

# SONY

4ch VCSEL

## Preliminary

# SLD177H5

---

### Description

SLD177H5 is a 4ch- VCSEL for 25 Gbps optical communications.

(Applications: Laser diode for industrial optical communication module)

---

### Features

- ◆ Wavelength : 850 nm
- ◆ 4ch (beam pitch 250  $\mu\text{m}$ )
- ◆ Data rates up to 25 Gbps
- ◆ Bare chip

---

### Structure

- ◆ MQW VCSEL
- ◆ Coplanar electrode structure

---

### Absolute Maximum Ratings

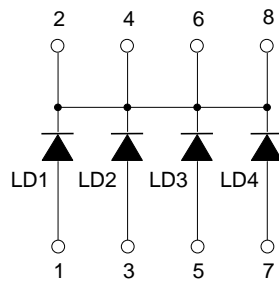
◆ Forward current	$I_b$	7.0	mA
◆ Reverse voltage	$V_R$	5.0	V
◆ Operating temperature	$T_{opr}$	0 to +75	°C
◆ Storage temperature	$T_{stg}$	-40 to +85	°C
◆ Maximum temperature of solder heat resistance *1	$T_s$	260	°C
◆ Maximum chip mounting temperature *2	$T_m$	220	°C

\*1 within 10 seconds

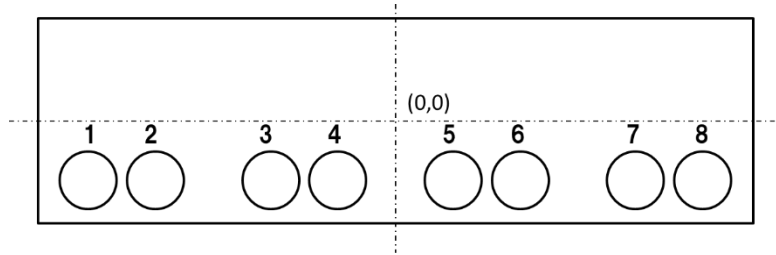
\*2 within 30 minutes

---

### Connection diagram



**Pad configuration**



No.	Symbol	Coordinate [ $\mu\text{m}$ ]	
		X	Y
1	Ch1 Anode	-422	-64.5
2	Ch1 Cathode	-328	-64.5
3	Ch2 Anode	-172	-64.5
4	Ch2 Cathode	-78	-64.5
5	Ch3 Anode	78	-64.5
6	Ch3 Cathode	172	-64.5
7	Ch4 Anode	328	-64.5
8	Ch4 Cathode	422	-64.5

**Electrical and Optical Characteristics**

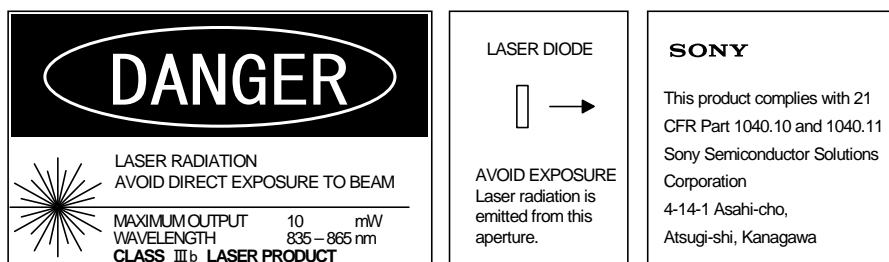
(Tc = 25 °C, Ib = 7.0 mA unless otherwise noted)

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Threshold current	Ith	Tc = 0 °C – 75 °C	—	—	1.6	mA
Operating voltage	Vop	Tc = 0 °C – 75 °C, Ib = 7.0mA	—	—	2.4	V
Differential resistivity	Rd	Tc = 0 °C – 75 °C, Ib = 7.0mA	—	—	90	Ω
Differential efficiency	η		0.3	—	0.6	W/A
Optical output power	Po	Tc = 0 °C – 75 °C, Ib = 7.0mA	1.4	—	4.0	mW
Wavelength	λp	Tc = 0 °C – 75 °C, Ib = 7.0mA	840	850	860	nm
RMS spectral width	Δλ		—	—	0.6	nm
Beam divergence	θ	Full width at including 86.5% cumulative light intensity	—	—	33	degree
3dB modulation bandwidth	BW	Tc = 25 °C – 75 °C, Ib = 7.0mA	12.5	14	—	GHz
Relative Intensity noise	RIN	Tc = 75 °C, Ib = 7.0mA	—	—	-128	dB/Hz
ESD pass voltage (Human body model)			100	—	—	V

## Notes on Operation

Care should be taken for the following points when using this product.

