# 1310 CWDFB Flipchip Product

## High Power DFB Laser Source

## (50mW CW DFB Flipchip)

The DS-DF30501D-TM-DP is an InGaAsP-based and uncooled distributed feedback laser optimized for data comm application. Denselight's advanced technology enables mode-hop-free tunability, high power, excellent SMSR, and high accuracy of lasing wavelength.

## FEATURES

- Uncooled operation from -5 to 75°C
- Min output power of 50mW at 75°C, 360mA (typical)
- Lasing wavelength of 1310 nm
- Typical SMSR ≥ 35dB
- Designed for CW transmission

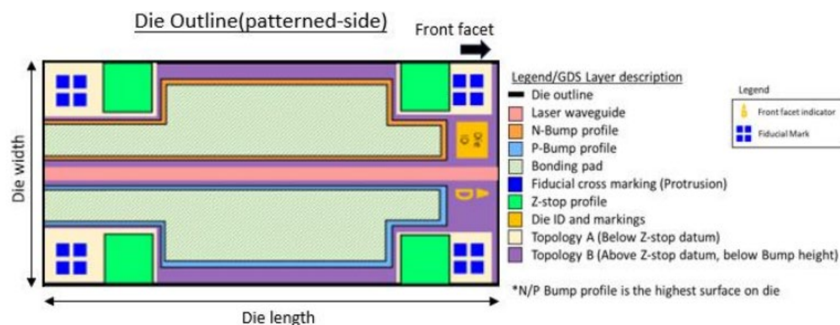
## APPLICATIONS

* CW laser
* Ethernet/Datacenter Interconnect
* Si Ph 400G/800G optical module
* Si Ph based light engine
* CPO Application

## ELECTRICAL AND OPTICAL CHARACTERISTICS

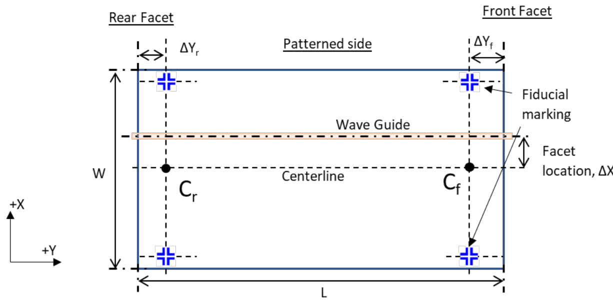
| Parameter | Symbol | Conditions | Min | Typical | Max | Unit |
|---|---|---|---|---|---|---|
| Optical Output Power | $P_o$ | $T_{chip}$,$I_{op}$ | 50 | - | - | mW |
| Center wavelength | $\lambda_c$ | $T_{chip}$,$I_{op}$ | 1307 | 1310 | 1313 | nm |
| Threshold current | $I_{th}$ | 25°C | - | 40 | - | mA |
| | | 75°C | - | 90 | - | mA |
| Operating current | $I_{op}$ | $T_{chip}$ | - | 360 | 400 | mA |
| Forward voltage | $V_f$ | $V_{op}$ | - | 1.5 | 1.8 | V |
| Slope efficiency | $\eta_s$ | $T_{chip}$,$I_{op}$ | 0.2 | - | - | W/A |
| Side Mode Suppression Ratio | SMSR | $I_{op}$(full range) | 35 | - | - | dB |
| Wavelength change with temperature | $\Delta\lambda/\Delta T$ | $I_{op}$(full range) | 0.09 | 0.1 | 0.11 | nm/°C |
| Far Field Divergence Angle Horizontal | $\theta_H$ | CW, FWHM | - | 16 | - | degree |
| Far Field Divergence Angle Vertical | $\theta_V$ | CW, FWHM | - | 20 | - | Degree |

## PHYSICAL CHARACTERISTICS



## a. Chip Dimensions and optical facet

| Symbol | Description | unit | Tolerance | Typical | Remarks |
|---|---|---|---|---|---|
| L | Die length | µm | +/- 6 | 1000 | Die outline length |
| W | Die width | µm | +/- 6 | 500 | Die outline width |
| t | Die thickness | µm | +/- 10 | 100 | Base of die to highest profile |
| ΔX | Waveguide offset (x-axis) | µm | +/- 0.1 | 0 | Waveguide offset from centerline |
| $ΔY_f$ | Front facet offset (y-axis) | µm | +/- 3 | +55 | Facet location from fiducial marking |
| $ΔY_r$ | Rear facet offset (y-axis) | µm | +/- 3 | -55 | Facet location from fiducial marking |




| Description | unit | Tolerance | Typical | Remarks |
|---|---|---|---|---|
| Bonding pad | µm | +/-1 | > 70 | Smallest feature > 80um |
| Z-stop pedestal size | µm | +/-5 | 100 x 100 | |
| Fiducial marking size | µm | +/-5 | 100 x 100 | For both patterned and back side of die |
| Fiducial marking linewidth | µm | +/-1 | > 5 | |
| Alignment error between patterned and back fiducial markings | µm | +/-10 | 0 | for waveguide alignment, use the patterned-side fiducials as reference |

## b. Die topology and optical axis height profile

| Layer | Profile | unit | Tolerance | Typical | Remarks |
|---|---|---|---|---|---|
| 1 | Bond pad | um | +/-0.5 | 4.4 | Bonding surface to SiPh platform |
| 2 | Optical axis | um | +/-0.01 | -0.11 | Aligned to platform waveguide height |
| 3 | Topology A | um | - | -1.42 to 0.0 | Features below Z-stop datum |
| 4 | Topology B | um | - | 0.0 to 4.5 | Features above Z-stop datum |
| 5 | Fiducial marking surface | um | +/-0.01 | 0.0 | Same height as Z-stop surface |