

Description

The HL1321AC/BF/DL/DM and HLP5400 are 1.3 μm band InGaAsP laser diodes with a double heterostructure. They are suitable as light sources for optical fiber communication systems and various types of optical equipment.

Features

- Long wavelength oscillation:
 $\lambda_p = 1270$ to 1330 nm (AC, HLP5400)
- Long wavelength oscillation:
 $\lambda_p = 1290$ to 1330 nm (BF, DL, DM)
- Room temperature
5mW CW operation (AC, HLP5400)
- High speed pulse response: $t_r, t_f \leq 0.5$ ns
- Attached single mode fiber (BF, DL, DM)
- High output:
 $P_f = 1.2$ mW (CW, pulse operation) (BF, DL)
- High output:
 $P_f = 1.5$ mW (CW, pulse operation) (DM)

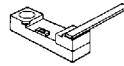
Fiber Specifications (BF, DL, DM only)

Mode field diameter: 10.0 ± 1.0 μm
Cutoff wavelength: 1.10 to 1.20 μm
Core diameter: 10 μm
External diameter: 125 μm
Jacket diameter: 900 μm
Fiber length: More than 500 mm

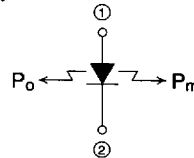
Package Type

- HL1321AC: AC

- HLP5400: A1



Internal Circuit



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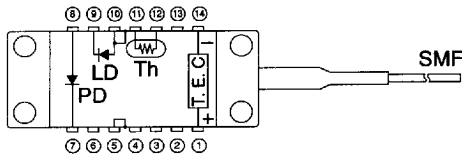
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HL1321AC/BF/DL/DM, HLP5400

Pin Connections (Bottom view)

• HL1321BF

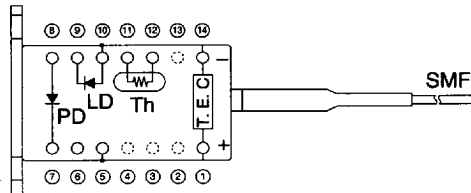


LD: Laser diode
PD: Photodiode
Th: Thermistor
T. E. C.: T. E. cooler
SMF: Single-mode fiber

- ① T.E.C. anode
- ② N. C.
- ③ N. C.
- ④ N. C.
- ⑤ Case
- ⑥ N. C.
- ⑦ PD cathode
- ⑧ PD anode
- ⑨ LD cathode
- ⑩ LD anode (case)
- ⑪ Thermistor
- ⑫ Thermistor
- ⑬ N. C.
- ⑭ T. E. C. cathode

Package Type
• HL1321BF: BF

• HL1321DL

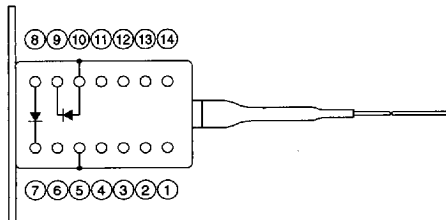


LD: Laser diode
PD: Photodiode
Th: Thermistor
T. E. C.: T. E. cooler
SMF: Single-mode fiber

- ① T.E.C. anode
- ② —
- ③ —
- ④ —
- ⑤ Case
- ⑥ N. C.
- ⑦ PD cathode
- ⑧ PD anode
- ⑨ LD cathode
- ⑩ LD anode (case)
- ⑪ Thermistor
- ⑫ Thermistor
- ⑬ —
- ⑭ T. E. C. cathode

Package Type
• HL1321DL: DL

• HL1321DM



- ① N. C.
- ② N. C.
- ③ N. C.
- ④ N. C.
- ⑤ Case
- ⑥ N. C.
- ⑦ PD cathode
- ⑧ PD anode
- ⑨ LD cathode
- ⑩ LD anode (case)
- ⑪ N. C.
- ⑫ N. C.
- ⑬ N. C.
- ⑭ N. C.

