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1. Scope :

This product specification contains the test results that general performances of C4201 connector were

2. Part name & part number :

Part name		Part number
Housing		C4201HF/HM,C4201HF-2/HM-2.
Terminal	F-TBe	C4201F-T C4201F-T-H C4201F-T-HH
	M-TBe	C4201M-T C4201M-T-H C4201M-T-HH
Wafer		C4201WV/WR,C4201WV-2/WR-2.

3. Construction, dimensions, material & surface finish :

Construction and dimensions shall be in accordance with the referenced drawings.

Material and surface finish shall be as specified below.

Part name		Material	Surface finish
Housing		Nylon 66	UL94V-2 or UL94V-0
Terminal	F-TB	Brass	Tin-plated
	M-TB	Brass	Tin-plated
Wafer	Post	Brass	Tin-plated
	Body	Nylon 66	UL 94V-2/UL 94V-0

4. Characteristics :

Current rating : 9.0A AC,DC

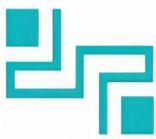
Voltage rating : 600V AC,DC

Temperature range : -40°C ~ 105°C

5. Conditions

The conditions shall be in accordance with the referenced drawing of next page.

Number	Item	Requirement
(1)	Bend up	4° max.
	Bend down	4° max.
	Twisting	3° max.
	Rolling	8° max.
(2)	Bell mouth (flare)	0.2-0.5 mm
(3)	Cut-off tab length	0.2 mm max.
(4)	Extruded wire length	0-1.0 mm
(5)	Seam	Seam shall not be opened and no wire allowed out of crimping
	Wire strip length	1.2-1.7 mm ref.
(8)	Lance height	0.3 mm ref.



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6. Mechanical test :

6.1 Crimp width 、 crimp height & crimp strength

After crimping , the crimped areas [(6) 、 (7)] should be as follows.

Wire Size (AWG)	Terminal Part Number	Conductor(mm)		Insulation(mm)		Crimp Strength (Kg)
		Crimp Width	Crimp Height	Crimp Width	Crimp Height	
# 16	C4201F-T-HH	1.65±0.15	1.35~1.50	2.8 (max)	2.10(max)	9.00(min)
# 18	C4201M-T-HH C4201F-T-H		1.20~1.35		2.00(max)	7.00(min)
# 20	C4201M-T-H C4201F-T		1.10~1.20		1.90(max)	4.00(min)
# 22	C4201M-T		1.00~1.10		1.80(max)	3.00(min)

Note no distorted after terminal crimped.

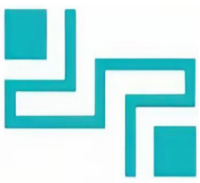
6.2 Insertion force (I.F.) & withdrawal force (W.F.)

(1) Requirement (single Row)

Number of Circuits	At initial		At 50th
	I.F. (max)	W.F. (min)	W.F. (min)
Single	1.50kg	0.10kg	0.05kg
2	3.00kg	0.30kg	0.20kg
3	4.00kg	0.70kg	0.60kg
4	5.50kg	1.00kg	0.80kg
5	6.50kg	1.20kg	1.10kg
6	7.00kg	1.60kg	1.40gk
7	8.00kg	1.80kg	1.60kg
8	9.00kg	2.10kg	2.00kg
9	10.00kg	2.50kg	2.30kg
10	11.00kg	2.80kg	2.50kg
11	12.00kg	3.00kg	2.80kg
12	13.00kg	3.20kg	3.00kg

(2) Requirement : (Dual Row)

Number of Circuits	At initial		At 50th
	I.F. (max)	W.F. (min)	W.F. (min)
Single	1.5kg	0.1kg	0.05kg
2X2	3.5kg	0.5kg	0.40kg
2X3	5.0kg	0.8kg	0.70kg
2X4	6.5kg	1.1kg	1.00kg
2X5	8.0kg	1.5kg	1.60kg
2X6	9.5kg	1.9kg	1.80kg
2X7	10.0kg	2.3kg	2.20kg
2X8	11.0kg	2.7kg	2.60kg
2X9	12.0kg	3.1kg	3.00kg
2X10	13.0kg	3.5kg	3.40kg
2X11	14.0kg	3.9kg	3.80kg
2X12	15.0kg	4.3kg	4.20kg

