

CNC1S101 (ON3131), CNZ3132 (ON3132), CNZ3133 (ON3133), CNZ3134 (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 response.

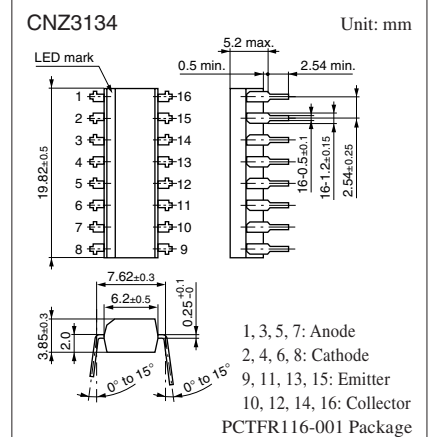
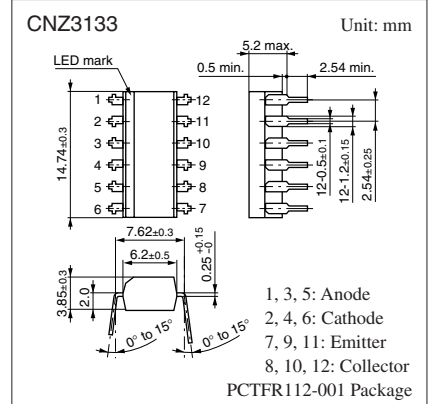
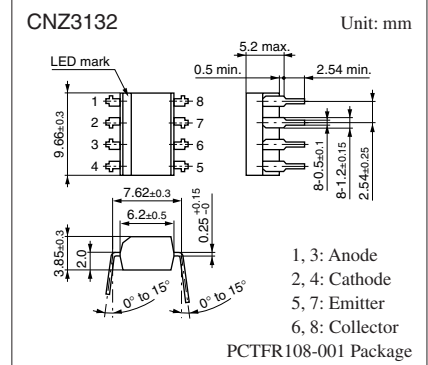
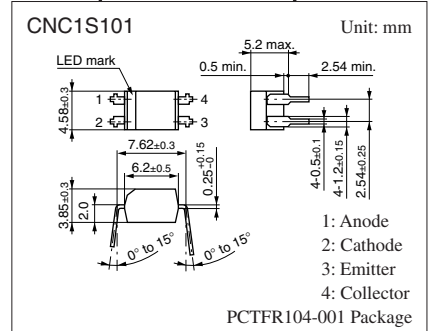
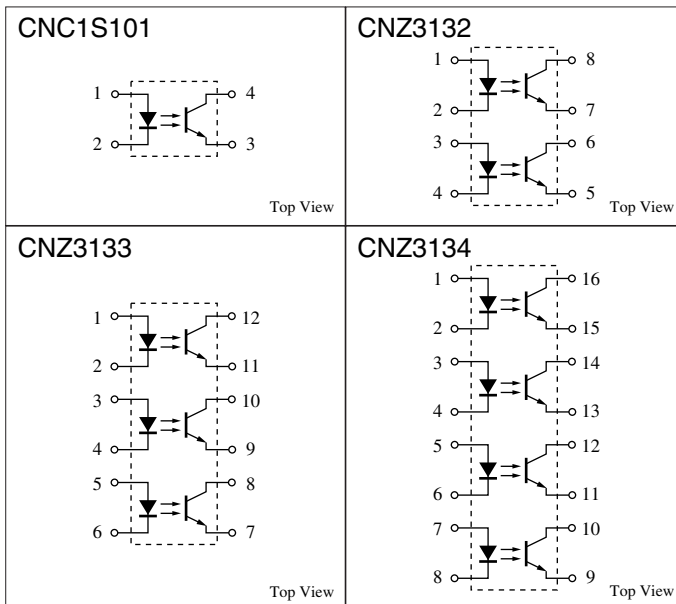
Features

