AZ-Delivery
Ihr Experte für Mikroelektronik!

Tracker Sensor
TCRT5000 Linienfolger Modul
Datenblatt

Contents:

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: IC = 1 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, Iout/Iin

(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	$t_p \leq 10$ µs	I_{FSM}	3	A
Power dissipation	$T_{amb} \leq 25$ °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	$T_{amb} \leq 55$ °C	P_V	100	mW
Junction temperature		T_j	100	°C
SENSOR				
Total power dissipation	$T_{amb} \leq 25$ °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

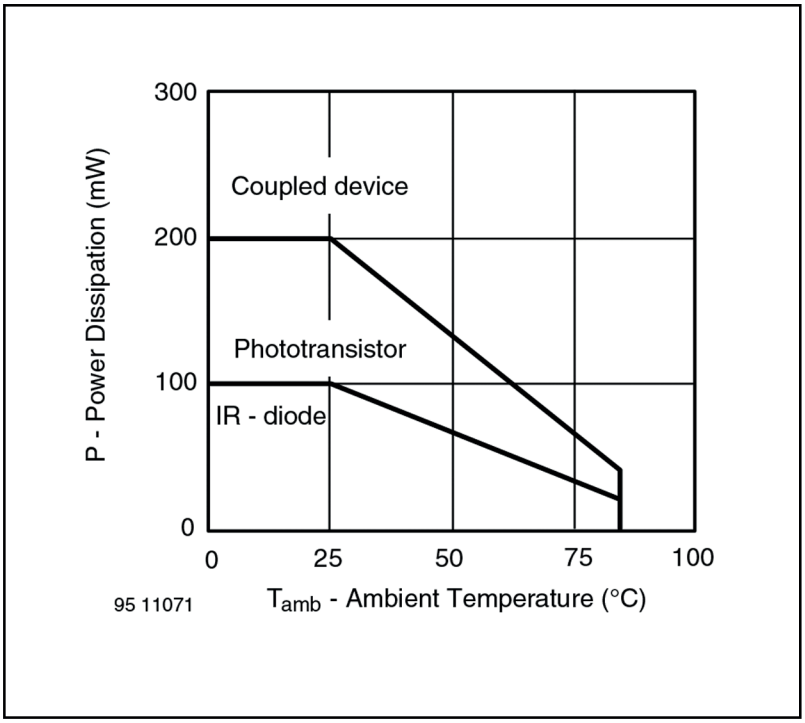


Figure 1 - Power Dissipation Limit vs. Ambient Temperature

6. Basic Characteristics

Basic Characteristics (1)

