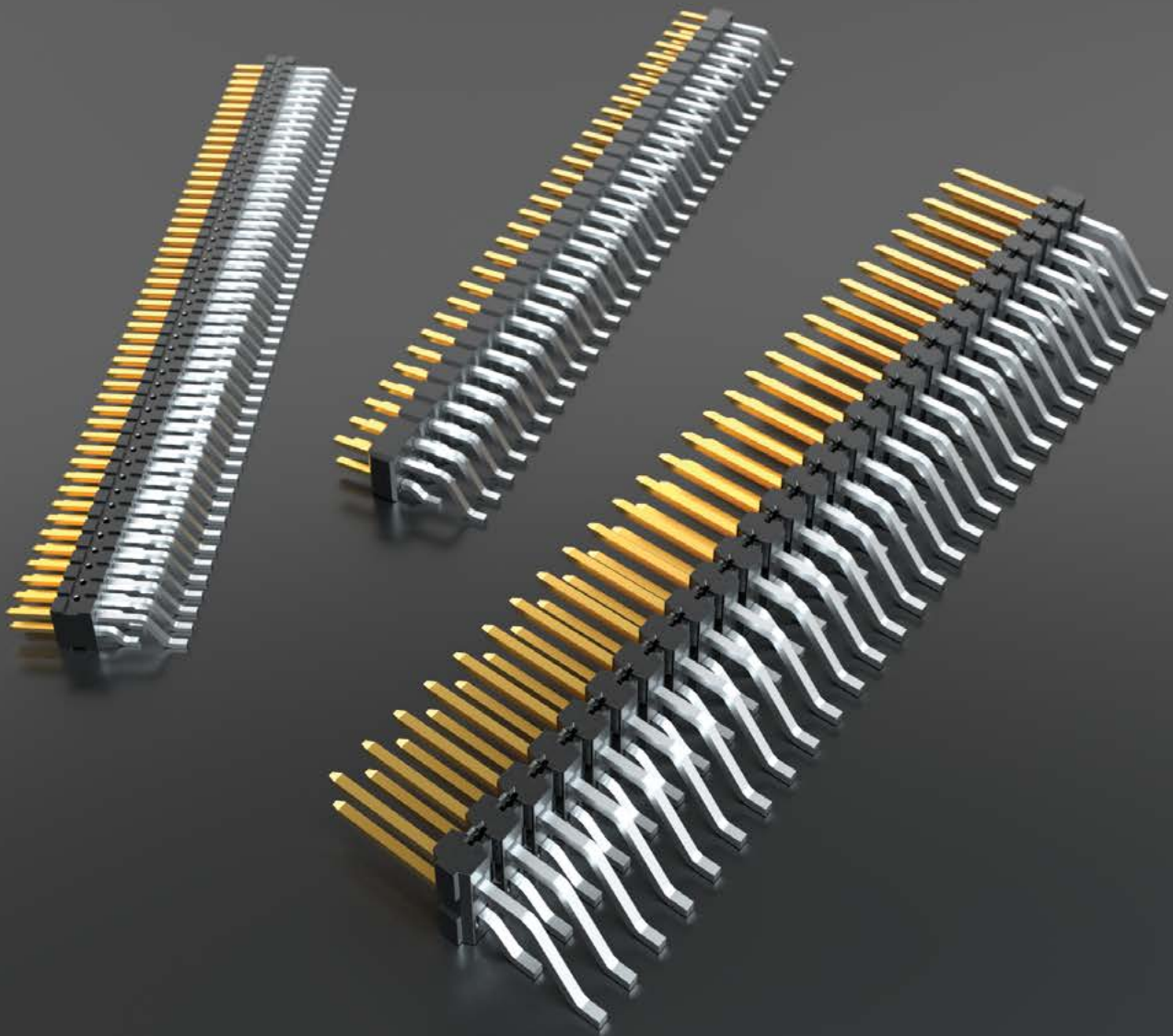




COPLANARITY & STENCIL THICKNESS

Soldering Success with 0.15 mm (.006") Coplanarity and 0.10 mm (.004") Stencil



COPLANARITY & STENCIL THICKNESS STUDY

The coplanarity requirements for most connectors may be relaxed to a maximum of 0.15 mm when using a 0.10 mm stencil, resulting in a lower cost to the customer and increased connector options for a wider range of solutions.

PURPOSE

To verify surface mount (SMT) connectors with a maximum coplanarity specification of 0.15 mm can be soldered successfully using a 0.10 mm stencil with optimized apertures. Samtec and Phoenix Contact performed dual studies.

CONCLUSION

It was verified that SMT connectors with a maximum coplanarity of 0.15 mm can be successfully soldered using a 0.10 mm stencil with optimized apertures. Between Samtec and Phoenix Contact, a total of 135 connectors were soldered using a 0.10 mm stencil with optimized apertures, and all passing and meeting at least IPC-J-STD-001 Class 2 acceptance criteria for a 100% yield. Based on these studies, the coplanarity requirements for most connectors may be relaxed to a maximum of 0.15 mm when using a 0.10 mm stencil, resulting in a lower cost to the customer and increased connector options for a wider range of solutions.

SCOPE

Samtec's Interconnect Processing Group (IPG) soldered (3) connector series using a 0.15 mm stencil with 1:1 apertures (same size/shape aperture and pad) and two variations of 0.10 mm stencils with enlarged apertures. Phoenix Contact performed a similar study using a 0.10 mm stencil with the enlarged aperture design that Samtec found to be optimal. Connectors were built and measured, then sorted to find a coplanarity range suitable for this study (0.10 - 0.15 mm).

PART NUMBERS TESTED:



FTSH-150-01-F-DH-A

MMT-132-01-S-DH-A

TSM-129-01-L-DH-A

RESULTS

PASSED (See charts on pages 6-11)

The following samples all passed visual inspection meeting at least IPC-J-STD-001 Class 2 acceptance criteria:

- (4) samples of each part number were soldered at Samtec using a 0.15 mm stencil with 1:1 apertures.
- (17) FTSH, (15) MMT and (19) TSM samples were soldered at Samtec using a 0.10 mm stencil with an optimized overprint (stencil revision SP1D; see chart page 4).
- (28) FTSH, (28) MMT and (28) TSM samples were soldered at Phoenix Contact using a 0.10 mm stencil with an optimized overprint (stencil revision SP1D; see chart page 4).

FAILED (See page 12)

- (5) FTSH, (6) MMT and (6) TSM samples were soldered at Samtec using a 0.10 mm stencil with less than optimal apertures (stencil revision SP1C; see chart page 4). At least (1) sample of each part number failed inspection due to open solder joints and/or insufficient fillets per IPC-J-STD-001.

