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Infrared Laser Obstacle Sensor Module

For 110°, 6~200mm Distance

Key Properties

View Angle: 110° ±10°
X Resolution: 640 pixels (~0.2°)
Sensing Distance: 6mm~200mm(more)
Distance Resolution: ±5% *Distance
Laser Wavelength: 808nm
Eye Safety: Class 1M

Application

Clean Robot / Robot Sensor / 2D X-Y Detection
Laser Line Scanning/ 2D(X-Z) Laser Obstacle Sensor

Feature

- FOV 110° wide view angle and infrared sensing with efficiency frame resolution.
  - VGA: X-640 pixels, Y-480 pixels, Frame rate: 30fps
  - The data transfer 27 points data of each frame by 30 frames rate per second.
- Cost effective and quick response solution for image obstacle detection or X-Z scanning sensor.
  - Image processing by MCU and UART transfer interface, resolution and data size adjustable depends on the backend processor ability.
- M12 x 0.5P is convenient for standard S-Mount M12 holder.
- Infrared laser light for eye safety class 1M and environment noise process.
  - The special DOE(Diffractive Optical Element) design for reflecting power intensity uniformity of laser projecting line. It helps the better sensitivity of wide angle and dynamic range of image.

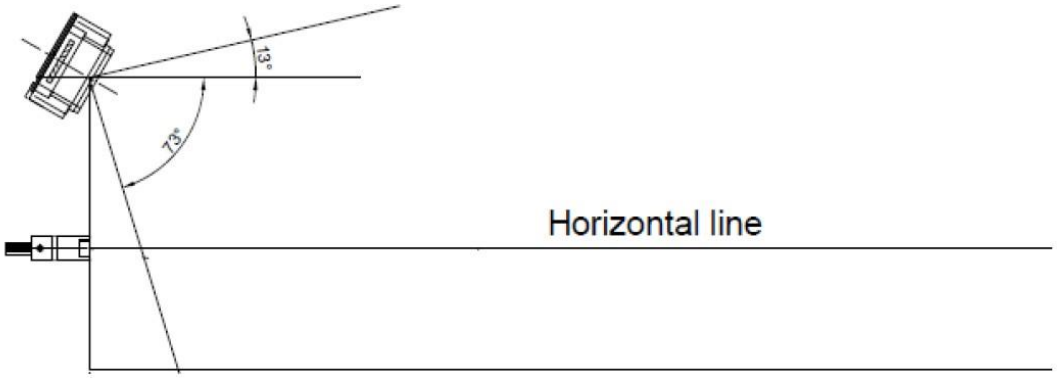
Introduction

LOS1V110F30 laser obstacle sensor integrates the laser line generator using our own designed DOE for linear uniformity of laser intensity and triangular image processing to simplify and increase the recognition for obstacle sensing in X-Z plane. It can recognize the position including the distance, and form shape of obstacle in front. The wide view angle is designed to 110 degree FOV can be detected and transfer the data rate as 30 frames per second. It can be used for robot, vehicle, auto machine real time detection. As the laser line scan to form a plane shape in front. It also can help the basic mapping in front and distance judgement. This cost effective and convenient laser sensor would be a good solution for image detection.

