	TYPE	NUMBER	
FCI	APPLICATION SPECIFICATION	GS-20-0369	
TITLE		PAGE	REVISION
HIGH POWER CARD EDGE (HPCE ®) CABLE SYSTEM		1 of 21	B
		AUTHORIZED BY	DATE
		Sunny Tsai	2013/7/16
		CLASSIFICATION	
		UNRESTRICTED	

TABLE OF CONTENTS

Section page No.

1. OBJECTIVE

This specification provides information and requirements for customer application of the HPCE Connector system. It is intended to provide general guidance for process development. It should be recognized that no single process will work under all customer applications and that customers should develop processes to meet individual needs. However, if the processes vary greatly from the recommended one, FCI cannot guarantee acceptable results.

2. SCOPE

This specification provides information and requirements regarding application of the HPCE Cable System to printed circuit boards (PCB).

HPCE CONNECTOR	HPCE CABLE RECEPTACLE
	HPCE RIGHT ANGLE HEADER
	HPCE WERTICAL HEADER

Table 1

HPCE Connector System

2.1. 36P-24S HPCE CABLE RECEPTACLE WITH MODULE LATCH (P/N: 10119746-001LF)

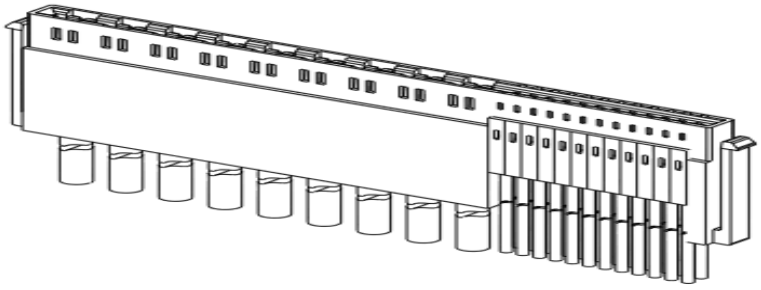


Figure 1

2.2. 24P-24S HPCE CABLE RECEPTACLE WITH MODULE LATCH (P/N: 10119735-001LF)

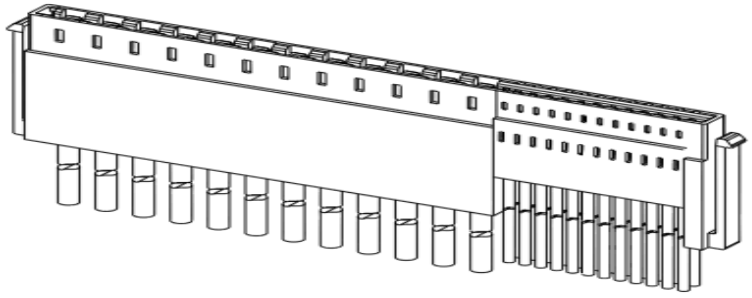


Figure 2

2.3. 36P-24S HPCE CABLE RECEPTACLE WITH MODULE LATCH& GUIDE PEG (P/N: 10119759-001LF)

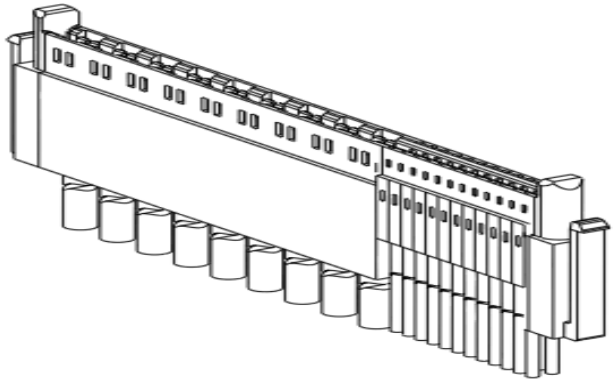


Figure 3

2.4. 24P-24S HPCE CABLE RECEPTACLE WITH MODULE LATCH& GUIDE PEG (P/N: 10120056-001LF)

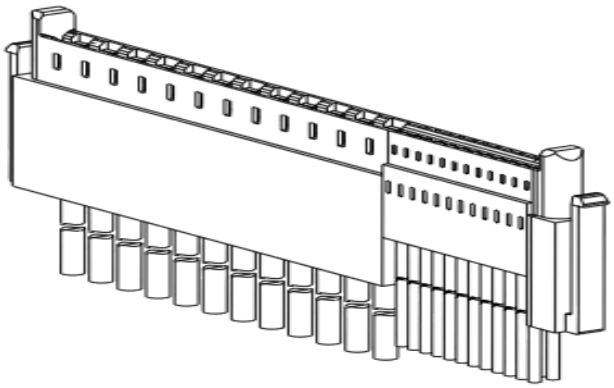


Figure 4

2.5. *36P-24S HPCE R/A HEADER WITH MODULE LATCH &GUIDE SLOT (P/N:10119736-11000LF)*

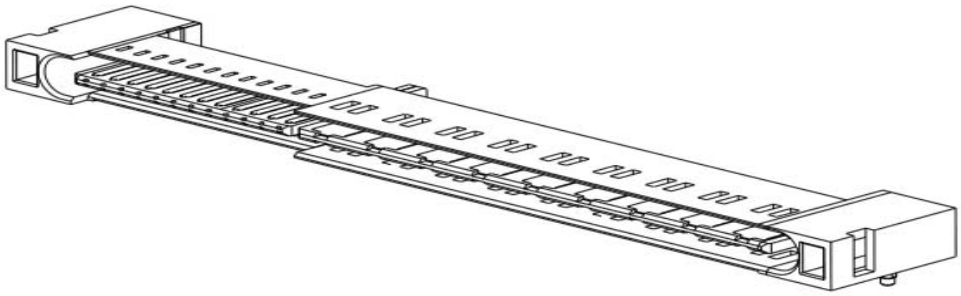


Figure 5

2.6. *24P-24S HPCE R/A HEADER WITH MODULE LATCH &GUIDE SLOT (P/N:10119738-11000LF)*

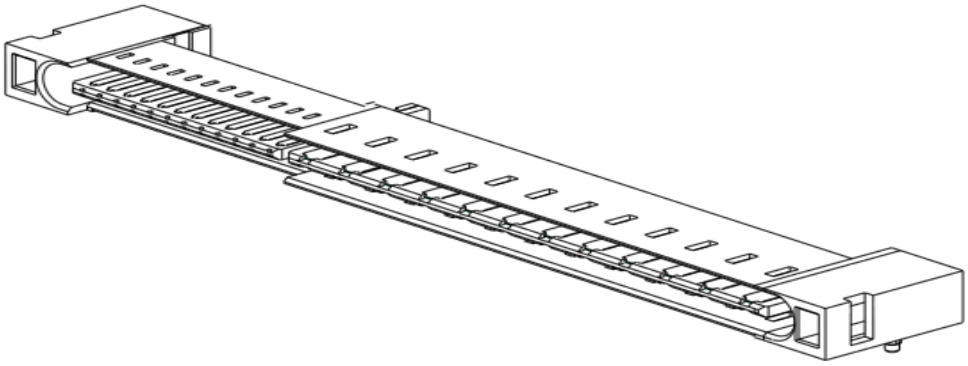


Figure 6

2.7. 36P-24S HPCE VERTIACLE HEADER WITH MODULE LATCH &GUIDE SLOT (P/N:10120942-11000LF)

