

Tracker Sensor TCRT5000 Linienfolger Modul Datenblatt



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1. Features

- Package type: leaded
- Detector type: phototransistor
- Dimensions (L x W x H in mm): 10.2 x 5.8 x 7
- Peak operating distance: 2.5 mm
- Operating range within > 20 % relative collector current: 0.2 mm to 15 mm
- Typical output current under test: $I_C = 1 \text{ mA}$
- 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



2. Description

The TCRT5000 and TCRT5000L are reflective sensors which include an infrared emitter and phototransistor in a leaded package which blocks visible light.

3. Applications

- Position sensor for shaft encoder
- Detection of reflective material such as paper, IBM cards, magnetic tapes etc.
- Limit switch for mechanical motions in VCR
- General purpose - wherever the space is limited

4. 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
TCRT5000	2.5	0.2 to 15	1	Yes
TCRT5000L	2.5	0.2 to 15	1	Yes

Notes

(1) CTR: current transfere ratio, I_{out}/I_{in}

(2) Conditions like in table basic charactristics/sensors

5. Absolute Maximum Ratings

Absoulte Maximum Ratings ⁽¹⁾

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT (EMITTER)				
Reverse voltage		V _R	5	V
Forward current		I _F	60	mA
Forward surge current	t _p ≤ 10 μs	I _{FSM}	3	A
Power dissipation	T _{amb} ≤ 25 °C	P _V	100	mW
Junction temperature		T _j	100	°C
Collector emitter voltage		V _{CEO}	70	V
Emitter collector voltage		V _{ECO}	5	V
Collector current		I _C	100	mA
Power dissipation	T _{amb} ≤ 55 °C	P _V	100	mW
Junction temperature		T _j	100	°C
SENSOR				
Total power dissipation	T _{amb} ≤ 25 °C	P _{tot}	200	mW
Ambient temperature range		T _{amb}	- 25 to + 85	°C
Storage temperature range		T _{stg}	- 25 to + 100	°C
Soldering temperature	2 mm from case, t ≤ 10 s	T _{sd}	260	°C

Note

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

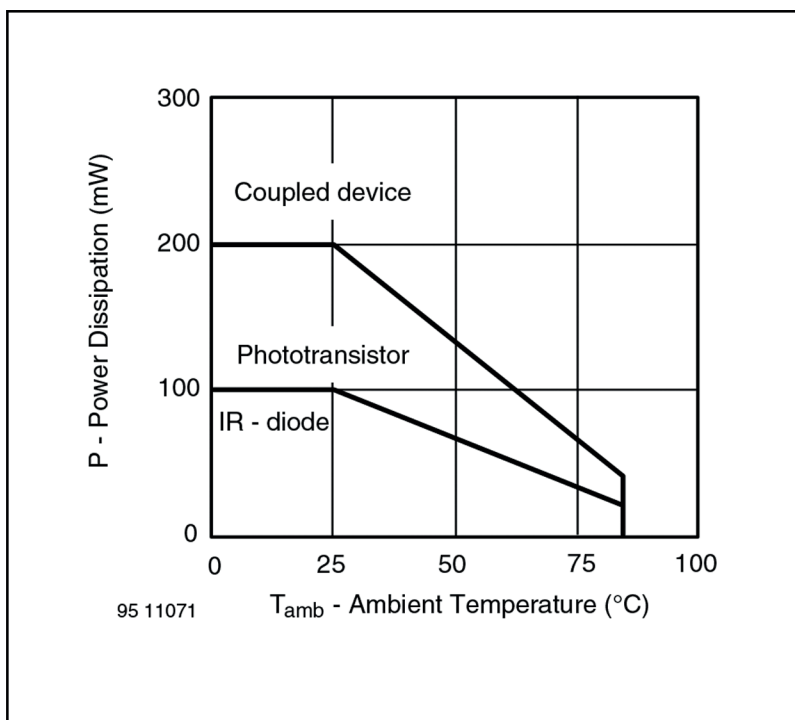


Figure 1 - Power Dissipation Limit vs. Ambient Temperature

6. Basic Characteristics

Basic Characteristics ⁽¹⁾

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT (EMITTER)						
Forward voltage	$I_F = 60 \text{ mA}$	V_F		1.25	1.5	V
Junction capacitance	$V_R = 0 \text{ V}$, $f = 1 \text{ MHz}$	C_j		17		pF
Radiant intensity	$I_F = 60 \text{ mA}$, $t_p = 20 \text{ ms}$	I_e			21	mW/sr
Peak wavelength	$I_F = 100 \text{ mA}$	λ_P	940			nm
Virtual source diameter	Method: 63 % encircled energy	d		2.1		mm
OUTPUT (DETECTOR)						
Collector emitter voltage	$I_C = 1 \text{ mA}$	V_{CEO}	70			V
Emitter collector voltage	$I_e = 100 \text{ }\mu\text{A}$	V_{ECO}	7			V
Collector dark current	$V_{CE} = 20 \text{ V}$, $I_F = 0 \text{ A}$, $E = 0 \text{ lx}$	I_{CEO}		10	200	nA
SENSOR						
Collector current	$V_{CE} = 5 \text{ V}$, $I_F = 10 \text{ mA}$, $D = 12 \text{ mm}$	$I_C^{(2)(3)}$	0.5	1	2.1	mA
Collector emitter saturation voltage	$I_F = 10 \text{ mA}$, $I_C = 0.1 \text{ mA}$, $D = 12 \text{ mm}$	$V_{CEsat}^{(2)(3)}$			0.4	V

Note

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

(2) See figure 3

(3) Test surface: mirror (Mfr. Spindler a. Hoyer, Part No. 340005)

