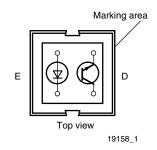


www.vishay.com

## Vishay Semiconductors

# **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:  $I_C = 1 \text{ mA}$ 

• 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



 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> (1) (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 transfere ratio,  $I_{out}/I_{in}$ 

(2) Conditions like in table basic charactristics/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 <sub>amb</sub> = 25 °C, unless otherwise specified)					
PARAMETER	TEST CONDITION	SYMBOL VALUE		UNIT	
COUPLER					
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	
INPUT (EMITTER)					
Reverse voltage		$V_{R}$	5	V	
Forward current		I <sub>F</sub>	50	mA	
Forward surge current	t <sub>p</sub> ≤ 10 μs	I <sub>FSM</sub>	3	Α	
Power dissipation	T <sub>amb</sub> ≤ 25 °C	P <sub>V</sub>	100	mW	
Junction temperature		T <sub>j</sub>	100	°C	



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<b>ABSOLUTE MAXIMUM RATINGS</b> (T <sub>amb</sub> = 25 °C, unless otherwise specified)					
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT	
OUTPUT (DETECTOR)					
Collector emitter voltage		V <sub>CEO</sub>	32	V	
Emitter collector voltage		V <sub>ECO</sub>	7	V	
Collector current		I <sub>C</sub>	50	mA	
Power dissipation	T <sub>amb</sub> ≤ 25 °C	P <sub>V</sub>	100	mW	
Junction temperature		Tj	100	°C	

### **ABSOLUTE MAXIMUM RATINGS**

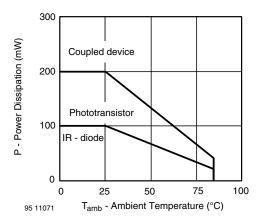


Fig. 1 - Power Dissipation vs. Ambient Temperature

<b>BASIC CHARACTERISTICS</b> (T <sub>amb</sub> = 25 °C, unless otherwise specified)							
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT	
COUPLER	COUPLER						
Collector current	$V_{CE} = 5 \text{ V}, I_F = 20 \text{ mA}, d = 0.3 \text{ mm (figure 1)}$	I <sub>C</sub> <sup>(2)</sup>	0.3	1.0		mA	
Cross talk current	$V_{CE} = 5 \text{ V}, I_F = 20 \text{ mA}, \text{ (figure 2)}$	I <sub>CX</sub> (3)			600	nA	
Collector emitter saturation voltage	$I_F = 20 \text{ mA}, I_C = 0.1 \text{ mA},$ d = 0.3 mm (figure 1)	V <sub>CEsat</sub> (2)			0.3	V	
INPUT (EMITTER)							
Forward voltage	I <sub>F</sub> = 50 mA	$V_{F}$		1.25	1.6	V	
Radiant intensity	$I_F = 50 \text{ mA}, t_p = 20 \text{ ms}$	l <sub>e</sub>			7.5	mW/sr	
Peak wavelength	I <sub>F</sub> = 100 mA	$\lambda_{P}$	940			nm	
Virtual source diameter	Method: 63 % encircled energy	d		1.2		mm	
OUTPUT (DETECTOR)							
Collector emitter voltage	I <sub>C</sub> = 1 mA	$V_{CEO}$	32			V	
Emitter collector voltage	I <sub>E</sub> = 100 μA	$V_{ECO}$	5			V	
Collector dark current	$V_{CE} = 20 \text{ V}, I_F = 0 \text{ A}, E = 0 \text{ Ix}$	I <sub>CEO</sub>			200	nA	

#### Notes

 $<sup>^{(1)}</sup>$  Measured with the "Kodak neutral test card", white side with 90 % diffuse reflectance

