


NUMBER <b>GS-12-451</b>	TYPE <b>PRODUCT SPECIFICATION</b>		
TITLE  <b>TransFlash Memory Card Connector with Card Detect</b>		PAGE <b>1 of 8</b>	REVISION <b>C</b>
		AUTHORIZED BY <b>Andy Lu</b>	DATE <b>2012-4-25</b>
		CLASSIFICATION <b>UNRESTRICTED</b>	

## 1.0 Objective

This specification defines the performance, test, quality and reliability requirements of the Motorola TransFlash memory card connector with card detect function.

## 2.0 Scope

This specification is applicable to the termination characteristics of the TransFlash memory card family of products which provides card detect function.

## 3.0 Ratings

- 3.1 Operating Voltage Rating = 5V DC
- 3.2 Operating Current Rating = 10mA /1pin
- 3.3 Operating Temperature Range =-20°C ~+70°C


## 4.0 Applicable Documents

- 4.1 FCI Specifications
  - 4.1.1 Engineering drawings 10067099
- 4.2 National or International Standards
  - 4.2.1 Flammability: UL94V-0 or similar applicable specification
  - 4.2.2 EIA 364: Electrical Connector/Socket Test Procedures Including Environmental Classifications.
  - 4.2.3 IEC 60512: Connectors for Electronic Equipment – Tests and Measurement
- 4.3 FCI Laboratory Reports - Supporting Data  
P07021 / P08144

## 5.0 Requirements

- 5.1 Qualification
 

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

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## 5.2 Material

Housing: High temperature thermoplastic, UL 94V-0 flame retardant.

Contact: Copper Alloy, gold flash over all, lead-free soldering.

Bracket: Stainless Steel.

## 5.3 Finish

Contact pin plating: gold plated on contact area and solder area

Detect pin plating: gold plated on contact area and tin plated on solder area

Bracket: gold flash on solder area

## 5.4 Design and Construction

Connectors shall be of the design, construction, and physical dimensions specified on the applicable product drawing 10067099. There shall be no cracks, burrs, or other physical defects that may impair performance.

## 6.0 Electrical Characteristics

### 6.1 Contact Resistance, Low Level (LLCR)

The low level contact resistance shall not exceed 25 milliohms. Measurements shall be in accordance with EIA 364-23.

The following details shall apply:

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

### 6.2 Insulation Resistance

The insulation resistance of unmated connectors shall not be less than 100M ohms.

Measurements shall be in accordance with EIA 364-21.

The following details shall apply:


- Test Voltage - 500 volts DC.
- Electrification Time - 1 minutes, unless otherwise specified.
- Points of Measurement - Between adjacent contacts.

### 6.3 Dielectric Withstanding Voltage

There shall be no evidence of arc-over, insulation breakdown when connectors are tested in accordance with EIA 364-20.

The following details shall apply:

- Test Voltage - 500 volts (AC RMS, 60Hz).
- Test Duration - 60 seconds.

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c. Points of Measurement - Between adjacent contacts.

#### 6.4 Current Rating

The temperature rise above ambient shall not exceed 30°C at any point in the system when one contact is powered at 10m amperes.

The following details shall apply:

- a. Ambient Conditions – Temperature: 15°C to 35°C  
Air pressure: 86 to 106 k Pa  
Relative humidity: 25% to 85%
- b. Reference - EIA 364-70

### 7.0 Mechanical Characteristics

#### 7.1 Mating/Unmating Force

The force to mate a receptacle connector and T-flash card shall not exceed 30N. The unmating force shall be 1N min. and 30N max.

The following details shall apply:

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

#### 7.2 Durability

The connector pairs shall be capable of withstanding 5000 mating/unmating cycles at the speed rate of

450~550 cycles/hour. Reference EIA-364-09.

#### 7.3 Contact normal force


Apply axial push force on contact area at the speed rate of 1.0mm/minute with nominal deflection of 0.5mm, 0.4N min. per contact.

### 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 1 test sequences. Unless specified otherwise, assemblies shall be mated during exposure.

