

May. 2007



***Guide for
Red and Infrared Laser Diodes***



Line up

Safety Considerations

Be sure to avoid direct exposure of human eyes to high power laser beams emitted from laser diodes. Even though barely visible and/or invisible to the human eye, they can be quite harmful. In particular, avoid looking directly into a laser diode or collimated beam along its optical axis when the diode is activated. One simple way to determine the optical path is to use a phosphor plate or infrared sensitive camera.

Opnext certifies compliance with US Safety Regulations (21 CFR Subchapter J) on laser products, as stipulated by the U.S. Department of Health and Human Services. The opnext products shown here correspond to the category "CLASS IIIb LASER PRODUCT" in this regulation.

DANGER

VISIBLE AND/OR INVISIBLE LASER RADIATION—
AVOID DIRECT EXPOSURE TO BEAM

PEAK POWER 60 mW
WAVELENGTH 625 to 1600 nm
CLASS IIIb LASER PRODUCT

This product conforms to FDA regulations 21 CFR Chapter I, Subchapter J.

AVOID EXPOSURE—Visible and/or invisible laser radiation is emitted from glass window.

beam direction

Because of the small size of the device, the required labels and these instructions are provided on this label rather than printed on the device.

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USER INSTRUCTIONS:
This laser device in operation produces visible and/or invisible laser radiation. Be sure to avoid direct exposure of human eyes to beams emitted from laser diode. Even though they are barely visible and/or invisible to the human eye, they can be quite harmful. In particular, avoid looking directly into a laser diode or collimated beam along its optical axis when it is in operation. One simple way to determine the optical path is to use a phosphor plate or infrared sensitive camera.

These devices are components to be used in producing complete laser systems. They do not emit radiation unless combined by the end user with other components. Please consult the Hitachi Optodevice Databook for some of the possible uses of these devices.

Cautions

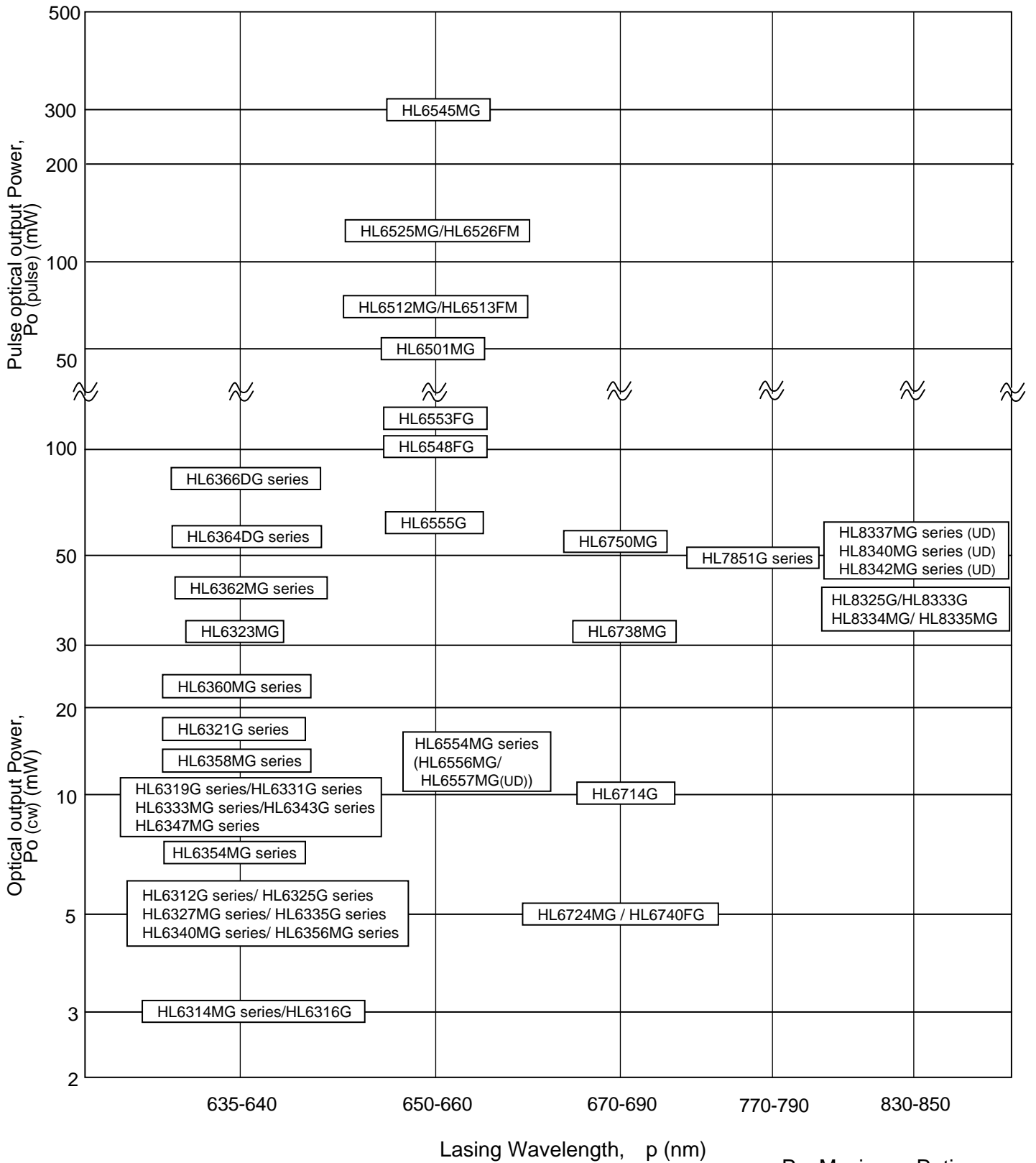
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2. Products and product specifications may be subject to change without notice. Confirm that you have received the latest product standards or specifications before final design, purchase or use.
3. OPJ makes every attempt to ensure that its products are of high quality and reliability. However, contact our sales office before using the product in an application that demands especially high quality and reliability or where its failure or malfunction may directly threaten human life or cause risk of bodily injury, such as aerospace, aeronautics, nuclear power, combustion control, transportation, traffic, safety equipment or medical equipment for life support.
4. Design your application so that the product is used within the ranges guaranteed by OPJ particularly for maximum rating, operating supply voltage range, heat radiation characteristics, installation conditions and other characteristics. OPJ bears no responsibility for failure or damage when used beyond the guaranteed ranges. Even within the guaranteed ranges, consider normally foreseeable failure rates or failure modes in semiconductor devices and employ systemic measures such as fail-safes, so that the equipment incorporating OPJ product does not cause bodily injury, fire or other consequential damage due to operation of the OPJ product.
5. This product is not designed to be radiation resistant.
6. No one is permitted to reproduce or duplicate, in any form, the whole or part of this document without written approval from OPJ.
7. Contact our sales office for any questions regarding this document or OPJ products.