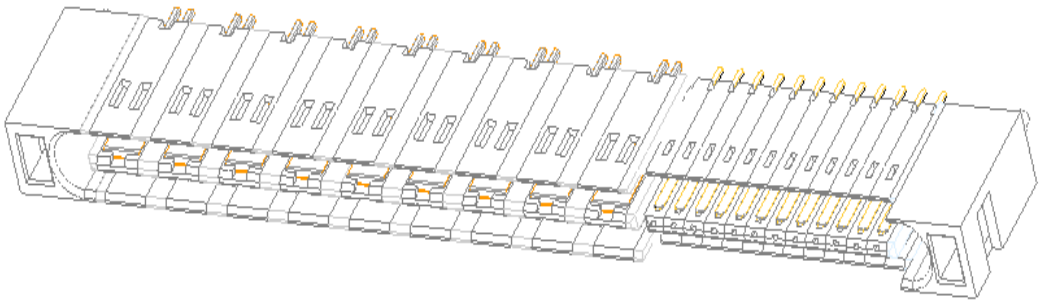


Figure 7

2.8. 24P-24S HPCE VERTIACLE HEADER WITH MODULE LATCH &GUIDE SLOT (P/N:10120947-11000LF)

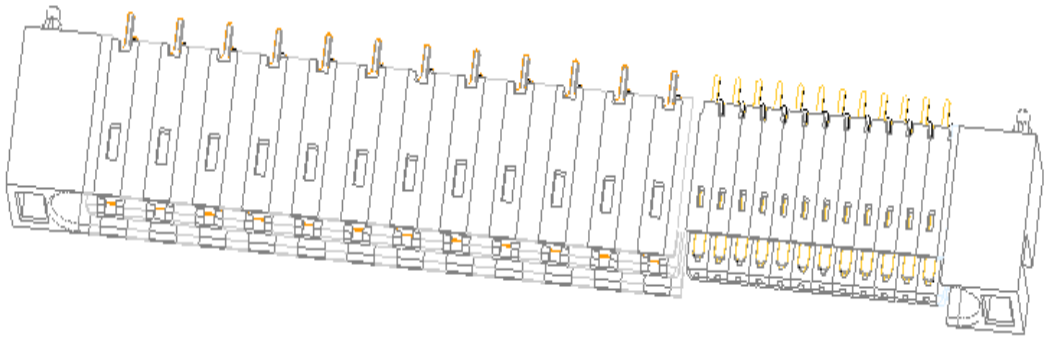


Figure 8

3. DRAWINGS AND APPLICABLE DOCUMENTS

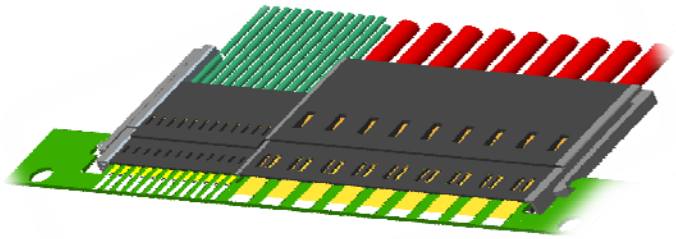
- FCI Product Specification GS-12-1031
- Applicable FCI Product Drawings

FCI product drawings and specifications are available by accessing the FCI website or contacting the FCI Technical Service. In the event of a conflict between this specification and the product drawing, the drawing takes precedence. Customers should refer to the latest revision level of FCI product drawings for appropriate product details.

4. GENERAL CUSTOMER INFORMATION

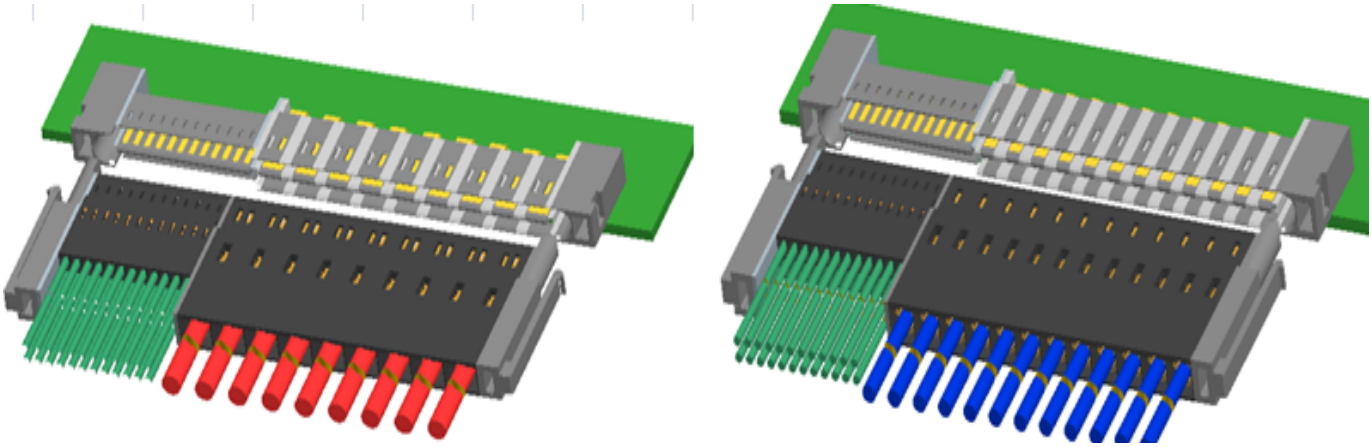
This document is a general application guide. If there is a conflict between the product drawings and this specification, the drawings take precedence.

