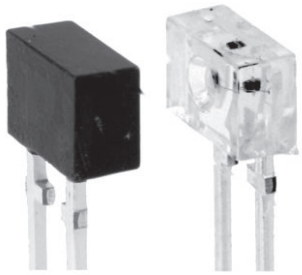
Matched Pairs of Emitters and Detectors



96 12317_1

FEATURES

- Package type: leaded
- Detector type: phototransistor
- Dimensions (L x W x H in mm): 4.4 x 2 x 3
- Typical output current under test: I_C = 0.5 mA
- Daylight blocking filter
- Emitter wavelength: 950 nm
- Angle of half intensity: φ = ± 25°
- S420P: single detector component (dark epoxy)
- V420P: single emitter component (clear epoxy)
- Lead (Pb)-free soldering released
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free
e4
RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

DESCRIPTION

The TCZT8020 include matched infrared emitters and phototransistors in leaded packages, used to assemble custom-designed transmissive sensors or reflective sensors. The phototransistor package blocks visible light.

APPLICATIONS

- Custom-design sensors for various distances
- Reflective sensors
- Transmissive sensors

PRODUCT SUMMARY			
PART NUMBER	**GAP WIDTH (mm)**	**TYPICAL OUTPUT CURRENT UNDER TEST (1) (mA)**	**DAYLIGHT BLOCKING FILTER INTEGRATED**
TCZT8020	Variable	0.5	Yes

Note

(1) Conditions like in table basic characteristics / coupler

ORDERING INFORMATION			
ORDERING CODE	**PACKAGING**	**VOLUME (1)**	**REMARKS**
TCZT8020	Bulk	MOQ: 2000 pairs, 1000 pcs/bulk	Detectors and emitters in separate bulk

Note

(1) MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
COUPLER				
Ambient temperature range		T_{amb}	-55 to +85	°C
Storage temperature range		T_{stg}	-55 to +100	°C
Soldering temperature	Distance to package 2 mm, t ≤ 5 s	T_{sd}	260	°C
INPUT (EMITTER)				
Reverse voltage		V_R	6	V
Forward current		I_F	60	mA
Forward surge current	t ≤ 10 µs	I_{FSM}	1	A
Power dissipation	T_{amb} ≤ 25 °C	P_V	100	mW
Junction temperature		T_j	100	°C
OUTPUT (DETECTOR)				
Collector emitter voltage		V_{CEO}	70	V
Emitter collector voltage		V_{ECO}	7	V
OUTPUT (DETECTOR)				
Collector current		I_C	50	mA
Collector peak current	t_p/T = 0.5, t ≤ 10 ms	I_{CM}	100	mA
Power dissipation	T_{amb} ≤ 25 °C	P_V	150	mW
Junction temperature		T_j	100	°C

