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

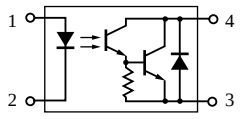
- High collector to emitter breakdown voltage : V_{CEO} > 300 V, A type : V_{CEO} > 350 V
- High current transfer ratio with Darlington phototransistor output : CTR = 4000% (typ.)
- High I/O isolation voltage : $V_{ISO} \geq 5000\ V_{rms}$
- Small DIL package for saving mounting space
- UL listed (UL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

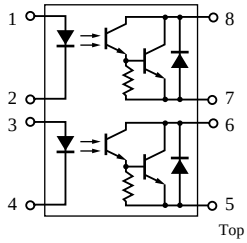
■ Pin Connection

CNZ3731
CNC2S501



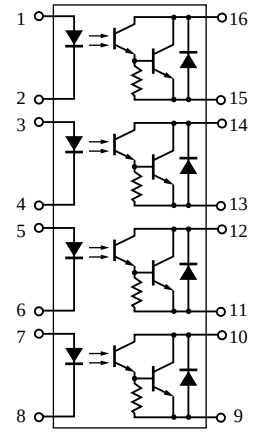
Top View

CNC7C501
CNC7C502



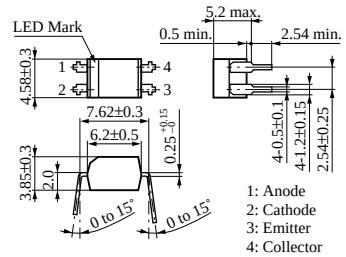
Top View

CNZ3734
CNC7H501

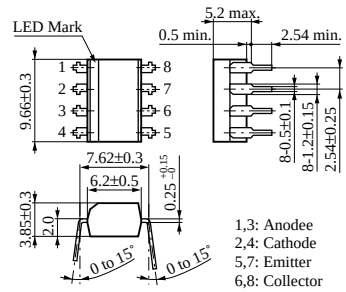


Top View

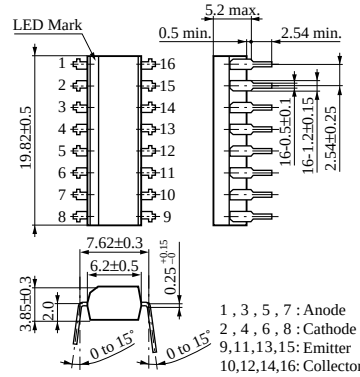
CNZ3731/CNC2S501 Unit : mm



CNC7C501/CNC7C502 Unit : mm



CNZ3734/CNC7H501 Unit : mm



■ 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 ≤ 100 µs, repeat 100 pps

*2 Input power derating ratio is 0.75 mW/˚C at Ta ≥ 25˚C.

*3 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).

*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	µA
	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}			Ω
	Rise time	t_r *2	V_{CC} = 10V, I_C = 10mA, R_t = 100Ω		40		µs
	Fall time	t_f *3			15		µs
	Collector to emitter saturation voltage	$V_{CE(sat)}$	I_F = 1mA, I_C = 2mA			1.0	V

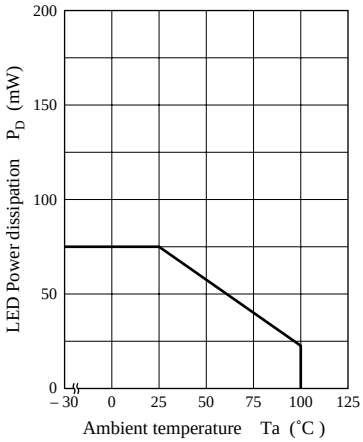
*1 DC current transfer ratio (CTR) is a ratio of output current against DC input current.

