



A New Direction in Mixed-Signal

October 2012

XRP2524

# 1A Dual Channel USB 3.0 Power Distribution Switch

Rev. 1.0.0

## GENERAL DESCRIPTION

The Exar XRP2524 Evaluation board (EVB) is a fully assembled and tested surface-mount PCB that demonstrates the XRP2524 dual-channel integrated high-side power distribution switches.

Optimized for USB  $V_{BUS}$  power distribution, the XRP2524 is compliant with the latest USB 3.0 specification and can be used in any self or bus powered USB applications. It is provided with an enable pin while an error flag is available to indicate fault conditions.

XRP2524 is offered in a RoHS compliant "green"/halogen free 8-pin NSOIC package.

## STANDARD CONFIGURATION

The XRP2524EVB is configured to operate under the following conditions:

- Input voltage range  $V_{IN}$ : 2.7V – 6.5V
- Output current/load range: 0 – 1.0A

## EVALUATION BOARD MANUAL



## FEATURES

- **Dual Channel Current Switch**
  - 1A continuous load current per channel
  - 1.5A Typical Over-current Limit
  - 2.7V to 6.5V Input Voltage Range
- **USB 2.0/3.0 Compliant**
- **Active High Enable**
- **Channel Error Flag Indicator**
- **Reverse Current, Short Circuit & Thermal Shutdown Protection**

