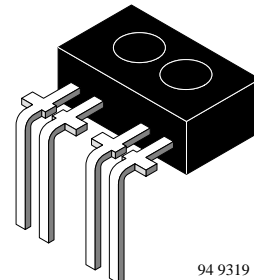
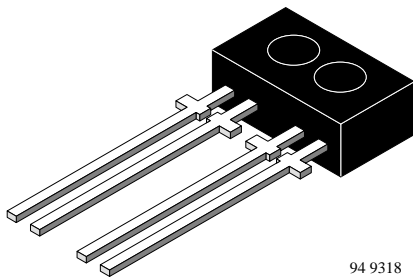


## Reflective Optosensor with Transistor Output

### Description

The TCRT1000/TCRT1010 have a compact construction where the emitting-light source and the detector are arranged in the same direction to sense the presence of an

object by using the reflective IR-beam from the object. The operating wavelength is 950 nm. The detector consists of a phototransistor.



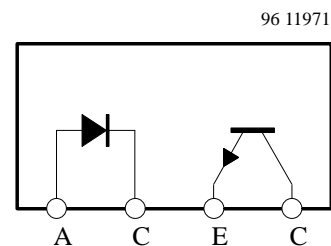
### Applications

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

### Features

- Compact construction in spacing of 0.1
- No setting efforts
- High signal outputs
- Low temperature coefficient
- Detector provided with optical filter

### Pin Connection



## Absolute Maximum Ratings

### Input (Emitter)

Parameters	Test Conditions	Symbol	Value	Unit
Reverse voltage		$V_R$	5	V
Forward current		$I_F$	50	mA
Forward surge current	$t_p \leq 10 \mu s$	$I_{FSM}$	3	A
Power dissipation	$T_{amb} \leq 25^\circ C$	$P_v$	100	mW
Junction temperature		$T_j$	100	$^\circ C$

### Output (Detector)

Parameters	Test Conditions	Symbol	Value	Unit
Collector emitter voltage		$V_{CEO}$	32	V
Emitter collector voltage		$V_{ECO}$	5	V
Collector current		$I_C$	50	mA
Power dissipation	$T_{amb} \leq 25^\circ C$	$P_v$	100	mW
Junction temperature		$T_j$	100	$^\circ C$

### Coupler

Parameters	Test Conditions	Symbol	Value	Unit
Total power dissipation	$T_{amb} \leq 25^\circ C$	$P_{tot}$	200	mW
Ambient temperature range		$T_{amb}$	-55 to +85	$^\circ C$
Storage temperature range		$T_{stg}$	-55 to +100	$^\circ C$
Soldering temperature	2 mm from case, $t \leq 5$ s	$T_{sd}$	260	$^\circ C$

## Electrical Characteristics

$T_{amb} = 25^{\circ}\text{C}$

### Input (Emitter)

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Forward voltage	$I_F = 50 \text{ mA}$	$V_F$		1.25	1.6	V
Breakdown voltage	$I_R = 100 \mu\text{A}$	$V_{(BR)}$	5			V

### Output (Detector)

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector emitter breakdown voltage	$I_C = 1 \text{ mA}$	$V_{(BR)CEO}$	32			V
Emitter collector breakdown voltage	$I_E = 100 \mu\text{A}$	$V_{(BR)ECO}$	5			V
Collector dark current	$V_{CE} = 20 \text{ V}, I_F = 0, E = 0$	$I_{CEO}$			200	nA

### Coupler

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector current	$V_{CE} = 5 \text{ V}, I_F = 20 \text{ mA}, d = 1 \text{ mm}$ (figure 1)	$I_C$	0.3	0.5		mA
Cross talk current	$I_F = 20 \text{ mA}, V_{CE} = 5 \text{ V}$	$I_{CX}^{(2)}$			1	$\mu\text{A}$
Collector emitter saturation voltage	$I_F = 20 \text{ mA}, I_C = 0.1 \text{ mA}, d = 1 \text{ mm}$	$V_{CEsat}$			0.3	V