1. The laser light is harmful to human body especially to eye no matter what directly or indirectly. The laser beam shall be observed or adjusted through infrared camera or equivalent.
2. This product contains gallium arsenide (GaAs), which may seriously endanger your health even at very low doses. Please avoid treatment which may create GaAs powder or gas, such as disassembly or performing chemical experiments, when you handle the product.
When disposing of the product, please follow the laws of your country and separate it from other waste such as industrial waste and household garbage.
3. Definition of items shown in this CAS is in accordance with that shown in Opto Device Databook issued by OPJ unless otherwise specified.

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Lasering Wavelength vs. Optical Output Power for Red and Infrared LDs



Section 2 Product Lineup of Red and Infrared LDs

	Wavelength	Optical power *	Internal circuit	Type No.	Main application	
Visible LDs	635nm	3mW		HL6324MG	Marker	
				HL6314MG HL6316G	Marker	
		5mW		HL6313G HL6325G HL6327MG HL6336G HL6341MG HL6357MG	Leveler/ Marker	
				HL6312G HL6326G HL6328MG HL6335G HL6340MG HL6356MG	Leveler/ Marker	
		7mW		HL6354MG	Leveler/ Marker	
				HL6355MG	Leveler/ Marker	
		10mW		HL6319G HL6331G HL6333MG HL6343G HL6347MG	Leveler/ Marker	
				HL6320G HL6332G HL6334MG HL6344G HL6348MG	Leveler/ Marker	
		639nm	12mW		HL6358MG	Leveler/ Marker
					HL6359MG	Leveler/ Marker
	15mW			HL6321G	Leveler/ Marker	
				HL6322G	Leveler/ Marker	
	25mW			HL6360MG	Leveler/ Marker	
				HL6361MG	Leveler/ Marker	
	35mW		HL6323MG	Leveler/ Marker		
		640nm	45mW		HL6362MG	Marker/ Display
				HL6363MG	Marker/ Display	
	642nm	65mW		HL6364DG	Marker/ Display	
				HL6365DG	Marker/ Display	
				HL6376DG	Marker/ Display	
90mW			HL6366DG	Marker/ Display		
			HL6367DG	Marker/ Display		
			HL6378DG	Marker/ Display		

