GH5R385C3C5

Sampling Hold Method High Power Output Hologram Laser for ×8 Speed CD-R Drive

■ Features

(1) High power output (pulse MAX. 108mW)
(2) For ×8 speed CD-R, ×24 to ×32 speed CD-ROM (With built-in MIN. 30MHz OPIC※)
(3) Sampling hold method (tracking method)
(4) ϕ4.8mm thickness
(5) With built-in beam splitter and diffraction grating

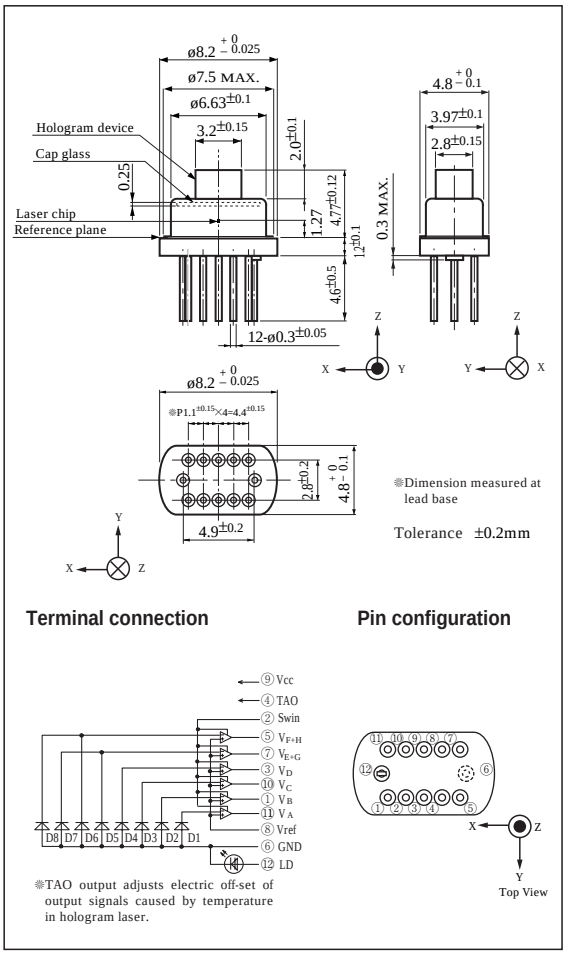
※OPIC : (Optical IC) is a trademark of SHARP Corporation. An OPIC consists of a light-detecting element and a signal-processing circuit integrated onto a single chip.

■ 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	76	mW
※2 Optical power output (pulse)		PHP	108	mW
Reverse voltage	Laser	VR	2	V
OPIC supply voltage		VCC	8	V
※3 Operating temperature		Topr	-5 to +70	˚C
※3 Storage temperature		Tstg	-40 to +85	˚C
※4 Soldering temperature		Tsold	260	˚C

※1 Output power from hologram laser Equivalent to 85mW (CW) from cap glass
※2 Output power from hologram laser Equivalent to 120mW (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

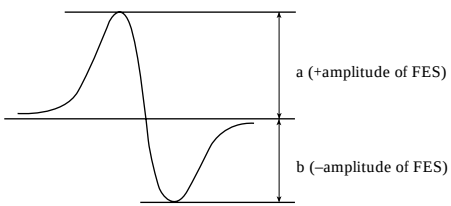
(T_C=25°C)