#### 8.1 Thermal Shock – EIA 364-32.

- a. Number of Cycles - 5

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- b. Temperature Range - Between -55°C and 105°C
  - c. Time at Each Temperature - 30 minutes
  - d. Transfer Time - 5 minutes, maximum
- 8.2 Humidity – EIA 364-31 method III (cyclic temperature)  
 Mate dummy card and connector to the conditions specified on<Figure 1>for 9 cycles. The test specimens shall be exposed to STEP 7a during any 5 of the first 9 cycles. A 10th cycle consisting of only STEP 1 through 6 is then performed, after which the test specimens shall be conditioned at ambient room conditions for 24 hours.
- 8.3 High Temperature Life – EIA 364-17.
  - a. Test Temperature - 85±2 °C
  - b. Test Duration - 120 hours
- 8.4 Salt Spray – EIA-364-26
  - a. Test Condition - 35±2°C, NaCl solution concentration: 5±1%
  - b. Duration - 48 hours
  - c. Acceptance criteria – No damage
- 8.5 Vibration Sinusoidal – EIA 364-28C  
 Mate dummy card and connector to the following vibration conditions, for a period of 2 hours in each of 3 mutually perpendicular axes, passing DC 1mA current during the test. Peak value: 15 G'S,  
 Frequency: 10-2000Hz, 0.4G2/Hz 20 minutes per plane. Discontinuity: 25 micro second max.
- 8.6 Mechanical Shock – EIA 364-27B
  - a. Condition – DC 1mA current during the test  
(100G, 6 millisecond, Half Sine pulse type (e.g. half-sine, sawtooth, etc.)
  - b. Shocks - 6 shocks in both directions along each of three orthogonal axes (18 shocks total)
  - c. Mounting - Rigidly mount assemblies; specify cable length and mounting location if appropriate.
  - d. No discontinuities greater than 25 microseconds or nanoseconds
- 8.7 Solderability – EIA-364-52
  - a. Test Condition: 250±5°C,
  - b. Steam or dry aging - 3±0.5 sec
  - c. Minimum solder coverage: 95 %

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8.8 Resistance to Solder Heat – EIA 364-56

- Test Condition - Reflow profile of Pb-free soldering process as Figure 2 show.
- There shall be no evidence of physical or mechanical damage after 2 reflows

