


SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

LA0151CS — Monolithic Linear IC For Ultra-small illumination Sensor Photo IC

Overview

The LA0151CS is a photo IC for ultra-small illumination sensor. It enables to be mounted on a very small limited space such as on the mobile phones which is becoming small and thinner and on other mobile applications.

Functions

- Linear current output
- Low gain mode function [low gain : -35dB]

Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC}		6	V
Operating temperature	T_{opr}		-30 to +85	$^\circ\text{C}$
Storage temperature	T_{stg}		-40 to +100	$^\circ\text{C}$

Recommended operating conditions and operating voltage range at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Recommended supply voltage	V_{CC}		2.2	3.3	5.5	V
SW pin low voltage	V_L	Normal gain mode	0		0.4	V
SW pin high voltage	V_H	Low gain mode	2.1			V

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SANYO Semiconductor Co., Ltd.

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

LA0151CS

Electrical and optical characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 3.3\text{V}$

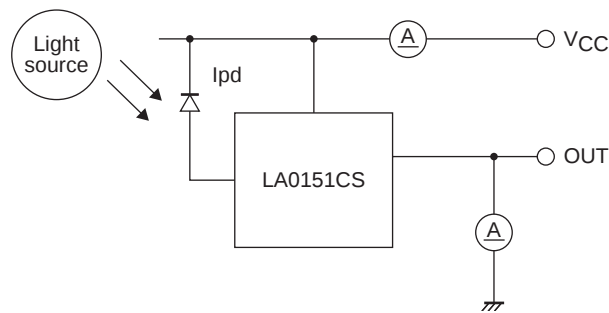
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Current dissipation (1) *1, *3	I_{CC}	$E_v = 1000 \text{ lx}$, $R_L = 5\text{k}\Omega$, N mode	90	150	210	μA
Current dissipation (2) *1, *3	I_{CC}	$E_v = 1000 \text{ lx}$, $R_L = 5\text{k}\Omega$, L mode	42	70	98	μA
Output current (1) *1, *3	I_{O1}	$E_v = 100 \text{ lx}$, N mode	6	8	10	μA
Output current (2) *1, *3	I_{O2}	$E_v = 1000 \text{ lx}$, N mode	60	80	100	μA
Output current (3) *1, *3	I_{O3}	$E_v = 100 \text{ lx}$, L mode	0.12	0.16	0.2	μA
Output current (4) *1, *3	I_{O4}	$E_v = 1000 \text{ lx}$, L mode	1.2	1.6	2.0	μA
Dark current	I_{leak}	$E_v = 0 \text{ lx}$, N mode, L mode			0.1	μA
Temperature coefficient *2	I_{tc}	$E_v = 100 \text{ lx}$, N mode, L mode, $T_a = -20 \text{ to } 60^\circ\text{C}$		0.34		$\%/\text{ }^\circ\text{C}$
Rise time (1) *4	T_{r1}	$E_v = 1000 \text{ lx}$, $R_L = 5\text{k}\Omega$, N mode		15	40	μs
Rise time (2) *4	T_{r2}	$E_v = 1000 \text{ lx}$, $R_L = 500\text{k}\Omega$, L mode		20	50	μs
Fall time (1) *4	T_{f1}	$E_v = 1000 \text{ lx}$, $R_L = 5\text{k}\Omega$, N mode		150	500	μs
Fall time (2) *4	T_{f2}	$E_v = 1000 \text{ lx}$, $R_L = 500\text{k}\Omega$, L mode		150	500	μs
Peak sensitivity wave length *2	λ_p			550		nm
Saturation output voltage *5	V_O	$E_v = 1000 \text{ lx}$, $R_L = 150\text{k}\Omega$, N mode	3.0	3.2		V

N mode and L mode stand for the normal gain mode and the low gain mode, respectively.

