GH5R495A3C

High Power Output Hologram Laser for ×16 Speed CD-R Drive

■ Features

(1) High power output (pulse MAX. 121mW)
(2) For ×16 speed CD-R, ×40 speed CD-ROM
(With built-in MIN. 45MHz OPIC※)
(3) High coupling efficiency
The ellipticity (θ⊥/θ//) is close to 1.
(4) ϕ4.8mm thickness
(5) With built-in beam splitter and diffraction grating

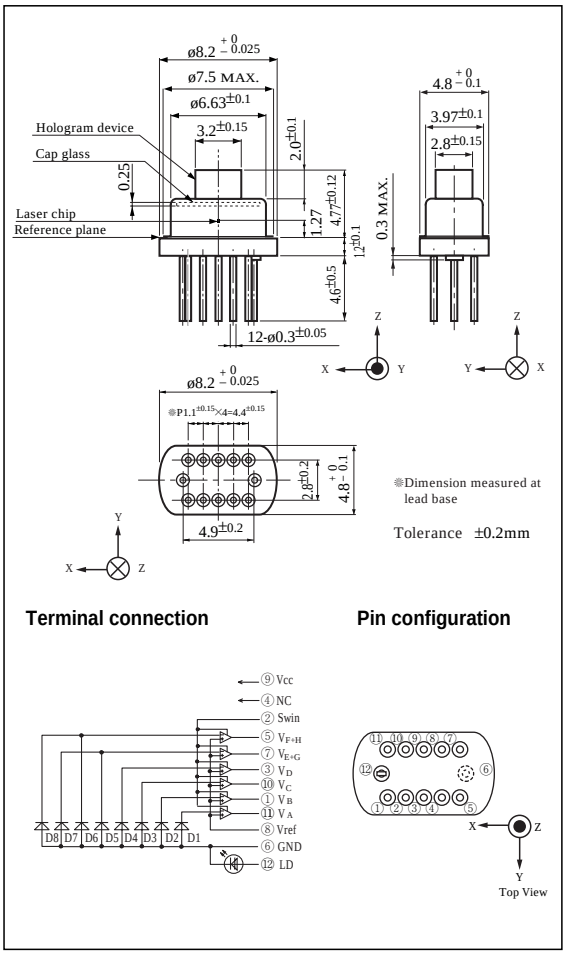
※OPIC : (Optical IC) is a trademark of SHARP Corporation. An OPIC consists of a light-detecting element and a signal-processing circuit integrated onto a single chip.

■ Applications

(1) CD-R drives
(2) CD-RW drives

■ Outline Dimensions

(Unit : mm)



■ Absolute Maximum Ratings

(Tc=25˚C)

Parameter		Symbol	Rating	Unit
※1 Optical power output		PHC	85	mW
※2 Optical power output (pulse)		PHP	121	mW
Reverse voltage	Laser	VR	2	V
OPIC supply voltage		VCC	6	V
※3 Operating temperature		Topr	0 to +60	˚C
※3 Storage temperature		Tstg	-40 to +85	˚C
※4 Soldering temperature		Tsold	260	˚C

※1 Output power from hologram laser Equivalent to 95mW (CW) from cap glass
※2 Output power from hologram laser Equivalent to 135mW (pulse) from cap glass (pulse width : 0.5μs, Duty : 50%)
※3 Case temperature ※4 At the position of 1.6mm from the lead base (Within 5s)

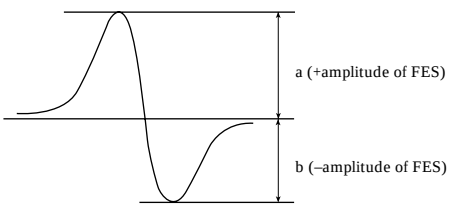
■ Electro-optical Characteristics

(T_C=25°C)

