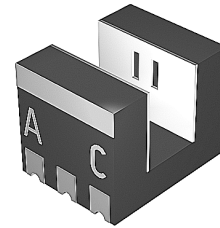


Subminiature Dual Channel Optical Sensor with Phototransistor Output

Description

This device has a compact construction where the emitting-light source and the detector are located face-to-face on the same optical axes.

The operating wavelength is 950 nm. The detector side incorporates 2 phototransistors. Distance of both channels is 0.8 mm.



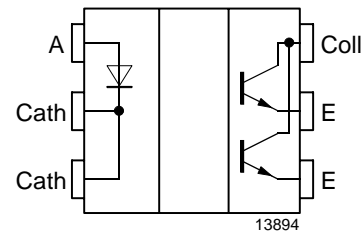
14849

Applications

- Accurate position sensor for encoder,
- Detection for motion direction,
- Suitable for computer mouse and track-balls

Features

- Dual channel with 0.3 mm aperture
- Channel 1 to channel 2 distance 0.8 mm (optical center)
- Gap 2 mm
- Package height: 4 mm
- Surface Mountable Technology (SMD)
- Parts shipped taped and reeled 2000 pcs/ reel
- Soldering method according to CECC00802 table 1, class B or C



Order Instruction

Ordering Code	Resolution (mm) / Aperture (mm)	Remarks
TCUT1200	0.24 / 0.3	

Absolute Maximum Ratings

Input (Emitter)

Parameter	Test Conditions	Symbol	Value	Unit
Reverse voltage		V_R	5	V
Forward current		I_F	25	mA
Forward surge current	$t_p \leq 10 \mu s$	I_{FSM}	100	mA
Power dissipation	$T_{amb} \leq 25^\circ C$	P_V	75	mW

Output (Detector)

Parameter	Test Conditions	Symbol	Value	Unit
Collector emitter voltage		V_{CEO}	70	V
Emitter collector voltage		V_{ECO}	7	V
Collector current		I_C	20	mA
Power dissipation	$T_{amb} \leq 25^\circ C$	P_V	75	mW

Coupler

Parameter	Test Conditions	Symbol	Value	Unit
Total power dissipation	$T_{amb} \leq 25^\circ C$	P_{tot}	150	mW
Ambient temperature range		T_{amb}	-40 to +85	$^\circ C$
Storage temperature range		T_{stg}	-40 to +100	$^\circ C$
Soldering temperature	$t \leq 5 s$	T_{sd}	230	$^\circ C$

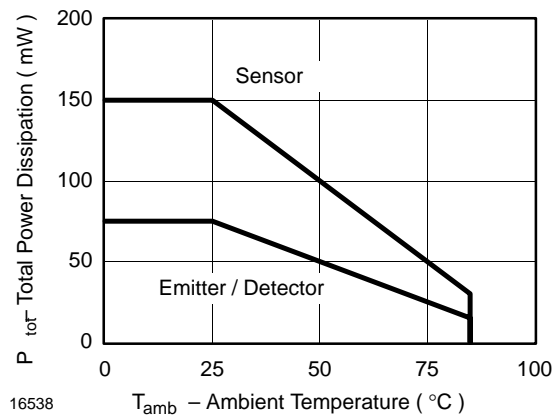


Figure 1. Derating diagram



Electrical Characteristics ($T_{amb} = 25^{\circ}\text{C}$)

Input (Emitter)

Parameter	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Forward voltage	$I_F = 15\text{ mA}$	V_F		1.2	1.5	V
Reverse current	$V_R = 5\text{ V}$	I_R			10	μA
Junction capacitance	$V_R = 0\text{ V}, f = 1\text{ MHz}$	C_j		50		pF

Output (Detector)

Parameter	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector emitter voltage	$I_C = 1\text{ mA}$	V_{CEO}	70			V
Emitter collector voltage	$I_E = 100\ \mu\text{A}$	V_{ECO}	7			V
Collector emitter cut-off current	$V_{CE} = 25\text{ V}, I_F = 0, E = 0$	I_{CEO}		10	100	nA

Coupler

Parameter	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector current per channel	$V_{CE} = 5\text{ V}, I_F = 15\text{ mA}$	I_C	300	500		μA
Collector emitter saturation voltage	$I_F = 15\text{ mA}, I_C = 0.05\text{ mA}$	V_{CEsat}			0.4	V

