CNC1S101, CNZ3132, CNZ3133, CNZ3134 (ON3131, ON3132, ON3133, ON3134)

Optoisolators

Overview

CNC1S101 is a DIL type 4-pin single-channel optoisolator which is housed in a small package. This optoisolator series also includes the two-channel CNZ3132, the three-channel CNZ3133, and the four-channel 3134. The CNC1S101 series has a number of good features, including high I/O isolation voltage and current transfer ratio (CTR), as well as high speed

Features

response.

• High current transfer ratio : CTR ≥ 100%

• High I/O isolation voltage : $V_{ISO} = 5000 V_{rms}$ (min.)

• Fast response : $t_r = 2 \mu s$, $t_f = 3 \mu s$ (typ.)

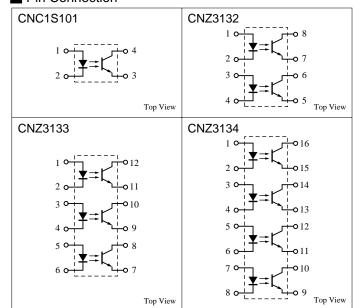
Low dark current : I_{CEO} ≤ 100 nA

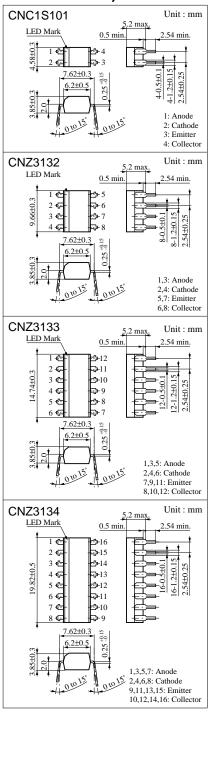
• UL listed (UL File No. E79920)

Applications

- Switching power supply
- Computer terminal equipment
- System equipment, measuring equipment
- Telephones, copier, vending machines
- Televisions, VCRs, and other consumer electronics products
- Medical equipment and phsical and chemical equipment
- Signal transmission 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)

| - | Symbol | Ratings | Unit | |
|---------------------------|------------------------------|-------------------|------|----|
| | Reverse voltage (DC) | V_R | 6 | V |
| Input (Light | Forward current (DC) | I_F | 50 | mA |
| emitting diode) | 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 di | P_{T} | 200 | mW | |
| Operating amb | T _{opr} | -30 to +100 | °C | |
| Storage tempe | T _{stg} | -55 to +125 | °C | |

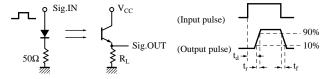
^{*1} Pulse width ≤ 100 µs, repeat 100 pps

■ Electrical Characteristics (Ta = 25°C)

| Parameter | | Symbol | Conditions | min | typ | max | Unit |
|---------------------------|---|-----------------------|---|------|------|-----|------------------|
| Input characteristics | Reverse current (DC) | I_R | $V_R = 3V$ | | | 10 | μΑ |
| | Forward voltage (DC) | V _F | $I_F = 50 \text{mA}$ | | 1.35 | 1.5 | V |
| | Capacitance between pins | C _t | $V_R = 0V, f = 1MHz$ | | 15 | | pF |
| Output characteristics | Collector cutoff current | I _{CEO} | $V_{CE} = 20V$ | | 5 | 100 | nA |
| | Collector to emitter voltage | V _{CEO} | $I_C = 100\mu A$ | 80 | | | V |
| | Collector to emitter capacitance | $C_{\rm C}$ | $V_{CE} = 10V, f = 1MHz$ | | 3 | | pF |
| | Emitter to collector voltage | V _{ECO} | $I_E = 10\mu A$ | 7 | | | V |
| Transfer characteristics | DC current transfer ratio | CTR*1, *5 | $V_{CE} = 5V$, $I_F = 5mA$ | 100 | | 600 | % |
| | Isolation voltage, input to output | V _{ISO} | t = 1 min., RH < 60% | 5000 | | | V _{rms} |
| | Isolation capacitance, input to output | C _{ISO} | f = 1MHz | | 0.7 | | pF |
| | Isolation resistance, input to output | R _{ISO} | $V_{\rm ISO} = 500 V$ | 1011 | | | Ω |
| | Rise time | t _r *2, *4 | $V_{CC} = 10V, I_C = 2mA$ | | 2 | | μs |
| | Fall time | t _f *3, *4 | $R_{\rm L} = 100\Omega$ | | 3 | | μs |
| | Collector to emitter saturation voltage | V _{CE(sat)} | $I_F = 20 \text{mA}, I_C = 1 \text{mA}$ | | 0.1 | 0.2 | V |

