



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

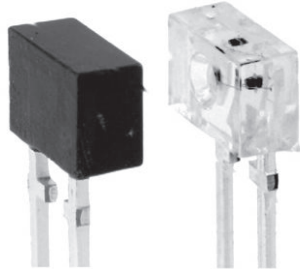
Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



## Matched Pairs of Emitters and Detectors



96 12317\_1

### 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.

### 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:  $I_C = 0.5 \text{ mA}$
- Daylight blocking filter
- Emitter wavelength: 950 nm
- Angle of half intensity:  $\varphi = \pm 25^\circ$
- S420P: single detector component (dark epoxy)
- V420P: single emitter component (clear epoxy)
- Lead (Pb)-free soldering released
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



**RoHS**  
COMPLIANT  
**GREEN**  
(5-2008)\*\*

### APPLICATIONS

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

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

#### Note

<sup>(1)</sup> Conditions like in table basic characteristics/coupler

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

#### Note

<sup>(1)</sup> MOQ: minimum order quantity

\*\* Please see document "Vishay Material Category Policy": [www.vishay.com/doc?99902](http://www.vishay.com/doc?99902)

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

## ABSOLUTE MAXIMUM RATINGS

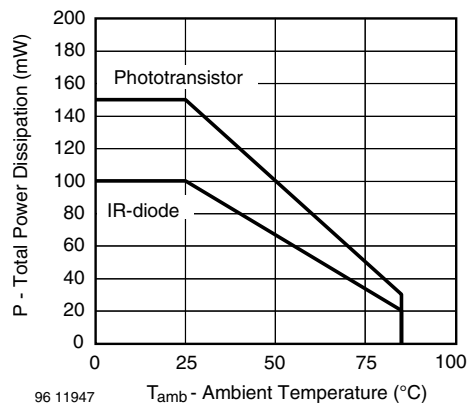


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

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

**Note**

<sup>(1)</sup> Characteristics are measurement with  $d = 4\text{ mm}$  (0.55") distance between emitter and detector, within a common axis of  $0.5\text{ mm}$  (0.02") and with parallel alignment within  $5^{\circ}$

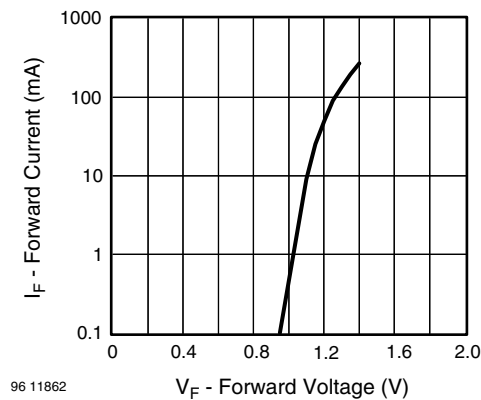
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 2 - Forward Current vs. Forward Voltage