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

Note

(1) Tamb = 25 °C, unless otherwise specified

(2) See figure 3

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

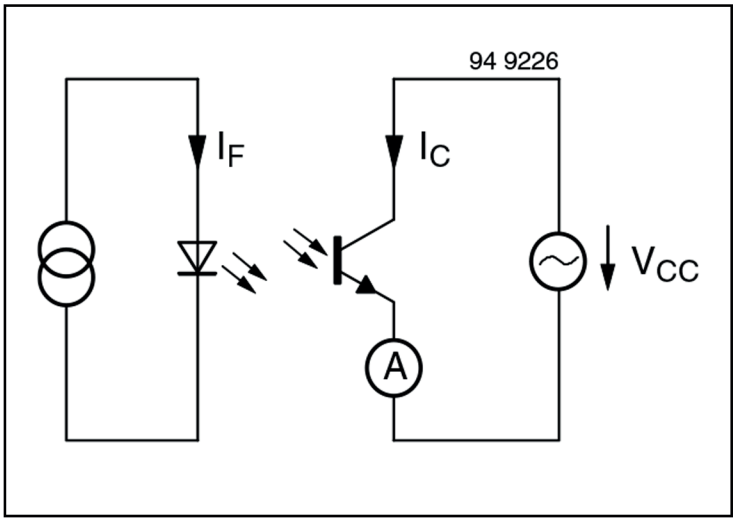


Figure 2 - Test Circuit

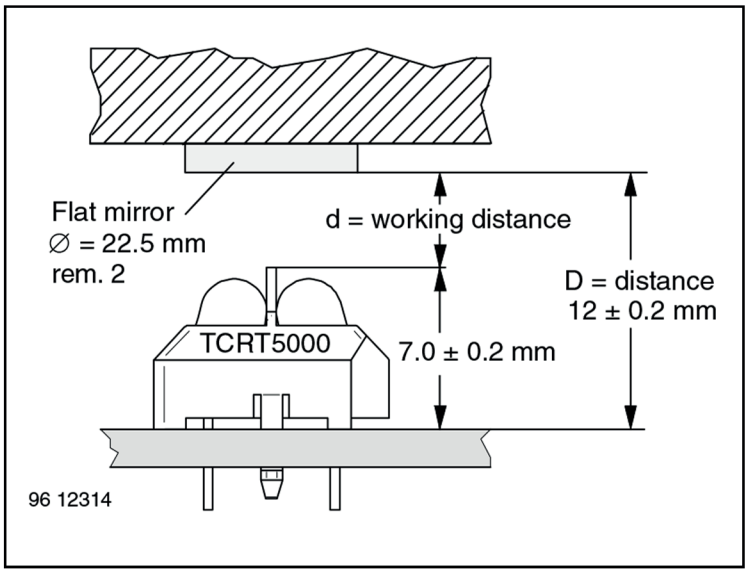


Figure 3 - Test Circuit

Basic Characteristics

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

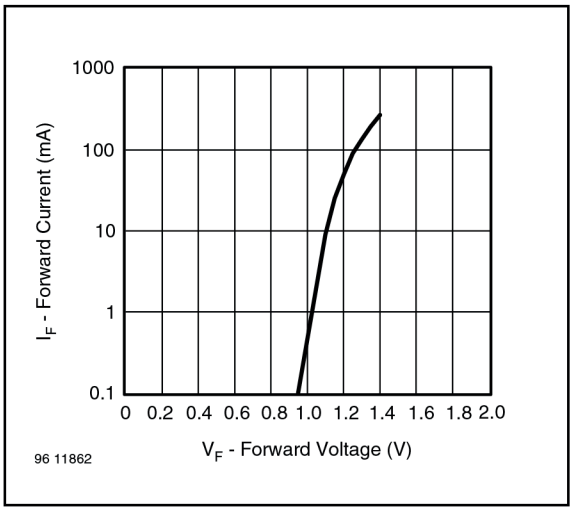


Figure 4 - Forward Current vs. Forward Voltage

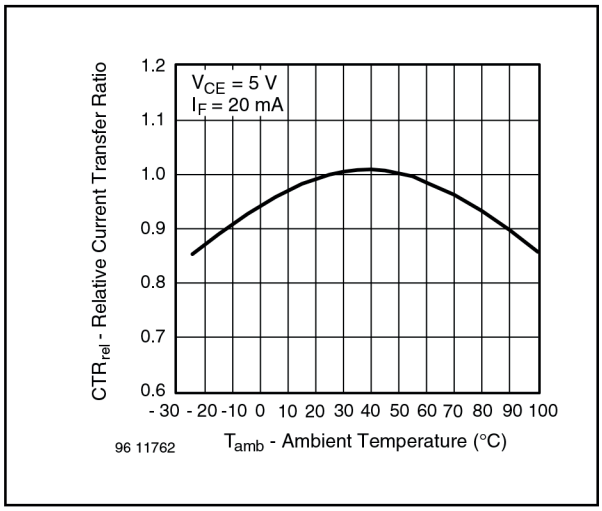