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

^{*4} Rise and fall time measurement circuit



t_d: Delay time

*5 CTR classifications

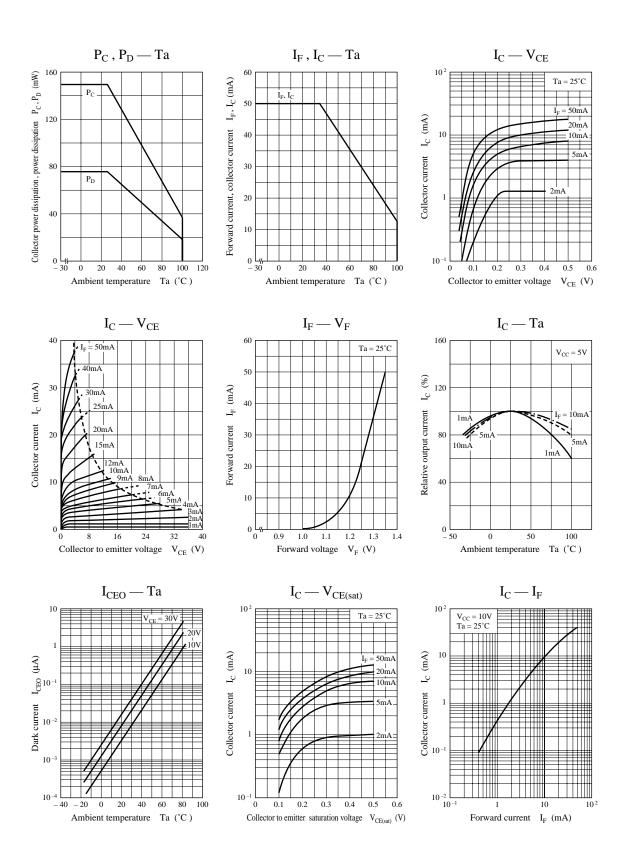
| Class | General | R | S |
|---------|------------|------------|------------|
| CTR (%) | 100 to 600 | 100 to 300 | 200 to 600 |

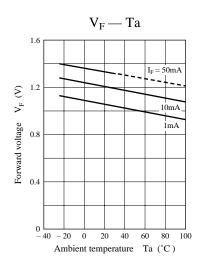
^{*2} Input power derating ratio is 0.75 mW/°C at Ta \geq 25°C.

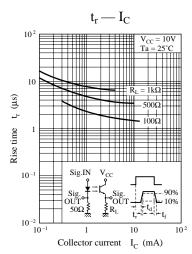
^{*3} Output power derating ratio is 1.5 mW/°C at Ta \geq 25°C.

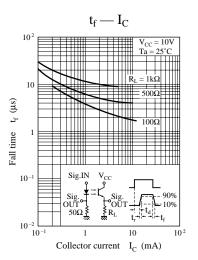
 $^{^{*2}}$ t_r: Time required for the collector current to increase from 10% to 90% of its final value

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

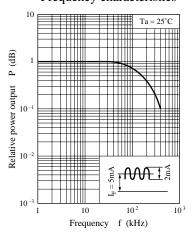




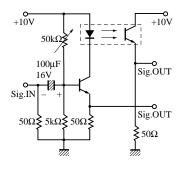




Frequency characteristics



Measurement circuit of frequency characteristics



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