



**Please note that Cypress is an Infineon Technologies Company.**

The document following this cover page is marked as “Cypress” document as this is the company that originally developed the product. Please note that Infineon will continue to offer the product to new and existing customers as part of the Infineon product portfolio.

**Continuity of document content**

The fact that Infineon offers the following product as part of the Infineon product portfolio does not lead to any changes to this document. Future revisions will occur when appropriate, and any changes will be set out on the document history page.

**Continuity of ordering part numbers**

Infineon continues to support existing part numbers. Please continue to use the ordering part numbers listed in the datasheet for ordering.



S6SBP401AJ0SA1001/S6SBP401AM2SA100

# Automotive Evaluation Board Operation Guide

Doc. No. 002-08764 Rev. \*B

Cypress Semiconductor  
198 Champion Court  
San Jose, CA 95134-1709  
<http://www.cypress.com>

## Copyrights

© Cypress Semiconductor Corporation, 2015-2019. This document is the property of Cypress Semiconductor Corporation and its subsidiaries, including Spansion LLC (“Cypress”). This document, including any software or firmware included or referenced in this document (“Software”), is owned by Cypress under the intellectual property laws and treaties of the United States and other countries worldwide. Cypress reserves all rights under such laws and treaties and does not, except as specifically stated in this paragraph, grant any license under its patents, copyrights, trademarks, or other intellectual property rights. If the Software is not accompanied by a license agreement and you do not otherwise have a written agreement with Cypress governing the use of the Software, then Cypress hereby grants you a personal, non-exclusive, nontransferable license (without the right to sublicense) (1) under its copyright rights in the Software (a) for Software provided in source code form, to modify and reproduce the Software solely for use with Cypress hardware products, only internally within your organization, and (b) to distribute the Software in binary code form externally to end users (either directly or indirectly through resellers and distributors), solely for use on Cypress hardware product units, and (2) under those claims of Cypress’s patents that are infringed by the Software (as provided by Cypress, unmodified) to make, use, distribute, and import the Software solely for use with Cypress hardware products. Any other use, reproduction, modification, translation, or compilation of the Software is prohibited.

TO THE EXTENT PERMITTED BY APPLICABLE LAW, CYPRESS MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARD TO THIS DOCUMENT OR ANY SOFTWARE OR ACCOMPANYING HARDWARE, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. No computing device can be absolutely secure. Therefore, despite security measures implemented in Cypress hardware or software products, Cypress does not assume any liability arising out of any security breach, such as unauthorized access to or use of a Cypress product. In addition, the products described in these materials may contain design defects or errors known as errata which may cause the product to deviate from published specifications. To the extent permitted by applicable law, Cypress reserves the right to make changes to this document without further notice. Cypress does not assume any liability arising out of the application or use of any product or circuit described in this document. Any information provided in this document, including any sample design information or programming code, is provided only for reference purposes. It is the responsibility of the user of this document to properly design, program, and test the functionality and safety of any application made of this information and any resulting product. Cypress products are not designed, intended, or authorized for use as critical components in systems designed or intended for the operation of weapons, weapons systems, nuclear installations, life-support devices or systems, other medical devices or systems (including resuscitation equipment and surgical implants), pollution control or hazardous substances management, or other uses where the failure of the device or system could cause personal injury, death, or property damage (“Unintended Uses”). A critical component is any component of a device or system whose failure to perform can be reasonably expected to cause the failure of the device or system, or to affect its safety or effectiveness. Cypress is not liable, in whole or in part, and you shall and hereby do release Cypress from any claim, damage, or other liability arising from or related to all Unintended Uses of Cypress products. You shall indemnify and hold Cypress harmless from and against all claims, costs, damages, and other liabilities, including claims for personal injury or death, arising from or related to any Unintended Uses of Cypress products.

Cypress, the Cypress logo, Spansion, the Spansion logo, and combinations thereof, WICED, PSoC, CapSense, EZ-USB, F-RAM, and Traveo are trademarks or registered trademarks of Cypress in the United States and other countries. For a more complete list of Cypress trademarks, visit [cypress.com](http://cypress.com). Other names and brands may be claimed as property of their respective owners.

# Preface



This manual explains how to use the evaluation board. Be sure to read this manual before using the product. For this product, please consult with sales representatives or support representatives.

## **Handling and Use**

Handling and use of this product and notes regarding its safe use are described in the manuals.

Follow the instructions in the manuals to use this product.

Keep this manual at hand so that you can refer to it anytime during use of this product.

## **Notice on this Document**

All information included in this document is current as of the date it is issued. Such information is subject to change without any prior notice.


Please confirm the latest relevant information with the sales representatives

# Cautions




## Caution of the Products Described in this Document

The following precautions apply to the product described in this manual.

 <b>WARNING</b>	Indicates a potentially hazardous situation which could result in death or serious injury and/or a fault in the user's system if the product is not used correctly.
--------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------

<b>Electric Shock, Damage</b>	Before performing any operation described in this manual, turn off all the power supplies to the system. Performing such an operation with the power on may cause an electric shock or device fault.
<b>Electric Shock, Damage</b>	Once the product has been turned on, do not touch any metal part of it. Doing so may cause an electric shock or device fault.