Package Type
• HL1321DM: DM

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Absolute Maximum Ratings ($T_C = 25^\circ\text{C}$)

Item		Symbol	Rated Value	Unit
Optical output power	HL1321AC / HLP5400	P_O	5	mW
Fiber optical output power	HL1321BF/DL	P_f	1.2	mW
	HL1321DM		1.5	
LD reverse voltage		V_R (LD)	2	V
PD reverse voltage	HL1321BF/DL/DM	V_R (PD)	15	V
PD forward current		I_F (PD)	1	mA
Cooler current	HL1321BF/DL	I_C	1.4	A
Operating temperature	HL1321AC/BF/DL	T_{opr}	0 to + 60	$^\circ\text{C}$
	HL1321DM		0 to + 65	
	HLP5400		0 to + 50	
Storage temperature	HL1321AC	T_{stg}	0 to + 80	$^\circ\text{C}$
	HL1321BF/DL		- 40 to + 70	
	HL1321DM		- 20 to + 70	
	HLP5400		0 to + 60	

Optical and Electrical Characteristics ($T_C = 25^\circ\text{C}$)

Item		Symbol	Min	Typ	Max	Unit	Test Conditions
Threshold current	HL1321AC/ BF/DM/DL	I_{th}	—	30	50	mA	
	HLP5400		—	30	80		
Optical output power	HL1321AC/ HLP5400	P_O	5	—	—	mW	Kink free
			1.5	3.0	—		$I_F = I_{th} + 20 \text{ mA}$
Fiber optical output power	HL1321BF/DL	P_f	1.2	—	—	mW	Kink free
			0.6	—	—		$I_F = I_{th} + 20 \text{ mA}$
	HL1321DM		1.5	—	—		Kink free
			0.75	—	—		$I_F = I_{th} + 20 \text{ mA}$
Monitor output	HL1321AC/ HLP5400	P_m	1.0	—	—	mW	$I_F = I_{th} + 20 \text{ mA}$
Lasing Wave-length	HL1321AC/ HLP5400	λ_p	1270	1300	1330	nm	$P_O = 3 \text{ mW}$
	HL1321BF/DL		1290	1310	1330		$P_f = 0.5 \text{ mW}$
	HL1321DM		1290	1310	1330		$P_f = 1.2 \text{ mW}$

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Optical and Electrical Characteristics (T_C = 25°C) (cont.)

Item		Symbol	Min	Typ	Max	Unit	Test Conditions
Spectral width at half power	HL1321AC/HLP5400	$\Delta\lambda$	—	2	—	nm	P _O = 3 mW
	HL1321BF/DL		—	2	—		P _f = 0.5 mW
	HL1321DM		—	2	—		P _f = 1.2 mW
Beam divergence (parallel)	HL1321AC/HLP5400	$\theta_{//}$	—	30	—	deg.	P _O = 3mW, FWHM
Beam divergence (perpendicular)		$\theta_{\perp}$	—	40	—	deg.	P _O = 3mW, FWHM
PD dark current	HL1321BF/DL/DM	I _{DARK}	—	—	350	nA	V _{R (PD)} = 5 V
Monitor current	HL1321BF/DL	I _S	50	—	—	μA	V _{R (PD)} = 5 V, P _f = 0.5 mW
	HL1321DM		100	—	—		V _{R (PD)} = 5 V, P _f = 1.2 mW
PD capacitance	HL1321BF/DL/	C _t	—	10	20	pF	V _{R (PD)} = 5 V, f = 1 MHz
Photosensitivity saturation bias voltage		V _{R(S)}	—	—	2	V	
Cooling capacity	HL1321BF/DL	ΔT	40	—	—	°C	P _f = 1.0 mW
Cooler current		I _C	—	—	1.4	A	ΔT = 40°C
Cooler voltage		V _C	—	—	1.8	V	ΔT = 40°C
Thermistor resistance		R _{TM}	—	10	—	kΩ	
Rise time		t _r	—	—	0.5	ns	
Fall time		t _f	—	—	0.5	ns	

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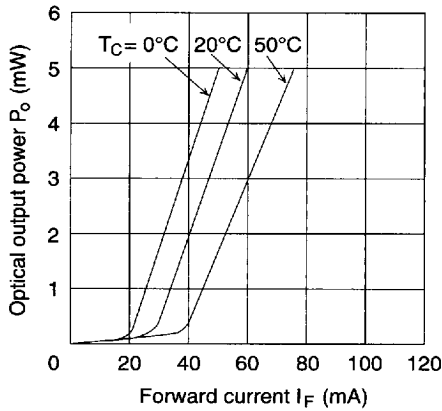
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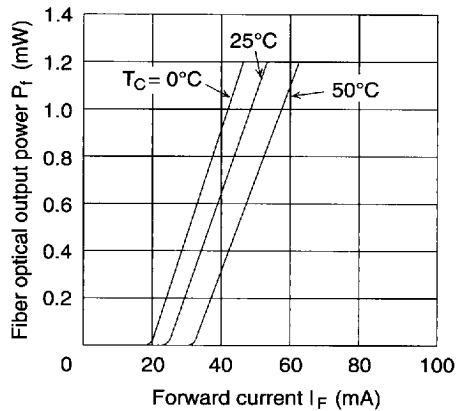
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Typical Characteristic Curves