## EVALUATION BOARD SCHEMATICS

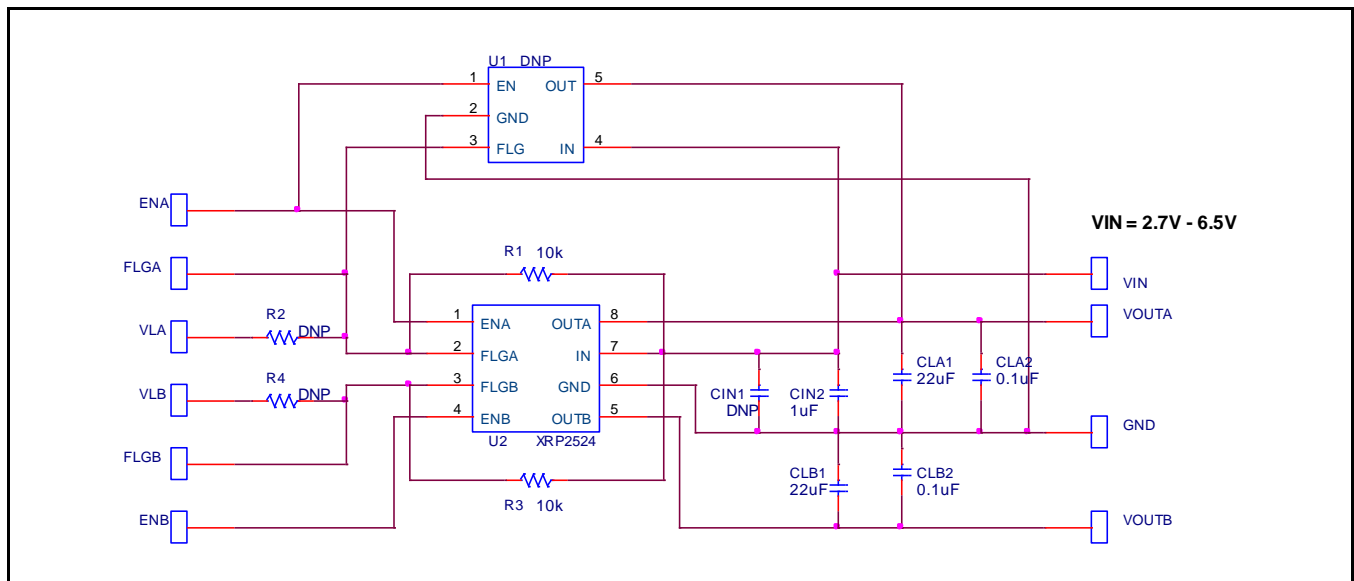


Fig. 1: XRP2524 Evaluation Board Schematic

**PIN ASSIGNMENT**

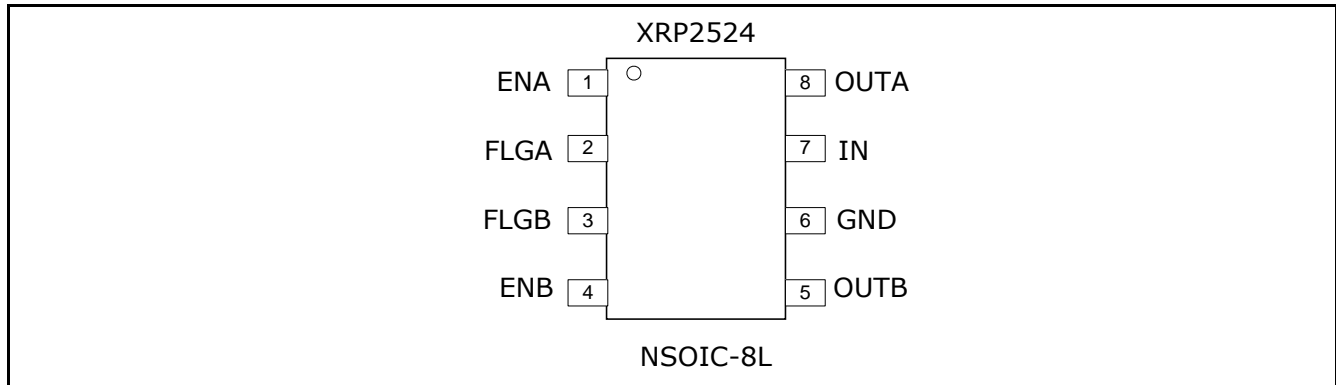


Fig. 2: XRP2524 Pin Assignment

**PIN DESCRIPTION – XRP2524**

Name	Pin Number	Description
EN <sub>x</sub>	1,4	Channel Enable Input Active High
FLG <sub>x</sub>	2,3	Error Flag Signal Active low open drain output. Active on over-current, over-temperature or short-circuit conditions.
GND	6	Ground Signal
IN	7	Voltage Input Pin
OUT <sub>x</sub>	5,8	Voltage Output Pin

**ORDERING INFORMATION**

Refer to XRP2524’s datasheet and/or [www.exar.com](http://www.exar.com) for exact and up to date ordering information.

**1A Dual Channel USB 3.0 Power Distribution Switch**

**USING THE EVALUATION BOARD**

**INITIAL SETUP**

The Board is supplied from EXAR with the XRP2524 device. Set the input supply to a voltage between 2.7V to 6.5V and connect it to VIN and GND connectors on the right side of the evaluation board.

Enable pin must be pulled up HIGH to enable the IC. Connect the load to the VOUT and PGND connectors on the right hand side of the board.

Flag pin is pulled up to VIN through a 10kΩ resistor (provided by default on the board) or can be instead connected to a separate external power supply voltage VLA/VLB.

The board will power-up upon turning on the input supply and reach the desired output voltage. The board can operate with a load current I<sub>OUT</sub> of up to 1A per channel.

**TYPICAL PERFORMANCE CHARACTERISTICS**

All data taken at V<sub>IN</sub> = 5V, C<sub>IN</sub> = 1μF, C<sub>OUT</sub> = 22μF//0.1μF, T<sub>J</sub> = T<sub>A</sub> = 25°C, unless otherwise specified - Schematic and BOM from Application Information section of this datasheet.

