#1 from Section 6 step 4. Measure the voltage across J3 and J4 as follows:

- Measure → V(J3(SYS), J3(GND)) = 3.65 V ±300 mV
- Measure → V(J4(BAT), J4(GND)) = 2.5 V ±200 mV
- Change load to 3.7V
- Measure → IBAT = 500 mA ±200 mA
- Measure → V(J4(BAT), J4(GND)) = 3.7 V ±200 mV

7.2.2 In the software, set “Fast Charge” to 1024 mA

- Measure → Iin = 500 mA ±200 mA

7.3 Boost Mode Verification

7.3.1 Turn off and disconnect PS#1

7.3.2 If the constant voltage load connected from BAT+ to GND is not a four-quadrant supply (sources current) remove the load and use the power source disconnected in step one, set to 3.7 V and 2 A current limit and connect between BAT+ and GND

7.3.3 Apply 10 Ω (5 W or greater) across J2 (PMID(+) to GND(–))

7.3.4 Check the “OTG” configurations option in the GUI

Measure: V: (TP2 (PMID) and TP6 (GND)) = 5.1V +/- 200mV

7.4 Clean-up

7.4.1 If at any point in the test the unit fails, failed assemblies are to be marked with failure step and dispositioned according with section 9.0. Passing units should also be specified in section 9.0.

7.4.2 Verify the jumpers are installed as specified in Table 1.

7.4.3 Repeat starting at 7.1 and continue until all units have been tested.

8 EQUIPMENT SHUTDOWN

- Shut down and disconnect all loads

- Shutdown and disconnect all power supplies
- No additional special power down procedure needed.

9 MATERIAL DISPOSITION & TRANSFER

9.1 CONFORMING MATERIAL

Units that have passed this test procedure shall be packaged into anti-static ESD approved bags, labeled with two labels according to the table below, and shipped per the P.O.

Label 1 Assembly Number+Dash Number if Applicable	Label 2 IC Number
PWR664-001	bq25890TRW
PWR664-002	bq25892TRW
PWR664-003	bq25895TRW

9.2 NON-CONFORMING MATERIAL

If yield loss is 2% or less, scrap non-conforming units and adjust P.O. to reflect total amount shipped. If yield loss approaches or exceeds 5%, contact EVM coordinator for assistance.

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