No. 139 Wuhan Rd., Longtan Township, Taoyuan County, Taiwan 32549
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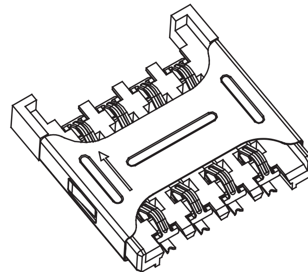
# PRODUCT SPECIFICATION

GradConn Part No.: CH03-FB

Product Description: Micro 3FF SIM Card Connector



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## 1.0 Product Specification

### 1.1 Features

ETSI TS 102 221 Standard Micro SIM Card.

## 2.0 Technical Characteristics

### 2.1 General Characteristics

| Items | Standard | Description |
|---|---|---|
| Dimension | | 13.40L x 13.40W x 2.40H mm. |
| Weight | | Approx. 0.50g. |
| Card Size | ETSI.TS.102.221 | 15.00 x 12.00 x 0.76 mm. |
| Contact Principle | | Friction technology. |
| Mounting System | | SMT Type (without post). |
| Durability | | 5,000 cycles min. |
| Material | | |
| Insulator | | Thermoplastic UL94V-0. |
| Data Contact | | Phosphor Bronze. |
| Cover | | SUS(304). |
| Plating | | Gold over Nickel . |

### 2.2 Electrical Characteristics (According to Standard IEC512)

| Items | Standard | Description |
|---|---|---|
| Number of contacts | | 6, 8 pins (optional). |
| Contact highly | | 0.70±0.05mm. |
| Rated voltage | | 50 V max. |
| Rated current | | 1 A max. 10μ A min. |
| Contact resistance | IEC512-2-2a | 100mΩ max. |
| Insulation resistance pin to pin | IEC512-2-3a | >1000 MΩ/500 VDC. |
| Dielectric withstanding voltage | IEC512-2-4a | 500 V AC rms 1 min. (sea level). |

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| 2.3 Mechanical Characteristics | | |
| --- | --- | --- |
| Items | Standard | Description |
| Card insertion force | | 20N Max. |
| Card retention force | | 1N min. |
| Contact location | ETSI.TS.102.221. | |
| Normal force | | Min. 0.5N. |
| Contact retention force | | >1.0N. |

| 2.4 Solderability | | |
| --- | --- | --- |
| Items | Standard | Description |
| Wave | IEC-68-2-20. | Not Applicable. |
| Vaporphase | | 215°C, 30sec. max. |
| IR reflow | | 260ºC, 10 sec. max. |
| Manual soldering | IEC68-2-20. | Not Applicable. |

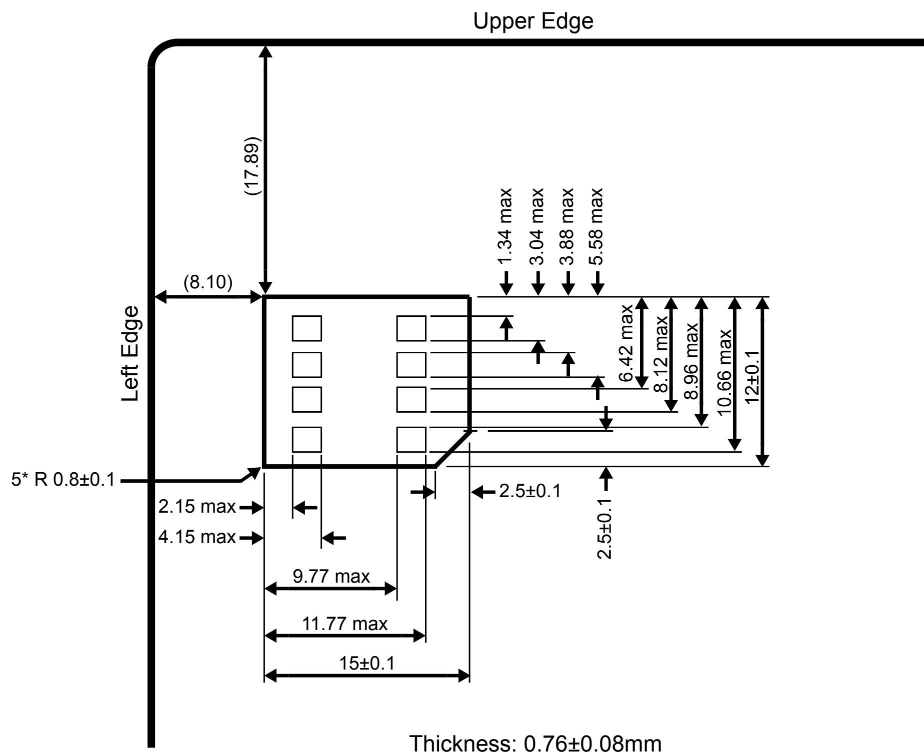
| 2.5 Environmental Characteristics (According to Standard IEC68) | | |
| --- | --- | --- |
| Items | Standard | Description |
| Operating temperature | | -40ºC ~ + 85ºC. |
| Operating humidity | | 10% ~ 95% RH. |
| Storage temperature | | - 40ºC ~ + 85ºC. |
| Storage humidity | | 10% ~ 95% RH. |
| Thermal Shock | | -40°C ~ +85°C, 5 cycles. |
| Damp heat | | 40°C, 90%RH, 10 days. |
| Salt-mist | | 35°C, 5% NaCl, 24HR. |

