

SLD1023S - January 19, 2018

Item # SLD1023S was discontinued on January 19, 2018. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

SUPERLUMINESCENT DIODES (SLDS)

- ▶ Broadband Emission Centered at 830, 1050, 1280, 1310, 1325, or 1550 nm
- ▶ Near-Gaussian Spectrum
- ▶ Low Ripple
- ▶ Butterfly Package



SLD1018S
Butterfly Package



SLD1550S-A2
Superluminescent Diode
Mounted in a CLD1015 Compact
Laser Diode Driver with TEC

OVERVIEW

Features

- Center Wavelength at 830, 1050, 1280, 1310, 1325, or 1550 nm
- Typical 3 dB Bandwidths Ranging from 20 to 110 nm
- 14-Pin Butterfly Package
- Pigtailed with at Least 1 m of SM or PM Fiber
- 2.0 mm Narrow Key FC/APC Connector
- Integrated TEC and Thermistor

Recommended Controller / Mount Options

Item #	Mount	Diode Driver	TEC Controller
CLD1015	✓	✓	✓
LM14S2	✓	-	-
ITC4000 Series	Use with LM14S2 Mount	✓	✓
LDC200 Series	Use with LM14S2 Mount	✓	-
TED200C	Use with LM14S2 Mount	-	✓

Superluminescent Diodes (SLDs) are excellent high-power, broadband light sources that are ideal for use in applications such as Optical Coherence Tomography (OCT) Imaging Systems and Fiber Optic Gyroscopes (FOG). The butterfly-packaged SLDs offered here are indium phosphide (InP) devices manufactured by Thorlabs' Quantum Electronics (TQE).

Each device is built into a 14-pin butterfly package with an integrated thermoelectric cooler (TEC) and thermistor to ensure output stability. The output is coupled into an SM or PM fiber terminated with a 2.0 mm narrow key FC/APC connector. Raw test data for each SLD is also available upon request; please contact Tech Support with inquiries.

Thorlabs is able to provide low-ripple SLDs with custom wavelengths or higher power diodes. Please note that the engineering design and wafer manufacturing costs involved make the purchase of low quantities very costly. For a quote on custom SLDs, please contact Tech Support.

A selection of the SLDs sold here are also available as benchtop sources. For more information, see the *Selection Guide* tab.

SPECS

The center wavelength with these devices is defined by an average weighted by the relative amplitude and may not correspond to peak power or the FWHM center wavelength due to the variability of the spectrum shape. For a given Optical Spectrum Analyzer (OSA) trace:

$$CW = \frac{\sum X_i Y_i}{\sum Y_i}$$

where

- X_i is the Wavelength of a Trace Data Point
- Y_i is the Amplitude of a Trace Data Point
- CW is the Specified Center Wavelength

The ASE power is the output from the fiber pigtail.

830 nm Superluminescent Diodes

Item #	SLD830S-A10			SLD830S-A20		
	Min	Typ.	Max	Min	Typ.	Max
Operating Current	-	-	150 mA	-	-	200 mA
Center Wavelength	820 nm	830 nm	840 nm	820 nm	830 nm	840 nm
ASE Power ^a	10 mW	13 mW	-	20 mW	22 mW	-
Optical 3 dB Bandwidth (nm) ^a	17 nm	20 nm	-	17 nm	20 nm	-
Optical 20 dB Bandwidth ^a	-	50 nm	-	-	50 nm	-
RMS Gain Ripple ^a (Click for Plot)	-	0.03 dB	0.15 dB	-	0.03 dB	0.15 dB
Forward Voltage ^a	-	2.0 V	2.5 V	-	2.0 V	2.5 V
Fiber Type	780HP			780HP		
TEC Operation: Typ. / Max @ T_{CASE} = 25 °C / 70 °C						
TEC Current	-	0.1 A	1.5 A	-	0.1 A	1.5 A
TEC Voltage	-	0.13 V	4.0 V	-	0.13 V	4.0 V
Thermistor Resistance	-	10 kΩ	-	-	10 kΩ	-

