
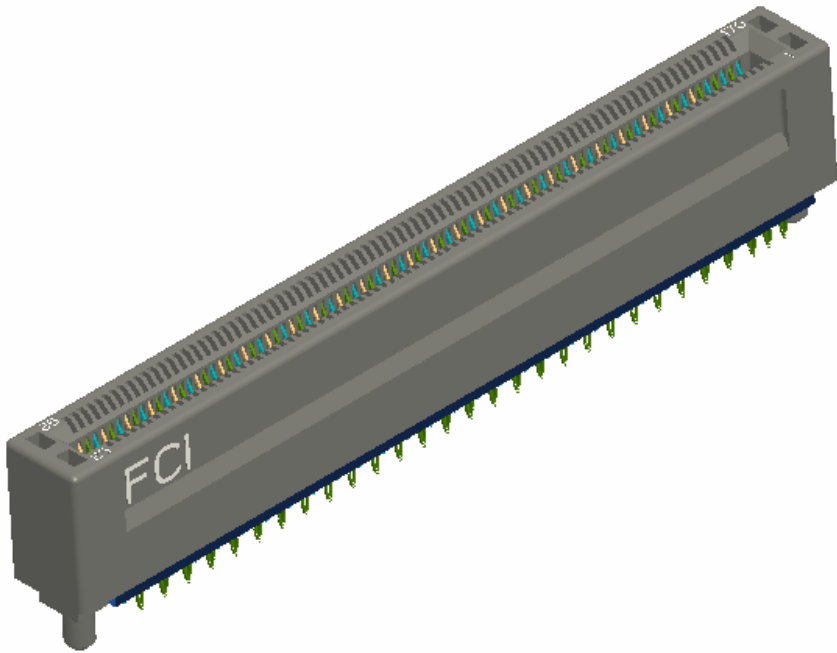



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# MicroTCA™



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## 1.0 General

This document covers the performance, minimum quality requirement and application of MICRO TCA connectors of press fit mounting style for AMC modules.

## 2.0 Applicable documents

The following document of the issue in effect on the date of the latest revision of this specification shall form a part of this specification to the extent specified herein.

### 2.1 Specification

FCI engineering drawing P/N 10058831.

### 2.2 Material

Parts	Material	Finish / Grade
Housing	High temperature resin	UL 94-V0
Terminal	Hi performance copper alloy	Under plate: 50μ Nickel Contact: gold plated Solder tail: 100u"min matte Tin

The product meets the RoHS requirements for banned substances.

### 2.3 Recommended foot print & module configuration

See customer drawing 10058831 for detail.


## 3.0 Mechanical requirements

### 3.1 visual inspection

There should be no defect that would impair normal operation.

### 3.2 Durability (IEC 60512, test 9a)

200 mating cycles with one AMC connector with 10 mm per sec. max., rest 5 sec.(unmated).  
The cycle rate per hour shall be 500 ± 50.

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Note: “\*” only half of specified durability is performed at each interval (100 cycles each time)

### **3.3 Contact force** (EIA 364-04)

The contact normal force shall not be less than 40 grams when tested in accordance with FCI test specification BUS-03-404.

### **3.4 Engaging and separating forces** (IEC 60512, test 13a)

Mating sides	Force
Maximum engaging force	100N
Maximum separating force	65N

### **3.5 Board retention / insertion force**

EON retention and insertion force should be checked on an 1.60±0.13 thickness segment of FR4 glass/epoxy circuit board segment with the plated hole 0.55±0.05mm. At a rate of 2.54mm per minute:  
Insertion force no more than 15N per pin.  
Retention force no less than 4.5N per pin

### **3.6 PCB Hole Deformation**


Radius-Cross-Section parallel to board surface. Photograph and measure the hole deformation( deformation on board material) radius at a point 0.010” from the surface, and at the center of the compliant pin section. Include 10 holes. The average (of 10 holes) hole deformation radius shall be no greater than 0.0381mm(0.0015in) when measured from the drilled hole. The absolute maximum deformation radius shall not exceed 0.0508mm (0.002 in). Reference MIL-STD-2166.

### **3.7 PCB Hole wall Damage**

Cross-section perpendicular to the board surface, and through the compliant section wear track. Photograph and measure the copper thickness remaining between the complaint pin and the printed wiring board laminate. Include 10 holes. The minimum average (of 10 holes) copper thickness remaining between the complaint pin and printed wiring board laminate shall not be less than 0.00762mm(0.0003in) In addition there shall be no copper cracks, separation between conductive interfaces, or laminate-to-copper separations. Reference MIL-STD-2166.

### **3.8 Vibration** (IEC 60512, test 6d)

10 Hz to 500 Hz with an amplitude of 0.35 mm or an acceleration of 10 G eight sweepings in each direction, duration 3x8 h/axis in there axes. Duration of disturbance = 1µs max.  
The specimen shall be installed in a fixture according to Fig.1.

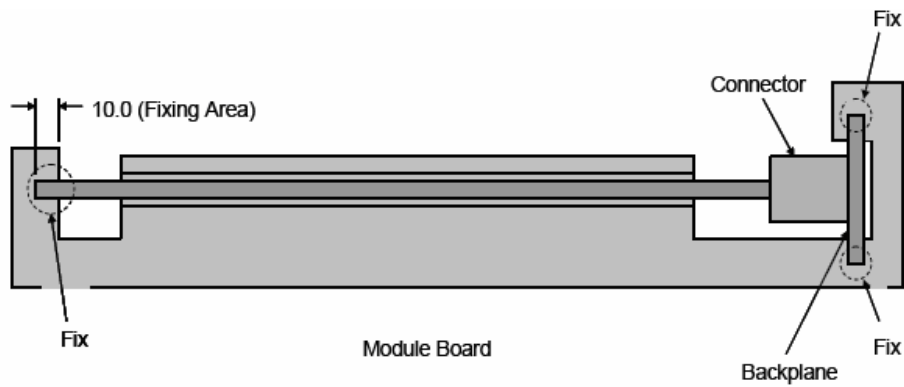
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### **3.9 Shock** (IEC 60512, test 6c)

Shock acceleration  $300 \text{ m/s}^2$ , duration of impact 11 ms, three shocks in two directions/axis, in three axes(18 shocks in total). Duration of disturbance =  $1\mu\text{s}$  max.

The specimen shall be installed in a fixture according to Fig.1.


**Fig.1 Shock/vibration test setup**

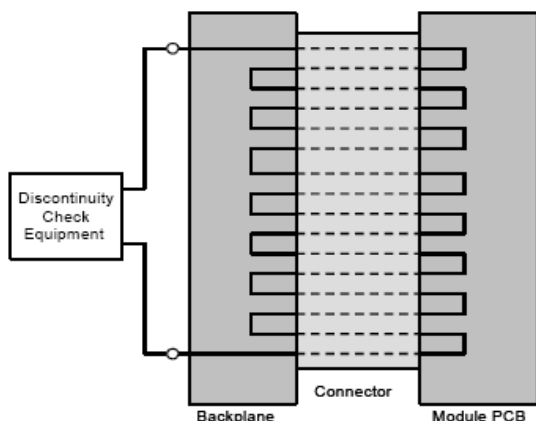


### **3.10 Minute disturbance**

Disturb module PCB slightly from connector, and then reseal, measure arrangement as Fig.2

**Fig.2 Contact disturbance measure arrangement**

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#### 4.0 Electrical requirements

##### **4.1 Voltage proof** (IEC 60512, test 4a)

There shall be no breakdown or flashover under minimum insulation voltage 80 VAC, leakage limit 0.5mA.

##### **4.2 Current carrying capacity** (IEC 60512, test 5b)

Connectors perform at 70°C ambient condition plus additional 30°C temperature rise by current 1A, which is 100°C..

##### **4.3 Contact resistance (IEC 60512, test 2a)**

Under Max. voltage = 20 mV in open circuit, and max. current = 100 mA

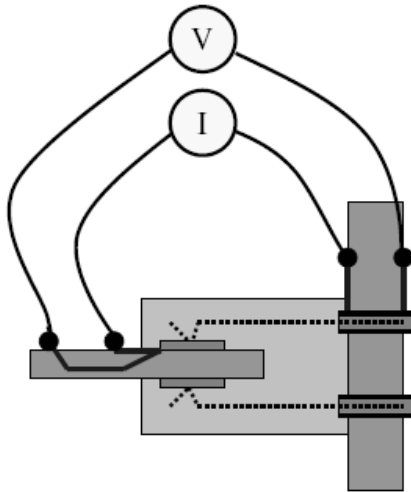
initial line resistance = 25 mΩ max.

\*change after test = 10 mΩ max.

Measure position as Fig.3.

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**Fig.3 Contact resistance measure position**



**4.4 Insulation resistance** (IEC 60512, test 3a)

Test voltage 500 V DC  
Initial value = 100 MΩ min.  
After moisture = 10 MΩ min.


**5.0 High-speed requirements**

**5.1 Differential impedance** (IEC 60512 test 23d method B)

Measured step rise time 30 ps max. throughout interconnection  
Environment impedance = 100Ω differential  
Adjacent lines terminated at both ends.  
Requirement : Average impedance 100Ω±5Ω  
Peak values 100Ω±10Ω

**5.2 Cross talk** (IEC 60512 test 25a)

Measured step rise time 30 ps max. throughout interconnection  
Environment impedance = 100Ω differential  
Adjacent lines terminated at both ends.  
Requirement : near end and far end cross talk between adjacent pairs < 2% (far end)

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### **5.3 Attenuation** (IEC 60512 test 25b)

Environment impedance = 100Ω differential  
Adjacent lines terminated at both ends  
Frequency range 0 to 20 GHz.  
Requirement : < 1 dB at 8 GHz  
                  < 2 dB at 12 GHz  
                  < 4 dB at 14.5 GHz

### **5.4 Return loss** (IEC 60512 test 25e)

Environment impedance = 100Ω differential  
Adjacent lines terminated at both ends  
Frequency range 0 to 20 GHz.  
Requirement : > 20 dB at 5 GHz  
                  > 13 dB at 8 GHz  
                  > 8 dB at 14.5 GHz

## **6.0 Environmental requirements**

### **6.1 High temperature life** (EIA 364-14)

Ambient temperature 105°C, duration 42 days.

### **6.2 Mixed flowing gas** (EIA 364-65A Class IIIA)

20 days for gold flash plating, 10 days unmated (connector only) followed by 10 days mated.

NO<sub>2</sub>: 200 ppb(±50)

Cl<sub>2</sub> : 20 ppb(± 5)

H<sub>2</sub>S: 100 ppb(±20)

SO<sub>2</sub>: 200 ppb(±50)

### **6.3 Dust exposure** (EIA 364-91)


Unmated connectors

Begin dust concentration of 300 g/cm<sup>3</sup> of chamber volume, flow rate = 300 m/s and exposure time of 1 hr.

### **6.4 Thermal shock** (EIA 364-35C)

5 cycles of alternating high and low temperature with no discontinuity for mated connectors.

30 min. dwell at each extreme, with a max. transfer time of 5 sec. between extremes -65°C to 105°C.

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### **6.5 Temperature cycling** (EIA 364-31B Method III)

Mated connectors.

Thermal cycling between 5°C and 85°C with 80% to 98% relative humidity 50 cycles, duration 500 hrs.

### **6.6 Damp heat steady state** (EIA 364-31)

No electrical load, polarizing voltage 60 Vdc.

Ambient temperature 40°C, 93% relative humidity, 10days.

## **7.0 Test schedule**


This section defines six groups of connector test requirements referenced from GR-1217-CORE. These are applicable to all connectors mounted on Micro TCA system.

- Group A – Mixed flowing gas
- Group B – Mechanical endurance and dust
- Group C – Thermal shock and moisture
- Group D – High temperature
- Group E – Electrical load Temperature Rise
- Group F – Signal integrity validation

### **7.1 Specimen measure arrangements**

- Set 1 – Contact resistance measure arrangement
- Set 2 – Insulation resistance and voltage-proofing measure arrangement
- Set 3 – Current carrying capacity measure arrangement
- Set 4 – Contact disturbance measure arrangement
- Set 5 – Signal integrity measure arrangement




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## 7.2 Test Schedule


Test group	Refer item	A		B			C			D		E	F	G
		Set1	Set2	Set1	Set2	Set4	Set1	Set2	Set4	Set1	Set2	Set3	Set5	Set 1
Sets arrangement														
Number of specimen		4	3	4	3	3	4	3	3	4	3	3	3	10
General inspection	3.1	1,15	1,10	1,15	1,12	1,7	1,13	1,11	1,6	1,7	1,6,10	1,3		1
Durability	3.2	4*,12*	5*,8*	4*,12*	5*8*	2*,6*	4	5	2				1	
Contact force	3.3	2,14		2,14			2,12			2,6				
Engaging and separating forces	3.4		2,9		2,9			2,8			2,7			
Individual pin insection	3.5													2
Individual pin retention	3.5													3
PCB hole deformation radius	3.6													4
PCB hole wall damage	3.7													5
Vibration	3.8			8	6	4								
Shock	3.9			10	7	5								
Minute disturbance	3.10	10												
Voltage proof	4.1		4		4,11			4,10			4,9			
Current carrying capacity	4.2											2		
Contact Resistance	4.3	3,5,7,9,11,13		3,5,7,9,11,13			3,5,7,9,11			3,5				
Insulation Resistance	4.4		3		3,10			3,9			3,8			
Differential impedance	5.1												3	
Cross talk	5.2												4	
Attenuation	5.3												5	
Return loss	5.4												6	
Temperature life	6.1	6	6							4	5			
Mixed flowing gas	6.2	8	7											
Dust exposure	6.3			6		3	6		3					
Thermal shock	6.4						8	6	4					
Temperature cycling	6.5						10	7	5					
Damp heat, steady state	6.6												2	

Note: "\*" refer to item 3.2

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### 8.0 Packaging

Packing per FCI spec. GS-14-1122, the traceability of all parts must be guaranteed by date code on each product.

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**REVISION RECORD**

REV	PAGE	DESCRIPTION	ECR #	DATE
A	ALL	FIRST RELEASED	DG07-0107	2007-03-23
B	All	ADD EON INSERTION AND RETENTION FORCE	DG07-0134	2007-04-06
C	3 ,9	Add item 3.7 and add test schedule Group G	DG07-0164	2007-04-20
D	All	Change document from Confidential to Unrestricted	DG07-0204	2007-5-18