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2212K⑥-1000Ei①

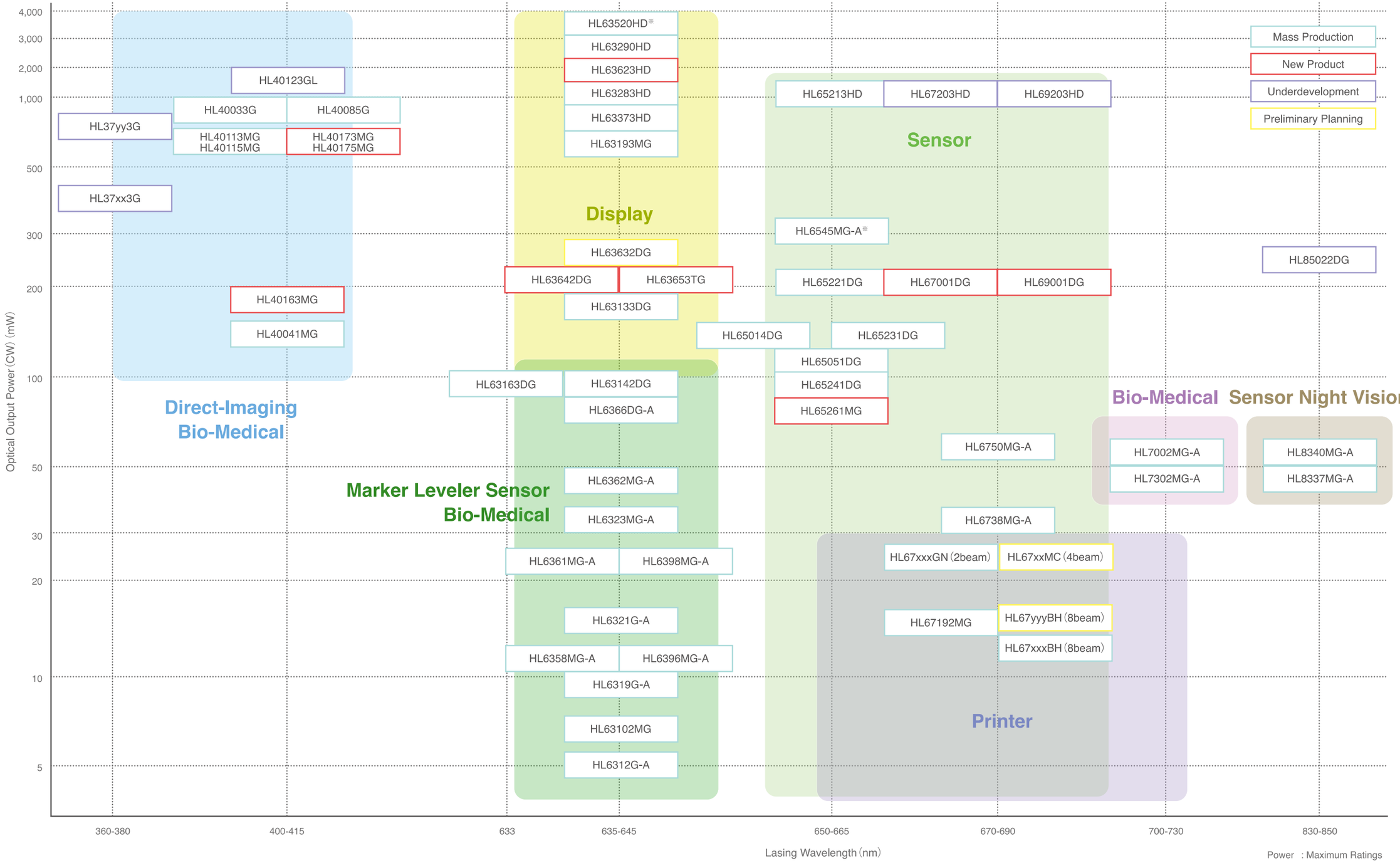
USHIO *Applying Light to Life*


# Opto Devices

Product Information

## Laser Diode

# Product Map




Power : Maximum Ratings
※ pulse : pulse optical power

# Laser Diode Line Up

| Part Number | Internal Circuit *5 | Maximum Ratings | | Po (mW) | Ith (mA) | Iop (mA) | Vop (V) | Is (mA) | λp (nm) | θ// ( °) | θ⊥ ( °) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Po (mW) | Topr (℃) | | | | | | | | |
| HL40041MG*1 | CC | 150 | -10 to 50 | 150 | 60 | 150 | 4.5 | 0.2 | 404 | 13*3 | 45*3 |
| HL40093MG*1 | FN | 500 | 0 to 30 | 400 | 110 | 370 | 4.9 | - | 404 | 13*3 | 42*3 |
| HL40163MG | FN | 210 | -5 to 85 | 175 | 35 | 150 | 5 | - | 405 | 9 | 20 |
| HL40071MG | CC | 360 | 0 to 70 | 300 | 50 | 280 | 6 | 0.09 | 405 | 6 | 15 |
| HL40113MG*1 | FN | 700 | 0 to 30 | 600 | 110 | 500 | 4.2 | - | 405 | 13*3 | 45*3 |
| HL40115MG*1 | BC | 700 | 0 to 30 | 600 | 110 | 550 | 4.2 | 2 | 405 | 13*3 | 45*3 |
| HL40173MG*1 | FN | 700 | 0 to 30 | 600 | 110 | 500 | 4.2 | - | 405 | 13*3 | 42*3 |
| HL40175MG*1 | BC | 700 | 0 to 30 | 600 | 110 | 500 | 4.2 | 2 | 405 | 13*3 | 42*3 |
| HL40033G*1 | FN | 1,000 | 0 to 30 | 1,000 | 320 | 1,000 | 4.3 | - | 405 | 13*3 | 42*3 |
| HL40085G*1 | BC | 1,000 | 0 to 30 | 1,000 | 320 | 1,000 | 4.3 | 1.3 | 405 | 13*3 | 42*3 |
| HL63163DG | FN | 100 | -10 to 40 | 100 | 70 | 170 | 2.6 | - | 633 | 8.5 | 18 |
| HL63101MG | CC | 7 | -10 to 60 | 5 | 15 | 20 | 2.2 | 0.2 | 637 | 8 | 34 |