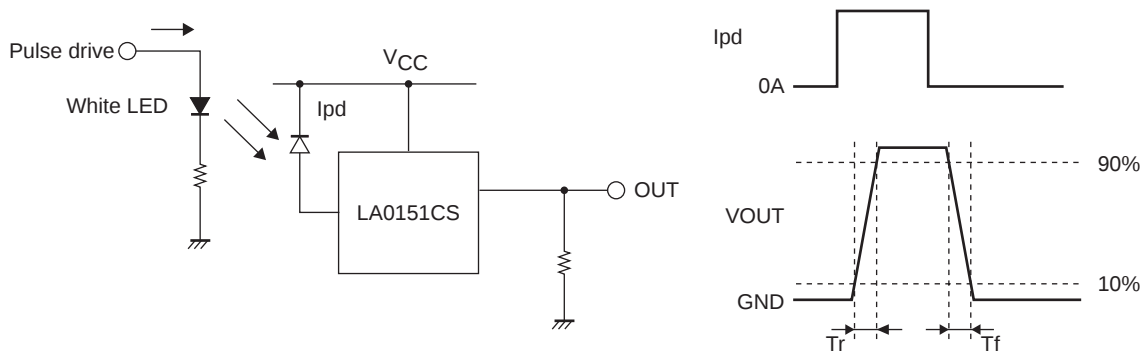
*1. Measured with the standard light source A. White LED is used instead in the mass production line.

*2. Design guaranteed item

*3. Test circuit for measuring current dissipation and output current



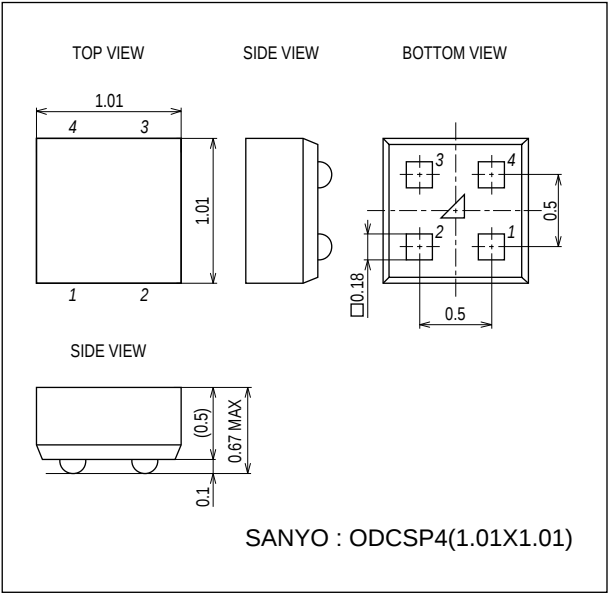
*4. Measuring method of rise time (T_r) and fall time (T_f)



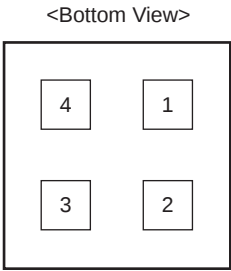
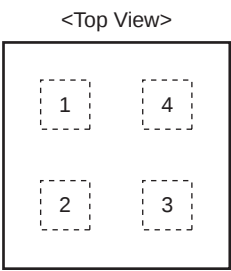
*5. Reference value : min = 2.6V and typ = 2.8V when $V_{CC} = 2.9\text{V}$

Package Dimensions

unit : mm (typ)
3350A



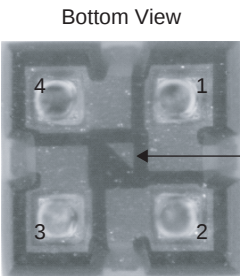
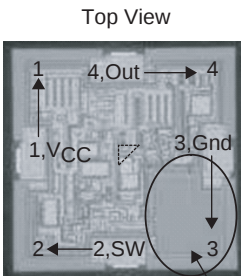
Pad layout



Pin No.	Pin Name	Function
1	VCC	Power supply
2	SW	Switch
3	GND	Ground
4	OUT	Output

Ball pitch : 0.5mm, Ball size : 0.18mm[□]

Pad layout (Photos)

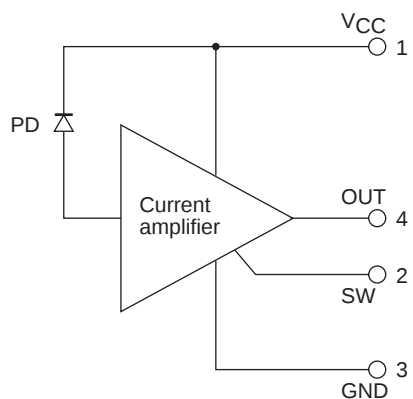


Pin 1 mark
It is located at the center of the bottom of the package.

