

# ODU MINI-CARD

Board-to-Board Connector

Grid 1.27 x 2.54 mm

SMT and Solder-In Technology



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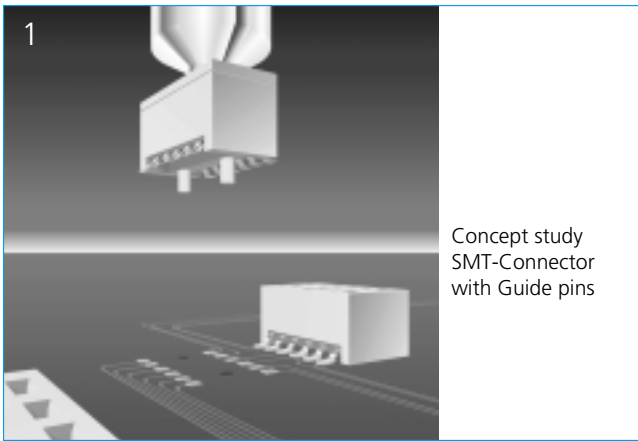
All dimensions in mm.

All figures are illustrations.

Changes reserved.

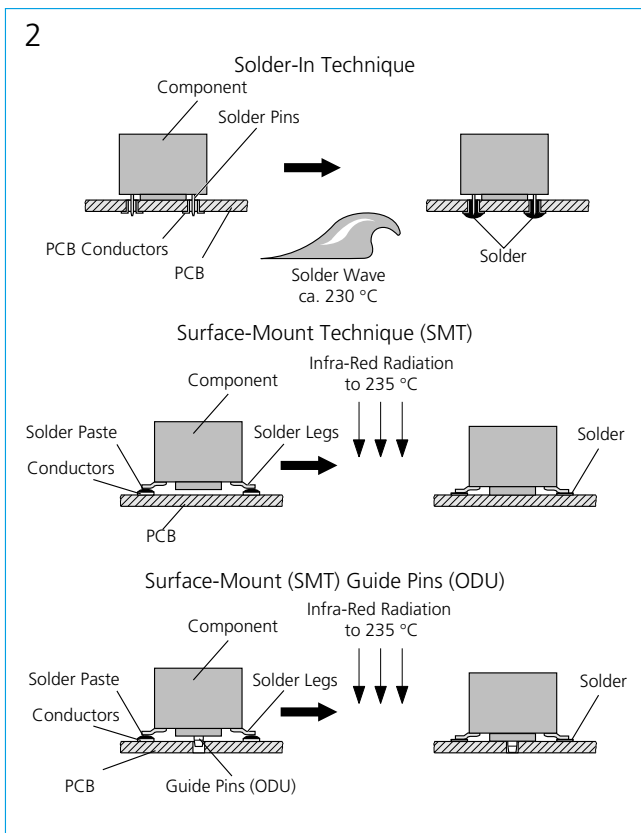
## Experience with SMT Connectors

Because of the importance of SMT technology we present a brief review of the concept:



**Solder-in components** are placed on the printed circuit board (PCB) with their pins pushed through holes in the PCB. The pins are then soldered from below using a wave solder machine. (see Fig. 2)

By contrast, **SMT components are placed onto the PCB** but use solder paste which is applied to the surface of the PCB (see Fig. 2).



Active and passive SMT components are placed automatically with robotic placement equipment onto the PCB.

Surprisingly, an exception is still in many cases the placement of electro-mechanical components, such as connectors. Some of these components are still placed by hand, primarily due to their larger dimensions or higher mechanical placement forces required. Soldering is done with conventional wave solder machines. This duality of technology, SMT and wave solder, is undesirable in a production environment. Therefore, SMT connectors are becoming more and more desirable, even in small and medium size production runs.

The following is a summary of our experience with SMT connectors, based on years of sales and Millions of installed connectors.

### Requirement on SMT Connectors

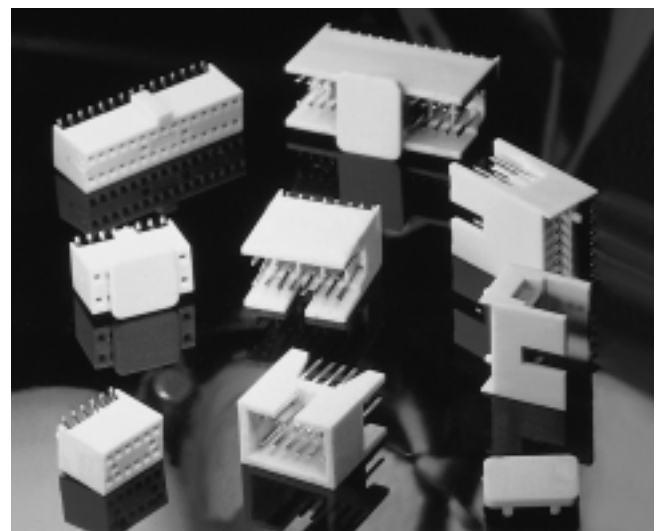
- High-temperature performance (-250°C)
- Automatic placement
- Resistant to mechanical forces (horizontal and vertical)
- Contact coplanarity of less than 0.1 mm
- Automatic Testing

### Requirements for the Pin-Socket combination

- Low insertion and withdrawal forces
- Low and constant resistance
- Good high frequency properties
- Safe locking of the two connector halves

### Board-to-board SMT connectors are shown in Fig. 3.

As shown, they have two guide pins and a vacuum adapter plate. The guide pins facilitate easy placement by pre-aligning the connector with the solder pad and taking up some of the mechanical forces due to relative movement between circuit boards.