Switching Characteristics

Parameter	Test Conditions	Symbol	Typ.	Max.	Unit
Rise time	$I_C = 0.3 \text{ mA}$, $V_{CE} = 5 \text{ V}$, $R_L = 1000 \Omega$ (see figure 2)	t_r	20	150	μs
Fall time		t_f	30	150	μs

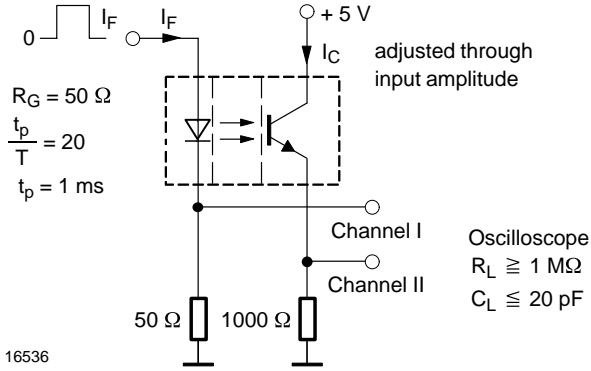
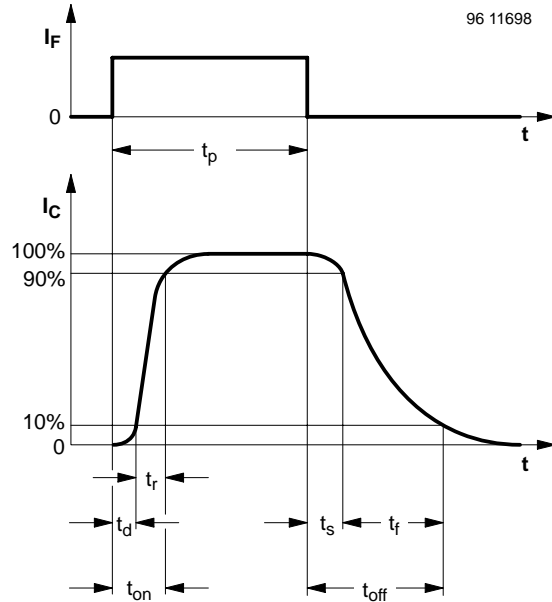


Figure 2. Test circuit



t_p pulse duration
 t_d delay time
 t_r rise time
 $t_{on} (= t_d + t_r)$ turn-on time
 t_s storage time
 t_f fall time
 $t_{off} (= t_s + t_f)$ turn-off time

