“Multispring B signal” Press-in zone for automotive use

PCB Hole size	**0.97…1.03…1.07 mm**
Board thickness	**>=1.6 mm (nominal)**
Stock thickness	**0.6 … 0.64 mm**

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1. SCOPE .

This specification covers all the information as required in the IEC 60352-5 (Issue 5; 2012) for a Multispring Press-In zone (further named "Multispring") for nominal hole-Ø 1 mm and made from 0.6 … 0.64 mm stock thickness.

The drilled holes do not follow the IEC-specification 60352-5 and are drilled 1.10 mm instead of 1.15 mm. Reason for this is to shift the finished hole diameter in chem. Sn PCB's more towards the nominal value.

The IEC requirements are supplemented with the requirements for automotive use based on the "Arbeitskreis Prüfrichtlinie für KFZ-Steckverbinder".

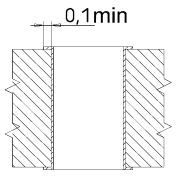
2. PRINTED BOARD AND HOLE INFORMATION

- Printed board material according to:
  - High temperature FR4 (CTE optimized): Base material: Matsushita R1566 or Nanya NP175F / 8 mal Prepreg 7628
    Aging of PCB with 2 reflow cycles with lead free temperature profile before pin insertion
  - FR4 (normal): Base material: S1000
    Aging of PCB with 2 reflow cycle with lead free temperature profile before pin insertion

  Other board materials possible after agreement between TE Engineering and the customer

- Maximum number of conductive layers: not limited.
- Printed board thickness: 1.6 ±0.14 mm and 1.5 ± 0.14 mm (without copper and solder resist)
  Other smaller board thicknesses have to be tested.

- Plated-Through-Hole dimensions:
  Hole-Ø prior to plating = 1.10±0.03 mm
  Thickness of the PTH-wall: 30...55 µm Cu
  Finished hole-Ø = 1.03 +0,04 -0,06 mm



- Printed board plating material:
  - PCB Type A: Sn plated PCB's:
    Chemical Sn ≥ 1 µm before reflow ageing
    (amount of Ag: 0.5...1.5 weight %; cpk 1.33; typical values with 3 Sigma are 1.1 µm–1.3 µm)
  - PCB Type B: OSP protected PCB's:
    OSP, surface thickness 0.2µm-0.5µm, released Entek Plus HT of company Enthone or Glicoat F2(LX) of company Shikoku.
  - Other plating materials have to be tested on request.

3. PRESS-IN ZONE INFORMATION

- Design: see dimensional drawing on page 5
  In order not to damage the PTH-hole during the press-in operation, the geometry of the guiding pin has to be rounded and have a smooth transition to the actual multispring geometry

- Stock Material:
  Material Type A: CuSn6 C51900
  CuSn6 UNS C51900 with tensile strength between 560-650 N/mm²

  Material Type B: CuNiSi C19010
  CuNiSi UNS C19010 R580s with tensile strength 580-650 N/mm²

  Other materials possible after agreement between TE Engineering and the customer

- Plating:

  - Scenario A old measuring method SnFlash
    Meant for airbag applications.
    SnFlash measurement according old measuring method (before 03/2019)
    0.25-0.52 µm SnPb/Sn over 1.27-2.2µm Ni. Only 1 measuring point (see page 5).

  - Scenario B old measuring method SnFlash:
    Meant for ABS and non-airbag applications.
    SnFlash measurement according old measuring method (before 03/2019)
    0.25-0.58 µm Sn over 1.27-2.2 µm Ni. 2 measuring points: (see page 5).
    Target should be 0.42 µm Sn

  - Scenario C new measuring method SnFlash:
    Meant for new applications after 03/2019
    SnFlash measurement according the new measuring method (after 03/2019)
    Measurement done on 2 measuring points (see page 5)

    Thickness measurement based on both sides: 0.45...0.85 µm Sn over 1.27…2.2 µm Ni.
    For the first 30 minutes after new start of plating line an increased thickness of 0.45…0.90µm Sn over 1.27…2.2µm Ni is allowed.

