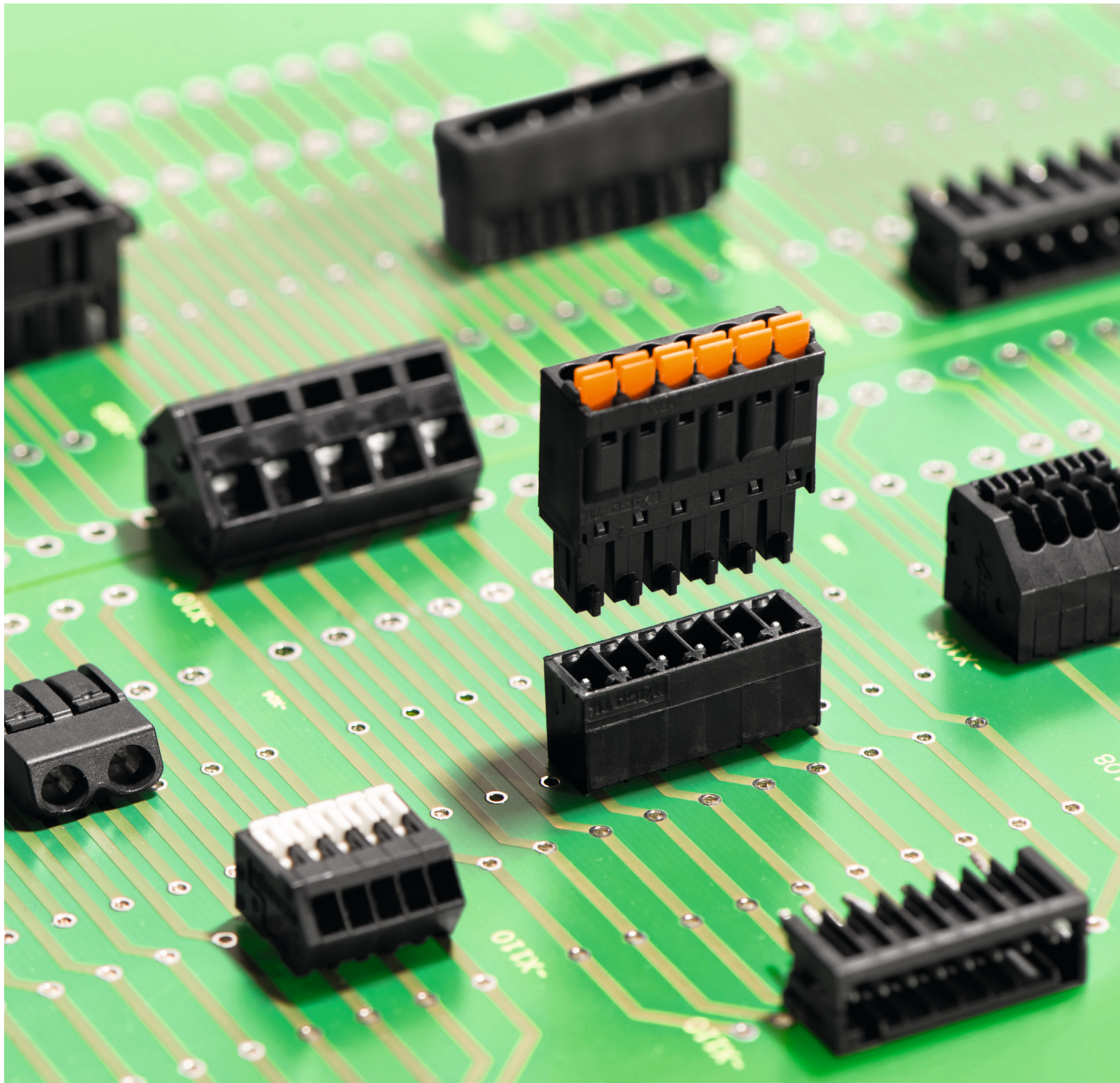


Reflow Technology Product Overview



THR COMPONENT REQUIREMENTS

THR Components

Components for THR (Through-Hole Reflow) soldering must withstand higher temperatures than those found in standard wave soldering. Therefore, WAGO THR components are made from high-temperature-resistant material and designed to provide optimal heat supply to the soldering point. These components have a suction area for automated pick-and-place assembly and are also available in tape-and-reel packaging. This allows WAGO THR components to be fully integrated into the SMT production process, resulting in greater cost savings.