Figure 3. Switching times

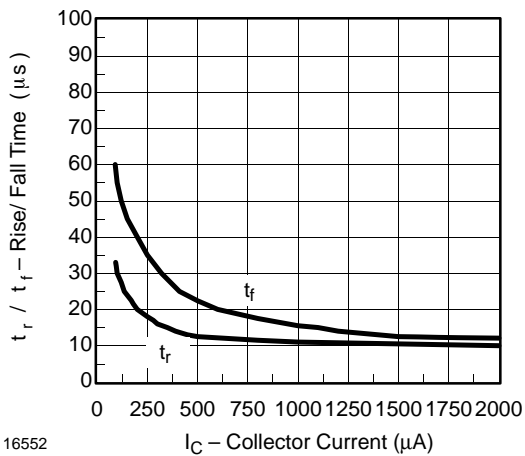


Figure 4. Rise/ Fall Time vs. Collector Current

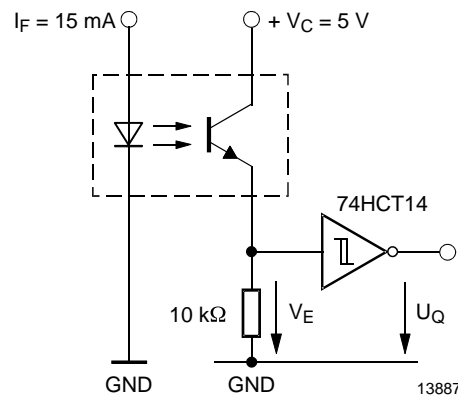


Figure 5. Application example

Temperature – Time Profile

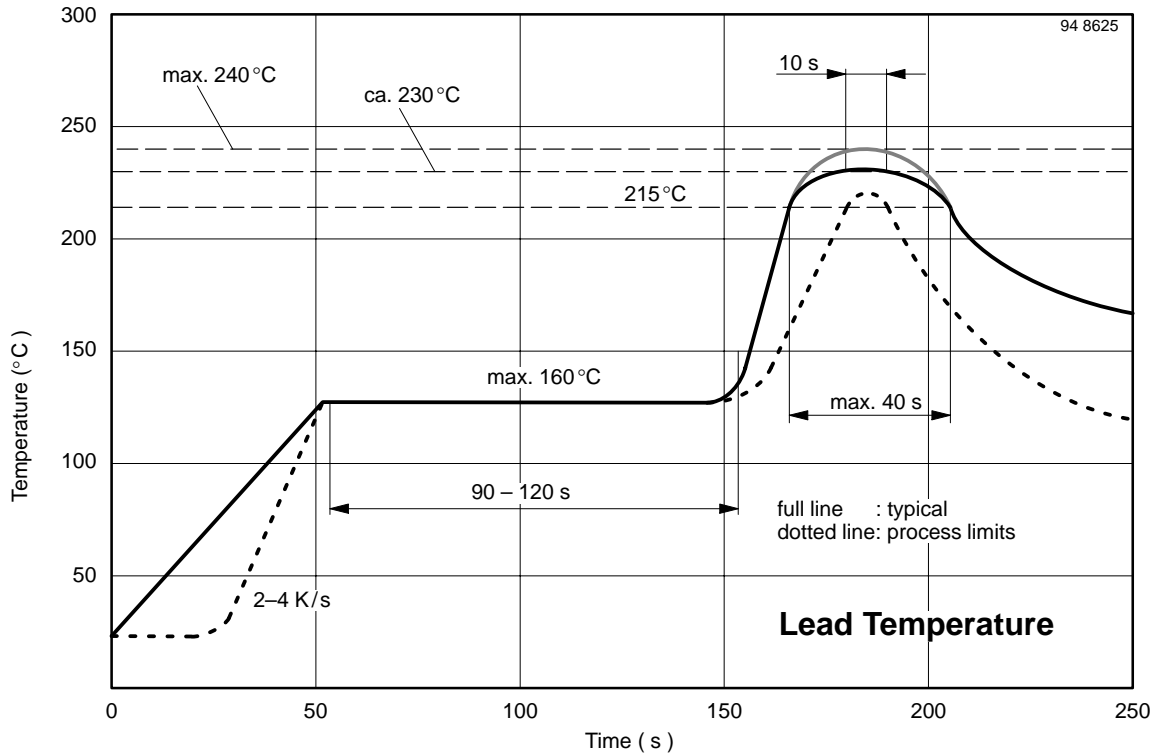


Figure 6. Infrared reflow soldering optodevices (SMD package)