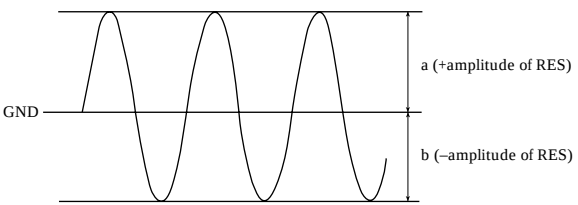
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
※1 Focal offset	DEF	Collimated lens output power 1.5mW, High gain	-0.7	-	+0.7	µm
※2 Focal error symmetry	B_{FES}	Collimated lens output power 1.5mW, High gain	-25	-	+25	%
※3 Radial error balance	B_{RES}	Collimated lens output power 1.5mW, High gain	-25	-	+25	%
※4 RF output amplitude	V_{RFH}	Collimated lens output power 1.5mW, High gain	0.61	0.90	1.06	V
※5 FES output amplitude	V_{FES}	Collimated lens output power 1.5mW, High gain	0.34	0.57	0.90	V
※6 RES output amplitude	V_{RES}	Collimated lens output power 1.5mW, High gain	0.09	0.18	0.29	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=85mW	-	127	155	mA
Operating voltage	V_{op}	Po=85mW	-	2.1	2.65	V
Wavelength	λ_p	Po=85mW	773	785	797	nm
Differential efficiency	η_d	$\frac{75mW}{I(85mW)-I(10mW)}$	0.55	0.9	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
Half intensity angle		Parallel	θ//	Po=85mW	8	9	12	°
		Perpendicular	θ⊥		17.1	21	25.5	°
Emission characteristics	Deviation angle	Parallel	ø//		-2	-	+2	°
		Perpendicular	ø⊥		-3	-	+3	°
Beam shift			Δø//	ø//(85mW)-ø//(3mW)	-1	-	+1	°
Kink			K-LI1	Po=10 to 120mW	0.988	-	-	-
			K-LI2	P1=24mW, P2=72mW, P3=120mW	-	-	15	%

■ 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	※9 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	
※10 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
Output terminal voltage of temperature sensor	T_{ao}	Common to high/low gain	1.8	2.2	2.6	V	

※9 Applicable divisions correspond to output terminals.

A : V_A, V_B, V_C, V_D

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

※10 Difference from V_{ref}

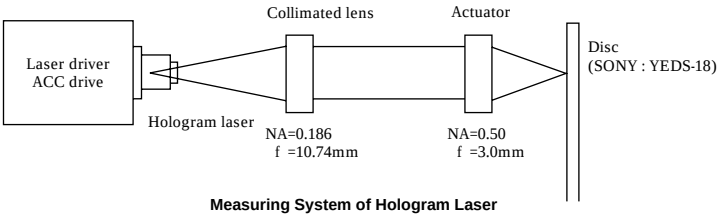
* These parameters are not guaranteed performance, but general specifications of each optical element which makes up a hologram laser.

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

(Tc=25°C)

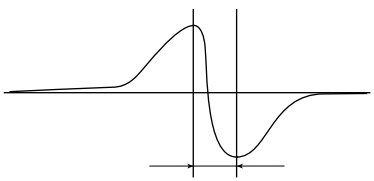
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
※2 Focal error signal capture range	-	−	-	14	-	μm
Focal error signal sensitivity	-	−	-	13	-	%/μm

※1



Measuring System of Hologram Laser

※2



■ Optical Characteristics of Hologram Device (Design Standard*)

(Tc=25°C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Hologram diffraction efficiency	0 th	-	λ=780nm	77	80	-	%
	±1st	-		7	8	10	%
Hologram diffraction angle	D1,D2	-	λ=780nm	-	21.1	-	°
	Except D1,D2	-		-	26.4	-	°
Grating diffraction efficiency		-	0:1	7.7	10	13.4	-
Grating diffraction angle		-	λ=780nm	-	2.8	-	°

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

(Tc=25°C)

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

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

■ 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	※4 Segment
Supply voltage	V_{CC}	−		4.5	5	5.5	V	
Reference voltage	V_{ref}	−		2.00	2.1	2.21	V	
Output terminal current	Io	Common to high/low gain		-0.03	0.01	0.3	mA	A, B
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		25	36	-	MHz	A
	$f_{cs}H$	Sub amp, Hign gain, -3dB		1	2	-	MHz	B
	$f_{cs}L$	Sub amp, Low gain, -3dB		8	12	-	MHz	B
※4,6,7 Peaking level	$V_{pk}2$	Common to high/low gain f=0.1 to 25MHz		-	-	3	dB	A
※7 Noise level	f_{nm}	Hign gain, 50 Ω end BW=30MHz, f=17.3MHz		-	-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		4.2	5.63	7.1	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		16.8	22.5	28.2	mV/μW	B
Settling time	$t_{estm}1$	600mV → 5mV	f=4.3MHz	-	60	-	ns	A
	$t_{ests}1$	Low gain, fall time	f=2.9MHz	-	110	-	ns	B
	$t_{estm}2$	600mV → 20mV	f=4.3MHz	-	35	-	ns	A
	$t_{ests}2$	Low gain, fall time	f=2.9MHz	-	70	-	ns	B
Maximum output voltage	Vomax	Main amp, Common to high/low gain		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 10kΩ 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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