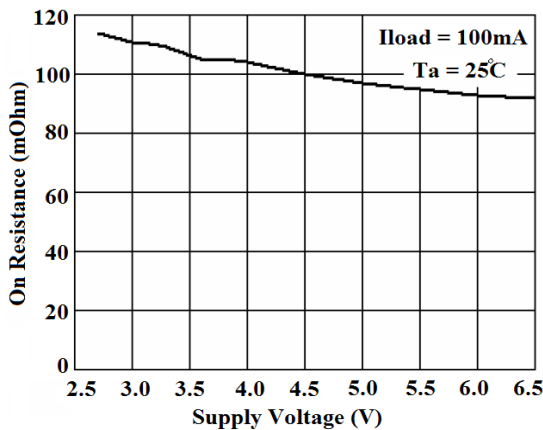


Fig. 3: Output On-Resistance vs. Supply Voltage

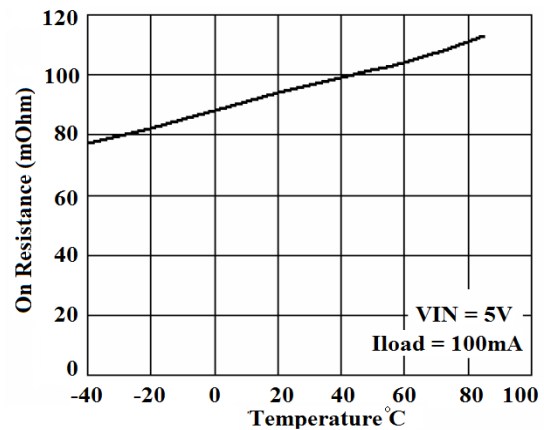


Fig. 4: Output On-Resistance vs. Temperature

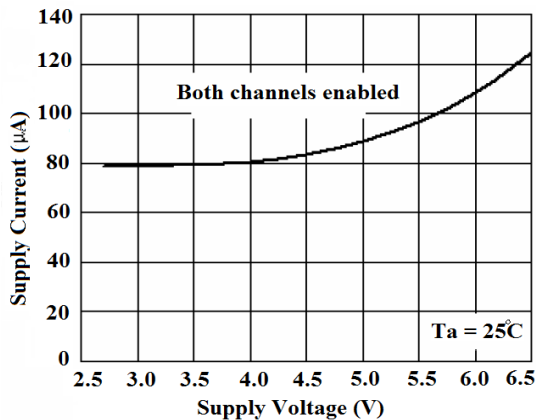


Fig. 5: ON-State Supply Current vs. Supply Voltage

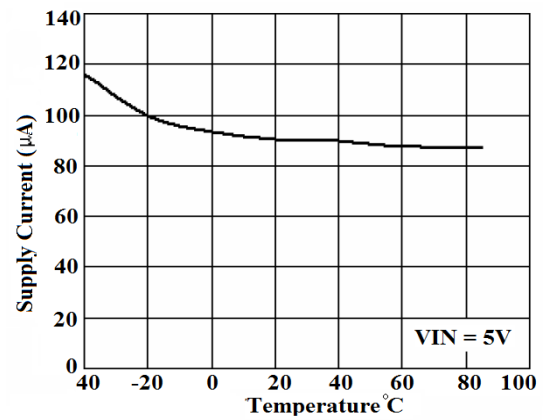


Fig. 6: ON-State Supply Current vs. Temperature

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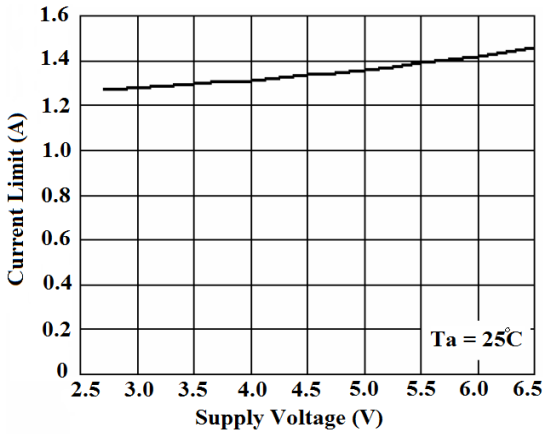


