

CNZ1402A/B, CNZ1403A/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)

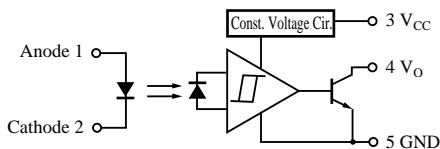
	Parameter	Symbol	Ratings	Unit
Input (Light emitting diode)	Reverse voltage (DC)	V_R	3	V
	Forward current (DC)	I_F	50	mA
	Power dissipation	P_D^{*1}	75	mW
Output (Photo IC)	Output current	I_O	20	mA
	Output voltage	V_O	30	V
	Supply voltage	V_{CC}	16	V
Temperature	Power dissipation	P_C^{*2}	200	mW
	Operating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

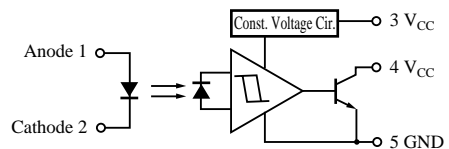
*2 Output power derating ratio is 2.67 mW/°C at Ta ≥ 25°C.

Pin Connection

CNZ1402A,CNZ1403A
(Normally ON type)

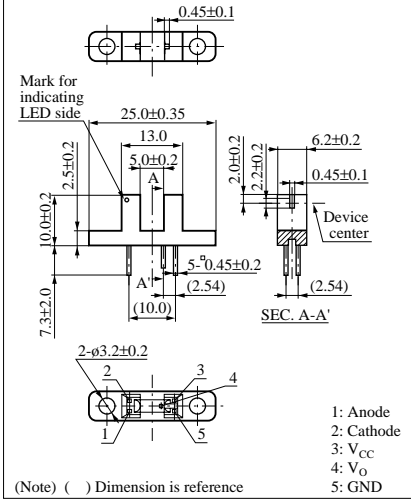


CNZ1402B,CNZ1403B
(Normally OFF type)



CNZ1402A/B

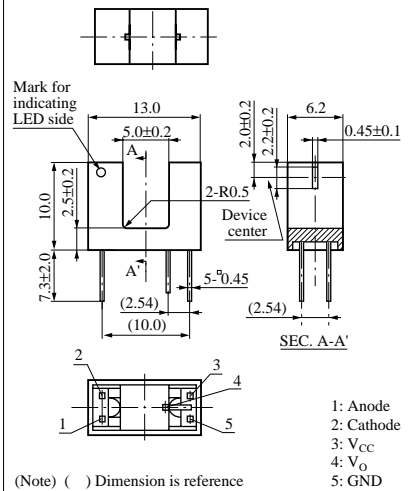
Unit : mm



(Note) () Dimension is reference

CNZ1403A/B

Unit : mm



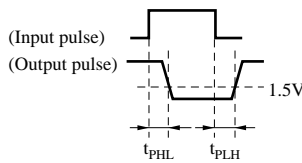
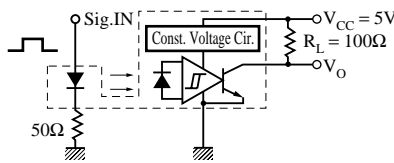
(Note) () Dimension is reference

■ 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

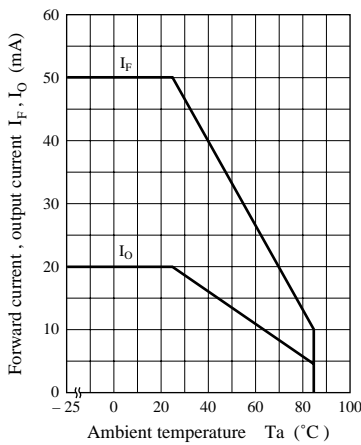
Note) Normally ON type characteristics is shown, () shows Normally OFF type.

* Switching time measurement circuit

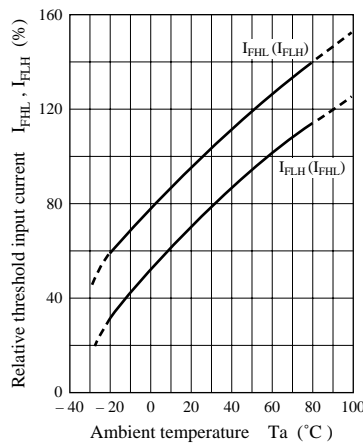


t_{PHL} : H → L Propagation time
 t_{PLH} : L → H Propagation time

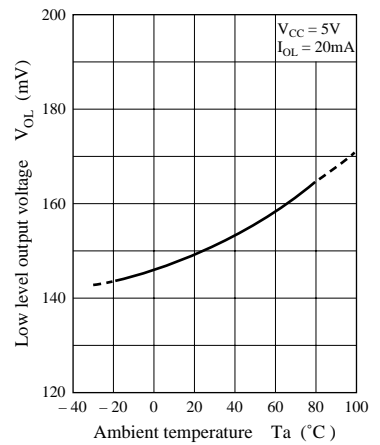
$I_F, I_O - T_a$



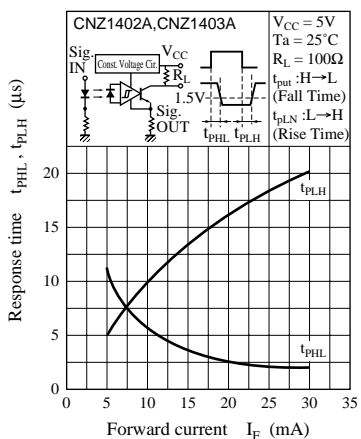
$I_{FT} - T_a$



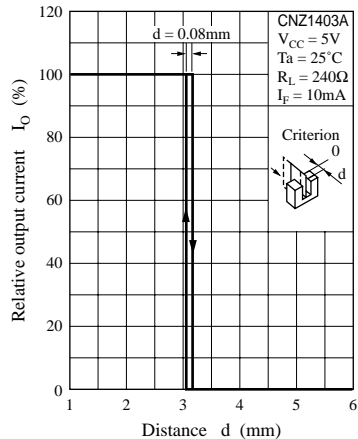
$V_{OL} - T_a$



$t_{pd} - I_F$



Detecting position characteristics (1)



Detecting position characteristics (2)