<sup>(2)</sup> Measured without reflecting medium



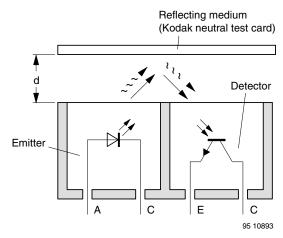


Fig. 2 - Test Condition

## **BASIC CHARACTERISTICS** (T<sub>amb</sub> = 25 °C, unless otherwise specified)

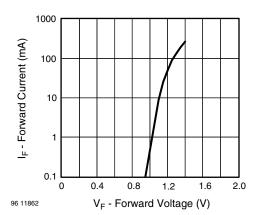


Fig. 3 - Forward Current vs. Forward Voltage

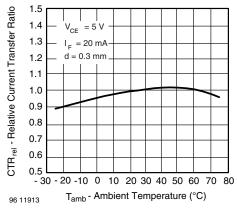


Fig. 4 - Relative Current Transfer Ratio vs. Ambient Temperature

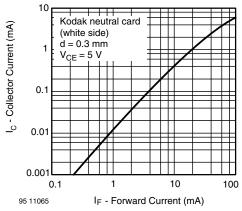


Fig. 5 - Collector Current vs. Forward Current

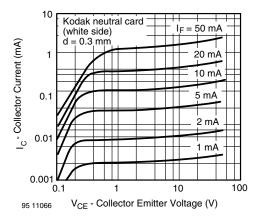


Fig. 6 - Collector Current vs. Collector Emitter Voltage

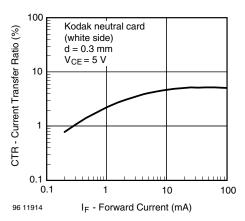


Fig. 7 - Current Transfer Ratio vs. Forward Current

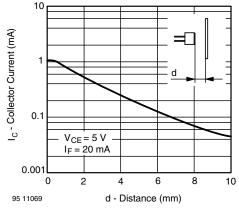


Fig. 9 - Collector Current vs. Distance

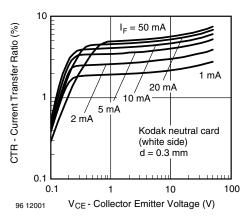


Fig. 8 - Current Transfer Ratio vs. Collector Emitter Voltage

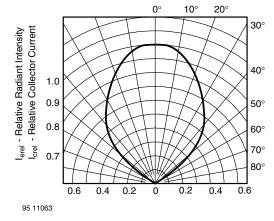


Fig. 10 - Relative Radiant Intensity/Collector Current vs.

Angular Displacement

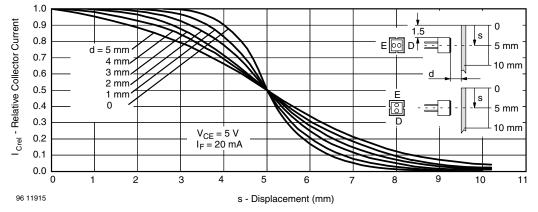
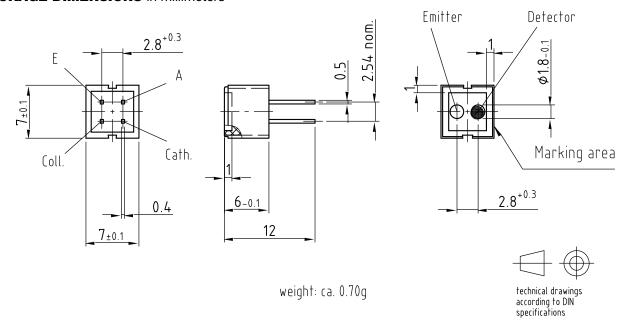


Fig. 11 - Relative Collector Current vs. Displacement

# Vishay Semiconductors

### **PACKAGE DIMENSIONS** in millimeters

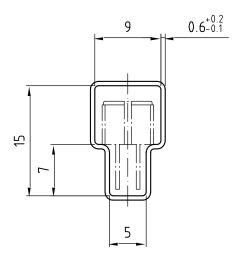


Drawing-No.: 6.544-5062.01-4

Issue: 6; 03.05.06

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### **TUBE DIMENSIONS** in millimeters



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

Drawing-No.: 9.700-5097.01-4

Issue: 1; 25.02.00

20291



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