S6SAP111A28SA1001

2ch DC/DC Converter Evaluation Board Operation Guide

Doc. No. 002-08726 Rev. *A

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

Copyrights

Trademarks

Source Code

Disclaimer

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.

⚠ **WARNING**	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.

Electric shock, **Damage**	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.
Electric shock, **Damage**	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.

⚠ **CAUTION**	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.

Cuts, Damage	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.
Cuts	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.
Damage	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.
Damage	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.
Damage	Use the product within the ranges given in the specifications. Operation over the specified ranges may cause a fault.
Damage	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.

Damage	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.
Damage	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.
Damage	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

1. Evaluation Board Specification

1.1 Description

The S6SAP111A28SA1001 is the evaluation board for 2ch DC/DC converter, S6AP111A28. This board implements S6AP111A28 and switching parts

1.2 Evaluation Board Specification

Table 1-1. Evaluation Board Specification

Item	Symbol	Min	Typ	Max	Unit
Input voltage	VIN	21.6	24	26.4	V
Output voltage (DAC0=DAC1=VB)	VOUT1	-	3.3	-	V
	VOUT2	-	5	-	V
Output current	IOUT1	-	-	6	A
	IOUT2	-	-	6	A
Over current limitation	ILIM1	-	12	-	A
	ILIM2	-	12	-	A

Board size: 55.88mm × 27.94mm

2. Pin Description

Table 2-1. Pin Description

Pin Symbol	I/O	Function Description
VIN	I	24Vdc power supply terminal
VOUT1	O	CH1 DC/DC converter output pin
VOUT1s	I	CH1 Output sense pin(Usually unused)
VOUT2	O	CH2 DC/DC converter output pin
VOUT2s	I	CH2 Output sense pin(Usually unused)
CTL1	I	CH1 control pin
CTL2	I	CH2 control pin
DAC0,DAC1	I	CH1 reference voltage setting pin for Error comp
PGND	G	Ground