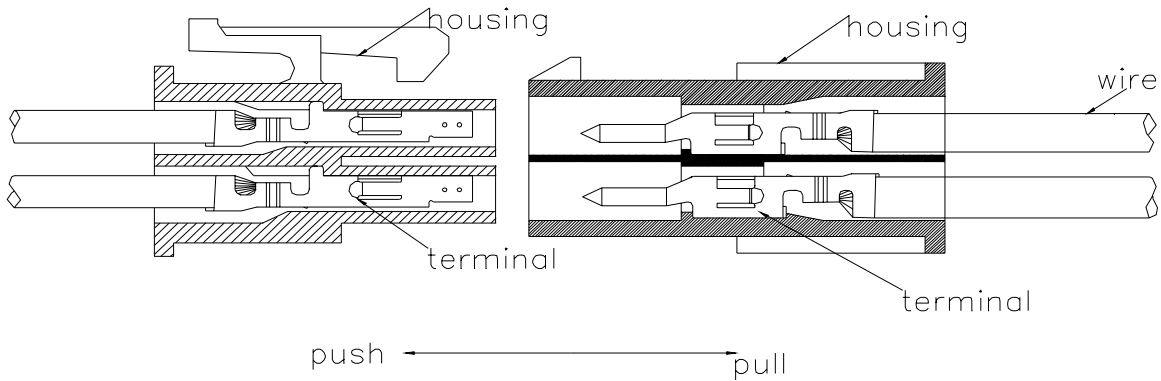


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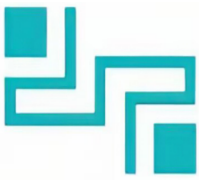
(3) Test method : Housing with crimped terminal and wafer shall be mated and unmated on the same axis. Initial insertion and withdrawal forces and withdrawal forces at 50th shall be measured for single circuit and multi-circuits. For the measurement of single circuit , housing lock shall be removed.

Insertion and withdrawal speed : 20± 5 mm/minute.



(4) Test results : (single Row)

Number of Circuits		At initial		AT 50th	N=20
		I.F. (Kg)	W.F. (Kg)	W.F. (Kg)	
Single	Max.	1.16	1.06	0.95	
	Min.	0.64	0.44	0.41	
	Ave.	0.98	0.87	0.82	
2	Max.	2.29	1.66	1.53	
	Min.	1.50	0.84	0.76	
	Ave.	2.02	1.41	1.28	
3	Max.	3.34	2.70	2.61	
	Min.	2.03	1.35	1.24	
	Ave.	2.88	2.28	2.13	
4	Max.	4.39	3.73	3.61	
	Min.	2.35	1.66	1.53	
	Ave.	3.67	3.09	2.98	
5	Max.	5.14	4.25	4.16	
	Min.	2.83	1.91	1.78	
	Ave.	4.44	3.52	3.35	
6	Max.	5.91	5.06	4.89	
	Min.	3.46	2.45	2.31	
	Ave.	5.14	4.30	4.12	
7	Max.	7.24	6.45	6.26	
	Min.	4.05	2.89	2.75	
	Ave.	6.37	5.39	5.23	
8	Max.	8.78	7.50	7.36	
	Min.	4.89	3.40	3.21	
	Ave.	7.86	6.29	6.06	
9	Max.	9.52	8.18	8.03	
	Min.	5.22	3.82	3.65	
	Ave.	8.21	6.82	6.63	



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10	Max.	10.31	8.77	8.59
	Min.	5.46	4.28	4.06
	Ave.	8.68	7.38	7.21
11	Max.	10.95	9.85	9.72
	Min.	5.80	4.48	4.26
	Ave.	9.64	8.29	8.06
12	Max.	11.57	10.77	10.53
	Min.	6.20	4.63	4.51
	Ave.	10.23	8.82	8.53

(5) Test results : (Dual Row)

Number of Circuits		At initial		AT 50th	N=20
		I.F. (Kg)	W.F. (Kg)	W.F. (Kg)	
Single	Max.	0.89	0.91	0.88	
	Min.	0.59	0.53	0.50	
	Ave.	0.75	0.73	0.71	
2X2	Max.	1.78	1.68	1.65	
	Min.	0.98	0.89	0.85	
	Ave.	1.54	1.41	1.37	
2X3	Max.	2.69	2.54	2.50	
	Min.	1.35	1.31	1.29	
	Ave.	1.75	1.71	1.67	
2X4	Max.	3.54	3.42	3.39	
	Min.	2.41	2.38	2.36	
	Ave.	2.87	2.78	2.76	
2X5	Max.	4.87	4.78	4.71	
	Min.	3.78	3.69	3.62	
	Ave.	4.21	4.17	4.10	
2X6	Max.	6.35	6.01	5.92	
	Min.	4.79	4.56	4.53	
	Ave.	5.12	5.07	4.99	
2X7	Max.	8.33	7.82	7.80	
	Min.	5.50	5.56	5.51	
	Ave.	7.17	6.90	6.87	
2X8	Max.	9.41	8.78	8.74	
	Min.	6.47	5.68	5.62	
	Ave.	8.01	7.15	7.11	
2X9	Max.	10.23	9.47	9.42	
	Min.	7.95	7.75	7.71	
	Ave.	8.65	8.35	8.29	



