

COMPLIANT ZONES CATALOG

Swoboda – Stamping, s.r.o. | Update, v3, 26. 05. 2025

Internal

COMPLIANT ZONE - SOLDER FREE CONNECTION

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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 criterias 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. CZ Thickness





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

* Pin Length and Pin Neck Size can be modified

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ONE-SIDED COMPLIANT ZONES IPC9797 QUALIFIACTION IN PROGESS

	Pin Type					
Parameter	0,4 mm	0,6 mm	0,8 mm	1,2 mm		
Length of Functional Zone:	0,3 mm					
Base Material:	CuSn6 R420-560 (low) CuNi3Si1Mg R620 (high)	CuSn6 R560 (low) CuNi3Si1Mg R620 (high)	CuSn6 R560 (low) CuNi3Si1Mg R620 (high) CuCrAgFeTiSi1 TR08 (high) CuCr1Zr C18160 R540S	CuCr1Zr R540S CuCrAgFeTiSi1 TR08		
Temperature Application:	-40°C	to +100 °C (low) / +150°C	C(high)	-40°C to +150°C		
Pin Type:	Signal Pin	Signal Pin	Signal / Low Power Pin	Power Pin		
Max Current Load (Derating Curve) *:	WIP	WIP	WIP	WIP		
Effective Insertion Depth:	1 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 S	Specification			
Typical Pin Plating:	0,8 – 1,5 μm Sn over 1,3 – 2 μm Ni					
Pin Standard on rec. PTH:	IEC 60352-5, IPC9797 for OSP is WIP					
Forces **						
Insertion Force:	≤ 100 N	≤ 100 N	≤ 160 N	≤ 200 N		
Retention Force:	≥ 20 N	≥ 30 N	≥ 40 N	≥ 50 N		
Recommended PCB De	etails					
Nominal Ø PTH in PCB:	0,6 mm	1,00 mm	1,45 mm	2,0 mm		
PCB Finish:	OSP, Immersion Sn or HASL					
Min PCB thickness:		1,44	1 mm			







Notes:

- WIP = Work in Progress
- * Max current depends on PCB and assembly heat dissipation
- ** The pin force effects depends on material properties and PCB coating
- Whisker growth depends mainly on plating
- Pin tip size can be modified

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DOUBLE-SIDED COMPLIANT ZONES IPC9797 QUALIFIED

	Pin Type				
Parameter	0,4 mm	0,6 mm	0,8 mm	1,2 mm + 1,2L	
Length of Functional Zone:		0,3 mm		0,3 / 0,6 (L) mm	
Base Material:	CuSn6 R560 (low) CuNi3Si1Mg (high)	CuSn6 R560 (low) CuNi3Si1Mg (high)	CuSn6 R560 (low) CuNi3Si1Mg (high) CuCrAgFeTiSi1(high)	CuCrAgFeTiSi1 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 Pin	Power Pin	
Max Current Load (Derating Curve) *:	not specified, signal only	8 A	25 A	45 A	
Effective Insertion Depth:		0,6 mm (for PC	B 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 S	Specification		
Typical Pin Plating:		0,8 – 1,5 µm Sn c	over 1,3 – 2 µm Ni		
Pin Standard on rec. PTH:	IPC WIP IPC9797 for OSP, IEC 60352-5 for Tin				
Forces **					
Insertion Force:	≤ 100 N	≤ 100 N	≤ 160 N	≤ 200 N	
Retention Force:	≥ 20 N	≥ 30 N	≥ 40 N	≥ 50 N	
Recommended P <u>CB De</u>	etails				
Nominal Ø PTH in PCB:	nal Ø PTH in PCB: 0,6 mm		1,45 mm	2,0 mm	
PCB Finish:		OSP, Immersio	on Sn or HASL		

1,44 mm

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Notes:

- WIP = Work in Progress
- * Max current depends on PCB and assembly heat dissipation
- ** The pin force effects depends on material properties and PCB coating
- Whisker growth depends mainly on plating
- Pin tip size can be modified

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Min PCB thickness:

INTERNAL QUALIFICATION



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

Force Measurements

Microsectioning

3D & Dimensional Scanning

Transitional Resistance Measurement

Internal Protocol Example

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EXTERNAL QUALIFICATION

Qualification according to IPC9797 is made by external certified laboratory Tiyo in Czech Republic. Laboratory is equipped to perform all chapters of IPC standard. Outputs are testing protocols and summary of the results.

TEST REPORT

Ing. Štěpánka Zamouřilová, Ph.D. 2025.03.04 11:28:69 +01'00'

Laboratory Protocol Example

Results

Tab. 7: Summary of test results – Forces and Contact resistance

Value Type	Push-in forces [N] Hole Diameter		Push-out forces [N] Hole Diameter		Contact resistance [μΩ]* Hole Diameter				
	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max
Request	N/A			N/A		N/A			
Min	110,91	88,99	68,64	51,12	54,78	55,61	141	168	147
Max	119,37	97,21	74,52	59,38	62,50	63,43	175	184	178
Average	113,98	92,13	72,01	53,90	60,01	58,71	165	177	161

* Initial contact resistance measured immediately after push-in test; results influenced by OSP PCB

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