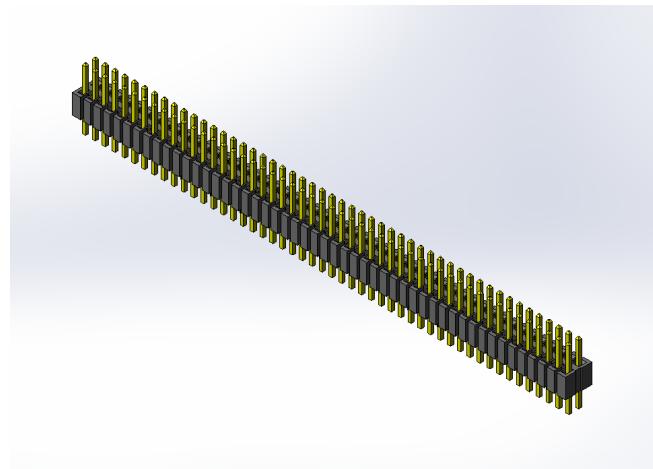
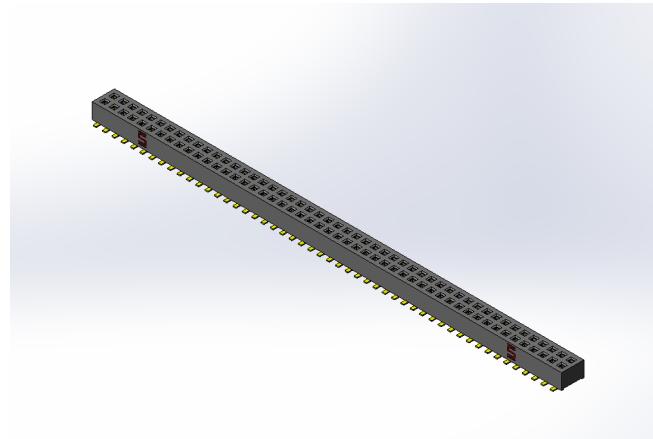




Project Number: Design Qualification Test Report	Tracking Code: 231300_Report_Rev_2		
Requested by: Craig Ryan	Date: 7/2/2013		Product Rev: CM
Part #: CLP-150-02-F-D-A / FTSH-150-01-F-D		Tech: Troy Cook	Eng: Eric Mings
Part description: CLP/FTSH			Qty to test: 8
Test Start: 12/10/2012	Test Completed: 1/7/2013		



DESIGN QUALIFICATION TEST REPORT

CLP/FTSH
CLP-150-02-F-D-A / FTSH-150-01-F-D

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
04/25/2013	1	Initial Issue	PC
07/02/2013	2	Update the cover page	PC

CERTIFICATION

All instruments and measuring equipment were calibrated to National Institute for Standards and Technology (NIST) traceable standards according to ISO 10012-1 and ANSI/NCSL 2540-1, as applicable.