 <b>CAUTION</b>	Indicates the presence of a hazard that may cause a minor or moderate injury, damages to this product or devices connected to it, or may cause to lose software resources and other properties such as data, if the device is not used appropriately.
----------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

<b>Cuts, Damage</b>	Before moving the product, be sure to turn off all the power supplies and unplug the cables. Watch your step when carrying the product. Do not use the product in an unstable location such as a place exposed to strong vibration or a sloping surface. Doing so may cause the product to fall, resulting in an injury or fault.
<b>Cuts</b>	The product contains sharp edges that are left unavoidably exposed, such as jumper plugs. Handle the product with due care not to get injured with such pointed parts.
<b>Damage</b>	Do not place anything on the product or expose the product to physical shocks. Do not carry the product after the power has been turned on. Doing so may cause a malfunction due to overloading or shock.
<b>Damage</b>	Since the product contains many electronic components, keep it away from direct sunlight, high temperature, and high humidity to prevent condensation. Do not use or store the product where it is exposed to much dust or a strong magnetic or electric field for an extended period of time. Inappropriate operating or storage environments may cause a fault.
<b>Damage</b>	Use the product within the ranges given in the specifications. Operation over the specified ranges may cause a fault.
<b>Damage</b>	To prevent electrostatic breakdown, do not let your finger or other object come into contact with the metal parts of any of the connectors. Before handling the product, touch a metal object (such as a door knob) to discharge any static electricity from your body.

<b>Damage</b>	When turning the power on or off, follow the relevant procedure as described in this document. Before turning the power on, in particular, be sure to finish making all the required connections. Furthermore, be sure to configure and use the product by following the instructions given in this document. Using the product incorrectly or inappropriately may cause a fault.
<b>Damage</b>	Always turn the power off before connecting or disconnecting any cables from the product. When unplugging a cable, unplug the cable by holding the connector part without pulling on the cable itself. Pulling the cable itself or bending it may expose or disconnect the cable core, resulting in a fault.
<b>Damage</b>	Because the product has no casing, it is recommended that it be stored in the original packaging. Transporting the product may cause a damage or fault. Therefore, keep the packaging materials and use them when re-shipping the product.

# Contents



<b>1. Description</b> .....	<b>7</b>
<b>2. Evaluation Board Specification</b> .....	<b>8</b>
<b>3. PIN Descriptions</b> .....	<b>9</b>
3.1 Input/Output Descriptions .....	9
3.2 Jumper Descriptions .....	11
<b>4. Setup</b> .....	<b>12</b>
4.1 Connecting .....	12
4.2 Verification .....	13
<b>5. Layout</b> .....	<b>14</b>
5.1 Component Layout .....	14
5.2 Wiring Layout .....	14
<b>6. Circuit Schematic</b> .....	<b>16</b>
<b>7. Component List</b> .....	<b>17</b>
<b>8. Ordering Information</b> .....	<b>19</b>
<b>Revision History</b> .....	<b>20</b>
Document Revision History .....	20