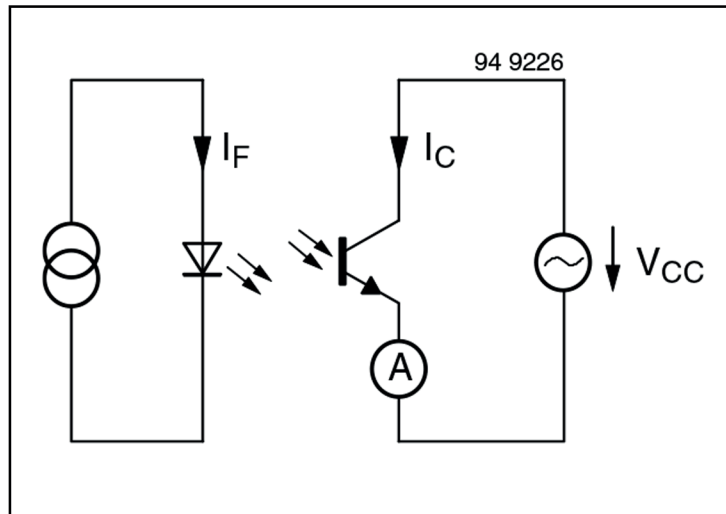


Figure 2 - Test Circuit

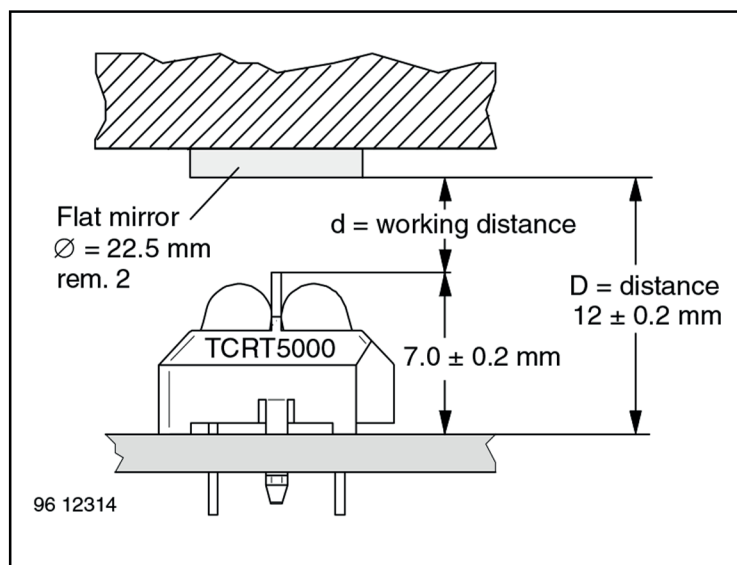


Figure 3 - Test Circuit

Basic Characteristics

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

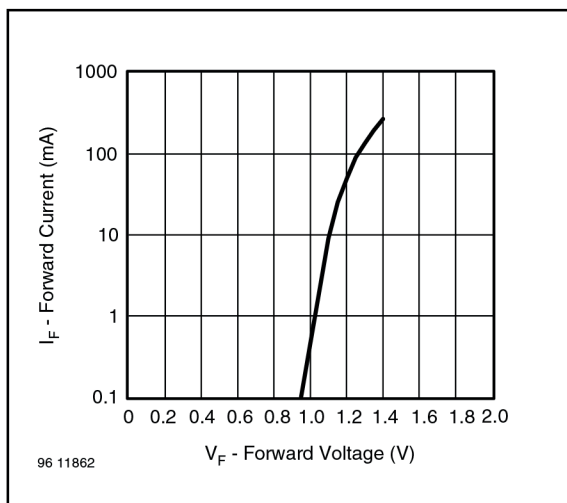


Figure 4 - Forward Current vs. Forward Voltage

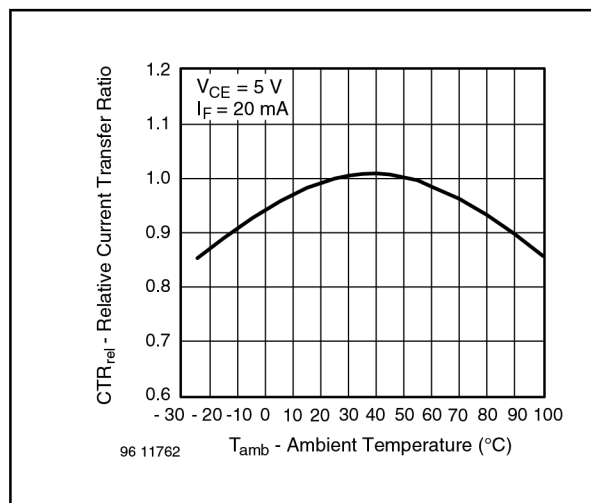


Figure 5 - Relative Current Transfer Ratio vs. Ambient Temperature

