GH6D407B5A/GH6D407B5B

3mm Thickness Resin Stem Hologram Laser for ×10 Speed DVD-ROM Drive

■ Features

(1) With built-in high speed response OPIC※ (MIN. 60MHz)

(2) For ×10 speed DVD-ROM drives

(3) Thin package (3.0mm thickness) due to insert frame structure

(4) For reading of low reflective disc (DVD-R, DVD-RAM, DVD-RW) due to built-in RF amp.

(5) With built-in beam splitter and diffraction grating

※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.
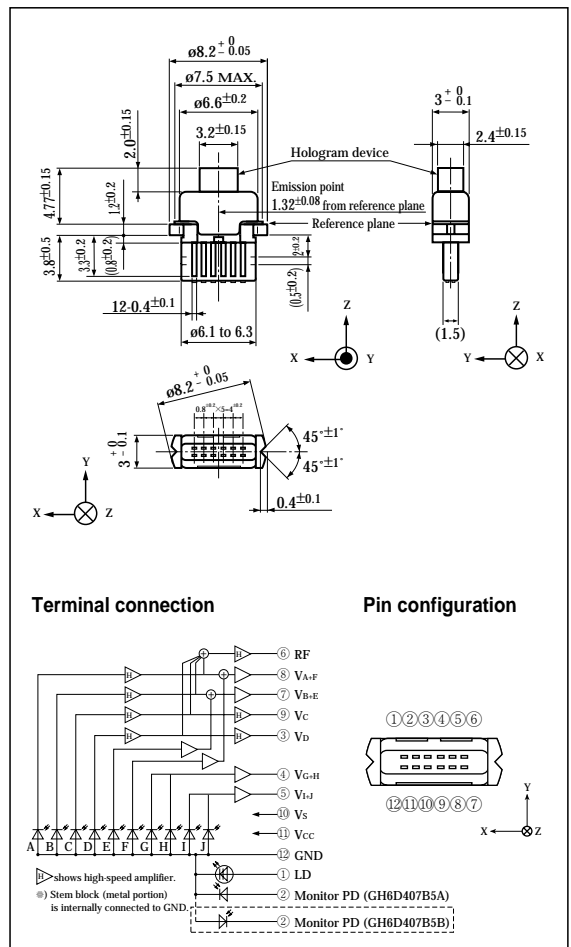
■ Model No.

(1) GH6D407B5A ....Dual power supply

(2) GH6D407B5B ....Single power supply

■ Applications

(1) DVD-ROM drives

(2) DVD-ROM drives for notebook PC

■ Outline Dimensions

(Unit : mm)

■ Absolute Maximum Ratings

(Tc=25°C)

Parameter		Symbol	Rating	Unit
※1 Optical power output		P_H	6.3	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 +70	°C
※2 Storage temperature		T_{stg}	-40 to +85	°C
※3 Soldering temperature		T_{sold}	260	°C

※1 Output power from hologram laser

※2 Case temperature

※3 At the position of 1.6mm or more from the lead base (Within 5s)

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■ Electro-optical Characteristics

(Vcc=5V, Vs=1/2Vcc, Tc=25°C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
[1] Focal offset		DEF	V_{RF}=1.0V	-0.5	-	+0.5	μm
[2] Focal error symmetry		B_{FES}	V_{RF}=1.0V	-25	-	+25	%
[3] Radial error balance		B_{RES}	P_H=4.75mW	-25	-	+25	%
[4] RF output amplitude		V_{RF}	P_H=4.75mW	0.75	1.05	1.35	V
[5] FES output amplitude		V_{FES}	V_{RF}=1.0V	0.51	0.66	0.83	V
[6] Main spot balance		MSB	P_H=4.75mW	75	(100)	125	%
[7] Radial spot balance		RSB	P_H=4.75mW	75	(100)	125	%
Jitter			V_{RF}=1.0V	-	-	12	%
Threshold current		I_{th}	−	-	27	35	mA
Operating current		I_{op}	P_H=4.75mW	-	36	49	mA
Operating voltage		V_{op}	P_H=4.75mW	-	2.2	2.7	V
Wavelength		λ_p	P_H=4.75mW	640	654	660	nm
Output current	GH6D407B5A	I_m	P_H=4.75mW, V_R=15V	0.055	(0.15)	0.26	mA
Differential efficiency		η_d	$\dfrac{3.8\text{mW}}{I(4.75\text{mW})\text{-}I(0.95\text{mW})}$	0.35	0.55	0.84	mW/mA

[1] Distance between FES=0 and jitter minimum point

[2] (a–b) / (a+b)

a (+amplitude of FES)

b (–amplitude of FES)

