

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)

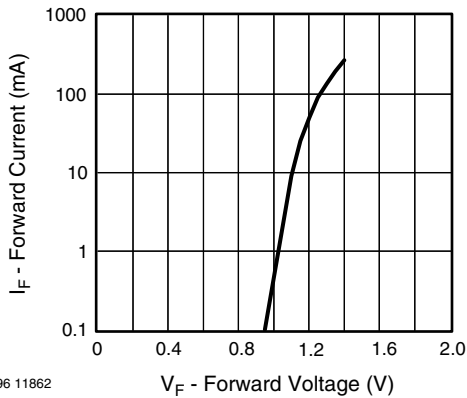


Fig. 3 - Forward Current vs. Forward Voltage



Fig. 5 - Collector Current vs. Forward Current

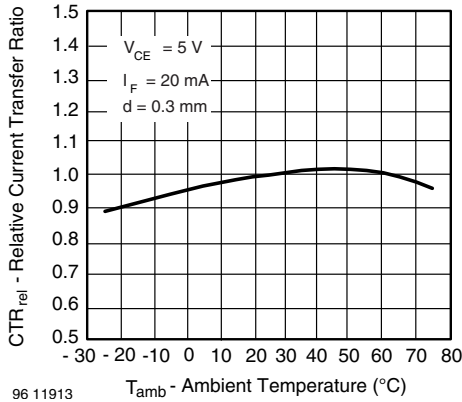


Fig. 4 - Relative Current Transfer Ratio vs. Ambient Temperature

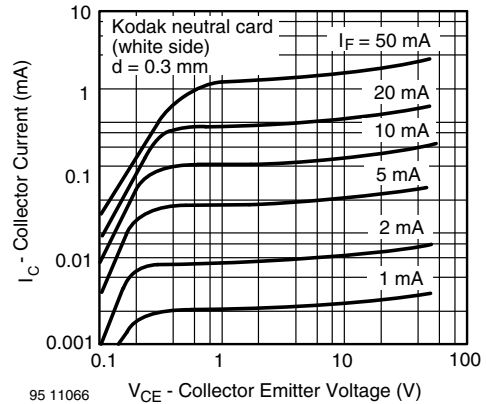
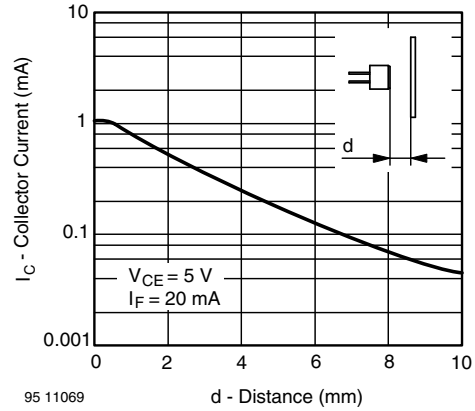


Fig. 6 - Collector Current vs. Collector Emitter Voltage



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



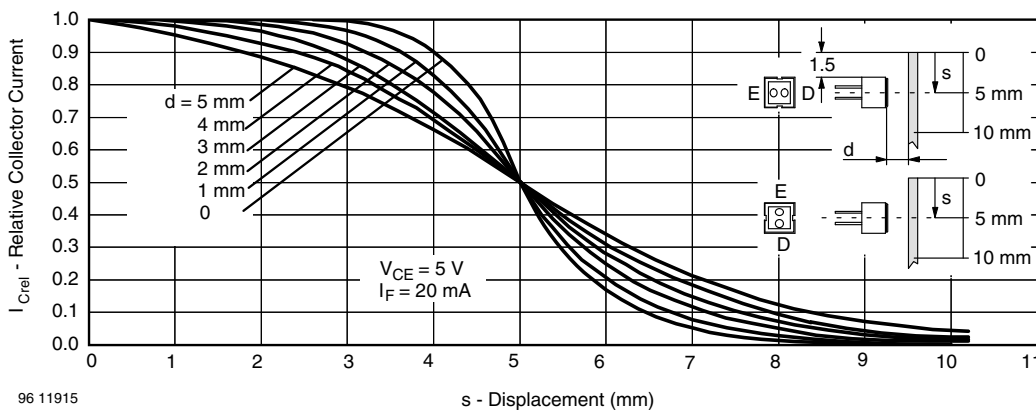
95 11069 d - Distance (mm)
Fig. 9 - Collector Current vs. Distance