# 1. Description

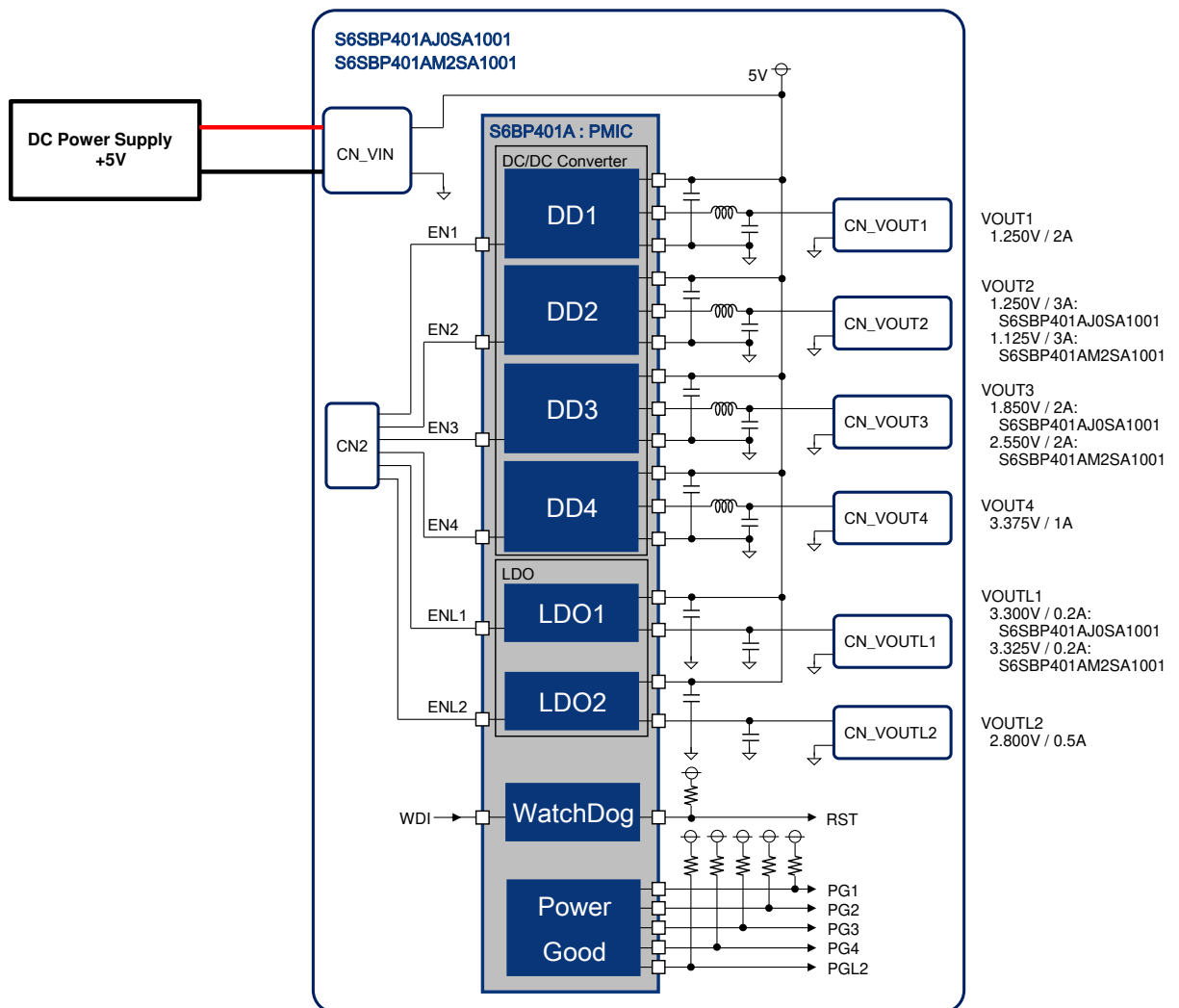


S6SBP401AJ0SA1001 and S6SBP401AM2SA1001 are the evaluation kit for power block of automotive ADAS platform.

These boards implement S6BP401A of power management IC.

It is necessary to prepare DC power supply.

Figure 1-1. Board Outline





## 2. Evaluation Board Specification



Table 2-1. Evaluation Board Specification

Item		Symbol	Min.	Typ.	Max.	Unit
Input Voltage		VIN	4.5	5.0	5.5	V
Output Voltage	S6SBP401AJ0SA1001	VOUT1	-	1.250	-	V
		VOUT2	-	1.250	-	V
		VOUT3	-	1.850	-	V
		VOUT4	-	3.375	-	V
		VOU TL1	-	3.300	-	V
		VOU TL2	-	2.800	-	V
	S6SBP401AM2SA1001	VOUT1	-	1.250	-	V
		VOUT2	-	1.125	-	V
		VOUT3	-	2.550	-	V
		VOUT4	-	3.375	-	V
		VOU TL1	-	3.325	-	V
		VOU TL2	-	2.800	-	V
Output Current	S6SBP401AJ0SA1001 S6SBP401AM2SA1001	IOUT1	-	-	2.0	A
		IOUT2	-	-	3.0	A
		IOUT3	-	-	2.0	A
		IOUT4	-	-	1.0	A
		IOUT L1	-	-	0.2	A
		IOUT L2	-	-	0.5	A