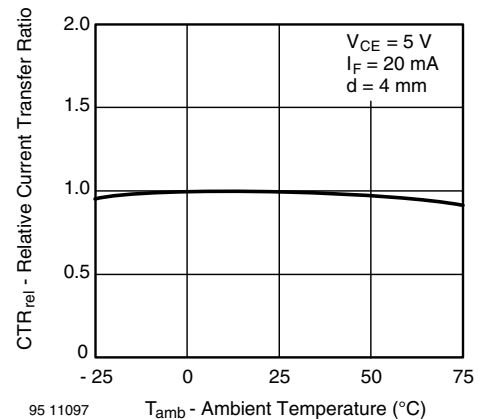


Fig. 3 - Relative Current Transfer Ratio vs. Ambient Temperature

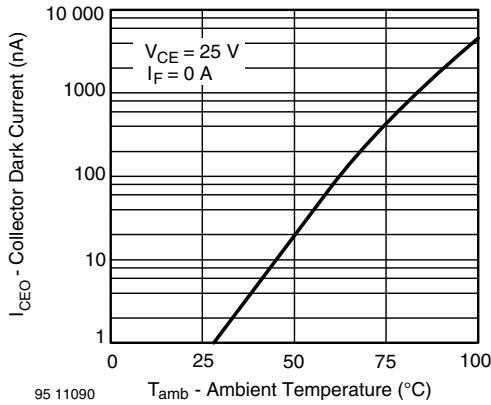


Fig. 4 - Collector Dark Current vs. Ambient Temperature

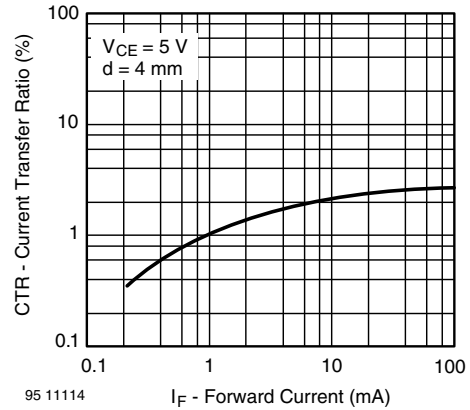


Fig. 7 - Current Transfer Ratio vs. Forward Current

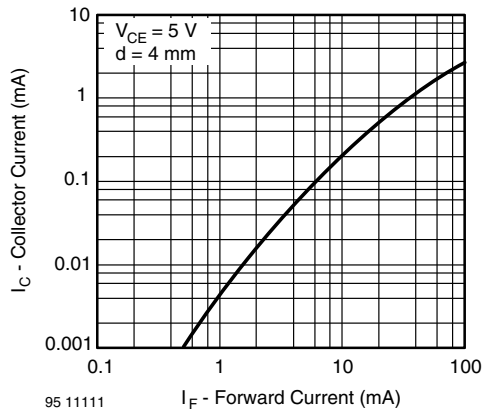


Fig. 5 - Collector Current vs. Forward Current