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

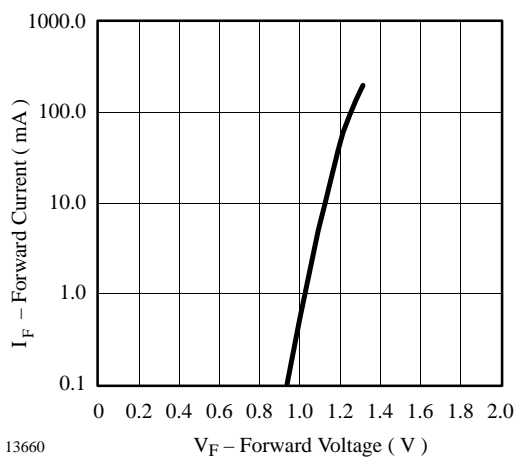


Figure 7. Forward Current vs. Forward Voltage

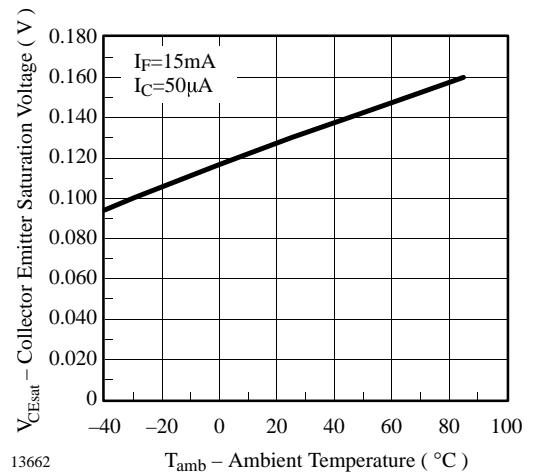
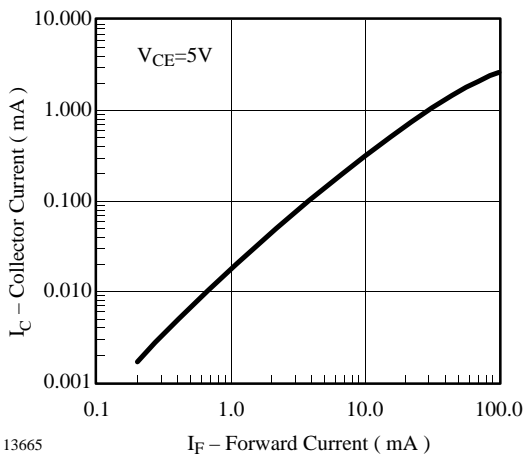
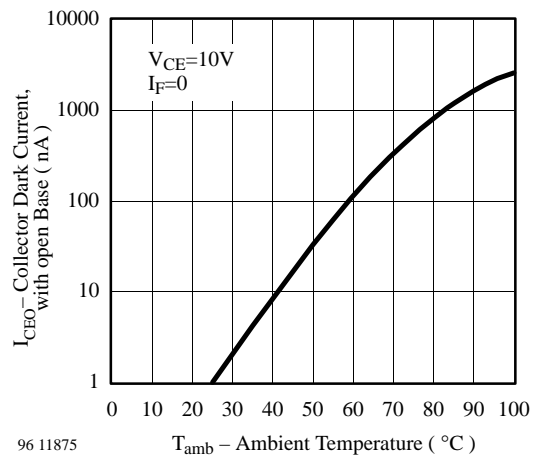


Figure 8. Collector Emitter Saturation Voltage vs. Ambient Temperature



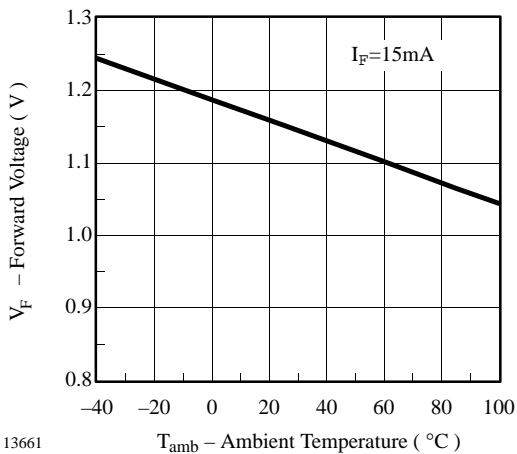
13665

Figure 9. Collector Current vs. Forward Current



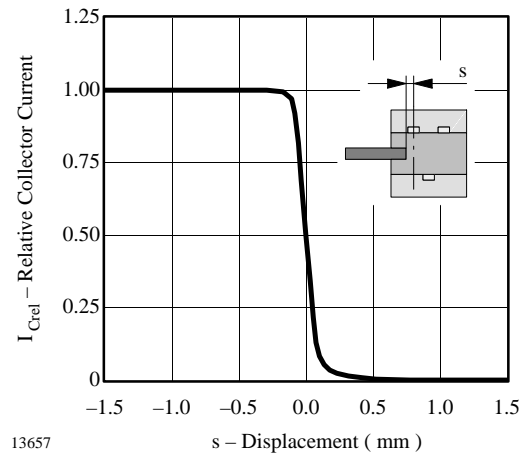
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Figure 12. Collector Dark Current vs. Ambient Temperature