# 3. PIN Descriptions

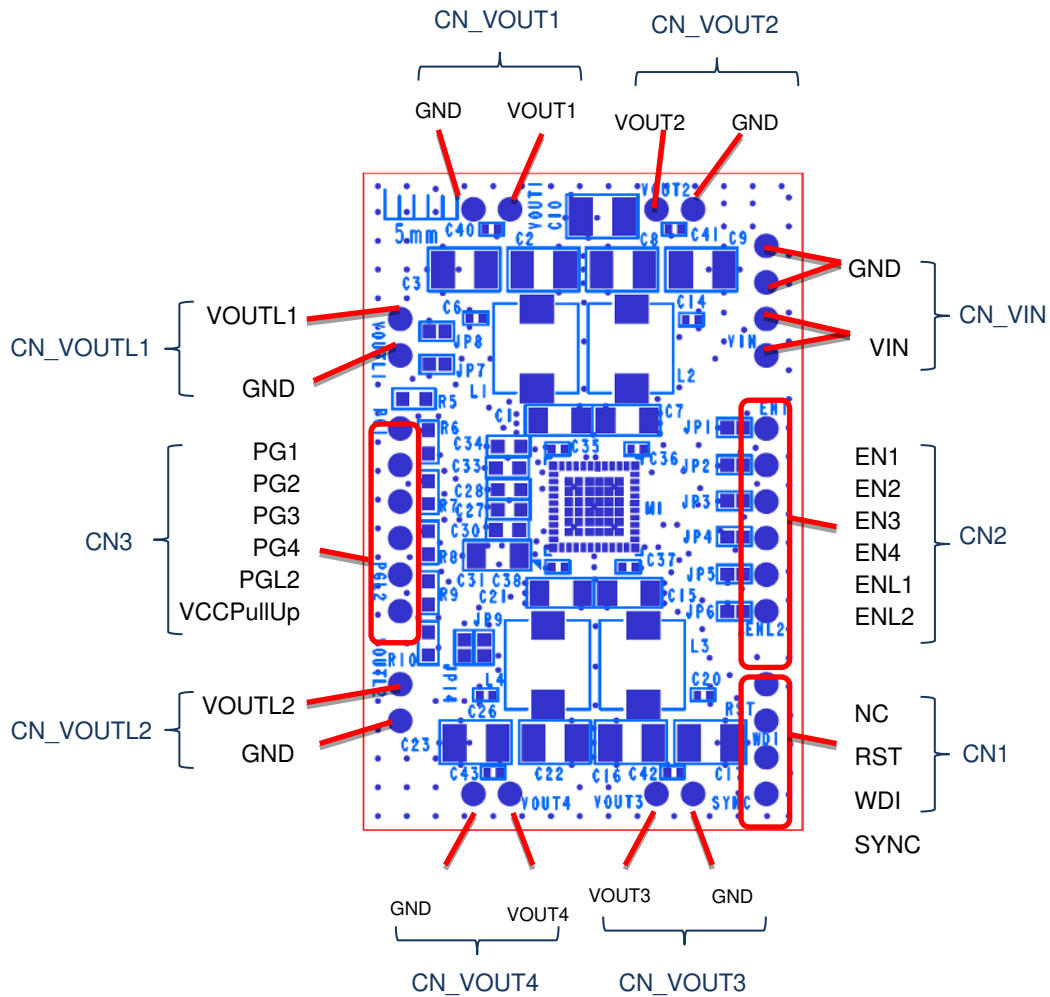


## 3.1 Input/Output Descriptions

Table 3-1. Input/Output Descriptions

Connector Symbol		I/O	Function Description
CN_VIN	VIN	I	+5Vdc power supply terminal
	GND	-	Ground terminal
CN_VOUT1	VOUT1	O	CH1 DC/DC convertor output terminal
	GND	-	Ground terminal
CN_VOUT2	VOUT2	O	CH2DC/DC convertor output terminal
	GND	-	Ground terminal
CN_VOUT3	VOUT3	O	CH3DC/DC convertor output terminal
	GND	-	Ground terminal
CN_VOUT4	VOUT4	O	CH4DC/DC convertor output terminal
	GND	-	Ground terminal
CN_VOCTL1	VOCTL1	O	CH1 LDO output terminal
	GND	-	Ground terminal
CN_VOCTL2	VOCTL2	O	CH2 LDO output terminal
	GND	-	Ground terminal
CN1	SYNC	I	External clock input terminal. Please use by referring to the data sheet of S6BP401A.
	WDI	I	Trigger input terminal of watchdog timer. Please use by referring to the data sheet of S6BP401A.
	RST	O	Reset output terminal of watchdog timer. Please use by referring to the data sheet of S6BP401A.
	NC	-	-
CN2	EN1, EN2, EN3, EN4	I	CH1 -CH4 DC/DC convertor enable terminal
	ENL1, ENL2	I	CH1,CH2 LDO enable terminal
CN3	PG1, PG2, PG3, PG4	O	CH1 -CH4 DC/DC convertor power good terminal
	PGL2	O	CH1,CH2 LDO power good terminal
	VCCPullUP	I	Voltage supply terminal for the pull up resistors of the power good

Figure 3-1. Pin Layout



## 3.2 Jumper Descriptions

Table 3-2. Jumper Descriptions

Jumper	Description	Initial Setting
JP1	Shorted between VIN and EN1 JP1 Short: EN1 pin is set to the H level. JP1 Open: EN1 pin is set to the L level. Input external signal to EN1 pin. Don't input external signal to EN1 pin with shorted JP1.	Open
JP2	Shorted between VIN and EN2 JP2 Short: EN2 pin is set to the H level. JP2 Open: EN2 pin is set to the L level. Input external signal to EN2 pin. Don't input external signal to EN2 pin with shorted JP2.	Open
JP3	Shorted between VIN and EN3 JP3 Short: EN3 pin is set to the H level. JP3 Open: EN3 pin is set to the L level. Input external signal to EN3 pin. Don't input external signal to EN3 pin with shorted JP3.	Open
JP4	Shorted between VIN and EN4 JP4 Short: EN4 pin is set to the H level. JP4 Open: EN4 pin is set to the L level. Input external signal to EN4 pin. Don't input external signal to EN4 pin with shorted JP4.	Open
JP5	Shorted between VIN and ENL1 JP5 Short: ENL1 pin is set to the H level. JP5 Open: ENL1 pin is set to the L level. Input external signal to ENL1 pin. Don't input external signal to ENL1 pin with shorted JP5.	Open
JP6	Shorted between VIN and ENL2 JP6 Short: ENL2 pin is set to the H level. JP6 Open: ENL2 pin is set to the L level. Input external signal to ENL2 pin. Don't input external signal to ENL2 pin with shorted JP6.	Open
JP7	Shorted VIN or VOUTL1 to power good pin through resistor. JP7 Short: Shorted between VOUTL1 and power good pin through resistor.	Open
JP8	JP8 Short: Shorted between VIN and power good pin through resistor. JP7 and JP8 must not be shorted simultaneously.	Short
JP9	Shorted VIN or VOUT4 to PVCCL2 of IC 37 pin. JP9 Short: Shorted between VIN and PVCCL2.	Short
JP14	JP14 Short: Shorted between VOUT4 and PVCCL2. JP9 and JP14 must not be shorted simultaneously.	Open