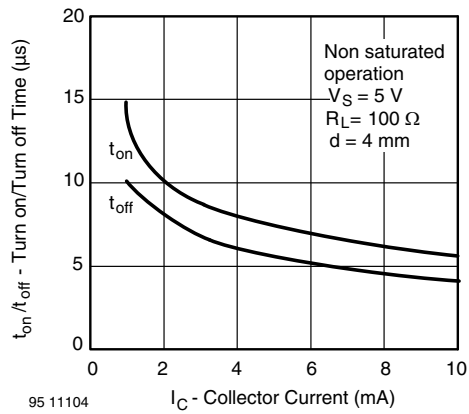


Fig. 8 - Turn on/off Time vs. Forward Current

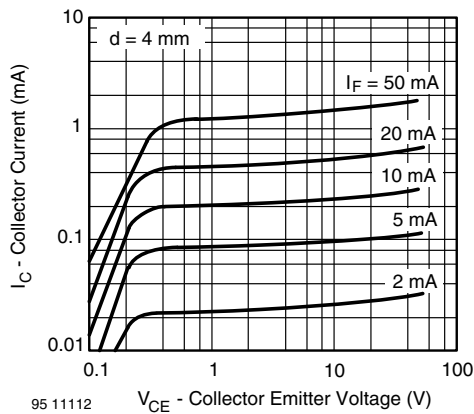


Fig. 6 - Collector Current vs. Collector Emitter Voltage

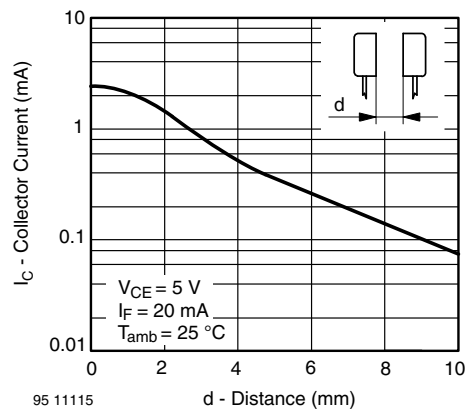


Fig. 9 - Collector Current vs. Distance

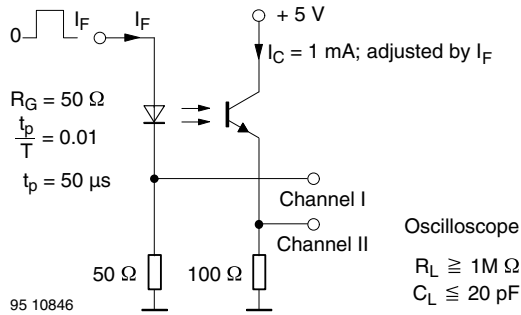


Fig. 10 - Pulse Diagram

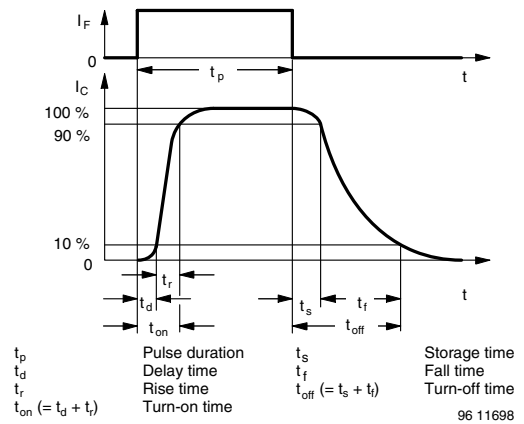
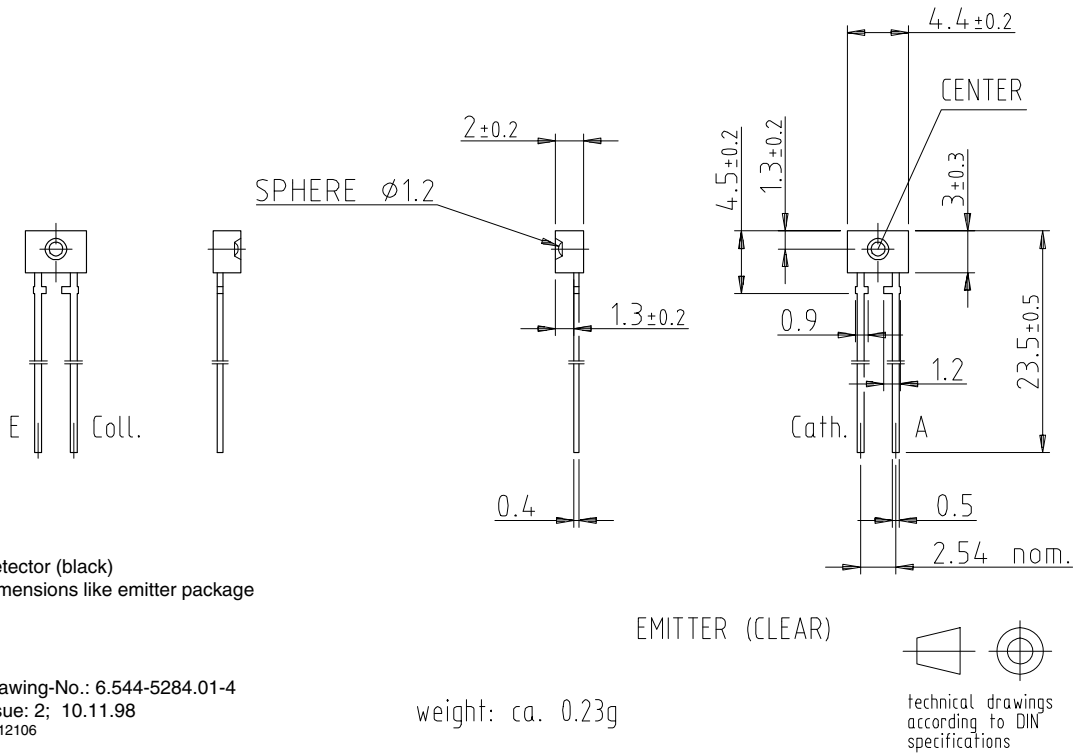