Fig. 7: Current Limit Threshold vs. Supply Voltage

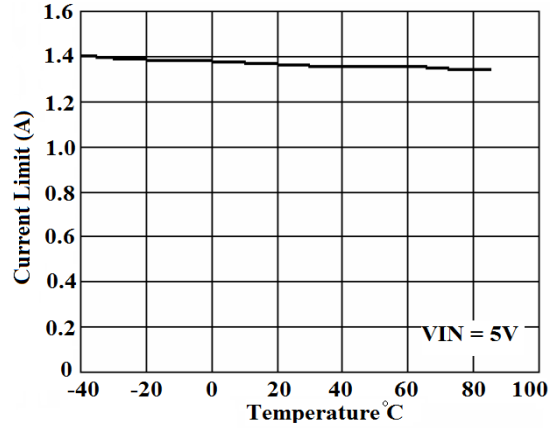


Fig. 8: Current Limit Threshold vs. Temperature

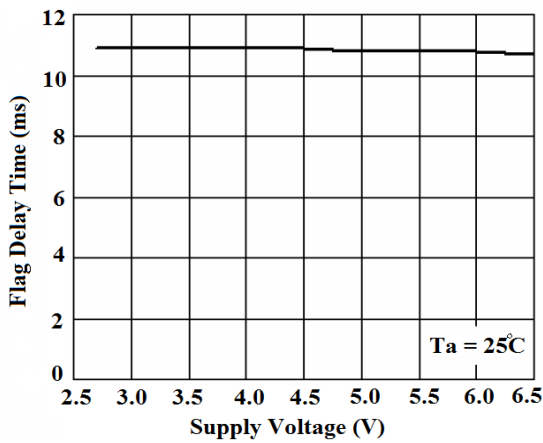


Fig. 9: Flag Delay Time vs. Supply Voltage

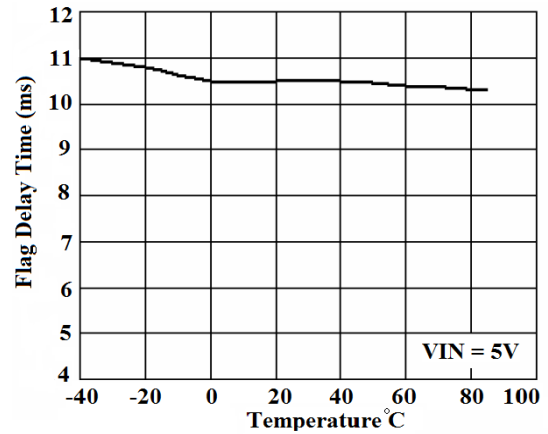


Fig. 10: Flag Delay Time vs. Temperature

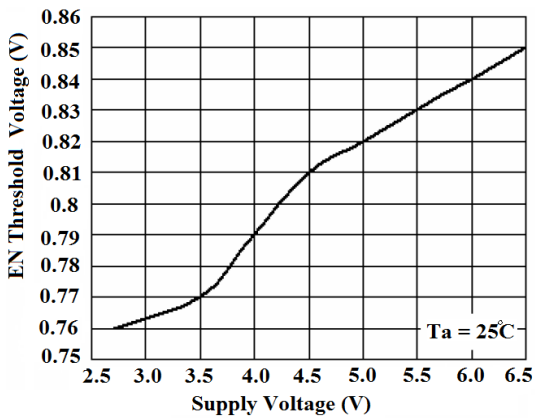


Fig. 11: Enable Threshold vs. Supply Voltage

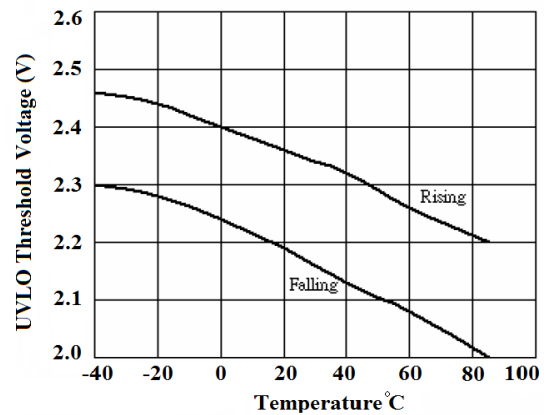


Fig. 12: UVLO Threshold Voltage vs. Temperature

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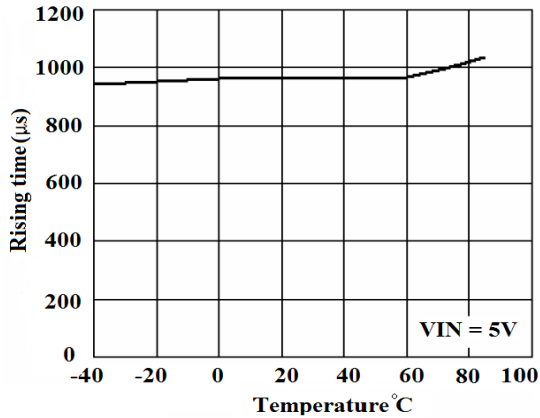