Materials

Plastic material for THR components must resist a maximum peak temperature of 260 °C for 10 seconds (temperature profile acc. to DIN EN 61760-1) and match the PCB base material's coefficient of thermal expansion (CTE) to prevent

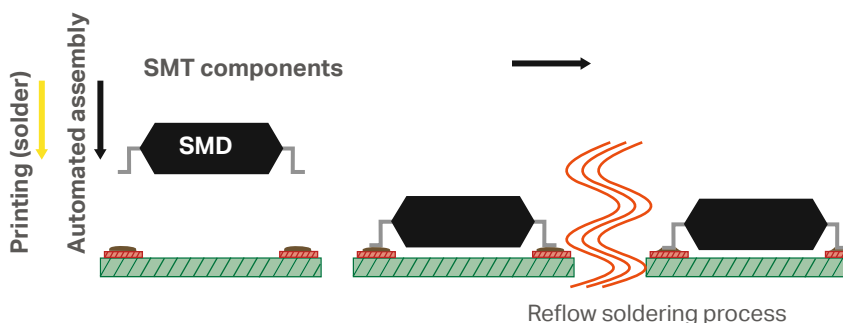
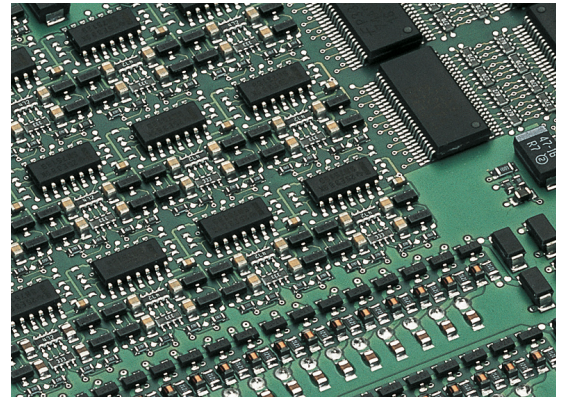
warpage of both component and PCB. WAGO PCB terminal blocks and connectors are molded of glass fiber-reinforced insulation plastic that withstands temperatures up to 260 °C. The selected material has the required elasticity and provides high dimensional stability for the entire range of pin spacing. It is therefore ideal for both lead-free and two-time reflow soldering processes.

Design

The streamlined design of the long THR component pins prevents the solder paste from being extruded during assembly. This may impair the ability of the paste to reflow properly. The free space around the solder pins ensures optimal heat flow to the solder joint, yielding an excellent bond. Stand-offs or ribs on both the left and right sides of the pin prevent the component's insulation body and solder paste from coming into contact with each other.

Surface-Mount Technology (SMT)

Surface-Mount Technology (SMT) means soldering electronic components directly onto PCB surface pads without drilling holes. The basic SMT process consists of applying solder paste to the PCB via solder dispensing equipment, screen or stencil printing. SMT assembly is performed using fully automated placement machines. Surface-mount components are soldered to the board in infrared, convection or vapor phase ovens.



SMT

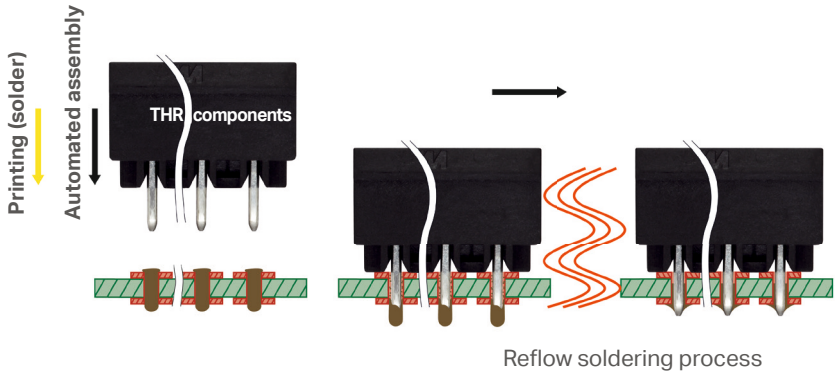
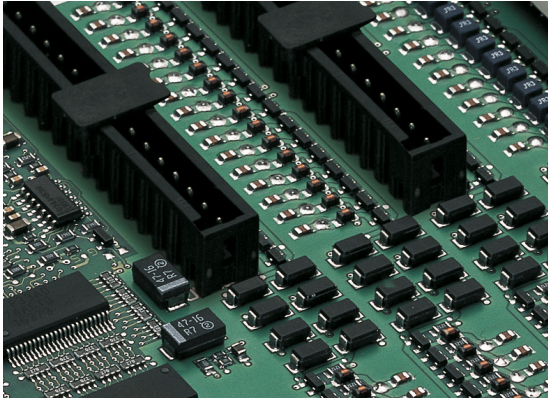