Wavelength	Optical power *	Internal circuit	Type No.	Main application
650 - 660nm	12mW		HL6554MG	Marker, LBP*
	70mW		HL6555G	Measurement
	100mW		HL6548FG	Measurement
	130mW		HL6553FG	Measurement
	50mW Pulse		HL6501MG	Measurement
	70mW Pulse		HL6512MG	Measurement
			HL6513FM	Measurement
	140mW Pulse		HL6525MG	Optical disc
			HL6526FM	Optical Disc
	300mW Pulse		HL6545MG	Optical Disc
		HL6546SU	Optical Disc	
670 - 690nm	5mW		HL6724MG	Marker, LBP**
	5mW x 2		HL6740FG	LBP, PPC***
	10mW		HL6714G	Measurement
	35mW		HL6738MG	Measurement
	55mW		HL6750MG	Measurement
785nm	50mW		HL7851G	Measurement
			HL7852G	Measurement
830nm	40mW		HL8325G	Measurement
			HL8333G	Measurement
			HL8334MG	Measurement
850nm	40mW		HL8335MG	Measurement

* : Maximum ratings optical output power

** : LBP : Laser Beam Printer

*** : PPC : plain paper copier

Optical and electrical Characteristics of Red and Infrared LDs

(Tc=25)

Type No.	Mark	Mark Layout	Internal Circuit	Maximum Ratings		Optical and Electrical Characteristics (Typ)						
				Po (mW)	Topr ()	Po (mW)	Ith (mA)	Iop (mA)	Is (mA)	λp (nm)	θ// (deg.)	θ (deg.)
HL6312G	DF	I	AC	5	-10 to 50	5	45	55	0.4	635	8	31
HL6313G	DM	I	CC	5	-10 to 50	5	45	55	0.4	635	8	31
HL6314MG	B	II	AC	3	-10 to 50	3	25	30	0.15	635	8	30
HL6316G	DP	I	AC	3	-10 to 50	3	25	30	0.3	635	8	30
HL6319G	DT	I	CC	10	-10 to 50	10	50	70	0.17	635	8	31
HL6320G	DU	I	AC	10	-10 to 50	10	50	70	0.17	635	8	31
HL6321G	HV	I	CC	15	-10 to 50	15	55	85	0.2	635	8	30
HL6322G	HW	I	AC	15	-10 to 50	15	55	85	0.2	635	8	30
HL6323MG	AU	II	AC	35	-10 to 50	30	45	95	0.15	639	8.5	30
HL6324MG	M	II	CC	3	-10 to 50	3	25	30	0.15	635	8	30
HL6325G	DX	I	CC	5	-10 to 60	5	30	40	0.1	635	8	31
HL6326G	DY	I	AC	5	-10 to 60	5	30	40	0.1	635	8	31
HL6327MG	AL	II	CC	5	-10 to 50	5	30	40	0.07	635	8	31
HL6328MG	AM	II	AC	5	-10 to 50	5	30	40	0.07	635	8	31
HL6331G	DZ	I	CC	10	-10 to 60	10	40	55	0.15	635	8	31
HL6332G	EA	I	AC	10	-10 to 60	10	40	55	0.15	635	8	31
HL6333MG	AS	II	CC	10	-10 to 50	10	40	55	0.08	635	8	31
HL6334MG	AT	II	AC	10	-10 to 50	10	40	55	0.08	635	8	31
HL6335G	EC	I	AC	5	-10 to 50	5	20	25	0.07	635	17	20
HL6336G	ED	I	CC	5	-10 to 50	5	20	25	0.07	635	17	20
HL6340MG	EF	II	AC	5	-10 to 50	5	20	25	0.03	635	17	20
HL6341MG	EG	II	CC	5	-10 to 50	5	20	25	0.03	635	17	20
HL6343G	EM	I	CC	10	-10 to 50	10	20	35	0.14	635	17	20
HL6344G	EN	I	AC	10	-10 to 50	10	20	35	0.14	635	17	20
HL6347MG	EP	II	CC	10	-10 to 50	10	20	35	0.06	635	17	20
HL6348MG	EQ	II	AC	10	-10 to 50	10	20	35	0.06	635	17	20
HL6354MG	EU	III	AC	7	-10 to 50	5	20	27	0.4	635	8	25
HL6355MG	EW	III	CC	7	-10 to 50	5	20	27	0.4	635	8	25
HL6356MG	EX	III	AC	5	-10 to 50	3	20	25	0.25	635	8	25
HL6357MG	EY	III	CC	5	-10 to 50	3	20	25	0.25	635	8	25
HL6358MG	HB	III	AC	12	-10 to 50	10	30	40	1.0	639	8	21