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

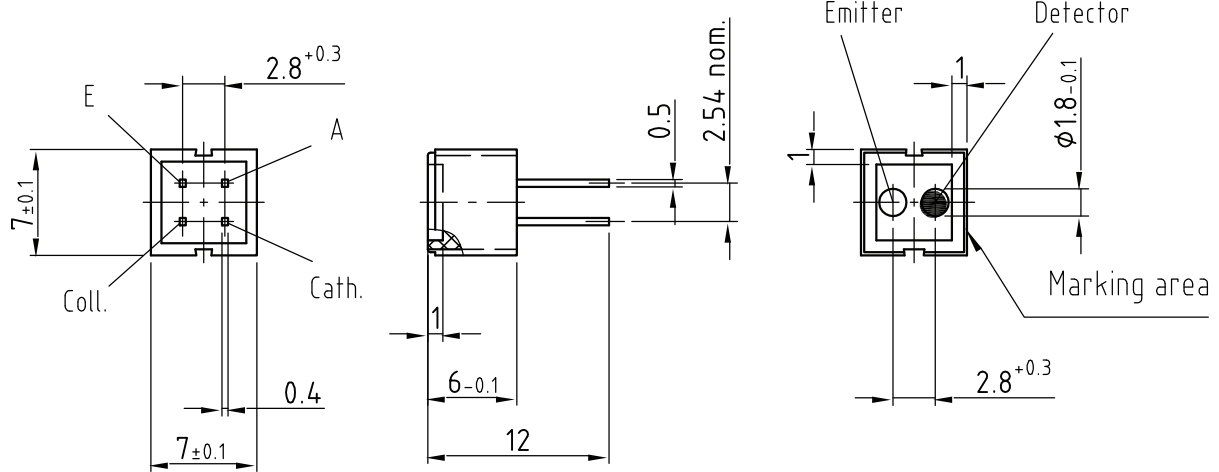


95 11063
Fig. 10 - Relative Radiant Intensity/Collector Current vs. Angular Displacement



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

PACKAGE DIMENSIONS in millimeters



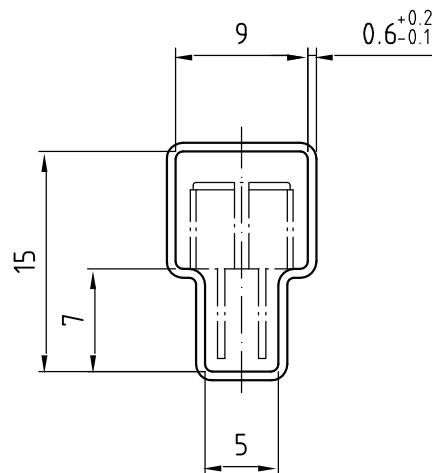
weight: ca. 0.70g



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: ±0.5mm
 Length: 575±1mm

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



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

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

15201

Fig. 3

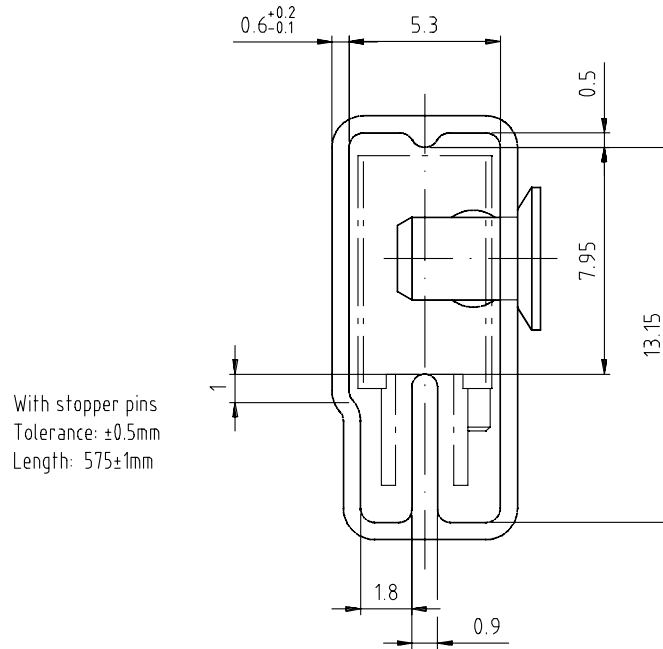


With rubber stopper
Tolerance: ±0.5mm
Length: 575±1mm

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

15199

Fig. 4



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

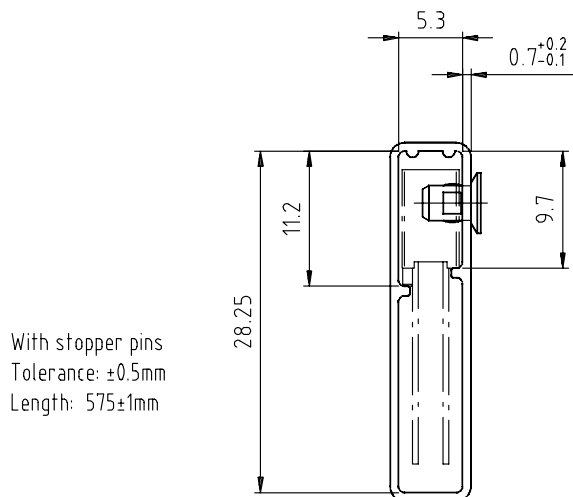
Drawing-No.: 9.700-5140.01-4
Issue: 1; 25.02.00

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: ± 0.5 mm
 Length: 450 ± 1 mm
 All dimensions in mm

Fig. 8



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