Ordering number : ENA1633

LA0152CS

Monolithic Linear IC

Photo IC for Ultra-small illumination Sensor

ON Semiconductor®

http://onsemi.com

Overview

The LA0152CS is a photo IC for micro-sized illumination sensor which has the characteristics of spectral response similar to that of human eyes. It is suitable for applications like mobile phone, laptop computer, PDA, DSC and Camcorder.

Characteristic

- Smallest OD-CSP package in the world (1.01mm x 1.01mm x thickness: 0.6mm)
- Low variation and Optical Output Current in low temperature fluctuation.
- Integrated Sleep function.
- Low current consumption.

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

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Recommended operating conditions and operating voltage range at Ta = 25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
SW pin low voltage	Vl	Sleep mode	0		0.4	V
SW pin high voltage	Vh	Active mode	1.4		V_{CC}	V

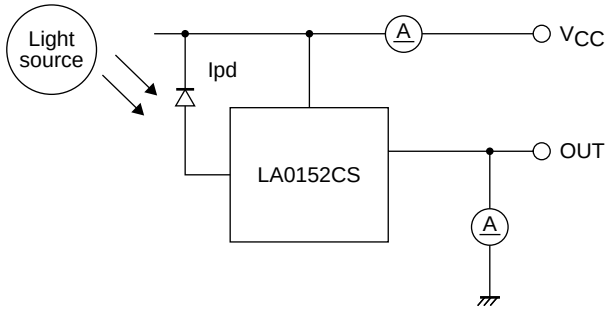
Electrical and optical characteristics at Ta = 25°C, V_{CC} = 3.3V

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Recommended Supply Voltage	V_{CC}		2.2	3.3	5.5	V
Current dissipation *1, *3	I_{CC}	Ev = 1000 lux, R_L = 5kΩ	90	150	210	μA
Sleep Current(1) *3	$I_{SL}1$	Ev= 0 lux			0.1	μA
Sleep Current(1) *3	$I_{SL}2$	Ev= 1000 lux			0.3	μA
Output current (2) *1, *3	I_O1	Ev = 100 lx	6	8	10	μA
Output current (2) *1, *3	I_O2	Ev = 1000 lx	60	80	100	μA
Dark current *3	Ileak	Ev = 0 lx			0.1	μA
Temperature coefficient *2	Itc	Ev = 100 lx		0.34		%/°C
Rise time *4	Tr	Ev = 1000 lx, R_L = 5kΩ		15	40	μs
Fall time *4	Tf	Ev = 1000 lx, R_L = 5kΩ		150	500	μs
Peak sensitivity wave length *2	λp			550		nm
Saturation output voltage *1, *3	V_O	Ev = 1000 lx, R_L = 150kΩ	3.0	3.2		V

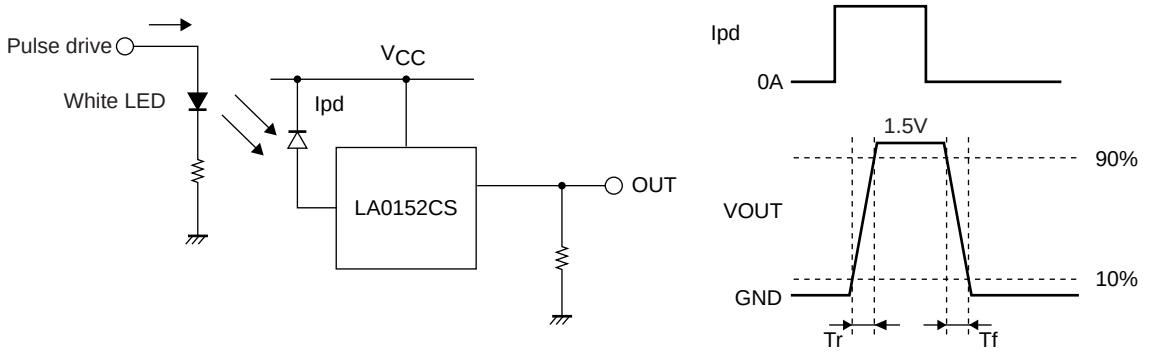
*1. Measured with the standard light source A. White LED is used instead in the mass production line.

