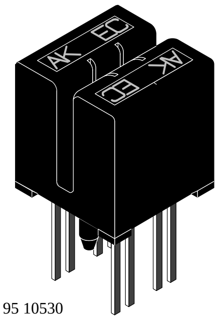
TEMIC
Semiconductors

TCVT1300

Dual Channel Transmissive Optical Sensor with Phototransistor Output

Description

This device has a compact construction where the emitting-light sources and the detectors are located face-to-face on the same optical axes. The operating wavelength is 950 nm. The detectors consists of a phototransistors. The distance of both channels is 2.66 mm.



95 10530

Applications

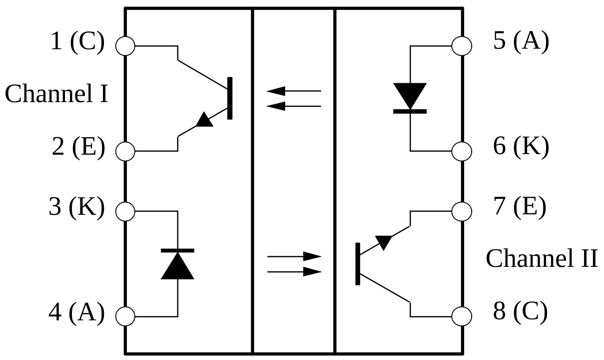
- Accurate position sensor for shaft encoder
- Detection of opaque material such as paper, IBM cards, magnetic tapes etc.
- Detection of motion direction

Features

- Gap 1.5 mm
- Package height: 10 mm
- Plastic polycarbonate housing
- Aperture 0.2 mm for both channels

Pin Connection

95 10789



Note: Thermal dot indicates channel 1

Absolute Maximum Ratings

Input (Emitter)

Parameters	Test Conditions	Symbol	Value	Unit
Reserve 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	$T_{amb} \leq 25°C$	P_v	100	mW
Junction temperature		T_j	100	°C

Output (Detector)

Parameters	Test Conditions	Symbol	Value	Unit
Collector emitter voltage		V_{CEO}	70	V
Emitter collector voltage		V_{ECO}	7	V
Collector current		I_C	50	mA
Power dissipation	$T_{amb} \leq 25°C$	P_v	100	mW
Junction temperature		T_j	100	°C

Coupler

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

Electrical Characteristics

T_{amb} = 25°C

Input (Emitter)

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Forward voltage	I_F = 30 mA	V_F		1.20	1.3	V
Breakdown voltage	I_R = 100 μA	$V_{(BR)}$	5			V
Junction capacitance	V_R = 0, f = 1 MHz	C_j		50		pF

Output (Detector)

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector emitter voltage	I_C = 1 mA	V_{CEO}	70			V
Emitter collector voltage	I_E = 100 μA	V_{ECO}	7			V
Collector dark current	V_{CE} = 25 V, I_F = 0, E = 0	I_{CEO}		10	200	nA

Coupler

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector current per channel	V_{CE} = 10 V, I_F = 30 mA	I_C	400		1300	μA
Collector emitter saturation voltage	I_F = 30 mA, I_C = 0.1 mA	V_{CEsat}			0.2	V
Crosstalk	I_{F1} = 0, I_{F2} = 30 mA, V_{CE} = 10 V	I_{CX1}			15	μA
	I_{F1} = 30 MA, I_{F2} = 0, V_{CE} = 10 V	I_{CX2}			15	μA
Phase angle	(see figure 1)	Phi		90		°