Specifications

2. OPTICAL CHARACTERISTIC

2.1 Schematic diagram

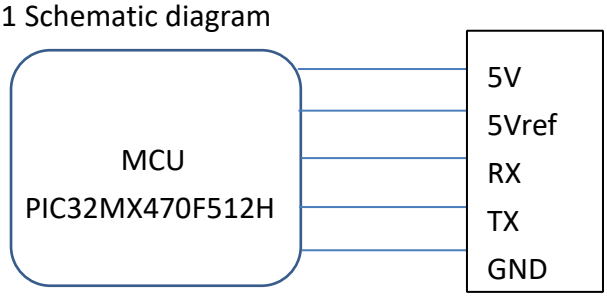


2.2 Optical Parameter

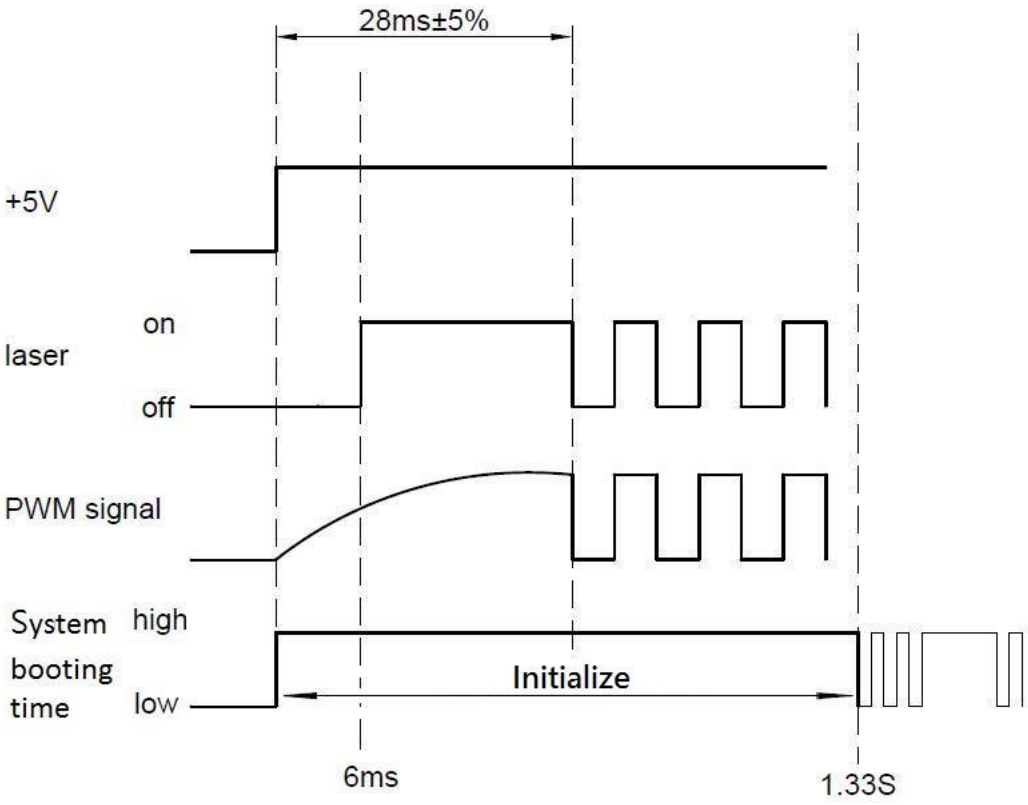
Items	Parameters			
	Min	Typ	Max	Unit
Sensing distance	60	180	200 over	mm
Accuracy at 50~200mm(Y value)	-5%	-	+5%	mm
Optical output power.		20		mw
Wavelength	803	808	813	nm
Line Span Angle	100	110	120	degrees

3. ELECTRICAL CHARACTERISTIC

3.1 Schematic diagram



3.2 Time diagram



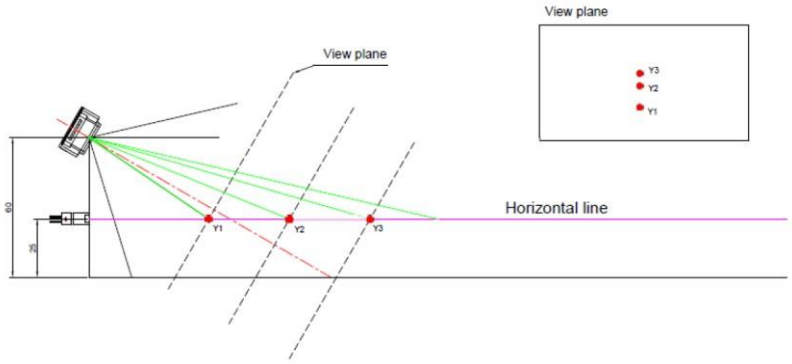
3.3 Electrical Parameter

Items	Parameters			
	Min	Typ	Max	Unit
Operating Voltage	4.8	5.0	5.3	V
Operating Current	124	140	160	mA
Baud Rate	2%	115200	2%	bps
PWM Frequency	-	3.3K	-	Hz

4. ALGORITHM

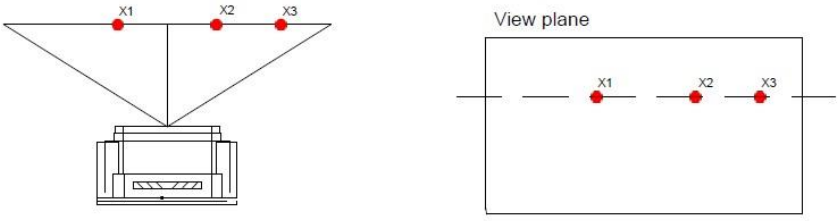
4.1 Diagram

Y direction: 480 pixels



Note. Sensing target need add the necessary distance for the radius of turn of the robot or vehicle to avoid the obstacle making the corrections in firmware.