4.1 PRODUCT APPLICATION



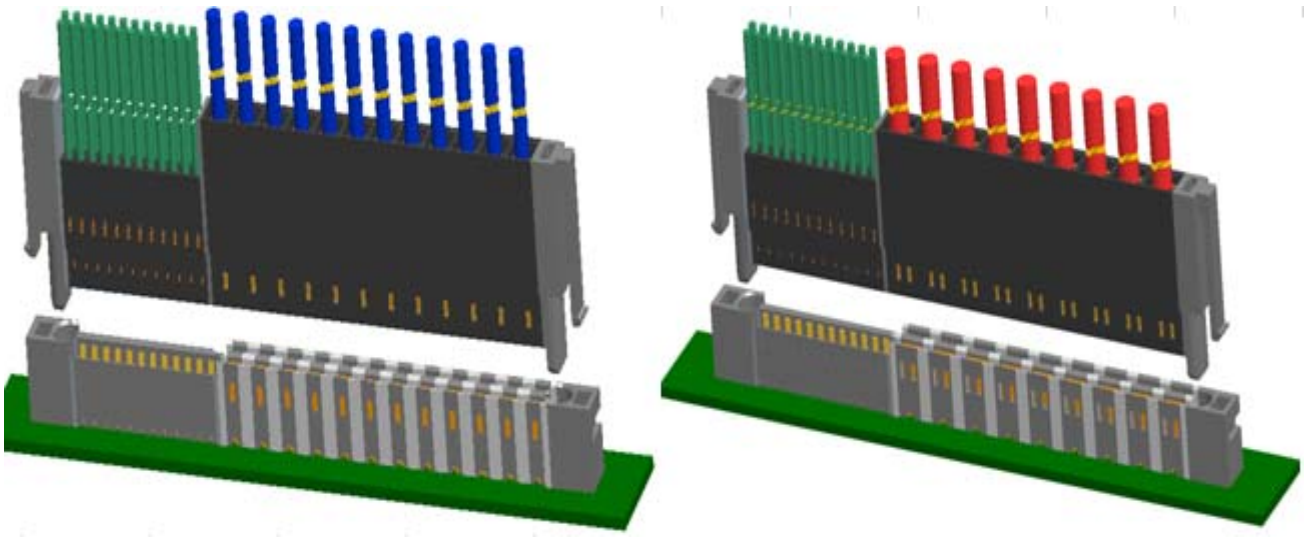
HPCE cable receptacle mate to edge card application

Figure 9



HPCE cable receptacle mate to HPCE CTB right angle header application

Figure 10



HPCE cable receptacle mate to HPCE CTB right angle header application

Figure 11

HPCE CTB vertical header has two options for connection to Printed Circuit Boards -- Press Fit and Solder to Board, HPCE CTB right angle header has one options for connection to Printed Circuit Boards -- Solder to Board available as follows:

Product Configuration	Solder Tail	Press-Fit Tail	PIP Tail
HPCE CTB Vertical Header	x	x	
HPCE CTB Right Angle Header	x		
HPCE Cable Recptacle			

Table 2

The HPCE Solder to Board Power and Signal contacts are compatible with several soldering processes, including wave soldering. They are versatile with many configurations to fit the individual needs of the client.

HPCE products are compatible with standard lead-free processing, and will withstand peak processing temperatures of 260˚C for a period of 60 seconds without affecting form, fit, or function.

4.2 WIPE DISTANCE AND CONTACT SEQUENCING

The nominal wipe distance of the Signal contact is shorter than the Power contact by 1.27mm.

Recommended minimum wipe is 1.27mm. I.0mm minimum wipe can be used in low shock/vibration situations where system boards and components are locked in place to eliminate relative motion.

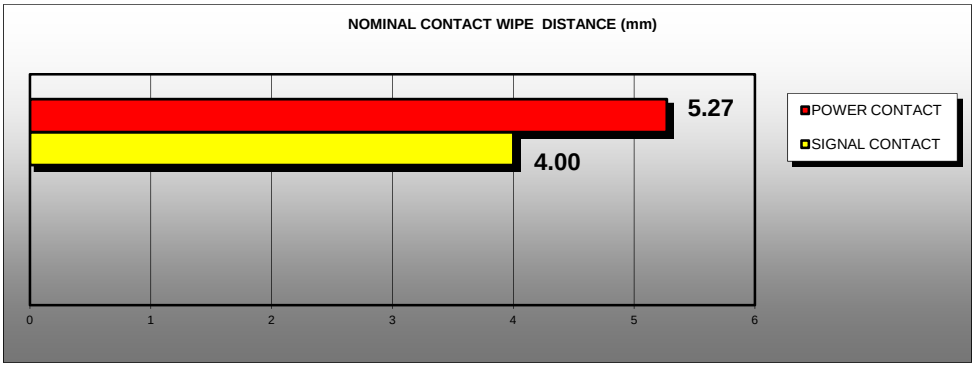


Table 3

4.3 VOLTAGE RATING

The Maximum Working Voltage of the HPCE connector system is rated base on UL 60950-1 Second Edition Table 2N.

- Pollution Degree : 2
- Material Group : 1 (Based on UL rating)

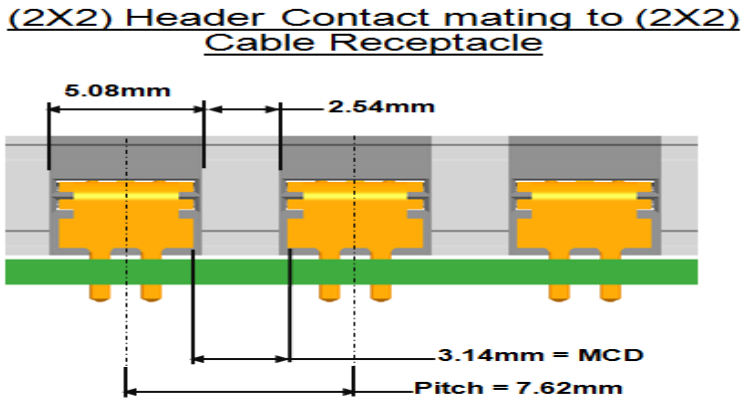
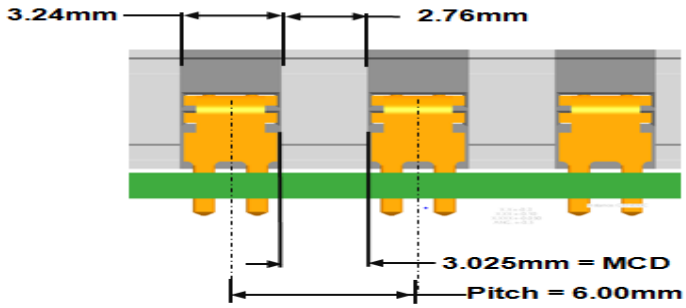