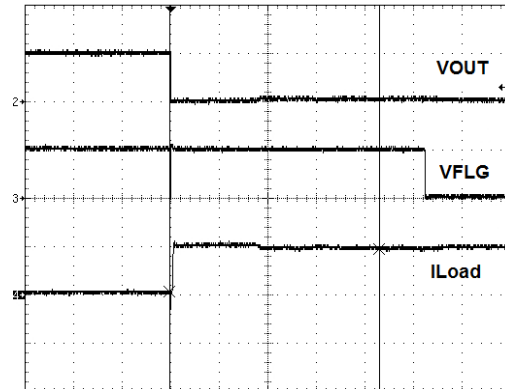
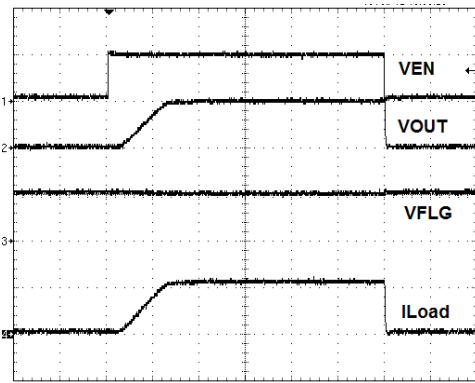


Fig. 13: Output Rising Time vs. Temperature

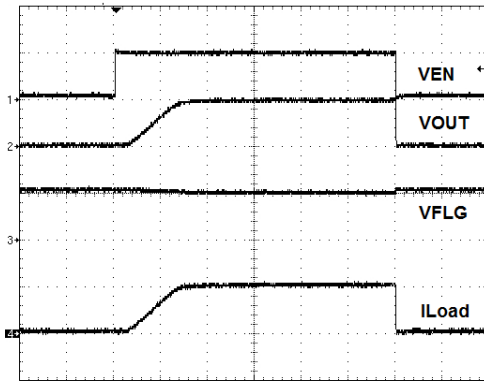


CH2 5.0V/div CH3 5.0V/div CH4 1.0A/div 2ms/div

Fig. 14: Short circuit protection, VIN = 5.0V



CH1 5.0V/div CH2 5.0V/div CH3 5.0V/div CH4 0.5A/div 1ms/div



CH1 5.0V/div CH2 5.0V/div CH3 5.0V/div CH4 1A/div 1ms/div

Fig. 15: Turn-On/Off Characteristics: COUT=1µF, Rload=10Ω Fig. 16: Turn-On/Off Characteristics: COUT=1µF, Rload=5.1Ω

