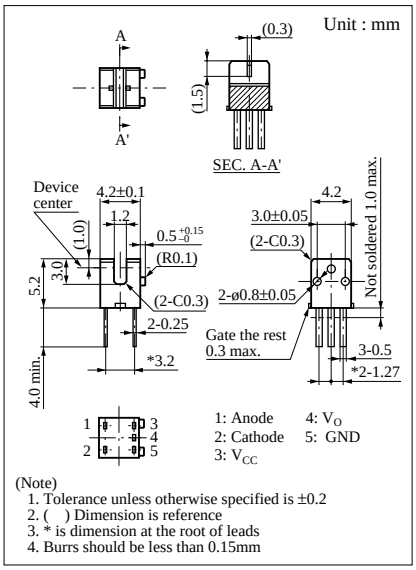
CNZ1413

Integrated Photosensors



■ Overview

CNZ1413 are ultraminiature, highly reliable transmissive photosensors consisting of a high-efficiency GaAs infrared light emitting diode chip that is integrated with a high-sensitivity Si-integrated-photodetector chip in a double molded resin package.

■ Features

- Ultraminiature : 4.2 × 4.2 mm (height : 5.2 mm)
- Fast response : t_{PHL} = 2.5µs, t_{PLH} = 6 µs (typ.) (ON1413A)
- Highly precise position detection (slit width : 0.3 mm)
- Gap width : 1.2 mm
- With attachment positioning pin

■ Absolute Maximum Ratings (Ta = 25˚C)

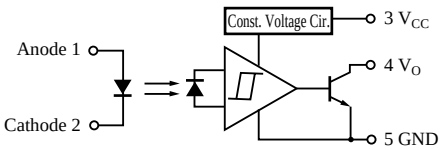
Parameter		Symbol	Ratings	Unit
Input (Light emitting diode)	Reverse voltage (DC)	V_R	6	V
	Forward current (DC)	I_F	50	mA
	Power dissipation	P_D *1	75	mW
Output (Photo IC)	Output current	I_O	20	mA
	Output voltage	V_O	30	V
	Supply voltage	V_{CC}	17	V
	Power dissipation	P_C *2	200	mW
Temperature	Operating ambient temperature	T_{opr}	–25 to +85	˚C
	Storage temperature	T_{stg}	– 40 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

CNZ1413
(Normally ON type)

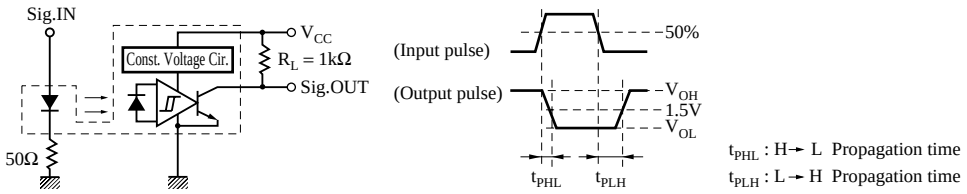


■ Electrical Characteristics (Ta = 25˚C)

Parameter		Symbol	Conditions	min	typ	max	Unit
Input characteristics	Forward voltage (DC)	V_F	I_F = 20mA		1.2	1.4	V
	Reverse current (DC)	I_R	V_R = 3V			10	μA
Output characteristics	"H" Output current	I_{OH}	V_{CC} = 5V, V_{OH} = 30V, I_F = 0mA			100	μA
	"L" Output voltage	V_{OL}	V_{CC} = 5V, I_{OL} = 20mA, I_F = 5mA		0.15	0.4	V
	Operating power voltage	V_{CC}			4.5	17	V
	Low-level supply current	I_{CCL}	V_{CC} = 5V, I_F = 5mA		2.4	5	mA
	High-level supply current	I_{CCH}	V_{CC} = 5V, I_F = 0mA		0.8	3	mA
Transfer characteristics	Threshold input current	$I_{FH\rightarrow L}(I_{FL\rightarrow H})$	V_{CC} = 5V			5	mA
	Hysteresis	$I_{FLH}/I_{FHL}(I_{FHL}/I_{FLH})$	V_{CC} = 5V		0.7		
	Response time	$t_{PHL}(t_{PLH})^*$	V_{CC} = 5V, I_F = 5mA, R_L = 1kΩ		2.5(3.5)		μs
		$t_{PLH}(t_{PHL})^*$	V_{CC} = 5V, I_{FP} = 5mA, R_L = 1kΩ		6(5)		μs

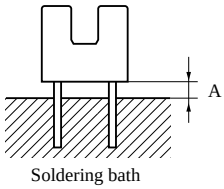
Note) Normally ON type characteristics is shown, ( ) shows Normally OFF type.

* Switching time measurement circuit



● Important Information for Soldering

1. Soldering Position



A : Make sure the distance is 0.1 mm or more.