| HL63102MG | AC | 7 | -10 to 60 | 5 | 15 | 20 | 2.2 | 0.2 | 637 | 8 | 34 |
| HL63142DG | AC | 120 | -10 to 50 | 100 | 50 | 140 | 2.7 | 0.3 | 637 | 8 | 18 |
| HL63253MG*1*6 | FN | 450 | -10 to 40 | 450 | 200 | 600 | 2.2 | - | 637 | 8.5 | 33 |
| HL63283HD*1 | FN | 1,200 (1,500*2) | -10 to 45 | 1,200 | 340 | 1,300 | 2.3 | - | 637 | 10 | 33 |
| HL6388MG-A*1*6 | LN | 250 | -10 to 50 | 250 | 100 | 340 | 2.3 | - | 637 | 11 | 40 |
| HL6354MG-A*6 | AC | 7 | -10 to 50 | 5 | 20 | 27 | 2.2 | 0.4 | 638 | 8 | 25 |
| HL6355MG-A*6 | CC | 7 | -10 to 50 | 5 | 20 | 27 | 2.2 | 0.4 | 638 | 8 | 25 |
| HL6312G-A | AC | 5 | -10 to 50 | 5 | 45 | 55 | 2.3 | 0.4 | 638 | 8 | 31 |
| HL6319G-A | CC | 10 | -10 to 50 | 10 | 50 | 70 | 2.3 | 0.17 | 638 | 8 | 31 |
| HL6320G-A | AC | 10 | -10 to 50 | 10 | 50 | 70 | 2.3 | 0.17 | 638 | 8 | 31 |
| HL6321G-A | CC | 15 | -10 to 50 | 15 | 55 | 85 | 2.5 | 0.2 | 638 | 8 | 30 |
| HL6322G-A | AC | 15 | -10 to 50 | 15 | 55 | 85 | 2.5 | 0.2 | 638 | 8 | 30 |
| HL63603TG*6 | FN | 120 | -10 to 60 | 120 | 50 | 165 | 2.7 | - | 638 | 8.5 | 18 |
| HL63133DG | FN | 170 | -10 to 40 | 170 | 60 | 250 | 2.8 | - | 638 | 9 | 17 |
| HL63192DG*1 | AC | 700 | -10 to 40 | 700 | 200 | 820 | 2.2 | 2 | 638 | 9 | 35 |
| HL63193MG*1 | FN | 700 | -10 to 40 | 700 | 200 | 820 | 2.2 | - | 638 | 9 | 35 |
| HL63373HD*1 | FN | 1,100 | -10 to 45 | 1,000 | 200 | 1,000 | 2.4 | - | 638 | 10 | 35 |
| HL63623HD*1 | FN | 1,600 (1,900*2) | -10 to 55 | 1,500 (1,800*2) | 420 | 1,550 (1,850*2) | 2.25 | - | 638 | 10 | 33 |
| HL63290HD*1 | FN | 2,200*4 (2,800*2*4) | -10 to 55 | 2,200 (2,800*2) | 600 | 2,400 (2,800*2) | 2.4 | - | 638 | 10 | 33 |