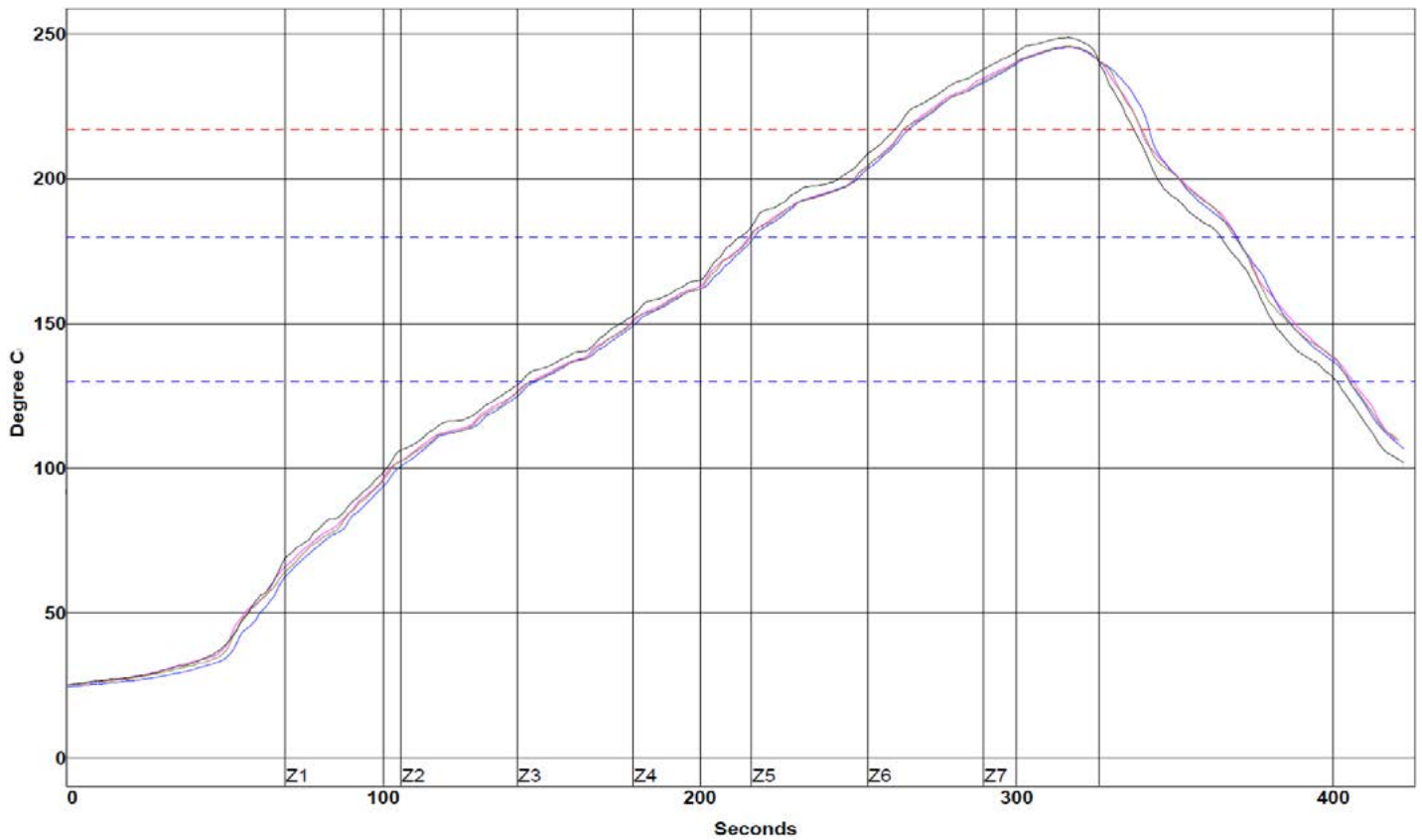
CONDITIONS (Both Samtec and Phoenix Contact used the following parameters)

Assembly Materials, Equipment and Environmental Conditions

TYPE	DESCRIPTION	COMMENT
PCB	PCB-109372-IPG-XX	2.36 mm (.093") PCB thickness
Stencil	PCB-109372-IPG-XX-00X-SP1X	
Connector	FTSH-150-01-F-DH-A MMT-132-01-S-DH-A TSM-129-01-L-DH-A	1.27 mm (.050") Pitch Dual Horizontal Micro Terminal Strip 2.00 mm (.0787") Pitch Dual Horizontal Surface Mount Terminal Strip 2.54 mm (.100") Pitch Dual Horizontal Surface Mount Terminal Strip
Solder Paste Alloy	SAC 305	Lead-free, no-clean
Chamber Environment	Nitrogen	<3000 ppm

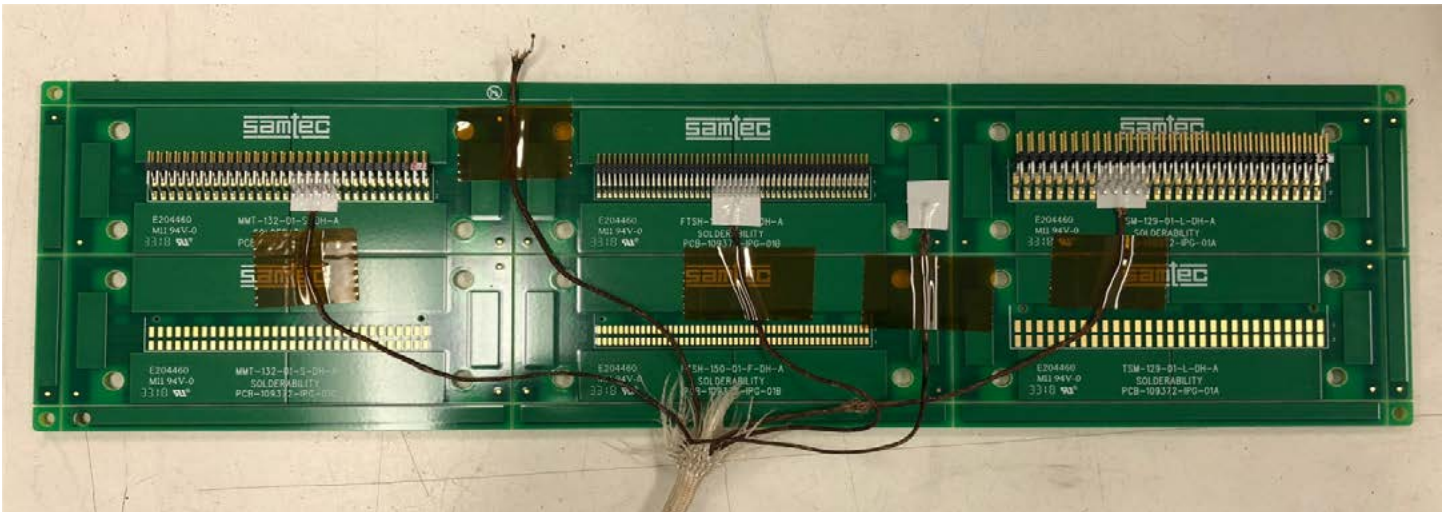
EVALUATION TESTING

Samtec Thermal Profile



PWI=71%	MAX RISING SLOPE		SOAK TIME 130-180 °C		REFLOW TIME /217 °C		PEAK TEMP	
MMT	1.44	-41%	68.77	-71%	74.94	45%	245.73	-14%
TSM	1.48	-36%	69.15	-70%	76.13	50%	245.60	-15%
FTSH	1.42	-44%	68.95	-70%	75.07	46%	245.92	-13%
PCB	1.55	-27%	69.24	-69%	75.47	47%	248.73	10%
DELTA	0.13		0.47		1.19		3.13	