2.1 Jumper, Switch Descriptions

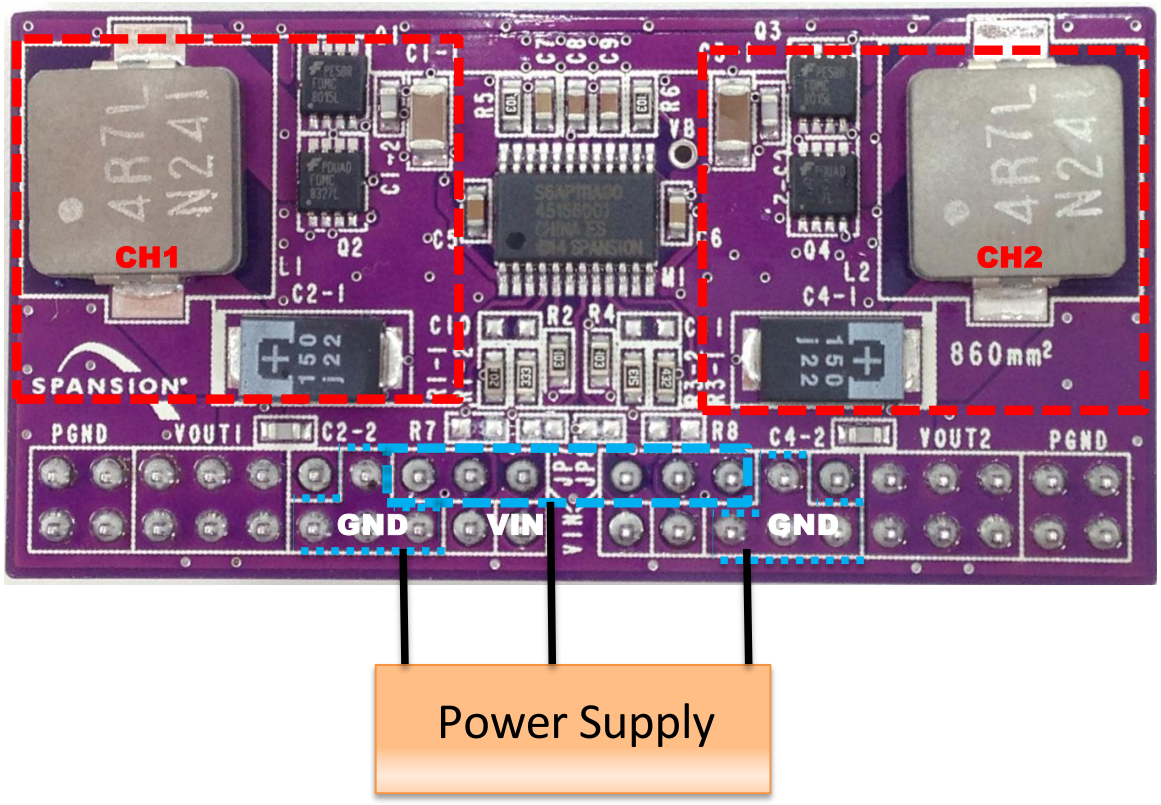
Table 2-2. Jumper, Switch Descriptions

Jumper, Switch	Description	Initial Setting
JP1	CH1 feedback line	short
JP2	CH2 feedback line	short
JP7	DAC0 – VB short jumper	short
JP8	DAC1 – VB short jumper	short

3. Setup and Verification

1. Connect VIN pin to +24V power supply when CTL1 and CTL2 are connected to GND.
2. Turn on +24V power supply.
3. Connect CTL1 and CTL2 to VIN.
4. If VOUT1 supply +3.3V and VOUT2 supply +5V, It is in correct operation