ABSOLUTE MAXIMUM RATINGS

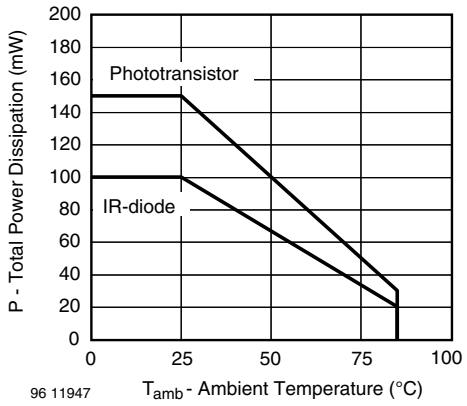


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
COUPLER						
Collector current	V_{CE} = 5 V, I_F = 20 mA, d = 4 mm (1)	I_C	0.25	0.5	-	mA
I_C/I_F	V_{CE} = 5 V, I_F = 20 mA, d = 4 mm	CTR	1.25	2.5	-	%
Collector emitter saturation voltage	I_F = 20 mA, I_C = 25 µA	V_{CEsat}	-	-	0.4	V
Cut-off frequency	I_F = 10 mA, V_{CE} = 5 V, R_L = 100 Ω	f_C	-	110	-	kHz
INPUT (EMITTER)						
Forward voltage	I_F = 50 mA	V_F	-	1.25	1.6	V
Radiant intensity	I_F = 60 mA, t_P = 20 ms	I_e	-	-	7.8	mW/sr
Peak wavelength	I_F = 100 mA	λ_P	940	-	-	nm
Virtual source diameter	DIN EN ISO 1146/1:2005	d	-	1.1	-	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} = 25 V, I_F = 0 A, E = 0 lx	I_{CEO}	-	-	100	nA
SWITCHING CHARACTERISTICS						
Turn-on time	V_S = 5 V, I_C = 1 mA, R_L = 100 Ω (see Fig. 10)	t_{on}	-	15	-	µs
Turn-off time	V_S = 5 V, I_C = 1 mA, R_L = 100 Ω (see Fig. 10)	t_{off}	-	10	-	µs

Note

(1) Characteristics are measurement with d = 4 mm (0.55") distance between emitter and detector, within a common axis of 0.5 mm (0.02") and with parallel alignment within 5°

