

Reflective Optical Sensor with Transistor Output



DESCRIPTION

The CNY70 is a reflective sensor that includes an infrared emitter and phototransistor in a leaded package which blocks visible light.

FEATURES

- Package type: leaded
- Detector type: phototransistor
- Dimensions (L x W x H in mm): 7 x 7 x 6
- Peak operating distance: < 0.5 mm
- Operating range within > 20 % relative collector current: 0 mm to 5 mm
- Typical output current under test: $I_C = 1$ mA
- Emitter wavelength: 950 nm
- Daylight blocking filter
- Lead (Pb)-free soldering released
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

APPLICATIONS

- Optoelectronic scanning and switching devices i.e., index sensing, coded disk scanning etc. (optoelectronic encoder assemblies).

PRODUCT SUMMARY

| PART NUMBER | DISTANCE FOR MAXIMUM CTR _{rel} ⁽¹⁾ (mm) | DISTANCE RANGE FOR RELATIVE I _{out} > 20 % (mm) | TYPICAL OUTPUT CURRENT UNDER TEST ⁽²⁾ (mA) | DAYLIGHT BLOCKING FILTER INTEGRATED |
|-------------|---|--|---|-------------------------------------|
| CNY70 | 0 | 0 to 5 | 1 | Yes |

Notes

- (1) CTR: current transference ratio, I_{out}/I_{in}
 (2) Conditions like in table basic characteristics/sensors

ORDERING INFORMATION

| ORDERING CODE | PACKAGING | VOLUME ⁽¹⁾ | REMARKS |
|---------------|-----------|----------------------------|---------|
| CNY70 | Tube | MOQ: 4000 pcs, 80 pcs/tube | - |

Note

- (1) MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)

| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
|---------------------------|--------------------------------|------------------|---------------|------|
| COUPLER | | | | |
| Total power dissipation | T _{amb} ≤ 25 °C | P _{tot} | 200 | mW |
| Ambient temperature range | | T _{amb} | - 40 to + 85 | °C |
| Storage temperature range | | T _{stg} | - 40 to + 100 | °C |
| Soldering temperature | Distance to case 2 mm, t ≤ 5 s | T _{sd} | 260 | °C |
| INPUT (EMITTER) | | | | |
| Reverse voltage | | V _R | 5 | V |
| Forward current | | I _F | 50 | mA |
| Forward surge current | t _p ≤ 10 μs | I _{FSM} | 3 | A |
| Power dissipation | T _{amb} ≤ 25 °C | P _V | 100 | mW |
| Junction temperature | | T _j | 100 | °C |



| ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | |
|---|---|-----------|-------|--------------------|
| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
| OUTPUT (DETECTOR) | | | | |
| Collector emitter voltage | | V_{CEO} | 32 | V |
| Emitter collector voltage | | V_{ECO} | 7 | V |
| Collector current | | I_C | 50 | mA |
| Power dissipation | $T_{amb} \leq 25\text{ }^{\circ}\text{C}$ | P_V | 100 | mW |
| Junction temperature | | T_j | 100 | $^{\circ}\text{C}$ |

