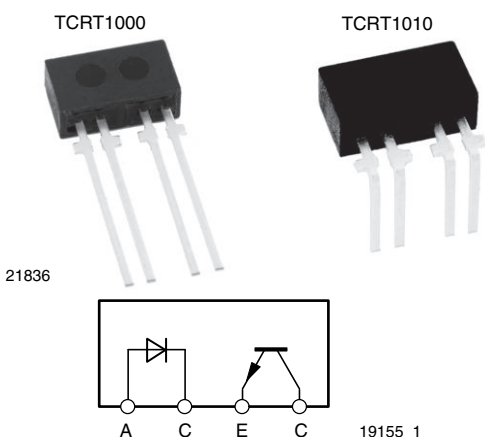


# **Reflective Optical Sensor With Transistor Output**



## **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:  $I_C = 0.7 \text{ mA}$
- 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](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

## **DESCRIPTION**

The TCRT1000 and TCRT1010 are reflective sensors which include an infrared emitter and phototransistor in a leaded package which blocks visible light.

## **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 <sub>REL</sub> <sup>(1)</sup> (mm)	DISTANCE RANGE FOR RELATIVE $I_{out} > 20 \%$ (mm)	TYPICAL OUTPUT CURRENT UNDER TEST <sup>(2)</sup> (mA)	DAYLIGHT BLOCKING FILTER INTEGRATED
TCRT1000	1	0.2 to 4	0.7	Yes
TCRT1010	1	0.2 to 4	0.7	Yes

### **Notes**

<sup>(1)</sup> CTR: current transference ratio,  $I_{out}/I_{in}$

<sup>(2)</sup> Conditions like in table basic characteristics/sensor

## **ORDERING INFORMATION**

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

### **Note**

<sup>(1)</sup> MOQ: minimum order quantity

## **ABSOLUTE MAXIMUM RATINGS** ( $T_{amb} = 25 \text{ }^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>SENSOR</b>				
Total power dissipation	$T_{amb} \leq 25 \text{ }^{\circ}\text{C}$	$P_{tot}$	270	mW
Ambient temperature range		$T_{amb}$	-40 to +85	$^{\circ}\text{C}$
Storage temperature range		$T_{stg}$	-40 to +100	$^{\circ}\text{C}$
Soldering temperature	2 mm distance to package, $t \leq 5 \text{ s}$	$T_{sd}$	260	$^{\circ}\text{C}$
<b>INPUT (EMITTER)</b>				
Reverse voltage		$V_R$	5	V
Forward current		$I_F$	100	mA
Forward surge current	$t_p \leq 100 \text{ } \mu\text{s}$	$I_{FSM}$	1.5	A
Power dissipation	$T_{amb} \leq 25 \text{ }^{\circ}\text{C}$	$P_V$	170	mW
Junction temperature		$T_j$	100	$^{\circ}\text{C}$

**ABSOLUTE MAXIMUM RATINGS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
<b>OUTPUT (DETECTOR)</b>				
Collector emitter voltage		$V_{CEO}$	32	V
Emitter collector voltage		$V_{ECO}$	5	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	$^{\circ}\text{C}$

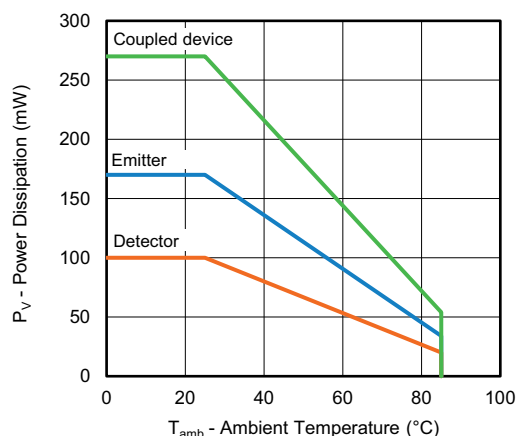
**ABSOLUTE MAXIMUM RATINGS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

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

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>SENSOR</b>						
Collector current	$V_{CE} = 5\text{ V}$ , $I_F = 20\text{ mA}$ , $d = 1\text{ mm}$ (Fig. 2)	$I_C^{(1)}$	0.6	0.7	-	mA
Cross talk current	$V_{CE} = 5\text{ V}$ , $I_F = 20\text{ mA}$	$I_{CX}^{(2)}$	-	-	1	$\mu\text{A}$
Collector emitter saturation voltage	$I_F = 20\text{ mA}$ , $I_C = 0.1\text{ mA}$ , $d = 1\text{ mm}$ (Fig. 2)	$V_{CEsat}^{(1)}$	-	-	0.3	V
<b>INPUT (EMITTER)</b>						
Forward voltage	$I_F = 100\text{ mA}$	$V_F$	-	1.6	1.7	V
Peak wavelength	$I_F = 100\text{ mA}$	$\lambda_P$	950	-	-	nm
<b>OUTPUT (DETECTOR)</b>						
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	$V_{CE} = 10\text{ V}$ , $I_F = 0\text{ A}$ , $E = 0\text{ lx}$	$I_{CEO}$	-	-	200	nA

