

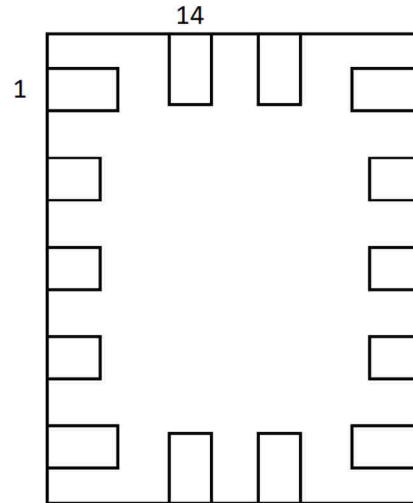
General Description

Dialog SLG4AX42396 is a low power and small form-factor bidirectional interface device for host-side low-speed OSFP standard interfaces based on a Dialog GreenPAK configurable mixed-signal IC. The device is available in a 1.6mm x 2.0mm STQFN package.

Features

- OSFP module specification V1.2 compliant low-speed host side interface support
- Integrated INT/RSTn and HPW/PRSn detection and generation
- Low Power Consumption
- Pb - Free / RoHS Compliant
- Halogen - Free
- STQFN - 14 Package

Pin Configuration



14-pin STQFN (Top View)

Table 1: Other Dialog OSFP Compatible Parts

Part Number	Description
SLG4AC42401	Dual OSFP Low-Speed Host Controller
SLG4AX42396	OSFP Low-Speed Host Controller
SLG4AX42397	OSFP Low-Speed Module Controller

Table 2: Pin name

Pin #	Pin name	Pin #	Pin name
1	VDD	8	GND
2	H_RSTn	9	HPW_PRS
3	H_INTn_invert	10	INT_RSTn
4	H_RSTn_invert	11	HPW
5	H_PRSn_invert	12	H_LPW
6	HPW_invert	13	H_PRSn
7	RST_L	14	H_INTn

Table 3: Ordering Information

Part Number	Package Type
SLG4AX42396V	14-pin STQFN
SLG4AX42396VTR	14-pin STQFN - Tape and Reel (3k units)