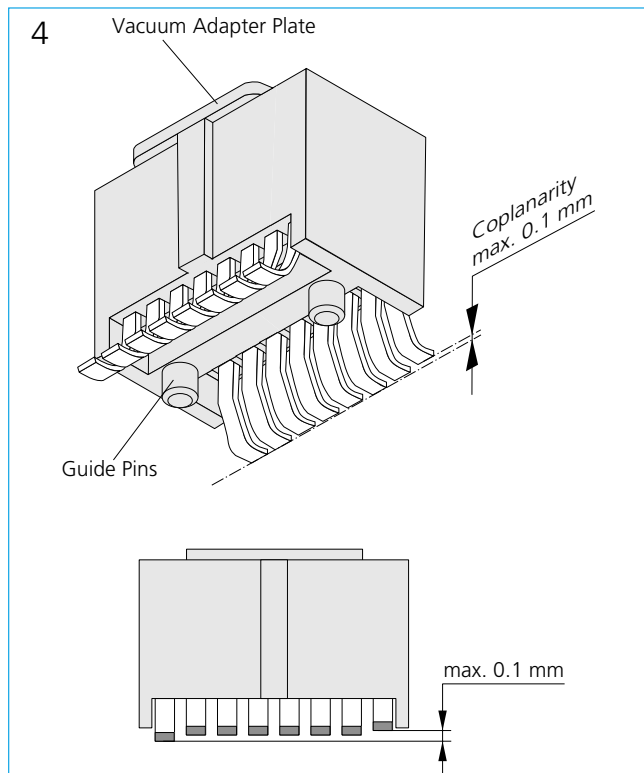


SMT-Connector in Grid 1,27 x 2,54 mm for Board-to-Board Connections 12, 16, 30, 40 and 50-positions

## Experience

### Guide Pins

Without exception, the guide pins have proven to be successful. Diameter and length is 1.00 mm. They provide excellent compensation for the horizontal forces. The alignment feature during component placement has become less important since today's automatic placement machines operate with great accuracy. However, for smaller production runs, where hand-placement is used, the pins have shown to be of significant help when aligning the connector with the PCB solder pad.



### Coplanarity

It is absolutely essential that a value  $<0.1$  is maintained. During the fully automatic assembly ODU has a 100% optical inspection to make sure that this value is maintained.

### Vacuum Adapter

The vacuum adapter plate is a complete success. Fully automated placement of the connectors is not only possible with a grabber (mostly larger and bulky) but also with the smaller vacuum head.

### Dimensions

Minimum component height of 8.5 mm for board-to-board appears to be sufficient for most applications. Most requirements are in the 10 to 18 mm range. Contacts are designed to take up to 1.5 mm tolerance in component height.

Example: For a nominal height of 10 mm the board-to-board distance can be extended to 11.5 mm.

### Grid

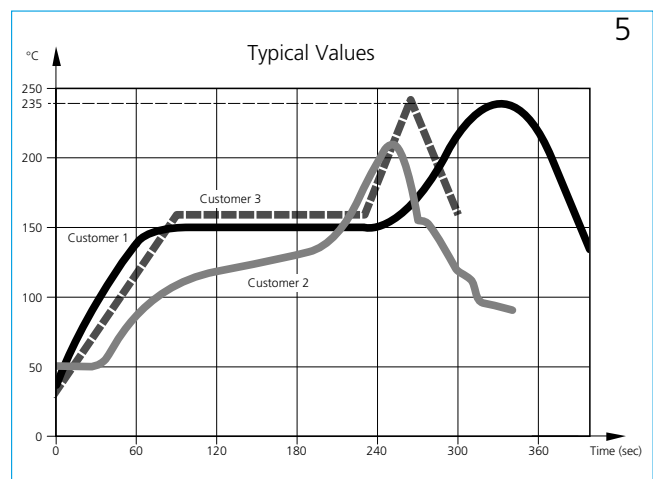
The 1.27 x 2.54 mm grid in the contact area meets most requirements.

### Contacts

Contacts are made of Be-Cu. They have two wiping contact points with long wiping action. The resulting low insertion and withdrawal force is less than 0.18 N. Contact resistance is less than 6 m $\Omega$  and results in exceptional good contact performance. For applications with very high number of contact positions the low contact forces provide significant advantage during assembling or disassembling circuit boards. Contact impedance is considered in all cases exceptional.

### Contact Design

The design of gull-wing solder legs involved a significant engineering effort. However, it appears that the spring action of the gull wings is of less importance than originally thought. Experience has shown that simple square posts (.64 x .64 mm), formed into a right-angle, can also be mounted onto a surface-mount board.



### Insulation Body

The high-temperature performance of the insulation body is of great importance. Temperature requirements are defined by a Temperature vs. Time diagram (see Fig. 5)

Contact surface finish in the solder area is CuNiSn (3  $\mu$ m). The tin alloy is 90% Sn and 10% lead. It has been shown acceptable for most solder pastes.

## Quality Assurance

Quality assurance at ODU follows ISO 9001 guidelines. Testing is performed with statistical methods in accordance with AQL 0.4. The most important aspect is the coplanarity which is tested with a profile projector.