- a. At Operating Current

1050 nm Superluminescent Diodes

Item #	SLD1050x		
	Min	Typ.	Max
Operating Current	-	-	300 mA
Center Wavelength	1030 nm	1050 nm	1070 nm
ASE Power ^a	6 mW	8 mW	-
Optical 3 dB Bandwidth ^a	40 nm	50 nm	-
RMS Gain Ripple ^a	-	0.1 dB	0.25 dB
Forward Voltage ^a	-	2.0 V	2.5 V
Fiber Type	HI1060 (SLD1050S) Corning PM 98-U25A (SLD1050P)		
TEC Operation: Typ. / Max @ T_{CASE} = 25 °C / 65 °C			
TEC Current	-	0.25 A	1.5 A
TEC Voltage	-	0.30 V	4.0 V
Thermistor Resistance	-	10 kΩ	-

- a. Operating Current = 300 mA

1280 nm Superluminescent Diode

Item #	SLD1023S		
	Min	Typ.	Max
Operating Current	-	600 mA	800 mA
Center Wavelength	1270 nm	1280 nm	1290 nm
ASE Power	10 mW	15 mW	-
Optical 3 dB Bandwidth	40 nm	45 nm	-
RMS Gain Ripple ^a	-	-	0.35 dB
Forward Voltage ^b	-	1.4 V	2.0 V
Fiber Type	SMF-28e+		
TEC Operation: Typ. / Max @ T_{CASE} = 25 °C / 65 °C			
TEC Current	-	0.3 A	1.5 A
TEC Voltage	-	0.6 V	3.5 V
Thermistor Resistance	-	10 kΩ	-

- a. At Operating Current; Res. BW = 0.1 nm
- b. At Operating Current

1310 nm Superluminescent Diodes

Item #	SLD1021S	SLD1018x

Parameter	Min	Typ.	Max	Min	Typ.	Max
Operating Current	-	700 mA	900 mA	-	600 mA	800 mA
Center Wavelength	1290 nm	-	1330 nm	1290 nm	-	1330 nm
ASE Power	10 mW	12.5 mW	-	22 mW	30 mW	-
Optical 3 dB Bandwidth	80 nm	85 nm	-	40 nm	45 nm	-
RMS Gain Ripple ^a	-	0.1 dB	0.35 dB	-	0.1 dB	0.35 dB
Forward Voltage ^b	-	1.55 V	2.0 V	-	1.5 V	1.8 V
Fiber Type	SMF-28e+			SMF-28e+ (SLD1018S) Corning PM 13-U25A (SLD1018P)		
TEC Operation: Typ. / Max @ T_{CASE} = 25 °C / 65 °C						
TEC Current	-	0.4 A	1.5 A	-	0.3 A	1.5 A
TEC Voltage	-	0.5 V	4 V	-	0.5 V	4 V
Thermistor Resistance	-	10 kΩ	-	-	10 kΩ	-

- a. At Operating Current; Res. BW = 0.1 nm
- b. At Operating Current

1325 nm Superluminescent Diode

Item #	SLD1325		
Parameter	Min	Typ.	Max
Operating Current	-	-	780 mA
Center Wavelength	-	1325 nm	-
ASE Power	10 mW	-	-
Optical 3 dB Bandwidth	100 nm	-	-
RMS Gain Ripple	-	-	-
Forward Voltage	-	-	4 V
Fiber Type	SMF-28e		
Operating Temperature Range	0 to 40 °C		
TEC Operation			
TEC Current	-	-	4 A
TEC Voltage	-	-	4 V
Thermistor Resistance ^a	-	-	10 kΩ
Integrated Isolator			
Isolation	30 dB	-	-

