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# LA0152CS

Monolithic Linear IC

## Ambient Light Sensor, Linear Current Output, with Standby Function, Ultra-small Package

### Overview

The LA0152CS is a photo IC for micro-sized ambient light 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 $T_a = 25^\circ\text{C}$

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	$^\circ\text{C}$

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 $T_a = 25^\circ\text{C}$

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

# LA0152CS

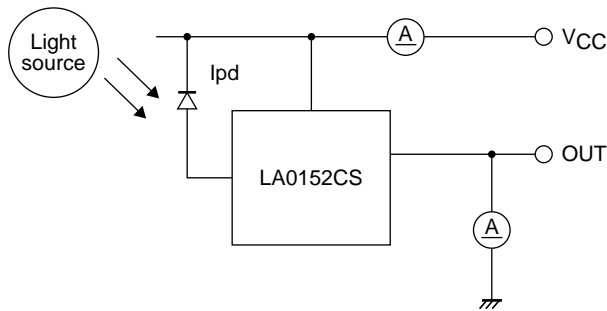
**Electrical and optical characteristics** at  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 3.3\text{V}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Recommended Supply Voltage	$V_{CC}$		2.2	3.3	5.5	V
Current dissipation *1, *3	$I_{CC}$	$E_v = 1000 \text{ lx}$ , $R_L = 5\text{k}\Omega$	90	150	210	$\mu\text{A}$
Sleep Current(1) *3	$I_{SL1}$	$E_v = 0 \text{ lx}$			0.1	$\mu\text{A}$
Sleep Current(1) *3	$I_{SL2}$	$E_v = 1000 \text{ lx}$			0.3	$\mu\text{A}$
Output current (2) *1, *3	$I_{O1}$	$E_v = 100 \text{ lx}$	6	8	10	$\mu\text{A}$
Output current (2) *1, *3	$I_{O2}$	$E_v = 1000 \text{ lx}$	60	80	100	$\mu\text{A}$
Dark current *3	$I_{leak}$	$E_v = 0 \text{ lx}$			0.1	$\mu\text{A}$
Temperature coefficient *2	$I_{tc}$	$E_v = 100 \text{ lx}$		0.34		$\%/\text{C}$
Rise time *4	$T_r$	$E_v = 1000 \text{ lx}$ , $R_L = 5\text{k}\Omega$		15	40	$\mu\text{s}$
Fall time *4	$T_f$	$E_v = 1000 \text{ lx}$ , $R_L = 5\text{k}\Omega$		150	500	$\mu\text{s}$
Peak sensitivity wave length *2	$\lambda_p$			550		nm
Saturation output voltage *1, *3	$V_O$	$E_v = 1000 \text{ lx}$ , $R_L = 150\text{k}\Omega$	3.0	3.2		V

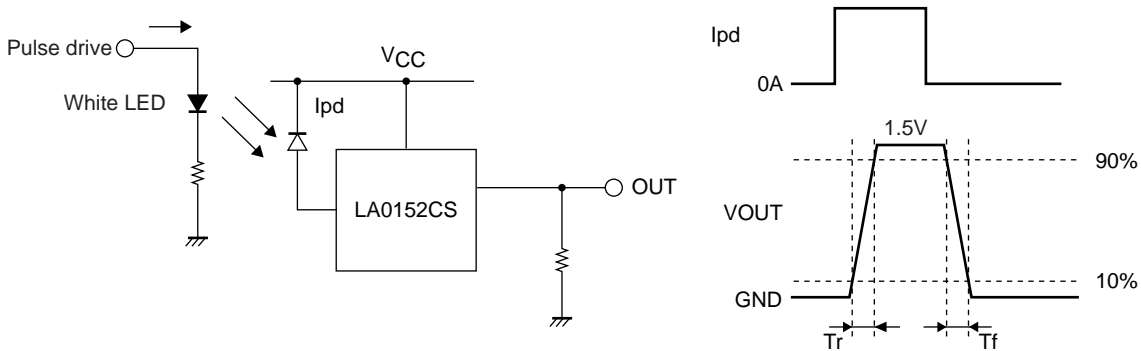
\*1. Measured with the standard light source A. White LED is used instead in the mass production line.