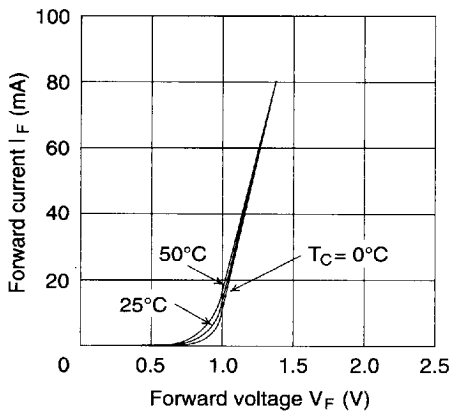
Optical Output Power vs. Forward Current
(HL1321AC, HLP5400)



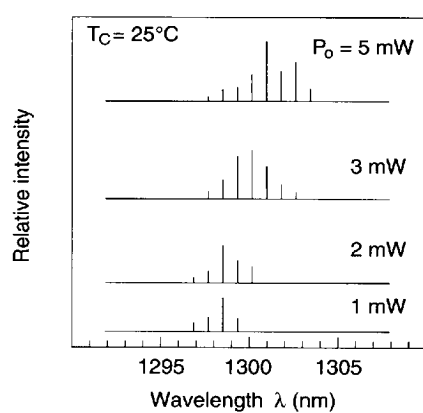
Optical Output Power vs. Forward Current
(HL1321BF, DL, DM)



Forward Current vs. Forward Voltage



Lasing Wavelength (HL1321AC, HLP5400)

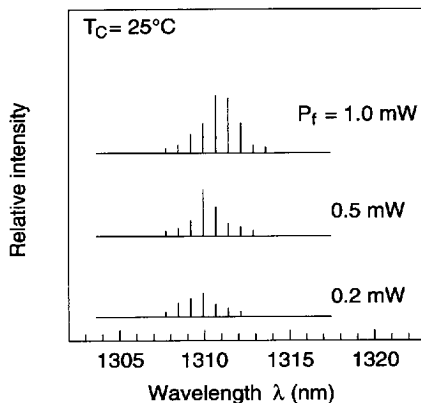


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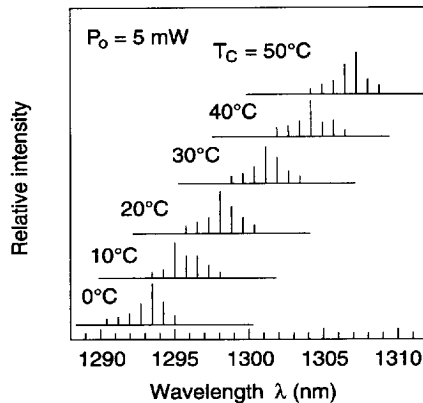
HL1321AC/BF/DL/DM, HLP5400

Typical Characteristic Curves (cont.)

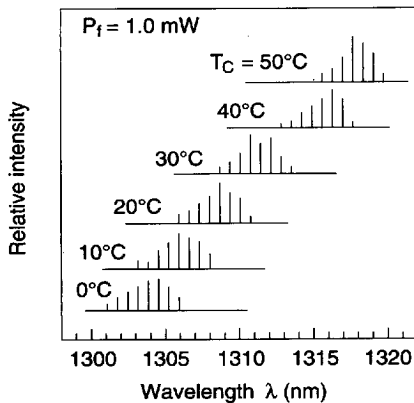
Lasing Wavelength (HL1321BF/DL/DM)



Lasing Wavelength Temperature Dependence (HL1321AC, HLP5400)



Lasing Wavelength Temperature Dependence (HL1321BF/DL/DM)