| HL63520HD*1 | FN | 2,400*4 (3,500*2*4) | -10 to 55 | 2,400 (3,500*2) | 570 | 2,400 (3,300*2) | 2.4 | - | 638 | 10 | 33 |
| HL63391DG*6 | CC | 200 | -10 to 60 | 200 | 65 | 255 | 2.8 | 0.8 | 639 | 8.5 | 14 |
| HL63392DG*6 | AC | 200 | -10 to 60 | 200 | 65 | 255 | 2.8 | 0.8 | 639 | 8.5 | 14 |
| HL6358MG-A | AC | 12 | -10 to 50 | 10 | 30 | 40 | 2.3 | 1 | 639 | 8 | 21 |
| HL6359MG-A | CC | 12 | -10 to 50 | 10 | 30 | 40 | 2.3 | 1 | 639 | 8 | 21 |
| HL6395MG-A | CC | 12 | -10 to 60 | 10 | 45 | 55 | 2.3 | 0.07 | 639 | 9 | 21 |
| HL6396MG-A | AC | 12 | -10 to 60 | 10 | 45 | 55 | 2.5 | 0.07 | 639 | 9 | 21 |
| HL6360MG-A | AC | 25 | -10 to 50 | 20 | 45 | 65 | 2.5 | 0.2 | 639 | 9 | 21 |
| HL6361MG-A | CC | 25 | -10 to 50 | 20 | 45 | 65 | 2.5 | 0.2 | 639 | 9 | 21 |
| HL6397MG-A | CC | 25 | -10 to 60 | 20 | 45 | 65 | 2.3 | 0.2 | 639 | 9 | 21 |
| HL6398MG-A | AC | 25 | -10 to 60 | 20 | 45 | 65 | 2.3 | 0.2 | 639 | 9 | 21 |
| HL6323MG-A | AC | 35 | -10 to 50 | 30 | 45 | 95 | 2.3 | 0.15 | 639 | 8.5 | 30 |
| HL63641DG | CC | 210 | -40 to 60 | 200 | 50 | 225 | 2.7 | 0.25 | 639 | 8 | 14 |
| HL63642DG | AC | 210 | -40 to 60 | 200 | 50 | 225 | 2.7 | 0.25 | 639 | 8 | 14 |
| HL63643DG | FN | 210 | -40 to 60 | 200 | 50 | 225 | 2.7 | - | 639 | 8 | 14 |
| HL63653TG | FN | 210 | -10 to 60 | 200 | 50 | 230 | 2.7 | - | 640 | 8 | 14 |
| HL6362MG-A | AC | 45 | -10 to 60 | 40 | 45 | 90 | 2.4 | 0.3 | 640 | 10 | 21 |
| HL6363MG-A | CC | 45 | -10 to 50 | 40 | 45 | 90 | 2.4 | 0.3 | 640 | 10 | 21 |