\*2. Design guaranteed item

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

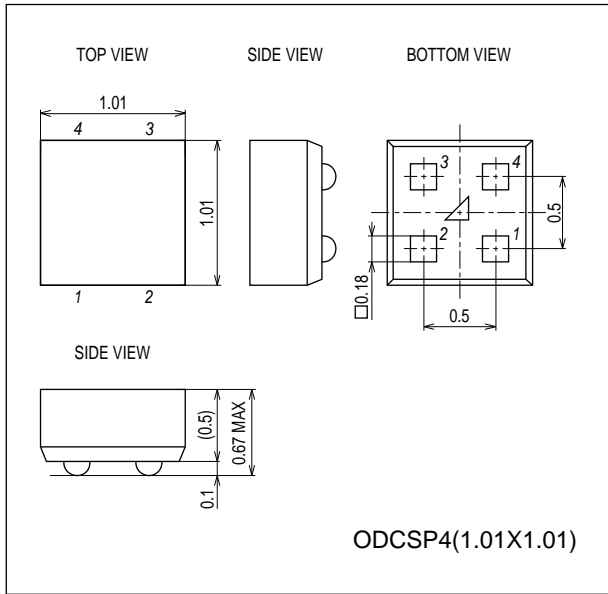


\*4. Measuring method of rise time ( $T_r$ ) and fall time ( $T_f$ )

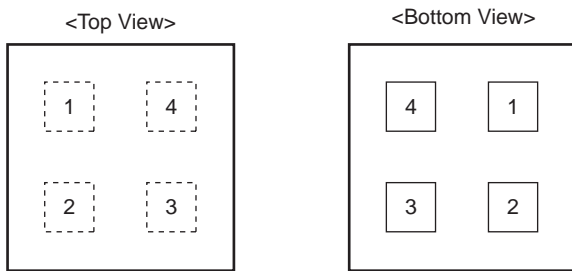


**Package Dimensions**

unit : mm (typ)  
3350A



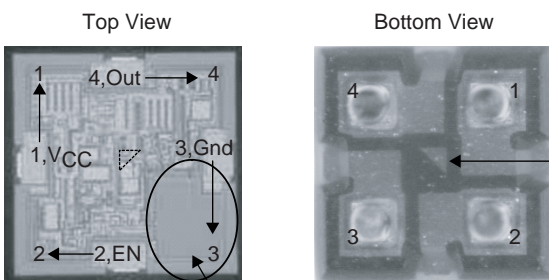
**Pad layout**



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

Ball pitch : 0.5mm, Ball size : 0.18mm<sup>□</sup>

**Pad layout (Photos)**



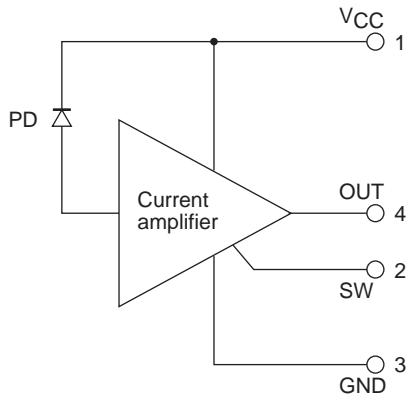
Pin 1 mark  
It is located at the center of the bottom of the package.

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

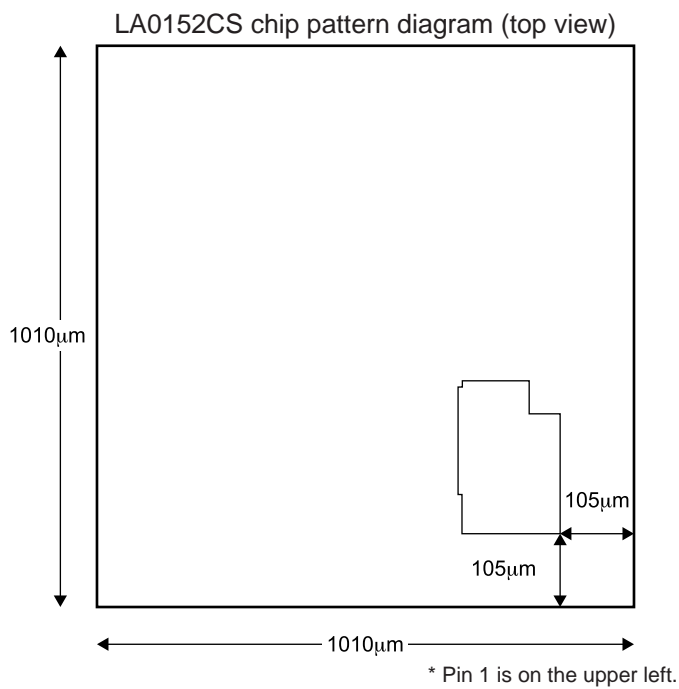
\* The photo diode is located in pin 3. Be careful not to mistake the pin 1 mark for the photo diode.

