

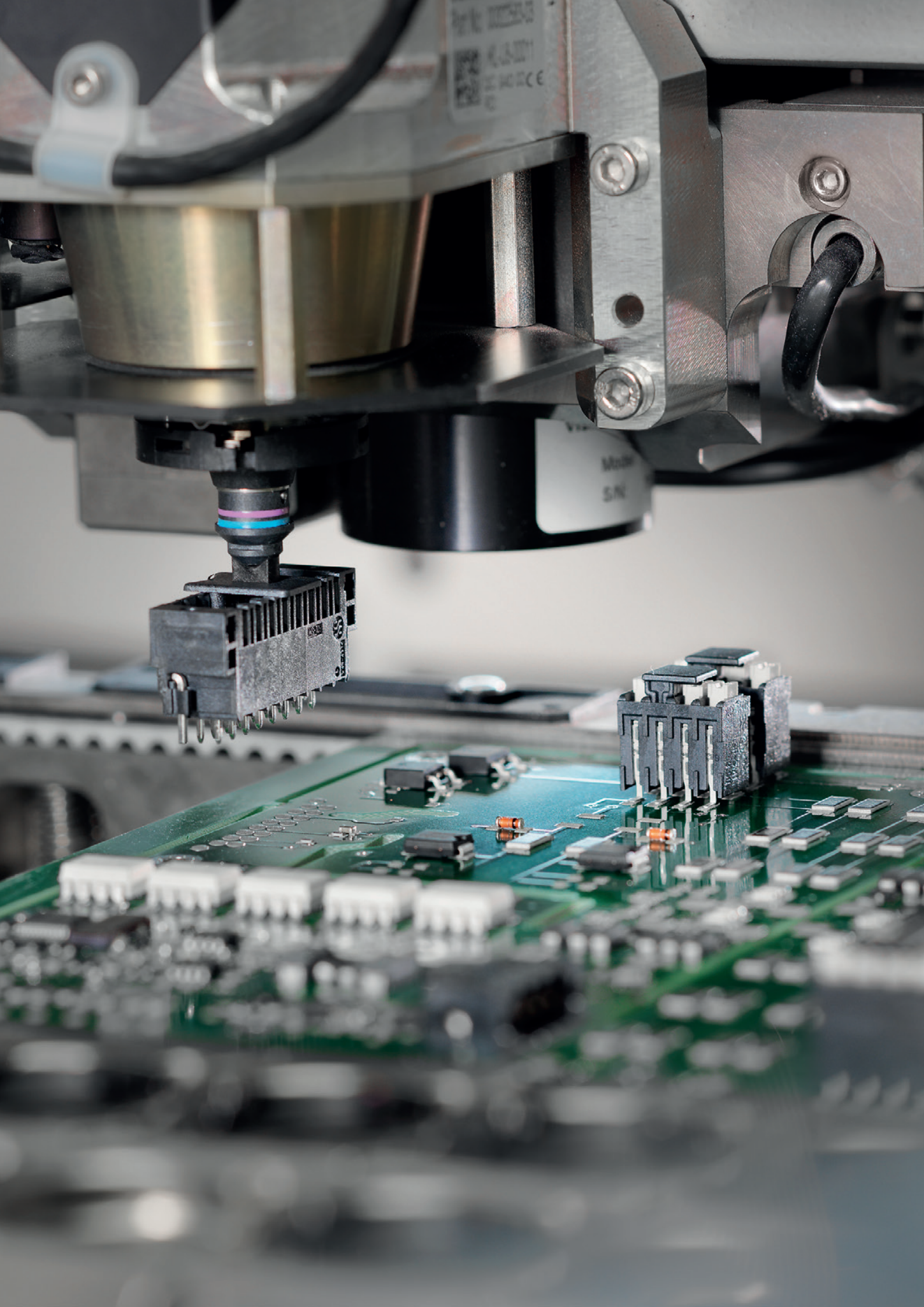
Making surface-mount technology faster and more efficient

As device connection technology pioneers, we impress our customers with intelligent product details

OMNIMATE - device connectivity



Weidmüller 



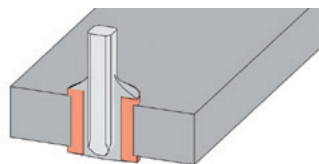
Efficient integration of device connectivity in the SMT process

With advanced products

Increasing requirements such as the demand for miniaturisation, higher functional densities of modules and cost-effective manufacturing processes have led to changes to PCB assembly processes. SMT (surface-mount technology) is thus increasingly used in practice instead of the conventional through-hole technology (THT). The SMT process has now established itself as the accepted standard in the manufacture of electronic components.