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

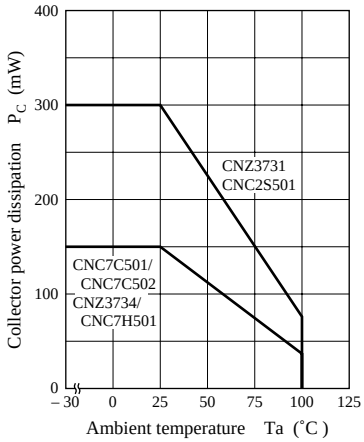
*2 t_r : Time required for the collector current to increase from 10% to 90% of its final value

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

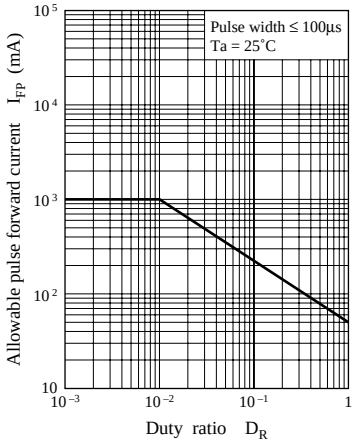
P_D — Ta



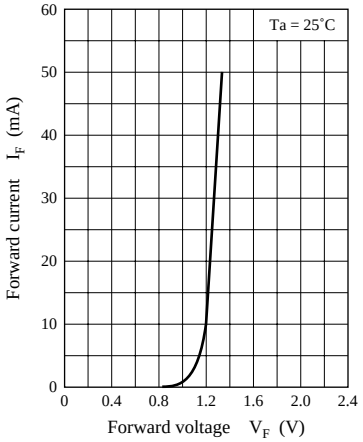
P_C — Ta



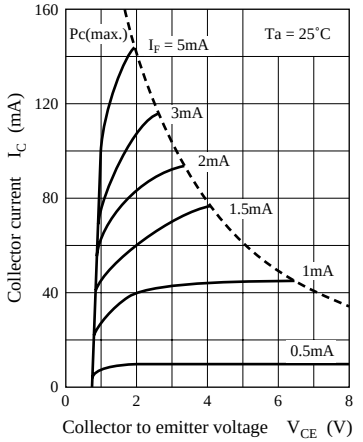
I_{FP} — D_R



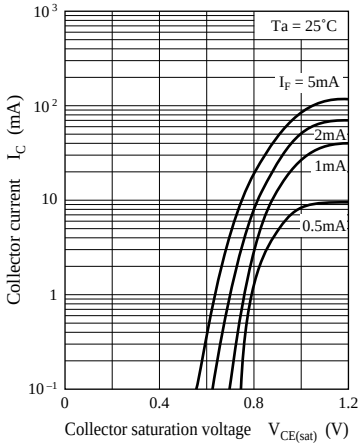
I_F — V_F



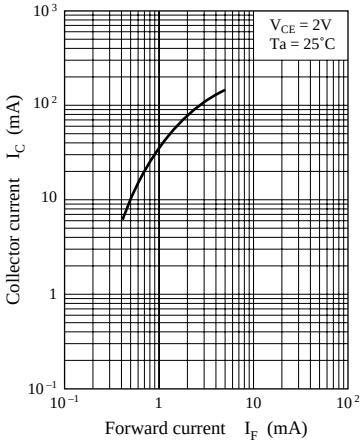
I_C — V_{CE}



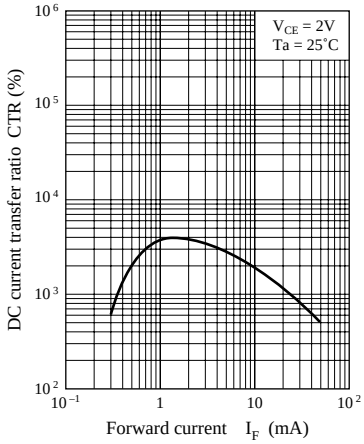
I_C — $V_{CE(sat)}$