# LA0152CS

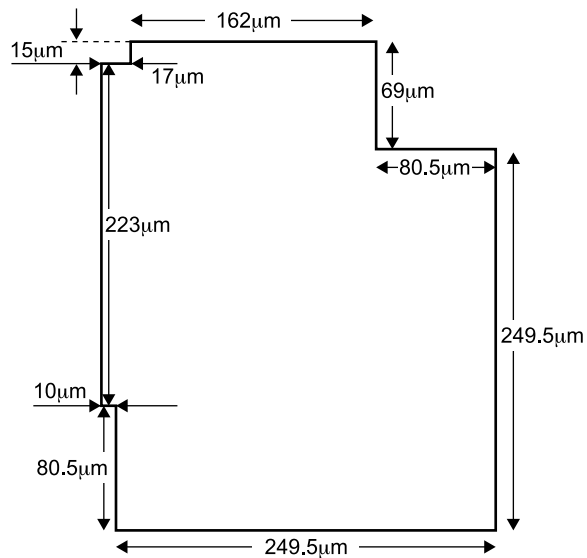
## Internal block diagram



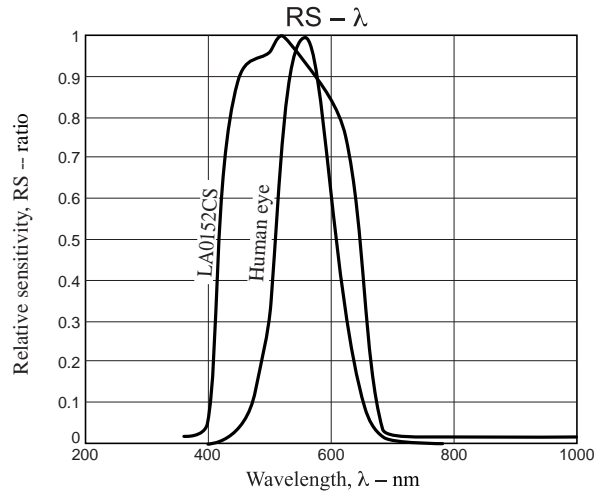
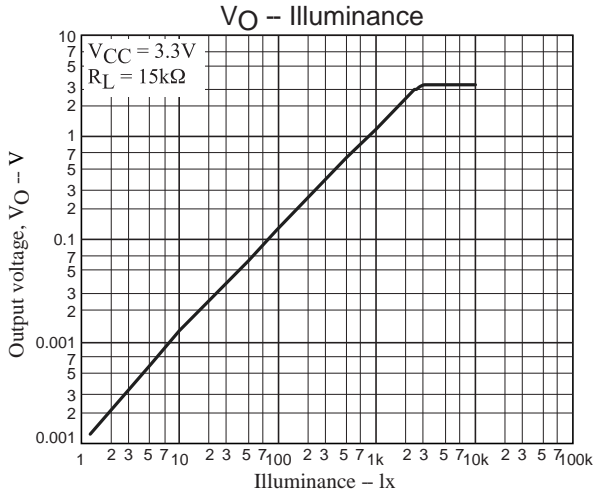
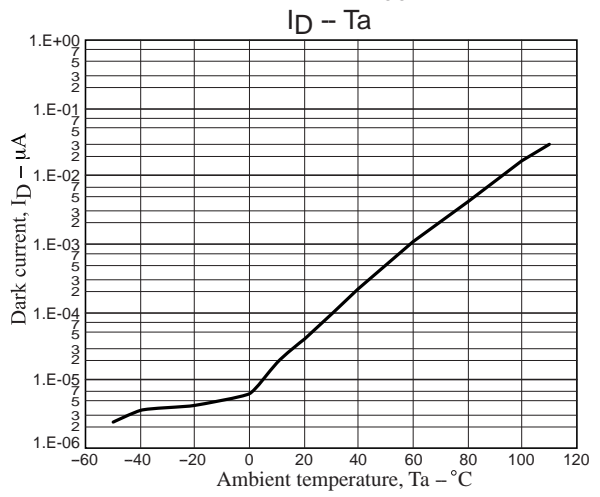
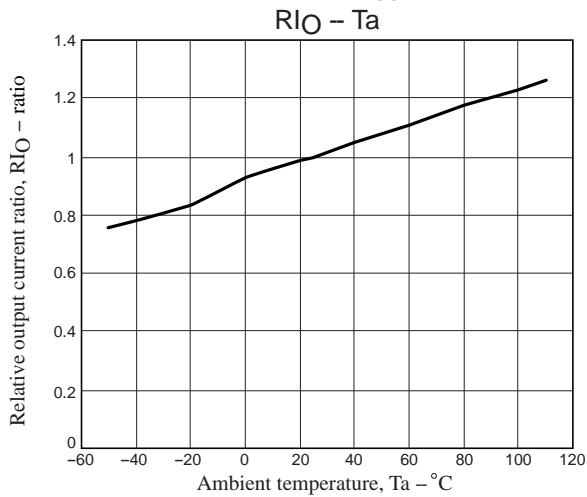
