



TEST REPORT

Report No.: HCO0127/2006
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Date: November 1, 2006

ZIBO MICRO COMMERCIAL COMPONENTS CORP.
ZHANG LIU ROAD, ZHANGDIAN DISTRICT,
ZIBO, SHANDONG, P.R. CHINA

The following merchandise was submitted and identified by the vendor as:

Product Description: Epoxy Encapsulated Electronic Devices
Style/Item No.: SOD-123 / No.1~No.11
Manufacturer / Vendor: Zibo Micro Commercial Components Corp.
Country of Origin: China
Quantity: Total 11 pieces
Note: (Client's declaration) The materials used for SMA, SMAL, SMAE, SMAG, SMB, SMBG, SMC, SMCG, HSMA, HSMB, HSMBG, HSMC, HSMCG, MELF, MINIMELF, D-PACK, D2-PACK, RA Button, SRA Button, SOD-723, SOD-523, SOD-323, SOD-123, SOT-363, SOT-563, SOT-223, SOT-323, SOT-523, SOT-353, SOT-23, SOT-343, SOT-23-3L, SOT-89, Powerlite-123 are similar.

We have tested the submitted sample(s) as requested and the following results were obtained:

Test Required: (According to client's test specification, please see following sheets in detail.)
Moisture / Reflow Sensitivity

Test Object: The test purpose is to identify the specimen that are sensitive to moisture-induced stress so that they can properly packaged, stored, and handled to avoid subsequent mechanical damage during the assembly solder reflow attachment and/or repair operation.

Test Results : -PLEASE SEE ATTACHED SHEETS-

Terence Hsieh
Asst. Manager

Moisture / Reflow Sensitivity:

Test Equipment:

Name	Brand	Model	Serial No.
Anaerobic Oven	KSON	NHC-200	3967
Triple Type Temperature & Humidity Chamber	GIANT FORCE	GTH-162TR-SP	MAA0605-012
Air-Solder Reflow System	ETC	AIS-20-62C-RLN	2942-0406
C-Mode Scanning Acoustic Microscope System	Sonoscan	D9000	2521

Lab Environmental Conditions:

Ambient temperature: 25±3°C

Relative humidity: 55±20%RH

Test Method/ Specification:

Test method: Reference to IPC/JEDEC J-STD-020C

Test procedure: The test sequence is shown as below,

Test Action / Item	Test Sequence
Initial Inspection	1
Bake	2
Moisture Soak	3
Reflow	4
Final External Visual	5

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Test Method / Specification--Continued:

1. Initial Inspection:

Test method: Perform an external visual, on all components, to establish a baseline for the cracking/delamination criteria.

2. Bake:

Test method: Bake the sample for 24 hours minimum at 125 +5/-0°C. This step is intended to remove moisture from the package so that it will be “dry.”

3. Moisture Soak:

Test method: Place devices in a clean, dry, shallow container so that the package bodies do not touch or overlap each other. Submit each sample to the appropriate soak requirements shown below item marked “●”.

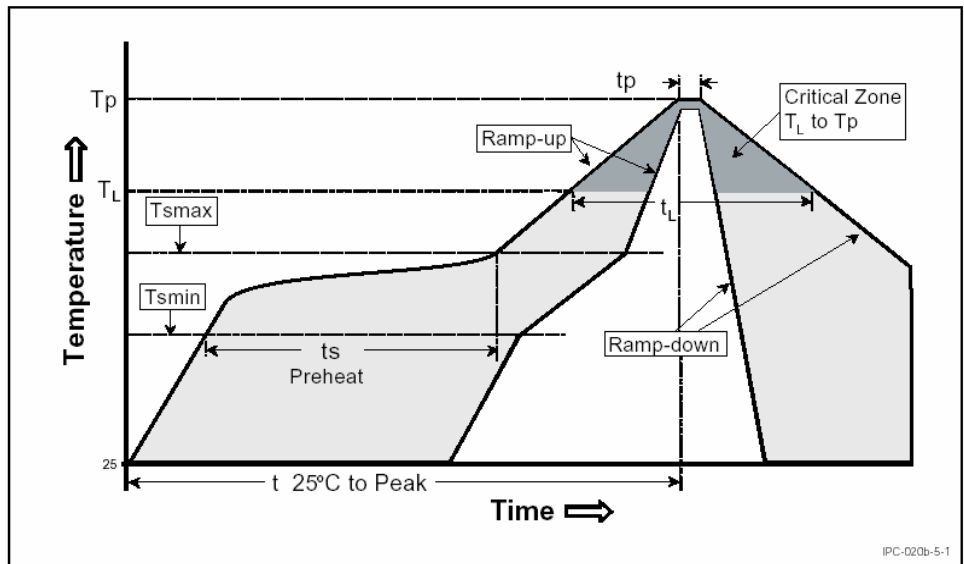
Level Select	Floor Life		Soak Requirement			
	Time	Condition	Standard		Accelerated Equivalent	
			Time (hour)	Conditions	Time (hour)	Conditions
● 1	Unlimited	≤ 30°C/85%RH	168 +5/-0	85°C/85%RH	-	-
2	1 year	≤ 30°C/60%RH	168 +5/-0	85°C/60%RH	-	-
2a	4 weeks	≤ 30°C/60%RH	696 +5/-0	30°C/60%RH	120 +1/-0	60°C/60%RH
3	168 hours	≤ 30°C/60%RH	192 +5/-0	30°C/60%RH	40 +1/-0	60°C/60%RH
4	72 hours	≤ 30°C/60%RH	96 +2/-0	30°C/60%RH	20 +0.5/-0	60°C/60%RH
5	48 hours	≤ 30°C/60%RH	72 +2/-0	30°C/60%RH	15 +0.5/-0	60°C/60%RH
5a	24 hours	≤ 30°C/60%RH	48 +2/-0	30°C/60%RH	10 +0.5/-0	60°C/60%RH
6	Time on Label	≤ 30°C/60%RH	TOL	30°C/60%RH	-	-
Note	Accelerated equivalent method is used for soak requirement.					