[3] DPD signal

$$\frac{a-b}{2\times(a+b)}$$
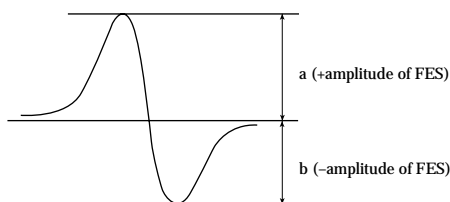
a (+amplitude of DPD)
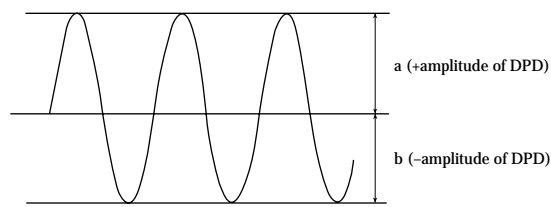
b (–amplitude of DPD)

[4] Amplitude of V_A+V_B+V_C+V_D (focal servo ON, radial servo ON)

[5] V_{A+F}–V_{B+E} (Focal vibration)

[6] (V_{A+F}+V_{B+E}) / (V_C+V_D) (focal servo ON, radial servo OFF)

[7] V_C / V_D (focal servo ON, radial servo OFF)

Laser driver
APC circuit

Hologram laser

Collimated lens

NA=0.13
f =19.07mm

Actuator

NA=0.60
f =3.3mm

Single layer DVD disc

Measuring System of Hologram Laser

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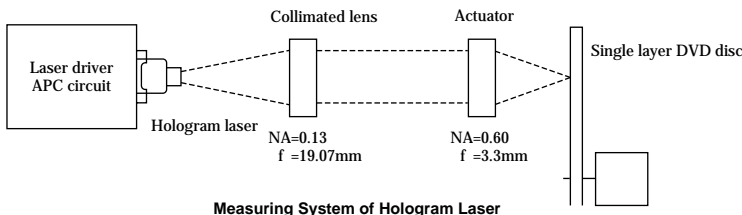
■ Electro-optical Characteristics of Laser Diode (Design Standard)　　(Tc=25℃)

Parameter			Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Half intensity angle		Parallel	θ//	Po=3mW	7	-	11	°
		Perpendicular	θ⊥		25	-	35	°
Emission characteristics	Deviation angle	Parallel	ø//		-2.1	-	+2.1	°
		Perpendicular	ø⊥		-3	-	+3	°
Misalignment position			Δx	−	-80	-	+80	µm
			Δy		-80	-	+80	µm
			Δz		-80	-	+80	µm
※6 Interference pattern intensity			α	Po=3mW	-	-	1	-

■ Electrical Characteristics of Monitor Photodiode (Design Standard)　　(Tc=25℃)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
※1 Sensitivity	S		-	0.032	-	mA/mW
Dark current	I_D	V_R=15V	-	-	1	nA
Terminal capacitance	C_t		-	8.5	-	pF

※1　For hologram output power

■ Electro-optical Characteristics of OPIC for Signal Detection (Design Standard)　　(Tc=25℃, Vcc=5V, Vs=2.5V)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit	※2 Segment
Supply voltage	V_{CC}	−	4.5	5.0	5.5	V	-
Reference voltage	V_s	−	2.0	2.5	2.63	V	-
Supply current	I_{CC}	−	10	17	24	mA	-
※3※4 Output off-set voltage	V_{OD1}	No light	-30	-	+30	mA	V_{AF}, V_{BE}, V_C, V_D, V_{GH}, V_{IJ}
	V_{OD2}		1.2	1.36	1.52	V	V_{RF}
Off-set voltage difference	ΔV_{OD1}		-25	-	+25	mV	V_{AF}-V_{BE}, V_C-V_D
	ΔV_{OD2}		-30	-	+30	mV	V_{GH}-V_{IJ}
※5 Response frequency	f_{CF1}	-3dB	1	5	-	MHz	V_{AF}, V_{BE}, V_{GH}, V_{IJ}
	f_{CF2}		60	90	-	MHz	V_C, V_D
	f_{CF3}		60	90	-	MHz	V_{RF}
Peaking level	V_{PK}	f=1 to 36MHz	-2	-	+2	dB	V_{RF}
Group delay	tgd	f=1 to 36MHz	-	5	10	ns	V_C, V_D, V_{RF}
Noise level	V_{mP}	f=36MHz, BW=30kHz	-	-74	-	dBm	V_{RF}

※2　Applicable divisions correspond to output terminals

G
C
H
E
A
B
F
I
D
J

Segment No.　　　　　Output
A + F ....V_{AF}
B + E ....V_{BE}
　C ....V_C
　D ....V_D
G + H ....V_{GH}
　I + J ....V_{IJ}

※3　Difference from Vs
※4　Difference from GND
※5　Output amplitude=0dB (input signal 1MHz)
　　Load resistance R_L=10kΩ, load capacitance C_L=10pF (For V_{RF}, load capacitance C_L=10pF)
※6　Noise solution against feed-back light (Radio frequency modulation circuit) is required.

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