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

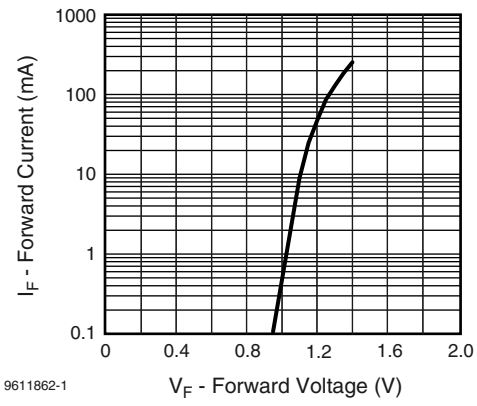


Fig. 2 - Forward Current vs. Forward Voltage

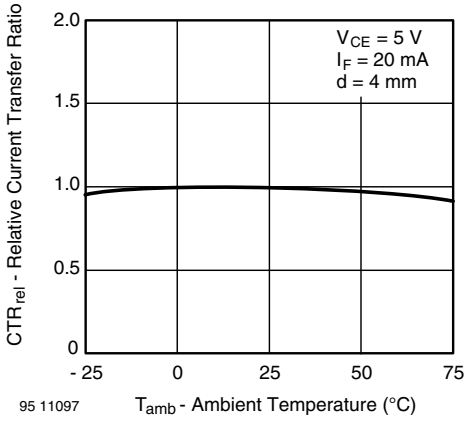


Fig. 3 - Relative Current Transfer Ratio vs. Ambient Temperature

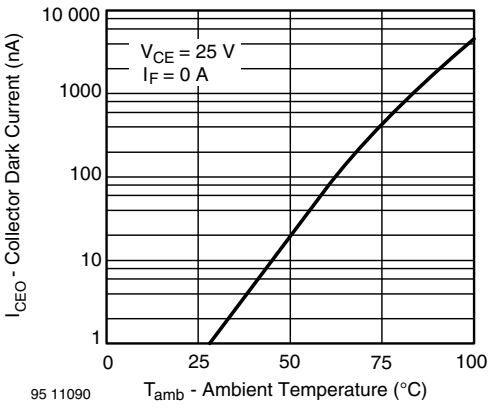


Fig. 4 - Collector Dark Current vs. Ambient Temperature

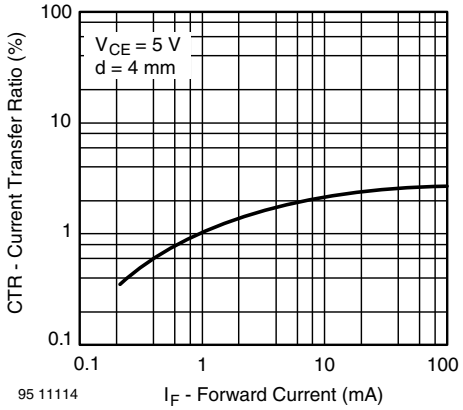


Fig. 7 - Current Transfer Ratio vs. Forward Current

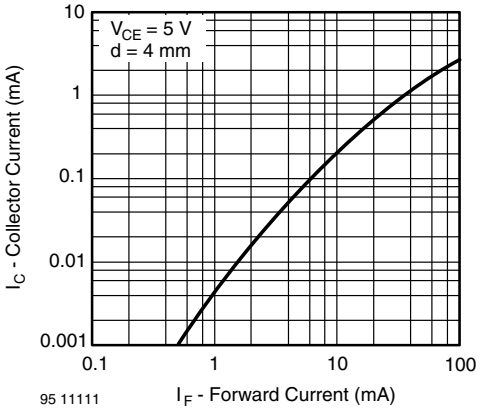


Fig. 5 - Collector Current vs. Forward Current

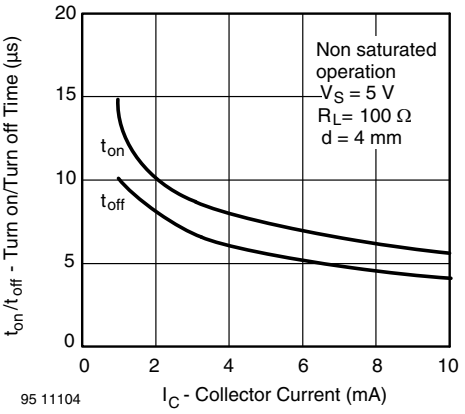


Fig. 8 - Turn on/off Time vs. Forward Current

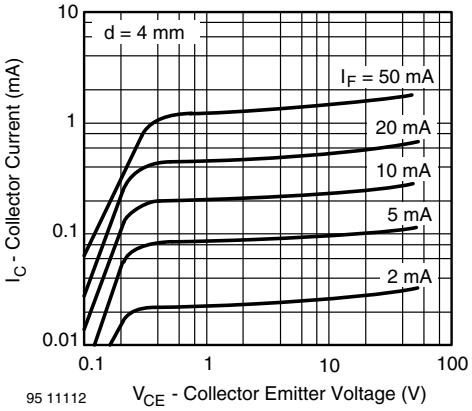


Fig. 6 - Collector Current vs. Collector Emitter Voltage

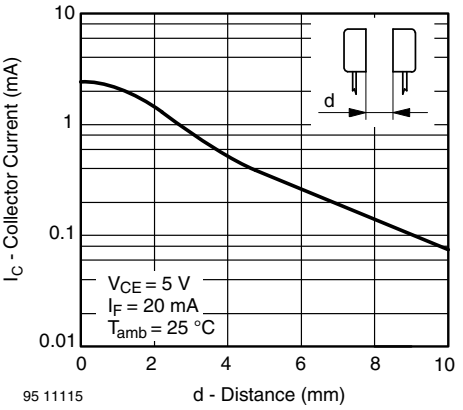


Fig. 9 - Collector Current vs. Distance