Fig. 11 - Switching Times

**PACKAGE DIMENSIONS** in millimeters


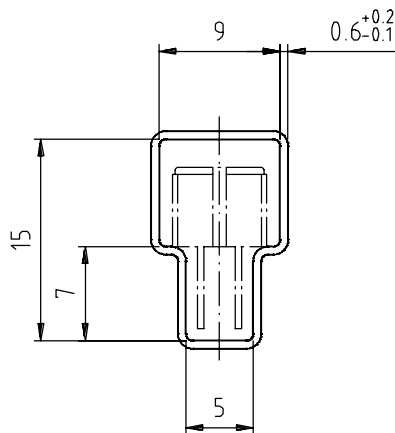
## Packaging and Ordering Information

PART NUMBER	MOQ <sup>(1)</sup>	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

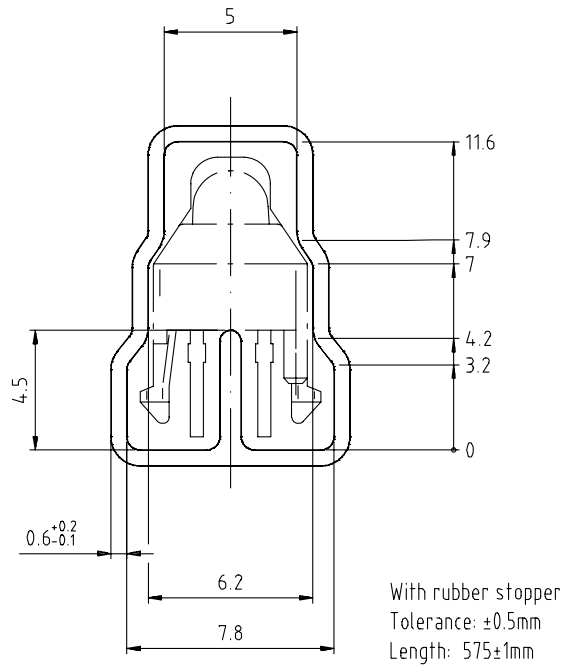
Drawing-No.: 9.700-5097.01-4  
 Issue: 1; 25.02.00

15198

Fig. 1

# Packaging and Ordering Information

Vishay Semiconductors Packaging and Ordering Information

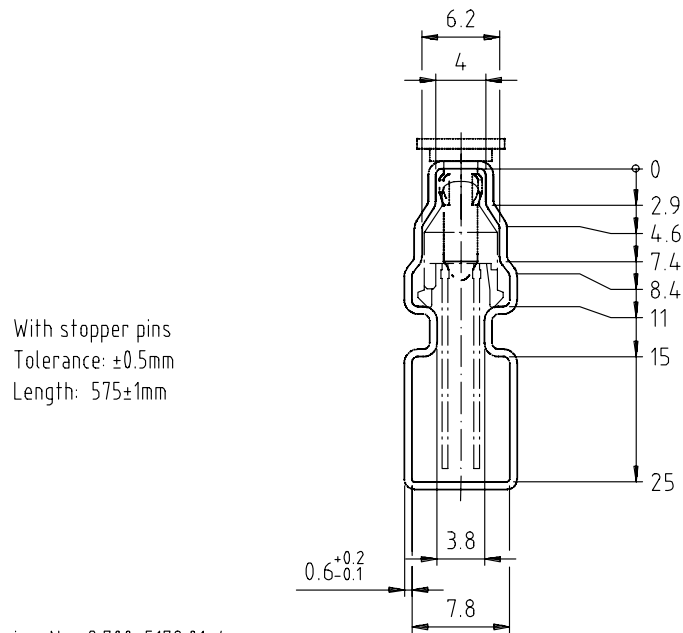


Drawing-No.: 9.700-5139.01-4  
Issue: 1; 10.05.00

Drawing refers to following types: TCRT 5000

15210

Fig. 2



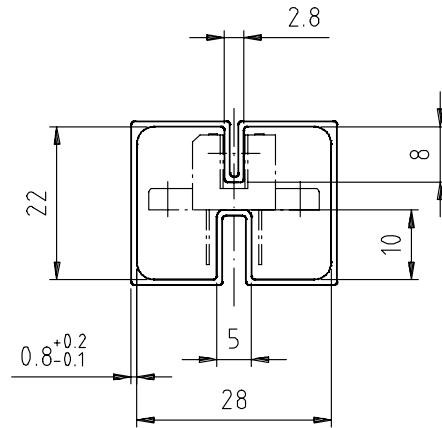
With stopper pins  
Tolerance:  $\pm 0.5\text{mm}$   
Length:  $575 \pm 1\text{mm}$

