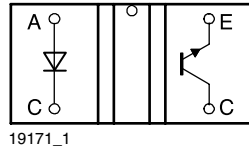


Transmissive Optical Sensor with Phototransistor Output



FEATURES

- Package type: leaded
- Detector type: phototransistor
- Dimensions (L x W x H in mm): 8.3 x 4.7 x 8.15
- Gap (in mm): 3.1
- Aperture: none
- Typical output current under test: $I_C = 2.4$ mA
- Daylight blocking filter
- Emitter wavelength: 950 nm
- Lead (Pb)-free soldering released
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC



RoHS
COMPLIANT

DESCRIPTION

The TCST1030 and TCST1030L are transmissive sensors that include an infrared emitter and phototransistor, located face-to-face on the optical axes in a leaded package which blocks visible light. TCST1030L is the long lead version.

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
TCST1030	3.1	-	2.4	Yes
TCST1030L	3.1	-	2.4	Yes

Note

⁽¹⁾ Conditions like in table basic characteristics/coupler

ORDERING INFORMATION			
ORDERING CODE	PACKAGING	VOLUME ⁽¹⁾	REMARKS
TCST1030	Tube	MOQ: 5200 pcs, 65 pcs/tube	3.4 mm lead length
TCST1030L	Tube	MOQ: 2600 pcs, 65 pcs/tube	16 mm lead length

Note

⁽¹⁾ MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS ⁽¹⁾				
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}	- 25 to + 100	°C
Soldering temperature	1.6 mm from case, $t \leq 10$ 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 (1)				
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	$T_{amb} \leq 25^\circ\text{C}$	P_V	150	mW
Junction temperature		T_j	100	$^\circ\text{C}$

Note

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

ABSOLUTE MAXIMUM RATINGS

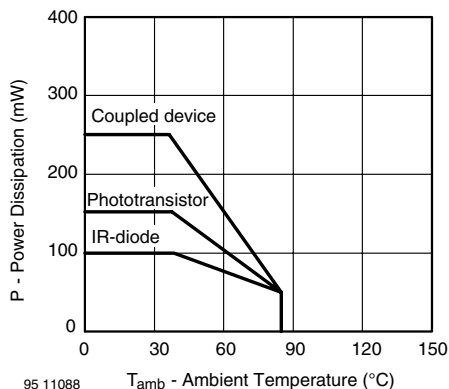


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

BASIC CHARACTERISTICS (1)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
COUPLER						
Collector current	$V_{CE} = 5\text{ V}, I_F = 10\text{ mA}$	I_C	1.2	2.4		mA
Collector emitter saturation voltage	$I_F = 10\text{ mA}, I_C = 1\text{ mA}$	V_{CEsat}			0.8	V
INPUT (EMITTER)						
Forward voltage	$I_F = 60\text{ mA}$	V_F		1.25	1.5	V
Junction capacitance	$V_R = 0\text{ V}, f = 1\text{ MHz}$	C_j		50		pF
OUTPUT (DETECTOR)						
Collector emitter voltage	$I_C = 1\text{ mA}$	V_{CEO}	70			V
Emitter collector voltage	$I_E = 10\ \mu\text{A}$	V_{ECO}	7			V
Collector dark current	$V_{CE} = 25\text{ V}, I_F = 0\text{ A}, E = 0\text{ lx}$	I_{CEO}		10	100	nA
SWITCHING CHARACTERISTICS						
Turn-on time	$I_C = 1\text{ mA}, V_{CE} = 5\text{ V}, R_L = 100\ \Omega$ (see figure 2)	t_{on}		15		μs
Turn-off time	$I_C = 1\text{ mA}, V_{CE} = 5\text{ V}, R_L = 100\ \Omega$ (see figure 2)	t_{off}		10		μs

