

# CNB2301 (ON2270)

## Reflective Photosensor

For contactless SW and object detection

### ■ Overview

CNB2301 is a small, thin reflective photosensor consisting of a high efficiency GaAs infrared light emitting diode which is integrated with a high sensitivity darlington phototransistor used as the photo detector in a single resin package.

### ■ Features

- Ultraminiature: 2.7 mm × 3.4 mm
- Visible light cutoff resin is used
- High current transfer ratio

### ■ Applications

- Detection of paper, film and cloth
- Detection of position and edge
- Liquid level sensor
- Detection of rotary positioning
- Start, end mark detection of magnetic tape

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

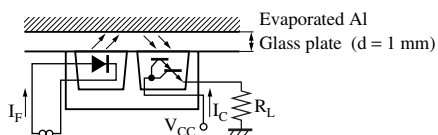
Parameter		Symbol	Rating	Unit
Input (Light emitting diode)	Power dissipation	$P_D$	75	mW
	Forward current	$I_F$	50	mA
	Reverse voltage	$V_R$	3	V
Output (Photo transistor)	Collector-emitter voltage (Base open)	$V_{CEO}$	20	V
	Emitter-collector voltage (Base open)	$V_{ECO}$	5	V
	Collector current	$I_C$	30	mA
	Collector power dissipation	$P_C$	75	mW
	Total power dissipation	$P_T$	100	mW
Operating ambient temperature		$T_{opr}$	-25 to +85	$^\circ\text{C}$
Storage temperature		$T_{stg}$	-30 to +100	$^\circ\text{C}$

Note) The part number in the parenthesis shows conventional part number.

■ Electrical-Optical Characteristics  $T_a = 25^{\circ}\text{C} \pm 3^{\circ}\text{C}$

