

# CNZ3731, CNC7C501, CNZ3734, CNC2S501, CNC7C502, CNC7H501 (ON3731, ON3732, ON3734, ON3731A, ON3732A, ON3734A)

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

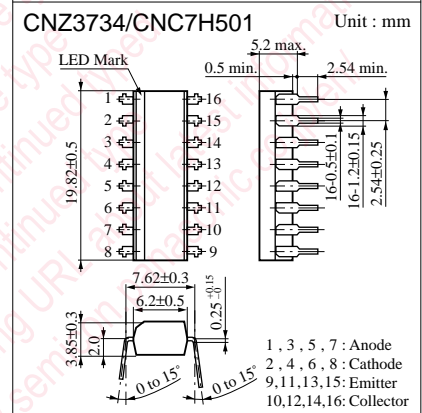
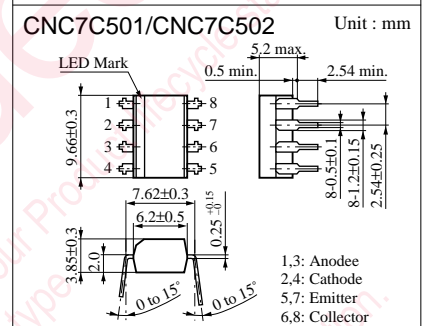
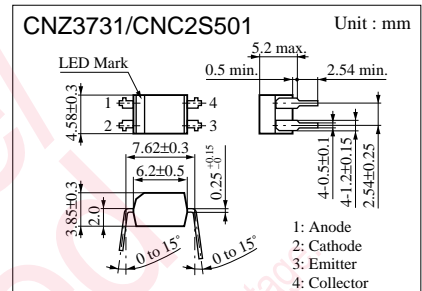
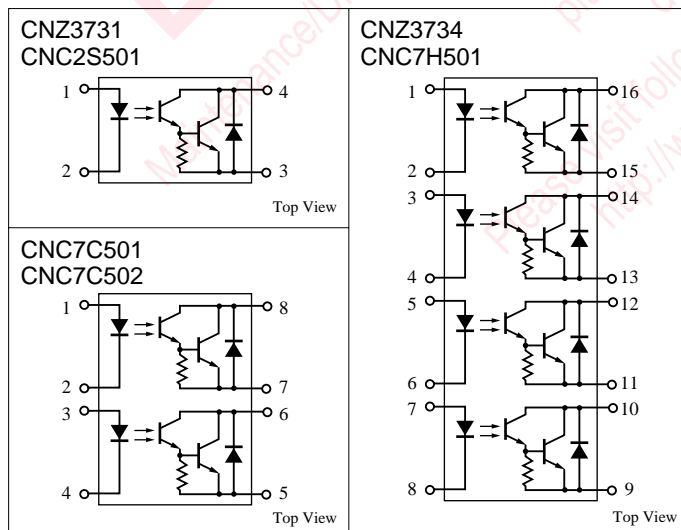
### Features