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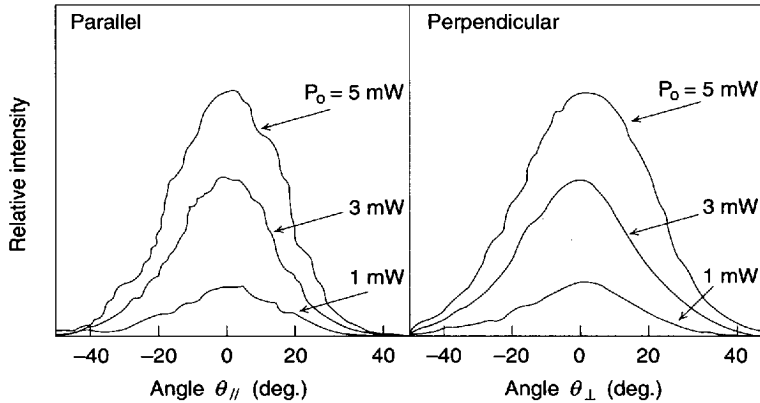
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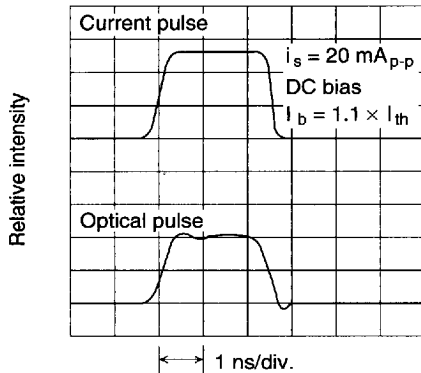
Typical Characteristic Curves (cont.)

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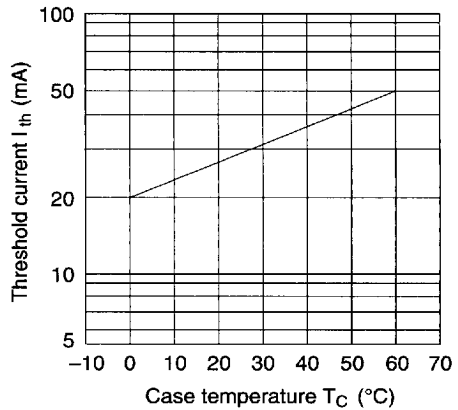
Far Field Pattern (HL1321AC, HLP5400)



Pulse Response Characteristics



Threshold Current vs. Case Temperature



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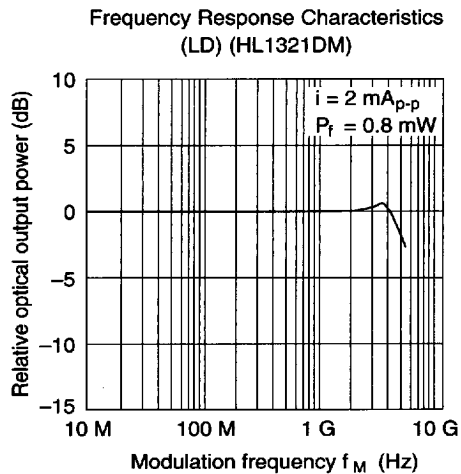
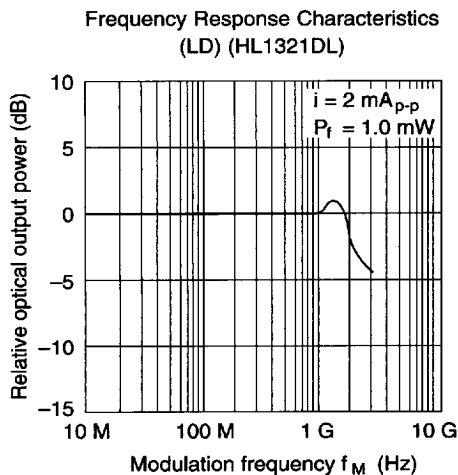
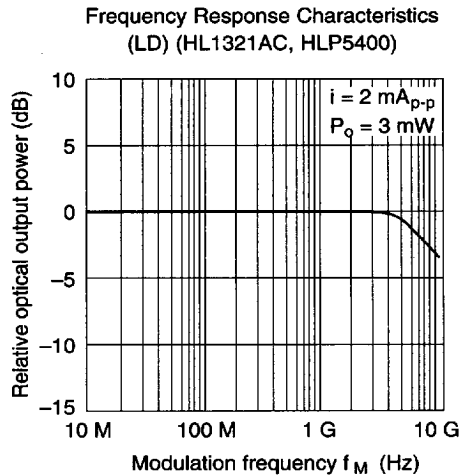
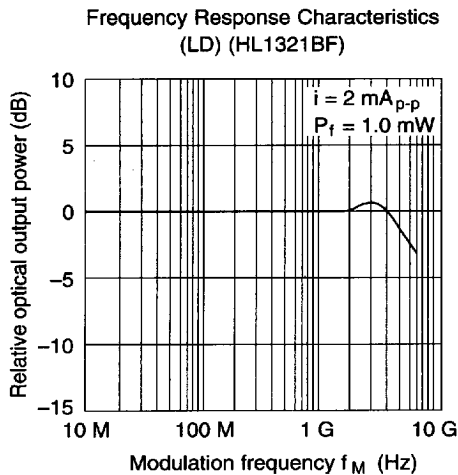
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Typical Characteristic Curves (cont.)



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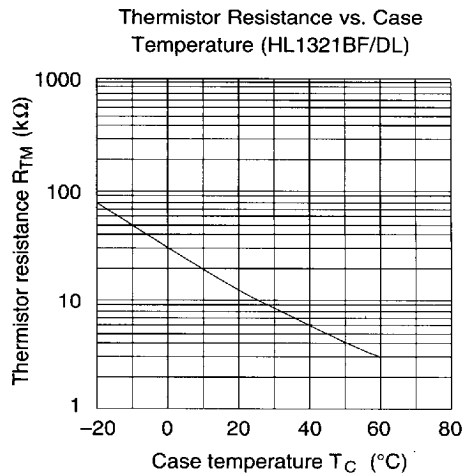
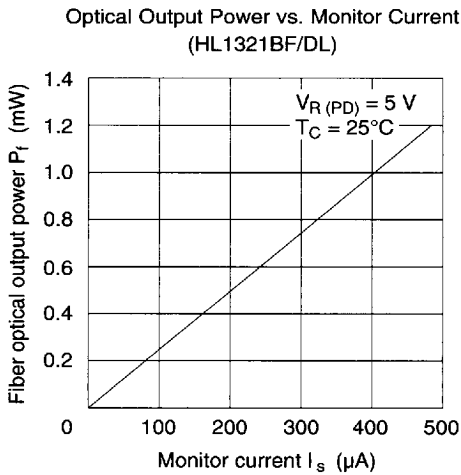
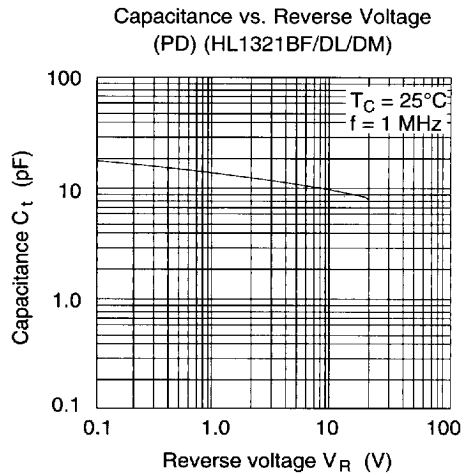
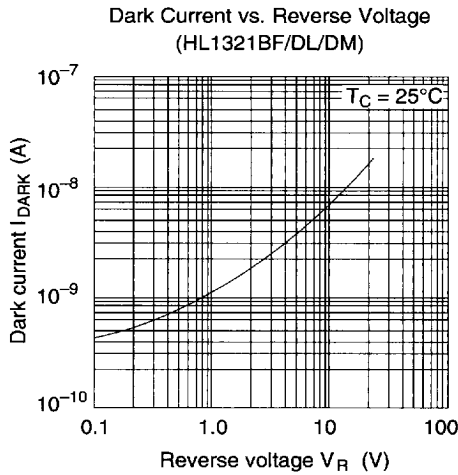
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Typical Characteristic Curves (cont.)



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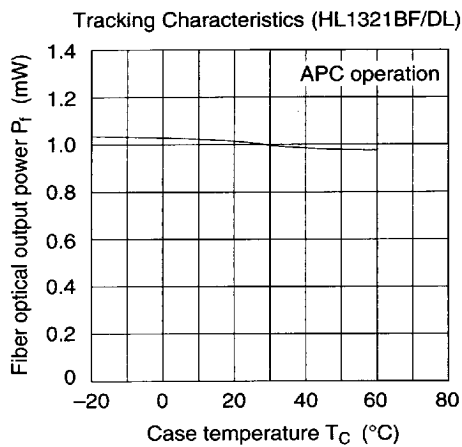
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Typical Characteristic Curves (cont.)



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