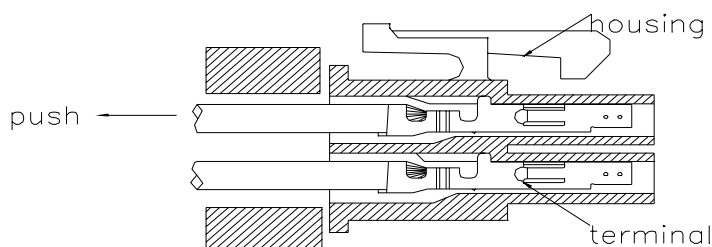
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2X10	Max.	11.78	9.89	9.84
	Min.	8.45	7.98	7.92
	Ave.	9.31	8.78	8.74
2X11	Max.	12.34	10.54	10.50
	Min.	9.21	8.74	8.71
	Ave.	10.21	9.24	9.19
2X12	Max.	13.74	11.25	11.21
	Min.	9.54	9.05	8.98
	Ave.	11.69	10.00	9.94

6.3 Contact retention force

- (1) Requirement: 2.5 Kg (min.)
- (2) Test method : Crimped terminal shall be mounted in a housing(HF) and pulled in an alignment. The load to pull the terminal out of the housing shall be measured.

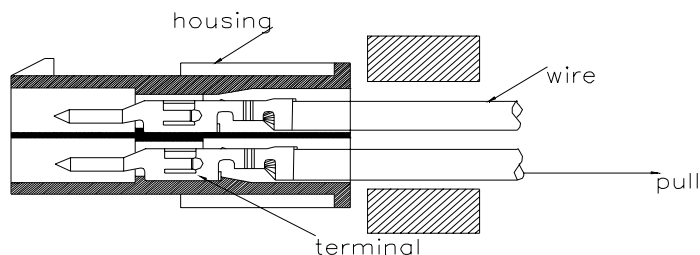


(3) Test results:

Max.	Min.	Ave.	N=10
6.15	4.50	5.49	

6.4 Contact retention force

- (1) Requirement : 2.5 Kg (min.)
- (2) Test method : Crimped terminal shall be mounted in a housing(HM) and pulled in an alignment. The load to pull the terminal out of the housing shall be measured.



(3) Test results

Max.	Min.	Ave.	N=10
5.85	4.45	5.25	



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6.4 Post retention force

- (1) Requirement : 2.0 Kg (min.)
- (2) Test method : The end of a post shall be pushed in a perpendicular to wafer. The load to make the post start moving shall be measured.
- (3) Test results

Max.	Min.	Ave.	N=10
5.32kg	3.21kg	4.38kg	

7. Electrical test

7.1 Contact resistance

- (1) Requirement : Initial : 10 m Ω (max.)
After environmental test : 20 m Ω (max.)
- (2) Condition : Test current : 10 mA (DC)
Open voltage : 20mV (max.)
- (3) Test result : See items 8.1 ~ 8.4

7.2 Insulation resistance

- (1) Requirement : Initial : 1000 M Ω (min.)
After humidity test : 500 M Ω (min.)
After thermal shock test : 500 M Ω (min.)
- (2) Test method : DC 1500V shall be applied between outer surface of housing and terminal and between adjacent terminals to measure insulation resistance.
(MIL-STD-202 , test method 302 , condition B)
- (3) Test result : See items 8.1 & 8.3

7.3 Dielectric withstanding voltage

- (1) Requirement : There shall be no breakdown nor flashover.
- (2) Test method : Initially AC 1500V (rms) and after humidity and thermal shock tests AC 800V (rms) shall be applied between outer surface of housing and terminal and between adjacent terminals for one minutes. (MIL-STD-202 , test method 301)

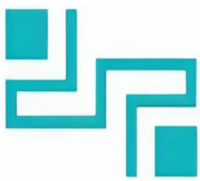
Test current : 1mA

- (3) Test result : See items 8.1 & 8.3

8. Environment test

8.1 Humidity

- (1) Requirement : Contact resistance shall be 20 milliohms (max.) after the test. Insulation resistance shall be 500 megohms (min.) after the test. There shall be no breakdown nor flashover on dielectric withstanding voltage test.
- (2) Test method : Mated connector shall be placed in a humidity chamber of the following conditions. After the test , contact resistance , insulation resistance and dielectric withstanding voltage shall be measured. (MIL-STD-202 , test method 103 , condition A)
Temperature : 40 \pm 2 $^{\circ}$ C
Humidity : 90% ~ 95% (RH)
Period : 240 hours continuously
- (3) Test results :



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Test item	Initial (mΩ)			After test (mΩ)		
	Max.	Min.	Ave.	Max	Min	Ave
Contact resistance	8.06	6.10	6.30	8.14	6.24	6.40

N=30

Test item	Housing-Terminal (MΩ)		Terminal-Terminal (MΩ)	
	Initial	After test	Initial	After test
Insulation resistance	1000min	500min	1000min	500min

N=20

Test item	Housing-Terminal (MΩ)		Terminal-Terminal (MΩ)	
	Initial	After test	Initial	After test
D.W.V.	Good	Good	Good	Good

N=20

(D.W.V. Dielectric withstanding voltage)

8.2 Salt spray

- (1) Requirement : Contact resistance shall be 20 milliohms (max.) after the test.
- (2) Test method : Mated connector shall be subjected to salt spray test of the following conditions. After the test, specimen shall be washed with running water and dried naturally before the measurement of contact resistance.
- Temperature : 40±2 °C
- Humidity : 90% ~ 95% (RH)
- Period :8 or 16 or 24 or 32 or 48 hours

(3) Test result :

Test item	Initial (mΩ)			After test (mΩ)		
	Max.	Min.	Ave.	Max.	Min	Ave.
Contact resistance	7.79	6.43	7.09	7.86	6.51	7.24

N=30

8.3 Thermal shock

- (1) Requirement : Contact resistance shall be 20 milliohms (max.) after the test. Insulation resistance shall be 500 megohms (min.) after the test. There shall be no breakdown nor flashover on dielectric withstanding voltage test.
- (2) Test method : Mated connector shall be subjected to thermal shock test of the following conditions. After the test , contact resistance , insulation resistance and dielectric withstanding voltage shall be measured.
- 1 cycle consists of :
- 55 °C for 30 minutes
- +85 °C for 30 minutes
- Times of cycles : 25 cycles

(3) Test results :

Test item	Initial (mΩ)			After test (mΩ)		
	Max.	Min.	Ave.	Max.	Min	Ave.
Contact resistance	8.04	6.12	7.00	8.13	6.24	7.20

N=30

Test item	Housing-Terminal (MΩ)		Terminal-Terminal (MΩ)	
	Initial	After test	Initial	After test
Insulation resistance	1000min	500min	1000min	500min

N=20



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Test item	Housing-Terminal (M Ω)		Terminal-Terminal (M Ω)	
	Initial	After test	Initial	After test
D.W.V.	Good	Good	Good	Good

 N=20

D.W.V. Dielectric withstanding voltage

8.4 Vibration

(1) Requirements : Contact resistance shall be 20 milliohms (max.) after the test. There shall be no current discontinuity longer than 1 microsecond during the test.

(2) Test method : Mated connector shall be mounted on a PCB and subjected to a vibration test of the following conditions. During the test , current continuity shall be checked. After the test , contact resistance shall be measured.

(MIL-STD-202 , test method 201)

Frequency : 10~55~10 Hz/min.

Amplitude : 1.5 mm

Direction : 1. Axis of up and down

2. Axis of right and left

3. Axis of front and back

(3) Test result :

Test item	Initial (m Ω)			After test (m Ω)		
	Max.	Min.	Ave.	Max.	Min	Ave.
Contact resistance	8.15	6.28	7.17	8.19	6.31	7.28

 N=30

Current discontinuity : There shall be no current discontinuity longer than 1 microsecond during the test.

8.5 Solderability

(1) Requirements : Solder-dipping section shall be covered by solder entirely.

(2) Test method : Fluxed soldering section of shrouded header shall be dipped in solder of the following conditions.

Solder temperature : 235 \pm 5 $^{\circ}$ C

Immersion period : 3-5 seconds

(3) Test result : Good.

8.6 Resistance to soldering heat

(1) Requirements : There shall be no deformation nor damage which may affect the performance.

(2) Test method : Specimen shall be mounted on a PCB (inserted only) and subjected to resistance to soldering heat test of the following conditions.

Solder temperature : 250 \pm 5 $^{\circ}$ C

Immersion period : 3-5 seconds

(3) Test result : Good.