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SCOPE

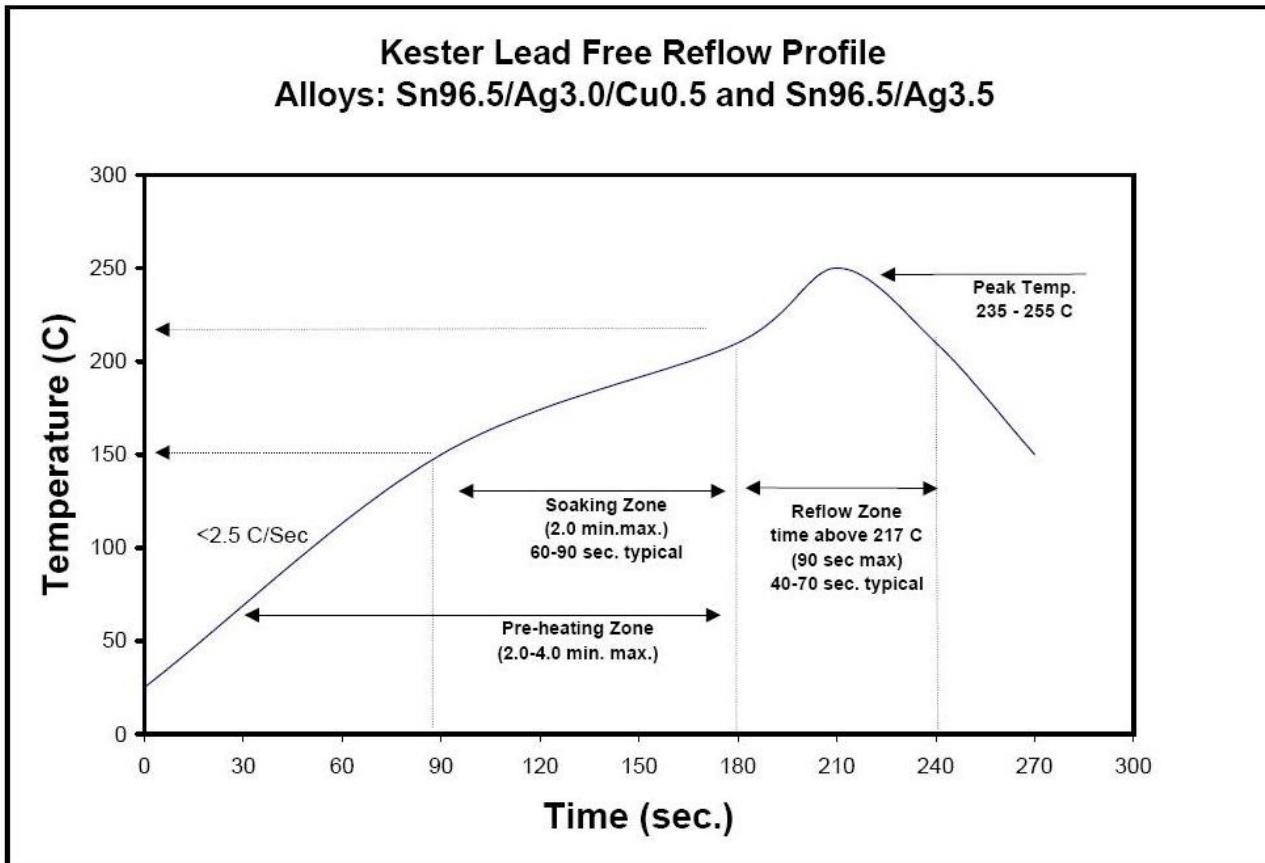
To perform the following tests: Design Qualification test. Please see test plan.

APPLICABLE DOCUMENTS

Standards: EIA Publication 364

TEST SAMPLES AND PREPARATION

- 1) All materials were manufactured in accordance with the applicable product specification.
- 2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
- 3) The automated procedure is used with aqueous compatible soldering materials.
- 4) Parts not intended for testing LLCR are visually inspected.
- 5) Any additional preparation will be noted in the individual test sequences.
- 6) Solder Information: Lead Free
- 7) Re-Flow Time/Temp: See accompanying profile.
- 8) Samtec Test PCBs used: PCB-102824-TST-XX

TYPICAL OVEN PROFILE (Soldering Parts to Test Boards)

FLOWCHARTS

Durability/LLCR

TEST STEP	GROUP A1 3u" Gold (-F) 8 Mated Sets
01	LLCR-1
02	10 Cycles
03	LLCR-2
04	Thermal Shock (Mated and Undisturbed)
05	LLCR-3
06	Cyclic Humidity (Mated and Undisturbed)
07	LLCR-4

Thermal Shock = EIA-364-32, Table II, Test Condition I:

-55°C to +85°C 1/2 hour dwell, 100 cycles

Humidity = EIA-364-31, Test Condition B (240 Hours)

and Method III (+25°C to +65°C @ 90% RH to 98% RH)

ambient pre-condition and delete steps 7a and 7b

LLCR = EIA-364-23, LLCR

20 mV Max, 100 mA Max

Use Keithley 580 or 3706 in 4 wire dry circuit mode

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

THERMAL SHOCK:

- 1) EIA-364-32, *Thermal Shock (Temperature Cycling) Test Procedure for Electrical Connectors*.
- 2) Test Condition 1: -55°C to $+85^{\circ}\text{C}$
- 3) Test Time: $\frac{1}{2}$ hour dwell at each temperature extreme
- 4) Number of Cycles: 100
- 5) All test samples are pre-conditioned at ambient.
- 6) All test samples are exposed to environmental stressing in the mated condition.