## Technical Data

### Electrical Specification

Contact Resistance:	$\leq 6 \text{ m}\Omega$
Test voltage:	750 Volt eff.
Operating voltage:	30 V rms
Operating current:	
Single contact by 25 °C	0,5 A
Insulation resistance	$\geq 1 \text{ G}\Omega$

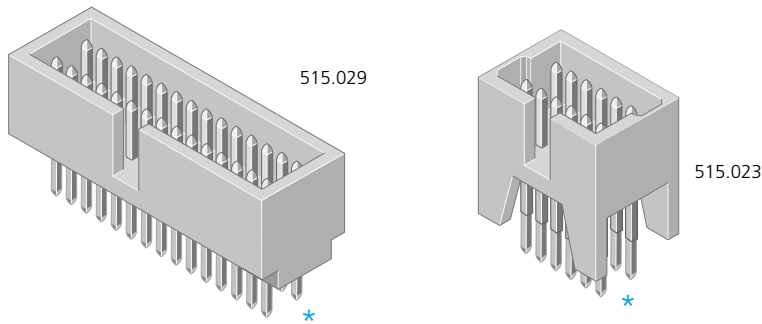
### Mechanical Specification

Operating Temperature:	PET: -40 °C up to +125 °C LCP: -40 °C up to +125 °C
SMT-Solder Temperature:	
max. 30 s on the solder area:	PET: 220 °C LCP: 260 °C
Humidity:	75% rel. Humidity acc. DIN 40 040
Insertionforce (contact):	< 0,18 N
Life operation	> 100

### Material and Surface

Contact Surface:	
Contact area:	0,75 $\mu\text{m}$ Au
Solder area:	3,0 $\mu\text{m}$ Sn
Material - insulation body:	PET, (GV) acc. to UL 94 V-O, grey RAL 7035 LCP on request
Material - contact:	
- contact socket:	beryllium-copper-alloy
- contact pin:	copper-alloy

## MINI-CARD Header – Solder-In 2-rows, straight, Grid 1.27 x 2.54 mm



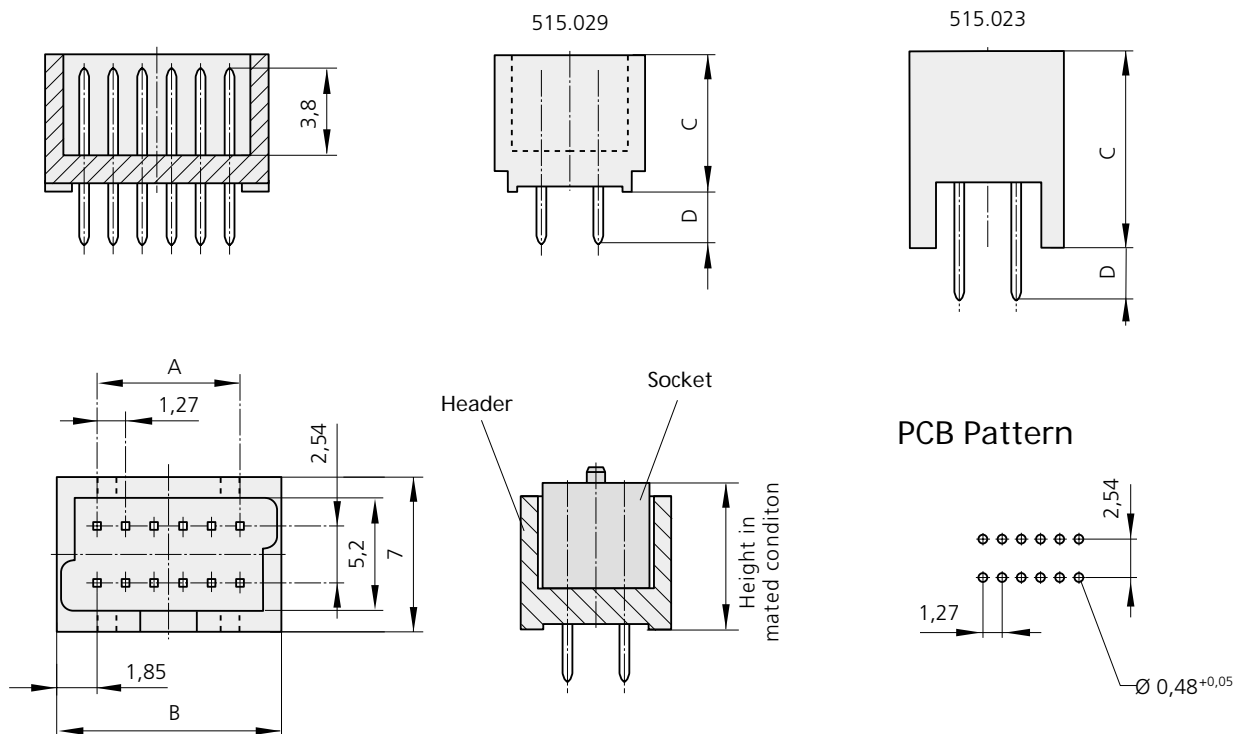
### Features

- Solder-in version
- Small dimensions
- Packaged in tubes

\* termination area with embossed round corner

**Technical Data see page 5**

### Dimensions



### Ordering Information and Dimensions (All Dimensions in mm)

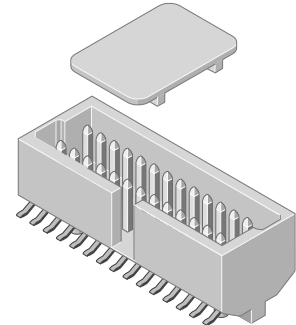
Position	Part-Number	Dim. A	Dim. B	Dim. C	Dim. D	Height in mated condition	Packaging	
							xxx=002 Tube	xxx=050 Tape/Reel
12	515.023.035.012.XXX	6,35	10,05	10,0	2,3	12,0 to 13,5 mm	40	---
30	515.029.035.030.XXX	17,78	21,48	7,0	3,0	9,0 to 10,5 mm	20	---

Other positions on request!

