TPS65266EVM-686 Evaluation Module

This document presents the information required to operate the TPS65266 PMIC as well as the support documentation including schematic, layout, hardware setup, and bill of materials (BOM).

Contents

List of Figures

List of Tables

1 Introduction

The TPS65266 PMIC is a triple 3A/2A/2A output current, synchronous step-down (buck) converter with an operational range of 2.7 to 6.5 V. The feedback voltage reference for each buck is 0.6 V. Each buck is independent with dedicated enable, soft-start, and loop compensation. The TPS65266 operates in force continuous current mode (FCC) at light load.

As there are many possible options to set the converters, Table 1 presents the performance specification summary for the EVM.

Table 1. Summary of Performance

Test Conditions	Performance
V_{IN} = 2.7 to 6.5 V f_{sw} = 1 MHz (25°C ambient)	Buck1, 1.0 V, up to 3 A Buck2, 1.5 V, up to 2 A Buck3, 1.8 V, up to 2 A

The evaluation module is designed to provide access to the features of the TPS65266 device. Some modifications can be made to this module to test performance at different input and output voltages, current, and switching frequency. Please contact TI Field Applications Group for advice on these matters.

2 TPS65266 EVM Schematic

Figure 1 illustrates the TPS65266 EVM schematic.

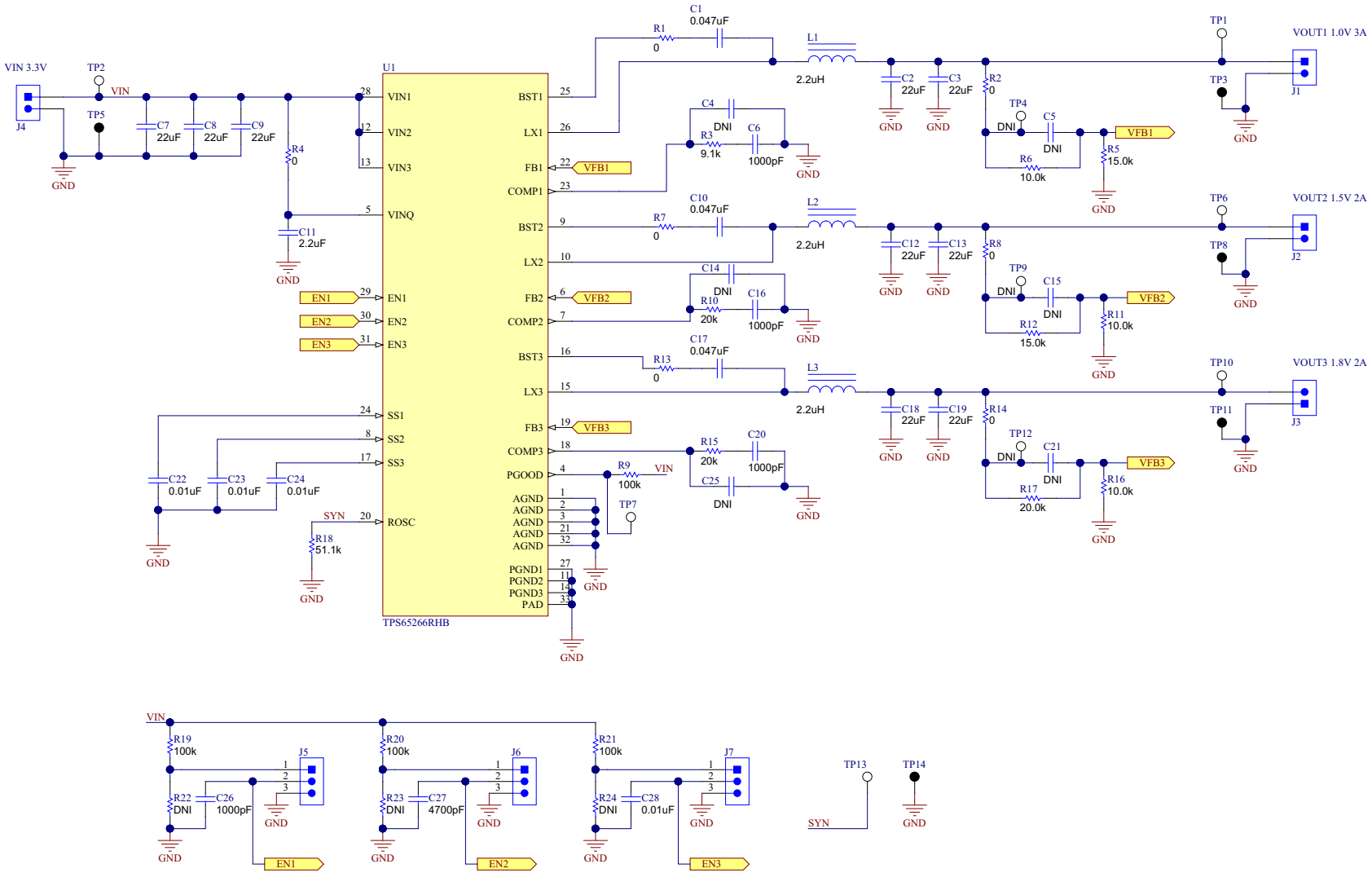

Figure 1. TPS65266EVM-686 Schematic

3 Board Layout

Figure 2 through Figure 6 illustrate the printed-circuit board (PCB) layouts.

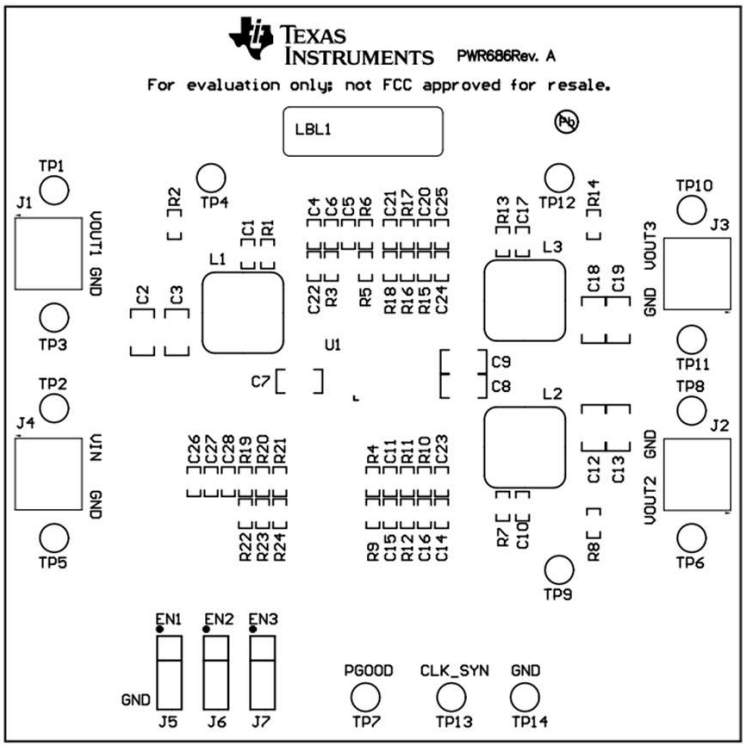

Figure 2. Component Placement (Top Layer)

