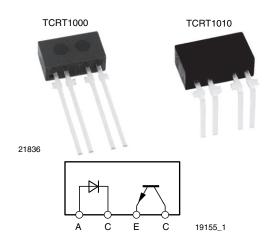


Vishay Semiconductors

Reflective Optical Sensor with Transistor Output



DESCRIPTION

The TCRT1000 and TCRT1010 are reflective sensors which include 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 4 x 2.5
- Peak operating distance: 1 mm
- Operating range within > 20 % relative collector current: 0.2 mm to 4 mm
- Typical output current under test: I_C = 0.5 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

APPLICATIONS

 Optoelectronic scanning and switching devices i.e., index sensing, coded disk scanning etc. (optoelectronic encoder assemblies for transmissive sensing).

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	
TCRT1000	1	0.2 to 4	0.5	Yes	
TCRT1010	1	0.2 to 4	0.5	Yes	

Notes

- (1) CTR: current transfere ratio, I_{out}/I_{in}
- (2) Conditions like in table basic charactristics/sensor

ORDERING INFORMATION					
ORDERING CODE	PACKAGING	VOLUME (1)	REMARKS		
TCRT1000	Bulk	MOQ: 1000 pcs, 1000 pcs/bulk	Straight leads		
TCRT1010	Bulk	MOQ: 1000 pcs, 1000 pcs/bulk	Bent leads		

Note

(1) MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified)					
PARAMETER	TEST CONDITION SYMBOI		VALUE	UNIT	
SENSOR					
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	ng temperature $2 \text{ mm distance to package,} $ $t \le 5 \text{ s}$		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	А	
Power dissipation	T _{amb} ≤ 25 °C	P _V	100	mW	
Junction temperature		T _j	100	°C	

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ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT		
OUTPUT (DETECTOR)						
Collector emitter voltage		V _{CEO}	32	V		
Emitter collector voltage		V _{ECO}	5	V		
Collector current		I _C	50	mA		
Power dissipation	T _{amb} ≤ 25 °C	P _V	100	mW		
Junction temperature		Tj	100	°C		

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

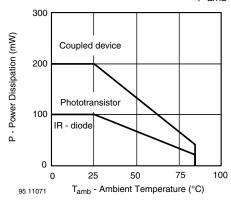


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

BASIC CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)							
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT	
SENSOR							
Collector current	$V_{CE} = 5 \text{ V, } I_{F} = 20 \text{ mA,} $ I_{C} (1) 0.3 0.5			mA			
Cross talk current	$V_{CE} = 5 \text{ V}, I_F = 20 \text{ mA}, \text{ (figure 1)}$	I _{CX} (2)			1	μA	
Collector emitter saturation voltage	$I_F = 20 \text{ mA}, I_C = 0.1 \text{ mA}, \\ d = 1 \text{ mm (figure 2)}$ V_{CEsat} (1)				0.3	V	
INPUT (EMITTER)							
Forward voltage	I _F = 50 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 mA	$I_F = 100 \text{ mA}$ λ_P 940				nm	
Virtual source diameter	Method: 63 % encircled energy d			1.2		mm	
OUTPUT (DETECTOR)							
Collector emitter voltage	I _C = 1 mA	I _C = 1 mA V _{CEO} 32				V	
Emitter collector voltage	I _E = 100 μA	= 100 μA V _{ECO} 5			V		
Collector dark current $V_{CE} = 20 \text{ V}, I_F = 0 \text{ A}, E = 0 \text{ lx}$ I_{CEO} 200		200	nA				

Notes

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

⁽²⁾ Measured without reflecting medium



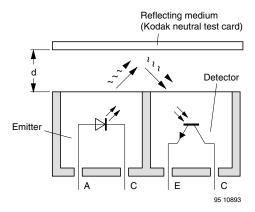


Fig. 2 - Test Condition

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

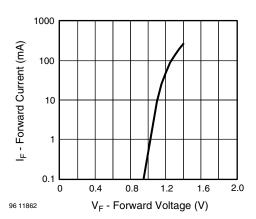


Fig. 3 - Forward Current vs. Forward Voltage

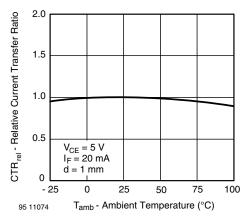


Fig. 4 - Relative Current Transfer Ratio vs. Ambient Temperature

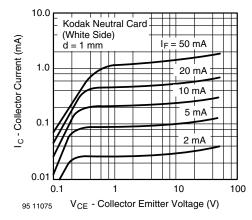


Fig. 5 - Collector Current vs. Collector Emitter Voltage

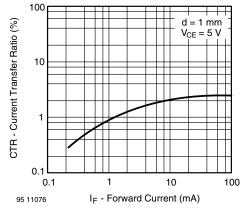


Fig. 6 - Current Transfer Ratio vs. Forward Current



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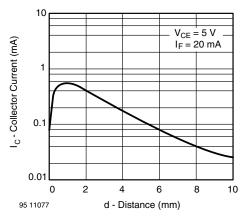


Fig. 7 - Collector Current vs. Distance

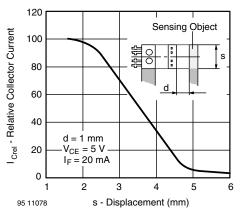
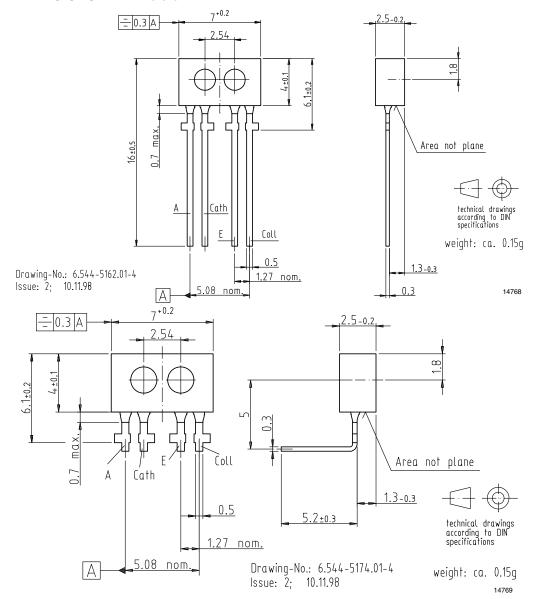


Fig. 8 - Relative Collector Current vs. Displacement

PACKAGE DIMENSIONS in millimeters





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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

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

⁽¹⁾ MOQ: minimum order quantity

⁽²⁾ Please refer to datasheets

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





Packaging and Ordering Information Vishay Semiconductors



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

Drawing-No.: 9.700-5100.01-4

Issue: 1; 25.02.00

15199

15202

Fig. 4



Fig. 5

Packaging and Ordering Information

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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





Packaging and Ordering Information Vishay Semiconductors





Drawing-No.: 9.700-5222.01-4

Issue: 2; 19.11.04

20257

With stopper pins Tolerance: ±0.5mm Length: 450±1mm All dimensions in mm

Fig. 8



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