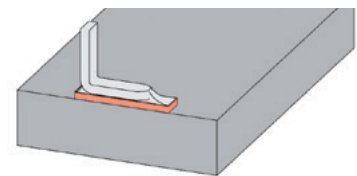
The connection system can be integrated in the SMT process in two ways: by means of THR (through-hole reflow) or SMD (surface-mount device) technology. A combination of the two approaches is also possible.

THR components



In the through-hole reflow process (THR), components are inserted through a hole in the PCB and then soldered to other SMT components. The special challenge of this method is that the components need to withstand the high temperatures of the SMT process.

SMD components



In the SMT process, the surface-mounted devices (SMDs) are soldered to the PCB with solder pads. The use of SMD components means that it is possible to dispense with wire pins to the components and with the holes normally required for attachment to the PCB.

As a leading supplier and pioneer of device connection technology, Weidmüller offers the broadest range of products that is available for the SMT process. With our THR and SMD connection components, we support highly efficient electronic device manufacturing. Our connection elements are handled fully automatically together with the component assembly in a single manufacturing process, which reduces your manufacturing costs. In addition, we assist you throughout the design-in process with products, in-depth knowledge of applications and proven solutions expertise.

You will find a detailed description of the integration of OMNIMATE device connection technology in the SMT process in our White Paper – see page 11.

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Reliable PCB assembly with THR technology

With our dimensionally stable pin headers made of fibreglass-reinforced LCP

Optimum solder pin length

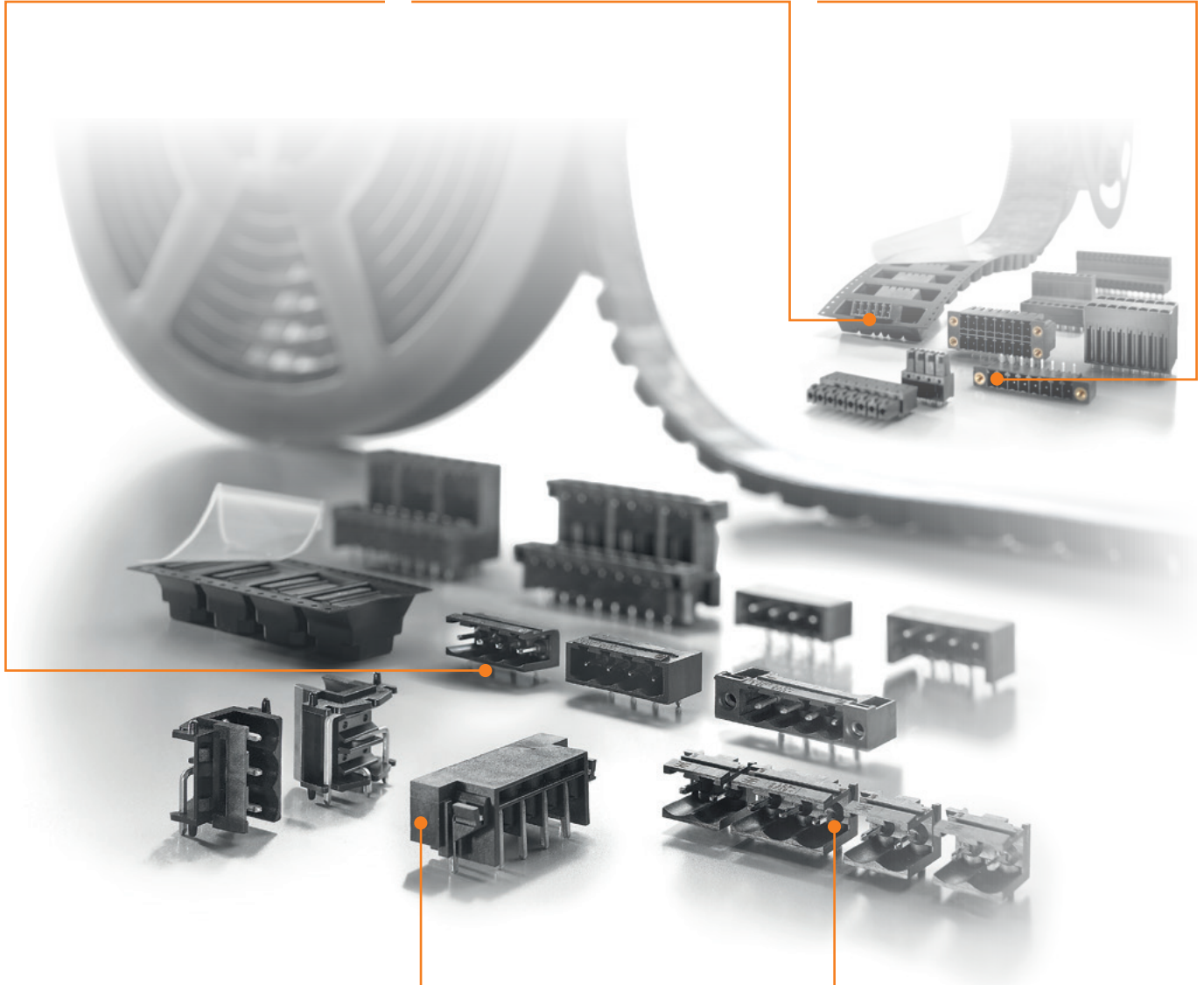
The pin length of 1.50 mm enables space saving, double-sided assembly of PCBs. At the same time, Weidmüller components meet all the requirements of IPC-A-610 E.