**MINI-CARD Header-SMT**  
2-rows, straight, Grid 1.27 x 2.54 mm

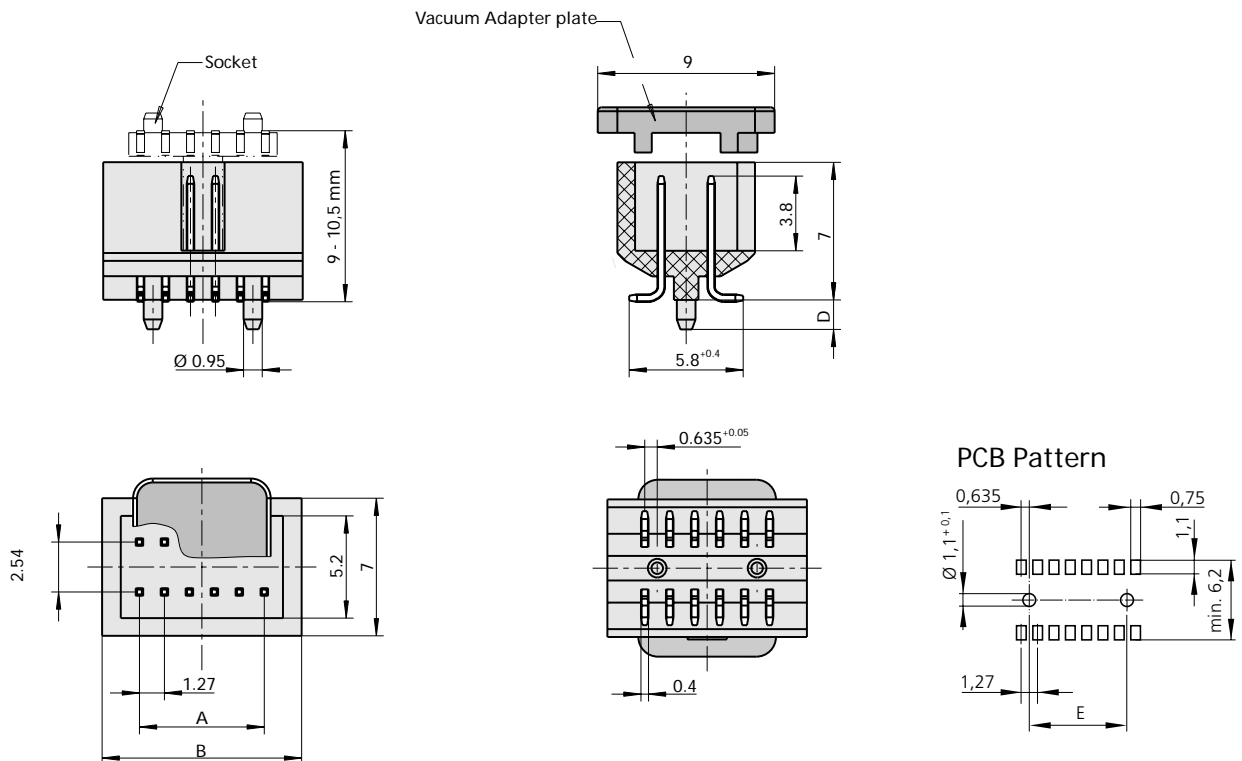
**Features**

- SMT Header for Board-to-Board connections
- Vacuum adapter plate
- 2 integrated guide pins
- small dimensions
- Packed in tubes or Tape/Reel



**Technical Data see page 5**

**Dimensions**

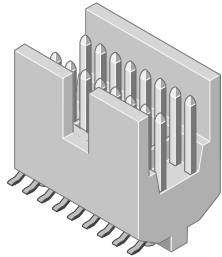


**Ordering Information and Dimensions (All Dimensions in mm)**

Position	Part-Number	Dim. A	Dim. B	Dim. D	Dim. E	Packaging	
						xxx=002 Tube	xxx=050 Tape/Reel
12	515.025.035.012.XXX	6,35	10,05	1,5	5,08	40	---
16	515.025.035.016.XXX	8,89	12,59	1,0	7,62	30	500
30	515.025.035.030.XXX	17,78	21,48	1,0	16,51	20	500

Other positions on request!