- High current transfer ratio: CTR ≥ 100%
- High I/O isolation voltage: $V_{ISO} = 5\,000\text{ V[rms]}$ (min.)
- Fast response: $t_r = 2\ \mu\text{s}$, $t_f = 3\ \mu\text{s}$ (typ.)
- Collector-emitter cutoff current (Base open): $I_{CEO} \leq 100\ \text{nA}$
- 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 physical 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 $T_a = 25^\circ\text{C}$

| Parameter | | Symbol | Rating | Unit |
|---------------------------------------|---------------------------------------|-----------|-------------|------------------|
| Input (Light emitting diode) | Reverse voltage | V_R | 6 | V |
| | Forward current | I_F | 50 | mA |
| | Pulse forward current *1 | I_{FP} | 1 | A |
| | Power dissipation *2 | P_D | 75 | mW |
| Output (Photo transistor) | Collector-emitter voltage (Base open) | V_{CEO} | 80 | V |
| | Emitter-collector voltage (Base open) | V_{ECO} | 7 | V |
| | Collector current | I_C | 50 | mA |
| | Collector power dissipation *3 | P_C | 150 | mW |
| Isolation voltage, input to output *4 | | V_{ISO} | 5 000 | V[rms] |
| Total power dissipation | | P_T | 200 | mW |
| Operating ambient temperature | | T_{opr} | -30 to +100 | $^\circ\text{C}$ |
| Storage temperature | | T_{stg} | -55 to +125 | $^\circ\text{C}$ |

Note) *1: Pulse width $\leq 100 \mu\text{s}$, repeat 100 pps

*2: Input power derating ratio is
0.75 mW/ $^\circ\text{C}$ at $T_a \geq 25^\circ\text{C}$

*3: Output power derating ratio is
1.5 mW/ $^\circ\text{C}$ at $T_a \geq 25^\circ\text{C}$

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

■ Electrical-Optical Characteristics $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

| Parameter | | Symbol | Conditions | Min | Typ | Max | Unit |
|--------------------------------------|--|--|--|-----------|------|------|---------------|
| Input characteristics | Forward voltage | V_F | $I_F = 50 \text{ mA}$ | | 1.35 | 1.50 | V |
| | Reverse current | I_R | $V_R = 3 \text{ V}$ | | | 10 | μA |
| | Terminal capacitance | C_t | $V_R = 0 \text{ V}$, $f = 1 \text{ MHz}$ | | 15 | | pF |
| Output characteristics | Collector-emitter voltage (Base open) | V_{CEO} | $I_C = 100 \mu\text{A}$ | 80 | | | V |
| | Emitter-collector voltage (Base open) | V_{ECO} | $I_E = 10 \mu\text{A}$ | 7 | | | V |
| | Collector-emitter cutoff current (Base open) | I_{CEO} | $V_{CE} = 20 \text{ V}$ | | 5 | 100 | nA |
| | Collector-emitter capacitance | C_C | $V_{CE} = 10 \text{ V}$, $f = 1 \text{ MHz}$ | | 10 | | pF |
| Transfer characteristics | DC current transfer ratio *1 | CNZ3132 | $V_{CE} = 5 \text{ V}$, $I_F = 5 \text{ mA}$ | 100 | | 600 | % |
| | | CNZ3133 | | | | | |
| | | CNZ3134 | | | | | |
| | | CNC1S101 *4 | | | | | |
| | Isolation capacitance, input to output | C_{ISO} | $f = 1 \text{ MHz}$ | | 0.7 | | pF |
| | Isolation resistance, input to output | R_{ISO} | $V_{ISO} = 500 \text{ V}$ | 10^{11} | | | Ω |
| | Rise time *2 | t_r | $V_{CC} = 10 \text{ V}$, $I_C = 2 \text{ mA}$ | | 2 | | μs |
| | Fall time *3 | t_f | $R_L = 100 \Omega$ | | 3 | | μs |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_F = 20 \text{ mA}$, $I_C = 1 \text{ mA}$ | | 0.1 | 0.2 | V | |

Note) 1. Input and output are handled electrically.