Figure 5 - Relative Current Transfer Ratio vs. Ambient Temperature

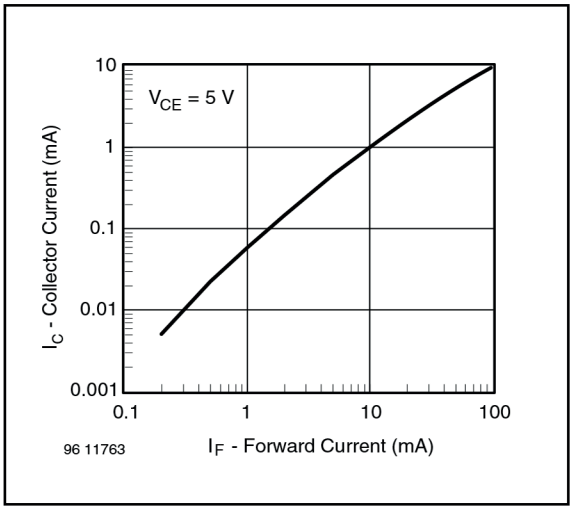


Figure 6 - Collector Current vs. Forward Current

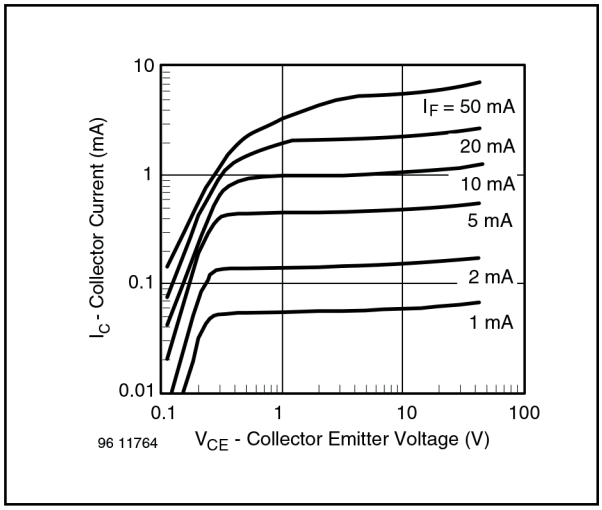


Figure 7 - Collector Emitter Saturation Voltage vs. Collector Current

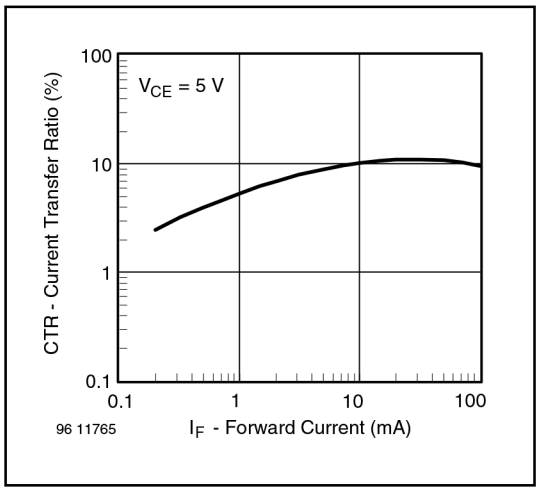


Figure 8 - Current Transfer Ratio vs. Forward Current

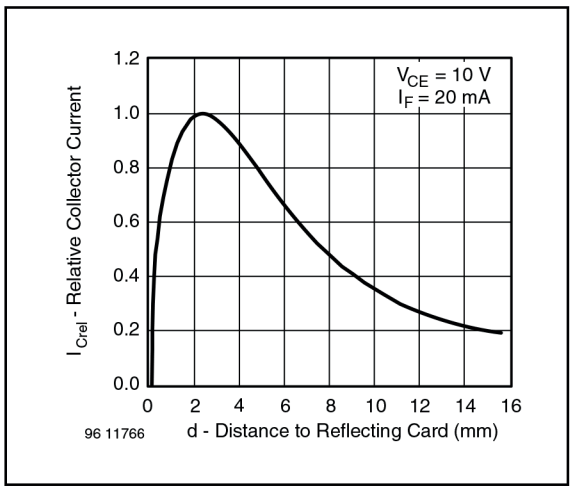
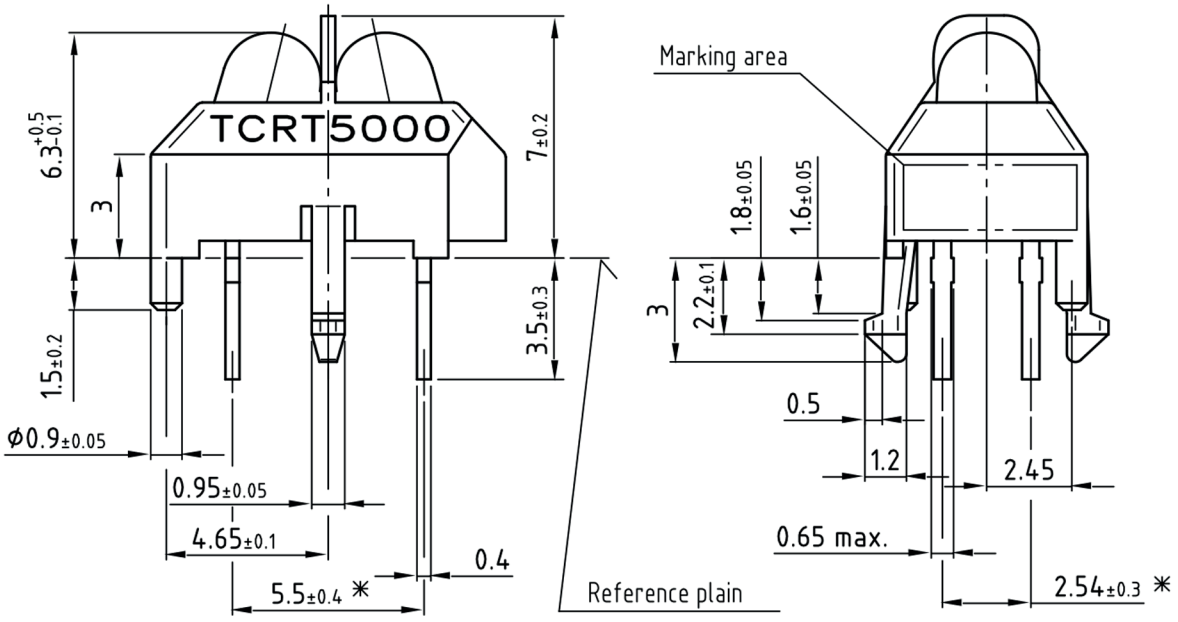
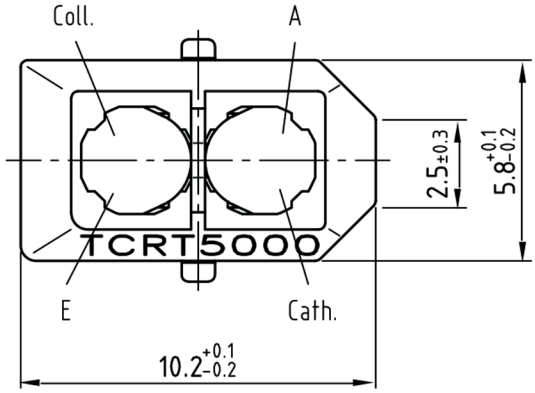


