CNC7S101,CNZ3182,CNC7T101,CNC1H101

Optoisolators

■ Overview

CNC7S101 is an AC input compatible optoisolator in which two GaAs high output infrared light emitting diode chips are connected in reverse parallel as light emitting elements, and opitically are connected to a high sensitivity Si phototransistor chip as a light detecting element in a small DIL 4-pin package.

This optoisolator series also includes the two-channel CNZ3182, the three-channel CNC7T101, and the four-channel CNC1H101.

The CNC7S101 series has a number of excellent features, including high I/O isolation voltage and current transfer ratio (CTR), as well as high speed response and high reliability.

■ Features

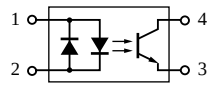
- AC input support
- High I/O isolation voltage : V_{ISO} = 5000 V_{rms} (min.)
- Fast response : t_r = 4 µs, t_f = 3 µs
- UL listed (UL File No. E79920)

■ Applications

- Telephones
- Telephone switches
- Programmable controllers
- AC/DC input modules for measuring

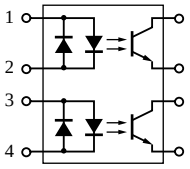
■ Pin Connection

CNC7S101



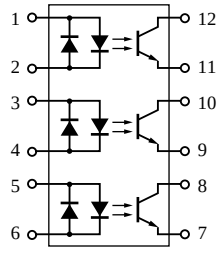
Top View

CNZ3182



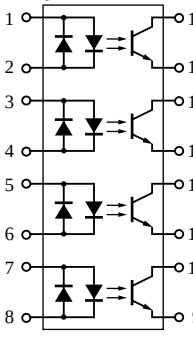
Top View

CNC7T101



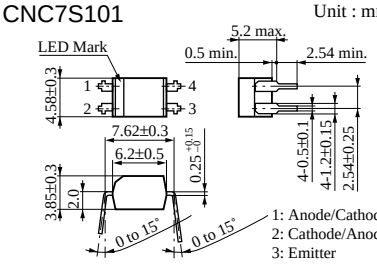
Top View

CNC1H101



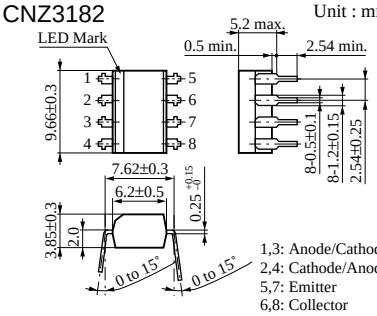
Top View

CNC7S101 Unit : mm



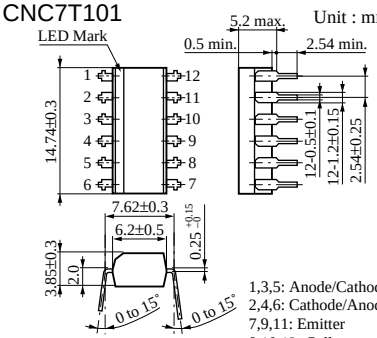
1: Anode/Cathode
2: Cathode/Anode
3: Emitter
4: Collector

CNZ3182 Unit : mm



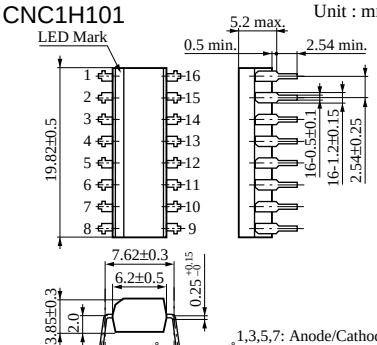
1,3: Anode/Cathode
2,4: Cathode/Anode
5,7: Emitter
6,8: Collector

CNC7T101 Unit : mm



1,3,5: Anode/Cathode
2,4,6: Cathode/Anode
7,9,11: Emitter
8,10,12: Collector

CNC1H101 Unit : mm



1,3,5,7: Anode/Cathode
2,4,6,8: Cathode/Anode
9,11,13,15: Emitter
10,12,14,16: Collector

■ Absolute Maximum Ratings (Ta = 25˚C)

Parameter		Symbol	Ratings	Unit
Input (Light emitting diode)	Forward current (DC)	I_F	±50	mA
	Pulse forward current	I_{FP} *1	±1	A
	Power dissipation	P_D *2	75	mW
Output (Photo transistor)	Collector current	I_C	50	mA
	Collector to emitter voltage	V_{CEO}	80	V
	Emitter to collector voltage	V_{ECO}	7	V
	Collector power dissipation	P_C *3	150	mW
Total power dissipation		P_T	200	mW
Isolation voltage, input to output		V_{ISO} *4	5000	V_{rms}
Operating ambient temperature		T_{opr}	–30 to +100	˚C
Storage temperature		T_{stg}	–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 1.5 mW/˚C at Ta ≥ 25˚C.

