Ordering number : ENA0975B

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 Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC}		6	V
Operating temperature	Topr		-30 to +85	°C
Storage temperature	Tstg		-40 to +100	°C

Recommended operating conditions and operating voltage range at Ta = 25°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	Vl	Normal gain mode	0		0.4	V
SW pin high voltage	Vh	Low gain mode	2.1			V

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Electrical and optical characteristics at Ta = 25°C, V_{CC} = 3.3V

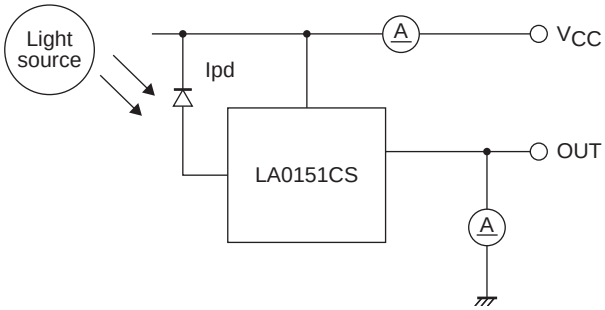
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Current dissipation (1) *1, *3	I_{CC}	Ev = 1000 lx, R_L = 5kΩ, N mode	90	150	210	μA
Current dissipation (2) *1, *3	I_{CC}	Ev = 1000 lx, R_L = 5kΩ, L mode	42	70	98	μA
Output current (1) *1, *3	I_O1	Ev = 100 lx, N mode	6	8	10	μA
Output current (2) *1, *3	I_O2	Ev = 1000 lx, N mode	60	80	100	μA
Output current (3) *1, *3	I_O3	Ev = 100 lx, L mode	0.12	0.16	0.2	μA
Output current (4) *1, *3	I_O4	Ev = 1000 lx, L mode	1.2	1.6	2.0	μA
Dark current	Ileak	Ev = 0 lx, N mode, L mode			0.1	μA
Temperature coefficient *2	Itc	Ev = 100 lx, N mode, L mode, Ta = -20 to 60°C		0.34		%/°C
Rise time (1) *4	Tr1	Ev = 1000 lx, R_L = 5kΩ, N mode		15	40	μs
Rise time (2) *4	Tr2	Ev = 1000 lx, R_L = 500kΩ, L mode		20	50	μs
Fall time (1) *4	Tf1	Ev = 1000 lx, R_L = 5kΩ, N mode		150	500	μs
Fall time (2) *4	Tf2	Ev = 1000 lx, R_L = 500kΩ, L mode		150	500	μs
Peak sensitivity wave length *2	λp			550		nm
Saturation output voltage *5	V_O	Ev = 1000 lx, R_L = 150kΩ, N mode	3.0	3.2		V

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

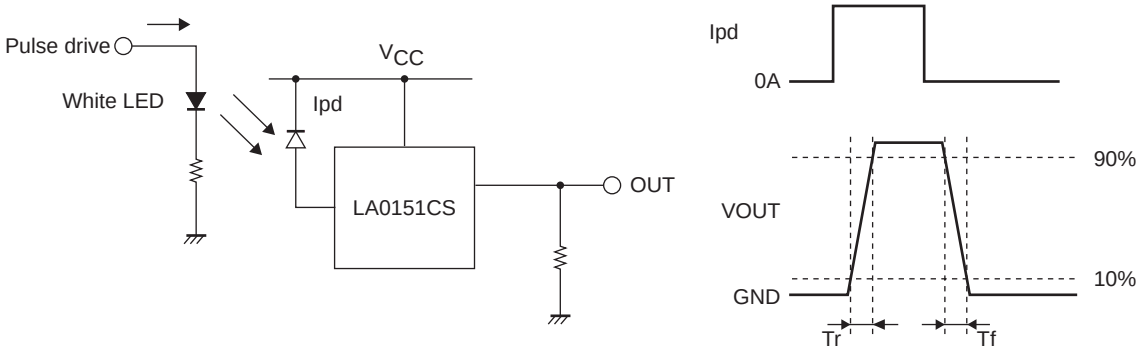
*1. Measured with the standard light source A. White LED is used instead in the mass production line.