HL6359MG	HC	III	CC	12	-10 to 50	10	30	40	1.0	639	8	21
HL6360MG	HD	III	AC	25	-10 to 50	20	45	65	0.2	639	9	21
HL6361MG	HE	III	CC	25	-10 to 50	20	45	65	0.2	639	9	21
HL6362MG	EZ	III	AC	45	-10 to 50	40	45	90	0.3	640	10	21
HL6363MG	HA	III	CC	45	-10 to 50	40	45	90	0.3	640	10	21
HL6364DG	HF	III	AC	65	-10 to 50	60	65	125	0.4	642	10	21
HL6365DG	HG	III	CC	65	-10 to 50	60	65	125	0.4	642	10	21
HL6376DG	HM	III	BC	65	-10 to 50	60	65	125	0.4	642	10	21
HL6366DG	HJ	III	AC	90	-10 to 50	80	80	155	0.3	642	10	21
HL6367DG	HK	III	CC	90	-10 to 50	80	80	155	0.3	642	10	21
HL6378DG	HN	III	BC	90	-10 to 50	80	80	155	0.3	642	10	21
HL6501MG	W	II	CC	50*	-10 to 60	30	45	85	0.2	658	8.5	22
HL6512MG	AZ	II	LN	70*	-10 to 70*	50	45	115	-	658	8.5	21
HL6513FM	BG	II	FN	70*	-10 to 70*	50	45	115	-	658	8.5	21
HL6525MG	BM	II	LN	140*	-10 to 75*	70	40	100	-	658	10	17
HL6526FM	BN	II	FN	140*	-10 to 75*	70	40	100	-	658	10	17
HL6545MG	CE	III	LN	300*	-10 to 75*	120	60	175	-	660	10	17
HL6548FG	CL	III	FC	100	-10 to 60	90	55	140	0.6	660	10	17
HL6553FG	CM	III	FC	130	-10 to 60	120	55	175	0.8	660	10	17
HL6554MG	CD	III	AC	12	-10 to 70	10	45	60	0.07	658	8.5	22
HL6556MG (UD)	EX	III	BC	12	-10 to 70	10	45	60	0.07	658	8.5	22
HL6557MG (UD)	EY	III	CC	12	-10 to 70	10	45	60	0.07	658	8.5	22
HL6555G	CN	III	AC	70	-10 to 60	60	60	120	0.4	664	10	17
HL6714G	DD	I	AC	10	-10 to 50	10	35	50	0.8	670	8	22
HL6724MG	A	II	AC	5	-10 to 50	5	25	35	0.9	670	8	30
HL6738MG	Q	II	CC	35	-10 to 70	30	45	90	0.1	690	8.5	19
HL6740FG	Z	I	CC**	5	-10 to 50	5	35	-	-	675	8	30
HL6750MG	CK	III	CC	55	-10 to 70	50	30	75	0.15	685	9	21
HL7851G	BD	I	AC	50	-10 to 60	50	45	135	0.045	785	9.5	23
HL7852G	BE	I	CC	50	-10 to 60	50	45	135	0.045	785	9.5	23
HL8325G	GE	I	CC	40	-10 to 60	40	40	120	0.04	830	10	22
HL8333G	FN	I	AC	40	-10 to 60	40	40	120	0.1	830	10	22
HL8334MG	FP	III	AC	40	-10 to 60	40	40	120	0.2	830	10	22
HL8335MG	FQ	III	AC	40	-10 to 60	40	40	120	0.2	850	10	22
HL8337MG (UD)	FR	III	AC	50	-10 to 60	50	20	75	0.25	830	9	22
HL8338MG (UD)	FS	III	CC	50	-10 to 60	50	20	75	0.25	830	9	22
HL8340MG (UD)	FT	III	AC	50	-10 to 60	50	20	75	0.25	852(+/-10)	9	22
HL8341MG (UD)	FU	III	CC	50	-10 to 60	50	20	75	0.25	852(+/-10)	9	22
HL8342MG (UD)	FV	III	AC	50	-10 to 60	50	20	75	0.25	852(+/-4)	9	22
HL8343MG (UD)	FW	III	CC	50	-10 to 60	50	20	75	0.25	852(+/-4)	9	22

*: pulse optical power and pulse operation

** : exceptional cathode common

: new product

(UD): under development

Note:

AC-connection: LD: anode common	PD: cathode common
BC-connection: LD: cathode common	PD: cathode common
CC-connection: LD: cathode common	PD: anode common
FC-connection: LD electrode is isolated from stem(common)	PD: cathode is frange connection
FN-connection: LD electrode is isolated from stem(common)	PD: none
LN-connection: LD: cathode common	PD: none