| Part Number | Internal Circuit *5 | Maximum Ratings | | Po (mW) | Ith (mA) | Iop (mA) | Vop (V) | Is (mA) | λp (nm) | θ// ( °) | θ⊥ ( °) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Po (mW) | Topr (℃) | | | | | | | | |
| HL6364DG-A*6 | AC | 65 | -10 to 50 | 60 | 65 | 125 | 2.5 | 0.4 | 642 | 10 | 21 |
| HL6365DG-A*6 | CC | 65 | -10 to 50 | 60 | 65 | 125 | 2.5 | 0.4 | 642 | 10 | 21 |
| HL6366DG-A | AC | 90 | -10 to 50 | 80 | 80 | 155 | 2.5 | 0.3 | 642 | 10 | 21 |
| HL6367DG-A | CC | 90 | -10 to 50 | 80 | 80 | 155 | 2.5 | 0.3 | 642 | 10 | 21 |
| HL6385DG-A*6 | LN | 150 | -10 to 40 | 150 | 110 | 280 | 2.6 | - | 642 | 9 | 17 |
| HL65014DG | LN | 150 | -10 to 40 | 150 | 110 | 280 | 2.6 | - | 648.5 | 9 | 17 |
| HL6501MG-A*6 | CC | 35 (50*2) | -10 to 60 | 30 (50*2) | 45 | 85 | 2.6 | 0.3 | 658 | 8.5 | 22 |
| HL65261MG | CC | 85 (310*2) | -10 to 60<br>-10 to 75*2 | 80 (300*2) | 30 | 90 | 2.6 | 0.6 | 658 | 7.5 | 15 |
| HL65262MG | AC | 85 (310*2) | -10 to 60<br>-10 to 75*2 | 80 (300*2) | 30 | 90 | 2.6 | 0.6 | 658 | 7.5 | 15 |
| HL65263MG | FN | 85 (310*2) | -10 to 60<br>-10 to 75*2 | 80 (300*2) | 30 | 90 | 2.6 | - | 658 | 7.5 | 15 |
| HL65264MG | LN | 85 (310*2) | -10 to 60<br>-10 to 75*2 | 80 (300*2) | 30 | 90 | 2.6 | - | 658 | 7.5 | 15 |
| HL65213HD*1 | FN | 1,200 | -10 to 45 | 1,200 | 450 | 1,350 | 2.3 | - | 659 | 10 | 33 |
| HL65051DG | CC | 130 | -10 to 60 | 120 | 60 | 175 | 2.5 | 0.4 | 660 | 10 | 17 |
| HL65055DG | BC | 130 | -10 to 60 | 120 | 60 | 175 | 2.5 | 0.4 | 660 | 10 | 17 |
| HL65241DG | CC | 110 (220*2) | -10 to 90 | 100 (200*2) | 60 | 145 | 2.45 | 0.35 | 660 | 7 | 15 |
| HL65242DG | AC | 110 (220*2) | -10 to 90 | 100 (200*2) | 60 | 145 | 2.45 | 0.35 | 660 | 7 | 15 |
| HL65243DG | FN | 110 (220*2) | -10 to 90 | 100 (200*2) | 60 | 145 | 2.45 | 0.35 | 660 | 7 | 15 |
| HL6544FM-A*6 | FN | 130 | -10 to 75 | 50 | 60 | 115 | 2.3 | - | 660 | 10 | 17 |
| HL6545MG-A | LN | 130 (300*2) | -10 to 75 | 120 (300*2) | 60 | 175 | 2.5 | - | 660 | 10 | 17 |
| HL65231DG | CC | 160 (320*2) | -10 to 75 | 150 (300*2) | 60 | 190 | 2.55 | 0.55 | 660 | 7.5 | 15 |