## MINI-CARD Header-SMT 2-rows, straight, Grid 1.27 x 2.54 mm

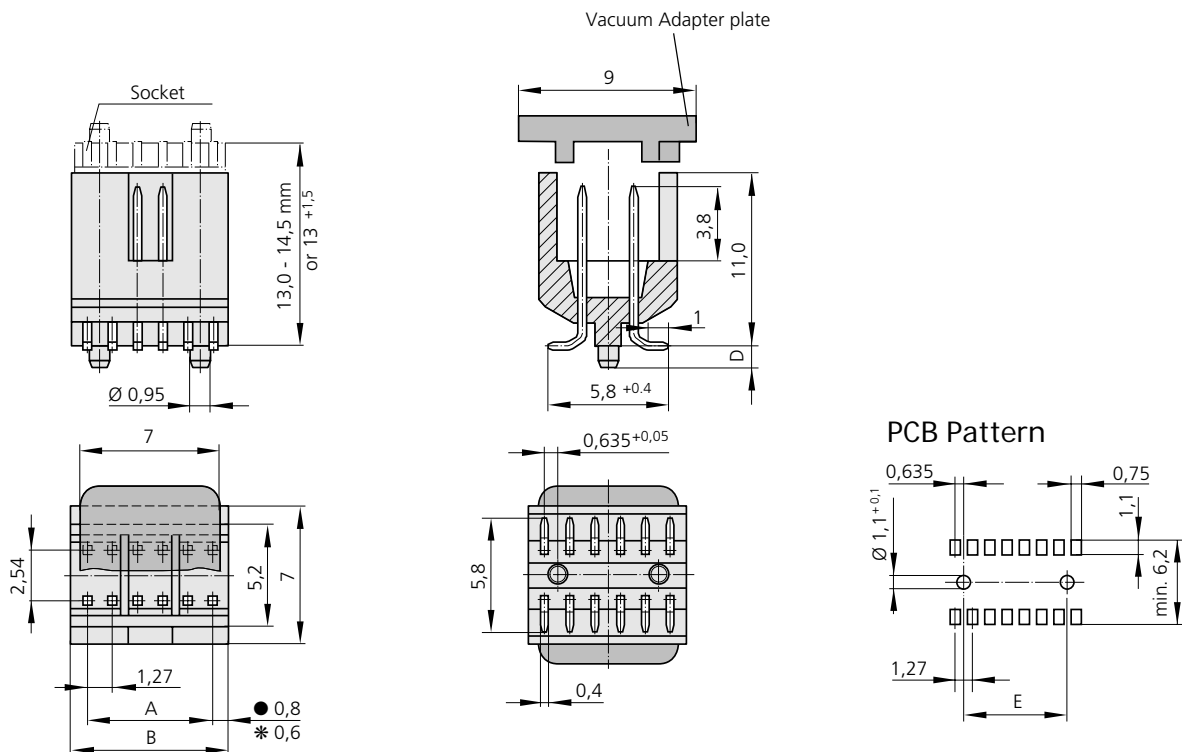


### Features

- SMT Header for Board-to-Board connections
- Vacuum adapter plate
- 2 integrated guide pins
- small dimensions
- Packed in tubes

**Technical Data see page 5**

### Dimensions



### Ordering Information and Dimensions (All Dimensions in mm)

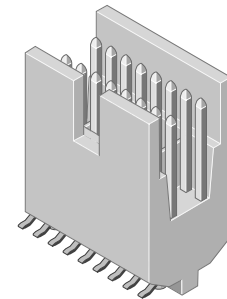
Position	Part-Number	Dim. A	Dim. B	Dim. D	Dim. E	Packaging	
						xxx=003 Tube	xxx=050 Tape/Reel
16	515.026.035.016.XXX	8,89	10,49	1,05	7,62	40	---
30	515.026.035.030.XXX	17,78	19,38	1,0	16,51	20	---

Other positions on request!

MINI-CARD Header-SMT  
2-rows, straight, Grid 1.27 x 2.54 mm

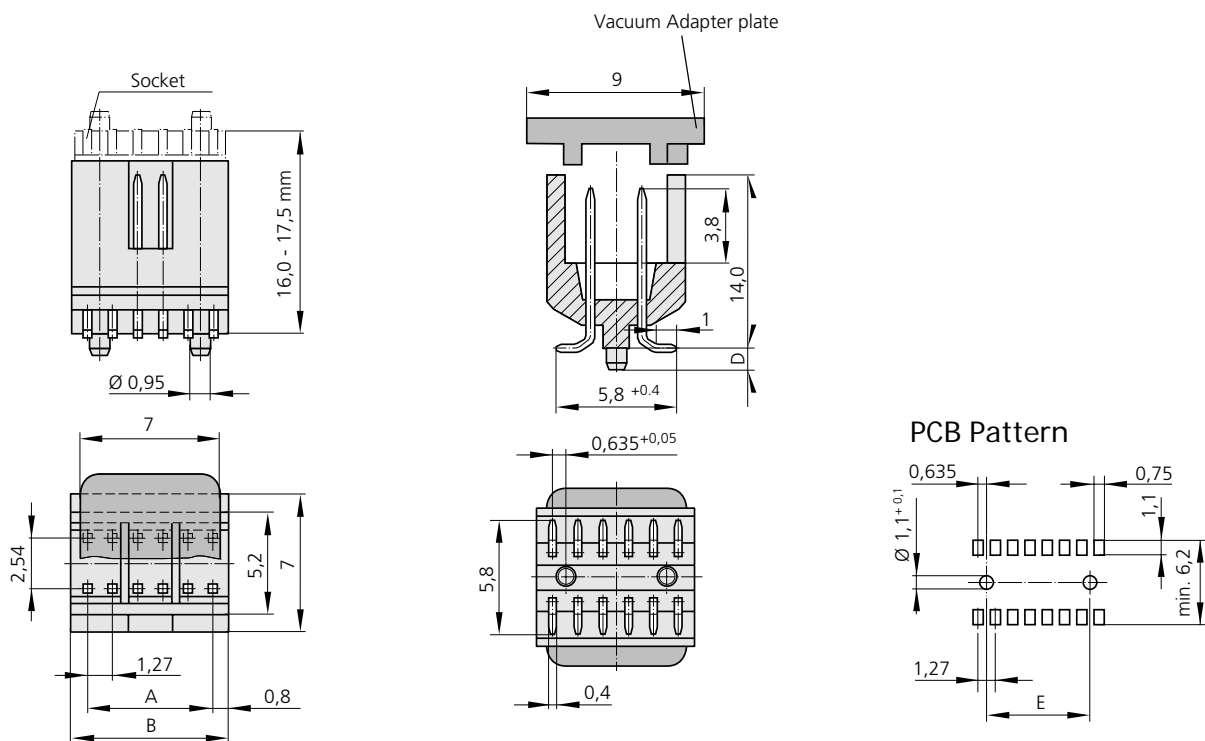
Features

- SMT Header for Board-to-Board connections
- Vacuum adapter plate
- 2 integrated guide pins
- small dimensions
- Packed in tubes



Technical Data see page 5

Dimensions

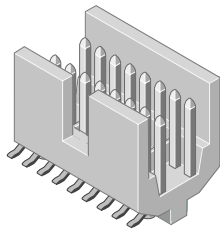


Ordering Information and Dimensions (All Dimensions in mm)

Position	Part-Number	Dim. A	Dim. B	Dim. D	Dim. E	Packaging	
						xxx=002 Tube	xxx=050 Tape/Reel
16	515.027.035.016.XXX	8,89	10,49	1,0	7,62	40	---

Other positions on request!

