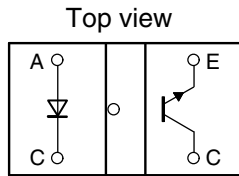


Transmissive Optical Sensor with Phototransistor Output



21833



19205_1

DESCRIPTION

The TCST1230 is a transmissive sensor that includes an infrared emitter and phototransistor, located face-to-face on the optical axes in a leaded package which blocks visible light.

FEATURES

- Package type: leaded
- Detector type: phototransistor
- Dimensions (L x W x H in mm): 9.2 x 4.8 x 5.4
- Gap (in mm): 2.8
- Aperture (in mm): 0.5
- Typical output current under test: $I_C = 2$ mA
- Daylight blocking filter
- Emitter wavelength: 950 nm
- Lead (Pb)-free soldering released
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

APPLICATIONS

- Optical switch
- Shaft encoder
- Detection of opaque material such as paper
- Detection of magnetic tapes

PRODUCT SUMMARY

PART NUMBER	GAP WIDTH (mm)	APERTURE WIDTH (mm)	TYPICAL OUTPUT CURRENT UNDER TEST ⁽¹⁾ (mA)	DAYLIGHT BLOCKING FILTER INTEGRATED
TCST1230	2.8	0.5	2	Yes

Note

- Conditions like in table basic characteristics/coupler

ORDERING INFORMATION

ORDERING CODE	PACKAGING	VOLUME ⁽¹⁾	REMARKS
TCST1230	Tube	MOQ: 4800 pcs, 60 pcs/tube	-

Note

- MOQ: minimum order quantity

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

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
COUPLER				
Total power dissipation	$T_{amb} \leq 25$ °C	P_{tot}	250	mW
Ambient temperature range		T_{amb}	- 25 to + 85	°C
Storage temperature range		T_{stg}	- 40 to + 100	°C
Soldering temperature	Distance to package 1.6 mm, $t \leq 5$ s	T_{sd}	260	°C
INPUT (EMITTER)				
Reverse voltage		V_R	6	V
Forward current		I_F	60	mA
Forward surge current	$t_p \leq 10$ μ s	I_{FSM}	3	A
Power dissipation	$T_{amb} \leq 25$ °C	P_V	100	mW
Junction temperature		T_j	100	°C



ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
OUTPUT (DETECTOR)				
Collector emitter voltage		V _{CEO}	70	V
Emitter collector voltage		V _{ECO}	7	V
Collector current		I _C	100	mA
Power dissipation	T _{amb} ≤ 25 °C	P _V	150	mW
Junction temperature		T _j	100	°C

ABSOLUTE MAXIMUM RATINGS

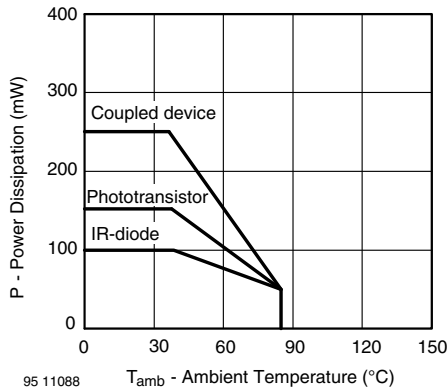


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

BASIC CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
COUPLER						
Collector current	V _{CE} = 10 V, I _F = 20 mA	I _C	0.5		14	mA
Collector emitter saturation voltage	I _F = 20 mA, I _C = 0.2 mA	V _{CEsat}			0.4	V
INPUT (EMITTER)						
Forward voltage	I _F = 60 mA	V _F		1.25	1.5	V
Junction capacitance	V _R = 0 V, f = 1 MHz	C _j		50		pF
OUTPUT (DETECTOR)						
Collector emitter voltage	I _C = 1 mA	V _{CEO}	70			V
Emitter collector voltage	I _E = 10 μA	V _{ECO}	7			V
Collector dark current	V _{CE} = 25 V, I _F = 0 A, E = 0 lx	I _{CEO}		10	100	nA
SWITCHING CHARACTERISTICS						
Turn-on time	I _C = 1 mA, V _{CE} = 5 V, R _L = 100 Ω (see figure 2)	t _{on}		15		μs
Turn-off time	I _C = 1 mA, V _{CE} = 5 V, R _L = 100 Ω (see figure 2)	t _{off}		10		μs