Figure 12

(1X2) Header Contact mating to (1X2) Cable Receptacle

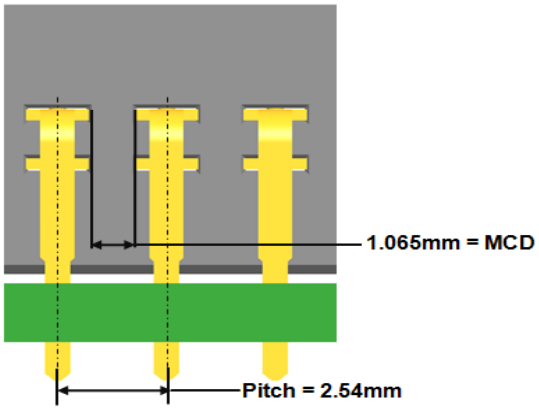


Based on UL 60950-1 Second Edition Table 2N
Pollution degree 2/Material Group I

WV = 500 + [130V/(3.20-2.50)*(3.025-2.50)] = 598 VAC RMS

Figure 13

Header Signal Contact mating to Cable Receptacle



Based on UL 60950-1 Second Edition Table 2N
Pollution degree 2/Material Group I

WV = 200 + [50V/(1.25-1.00)*(1.065-1.00)] = 213 VAC RMS

Figure 14

4.4 CURRENT RATING

(Refer to FCI Product Specification GS-12-1031 See Table 4 and current rate curve)

HPCE CABLE REC mates to HPCE CARD OR HPCE HEADER

High power contact current rating (30°T-rise)

contact type	mates to	Wire gage(AWG)	current(per contact) AMPS		
			1 Ccontact	5 Contacts	9 Contacts
High power	mates to card	10	54	41	36
		12	44	33	30
	mates to header	10	51	41	38
		12	40	32	30

Low power contact current rating (30°T-rise)

contact type	mates to	Wire gage(AWG)	current(per contact) AMPS		
			1 Ccontact	6 Contacts	12 Contacts
Low power	mates to card	14	35	25	22
		16	31	21	20
	mates to header	14	35	26	24
		16	30	23	20

signal contact current rating(30°T-rise)

contact type	mates to	Wire gage(AWG)	current(per contact) AMPS			
			2 contacts	8 contacts	16 contacts	24 contacts
signal contact	mates to card	22	11	8	6	5
		24	9	6	5	4
		26	7	5	4	4
	mates to header	22	10	6	5	5
		24	8	5	5	4
		26	7	5	4	4

NOTES:

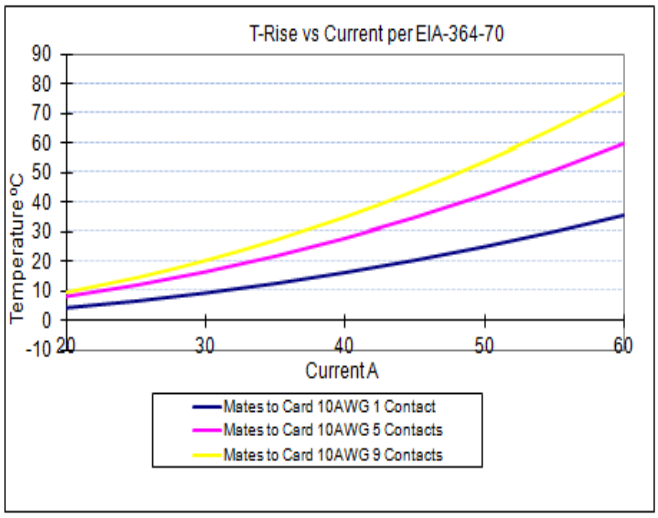
1.copper trace weight: multi-layers copper trace and 2 oz

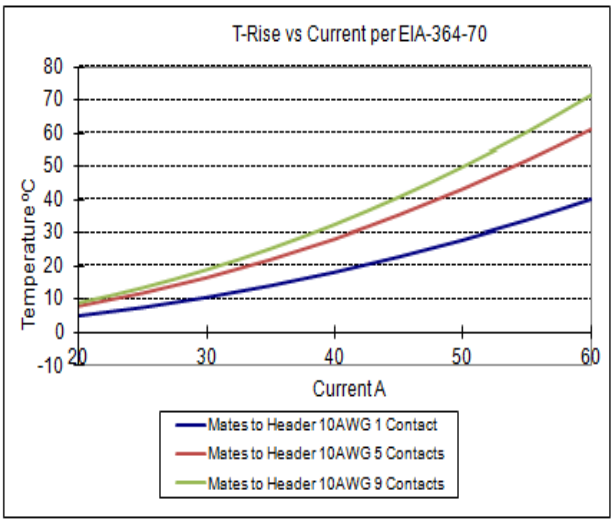
2.Ambient conditions : still air at lab ambient.

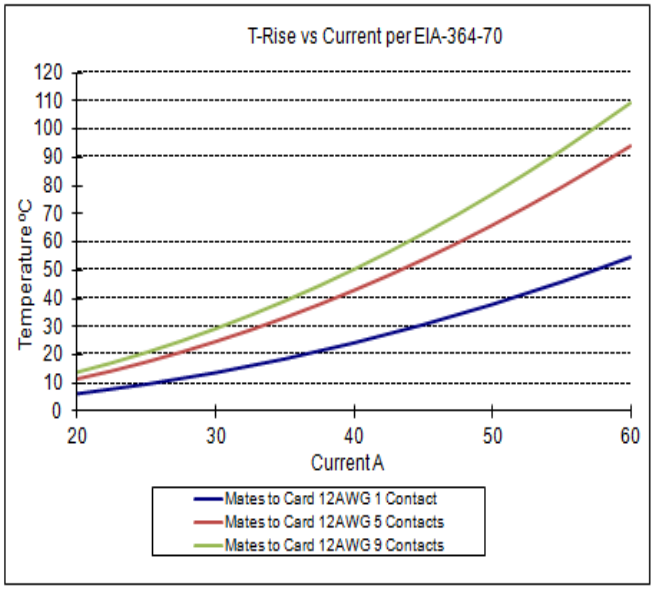
3. Temperture rise 30°C Max.

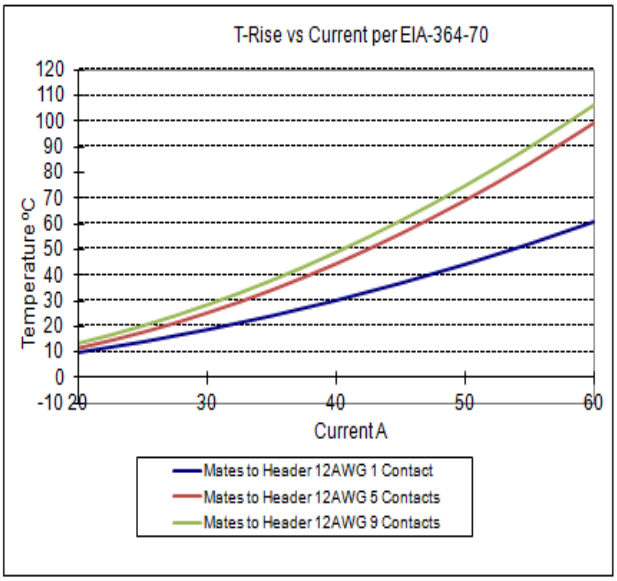
Table 4

Table 4

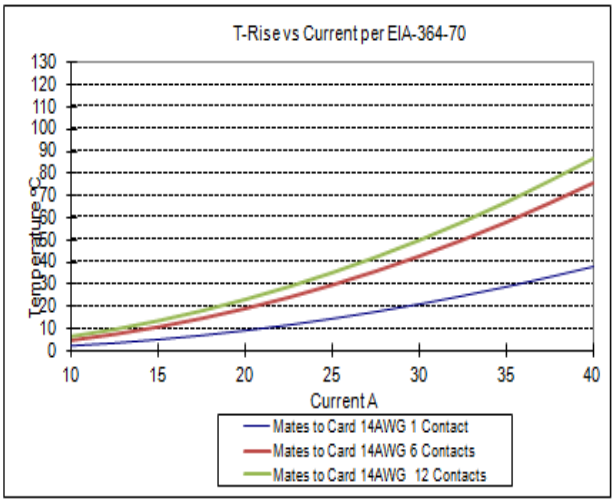


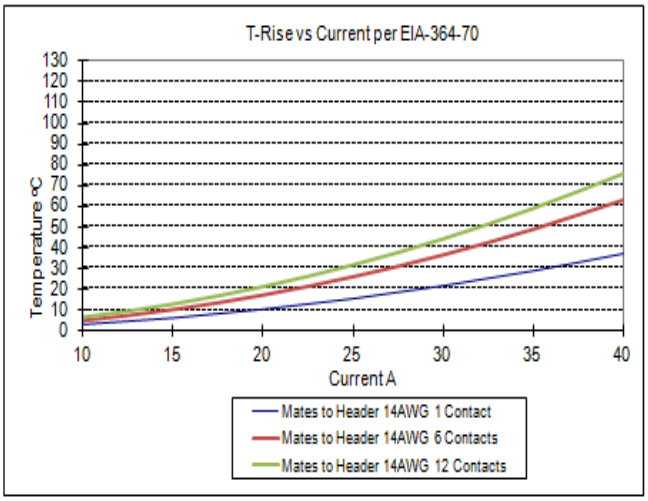


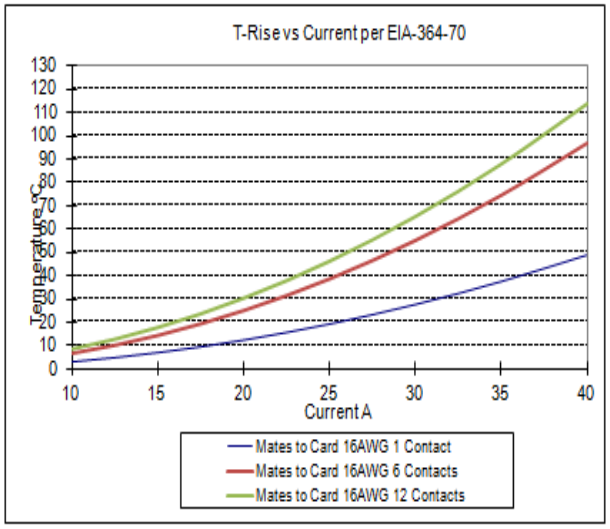


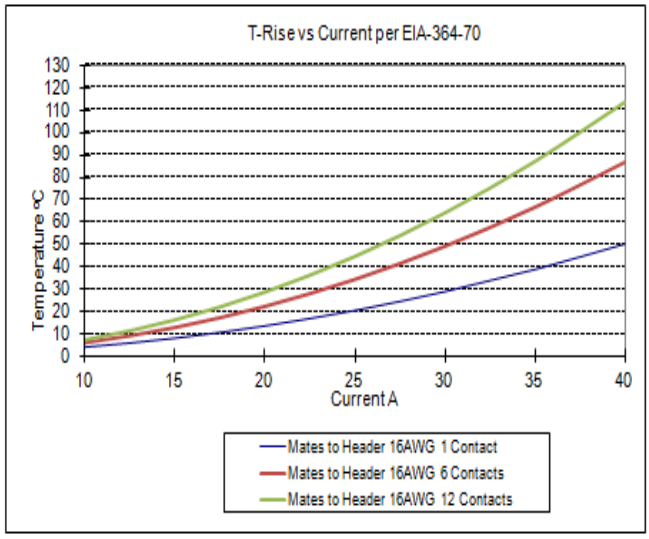


High power current rate curve

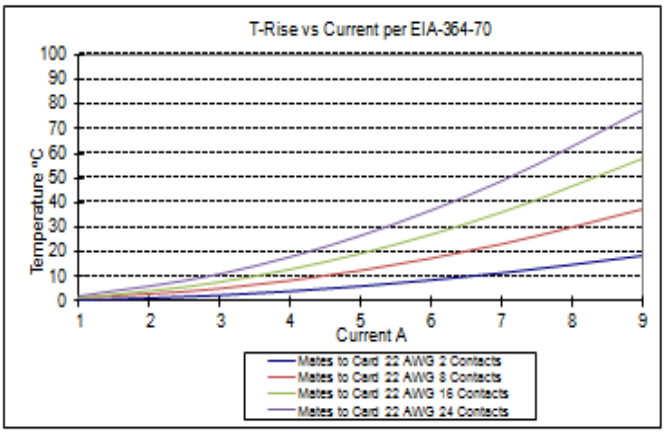


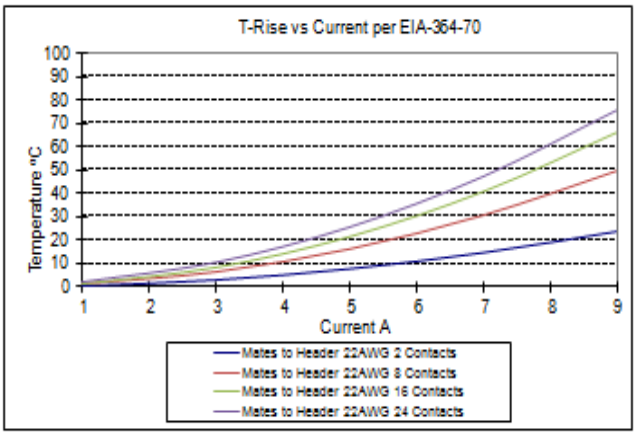


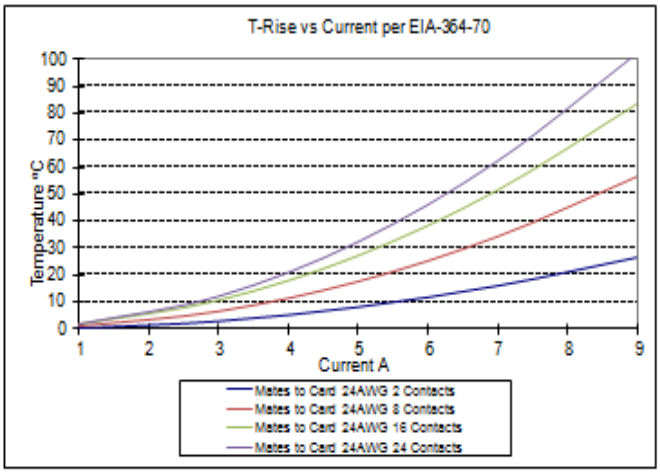


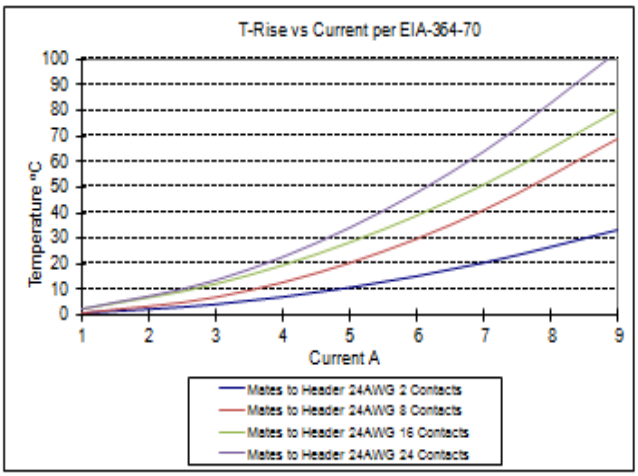


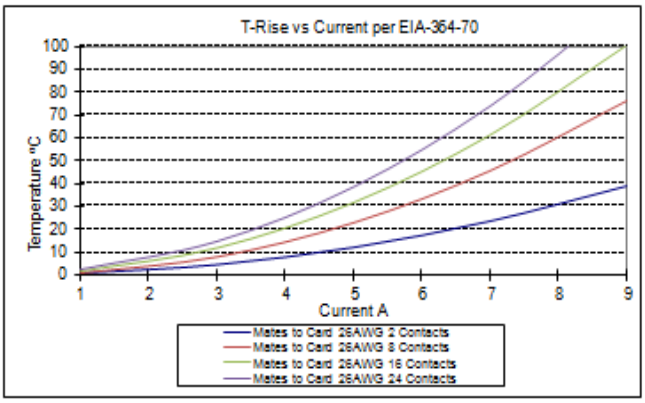
Low power current rate curve

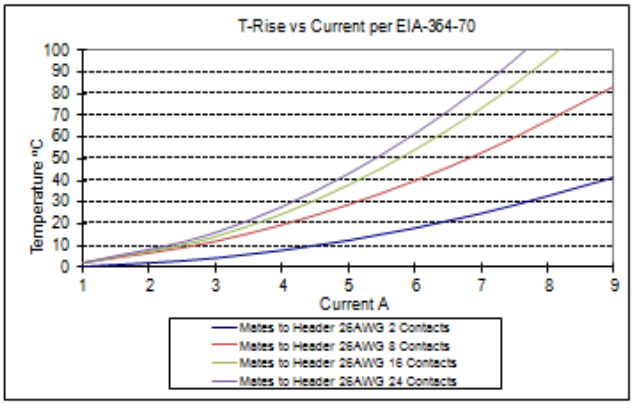












Signal current rate curve

4.5. MECHANICAL PROPERTIES

4.5.1 Mating/Un-mating forces

Configuration	Edge card Mating Force (N) (Max. Allowance)	Edge card Un-Mating Force (N) (Min. Allowance)	Header Mating Force (N) (Max. Allowance)	Header Un-Mating Force (N) (Min. Allowance)
36P+24S	46.08	17.61	56.52	17.61
4 BEAM POWER Contact	3.68	0.89	4.28	0.89
2 BEAM POWER Contact	2.6	0.6	3.65	0.6
Single SIGNAL Contact Beam	0.54	0.4	0.75	0.4

Table 5

4.5.2. Crimp Tensile Strength:

The force required to pull the properly crimped wire from the terminal shall not be less than the value specified in Table" 6 "for Power Cables and Table" 7" for Signal Cables when tested per SAE/USCAR 21 section 4.4.5. If terminals are equipped with an insulation barrel, they should not be crimped to have an effect on this test.

Cable Size (AWG)	10	12	14	16
Crimping Pull Force (N) min.	290	240	180	115

Table 6 (POWER ONLY)

Cable Size (AWG)	22	24	26
Crimping Pull Force (N) min.	71	49	29

Table 7 (SIGNAL ONLY)

4.6. SAFETY

Prevention of operator access to energized part
Reference UL60950 & IEC 60950-1 SECTION 2.1.1.1

UL and IEC specifications define three different probe designs to test for prevention of operator access to energized conductors (such as powered electrical contacts within an unmated connector). The two probes are referred to as follows:

The following sections show each of these test probes positioned as closely as possible to the mating side contacts of the HPCE CTB vertical header, which will be located on the PCB and may be powered in an unmated state.

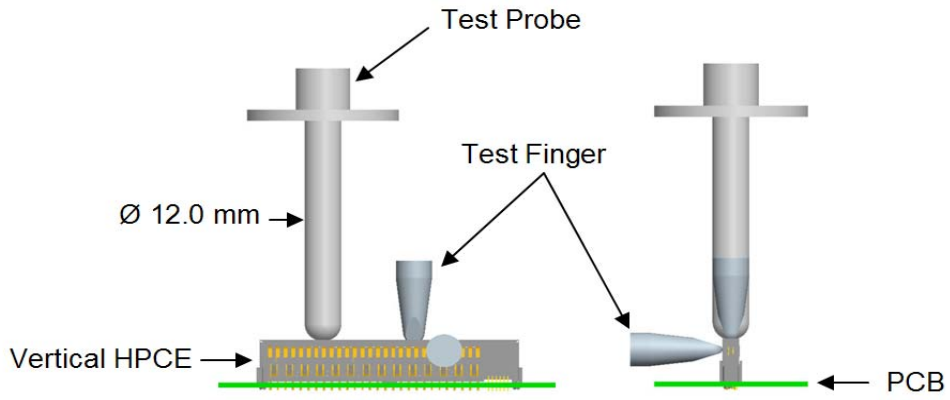
Although the HPCE CTB vertical header connector system meets these probe requirements, it is not recommended that the customer “hot plug” the edge card to the HPCE cable receptacle.

4.6.1 Test Finger

The **Test Finger** may not make contact with energized parts while the access doors and covers of the system enclosure are open. Separable connectors must be disconnected for this test. The tip of the **Test Finger** inserted into a HPCE CTB vertical header capture window, showing that it is impossible for the probe (shown at the smallest size per specified tolerances) to touch the receptacle contacts.

4.6.2 Test Probe

The requirements for the **Test Probe** conditions are not as clearly specified by UL and IEC. However assuming the worst-case scenario where the HPCE connector is accessible, the following 3D model was created. This model shows that the Test Probe is very large compared to the Test Finger and will never come close to touching a powered contact within the representative receptacle.



5. REQUIREMENT FOR CUSTOMERS PCB

Note: Generic figures are representative of all product configurations

For specifics of the PCB layout, refer to the customer drawing of the part number being applied.

5.1 PCB LAYOUT (36HP-24S R/A header with latch& guide slot customer drawing for more details)

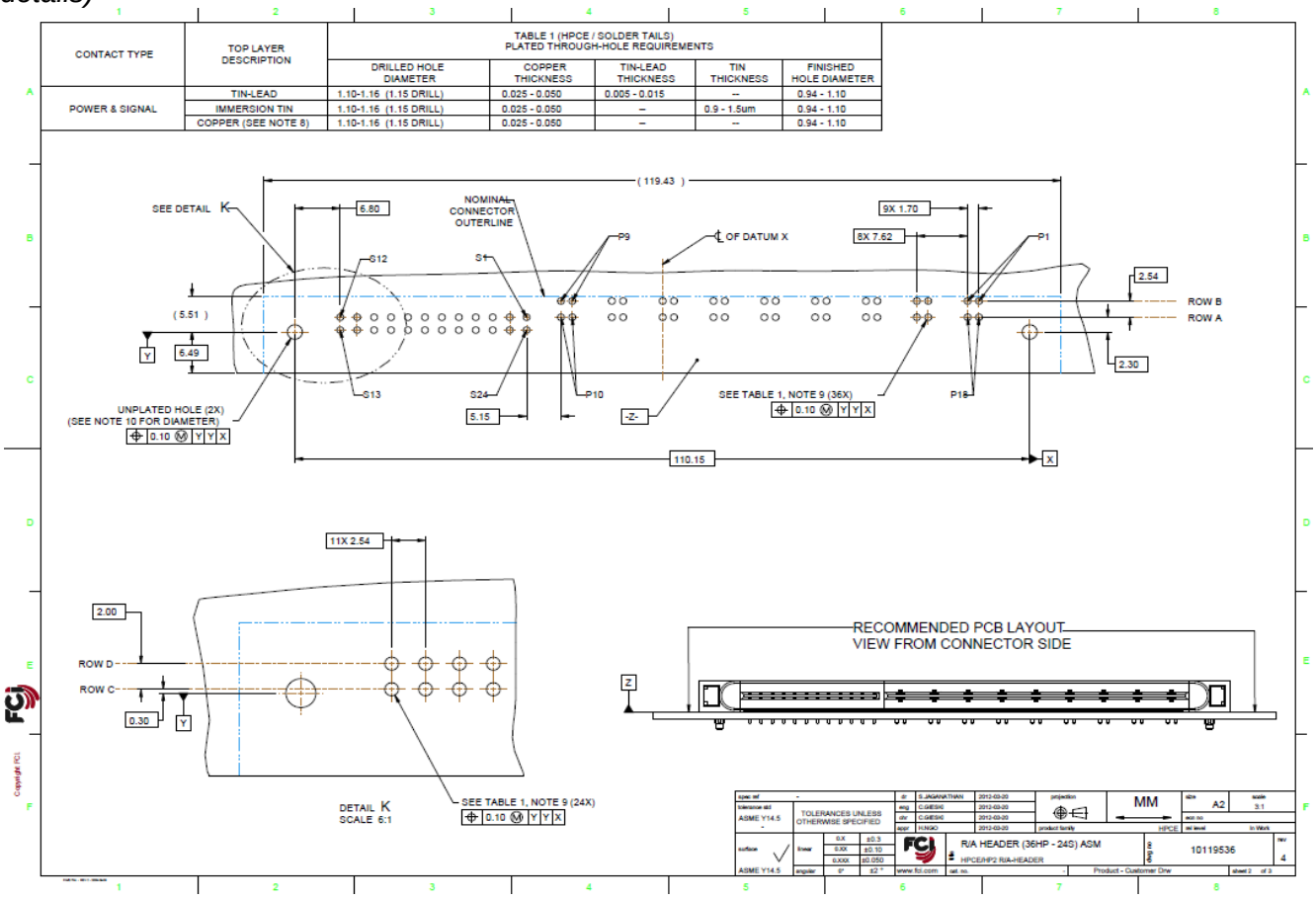


Figure 16

PCB LAYOUT *(36HP-24S vertical header with latch & guide slots customer drawing)*

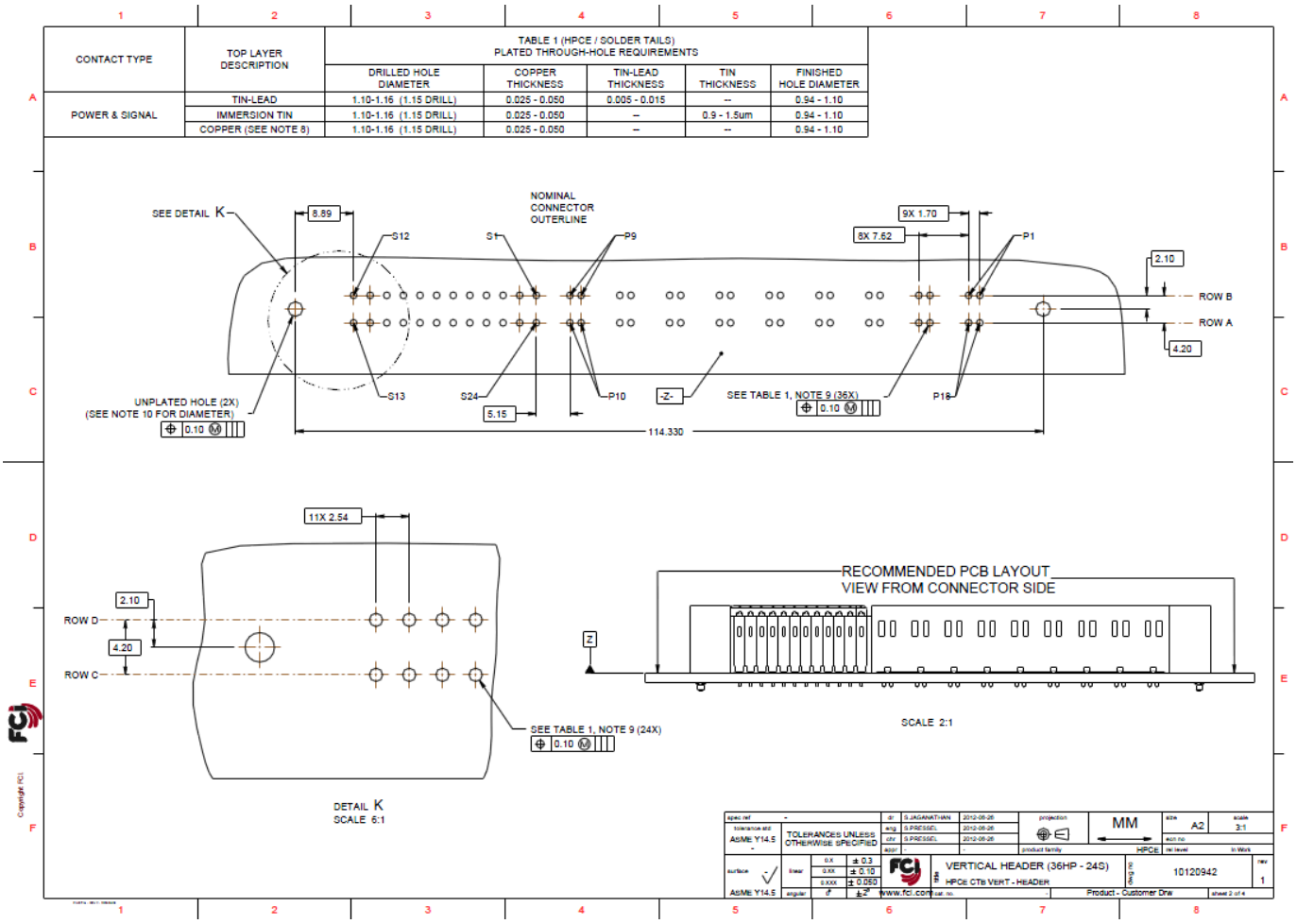


Figure 17

5.2 ***EDGE CARD LAYOUT*** *(36HP-24S HPCE CABLE RECEPTACLE WITH LATCH customer drawing)*

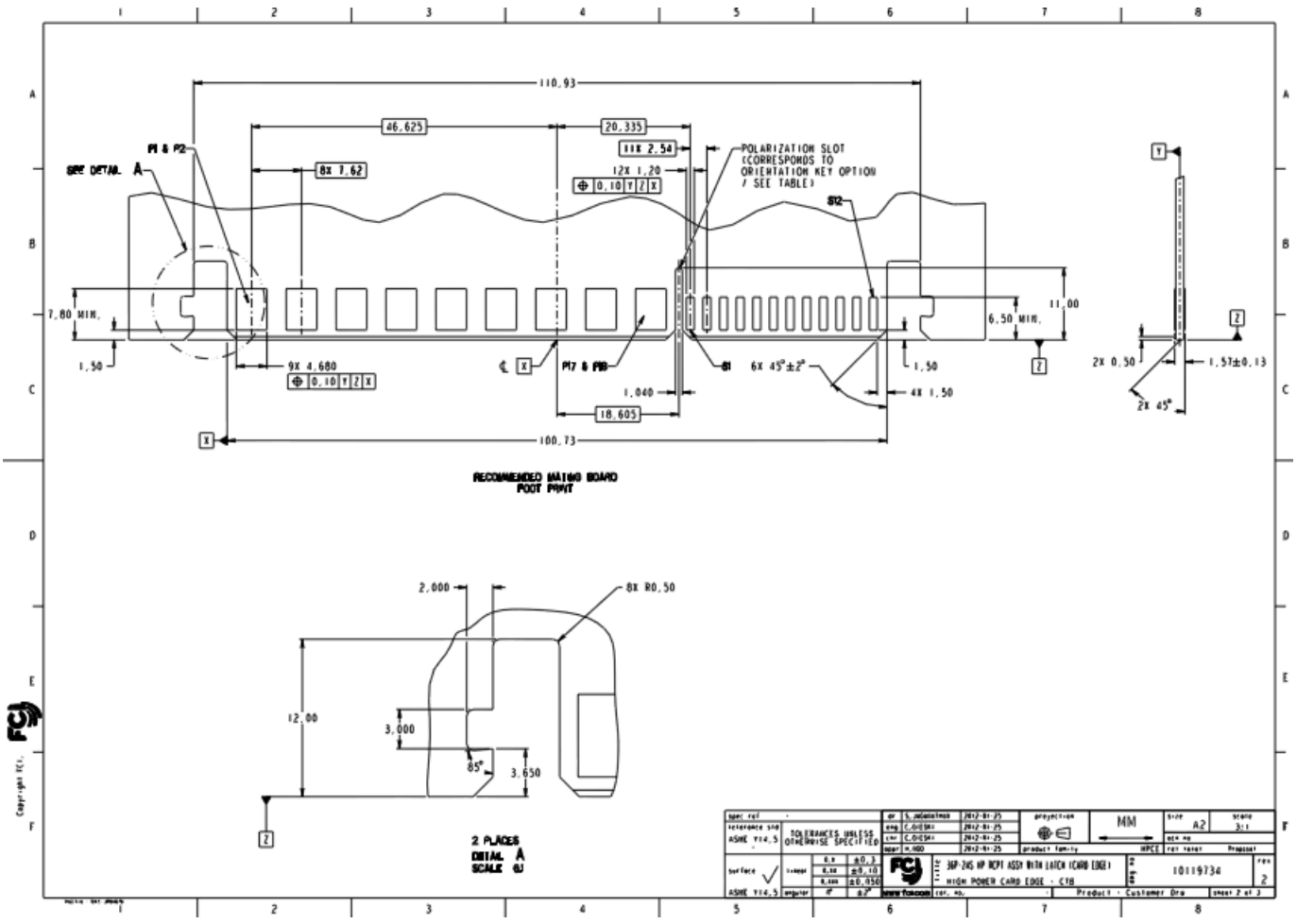


Figure 18

6 APPLICATION TOOLING

6.1 No application tooling is required for the HPCE CTB right angle header application.

6.2. No application tooling is required for the HPCE CTB vertical header application.

6.3. HPCE Cable receptacle crimp cable tooling – Not recommended.

7. REVISION RECORD

REV	PAGE	DESCRIPTION	EC #	DATE
A	ALL	APPLICATION SPECIFICATION	N/A	07/16'2013
B	ALL	CORRECT DOCUMENT TITLE	ECN-ELX-N-15350-1	07/26'2013