X direction: 640 pixels



Data format:

in binary, short integer frame separator begin and end: 0xCC 0xCC

horizontal line and down line separator: 0xDD 0xDD

4.2 Horizontal Line Data

X,Y data bytes length:2

X,Y data type: short integer

X,Y data fixed: 27 points

For instance:

0XCC	0XCC	0X00	0X64	0X01	0XF4	0X00	0X32	0X01	0XF4
Begin frame separator		X-high byte	X-low byte	Y-high byte	Y-low byte	X-high byte	X-low byte	Y-high byte	Y-low byte

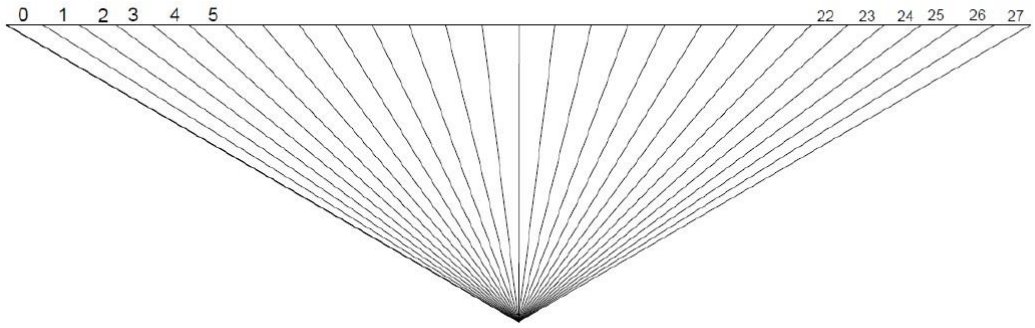
PS: 0x00 0x64 = 100; 0x01 0xF4=500;0x00 0x32=50; (unit:mm)

Means (100,500),(50,500) have object reflect the Horizontal line.

X value in [-600 to 600]

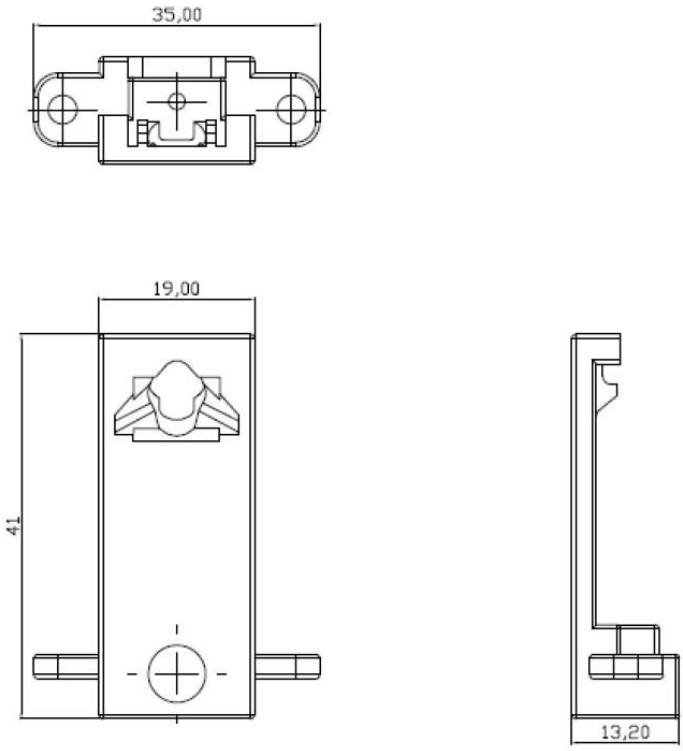
Y value in [0 to 1000]

0x--	0x--	0x--	0x--	0x00	0x32	0x01	0xF4
X-high byte	X-low byte	Y-high byte	Y-low byte	X-high byte	X-low byte	Y-high byte	Y-low byte

