

# CNZ3731, CNC7C501, CNZ3734 CNC2S501, CNC7C502, CNC7H501

## Optoisolators

### Overview

The CNZ3731 series of optoisolators consist of a GaAs infrared LED which is optically coupled with a Si NPN Darlington phototransistor, and housed in a small DIL package. The series provides high I/O isolation voltage and high collector/emitter isolation voltage, as well as a high current transfer ratio (CTR). This opto isolator series also includes the two-channel CNC7C501 and the four-channel CNZ3734, and A type of these models with increased collector to emitter breakdown voltage ( $V_{CEO} > 350V$ ).

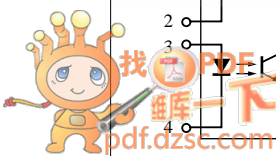
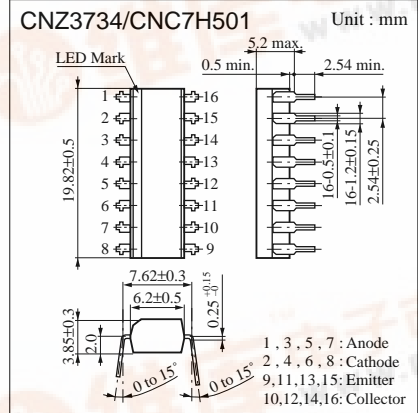
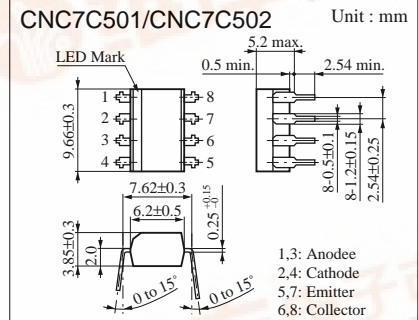
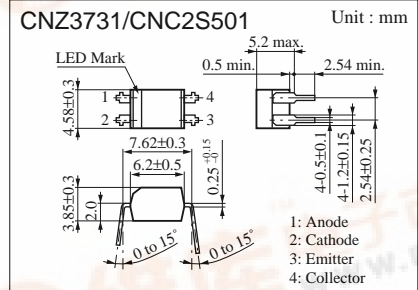
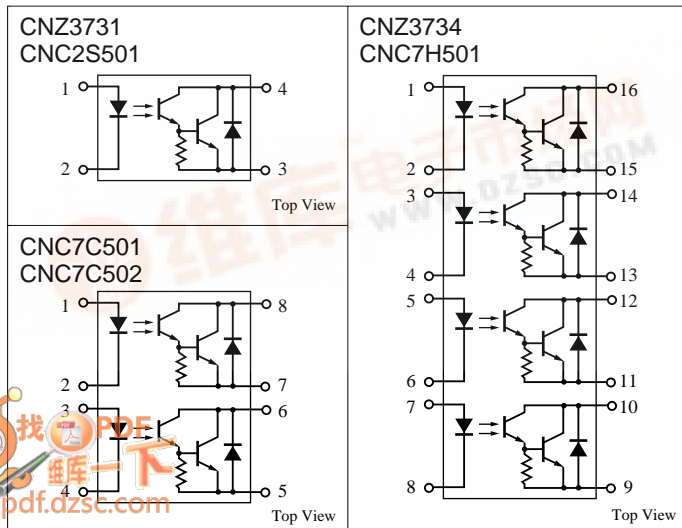
### Features

- High collector to emitter breakdown voltage :  $V_{CEO} > 300V$ ,  
A type :  $V_{CEO} > 350V$
- High current transfer ratio with Darlington phototransistor output :  
CTR = 4000% (typ.)
- High I/O isolation voltage :  $V_{ISO} \geq 5000V_{rms}$
- Small DIL package for saving mounting space
- UL listed (UL File No. E79920)
- A-type models have a guaranteed internal insulating distance of 0.4 mm

### Applications

- Telephones
- Telephone exchange
- FAX
- Programmable controllers
- Signal transfer between circuits with different potentials and impedances