*4 AC 1 min. RH < 60 %

■ Electrical Characteristics (Ta = 25˚C)

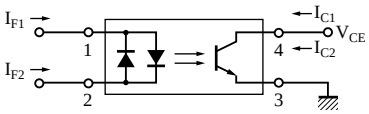
Parameter		Symbol	Conditions	min	typ	max	Unit
Input characteristics	Forward voltage (DC)	V_F	I_F = ±50mA		1.35	1.5	V
	Capacitance between pins	C_t	V_R = 0V, f = 1MHz		35		pF
Output characteristics	Collector cutoff current	I_{CEO}	V_{CE} = 20V		5	100	nA
	Collector to emitter voltage	V_{CEO}	I_C = 100µA	80			V
	Emitter to collector voltage	V_{ECO}	I_E = 10µA	7			V
	Collector to emitter capacitance	C_C	V_{CE} = 10V, f = 1MHz		3		pF
Transfer characteristics	DC current transfer ratio	CTR*1, 5	V_{CE} = 5V, I_F = ±1mA	20		300	%
	Isolation capacitance, input to output	C_{ISO}	f = 1MHz		0.6		pF
	Isolation resistance, input to output	R_{ISO}	V_{ISO} = 500V	10^{11}			Ω
	Rise time	t_r *2	V_{CC} = 10V, I_C = 2mA,		4		µs
	Fall time	t_f *3	R_L = 100Ω		3		µs
	Collector to emitter saturation voltage	$V_{CE(sat)}$	I_F = ±20mA, I_C = 1mA		0.1	0.2	V
	Collector current ratio	$I_{C(Ratio)}$ *4	V_{CE} = 5V, I_F = 1mA	0.33	1.0	3.0	–

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

*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

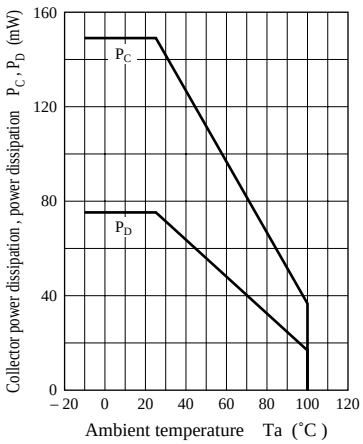
*4 $I_{C\,(Ratio)} = \dfrac{I_{C2}\ (I_F=I_{F2},\ V_{CE}=5V)}{I_{C1}\ (I_F=I_{F1},\ V_{CE}=5V)}$