Figure 9 - Relative Collector Current vs. Distance

7. Dimensions

Dimensions in milimeters
TCRT5000



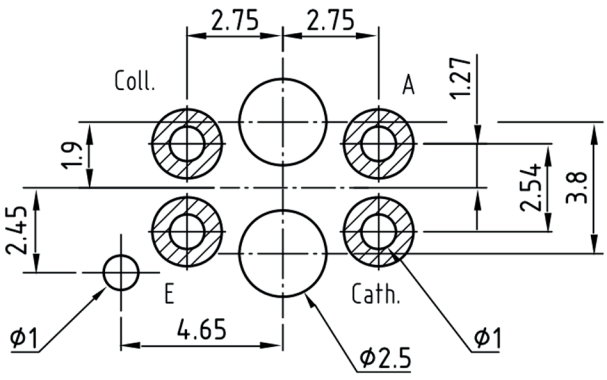


✳ Tolerances related to reference plain

weight: ca. 0.23g

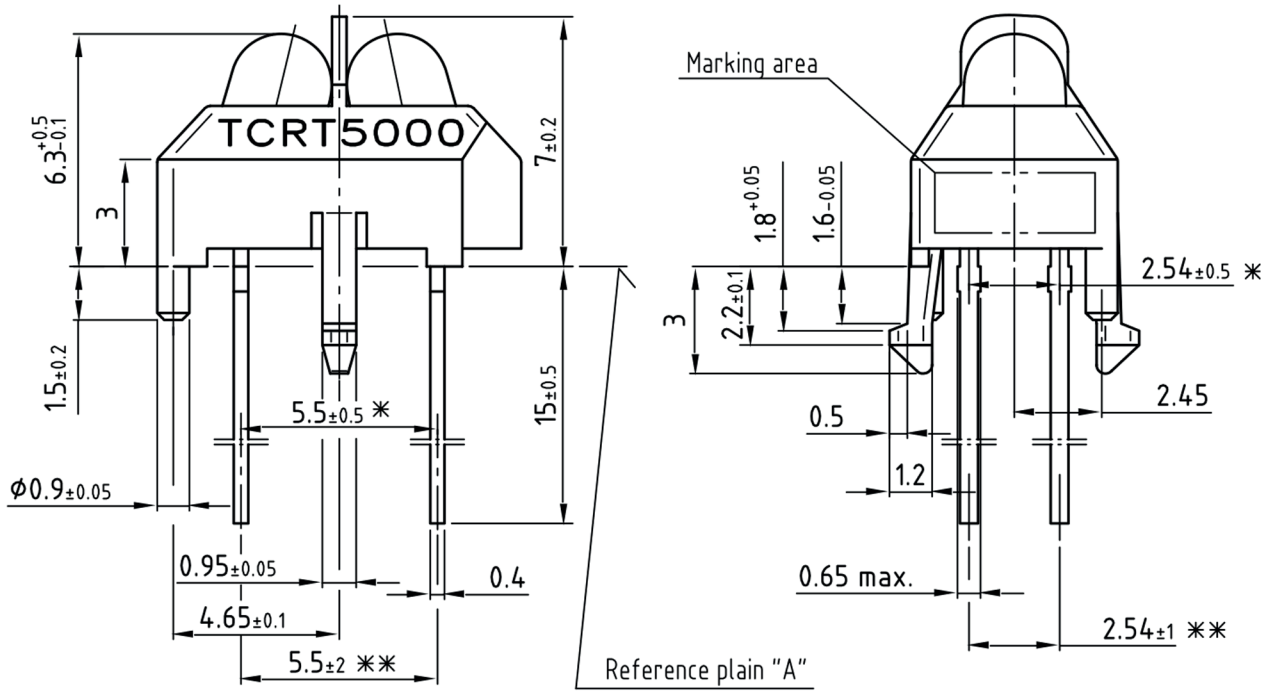
technical drawings according to DIN specifications

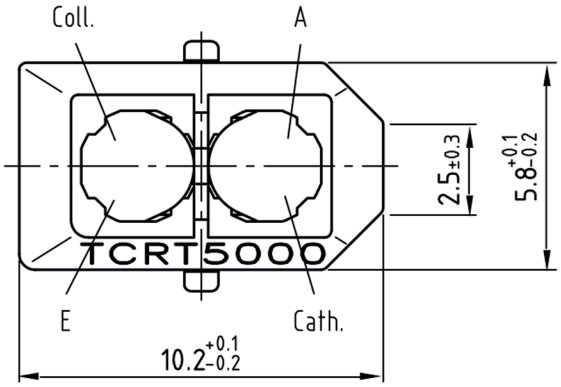
Footprint Top View



Drawing-No.: 6.550-5096.01-4
Issue: 4; 11.04.02
96 12073

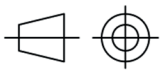
Dimensions in milimeters
TCRT5000L





✳ Tolerances related to reference plain "A"

