

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



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

** Please see document "Vishay Material Category Policy": www.vishay.com/doc?99902



ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
COUPLER				
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	$^{\circ}\text{C}$
INPUT (EMITTER)				
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	$^{\circ}\text{C}$
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	$t_p/T = 0.5, t \leq 10\text{ ms}$	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

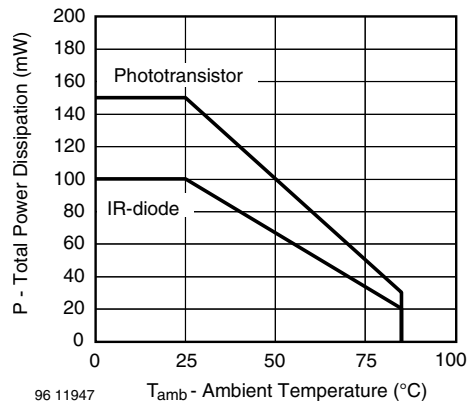


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
COUPLER						
Collector current	$V_{CE} = 5\text{ V}$, $I_F = 20\text{ mA}$, $d = 4\text{ mm}$ ⁽¹⁾	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
INPUT (EMITTER)						
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	$I_F = 100\text{ mA}$	λ_P	940			nm
Virtual source diameter	DIN EN ISO 1146/1:2005	d		1.1		mm
OUTPUT (DETECTOR)						
Collector emitter voltage	$I_C = 1\text{ mA}$	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
SWITCHING CHARACTERISTICS						
Turn-on time	$V_S = 5\text{ V}$, $I_C = 1\text{ mA}$, $R_L = 100\text{ }\Omega$ (see figure 10)	t_{on}		15		μs
Turn-off time	$V_S = 5\text{ V}$, $I_C = 1\text{ mA}$, $R_L = 100\text{ }\Omega$ (see figure 10)	t_{off}		10		μs

Note

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

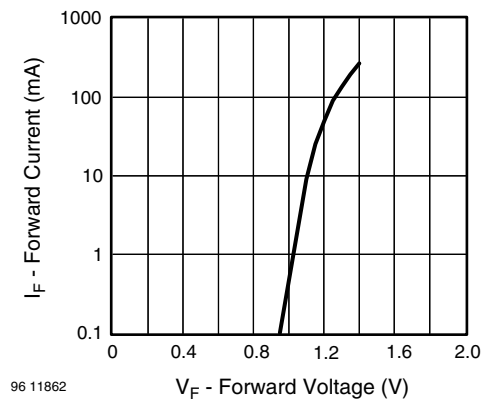
BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 2 - Forward Current vs. Forward Voltage

