

**HL1521A/AC/FG****InGaAsP LD**

T-41-05

**Description**

The HL1521A/AC/FG are 1.55  $\mu\text{m}$  band laser diodes.

**Features**

- Long wavelength output:  $\lambda_p = 1530 - 1570 \text{ nm}$
- 5 mW CW operation at room temperature
- Built-in monitor photodiode (HL1521FG)
- Fast pulse response:  $t_r, t_f \leq 0.5 \text{ ns}$

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

Item	Symbol	Rated Value	Units
Optical output power	$P_O$	5	mW
LD reverse voltage	$V_{R(LD)}$	2	V
PD reverse voltage	HL1521FG $V_{R(PD)}$	15	V
PD forward current	HL1521FG $I_F(PD)$	1	mA
Operating temperature	$T_{opr}$	0 to +60	$^\circ\text{C}$
Storage temperature	HL1521A/AC $T_{stg}$	0 to +80	$^\circ\text{C}$
	HL1521FG $T_{stg}$	-40 to +80	$^\circ\text{C}$

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

Item	Symbol	Min	Typ	Max	Units	Test Conditions
Threshold current	$I_{th}$	—	30	50	mA	
Optical power output	HL1521A/AC $P_O$	5	—	—	mW	Kink free
		2.0	—	—		$I_F = I_{th} + 20 \text{ mA}$
	HL1521FG	5	—	—	mW	Kink free
		1.5	—	—		$I_F = I_{th} + 20 \text{ mA}$
Monitor output	HL1521A/AC $P_m$	0.45	—	—	mW	$I_F = I_{th} + 20 \text{ mA}$
Lasing wavelength	$\lambda_p$	1530	1550	1570	nm	$P_O = 3 \text{ mW}$
Spectral width	$\Delta\lambda$	—	2	—	nm	$P_O = 3 \text{ mW}$
Beam divergence (horizontal)	$\theta_{//}$	—	30	—	deg.	$P_O = 3 \text{ mW}$ , FWHM
Beam divergence (vertical)	$\theta_{\perp}$	—	40	—	deg.	$P_O = 3 \text{ mW}$ , FWHM
PD dark current	HL1521FG $I_{DARK}$	—	—	350	nA	$V_{R(PD)} = 5 \text{ V}$
Monitor current	HL1521FG $I_S$	50	—	—	$\mu\text{A}$	$V_{R(PD)} = 5 \text{ V}$ , $P_O = 3 \text{ mW}$
PD capacitance	HL1521FG $C_t$	—	10	20	pF	$V_{R(PD)} = 5 \text{ V}$ , $f = 1 \text{ MHz}$
Photosensitivity saturation bias current	HL1521FG $V_{R(S)}$	—	—	2	V	
Rise time	$t_r$	—	—	0.5	ns	$I_{bias} = I_{th}$ , 10 to 90 %
Fall time	$t_f$	—	—	0.5	ns	$I_{bias} = I_{th}$ , 90 to 10 %

**HITACHI**

# HL1521A/AC/FG

## Internal Circuit

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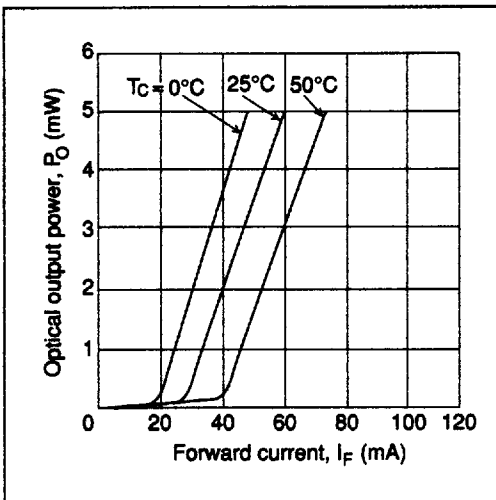
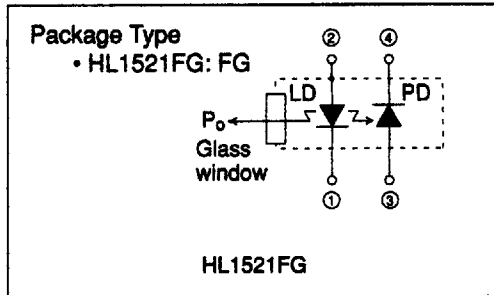
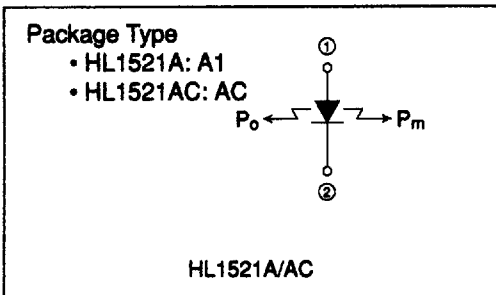


Figure 1 Optical Output Power vs. Forward Current

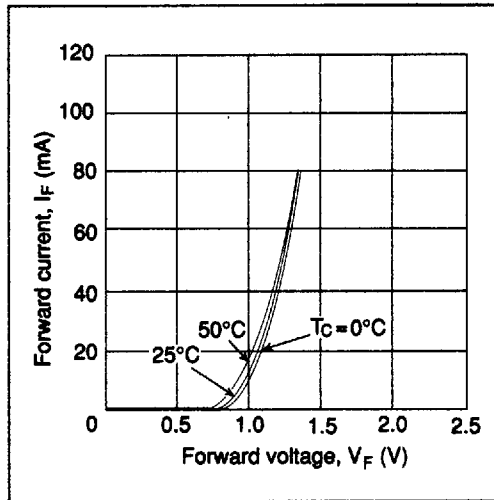
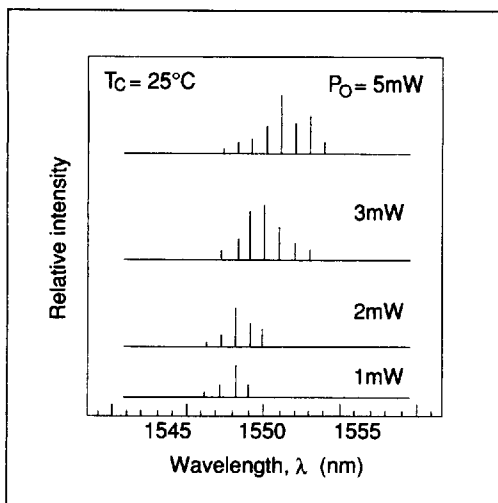
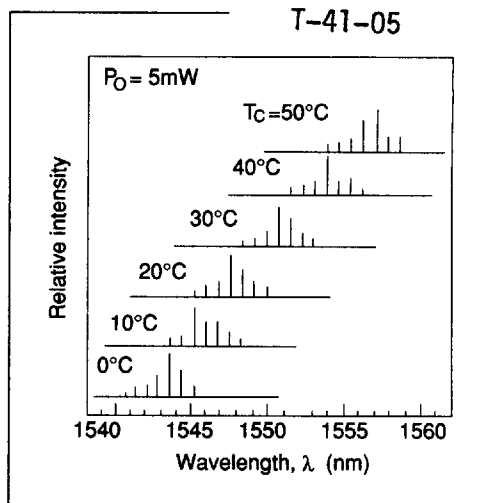


Figure 2 Forward Current vs. Forward Voltage

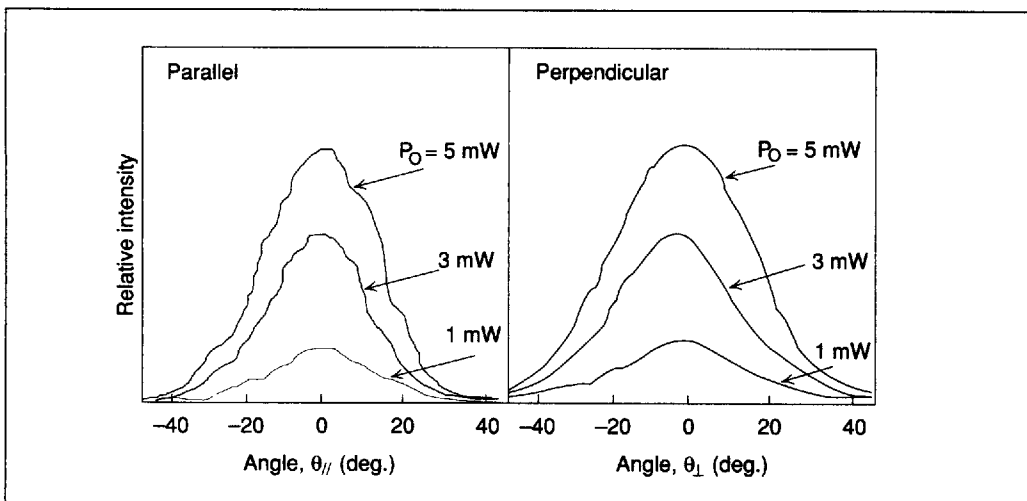
**HL1521A/AC/FG**



**Figure 3 Lasing Spectrum**



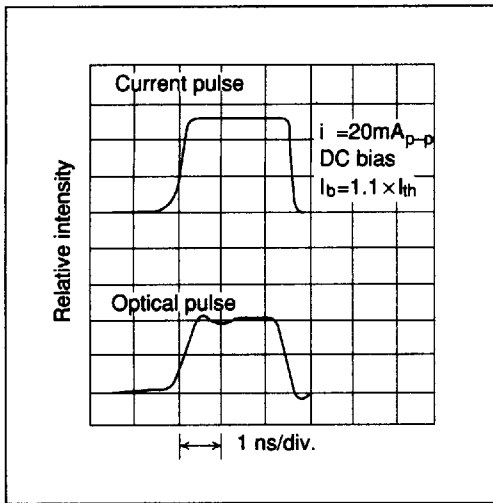
**Figure 4 Lasing Spectrum Temperature Dependence**



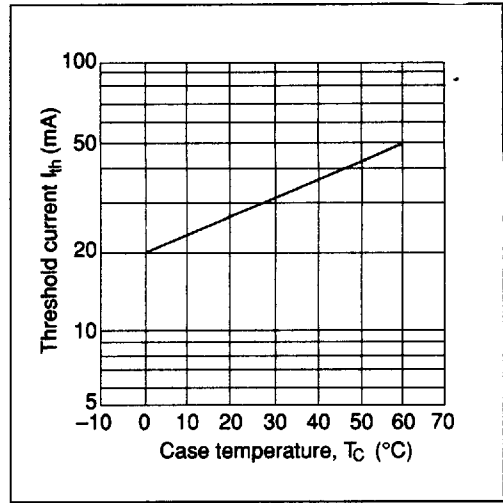
**Figure 5 Far Field Pattern**

**HL1521A/AC/FG**

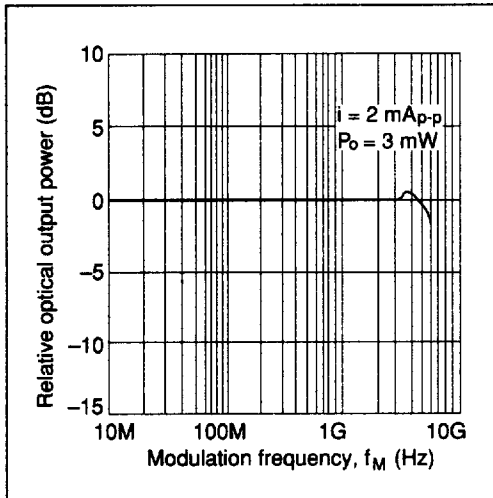
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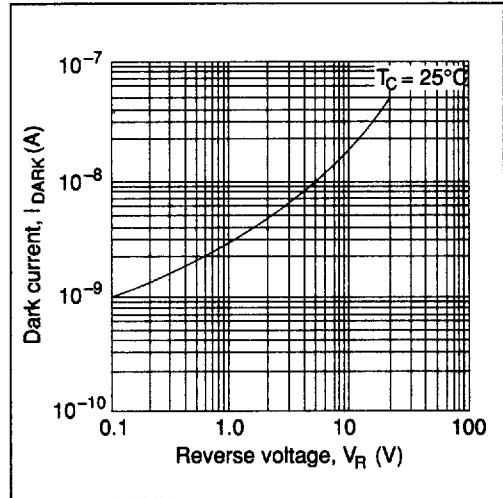
**Figure 6 Pulse Response Characteristics**



**Figure 7 Threshold Current vs. Case Temperature**

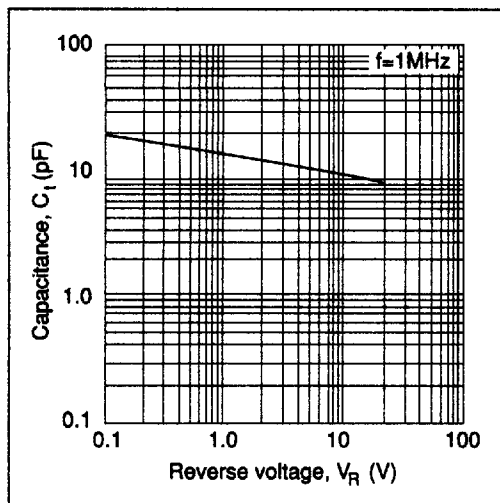


**Figure 8 Frequency Response Characteristics**

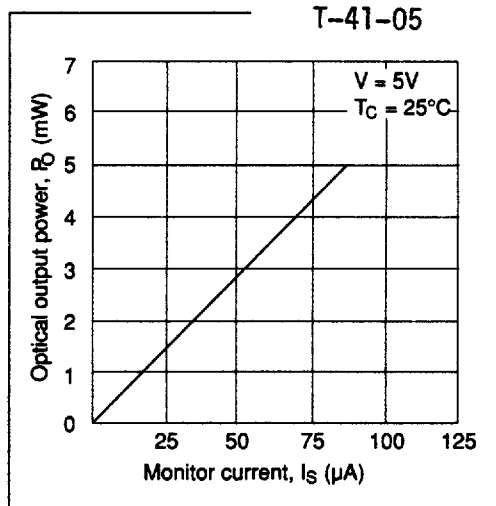


**Figure 9 Dark Current vs. Reverse Voltage (HL1521FG)**

**HL1521A/AC/FG**



**Figure 10** Capacitance vs. Reverse Voltage (HL1521FG)



**Figure 11** Optical Output Power vs. Monitor Current (HL1521FG)