Robust insulating body

Thanks to MSL 1 (moisture sensitivity level 1), you can mount our THR components directly on the PCB without pre-drying. The durable material ensures dimensional stability and accurate grid alignment.

High-precision pin headers

With a position tolerance of less than ± 0.1 mm around the zero position, our solder pins comply with the IEC 61760-3 standard, and thanks to the latest production techniques they always remain dimensionally stable.

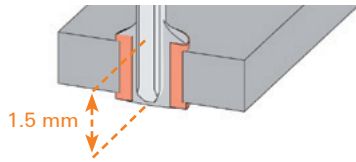


Stable positioning with solder flange pin

Our solder flanges make additional fixing with screws unnecessary. You can fix the THR components to the circuit board securely in a single step.

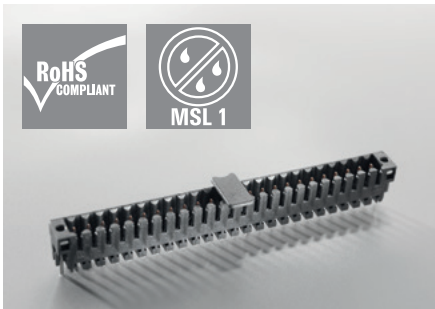
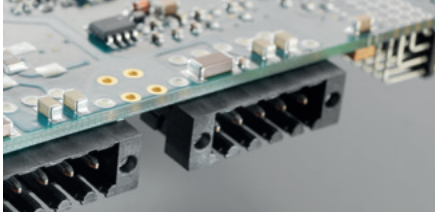
Sophisticated technology

With their modular design, our SL-SMaRT units can be combined with flexibility. For you, the bottom line is fewer components, less data administration and lower storage space requirements.



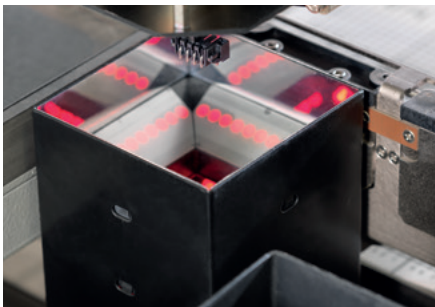
Optimum solder pin length

With their short pin length of 1.50 mm, our components free up more space and allow greater design freedom, while meeting the requirements of IPC-A-610 E (7.3.3, Table 7-3, Note 1). With a PCB thickness of 1.60 mm, you benefit from double-sided assembly. The option of vapour-phase soldering is also available, since no drops of solder paste form on the underside of the circuit board. Our simplified paste application process and minimised paste volumes also reduce your manufacturing costs. The optimum temperature absorption and trouble-free degassing of the flux in the soldering process also contribute to cost-efficient PCB assembly.