2. This product is not designed to withstand radiation

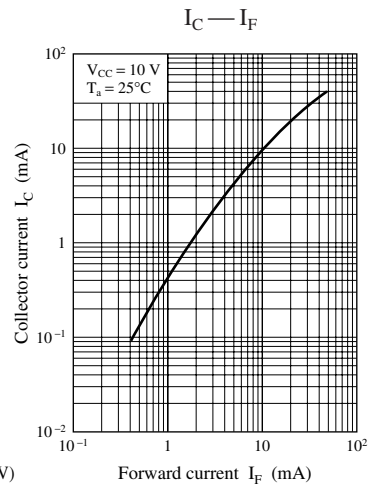
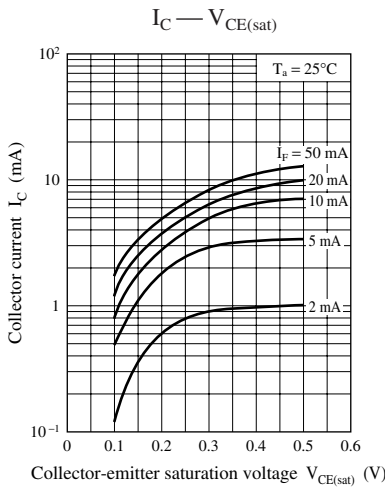
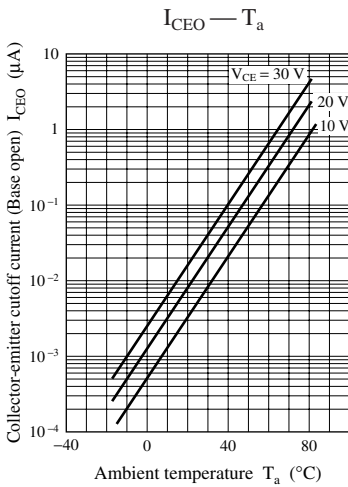
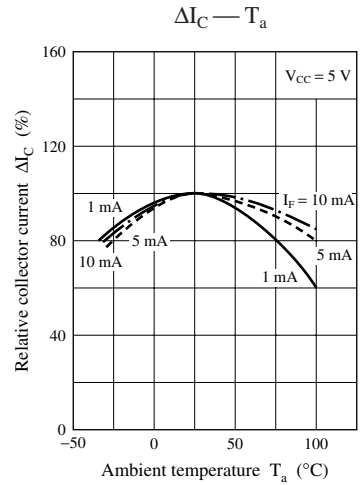
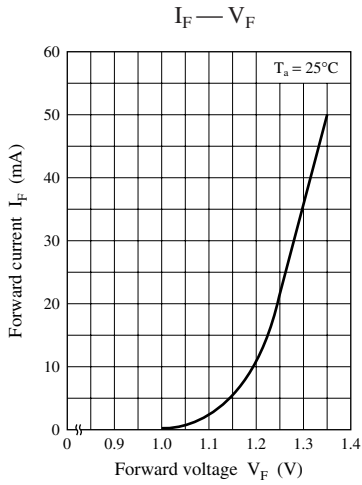
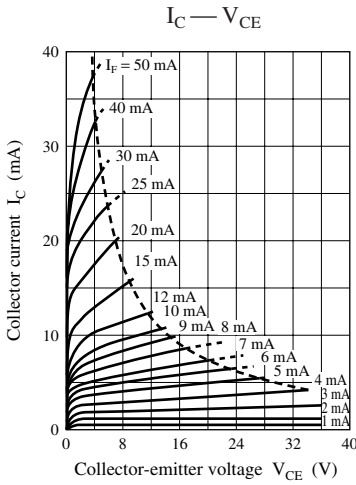
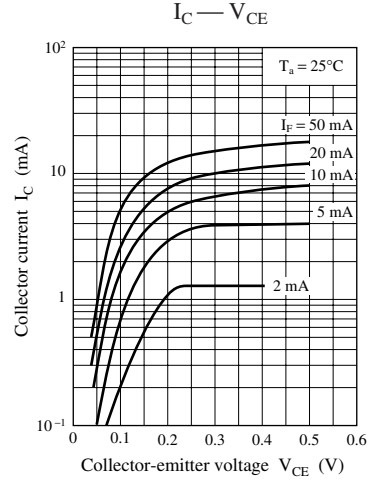
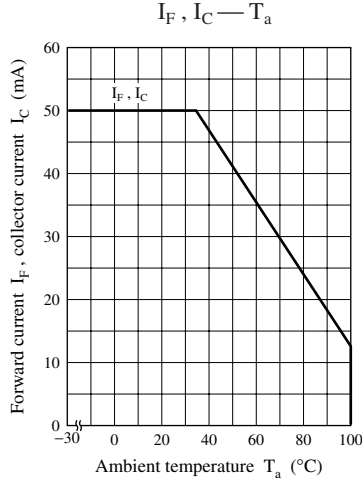
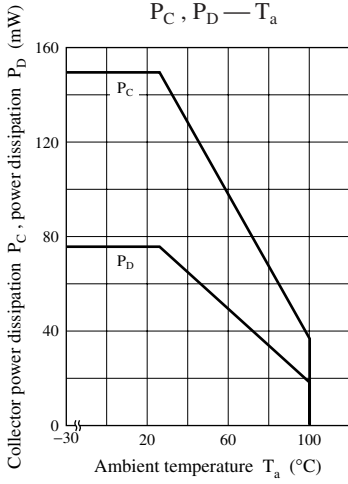
3. *1:
$$\text{CTR} = \frac{I_C}{I_F} \times 100\%$$

