FAN53745 Evaluation Board User's Manual

3.33 MHz 1 A Synchronous Buck Regulator

EVBUM2963/D

This user guide supports the evaluation kit for the FAN53745. It should be used in conjunction with the FAN53745 datasheet.

DESCRIPTION

The FAN53745 evaluation board is a compact circuit including **onsemi**'s FAN53745 buck regulator in a 6-bump Wafer-Level Chip-Scale Package (WLCSP). The regulator output voltage is programmable through I^2C interface and operates at a nominal fixed frequency of 3.33 MHz.

The board also features footprints to accommodate additional output capacitors. The evaluation board provides probe access points to all key circuit nodes so that electrical characteristics can be measured.

Features

- 43 µA Typical Quiescent Current
- 6.6 mm^2 Total Solution Size
- 1000 mA Output Current Capability
- Programmable Output Voltage 0.6 V to 3.3 V via I^2C functionality
- Programmable Current limit
- 2.3 V to 5.5 V Input Voltage Range
- 3.33 MHz Fixed Frequency Operation
- Internal Soft-Start limits input current to avoid brown out scenarios
- Protection Faults (UVLO, OTP and Short Circuit)
- Hardware reset by holding SCL low
- Thermal Shutdown and Overload Protection
- 6-Bump, WLCSP, 0.4 mm Pitch

Quick Start Connection Guide

1. Connect input power supply (2.30 V−5.50 V) between banana jacks VIN and GND as shown Figure 1.
2. Connect the USB Interface POD as shown in Figure 1.
3. Start up the GUI application. If not installed, refer to GUI Installation.
4. Connect external load between banana jacks VOUT and GND as shown in Figure 1.
5. Kelvin connected input and output voltage sense points (VIN_S, VOUT_S) are provided.

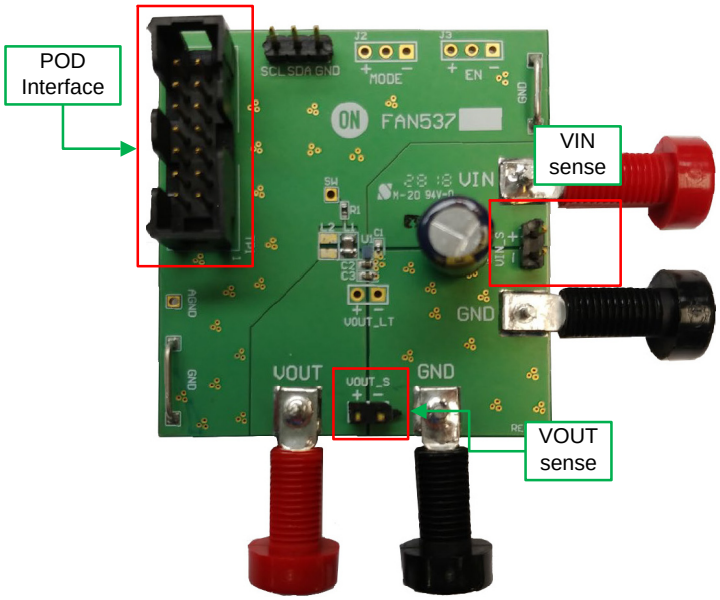


Figure 1. Evaluation Board Connection Diagram

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GUI INSTALLATION

Installation

a. Run the installer FAN53745.exe.
b. Follow the steps as shown in the dialog box for setup.