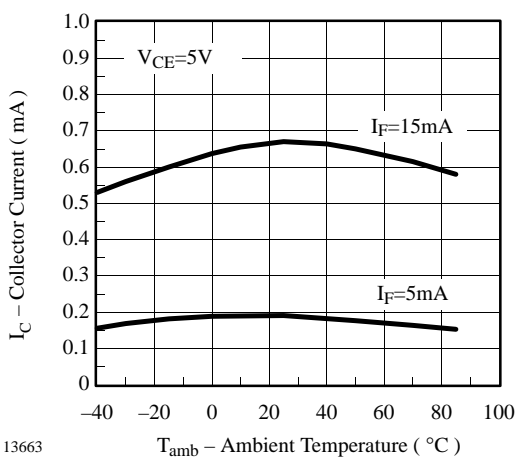
13661

Figure 10. Forward Voltage vs. Ambient Temperature



13657

Figure 13. Relative Collector Current vs. Displacement



13663

Figure 11. Collector Current vs. Ambient Temperature

Packing

Dampproof packing

Products will be packed in anti-humidity aluminium bags to prevent the products from moisture absorption during transportation and storage. Each bag contains a desiccant with moisture indicators. In the event bags absorb moisture, the indicators change their color from blue to pink.

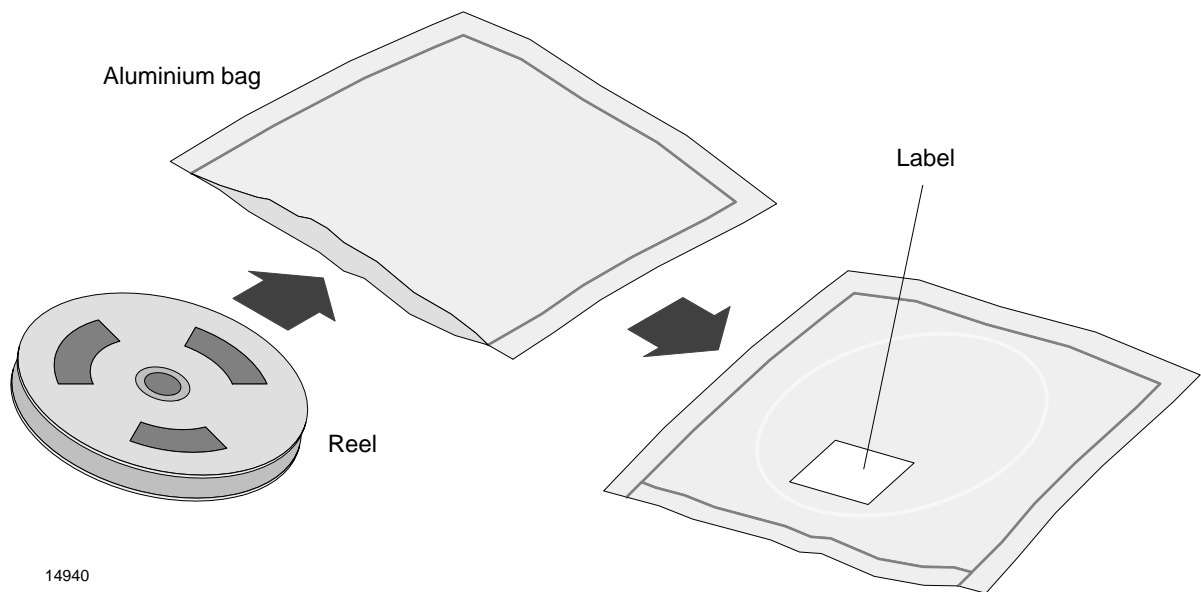
Recommended method of storage

Dry box storage is recommended to prevent the parts from moisture absorption. The following conditions should be preserved if dry boxes are not available.

Storage temperature: 10 to 30°C Storage humidity: 60% RH max

In case of moisture absorption the device will recover to the former condition by drying under the following recommended conditions:

Taped version: 60°C/ 48 h Untaped version: 60°C/ 48 h

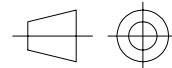
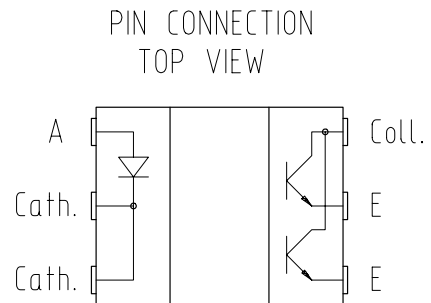
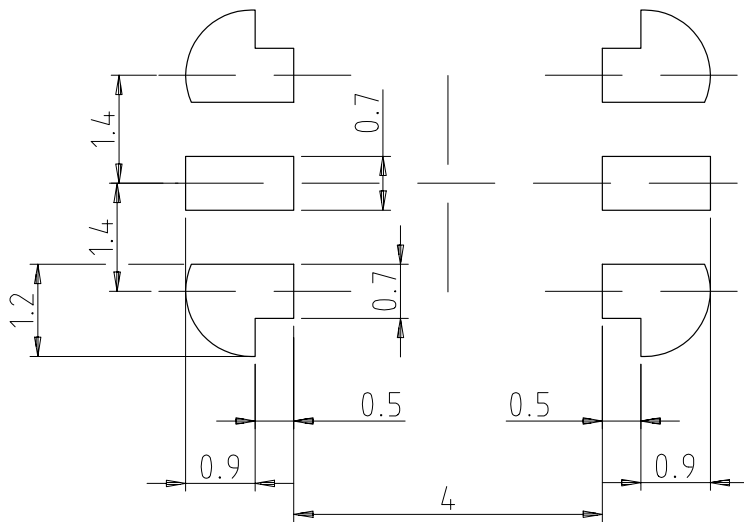
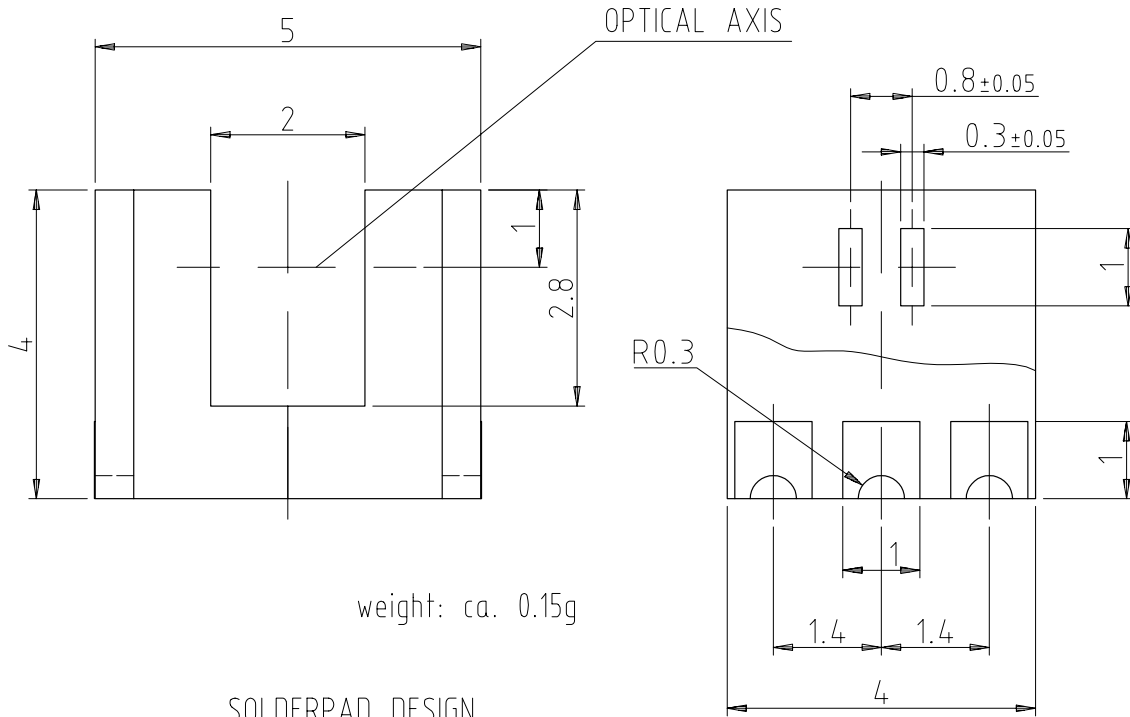