Test Circuit

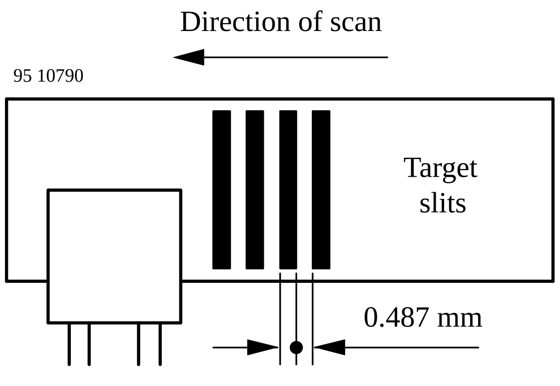


Figure 1. Phase angle measurement

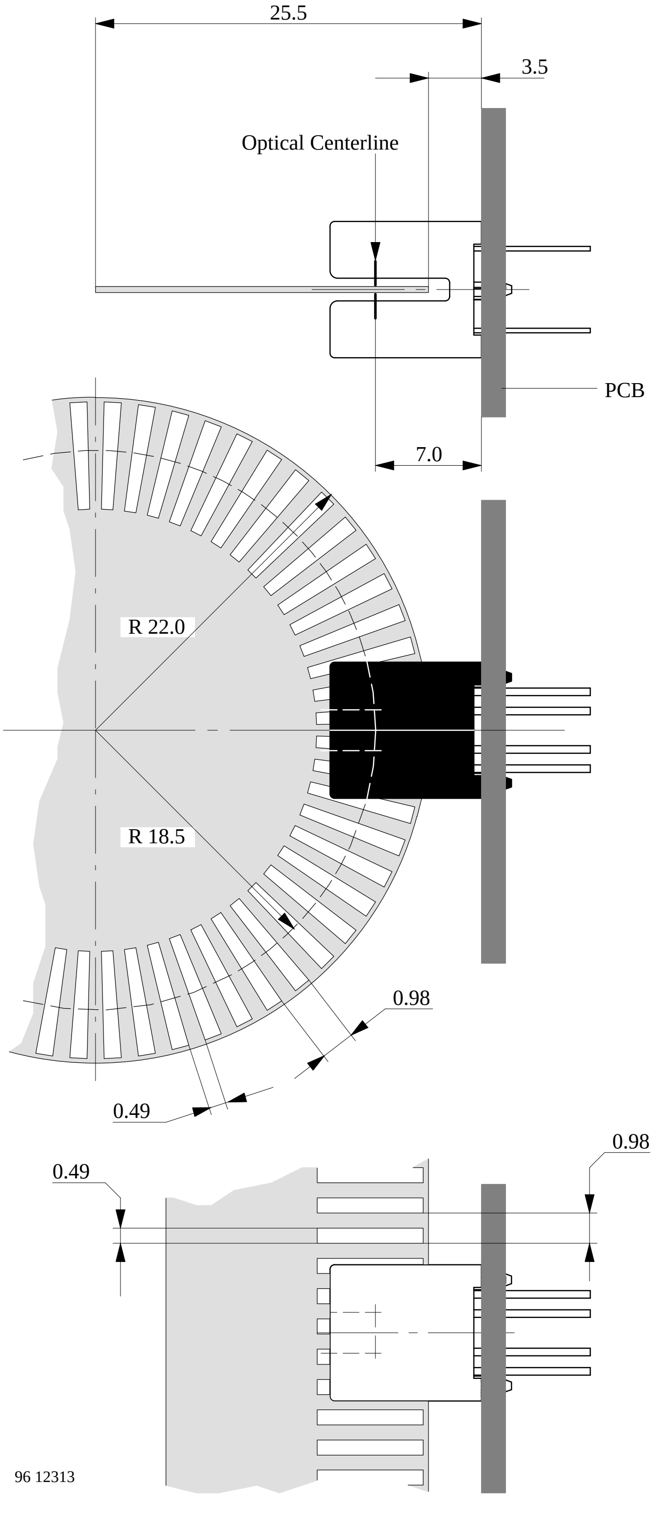

25.5
3.5
Optical Centerline
PCB
7.0
R 22.0
R 18.5
0.98
0.49
0.98
0.49
96 12313

Figure 2.

Typical Characteristics (T_{amb} = 25°C, unless otherwise specified)