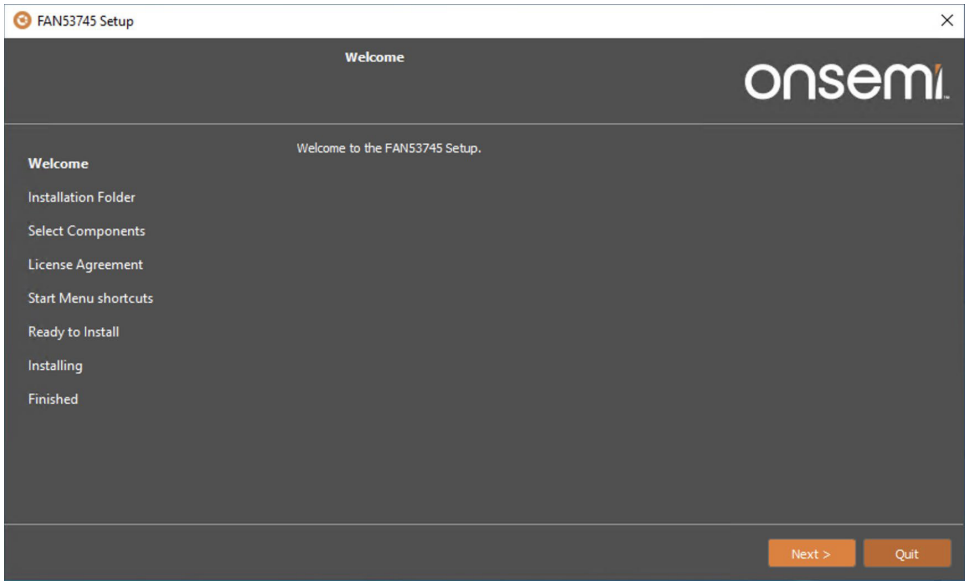


Figure 2. FAN53745 GUI Installation

c. When prompted for Selecting Components, please check the box for PIC POD Driver to install appropriate drivers needed for USB Interface POD.

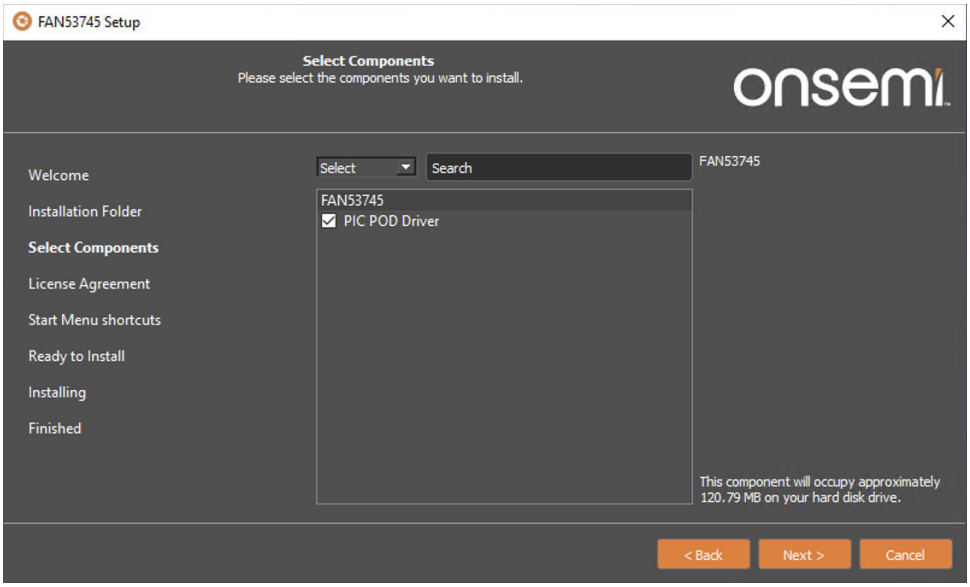


Figure 3. FAN53745 GUI Component Selection

d. Once all steps have been completed, it will start installing the GUI.