    Thickness measurement needs to be done according to Bosch General Measurement instruction 1 279 916 072 and specific Instruction for Sn 1 279 916 073 (TE spec 129-90108).

  - Scenario D old measuring method: SnEP:
    Not applicable anymore (before 03/2019)

  - Scenario E new measuring method: SnEP:
    Meant for new applications after 03/2019
    0.35 … 0.75 µm SnEP Fa. Enayati GmbH &Co KG (order specification 2 269 915 602 v02) over 1.30 …2.2 µm Ni at functional press fit zone
    see drawings page 5 (2 measuring points are same as scenario B old & C new)
    The surface thickness measurement of the plating has to be done according to Bosch 1 279 916 072 in general and according to Bosch 1 279 916 074 SnAg / AgSn flash coating specific.
    Any temperature treatment after electroplating (for example reflow process) is not allowed without the agreement of product engineering and customer

General remarks

Measures to reduce Sn-whisker formation have to be checked together with customer.

Measuring points for plating thickness are situated on the functional sides of the Multispring press-fit zone. See drawing on page 5.

The use of a lubricant on the Multispring zone during the press-in operation can influence the performance and should therefore be avoided.

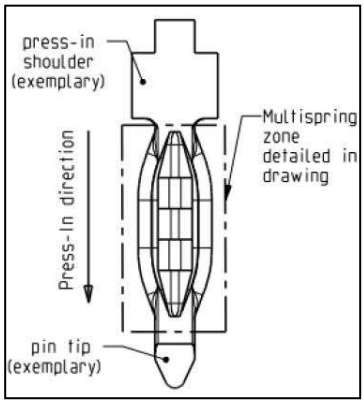
Other plating has to be tested on request.

- Released combinations of material / plating and PCB parameters:

	Multispring B06				
	108-90807-1	108-90807-2	108-90807-3	108-90807-4	108-90807-5
Material used	CuSn6 C51900	CuSn6 C51900	CuSn6 C51900	CuSn6 C51900	CuNiSi C19010
Plating	SnFlash old Scenario B	SnFlash new Scenario C	SnEP old Scenario D	Sn EP new Scenario E	SnEP new Scenario E
PCB technology	iSn	iSn	iSn	iSn / OSP	iSn / OSP
Info: Bosch BV	1 279 927 156 02 2 269 915 608 00	1 279 927 405 00	1 039 xxx yyy v00	1 039 926 523 v00	2 269 915 681