Note

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

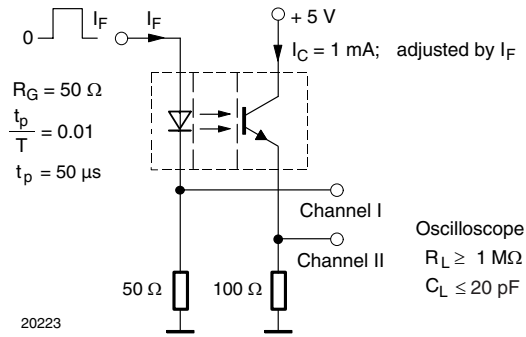


Fig. 2 - Test Circuit for t_{on} and t_{off}

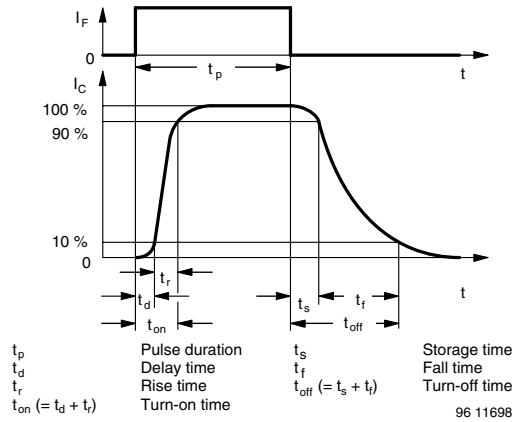
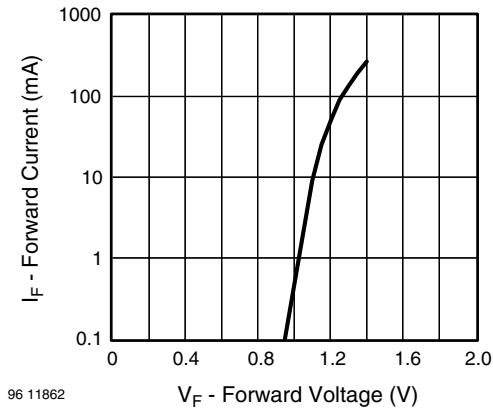


Fig. 3 - Switching Times

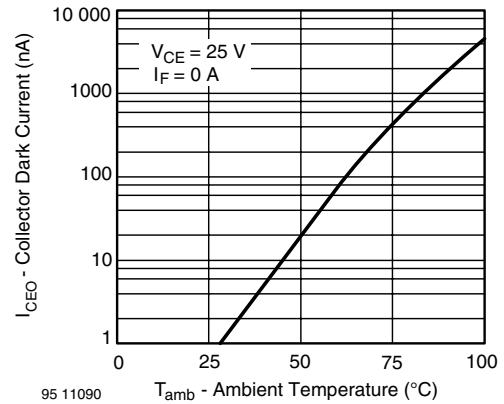
BASIC CHARACTERISTICS

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



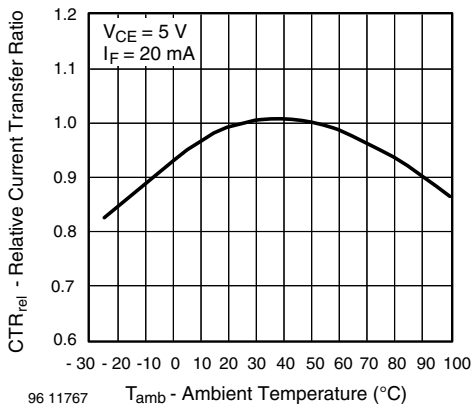
96 11862

Fig. 4 - Forward Current vs. Forward Voltage



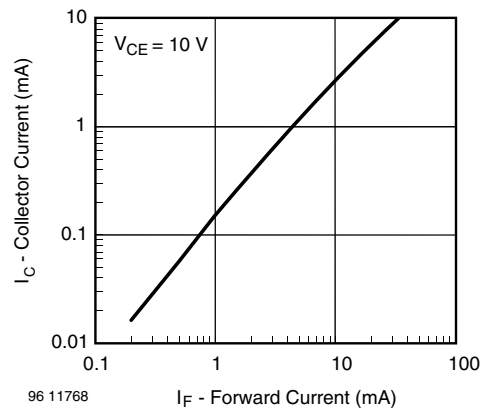
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Fig. 6 - Collector Dark Current vs. Ambient Temperature



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



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Fig. 7 - Collector Current vs. Forward Current