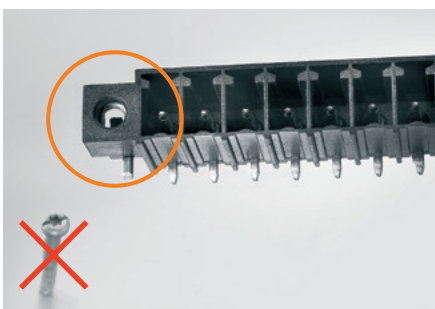
Robust insulating body

We manufacture our THR components from the high-performance plastic LCP to ensure reliable, problem-free use on your printed circuit boards. You can use these halogen-free, high-temperature-resistant components in all common soldering methods and benefit from their outstanding dimensional stability and accurate grid alignment. With their extremely low moisture sensitivity level (MSL 1), you can store the components indefinitely and use them in the assembly process without pre-drying. Our components remain dimensionally stable even at high operating temperatures and fit snugly on the PCB.



High-precision pin headers

With a position tolerance of less than ± 0.1 mm around the zero position, our solder pins exceed the requirements of the IEC 61760-3 standard. Due to our advanced manufacturing methods, our high-precision pin connectors are ideally suited for use in automated assembly. The contact pin is positioned and checked with the utmost care. Our dimensionally stable pin headers thus assure you of a seamless THR process without downtimes.



Stable position with solder flange pin

For particularly fast and stable fixing to the circuit board, you no longer need any additional screws. With our solder flanges, you solder the connection components to the contact pins in a single step in the reflow process. Time-consuming steps involving screws are no longer required. In addition, the geometry and positioning of the solder flange protects the solder joints against long-term mechanical stress and prevents them from being put under strain when screws are tightened.



Sophisticated technology

Reduce the number of items, the time spent on data administration and the storage space required to a minimum. Thanks to their modular structure, our SL-SMaRT pin headers with THR solder connections can be combined using any number of two- and three-pin components. Since you only need two conveyor systems, you optimise use of the available feeder space. Especially for circuit boards with different, multi-pole pin headers, the processing rate and cost optimisation achieved with the SL-SMaRT are unrivalled.

Flexible device design with fully automatic SMD assembly

OMNIMATE components combine connection efficiency with design freedom

Reliable processing

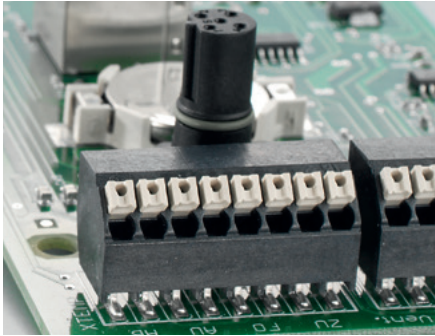
Thanks to the use of LCP, assembly can take place in the SMD process without pre-drying. The low expansion coefficient prevents assemblies from being deflected.

Efficient assembly

High component precision and low weight facilitate your assembly process. A high number of packing units per roll increases efficiency still further.

Stable solder connection

Featuring two soldering pads per pin, LSF-SMD PCB terminals satisfy the most stringent mechanical fixing requirements without the need for additional mounting flanges.



Reliable processing

To maximise dimensional stability and ensure accurate grid alignment, we make our SMD components from the high-performance plastic LCP. This material offers high dimensional stability and excellent solder heat resistance. Our SMD connection system thus ensures a reliable, smooth SMD process. With their low moisture sensitivity level (MSL 1), you can process our components without pre-drying. Their low thermal expansion coefficient also prevents an assembly from being deflected during the soldering process, thus speeding up your fully automated assembly process.