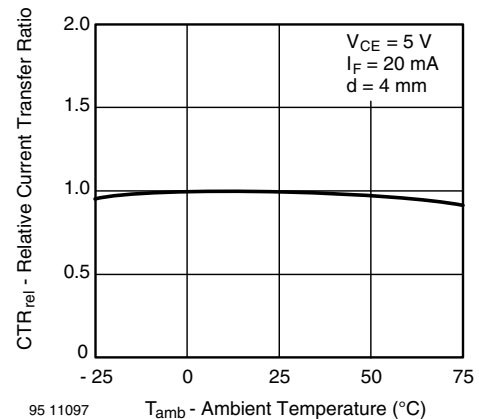


Fig. 3 - Relative Current Transfer Ratio vs. Ambient Temperature

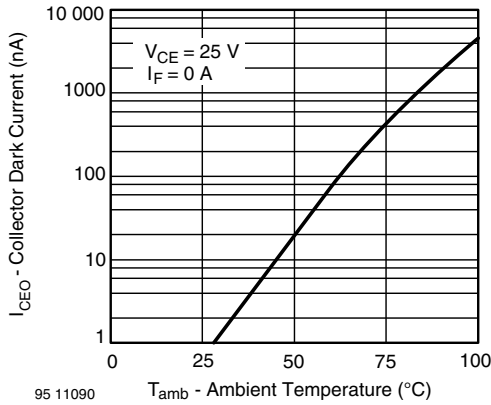


Fig. 4 - Collector Dark Current vs. Ambient Temperature

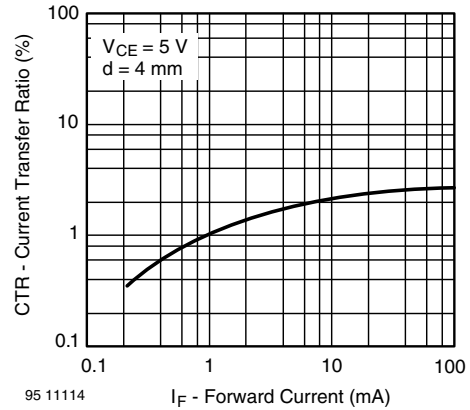


Fig. 7 - Current Transfer Ratio vs. Forward Current

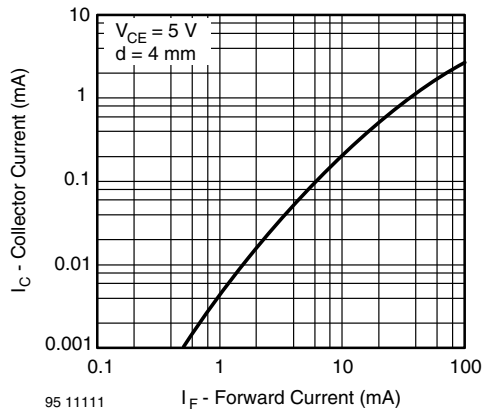


Fig. 5 - Collector Current vs. Forward Current