According to Optical Power for your Application

Maximum Ratings		Φ9mm Package (G/FG-type)			Φ5.6mm Package (MG/DG/FM-type)				
Optical Power	Wavelength	AC-	CC-	FC-	AC-	BC-	CC-	FN-	LN-
Po(mW)	λp (nm)	connection ^{Note)}	connection ^{Note)}	connection ^{Note)}	connection ^{Note)}	connection ^{Note)}	connection ^{Note)}	connection ^{Note)}	connection ^{Note)}
3	635	HL6316G			HL6314MG		HL6324MG		
5	635	HL6312G		HL6313G					
		HL6326G		HL6325G		HL6328MG		HL6327MG	
		HL6335G		HL6336G		HL6340MG		HL6341MG	
5	670				HL6356MG		HL6357MG		
	675	HL6740FG**							
7	635				HL6354MG		HL6355MG		
10	635	HL6320G		HL6319G		HL6334MG		HL6333MG	
		HL6332G		HL6331G		HL6348MG		HL6347MG	
		HL6344G		HL6343G					
12	670	HL6714G							
	639				HL6358MG		HL6359MG		
15	658				HL6554MG		HL6556MG(UD)		HL6557MG(UD)
	635	HL6322G	HL6321G						
25	639				HL6360MG		HL6361MG		
35	639				HL6323MG				
	690						HL6738MG		
40	830	HL8333G	HL8325G		HL8334MG				
	850				HL8335MG				
45	640				HL6362MG		HL6363MG		
50	785	HL7851G	HL7852G						
	830				HL8337MG (UD)		HL8338MG (UD)		
	852 (+/-10)				HL8340MG (UD)		HL8341MG (UD)		
	852 (+/-4)				HL8342MG (UD)		HL8343MG (UD)		
50*	658						HL6501MG		
55	685						HL6750MG		
65	642				HL6364DG		HL6376DG	HL6365DG	
70	664	HL6555G							
70*	658								HL6512MG
									HL6513FM
90	642				HL6366DG	HL6378DG	HL6367DG		
100	660				HL6548FG				
130	660				HL6553FG				
140*	658								HL6525MG
									HL6526FM
300*	660								HL6545MG

*: pulse optical power and pulse operation

** : exceptional cathode common

(UD): under development

Note:

AC-connection: LD: anode common	PD: cathode common
BC-connection: LD: cathode common	PD: cathode common
CC-connection: LD: cathode common	PD: anode common
FC-connection: LD electrode is isolated from stem(common)	PD: cathode is frange connection
FN-connection: LD electrode is isolated from stem(common)	PD: none
LN-connection: LD: cathode common	PD: none

According to Wavelength for your Application

Maximum Ratings		Φ9mm Package (G/FG-type)			Φ5.6mm Package (MG/DG/FM-type)				
Wavelength λp (nm)	Optical Power Po(mW)	AC- connection ^{Note)}	CC- connection ^{Note)}	FC- connection ^{Note)}	AC- connection ^{Note)}	BC- connection ^{Note)}	CC- connection ^{Note)}	FN- connection ^{Note)}	LN- connection ^{Note)}
635	3	HL6316G			HL6314MG		HL6324MG		
	5	HL6312G	HL6313G						
		HL6326G	HL6325G		HL6328MG		HL6327MG		
		HL6335G	HL6336G		HL6340MG		HL6341MG		
	7				HL6356MG		HL6357MG		
					HL6354MG		HL6355MG		
	10	HL6320G	HL6319G		HL6334MG		HL6333MG		
		HL6332G	HL6331G		HL6348MG		HL6347MG		
		HL6344G	HL6343G						
	15	HL6322G	HL6321G						
639	12				HL6358MG		HL6359MG		
	25				HL6360MG		HL6361MG		
	35				HL6323MG				
640	45			HL6362MG		HL6363MG			
642	65				HL6364DG	HL6376DG	HL6365DG		
	90				HL6366DG	HL6378DG	HL6367DG		
658	12				HL6554MG	HL6556MG(UD)	HL6557MG(UD)		
	50*						HL6501MG		
	70*								HL6512MG
	140*							HL6513FM	HL6525MG
							HL6526FM		
660	100			HL6548FG					
	130			HL6553FG					
	300*								HL6545MG
664	70	HL6555G							
670	5				HL6724MG				
	10	HL6714G							
675	5		HL6740FG**						
685	55						HL6750MG		
690	35						HL6738MG		
785	50	HL7851G	HL7852G						
830	40	HL8333G	HL8325G		HL8334MG				
	50				HL8337MG (UD)		HL8338MG (UD)		
850	50				HL8335MG				
852(+/-10)	50				HL8340MG (UD)		HL8341MG (UD)		
852(+/-4)	50				HL8342MG (UD)		HL8343MG (UD)		

*: pulse optical power and pulse operation

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(UD): under development

Note:

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FN-connection: LD electrode is isolated from stem(common)	PD: none
LN-connection: LD: cathode common	PD: none