- 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



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

**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)**

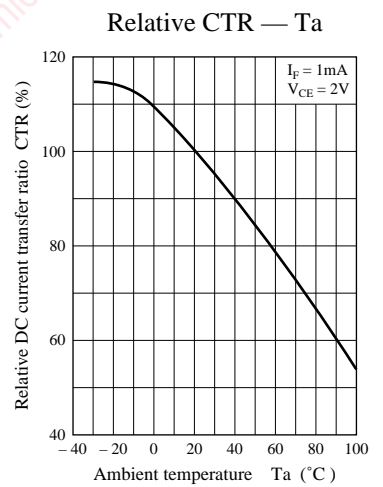
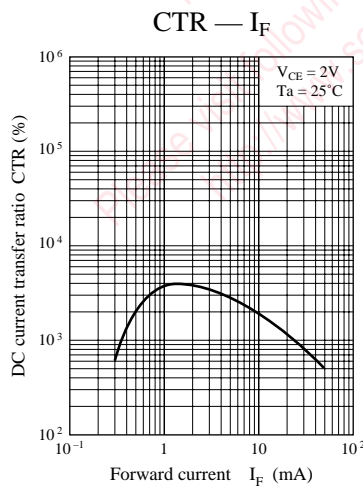
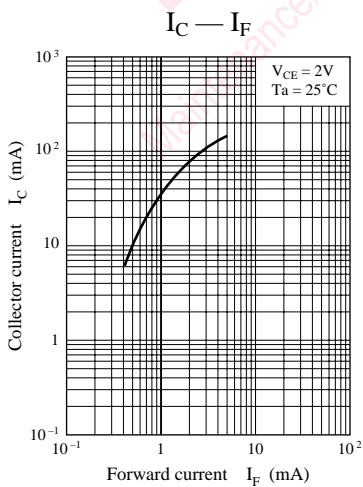
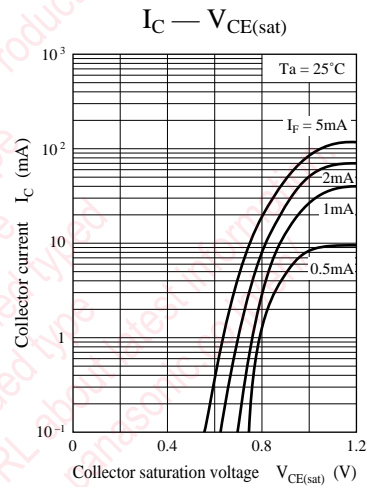
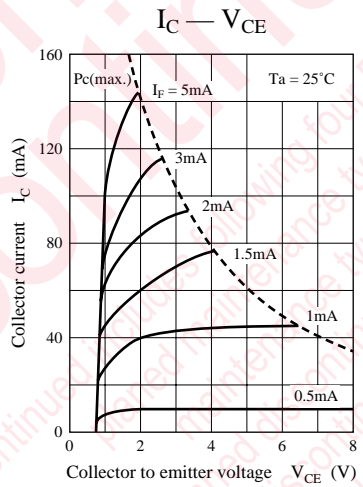
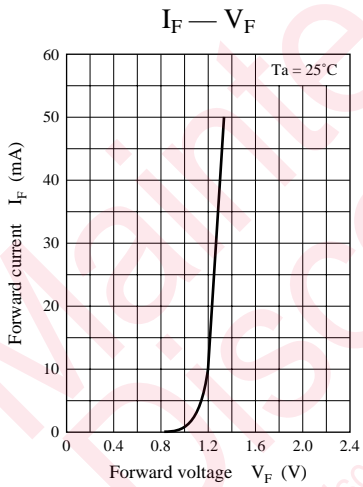
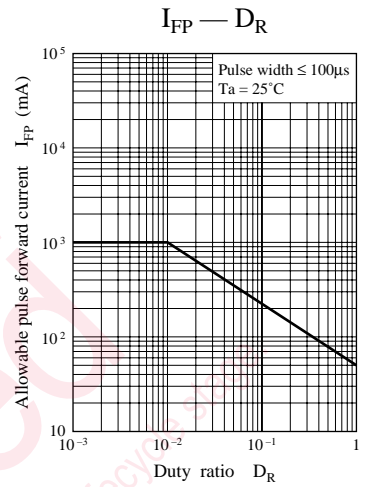
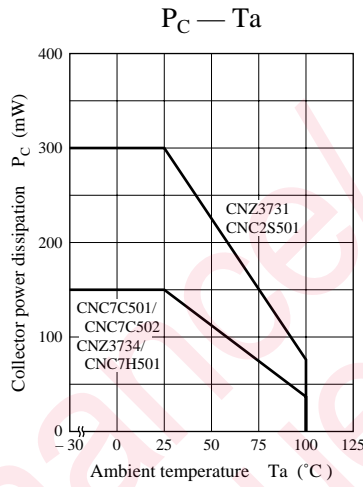
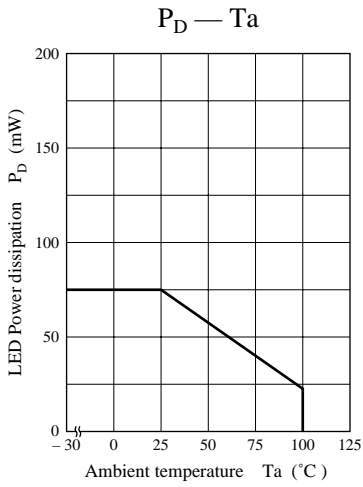
Parameter		Symbol	Conditions	min	typ	max	Unit
Input characteristics	Reverse current (DC)	$I_R$	$V_R = 3V$			10	$\mu A$
	Forward voltage (DC)	$V_F$	$I_F = 50mA$		1.35	1.5	V
	Capacitance between pins	$C_t$	$V_R = 0V, f = 1MHz$		30		pF
Output characteristics	Collector cutoff current	$I_{CEO}$	$V_{CE} = 200V$			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