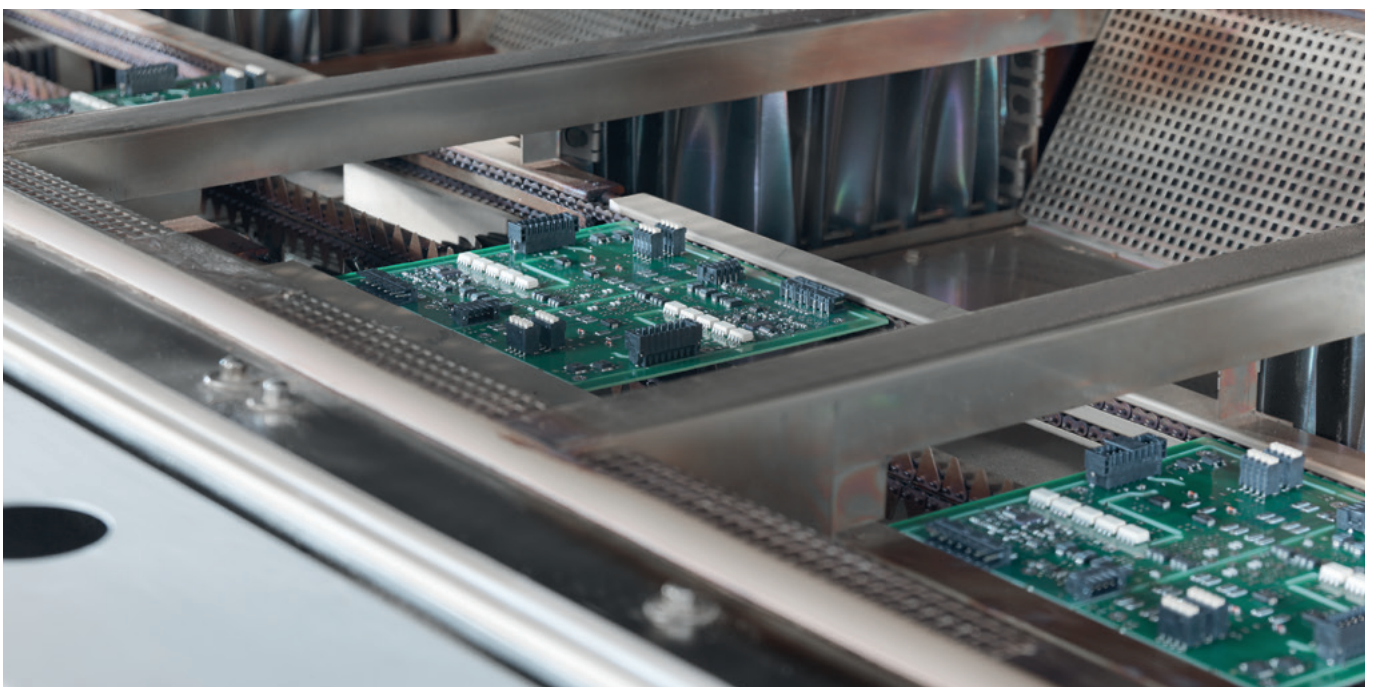
Stable solder joint

Our LSF-SMD PCB terminals guarantee a secure hold on the circuit board thanks to the use of two solder pads per pole – even without additional mounting flanges. Holding forces per pin of over 150 N in an axial direction withstand even heavy loading. Simulated endurance tests confirm the high vibration and shock resistance of our products according to IEC 61373/10.2011, assuring you of a smooth and maintenance-free SMT process over the long term. Even secure integration on composite boards made of glass, ceramics or aluminium is unproblematic.



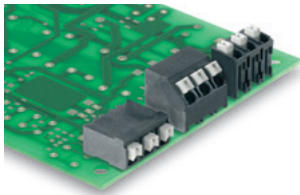
Efficient assembly

Our components with pick-and-place pads and suction surfaces support secure mounting and precise placement in fully automated assembly. With their light weight, our SMD-optimised PCB terminals also maximise assembly performance. You benefit from simple integration of the connection elements in the assembly process with tape-on-reel packaging in standard conveyor widths. They are designed for automation and contain a very high number of components per roll. This reduces your setup costs in automated SMD processes.



Product overview

SMT PCB terminals and pin headers



LSF-SMT

- 90°, 135° and 180° PCB connection types
- All solder processes
- Tape-on-reel and box packaging
- Pitch sizes: 3.50/3.81/5.00/5.08/7.50/7.62
- Pin lengths: 1.5 mm and 3.2 mm



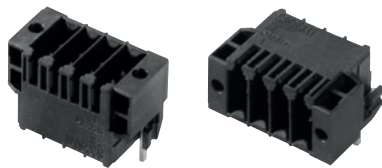
SL-SMT 3.5

- 90°, 135° and 180° PCB connection types
- All solder processes
- Tape-on-reel and box packaging
- Enclosed version, screw flange or solder flange
- Pin lengths: 1.5 mm and 3.2 mm



SL-SMT 3.5/ .. / RF

- 90° and 180° PCB connection types
- All solder processes
- Tape-on-reel and box packaging
- Latch/solder flange for release latch
- Pin lengths: 1.5 mm and 3.2 mm



S2C-SMT 3.5

- 90° and 180° PCB connection types
- All solder processes
- Box packaging
- Enclosed version or solder flange
- Pin lengths: 1.5 mm and 3.2/3.5 mm