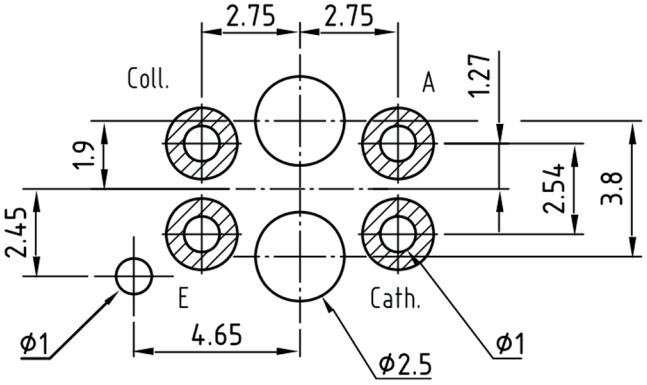
✳✳ Tolerances related on lead end



technical drawings according to DIN specifications

weight: ca. 0.23g

Footprint Top View

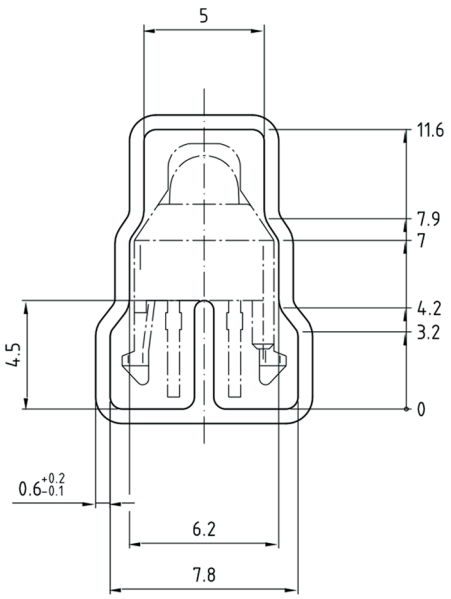


Drawing-No.: 6.550-5146.01-4
Issue: 4; 11.04.02

95 11267

Tube dimensions in milimeters

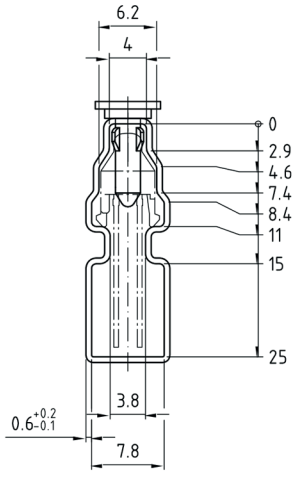
TCRT5000



With rubber stopper
Tolerance: ±0.5mm
Length: 575±1mm

Drawing-No.: 9.700-5139.01-4
Issue: 1; 10.05.00
20298

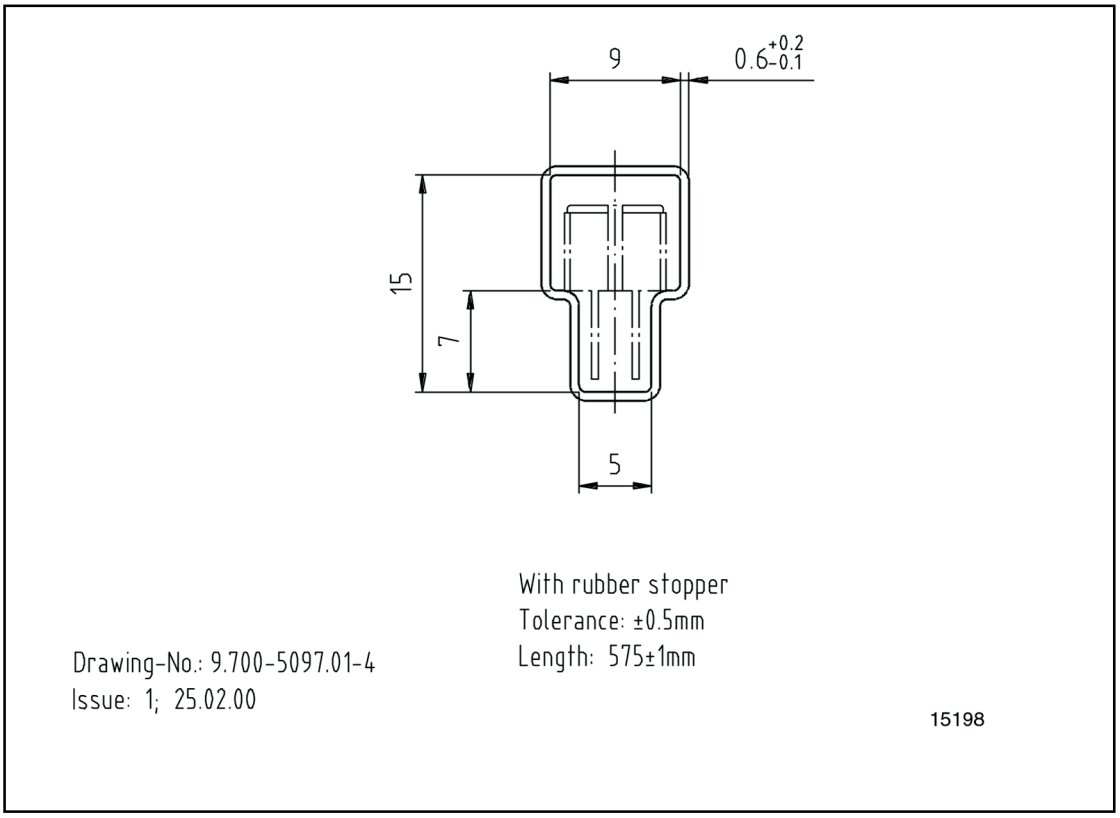
TCRT5000L



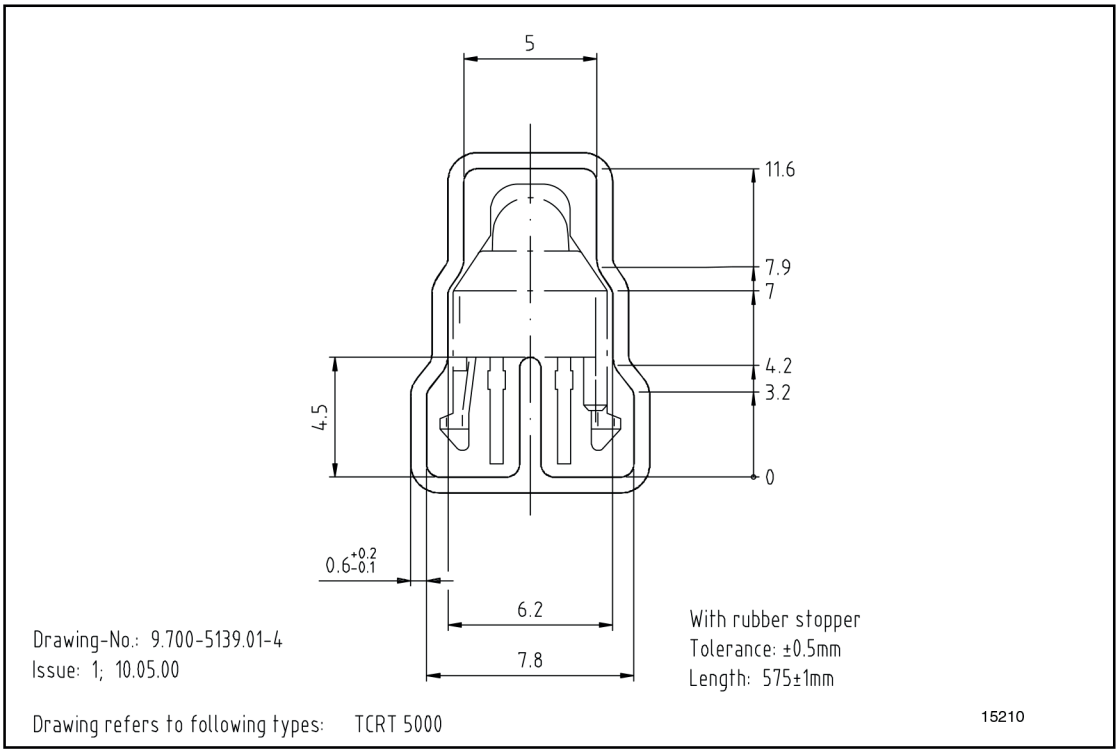
With stopper pins
Tolerance: ±0.5mm
Length: 575±1mm

