

## 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](http://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 <sub>rel</sub> <sup>(1)</sup> (mm)	DISTANCE RANGE FOR RELATIVE I <sub>out</sub> > 20 % (mm)	TYPICAL OUTPUT CURRENT UNDER TEST <sup>(2)</sup> (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 <sup>(1)</sup>	REMARKS
CNY70	Tube	MOQ: 4000 pcs, 80 pcs/tube	-

#### Note

- (1) MOQ: minimum order quantity

### ABSOLUTE MAXIMUM RATINGS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>COUPLER</b>				
Total power dissipation	T <sub>amb</sub> ≤ 25 °C	P <sub>tot</sub>	200	mW
Ambient temperature range		T <sub>amb</sub>	- 40 to + 85	°C
Storage temperature range		T <sub>stg</sub>	- 40 to + 100	°C
Soldering temperature	Distance to case 2 mm, t ≤ 5 s	T <sub>sd</sub>	260	°C
<b>INPUT (EMITTER)</b>				
Reverse voltage		V <sub>R</sub>	5	V
Forward current		I <sub>F</sub>	50	mA
Forward surge current	t <sub>p</sub> ≤ 10 μs	I <sub>FSM</sub>	3	A
Power dissipation	T <sub>amb</sub> ≤ 25 °C	P <sub>V</sub>	100	mW
Junction temperature		T <sub>j</sub>	100	°C



ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>OUTPUT (DETECTOR)</b>				
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
<b>COUPLER</b>						
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
<b>INPUT (EMITTER)</b>						
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	$I_F = 100\text{ mA}$	$\lambda_P$	940			nm
Virtual source diameter	Method: 63 % encircled energy	$d$		1.2		mm
<b>OUTPUT (DETECTOR)</b>						
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

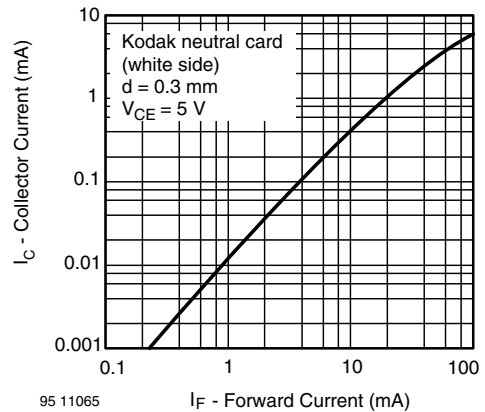


Fig. 5 - Collector Current vs. Forward Current

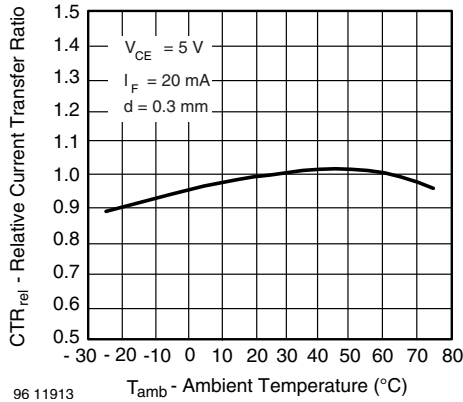


Fig. 4 - Relative Current Transfer Ratio vs. Ambient Temperature

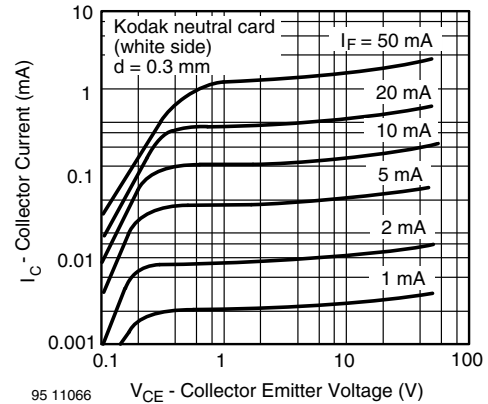
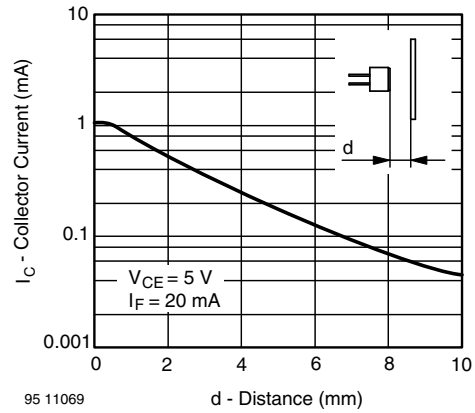


Fig. 6 - Collector Current vs. Collector Emitter Voltage



96 11914  $I_F$  - Forward Current (mA)  
Fig. 7 - Current Transfer Ratio vs. Forward Current



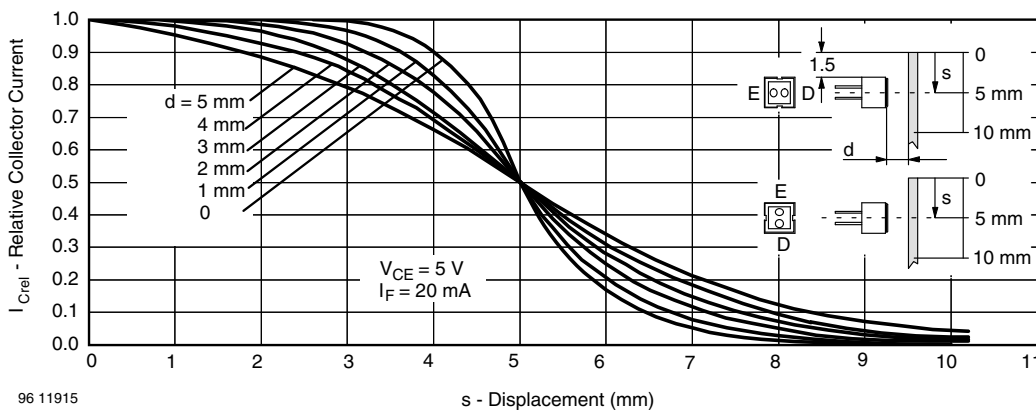
95 11069  $d$  - Distance (mm)  
Fig. 9 - Collector Current vs. Distance