**Notes**

- (1) Measured with the "Kodak neutral test card", white side with 90 % diffuse reflectance  
 (2) Measured without reflecting medium

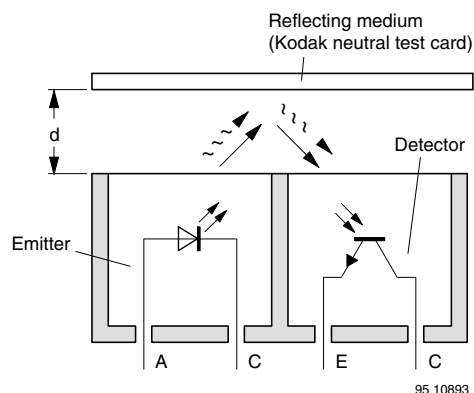


Fig. 2 - Test Condition

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

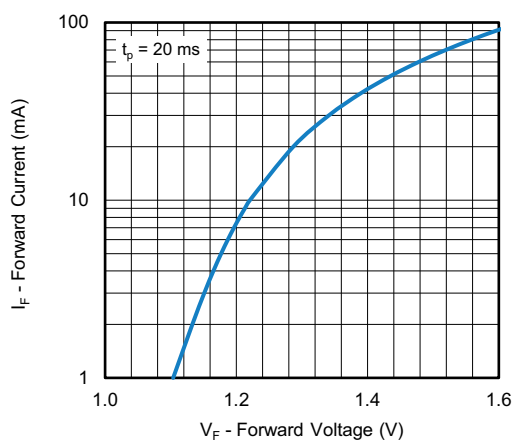


Fig. 3 - Forward Current vs. Forward Voltage

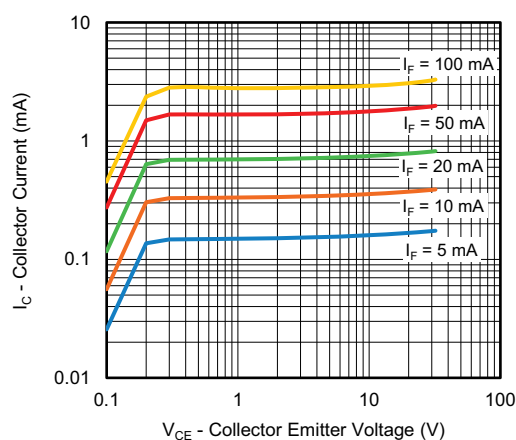


Fig. 5 - Collector Current vs. Collector Emitter Voltage

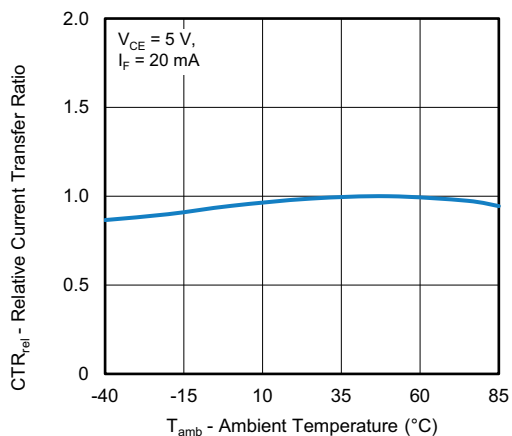


Fig. 4 - Relative Current Transfer Ratio vs. Ambient Temperature