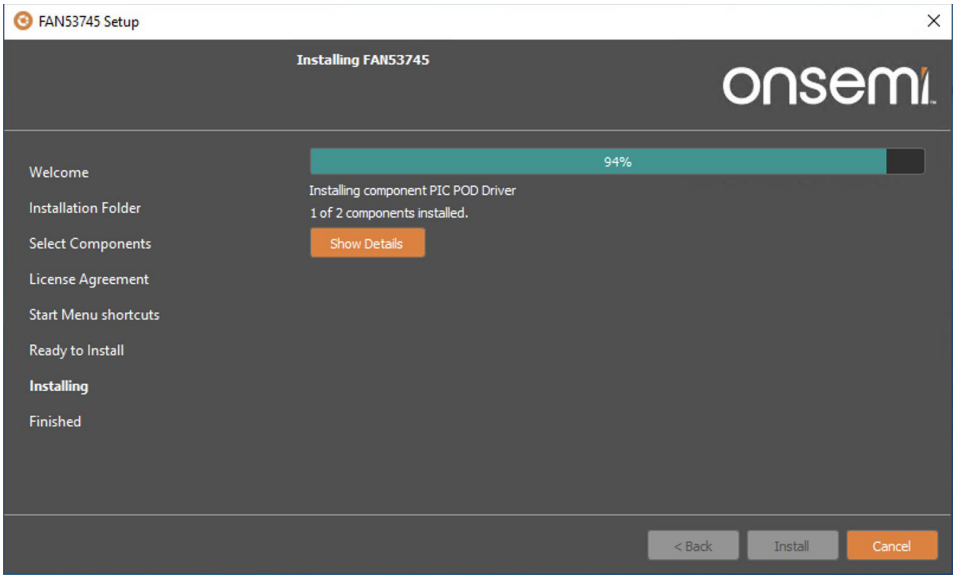


Figure 4. FAN53745 GUI Installation Update

e. Once the installation is complete, FAN53745 GUI will open automatically.

f. You can find installed GUI at this path: C:\Users*******\onsemi\FAN53745.

g. Below is a screen shot of the FAN53745 GUI that is used to communicate via I^2C.