- a. Steinhart-Hart Coefficients: C₁ = 1.1291, C₂ = 2.3413, and C₃ = 0.8767

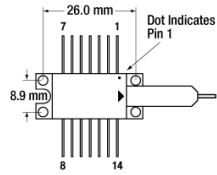
1550 nm Superluminescent Diodes

Item #	SLD1550x-A2			SLD1550x-A1			SLD1550x-A40			SLD1005S		
	Min	Typ.	Max	Min	Typ.	Max	Min	Typ.	Max	Min	Typ.	Max
Operating Current	-	550 mA	600 mA	-	450 mA	500 mA	-	750 mA	900 mA	-	600 mA	800 mA
Center Wavelength	1520 nm	1550 nm	1580 nm	1520 nm	1550 nm	1580 nm	1530 nm	1550 nm	1570 nm	1530 nm	1550 nm	1570 nm
ASE Power	2.0 mW	2.5 mW	-	0.75 mW	1.0 mW	-	35 mW	40 mW	-	20 mW	22 mW	-
Optical 3 dB Bandwidth	85 nm	90 nm	-	100 nm	110 nm	-	30 nm	33 nm	-	45 nm	50 nm	-
RMS Gain Ripple ^a	-	-	0.25 dB	-	-	0.1 dB	-	0.2 dB	0.35 dB	-	0.2 dB	0.35 dB
Forward Voltage ^b	-	1.6 V	2.0 V	-	1.6 V	2.0 V	-	1.4 V	1.8 V	-	1.4 V	1.8 V
Fiber Type	SMF-28e+ (SLD1550S-A2) Corning PM 15-U40A (SLD1550P-A2)			SMF-28e+ (SLD1550S-A1) Corning PM 15-U40A (SLD1550P-A1)			SMF-28e+ (SLD1550S-A40) Corning PM 15-U40A (SLD1550P-A40)			SMF-28e+		
TEC Operation: Typ. / Max @ T_{CASE} = 25 °C / 65 °C												
TEC Current	-	0.3 A	1.5 A	-	0.3 A	1.5 A	-	0.3 A	1.5 A	-	0.3 A	1.5 A
TEC Voltage	-	0.3 V	3.5 V	-	0.3 V	3.5 V	-	0.3 V	3.5 V	-	0.3 V	3.5 V
Thermistor Resistance	-	10 kΩ	-	-	10 kΩ	-	-	10 kΩ	-	-	10 kΩ	-

- a. At Operating Current; Res. BW = 0.1 nm
- b. At Operating Current

PACKAGE DIAGRAM

Butterfly Package, Type 1



Pin	Description	Pin	Description
1	+ TEC	14	- TEC
2	Thermistor	13	Case
3	NC	12	NC
4	NC	11	SLD Cathode
5	Thermistor	10	SLD Anode
6	NC	9	NC
7	NC	8	NC

SELECTION GUIDE

Superluminescent Diode Performance:

Item #	Center Wavelength ^a	Output Power	Bandwidth (3 dB)	Optical Spectrum	LIV Curves ^b	Benchtop Source
SLD830S-A10	830 nm	13 mW	20 nm			N/A
SLD830S-A20	830 nm	22 mW	20 nm			N/A
SLD1050S	1050 nm	8 mW	50 nm			N/A
SLD1050P	1050 nm	8 mW	50 nm			N/A
SLD1023S	1280 nm	15 mW	45 nm			N/A
SLD1021S	1310 nm	12.5 mW	85 nm			S5FC1021S
SLD1018x	1310 nm	30 mW	45 nm			S5FC1018S S5FC1018P
SLD1325	1325 nm	10 mW	100 nm (Min)			N/A
SLD1550x-A1	1550 nm	1.0 mW	110 nm			N/A
SLD1550x-A2	1550 nm	2.0 mW	90 nm			S5FC1550S-A2 S5FC1550P-A2
SLD1005S	1550 nm	22 mW	50 nm			S5FC1005S
SLD1550x-A40	1550 nm	40 mW	33 nm			N/A

- a. The center wavelength with these devices is defined by an average weighted by the relative amplitude and will not correspond to peak power or the FWHM center wavelength due to the variability of the spectrum shape.
- b. Basic laser diode operating characteristics can be measured by increasing current (I) while measuring the device voltage (V) and light output (L). The resulting data is usually referred to as an LIV curve.