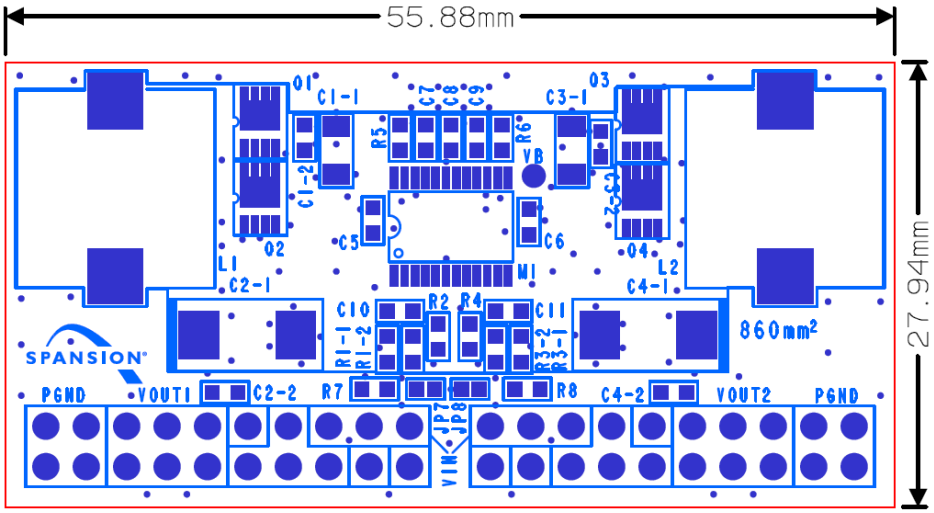
Figure 3-1. Image of Connection



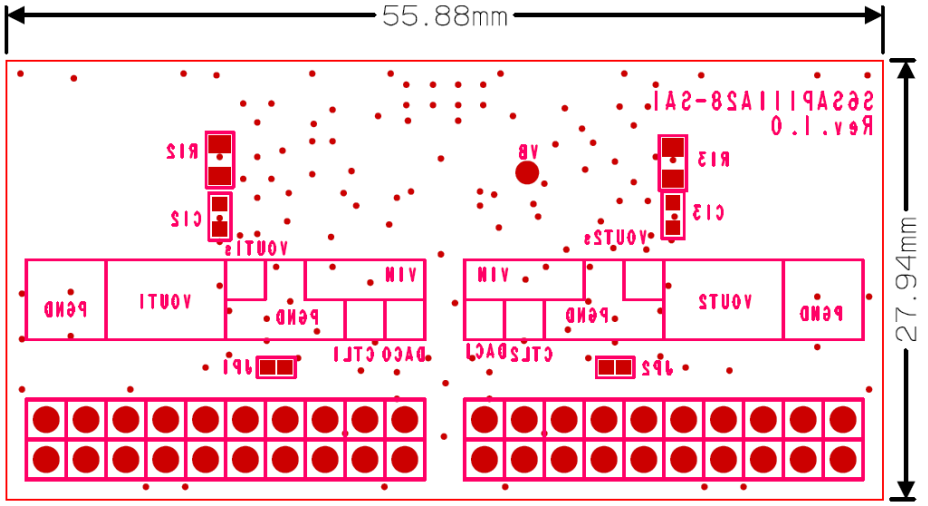
4. Component Layout

Figure 4-1. Component Layout

Top View

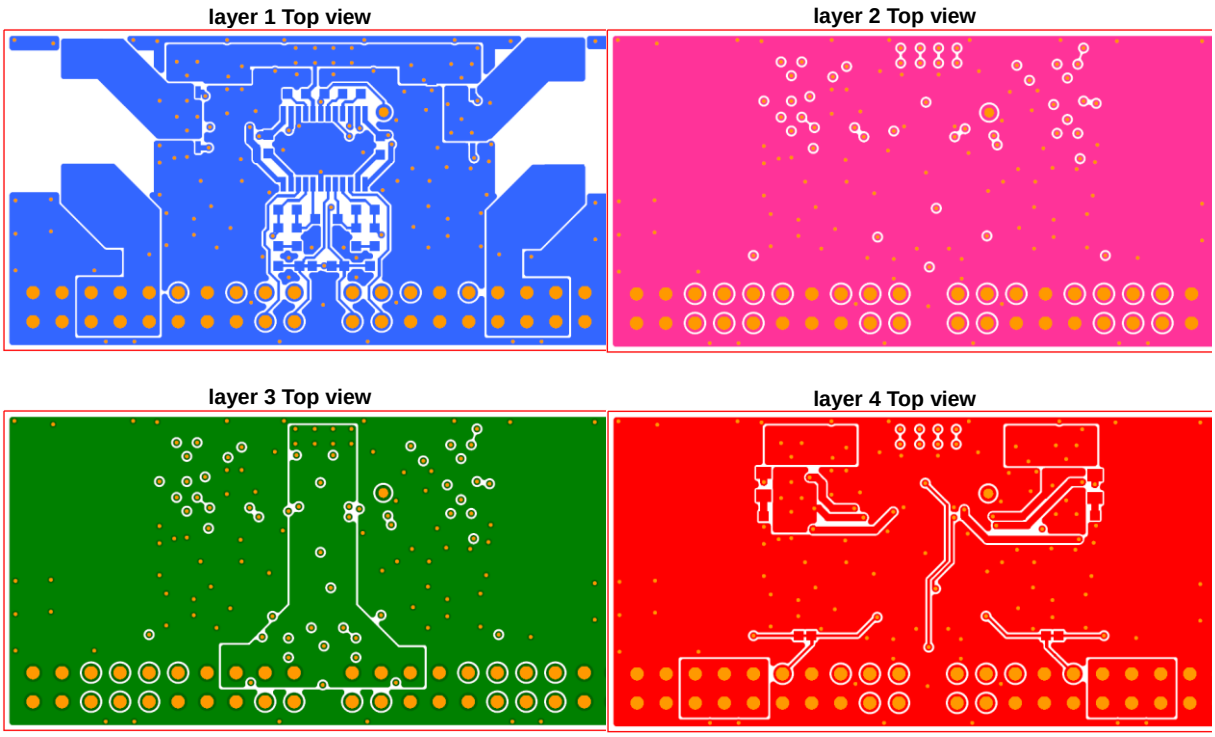


Bottom side (Top view)