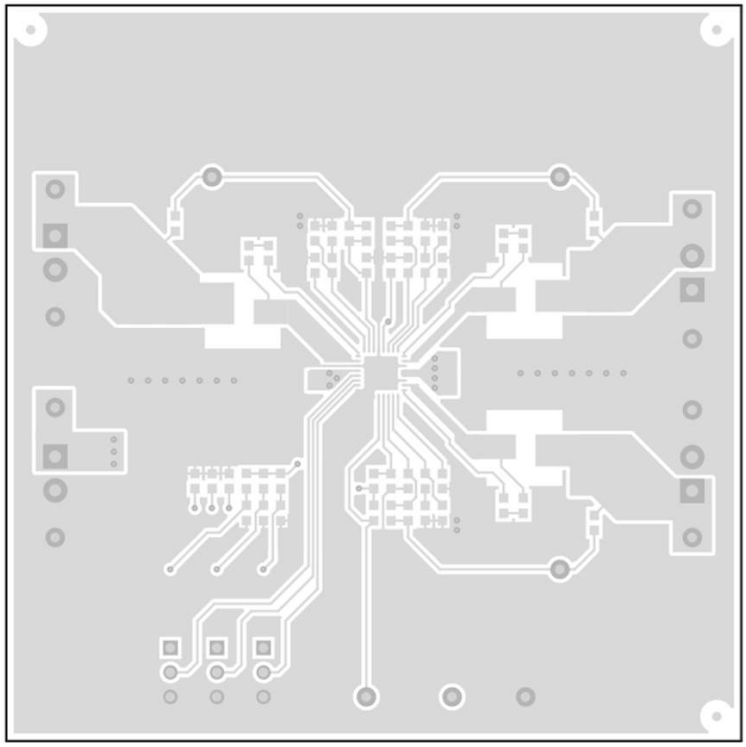

Figure 3. Board Layout (Top Layer)

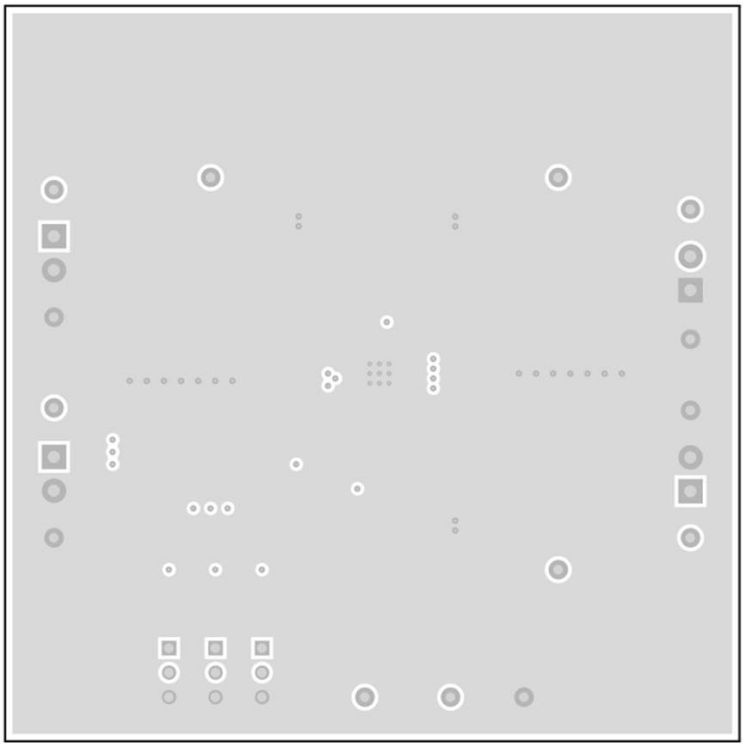

Figure 4. Board Layout (Second Layer)

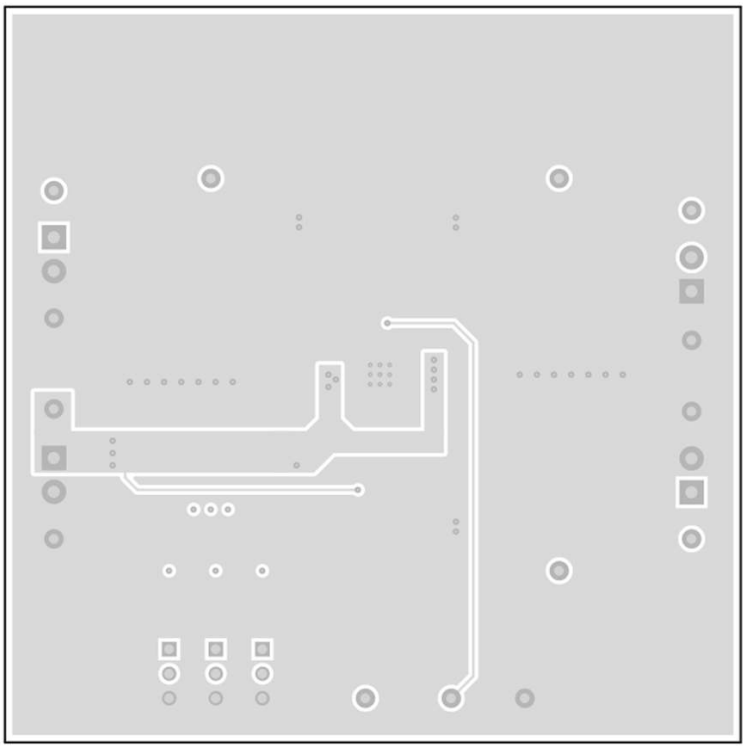

Figure 5. Board Layout (Third Layer)