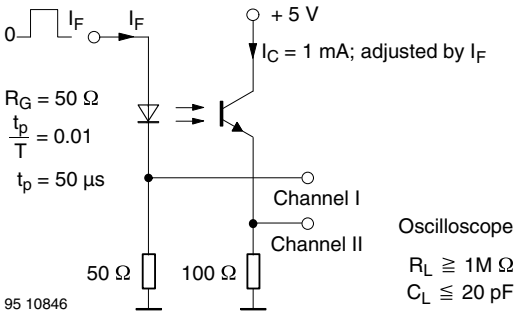


Fig. 10 - Pulse Diagram

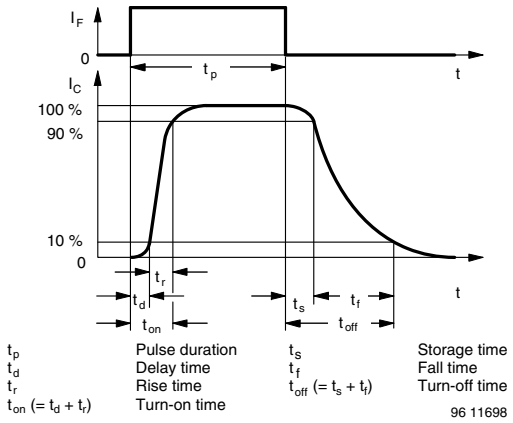
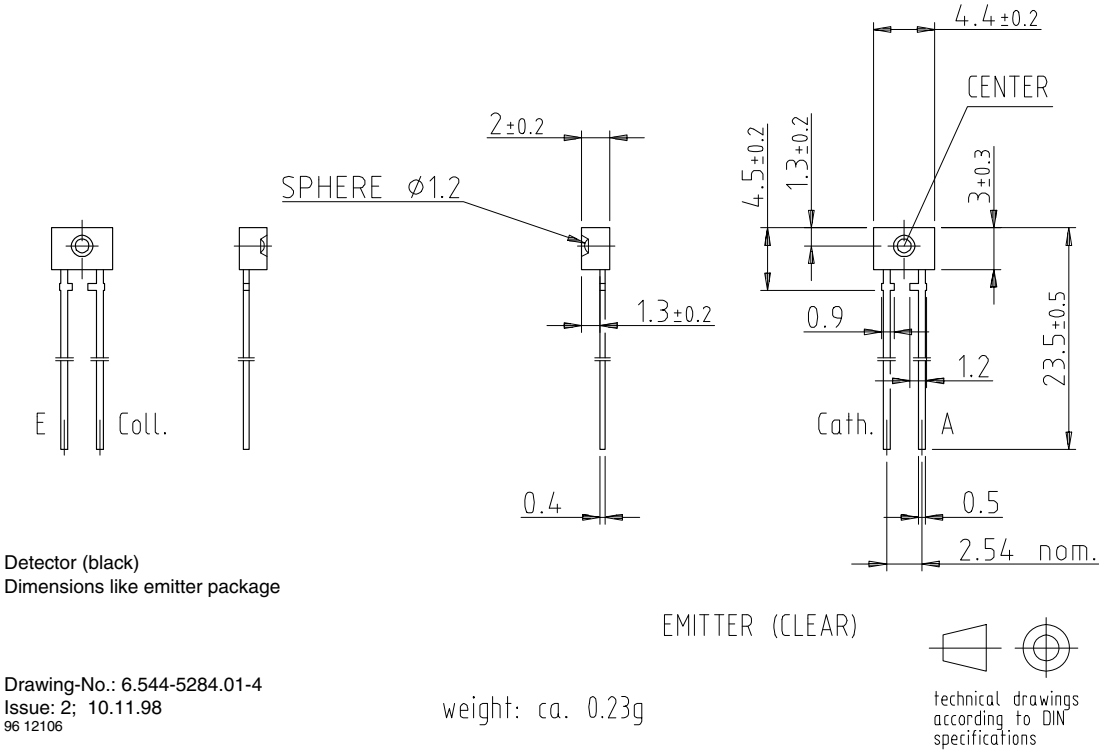


Fig. 11 - Switching Times

PACKAGE DIMENSIONS in millimeters



Packaging and Ordering Information

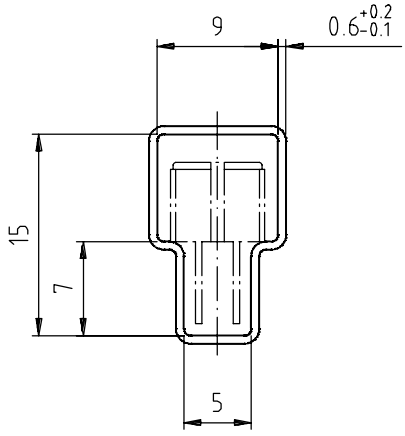
PART NUMBER	MOQ (1)	PCS PER TUBE	TUBE SPEC. (FIGURE)	CONSTITUENTS (FORMS)
CNY70	4000	80	1	28
TCPT1300X01	2000	Reel	(2)	29
TCRT1000	1000	Bulk	-	26
TCRT1010	1000	Bulk	-	26
TCRT5000	4500	50	2	27
TCRT5000L	2400	48	3	27
TCST1030	5200	65	5	24
TCST1030L	2600	65	6	24
TCST1103	1020	85	4	24
TCST1202	1020	85	4	24
TCST1230	4800	60	7	24
TCST1300	1020	85	4	24
TCST2103	1020	85	4	24
TCST2202	1020	85	4	24
TCST2300	1020	85	4	24
TCST5250	4860	30	8	24
TCUT1300X01	2000	Reel	(2)	29
TCZT8020-PAER	2500	Bulk	-	22