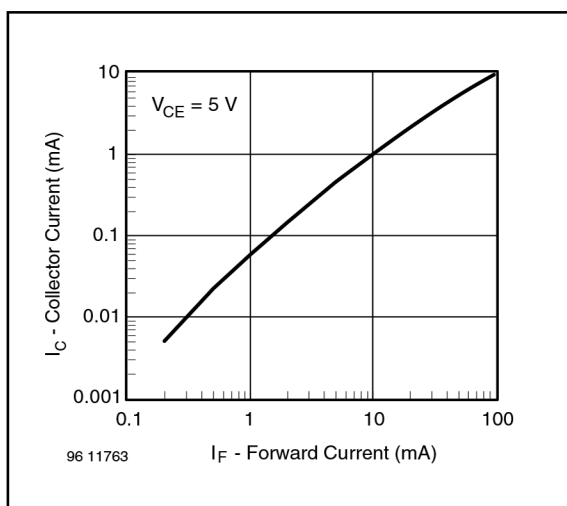


Figure 6 - Collector Current vs. Forward Current

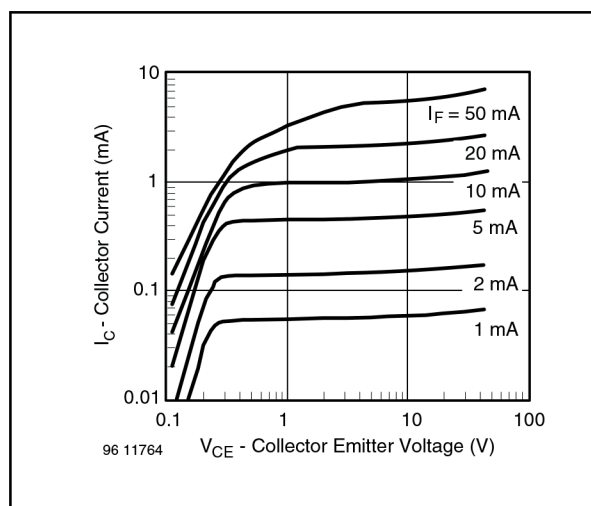


Figure 7 - Collector Emitter Saturation Voltage vs. Collector Current

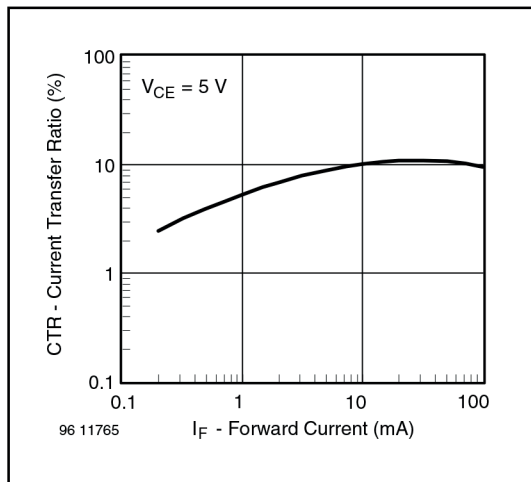


Figure 8 - Current Transfer Ratio vs. Forward Current

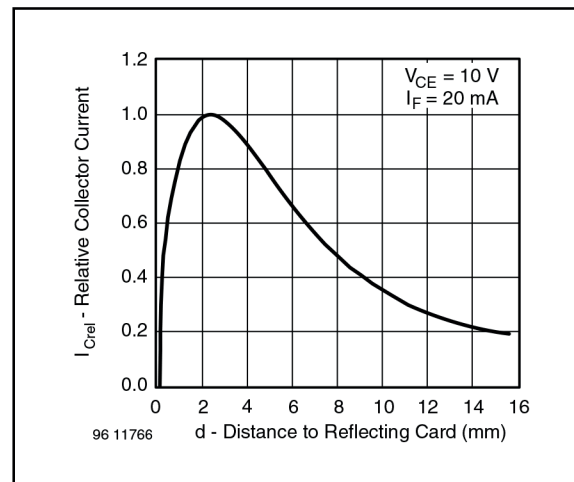
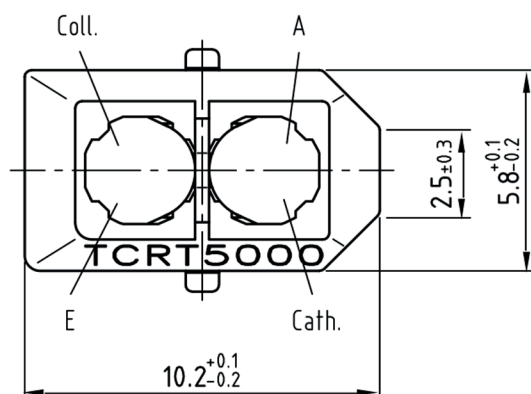
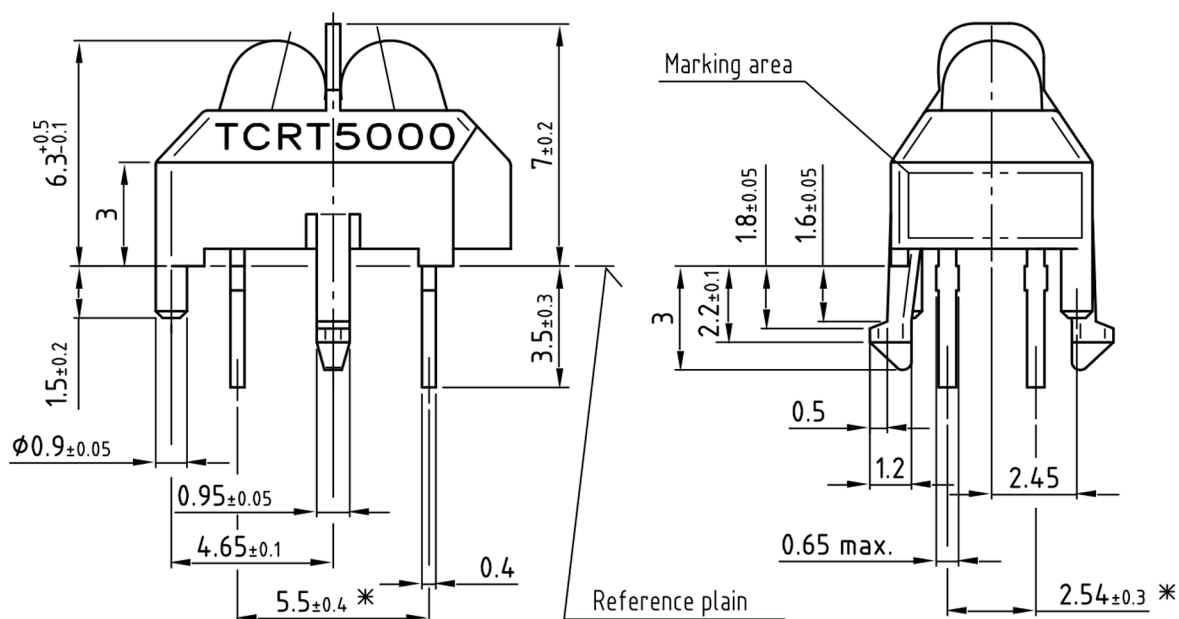