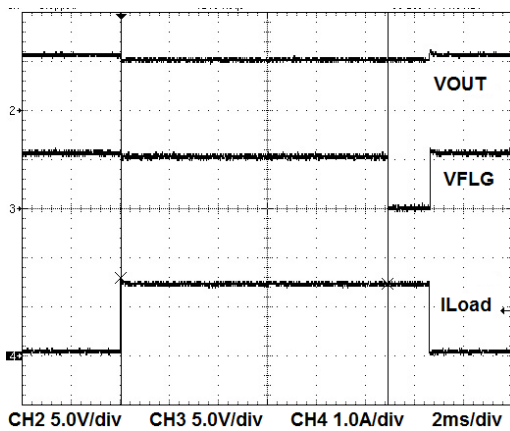


Fig. 17: Current Limit Operation: VIN = 5.5V, Rload = 3.3Ω

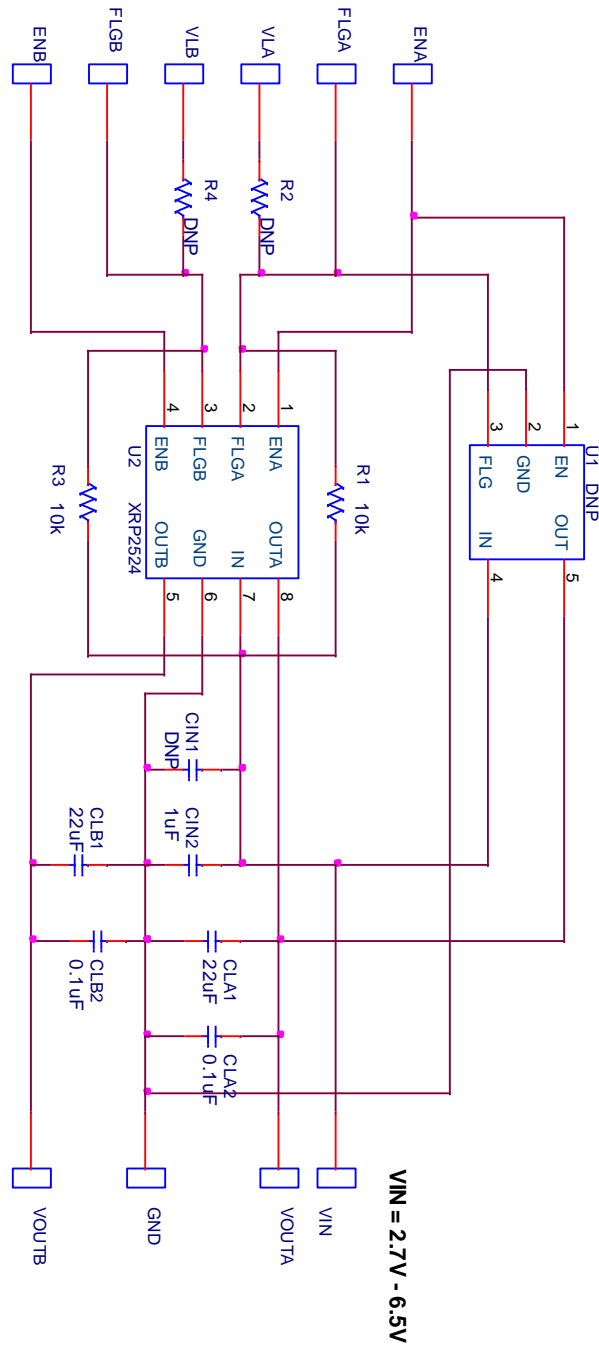


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## EVALUATION BOARD SCHEMATICS