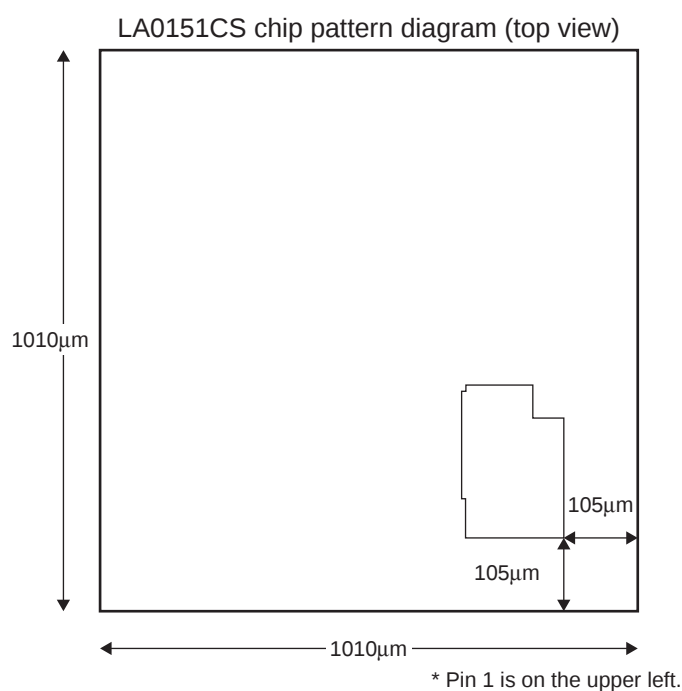
Photo diode. Only this part looks dark on the product.

* The photo diode is located in pin 3. Be careful not to mistake the pin 1 mark for the photo diode.

