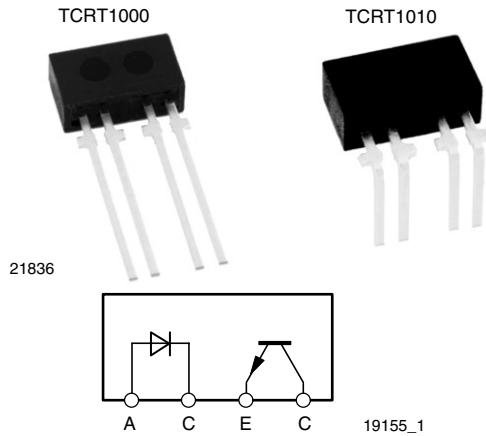


Reflective Optical Sensor with Transistor Output



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: $I_C = 0.5 \text{ mA}$
- 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 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_{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 transference ratio, I_{out}/I_{in}

(2) Conditions like in table basic characteristics/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 (1)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
SENSOR				
Total power dissipation	$T_{amb} \leq 25^\circ\text{C}$	P_{tot}	200	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	$^\circ\text{C}$
INPUT (EMITTER)				
Reverse voltage		V_R	5	V
Forward current		I_F	50	mA
Forward surge current	$t_p \leq 10 \mu\text{s}$	I_{FSM}	3	A
Power dissipation	$T_{amb} \leq 25^\circ\text{C}$	P_V	100	mW
Junction temperature		T_J	100	$^\circ\text{C}$

ABSOLUTE MAXIMUM RATINGS (1)				
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	$T_{amb} \leq 25\text{ }^\circ\text{C}$	P_V	100	mW
Junction temperature		T_j	100	$^\circ\text{C}$

Note

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

ABSOLUTE MAXIMUM RATINGS

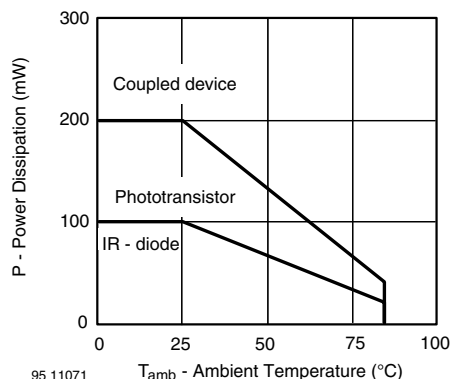


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

BASIC CHARACTERISTICS (1)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
SENSOR						
Collector current	$V_{CE} = 5\text{ V}$, $I_F = 20\text{ mA}$, $d = 1\text{ mm}$ (figure 2)	I_C (2)	0.3	0.5		mA
Cross talk current	$V_{CE} = 5\text{ V}$, $I_F = 20\text{ mA}$, (figure 1)	I_{CX} (3)			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} (2)			0.3	V
INPUT (EMITTER)						
Forward voltage	$I_F = 50\text{ mA}$	V_F		1.25	1.6	V
Radiant intensity	$I_F = 50\text{ mA}$, $t_p = 20\text{ ms}$	I_e			75	mW/sr
Peak wavelength	$I_F = 100\text{ mA}$	λ_P	940			nm
Virtual source diameter	Method: 63 % encircled energy	d		1.2		mm
OUTPUT (DETECTOR)						
Collector emitter voltage	$I_C = 1\text{ mA}$	V_{CEO}	32			V
Emitter collector voltage	$I_E = 100\text{ }\mu\text{A}$	V_{ECO}	5			V
Collector dark current	$V_{CE} = 20\text{ V}$, $I_F = 0\text{ A}$, $E = 0\text{ lx}$	I_{CEO}			200	nA

Notes

- (1) $T_{amb} = 25\text{ }^\circ\text{C}$, unless otherwise specified
- (2) Measured with the 'Kodak neutral test card', white side with 90 % diffuse reflectance
- (3) Measured without reflecting medium