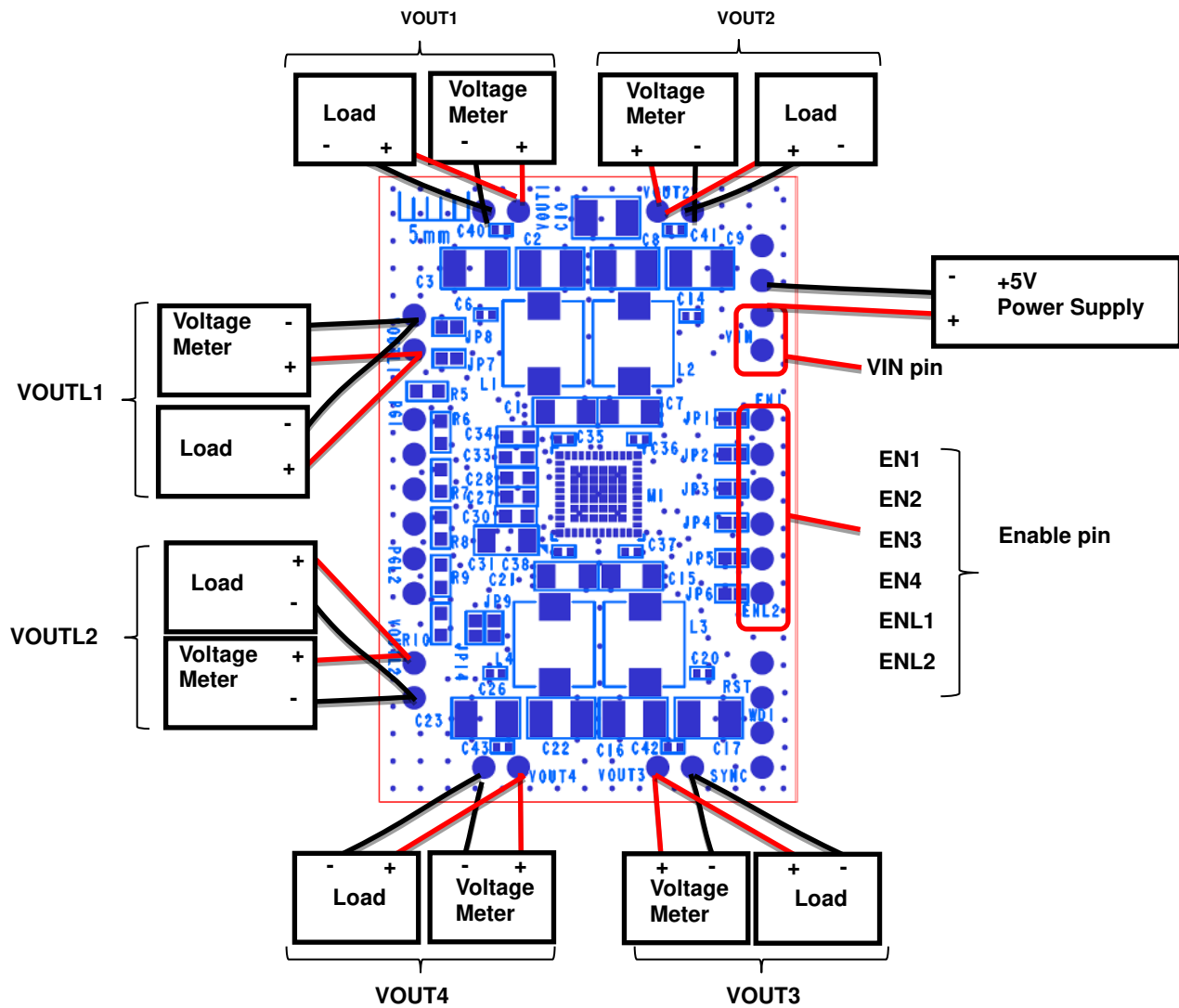
# 4. Setup



## 4.1 Connecting

1. Connect the board to the power supply, load equipment and voltage meter as below.

Figure 4-1. Connecting the Board and Some Equipment



## 4.2 Verification

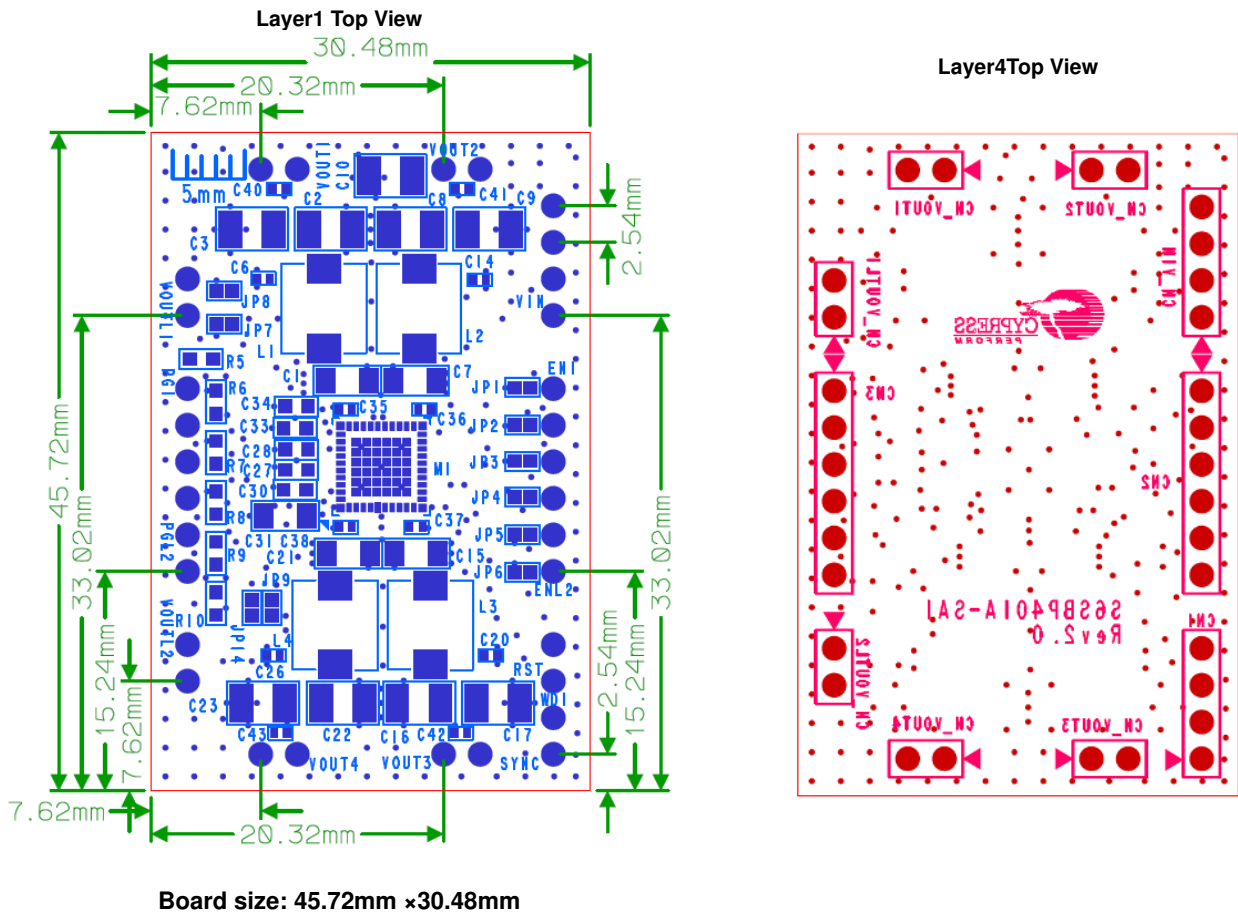
1. Turn on +5V power supply.
2. Connect some enable pin to VIN, then, each DC/DC (or LDO) channel will start output.
3. Check that each output voltage is the same as the 'Output Voltage' of Figure 2-1 Evaluation Board Specification.