830 nm Superluminescent Diodes

In order to support OCT imaging applications, these SLDs are designed with a low gain ripple no larger than 0.15 dB (RMS) and a typical ripple value 0.03 dB (RMS). More information on Thorlabs' SLDs for OCT systems can be found here.





Item #	SLD830S-A10			SLD830S-A20		
	Min	Typical	Max	Min	Typical	Max
Operating Current (mA)	-	-	150	-	-	200
Center Wavelength (nm) ^b	820	830	840	820	830	840
ASE Power (mW) ^{c,d}	10	13	-	20	22	-
3 dB Optical Bandwidth (nm) ^c	17	20	-	17	20	-
20 dB Optical Bandwidth (nm) ^c	-	50	-	-	50	-
RMS Gain Ripple (dB) (Click for Plot) ^c	-	0.03	0.15	-	0.03	0.15
Output Spectrum (Click to Enlarge)						
LIV Plot (Click to Enlarge)						
Fiber Type	780HP			780HP		

- a. Full specifications are available by clicking on the Specs tab above.
- b. The center wavelength with these devices is defined by an average weighted by the relative amplitude and may not correspond to peak power or the FWHM center wavelength due to the variability of the spectrum shape.
- c. At Operating Current
- d. Corresponds to the output of the fiber pigtail.

Part Number	Description	Price	Availability
SLD830S-A10	13 mW SLD, CWL = 830 nm, FWHM = 20 nm, Butterfly Pkg, SM Fiber, FC/APC	\$1,721.76	Today

SLD830S-A20	22 mW SLD, CWL = 830 nm, FWHM = 20 nm, Butterfly Pkg, SM Fiber, FC/APC	\$2,033.88	Today
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

1050 nm Superluminescent Diodes

Item #	SLD1050S			SLD1050P		
	Min	Typ	Max	Min	Typ	Max
Parameter ^a						
Operating Current (mA)	-	-	300	-	-	300
Center Wavelength (nm) ^b	1030	1050	1070	1030	1050	1070
ASE Power (mW)	6	8	-	6	8	-
Optical 3 dB Bandwidth (nm)	40	50	-	40	50	-
Output Spectrum (Click to Enlarge)						
LIV Plot (Click to Enlarge)						
Fiber Type	HI1060			Corning PM 98-U25A ^c		

- a. Full specifications are available by clicking on the Specs tab above.
- b. The center wavelength with these devices is defined by an average weighted by the relative amplitude and will not correspond to peak power or the FWHM center wavelength due to the variability of the spectrum shape.
- c. The connector key is aligned to the slow axis of the PM fiber.

Part Number	Description	Price	Availability
SLD1050S	8 mW SLD, CWL = 1050 nm, FWHM = 50 nm, Butterfly Pkg, SM Fiber, FC/APC	\$1,627.92	Today
SLD1050P	8 mW SLD, CWL = 1050 nm, FWHM = 50 nm, Butterfly Pkg, PM Fiber, FC/APC	\$1,783.98	Today





1280 nm Superluminescent Diode

Item #	SLD1023S		
Parameter ^a	Min	Typ	Max
Operating Current (mA)	-	600	800
Center Wavelength (nm) ^b	1270	1280	1290
ASE Power (mW)	10	15	-
Optical 3 dB Bandwidth (nm)	40	45	-
Output Spectrum (Click to Enlarge)			
LIV Plot (Click to Enlarge)			
Fiber Type	SMF-28e+		

- a. Full specifications are available by clicking on the Specs tab above.
- b. The center wavelength is defined as an average weighted by the relative amplitude and will not correspond to peak power or the FWHM center wavelength due to the variability of the spectrum shape.