Notes

(1) MOQ: minimum order quantity

(2) Please refer to datasheets

TUBE SPECIFICATION FIGURES

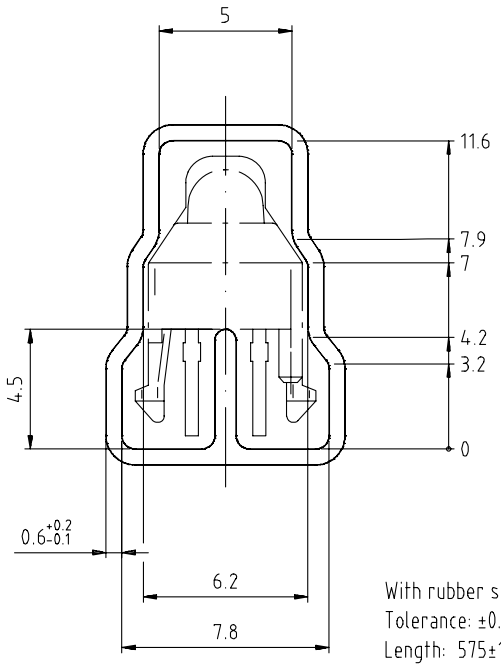


With rubber stopper
Tolerance: ±0.5mm
Length: 575±1mm

Drawing-No.: 9.700-5097.01-4
Issue: 1; 25.02.00

15198

Fig. 1



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

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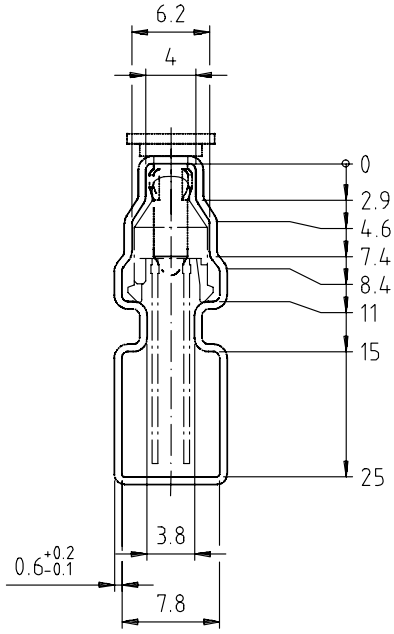
Tolerance: ±0.5mm
Length: 575±1mm