Both material and design provide optimal processing performance at high temperatures.

Through-Hole Reflow (THR)

Mechanically stressed THR components, like PCB terminal blocks and connectors, are placed into metal-plated holes filled with solder paste. They can then be soldered along with surface-mount components using the time-saving and cost-effective reflow soldering process.

WAGO's THR components are designed for fully automated assembly and withstand high reflow oven temperatures.



THR

PRODUCT OVERVIEW SORTED BY PIN SPACING

THR Male and Female Headers

2.5 mm	3.5 mm		3.81 mm	5 mm
Male headers with straight solder pins	Male headers with straight solder pins	Male headers with angled solder pins	Male headers with straight solder pins	Male headers with 1 x 1 mm straight solder pins
MCS-MICRO, 733 Series 160 V/2.5 kV/2 6 A Male headers with angled solder pins	MCS-MINI, 734 Series 160 V/2.5 kV/2 10 A Male headers with straight solder pins	MCS-MINI, 734 Series 160 V/2.5 kV/2 10 A Male headers with angled solder pins	MCS-MINI, 734 Series 160 V/2.5 kV/2 10 A Male headers with angled solder pins	MCS-MIDI Classic, 231 Series 320 V/4 kV/2 12 A Male headers with 1.2 x 1.2 mm straight solder pins
MCS-MICRO, 733 Series 160 V/2.5 kV/2 6 A	MCS-MINI HD, 713 Series 160 V/2.5 kV/2 10 A Male headers with straight solder pins and levers	MCS-MINI HD, 713 Series 160 V/2.5 kV/2 10 A Male headers with angled solder pins and levers	MCS-MINI, 734 Series 160 V/2.5 kV/2 10 A	MCS-MIDI Classic, 231 Series 320 V/4 kV/2 12 A
	MCS-MINI HD, 713 Series 160 V/2.5 kV/2 10 A Male headers with straight solder pins and threaded flanges	MCS-MINI HD, 713 Series 160 V/2.5 kV/2 10 A Male headers with angled solder pins and threaded flanges		
	MCS-MINI HD, 713 Series 160 V/2.5 kV/2 10 A Male headers with straight solder pins	MCS-MINI HD, 713 Series 160 V/2.5 kV/2 10 A Male headers with angled solder pins		Male headers with straight solder pins
	picoMAX®, 2091 Series 160 V/2.5 kV/2 10 A Male headers with straight solder pins and mounting flanges	picoMAX®, 2091 Series 160 V/2.5 kV/2 10 A Male headers with angled solder pins and mounting flanges		picoMAX®, 2092 Series 320 V/4 kV/2 16 A Male headers with straight solder pins and mounting flanges
	picoMAX®, 2091 Series 160 V/2.5 kV/2 10 A Female headers with straight solder pins	picoMAX®, 2091 Series 160 V/2.5 kV/2 10 A Female headers with straight solder pins		picoMAX®, 2092 Series 320 V/4 kV/2 16 A Female headers with straight solder pins
	picoMAX®, 2091 Series 160 V/2.5 kV/2 10 A	picoMAX®, 2091 Series 160 V/2.5 kV/2 10 A		picoMAX®, 2092 Series 320 V/4 kV/2 16 A

Depending on reflow soldering temperatures and times, color deviations may occur for light gray connectors. These deviations will have no impact on functionality.



