

# CNZ1402A/B, CNZ1403A/B (ON1402A/B, ON1403A/B)

## Integrated Photosensors

For contactless SW, object detection

### Overview

CNZ1402A/B and CNZ1403A/B are photocouplers in which a high efficiency GaAs infrared light emitting diode as the light emitting element, and a photodiode and a signal processing circuit as a light detecting element are intergrated on a single chip.

The two elements are arranged so as to face each other, and objects passing between them are detected.

### Features

- Built-in Schmitt circuit for strong noise-withstanding capability
- Large output current
- Open-collector output
- Output transistors turn on and off (two types) when light is shined  
 CNZ1402A/CNZ1403A : Normally ON type  
 CNZ1402B/CNZ1403B : Normally OFF type

### Absolute Maximum Ratings (Ta = 25°C)

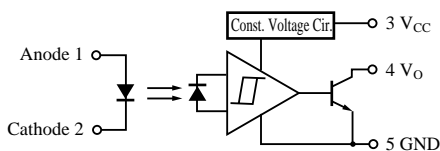
	Parameter	Symbol	Ratings	Unit
Input (Light emitting diode)	Reverse voltage (DC)	$V_R$	3	V
	Forward current (DC)	$I_F$	50	mA
	Power dissipation	$P_D^{*1}$	75	mW
Output (Photo IC)	Output current	$I_O$	20	mA
	Output voltage	$V_O$	30	V
	Supply voltage	$V_{CC}$	16	V
Temperature	Power dissipation	$P_C^{*2}$	200	mW
	Operating ambient temperature	$T_{opr}$	-20 to +85	°C
	Storage temperature	$T_{stg}$	-30 to +100	°C

\*1 Input power derating ratio is 1.0 mW/°C at Ta ≥ 25°C.

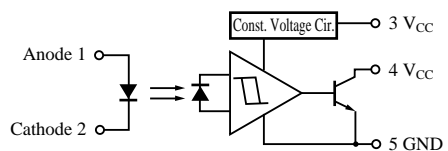
\*2 Output power derating ratio is 2.67 mW/°C at Ta ≥ 25°C.

### Pin Connection

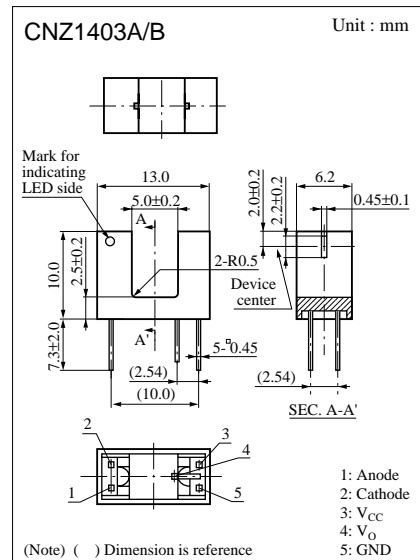
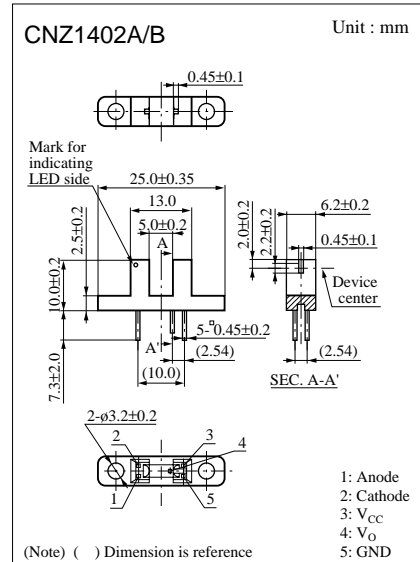
CNZ1402A, CNZ1403A  
(Normally ON type)



CNZ1402B, CNZ1403B  
(Normally OFF type)



Note) The part numbers in the parenthesis show conventional part number.

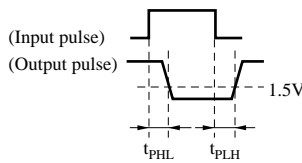
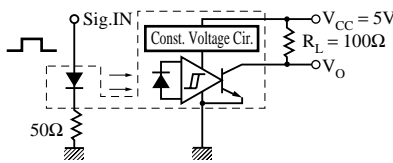


■ Electrical Characteristics (Ta = 25°C)