*2. Design guaranteed item

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



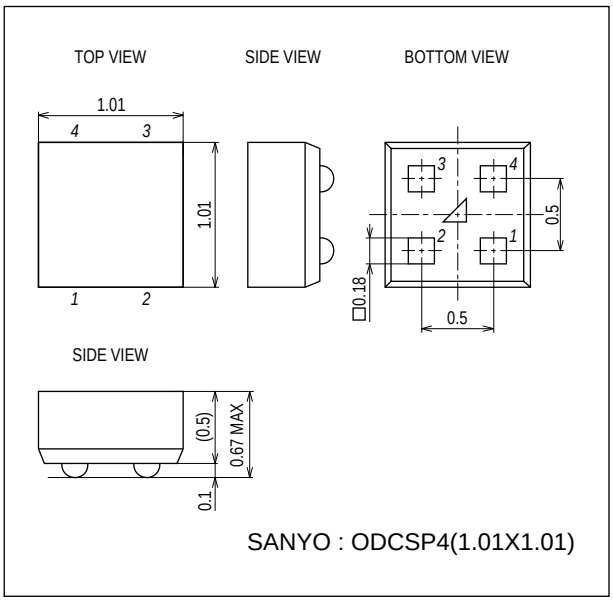
*4. Measuring method of rise time (Tr) and fall time (Tf)



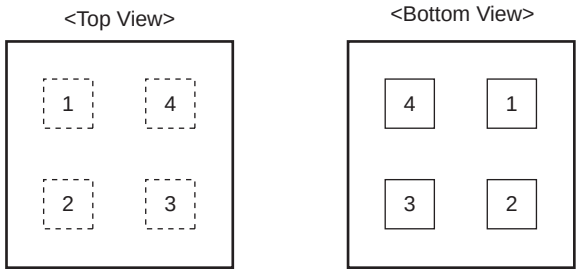
*5. Reference value : min = 2.6V and typ = 2.8V when V_{CC} = 2.9V

Package Dimensions

unit : mm (typ)
3350A



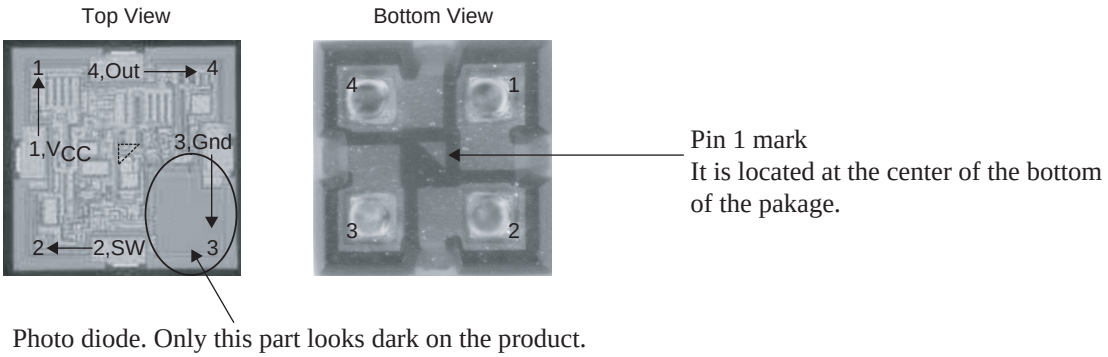
Pad layout



Pin No.	Pin Name	Function
1	V_{CC}	Power supply
2	SW	Switch
3	GND	Ground
4	OUT	Output

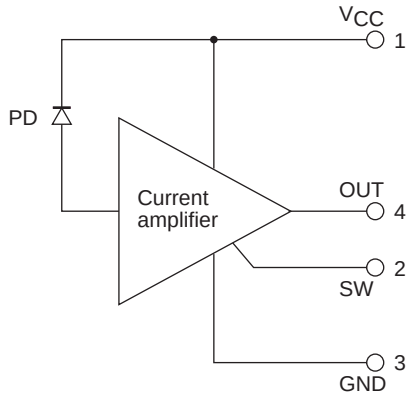
Ball pitch : 0.5mm, Ball size : 0.18mm□

Pad layout (Photos)



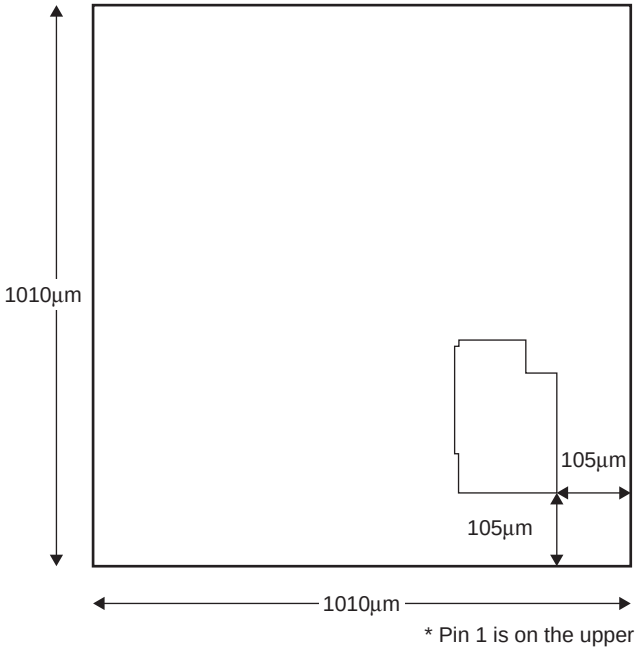
* The photo diode is located in pin 3. Be careful not to mistake the pin 1 mark for the photo diode.