SAMTEC PROFILE BOARD



STENCIL INFORMATION

FTSH					
Stencil	Row	Aperture Width	Aperture Length	Solder Volume	% of Recommended Volume
PCB-109372-IPG-XX-006-SP1A (Standard 0.15 mm (.006") Design)	Inner Row	0.76 mm (.030")	2.03 mm (.080")	0.0000144	100
	Outer Row	0.76 mm (.030")	2.03 mm (.080")	0.0000144	100
PCB-109372-IPG-XX-004-SP1C (0.10 mm (.004") Design)	Inner Row	0.76 mm (.030")	2.79 mm (.110")	0.0000132	92
	Outer Row	0.76 mm (.030")	2.79 mm (.110")	0.0000132	92
PCB-109372-IPG-XX-004-SP1D (Optimized 0.10 mm (.004") Design)	Inner Row	0.97 mm (.038")	2.84 mm (.112")	0.0000170	118
	Outer Row	0.97 mm (.038")	2.84 mm (.112")	0.0000170	118

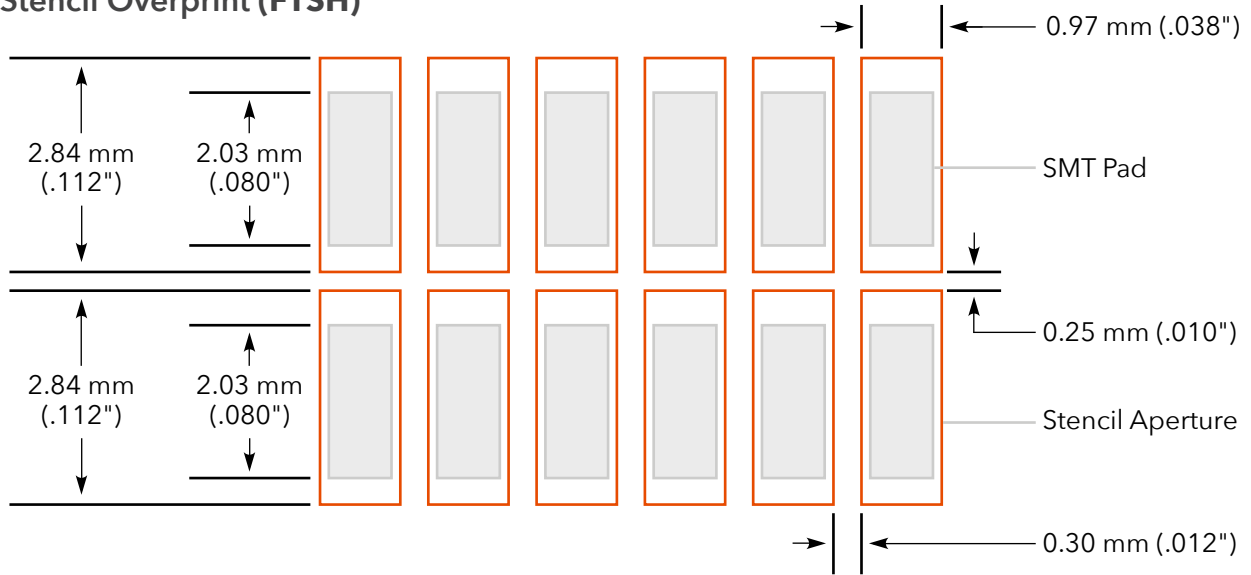
MMT					
Stencil	Row	Aperture Width	Aperture Length	Solder Volume	% of Recommended Volume
PCB-109372-IPG-XX-006-SP1A (Standard 0.15 mm (.006") Design)	Inner Row	1.02 mm (.040")	2.59 mm (.102")	0.0000245	100
	Outer Row	1.02 mm (.040")	2.29 mm (.090")	0.0000216	100
PCB-109372-IPG-XX-004-SP1C (0.10 mm (.004") Design)	Inner Row	1.02 mm (.040")	3.10 mm (.122")	0.0000195	80
	Outer Row	1.02 mm (.040")	2.79 mm (.110")	0.0000176	81
PCB-109372-IPG-XX-004-SP1D (Optimized 0.10 mm (.004") Design)	Inner Row	1.52 mm (.060")	3.10 mm (.122")	0.0000293	120
	Outer Row	1.52 mm (.060")	2.79 mm (.110")	0.0000264	122

TSM					
Stencil	Row	Aperture Width	Aperture Length	Solder Volume	% of Recommended Volume
PCB-109372-IPG-XX-006-SP1A (Standard 0.15 mm (.006") Design)	Inner Row	1.27 mm (.050")	3.18 mm (.125")	0.0000375	100
	Outer Row	1.27 mm (.050")	3.18 mm (.125")	0.0000375	100
PCB-109372-IPG-XX-004-SP1C (0.10 mm (.004") Design)	Inner Row	1.70 mm (.067")	3.56 mm (.140")	0.0000375	100
	Outer Row	1.70 mm (.067")	3.56 mm (.140")	0.0000375	100
PCB-109372-IPG-XX-004-SP1D (Optimized 0.10 mm (.004") Design)	Inner Row	1.91 mm (.075")	3.81 mm (.150")	0.0000450	120
	Outer Row	1.91 mm (.075")	3.81 mm (.150")	0.0000450	120

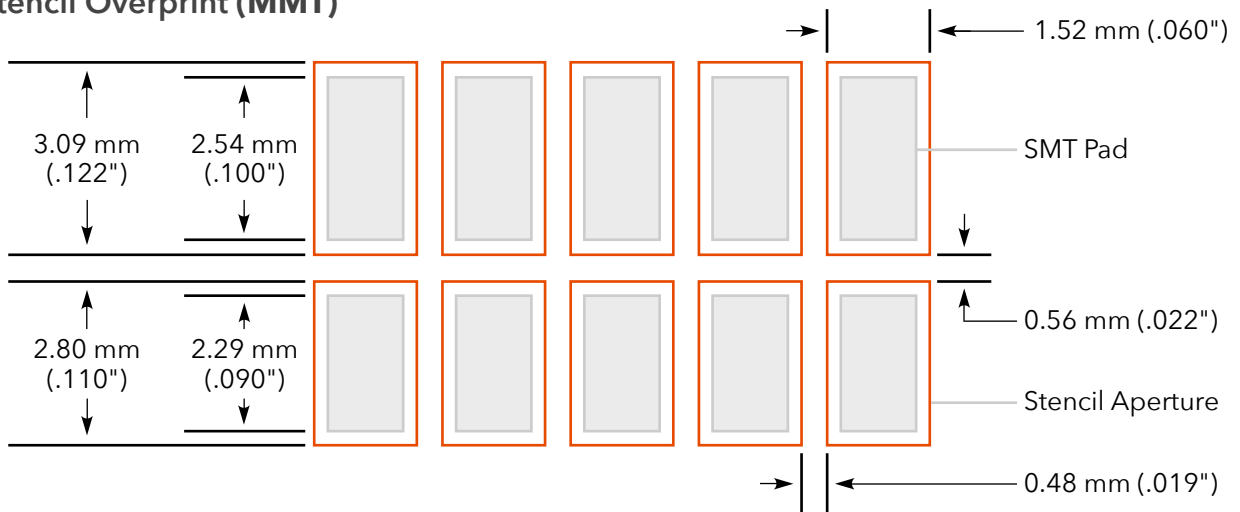
OPTIMIZED 0.10 mm (.004") STENCIL DESIGNS

Even though solder paste was slightly overprinted, no residual solder balling occurred.