Block Diagram

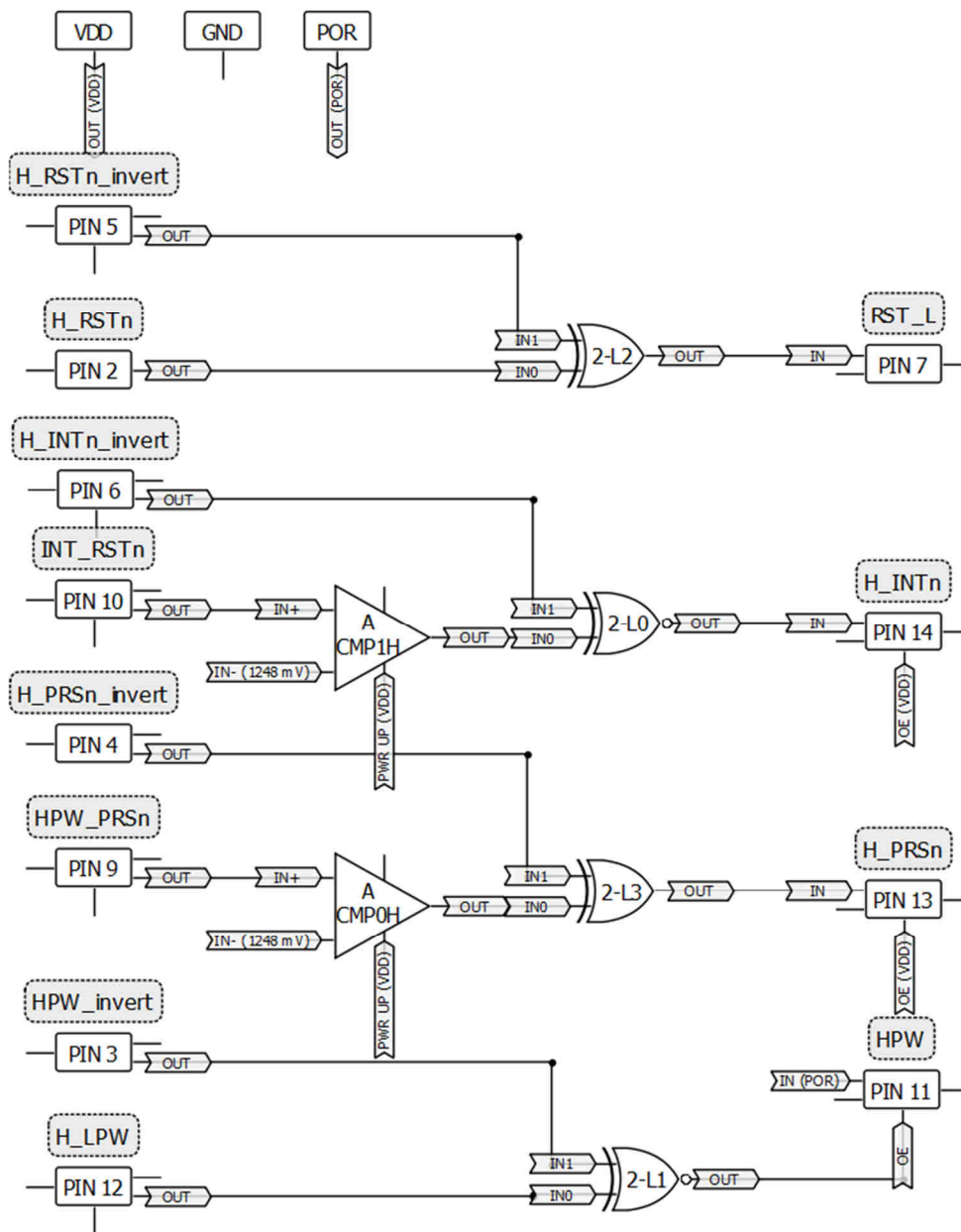


Figure 1. SLG4AX42396 internal block diagram

OSFP Low-Speed Host Controller

Table 4: Pin Configuration

Pin #	Pin Name	Type	Pin Description	Polarity
1	VDD	PWR	Supply Voltage	
2	H_RSTn	Digital Input	Host control to GPAK to assert Module Reset	Active Low
3	H_INTn_invert	Digital Input	Input to invert H_INTn default polarity	N/A
4	H_RSTn_invert	Digital Input	Input to invert H_RSTn default polarity	N/A
5	H_PRSn_invert	Digital Input	Input to invert H_PRSn default polarity	N/A
6	HPW_invert	Digital Input	Input to invert HPW default polarity	N/A
7	RST_L	Digital Output	Output to drive INT_RSTn line to reset the Module	Active Low
8	GND	GND	Ground	
9	HPW_PRS	Analog Input/Output	OSFP slow speed signal	
10	INT_RSTn	Analog Input/Output	OSFP slow speed signal	
11	HPW	Digital Output	Output to drive HPW_PRSn line to High Power Mode	Active High
12	H_LPW	Digital Input	Host control to GPAK to assert Module Low Power Mode	Active High
13	H_PRSn	Digital Output	Signal to Host that Module is Present	Active Low
14	H_INTn	Digital Output	Signal to Host that Module sent Interrupt	Active Low

Table 5: Absolute Maximum Conditions

Symbol	Parameter	Min.	Max.	Unit
V _{DD}	Supply voltage to GND	-0.3	7	V
V _I	Voltage at Input Pin	-0.3	7	V
I _{MAX}	Maximum Average or DC Current (Through V _{DD} or GND pin)	--	90	mA
I _{Ikg}	Input leakage Current (Absolute Value)	--	1.0	μA
T _{STRG}	Storage Temperature Range	-65	150	°C
T _J	Junction Temperature	--	150	°C
T _{AMB}	Ambient operating temperature	-40	+85	°C
ESD	ESD Protection (Human Body Model)	±2000	--	V
	ESD Protection (Charged Device Model)	±1300	--	V
MSL	Moisture Sensitivity Level	1		