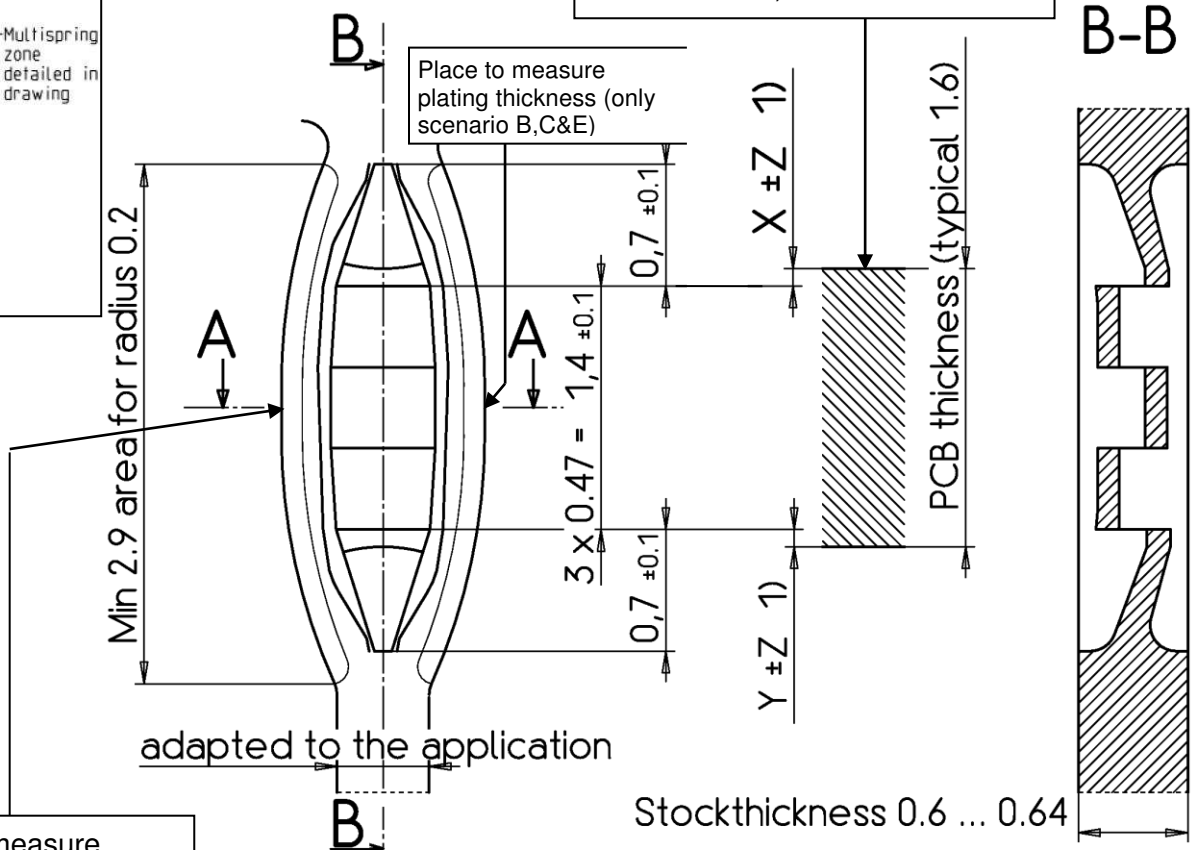
4. INFORMATION ON THE APPLICATION.

The Multispring press-fit zone as described, can be used in a
Individual press-in termination.
Straight or right-angle termination.
Rear plug up.
Wrapped connection.
Connector or module with pre-assembled press-in terminations.

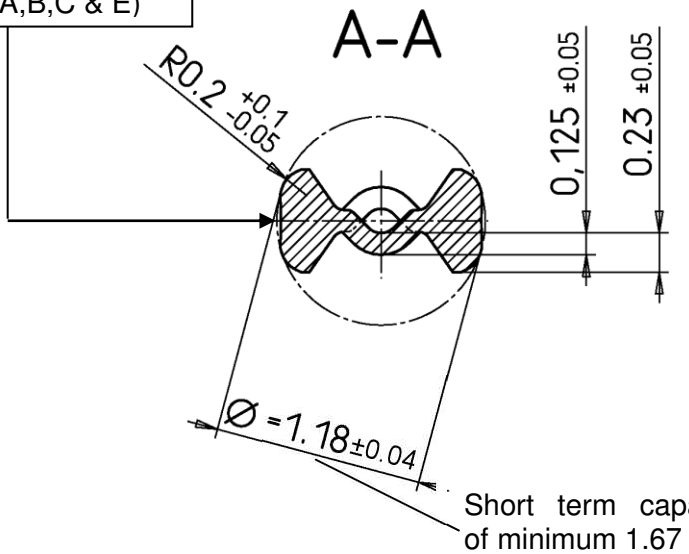


Plating direction of strip

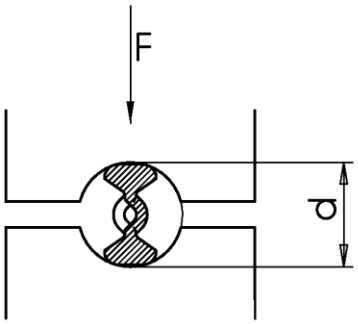
Place for clamping (radial force measurement): X = 0.1 mm



Place to measure plating thickness (scenario A,B,C & E)



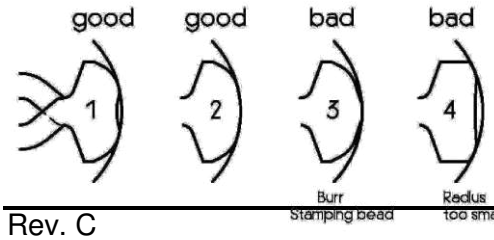
Radial deformation forces.