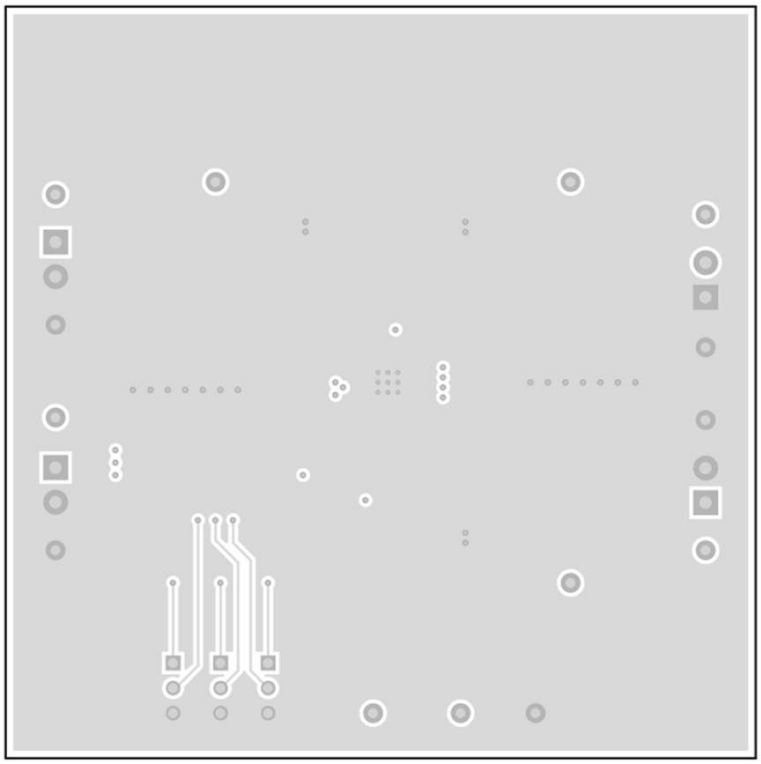

Figure 6. Board Layout (Bottom Layer)

4 Bench Test Setup Conditions

4.1 Headers Description and Jumper Placement

Figure 7 illustrates the header descriptions and jumper placement on the EVM.