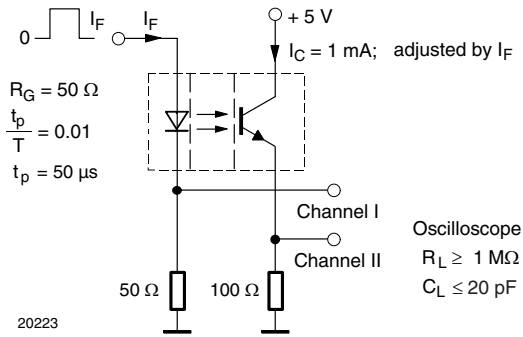


Fig. 2 - Test Circuit for t_{on} and t_{off}

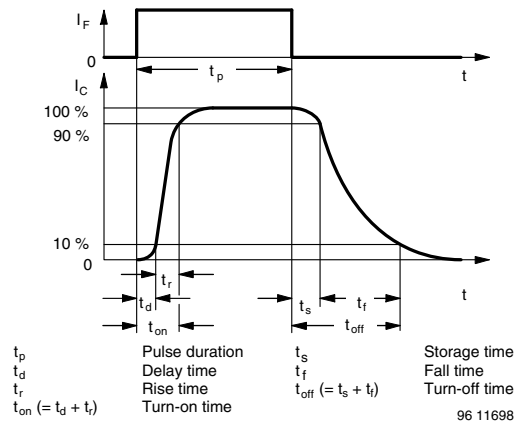


Fig. 3 - Switching Times

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

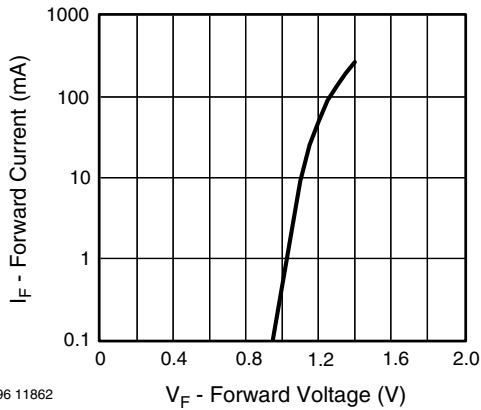


Fig. 4 - Forward Current vs. Forward Voltage

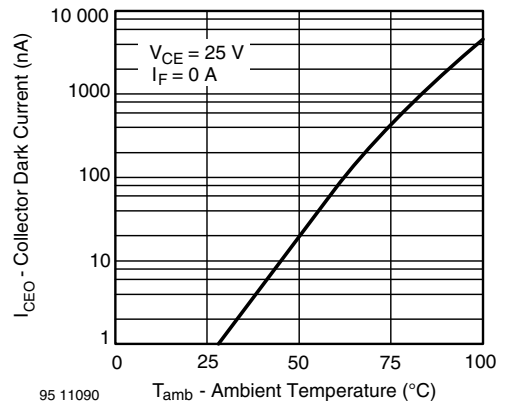


Fig. 6 - Collector Dark Current vs. Ambient Temperature

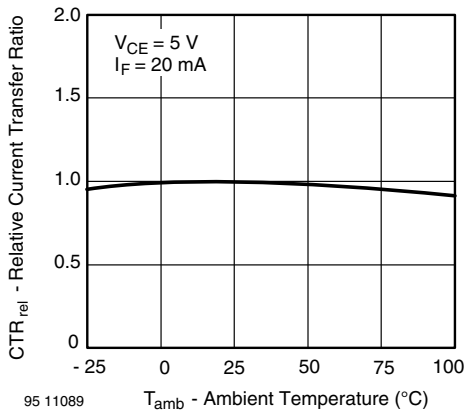


Fig. 5 - Relative Current Transfer Ratio vs. Ambient Temperature