Table 6: Electrical Characteristics

Symbol	Parameter	Condition/Note	Min.	Typ.	Max.	Unit
V _{DD}	Supply Voltage		3	3.3	3.6	V
C _{IN}	Input Capacitance		--	4	--	pF
I _Q	Quiescent Current	Static inputs and floating outputs	--	57	--	μA
V _{IH}	HIGH-Level Input Voltage	Logic Input at V _{DD} =3.3V	0.7*V _{DD}	--	V _{DD} +0.3	V
V _{IL}	LOW-Level Input Voltage	Logic Input at V _{DD} =3.3V	GND-0.3	--	0.3*V _{DD}	V
V _{OH}	HIGH-Level Output Voltage	Push-Pull 1X, I _{OH} =3mA at V _{DD} =3.3V	2.7	--	--	V
V _{OL}	LOW-Level Output Voltage	Push-Pull 1X, I _{OL} =3mA, at V _{DD} =3.3V	--	--	0.16	V
I _{OH}	HIGH-Level Output Current (Note 1)	Push-Pull 1X, V _{OH} =2.4V at V _{DD} =3.3V	5.29	--	--	mA
I _{OL}	LOW-Level Output Current (Note 1)	Push-Pull 1X, V _{OL} =0.4V, at V _{DD} =3.3V	4.68	--	--	mA
		Open Drain NMOS 1X, V _{OL} =0.4V, at V _{DD} =3.3V	12.07	--	--	mA
R _{PULL_UP}	Internal Pull Up Resistance	Pull up on PINs 12	6	--	14	kΩ
R _{PULL_DOWN}	Internal Pull Down Resistance	Pull down on PIN 2	6	--	14	kΩ
V _{ACMP}	Analog Comparator 2 and 3 Threshold Voltage	Low to High transition, at temperature -40 +85°C (Note 3)	--	2496	--	mV

OSFP Low-Speed Host Controller

Symbol	Parameter	Condition/Note	Min.	Typ.	Max.	Unit
T _{SU}	Startup Time	From VDD rising past P _{ON} THR	--	1	2	ms
P _{ON} THR	Power On Threshold	V _{DD} Level Required to Start Up the Chip	1.6	1.85	2.05	V
P _{OFF} THR	Power Off Threshold	V _{DD} Level Required to Switch Off the Chip	0.85	1.25	1.5	V

Note:

1. DC or average current through any pin should not exceed value given in Absolute Maximum Conditions.
2. The GreenPAK's power rails are divided in two sides.
3. Guaranteed by Design.

Description

The SLG4AX42396 OSFP Low-Speed Host Controller device contains one pair of INT_RSTn and HPW_PRS signals transceivers.

INT_RSTn is a bi-directional dual function signal that allows the module to raise an interrupt to the host and allows the host to reset the module. The link uses multi-level signaling to provide direct signal control in both directions. The host signals a RESET to the module when M_RSTn is asserted low. The module (SLG4AX42397) signals an interrupt to the host when M_INT_L is asserted low.

HPW_PRS is another bi-directional dual function signal that allows the host to signal Low Power mode and the module (SLG4AX42397) to indicate Module Present using multi-level signaling to provide direct signal control in both directions. The host signals the module to enter the low power state when M_RSTn is asserted low.

For ease of system use, four invert input pins have been added to invert the default polarity of output signals. Refer to Table 7.

Table 7: Output Polarity Control

Invert Pin Name	Status	Output Polarity
H_INTn_invert	Low	Active Low
	High	Active High
H_RSTn_invert	Low	Active Low
	High	Active High
H_PRSn_invert	Low	Active Low
	High	Active High
HPW_invert	Low	Active High
	High	Active Low

Table 8: Other Dialog OSFP Compatible Parts

Part Number	Description
SLG4AC42401	Dual OSFP Low-Speed Host Controller
SLG4AX42396	OSFP Low-Speed Host Controller
SLG4AX42397	OSFP Low-Speed Module Controller