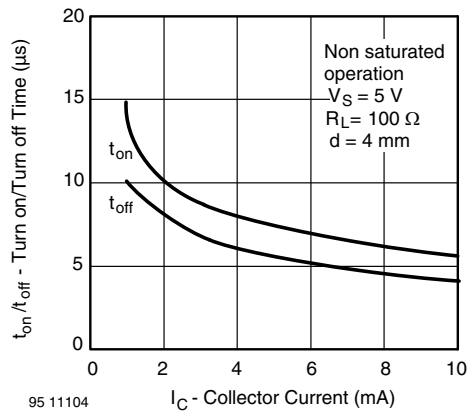


Fig. 8 - Turn on/off Time vs. Forward Current

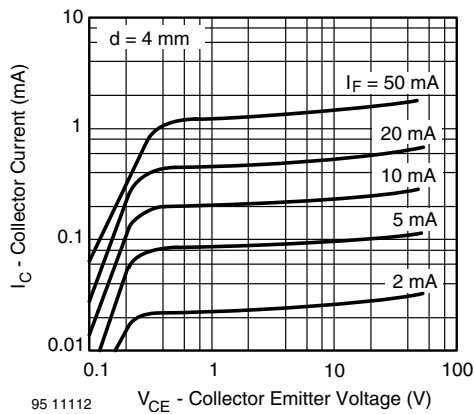


Fig. 6 - Collector Current vs. Collector Emitter Voltage

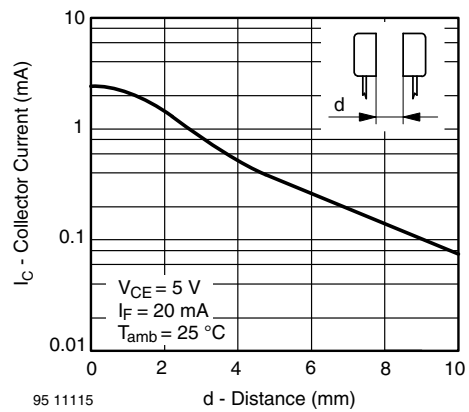


Fig. 9 - Collector Current vs. Distance

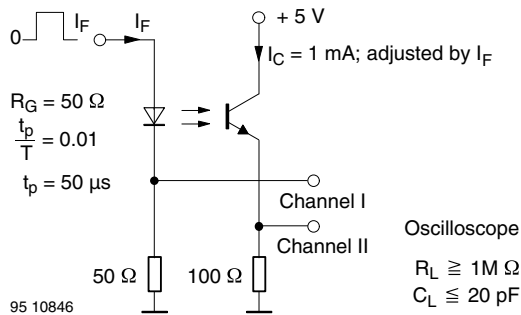


Fig. 10 - Pulse Diagram

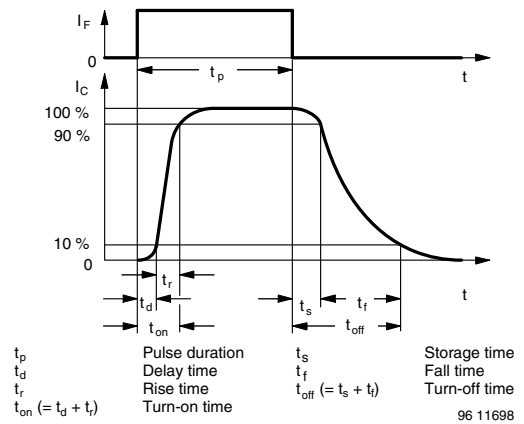
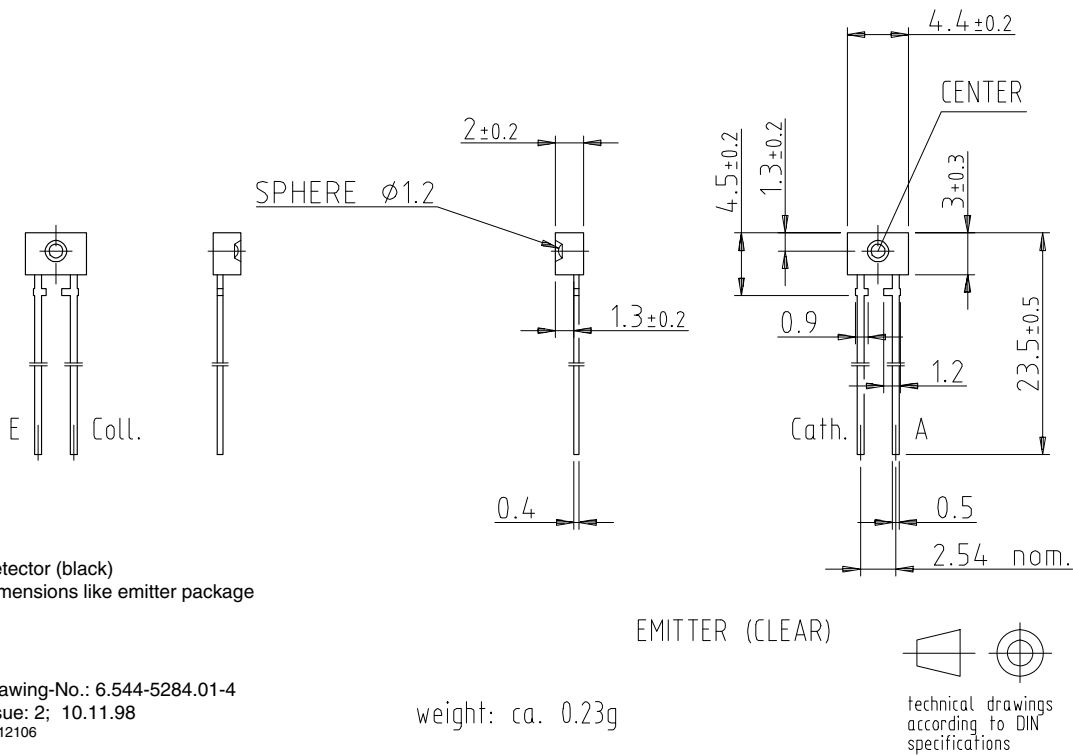