Select for your Application

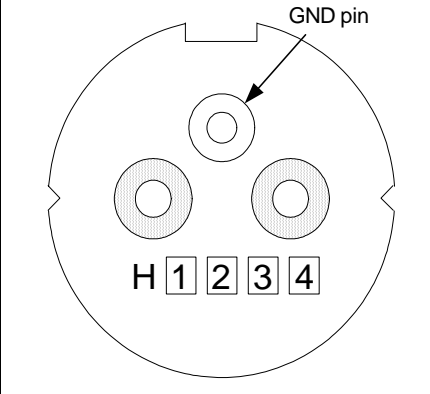
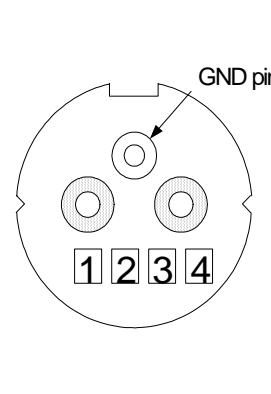
Main Application										Mximum Rating Optical Power Po (mW)	Wavelength P(nm)	Φ9mm Package (G/FG-type)	Φ5.6mm Package (MG/DG/FM-type)
Experiments etc.	Marker	Leveler	Distance meter	Measurement (Bio, Analysis)	Scanner (PPC, LBP)	Display	Optical strage	Infrared sensor					
										3		HL6316G	HL6314MG series
										5	635	HL6312G series	HL6327MG series
									HL6325G series			HL6340MG series	
									HL6335G series			HL6356MG series	
												HL6724MG	
										7		HL6740FG**	HL6354MG series
										10	635	HL6319G series	HL6333MG series
									HL6331G series			HL6347MG series	
									HL6343G series				
											670	HL6714G	
										12	639		HL6358MG series
									658			HL6554MG series (UD)	
										15	635	HL6321G series	
										25	639		HL6360MG series
									690				HL6323MG
										35	690		HL6738MG
													HL8334MG
										40	830	HL8325G	
											850		HL8335MG
										50	640		HL6362MG series
									785			HL7851G series	
									830			HL8337MG series (UD)	
									852(+/-10)			HL8340MG series (UD)	
											852(+/-4)		HL8342MG series (UD)
										50*	658		HL6501MG
										55	685		HL6750MG
										65	642		HL6364DG series
										70	664	HL6555G	
										70*	658		HL6512MG
													HL6513FM
										90	642		HL6366DG series
										100	660	HL6548FG	
										130	660	HL6553FG	
										140*	658		HL6525MG
													HL6526FM
										300*	660		HL6545MG

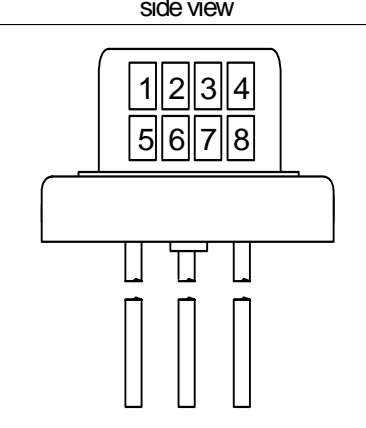
*: pulse optical power and pulse operation

** : exceptional cathode common

Section 7 Mark Layout and Internal Circuit

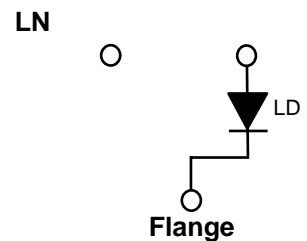
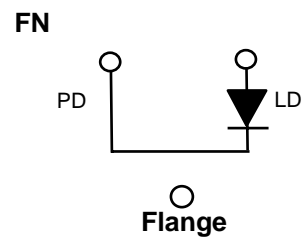
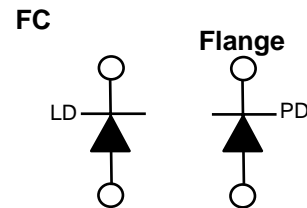
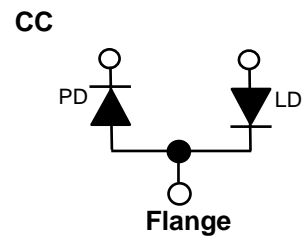
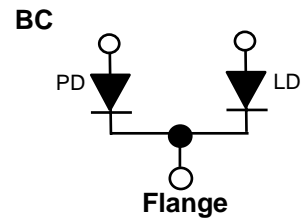
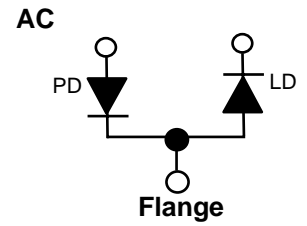
Mark Layout