Figure 9 - Relative Collector Current vs. Distance

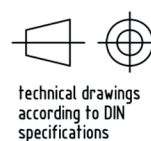
7. Dimensions

Dimensions in millimeters
TCRT5000

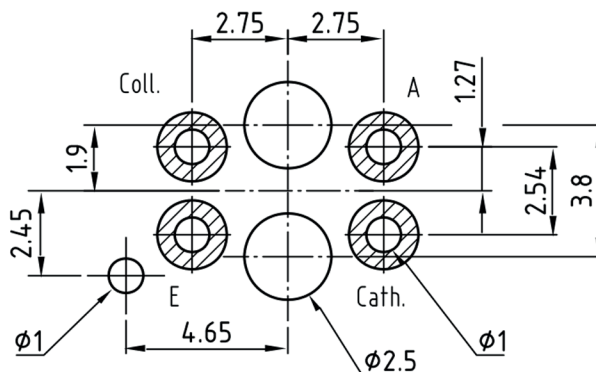


* Tolerances related to reference plain

weight: ca. 0.23g



Footprint Top View

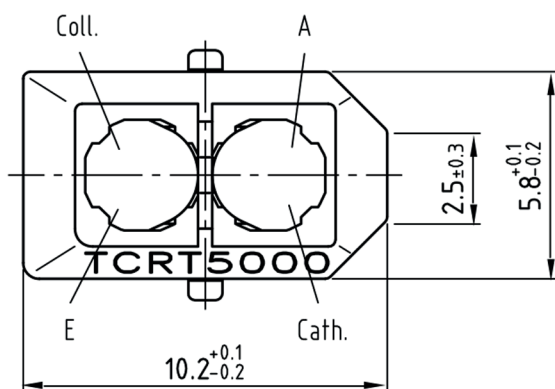
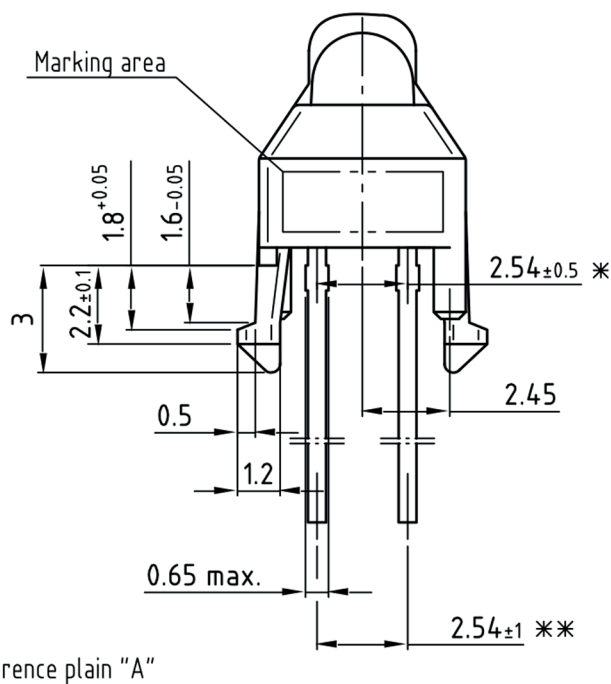
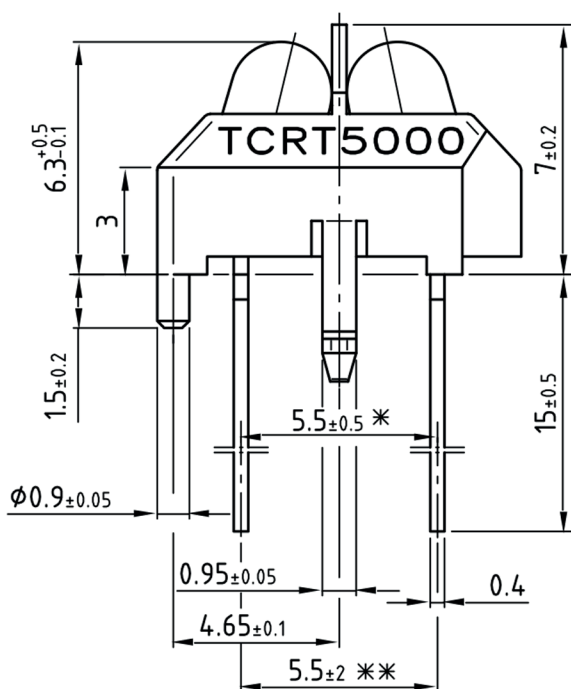


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Issue: 4; 11.04.02

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Dimensions in millimeters TCRT5000L



weight: ca. 0.23g

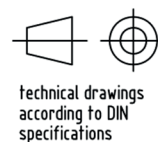
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Issue: 4; 11.04.02

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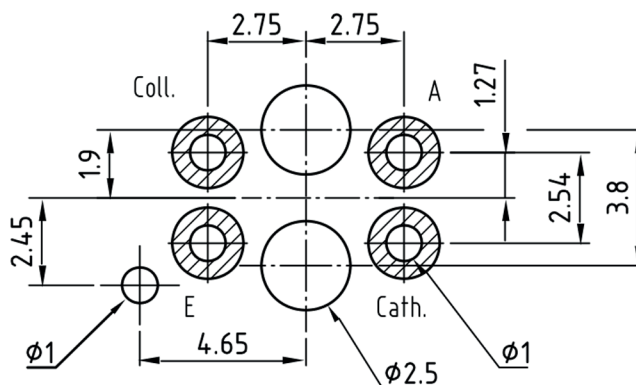
* Tolerances related to reference plain "A"