*2. Design guaranteed item

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

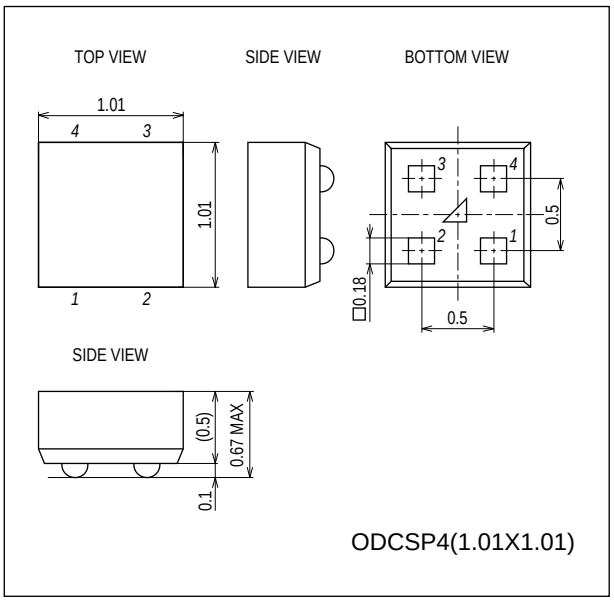


*4. Measuring method of rise time (Tr) and fall time (Tf)

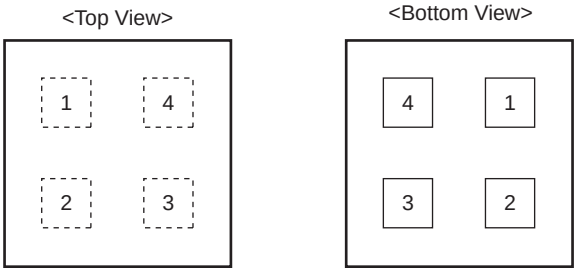


Package Dimensions

unit : mm (typ)
3350A



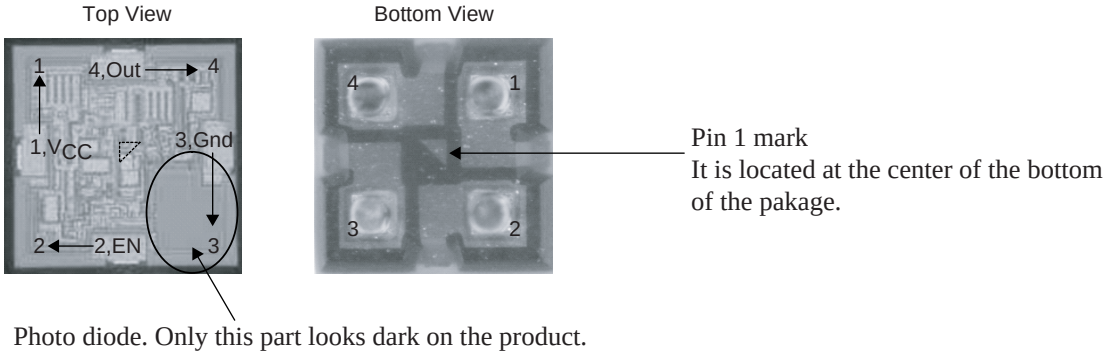
Pad layout



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

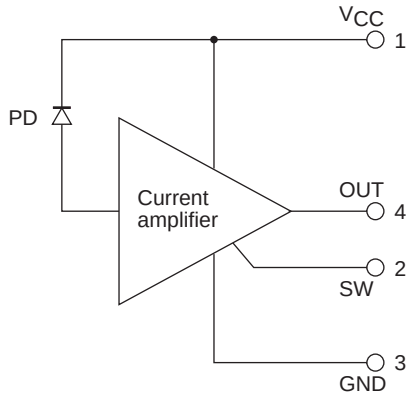
Ball pitch : 0.5mm, Ball size : 0.18mm□

Pad layout (Photos)