**BILL OF MATERIAL**

Ref.	Qty	Manufacturer	Part Number	Size	Component
EVAL BD	1	Exar Corp.	146-6693-01		XRP2524 Evaluation Board
U2	1	Exar Corp.	XRP2524	8-pin NSOIC	XRP2524
CIN2	1	Murata Corp.	GRM188R71E105KA12D	0603	Ceramic 1uF, 25V, X7R
CLA1, CLB1	2	Murata Corp.	GRM31CR61C226KE15L	1206	Ceramic 22uF, 16V, X5R
CLA2, CLB2	2	Murata Corp.	GRM188R71H104KA93D	0603	Ceramic 0.1uF, 50V, X7R
R1, R3	3	Panasonic Corp.	ERJ-3EKF1002V	0603	Resistor 10KΩ, 1/10W, 1%
Test Point VIN, GND, PGND, VOUTA, VOUTB, ENA, ENB, FLGA, FLGB, VLA, VLB	12	VECTOR	K24C/M	0.042" diameter	Test Point Post

**EVALUATION BOARD LAYOUT**

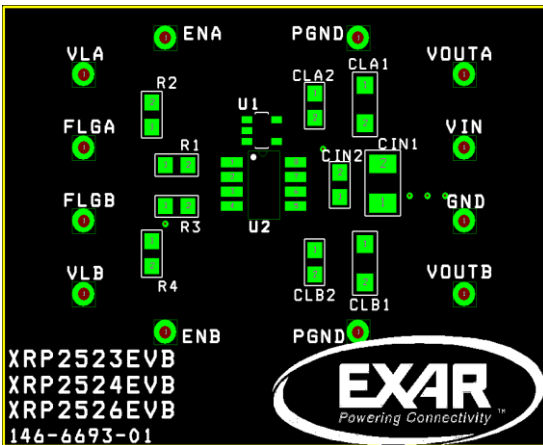


Fig. 18: Component Placement – Top Side

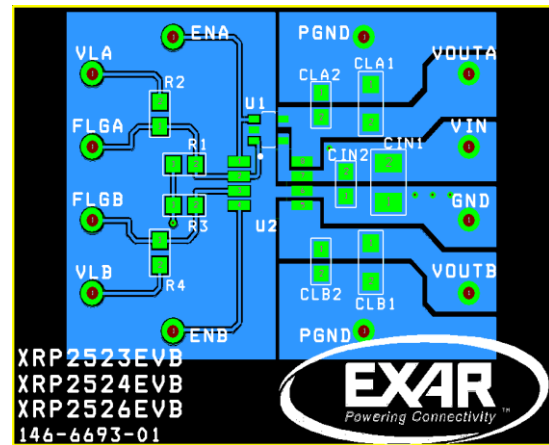


Fig. 19: Top Side Layout

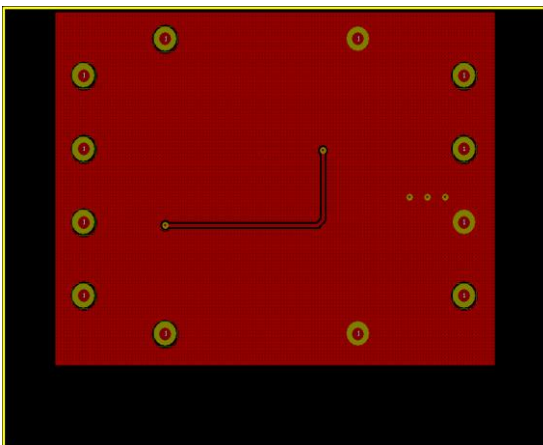


Fig. 20: Bottom Side Layout

**1A Dual Channel USB 3.0 Power Distribution Switch**

**DOCUMENT REVISION HISTORY**

Revision	Date	Description
1.0.0	11/05/2012	Initial release of evaluation board manual

**BOARD REVISION HISTORY**

Board Revision	Date	Description
146-6693-01	10/10/2012	Initial release of evaluation board

**FOR FURTHER ASSISTANCE**

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Exar Technical Documentation:

<http://www.exar.com/TechDoc/default.aspx?>



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