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Environmental Test Specifications for COB Small Pitch LED Displays

COB 小间距 LED 显示屏环境试验技术规范

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Environmental Test Specifications for COB Small Pitch LED Displays

1 Scope

This Standard specifies the general requirements and test methods for the test environment of COB small pitch LED displays.

This Standard is applicable to the reliability test of COB small pitch LED displays under different environmental conditions.

2 Normative References

The following documents are essential to the application of this Document. For the dated documents, only the versions with the dates indicated are applicable to this Document; for the undated documents, only the latest version (including all the amendments) is applicable to this Document.

GB/T 2423.55 Environmental testing for electric and electronic products - Part 2: Test methods - Test Eh: hammer tests

SJ/T 11141-2017 Generic specification for LED displays

SJ/T 11281-2017 Measure methods of light emitting diode (LED) displays

3 Terms and Definitions

For the purposes of this Document, the terms and definitions given in SJ/T 11141-2017 and SJ/T 11281-2017 and the following apply.

3.1 COB chip on board

An integrated packaging method that directly packages an LED light-emitting chip onto a module carrier board.

3.2 Display module

An integrated packaging unit that consists of an LED light-emitting chip pixel array with a resolution of no less than 32×32, a module carrier board, surface packaging materials and a driving circuit.

5.1.1.2 When the sample is not packaged, the temperature in the test chamber is -10 ℃, and the storage time is 48 h.

5.1.1.3 When the sample is packaged, the temperature in the test chamber is -30 ℃, and the storage time is 48 h.

5.1.2 Test method

5.1.2.1 Place the sample in the test chamber; and cool the test chamber at a rate of ≤1 ℃/min (average value of 5 min time). When the temperature stabilizes at ±2 ℃ of the test temperature, start recording the time and store for 48 h.

5.1.2.2 At the end of the test, the sample is restored to 25 ℃ at a rate of ≤1 ℃/min (average value of 5 min) in the test chamber and the temperature is kept constant for 30 min.

5.1.2.3 Take out the sample; check the changes on the outer surface of the sample; and power on to check whether the working state of the sample control card, the display of each primary color, the video playback are abnormal or not, and whether the pixel points are out of control.

5.2 Low temperature operation

5.2.1 Test requirements

5.2.1.1 The temperature in the sample test chamber is -10 ℃. After the temperature is reached, power on and work for 48 h.

5.2.1.2 The sample and the test chamber shall be kept dry, the test chamber shall be kept sealed, and the initial working temperature shall be room temperature.

5.2.2 Test method

5.2.2.1 Place the sample in the test chamber and power on to reach maximum brightness. The test chamber is cooled at a rate of ≤1 ℃/min (average value of 5 min time). When the temperature stabilizes at ±2 ℃ of the test temperature, the time is recorded and the power is turned on for 48 h.

5.2.2.2 During the test, the sample is observed twice every 24 h; with an interval of ≥4 hours. Each time the sample is observed, 20 hot start tests within 3 min shall be completed.

5.2.2.3 At the end of the test, the sample is restored to 25 ℃ in the test chamber at a rate of ≤1 ℃/min (average value of 5 min time) and the temperature is kept constant for 30 min, and the sample is taken out.

5.3 Constant temperature and humidity

5.3.1 Test requirements

5.3.1.1 Temperature 60 ℃ ± 2 ℃, relative humidity 87% ~ 93%, storage for 48 h.

5.3.1.2 The test chamber is kept sealed; the initial working temperature is room temperature; and the volume of the test chamber is at least 5 times the test sample.

5.3.1.3 During the test, condensed water on the top and side walls of the test chamber shall not drip onto the sample; and the sample shall be free of condensation.

5.3.2 Test method

5.3.2.1 Place the sample in the test chamber; support the sample and make sure there is no contact between the sample and the test chamber. The test chamber is heated at a rate of ≤1 ℃/min (average value of 5 min). When the temperature stabilizes at the test temperature, adjust the humidity to the specified value within 1 h; start recording the time, and store for 48 h.

5.3.2.2 At the end of the test, first reduce the relative humidity and adjust it to less than 60% within 2 h; then reduce the temperature again. The sample is restored to 25 ℃ in the test chamber at a rate of ≤1 ℃/min (average value of 5 min) and the temperature is kept constant for 30 min.

5.3.2.3 Take out the sample and check the changes on the outer surface of the sample. After the room temperature is restored for 2 h, power on to check whether the working status of the sample control card, the display of each primary color, the video playback is abnormal or not, and whether the pixel is out of control.

5.4 Wet heat load

5.4.1 Test conditions

5.4.1.1 Temperature at 40 ℃±2 ℃, relative humidity 87%~93%, power on to operate for 48 h.

5.4.1.2 The test chamber is kept sealed; the initial working temperature is room temperature; and the volume of the test chamber is at least 5 times that of the test sample.

5.4.1.3 During the test, condensed water on the top and side walls of the test chamber shall not drip onto the sample; and the sample shall be free of condensation.

5.4.2 Test method

5.4.2.1 Place the sample in the test chamber; support the sample and make sure there is no contact between the sample and the test chamber. Heat the test chamber at a rate of ≤1 ℃/min (average value of 5 min). When the temperature stabilizes at ±2 ℃ of the test temperature, adjust the humidity to the specified value within 1 h; power on to reach the maximum brightness; and start recording the time when the temperature and humidity are both stable at the severe level. Power on and run for 48 h. During the test, observe the working status of the sample at least twice.

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