### Pin Connection



## CNZ3731, CNC7C501, CNZ3734, CNC2S501, CNC7C502, CNC7H501 Optoisolators (Photocouplers)

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

Parameter		Symbol	Ratings				Unit
			CNZ3731	CNC7C501 CNZ3734	CNC2S501	CNC7C502 CNC7H501	
Input (Light emitting diode)	Reverse voltage (DC)	V <sub>R</sub>	6		6		V
	Forward current (DC)	I <sub>F</sub>	50		50		mA
	Pulse forward current	I <sub>FP</sub> <sup>*1</sup>	1		1		A
	Power dissipation	P <sub>D</sub> <sup>*2</sup>	75		75		mW
Output (Photo transistor)	Collector current	I <sub>C</sub>	150		150		mA
	Collector to emitter voltage	V <sub>CEO</sub>	300		350		V
	Emitter to collector voltage	V <sub>ECO</sub>	0.3		0.3		V
	Collector power dissipation	P <sub>C</sub> <sup>*3</sup>	300	150	300	150	mW
Total power dissipation		P <sub>T</sub>	320	200	320	200	mW
Isolation voltage, input to output		V <sub>ISO</sub> <sup>*4</sup>	5000		5000		V <sub>rms</sub>
Operating ambient temperature		T <sub>opr</sub>	-30 to +100		-30 to +100		°C
Storage temperature		T <sub>stg</sub>	-55 to +125		-55 to +125		°C

<sup>\*1</sup> Pulse width ≤ 100 μs, repeat 100 pps

<sup>\*2</sup> Input power derating ratio is 0.75 mW/°C at Ta ≥ 25°C.

<sup>\*3</sup> Output power derating ratio is 3.0 mW/°C at Ta ≥ 25°C (CNZ3731, CNC2S501).

Output power derating ratio is 0.75 mW/°C at Ta ≥ 25°C (CNC7C501, CNC2S502, CNZ3734, CNC7H501).

<sup>\*4</sup> AC 1min., RH < 60 %

### ■ Electrical Characteristics (Ta = 25°C)

Parameter		Symbol	Conditions	min	typ	max	Unit
Input characteristics	Reverse current (DC)	I <sub>R</sub>	V <sub>R</sub> = 3V			10	μA
	Forward voltage (DC)	V <sub>F</sub>	I <sub>F</sub> = 50mA		1.35	1.5	V
	Capacitance between pins	C <sub>t</sub>	V <sub>R</sub> = 0V, f = 1MHz		30		pF
Output characteristics	Collector cutoff current	I <sub>CEO</sub>	V <sub>CE</sub> = 200V			200	nA
	Collector to emitter capacitance	C <sub>C</sub>	V <sub>CE</sub> = 10V, f = 1MHz		10		pF
Transfer characteristics	DC current transfer ratio	CTR <sup>*1</sup>	V <sub>CE</sub> = 2V, I <sub>F</sub> = 1mA	1000	4000		%
	Isolation capacitance, input to output	C <sub>ISO</sub>	f = 1MHz		0.7		pF
	Isolation resistance, input to output	R <sub>ISO</sub>	V <sub>ISO</sub> = 500V	10 <sup>11</sup>			Ω
	Rise time	t <sub>r</sub> <sup>*2</sup>	V <sub>CC</sub> = 10V, I <sub>C</sub> = 10mA,		40		μs
	Fall time	t <sub>f</sub> <sup>*3</sup>	R <sub>t</sub> = 100Ω		15		μs
Collector to emitter saturation voltage		V <sub>CE(sat)</sub>	I <sub>F</sub> = 1mA, I <sub>C</sub> = 2mA			1.0	V