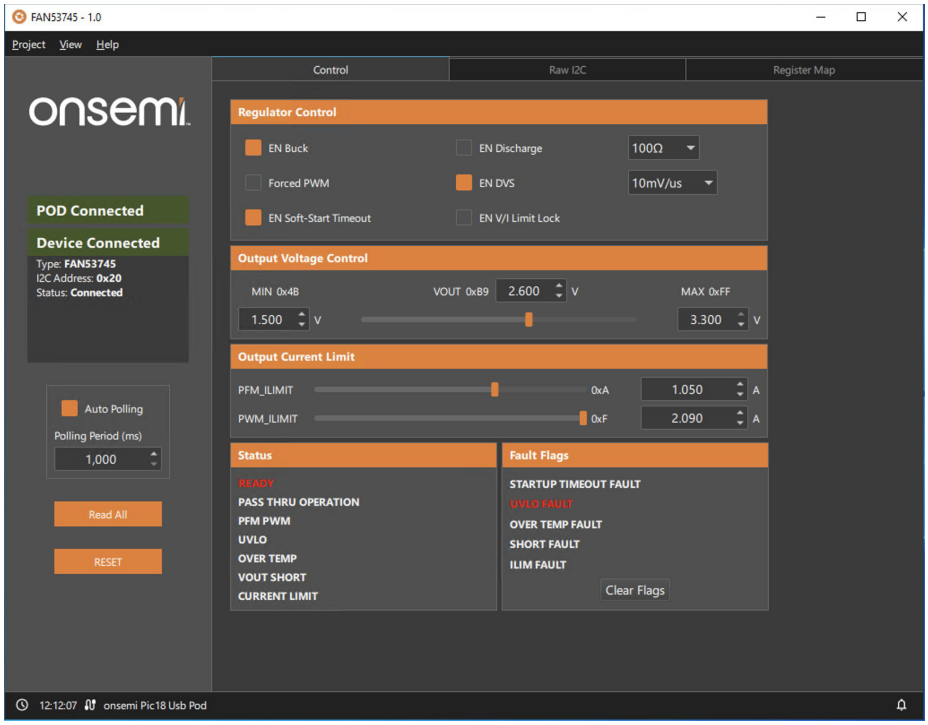


Figure 5. FAN53745 GUI Interface

GUI OVERVIEW

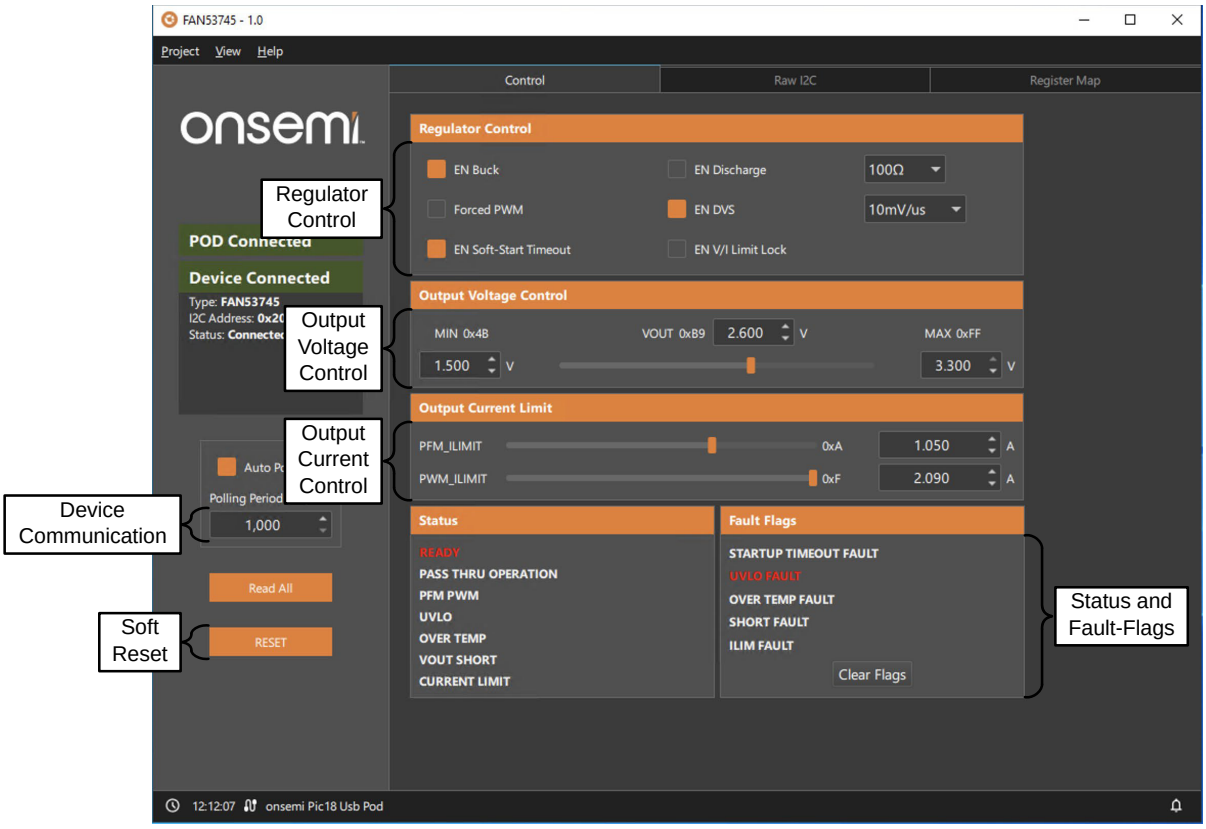


Figure 6.

Regulator Control

a. Enables or disables the part.
b. FAN53745 will operate in either AUTO mode or Forced PWM mode.
c. Soft-Start Timeout activates the soft start time-out timer.
d. Discharge resistance is enabled, and value specified in DISCHARGE SEL [2:1] in Register 0x07.
e. DVS functionality is enabled based on the rate specified in DVS [2:0] in register 0x03.
f. V_ILIMIT Lock will lock the minimum and maximum voltage and PFM/PWM current limits.

Output Voltage Control

a. Program output voltage through a valid value specified in register VSEL.
b. Limits output voltage range through values specified in registers VMIN and VMAX.

Output Current Control

a. Controls PFM Output Current from 500 mA to 1325 mA.
b. Controls PWM Output Current from 440 mA to 2090 mA.

Status and Fault-Flags

a. Highlights operating status of device respective to register STATUS.
b. Alerts for fault events occurred. Fault Flags are cleared upon read.

Soft Reset

a. Soft Reset resets the part to its default register values.

Device Communication

a. Allows GUI to automatically poll or write during a GUI change.