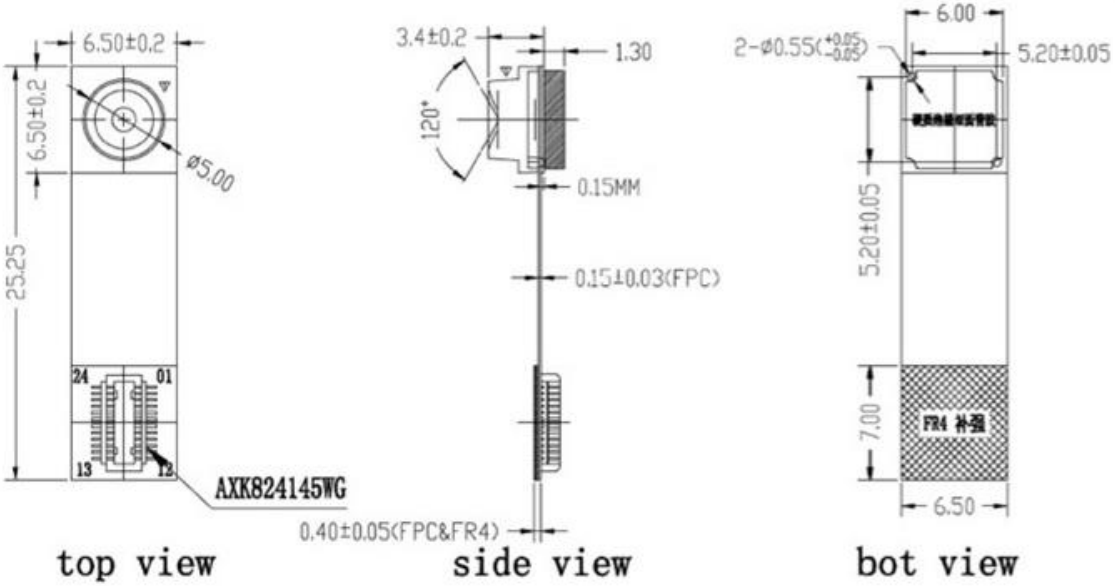


5. DIMENSION & MODULES & CONSTRUCTION

5.1 Casing



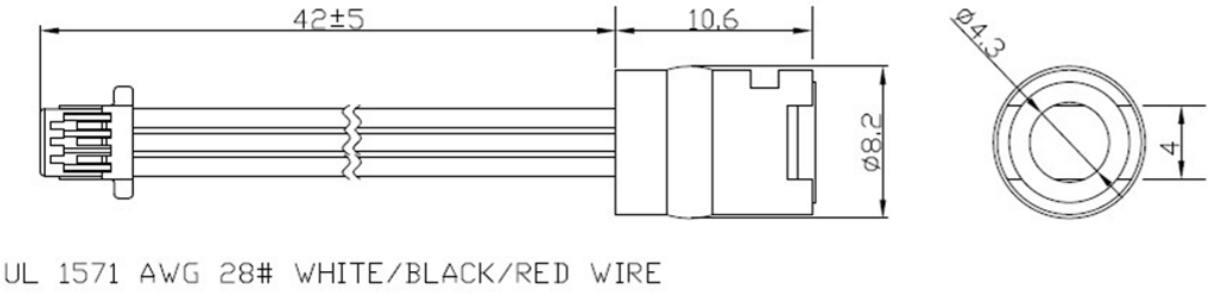
5.2 Camera Module



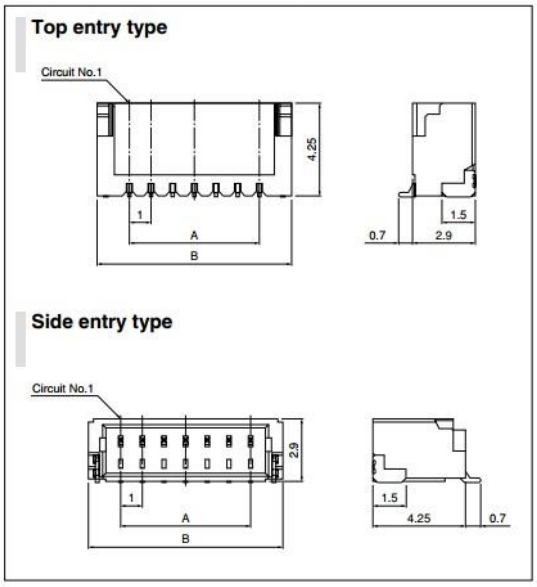
CONNECTOR 24Pin DESCRIPTION

NO.	SYMBOL		
1	NC	22	RESETB
2	AVDD_2V8	23	Y6
3	AGND	24	Y7
4	HREF		
5	YSYNC		
6	PWDN		
7	PCLK		
8	DVDD_1V8		
9	DVDD_2V8		
10	SI0_D		
11	MCLK		
12	SI0_C		
13	NC		
14	NC		
15	Y0		
16	Y1		
17	DGND		
18	Y2		
19	Y3		
20	Y4		
21	Y5		