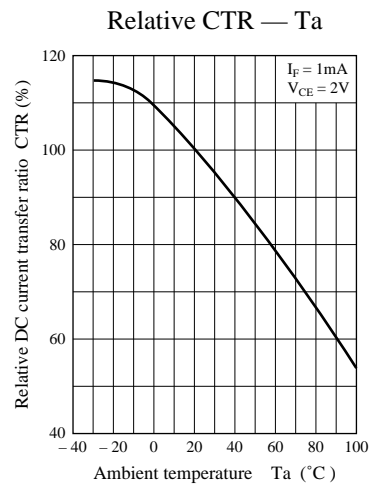
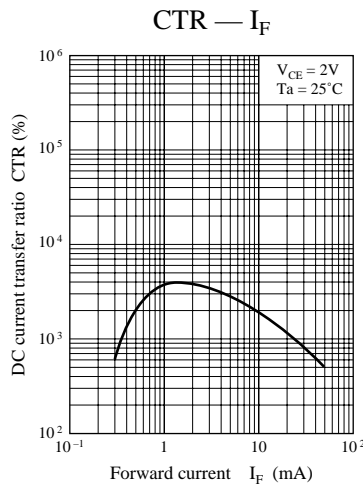
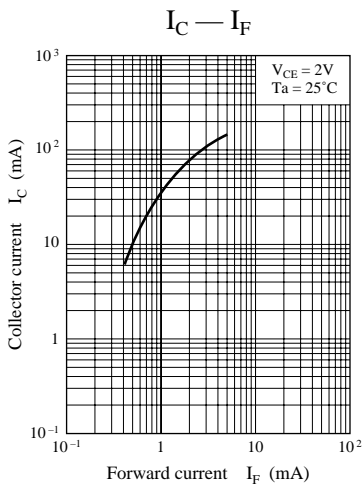
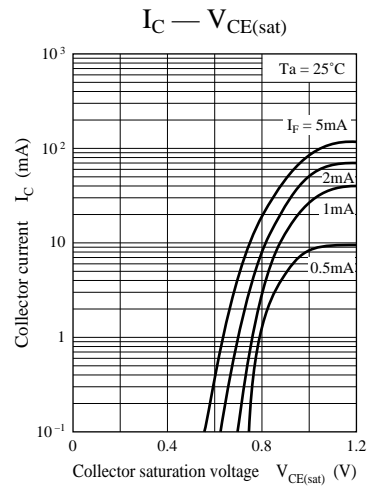
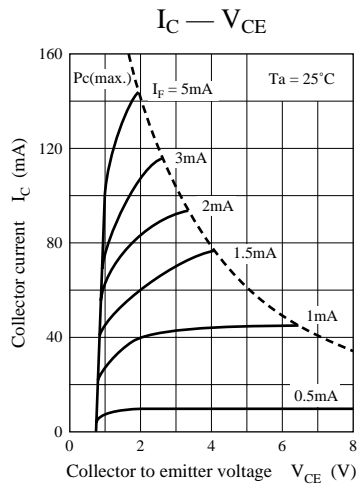
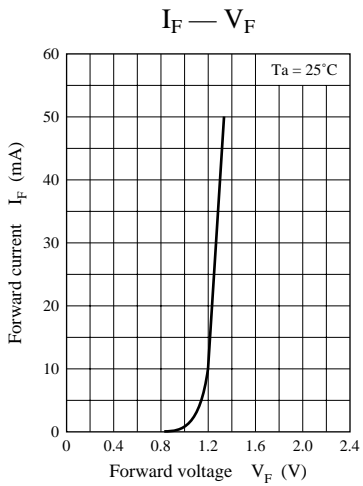
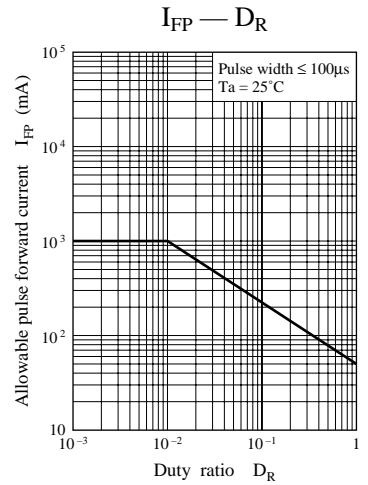
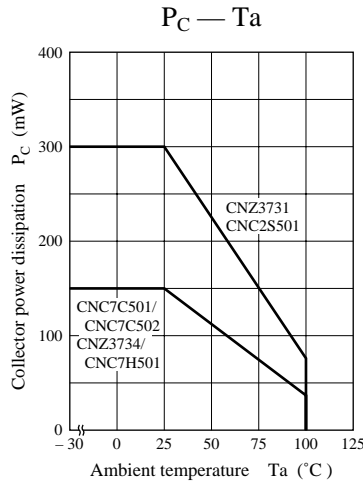
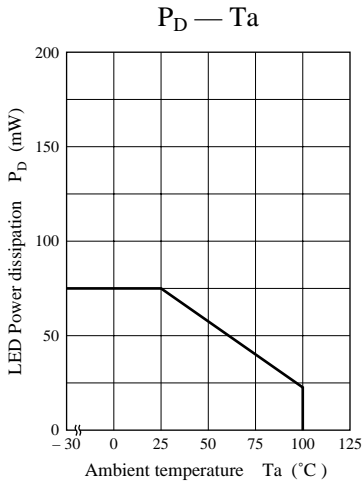
<sup>\*1</sup> DC current transfer ratio (CTR) is a ratio of output current against DC input current.