S2CD-THR 3.5

- 90° PCB connection type
- All solder processes
- Box packaging
- Enclosed version or solder flange
- Pin lengths: 1.5 mm and 3.2/3.5 mm



SC-SMT 3.81

- 90°, 135°, 180° and 270° PCB connection types
- All solder processes
- Tape-on-reel and box packaging
- Enclosed version, screw flange or solder flange
- Pin lengths: 1.5 mm and 3.2 mm



SCD-THR 3.81

- 90° and 180° PCB connection types
- All solder processes
- Box packaging
- Enclosed version, screw flange or solder flange
- Pin lengths: 1.5 mm and 3.2 mm



SL-SMT 5.00/5.08

- 90°, 180° and 270° PCB connection types
- All solder processes
- Tape-on-reel and box packaging
- Open, enclosed version, screw flange or solder flange
- Pin lengths: 1.5 mm and 3.2 mm



SL-SMaT 5.0x

- 90° and 180° PCB connection types
- All solder processes
- Tape-on-reel and box packaging
- Open version
- Pin length 1.5 mm

Product overview

SMD PCB terminals



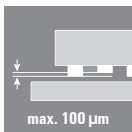
LSF-SMD

- 90°, 135° and 180° PCB connection types
- SMT solder processes
- Tape-on-reel and box packaging
- Pitch sizes: 3.50/5.00/7.50
- Coplanarity $\leq 100 \mu\text{m}$

Flexible, robust and practical

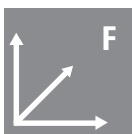
Conformity with standards and the consistently high level of quality of all electronic parts and components are among the key factors of success in product development, particularly in the industrial environment. Our LSF-SMD product family meets all of the requirements of PCB terminals in the industrial environment, the conditions of which are simulated in our accredited laboratory.

LSF-SMD PCB terminals from Weidmüller were specifically designed for soldering using the SMD reflow process and are able to withstand temperatures of up to 260 °C. The terminals fulfil JEDEC requirements as regards process sensitivity (PSL) and moisture sensitivity levels (MSL) with the highest rating class. Our LSF-SMD PCB terminals also stand up to any comparison in terms of coplanarity, strength and vibration resistance. As such, they can easily be integrated into all of the current production processes.



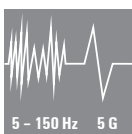
Coplanarity:

To ensure reliable soldering quality in the manufacturing process, the contact surfaces of solder pins must be wetted with the solder paste immediately after assembly. This allows the flux contained within the paste to react with the Sn coating, resulting in a reliable soldering quality. The LSF-SMD has a coplanarity of up to 100 μm . We recommend a stencil thickness of 150 to 200 μm .



Mechanical stability:

Stability properties are covered by normative values as well as additional practical testing. The axial torque per contact point (pole) is significantly higher than the values permitted by the standard IEC 60947-7-4. A clamping force per pole of around 150 N (40 N limit value for 1.5 mm² conductor cross-sections) in the axial direction is many times higher than the normative requirements.



Vibration and shock resistance:

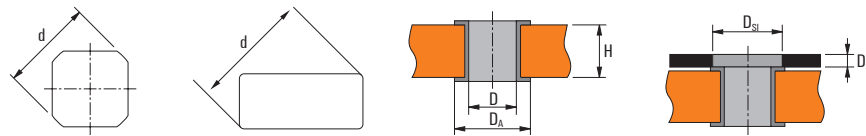
A simulated service life test is performed. The test spectrum includes increased broadband noise and shock in accordance with IEC 61373/10.2011 with a category 1B severity level ("body mounted") in the 5-to-150-Hz frequency range and with an ASD level of 1.857 (m/s²)²/Hz 3 dB and an effective acceleration of 5.72 m/s² and 240 degrees of freedom (DOF). The test duration is five hours per axis. The half-sine shock wave form has a peak acceleration of 50 m/s² and a nominal duration of 30 ms.