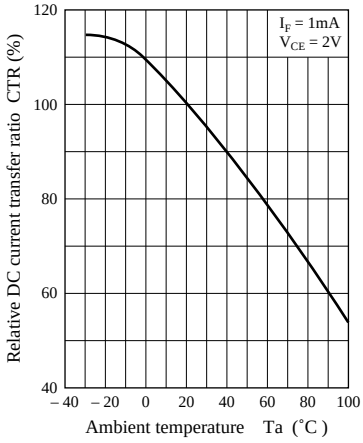
I_C — I_F



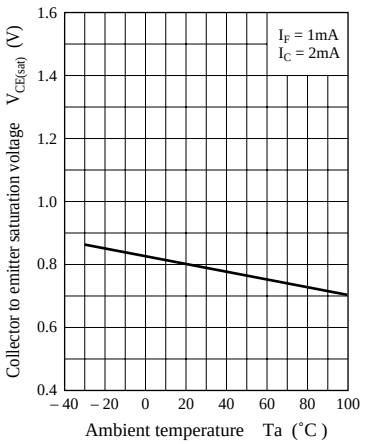
CTR — I_F



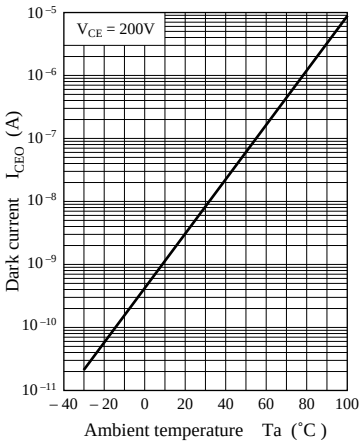
Relative CTR — Ta



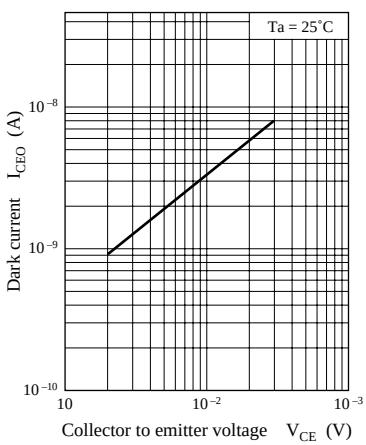
$V_{CE(sat)}$ — Ta



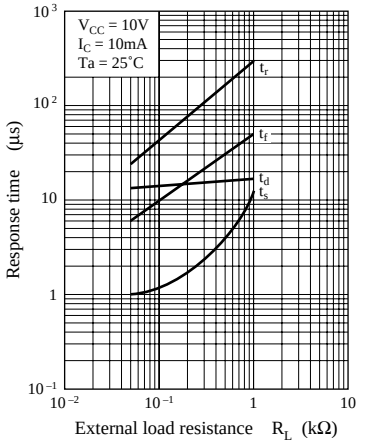
I_{CEO} — Ta



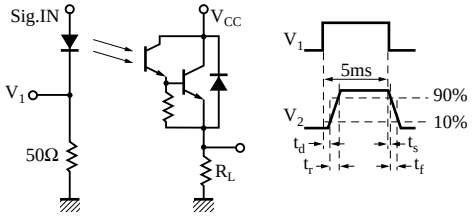
I_{CEO} — V_{CE}



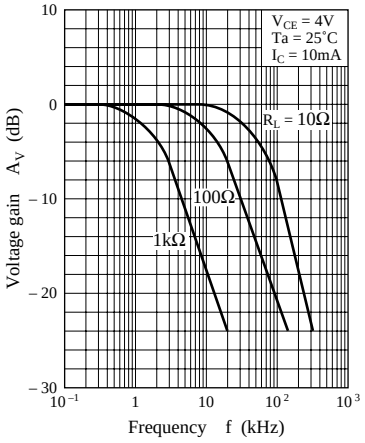
Response time — External load resistance characteristics



Response time measurement circuit



Frequency characteristics



Measurement circuit of frequency characteristics