| HL65232DG | AC | 160 (320*2) | -10 to 75 | 150 (300*2) | 60 | 190 | 2.55 | 0.55 | 660 | 7.5 | 15 |
| HL65233DG | FN | 160 (320*2) | -10 to 75 | 150 (300*2) | 60 | 190 | 2.55 | 0.55 | 660 | 7.5 | 15 |
| HL65221DG | CC | 210 (420*2) | -10 to 75 | 200 (400*2) | 60 | 230 | 2.7 | 0.7 | 660 | 8 | 15 |
| HL65222DG | AC | 210 (420*2) | -10 to 75 | 200 (400*2) | 60 | 230 | 2.7 | 0.7 | 660 | 8 | 15 |
| HL65223DG | FN | 210 (420*2) | -10 to 75 | 200 (400*2) | 60 | 230 | 2.7 | 0.7 | 660 | 8 | 15 |
| HL6714G-A*6 | AC | 10 | -10 to 50 | 10 | 30 | 50 | 2.2 | 0.9 | 670 | 8 | 22 |
| HL6748MG-A*6 | AC | 10 | -10 to 60 | 10 | 20 | 30 | 2.2 | 1 | 670 | 8 | 25 |
| HL67191MG | CC | 16 | -10 to 70 | 15 | 15 | 30 | 2.25 | 1.5 | 670 | 7.5 | 24 |
| HL67192MG | AC | 16 | -10 to 70 | 15 | 15 | 30 | 2.25 | 1.5 | 670 | 7.5 | 24 |
| HL6756MG-A*6 | AC | 15 | -10 to 60 | 15 | 20 | 35 | 2.3 | 1.5 | 670 | 8 | 24 |
| HL67001DG | CC | 210 | -5 to 75 | 200 | 55 | 225 | 2.7 | 0.7 | 675 | 8 | 15 |
| HL67203HD (UD) | FN | 1300 | -10 to 75 | 1200 | 360 | 1380 | 2.2 | - | 675 | 12 | 32 |
| HL6750MG-A | CC | 55 | -10 to 70 | 50 | 30 | 75 | 2.3 | 0.12 | 685 | 9 | 21 |
| HL6738MG-A | CC | 35 (50*2) | -10 to 70 | 30 (50*2) | 45 | 90 | 2.5 | 0.1 | 690 | 8.5 | 19 |
| HL69001DG | CC | 210 | -5 to 75 | 200 | 50 | 230 | 2.75 | 0.7 | 690 | 8 | 15 |
| HL69203HD (UD) | FN | 1300 | -10 to 75 | 1200 | 330 | 1340 | 2.2 | - | 690 | 12 | 31 |
| HL7001MG-A | CC | 50 | -10 to 60 | 40 | 30 | 75 | 2.5 | 0.3 | 705 | 9 | 18 |
| HL7002MG-A | AC | 50 | -10 to 60 | 40 | 30 | 75 | 2.5 | 0.3 | 705 | 9 | 18 |
| HL7301MG-A | CC | 50 | -10 to 60 | 40 | 30 | 75 | 2.5 | 0.3 | 730 | 9 | 18 |
| HL7302MG-A | AC | 50 | -10 to 60 | 40 | 30 | 75 | 2.5 | 0.3 | 730 | 9 | 18 |
| HL83013MG | FN | 50 | -10 to 60 | 50 | 20 | 75 | 1.9 | 0.25 | 830 | 9 | 22 |
| HL8337MG-A | AC | 50 | -10 to 60 | 50 | 20 | 75 | 1.9 | 0.25 | 830 | 9 | 22 |
| HL8338MG-A | CC | 50 | -10 to 60 | 50 | 20 | 75 | 1.9 | 0.25 | 830 | 9 | 22 |
| HL8340MG-A | AC | 50 | -10 to 60 | 50 | 20 | 75 | 1.9 | 0.25 | 852 | 9 | 22 |
| HL8341MG-A | CC | 50 | -10 to 60 | 50 | 20 | 75 | 1.9 | 0.25 | 852 | 9 | 22 |