## 3.0 Interface

### 3.1 Signals

| Contact No | Assignment | Description |
|---|---|---|
| C1 | Vcc | Power Voltage. |
| C2 | RST | Reset signal. |
| C3 | CLK | Clocking signal. |
| C4 | RFU | Reserved for future use. |
| C5 | GND | Power and signal ground. |
| C6 | Vpp | Programming voltage. |
| C7 | I/O | Serial data input/output. |
| C8 | RFU | Reserved for future use. |

### 3.2 Micro SIM Card Contact Location (ETSI TS 102 221)



| 4.0 Test Data |
|---|

| 4.1 Durability | | | | | |
|---|---|---|---|---|---|
| Before Test | | | | | |
| Purpose: | 1. To test the mating/unmating force before and after 5,000 cycles mating.<br>2. To test the strength of cover. | | | | |
| Standard: | Product spec. | | | | |
| Test Method: | 1. Put the part on tester.<br>2. Test at speed of 5mm/min. | | | | |
| Inspect Item: | 1. Insertion Force: Max 20N.<br>2. Withdraw Force: Min 1N.<br>3. Low Level Contact Resistance: <100mΩ. | | | | |
| Sample | Data | | | | Result |
| | Appearance | Insertion Force (N) | Withdrawal Force (N) | Contact Resistance (mΩ) | |
| 1 | No damage | 5.34 | 3.25 | 9.09 | Ok |
| 2 | No damage | 5.46 | 2.89 | 9.47 | Ok |
| 3 | No damage | 5.71 | 3.16 | 9.17 | Ok |
| 4 | No damage | 6.29 | 3.08 | 8.53 | Ok |
| 5 | No damage | 5.95 | 3.05 | 8.74 | Ok |

| After 5000 cycles. | | | | | |
|---|---|---|---|---|---|
| Standard: Product spec. | | | | | |
| Inspect Item: | 1. Contact deform, damage.<br>2. Insertion Force: Max 20N.<br>3. Withdraw Force: Min 1N.<br>4. Low Level Contact Resistance: <100mΩ. | | | | |
| Sample | Data | | | | Result |
| | Appearance | Insertion Force (N) | Withdrawal Force (N) | Contact Resistance (mΩ) | |
| 1 | No damage | 7.45 | 6.09 | 9.09 | Ok |
| 2 | No damage | 7.54 | 6.02 | 9.47 | Ok |
| 3 | No damage | 7.49 | 6.07 | 9.17 | Ok |
| 4 | No damage | 7.4 | 6.03 | 8.53 | Ok |
| 5 | No damage | 7.51 | 5.98 | 8.74 | Ok |
| Adjustment | Ok | | | | |

| 4.2 Normal Force | | | |
|---|---|---|---|
| Purpose: Measure force required to push the terminal down. Contacts require a proper normal force to make sure of a good contact with SIM card. | | | |
| Standard: Product Spec | | | |
| Method: 1. Fix the part on jig, measure the distance from contact to insulator surface.<br>2. Start the tester, write down the distance and force. | | | |
| Criteria: Normal force: Min 0.5N. | | | |
| Sample | Terminal Travelling (mm) | Normal Force (N) | Results |
| 1 | 0.82 | 1.30 | Ok |
| 2 | 0.8 | 1.27 | Ok |
| 3 | 0.81 | 1.03 | Ok |
| 4 | 0.8 | 0.97 | Ok |
| 5 | 0.85 | 0.97 | Ok |

| 4.3 Contact Retention Force | | | | | | | |
|---|---|---|---|---|---|---|---|
| Method: Apply an axial load to terminal, assembled in the housing at a speed of 25-50 mm/min. | | | | | | | |
| Equipment: Mating/unmating tester. | | | | | | | |
| Criteria: >1N. | | | | | | | |
| Pin / Sample | 1 | 2 | 3 | 4 | 5 | 6 | Result |
| 1 | 2.37 | 2.88 | 2.13 | 2.78 | 2.01 | 3.01 | Ok |
| 2 | 2.14 | 2.12 | 2.56 | 3.02 | 3.14 | 2.89 | Ok |
| 3 | 2.22 | 2.21 | 2.88 | 3.04 | 3.02 | 2.11 | Ok |
| 4 | 3.16 | 3.14 | 2.99 | 2.31 | 3.01 | 2.15 | Ok |

| 4.4 Dielectric | |
|---|---|
| Purpose: | 1. Verify the performance of withstanding rate voltage.<br>2. Verify the material insulation performance. |
| Standard: | Product Spec. |
| Method: | 1. Test adjacent pin: shell and closed pin.<br>2. Test duration 1 min.<br>3. Leakage current 0.2mA. |
| Criteria: | 500V/Minute. |