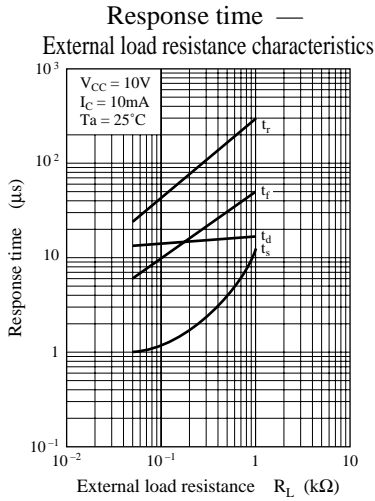
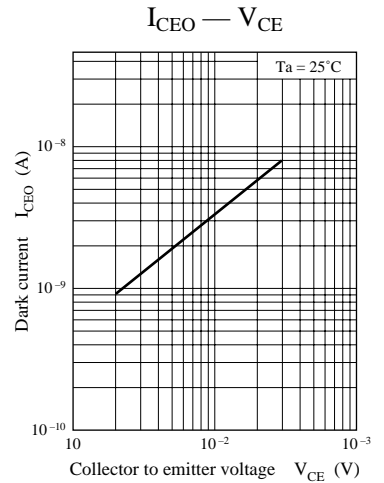
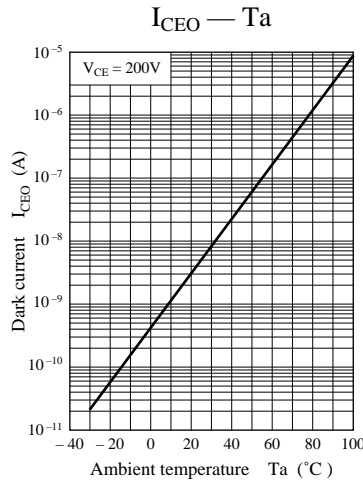
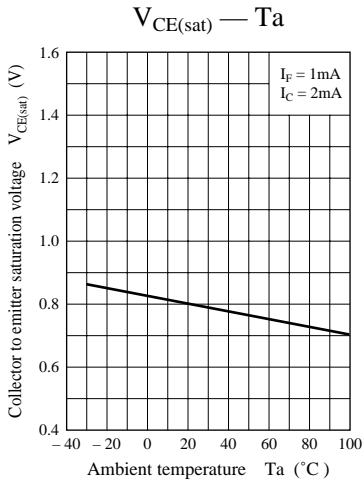
$$CTR = \frac{I_C}{I_F} \times 100 (\%)$$

<sup>\*2</sup> t<sub>r</sub>: Time required for the collector current to increase from 10% to 90% of its final value

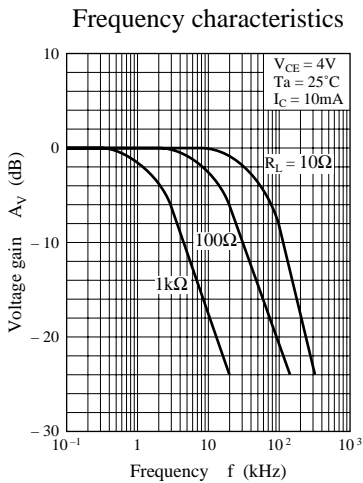
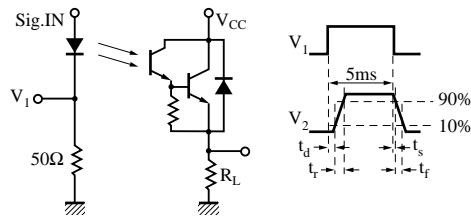
<sup>\*3</sup> t<sub>f</sub>: Time required for the collector current to decrease from 90% to 10% of its initial value

Optoisolators (Photocouplers) CNCZ3731, CNCZ7C501, CNCZ3734, CNCZ2S501, CNCZ7C502, CNCZ7H501





Response time measurement circuit



Measurement circuit of frequency characteristics