** Tolerances related on lead end

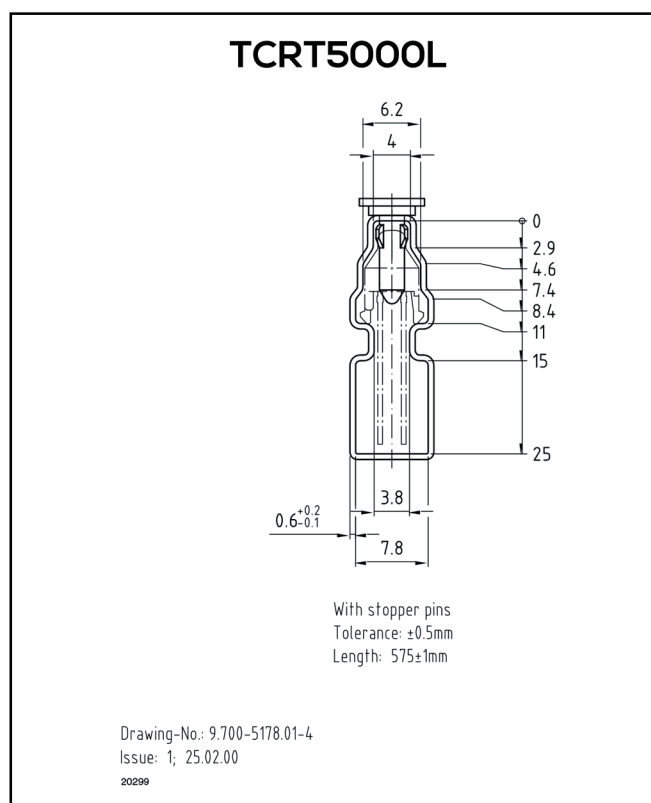
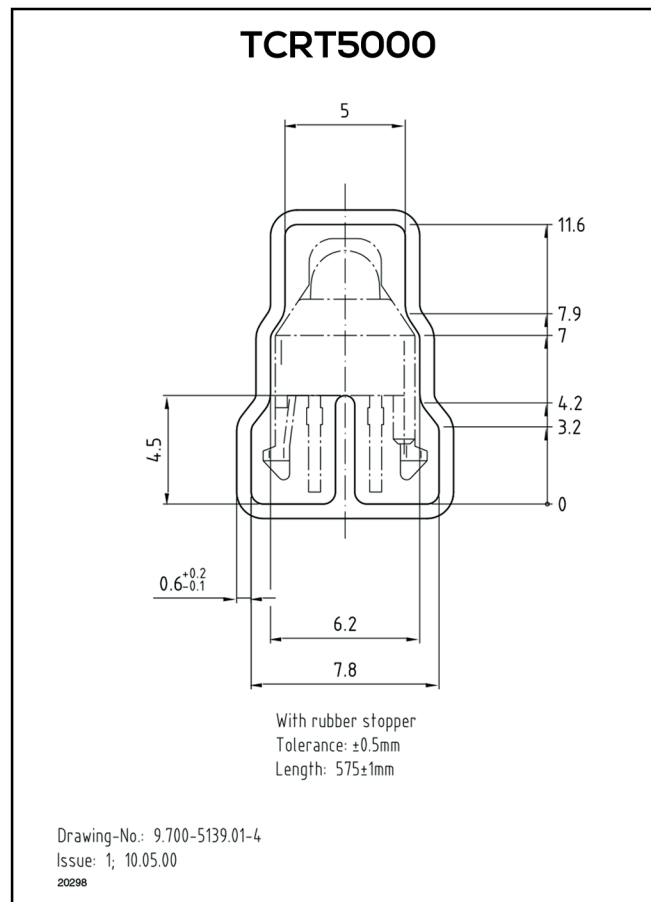


