


SANYO Semiconductors

DATA SHEET

LV0220CS — Monolithic Linear IC For Optical Pickups Front Monitor OE-IC

Overview

The LV0220CS is a front monitor optoelectronic IC for optical pickups that has a built-in photo diode compatible with three waveforms. A high-speed process is adopted, and high sensitivity and high reliability are obtained with 405nm AR coating cover glass. Moreover, LV0220CS is small size and thin type CSP packages.

Functions

- I-V amplifier with a built-in PIN type photo detector ($\phi = 0.7\text{mm}$) that supports three wavelengths
- Differential output amplifier
- Mode switching (BD/DVD/CD gain, volume output switching)

Specifications

Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC\text{ max}}$		6	V
Allowable power dissipation	$P_d\text{ max}$	$T_a \leq 75^\circ\text{C} *$	92	mW
Operating temperature	T_{opr}		-10 to +75	$^\circ\text{C}$
Storage temperature	T_{stg}		-40 to +85	$^\circ\text{C}$

* Mounted on a specified board: 20mm $\times$ 20mm $\times$ 1.6mm, glass epoxy board.

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Recommended Operating Conditions at Ta = 25°C

Parameter		Symbol	Conditions	Ratings			Unit
				min	typ	max	
Operating supply voltage		V _{CC}		4.5	5.0	5.5	V
Operating reference voltage		V _{ref}		1.9	2.2	2.5	V
Mode switch	CD	V _{swC}		2.6		V _{CC}	V
	DVD	V _{swD}	DVD mode when SW pin is floating	1.25	1.65	2.0	V
	BD	V _{swB}		0		0.8	V
Output load capacitance		C _o		12	20	33	pF
Output load resistance		Z _o		3			kΩ

Electrical and Optical Characteristics at Ta = 25°C, V_{CC} = 5.0V, V_{ref} = 2.2V, R_L = 6kΩ, R_{in} = 1kΩ

Parameter		Symbol	Conditions	Ratings			Unit
				min	typ	max	
Current dissipation		I _{CC}		9	13	17	mA
Output offset voltage		V _{Ofs}	At shielding, voltage between OUT+ and -	-20	0	+20	mV
Output DC voltage		V _{Odc}	At shielding, OUT+ and - voltage, V _{ref} standard	-30	0	+30	mV
Temperature dependence of offset voltage *		V _{OfsT}	Ta = -10 to 85°C, at shielding	20	50	80	μV/°C
Optical output voltage *	V _{OC}		CD mode, λ = 780nm	1.96	2.45	2.94	mV/μW
	V _{OD}		DVD mode, λ = 650nm	2.09	2.61	3.13	mV/μW
	V _{OB}		BD mode, λ = 405nm	0.83	1.04	1.25	mV/μW
D range *		V _D	Voltage between OUT+ and -	2200	2600		mV
Frequency characteristics *	f _{CC}		-3dB (1MHz reference), λ = 780nm	24	30		MHz
	f _{CD}		-3dB (1MHz reference), λ = 650nm	40	50		MHz
	f _{CB}		-3dB (1MHz reference), λ = 405nm	40	50		MHz
Output noise voltage *		V _n	f = 30MHz, RBW = 30kHz, VBW = 100Hz, Blue mode		-88	-83	dBm
Settling time *		T _{set}			10		ns
Response time *		Tr, Tf	V _O = 0.9Vp-p, output level (10 to 90%), f _C = 10MHz, duty = 50%			15	ns
Response time difference *		ΔTr, Tf	Tr-Tf, V _O = 0.9Vp-p, output level (10 to 90%), f _C = 10MHz, duty = 50%	-1.5		+1.5	ns
Overshoot *		Ovst	V _O = 0.9Vp-p			15	%
Undershoot *		Unst	V _O = 0.9Vp-p			15	%
Linearity *		Lin	At output voltages 0.5V and 1.0V	-1		+1	%
Wavelength dependence of output voltage		V _{of}	λ = 400 → 415nm	-2		6	%

* : Parameters are design values for reference.

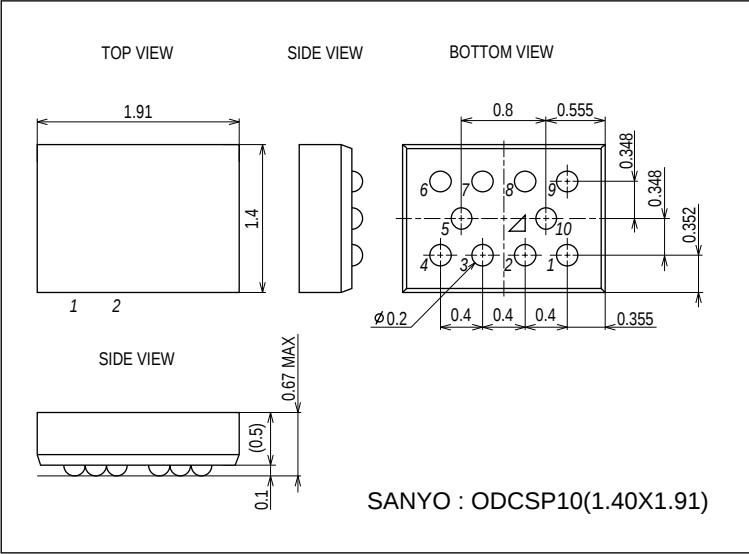
PD-wave length sensitivity ratio (when DVD = 1)