Internal block diagram



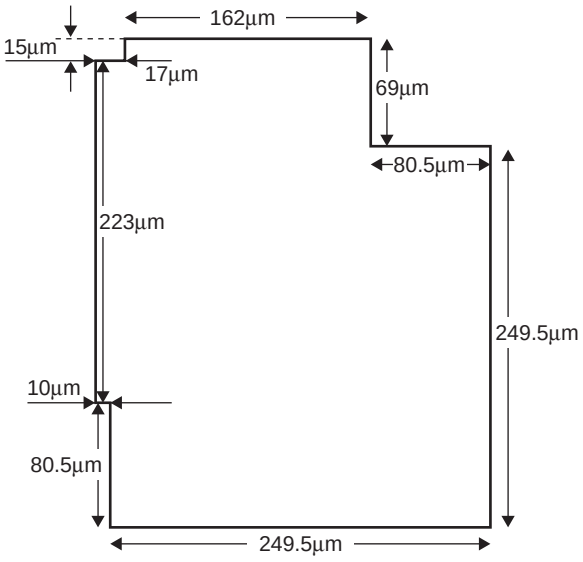
Chip pattern and photo-receiving pattern diagrams

LA0151CS chip pattern diagram (top view)

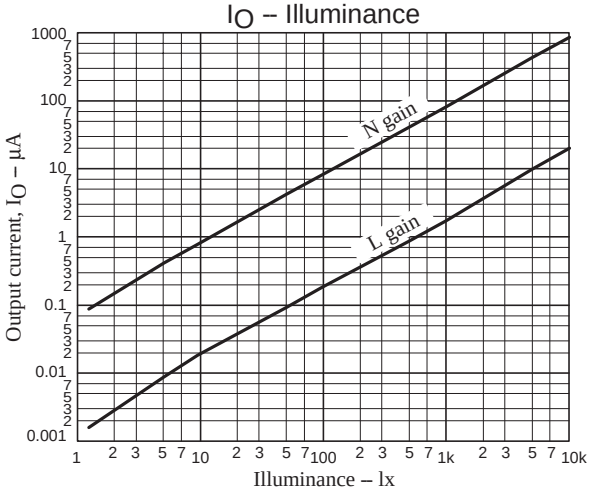


* Pin 1 is on the upper left.

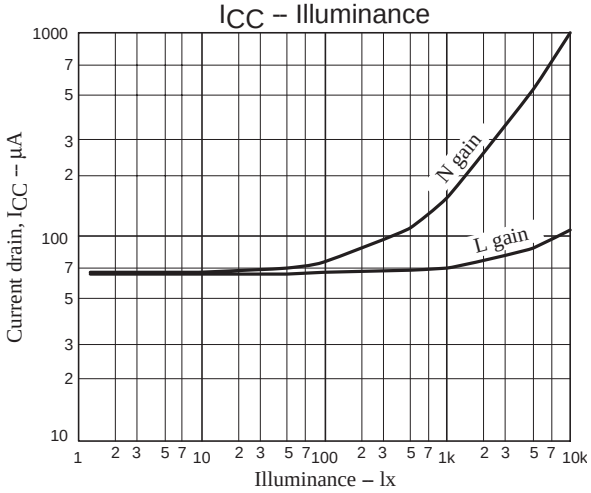
LA0151CS photo-receiving pattern enlarged diagram (effective area)