ABSOLUTE MAXIMUM RATINGS

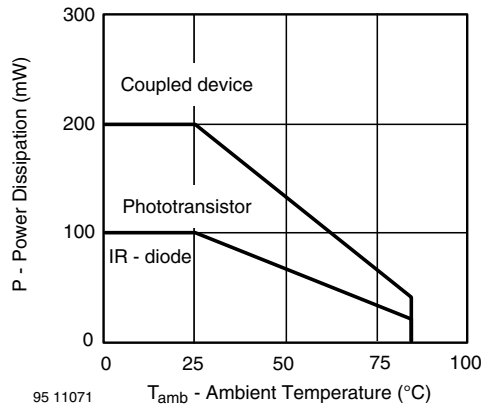


Fig. 1 - Power Dissipation vs. Ambient Temperature

| BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | |
|--|---|-------------------|------|------|------|-------|
| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| COUPLER | | | | | | |
| Collector current | $V_{CE} = 5\text{ V}$, $I_F = 20\text{ mA}$, $d = 0.3\text{ mm}$ (figure 1) | $I_C^{(2)}$ | 0.3 | 1.0 | | mA |
| Cross talk current | $V_{CE} = 5\text{ V}$, $I_F = 20\text{ mA}$, (figure 2) | $I_{CX}^{(3)}$ | | | 600 | nA |
| Collector emitter saturation voltage | $I_F = 20\text{ mA}$, $I_C = 0.1\text{ mA}$, $d = 0.3\text{ mm}$ (figure 1) | $V_{CEsat}^{(2)}$ | | | 0.3 | V |
| INPUT (EMITTER) | | | | | | |
| Forward voltage | $I_F = 50\text{ mA}$ | V_F | | 1.25 | 1.6 | V |
| Radiant intensity | $I_F = 50\text{ mA}$, $t_p = 20\text{ ms}$ | I_e | | | 7.5 | mW/sr |
| Peak wavelength | $I_F = 100\text{ mA}$ | λ_P | 940 | | | nm |
| Virtual source diameter | Method: 63 % encircled energy | d | | 1.2 | | mm |
| OUTPUT (DETECTOR) | | | | | | |
| Collector emitter voltage | $I_C = 1\text{ mA}$ | V_{CEO} | 32 | | | V |
| Emitter collector voltage | $I_E = 100\text{ }\mu\text{A}$ | V_{ECO} | 5 | | | V |
| Collector dark current | $V_{CE} = 20\text{ V}$, $I_F = 0\text{ A}$, $E = 0\text{ lx}$ | I_{CEO} | | | 200 | nA |

Notes

- (1) Measured with the "Kodak neutral test card", white side with 90 % diffuse reflectance
- (2) Measured without reflecting medium



Fig. 2 - Test Condition

BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)



Fig. 3 - Forward Current vs. Forward Voltage



Fig. 5 - Collector Current vs. Forward Current



Fig. 4 - Relative Current Transfer Ratio vs. Ambient Temperature



Fig. 6 - Collector Current vs. Collector Emitter Voltage



Fig. 7 - Current Transfer Ratio vs. Forward Current

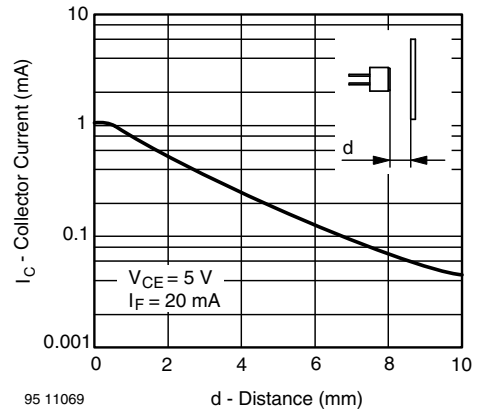


Fig. 9 - Collector Current vs. Distance



Fig. 8 - Current Transfer Ratio vs. Collector Emitter Voltage



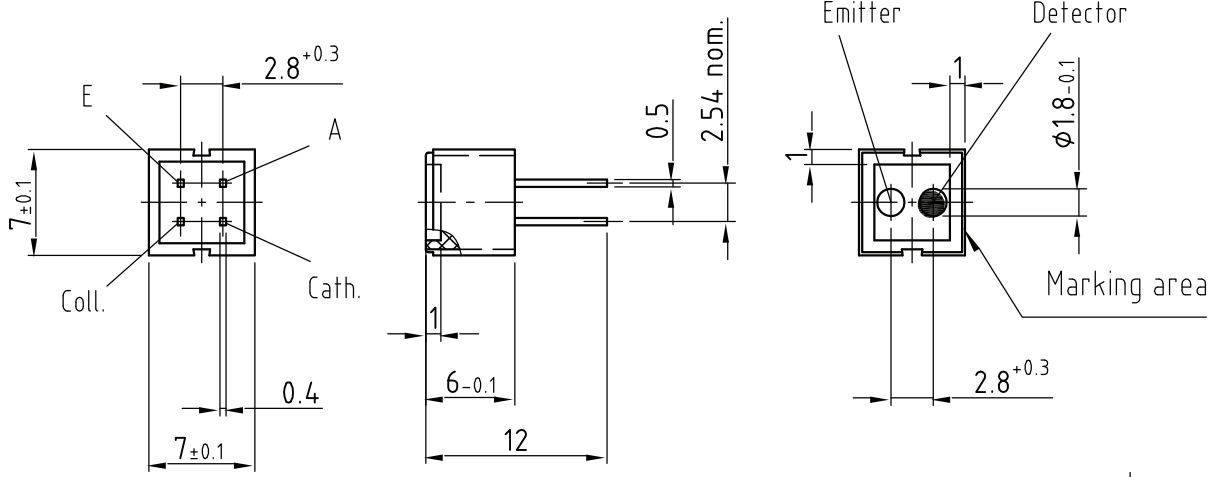
Fig. 10 - Relative Radiant Intensity/Collector Current vs. Angular Displacement