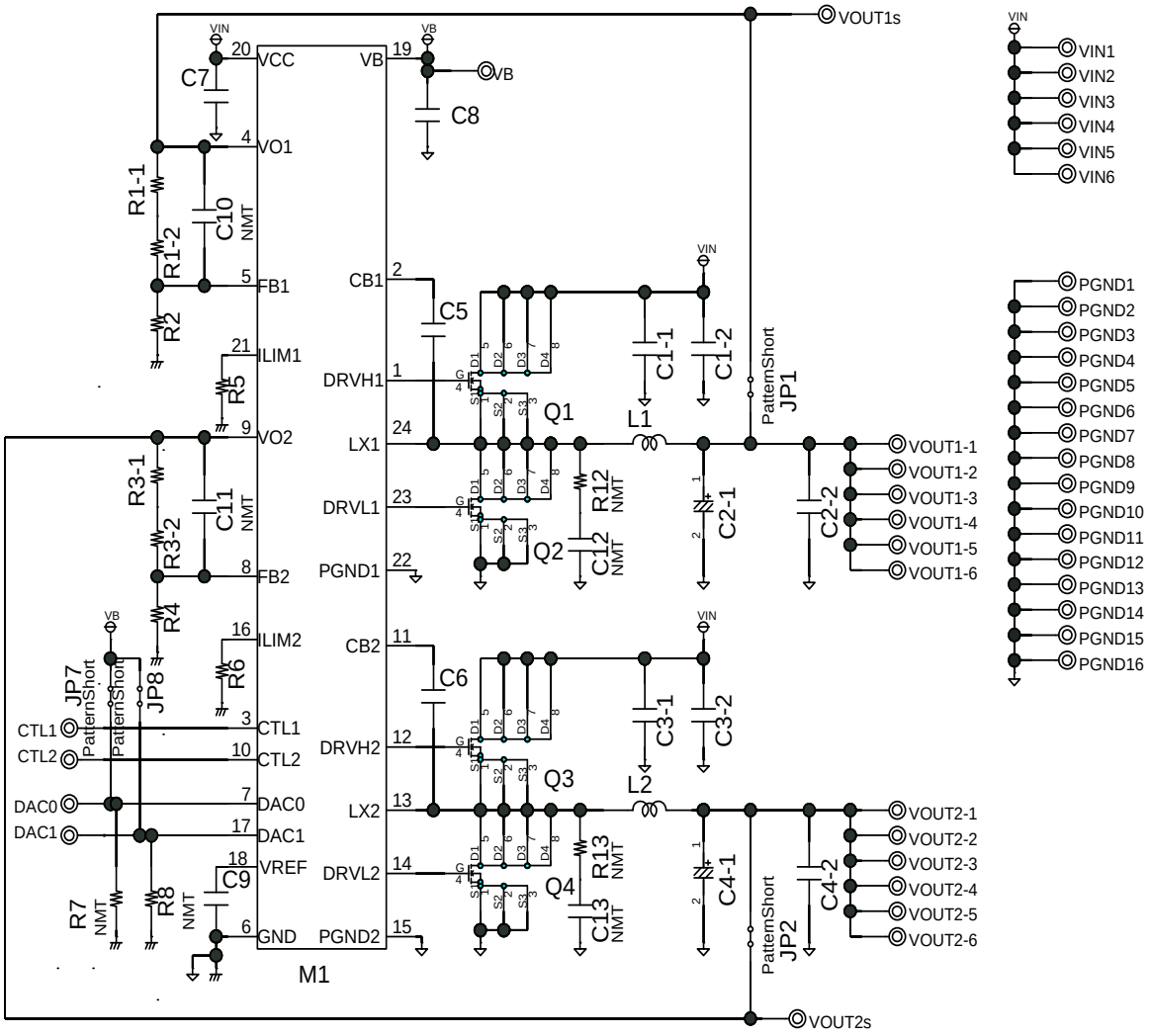
5. Wiring Layout

Figure 5-1. Wiring Layout



6. Circuit Diagram

Figure 6-1. Circuit Diagram



7. Parts List

Table 7-1. Parts List

No.	Component	Item	Parts Number	Vendor	Value	Remarks
1	M1	PMIC	S6AP111A28GT1B000	CYPRESS	-	-
2	L1	Inductor	MPLC1040L4R7	KEMET	4.7µH	8A
3	L2	Inductor	MPLC1040L4R7	KEMET	4.7µH	8A
4	Q1	FET	FDMC8015L	FAIRCHILD	-	40V, 7A
5	Q2	FET	FDMC8327L	FAIRCHILD	-	40V, 12A
6	Q3	FET	FDMC8015L	FAIRCHILD	-	40V, 7A
7	Q4	FET	FDMC8327L	FAIRCHILD	-	40V, 12A
8	C1-1	Ceramic Capacitor	C3216X5R1V226M160AC	TDK	22µF	35V
9	C1-2	Ceramic Capacitor	C1608CH1H102J	TDK	0.001µF	50V
10	C2-1	Ceramic Capacitor	6TPE150MF	PANASONIC	150µF	6.3V
11	C2-2	Ceramic Capacitor	C1608CH1H102J	TDK	0.001µF	50V
12	C3-1	Ceramic Capacitor	C3216X5R1V226M160AC	TDK	22µF	35V
13	C3-2	Ceramic Capacitor	C1608CH1H102J	TDK	0.001µF	50V
14	C4-1	Ceramic Capacitor	6TPE150MF	PANASONIC	150µF	6.3V
15	C4-2	Ceramic Capacitor	C1608CH1H102J	TDK	0.001µF	50V
16	C5	Ceramic Capacitor	C1608X5R1H104K080AA	TDK	0.1µF	50V
17	C6	Ceramic Capacitor	C1608X5R1H104K080AA	TDK	0.1µF	50V
18	C7	Ceramic Capacitor	C1608X5R1H104K080AA	TDK	0.1µF	50V
19	C8	Ceramic Capacitor	C1608X5R1C225K	TDK	2.2µF	16V
