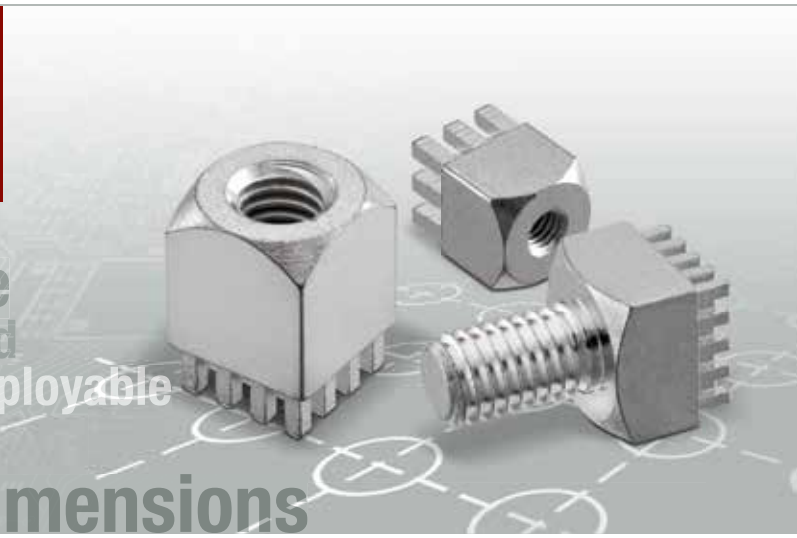
PowerOne
Single-Piece Power Elements

Original
POWER ELEMENT
Intelligent Systems



Single-piece Power Elements are used for the supply and distribution of high currents in connection with circuit board based systems. Depending on the pin arrangement and the layout, currents of up to 1,000 ampere are possible. PowerOne high current terminal blocks and spacers were developed by Würth Elektronik in 1987. Meanwhile this product group has been successfully used in the field in thousands of various designs. The manufacturing method allows individual adaptions regarding design and dimensions. That is the reason why Power Elements perfectly qualify as connecting element for fuses, IGBTs, switches and cables to the circuit board or as contact element for board-to-board respectively board-to-case.

Application Possibilities

- Board-to-board over 90° or packaging
- Wire-to-board screw connection of ring terminals
- Electro mechanics such as hinges and case mounting
- Spacers
- Retainers / fastenings of switches, fuses, IGBTs
- Any combination of all these and much more

Processing

Würth Elektronik PowerOne Power Elements are pressed in into the circuit board. Soldering is not necessary. Therefore, the PCBs are not exposed to temperature stress. This processing step easily blends in to the processing chain and is highly cost efficient. With the aid of the corresponding Press Fit tools, several Power Elements can be pressed in simultaneously.

- For assembling prototypes, no special equipment is needed for pressing in, a simple toggle press is sufficient
- The circuit board needs support during the pressing procedure
- The pressing force must be executed in a 90° angle to the circuit board
- Plated through holes of the circuit board must be executed according to our indications
- PowerOne high current terminal blocks and spacers are manufactured for pressing, soldering is not intended

Technical Data

Current carrying capacity per pin at 20 °C	~ 10 / 15 A (areal / circumferential pins)
Current carrying capacity per pin at 85 °C	~ 6 / 10 A (areal / circumferential pins)
Material	CuZn39Pb3
Surfaces	tin-plated (standard)
	further surfaces such as nickel, silver, nickel / gold and others on demand

Dimensions

Length x width	from 5 x 5 to 22 x 22 mm
Height	from 3 mm individually
Height above PCB	from 3 mm individually
Pin length	up to 7.5 mm (standard of 3.5 mm)
Pin diagonal	1.6 mm standard
	others on demand

Circuit Board

Base material		FR4 (EP-GC-)
PCB thickness		from 1.5 mm
Drilling diameter		1.6 +/- 0.025 mm
Final diameter	HAL surface	1.45 +/- 0.05 mm
	chemical surface	1.475 +/- 0.05 mm
Copper in hole thickness		min. 25 µm, max. 80 µm

Processing Parameters

Press-in force	min. 40 N per Pin max. 250 N per Pin
Retention force	60 - 80 % of the press-in force
Press-in speed	100 - 250 mm / min

Compliant

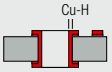
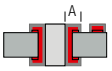
COMPLIANT
RoHS&REACh
WÜRTH ELEKTRONIK

PowerOne
Single-Piece Power Elements

Circuit Board Design

For the massive Press Fit Technology the PCBs are to be finished according to the Würth Elektronik ICS Press Fit specifications (see table on the side). Particular attention should be paid to the drill diameter and the copper thickness. Due to the different layer thicknesses of Hot Air Levelling compared to chemical surfaces, the final diameters vary.