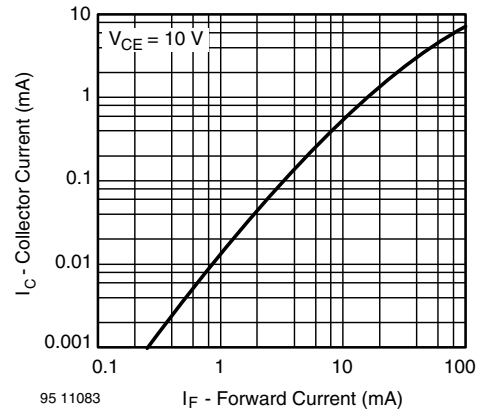


Fig. 7 - Collector Current vs. Forward Current

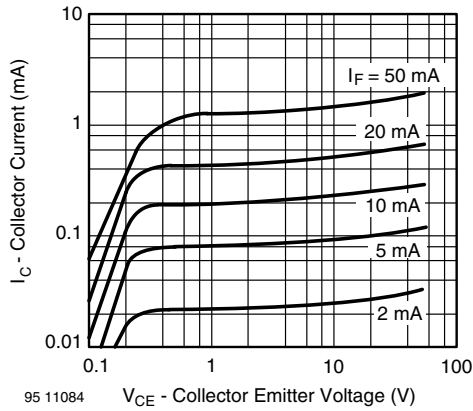


Fig. 8 - Collector Current vs. Collector Emitter Voltage

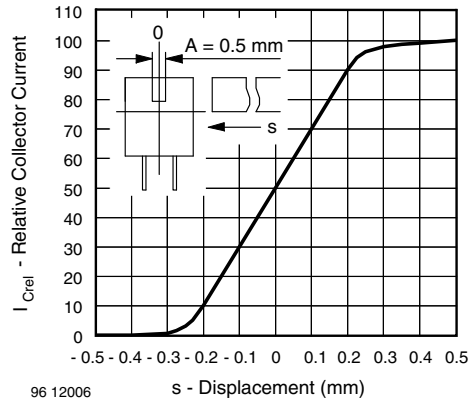


Fig. 11 - Relative Collector Current vs. Displacement

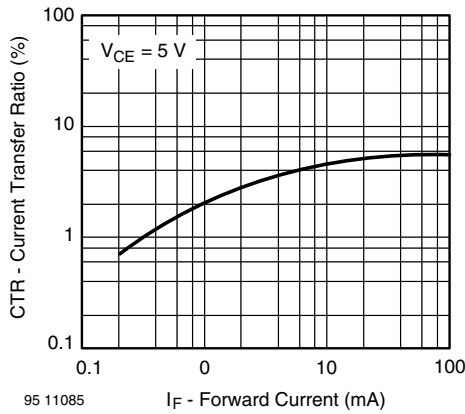


Fig. 9 - Current Transfer Ratio vs. Forward Current

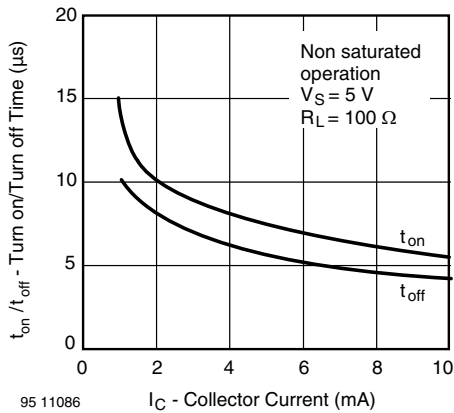
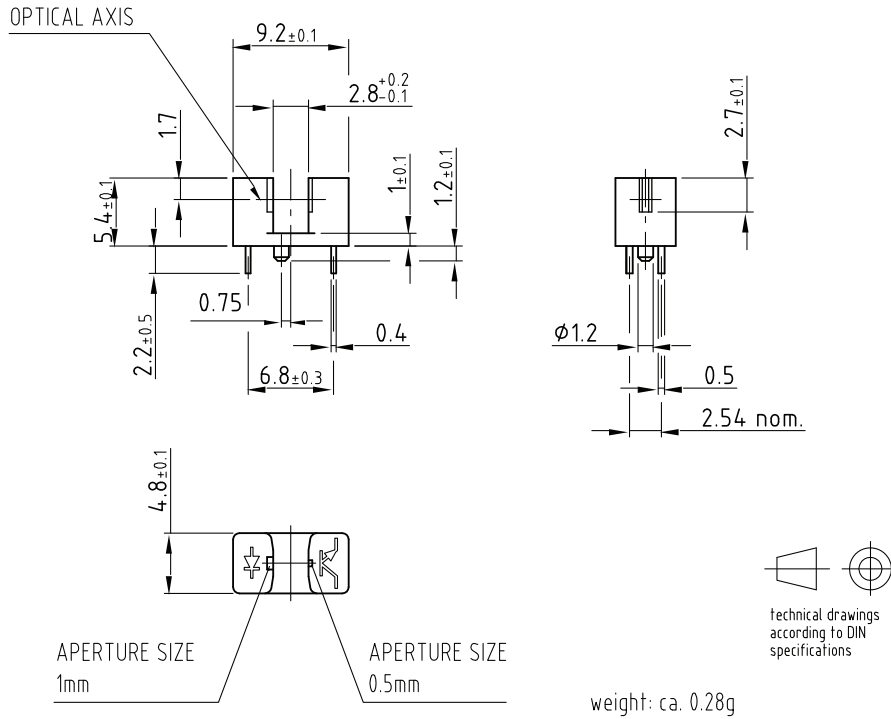