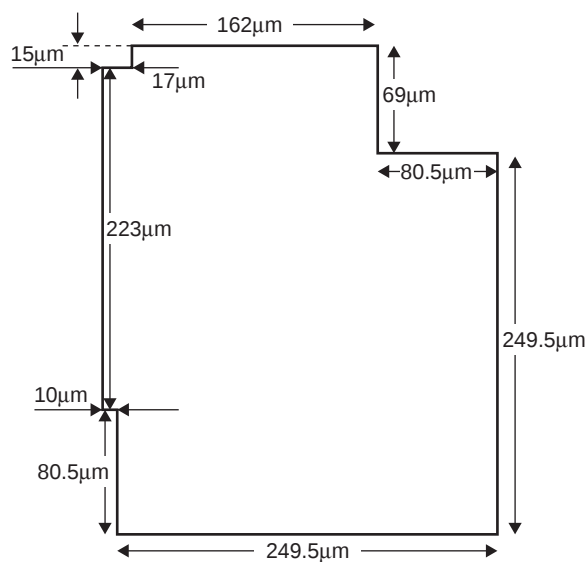
Internal block diagram

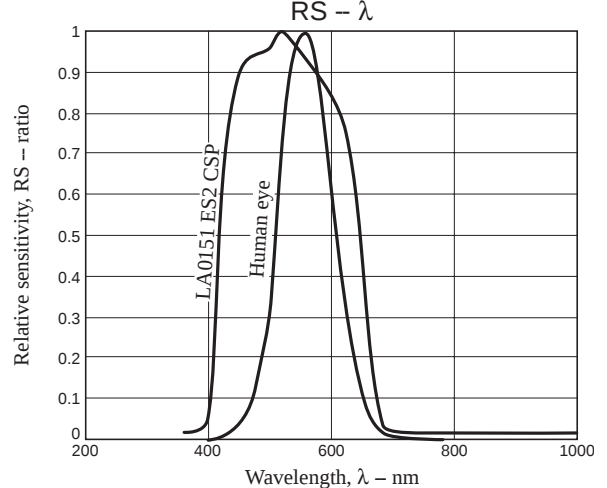
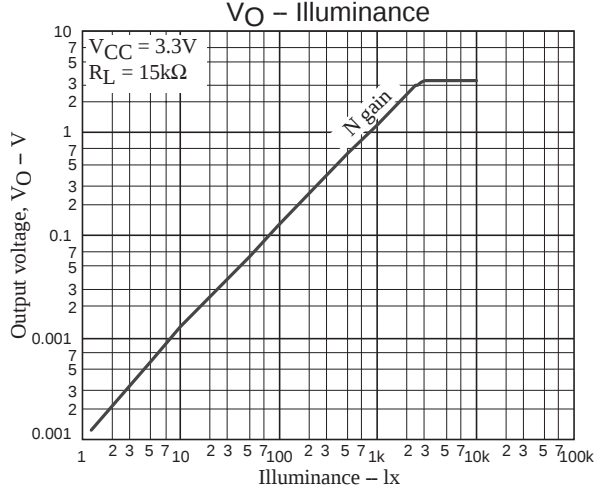
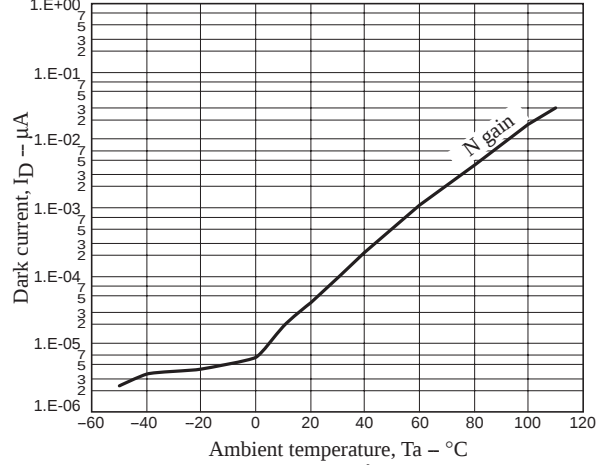
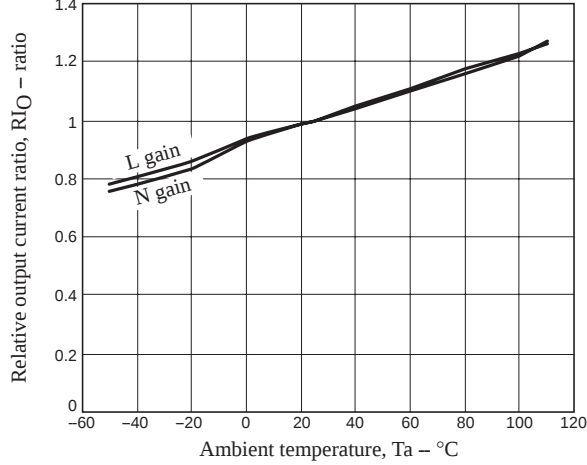
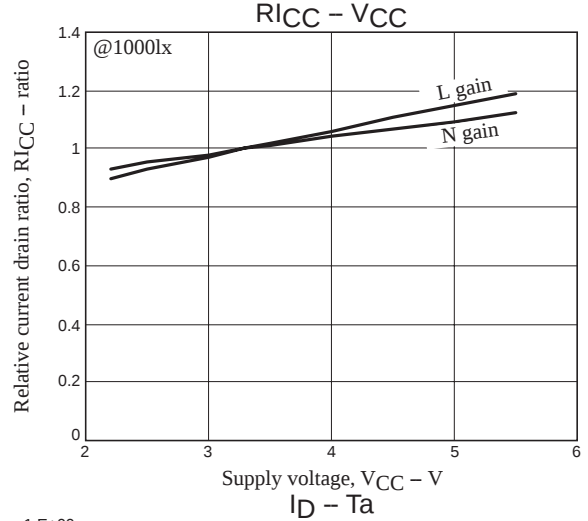
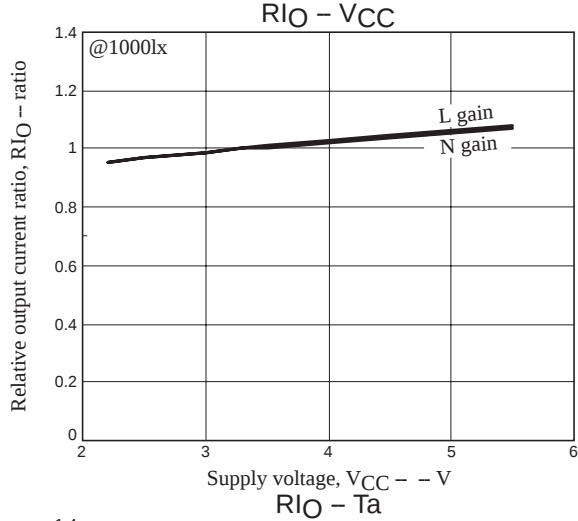
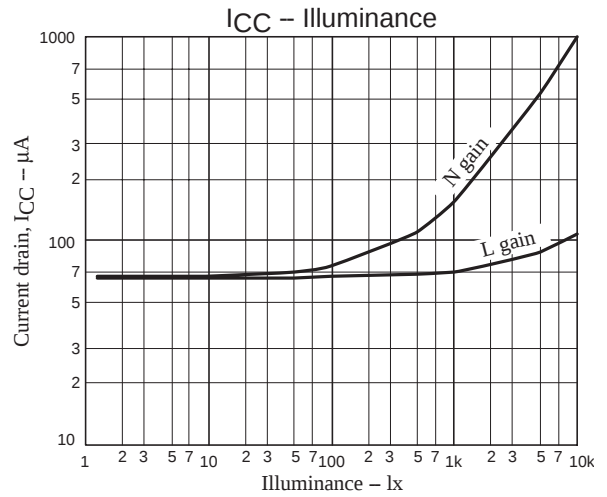
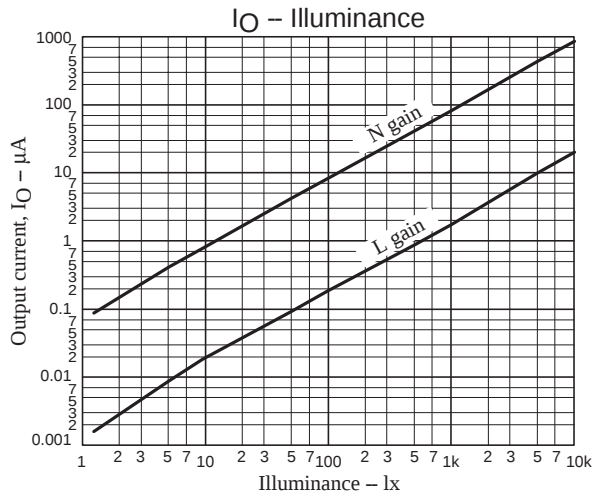