technical drawings according to DIN specifications

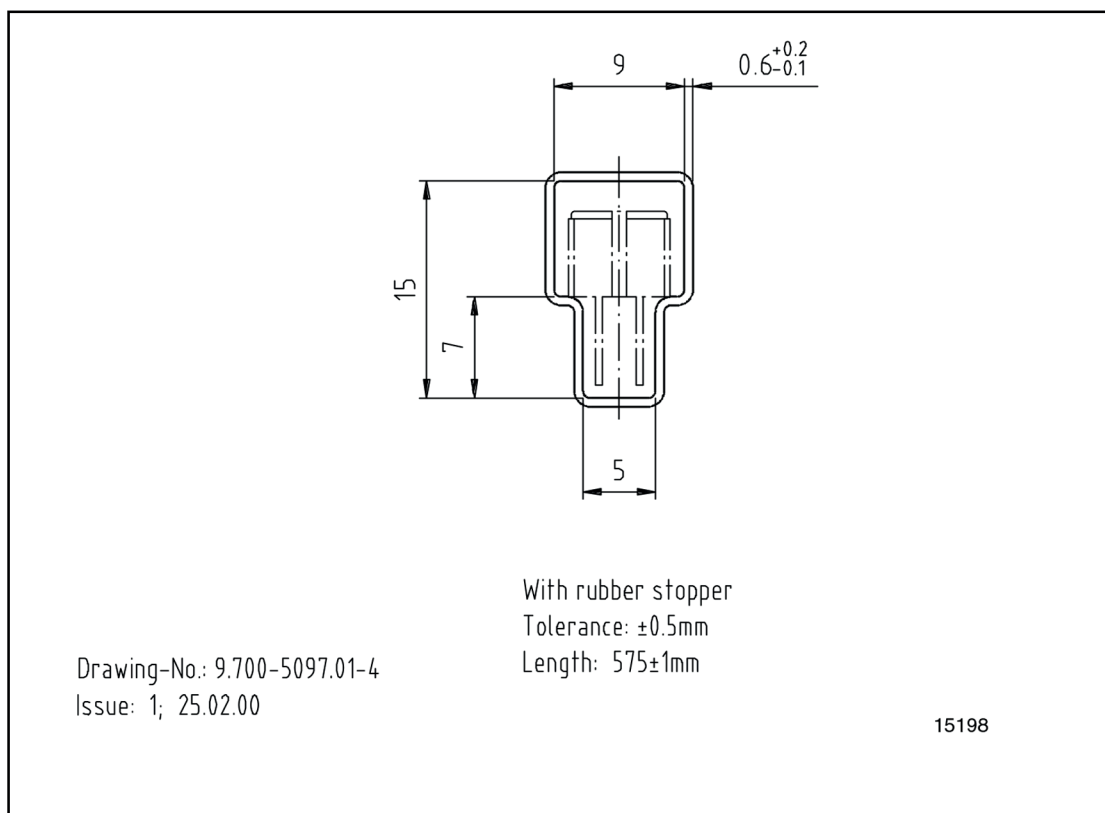
Footprint Top View



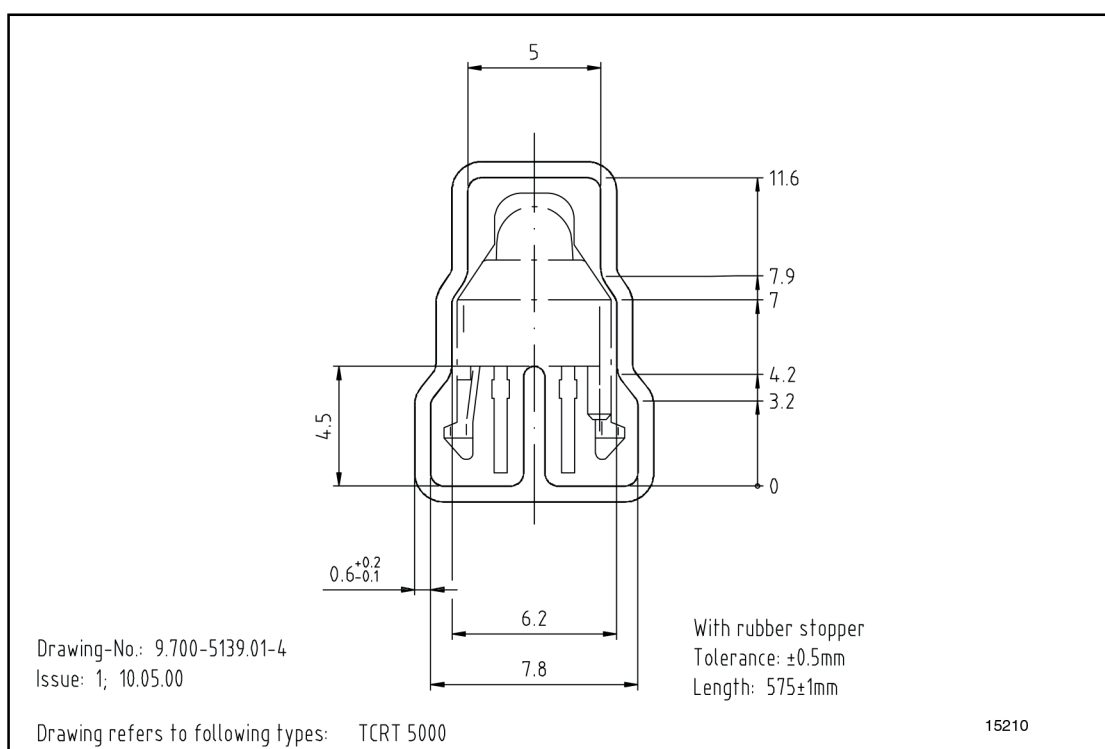
Tube dimensions in millimeters



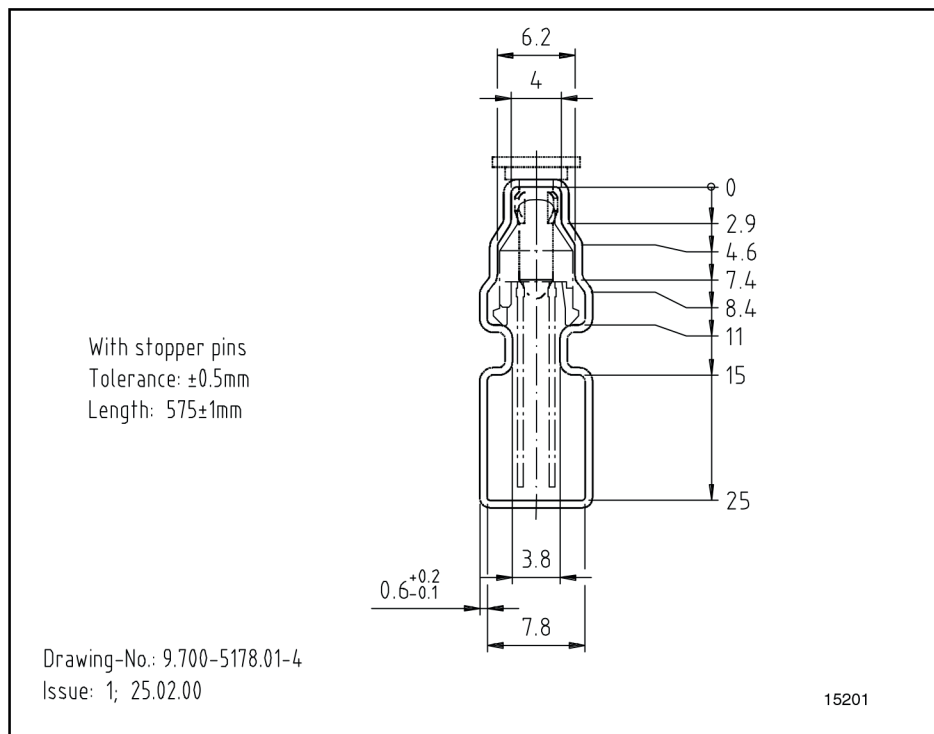
8. Tube Specification Figures



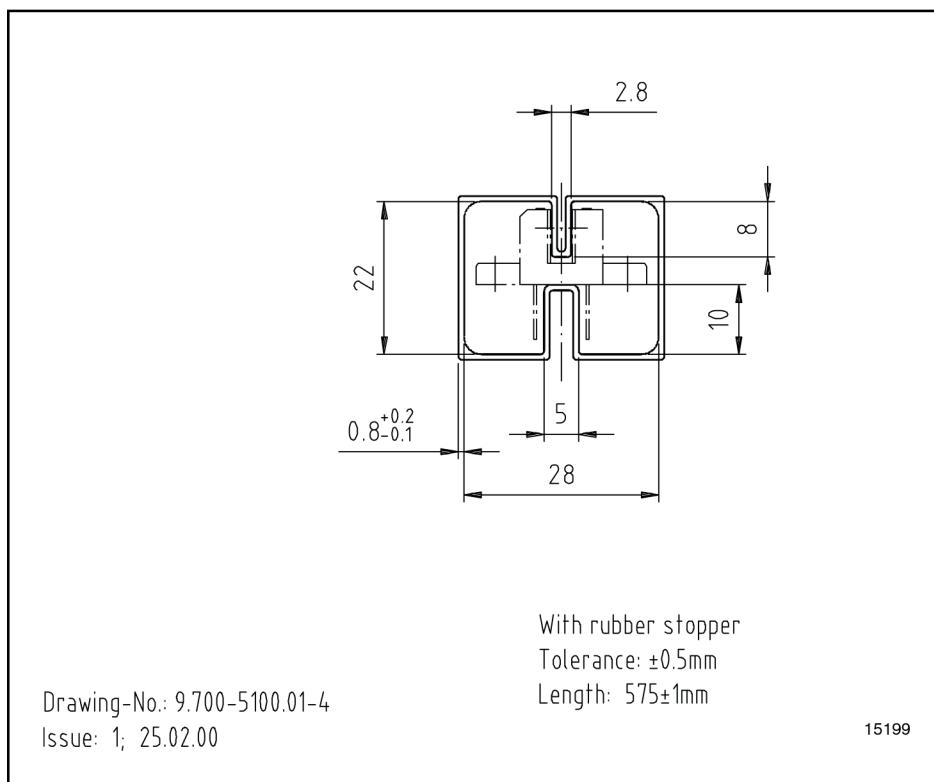
Tube Specification Figure 1



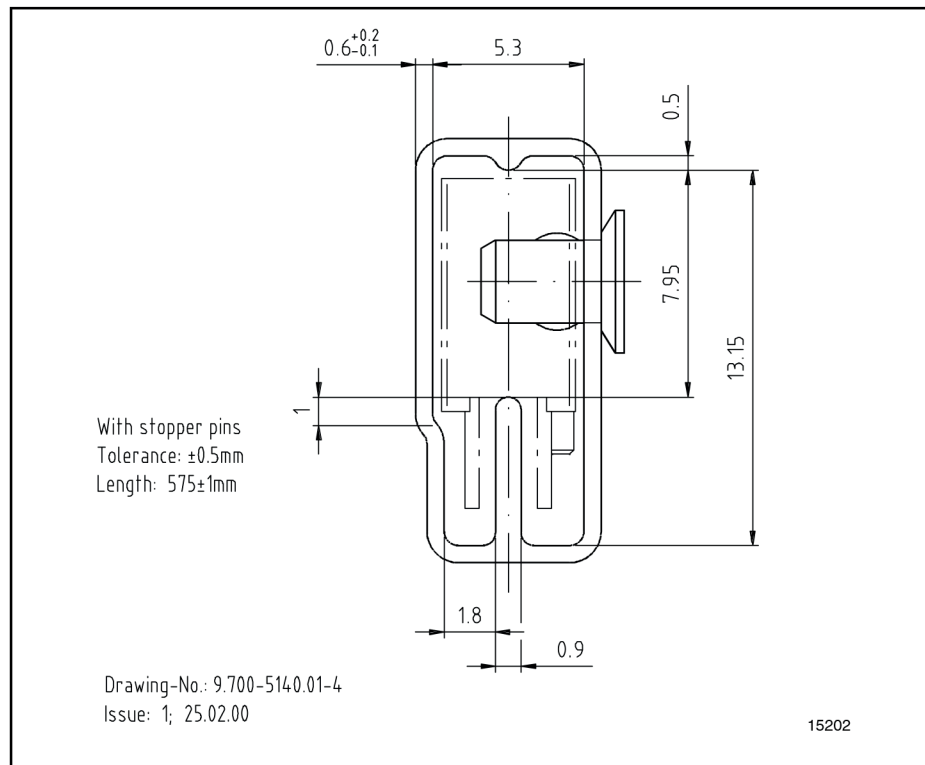
Tube Specification Figure 2



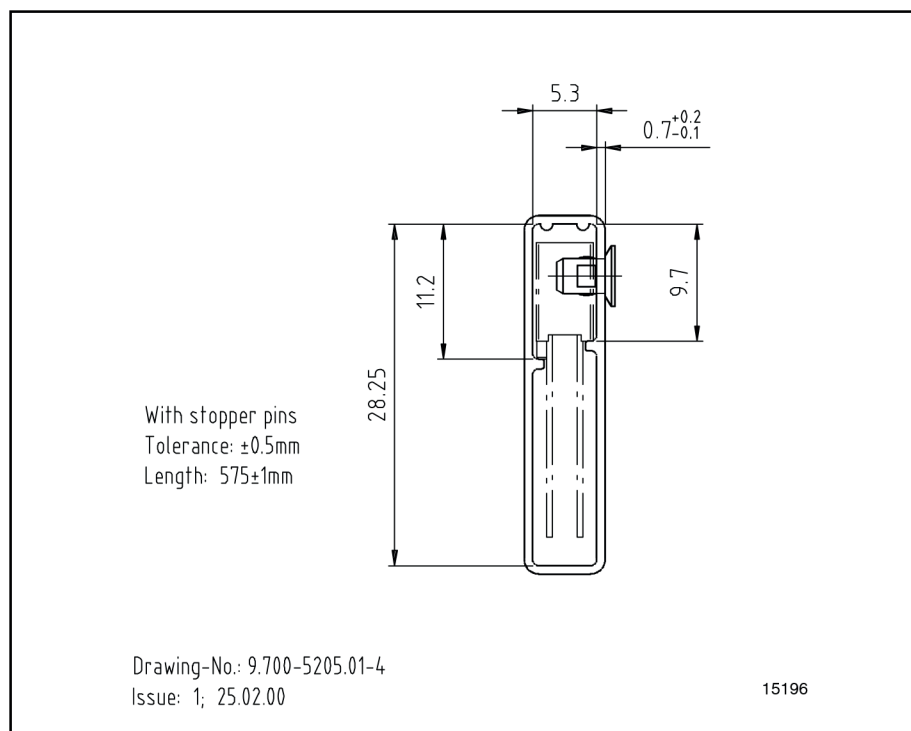
Tube Specification Figure 3



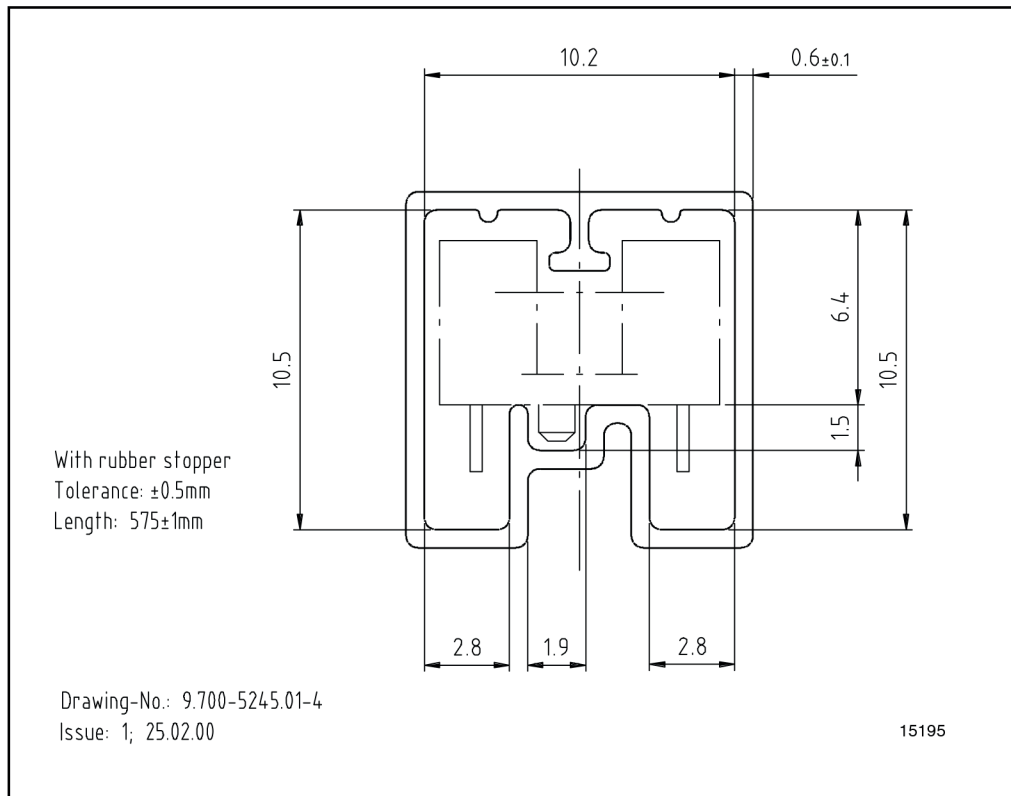
Tube Specification Figure 4



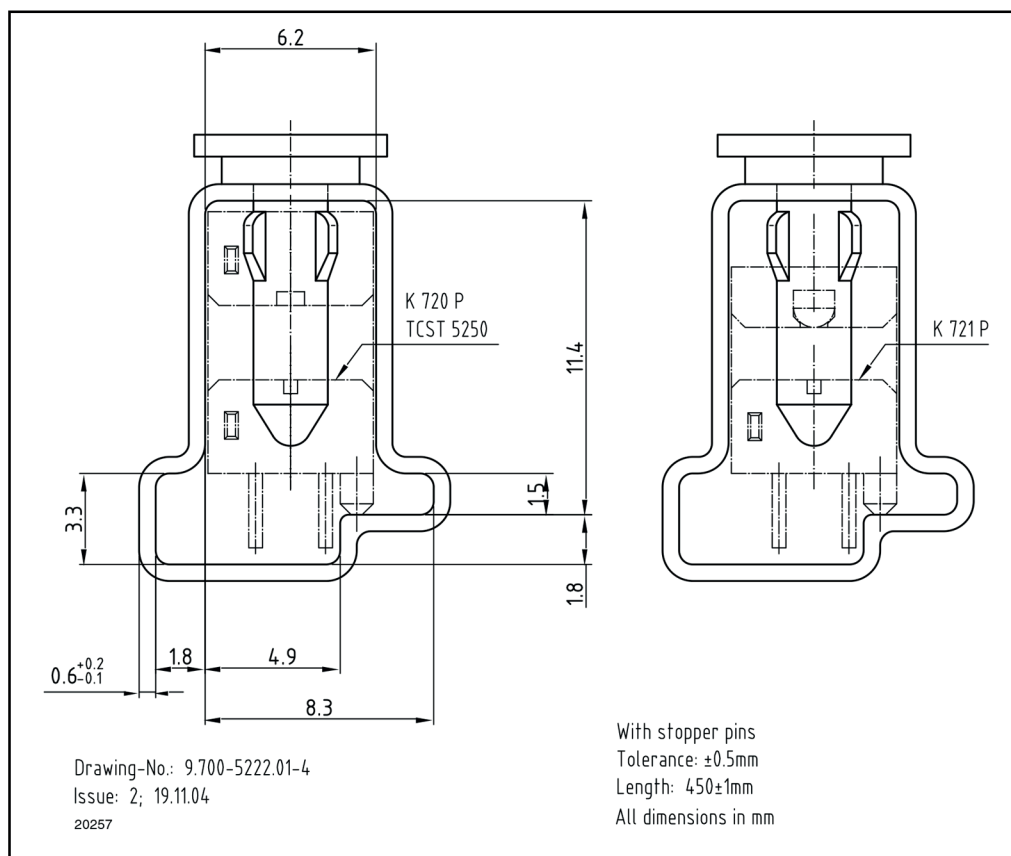
Tube Specification Figure 5



Tube Specification Figure 6



Tube Specification Figure 7



Tube Specification Figure 8

HW-006 1 way tracing module infrared tracking probe tracing sensor module for smart car

Product Parameters:

Size	36mm*10mm*11mm
Voltage	5V
Output form	Digital signal (0 and 1)
Detecting reflection distance	1mm~25mm
Weight	4.5g

The infrared emitting diode of the TCRT5000 sensor continuously emits infrared rays. When the emitted infrared rays are not reflected back or reflected back but the intensity is not large enough, the infrared receiving tube is always in the off state, and the output end of the module is low level, indicating The diode is always off; when the detected object appears in the detection range, the infrared light is reflected back and the intensity is large enough, and the infrared receiving tube is saturated. At this time, the output end of the module is high, indicating that the diode is illuminated.

Wiring:

1. VCC: Connect the positive pole of the power supply (5V)
- 2, GND: connected to the negative power supply
- 3, OUT: high / low level switching signal (digital signal 0 and 1)

Product details:

