GH5C105D3A/GH5C105D3B

Compact Size, Low Current Drive Hologram Laser for ×8 to ×12 Speed CD-ROM Drive(3-beam)

■ Features

(1) With built-in high speed OPIC*(TYP.20MHz) for ×8 to ×12 speed CD-ROM drive

(2) Enables to design compact pick-up thanks to compact package(Thickness: 4.8mm)

(3) Voltage output type(External noise solution is unnecessary.)

(4) Low current drive(Operating current:TYP.18mA)

(5) Maximum optical power output : 4.3mW*1

(6) Wavelength : 780nm

*OPIC : (Optical IC) is a trademark of the SHARP Corporation. An OPIC consists of a light-detecting element and signal-processing circuit integrated onto a single chip.
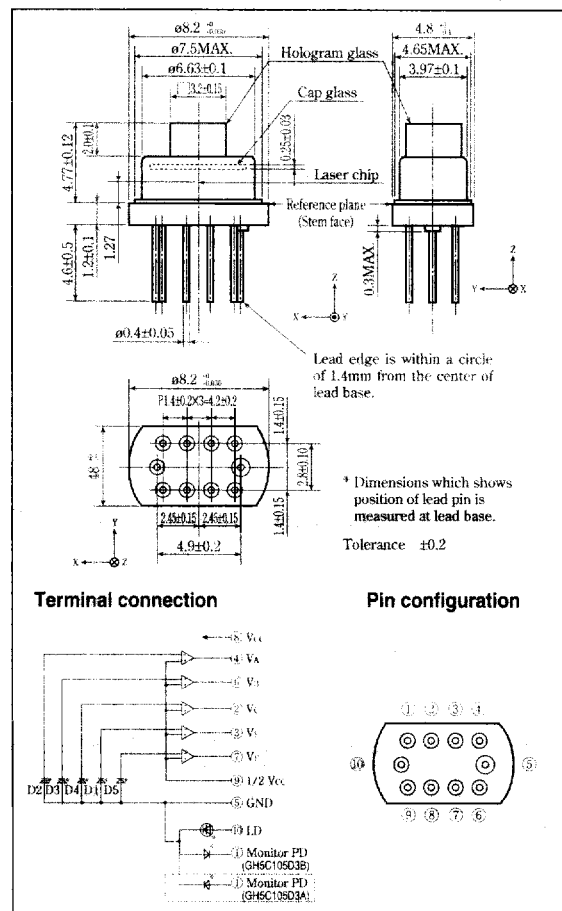
■ Model No.

(1) GH5C105D3A   Dual power supply
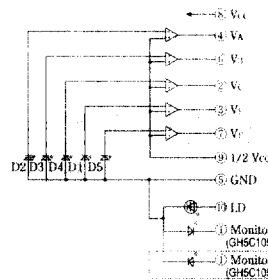
(2) GH5C105D3B   Single power supply

■ Applications

(1) ×8 to ×12 speed CD-ROM drives

(2) CD players etc.

■ Outline Dimensions
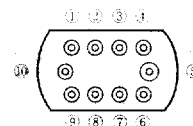(Unit : mm)

Terminal connection   **Pin configuration**

■ Absolute Maximum Ratings
(Tc=25°C)

Parameter		Symbol	Rating	Unit
*1 Optical power output		P_H	4.3	mW
Reverse voltage	Laser	V_R	2	V
	Monitor photodiode		30	V
OPIC supply voltage		V_{CC}	6	V
*2 Operating temperature		T_{opr}	-10 to +60	°C
*2 Storage temperature		T_{stg}	-40 to +85	°C
*3 Soldering temperature		T_{sold}	260(5s to less)	°C

*1 Output power from hologram laser

*2 Case temperature

*3 At the position of 1.6mm or more from the lead base

**SHARP**

■ Electro-optical Characteristics

(Vcc=5V, Tc=25°C)

Parameter	Symbol	Conditions		MIN.	TYP.	MAX.	Unit
[*1] Focal offset	DEF	V_{RF}=0.75V		-0.7	-	+0.7	μm
[*2] Focal error symmetry	B_{FES}	V_{RF}=0.75V		-25	-	+25	%
[*3] Radial error balance	B_{RES}	V_{RI}=0.75V		-25	-	+25	%
[*4] RF output amplitude	V_{RF}	P_H=3.0mW		0.53	1.20	2.10	V_{p-p}
[*5] FES output amplitude	V_{FES}	V_{RF}=0.75V		0.31	0.47	0.64	V_{p-p}
	I_{FES}						
[*6] RES output amplitude	V_{RES}	V_{RF}=0.75V		0.12	0.21	0.29	V_{p-p}
	I_{RES}						
Threshold current	I_{th}	—		-	13	18	mA
Operating current	I_{op}	P_H=2.7mW		-	18	22	mA
Operating voltage	V_{op}	P_H=2.7mW		-	1.8	2.2	V
Wavelength	λ_p	P_H=2.7mW		770	780	795	nm
Monitor current	I_m	P_H=2.7mW, V_R=15V	GH5C105D3A	0.048	0.13	0.24	mA
			GH5C105D3B	0.021	0.6	0.11	
Differential efficiency	η	$\dfrac{1.8mW}{I(2.7mW)-I(0.9mW)}$		-	0.65	-	mW/mA
Coherence	γ	P_O=1.5mW		-	-	0.95	-

[*1] Distance between FES=0 and jitter minimum point
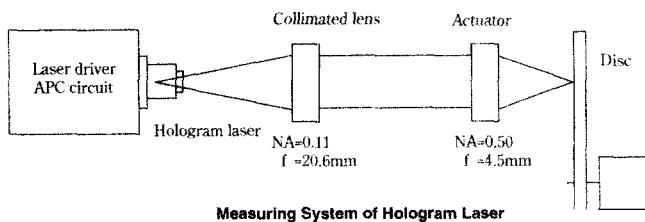At the condition of FES sensitivity = 20%/1μm

[*2] (a–b) / (a+b)

[*3] $\dfrac{a-b}{2\times(a+b)}$

a (+amplitude of FES)

b (–amplitude of FES)

GND

a (+amplitude of RES)
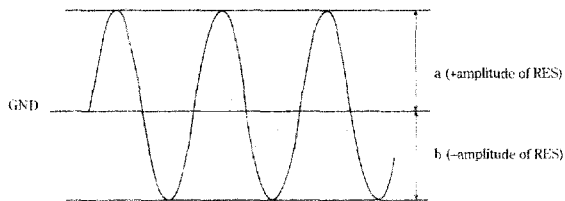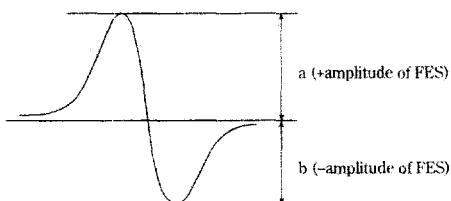
b (–amplitude of RES)

[*4] Amplitude of V_A+Va+2Vc (focal servo ON, radial servo ON)
[*5] V_B–V_A (Focal vibration)
[*6] V_E–V_F (focal servo ON, radial servo OFF)

Collimated lens   Actuator

Laser driver
APC circuit

Disc

Hologram laser

NA=0.11
f =20.6mm

NA=0.50
f =4.5mm

Measuring System of Hologram Laser

■ Electro-optical Characteristics of Laser Diode (Design Standard)

(Tc=25°C)

Parameter			Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Radiation characteristics	Symmetry	Parallel	SΗ	Po=3mW, into NA=0.11	-25	-	+25	%
		Perpendicular	S⊥		-15	-	+15	%
Emission point accuracy		Position	Δx	—	-80	-	+80	μm
			Δy	—	-80	-	+80	μm
			Δz	—	-80	-	+80	μm

■ Electrical Characteristics of Monitor Photodiode (Design Standard)

(Tc=25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
[7] Sensitivity	S	V_R=15V	-	0.048	-	mA/mW
Dark current	I_d	V_R=15V	-	-	150	nA
Terminal capacitance	C_t	V_R=15V	-	3.5	-	pF

[7] For hologram output power

■ Electro-optical Characteristics of OPIC for Siganal Detection (Design Standard)

(Tc=25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit	[8] Segment
Supply voltage	V_{CC}		2.5	-	5.5	V	-
Supply current	I_{CC}	V_{CC}=2.5V	2	5	10	mA	-
[9] Output off-set voltage	V_{OD}	V_{CC}=2.5V, No light	-25	0	+25	mV	V_A to F
Off-set voltage difference	ΔV_{OD}		-25	0	+25	mV	V_A-V_B,V_E-V_F
Response frequency	f_{CF}	[10] V_{CC}=5V, -3dB	3	5	-	MHz	V_A,V_B,V_C
	f_{CR}	[10] V_{CC}=5V, -3dB	0.2	0.7	-	MHz	V_E,V_F
Temperature coefficient of sensitivity	R_{plt}	Ta=-20 to +70°C	- / -	1660 / 1422	- / -	- / -	ppm/°C	V_A,V_B,V_C / V_E,V_F

[8] Applicable divisions correspond to pattern segment No.   [9] Difference from V_{CC}/2

[10] Output amplitude=0dB(input signal 100kHz)

Segment No.	output
D 1	V_E
D 2	V_A
D 3	V_B
D 4	V_C
D 5	V_F

D1	
D2	
D3	D4
D5	