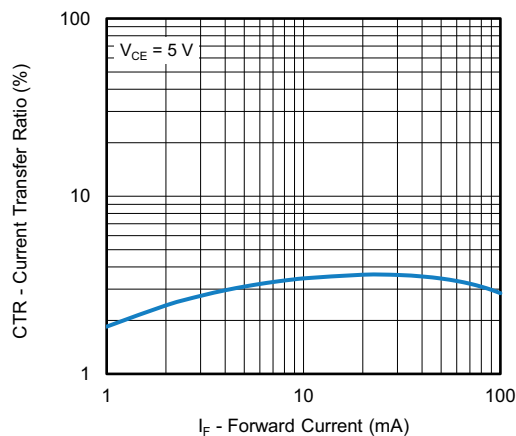


Fig. 6 - Current Transfer Ratio vs. Forward Current

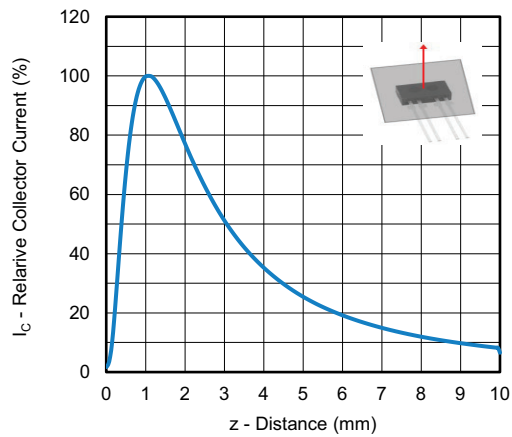


Fig. 7 - Collector Current vs. Distance

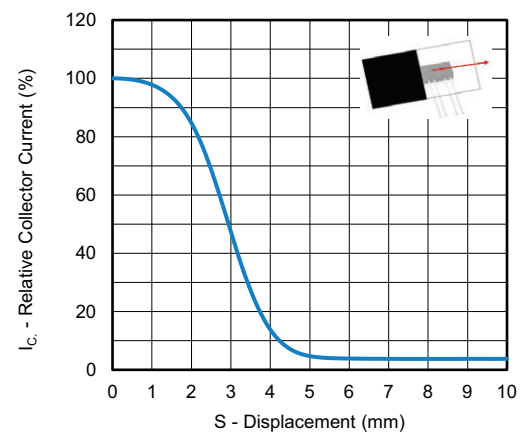
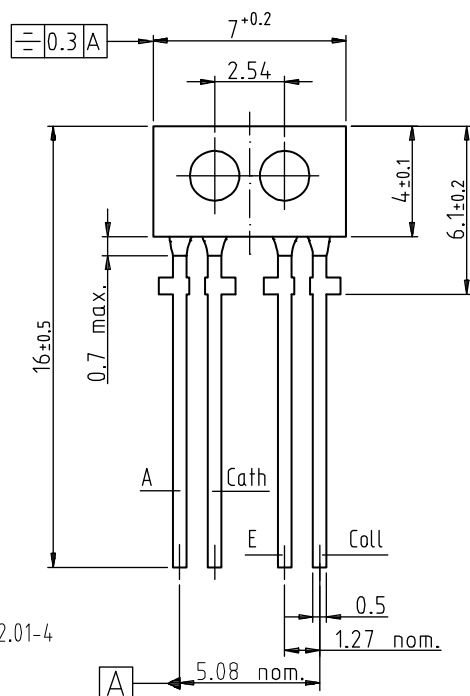
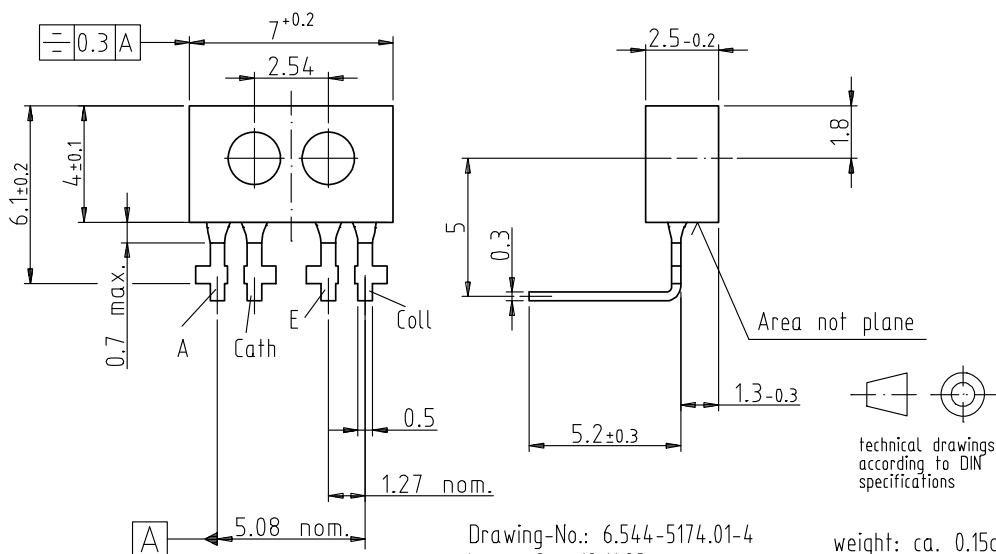


Fig. 8 - Relative Collector Current vs. Displacement

**PACKAGE DIMENSIONS** in millimeters


Drawing-No.: 6.544-5162.01-4  
Issue: 2; 10.11.98

14768



Drawing-No.: 6.544-5174.01-4  
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