

# 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 ( $V_{CEO} > 350V$ ).

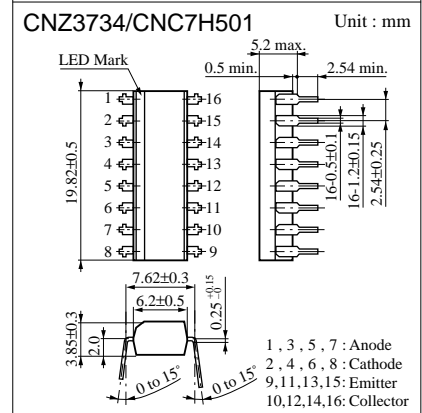
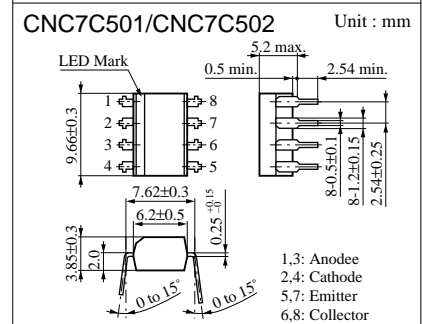
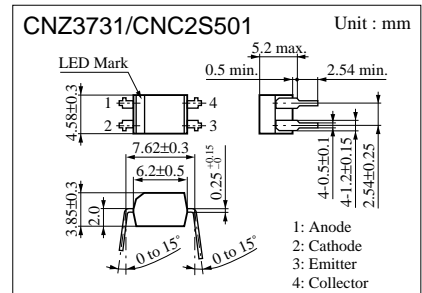
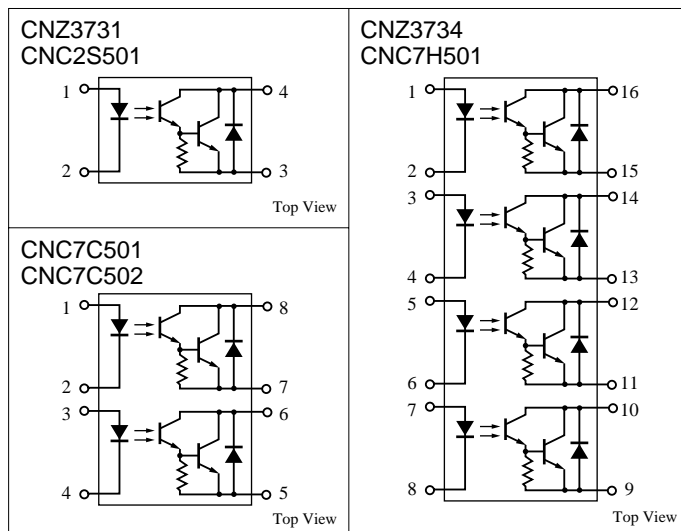
### Features

- High collector to emitter breakdown voltage :  $V_{CEO} > 300 V$ ,  
A type :  $V_{CEO} > 350 V$
- High current transfer ratio with Darlington phototransistor output :  
CTR = 4000% (typ.)
- High I/O isolation voltage :  $V_{ISO} \geq 5000 V_{rms}$
- 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



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

Parameter		Symbol	Ratings				Unit
			CNZ3731	CNC7C501 CNZ3734	CNC2S501	CNC7C502 CNC7H501	
Input (Light emitting diode)	Reverse voltage (DC)	$V_R$	6		6		V
	Forward current (DC)	$I_F$	50		50		mA
	Pulse forward current	$I_{FP}^{*1}$	1		1		A
	Power dissipation	$P_D^{*2}$	75		75		mW
Output (Photo transistor)	Collector current	$I_C$	150		150		mA
	Collector to emitter voltage	$V_{CEO}$	300		350		V
	Emitter to collector voltage	$V_{ECO}$	0.3		0.3		V
	Collector power dissipation	$P_C^{*3}$	300	150	300	150	mW
Total power dissipation		$P_T$	320	200	320	200	mW
Isolation voltage, input to output		$V_{ISO}^{*4}$	5000		5000		$V_{rms}$
Operating ambient temperature		$T_{opr}$	-30 to +100		-30 to +100		°C
Storage temperature		$T_{stg}$	-55 to +125		-55 to +125		°C

\*1 Pulse width  $\leq 100 \mu s$ , repeat 100 pps

\*2 Input power derating ratio is 0.75 mW/°C at  $T_a \geq 25^\circ C$ .