20	C9	Ceramic Capacitor	C1608X5R1H105K080AB	TDK	1µF	50V

No.	Component	Item	Parts Number	Vendor	Value	Remarks
21	C10,C11,C12,C13	Ceramic Capacitor	C1608CH1H102J	TDK	0.001µF	NMT
22	R1-1	Chip Resistor	RR0816P-201-D	SUSUMU	0.2kΩ	-
23	R1-2	Chip Resistor	RR0816P-333-D	SUSUMU	33 kΩ	-
24	R2	Chip Resistor	RR0816P-103-D	SUSUMU	10 kΩ	-
25	R3-1	Chip Resistor	RR0816P-432-D	SUSUMU	4.3 kΩ	-
26	R3-2	Chip Resistor	RR0816P-513-D	SUSUMU	51 kΩ	-
27	R4	Chip Resistor	RR0816P-103-D	SUSUMU	10 kΩ	-
28	R5	Chip Resistor	RR0816P-103-D	SUSUMU	10 kΩ	-
29	R6	Chip Resistor	RR0816P-103-D	SUSUMU	10 kΩ	-
30	R7,R8	Chip Resistor	RR0816P-103-D	SUSUMU	10 kΩ	NMT
31	R12,R13	Chip Resistor	RK73H2ATTD10R0F	SUSUMU	10 Ω	NMT
32	JP1,JP2,JP7,JP8	Jumper	-	-	-	Pattern short
33	PGND, VOUT1, VOUT1a,VIN, CTL1, DAC0	Terminal	90131-0770	molex	-	2 × 10pin header
34	PGND, VOUT2, VOUT2a,VIN, CTL2, DAC1	Terminal	90131-0770	molex	-	2 × 10pin header

NMT: No mount.

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

KEMET : KEMET Electronics Corporation

FAIRCHILD : Fairchild Semiconductor Corp.

TDK : TDK Corporation

PANASONIC : Panasonic Corporation

SUSUMU : SUSUMU Co., Ltd.

molex : Molex Japan Co., Ltd.

8. Evaluation Board Picture

Figure 8-1. Evaluation Board Picture (Top)