The universal connection for solid, stranded wires
To use: Open clamping unit, insert the conductor

5 mm

Male headers with 1 x 1 mm angled solder pins



MCS-MIDI, 231 Series
320 V/4 kV/2 12 A
Male headers with 1.2 x 1.2 mm angled solder pins



MCS-MIDI, 231 Series
320 V/4 kV/2 12 A

7.5 mm

Male headers with 1 x 1 mm straight solder pins



MCS-MIDI, 231 Series
630 V/6 kV/2 12 A
Male headers with 1.2 x 1.2 mm straight solder pins



MCS-MIDI, 231 Series
630 V/6 kV/2 16 A

Male headers with 1 x 1 mm angled solder pins



MCS-MIDI, 231 Series
630 V/6 kV/2 12 A
Male headers with 1 x 1 mm angled solder pins



MCS-MIDI, 231 Series
630 V/6 kV/2 16 A

THR Terminal Blocks

2.5 mm

Terminal strips with locking slides



218 Series **CAGE CLAMP®**
0.08 ... 0.5 mm² / 28 ... 20 AWG
160 V/2.5 kV/2 6 A
Terminal strips with push-buttons



250 Series **PUSH-IN CAGE CLAMP®**
0.2 ... 0.5 mm² / 24 ... 20 AWG
160 V/2.5 kV/2 4 A

3.5 mm

Terminal strips with push-b



250 Series **PUSH-IN CAGE CLAMP®**
0.2 ... 1.5 mm² / 24 ... 16 AWG
320 V/4 kV/2 8 A
Terminal strips with push-b and straight, staggered sol



805 Series **PUSH-IN CAGE CLAMP®**
0.2 ... 1.5 mm² / 24 ... 16 AWG
320 V/4 kV/2 17.5 A

Male headers with angled solder pins



picoMAX®, 2092 Series
320 V/4 kV/2 16 A
Male headers with angled solder pins and mounting flanges



picoMAX®, 2092 Series
320 V/4 kV/2 16 A
Female headers with angled solder pins



picoMAX®, 2092 Series
320 V/4 kV/2 16 A

Male headers with straight solder pins



picoMAX®, 2092 Series
630 V/6 kV/2 16 A
Male headers with straight solder pins and mounting flanges



picoMAX®, 2092 Series
630 V/6 kV/2 16 A
Female headers with straight solder pins



picoMAX®, 2092 Series
630 V/6 kV/2 16 A

Male headers with angled solder pins



picoMAX®, 2092 Series
630 V/6 kV/2 16 A
Male headers with angled solder pins and mounting flanges



picoMAX®, 2092 Series
630 V/6 kV/2 16 A
Female headers with angled solder pins



picoMAX®, 2092 Series
630 V/6 kV/2 16 A

4 mm

THR terminal blocks with push-buttons



2060 Series **PUSH-IN CAGE CLAMP®**
0.2 ... 0.75 mm² / 24 ... 18 AWG
160 V/2.5 kV/2 9A
THR terminal blocks with push-buttons



2060 Series **PUSH-IN CAGE CLAMP®**
0.2 ... 0.75 mm² / 24 ... 18 AWG
160 V/2.5 kV/2 9A

stranded and fine-stranded conductors
e conductor, release clamp – done!




The universal connection with an additional advantage: Push-in connection
To Use: Open clamping unit, insert the conductor, release clamp – done!
Terminate both solid and ferruled conductors by simply pushing them in – no operating tool needed.

SMD Terminal Blocks

5 mm

Terminal strips (tape-and-reel packaging upon request)