## MINI-CARD Header-SMT 2-rows, straight, Grid 1.27 x 2.54 mm

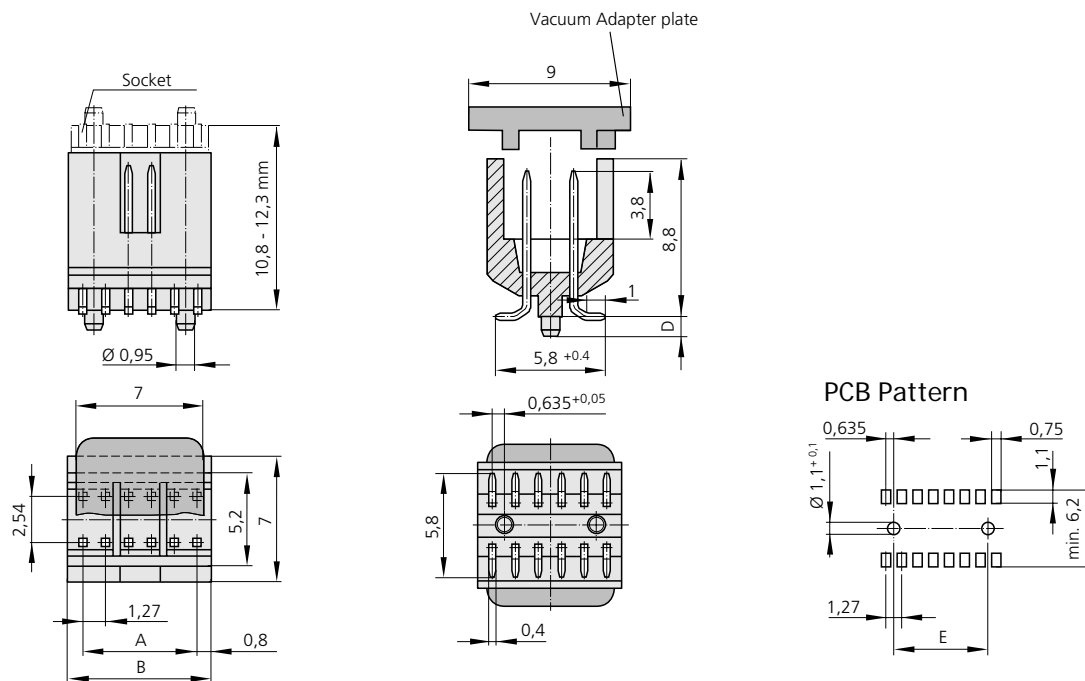


### Features

- SMT Header for Board-to-Board connections
- Vacuum adapter plate
- 2 integrated guide pins
- small dimensions
- Packed in tubes or Tape/Reel

**Technical Data see page 5**

### Dimensions



### Ordering Information and Dimensions (All Dimensions in mm)

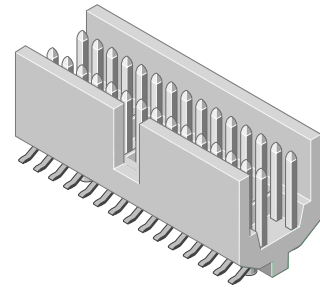
Position	Part-Number	Dim. A	Dim. B	Dim. D	Dim. E	Packaging	
						xxx=002 Tube	xxx=050 Tape/Reel
16	515.028.035.016.XXX	8,89	10,49	1,0	7,62	40	350

Other positions on request!

**MINI-CARD Header-SMT**  
2-rows, straight, Grid 1.27 x 2.54 mm

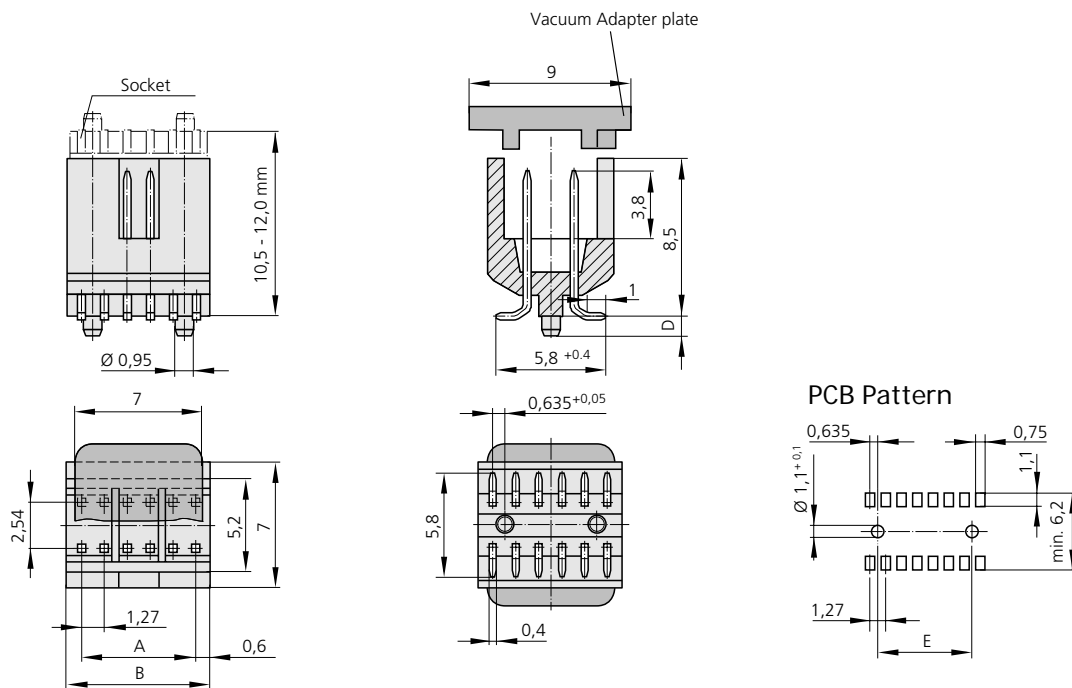
**Features**

- SMT Header for Board-to-Board connections
- Vacuum adapter plate
- 2 integrated guide pins
- small dimensions
- Packed in tubes or Tape/Reel