# 5. Layout



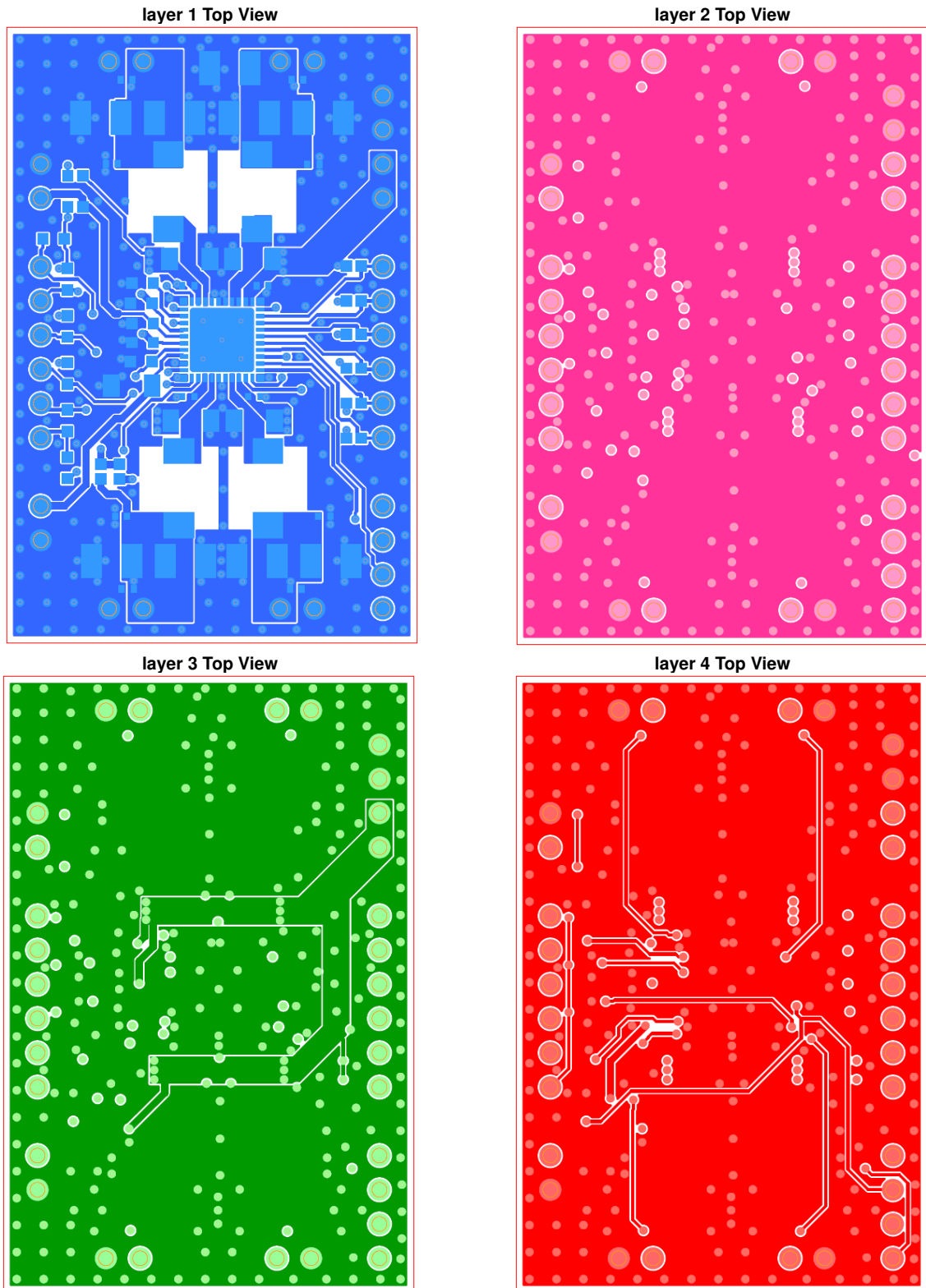
## 5.1 Component Layout

Figure 5-1. Evaluation Board Component Layout



## 5.2 Wiring Layout

Figure 5-2. Evaluation Board Wiring Layout

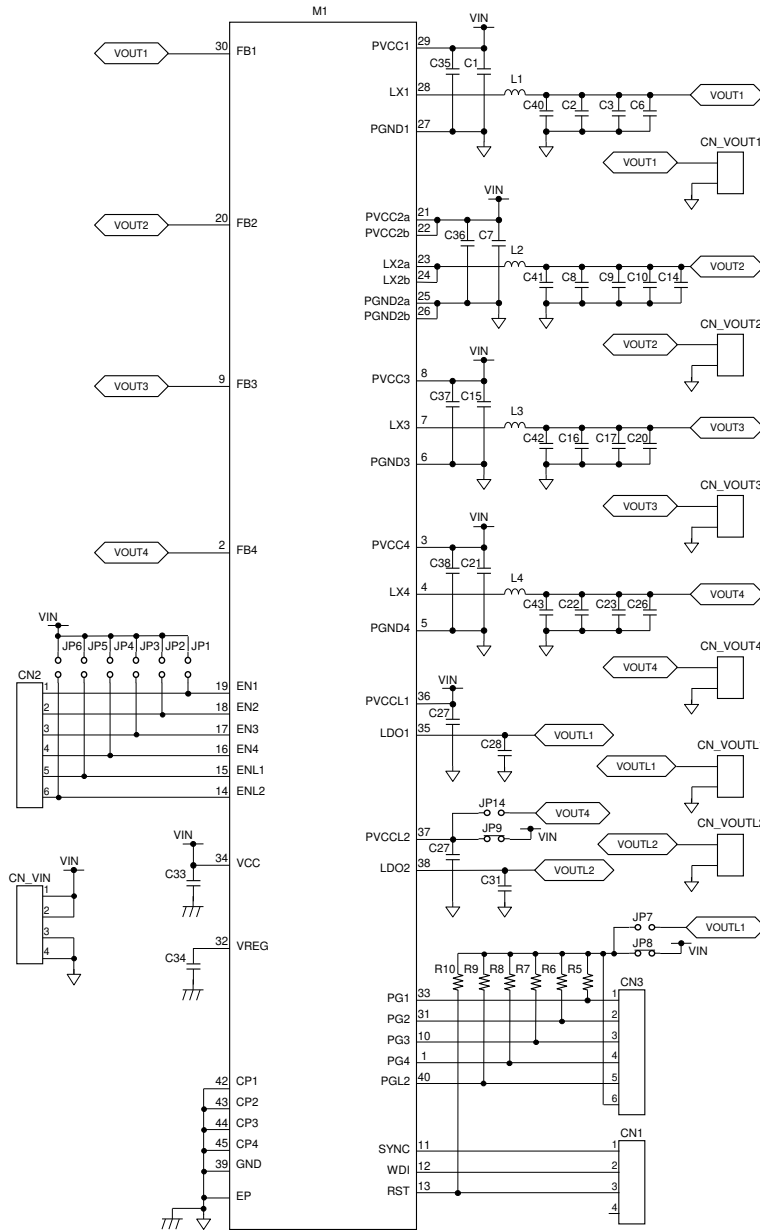




# 6. Circuit Schematic



Figure 6-1. Evaluation Board Circuit Schematic



# 7. Component List



Table 7-1. Evaluation Board Component List

No.	Component	Parts Number	Vendor	Value	Rated Voltage(V)	Rated Current(A)	Remarks
1	C1	CGA5L1X7R1C106K160AC	TDK	10 $\mu$ F	16	-	-
2	C2	CGA6P1X7R1C226M250AC	TDK	22 $\mu$ F	16	-	-
3	C3	CGA6P1X7R1C226M250AC	TDK	22 $\mu$ F	16	-	-
4	C6	CGA2B3X7R1H104K050BB	TDK	0.1 $\mu$ F	50	-	-
5	C7	CGA5L1X7R1C106K160AC	TDK	10 $\mu$ F	16	-	-
6	C8	CGA6P1X7R1C226M250AC	TDK	22 $\mu$ F	16	-	-
7	C9	CGA6P1X7R1C226M250AC	TDK	22 $\mu$ F	16	-	-
8	C10	CGA6P1X7R1C226M250AC	TDK	22 $\mu$ F	16	-	-
9	C14	CGA2B3X7R1H104K050BB	TDK	0.1 $\mu$ F	50	-	-
10	C15	CGA5L1X7R1C106K160AC	TDK	10 $\mu$ F	16	-	-
11	C16	CGA6P1X7R1C226M250AC	TDK	22 $\mu$ F	16	-	-
12	C17	CGA6P1X7R1C226M250AC	TDK	22 $\mu$ F	16	-	-
13	C20	CGA2B3X7R1H104K050BB	TDK	0.1 $\mu$ F	50	-	-
14	C21	CGA5L1X7R1C106K160AC	TDK	10 $\mu$ F	16	-	-
15	C22	CGA6P1X7R1C226M250AC	TDK	22 $\mu$ F	16	-	-
16	C23	CGA6P1X7R1C226M250AC	TDK	22 $\mu$ F	16	-	-
17	C26	CGA2B3X7R1H104K050BB	TDK	0.1 $\mu$ F	50	-	-
18	C27	CGA3E1X7R1C105M080AC	TDK	1 $\mu$ F	16	-	-
19	C28	CGA3E1X7R1C105M080AC	TDK	1 $\mu$ F	16	-	-
20	C30	CGA3E1X7R1C105M080AC	TDK	1 $\mu$ F	16	-	-
21	C31	CGA5L1X7R1C106K160AC	TDK	10 $\mu$ F	16	-	-
22	C33	CGA3E1X7R1C105M080AC	TDK	1 $\mu$ F	16	-	-
23	C34	CGA3E1X7R1C105M080AC	TDK	1 $\mu$ F	16	-	-
24	C35	CGA2B3X7R1H104K050BB	TDK	0.1 $\mu$ F	50	-	-
25	C36	CGA2B3X7R1H104K050BB	TDK	0.1 $\mu$ F	50	-	-