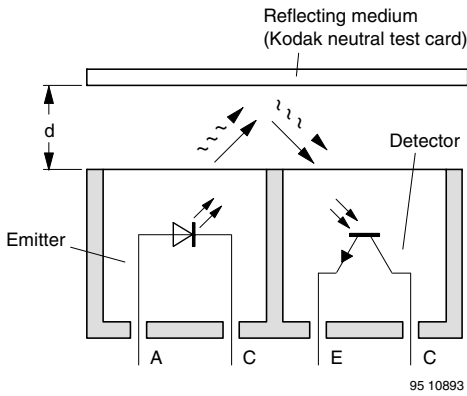


Fig. 2 - Test Condition

BASIC CHARACTERISTICS

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

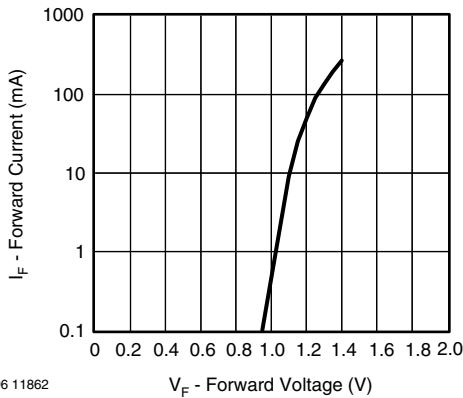


Fig. 3 - Forward Current vs. Forward Voltage

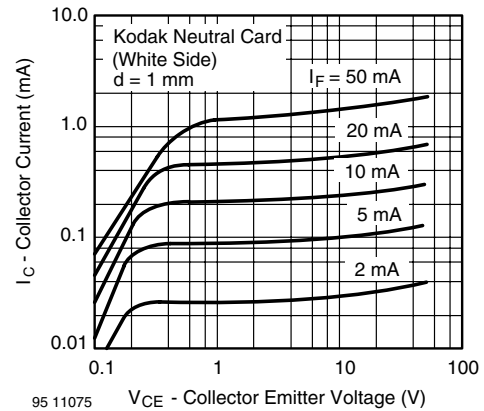


Fig. 5 - Collector Current vs. Collector Emitter Voltage

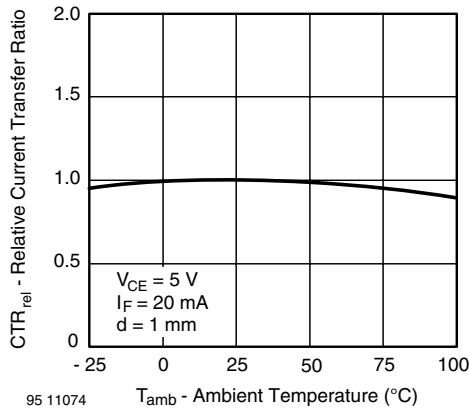


Fig. 4 - Relative Current Transfer Ratio vs. Ambient Temperature