**Technical Data see page 5**

**Dimensions**

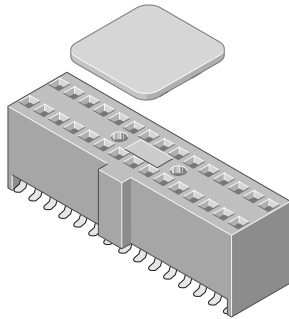


**Ordering Information and Dimensions (All Dimensions in mm)**

Position	Part-Number	Dim. A	Dim. B	Dim. D	Dim. E	Packaging	
						xxx=002 Tube	xxx=050 Tape/Reel
30	515.031.035.030.XXX	17,78	18,98	1,5	16,51	20	300
40	515.031.035.040.XXX	24,13	25,33	1,0	22,86	15	300
50	515.031.035.050.XXX	30,48	31,68	1,0	29,21	10	300

Other positions on request!

## MINI-CARD Socket SMT 2-rows, straight, Grid 1.27 x 2.54 mm

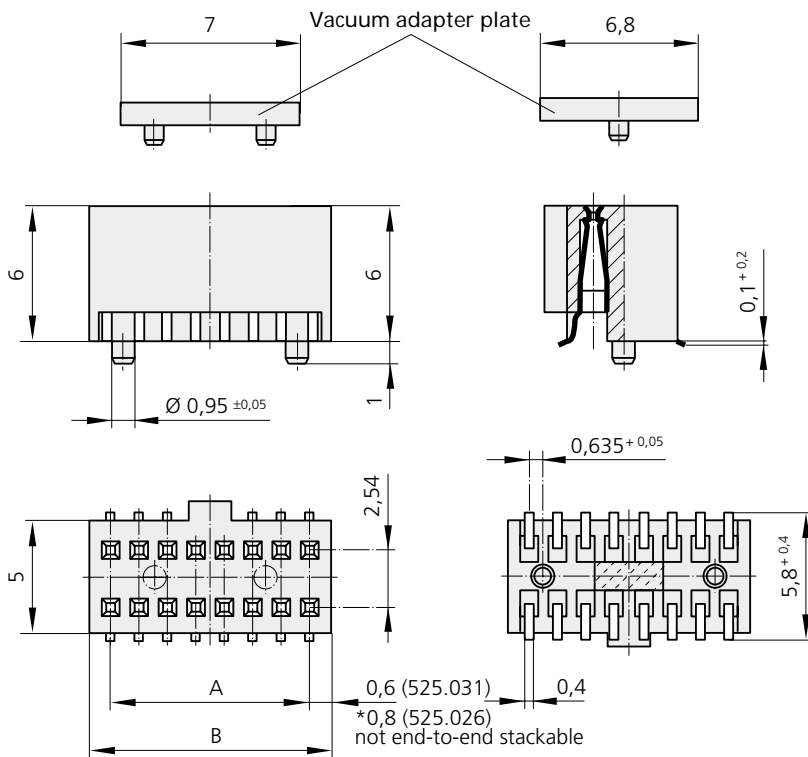


### Features

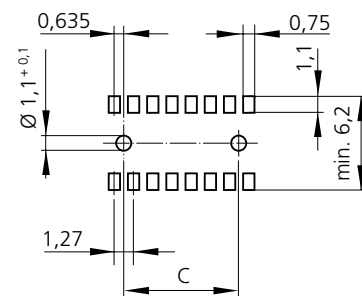
- Height 6.0 mm
- End-to-end stackable without loss of contacts
- SMT Socket connector for board-to-board interconnect
- Vacuum adapter plate
- 2 integrated guide pins
- stackable (525.031)

**Technical Data see page 5**

### Dimensions



### PCB Pattern



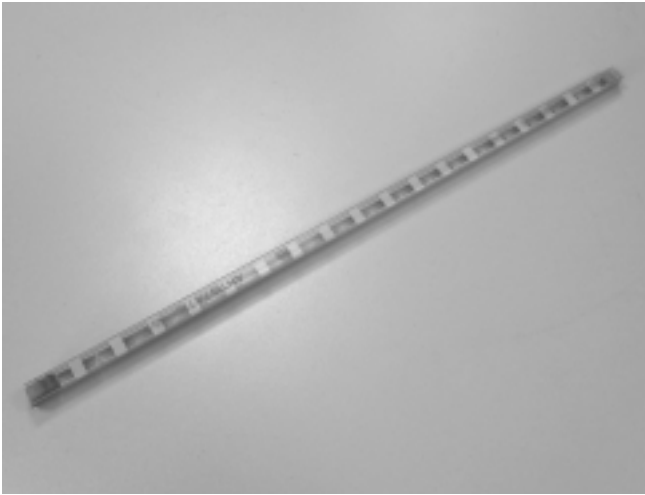
### Ordering Information and Dimensions (All Dimensions in mm)

Position	Part-Number	Dim. A	Dim. B	Dim. C	Packaging	
					xxx=002 Tube	xxx=050 Tape/Reel
12	525.026.035.012.XXX	6,35	7,95	5,08	40	600
16	525.026.035.016.XXX	8,89	10,49	7,62	40	500
30	525.031.035.030.XXX	17,78	18,98	16,51	20	500
40	525.031.035.040.XXX	24,13	25,33	22,86	15	550
50	525.031.035.050.XXX	30,48	31,68	29,21	10	550