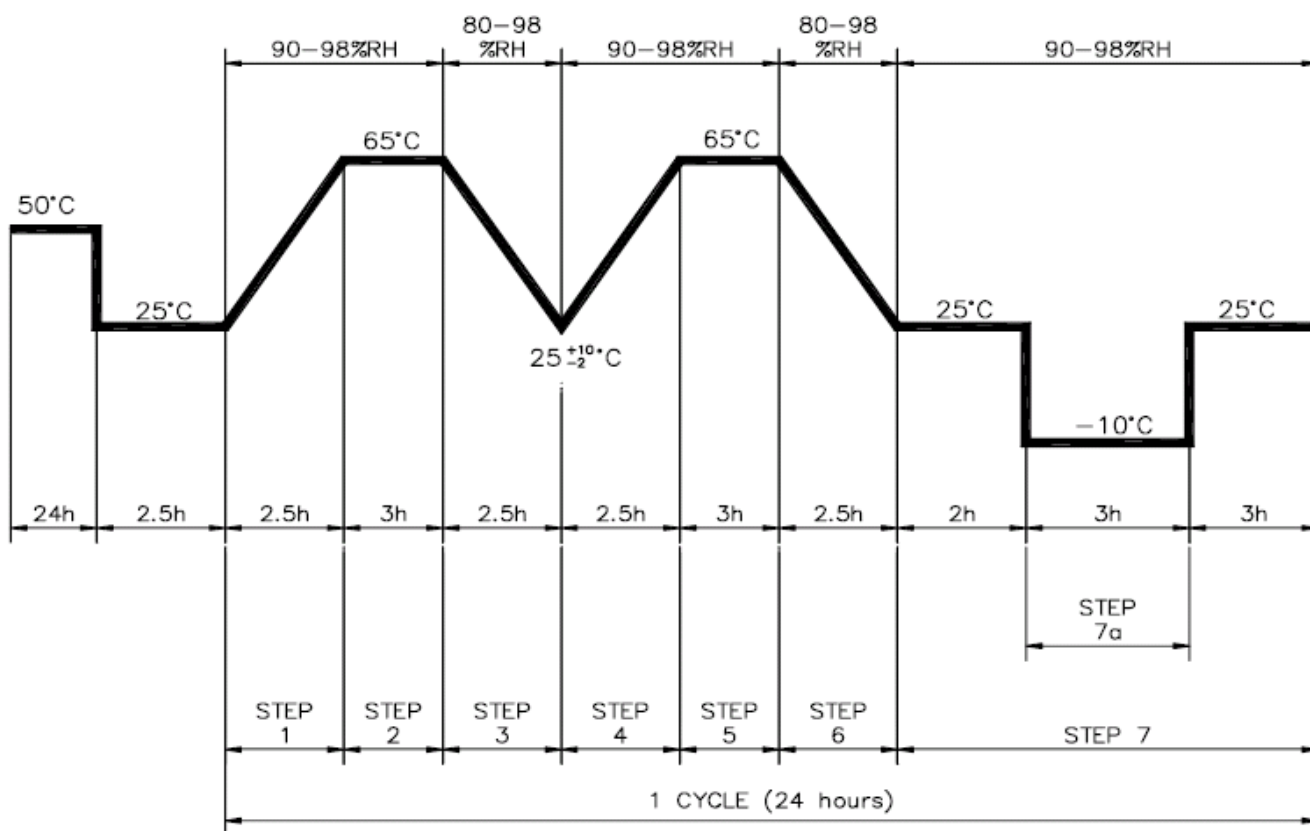



Figure 1 (Cyclic Humidity test conditions)

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<b>Method of heat transfer</b>	a) Forced hot air convection b) Vapour Phase soldering
<b>Preheating conditions</b> Average ramp-up rate in preheating (25°C to T <sub>S</sub> ) Preheat temperature Preheating time (T <sub>S,min</sub> to T <sub>S,max</sub> )	$\Delta T/\Delta t$ : 4K/s max. T <sub>S</sub> : 150 - 200°C t <sub>s</sub> : 60 - 180s
<b>Reflow conditions</b> Average ramp-up Reflow (T <sub>S</sub> to T <sub>P</sub> ) Time above T <sub>L</sub> (T <sub>L</sub> = 217°C) Peak Temperature Time within 5°C of actual peak temp.	$\Delta T/\Delta t$ : 4K/s max. t <sub>L</sub> : 35 - 150s T <sub>P</sub> : max. 255°C t <sub>p</sub> : 10 - 30s
Ramp-down rate	$\Delta T/\Delta t$ : -6K/s max.
Time 25°C to Peak temperature (T <sub>P</sub> )	t <sub>25°C to peak</sub> : 480s max.
Total profile duration (25°C in heating to 100°C in cooling)	t <sub>total</sub> : 540s max.