\*3 Output power derating ratio is 3.0 mW/°C at  $T_a \geq 25^\circ C$  (CNZ3731, CNC2S501).

Output power derating ratio is 0.75 mW/°C at  $T_a \geq 25^\circ C$  (CNC7C501, CNC2S502, CNZ3734, CNC7H501).

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

**Electrical Characteristics (Ta = 25°C)**

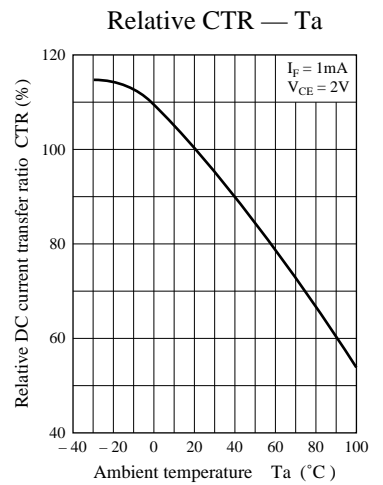
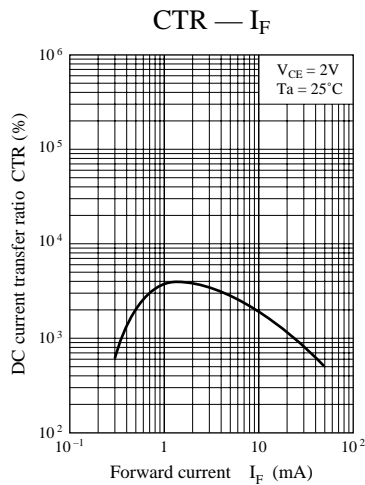
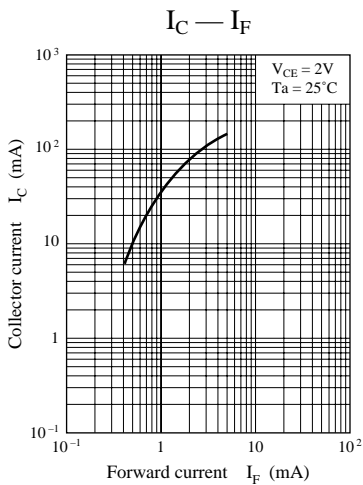
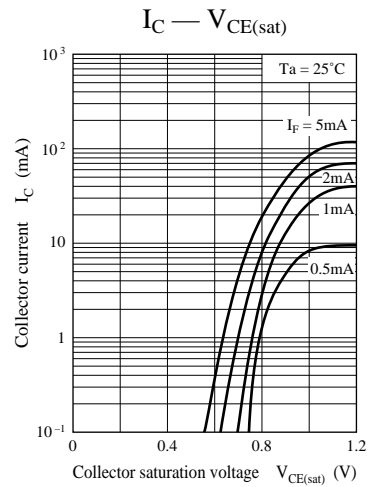
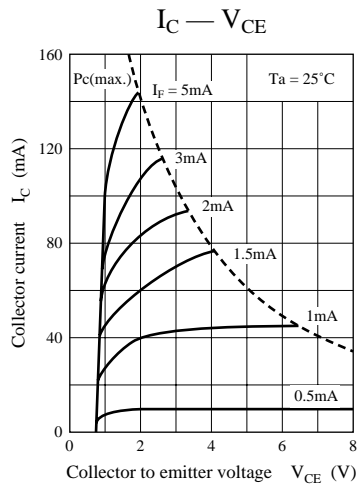
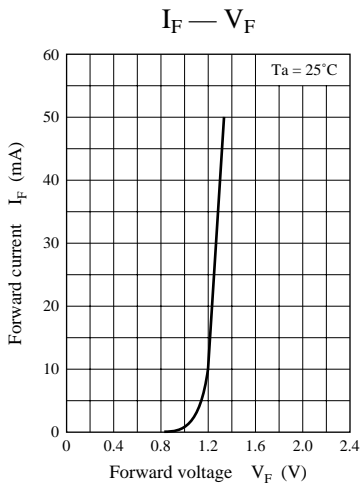
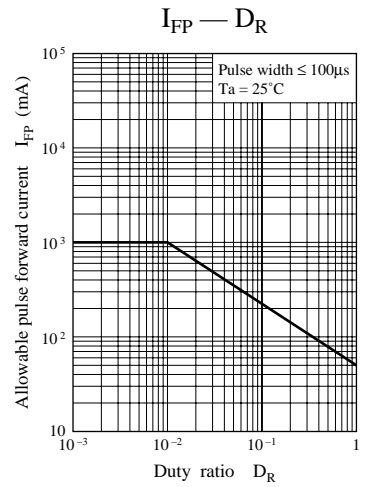
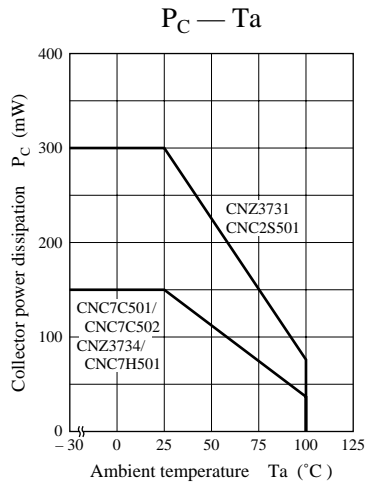
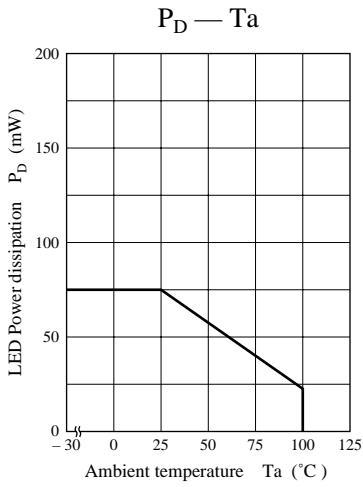
Parameter		Symbol	Conditions	min	typ	max	Unit
Input characteristics	Reverse current (DC)	$I_R$	$V_R = 3V$			10	$\mu A$
	Forward voltage (DC)	$V_F$	$I_F = 50mA$		1.35	1.5	V
	Capacitance between pins	$C_t$	$V_R = 0V, f = 1MHz$		30		pF
Output characteristics	Collector cutoff current	$I_{CEO}$	$V_{CE} = 200V$			200	nA
	Collector to emitter capacitance	$C_C$	$V_{CE} = 10V, f = 1MHz$		10		pF
Transfer characteristics	DC current transfer ratio	$CTR^{*1}$	$V_{CE} = 2V, I_F = 1mA$	1000	4000		%
	Isolation capacitance, input to output	$C_{ISO}$	$f = 1MHz$		0.7		pF
	Isolation resistance, input to output	$R_{ISO}$	$V_{ISO} = 500V$	$10^{11}$			$\Omega$
	Rise time	$t_r^{*2}$	$V_{CC} = 10V, I_C = 10mA,$		40		$\mu s$
	Fall time	$t_f^{*3}$	$R_t = 100\Omega$		15		$\mu s$
Collector to emitter saturation voltage		$V_{CE(sat)}$	$I_F = 1mA, I_C = 2mA$			1.0	V