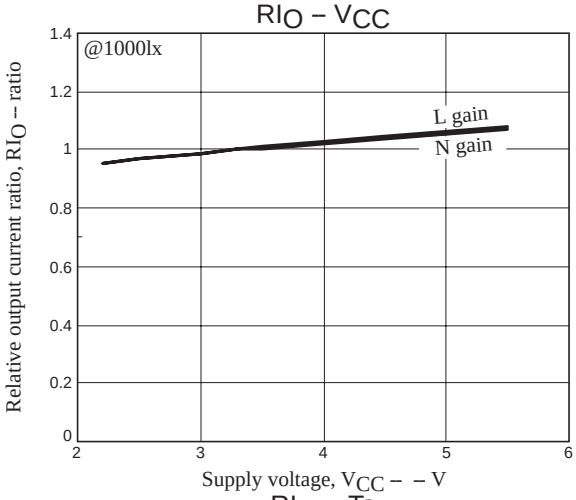
I_O – Illuminance



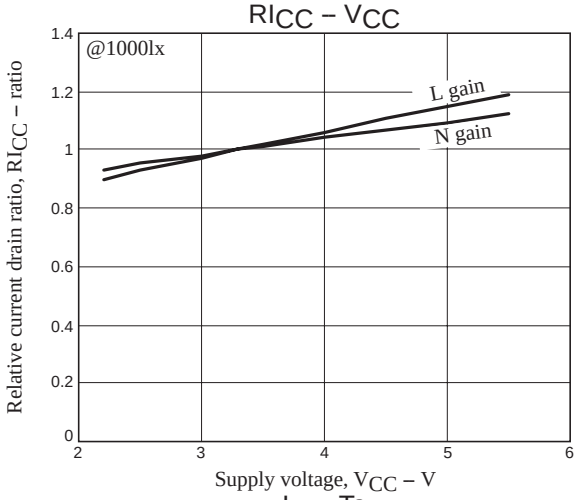
I_{CC} – Illuminance



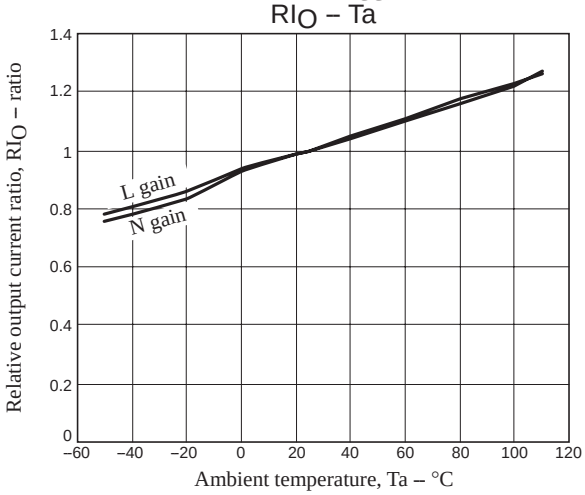
RI_O – V_{CC}



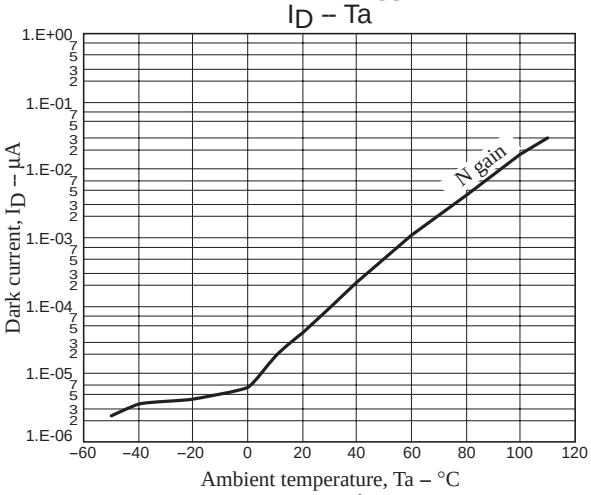
RI_{CC} – V_{CC}



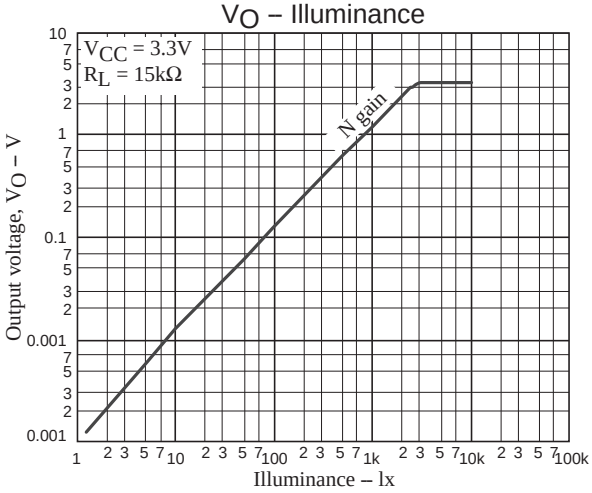
RI_O – Ta



I_D – Ta



V_O – Illuminance



RS – λ