TCUT1200

Vishay Semiconductors



Dimensions of TCUT1200 in mm



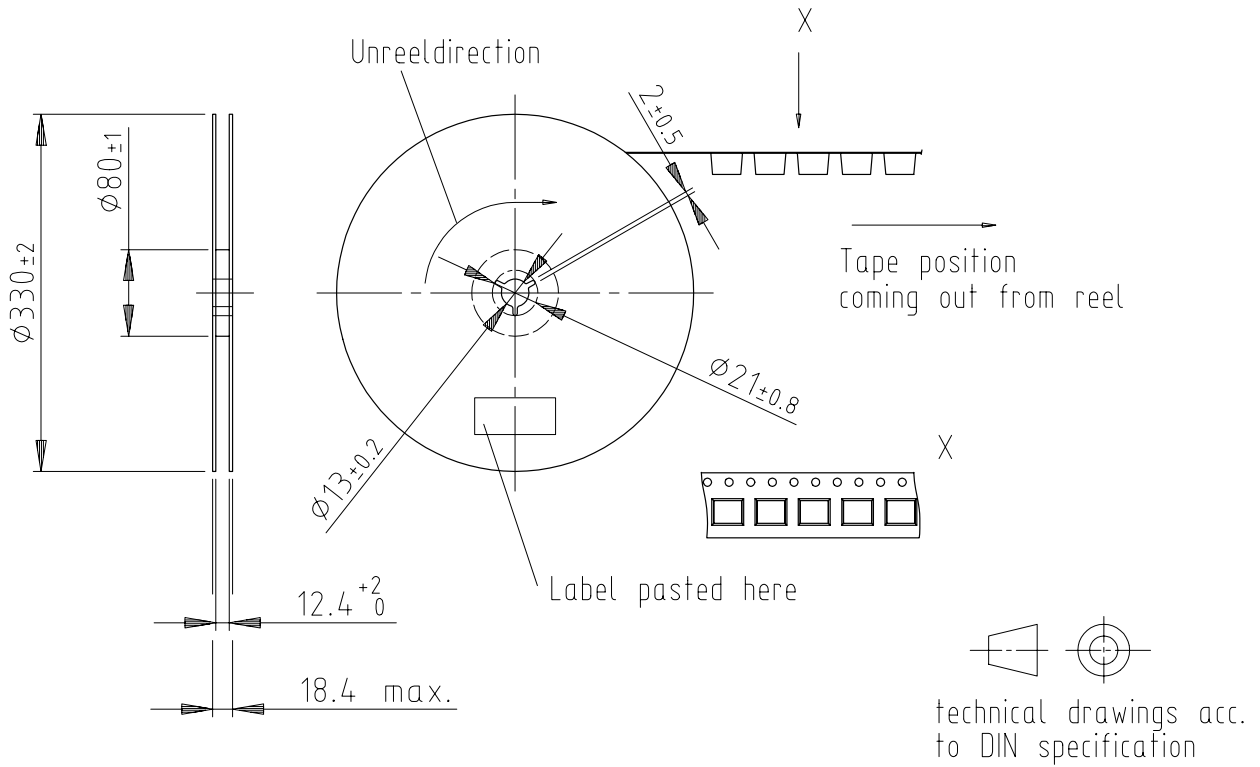
technical drawings
according to DIN
specifications

12898

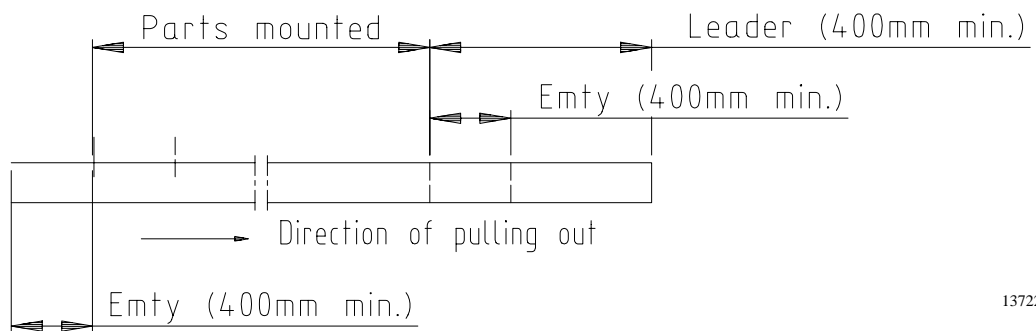
All dimensions in mm
Not indicated tolerances ± 0.15