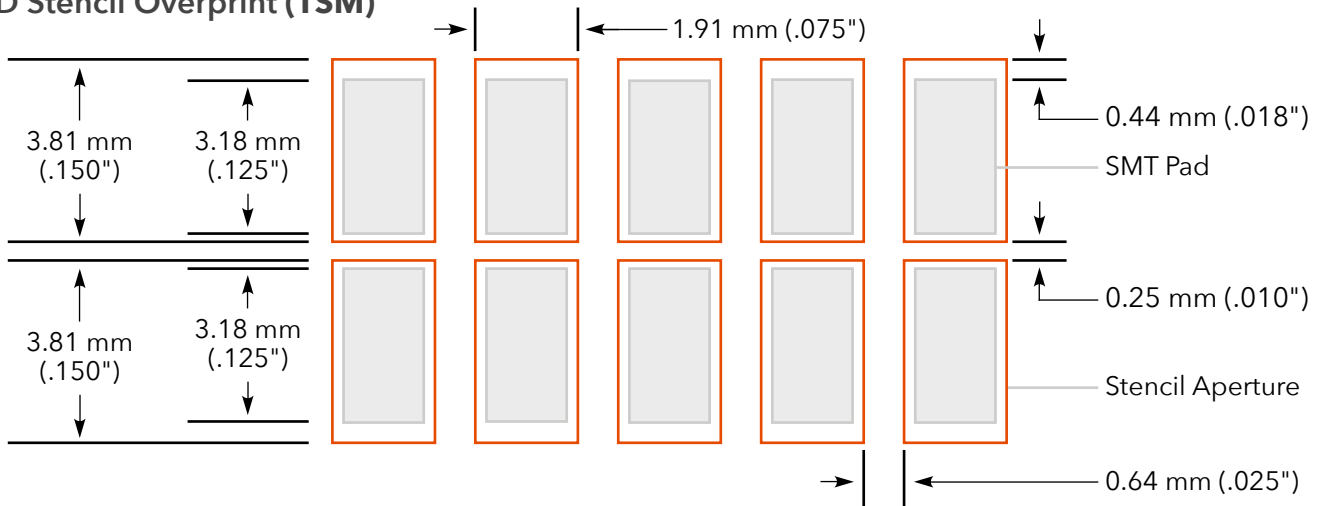
SP1D Stencil Overprint (FTSH)



SP1D Stencil Overprint (MMT)



SP1D Stencil Overprint (TSM)



FTSH PROCESSING RESULTS

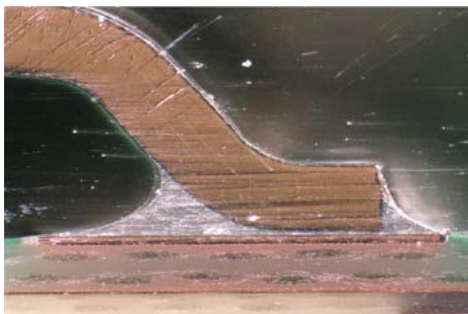
1.27 mm (.050") PITCH DUAL HORIZONTAL MICRO TERMINAL STRIP

SAMTEC PROCESSING RESULTS				
Sample ID	Coplanarity	Stencil Aperture Design	Stencil Thickness	Result
10	0.124 mm (.0049")	SP1A	0.15 mm (.006")	Pass
4	0.132 mm (.0052")			Pass
45*	0.145 mm (.0057")			Pass
41	0.152 mm (.0060")			Pass
13	0.112 mm (.0044")	SP1C	0.10 mm (.004")	Pass
5**	0.122 mm (.0048")			Fail
12	0.140 mm (.0055")			Pass
52	0.140 mm (.0055")	SP1D	0.10 mm (.004")	Pass
6	0.152 mm (.0060")			Fail
33	0.097 mm (.0038")			Pass
39	0.107 mm (.0042")			Pass
37	0.112 mm (.0044")			Pass
31	0.117 mm (.0046")			Pass
14	0.119 mm (.0047")			Pass
17	0.127 mm (.0050")			Pass
23	0.135 mm (.0053")			Pass
30	0.135 mm (.0053")			Pass
28	0.137 mm (.0054")			Pass
26	0.140 mm (.0055")			Pass
3	0.142 mm (.0056")			Pass
8	0.147 mm (.0058")			Pass
29	0.147 mm (.0058")			Pass
19	0.150 mm (.0059")			Pass
32	0.150 mm (.0059")	Pass		
38*	0.150 mm (.0059")	Pass		
189*	0.152 mm (.0060")	Pass		

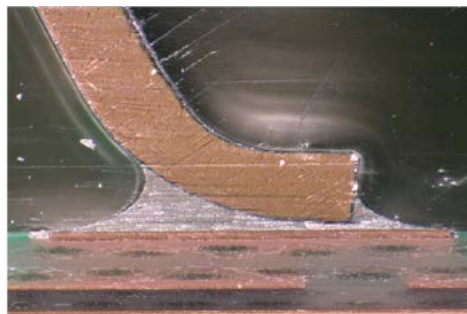
PHOENIX CONTACT PROCESSING RESULTS				
Sample ID	Coplanarity	Stencil Aperture Design	Stencil Thickness	Result
34	0.102 mm (.0040")	SP1D	0.10 mm (.004")	Pass
204	0.109 mm (.0043")			Pass
102	0.114 mm (.0045")			Pass
190	0.114 mm (.0045")			Pass
137	0.117 mm (.0046")			Pass
111	0.119 mm (.0047")			Pass
214	0.122 mm (.0048")			Pass
99	0.124 mm (.0049")			Pass
116	0.127 mm (.0050")			Pass
59	0.130 mm (.0051")			Pass
142	0.132 mm (.0052")			Pass
46	0.135 mm (.0053")			Pass
74				Pass
101				Pass
181	0.137 mm (.0054")			Pass
11				Pass
144	0.140 mm (.0055")			Pass
64	0.140 mm (.0055")			Pass
184	0.140 mm (.0055")			Pass
85	0.142 mm (.0056")			Pass
150	0.142 mm (.0056")	Pass		
70	0.145 mm (.0057")	Pass		
140	0.145 mm (.0057")	Pass		
49	0.147 mm (.0058")	Pass		
164	0.147 mm (.0058")	Pass		
194	0.147 mm (.0058")	Pass		
44	0.150 mm (.0059")	Pass		
178	0.150 mm (.0059")	Pass		

< 0.102 mm (.0040")	0.117 (.0046") - 0.127 mm (.0050")	0.142 (.0056") - 0.152 mm (.0060")
0.102 (.0040") - 0.114 mm (.0045")	0.130 (.0051") - 0.140 mm (.0055")	> 0.152 mm (.0060")

*See images page 6-7 ** See image page 12



FTSH Samtec Sample 45 (Inner Row)
0.145 mm (.0057") Coplanarity,
0.15 mm (.006") SP1A Stencil



