

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)

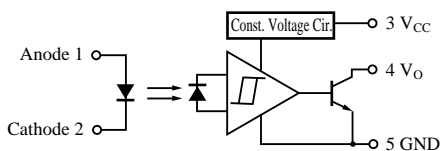
	Parameter	Symbol	Ratings	Unit
Input (Light emitting diode)	Reverse voltage (DC)	V_R	3	V
	Forward current (DC)	I_F	50	mA
	Power dissipation	P_D^{*1}	75	mW
Output (Photo IC)	Output current	I_O	20	mA
	Output voltage	V_O	30	V
	Supply voltage	V_{CC}	16	V
Temperature	Power dissipation	P_C^{*2}	200	mW
	Operating 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.

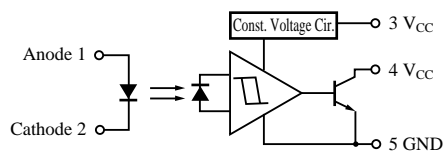
*2 Output power derating ratio is 2.67 mW/°C at Ta ≥ 25°C.

Pin Connection

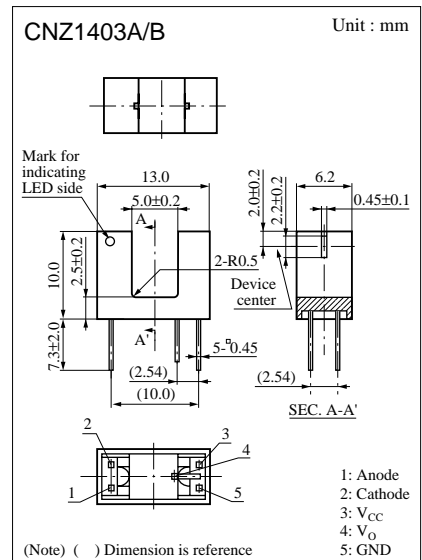
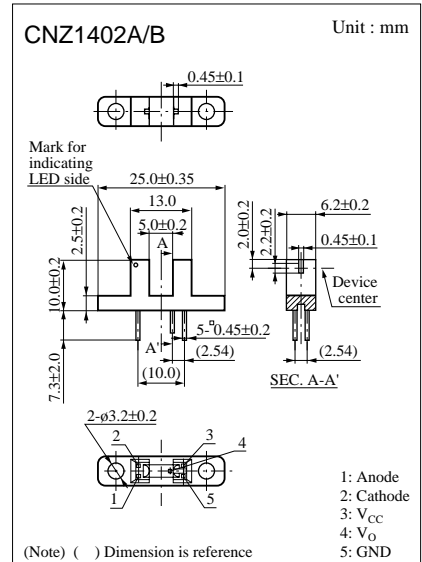
CNZ1402A, CNZ1403A
(Normally ON type)



CNZ1402B, CNZ1403B
(Normally OFF type)



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

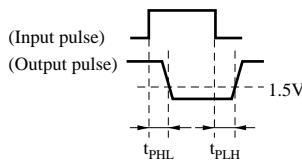
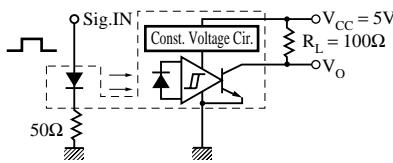


■ Electrical Characteristics (Ta = 25°C)

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	μA
	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	μA
	“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	$I_{HLH} / I_{FHL} (I_{FLH} / I_{FHL})$	$V_{CC} = 5\text{V}, R_L = 240\Omega$		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		μs

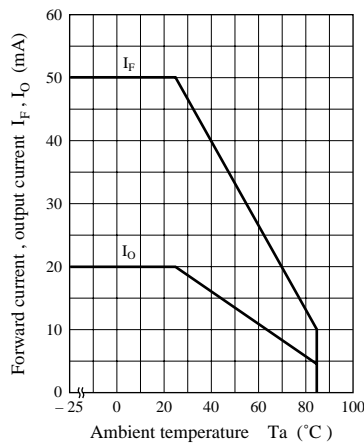
Note) Normally ON type characteristics is shown, () shows Normally OFF type.

* Switching time measurement circuit

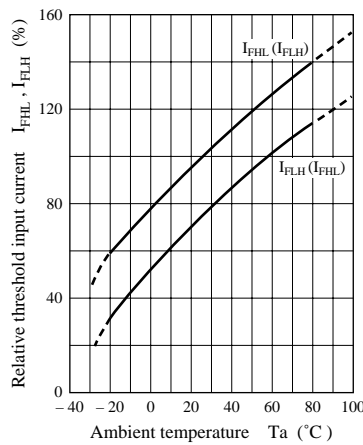


t_{PHL} : H \rightarrow L Propagation time
 t_{PLH} : L \rightarrow H Propagation time

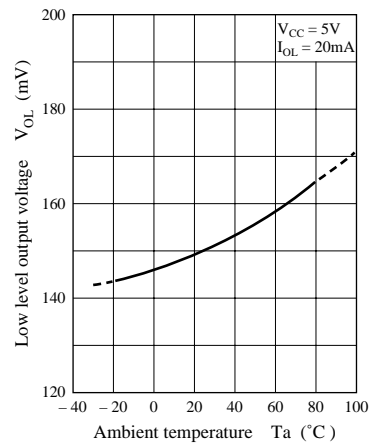
$I_F, I_O - T_a$



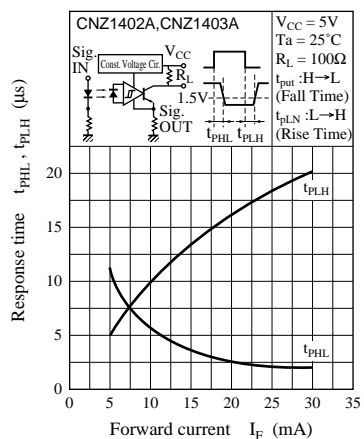
$I_{FT} - T_a$



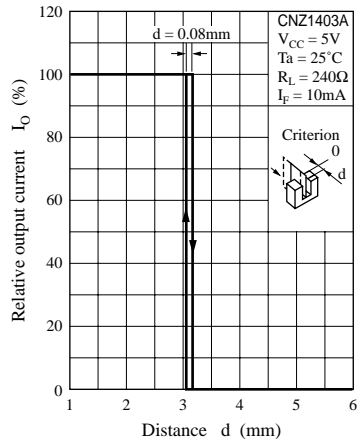
$V_{OL} - T_a$



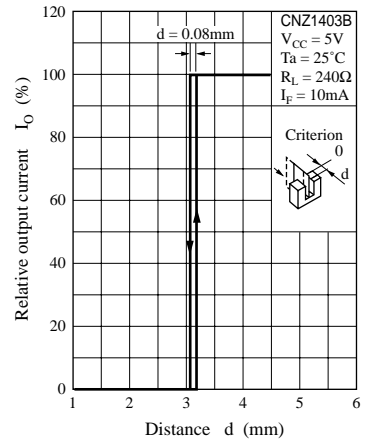
$t_{pd} - I_F$



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.

Observe the relevant laws and regulations when disposing of the products. Do not mix them with ordinary industrial waste or household refuse when disposing of GaAs-containing products.

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