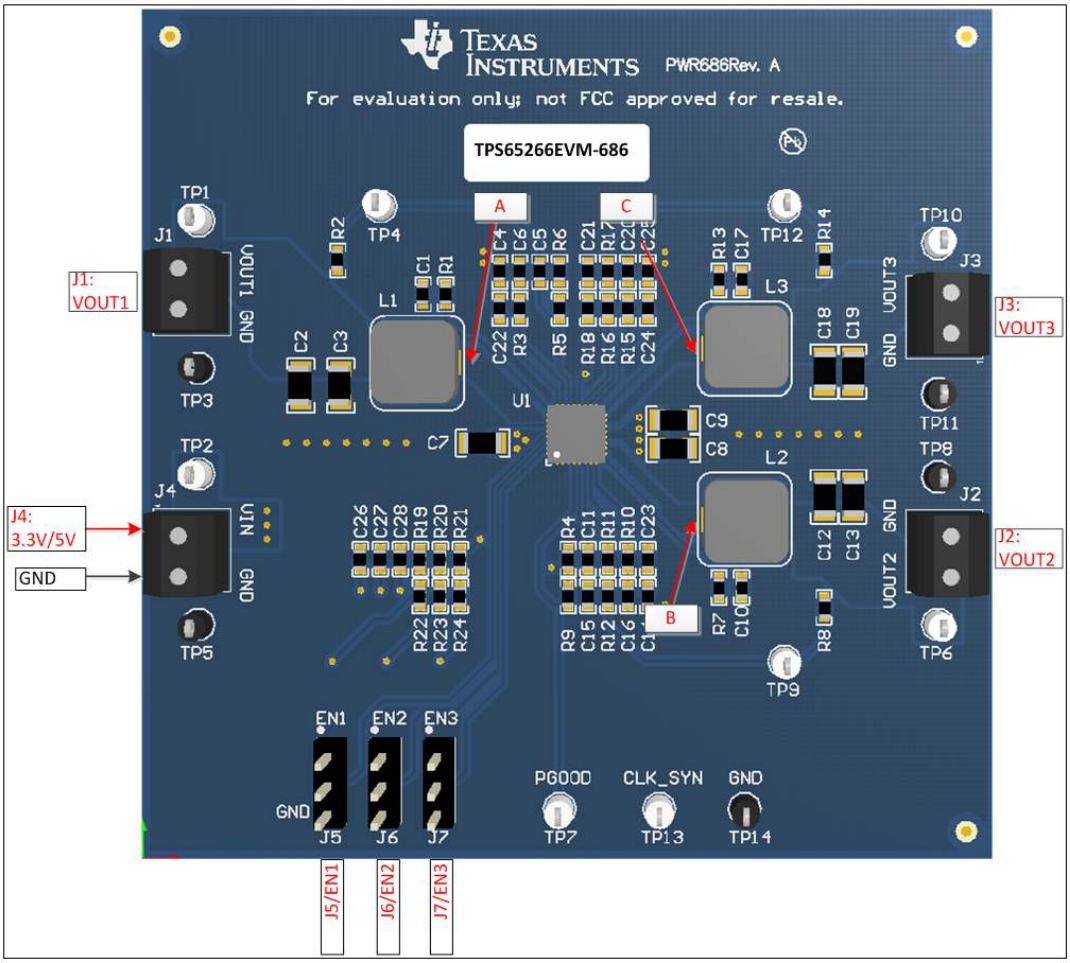

Figure 7. Headers Description and Jumper Placement

Test points:

(A) LX of VOUT1

(B) LX of VOUT2

(C) LX of VOUT3

VOUT1, VOUT2, VOUT3, VIN, PGOOD, CLK_SYN

Table 2 lists the I/O connections and Table 3 lists the jumpers for the TPS65266EVM-686.

Table 2. Input/Output Connection

No.	Function	Description
J1	Buck1 Connector	Output of Buck1
J2	Buck2 Connector	Output of Buck2
J3	Buck3 Connector	Output of Buck3
J4	VIN Connector	Apply power supply to this connector

Table 3. Jumpers

No.	Function	Placement
J5	Buck1 enable (EN1)	Connect EN1 to GND to disable V_{OUT1}, connect EN1 to V_{IN} through a 100-kΩ resistor to enable V_{OUT1}; Leave open to enable V_{OUT1}
J6	Buck2 enable (EN2)	Connect EN2 to GND to disable V_{OUT2}, connect EN2 to V_{IN} through a 100-kΩ resistor to enable V_{OUT2}; Leave open to enable V_{OUT2}
J7	Buck3 enable (EN3)	Connect EN3 to GND to disable V_{OUT3}, connect EN3 to V_{IN} through a 100-kΩ resistor to enable V_{OUT3}; Leave open to enable V_{OUT3}

5 Power-Up Procedure

This section provides the steps for powering up the EVM.

POWER-UP with the dedicated enable pin:

1. Apply 2.7 V – 6.5 V to J4
2. Toggle J5 , J6, or J7 to enable V_{OUT1}, V_{OUT2}, AND V_{OUT3}, respectively
3. Apply loads to the output connectors

6 Bill of Materials

Table 4 lists the BOM for this EVM.