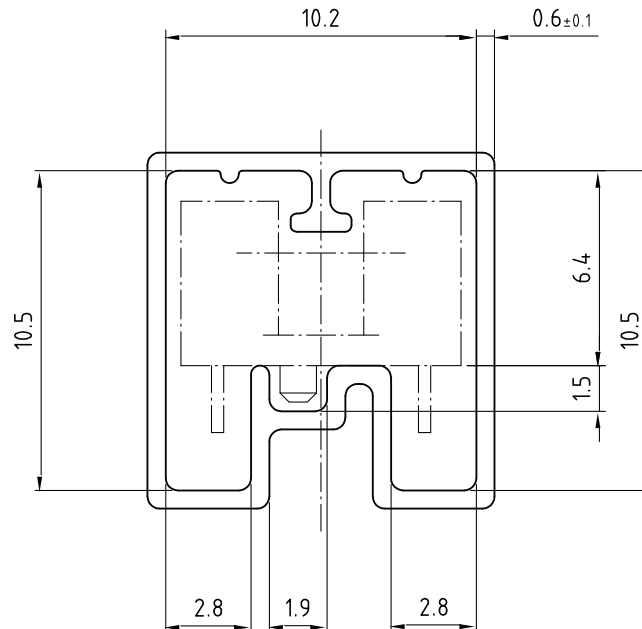
Fig. 10 - Turn-on/Turn-off Time vs. Collector Current

PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.550-5123.01-4
 Issue: 5; 30.01.06
 96 12083

TUBE DIMENSIONS in millimeters



Drawing-No.: 9.700-5245.01-4
 Issue: 1; 25.02.00
 20256

With rubber stopper
 Tolerance: $\pm 0.5\text{mm}$
 Length: $575 \pm 1\text{mm}$

Packaging and Ordering Information

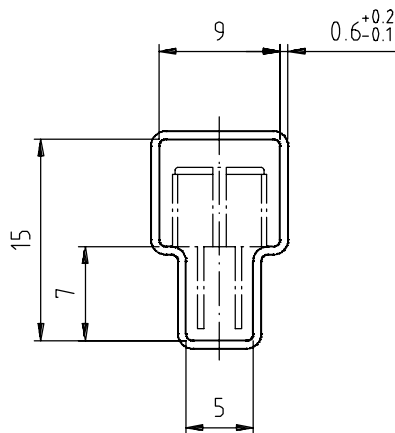
PART NUMBER	MOQ ⁽¹⁾	PCS PER TUBE	TUBE SPEC. (FIGURE)	CONSTITUENTS (FORMS)
CNY70	4000	80	1	28
TCPT1300X01	2000	Reel	(2)	29
TCRT1000	1000	Bulk	-	26
TCRT1010	1000	Bulk	-	26
TCRT5000	4500	50	2	27
TCRT5000L	2400	48	3	27
TCST1030	5200	65	5	24
TCST1030L	2600	65	6	24
TCST1103	1020	85	4	24
TCST1202	1020	85	4	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: $\pm 0.5\text{mm}$