HUMIDITY:

- 1) Reference document: EIA-364-31, *Humidity Test Procedure for Electrical Connectors*.
- 2) Test Condition B, 240 Hours.
- 3) Method III, $+25^{\circ}\text{C}$ to $+65^{\circ}\text{C}$, 90% to 98% Relative Humidity excluding sub-cycles 7a and 7b.
- 4) All samples are pre-conditioned at ambient.
- 5) All test samples are exposed to environmental stressing in the mated condition.

LLCR:

- 1) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
- 2) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
- 3) The following guidelines are used to categorize the changes in LLCR as a result from stressing
 - a. $\leq +5.0 \text{ mOhms}$:----- Stable
 - b. $+5.1 \text{ to } +10.0 \text{ mOhms}$:----- Minor
 - c. $+10.1 \text{ to } +15.0 \text{ mOhms}$:----- Acceptable
 - d. $+15.1 \text{ to } +50.0 \text{ mOhms}$:----- Marginal
 - e. $+50.1 \text{ to } +2000 \text{ mOhms}$:----- Unstable
 - f. $>+2000 \text{ mOhms}$:----- Open Failure

RESULTS

LLCR Durability:

Initial-----7.72 mOhms Max

- Durability, 10 Cycles
 - <= +5.0 mOhms ----- 192 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- Thermal Shock
 - <= +5.0 mOhms ----- 192 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- Humidity
 - <= +5.0 mOhms ----- 192 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure

DATA SUMMARIES

LLCR Durability:

- 1) A total of 192 points were measured.
- 2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
- 3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
- 4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
 - a. $\leq +5.0$ mOhms: ----- Stable
 - b. $+5.1$ to $+10.0$ mOhms: ----- Minor
 - c. $+10.1$ to $+15.0$ mOhms: ----- Acceptable
 - d. $+15.1$ to $+50.0$ mOhms: ----- Marginal
 - e. $+50.1$ to $+2000$ mOhms ----- Unstable
 - f. $>+2000$ mOhms: ----- Open Failure

LLCR Measurement Summaries by Pin Type				
mOhm values	Date	12/10/2012	12/12/2012	12/27/2012
	Room Temp (Deg C)	22	22	22
	Rel Humidity (%)	25	31	32
	Technician	Troy Cook	Troy Cook	Troy Cook
	Actual Initial	Delta 10 Cycles	Delta Therm Shck	Delta Humidity
	Pin Type 1: Signal			
	Average	6.19	0.30	0.36
	St. Dev.	0.77	0.29	0.36
	Min	4.67	0.00	0.00
	Max	7.72	1.60	1.51
Summary Count		192	192	192
Total Count		192	192	192

LLCR Delta Count by Category						
mOhms	Stable	Minor	Acceptable	Marginal	Unstable	Open
	≤ 5	$>5 \text{ & } \leq 10$	$>10 \text{ & } \leq 15$	$>15 \text{ & } \leq 50$	$>50 \text{ & } \leq 1000$	>1000
10 Cycles	192	0	0	0	0	0
Therm Shck	192	0	0	0	0	0
Humidity	192	0	0	0	0	0

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: MO-04

Description: Multimeter /Data Acquisition System

Manufacturer: Keithley

Model: 2700

Serial #: 0798688

Accuracy: See Manual

... Last Cal: 04/30/2013, Next Cal: 04/30/2014

Equipment #: THC-02

Description: Temperature/Humidity Chamber

Manufacturer: Thermotron

Model: SE-1000-6-6

Serial #: 31808

Accuracy: See Manual

... Last Cal: 02/16/2013, Next Cal: 02/16/2014

Equipment #: TSC-01

Description: Vertical Thermal Shock Chamber

Manufacturer: Cincinnati Sub Zero

Model: VTS-3-6-6-SC/AC

Serial #: 10-VT14993

Accuracy: See Manual

... Last Cal: 05/18/2013, Next Cal: 05/18/2014