Layout	I	II
Outline	G	MG / FM
Mark Method	Stamp Mark	
Mark Layout	bottom view	
		
The first character	Mark No.	←
The second character		←
The third character		←
The fourth character		←

Layout	III	
Outline	G / DG / FG / MG / FM / SU	
Mark Method	Laser Mark	
Mark Layout	side view	
		
The first character	Mark No.	
The second character		
The third character		Year code : last character
The fourth character		Monthly code : below table
The five-eight characters		Management code of Opnext

Month	1	2	3	4	5	6	7	8	9	10	11	12
Code	A	B	C	D	E	F	G	H	J	K	L	M

Internal Circuit



Note : Each specification of LDs is on Section 3 "Optical and Electrical Characteristics of Visible LDs".

Section 8 Package Outlines



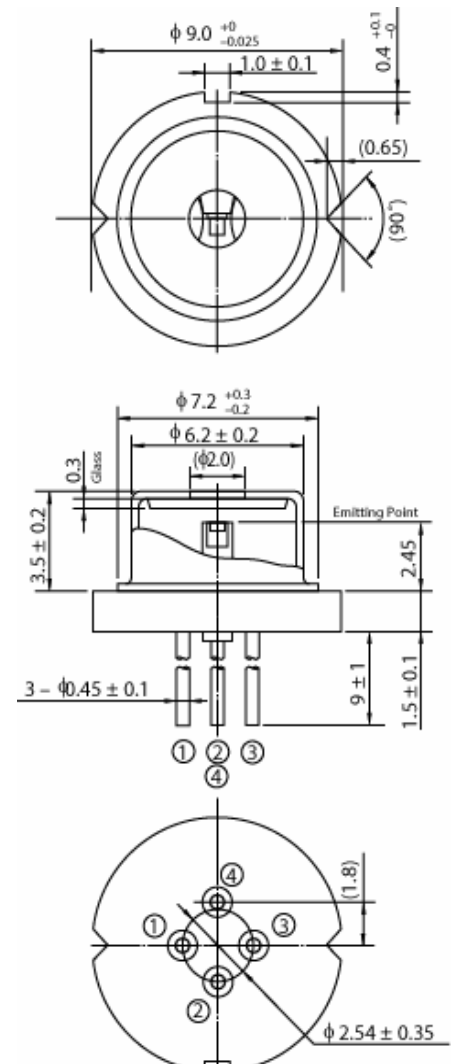
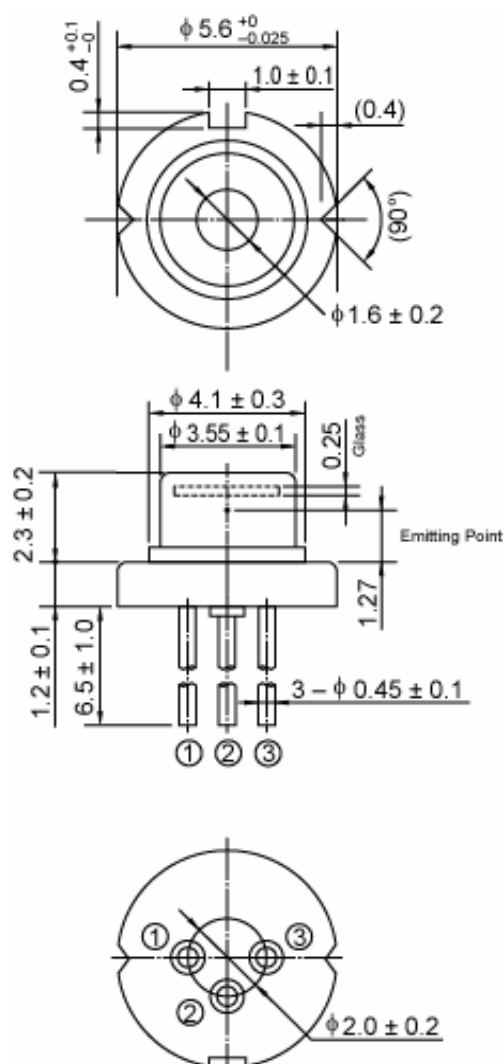
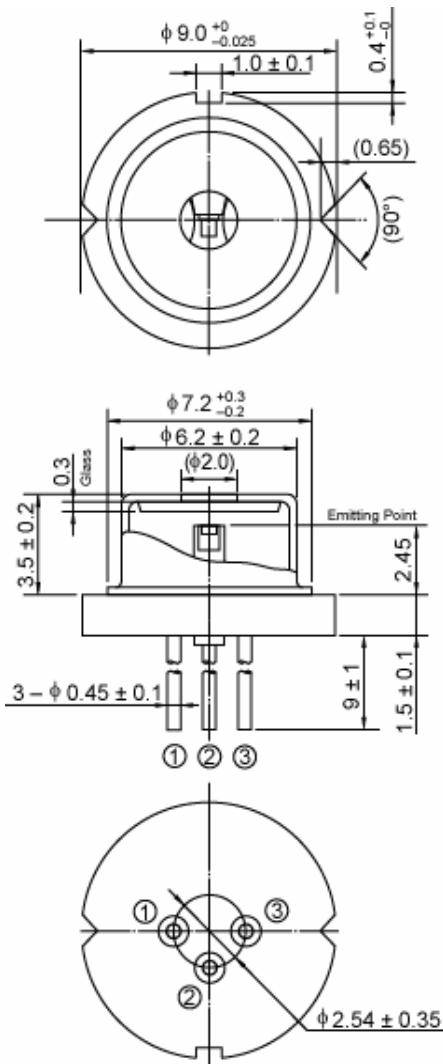
G-outline