Fig. 11 - Switching Times

PACKAGE DIMENSIONS in millimeters

 Detector (black)
 Dimensions like emitter package

 Drawing-No.: 6.544-5284.01-4
 Issue: 2; 10.11.98
 96 12106

weight: ca. 0.23g

 technical drawings
 according to DIN
 specifications

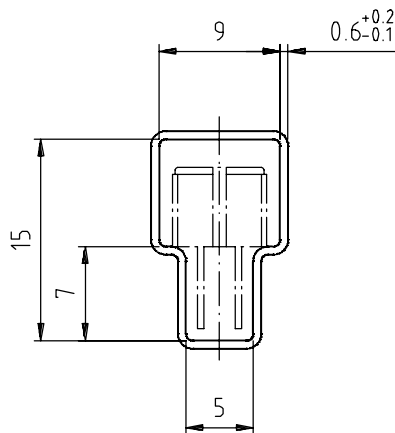
Packaging and Ordering Information

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: $\pm 0.5\text{mm}$

Length: $575 \pm 1\text{mm}$

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



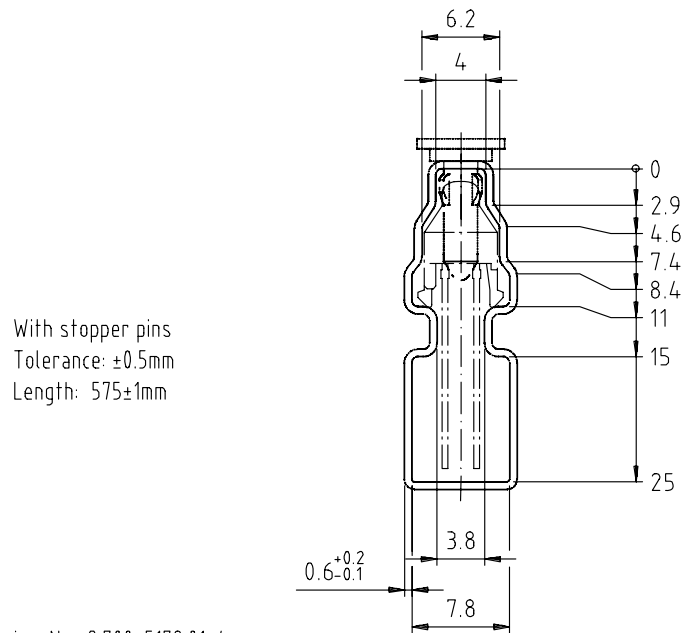
Drawing-No.: 9.700-5139.01-4
Issue: 1; 10.05.00