Test Method / Specification--Continued:

4. Reflow:

Test method:

Not sooner than 15 minutes and not longer than 4 hours after removal from the temperature/humidity chamber, subject the sample to 3 cycles of the appropriate reflow conditions as defined in below Figure and Table. The time between reflows shall be 5 minutes minimum and 60 minutes maximum.



Test Method/ Specification--Continued:

5. Reflow--Continued:

Test Condition Selected (see the item marked "●")	Package Thickness	Volume mm ³ < 350	Volume mm ³ 350 - 2000	Volume mm ³ > 2000
	< 1.6 mm	● 260°C	260°C	260°C
	1.6 mm - 2.5 mm	260°C	250°C	245°C
	> 2.5 mm	250°C	245°C	245°C
Profile Feature	Pb-Free Assembly			
Average ramp-up rate (T _L to T _p)	3°C/second max.			
Preheat				
- Temperature Min (T _{Smin})	150°C			
- Temperature Max (T _{Smax})	200°C			
- Time (min to max) (t _s)	60-180 seconds			
T _{Smax} to T _L	3°C/second max.			
Time maintained above:				
- Temperature (T _L)	217°C			
- Time (t _L)	60-150 seconds			
Peak Temperature (T _p)	(see test condition marked "●")			
Time within 5°C of actual Peak Temperature (t _p)	20-40 seconds			
Ramp-down Rate	6°C/second max.			
Time 25°C to Peak Temperature	8 minutes max.			

6. Final External Visual:

Test method: Examine the devices visually and using an optical microscope (40X) to look for external cracks.

Specimen:

Style/Item No.: SOD-123 / No.1~ No.11

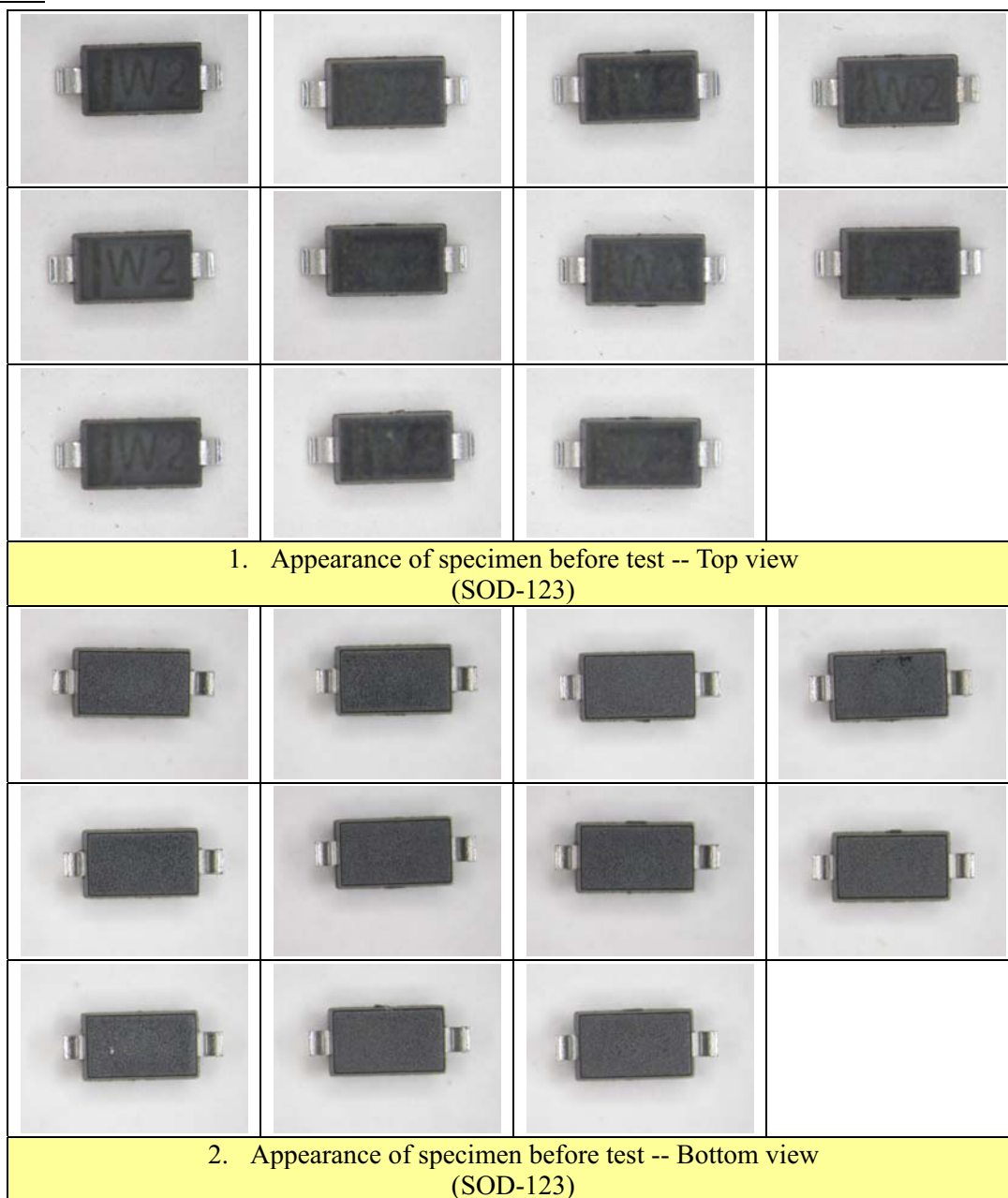
Quantity: Total 11 piece(s)

Test Result:


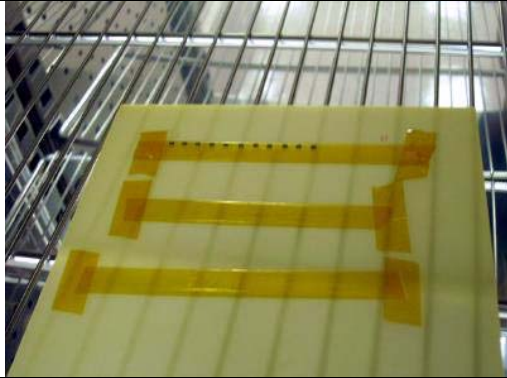



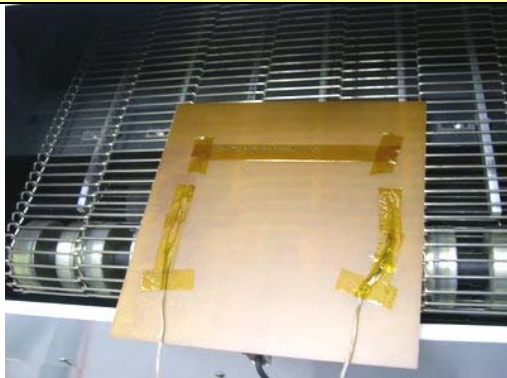
1. Examination of Product: (Appearance Check)

Style/Item No.	Check Item	Initial Inspection	Final External Visual
		Any visible defect be found?	Any external defect be found?
SOD-123 / No.1		No	No
SOD-123 / No.2		No	No
SOD-123 / No.3		No	No
SOD-123 / No.4		No	No
SOD-123 / No.5		No	No
SOD-123 / No.6		No	No
SOD-123 / No.7		No	No
SOD-123 / No.8		No	No
SOD-123 / No.9		No	No
SOD-123 / No.10		No	No
SOD-123 / No.11		No	No

Test Photos:



Test Photos-- Continued:

	
<p>4. Moisture/ Reflow Sensitivity--Bake</p>	<p>5. Moisture/ Reflow Sensitivity--Bake</p>
	
<p>6. Moisture/ Reflow Sensitivity--Moisture Soak</p>	<p>7. Moisture/ Reflow Sensitivity--Moisture Soak</p>
	
<p>8. Moisture/ Reflow Sensitivity--Reflow</p>	<p>9. Moisture/ Reflow Sensitivity--Reflow</p>

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Test Photos-- Continued:

