

SWOBODA COMPLIANT ZONES (PRESS-FIT) CATALOG

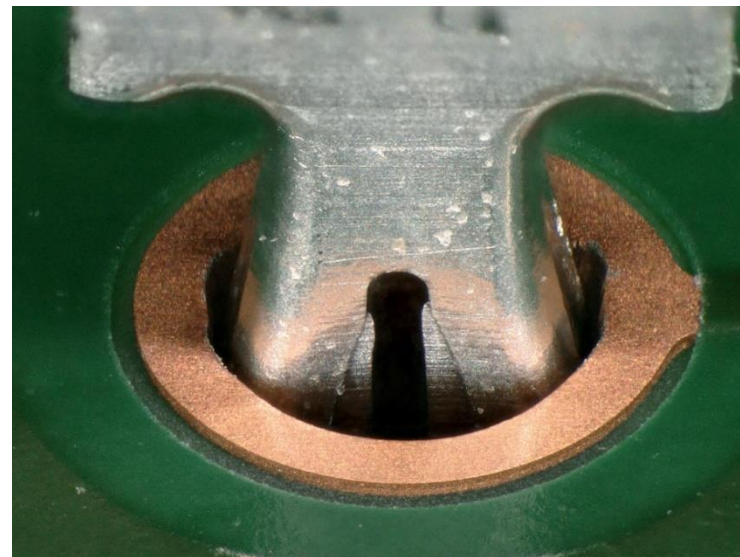
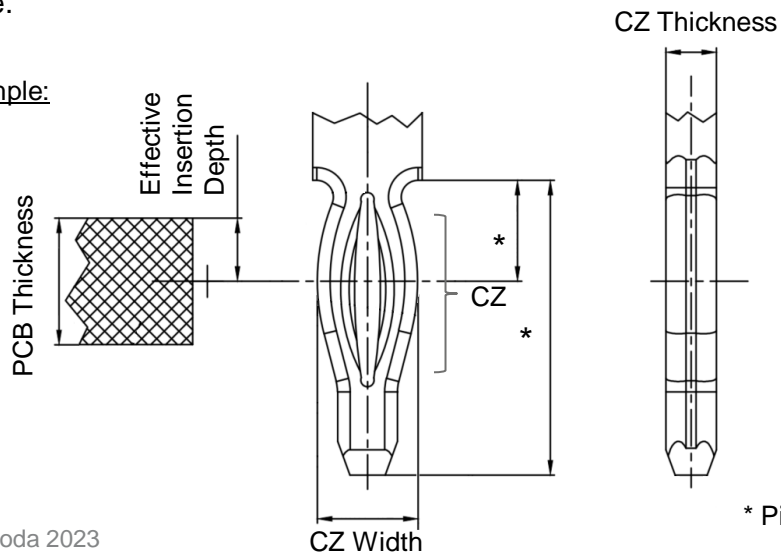
Update, v3, 26.02.2024

SOLDER FREE CONNECTIONS

The solder free connections are mechanical connections of the pins pressed into the printed circuit board (PCB). The pins consist of the compliant zone (CZ), which must fulfill material and dimensional criteria to get the necessary elastic strength as well as the plating specification to perform well in real assembly. The PCB and its' plated through hole (PTH) must also conform to certain requirements, which are partially fixed by used press-fit pin design.

In the next pages the specifications are based on the terminology and the brief dimensional summary as explains the sketch on this page.

Example:



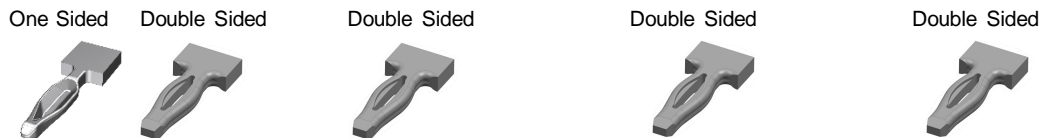
Example of press-fit pin inside the PTH hole of the PCB.

