

# UG400: Si53258-EVB User's Guide (Using Si53258-D02-AM-QFN40-EVB)

The Si53258-EVB is used for evaluating the two input, eight output Si53258A-D02AM Automotive grade PCIe Reference Clock Buffer. The Si53258A-D02AM device selects one of two differential input clocks to buffer 8 copies of a 100 MHz HCSL format output clock compliant to PCIe Gen 1/2/3/4/5 common clock and separate reference clock specifications.



#### EVB FEATURES

- Powered from either USB port or external +5V power supply.
- Two differential input clocks to select from for buffering.
- Eight buffered HCSL format differential output clocks.
- Programmable device core VDD supply for operation at 3.3 V, 2.5 V, or 1.8 V.
- Programmable VDDO (output driver) supplies allow each of the clock output banks to have its own power supply voltage selectable from 3.3 V, 2.5 V, or 1.8 V.
- SMA connectors for all output clocks.
- Internal output termination switch selectable for 100  $\Omega$  or 85  $\Omega$  operation.
- Output enable (OE) control switch per output.
- All output trace lengths matched to 10 inches.
- Loss of Signal (LOS) indication LED.

## **Table of Contents**

1.	Functional Block Diagram	•	•	 •	•	•	•	•	•		•	•	•	•	•	•	•	•	•	3
2.	Si53258-EVB Operation	•																		4
	2.1 EVB Configuration: Switches & Jumpers	-																		4
3.	LEDs					•								•						6
4.	Output Clocks		•		•				•					•	•	•				7
5.	Input Clocks		•		•		•	•	•	• •	•			•	•	•			•	8
6.	Si53258-EVB Rev 1.0 Schematics																			9

UG400: Si53258-EVB User's Guide (Using Si53258-D02-AM-QFN40-EVB) • Functional Block Diagram

#### 1. Functional Block Diagram

Below is a functional block diagram of the Si53258-EVB PCIe Buffer Evaluation Board. The +5V required by the EVB can come from a powered USB connection (only +5V is required) or from an external +5V power supply.



Figure 1.1. Si53258-EVB Functional Block Diagram

3

UG400: Si53258-EVB User's Guide (Using Si53258-D02-AM-QFN40-EVB) • Si53258-EVB Operation

#### 2. Si53258-EVB Operation

#### 2.1 EVB Configuration: Switches & Jumpers

#### **Power Supplies:**

DIP switches SW1 – SW7 control the on-board power supplies. The table below is a guide to show how to select output voltages for each supply and the EVB default settings. Jumper JP1 selects the source of the +5V used by all the power supply regulators. JP1 jumper pin 1 to 2 selects USB as power source (default) and pin 2 to 3 selects external +5V source via J21 terminal block (refer to schematic).

Switch Position:		1	2	3	4	
DIP Switch #	Control Function	1.8V*	2.5V*	3.3V*	Enable	EVB Default
SW1	VDDO0	0	1	1	0	Enabled, +1.8V
SW2	VDDO1	0	1	1	0	Enabled, +1.8V
SW3	VDDO2	0	1	1	0	Enabled, +1.8V
SW4	VDDO3	0	1	1	0	Enabled, +1.8V
SW5	VDDO4	0	1	1	0	Enabled, +1.8V
SW6	VDDO5	0	1	1	0	Enabled, +1.8V
SW7	VDD_CORE	NC	1	1	0	Enabled, +1.8V

Note:

• 0 = Switch Position Closed (On)

• 1 = Switch Position Open (Off)

\*Caution: Only 1 voltage select switch position can be 0 (On) at a time. Do not set more than 1 position to On and only change switches with power OFF.

#### **Output Enables, Input Clock Select, Impedance Select:**

DIP switch SW8 is used to control the clock output enables, input clock selection, and output impedance control. There are 4 output enables (OE), one per output clock pair as shown. The input clock select control is 0 to select Input Clock 1, and 1 to select Input Clock 2. The output impedance select is 0 for 100  $\Omega$  and 1 for 85  $\Omega$ . The EVB default setting all outputs enabled, Clock 1 selected, and 85  $\Omega$ .

	1	2	3	4	5	6	7	8			
DIP Switch #	Control Function	OEb_ OUT1:0	OEb_ OUT3:2	OEb_ OUT5:4	OEb_ OUT7:6	NC	NC	CLK_ SEL	IMP_ SEL	EVB Default	
	Output Enables	0	0	0	0	_	_	_	_	All Enabled	
SW8	Clock Select	_	_	_	_	_	_	0	_	Input Clock 1	
	Impedance	_	_	_	_	_	_	_	1	85 Ω	
Note:											
• 0 = Switch Position Closed (On)											

1 = Switch Position Open (Off)

#### Location of DIP Switches:



Figure 2.1. DIP Switches Location

5

UG400: Si53258-EVB User's Guide (Using Si53258-D02-AM-QFN40-EVB) • LEDs

#### 3. LEDs

The Si53258-EVB has 2 LEDs defined below.

D2: Blue LED indicating +5V presence.