(UD): Under development *1 Multi transverse mode (The other products without *1 are single transverse mode) *2 Pulse optical power and pulse operation
*3 Full angle, ⅛ *4 Typical PO at maximum current rating *5 Please refer to the following diagrum for internal circuit *6 NRND: Not Recommended for New Design

# Part Numbering

Example 1 : HL6545MG-A

**HL 65 45 MG –A**
(a) (b) (c) (e) (f)

Example 2 : HL63101MG

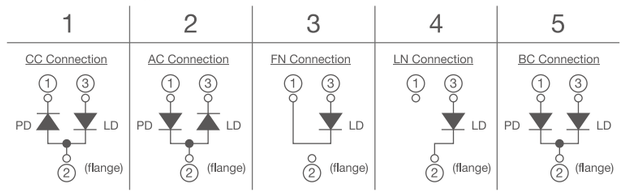
**HL 63 10 1 MG**
(a) (b) (c) (d) (e)

**(a)** HL: Ushio Laser Diode
**(b)** Wavelength: (first 2-number of wavelength)
37: 375nm 69: 690nm
40: 404~405nm 70: 705nm
63: 633~642nm 73: 730nm
65: 648.5~660nm 83: 830nm (or 850nm)
67: 670~690nm
**(c)** 45: Serial Number
**(d)** 1: Internal Circuit(assigned either 1, 2, 3, 4or 5)

**(e)** MG: Package Type (CAN package)
G, HD: ⌀9.0mm MG: ⌀5.6mm(short can)
DG: ⌀5.6mm (tall can) TG: ⌀3.8mm
**(f)** -A: RoHS compliant*

* All of current available Ushio are RoHS compliant
* All products with new numbering like example 2 are RoHS compliant. (Therefore, No "-A". )

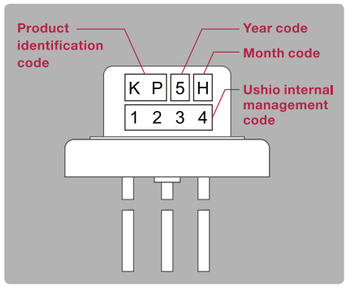
Internal circuit diagrum




# Marking

## Package Type : MG, DG, G, FM, HD

combination of numerical and alphabetical letters are laser marked on cap.




1st line :

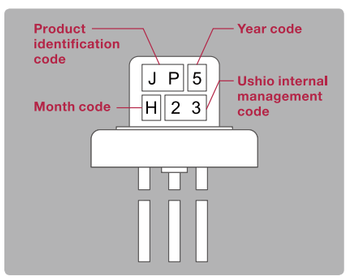
**1st and 2nd letters :**
**Product identification code**
If code is one character, 1st line is 3 characters.
**3rd letter : Year code**
The year code is the last number of the produced year.
(ex; "5" means the year 2015)
**4th letter : Month code**
The month code is marked with alphabet character. (see Table-1)

2nd line :

**5th to 8th letters :**
**Ushio internal management code**

## Package Type : TG

combination of numerical and alphabetical letters are laser marked on cap.




1st line :

**1st and 2nd letters :**
**Product identification code**
**3rd letter : Year code**
The year code is the last number of the produced year.
(ex; "5" means the year 2015)

2nd line :

**4th letter : Month code**
The month code is marked with alphabet character. (see Table-1)
**5th to 6th letters :**
**Ushio internal management code**

Table-1) Month code

| 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 |



# History of Ushio Laser Diode

## Product Development History (Laser Diode)

1978 IRED awarded "IR100".
1979 830nm LD awarded "IR100".
1980 World first shipment of 830nm LD.
1983 World first shipment of 830nm high power LD for Optical Disc.
1984 World first shipment of 780nm LD for printer.
1989 Started 670nm LD shipment for pointer
2005 Started shipment of high efficiency Red LD with Air Ridge Structure
2006 World first shipment of 640nm/40mW LD and 642nm/60mW LD
2007 World first shipment of 642nm/80mW LD
2008 World first released of 642nm/150mW LD for Show Laser and 705nm/50mW for Medical
2010 World first release of 638nm/120mW LD for small Projector
2011 Started shipment of Violet high power (404nm/400mW) LD for industrial market.
2013 Started shipment of 633nm/100mW LD for Biomedical and Inspection
2014 Started shipment of 638nm/700mW LD for Projector and Laser TV.
2019 Started shipment of 638nm/3.5W Pulse LD for Projector and Laser TV.
2021 Started shipment of 675nm/690nm/200mW LD for Medical and Quantum technology
2022 Started shipment of 405nm/600mW LD for Direct Imaging
2022 Started Shipment of 639nm/200mW LD for Sensing and Measurement

# Global Networks

We deliver our products developed and produced in Japan through global networks