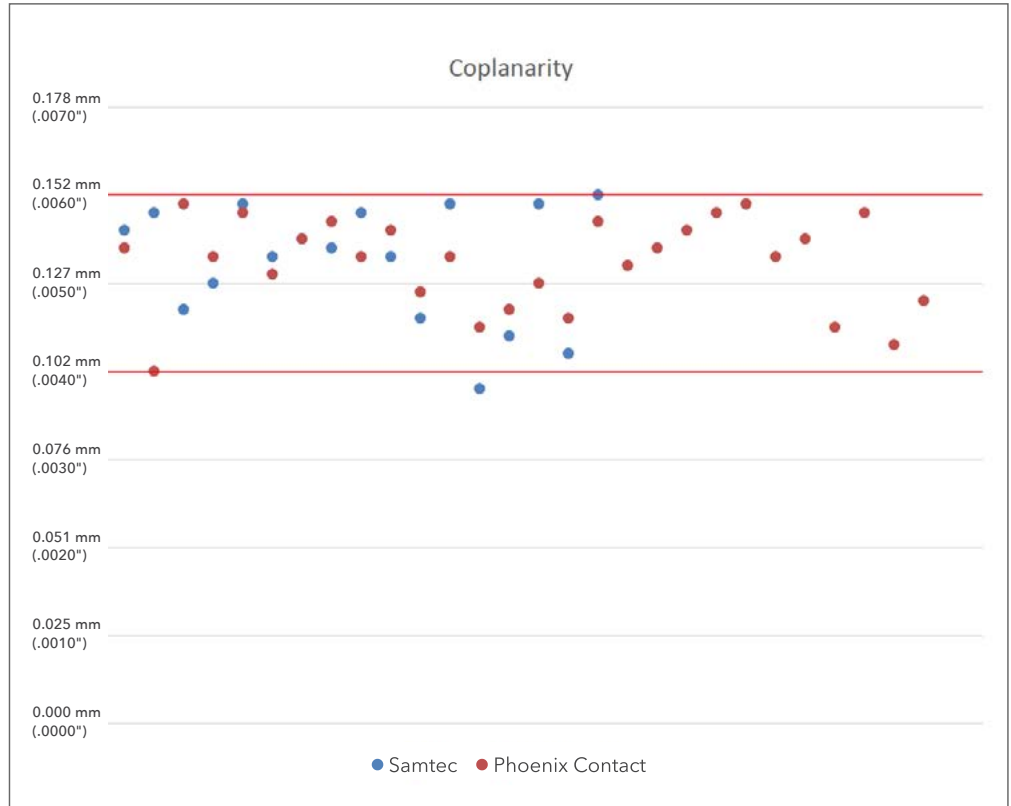
FTSH Samtec Sample 45 (Outer Row)
0.145 mm (.0057") Coplanarity,
0.15 mm (.006") SP1A Stencil



FTSH Samtec Sample 189 (Inner Row)
0.152 mm (.0060") Coplanarity,
0.10 mm (.004") SP1D Stencil

FTSH COPLANARITY (CONNECTORS SOLDERED WITH 0.10 mm (.004") SP1D STENCIL)

SOLDERED AT SAMTEC	SOLDERED AT PHOENIX CONTACT
0.097 mm (.0038")	0.102 mm (.0040")
0.107 mm (.0042")	0.109 mm (.0043")
0.112 mm (.0044")	0.114 mm (.0045")
0.117 mm (.0046")	0.114 mm (.0045")
0.119 mm (.0047")	0.117 mm (.0046")
0.127 mm (.0050")	0.119 mm (.0047")
0.135 mm (.0053")	0.122 mm (.0048")
0.135 mm (.0053")	0.124 mm (.0049")
0.137 mm (.0054")	0.127 mm (.0050")
0.140 mm (.0055")	0.130 mm (.0051")
0.142 mm (.0056")	0.132 mm (.0052")
0.147 mm (.0058")	0.135 mm (.0053")
0.147 mm (.0058")	0.135 mm (.0053")
0.150 mm (.0059")	0.135 mm (.0053")
0.150 mm (.0059")	0.135 mm (.0053")
0.150 mm (.0059")	0.137 mm (.0054")
0.152 mm (.0060")	0.137 mm (.0054")
	0.140 mm (.0055")
	0.140 mm (.0055")
	0.142 mm (.0056")
	0.142 mm (.0056")
	0.145 mm (.0057")
	0.145 mm (.0057")
	0.147 mm (.0058")
	0.147 mm (.0058")
	0.147 mm (.0058")
	0.150 mm (.0059")
	0.150 mm (.0059")



FTSH Samtec Sample 189 (Outer Row)
0.152 mm (.0060") Coplanarity,
0.10 mm (.004") SP1D Stencil



FTSH Samtec Sample 38
0.150 mm (.0059") Coplanarity,
0.10 mm (.004") SP1D Stencil



FTSH Phoenix Contact Sample
(Representative) 0.10 mm (.004")
SP1D Stencil

MMT PROCESSING RESULTS

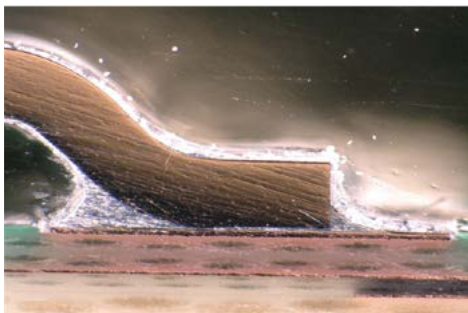
2.00 mm (.0787") PITCH DUAL HORIZONTAL SURFACE MOUNT TERMINAL STRIP

SAMTEC PROCESSING RESULTS				
Sample ID	Coplanarity	Stencil Aperture Design	Stencil Thickness	Result
75	0.109 mm (.0043")	SP1A	0.15 mm (.006")	Pass
83	0.124 mm (.0049")			Pass
21*	0.130 mm (.0051")			Pass
26	0.142 mm (.0056")			Pass
9	0.112 mm (.0044")	SP1C	0.10 mm (.004")	Pass
5	0.122 mm (.0048")			Pass
29	0.130 mm (.0051")			Pass
209	0.135 mm (.0053")			Pass
160**	0.150 mm (.0059")			Fail
77	0.150 mm (.0059")			Pass
13	0.099 mm (.0039")	SP1D	0.10 mm (.004")	Pass
127	0.102 mm (.0040")			Pass
128	0.107 mm (.0042")			Pass
155	0.114 mm (.0045")			Pass
11	0.119 mm (.0047")			Pass
130	0.122 mm (.0048")			Pass
156	0.122 mm (.0048")			Pass
10	0.124 mm (.0049")			Pass
37	0.127 mm (.0050")			Pass
196	0.127 mm (.0050")			Pass
47	0.132 mm (.0052")			Pass
138	0.135 mm (.0053")			Pass
66	0.137 mm (.0054")			Pass
82*	0.142 mm (.0056")			Pass
139*	0.142 mm (.0056")	Pass		

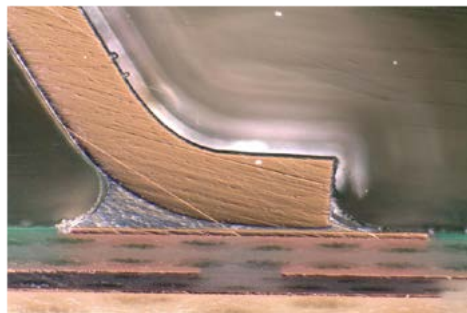
PHOENIX CONTACT PROCESSING RESULTS				
Sample ID	Coplanarity	Stencil Aperture Design	Stencil Thickness	Result
108	0.102 mm (.0040")	SP1D	0.10 mm (.004")	Pass
61	0.104 mm (.0041")			Pass
7	0.107 mm (.0042")			Pass
144	0.109 mm (.0043")			Pass
76	0.112 mm (.0044")			Pass
36	0.114 mm (.0045")			Pass
65	0.117 mm (.0046")			Pass
104	0.117 mm (.0046")			Pass
163	0.119 mm (.0047")			Pass
119	0.119 mm (.0047")			Pass
151	0.119 mm (.0047")			Pass
172	0.119 mm (.0047")			Pass
178	0.119 mm (.0047")			Pass
187	0.119 mm (.0047")			Pass
20	0.122 mm (.0048")			Pass
31	0.122 mm (.0048")			Pass
34	0.122 mm (.0048")			Pass
45	0.122 mm (.0048")			Pass
49	0.122 mm (.0048")			Pass
114	0.124 mm (.0049")			Pass
124	0.124 mm (.0049")			Pass
161	0.124 mm (.0049")	Pass		
211	0.124 mm (.0049")	Pass		
28	0.130 mm (.0051")	Pass		
50	0.130 mm (.0051")	Pass		
72	0.135 mm (.0053")	Pass		
167	0.135 mm (.0053")	Pass		
190	0.145 mm (.0057")	Pass		

< 0.102 mm (.0040")	0.117 (.0046") - 0.127 mm (.0050")	0.142 (.0056") - 0.152 mm (.0060")
0.102 (.0040") - 0.114 mm (.0045")	0.130 (.0051") - 0.140 mm (.0055")	> 0.152 mm (.0060")

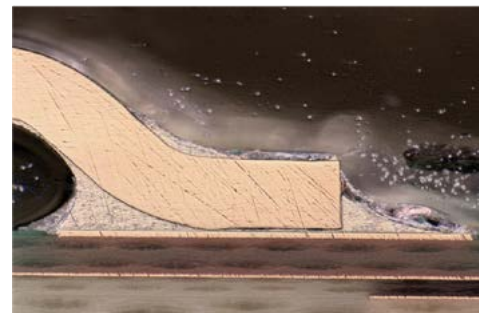
*See images page 8-9 ** See image page 12



MMT Samtec Sample 21 (Inner Row)
0.130 mm (.0051") Coplanarity,
0.15 mm (.006") SP1A Stencil



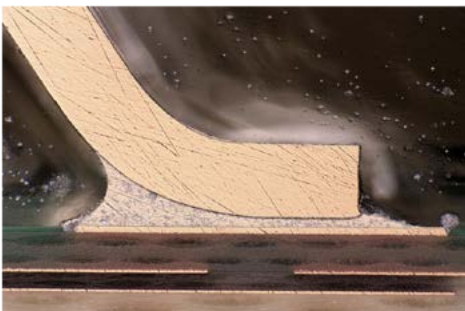
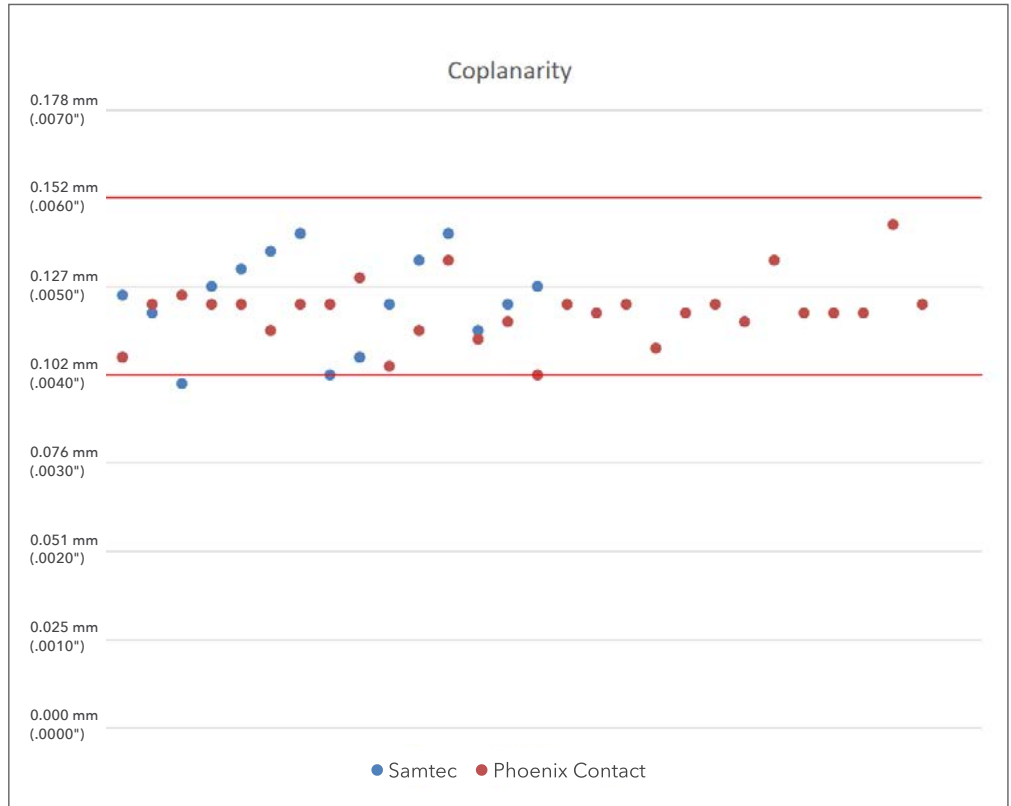
MMT Samtec Sample 21 (Outer Row)
0.130 mm (.0051") Coplanarity,
0.15 mm (.006") SP1A Stencil



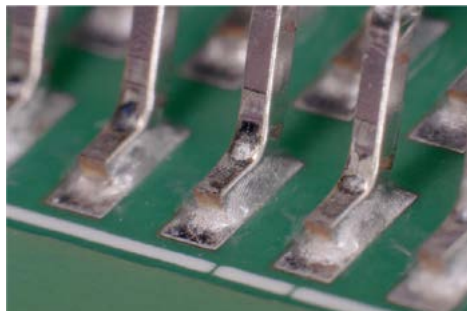
MMT Samtec Sample 139 (Inner Row)
0.142 mm (.0056") Coplanarity,
0.10 mm (.004") SP1D Stencil

MMT COPLANARITY (CONNECTORS SOLDERED WITH 0.10 mm SP1D STENCIL)

SOLDERED AT SAMTEC	SOLDERED AT PHOENIX CONTACT
0.099 mm (.0039")	0.102 mm (.0040")
0.102 mm (.0040")	0.104 mm (.0041")
0.107 mm (.0042")	0.107 mm (.0042")
0.114 mm (.0045")	0.109 mm (.0043")
0.119 mm (.0047")	0.112 mm (.0044")
0.122 mm (.0048")	0.114 mm (.0045")
0.122 mm (.0048")	0.114 mm (.0045")
0.124 mm (.0049")	0.117 mm (.0046")
0.127 mm (.0050")	0.117 mm (.0046")
0.127 mm (.0050")	0.119 mm (.0047")
0.132 mm (.0052")	0.119 mm (.0047")
0.135 mm (.0053")	0.119 mm (.0047")
0.137 mm (.0054")	0.119 mm (.0047")
0.142 mm (.0056")	0.119 mm (.0047")
0.142 mm (.0056")	0.122 mm (.0048")
	0.122 mm (.0048")
	0.122 mm (.0048")
	0.122 mm (.0048")
	0.122 mm (.0048")
	0.122 mm (.0048")
	0.122 mm (.0048")
	0.122 mm (.0048")
	0.122 mm (.0048")
	0.124 mm (.0049")
	0.130 mm (.0051")
	0.135 mm (.0053")
	0.135 mm (.0053")
	0.145 mm (.0057")



MMT Samtec Sample 139 (**Outer Row**)
 0.142 mm (.0056") Coplanarity,
 0.10 mm (.004") SP1D Stencil



MMT Samtec Sample 82
 0.142 mm (.0056") Coplanarity,
 0.10 mm (.004") SP1D Stencil



MMT Phoenix Contact Sample
 (Representative) 0.10 mm (.004")
 SP1D Stencil

TSM PROCESSING RESULTS

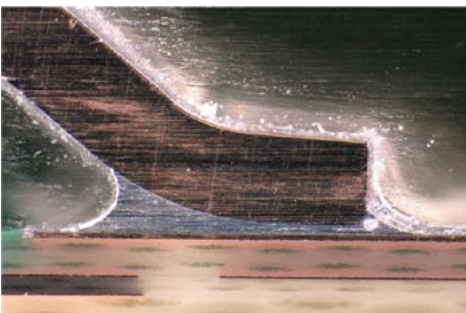
2.54 mm (.100") PITCH DUAL HORIZONTAL SURFACE MOUNT TERMINAL STRIP***

SAMTEC PROCESSING RESULTS				
Sample ID	Coplanarity	Stencil Aperture Design	Stencil Thickness	Result
11	0.132 mm (.0052")	SP1A	0.15 mm (.006")	Pass
10*	0.140 mm (.0055")			Pass
12	0.145 mm (.0057")			Pass
5	0.150 mm (.0059")			Pass
73	0.127 mm (.0050")			Pass
7**	0.135 mm (.0053")	SP1C	0.10 mm (.004")	Fail
109	0.137 mm (.0054")			Pass
29	0.140 mm (.0055")			Pass
65	0.152 mm (.0060")			Fail
6	0.155 mm (.0061")			Fail
14	0.109 mm (.0043")	SP1D	0.10 mm (.004")	Pass
30	0.132 mm (.0052")			Pass
18	0.140 mm (.0055")			Pass
9	0.140 mm (.0055")			Pass
32	0.142 mm (.0056")			Pass
24	0.145 mm (.0057")			Pass
17	0.147 mm (.0058")			Pass
78	0.150 mm (.0059")			Pass
31	0.150 mm (.0059")			Pass
35	0.150 mm (.0059")			Pass
82	0.152 mm (.0060")			Pass
63*	0.152 mm (.0060")			Pass
16	0.155 mm (.0061")			Pass
15	0.155 mm (.0061")			Pass
28	0.157 mm (.0062")			Pass
27	0.157 mm (.0062")	Pass		
3*	0.160 mm (.0063")	Pass		
25	0.163 mm (.0064")	Pass		
2	0.170 mm (.0067")	Pass		

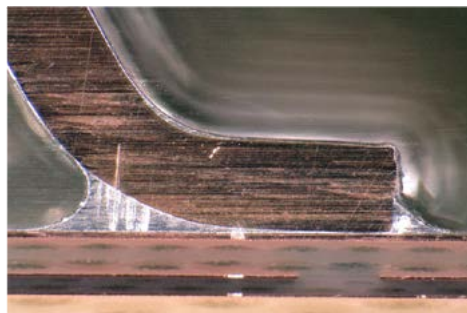
PHOENIX CONTACT PROCESSING RESULTS				
Sample ID	Coplanarity	Stencil Aperture Design	Stencil Thickness	Result
112	0.104 mm (.0041")	SP1D	0.10 mm (.004")	Pass
90	0.114 mm (.0045")			Pass
87	0.117 mm (.0046")			Pass
92	0.122 mm (.0048")			Pass
111	0.122 mm (.0048")			Pass
95	0.124 mm (.0049")			Pass
77	0.127 mm (.0050")			Pass
108	0.127 mm (.0050")			Pass
37	0.130 mm (.0051")			Pass
52	0.130 mm (.0051")			Pass
44	0.132 mm (.0052")			Pass
23	0.135 mm (.0053")			Pass
76	0.135 mm (.0053")			Pass
42	0.137 mm (.0054")			Pass
54	0.137 mm (.0054")			Pass
114	0.140 mm (.0055")			Pass
61	0.140 mm (.0055")			Pass
96	0.142 mm (.0056")			Pass
13	0.142 mm (.0056")			Pass
85	0.142 mm (.0056")			Pass
88	0.145 mm (.0057")			Pass
38	0.145 mm (.0057")			Pass
56	0.145 mm (.0057")			Pass
75	0.147 mm (.0058")			Pass
26	0.150 mm (.0059")			Pass
51	0.150 mm (.0059")			Pass
59	0.152 mm (.0060")			Pass
67	0.152 mm (.0060")	Pass		

< 0.102 mm (.0040")	0.117 (.0046") - 0.127 mm (.0050")	0.142 (.0056") - 0.152 mm (.0060")
0.102 (.0040") - 0.114 mm (.0045")	0.130 (.0051") - 0.140 mm (.0055")	> 0.152 mm (.0060")

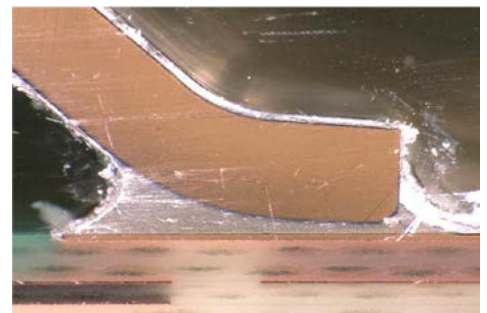
*See images page 10-11 ** See image page 12



TSM Samtec Sample 10 (Inner Row)
0.140 mm (.0055") Coplanarity,
0.15 mm (.006") SP1A Stencil



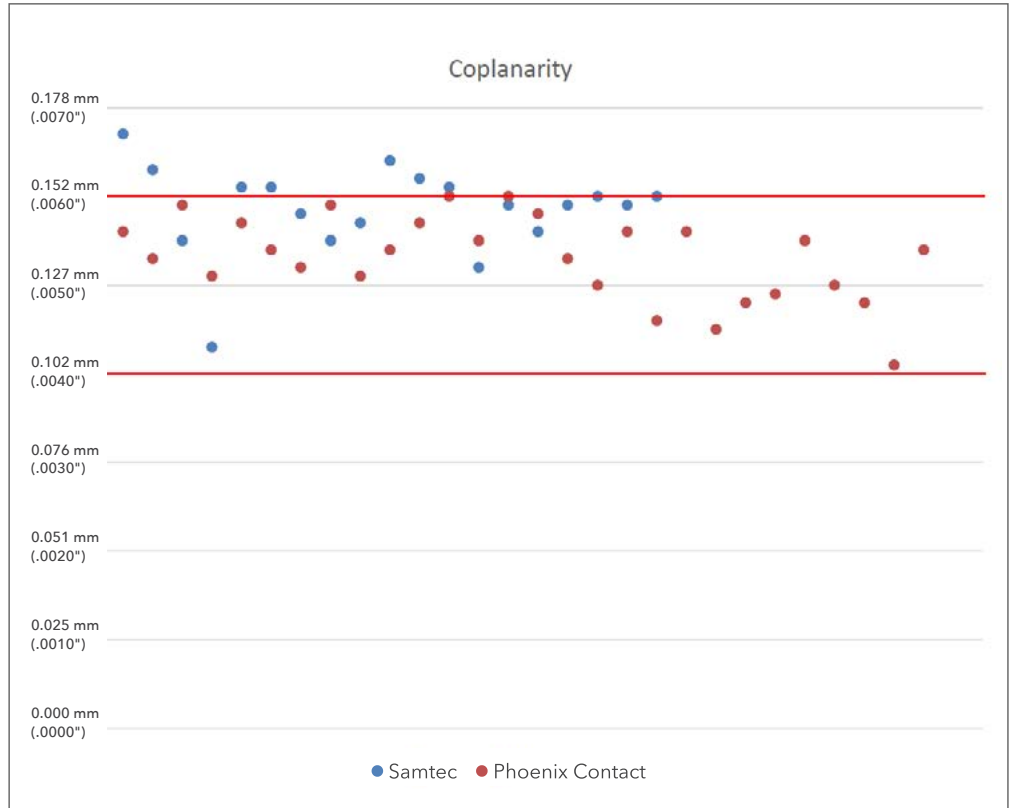
TSM Samtec Sample 10 (Outer Row)
0.140 mm (.0055") Coplanarity,
0.15 mm (.006") SP1A Stencil



TSM Samtec Sample 3 (Inner Row)
0.160 mm (.0063") Coplanarity,
0.10 mm (.004") SP1D Stencil

TSM COPLANARITY (CONNECTORS SOLDERED WITH 0.10 mm (.004") SP1D STENCIL)***

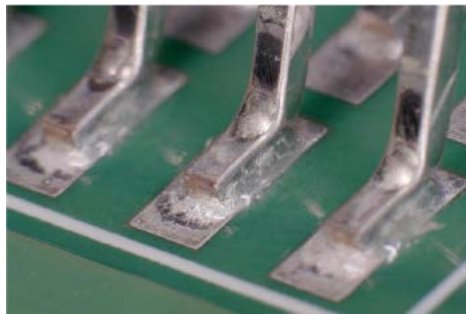
SOLDERED AT SAMTEC	SOLDERED AT PHOENIX CONTACT
0.109 mm (.0043")	0.104 mm (.0041")
0.132 mm (.0052")	0.114 mm (.0045")
0.140 mm (.0055")	0.117 mm (.0046")
0.140 mm (.0055")	0.122 mm (.0048")
0.142 mm (.0056")	0.122 mm (.0048")
0.145 mm (.0057")	0.124 mm (.0049")
0.147 mm (.0058")	0.127 mm (.0050")
0.150 mm (.0059")	0.127 mm (.0050")
0.150 mm (.0059")	0.130 mm (.0051")
0.150 mm (.0059")	0.130 mm (.0051")
0.152 mm (.0060")	0.132 mm (.0052")
0.152 mm (.0060")	0.135 mm (.0053")
0.155 mm (.0061")	0.135 mm (.0053")
0.155 mm (.0061")	0.137 mm (.0054")
0.155 mm (.0061")	0.137 mm (.0054")
0.157 mm (.0062")	0.137 mm (.0054")
0.160 mm (.0063")	0.140 mm (.0055")
0.163 mm (.0064")	0.140 mm (.0055")
0.170 mm (.0067")	0.142 mm (.0056")
	0.142 mm (.0056")
	0.142 mm (.0056")
	0.145 mm (.0057")
	0.145 mm (.0057")
	0.147 mm (.0058")
	0.150 mm (.0059")
	0.150 mm (.0059")
	0.152 mm (.0060")
	0.152 mm (.0060")



*** TSM samples were originally not in the desired coplanarity range for this study (0.10 mm (.004") to 0.15 mm (.006"). TSM connector tails were manipulated by hand to increase coplanarity.



TSM Samtec Sample 3 (Outer Row)
0.160 mm (.0063") Coplanarity,
0.10 mm (.004") SP1D Stencil

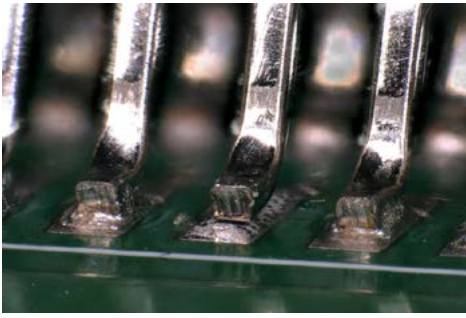


TSM Samtec Sample 63
0.152 mm (.0060") Coplanarity,
0.10 mm (.004") SP1D Stencil

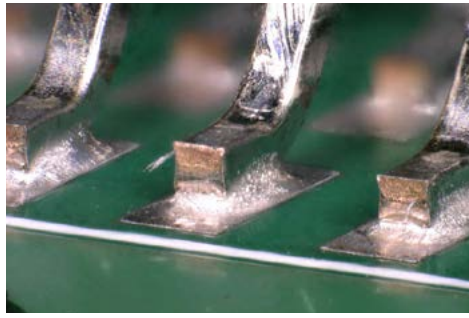


TSM Phoenix Contact Sample
(Representative) 0.10 mm (.004")
SP1D Stencil

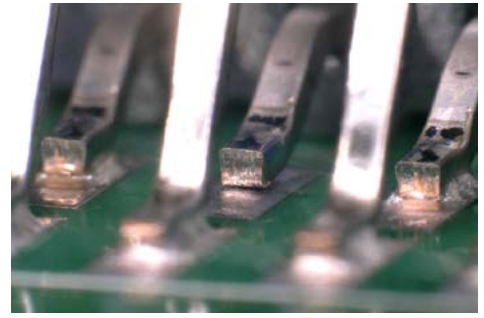
FAILURES: All occurred when less than optimal stencil apertures were used.



FTSH Sample 5: 0.122 mm (.0048")
Coplanarity, 0.10 mm (.004") SP1C
Stencil, Open Solder Joint



MMT Sample 160: 0.135 mm (.0053")
Coplanarity, 0.10 mm (.004") SP1C
Stencil, Insufficient Fillets



TSM Sample 7: 0.135 mm (.0053")
Coplanarity, 0.10 mm (.004") SP1C
Stencil, Open Solder Joint

INTERCONNECT PROCESSING GROUP

Samtec's Interconnect Processing Group (IPG) is an in-house staff of Engineers equipped to field all of your interconnect processing concerns. IPG assists in improving the overall processing and manufacturability of your board as well as helping lower its total applied cost. You may contact IPG directly by emailing ipg@samtec.com.

Visit samtec.com/processing for more interconnect processing information.



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