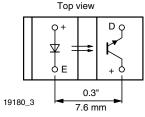


Transmissive Optical Sensor with Phototransistor Output



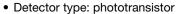


DESCRIPTION

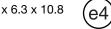
The TCST1103, TCST1202, and TCST1300 are transmissive sensors that include an infrared emitter and phototransistor, located face-to-face on the optical axes in a leaded package which blocks visible light. These part numbers include options for aperture width.

FEATURES

Package type: leaded







• Gap (in mm): 3.1

• Typical output current under test: $I_C = 4 \text{ mA}$ (TCST1103)

COMPLIANT

• Typical output current under test: I_C = 2 mA (TCST1202)

Typical output current under test: I_C = 0.5 mA (TCST1300)

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

APPLICATIONS

- · Optical switch
- Photo interrupter
- Counter
- Encoder

PRODUCT SUMMARY							
PART NUMBER	GAP WIDTH (mm)	APERTURE WIDTH (mm)	TYPICAL OUTPUT CURRENT UNDER TEST ⁽¹⁾ (mA)	DAYLIGHT BLOCKING FILTER INTEGRATED			
TCST1103	3.1	1	4	Yes			
TCST1202	3.1	0.5	2	Yes			
TCST1300	3.1	0.25	0.5	Yes			

Note

· Conditions like in table basic characteristics/coupler

ORDERING INFORMATION						
ORDERING CODE	PACKAGING	VOLUME (1)	REMARKS			
TCST1103	Tube	MOQ: 1020 pcs, 85 pcs/tube	Without mounting flange			
TCST1202	Tube	MOQ: 1020 pcs, 85 pcs/tube	Without mounting flange			
TCST1300	Tube	MOQ: 1020 pcs, 85 pcs/tube	Without mounting flange			

Note

• MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION SYMBOL VALUE U					
COUPLER						
Total power dissipation	T _{amb} ≤ 25 °C	P _{tot}	250	mW		
Ambient temperature range		T _{amb}	- 55 to + 85	°C		
Storage temperature range		T _{stg}	- 55 to + 100	°C		
Soldering temperature	Distance to package: 2 mm; t ≤ 5 s	T _{sd}	260	°C		



ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified)							
PARAMETER	TEST CONDITION	SYMBOL	SYMBOL VALUE				
INPUT (EMITTER)							
Reverse voltage		V _R	6	V			
Forward current		I _F	60	mA			
Forward surge current	t _p ≤ 10 μs	I _{FSM}	3	Α			
Power dissipation	T _{amb} ≤ 25 °C	P _V	100	mW			
Junction temperature		T _j	100	°C			
OUTPUT (DETECTOR)							
Collector emitter voltage		V _{CEO}	70	V			
Emitter collector voltage		V _{ECO}	7	V			
Collector peak current	$t_p/T = 0.5, t_p \le 10 \text{ ms}$	I _{CM}	200	mA			
Power dissipation	T _{amb} ≤ 25 °C	P _V	150	mW			
Junction temperature		T _j	100	°C			

ABSOLUTE MAXIMUM RATINGS

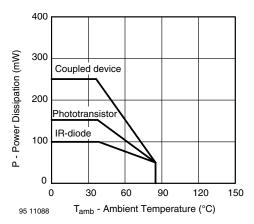


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

BASIC CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
COUPLER							
		TCST1103	CTR	10	20 %	%	
Current transfer ratio	$V_{CE} = 5 \text{ V}, I_F = 20 \text{ mA}$	TCST1202	CTR	5	10		%
		TCST1300	CTR	1.25	2.5		%
		TCST1103	I _C	2	4		mA
Collector current	$V_{CE} = 5 \text{ V}, I_F = 20 \text{ mA}$	TCST1202	I _C	1	2		mA
		TCST1300	I _C	0.25	0.5		mA
Collector emitter saturation voltage	$I_F = 20 \text{ mA}, I_C = 1 \text{ mA}$	TCST1103	V _{CEsat}			0.4	V
	$I_F = 20 \text{ mA}, I_C = 0.5 \text{ mA}$	TCST1202	V_{CEsat}			0.4	V
	$I_F = 20 \text{ mA}, I_C = 0.1 \text{ mA}$	TCST1300	V _{CEsat}			0.4	V
Resolution, path of the shutter crossing the radiant sensitive zone		TCST1103	S		0.6		mm
	$I_{Crel} = 10 \% \text{ to } 90 \%$	TCST1202	S		0.4		mm
		TCST1300	S		0.2		mm