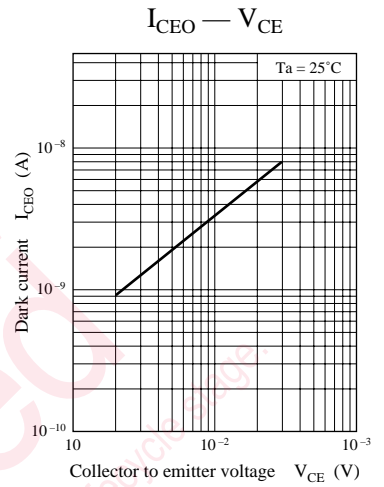
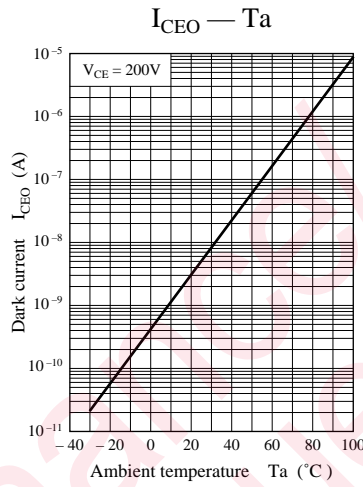
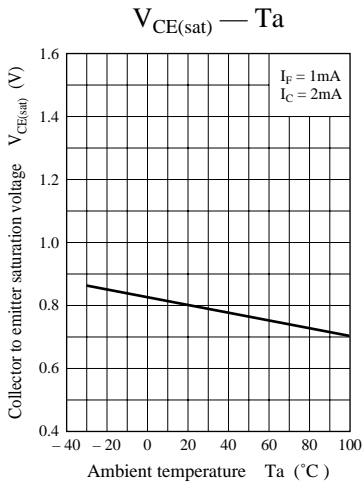
\*1 DC current transfer ratio (CTR) is a ratio of output current against DC input current.

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

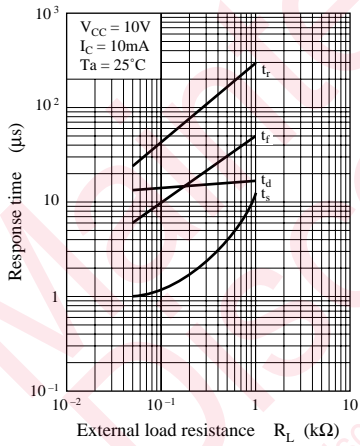
\*2  $t_r$ : Time required for the collector current to increase from 10% to 90% of its final value

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

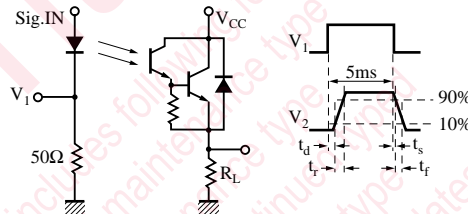




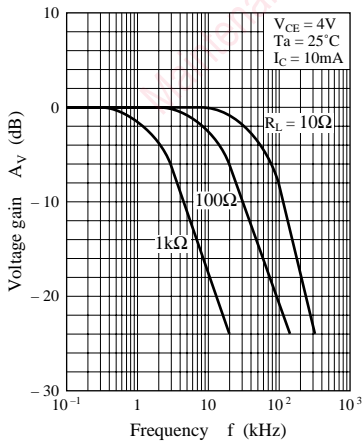
**Response time — External load resistance characteristics**



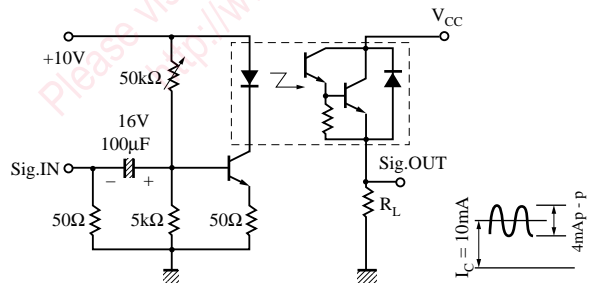
**Response time measurement circuit**



**Frequency characteristics**



**Measurement circuit of frequency characteristics**



# Caution for Safety

 **DANGER**

## ■ This product contains Gallium Arsenide (GaAs).

GaAs powder and vapor are hazardous to human health if inhaled or ingested. Do not burn, destroy, cut, cleave off, or chemically dissolve the product. Follow related laws and ordinances for disposal. The product should be excluded from general industrial waste or household garbage.

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