5.3 IR Laser Module



Laser Module Connector: BM03B-SRSS-TB



Circuits	Model No.		Dimensions (mm)		Q'ty/reel	
	Top entry type	Side entry type	A	B	Top entry type	Side entry type
2	BM02B-SRSS-TB	SM02B-SRSS-TB	1.0	4.0	1,500	3,000
3	BM03B-SRSS-TB	SM03B-SRSS-TB	2.0	5.0	1,500	3,000
4	BM04B-SRSS-TB	SM04B-SRSS-TB	3.0	6.0	1,500	3,000
5	BM05B-SRSS-TB	SM05B-SRSS-TB	4.0	7.0	1,500	3,000
6	BM06B-SRSS-TB	SM06B-SRSS-TB	5.0	8.0	1,500	3,000
7	BM07B-SRSS-TB	SM07B-SRSS-TB	6.0	9.0	1,500	3,000
8	BM08B-SRSS-TB	SM08B-SRSS-TB	7.0	10.0	1,500	3,000
9	BM09B-SRSS-TB	SM09B-SRSS-TB	8.0	11.0	1,500	3,000
10	BM10B-SRSS-TB	SM10B-SRSS-TB	9.0	12.0	1,500	3,000
11	BM11B-SRSS-TB	SM11B-SRSS-TB	10.0	13.0	1,500	3,000
12	BM12B-SRSS-TB	SM12B-SRSS-TB	11.0	14.0	1,500	3,000
13	BM13B-SRSS-TB	SM13B-SRSS-TB	12.0	15.0	1,500	3,000
14	BM14B-SRSS-TB	SM14B-SRSS-TB	13.0	16.0	1,500	3,000
15	BM15B-SRSS-TB	SM15B-SRSS-TB	14.0	17.0	1,500	3,000
20	—	SM20B-SRSS-TB	19.0	22.0	—	3,000

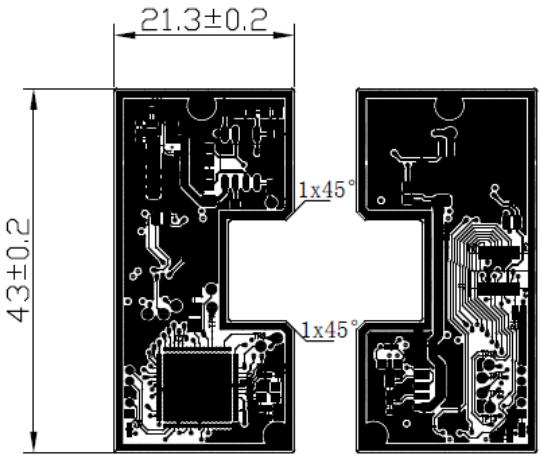
Material and Finish

Contact: Copper alloy, copper-undercoated, tin-plated (reflow treatment)
Housing: PA, UL94V-0, natural (ivory)
Solder tab: Brass, copper-undercoated, tin-plated (reflow treatment)

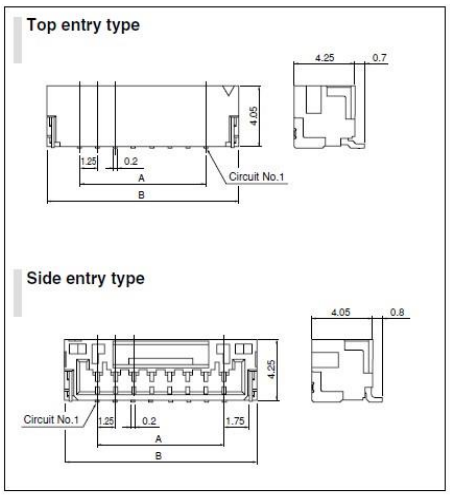
RoHS compliance *This product displays (LF)(SN) on a label.*
Note: 1. The products listed above are supplied on embossed-tape.
2. Contact JST for the headers with gold-plated pins.
3. Contact JST for the top entry type headers with suction cap.