Dimensions of Reel and Shape in mm

Reel-dimension and shape:



Leader and trailer tape:



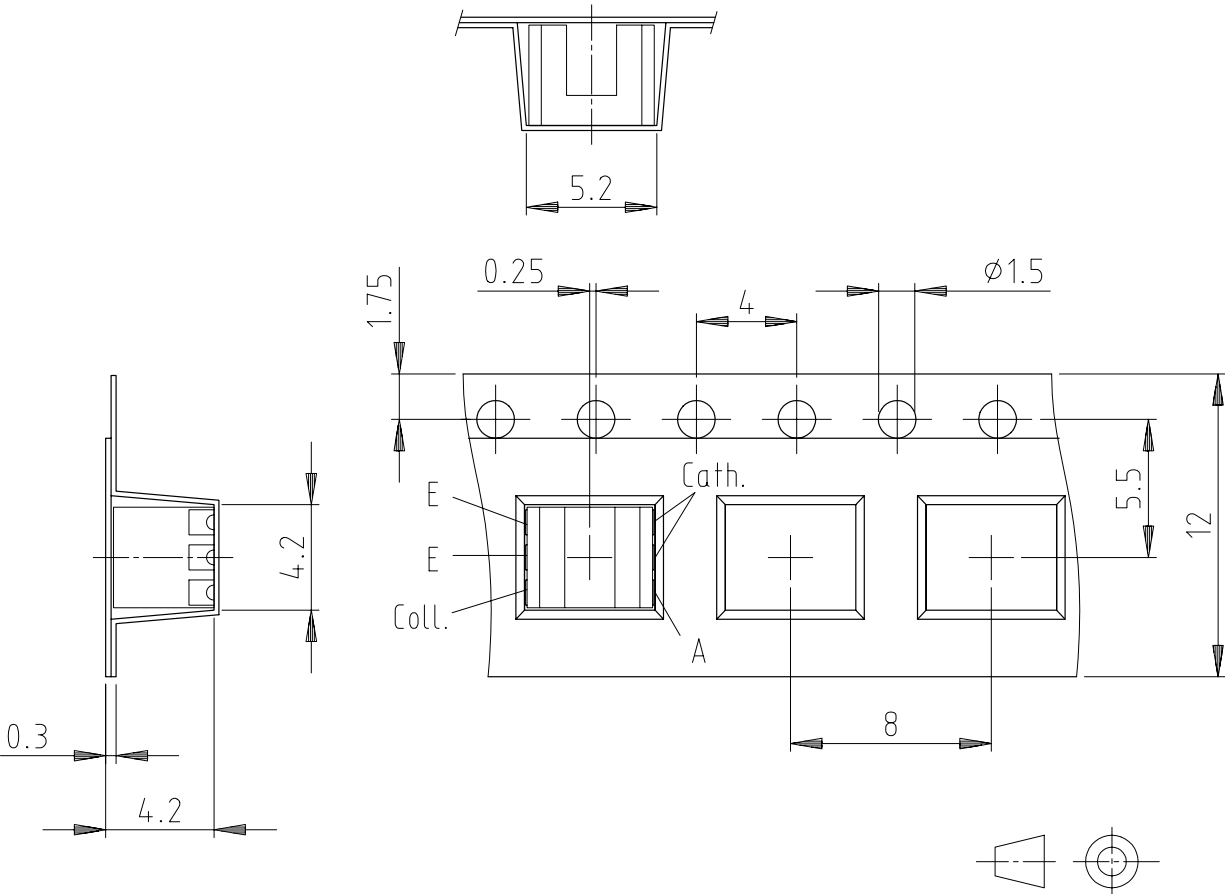
13722

TCUT1200

Vishay Semiconductors



Dimensions of Tape in mm



technical drawings acc.
to DIN specification

Quantity per reel: 2000 pcs.

13720



Ozone Depleting Substances Policy Statement

It is the policy of **Vishay Semiconductor GmbH** to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

We reserve the right to make changes to improve technical design and may do so without further notice.

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use Vishay Semiconductors products for any unintended or unauthorized application, the buyer shall indemnify Vishay Semiconductors against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany
Telephone: 49 (0) 7131 67 2831, Fax number: 49 (0) 7131 67 2423

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Datasheets for electronics components.