| Voltage: | 500V/AC | Temp: | 25°C |
|---|---|---|---|
| Leakage current: | 0.02mA | Humidity: | 60% |
| Test duration: | 60 Seconds | Unit: | V |

| Sample | Record | Result |
|---|---|---|
| 1 | No breakdown. | Ok |
| 2 | No breakdown. | Ok |
| 3 | No breakdown. | Ok |
| 4 | No breakdown | Ok |
| 5 | No breakdown | Ok |
| Pass | | |

| 4.5 Insulation Resistance | |
|---|---|
| Purpose: | Performance of the insulation resistance. |
| Standard: | Product spec. |
| Method: | 1. Apply on adjacent contact or contact and shell.<br>2. Write down the min data if various data available.<br>3. No breakdown, flashover. |
| Criteria: | >1000MΩ./min |

| Sample | Record | Result |
|---|---|---|
| 1 | 1962MΩ | Ok |
| 2 | 1847MΩ | Ok |
| 3 | 1967MΩ | Ok |
| 4 | 1694MΩ | Ok |
| 5 | 1606MΩ | Ok |
| Pass | | |

| 4.6 Contact Resistance | | |
|---|---|---|
| Purpose: | Verify the contact resistance. | |
| Standard: | Product spec. | |
| Method: | Measure the voltage drop at the circuit and work out the CR. | |
| Criteria: | >80MΩ/max. | |
| Sample | Record | Result |
| 1 | 9.17mΩ | Ok |
| 2 | 8.93mΩ | Ok |
| 3 | 8.99mΩ | Ok |
| 4 | 9.78mΩ | Ok |
| 5 | 9.69mΩ | Ok |
| Pass | | |

| 4.7 IR Heat Resistant Test | | | | | | |
|---|---|---|---|---|---|---|
| Purpose: | 1. Check the contact and insulator stress after high temp.<br>2. Any other damage to the connector after high temp. | | | | | |
| Standard: | Product spec. | | | | | |
| Equipment: | IR reflow. | | | | | |
| Requirement: | 1. Sample without damage, bending, deforming or bubbles before test.<br>2. Set IR Reflow temperature at 260°C (+/- 5°C), duration 7 minutes. | | | | | |
| Criteria: | 1. No damage, bending, deforming or bubbles after test.<br>2. Coplanairity ≤0.08mm. | | | | | |
| Sample | Appearance | Deform | Bending | Bubble | Coplanairty | Result |
| 1 | Ok | Ok | Ok | Ok | 0.08mm | Ok |
| 2 | Ok | Ok | Ok | Ok | 0.07mm | Ok |
| 3 | Ok | Ok | Ok | Ok | 0.07mm | Ok |
| 4 | Ok | Ok | Ok | Ok | 0.08mm | Ok |
| 5 | Ok | Ok | Ok | Ok | 0.05mm | Ok |
| Pass | | | | | | |

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| 4.8 Salt Spray | | | | |
|---|---|---|---|---|
| Setting: | 1. | Tester Temp: 35±2°C. | 6. | Solution PH: 6.5-7.5. |
| | 2. | Reservoir: 47±2°C. | 7. | Solution speed: 1.0-2.0ml/80cm. |
| | 3. | Nozzle press: 0.7-1.0Kg/cm². | 8. | Dry temp: 80°C. |
| | 4. | Air press: 2.4Kg/cm². | 9. | Dry time: 30minutes. |
| | 5. | Concentration: 5±0.5%NaCl. | 10. | Test time: 24H. |
| Method: | 1. | Clean and check samples. | | |
| | 2. | Put into tester. | | |
| | 3. | Set Machine. | | |
| | 4. | Clean the sample with water for 5 min and dry. | | |
| Standard: | Product spec. | | | |
| Criteria: | No bubble, oxidation, corrosion, rust. | | | |
| Results: | Pass. | | | |

| 4.9 Solderability | |
|---|---|
| Purpose: | 1. To verify the performance of solderability after plating.<br>2. Verify contact solderability. |
| Standard: | Product spec. |
| Method: | Temp (255±5) °C, with speed of 1±0.25 (inch)/S dip into solder pot, duration 3-5 seconds. |

| Sample | Criteria | Result |
|---|---|---|
| 1 | 95% with solder covered, no pin hole. | Ok |
| 2 | 95% with solder covered, no pin hole. | Ok |
| 3 | 95% with solder covered, no pin hole. | Ok |
| 4 | 95% with solder covered, no pin hole. | Ok |
| 5 | 95% with solder covered, no pin hole. | Ok |
| Pass | | |

| 5.0 Dip Heat Resistant | | |
|---|---|---|
| Purpose: To verify the heat resistance on dip solder. | | |
| Standard: Product spec. | | |
| Method: Temp (255±5)°C, with speed of 1±0.25 (inch)/S dip into solder pot, duration 3-5 seconds. | | |
| Criteria: No crack, melt, deform. | | |
| Sample | Criteria | Result |
| 1 | No crack, melt, deform. | Ok |
| 2 | No crack, melt, deform. | Ok |
| 3 | No crack, melt, deform. | Ok |
| 4 | No crack, melt, deform. | Ok |
| 5 | No crack, melt, deform. | Ok |
| Pass | | |