Part Number	Description	Price	Availability
SLD1023S	15 mW SLD, CWL 1280 nm, FWHM = 45 nm, Butterfly Pkg, SM Fiber, FC/APC	\$2,326.62	Today

1310 nm Superluminescent Diodes

Item #	SLD1021S			SLD1018x		
	Min	Typ	Max	Min	Typ	Max
Parameter ^a						
Operating Current (mA)	-	700	900	-	600	800
Center Wavelength (nm) ^b	1290	-	1330	1290	-	1330
ASE Power (mW)	10	12.5	-	22	30	-
Optical 3 dB Bandwidth (nm)	80	85	-	40	45	-
Output Spectrum (Click to Enlarge)						
LIV Plot (Click to Enlarge)						
Fiber Type	SMF-28e+			SMF-28e+ (SLD1018S) Corning PM 13-U25A (SLD1018P) ^c		
Benchtop Version	S5FC1021S			S5FC1018S S5FC1018P		

- a. Full specifications are available by clicking on the Specs tab above.



The center wavelength with these devices is defined by an average weighted by the relative amplitude and will not correspond to peak power or the FWHM center wavelength due to the variability of the spectrum shape.

- b. The connector key is aligned to the slow axis of the PM fiber.

Part Number	Description	Price	Availability
SLD1021S	12.5 mW SLD, CWL 1310 nm, FWHM = 85 nm, Butterfly Pkg, SM Fiber, FC/APC	\$2,003.28	Today
SLD1018S	30 mW SLD, CWL 1310 nm, FWHM = 45 nm, Butterfly Pkg, SM Fiber, FC/APC	\$2,326.62	Lead Time
SLD1018P	30 mW SLD, CWL 1310 nm, FWHM = 45 nm, Butterfly Pkg, PM Fiber, FC/APC	\$2,482.68	Today

1325 nm Superluminescent Diode









The SLD1325 is designed to have a broad bandwidth of >100 nm for improved resolution when used in Spectral Domain Optical Coherence Tomography (SD-OCT) systems. This SLD is packaged with an integrated TEC and thermistor for temperature control, as well as an optical isolator for enhanced optical stability. More information on Thorlabs' SLDs for OCT systems can be found here.

Item #	SLD1325		
Parameter ^a	Min	Typ	Max
Operating Current (mA)	-	-	780
Center Wavelength (nm) ^b	-	1325	-
ASE Power (mW)	10	-	-
Optical 3 dB Bandwidth (nm)	100	-	-
Output Spectrum (Click to Enlarge)			
LIV Plot (Click to Enlarge)			
Fiber Type	SMF-28e		
Integrated Optical Isolator			
Isolation (dB)	30	-	-

- a. Full specifications are available by clicking on the Specs tab above.
- b. The center wavelength with these devices is defined by an average weighted by the relative amplitude and will not correspond to peak power or the FWHM center wavelength due to the variability of the spectrum shape.

Part Number	Description	Price	Availability
SLD1325	10 mW (Min) SLD, CWL = 1325 nm, FWHM = 100 nm (Min), Butterfly Pkg, SM Fiber, FC/APC	\$3,452.70	Today