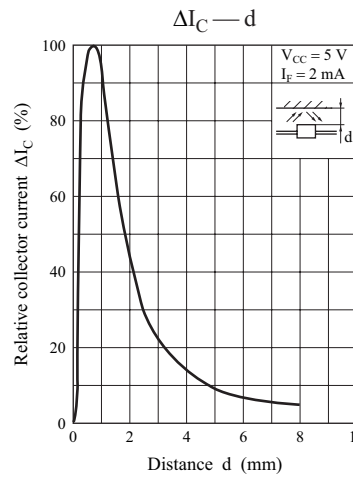
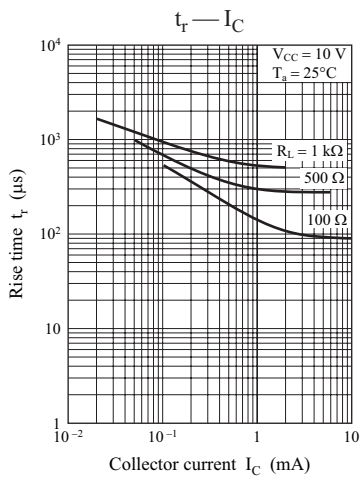
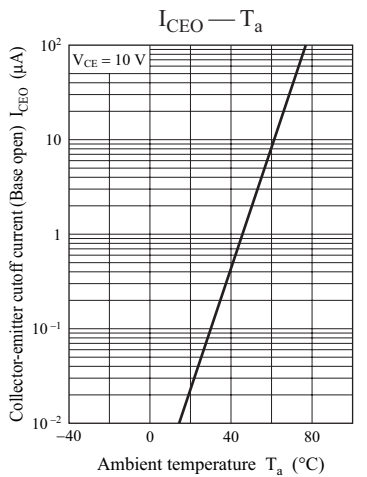
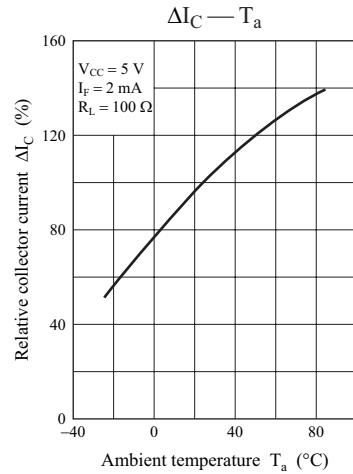
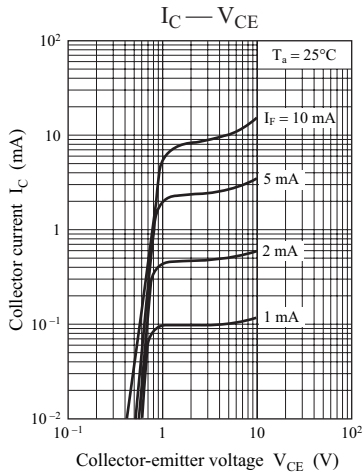
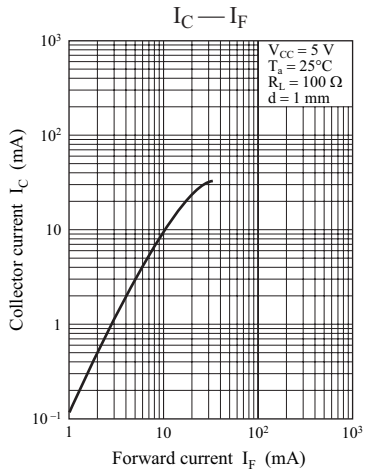
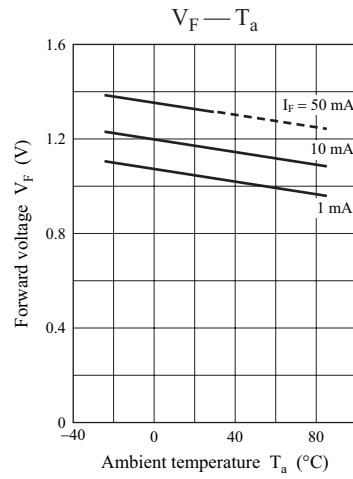
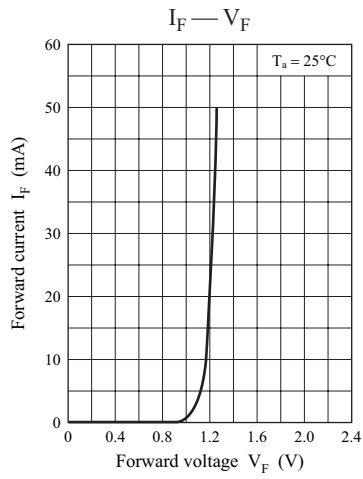
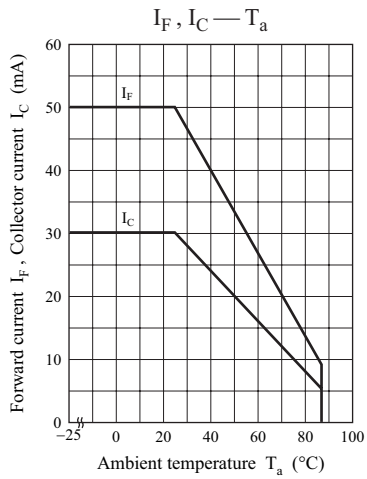
Parameter		Symbol	Conditions	Min	Typ	Max	Unit
Input characteristics	Reverse current	$I_R$	$V_R = 3\text{ V}$		0.01	10	$\mu\text{A}$
	Forward voltage	$V_F$	$I_F = 50\text{ mA}$		1.3	1.5	V
	Terminal capacitance	$C_T$	$V_R = 0\text{ V}, f = 1\text{ MHz}$		30		pF
Output characteristics	Collector-emitter cutoff current (Base open)	$I_{\text{CEO}}$	$V_{\text{CE}} = 10\text{ V}$			1.0	$\mu\text{A}$
Transfer characteristics	Collector current *1, *2	$I_C$	$V_{\text{CC}} = 5\text{ V}, I_F = 2\text{ mA}, R_L = 100\ \Omega, d = 1\text{ mm}$	0.46		12.0	mA
	Drain current	$I_D$	$V_{\text{CC}} = 5\text{ V}, I_F = 2\text{ mA}, R_L = 100\ \Omega$			2.0	$\mu\text{A}$
	Collector-emitter saturation voltage	$V_{\text{CE(sat)}}$	$I_F = 5\text{ mA}, I_C = 0.5\text{ mA}$			1.5	V
	Rise time	$t_r$	$V_{\text{CC}} = 10\text{ V}, I_C = 1\text{ mA}, R_L =$		150		$\mu\text{s}$
	Fall time	$t_f$	$100\ \Omega$		150		$\mu\text{s}$

- Note) 1. Input and output are practiced by electricity.  
 2. This device is designed by disregarding radiation.  
 3. \*1: Output current measurement circuit