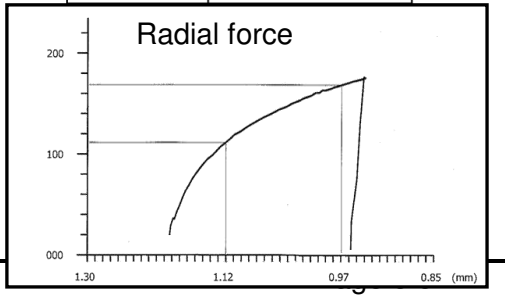


d	Force F (N)
0.97	max 190
1.12	min 80

1) Depending on which side the detection of the press-in tool is situated
Values for X,Y & Z: see table page 4

Visual inspection





5. INSTRUCTION AND TOOLS FOR THE PRESS-IN OPERATION.

- Replacement with a new press-in termination is for the moment not guaranteed.
  Repairs have to be tested on request.

- Press-in depth:
  See the dimensional drawing on page 5 for the nominal thickness printed board (1.6mm).

  The use of thinner printed boards has to be tested.

  For thicker printed boards the position of the press-in zone should be preferably in the upper half of the printed board thickness. See the application drawing and table.

  For complex applications with a high number of pins in the same module, the dimension of X±0.2mm can be interpreted of the mean of all press-in depths. The maximum single press-in depth should however be within X±0.3mm. For standalone pins as Single Pin Insertion, the depth tolerance of +0.2 mm to -0.2 mm is valid

PCB Thickness (nominal)	Nominal Press-in dimension X	Nominal Press-in dimension Y	Tolerance Press-in dimension Z
> 1.6 mm	0.1		±0.2
1.5…1.6 mm	0.1	0.1	
0.8…1.5 mm *)	*Not released*		

  Depending on the detection side of the press-in tooling, dimension X or Y can be used.

  *) The use of thinner printed circuit boards has not been tested. The normal granted retention forces and PCB deformations can deviate from the usual allowed limits when using a thinner PCB. This should be tested on request if needed.

  Press in force / distance should be controlled.

- Press-in speed:
  Maximum 5mm/s for headers, housings & modules. Maximum 200 mm/s for stitched pins. Other speeds need to be tested

- Tool information:
  The press-in tool has to be adapted to the actual application. To ensure an optimal quality of the applied TE Connectivity products, we recommend the utilization of application equipment from TE Connectivity.
  The latest news and detailed information can be found on http://www.te.com/en/products/application-tooling.html.
  Contact person : siegfried.beck@te.com.

6. PRESS-IN CHARACTERISTICS.

6.1 Mechanical

Press-in and retention forces (performed on single multispring terminations)

Plating multispring	Max. press-in force *)**)	Typ. press-in force *)	Min. press-in force *)	Min. Push-out force *) ***)
SnFlash /SnPbFlash	150N	100-135N	70 N	20N
SnEP	150N	80-125N	65N	15N
Au	tbd	tbd	tbd	tbd

*) Values in chemical tin-plated printed boards (SnFlash based on the qualification parts 11/2008)
**) Value pro press-in zone
***) Minimum push-out force per termination (incl. end of life).

Values in other printed circuit boards: have to be tested on request.

6.2 Electrical

Contact resistance < 0.5 mΩ (measured values acc. IEC 60352-5 in tin plated printed boards)

6.3 Environmental

Temperature Range –40°C /+140°C
Other temperatures can be used depending on the temperature limitations of the printed board used in the application but have to be tested.

7. REQUIREMENTS

Qualification tests based on IEC 60352-5. Test group C based on more severe automotive requirements

8. RELATED DOCUMENTS

8.1 Customer documents

- Bosch Order specifications: see table page 4
- Bosch 1 279 927 296 Guidelines for required evaluations of press-fit pins for technology release rev 13/06/2013

8.2 Test-Reports

- See 0808-608-04-01 CuSn6
- See 18-AUT-BE-0129-1/2/3/7/8 CuNiSi