1550 nm Superluminescent Diodes

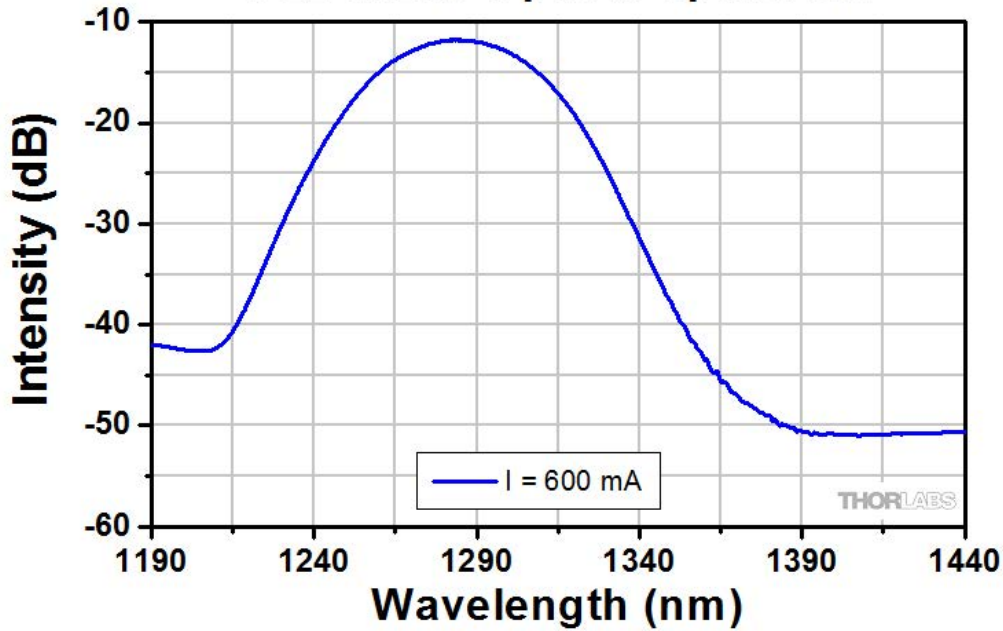
Item #	SLD1550x-A1			SLD1550x-A2			SLD1005S			SLD1550x-A40		
Parameter ^a	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max
Operating Current (mA)	-	450	500	-	550	600	-	600	800	-	750	900
Center Wavelength (nm) ^b	1520	1550	1580	1520	1550	1580	1530	1550	1570	1530	1550	1570
ASE Power (mW)	0.75	1.0	-	2.0	2.5	-	20	22	-	35	40	-
Optical 3 dB Bandwidth (nm)	100	110	-	85	90	-	45	50	-	30	33	-
Output Spectrum (Click to Enlarge)												
LIV Plot (Click to Enlarge)												
Fiber Type	SMF-28e+ (SLD1550S-A1 and SLD1550S-A2) Corning PM 15-U40A (SLD1550P-A1 and SLD1550P-A2) ^c						SMF-28e+			SMF-28e+ (SLD1550S-A40) Corning PM 15-U40A (SLD1550P-A40) ^c		
Benchtop Version	N/A			S5FC1550S-A2 S5FC1550P-A2			S5FC1005S			N/A		

- a. Full specifications are available by clicking on the Specs tab above.
- b. The center wavelength with these devices is defined by an average weighted by the relative amplitude and will not correspond to peak power or the FWHM center wavelength due to the variability of the spectrum shape.
- c. The connector key is aligned to the slow axis of the PM fiber.

Part Number	Description	Price	Availability
SLD1550S-A1	1.0 mW SLD, CWL=1550 nm, FWHM = 110 nm, Butterfly Package, SM Fiber, FC/APC	\$1,564.68	Today
SLD1550P-A1	1.0 mW SLD, CWL=1550 nm, FWHM = 110 nm, Butterfly Package, PM Fiber, FC/APC	\$1,700.34	Today
SLD1550S-A2	2.5 mW SLD, CWL=1550 nm, FWHM = 90 nm Butterfly Package, SM Fiber, FC/APC	\$1,564.68	Today

SLD1550P-A2	2.5 mW SLD, CWL=1550 nm, FWHM = 90 nm, Butterfly Package, PM Fiber, FC/APC	\$1,700.34	Today
SLD1005S	22 mW SLD, CWL= 1550 nm, FWHM = 50 nm, Butterfly Pkg, SM Fiber, FC/APC	\$1,815.60	Today
SLD1550S-A40	Customer Inspired!40 mW SLD, CWL=1550 nm, FWHM = 33 nm, Butterfly Package, SM Fiber, FC/APC	\$2,055.30	Today
SLD1550P-A40	Customer Inspired!40 mW SLD, CWL=1550 nm, FWHM = 33 nm, Butterfly Package, PM Fiber, FC/APC	\$2,190.96	Today

SLD1023S Optical Spectrum



SLD1023S Optical Power and Forward Voltage