SCHEMATIC

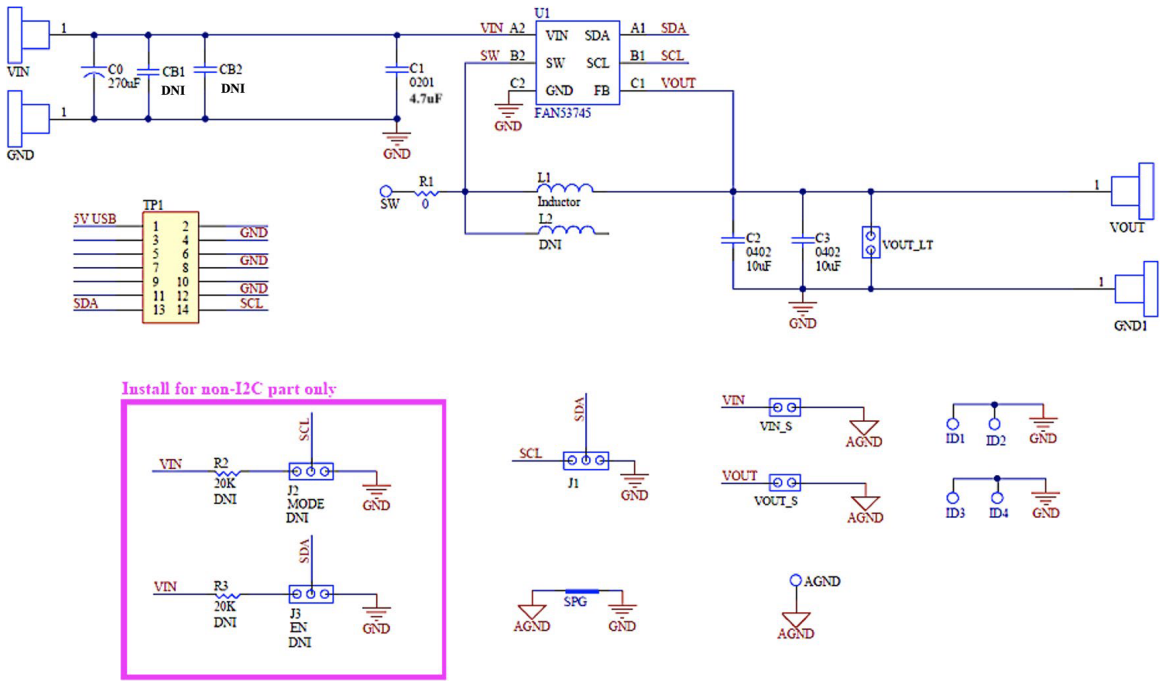


Figure 7. Evaluation Board Schematic

BILL OF MATERIALS

Table 1. BILL OF MATERIALS

Ref	Qty	Description	Manufacturer / Number
U1	1	IC, FAN53745	**onsemi**, FAN53745
L1	1	0.47 μH, 20%, ISAT = 4.3 A, DCR = 31 mΩ	Samsung, CIGT201208EHR47MNE
C0	1	270 μF, 16 V, Aluminum Electrolytic Capacitor	Panasonic Electronic Components, Digikey P11200-ND
C1	1	4.7 μF, 6.3 V, 20%, X5R, 0201	Murata, GRM035R60J475ME15D
C2, C3	2	10 μF, 6.3 V, 20%, X5R, 0402	Murata, GRM155R60J106ME47D
VIN, VOUT	2	Banana Jack, Red	Digikey J151-ND
GND, GND	2	Banana Jack, Black	Digikey J152-ND
VIN, VOUT, GND, GND	4	Turret	Digikey 36-1573-2-ND
R1	1	0 Ω, 0402	Digikey 1276-3538-2-ND
J1	1	3x1 Header Strip	Digikey S1011E-03-ND
VIN_S, VOUT_S	2	2x1 Header Strip	Digikey S1011E-02-ND
TP1	1	7x2 Header Strip, Shrouded	Digikey MHC14K-ND

EVALUATION BOARD SPECIAL FEATURES

Input/ Output Capacitance

The FAN53745 evaluation board includes empty locations for the addition of output capacitance.

C0, C1 and C2 provide a suitable local charge reservoir when inductance is introduced by long cables from the DC source.

I²C Header

I²C Header connects to the USB POD Interface to accomplish I²C communication with the FAN53745.

Signal Monitoring

VIN_S, VOUT_S, SDA, and SCL signals can be monitored with an oscilloscope probe.

For best output ripple measurements, do not use VOUT_S headers; instead, monitor directly across the output capacitor with an oscilloscope probe.

For efficiency measurements, measure VIN and VOUT voltages at VIN_S and VOUT_S headers.

REVISION HISTORY

Revision	Description of Changes	Date
0	Initial document release.	10/11/2026

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