Würth Elektronik ICS – Press Fit Specification 5.1

Drill Ø			1.6 +/- 0.025 mm
Cu		**Cu** - in **H**ole **A**nnular Ring	min. 25 µm, max. 80 µm min. 125 µm
End Ø		**depends on surface** **HAL** **chem. surfaces**	 1.45 +/- 0.05 mm 1.475 +/- 0.05 mm

Torques

The torques indicated in the table are based on DIN 267 part 25. Different material combinations or different thread lengths of the connectors are not regarded here.

Torques for Brass

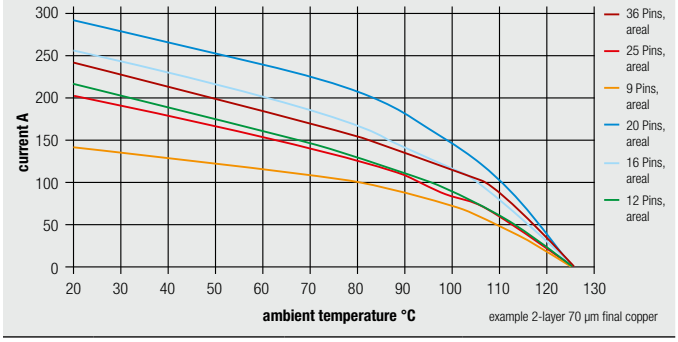
Thread	M 2.5	M 3	M 4	M 5	M 6	M8	M 10	M 12
(Nm)	0.3	0.5	1.2	2.2	3.9	9.0	17.0	35.0

Current Carrying Capacity

The current carrying capacity of a Press Fit connection needs to be seen in the context of the overall system. The Press Fit zone has a very low electrical contact resistance of 100 - 200 µOhm. The limiting factor therefore usually lies in the circuit board layout or in the connection of a feed line.

Reference values for a pre-dimensioning can be found under Technical Data on page 1.

Derating Curve



Overview of Standard Products

							
available products		**138**	**85**	**22**	**93**	**32**	**2176**
construction form		**bush blind hole vertical**	**bush through hole vertical**	**bush through hole horizontal**	**bolt**	**bracket through hole horizontal**	**customer specific**
■	**Pins**						
5	**4, 6, 9**	M 2.5 - M 3 · Ø 2.6 - Ø 3.4					
7	**4, 6, 9**	M 2.5 - M 5 · Ø 2.6 - Ø 5.5					
9	**4, 8, 12, 16**	M 3 - M 6 · Ø 3.2 - Ø 6.6					
10	**4, 8, 12, 16**	M 3 - M 6 · Ø 3.2 - Ø 6.6					
12	**4, 10, 16, 25**	M 4 - M 6 · Ø 4.2 - Ø 6.6					
13	**4, 10, 16, 25**	M 4 - M 8 · Ø 4.2 - Ø 9.0					
16	**12, 20, 36**	M 5 - M 10 · Ø 5.2 - Ø 10.5					
18	**14, 24, 40, 49**	M 5 - M 10 · Ø 5.2 - Ø 10.5					
20	**16, 28, 48, 64**	M 5 - M 10 · Ø 5.2 - Ø 10.5					
22	**18, 32, 56, 81**	M 5 - M 10 · Ø 5.2 - Ø 10.5					

All threads are also available in UNC.

Supplies

Under the product category PowerCover, we offer a large choice of twist and contact protection elements. Press Fit tools and die plates are available on demand.

For more information visit us at:
www.we-online.com/pe
or call our Hotline: **+49 7940 9810-4444**