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BASIC CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT (EMITTER)							
Forward voltage	$I_F = 60 \text{ mA}$		V _F		1.25	1.6	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	$V_{CE} = 25 \text{ V}, I_F = 0 \text{ A}, E = 0 \text{ Ix}$		I _{CEO}			100	nA
SWITCHING CHARACTERISTICS							
Turn-on time	$I_C = 2$ mA, $V_S = 5$ V, $R_L = 100 \Omega$ (see figure 2)		t _{on}		10		μs
Turn-off time	$I_C = 2 \text{ mA}, V_S = 5 \text{ V},$ $R_L = 100 \Omega \text{ (see figure 2)}$		t _{off}		8		μs

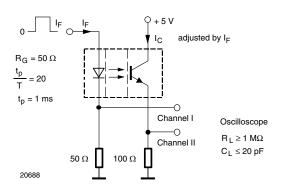


Fig. 2 - Test Circuit for t_{on} and t_{off}

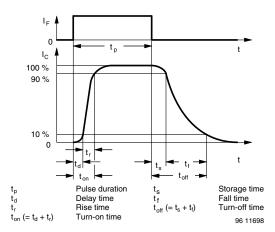


Fig. 3 - Switching Times

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

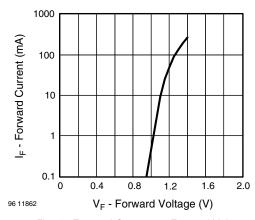


Fig. 4 - Forward Current vs. Forward Voltage

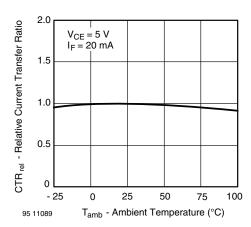


Fig. 5 - Relative Current Transfer Ratio vs. Ambient Temperature



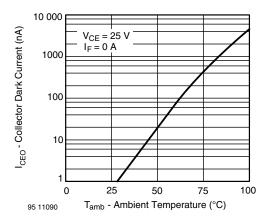


Fig. 6 - Collector Dark Current vs. Ambient Temperature

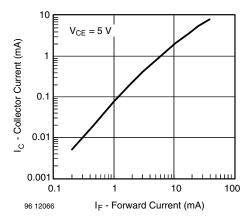


Fig. 7 - Collector Current vs. Forward Current

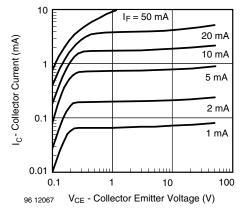


Fig. 8 - Collector Current vs. Collector Emitter Voltage

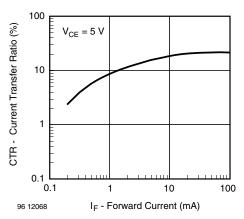


Fig. 9 - Current Transfer Ratio vs. Forward Current

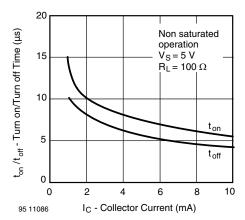


Fig. 10 - Turn-off/Turn-on Time vs. Collector Current

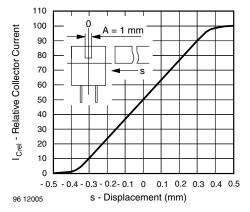


Fig. 11 - Relative Collector Current vs. Displacement

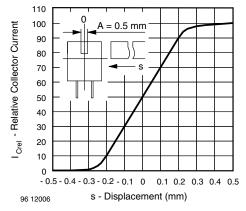


Fig. 12 - Relative Collector Current vs. Displacement

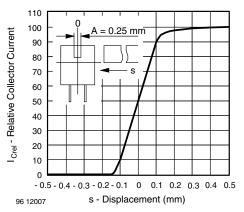
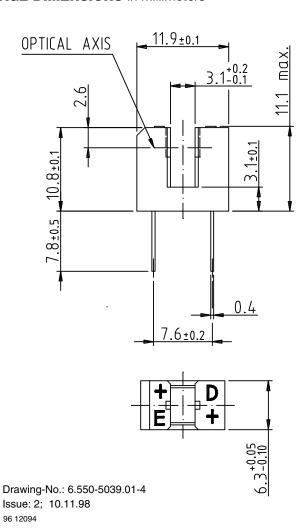


Fig. 13 - Relative Collector Current vs. Displacement

PACKAGE DIMENSIONS in millimeters



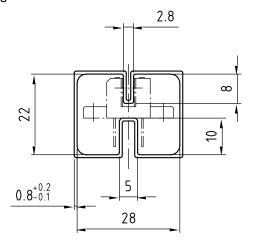
0.45
2.54 nom.

technical drawings according to DIN specifications

weight: ca. 0.80g

Rev. 2.0, 24-Aug-11 5 Document Number: 83764

TUBE DIMENSIONS in millimeters



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

Drawing-No.: 9.700-5100.01-4

Issue: 1; 25.02.00

20252



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