Parameter		Symbol	Conditions	min	typ	max	Unit
Input characteristics	Forward voltage (DC)	$V_F$	$I_F = 50\text{mA}$		1.2	1.5	V
	Reverse current (DC)	$I_R$	$V_R = 3\text{V}$			10	$\mu\text{A}$
	Capacitance between terminals	$C_t$	$V_R = 0\text{V}, f = 1\text{MHz}$		50		pF
Output characteristics	“H” Output current	$I_{OH}$	$V_{CC} = 5\text{V}, V_{OH} = 30\text{V}, I_F = 0\text{mA}, (I_F = 10\text{mA})$			100	$\mu\text{A}$
	“L” Output voltage	$V_{OL}$	$V_{CC} = 5\text{V}, I_{OL} = 20\text{mA}, I_F = 10\text{mA}, (I_F = 0\text{mA})$		0.15	0.4	V
Transfer characteristics	Threshold input current	$I_{FH \rightarrow L} (I_{FL \rightarrow H})$	$V_{CC} = 5\text{V}$		5	10	mA
	Hysteresis	$I_{HLH} / I_{FHL} (I_{FHL} / I_{HLH})$	$V_{CC} = 5\text{V}, R_L = 240\Omega$		0.75		
	Response time	$t_{PHL} (t_{PLH})^*$	$V_{CC} = 5\text{V}, I_{FP} = 10\text{mA}, R_L = 100\Omega$			6	
$t_{PLH} (t_{PHL})^*$		$V_{CC} = 5\text{V}, I_{FP} = 10\text{mA}, R_L = 100\Omega$			10		$\mu\text{s}$

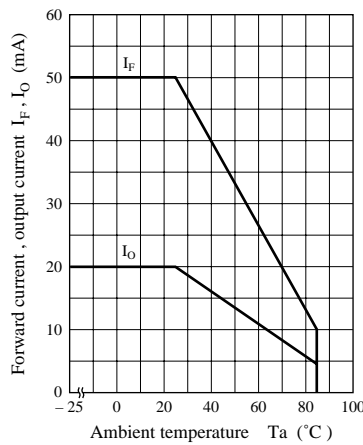
Note) Normally ON type characteristics is shown, ( ) shows Normally OFF type.

\* Switching time measurement circuit

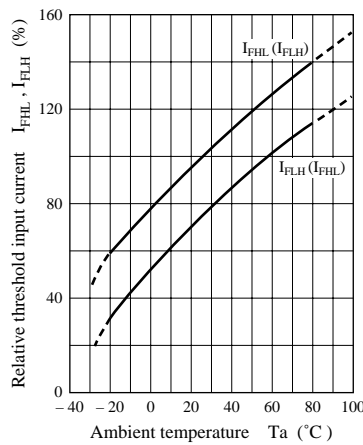


$t_{PHL}$  : H → L Propagation time  
 $t_{PLH}$  : L → H Propagation time

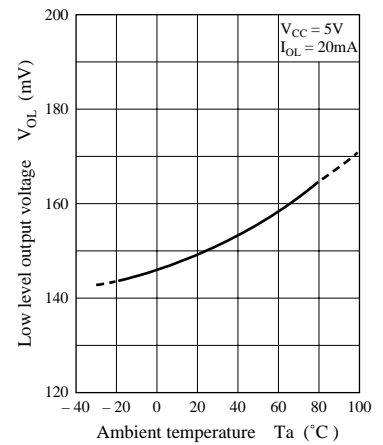
$I_F, I_O - T_a$



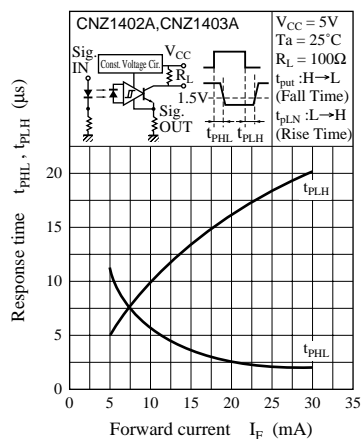
$I_{FT} - T_a$



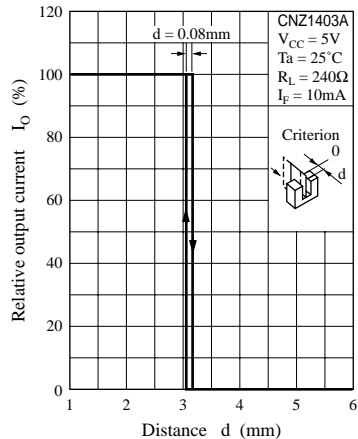
$V_{OL} - T_a$



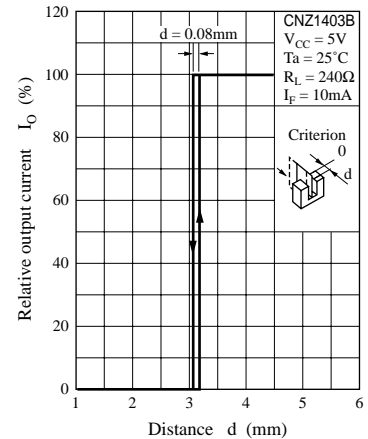
$t_{pd} - I_F$



Detecting position characteristics (1)



Detecting position characteristics (2)



# Caution for Safety

 **DANGER**

Gallium arsenide material (GaAs) is used in this product.

Therefore, do not burn, destroy, cut, crush, or chemically decompose the product, since gallium arsenide material in powder or vapor form is harmful to human health.

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