Drawing refers to following types: TCRT 5000

15210

Fig. 2

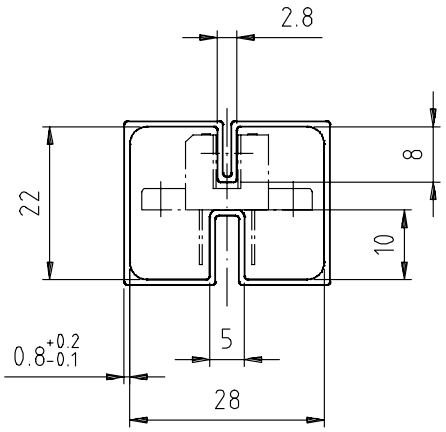


With stopper pins
Tolerance: ±0.5mm
Length: 575±1mm

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

15201

Fig. 3

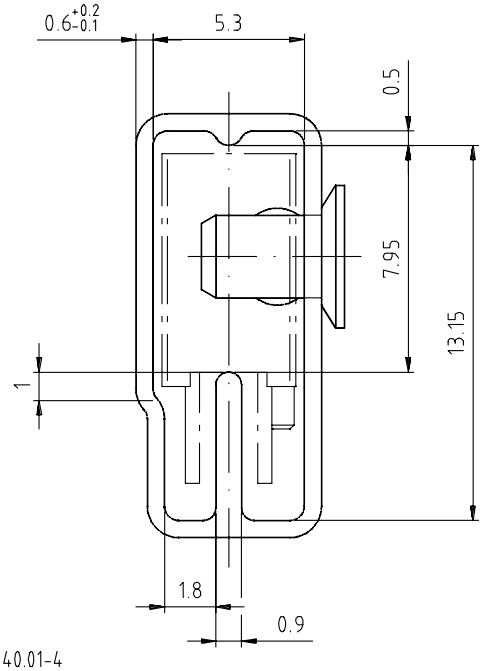


With rubber stopper
Tolerance: ±0.5mm
Length: 575±1mm

Drawing-No.: 9.700-5100.01-4
Issue: 1; 25.02.00

15199

Fig. 4



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

Drawing-No.: 9.700-5140.01-4
Issue: 1; 25.02.00

15202

Fig. 5

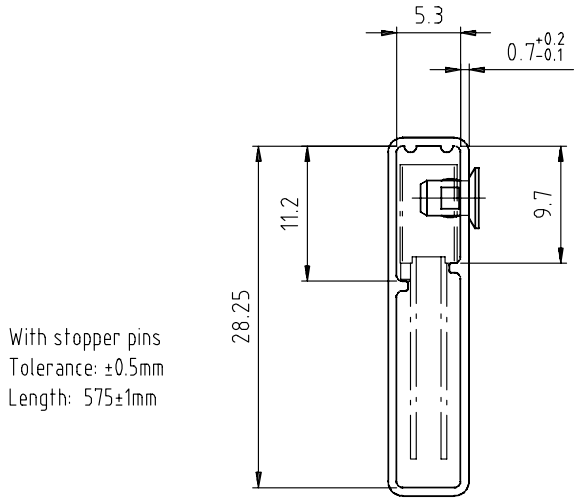

5.3
0.7+0.2-0.1
11.2
9.7
28.25
With stopper pins
Tolerance: ±0.5mm
Length: 575±1mm
Drawing-No.: 9.700-5205.01-4
Issue: 1; 25.02.00
15196