5.4 PCBA Dimension

PCBA UART Control Connector: BM05B-GHS-TBT



Shrouded header



Circuits	Model No.		Dimensions (mm)		Q'ty/reel
	Top entry type	Side entry type	A	B	
2	BM02B-GHS-TBT	SM02B-GHS-TB	1.25	5.75	2,500
3	BM03B-GHS-TBT	SM03B-GHS-TB	2.50	7.00	2,500
4	BM04B-GHS-TBT	SM04B-GHS-TB	3.75	8.25	2,500
5	BM05B-GHS-TBT	SM05B-GHS-TB	5.00	9.50	2,500
6	BM06B-GHS-TBT	SM06B-GHS-TB	6.25	10.75	2,500
7	BM07B-GHS-TBT	SM07B-GHS-TB	7.50	12.00	2,500
8	BM08B-GHS-TBT	SM08B-GHS-TB	8.75	13.25	2,500
9	BM09B-GHS-TBT	SM09B-GHS-TB	10.00	14.50	2,500
10	BM10B-GHS-TBT	SM10B-GHS-TB	11.25	15.75	2,500
11	BM11B-GHS-TBT	SM11B-GHS-TB	12.50	17.00	2,500
12	BM12B-GHS-TBT	SM12B-GHS-TB	13.75	18.25	2,500
13	BM13B-GHS-TBT	SM13B-GHS-TB	15.00	19.50	2,500
14	BM14B-GHS-TBT	SM14B-GHS-TB	16.25	20.75	2,500
15	BM15B-GHS-TBT	SM15B-GHS-TB	17.50	22.00	2,500

Material and Finish

Contact: Phosphor bronze, copper-undercoated, tin-plated (reflow treatment)
Housing: PA9T, UL94V-0, natural (ivory)
Solder tab: Brass, copper-undercoated, tin-plated

RoHS compliance *This product displays (LF)(SN) on a label.*
Note: Contact JST for gold-plated products.

<For reference> As the color identification, the following alphabet shall be put in the underlined part. For availability, delivery and minimum order quantity, contact JST.

ex. **BM04B-GHS-TBT**
S…natural (ivory) LE…light blue TR…tomato red K …black E…blue O…orange L…lemon yellow MG…moss green DPK…dark pink

6. RELIABILITY

Item	Method	Criteria
Thermal Cycle Test	Temperature cycle: -20°C(2Hrs), 60°C (2Hrs) Cycle time:7 cycles Transfer time:1hr	No losing and function fail
Cooling Test	Temperature: -20 ±1°C Time:168hrs	No losing and function fail
Heat Test	Temperature: 60 ±2°C Humidity: under 35% Time:168hrs	No losing and function fail
High Temperature & Humid	Temperature: 40 ±1°C Humidity: above 90% Time:168hrs	No losing and function fail
Thermal Shock(PCB)	Temperature cycle: -20 °C (30min), 80 °C (30min) Cycle time:750cycles Transfer time: under 10 seconds	No damage, crash
Vibration Test(PCB)	Frequency：5～55～5 Hz range：1.5mm Time：1min Method：logarithmic frequency sweep Direction & Time：X,Y,Z (each 2hrs)	No damage, crash
THB(PCB)	Temperature:85 °C Humidity: above 85% Cycle: 1hr on, 3hrs off Time:500hrs	No damage, crash

7. **OPERATING & STORAGE TEMPERATURE**

Operating Temperature	-10~45 ºC
Storage Temperature	-20~60 ºC

8. **CERTIFICATION**

8.1 CLASS 1M (IEC60825)

8.2 ROHS

Laser Safety

The light emitted from these devices has been set in accordance with IEC60825. However, staring into the beam, whether directly or indirectly, must be avoided.

Class I

The maximum permissible exposure(MPE) cannot be exceeded, it includes High-power lasers within an enclosure that prevents exposure to the radiation and that cannot be opened without shutting down the laser. For example, a continuous laser at 600nm can emit up to 0.39mW, but for shorter wavelengths, the maximum emission is lower.

Class II

“Caution”, visible laser light less than 1.0mW. Considered eye safe, normal exposure to this type of beam will not cause permanent damage to the retina.

Class IIIA

“Danger”, visible laser light between 1.0mW and 5.0mW. Considered eye safe with caution. Focusing of this light into the eye could cause some damage.

Class IIIB

“Danger”, infrared(IR), and high power visible lasers considered dangerous to the retina if exposed. NB: it is important to note that while complying with the above classifications, unless otherwise stated. Our laser diode products are not certified and are designed solely for use in OEM products. The way in which device is used in the final product may alter its original design classification, and it is the responsibility of the OEM to ensure compliance with the relevant standards.

Specifications are subject to change without notice.