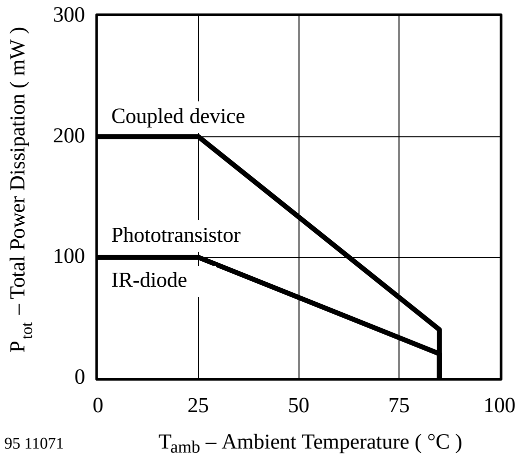


Figure 3. Total Power Dissipation vs. Ambient Temperature

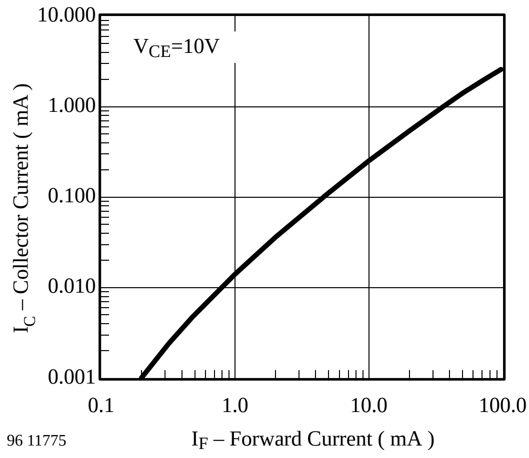


Figure 6. Collector Current vs. Forward Current

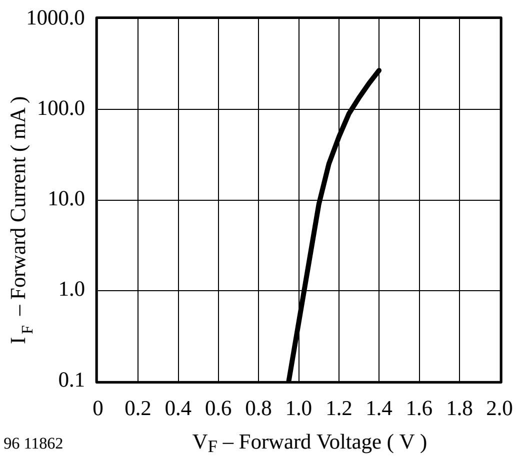


Figure 4. Forward Current vs. Forward Voltage

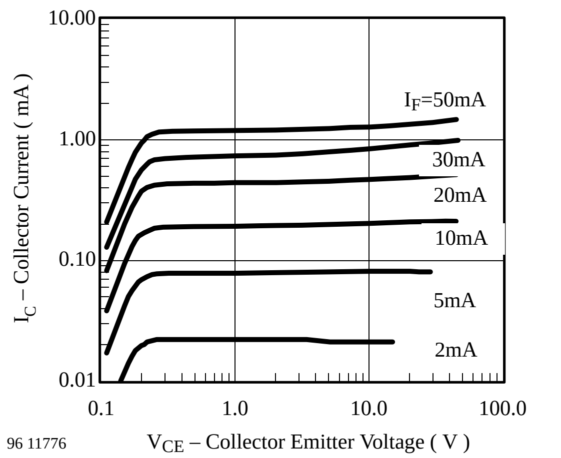


Figure 7. Collector Current vs. Collector Emitter Voltage