Drawing refers to following types: TCRT 5000

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

15210

Fig. 2

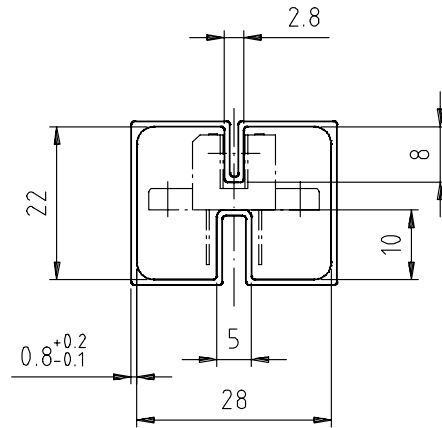


With stopper pins
Tolerance: ±0.5mm
Length: 575±1mm

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

15201

Fig. 3

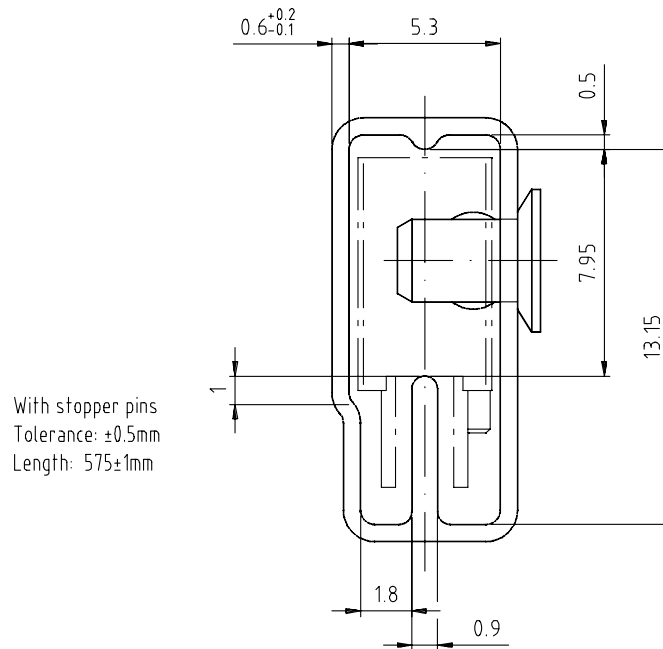


With rubber stopper
Tolerance: ±0.5mm
Length: 575±1mm

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

15199

Fig. 4



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

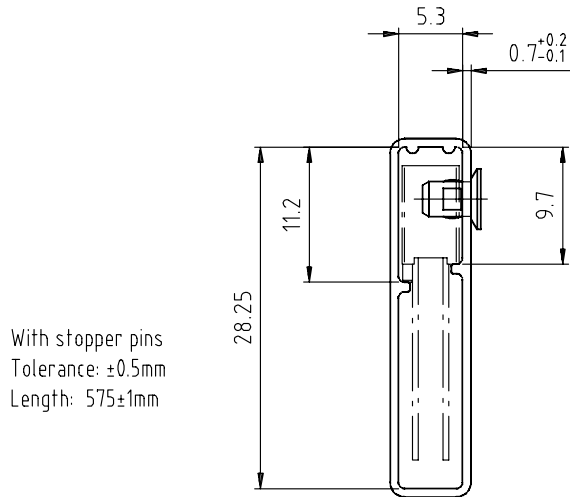
Drawing-No.: 9.700-5140.01-4
Issue: 1; 25.02.00

15202

Fig. 5

Packaging and Ordering Information

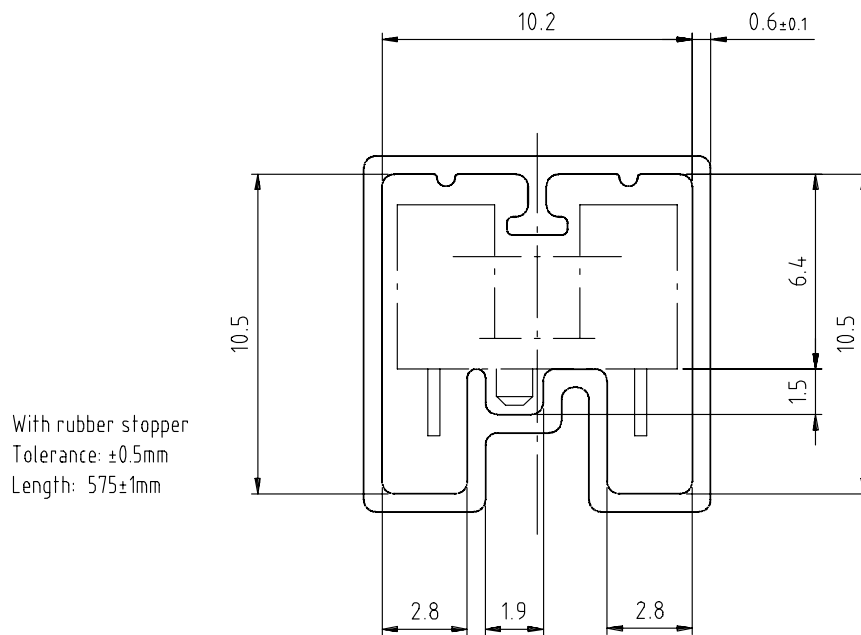
Vishay Semiconductors Packaging and Ordering Information



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

Fig. 8



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