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

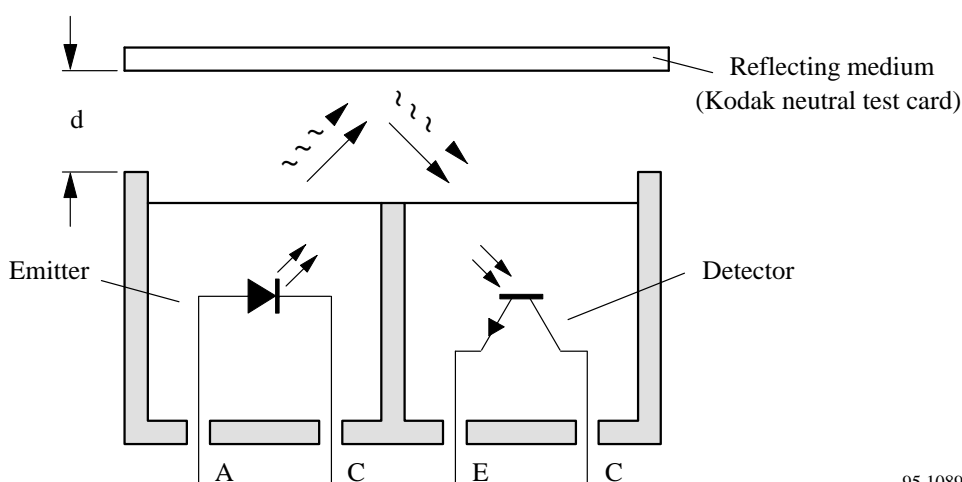


Figure 1. Test circuit

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

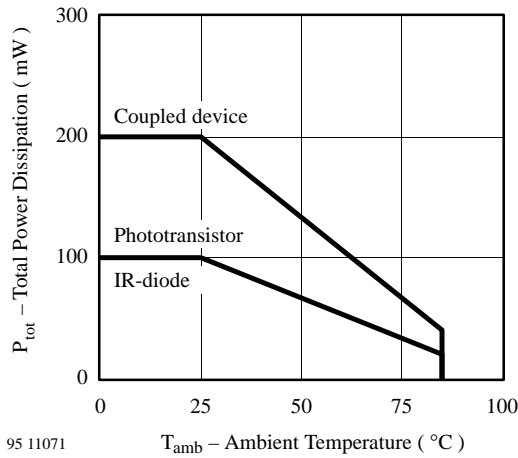


Figure 2. Total Power Dissipation vs. Ambient Temperature

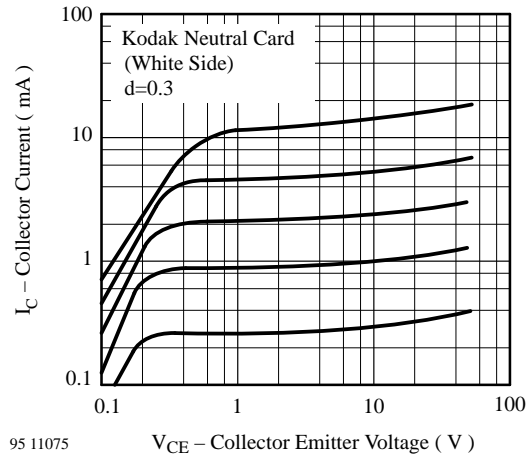


Figure 5. Collector Current vs. Collector Emitter Voltage

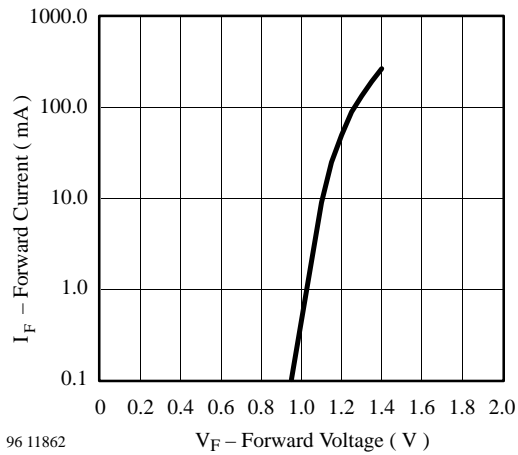


Figure 3. Forward Current vs. Forward Voltage

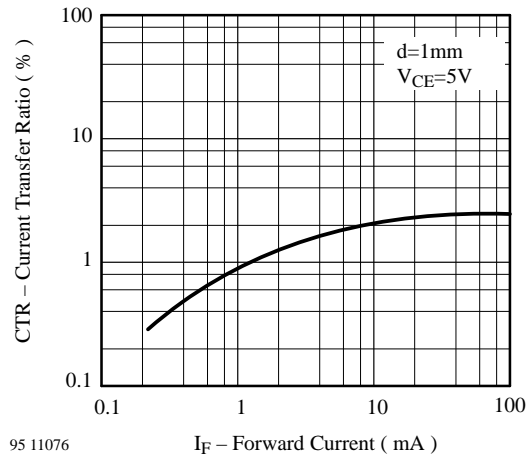


Figure 6. Current Transfer Ratio vs. Forward Current

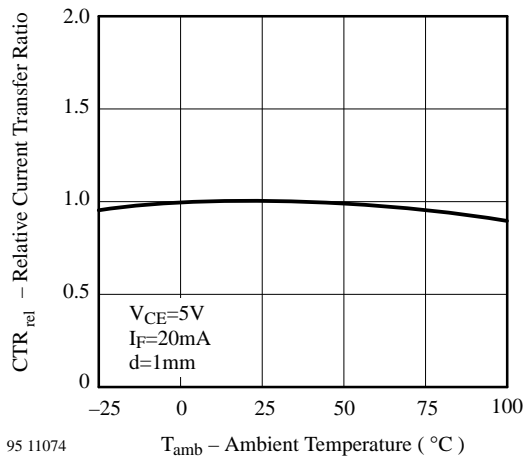