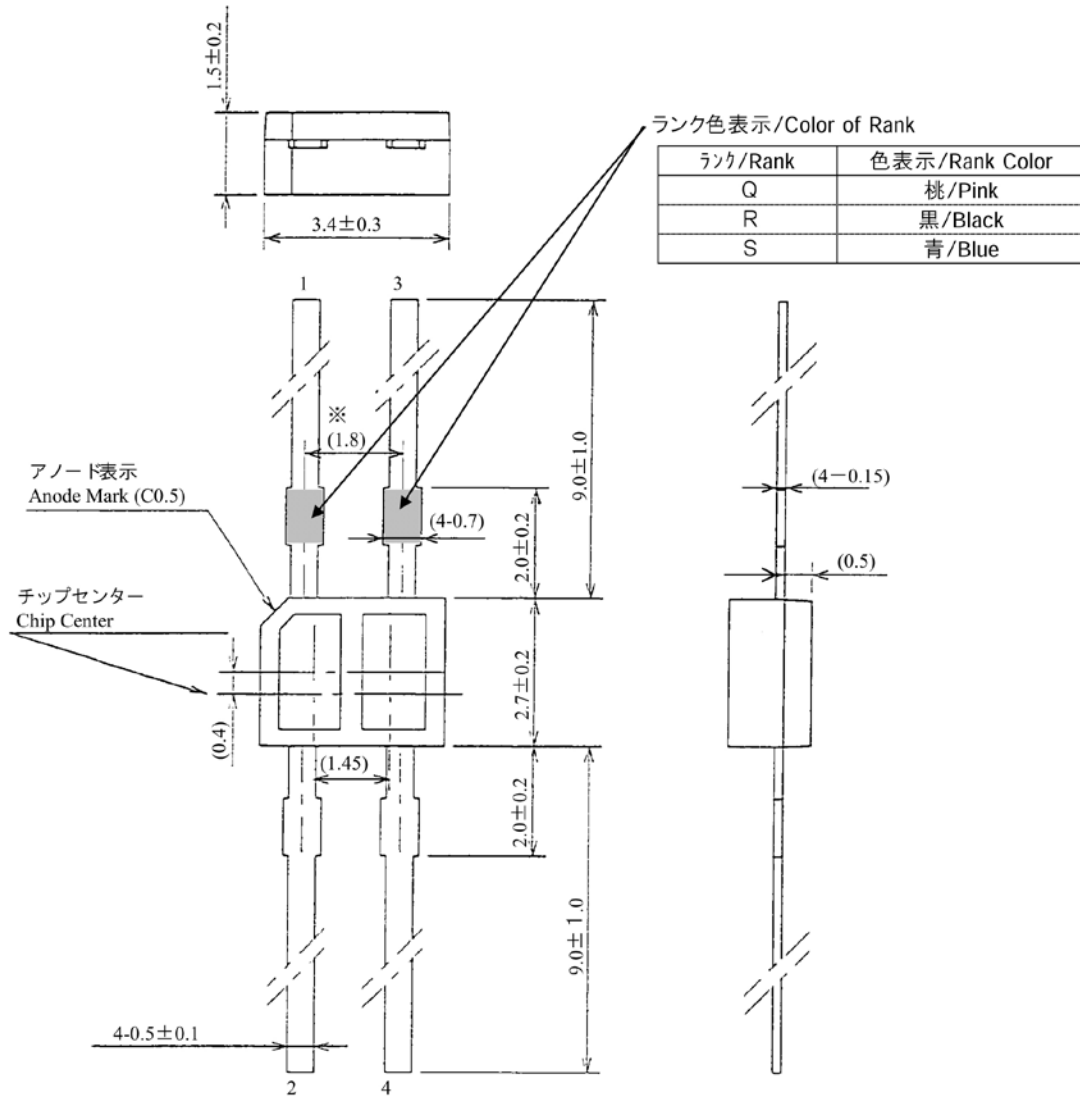
\*2: Rank classification

Rank	Q	R	S
$I_C$ (mA)	0.46 to 1.75	1.30 to 4.95	3.15 to 12.0
Color	Pink	Black	Blue



■ Package (Unit: mm)

LSMFRN4S0001



(注 1) ※リード根元寸法とします。

(Note1) ※Indicates root dimensions of lead.

(注 2) ランク色表示は、目視又は顕微鏡に於いて解読できる事。

(Note2) What rank color a sees an attention and can decode in a microscope.

• Pin name

- 1: Anode
- 2: Cathode
- 3: Emitter
- 4: Collector

## Request for your special attention and precautions in using the technical information and semiconductors described in this book

- (1) If any of the products or technical information described in this book is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially, those with regard to security export control, must be observed.
- (2) The technical information described in this book is intended only to show the main characteristics and application circuit examples of the products. No license is granted in and to any intellectual property right or other right owned by Panasonic Corporation or any other company. Therefore, no responsibility is assumed by our company as to the infringement upon any such right owned by any other company which may arise as a result of the use of technical information described in this book.
- (3) The products described in this book are intended to be used for standard applications or general electronic equipment (such as office equipment, communications equipment, measuring instruments and household appliances).  
Consult our sales staff in advance for information on the following applications:
  - Special applications (such as for airplanes, aerospace, automobiles, traffic control equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
  - Any applications other than the standard applications intended.
- (4) The products and product specifications described in this book are subject to change without notice for modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.
- (5) When designing your equipment, comply with the range of absolute maximum rating and the guaranteed operating conditions (operating power supply voltage and operating environment etc.). Especially, please be careful not to exceed the range of absolute maximum rating on the transient state, such as power-on, power-off and mode-switching. Otherwise, we will not be liable for any defect which may arise later in your equipment.
  - Even when the products are used within the guaranteed values, take into the consideration of incidence of break down and failure mode, possible to occur to semiconductor products. Measures on the systems such as redundant design, arresting the spread of fire or preventing glitch are recommended in order to prevent physical injury, fire, social damages, for example, by using the products.
- (6) Comply with the instructions for use in order to prevent breakdown and characteristics change due to external factors (ESD, EOS, thermal stress and mechanical stress) at the time of handling, mounting or at customer's process. When using products for which damp-proof packing is required, satisfy the conditions, such as shelf life and the elapsed time since first opening the packages.
- (7) This book may be not reprinted or reproduced whether wholly or partially, without the prior written permission of our company.