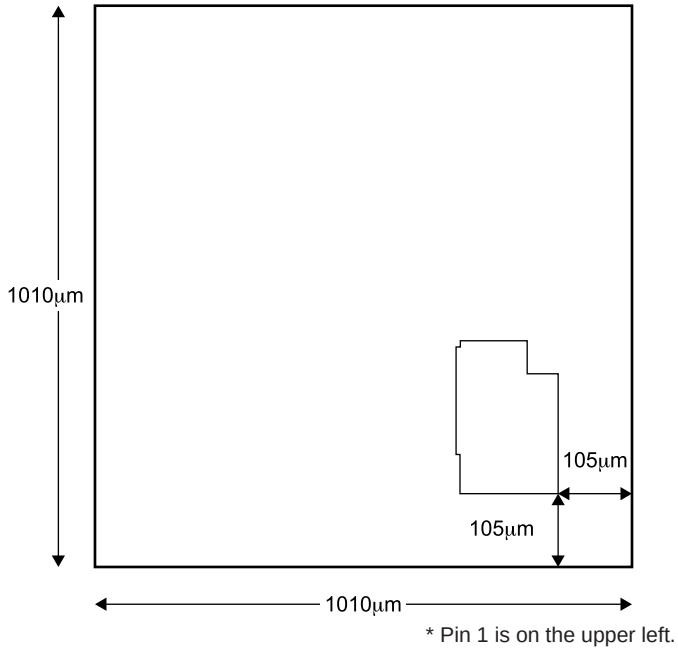
* The photo diode is located in pin 3. Be careful not to mistake the pin 1 mark for the photo diode.

Internal block diagram



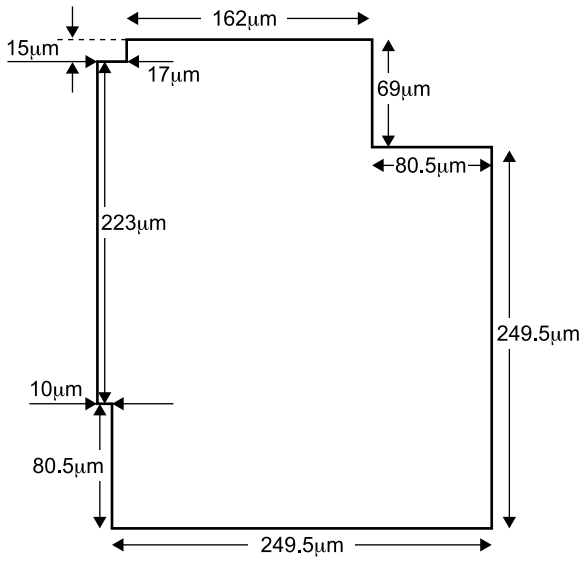
Chip pattern and photo-receiving pattern diagrams

LA0152CS chip pattern diagram (top view)

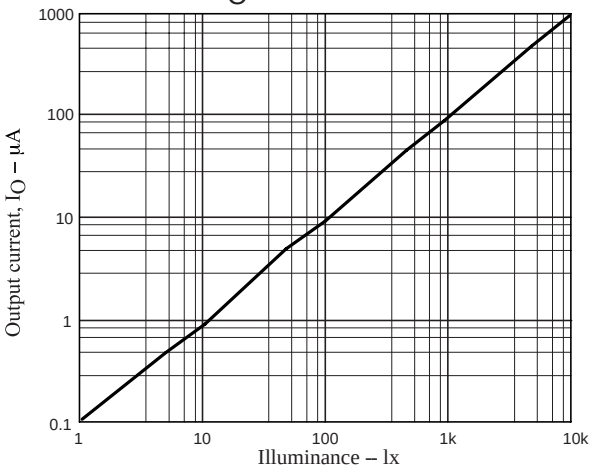


* Pin 1 is on the upper left.

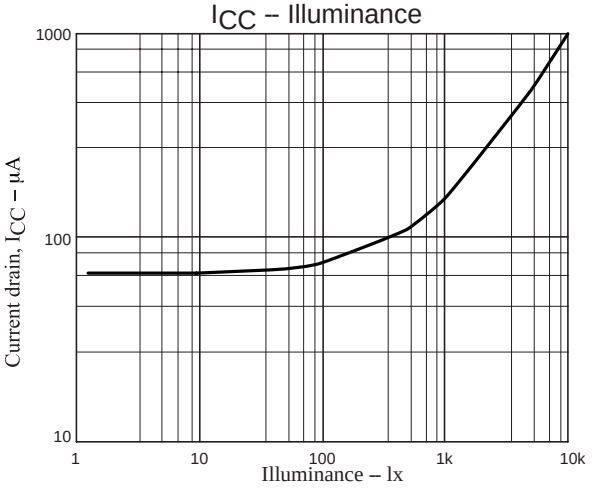
LA0152CS photo-receiving pattern enlarged diagram (effective area)