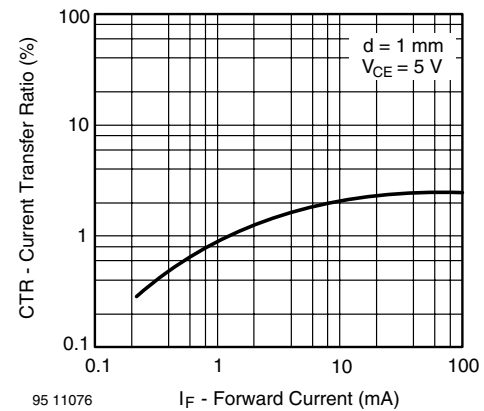


Fig. 6 - Current Transfer Ratio vs. Forward Current

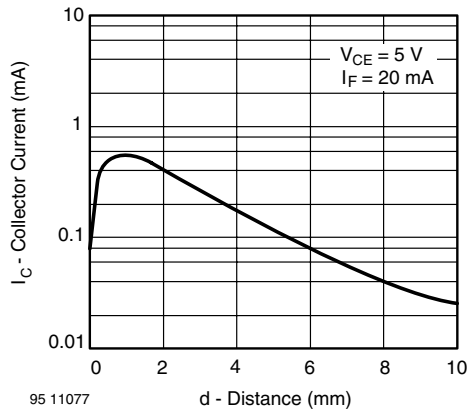


Fig. 7 - Collector Current vs. Distance

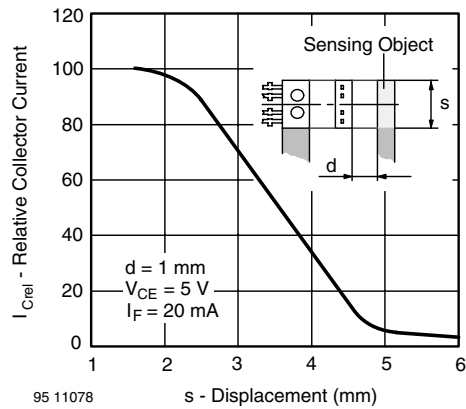
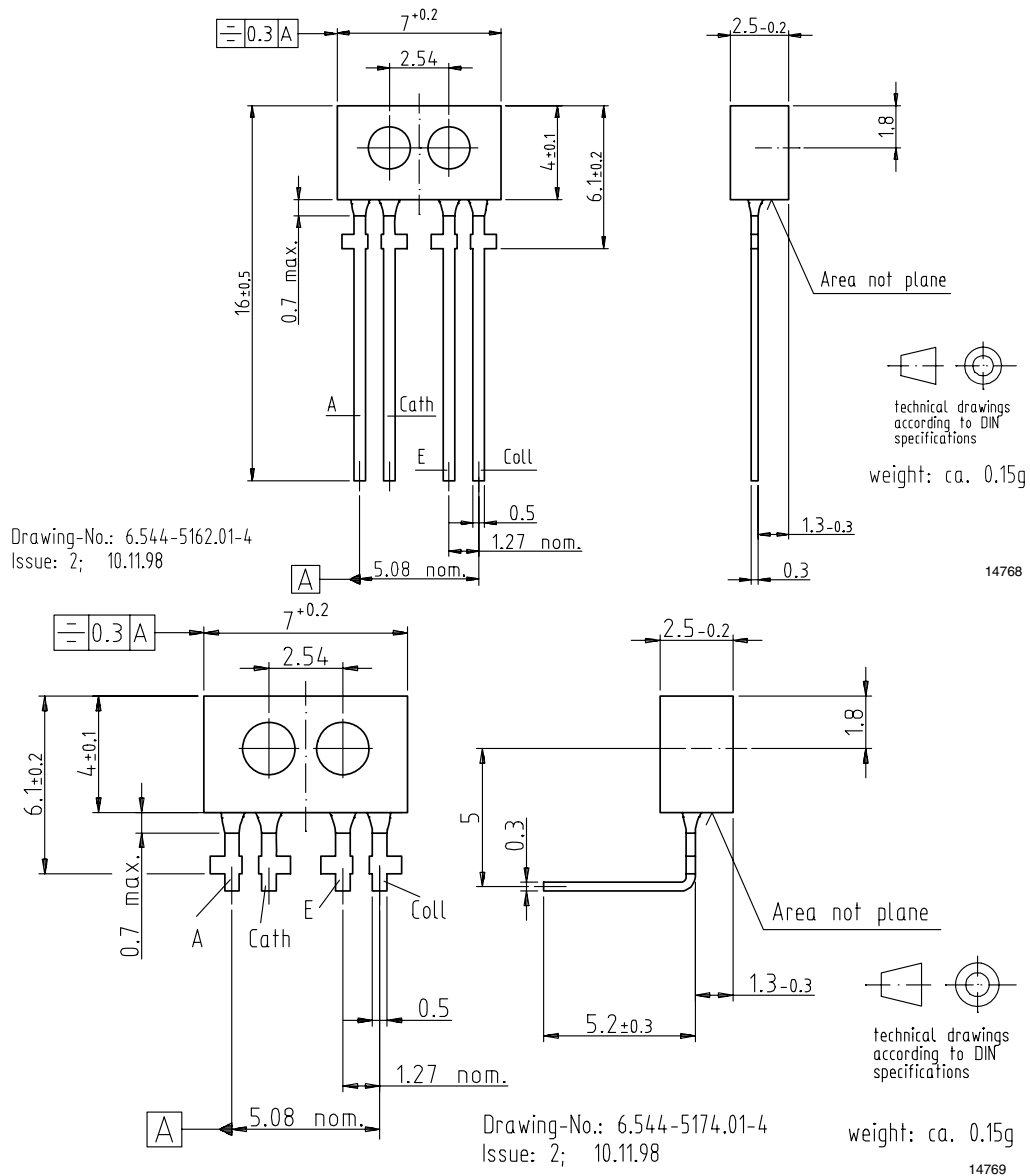


Fig. 8 - Relative Collector Current vs. Displacement

PACKAGE DIMENSIONS in millimeters





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