Typical Application Circuit

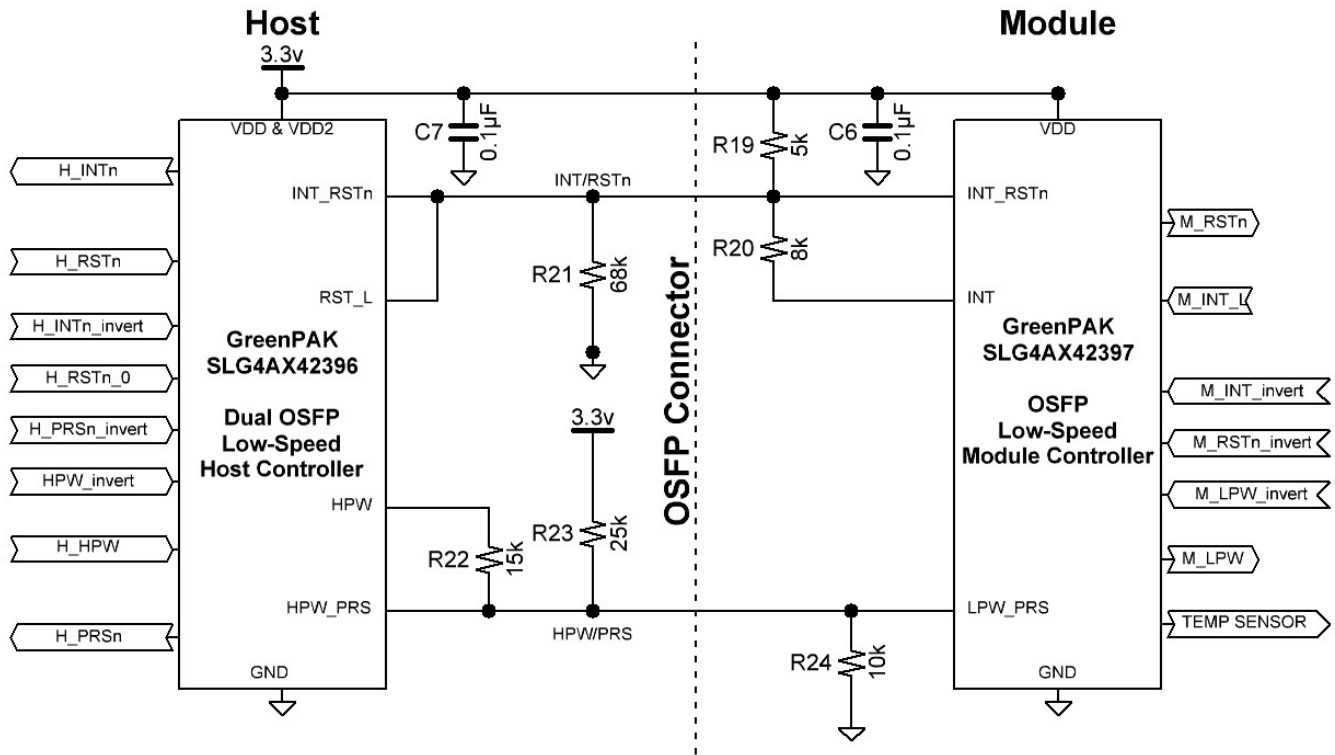


Figure 2: SLG4AX42396 Typical Application Circuit

Package Top Marking

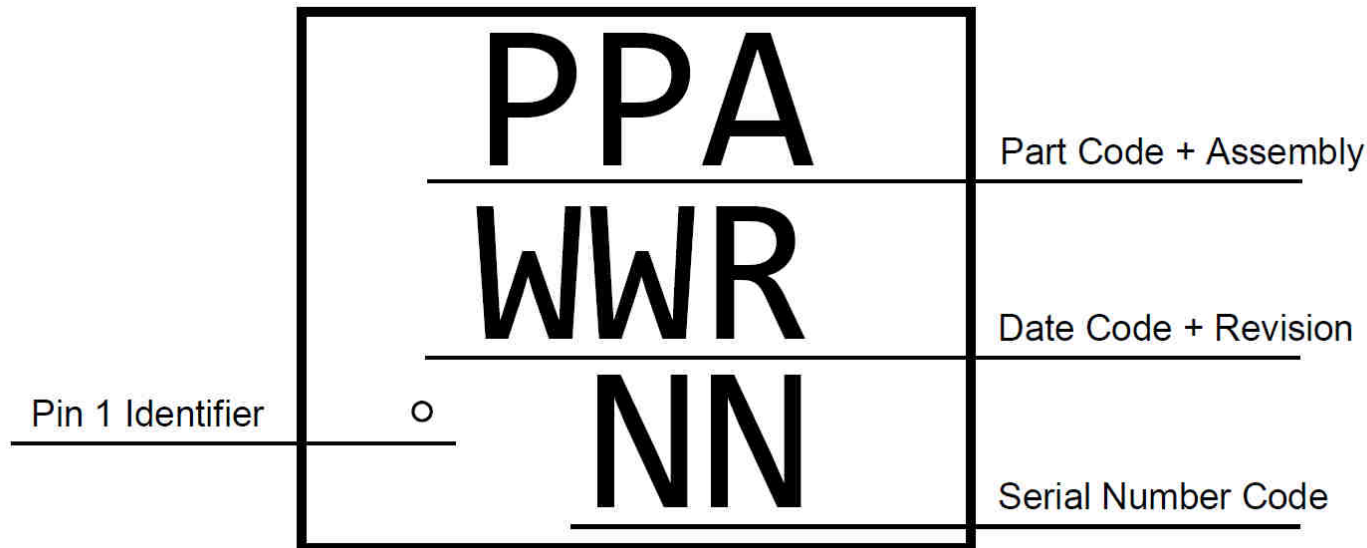


Figure 3. Package Top Marking

Table 9: Part Information

Datasheet Revision	Programming Code Number	Locked Status	Checksum	Part Code	Revision	Date
0.11	004	U	0xAF238603			07/25/2018

Lock coverage for this part is indicated by √, from one of the following options:

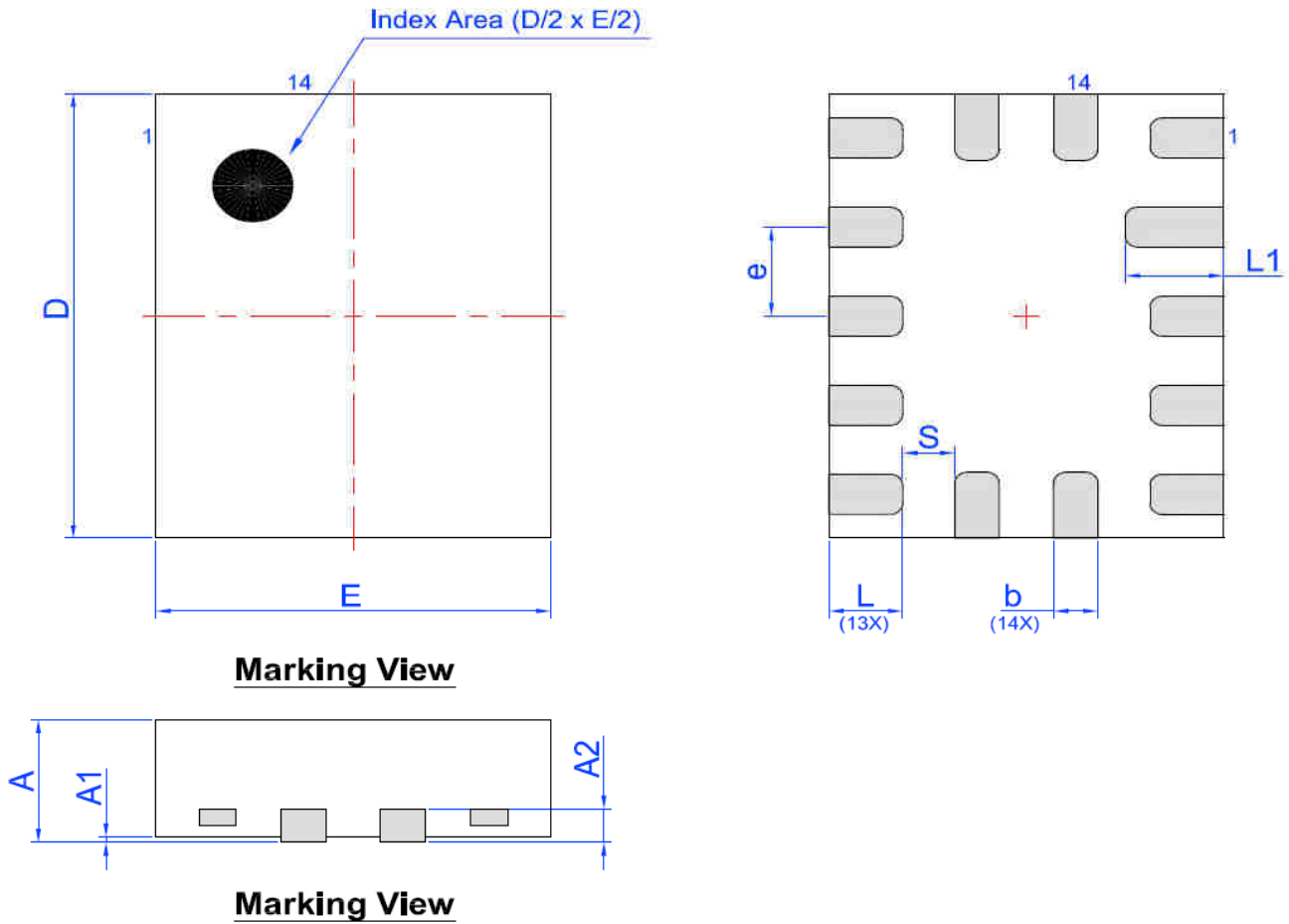
Table 10: Lock Status

Lock Status	
X	Unlocked
	Partly lock read (mode 1)
	Partly lock read2 (mode 2)
	Partly lock read2/write (mode 3)
	All lock read (mode 4)
	All lock write (mode 5)
	All lock read/write (mode 6)

The IC security bit is locked/set for code security for production unless otherwise specified. Revision number is not changed for bit locking.

Package Drawing and Dimensions

STQFN 14L 1.6 x 2.0 x 0.55 mm 0.4P FC Package
 IC Net Weight: TBD g



Unit: mm

Symbol	Min	Nom.	Max	Symbol	Min	Nom.	Max
A	0.50	0.55	0.60	D	1.95	2.00	2.05
A1	0.005	-	0.050	E	1.55	1.60	1.65
A2	0.10	0.15	0.20	L	0.25	0.30	0.35
b	0.13	0.18	0.23	L1	0.35	0.40	0.45
e	0.40 BSC			S	0.21 REF		

Figure 4. SLG4AX42396 Package Drawing and Dimensions

OSFP Low-Speed Host Controller

Table 11: Tape and Reel Specification

Package Type	Nominal Package Size [mm]	Max Units		Reel & Hub Size [mm]	Leader (min)		Trailer (min)		Tape Width [mm]	Part Pitch [mm]
		per Reel	per Box		Pockets	Length [mm]	Pockets	Length [mm]		
STQFN 14L 1.6x2mm 0.4P FC Green	1.6x2.0x0.55	3000	3000	178 / 60	100	400	100	400	8	4

Table 12: Carrier Tape Drawing and Dimensions

Package Type	Pocket BTM Length	Pocket BTM Width	Pocket Depth	Index Hole Pitch	Pocket Pitch	Index Hole Diameter	Index Hole to Tape Edge	Index Hole to Pocket Center	Tape Width
	A0	B0	K0	P0	P1	D0	E	F	W
STQFN 14L 1.6x2 mm 0.4P FC Green	1.9	2.3	0.76	4	4	1.5	1.75	3.5	8