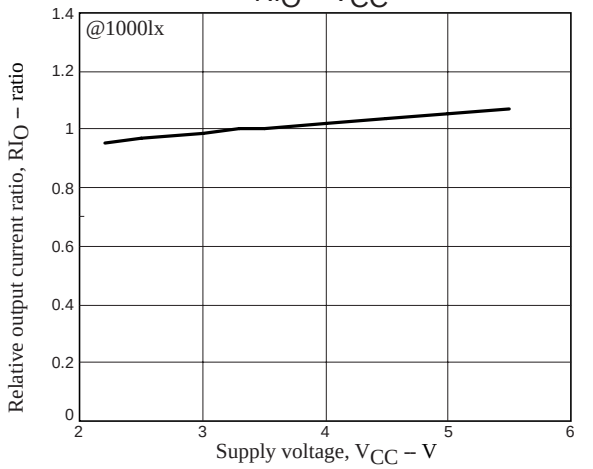
I_O - Llluminance



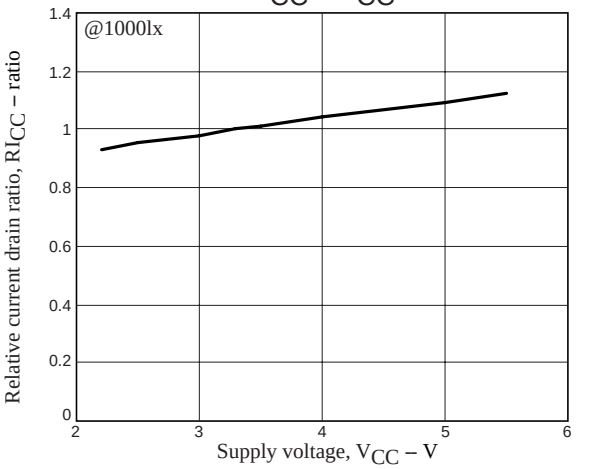
I_{CC} – Illuminance



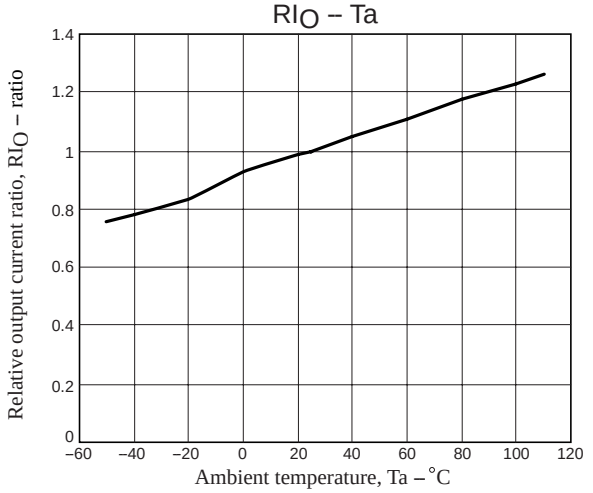
RI_O – V_{CC}



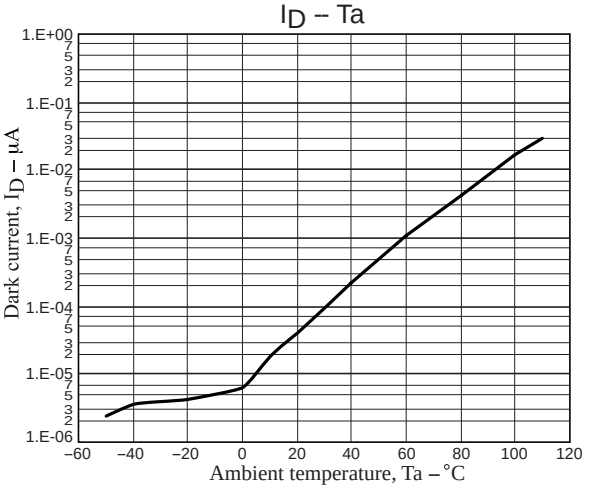
RI_{CC} – V_{CC}



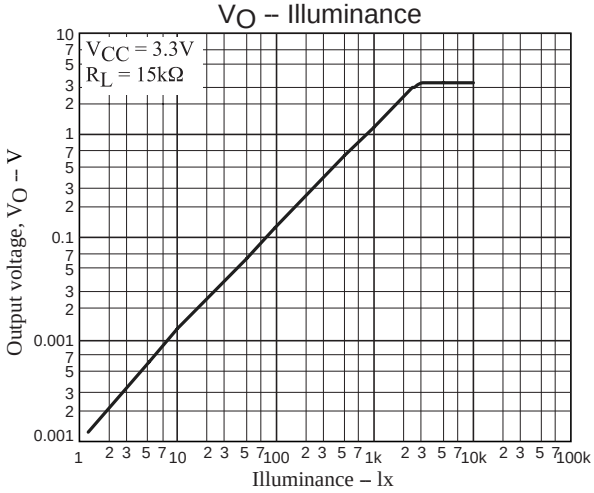