1. This product corresponds to a Class 3B product under IEC 60825-1 or JIS C6802.



2. Eye protection against laser beams  
Take care not to allow laser beams to enter your eyes under any circumstances.  
For observing laser beams always use safety goggles that block laser beams. Usage of IR scopes, IR cameras and fluorescent plates is also recommended for monitoring laser beams safely.
3. Gallium Arsenide  
This product uses gallium arsenide (GaAs). This is not a problem for normal use, but GaAs vapors may be potentially hazardous to the human body. Therefore, never crush, heat to the maximum storage temperature or higher, or place the product in your mouth. In addition, the following disposal methods are recommended when disposing of this product.
  - (1) Engaging the services of a contractor certified in the collection, transport and intermediate treatment of items containing arsenic.
  - (2) Managing the product through to final disposal as specially managed industrial waste which is handled separately from general industrial waste and household waste.
4. Prevention of surge current and electrostatic discharge  
Laser diodes are most sensitive to electrostatic discharge among semiconductors. When a large current is passed through the laser diode for even an extremely short time, the strong light emitted from the laser diode promotes deterioration and then destruction of the laser diode. Therefore, note that surge current should not flow to the laser diode driving circuit from switches and others. Also, if the laser diode is handled carelessly, it may be destroyed instantly because electrostatic discharge is easily applied by a human body. Therefore, be extremely careful about over current and electrostatic discharge. Also, use the power supply that was designed not to exceed the optical power output specified at the absolute maximum ratings.
5. Use for special applications  
This product is not designed or manufactured for use in equipment used under circumstances where failure may pose a risk to life and limb, or result in significant material damage, etc. Consult your Sony sales representative when investigating use for medical, vehicle, nuclear power control or other special applications.
6. "Environment-related Substances to be Controlled"  
No substances classified at Level 1 (immediate ban) of Sony Technical Standard, SS-00259, "Management regulations for the Environment- related Substances to be Controlled".  
The excerpt from SS-00259 is introduced on following URL.  
<http://www.sony.net/SonyInfo/procurementinfo/ss00259/>



---

### **Purpose of Use of the Products:**

Customer shall use the Products with the utmost concern for safety, and shall not use the Products for any purpose that may endanger life or physical wellbeing, or cause serious damage to property or the environment, either through normal use or malfunction. Use of the Products for purposes other than those stipulated in this specification is strictly prohibited. Furthermore, usage of the Products for military purposes is strictly prohibited at all times.

### **Safe Design:**

- ◆ Customer is responsible for taking due care to ensure the product safety design of its products in which the Products are incorporated, such as by incorporating redundancy, anti-conflagration features, and features to prevent mis-operation, in order to prevent accidents resulting in injury, death, fire, or other social damage as a result of failure.

### **Product Information:**

- ◆ The product specifications, and any and all other technical information and content contained in this specification, as well as any other information and materials provided to Customer in connection with the Products (collectively, "Product Information") have been provided to Customer for reference purpose only, and the availability and disclosure of such Product Information and its usage by Customer shall not be construed as giving any indication that Sony, its subsidiaries and/or its licensors will license any right, including intellectual property rights in such Product Information by any implication or otherwise.

### **EXCLUSION OF WARRANTY ON THE PRODUCTS:**

- ◆ UNLESS OTHERWISE NOTIFIED BY US IN WRITING, OTHERWISE AGREED BETWEEN THE CUSTOMER AND SONY, ITS SUBSIDIARIES OR ANY OF THEIR AUTHORIZED REPRESENTATIVES IN WRITING, OR TO THE EXTENT PERMITTED BY LAW, THE FOLLOWING TERMS AND CONDITIONS SHALL APPLY TO THE USAGE OF THE PRODUCTS AND THE PRODUCT INFORMATION:

THE PRODUCTS AND THE PRODUCT INFORMATION ARE PROVIDED BY SONY, ITS SUBSIDIARIES AND/OR THEIR AUTHORIZED REPRESENTATIVES "AS IS" AND WITHOUT WARRANTY OF ANY KIND AND SONY, ITS SUBSIDIARIES AND/OR THEIR AUTHORIZED REPRESENTATIVES MAKE OR HAVE MADE NO REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE, AND EXPRESSLY DISCLAIMS ANY REPRESENTATION OR WARRANTY (I) WITH RESPECT TO ACCURACY, RELIABILITY, VALUE, UTILITY OR SAFETY OF THE PRODUCTS AND THE PRODUCT INFORMATION, OR THE ABILITY OF CUSTOMER TO MAKE USE THEREOF, (II) WITH RESPECT TO ANY IMPLEMENTATION OF THE PRODUCTS AND THE TECHNICAL INFORMATION; (III) WITH RESPECT TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE; OR (IV) THAT THE PRODUCTS AND THE PRODUCT INFORMATION OR ANY IMPLEMENTATION THEREOF IS OR WILL BE FREE FROM INFRINGEMENT, MISAPPROPRIATION OR VIOLATION OF ANY INTELLECTUAL PROPERTY RIGHT OR ANY OTHER RIGHT OF ANY THIRD PARTY, AND ANY EQUIVALENTS OF ANY OF THE FOREGOING UNDER THE LAWS OF ANY JURISDICTION.

CUSTOMER HEREBY ACKNOWLEDGES AND AGREES THAT USE OF THE PRODUCTS AND THE PRODUCT INFORMATION IS AT CUSTOMER'S SOLE RISK AND THAT CUSTOMER IS RESPONSIBLE FOR THE USE OF THE PRODUCTS AND THE PRODUCT INFORMATION, INCLUDING DEFENDING ANY INFRINGEMENT CLAIM MADE AGAINST THE CUSTOMER IN RELATION WITH CUSTOMER'S USAGE OF THE PRODUCTS AND TECHNICAL INFORMATION.

NO ORAL OR WRITTEN INFORMATION OR ADVICE GIVEN BY SONY, ITS SUBSIDIARIES OR THEIR AUTHORIZED REPRESENTATIVES SHALL CREATE A WARRANTY, DUTY OR CONDITION OR IN ANY WAY INCREASE THE SCOPE OF THIS WARRANTY.

**LIMITATION OF LIABILITY:**

- ◆ TO THE EXTENT PERMITTED BY LAW, SONY, ITS SUBSIDIARIES AND/OR THEIR AUTHORIZED REPRESENTATIVES SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY, BREACH OF CONTRACT, NEGLIGENCE, STRICT LIABILITY OR UNDER ANY OTHER LEGAL THEORY RELATED TO THE PRODUCTS AND PRODUCT INFORMATION, INCLUDING, BUT NOT LIMITED TO, ANY DAMAGES ARISING OUT OF LOSS OF PROFITS, LOSS OF REVENUE, LOSS OF DATA, LOSS OF USE OF THE PRODUCTS OR ANY ASSOCIATED HARDWARE, DOWN TIME AND USER'S TIME, EVEN IF ANY OF THEM HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

**Compliance with Laws:**

- ◆ Customer shall comply with all applicable laws, ordinances, rules and regulations in connection with the usage of the Products, including the export control laws or regulations of various countries and shall be fully responsible for obtaining approvals in connection with the export of the Products in accordance with such said laws, ordinances, rules and/or regulations.

**Governing Law:**

- ◆ This specification and the terms and conditions contained herein shall be governed by and construed in accordance with the laws of Japan, without reference to principles of conflict of laws or choice of laws. All controversies and disputes arising out of or relating to this specification and the terms and conditions contained herein shall be submitted to the exclusive jurisdiction of the Tokyo District Court in Japan as the court of first instance.

**Notes:**

- ◆ The product specifications, technical information and any and all other information and content relating to the Products contained in this specification may be revised or updated by Sony at Sony's sole discretion without prior notice to the Customer and Customer shall abide by their latest versions. Such revisions or updates will be made available to Customer in a way as Sony deems appropriate.
- ◆ Ensure that you have read and reviewed the notices contained in our delivery specification as well as this specification when purchasing and using the Products.