2. Solder Temperature and Soldering Time

Temperature : 260˚C or less

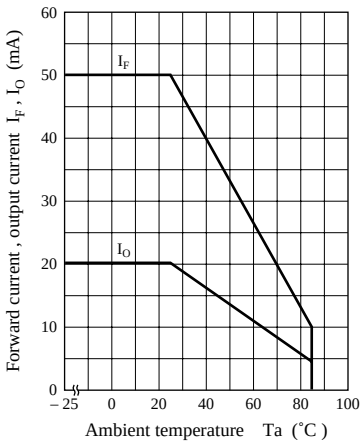
Time : within 3 seconds

Note) Avoid using reflow soldering methods.

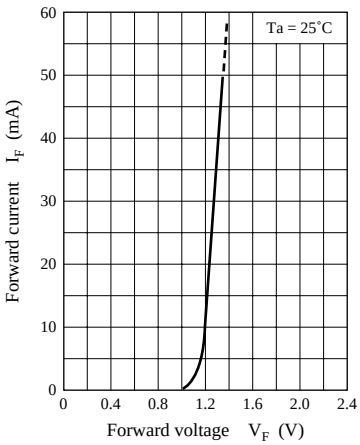
3. Other Issues

1) Soldering should not create excessive thermal or mechanical stress on the case package or leads. Excessive stress may cause changes in the shape or characteristics of the package or leads.
2) Be careful not to allow solder, flux, solvents, etc. to remain on the case package. Doing so may cause problems related to transmission characteristics, etc.

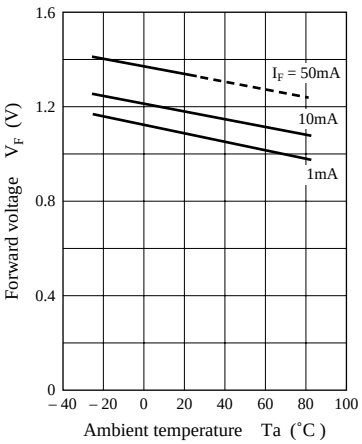
I_F , I_O — Ta



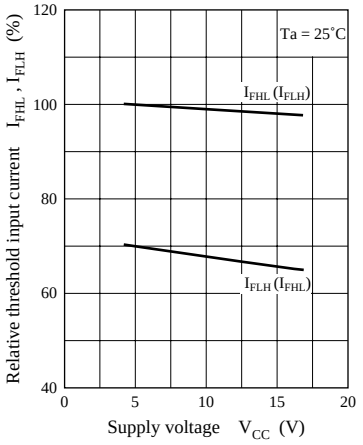
I_F — V_F



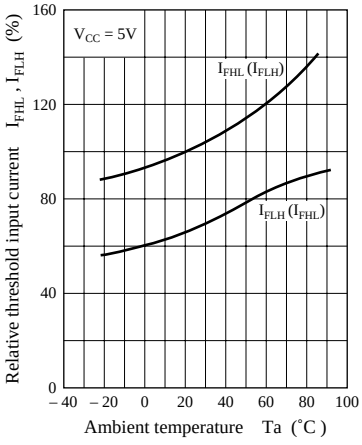
V_F — Ta



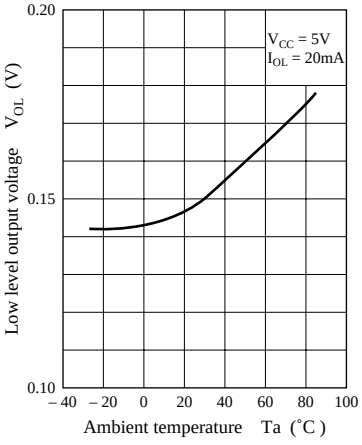
I_{FT} — V_{CC}



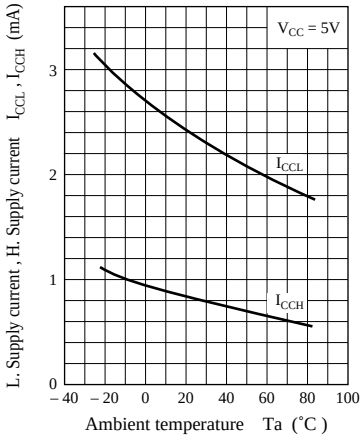
I_{FT} — Ta



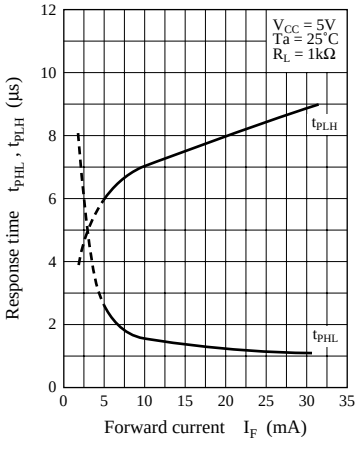
V_{OL} — Ta



I_{CCL} , I_{CCH} — Ta



t_{PHL} , t_{PLH} — I_F



Detecting position characteristics