Table 4. Bill of Materials

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
PCB1	1		Printed Circuit Board		PWR686	Any
C1, C10, C17	3	0.047uF	CAP, CERM, 0.047uF, 50V, +/-10%, X7R, 0603	0603	C1608X7R1H473K	TDK
C2, C3, C7, C8, C9, C12, C13, C18, C19	9	22uF	CAP, CERM, 22uF, 16V, +/-20%, X5R, 1206	1206	1206YD226MAT2A	AVX
C6, C16, C20	3	1000pF	CAP, CERM, 1000 pF, 50 V, +/- 10%, X7R, 0603	0603	C0603C102K5RACTU	Kemet
C11	1	2.2uF	CAP, CERM, 2.2 uF, 10 V, +/- 10%, X5R, 0603	0603	C0603C225K8PACTU	Kemet
C22, C23, C24	3	0.01uF	CAP, CERM, 0.01uF, 50V, +/-5%, X7R, 0603	0603	C0603C103J5RACTU	Kemet
C26	1	1000pF	CAP, CERM, 1000 pF, 50 V, +/- 5%, X7R, 0603	0603	C0603C102J5RACTU	Kemet
C27	1	4700pF	CAP, CERM, 4700 pF, 50 V, +/- 5%, X7R, 0603	0603	C0603C472J5RACTU	Kemet
C28	1	0.01uF	CAP, CERM, 0.01 uF, 50 V, +/- 5%, X7R, 0603	0603	C0603C103J5RACTU	Kemet
H1, H2, H3, H4	4		Bumpon, Hemisphere, 0.44 X 0.20, Clear	Transparent Bumpon	SJ-5303 (CLEAR)	3M
J1, J2, J3, J4	4		Terminal Block, 6A, 3.5mm Pitch, 2-Pos, TH	7.0x8.2x6.5mm	ED555/2DS	On-Shore Technology
J5, J6, J7	3		Header, 100mil, 3x1, Tin plated, TH	Header, 3 PIN, 100mil, Tin	PEC03SAAN	Sullins Connector Solutions
L1, L2, L3	3	2.2uH	Inductor, Shielded Drum Core, Superflux, 2.2 uH, 9 A, 0.0115 ohm, SMD	WE-HC4	744311220	Wurth Elektronik eiSos
LBL1	1		Thermal Transfer Printable Labels, 0.650" W x 0.200" H - 10,000 per roll	PCB Label 0.650"H x 0.200"W	THT-14-423-10	Brady
R1, R2, R4, R7, R8, R13, R14	7	0	RES, 0 ohm, 5%, 0.1W, 0603	0603	CRCW06030000Z0EA	Vishay-Dale
R3	1	9.1k	RES, 9.1 k, 5%, 0.1 W, 0603	0603	CRCW06039K10JNEA	Vishay-Dale
R5, R12	2	15.0k	RES, 15.0 k, 1%, 0.1 W, 0603	0603	CRCW060315K0FKEA	Vishay-Dale
R6, R11, R16	3	10.0k	RES, 10.0k ohm, 1%, 0.1W, 0603	0603	CRCW060310K0FKEA	Vishay-Dale
R9, R19, R20, R21	4	100k	RES, 100k ohm, 1%, 0.1W, 0603	0603	CRCW0603100KFKEA	Vishay-Dale
R10, R15	2	20k	RES, 20 k, 5%, 0.1 W, 0603	0603	CRCW060320K0JNEA	Vishay-Dale
R17	1	20.0k	RES, 20.0k ohm, 1%, 0.1W, 0603	0603	CRCW060320K0FKEA	Vishay-Dale
R18	1	51.1k	RES, 51.1 k, 1%, 0.1 W, 0603	0603	CRCW060351K1FKEA	Vishay-Dale
TP1, TP2, TP6, TP7, TP10, TP13	6	White	Test Point, Miniature, White, TH	White Miniature Testpoint	5002	Keystone
TP3, TP5, TP8, TP11, TP14	5	Black	Test Point, Miniature, Black, TH	Black Miniature Testpoint	5001	Keystone
U1	1		2.7V to 6.5V Input Voltage, 3A/2A/2A Output Current Triple Synchronous Step-down Converters, RHB0032E	RHB0032E	TPS65266RHB	Texas Instruments
C4, C14, C15, C21, C25	0	22pF	CAP, CERM, 22pF, 50V, +/-5%, C0G/NP0, 0603	0603	06035A220JAT2A	AVX
C5	0	82pF	CAP, CERM, 82pF, 50V, +/-5%, C0G/NP0, 0603	0603	06035A820JAT2A	AVX
R22, R23, R24	0	DNI	RES, 100k ohm, 1%, 0.1W, 0603	0603	CRCW0603100KFKEA	Vishay-Dale
TP4, TP9, TP12	0	DNI	Test Point, Miniature, White, TH	White Miniature Testpoint	5002	Keystone

Revision History

Changes from Original (November 2014) to A Revision	Page
• Changed pulse skipping mode (PSM) to force continuous current mode (FCC)	2

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

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