Figure 4. Rel. Current Transfer Ratio vs. Ambient Temperature

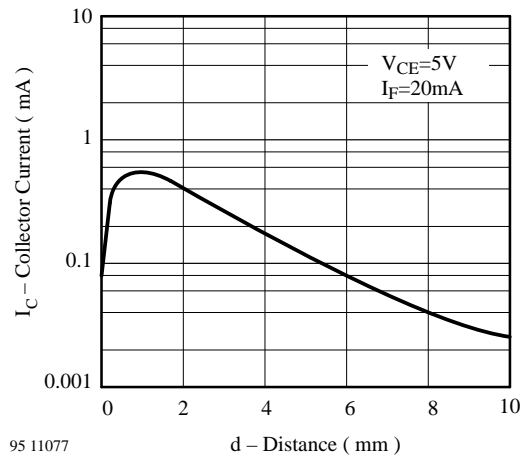


Figure 7. Collector Current vs. Distance

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

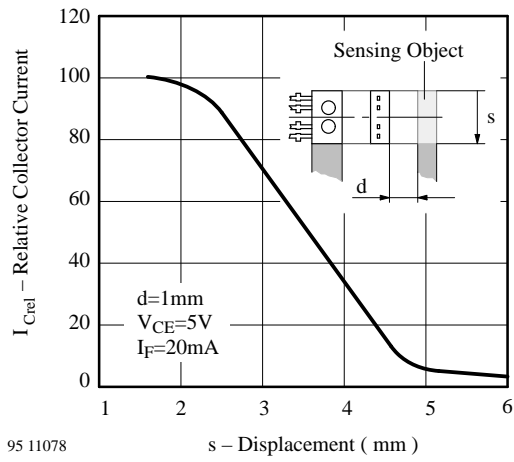
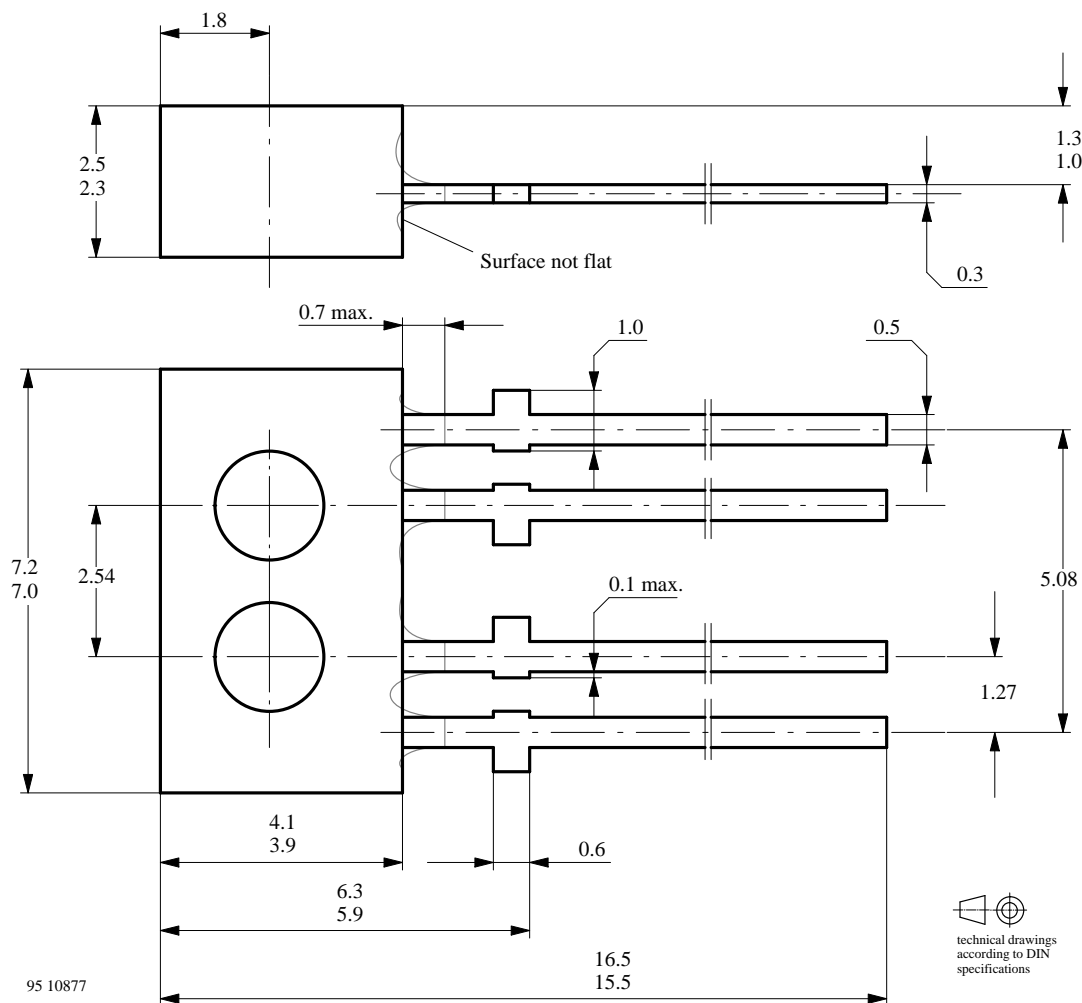
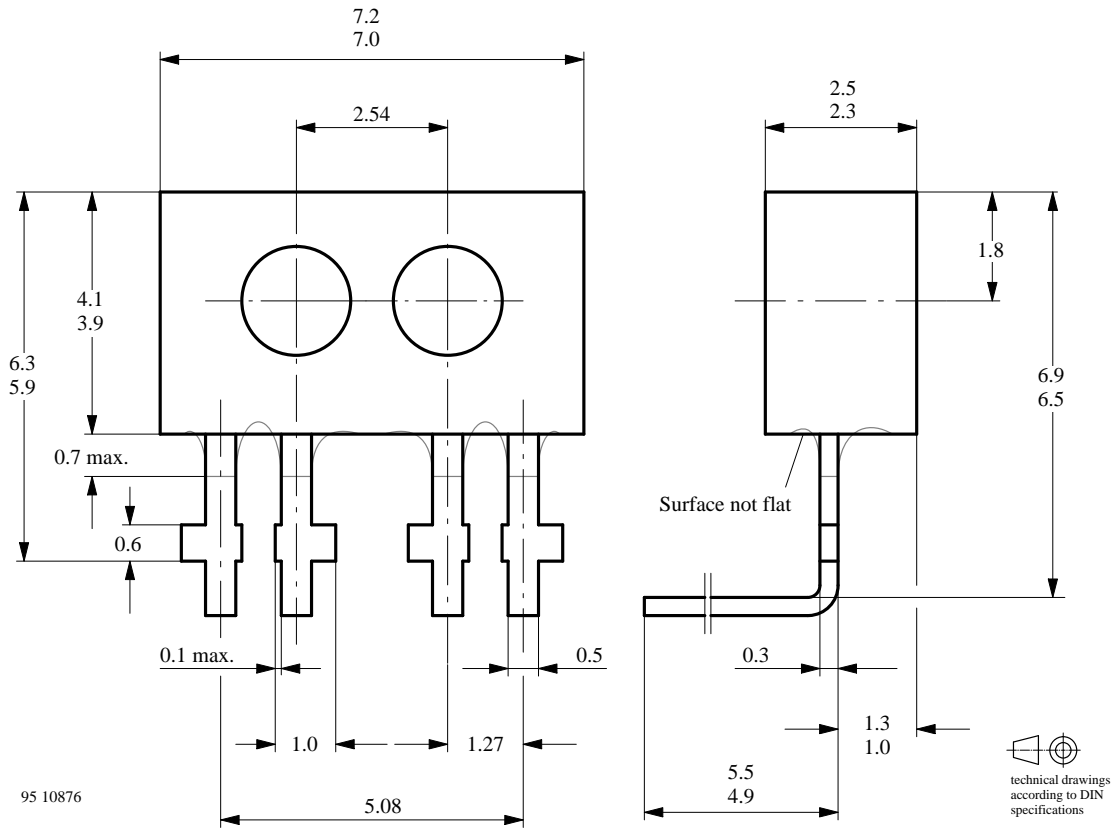


Figure 8. Relative Collector Current vs. Displacement

## Dimensions of TCRT1000 in mm



**Dimensions of TCRT1010 in mm**



## Ozone Depleting Substances Policy Statement

It is the policy of **TEMIC TELEFUNKEN microelectronic GmbH** to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

**TEMIC TELEFUNKEN microelectronic GmbH** semiconductor division has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

**TEMIC** can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

**We reserve the right to make changes to improve technical design and may do so without further notice.**

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use TEMIC products for any unintended or unauthorized application, the buyer shall indemnify TEMIC against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

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