Fig. 11 - Relative Collector Current vs. Displacement



PACKAGE DIMENSIONS in millimeters



weight: ca. 0.70g



technical drawings according to DIN specifications

Drawing-No.: 6.544-5062.01-4

Issue: 6; 03.05.06

95 11345

TUBE DIMENSIONS in millimeters



With rubber stopper

Tolerance: ± 0.5 mm

Length: 575 ± 1 mm

Drawing-No.: 9.700-5097.01-4

Issue: 1; 25.02.00

20291

Packaging and Ordering Information

| PART NUMBER | MOQ ⁽¹⁾ | PCS PER TUBE | TUBE SPEC. (FIGURE) | CONSTITUENTS (FORMS) |
|---------------|--------------------|--------------|---------------------|----------------------|
| CNY70 | 4000 | 80 | 1 | 28 |
| TCPT1300X01 | 2000 | Reel | (2) | 29 |
| TCRT1000 | 1000 | Bulk | - | 26 |
| TCRT1010 | 1000 | Bulk | - | 26 |
| TCRT5000 | 4500 | 50 | 2 | 27 |
| TCRT5000L | 2400 | 48 | 3 | 27 |
| TCST1030 | 5200 | 65 | 5 | 24 |
| TCST1030L | 2600 | 65 | 6 | 24 |
| TCST1103 | 1020 | 85 | 4 | 24 |
| TCST1202 | 1020 | 85 | 4 | 24 |
| TCST1230 | 4800 | 60 | 7 | 24 |
| TCST1300 | 1020 | 85 | 4 | 24 |
| TCST2103 | 1020 | 85 | 4 | 24 |
| TCST2202 | 1020 | 85 | 4 | 24 |
| TCST2300 | 1020 | 85 | 4 | 24 |
| TCST5250 | 4860 | 30 | 8 | 24 |
| TCUT1300X01 | 2000 | Reel | (2) | 29 |
| TCZT8020-PAER | 2500 | Bulk | - | 22 |

Notes

(1) MOQ: minimum order quantity

(2) Please refer to datasheets

TUBE SPECIFICATION FIGURES



With rubber stopper

Tolerance: ±0.5mm

Length: 575±1mm

Drawing-No.: 9.700-5097.01-4

Issue: 1; 25.02.00

15198

Fig. 1

Packaging and Ordering Information

Vishay Semiconductors Packaging and Ordering Information



Drawing-No.: 9.700-5139.01-4
Issue: 1; 10.05.00

Drawing refers to following types: TCRT 5000

15210

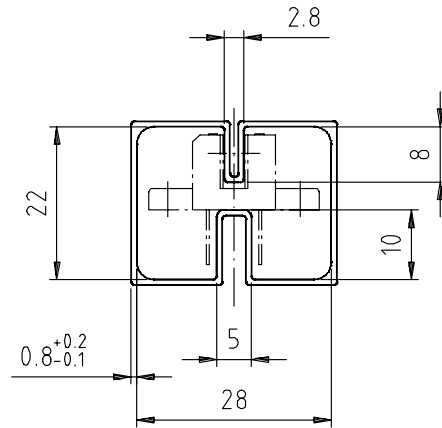
Fig. 2



Drawing-No.: 9.700-5178.01-4
Issue: 1; 25.02.00

15201

Fig. 3

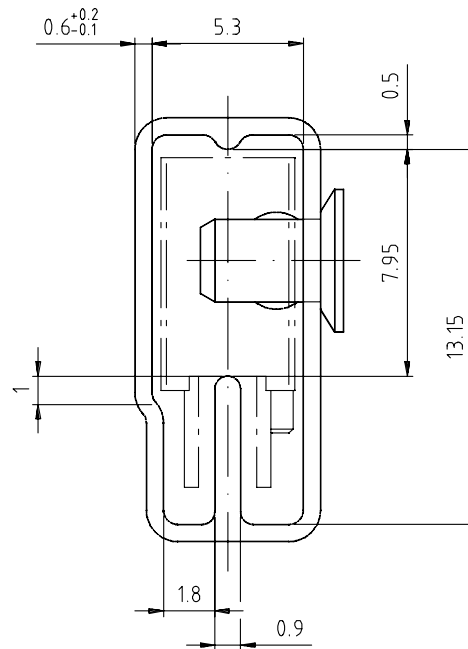


With rubber stopper
Tolerance: ±0.5mm
Length: 575±1mm

Drawing-No.: 9.700-5100.01-4
Issue: 1; 25.02.00

15199

Fig. 4



With stopper pins
Tolerance: ±0.5mm
Length: 575±1mm

Drawing-No.: 9.700-5140.01-4
Issue: 1; 25.02.00

15202

Fig. 5



Drawing-No.: 9.700-5205.01-4
Issue: 1; 25.02.00

15196

Fig. 6



Drawing-No.: 9.700-5245.01-4
Issue: 1; 25.02.00

15195

Fig. 7



Drawing-No.: 9.700-5222.01-4
 Issue: 2, 19.11.04
 20257

With stopper pins
 Tolerance: $\pm 0.5\text{mm}$
 Length: $450 \pm 1\text{mm}$
 All dimensions in mm

Fig. 8



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