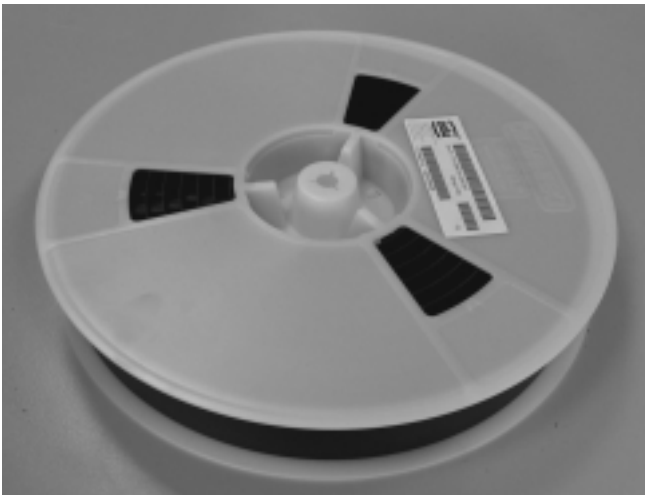
Other positions on request!



## Packing versions for ODU MINI-CARD

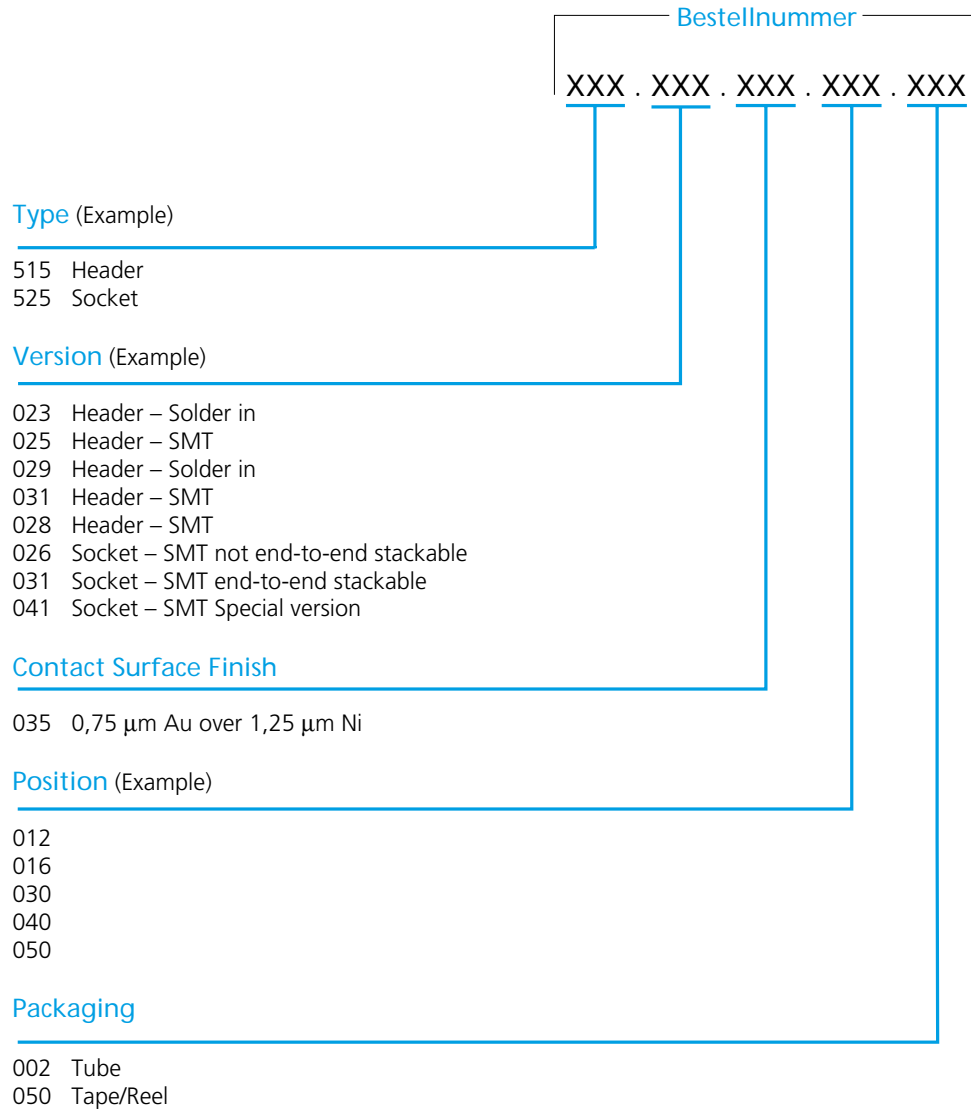


Tube  
XXX = 002



Tape/Reel  
XXX = 050

## Ordering key

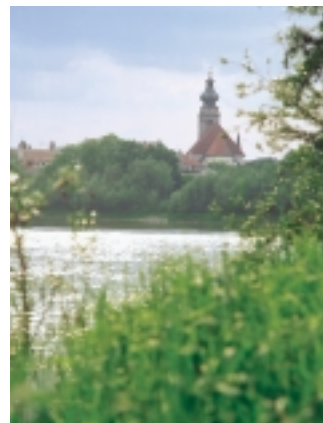




ODU's headquarters and factory are located in Mühlendorf, at the river Inn, approximately 50 miles east of Munich, at the foothills of the Bavarian Alps.



Photo of City Mühlendorf /Inn



Mühlendorf an idyllic small town with its typical Inn-Salzach architecture.



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