D3: Red LED indicating Loss of Signal (LOS). When lit, this LED indicates selected input clock is not present.

UG400: Si53258-EVB User's Guide (Using Si53258-D02-AM-QFN40-EVB) • Output Clocks

#### 4. Output Clocks

The Si53258-EVB supports all 8 differential pair output clocks, each terminated as shown in the figure below. The EVB has locations to install 2 pf parallel termination capacitors if desired, which are tagged with "NI" in schematic to indicate they are not installed by default. The outputs are otherwise direct DC coupled to the SMA connectors. Convenient connection pads are also provided for measuring the output with a differential probe, in which case removal of the 0  $\Omega$  resistors to isolate the SMA "stub" from the transmission line is suggested.



Figure 4.1. Si53258-EVB Output Clock Differential Pair Termination Circuit

UG400: Si53258-EVB User's Guide (Using Si53258-D02-AM-QFN40-EVB) • Input Clocks

#### 5. Input Clocks

The Si53258-EVB supports 2 input clocks (selectable) with input termination as shown below. Each input pair is AC coupled through a 0.1 $\mu$ F capacitor with on-board 50  $\Omega$  AC termination from each leg to GND.



Figure 5.1. Si53258-EVB Input Clock Differential Pair Termination Circuit

#### 6. Si53258-EVB Rev 1.0 Schematics











# SKYWORKS

### **ClockBuilder Pro**

Customize Skyworks clock generators, jitter attenuators and network synchronizers with a single tool. With CBPro you can control evaluation boards, access documentation, request a custom part number, export for in-system programming and more!

www.skyworksinc.com/CBPro



C

**Portfolio** www.skyworksinc.com/ia/timing

www.skyworksinc.com/CBPro



Quality www.skyworksinc.com/quality



Support & Resources www.skyworksinc.com/support

#### Copyright © 2021 Skyworks Solutions, Inc. All Rights Reserved.

Information in this document is provided in connection with Skyworks Solutions, Inc. ("Skyworks") products or services. These materials, including the information contained herein, are provided by Skyworks as a service to its customers and may be used for informational purposes only by the customer. Skyworks assumes no responsibility for errors or omissions in these materials or the information contained herein. Skyworks may change its documentation, products, services, specifications or product descriptions at any time, without notice. Skyworks makes no commitment to update the materials or information and shall have no responsibility whatsoever for conflicts, incompatibilities, or other difficulties arising from any future changes.

No license, whether express, implied, by estoppel or otherwise, is granted to any intellectual property rights by this document. Skyworks assumes no liability for any materials, products or information provided hereunder, including the sale, distribution, reproduction or use of Skyworks products, information or materials, except as may be provided in Skyworks' Terms and Conditions of Sale.

THE MATERIALS, PRODUCTS AND INFORMATION ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, WHETHER EXPRESS, IMPLIED, STATUTORY, OR OTHERWISE, INCLUDING FITNESS FOR A PARTICULAR PURPOSE OR USE, MERCHANTABILITY, PERFORMANCE, QUALITY OR NON-INFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHT; ALL SUCH WARRANTIES ARE HEREBY EXPRESSLY DISCLAIMED. SKYWORKS DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. SKYWORKS SHALL NOT BE LIABLE FOR ANY DAMAGES, INCLUDING BUT NOT LIMITED TO ANY SPECIAL, INDIRECT, INCIDENTAL, STATUTORY, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS THAT MAY RESULT FROM THE USE OF THE MATERIALS OR INFORMATION, WHETHER OR NOT THE RECIPIENT OF MATERIALS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Skyworks products are not intended for use in medical, lifesaving or life-sustaining applications, or other equipment in which the failure of the Skyworks products could lead to personal injury, death, physical or environmental damage. Skyworks customers using or selling Skyworks products for use in such applications do so at their own risk and agree to fully indemnify Skyworks for any damages resulting from such improper use or sale.

Customers are responsible for their products and applications using Skyworks products, which may deviate from published specifications as a result of design defects, errors, or operation of products outside of published parameters or design specifications. Customers should include design and operating safeguards to minimize these and other risks. Skyworks assumes no liability for applications assistance, customer product design, or damage to any equipment resulting from the use of Skyworks products outside of Skyworks' published specifications or parameters.

Skyworks, the Skyworks symbol, Sky5<sup>®</sup>, SkyOne<sup>®</sup>, SkyBlue<sup>™</sup>, Skyworks Green<sup>™</sup>, Clockbuilder<sup>®</sup>, DSPLL<sup>®</sup>, ISOmodem<sup>®</sup>, ProSLIC<sup>®</sup>, and SiPHY<sup>®</sup> are trademarks or registered trademarks of Skyworks Solutions, Inc. or its subsidiaries in the United States and other countries. Third-party brands and names are for identification purposes only and are the property of their respective owners. Additional information, including relevant terms and conditions, posted at www.skyworksinc.com, are incorporated by reference.



# **Mouser Electronics**

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Skyworks: Si53258-A-EVB