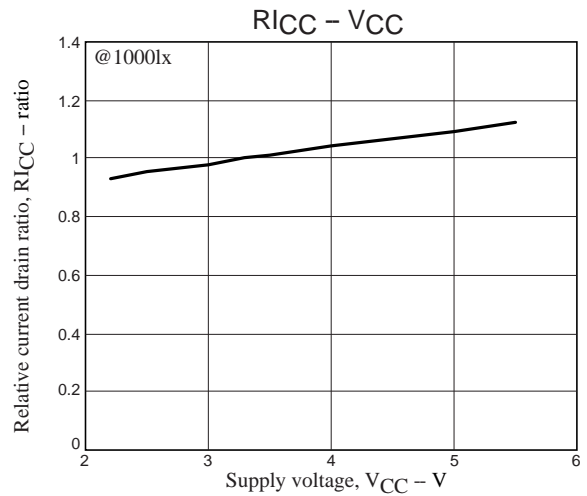
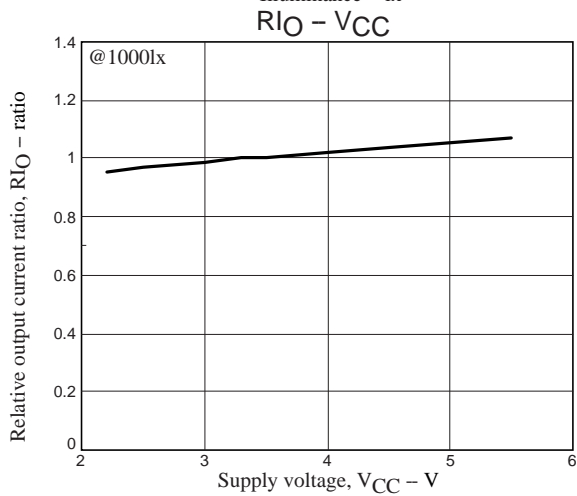
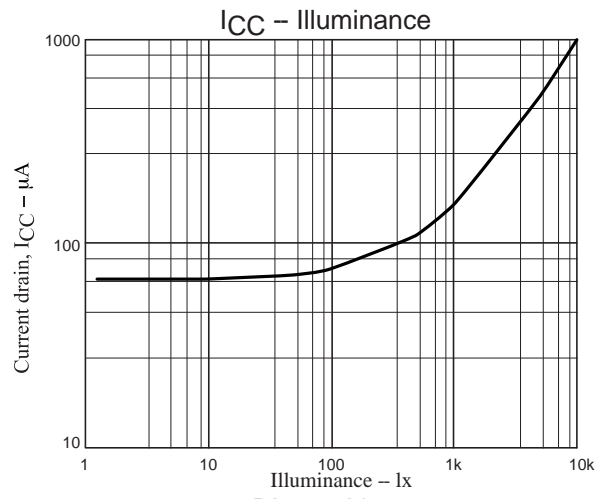
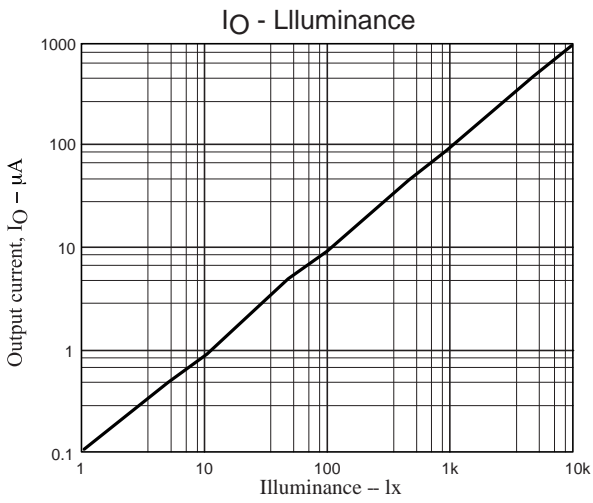
## Chip pattern and photo-receiving pattern diagrams



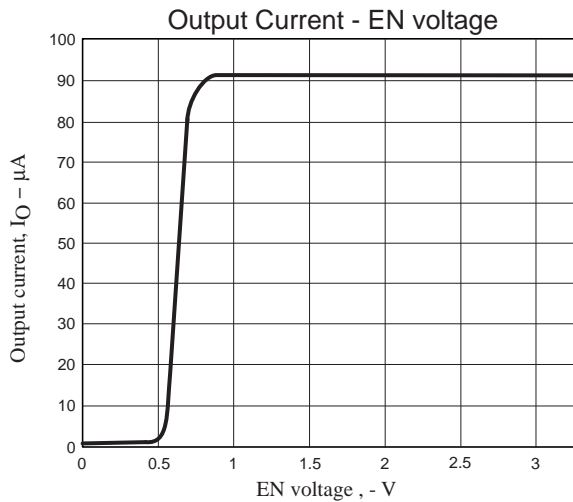
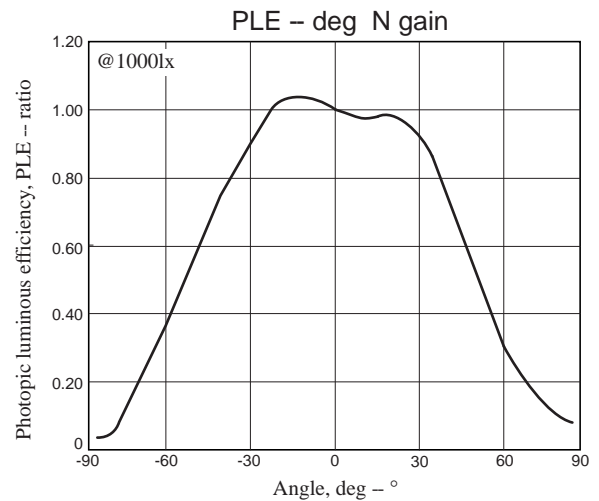
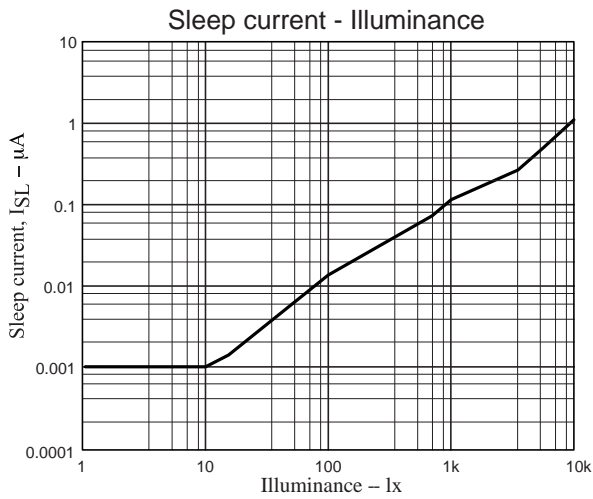
LA0152CS photo-receiving pattern enlarged diagram (effective area)



# LA0152CS



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