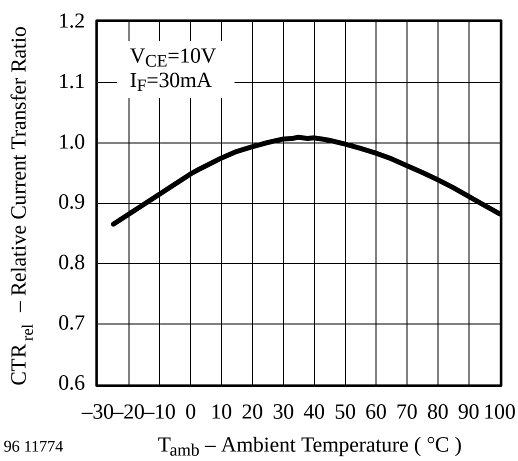


Figure 5. Rel. Current Transfer Ratio vs. Ambient Temperature

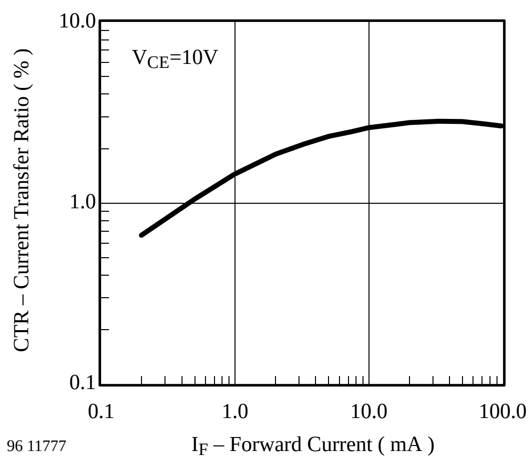
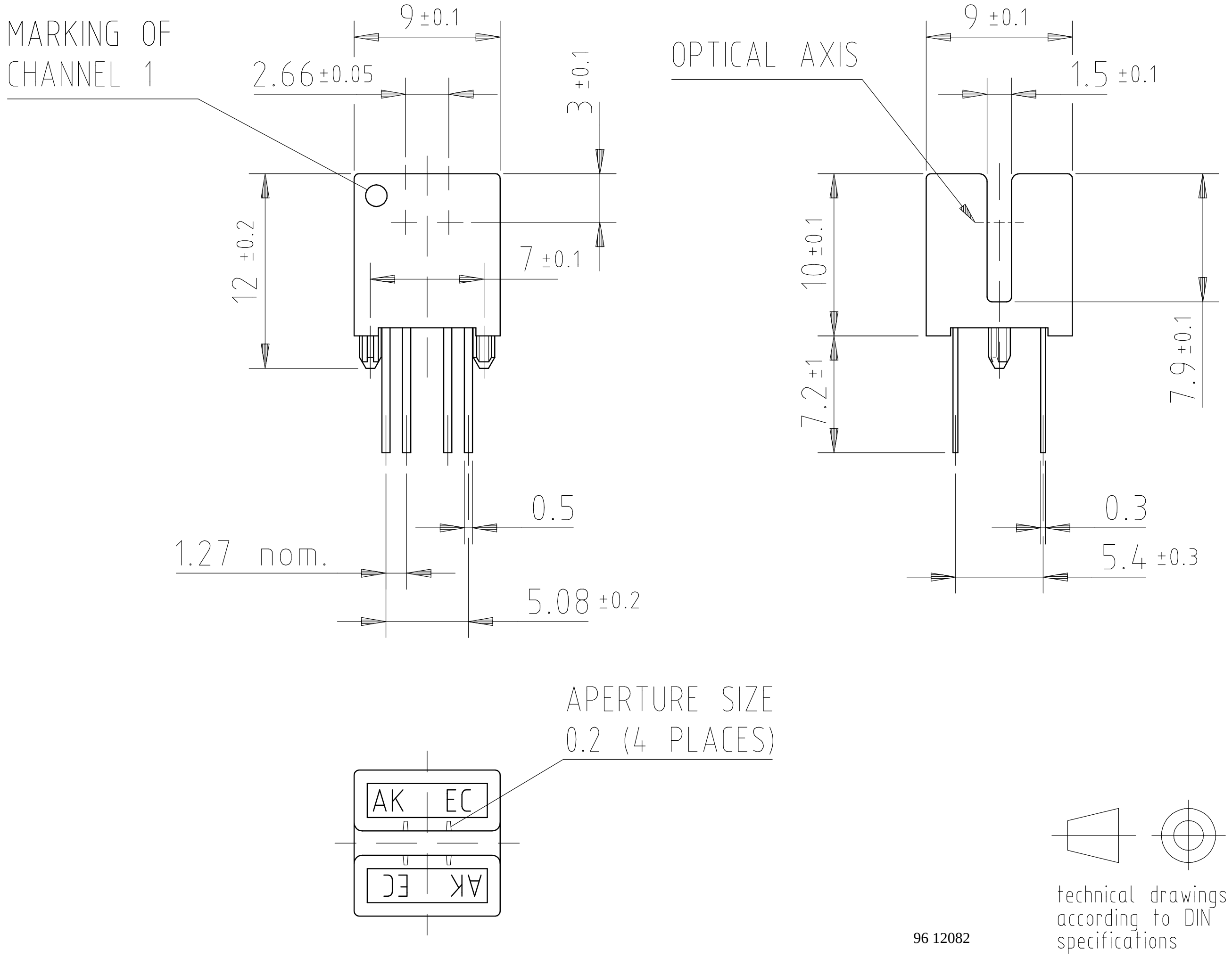


Figure 8. Current Transfer Ratio vs. Forward Current

Dimensions 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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