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

15201

Fig. 3



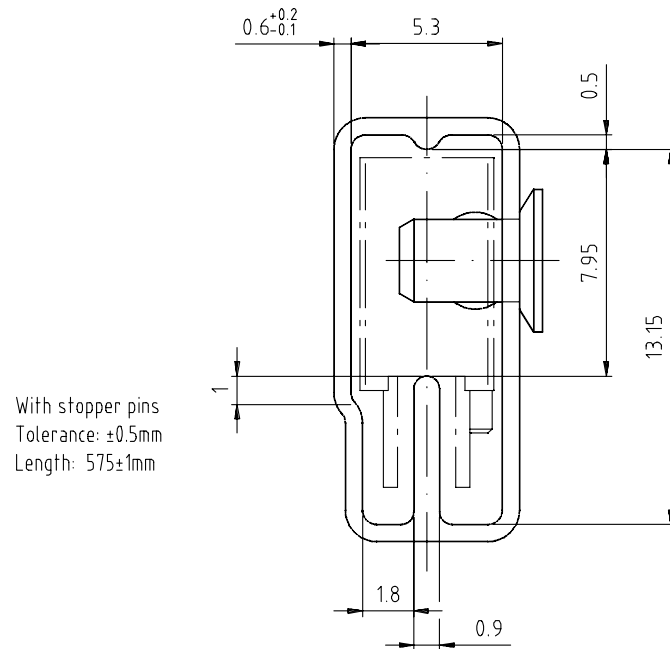


With rubber stopper  
Tolerance: ±0.5mm  
Length: 575±1mm

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

15199

Fig. 4



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

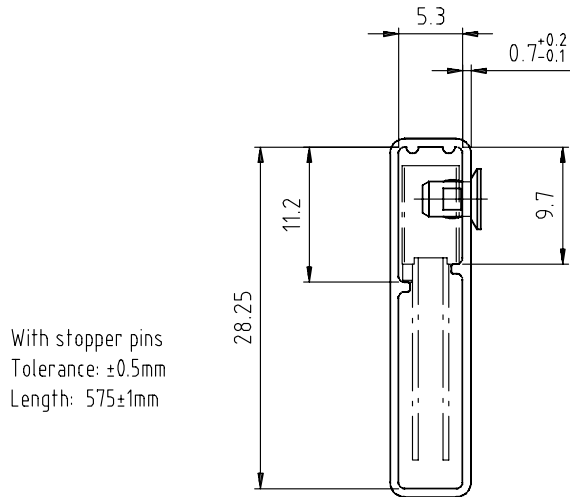
Drawing-No.: 9.700-5140.01-4  
Issue: 1; 25.02.00

15202

Fig. 5

# Packaging and Ordering Information

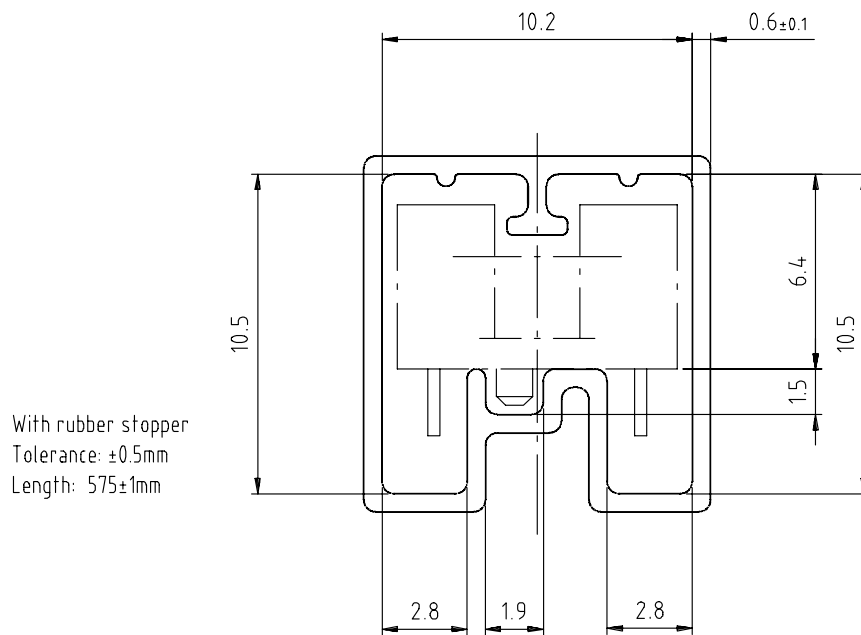
Vishay Semiconductors Packaging and Ordering Information