MG/F M-outline



FG-outline

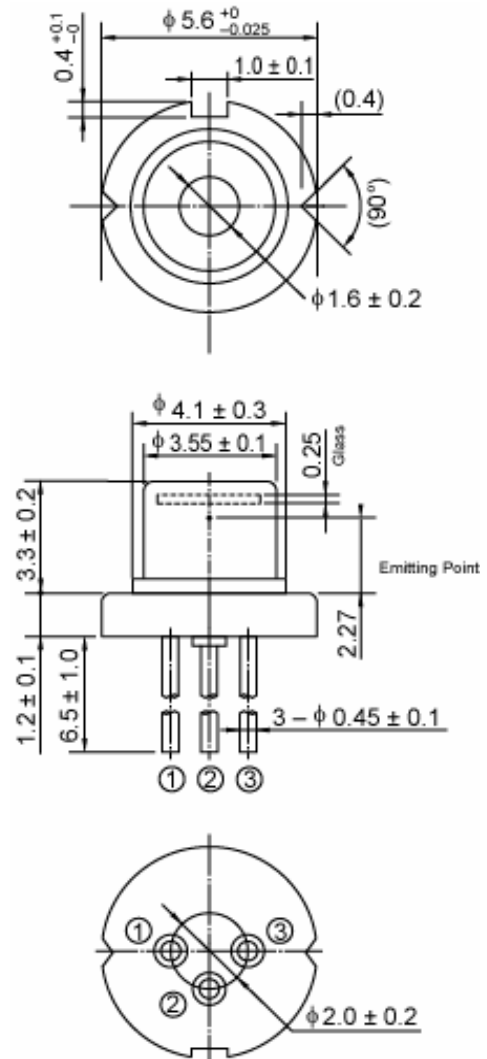
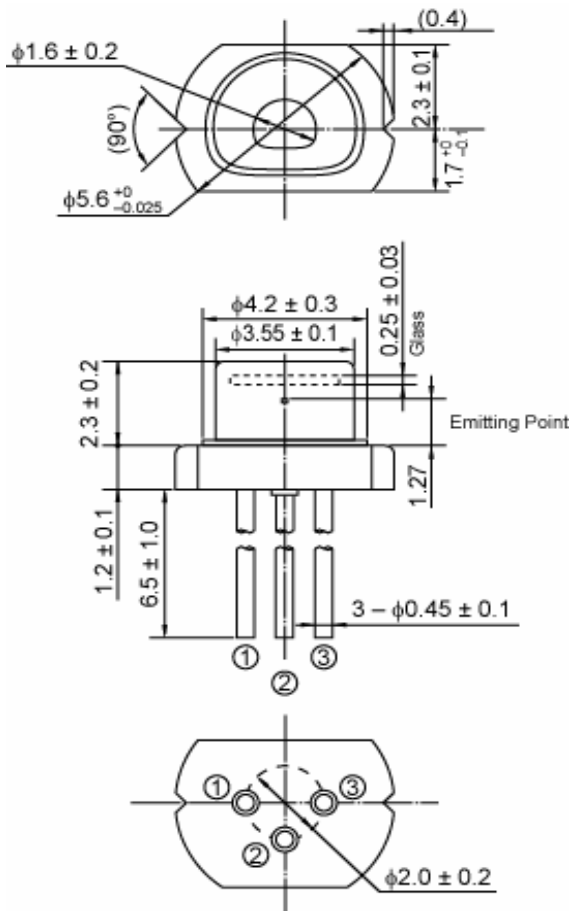


Note : Beam point (Emitting point) is measured by mechanical dimension from datum plane.



SU-outline

DG-outline



Note : Beam point (Emitting point) is measured by mechanical dimension from datum plane.

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