


NUMBER GS-12-500	TYPE PRODUCT SPECIFICATION		
Universal Contact		PAGE 1 of 9	REVISION J
		AUTHORIZED BY Andy Lu	DATE 11-Sept-14
		CLASSIFICATION UNRESTRICTED	

1.0 Objective

This specification defines the performance, test, quality and reliability requirements of the Universal Contact product.

2.0 Scope

This specification is applicable to the termination characteristics of the Universal Contact family of products which provides a means to electrically connect a device to a printed circuit board assembly.

3.0 Ratings

3.1 Operating Voltage Rating = 12V DC

3.2 Operating Current Rating = 2 Amps/pin (1 Amps/pin only for 10123973-00*RLF)

3.3 Operating Temperature Range = -40 °C~+85°C

3.4 Storage Conditions

Well controlled storage conditions are a major factor in ensuring good product solderability. Do not store products where their properties can be deteriorated by harmful gases or significant variations in temperatures or humidity. In the storage facility, climatic conditions shall be according to IEC 60721-3-1, class 1K2 are advised, with the following exceptions:

- low relative humidity shall be $\geq 10\%$
- high relative humidity shall be $\leq 75\%$

It is assumed that during storage the product is in the as-received shipping cartons or boxes from FCI; (i.e, the shipping cartons or boxes have not been opened).

3.5 Shelf life

FCI Electronics Division recommends that the shelf life of solderable products be ≤ 30 months following the date printed on the primary labels on the product packaging:

- FCI Electronics division or Distributor partner storage may not exceed 24 months.
- Storage at customer locations shall not exceed 6 months.

This is based upon solderability evaluations after storage under controlled environmental conditions.

4.0 Applicable Documents

4.1 FCI Specifications

Engineering drawings

10076429/10076430/10076431/10076432/10094594/10103955/10104319/10104320/10104321/10115748/10123973/10125000/10128200/10128875

4.2 National or International Standards

EIA 364: Electrical Connector/Socket Test Procedures Including Environmental Classifications.

4.3 FCI Laboratory Reports - Supporting Data

P08058, P08136, DL-2009-10-013, P09125, DL-2011-12-011, DL-2013-03-045, DL-2013-06-020, DL-2013-12-035,DL-2014--07-014

5.0 Requirements

5.1 Qualification

NUMBER GS-12-500	TYPE PRODUCT SPECIFICATION	FCI	
Universal Contact		PAGE 2 of 9	REVISION J
		AUTHORIZED BY Andy Lu	DATE 11-Sept-14
		CLASSIFICATION UNRESTRICTED	

Connectors furnished under this specification shall be capable of meeting the qualification test requirements specified herein.

5.2 Material

Contact: Copper Alloy or Stainless Steel.

5.3 Finish

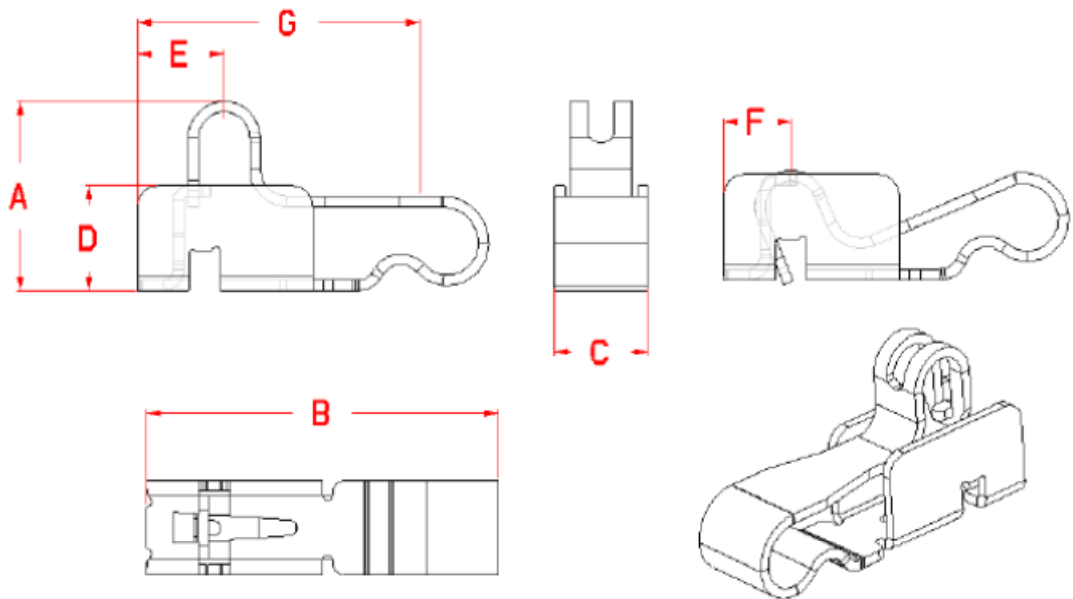
Contact Plating:

Contact area: Plating shall be gold or GXT or Tin over Ni underplate.

Solder tail: Plating shall be gold flash or Tin over Ni underplate.


5.4 Design and Construction

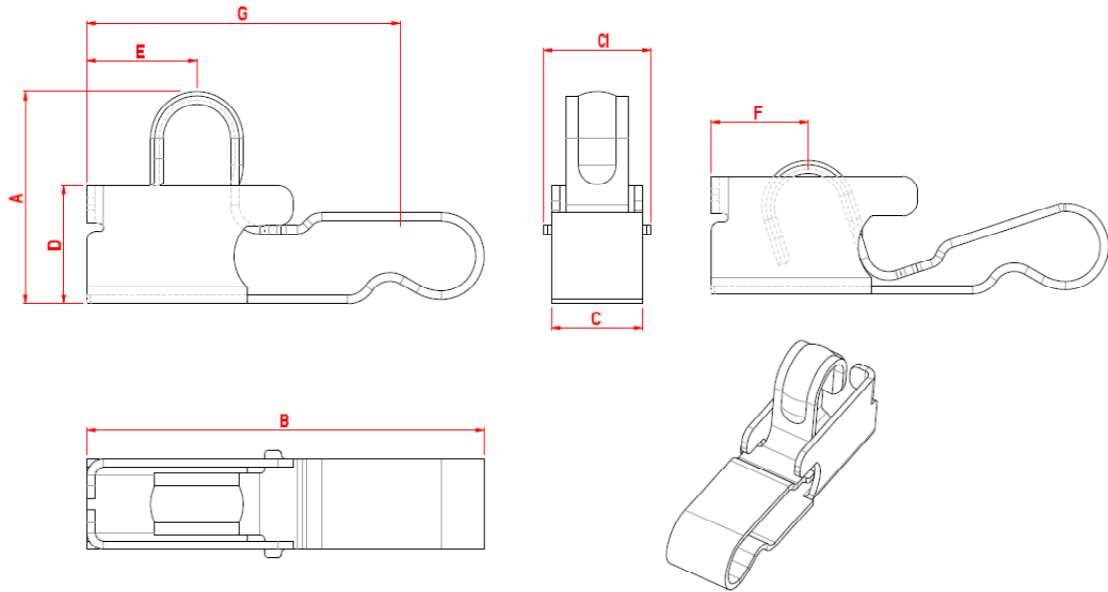
5.4.1 Mechanical configuration dimensions.



Split type Universal Contact Compact Dimensions in mm

Part Number	A	B	C	D	E	F	G (pick and place nozzle location)	Working Height
10076429- 00*RLF	2.50 ±0.10	4.87 ±0.15	0.98 ±0.10	1.40 ±0.10	1.19 ±0.20	0.74 min	2.8 Ref.	1.55 ±0.10
10076431- 00*RLF	1.3 ±0.10	3.48 ±0.10	1.10 ±0.10	0.77 ±0.10	0.80 ±0.20	0.30 min	2.5 Ref.	0.92 ±0.10
10076432- 00*RLF	3.50 ±0.10	5.00 ±0.13	1.10 ±0.10	2.00 ±0.10	1.65 ±0.20	0.50 min	3.4Ref.	2.20 ±0.10

NUMBER GS-12-500	TYPE PRODUCT SPECIFICATION		
Universal Contact		PAGE 3 of 9	REVISION J
		AUTHORIZED BY Andy Lu	DATE 11-Sept-14
		CLASSIFICATION UNRESTRICTED	



Solid type Universal Contact Compact Dimension in MM

Part Number	A	B	C	C1	D	E	F	G (pick and place nozzle location)	Working Height
10076430-00*RLF	1.8 ±0.10	3.40 ±0.13	0.90 ±0.10	1.10 ±0.10	1.00 ±0.10	0.84 ±0.20	0.47 min	2.7 Ref.	1.10 ±0.10
10094594-00*RLF	1.30 ±0.10	3.48 ±0.10	1.40 ±0.10	1.50 ±0.10	0.77 ±0.10	0.80 ±0.20	0.30 min	2.5 Ref.	1.00 ±0.10
10103955-00*RLF	1.8 ±0.10	3.40 ±0.13	0.90 ±0.10	1.10 ±0.10	0.95 ±0.10	0.84 ±0.20	0.47 min	2.7 Ref.	1.10 ±0.10
10104319-00*RLF	2.50 ±0.10	4.87 ±0.15	0.98 ±0.10	1.28 ±0.10	1.40 ±0.10	1.19 ±0.20	0.74 min	2.8 Ref.	1.55 ±0.10
10104320-00*RLF	1.3 ±0.10	3.48 ±0.10	1.10 ±0.10	1.30 ±0.10	0.72 ±0.10	0.80 ±0.20	0.30 min	2.5 Ref.	1.00 ±0.10
10104321-00*RLF	3.50 ±0.10	5.00 ±0.13	1.10 ±0.10	1.40 ±0.10	2.00 ±0.10	1.65 ±0.20	0.50 min	3.4 Ref.	2.20 ±0.10
10115748-00*RLF	1.55 ±0.10	3.48 ±0.10	1.40 ±0.10	1.50 ±0.10	0.87 ±0.10	0.80 ±0.20	0.30 min	2.5 Ref.	1.02 ±0.10
10123973-00*RLF	1.20+ 0.15/-0	2.60 ±0.10	1.10 ±0.10	/	0.40 ±0.05	0.32 ±0.10	0.15 min	1.75 Ref.	0.50 ±0.05
10125000-00*RLF	2.1 ±0.10	3.40 ±0.13	1.10 ±0.10	1.20 ±0.13	1.20 ±0.10	0.90 ±0.20	0.30 min	2.2 Ref.	1.60 ±0.05
10128200-00*RLF	2.1 ±0.10	3.40 ±0.13	1.10 ±0.10	1.20 ±0.13	1.25 ±0.10	0.90 ±0.20	0.30 min	2.2 Ref.	1.60 ±0.05
10128875-00*RLF	4.10 ±0.10	5.00 ±0.13	1.10 ±0.10	1.40 ±0.10	2.30 ±0.10	1.65 ±0.20	0.40 min	3.4 Ref.	2.50 ±0.10

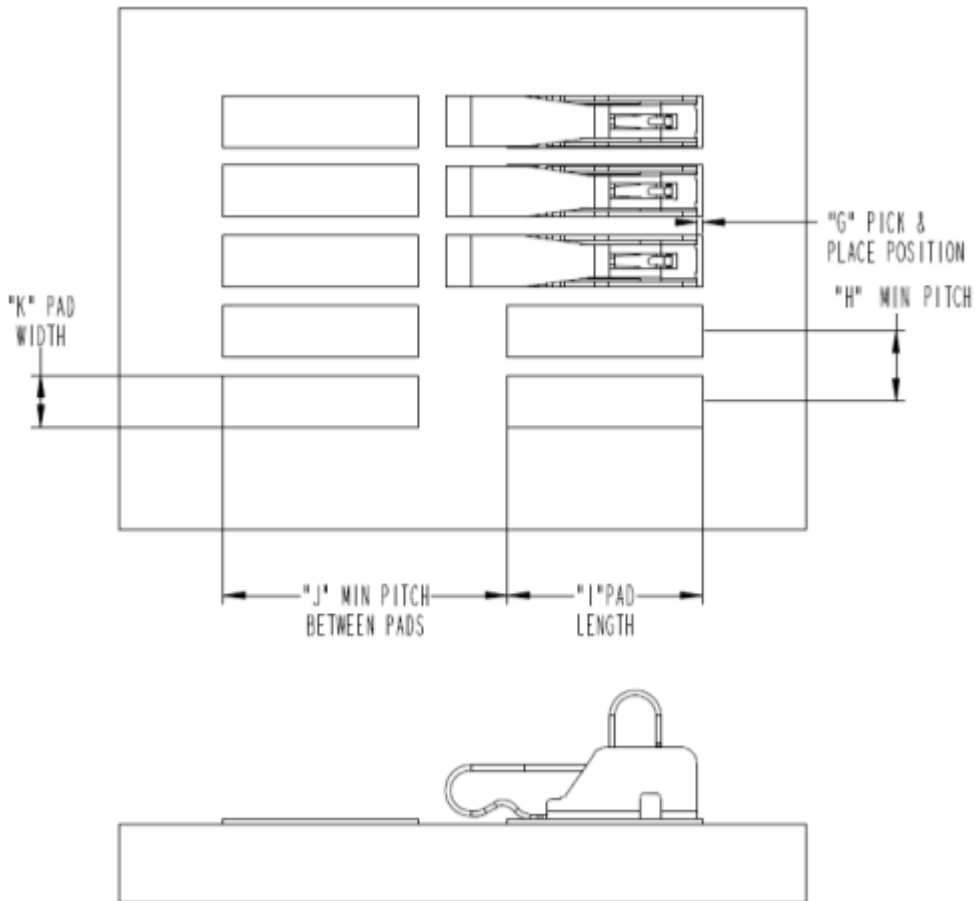
Note: *: plating code, refer to product drawing,

* in below table has the same meaning

NUMBER GS-12-500	TYPE PRODUCT SPECIFICATION	FCI	
TITLE Universal Contact		PAGE 4 of 9	REVISION J
		AUTHORIZED BY Andy Lu	DATE 11-Sept-14
		CLASSIFICATION UNRESTRICTED	


5.4.2 Pad Geometry and Dimension:

5.4.2.1 Pad Geometry:



5.4.2.2 Pad Geometry Dimension (unit: mm):

Part Number	G	H	I	J	K
10076429-00*RLF	0.10	1.35	3.76	5.50	1.00
10076430-00*RLF	0.10	1.25	2.75	3.90	0.90
10076431-00*RLF	0.10	1.45	2.45	4.00	1.10
10076432-00*RLF	0.10	1.45	3.65	5.50	1.10
10094594-00*RLF	0.10	1.85	2.45	4.00	1.10
10103955-00*RLF	0.10	1.25	2.75	3.90	0.90
10104319-00*RLF	0.10	1.35	3.76	5.50	1.00
10104320-00*RLF	0.10	1.45	2.45	4.00	1.10

NUMBER GS-12-500	TYPE PRODUCT SPECIFICATION				
Universal Contact		PAGE 5 of 9	REVISION J		
		AUTHORIZED BY Andy Lu	DATE 11-Sept-14		
		CLASSIFICATION UNRESTRICTED			

10104321-00*RLF	0.10	1.45	3.65	5.50	1.10
10115748-00*RLF	0.10	1.85	2.45	4.00	1.10
10123973-00*RLF	0.10	1.45	2.50	3.20	1.10
10125000-00*RLF	0.10	1.45	2.50	4.00	1.10
10128200-00*RLF	0.10	1.45	2.50	4.00	1.10
10128875-00*RLF	0.10	1.55	3.00	5.60	1.20

6.0 Electrical Characteristics

6.1 Contact Resistance, Low Level (LLCR)

The low level contact resistance shall not exceed 20 milliohms (50 milliohms for 10123973-00*RLF). Measurements shall be in accordance with or EIA 364-23.

The following details shall apply:

- a. Test Voltage - 20 milli-volts DC max open circuit.
- b. Test Current - Not to exceed 100 milli-amperes.

6.2 Current Rating

The temperature rise above ambient shall not exceed 30°C at any point in the system when one contact is powered at 2 amperes (1 Amps for 10123973-00*RLF).

- a. Reference - EIA 364-70

7.0 Mechanical Characteristics


7.1 Normal Force (All data after 3 X reflow cycles)

The following details shall apply:

- a. Cross Head Speed – 25.4 mm per minute.
- b. Utilize free floating fixtures.
- c. Reference –EIA 364-13.

Table 1 Split type Universal Contacts

Part Number	Pre-load Apply Load(N)	Pre-load Un-Applying load(N)	Max deflection (mm)	Minimal Normal Force @ max Deflection (N)	Spring Rate(N/mm)
10076429-00*RLF	0.28	0.20	0.93	0.50	0.34
10076431-00*RLF	0.30	0.20	0.40	0.58	0.90
10076432-00*RLF	0.40	0.30	1.30	0.98	0.53

NUMBER GS-12-500	TYPE PRODUCT SPECIFICATION		
Universal Contact		PAGE 6 of 9	REVISION J
		AUTHORIZED BY Andy Lu	DATE 11-Sept-14
		CLASSIFICATION UNRESTRICTED	

Force vs. Deflection(Split type)

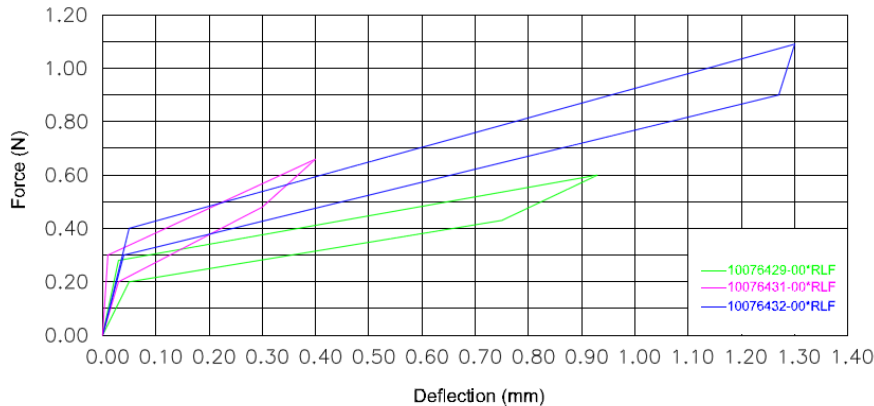


Figure 1. Force VS. deflection Curve

Table 2 Solid type Universal Contacts

Part Number	Pre-load Apply Load(N)	Pre-load Un-Applying load(N)	Max Deflection (mm)	Minimal Normal Force @ max Deflection(N)	Spring Rate(N/mm)
10076430-00*RLF	0.50	0.38	0.65	0.70	0.86
10094594-00*RLF	0.78	0.58	0.32	0.87	1.20
10103955-00*RLF	0.35	0.15	0.80	0.75	0.74
10104319-00*RLF	0.42	0.31	1.00	0.54	0.32
10104320-00*RLF	0.41	0.36	0.40	0.70	1.50
10104321-00*RLF	0.56	0.38	1.30	1.02	0.49
10115748-00*RLF	0.44	0.26	0.60	0.73	0.78
10123973-00*RLF	/	/	0.65	0.60	0.92
10125000-00*RLF	0.50	0.36	0.45	0.60	0.67
10128200-00*RLF	0.50	0.36	0.45	0.60	0.67
10128875-00*RLF	0.35	0.31	1.60	0.66	0.30

Force vs. Deflection(solid type)

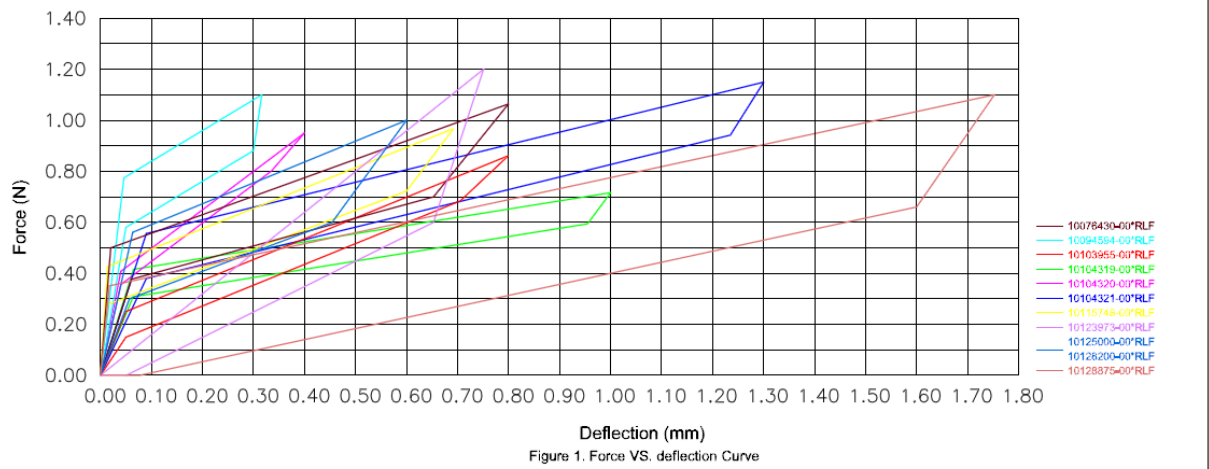



Figure 1. Force VS. deflection Curve

The normal force of 10094594-001RLF needs to be 0.7N Min. at 0.15mm deflection

NUMBER GS-12-500	TYPE PRODUCT SPECIFICATION		
Universal Contact		PAGE 7 of 9	REVISION J
		AUTHORIZED BY Andy Lu	DATE 11-Sept-14
		CLASSIFICATION UNRESTRICTED	

The normal force of 10104319-001RLF needs to be 0.4N Min. at 0.4mm deflection

7. 2 Durability (Minimum): Mated 100 times and still meet electrical characteristics in section 6.1

Note: Can achieve 2500 times when mated with a PCB pad with 0.05/0.15um Au, no breakdown.

- EIA 364-09

7. 3 GXT Plating Coating Adhesion Test: refer to FDQWI-PP-0000-P05 (test method).

8.0 Environmental Conditions

After exposure to the following environmental conditions in accordance with the specified test procedure and/or details, the product shall show no physical damage and shall meet the electrical and mechanical requirements per paragraphs 6.0 and 7.0 as specified in the Table test sequences. Unless specified otherwise, assemblies shall be mated during exposure.

8. 1 Thermal Shock – EIA 364-32.
- a. Number of Cycles - 32
 - b. Temperature Range - Between -40°C and $+85^{\circ}\text{C}$
 - c. Time at Each Temperature - 30 minutes
 - d. Transfer Time – 20 seconds, maximum
8. 2 Humidity –EIA 364-31 method II (steady state)
- a. Relative Humidity – 90~95%
 - b. Temperature – $40 \pm 2^{\circ}\text{C}$
 - c. Duration - 96 hours
8. 3 Salt Spray – EIA-364-26
- a. Test Condition – Temperature: $35 \pm 2^{\circ}\text{C}$, NaCl solution Concentration: $5 \pm 1\%$
 - b. Duration - 48 hours
8. 4 Solderability – J-STD-002
- a. Test Condition - Immersion
 - b. Minimum solder coverage: 95%

9.0 QUALITY ASSURANCE PROVISIONS


- 9.1 Equipment Calibration

All test equipment and inspection facilities used in the performance of any test shall be maintained in a calibration system in accordance with ANSI Z-540 and ISO 9000.

- 9.2 Inspection Conditions

Unless otherwise specified herein, all inspections shall be performed under the following ambient conditions:

- a. Temperature: $25 \pm 5^{\circ}\text{C}$
- b. Relative Humidity: 30% to 60%
- c. Barometric Pressure: Local ambient

NUMBER GS-12-500	TYPE PRODUCT SPECIFICATION		
Universal Contact		PAGE 8 of 9	REVISION J
		AUTHORIZED BY Andy Lu	DATE 11-Sept-14
		CLASSIFICATION UNRESTRICTED	

9.3 Acceptance

9.3.1 Electrical and mechanical requirements placed on test samples as indicated in paragraphs 6.0 and 7.0 shall be established from test data using appropriate statistical techniques or shall otherwise be customer specified, and all samples tested in accordance with this product specification shall meet the stated requirements.

9.3.2 Failures attributed to equipment, test setup, or operator error shall not disqualify the product. If product failure occurs, corrective action shall be taken and samples resubmitted for qualification.

9.4 Qualification Testing

Qualification testing shall be performed on sample units produced with equipment and procedures normally used in production. The test sequences shall be as shown in the qualification test table. Data shall be provided with the samples noting production history: production lot codes for components and assemblies, components and assemblies produced to print revision, verification of plating composition and thickness, etc.

9.5 Re-Qualification Testing

If any of the following conditions occur, the responsible product engineer shall initiate requalification testing consisting of all applicable parts of the qualification test matrix.

a. A significant design change is made to the existing product which impacts the product form, fit or function. Examples of significant changes shall include, but not be limited to, changes in the plating material composition or thickness, contact force, contact surface geometry, insulator design, contact base material, or contact lubrication requirements.

b. A significant change is made to the manufacturing process which impacts the product form, fit or function.


c. A significant event occurs during production or end use requiring corrective action to be taken relative to the product design or manufacturing process.

9.6 Qualification Test Table and Sample Quantity.

Test Items	Test method	TEST SEQUENCE			
		Group1	Group2	Group3	Group4
Examination of product		1,6	1,5	1,6	1,3
Contact Resistance	6.1	2,5	2,4	2,5	
Normal force	7.1	3			
Durability	7.2	4			
Salt Spray	8.3		3		
Thermal Shock	8.1			3	
Humidity	8.2			4	
Solderability test	8.4				2
Sample Quantity		5	5	5	5

10.0 PACKAGING SPECIFICATION

Refer to FCI specification GS-14-1216.

NUMBER GS-12-500	TYPE PRODUCT SPECIFICATION		
Universal Contact		PAGE 9 of 9	REVISION J
		AUTHORIZED BY Andy Lu	DATE 11-Sept-14
CLASSIFICATION UNRESTRICTED			

REVISION RECORD

Rev	Page	Description	EC#	Date
A	All	PRELIMINARY	DG07-0366	2007-07-09
B	All	ADD Y01,Y04 SPEC IN THE SPEC	DG08-0055	2008-03-10
C	All	MODIFY THE CPN AND ADD THE PAD GEOMETRY	DG08-0254	2008-09-11
D	All	ADD Y05 IN SPEC	DG09-0056	2009-05-05
E	All	ADD Y06 IN SPEC	DG09-0331	2009-08-20
F	All	ADD THREE NEW P/Ns IN SPEC	DG10-0291	2009-11-20
G	All	ADD NEW P/N IN SPEC	DG12-0086	2010-08-11
H	All	ADD NEW P/N(F01) INTO SPEC AND CHANGE FORMAT	ELX-DG-011189-1	2012-04-01
J	All	ADD NEW P/N INTO SPEC	ELX-DG-18794-1	2014-09-11

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