96 12001  $V_{CE}$  - Collector Emitter Voltage (V)  
Fig. 8 - Current Transfer Ratio vs. Collector Emitter Voltage

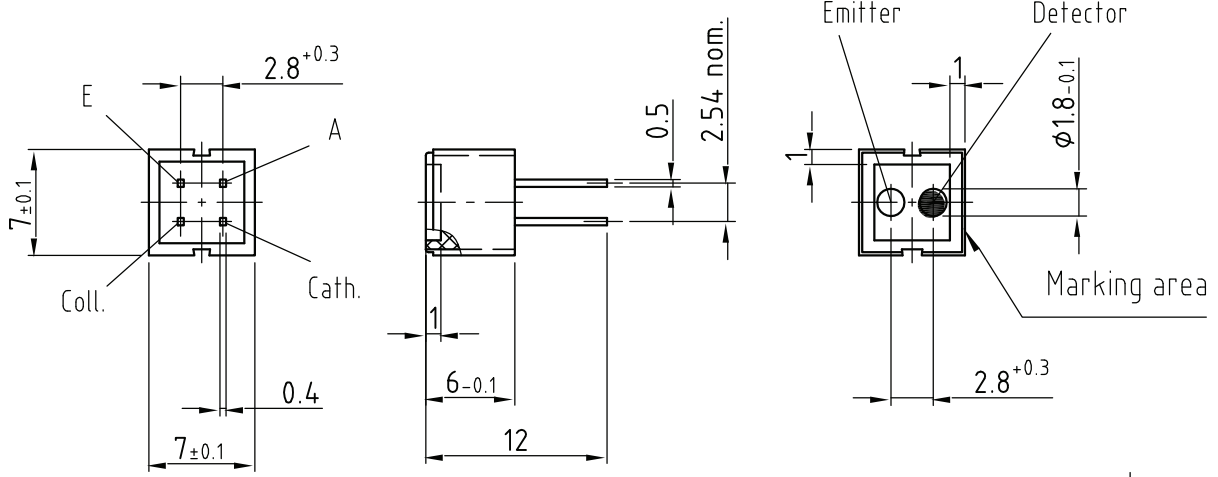


95 11063  
Fig. 10 - Relative Radiant Intensity/Collector Current vs. Angular Displacement

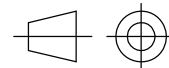


96 11915  $s$  - Displacement (mm)  
Fig. 11 - Relative Collector Current vs. Displacement

**PACKAGE DIMENSIONS** in millimeters



weight: ca. 0.70g



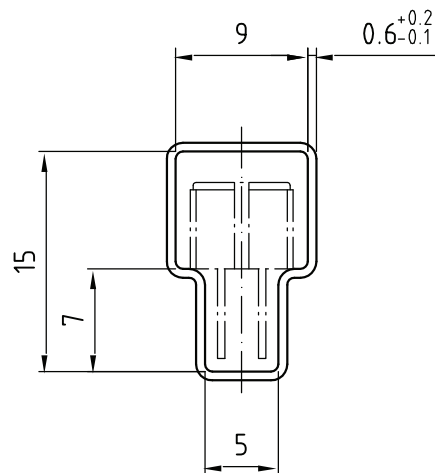
technical drawings according to DIN specifications

Drawing-No.: 6.544-5062.01-4

Issue: 6; 03.05.06

95 11345

**TUBE DIMENSIONS** in millimeters



With rubber stopper

Tolerance:  $\pm 0.5$ mm

Length:  $575 \pm 1$ mm

Drawing-No.: 9.700-5097.01-4

Issue: 1; 25.02.00

20291

## Packaging and Ordering Information

PART NUMBER	MOQ <sup>(1)</sup>	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

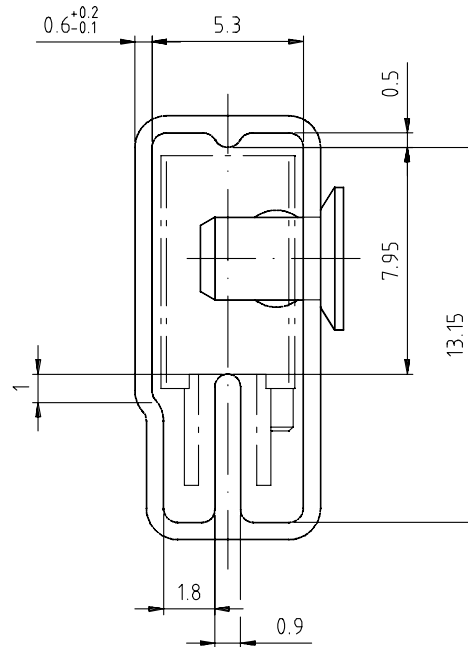


With rubber stopper  
Tolerance: ±0.5mm  
Length: 575±1mm

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



# Packaging and Ordering Information

Vishay Semiconductors Packaging and Ordering Information



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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