CD	1.1
DVD	1.0
Blue	0.6

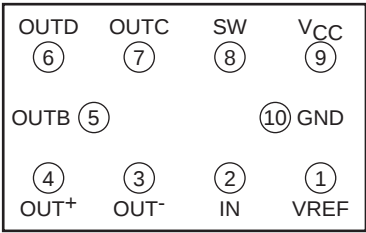
Package Dimensions

unit : mm (typ)

3352

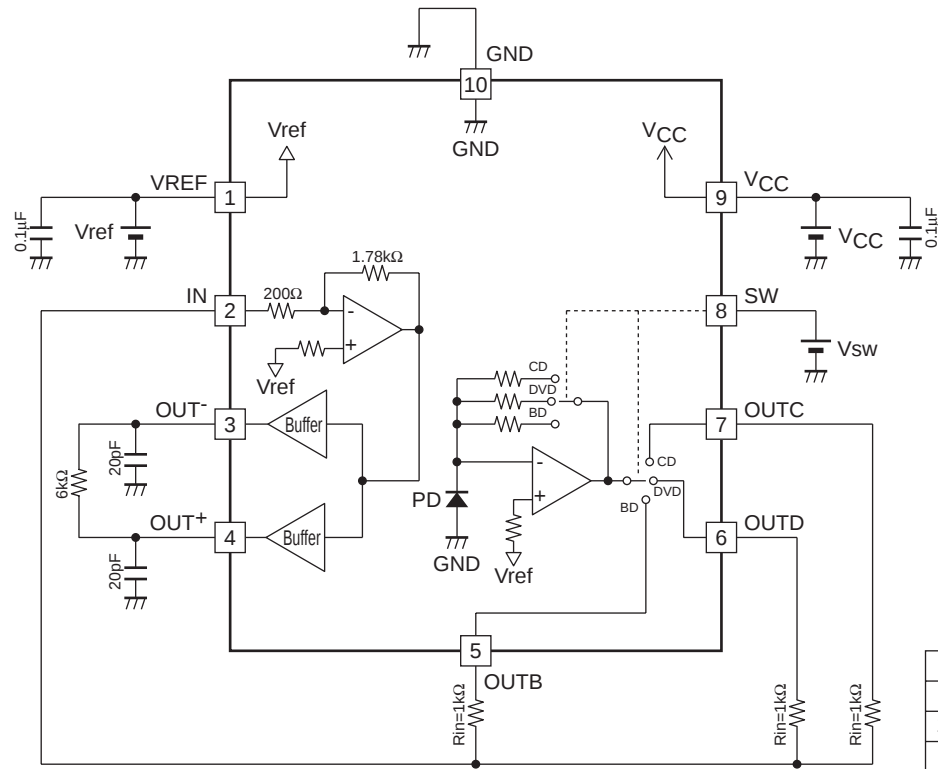


Pin Assignment



Bottom view

Block Diagram and Test Circuit Diagram



V _{sw} (V)	Gain
2.6V to V _{CC}	CD
1.25V to 2.0V	DVD
0V to 0.8V	BD

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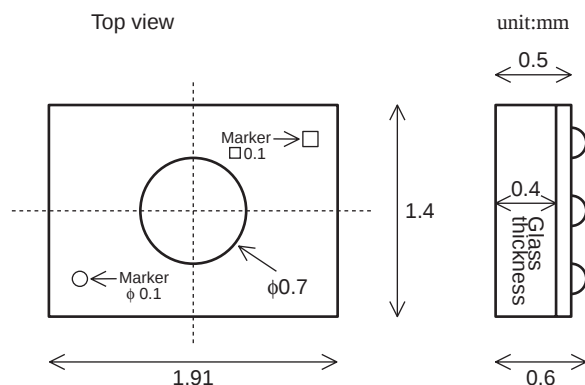
Pin Description

Pin No.	Pin Name	Description	Equivalent Circuit
1	VREF	Reference power supply voltage pin.	
2	IN	Differential output input-pin.	
3 4 5 6 7	OUT- OUT+ OUTB OUTD OUTC	Negative side output pin. Positive side output pin. Blue mode volume output pin. DVD mode volume output pin. CD mode volume output pin.	
8	SW	Mode switch pin.	
9	VCC	Power supply voltage pin.	
10	GND	Ground pin.	

Photo-receiver Layout

PD aperture size $\phi = 0.7\text{mm}$

The center of PD corresponds to the center of the package



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