# HL1566AF

1.55 µm Laser Diode with EA Modulator

HITACHI

## Description

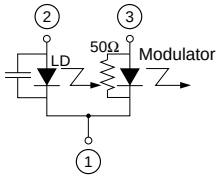
The HL1566AF is a 1.55 µm InGaAsP distributed-feedback laser diode (DFB-LD) with a multi-quantum well (MQW) structure. An electroabsorption (EA) modulator is integrated with the laser diode. It is suitable as a light source for high-bit-rate, long haul fiberoptic communication systems, such as 2.5 Gbps external modulation systems for up to 600 km.

## Features

- Long wavelength output: $\lambda p$ = 1550 nm Typ.
- High extinction ratio: 13 dB Min. at $V_{R(EA)}$ = –2 V
- Fast pulse response: tr/tf ≤ 80 ps
- Dynamic single longitudinal mode: Sr = 40 dB Typ.
- Package: open air package (chip on carrier) with micro strip-line

Package Type
• HL1566AF: AF

Internal Circuit
• HL1566AF



## Absolute Maximum Ratings ($T_C$ = 25°C)

| Item | Symbol | Value | Unit |
|---|---|---|---|
| LD forward current | $I_F$ | 100 | mA |
| Laser diode reverse voltage | $V_{R(LD)}$ | 2 | V |
| Modulator reverse voltage | $V_{R(EA)}$ | –5 | V |
| Operating Temperature | Topr | 10 to 40 | °C |
| Storage temperature[*1] | Tstg | –40 to 85 | °C |

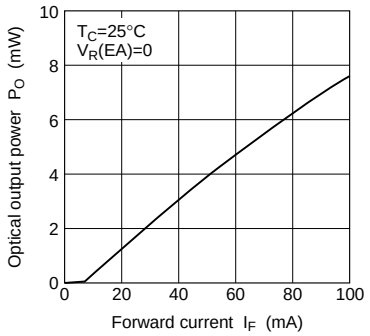
Note: 1. without condensation

## Optical and Electrical Characteristics ($T_C$ = 25°C)

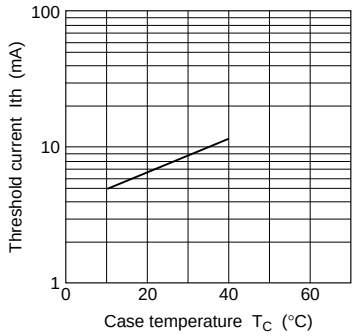
| Item | Symbol | Min | Typ | Max | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| Threshold current | Ith | — | 10 | 20 | mA | |
| Optical output power | $P_O$ | 3.5 | — | — | mW | $I_{F(LD)}$ = 50 mA, $V_{R(EA)}$ = 0 V |
| Extinction ratio | ER | 13 | — | — | dB | $I_{F(LD)}$ = 50 mA, $V_{R(EA)}$ = 0/–2 V |
| Lasing wavelength | λp | 1530 | 1550 | 1570 | nm | 2.5 Gbps (NRZ) |
| Side-mode suppression ratio | Sr | 30 | 40 | — | dB | 2.5 Gbps (NRZ) |
| Beam divergence (parallel) | θ// | — | 30 | — | deg. | $P_O$ = 3.5 mW, FWHM |
| Beam divergence (perpendicular) | θ⊥ | — | 40 | — | deg. | $P_O$ = 3.5 mW, FWHM |
| Rise time | tr | — | — | 80 | ps | 2.5 Gbps (NRZ) |
| Fall time | tr | — | — | 80 | ps | 2.5 Gbps (NRZ) |
| Cutoff frequency | $S_{21}$ | 4 | — | — | GHz | $I_{F(LD)}$ = 50 mA, $V_{R(EA)}$ = –1 V |
| RF return loss | $S_{11}$ | 10 | — | — | dB | $I_{F(LD)}$ = 50 mA, $V_{R(EA)}$ = –1 V, f ² 3 GHz |

## Typical Characteristics Curves

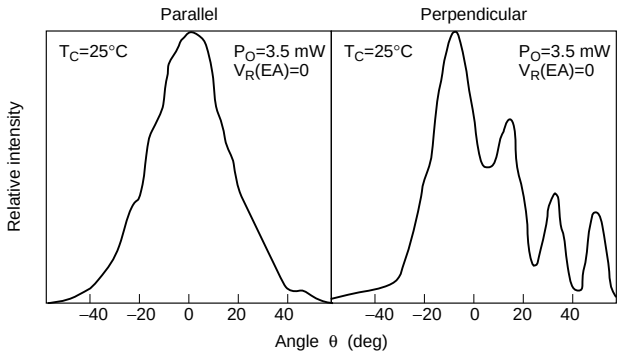
Optical Output Power vs. Forward Current




Threshold Current vs. Case Temperature

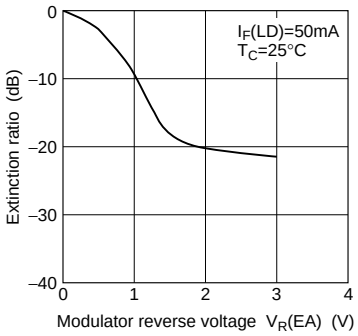



Far Field Pattern



## Typical Characteristics Curves (cont)

Extinction Ratio vs. Modulator Reverse Voltage




Bit Error Rate vs. Received Power