Drawing-No.: 9.700-5178.01-4
Issue: 1; 25.02.00
20299

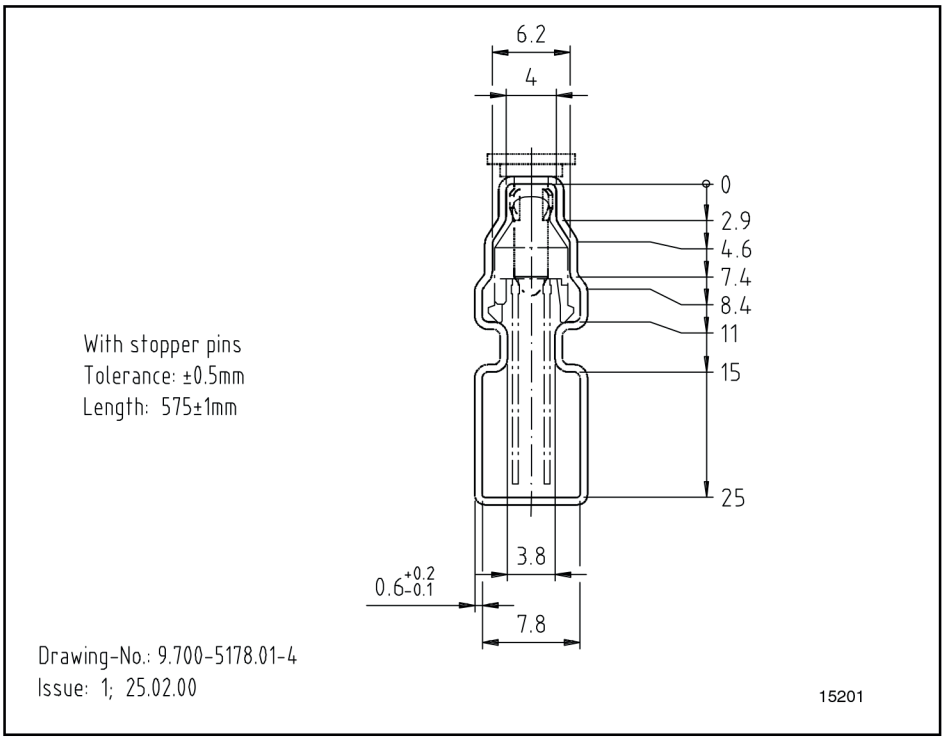
8. Tube Specification Figures



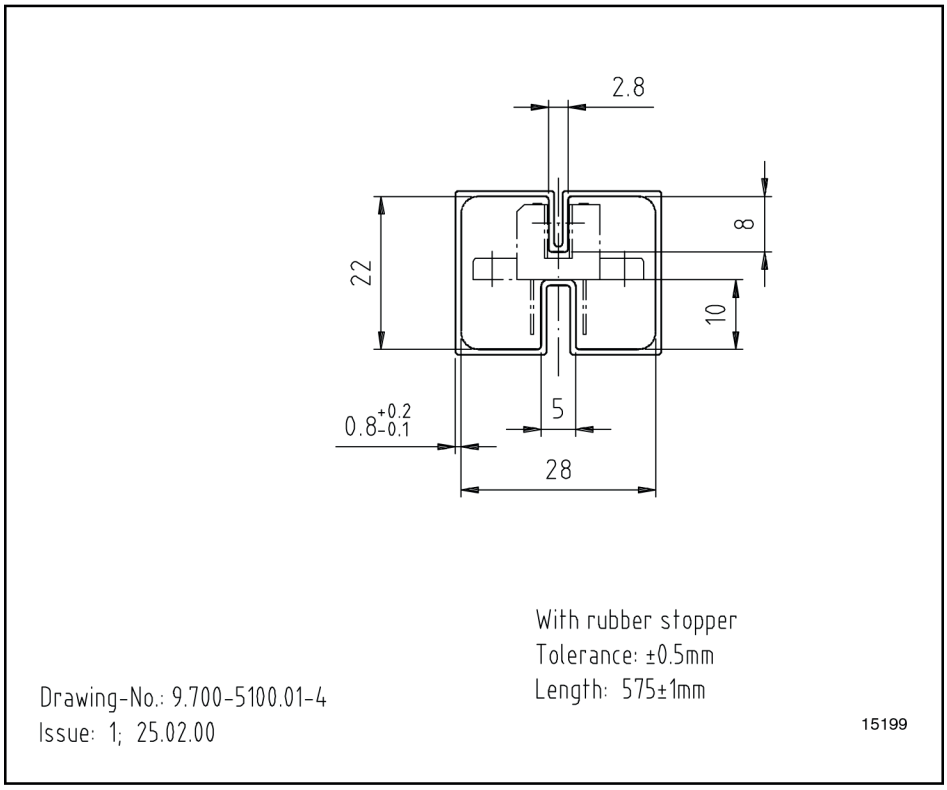
Tube Specification Figure 1