Design and processing recommendations

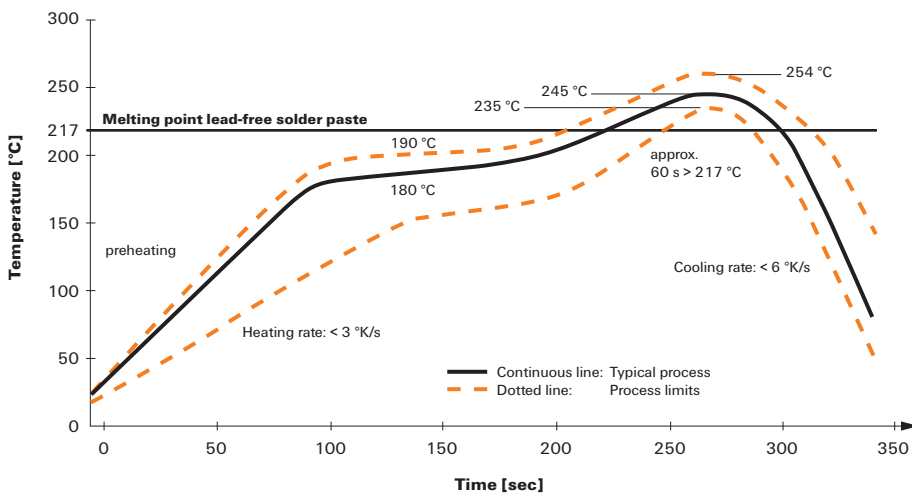
With our expertise, you can realise your ideas efficiently

For optimum soldering results in the SMT process we recommend the following parameters for our **THR components**:

Pin header	Pins	Inner diameter of solder eyelet D [mm]	Outer diameter of solder eyelet D _A [mm]	Stencil aperture diameter D _{st} [mm]	Solder pin diameter d [mm]	Solder pin length L [mm]
S2C-SMT 3.50 & S2L-SMT 3.50	4-36	1.30 ^{+0,1}	2.10	1.90	1.0, octagonal	1.50
SL-SMT 3.50	2-8	1.40 ^{+0,1}	2.30	2.10	1.2, octagonal	1.50
SL-SMT 3.50 LF/RF	2-8	1.50 ^{+0,1}	2.30	2.10	1.2, octagonal	1.50
SL-SMT 3.50	9-24					
SC-SMT 3.81	2-16	1.30 ^{+0,1}	2.10	1.90	1.0, octagonal	1.50
SL-SMT 5.00/5.08	2-8	1.40 ^{+0,1}	2.30	2.10	1.2, octagonal	1.50
SL-SMT 5.00/5.08 LF/F	2-8	1.50 ^{+0,1}	2.30	2.10	1.2, octagonal	1.50
SL-SMT 5.00/5.08	9-24					
LSF-SMT 3.xx	2-12	1.10 ^{+0,1}	1.90	1.70	0.9 (0.35 x 0.8)	1.50
LSF-SMT 5.xx	2-8					
LSF-SMT 7.xx	2-6					
Stencil thickness D _s [μm]	120-180 (continuous for all product families listed)					
Solder paste grain size [μm]	20-40 = Type 3					



For our **SMT components**, we recommend the following reflow soldering profile, illustrated here with a typical characteristic and process boundaries. In the preheating phase, the PCB and components are preheated while the solder paste is activated. Above a temperature of 217 °C to 221 °C, the solder fuses and joins the components to the connectors on the board. The temperature is maintained at 245 °C to 254 °C for between 10 and 45 seconds in order to ensure a secure connection. During the cooling period the solder hardens. Stress cracks as a result of excessively rapid cooling must be avoided.



Services and support

Our offers around SMT technology and OMNIMATE device connectivity

SMT White Paper

Our device connection technology maximises design flexibility for devices and enables reliable and cost-optimised processes. Please find further information and details about how to optimally integrate our device connection technology into your SMT processes in our White Paper.



www.weidmueller.com/whitepaper

More interesting online offers

Product support

In the Weidmüller online catalogue, you can find suitable OMNIMATE components.

www.eshop.weidmueller.com

Application guide

The Weidmüller AppGuide recommends products suiting the specific functions of your device application.

www.weidmueller.com/appguide

Design-in service

Find your design-in sample quickly and easily in the online catalogue. It will be delivered to you within 72 hours.

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Component library

Our comprehensive OMNIMATE component library makes development and design-in processes more efficient.

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Weidmüller – Your partner in Industrial Connectivity

As experienced experts we support our customers and partners around the world with products, solutions and services in the industrial environment of power, signal and data. We are at home in their industries and markets and know the technological challenges of tomorrow. We are therefore continuously developing innovative, sustainable and useful solutions for their individual needs. Together we set standards in Industrial Connectivity.

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