RI_O – Ta



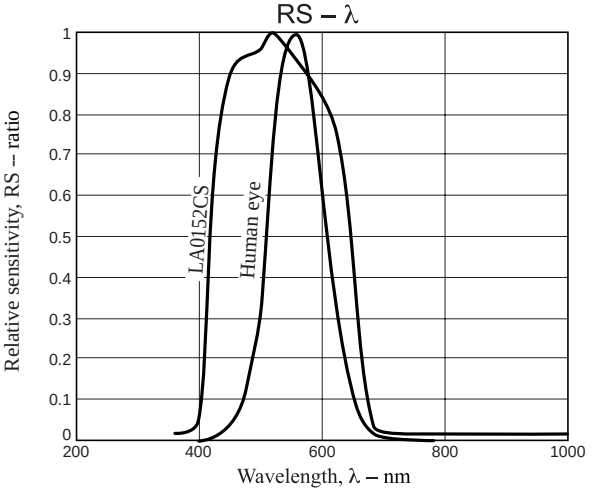
I_D – Ta



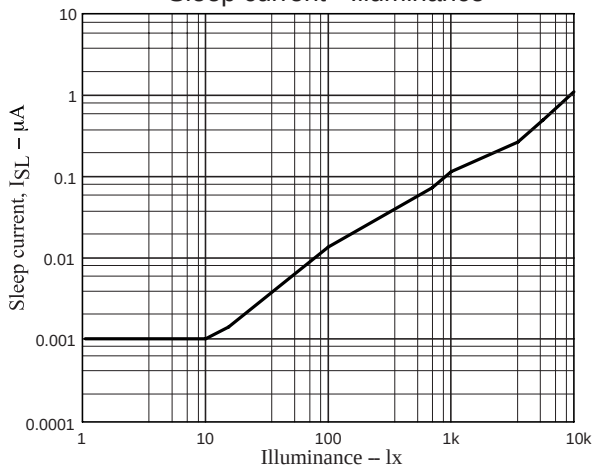
V_O – Illuminance



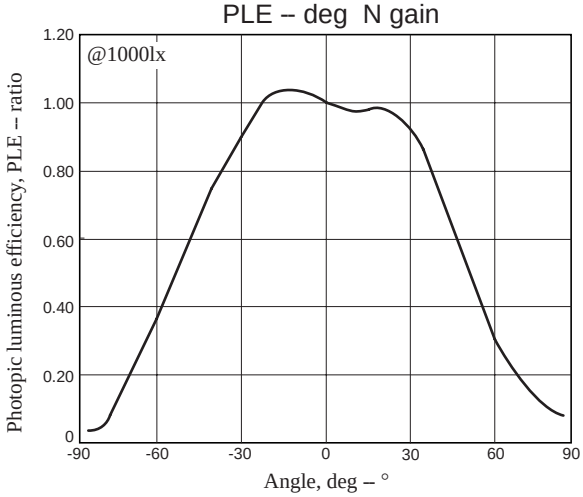
RS – λ



Sleep current - Illuminance



PLE – deg N gain



Output Current - EN voltage