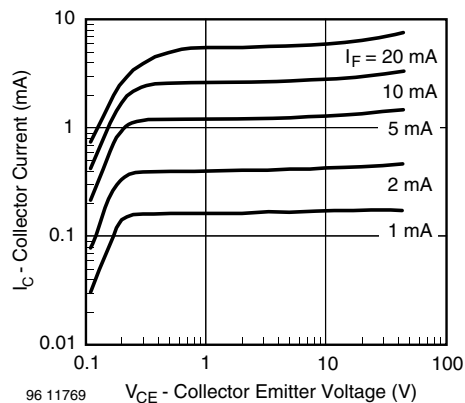


Fig. 8 - Collector Current vs. Collector Emitter Voltage

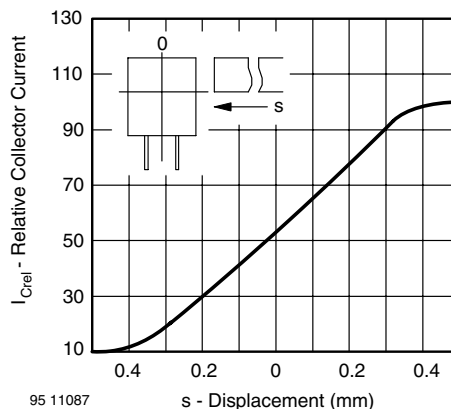


Fig. 11 - Relative Collector Current vs. Displacement

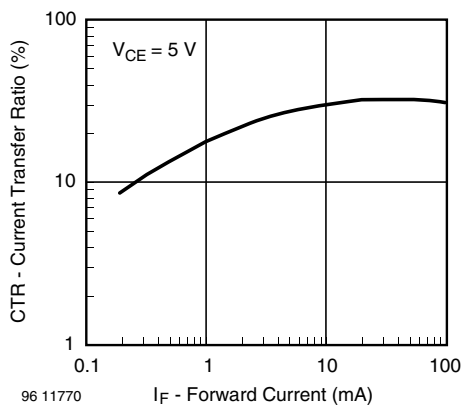


Fig. 9 - Current Transfer Ratio vs. Forward Current

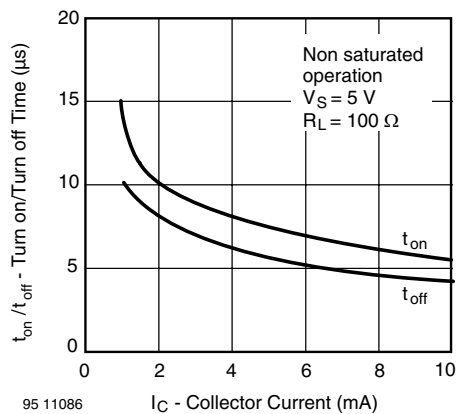


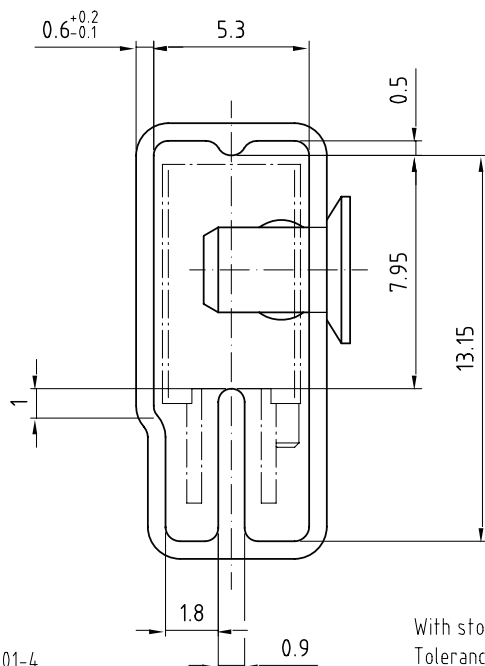
Fig. 10 - Turn-on/Turn-off Time vs. Collector Current

TCST1030, TCST1030L



Vishay Semiconductors Transmissive Optical Sensor with Phototransistor Output

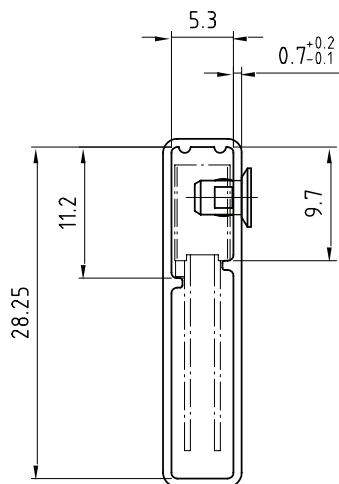
TUBE DIMENSIONS in millimeters



Drawing-No.: 9.700-5140.01-4
Issue: 1; 25.02.00
20253

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

TUBE DIMENSIONS in millimeters



With stopper pins
Tolerance: $\pm 0.5\text{mm}$
Length: $575 \pm 1\text{mm}$
All dimensions in mm

Drawing-No.: 9.700-5205.01-4
Issue: 1; 25.02.00
20254



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