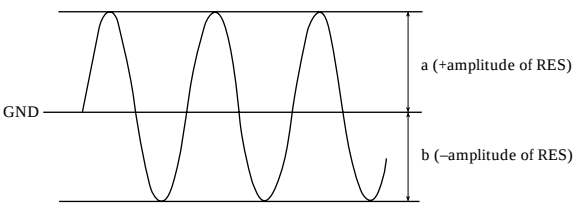
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
※1 Focal offset	DEF	Collimated lens output power 1.5mW, High gain	-0.7	-	+0.7	μm
※2 Focal error symmetry	B_{FES}	Collimated lens output power 1.5mW, High gain	-25	-	+25	%
※3 Radial error balance	B_{RES}	Collimated lens output power 1.5mW, High gain	-25	-	+25	%
※4 RF output amplitude	V_{RF}	Collimated lens output power 1.5mW, High gain	0.65	0.94	1.23	V
※5 FES output amplitude	V_{FES}	Collimated lens output power 1.5mW, High gain	0.35	0.59	0.94	V
※6 RES output amplitude	V_{RES}	Collimated lens output power 1.5mW, High gain	0.09	0.19	0.30	V
※7 Main spot balance	MSB	Collimated lens output power 1.5mW, High gain	80	100	120	%
※8 Sub spot balance	SSB	Collimated lens output power 1.5mW, High gain	80	100	120	%
Jitter	JIT	Collimated lens output power 1.5mW, High gain	-	-	23	ns
Threshold current	I_{th}	–	-	30	40	mA
Operating current	I_{op}	Po=80mW	-	120	145	mA
Operating voltage	V_{op}	Po=80mW	-	2.2	2.5	V
Wavelength	λ_p	Po=80mW	773	784	797	nm
Differential efficiency	η_d	$\frac{70mW}{I(80mW)-I(10mW)}$	0.7	0.85	1.2	mW/mA

※1 Distance between FES=0 and jitter minimum point

※2 (a–b) / (a+b)



※3 $\frac{a-b}{2\times(a+b)}$



※4 Amplitude of $V_A+V_B+V_C+V_D$ (focal servo ON, radial servo ON)

※5 V_B-V_A (Focal vibration)

※6 Amplitude of $(V_C-V_D)-k1(V_{E+G}-V_{F+H})$. $k1=(V_C+V_D)/(V_{E+G}+V_{F+H})=1$
When tracking servo is ON, $(V_C-V_D)-k1(V_{E+G}-V_{F+H})+\alpha$ should be 0.

※7 (V_A+V_B) / (V_C+V_D)

※8 V_C/V_D

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

(T_C=25°C)

Parameter			Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Stability of differential efficiency			$\Delta\eta_d$	Po=10 to 135mW	-	-	40	%
Half intensity angle		Parallel	θ//	Po=95mW	8	9	10	°
		Perpendicular	θ⊥		15	17	19	°
Emission characteristics	Deviation angle	Parallel	ø//		-2	-	+2	°
		Perpendicular	ø⊥		-3	-	+3	°
Beam shift			Δø//	ø//(95mW)-ø//(3mW)	-1	-	+1	°
Kink			K-LI	P1=27mW, P2=81mW, P3=135mW	-	-	15	%

■ Electro-optical Characteristics of OPIC for Signal Detection※9

(T_C=25°C, V_{CC}=5V, V_{ref}=2.1V)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit	※10 Segment
Supply current	I_{CC1}	High gain, Gain switching SW=H	-	20	25	mA	
	I_{CC2}	Low gain, Gain switching SW=L	-	30	35	mA	
※11 Output offset voltage	V_{od}	Common to high/low gain, No light	-25	2	+25	mV	A, B
Offset voltage difference, Gain switching	ΔV_{od}	Common to high/low gain	-30	-	+30	mV	A, B

※9 0.1µF or more capacitor should be added between OPIC power supply terminal and GND, Vref terminal and GND. (at the position of 10mm or less from the lead base)

※10 Applicable divisions correspond to output terminals.