Fig. 6

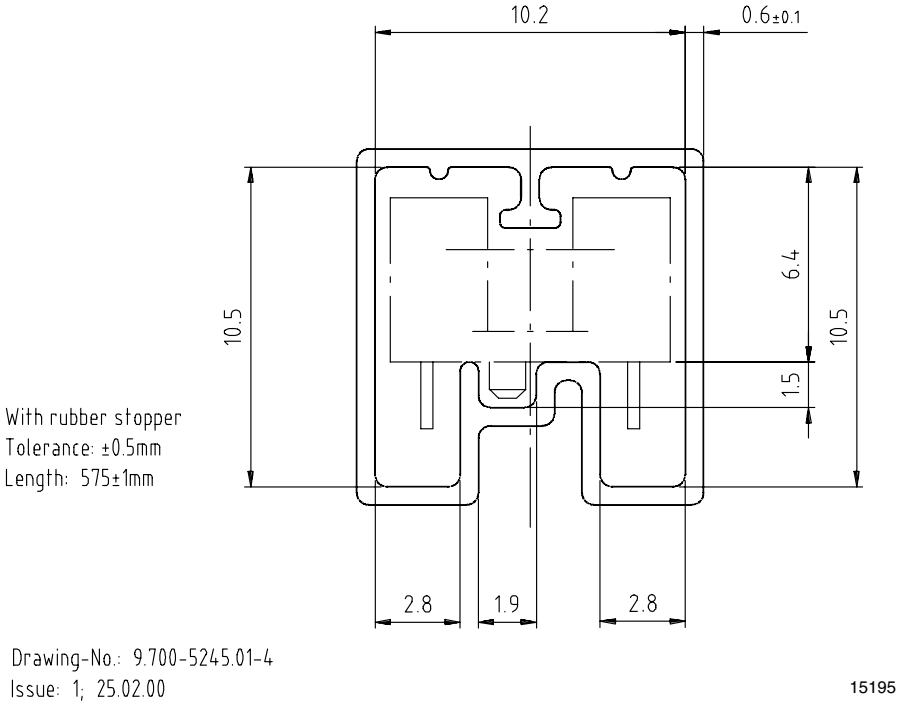
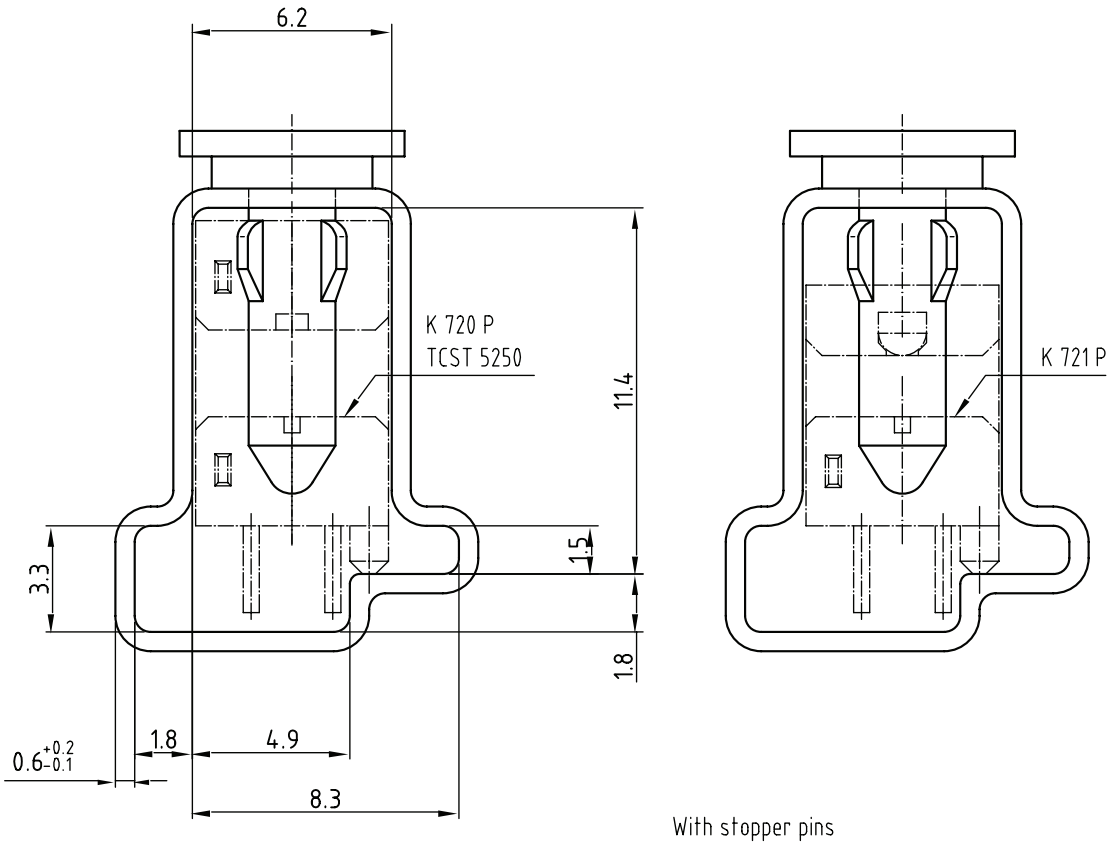

10.2
0.6±0.1
10.5
6.4
10.5
1.5
With rubber stopper
Tolerance: ±0.5mm
Length: 575±1mm
2.8
1.9
2.8
Drawing-No.: 9.700-5245.01-4
Issue: 1; 25.02.00
15195

Fig. 7



Drawing-No.: 9.700-5222.01-4
Issue: 2; 19.11.04
20257

With stopper pins
Tolerance: ±0.5mm
Length: 450±1mm
All dimensions in mm

Fig. 8

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