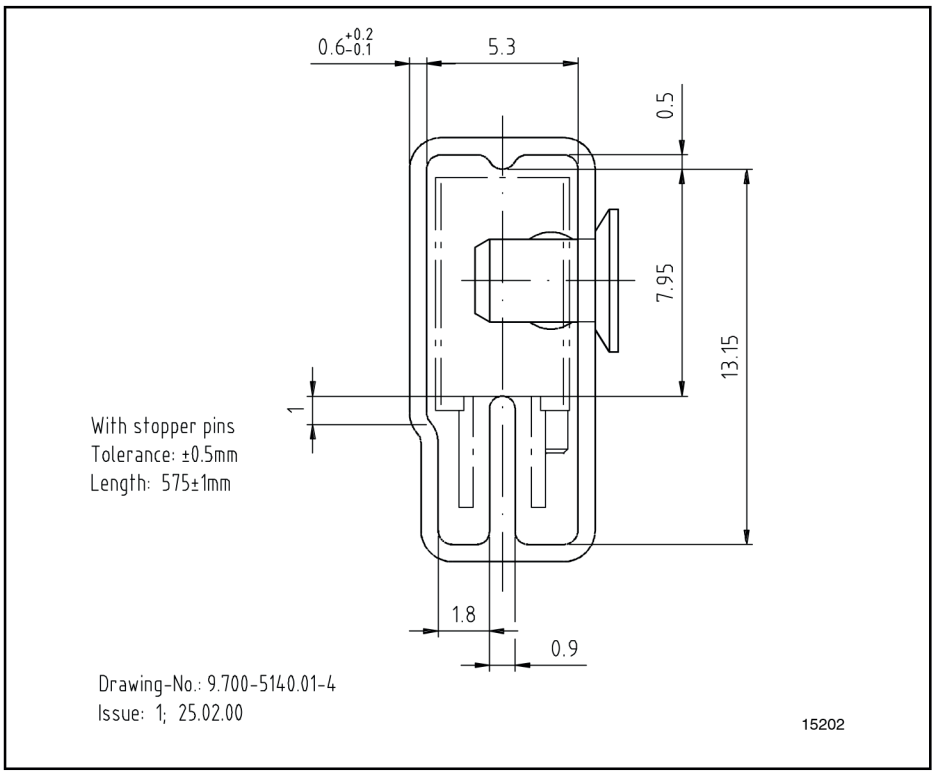
Tube Specification Figure 2



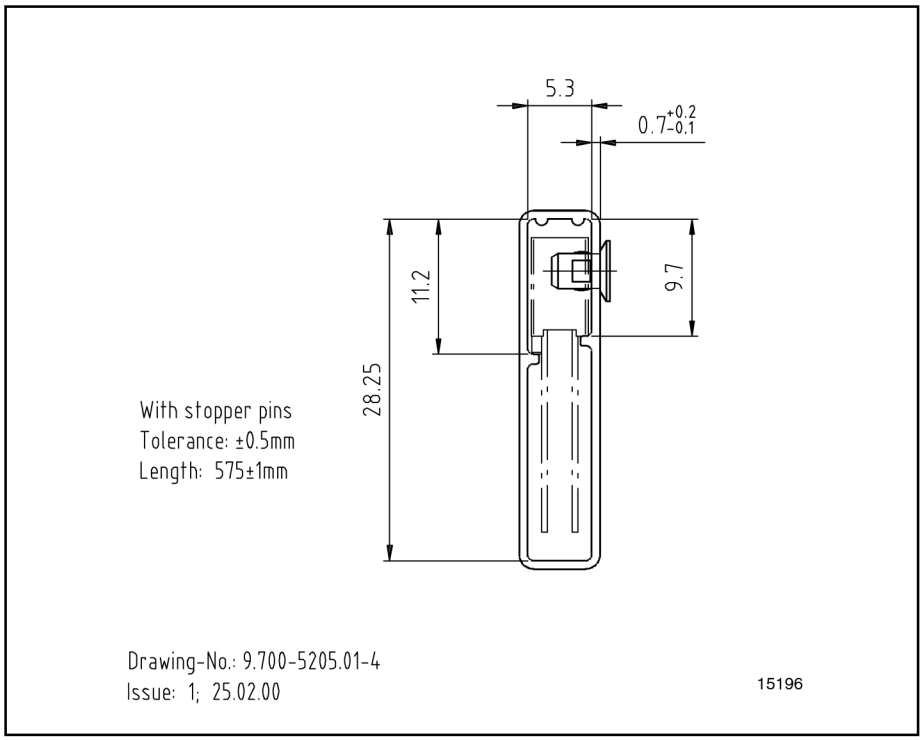
Tube Specification Figure 3



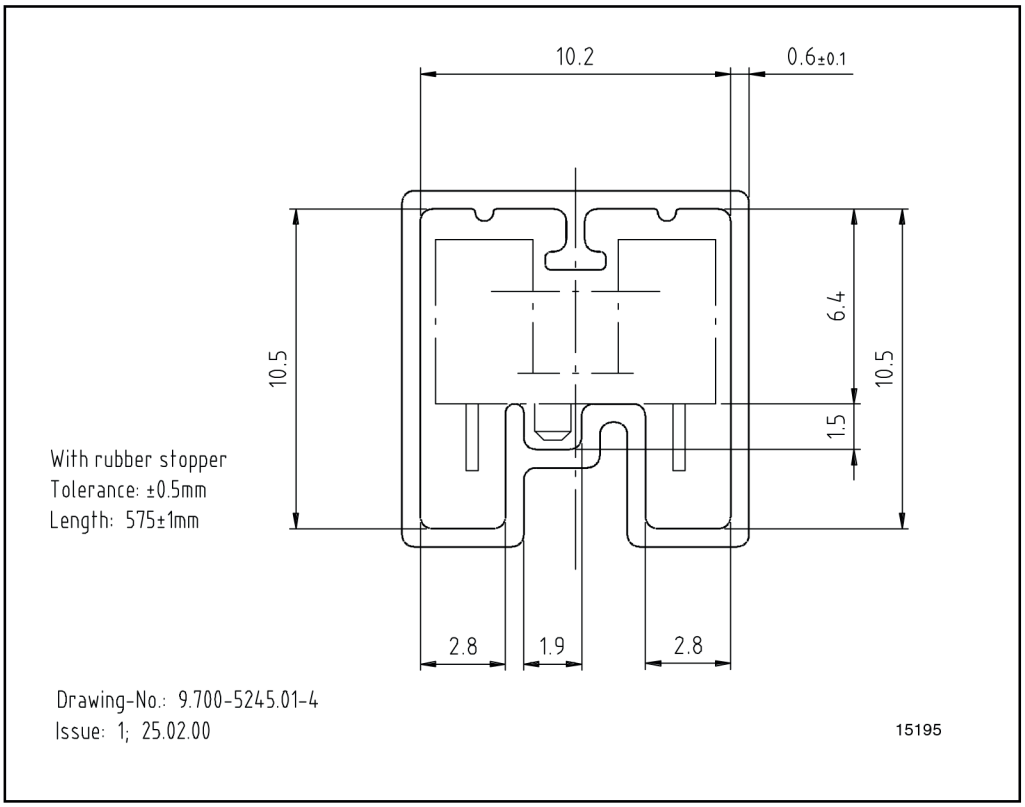