26	C37	CGA2B3X7R1H104K050BB	TDK	0.1 $\mu$ F	50	-	-
27	C38	CGA2B3X7R1H104K050BB	TDK	0.1 $\mu$ F	50	-	-
28	C40	CGA2B3X7R1H104K050BB	TDK	0.1 $\mu$ F	50	-	-

No.	Component	Parts Number	Vendor	Value	Rated Voltage(V)	Rated Current(A)	Remarks
29	C41	CGA2B3X7R1H104K050BB	TDK	0.1μF	50	-	-
30	C42	CGA2B3X7R1H104K050BB	TDK	0.1μF	50	-	-
31	C43	CGA2B3X7R1H104K050BB	TDK	0.1μF	50	-	-
32	L1	CLF6045T-1R5N-D	TDK	1.5μH	-	4.2	-
33	L2	CLF6045T-1R5N-D	TDK	1.5μH	-	4.2	-
34	L3	CLF6045T-1R5N-D	TDK	1.5μH	-	4.2	-
35	L4	CLF6045T-1R5N-D	TDK	1.5μH	-	4.2	-
36	M1	S6BP401AJ0SN1B000	Cypress	-	-	-	S6SBP40 1AJ0SA10 01
		S6BP401AM2SN1B000					S6SBP40 1AM2SA1 001
37	R5	RG1608P-473-B	SSM	47kΩ	-	-	-
38	R6	RG1608P-473-B	SSM	47 kΩ	-	-	-
39	R7	RG1608P-473-B	SSM	47 kΩ	-	-	-
40	R8	RG1608P-473-B	SSM	47 kΩ	-	-	-
41	R9	RG1608P-473-B	SSM	47 kΩ	-	-	-
42	R10	RG1608P-473-B	SSM	47 kΩ	-	-	-

TDK : TDK Corporation

Cypress : Cypress Semiconductor Corp

SSM : SUSUMU CO., LTD.

NMT : No mount.

These components are compliant with RoHS, and please ask each vendor for details if necessary.

## 8. Ordering Information



Table 8-1. Ordering Information

Part Number	EV B Revision	Note
S6SBP401AJ0SA1001	S6SBP401A-SA1	Mounted IC: S6BP401AJ0SN1B000
S6SBP401AM2SA1001	Rev 2.0	Mounted IC: S6BP401AM2SN1B000

# Revision History



## Document Revision History

Document Title: S6SBP401AJ0SA1001/S6SBP401AM2SA100 Automotive Evaluation Board Operation Guide

Document Number: 002-08764

Revision	ECN Number	Issue Date	Description of Change
**	-	09/11/2015	Initial release.
*A	5126854	02/05/2016	Migrated Spansion Guide from S6SBP401AJ0SA1001_SS901-00045-1v0-E to Cypress template.
*B	6681128	09/25/2019	Updated to new template. Completing Sunset Review.