Length: $575 \pm 1\text{mm}$

Drawing-No.: 9.700-5097.01-4

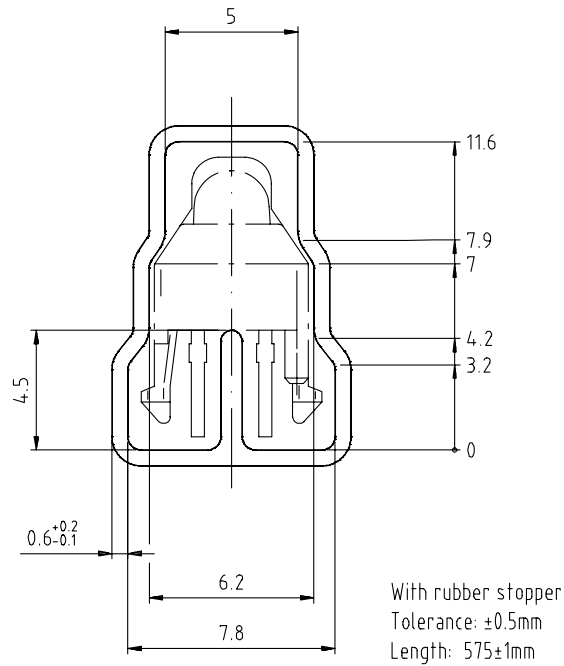
Issue: 1; 25.02.00

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

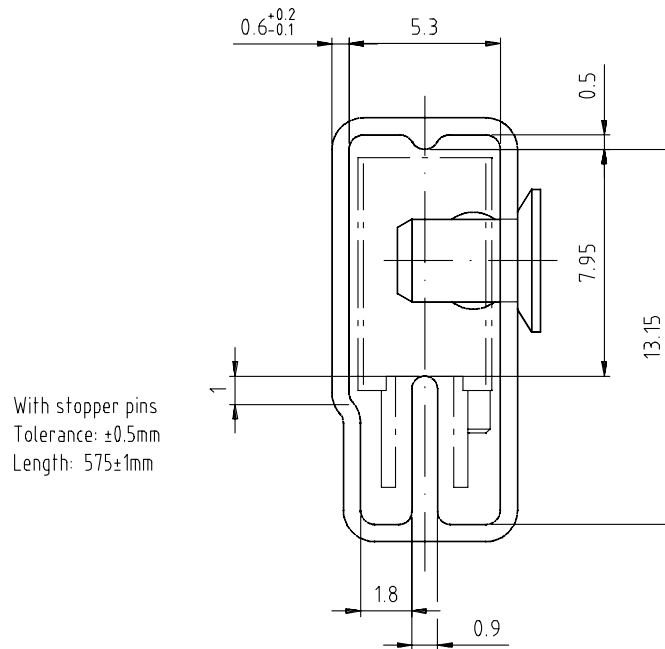


With rubber stopper
Tolerance: ±0.5mm
Length: 575±1mm

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

15199

Fig. 4

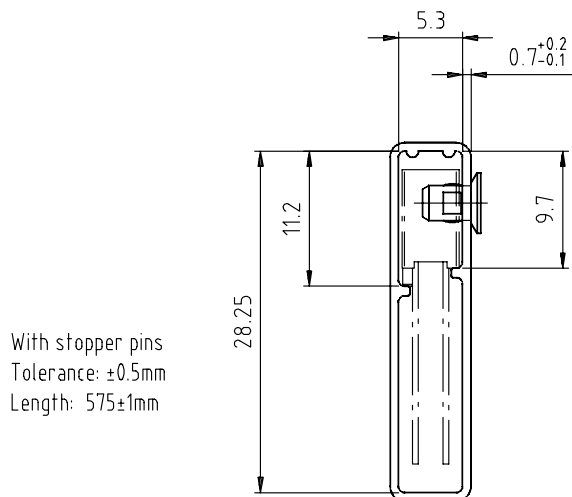


With stopper pins
Tolerance: ±0.5mm
Length: 575±1mm

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

15202

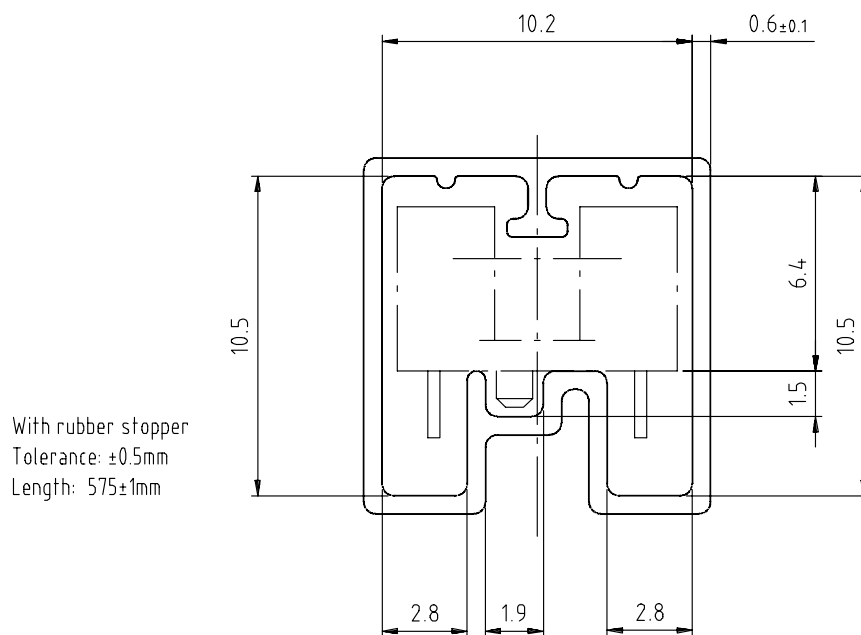
Fig. 5



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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