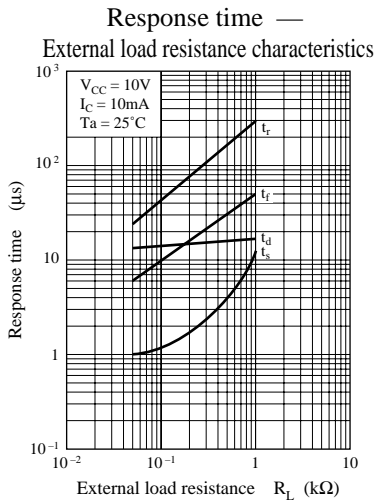
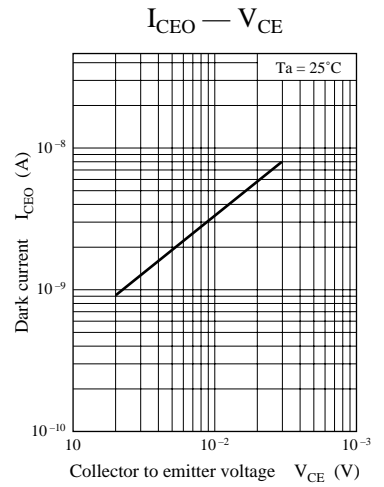
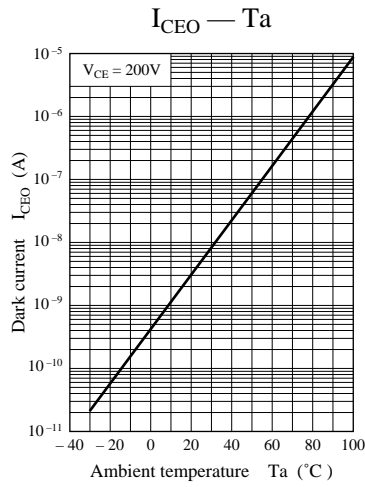
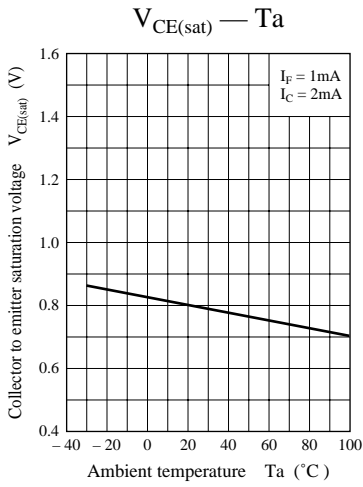
\*1 DC current transfer ratio (CTR) is a ratio of output current against DC input current.

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

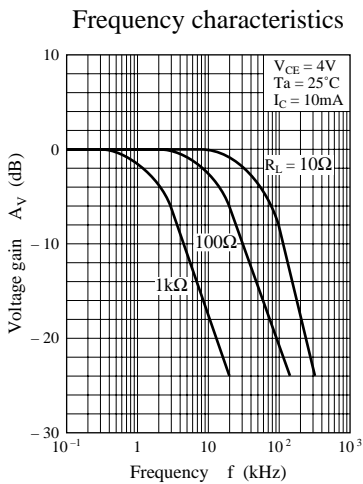
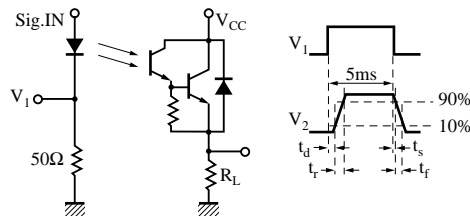
\*2  $t_r$ : Time required for the collector current to increase from 10% to 90% of its final value

\*3  $t_f$ : Time required for the collector current to decrease from 90% to 10% of its initial value





Response time measurement circuit



Measurement circuit of frequency characteristics