Drawing-No.: 9.700-5205.01-4  
Issue: 1; 25.02.00

15196

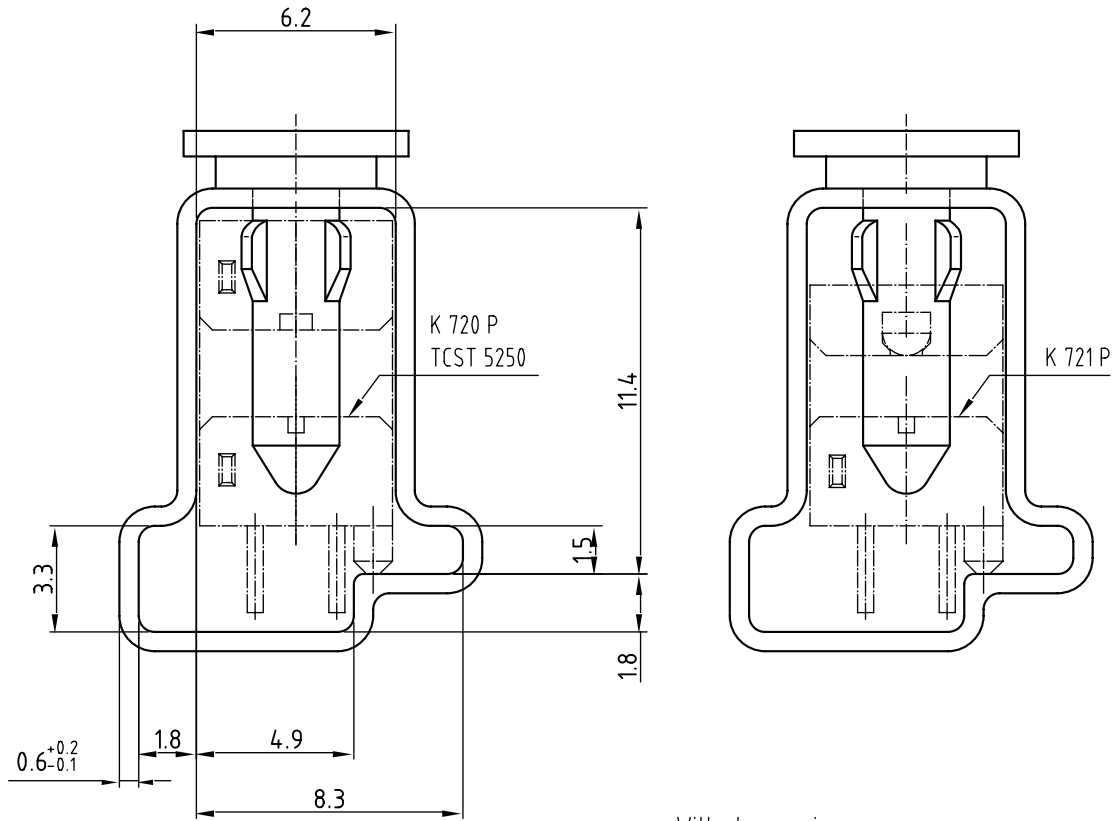
Fig. 6



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:  $\pm 0.5$ mm  
 Length:  $450 \pm 1$ mm  
 All dimensions in mm

Fig. 8



## **Disclaimer**

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.