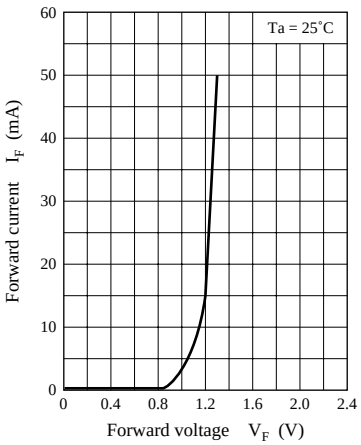
*5 CTR classifications

Class	General	R	S
CTR (%)	20 to 300	50 to 150	100 to 300

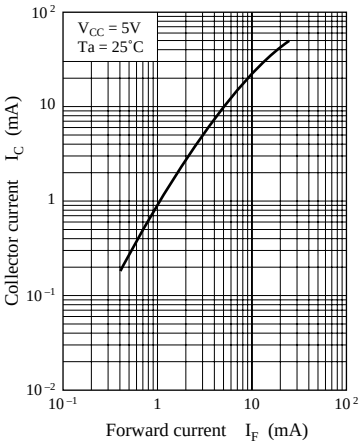
P_C , P_D — Ta



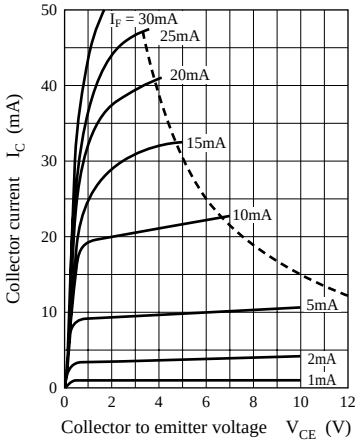
I_F — V_F



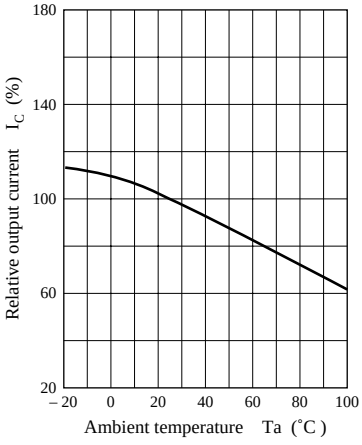
I_C — I_F



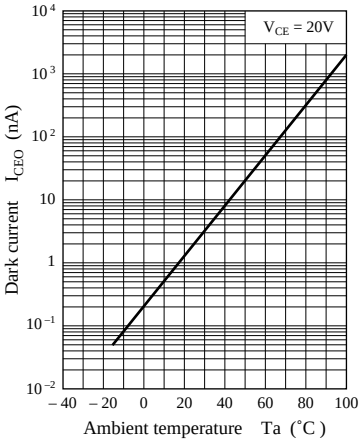
I_C — V_{CE}



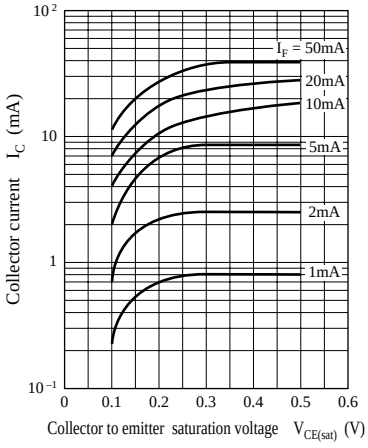
I_C — Ta



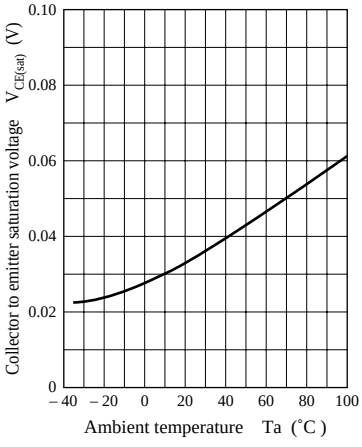
I_{CEO} — Ta



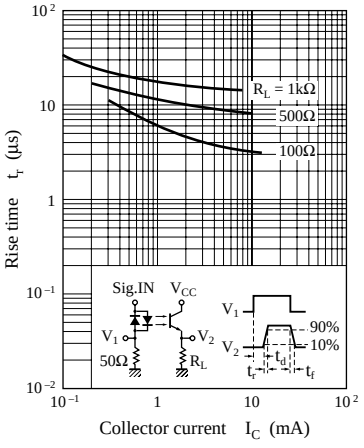
I_C — $V_{CE(sat)}$



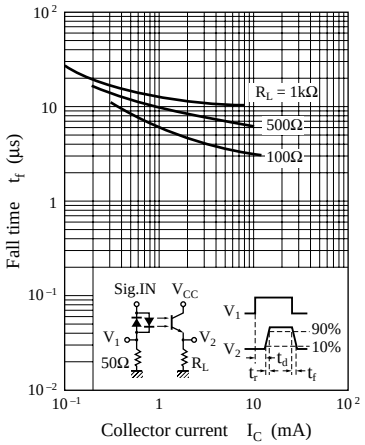
$V_{CE(sat)}$ — Ta



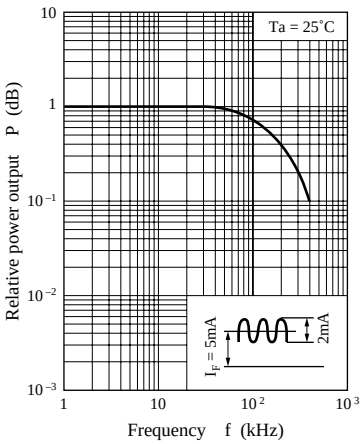
t_r — I_C



t_f — I_C



Frequency characteristics



Measuring circuit of frequency characteristics