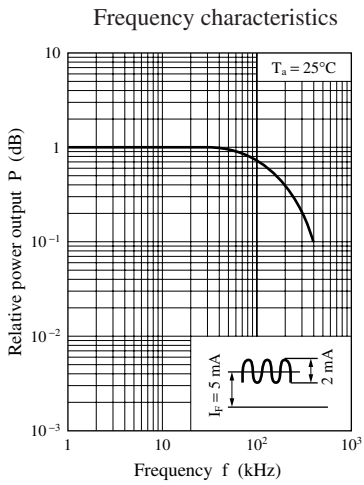
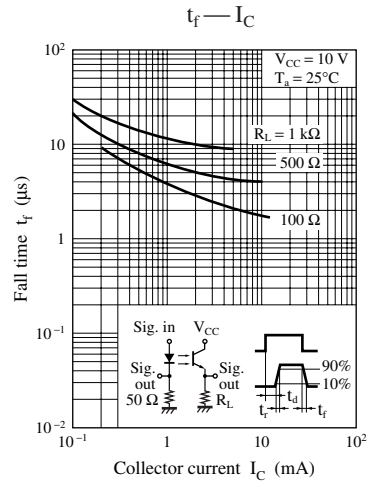
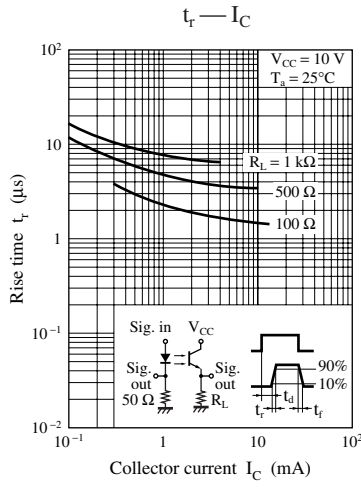
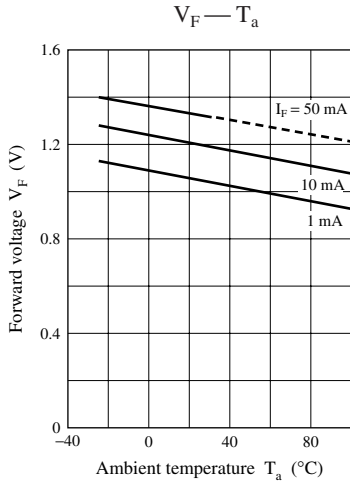
*2: t_r : Time required for the collector current to increase from 10% to 90% of its final value

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

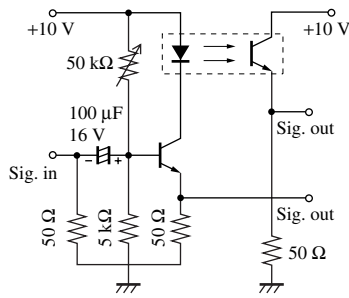
*4: Rank classification

| Rank | R | S | V | No-rank |
|---------|------------|------------|-----------|------------|
| CTR (%) | 100 to 300 | 200 to 600 | 80 to 130 | 100 to 600 |





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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