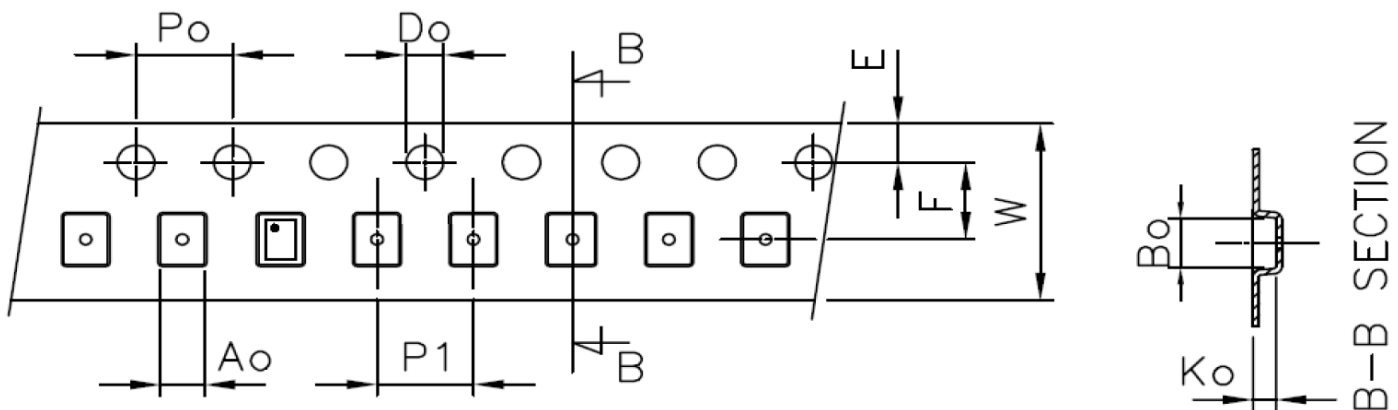
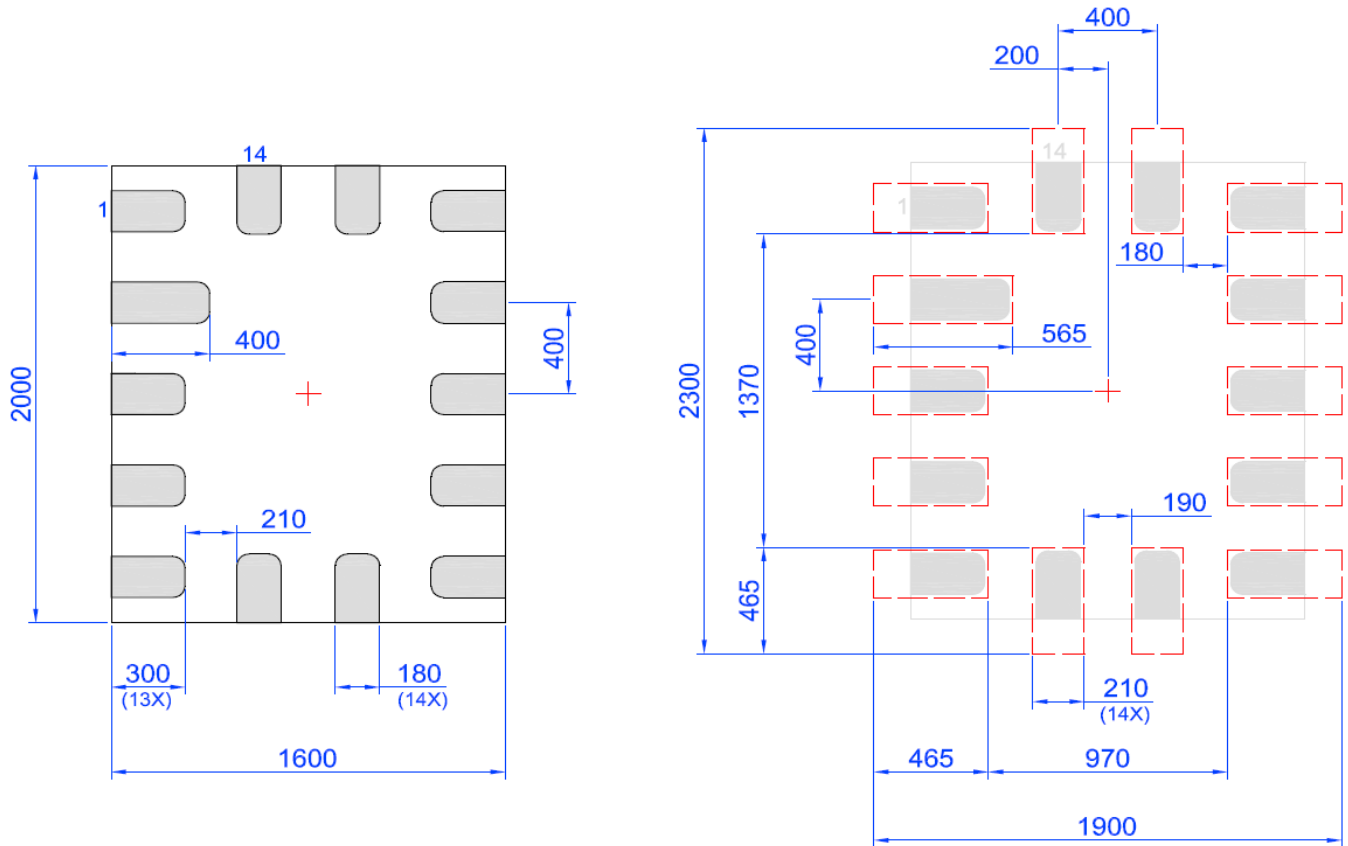


Figure 5. Tape Dimensions

Recommended Reflow Soldering Profile

Please see IPC/JEDEC J-STD-020: latest revision for reflow profile based on package volume of 2.64 mm³ (nominal) for STQFN 14L Package. More information can be found at www.jedec.org.

Recommended Land Pattern



Unit: um

Figure 6. SLG4AX42396 Recommended Land Pattern

Table 13: Datasheet Revision History

Date	Version	Change
03/30/2018	0.10	New design for SLG46855 chip
07/25/2018	0.11	Updated DS formatting

Disclaimer

Information in this document is believed to be accurate and reliable. However, Dialog Semiconductor does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information. Dialog Semiconductor furthermore takes no responsibility whatsoever for the content in this document if provided by any information source outside of Dialog Semiconductor.

Dialog Semiconductor reserves the right to change without notice the information published in this document, including without limitation the specification and design of the related semiconductor products, software and applications.

Applications, software, and semiconductor products described in this document are for illustrative purposes only. Dialog Semiconductor makes no representation or warranty that such applications, software and semiconductor products will be suitable for the specified use without further testing or modification. Unless otherwise agreed in writing, such testing or modification is the sole responsibility of the customer and Dialog Semiconductor excludes all liability in this respect. Customer notes that nothing in this document may be construed as a license for customer to use the Dialog Semiconductor products, software and applications referred to in this document. Such license must be separately sought by customer with Dialog Semiconductor.

All use of Dialog Semiconductor products, software and applications referred to in this document are subject to Dialog Semiconductor's [Standard Terms and Conditions of Sale](http://www.dialog-semiconductor.com), available on the company website (www.dialog-semiconductor.com) unless otherwise stated.

Dialog and the Dialog logo are trademarks of Dialog Semiconductor plc or its subsidiaries. All other product or service names are the property of their respective owners.
© 2018 Dialog Semiconductor. All rights reserved.

RoHS Compliance

Dialog Semiconductor's suppliers certify that its products are in compliance with the requirements of Directive 2011/65/EU of the European Parliament on the restriction of the use of certain hazardous substances in electrical and electronic equipment. RoHS certificates from our suppliers are available on request

Contacting Dialog Semiconductor

United Kingdom (Headquarters)

Dialog Semiconductor (UK) LTD
Phone: +44 1793 757700

North America

Dialog Semiconductor Inc.
Phone: +1 408 845 8500

Hong Kong

Dialog Semiconductor Hong Kong
Phone: +852 2607 4271

China (Shenzhen)

Dialog Semiconductor China
Phone: +86 755 2981 3669

Germany

Dialog Semiconductor GmbH
Phone: +49 7021 805-0

Japan

Dialog Semiconductor K. K.
Phone: +81 3 5769 5100

Korea

Dialog Semiconductor Korea
Phone: +82 2 3469 8200

China (Shanghai)

Dialog Semiconductor China
Phone: +86 21 5424 9058

The Netherlands

Dialog Semiconductor B.V.
Phone: +31 73 640 8822

Taiwan

Dialog Semiconductor Taiwan
Phone: +886 281 786 222

Email:

enquiry@diasemi.com

Web site:

www.dialog-semiconductor.com