236 Series **PUSH WIRE®**

0.08 ... 2.5 mm² / 28 ... 12 AWG
320 V/4 kV/2 24 A

6 mm

THR terminal blocks with push-buttons



2061 Series **PUSH-IN CAGE CLAMP™**

0.5 ... 1.5 mm² / 20 ... 16 AWG
320 V/4 kV/2 17.5 A

6 mm

THR terminal blocks with push-buttons



2061 Series **PUSH-IN CAGE CLAMP™**

0.5 ... 1.5 mm² / 20 ... 16 AWG
320 V/4 kV/2 17.5 A

8 mm

THR terminal blocks with push-buttons



2060 Series **PUSH-IN CAGE CLAMP™**

0.2 ... 0.75 mm² / 24 ... 18 AWG
630 V/6 kV/2 9 A

8 mm

THR terminal blocks with push-buttons




2060 Series **PUSH-IN CAGE CLAMP™**

0.2 ... 0.75 mm² / 24 ... 18 AWG
630 V/6 kV/2 9 A

3 mm

SMD terminal blocks




2059 Series **PUSH WIRE®**

0.14 ... 0.5 mm² „e“ / 26 ... 20 AWG „sol“*
160V/2.5 kV/2 3 A

4 mm

SMD terminal blocks with push-buttons




2060 Series **PUSH-IN CAGE CLAMP™**

0.2 ... 0.75 mm² / 24 ... 18 AWG
160 V/2.5 kV/2 9 A

4 mm

SMD terminal blocks with push-buttons



2060 Series **PUSH-IN CAGE CLAMP™**

0.2 ... 0.75 mm² / 24 ... 18 AWG
160 V/2.5 kV/2 9 A

6 mm

SMD terminal blocks with push-buttons




2061 Series **PUSH-IN CAGE CLAMP™**

0.5 ... 1.5 mm² / 20 ... 16 AWG
320 V/4kV/2 17,5 A

6 mm

SMD terminal blocks with push-buttons



2061 Series **PUSH-IN CAGE CLAMP™**

0.5 ... 1.5 mm² / 20 ... 16 AWG
320 V/4kV/2 17,5 A

8 mm

SMD terminal blocks with push-buttons



2060 Series **PUSH-IN CAGE CLAMP™**

0.2 ... 0.75 mm² / 24 ... 18 AWG
630 V/6 kV/2 9 A

8 mm

SMD terminal blocks with push-buttons



2060 Series **PUSH-IN CAGE CLAMP™**

0.2 ... 0.75 mm² / 24 ... 18 AWG
630 V/6 kV/2 9 A

8 mm

SMD terminal blocks with push-buttons




2060 Series **PUSH-IN CAGE CLAMP™**

0.2 ... 0.75 mm² / 24 ... 18 AWG
630 V/6 kV/2 9 A

8 mm

SMD terminal blocks with push-buttons



2060 Series **PUSH-IN CAGE CLAMP™**

0.2 ... 0.75 mm² / 24 ... 18 AWG
630 V/6 kV/2 9 A

8 mm

SMD terminal blocks with push-buttons



2060 Series **PUSH-IN CAGE CLAMP™**

0.2 ... 0.75 mm² / 24 ... 18 AWG
630 V/6 kV/2 9 A

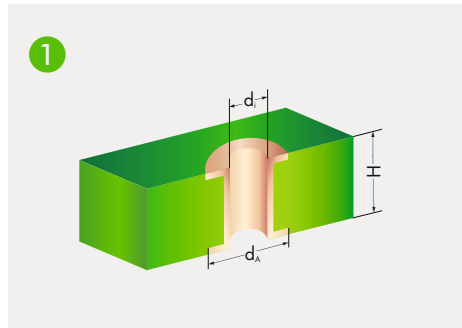
PUSH WIRE® connection for solid and stranded conductors
(depending on model used)

To Use: Tool-free, twist-free terminations for solid and rigid stranded conductors — simply push into the unit.

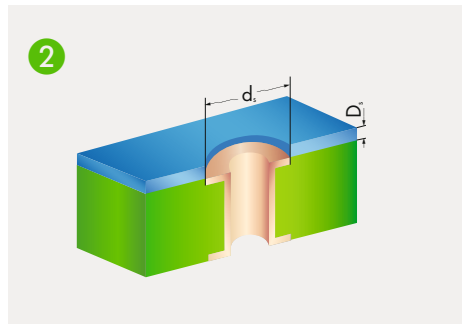
* 0.5 mm² "sol.": Please observe the conductor data found in the data sheet!