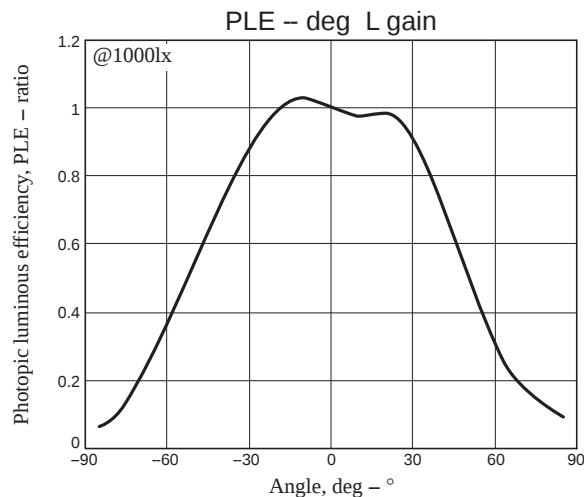
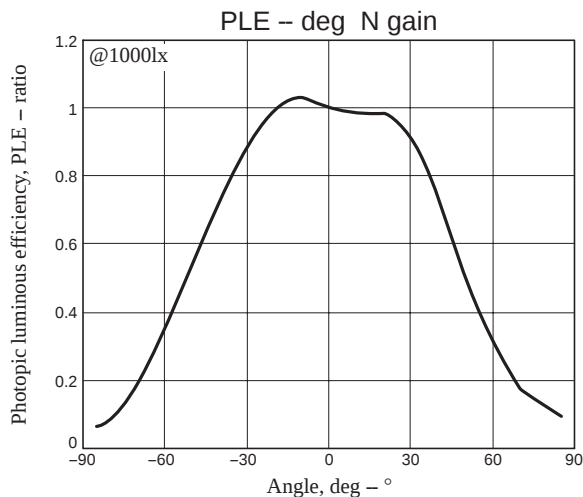
Chip pattern and photo-receiving pattern diagrams



LA0151CS photo-receiving pattern enlarged diagram (effective area)







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