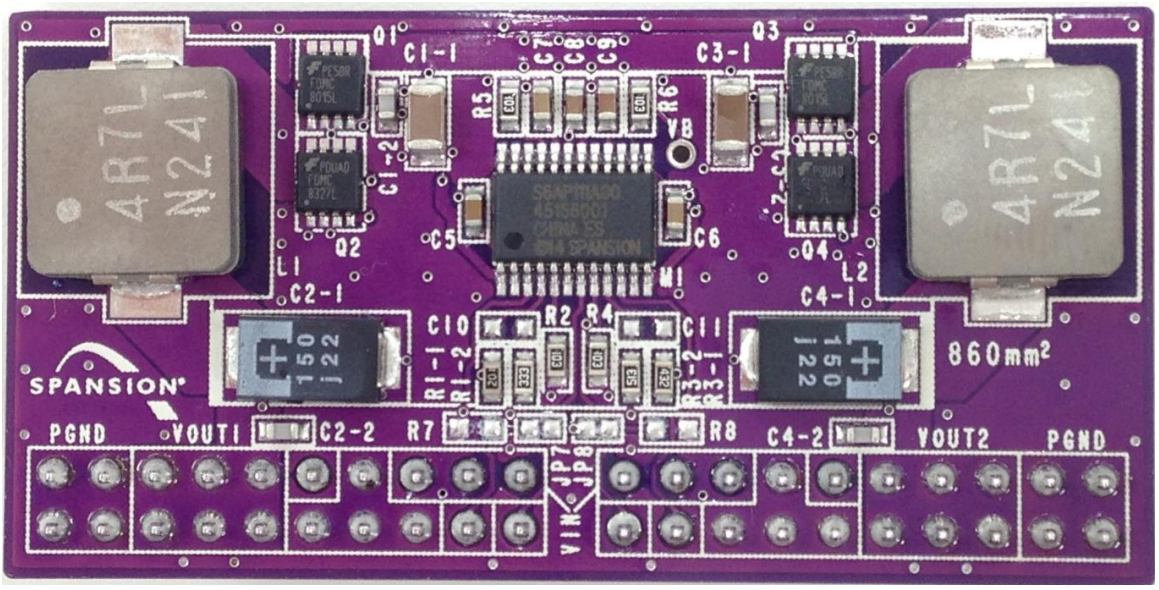
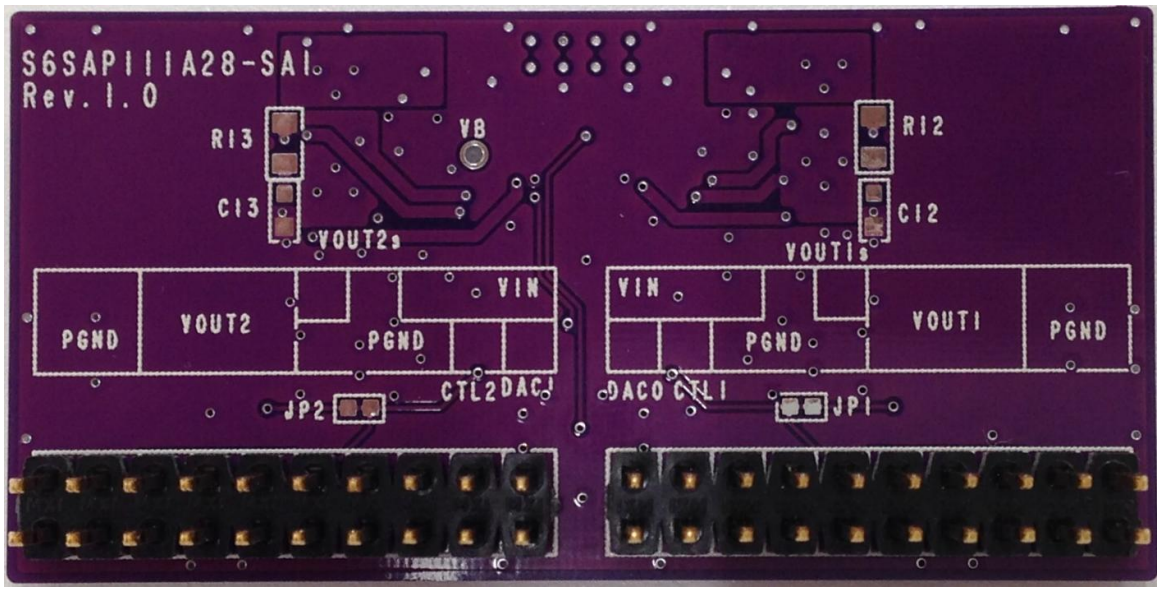


Figure 8-2. Evaluation Board Picture (Back)



9. Ordering Information

Table 9-1. Ordering Information

Part Number	EVB Revision	Note
S6SAP111A28SA1001	Rev 1.0	---

Revision History

Document Revision History

Document Title: S6SAP111A28SA1001 2ch DC/DC Converter Evaluation Board Operation Guide Document Number: 002-08726			
Revision	**Issue Date**	**Origin of Change**	**Description of Change**
**	02/27/2015	ATTS	Initial release
*A	02/04/2016	ATTS	Migrated Spansion Guide from S6SAP111A28SA1001_SS901-00037-1v0-E to Cypress format