* Pin Length and Pin Neck Size can be modified

DISTINCTION OF THE COMPLIANT ZONES

	Possible Materials			
Temperature	≤ 100 °C	≤ 150 °C	≤ 150 °C	≤ 150 °C
EN Designation	CuSn6 (B16)	CuNiSiP (76M)	CuNi3Si1Mg (K55)	CuCrAgFeTiSi (K88)
JIS Designation	C51900	C19010	C70250	C18080
El. Conductivity % of IACS	14 - 18	50 – 56	40 - 55	76 - 83
Material Thicknesses in mm	0,4	0,4	0,4	0,8
Compliant Zone (CZ) Designation	Signal Low Power	Signal Power	Signal Power	High Power
	0,6 0,8	0,6 0,8	0,6 0,8	1,2

CZ Types



	Possible Plating				
Plating Type	Sn (Tin)	SnAg (Silver-Tin)	Ag (Silver)	In (Indium)	Ni (Nickel)
Under-layer (Barrier)	Ni (Nickel)	Ni (Nickel)	Ni (Nickel)	Ni (Nickel)	N/A
Tested Range (Forces, Resistance, Whisker, Temperature and Corrosion)	Full	In Progress	Not Tested	Only Forces	Not Tested

See next slides for details.

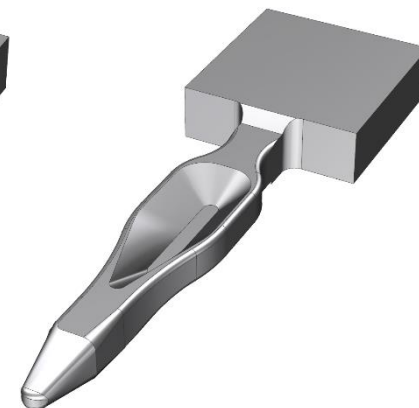
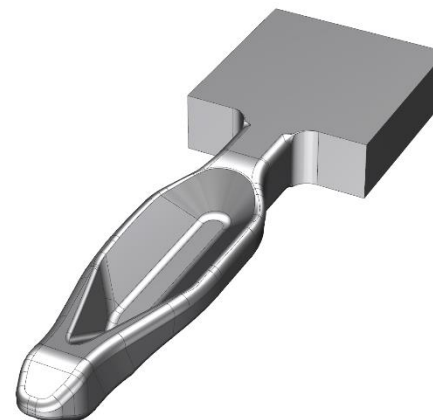
ONE-SIDED (OS) COMPLIANT ZONES

Parameter	Pin Type	
	OS 0,6 ST	OS 0,6 LT
Design Base:	EE - Erni	
Base Material:	CuSn6 R420, R500, R560	CuSn6 R560
Temperature Application:	-40°C to +100 °C (low temp. application)	
Pin Type:	Signal Pin	
Max Current Load:	approx. 8 A	
Effective Insertion Depth:	1 mm for PCB 1,6 mm thick	
Effective Zone Width:	1,2 ± 0,05 mm	1,15 – 1,19 mm
Material Thickness:	0,60 – 0,62 mm	
Pin Plating:	Customer Specification	
Typical Pin Plating:	1 – 2 µm Sn over 1 – 3 µm Ni or Ni only	
Pin Standard on rec. PTH:	IEC 60352-5	
Minimal Forces		
Insertion Force:	≤ 120 N	
Retention Force:	≥ 40 N	
PCB Details		
Nominal PTH in PCB:	1,00 mm	
PCB Finish:	Immersion Sn or HASL	

Now we are also preparing OS sizes 0,4 / 0,8 / 1,2. These versions will be available in late 2024.

Short Pin Tip (ST)

Long Pin Tip (LT)



Notes:

- Whisker growth depends mainly on pin plating and PCB type

DOUBLE-SIDED (DS) COMPLIANT ZONES

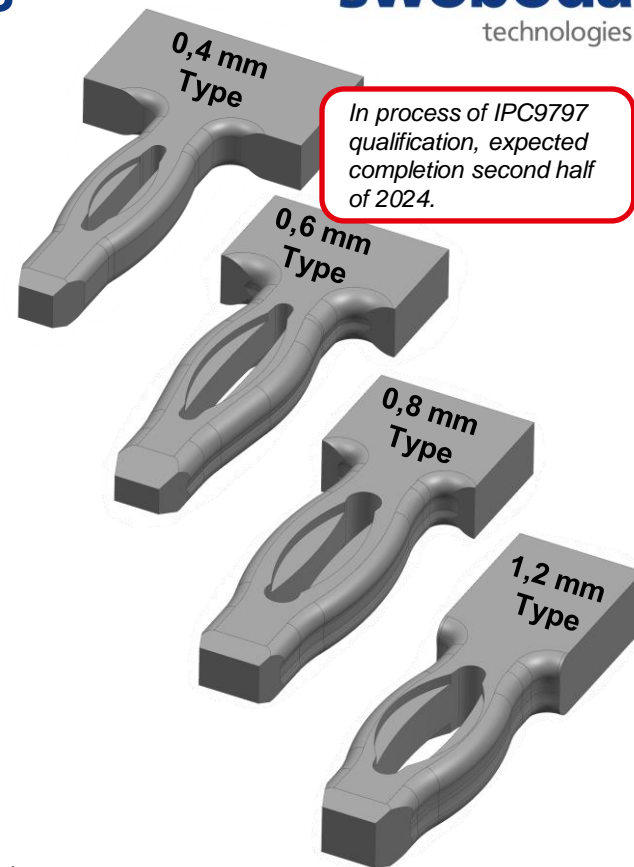
	Pin Type			
Parameter	0,4 mm	0,6 mm	0,8 mm	1,2 mm
Design Base:	EloPin			
Base Material:	CuSn6 R560 (low) CuNi3Si1Mg (high)	CuSn6 R560 (low) CuNi3Si1Mg (high)	CuSn6 R560 (low) CuNi3Si1Mg (high) CuCrAgFeTiSi1 (high)	CuCrAgFeTiSi1 (= K88 TR08)
Temperature Application:	-40°C to +100 °C (low) / +150°C (high)			-40°C to +150°C
Pin Type:	Signal Pin	Signal Pin	Signal / Low Power	Power Pin
Max Current Load *:	not specified, signal only	8 A	25 A	45 A
Effective Insertion Depth:	0,6 mm (for PCB 1,6 mm thick)			
Effective Zone Width:	0,72 mm	1,24 mm	1,67 mm	2,25 mm
Material Thickness:	0,40 – 0,42 mm	0,60 – 0,62 mm	0,8 – 0,82 mm	1,2 – 1,22 mm
Pin Plating:	Customer Specification			
Typical Pin Plating:	0,8 – 1,5 µm Sn over 1,3 – 2 µm Ni			
Pin Standard on rec. PTH:	IEC 60352-5			

Minimal Forces

Insertion Force:	≤ 100 N	≤ 100 N	≤ 160 N	≤ 200 N
Retention Force:	≥ 20 N	≥ 30 N	≥ 40 N	≥ 50 N

Recommended PCB Details

Nominal PTH in PCB:		1,00 mm	1,45 mm	2,0 mm
PCB Finish:	Immersion Sn or HASL			
Min PCB thickness:	1,44 mm			



Notes:

- * Max current depends on PCB and assembly heat dissipation
- The pin force effects depends on material properties
- Whisker growth depends mainly on plating

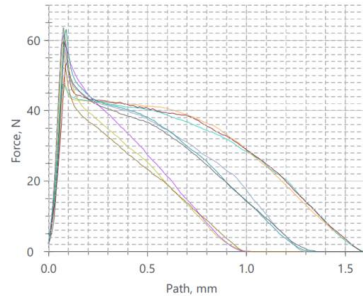
IN HOUSE TESTING

Swoboda-Stamping is equipped to perform internal force, microsectional and electrical testing of the press-fit pins according to IEC 60352-5 or IPC-9797 standards.

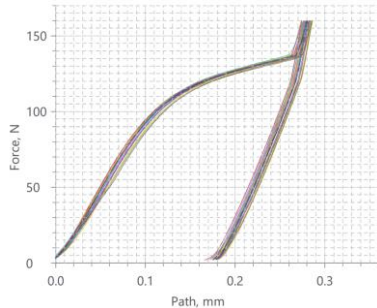
Force Measurements



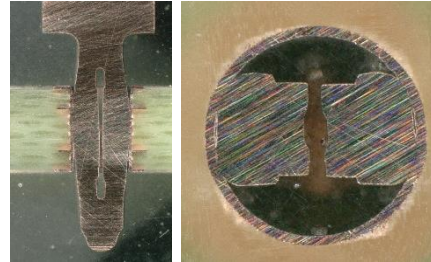
Retention Force



Spring Force



Microsectioning



3D & Dimensional Scanning



Transitional resistance measurement

