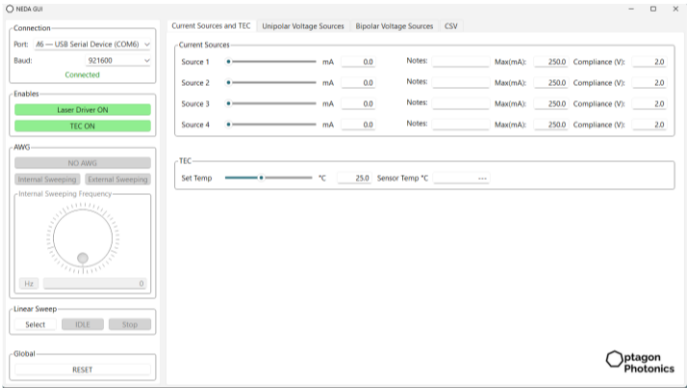
NEDA LD4H16T: Datasheet



Short Description

NEDA LD4H16T is a versatile controller for optical modules and photonic integrated circuits (PICs) that offers multiple current and voltage sources and thermal regulation in a compact form. The controller is compatible with all mainstream photonic platforms including silicon-on-insulator, silicon nitride, optical polymers, indium phosphide and thin-film lithium niobate. It offers 4 current sources of up to 500 mA per channel, suited for laser diodes (LDs), super-luminescent diodes (SLDs), light emitting diodes (LEDs) and semiconductor optical amplifiers (SOAs), 12 unipolar voltage sources of up to 20 V and 200 mA per channel, suited for all known types of heating electrodes utilized as thermal phase shifters (TPS), and 4 bipolar voltage sources within the -10 to +10 V range with current up to 20 mA, suited for biasing of elements such as modulators and photodiodes. In addition, NEDA LD4H16T incorporates a 2.2 A thermo-electric cooler (TEC) controller for precise thermal regulation of the operated module or PIC.

The 4 current sources are independent and based on the core driving engine of Optagon Photonics (NEDA LD4-A). They exhibit a common cathode (CC) architecture and have all safety features (adjustable current and voltage compliance limits, soft-start ramp and hot-plug protection) required for spike-free operation and overall protection of precious optoelectronic loads. Additionally, NEDA LD4H16T provides low-jitter arbitrary waveform generation at rates up to 2 MSPS across all unipolar voltage sources using either an internal or external sync signal. This feature supports programmability and fast reconfigurability during PIC testing, calibration and operation. The device is controlled by a modern graphical user interface (GUI). A Python application programming interface (API) is also provided, enabling the users to build their own custom scripts.

Applications

Test and measurement, semiconductor lasers, external cavity lasers, microwave photonics, OTDR/OFDR systems, LIDAR systems, optical coherence tomography (OCT), optical computing, Raman spectroscopy, chemical-biochemical sensors.

Features

- 4 current sources for active elements (CC).
- 12 unipolar voltage sources for TPS, capable of arbitrary waveform generation at rates up to 2 MSPS – Operation with internal or external sync.
- 4 bipolar voltage sources for biasing purposes.
- TEC controller for thermal management of load/s.
- USB connection to laptop/desktop – GUI and API.
- Single power supply with 23.5-32 V supply range.

Specifications

NEDA LD4H16T is rated for ambient temperatures from 5 to 50°C, and requires a single supply voltage V_s between 23.5 and 32 V. Unless noted otherwise, the operating parameters presented below are measured for V_s = 24 V and T = 25°C, and apply to every channel of the same type:

PARAMETER	NOTES	MIN	TYP	MAX	UNIT
Product storage temperature		-25		+70	°C
Operating Conditions					
Usage	Indoor use only				
Temperature		5		50	°C
Relative humidity				80	%
Pollution Degree	Pollution Degree 2				
IP rating	IP 30				
Power Supply Requirements					
Voltage supply Vs		23.5	24	32	V
Current supply		0.3		3	A
Power consumption		7.5		80	W
Power connector	5.5 x 2.5 mm barrel jack				
Current sources (4x channels)					
Type of connector	Screw terminals				
Load current	Limited by firmware*	0		500	mA
Voltage compliance		0		5	V
Soft-start	Current ramp		20		mA/ms
Turn-on delay	After power-on		2		s
Unipolar voltage sources (12x channels)					
Type of connector	24-pin headers 2.54 mm				
Load voltage		0		20	V
Load current		0		200	mA
Load power**		0		4	W
Arbitrary waveform generator speed	Multiplexed to all channels			2	MSPS
External sync input voltage	SMA connector - TTL input	0	3.3	3.6	V
Bipolar voltage sources (4x channels)					
Type of terminals	8-pin headers 2.54 mm				
Load voltage		-10		10	V
Load current		-20		20	mA
Load power		0		0.2	W

TEC controller (bidirectional)					
Type of connector	Screw terminals				
Voltage under load		-4.5		+4.5	V
Current under load		-2.2		+2.2	A
Thermistor value			10K		Ohm
TEC temperature range	Recommended	15	25	40	°C
Interlock					
Interlock pin voltage	Tie to GND to enable LDs	0	5	5.5	V
USB connection					
USB port type	USB2.0 Micro-B				

* Ultimate limit (by hardware) of the load current of each current source is 600 mA.

** **Recommendation**: Total power dissipation on the loads of the 12 unipolar voltage sources should remain <30 W.

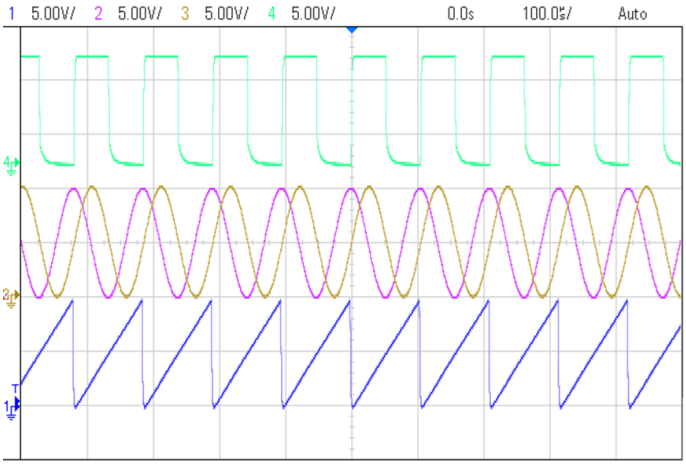


Figure: Example of AWG operation involving 4 unipolar voltage channels with independent generation of square, sinusoidal and sawtooth waveforms (time scale: 100 µs/div).

Connections

The active elements to be driven by the current sources (LDs, SLDs, LEDs or SOAs), the temperature sensor (thermistor) and the thermoelectric cooler (Peltier element) can be connected to the NEDA LD4H16T controller through the screw block terminal (max. AWG 18 or 0.75 mm^2). The loads of the unipolar and bipolar voltage sources can be connected through the standard 2.54 mm pitch female pin headers. Custom printed circuit boards (PCB) serving as interposers for any PIC packages can be made available to customers upon request.

Precautions

While a great effort has been made to protect the device against ESD discharges, components inside the device can be ESD sensitive. Take appropriate precautions to discharge personnel and equipment before making any electrical connections to the unit, and ensure an ESD safe operation throughout.

Manufacturing and compliance

NEDA LD4H16T product designed by Optagon Photonics. Device PCB manufactured and assembled in Europe. Final device assembly by Optagon Photonics in Pallini 15351, Athens Greece.

NEDA LD4H16T product is CE and RoHS compliant.

Warranty

NEDA LD4H16T is warranted to be free from defects in materials and workmanship and to conform to its published specifications for a period of one year from the date of product shipment. This warranty applies under normal use and operating conditions.

Contact and ordering information

For technical questions and ordering information please contact us at: sales@optagon-photonics.eu. Manual & software at: www.optagon-photonics.eu.

Mechanical specifications

The external dimensions of the aluminum enclosure (box) of the NEDA LD4H16T controller are as follows: (L) 167.0 mm x (W) 169.5 mm x (H) 55.7 mm. The drawings of that enclosure are presented below.