Tube Specification Figure 4



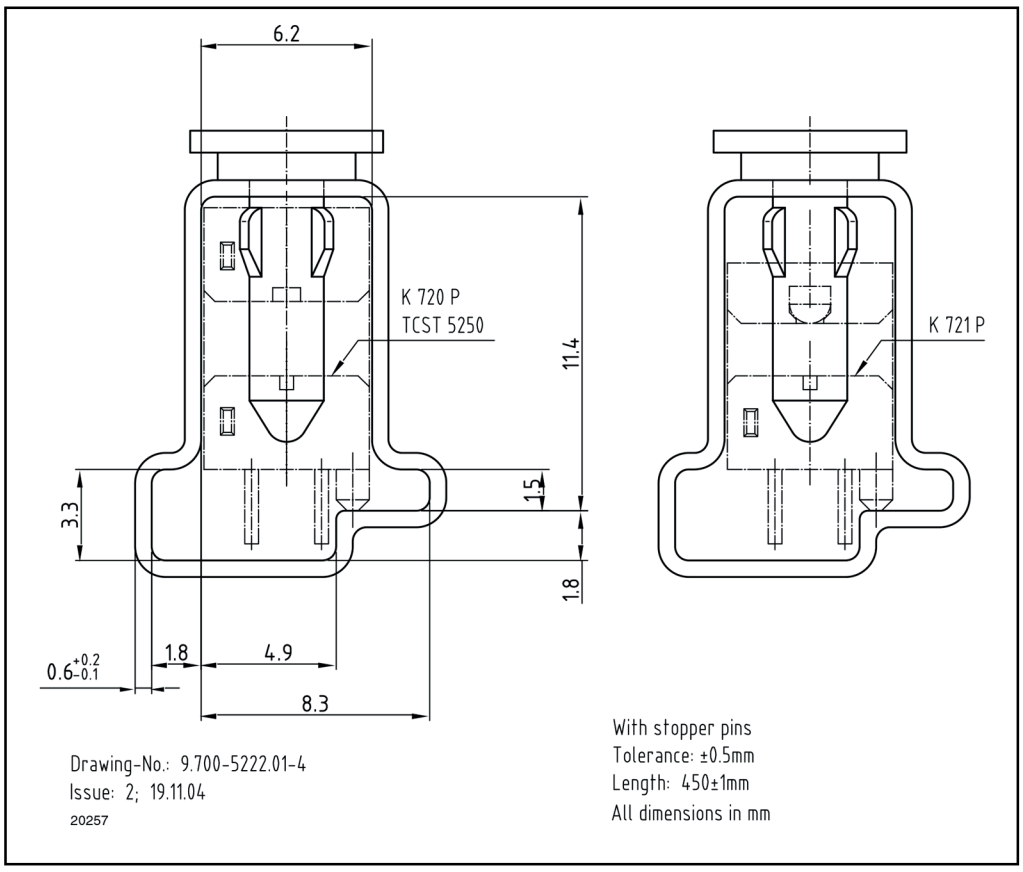
Tube Specification Figure 5



Tube Specification Figure 6



Tube Specification Figure 7



Tube Specification Figure 8