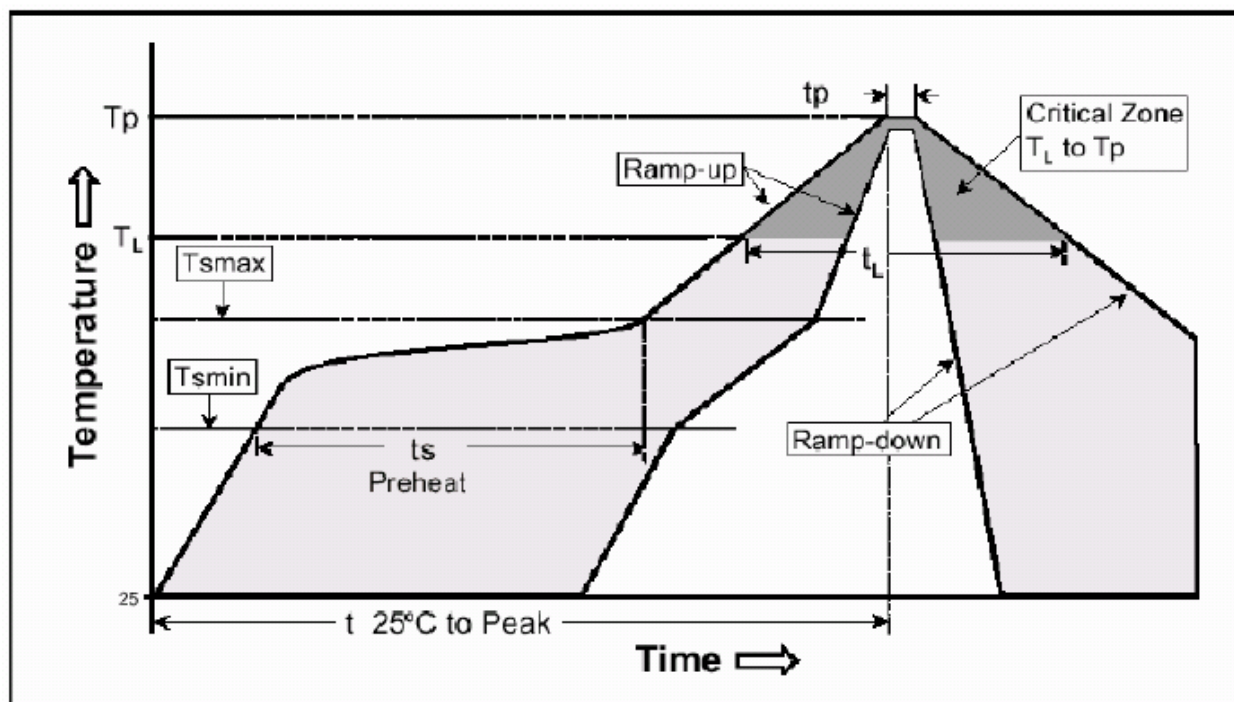



Figure 2 (Resistance to Soldering Heat Reflow profile)

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## 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:

- Temperature: 25 +/- 5 deg C
- Relative Humidity: 30% to 60%
- Barometric Pressure: Local ambient

### 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 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.
- A significant change is made to the manufacturing process which impacts the product form, fit or function.
- A significant event occurs during production or end use requiring corrective action to be taken relative to the product design or manufacturing process.

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#### 9.6 Qualification Test Table and Sample Quantity

Test Items	Ref. Para.	TEST SEQUENCE							
		A	B	C	D	E	F	G	H
Visual Examination		1,8	1,9	1	1	1,9	1,3	1,3	1
LLCR	6.1	2,5	2,6	2,4		4,6			
Insulation Resistance	6.2				2,6				
Dielectric Withstanding Voltage	6.3				3,7				
Mating Force	7.1	6	3,7			2,7			
Unmating Force	7.1	7	4,8			3,8			
Contact Normal Force	7.3								2
Durability	7.2		5						
Mechanical Shock	8.6	3							
Vibration	8.5	4							
Temperature Life	8.3					5			
Cyclic Humidity	8.2				5				
Salt Spray	8.4			3					
Thermal Shock	8.1				4				
Resistance to Solder Heat	8.8						2		
Solderability test	8.7							2	
Sample Quantity		5	5	5	5	5	5	5	5

#### REVISION RECORD

Rev	Page	Description	EC#	Date
A	All	NEW RELEASE	DG07-0098	22-Mar-07
B	All	5.3.4 Change the temperature scope from -40°C ~ +80°C to -40°C ~ +85°C 6.1.2 Change the voltage from 100V to 500V , change the Electrification time from 2 seconds to 1 second 6.1.3 Change the voltage from 100V to 500V	DG07-0333	16-Aug-07
C	All	Updated with new format	ELX-DG-011460-1	25-Apr-12

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