A : V_A, V_B, V_C, V_D

B : V_{E+G}, V_{F+H}

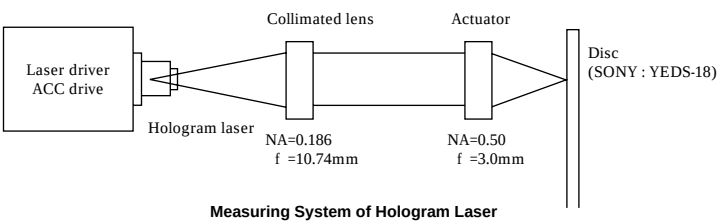
※11 Difference from V_{ref}

■ Electro-optical Characteristics of Hologram Laser (Design Standard*)※1

(T_C=25°C)

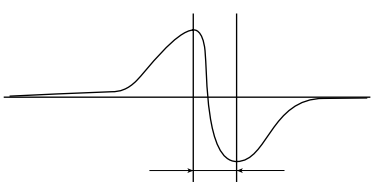
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
※2 Focal error signal capture range	-	−	-	14	-	µm
Focal error signal sensitivity	-	−	-	13	-	%/µm

※1



Measuring System of Hologram Laser

※2



* These parameters are not guaranteed performance, but general specifications of each optical element which makes up a hologram laser.

■ Optical Characteristics of Hologram Device (Design Standard*)

(T_C=25°C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Hologram diffraction efficiency	0 th	-	λ=780nm	77	82	-	%
	±1st	-		6	7	9	%
Hologram diffraction angle	D1,D2	-	λ=780nm	-	21.1	-	°
	Except D1,D2	-		-	26.4	-	°
Grating diffraction efficiency		-	0:1	6.7	9	12.4	-
Grating diffraction angle		-	λ=780nm	-	2.8	-	°

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

(T_C=25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Misalignment position	Δx	−	-80	-	+80	μm
	Δy		-80	-	+80	μm
	Δz		-80	-	+80	μm

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

(T_C=25°C, V_{CC}=5V, V_{ref}=2.1V)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit	※3 Segment
Supply voltage	V_{CC}	−	4.5	5	5.5	V	
Reference voltage	V_{ref}	−	2.00	2.1	2.21	V	
Reference voltage terminal current	I_{ref}	Common to high/low gain, No light	-0.5	1	2	mA	
※4,5,6,7 Response frequency	f_{cm}	Common to high/low gain, -3dB	45	60	-	MHz	A
	f_{cs}	Common to high/low gain, -3dB	1	2	-	MHz	B
※4,6,7 Peaking level	$V_{pk}2$	Common to high/low gain f=0.1 to 45MHz	-	-	3	dB	A
※7 Noise level	f_{nm}	Hign gain, 50 Ω end BW=30kHz, f=28.8MHz	-	-74	-68	dBm	A
Sensitivity 1	R_m1	Main amp, Hign gain	18	24	30	mV/μW	A
Sensitivity 2	R_m2	Main amp, Low gain	0.72	0.96	1.2	mV/μW	A
Sensitivity 3	R_m3	Sub amp, Hign gain	72	96	120	mV/μW	B
Sensitivity 4	R_m4	Sub amp, Low gain	2.88	3.84	4.8	mV/μW	B
Settling time	t_{set}	Output voltage 500mV → 5mV, Low gain, fall time, f=6.9 MHz	-	30	-	ns	A
Maximum output voltage	$V_o$max	Common to high/low gain, V_{ref} reference	1	-	-	V	A, B

※3 Appricable divisions correspond to output terminals.
A : V_A, V_B, V_C, V_D
B : V_{E+G}, V_{F+H}

※4 Light source is a laser diode of λ=780nm.

※5 -3dB level (0dB level is taken for output level when f=0.1MHz)

※6 10μW of DC light is applied to the center of each photodiode, and 4μW of AC light is irradiated. BW=10kHz

※7 5kΩ of resistor and 10pF of capacitor should be connected in parallel between output terminal and Vref terminal.

* These parameters are not guaranteed performance, but general specifications of each optical element which makes up a hologram laser.
• Please refer to the chapter "Handling Precautions"

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