PUSH WIRE®

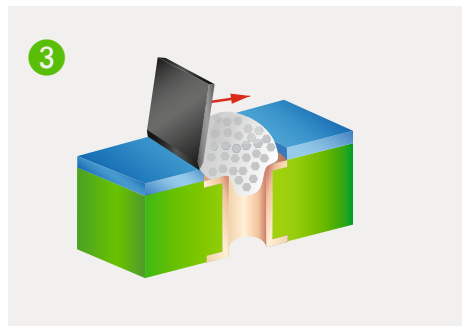
THR PCB Layout Parameters



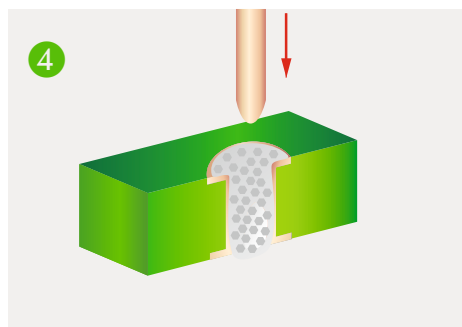
Metal-plated PCB bore hole



SMD positioning pattern



Solder paste application



Component assembly, automatic/by hand

Series	d_i (mm)	d_A (mm)	H (mm)	d_s (mm)	D_s (μ m)	d (mm)	L (mm)
218	1.1 ^{+0.1}	1.9	< 2	1.8	150	0.9	2.8
231 (1 x 1 mm)	1.4 ^{+0.1}	2.5	< 2	2.4	150	1.2	2.4
231 (1.2 x 1.2 mm)	1.7 ^{+0.1}	2.8	< 2	2.7	150	1.5	2.4
236	1.1 ^{+0.1}	2.2	< 2	2.1	150	0.9	3.6
250	1.1 ^{+0.1}	2.0	< 2	1.9	150	0.9	3.6
713	1.2 ^{+0.1}	1.9	< 2	1.8	150	1.0	2.4
733	1.2 ^{+0.1}	1.9	< 2	1.8	150	1.0	2.4
734	1.4 ^{+0.1}	2.5	< 2	2.4	150	1.2	2.4
2060	1.5 ^{+0.1}	2.4	< 2	2.3	150	1.25	2.4
2061	1.5 ^{+0.1}	2.4	< 2	2.3	150	1.25	1.5 / 2.4
2091 (Male Headers)	1.2 ^{+0.1}	1.9	< 2	1.8	150	1.0	2.4
2091 (Female Headers)	1.2 ^{+0.1}	1.9	< 2	1.8	150	0.85	2.4
2092 (Male Headers)	1.6 ^{+0.1}	2.3	< 2	2.2	150	1.4	2.4
2092 (Female Headers)	1.5 ^{+0.1}	2.2	< 2	2.1	150	1.36	2.4

d_i : Inner diameter of metal-plated PCB bore hole

d_A : Outer diameter of metal-plated PCB hole*

H: PCB thickness

d_i : Pattern hole diameter

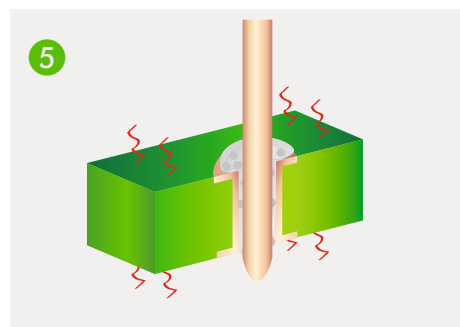
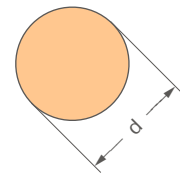
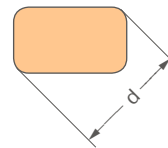
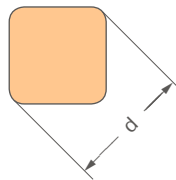
D_i : Pattern thickness

d: Pin diagonal/diameter

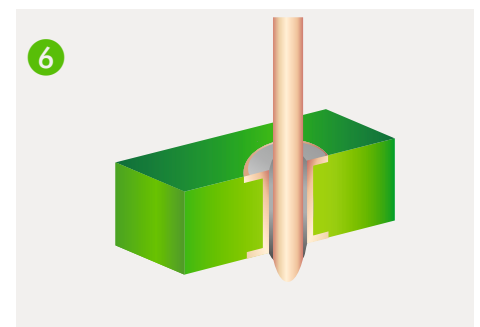
L: Pin length

*When laying out the metal-plated bore holes, the clearance and creepage distance requirements – as specified in the equipment standards – must be considered

Solder pin design:



Reflow soldering process



THR soldering joint

THR products in tape-and-reel packaging acc. to IEC 60286-3

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