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ESD Characterization Report for **NRC**

Job No :	80013
Customer :	Brent Carlson NRC
Author :	Joanne Woodward Jack
Date :	May 9, 2008
Request :	Characterize the Human Body Model ESD sensitivity of the EVLA

1. Purpose

The purpose of the assessment is to characterize Human Body Model ESD sensitivity of the EVLA device.

2. Results summary

One device was stressed at each of 1000, 2000 and 4000 V. Three devices were stressed at 8000 V Human Body Model with no degradation observed.

3. Test method

3.1. Equipment

Keytek Zapmaster 7/4

3.2. ESD test method

Samples were stressed using the pin combinations specified in Table 1, applying 1 positive pulse and 1 negative pulse for each pin combination according to Jedec ESD22-A114-E.

Note: the ESD simulator has 256 channels. To test the complete device, the device was mapped into 4 orientations. Care was taken to ensure all pins were zapped and no pin was stressed more than once.

Pin combinations	Pins zapped	Pins connected to ground	Floating pins (unconnected)
1	All accessible pins except VSS	VSS	All pins except the pin under test and VSS pins
2	All accessible pins except VSSPST	VSSPST	All pins except the pin under test and VSSPST pins
3	All accessible pins except DVSS_PLL	DVSS_PLL	All pins except the pin under test and DVSS_PLL pins
4	All accessible pins except AHVSSG	AHVSSG	All pins except the pin under test and AHVSSG pins
5	All accessible pins except AHVSS	AHVSS	All pins except the pin under test and AHVSS pins
6	All accessible pins except VDD	VDD	All pins except the pin under test and VDD pins
7	All accessible pins except VCC	VCC	All pins except the pin under test and VCC pins
8	All accessible pins except DVDD_PLL	DVDD_PLL	All pins except the pin under test and DVDD_PLL pins
9	All accessible pins except AHVDDG	AHVDDG	All pins except the pin under test and AHVDDG pins
10	All accessible pins except AHVDD	AHVDD	All pins except the pin under test and AHVDD pins
11	All accessible IOPins	Accessible IOPins	All accessible IOPins individually

Table 2. Test pin combinations

3.3. Curve-trace conditions

Each unit was curve-traced before and after ESD stress. For device 30, curve-tracing was done on all pins after each zap.

Pin type	Voltage range (full scale)	Current range (full scale)	Pins states	Envelope (% of full scale)
Iopins	± 1.2 V	100 µA	Ground ALL VDD ALL VSS	10 %
ALL VDD	± 1.2 V	100 µA	Ground ALL VSS	10 %
ALL VSS	± 1.2 V	100 µA	Ground ALL VDD	10 %

Table 3. Curve trace conditions

4. Test samples identification

Reference	80013
Brand	CA2048CL-F672C256-A WIDAR Correlator iSine, Inc. N63944.12 0810 USA Devices 1-6
Package type	672 BGA



5. Results

*Curvetraces shown in appendix

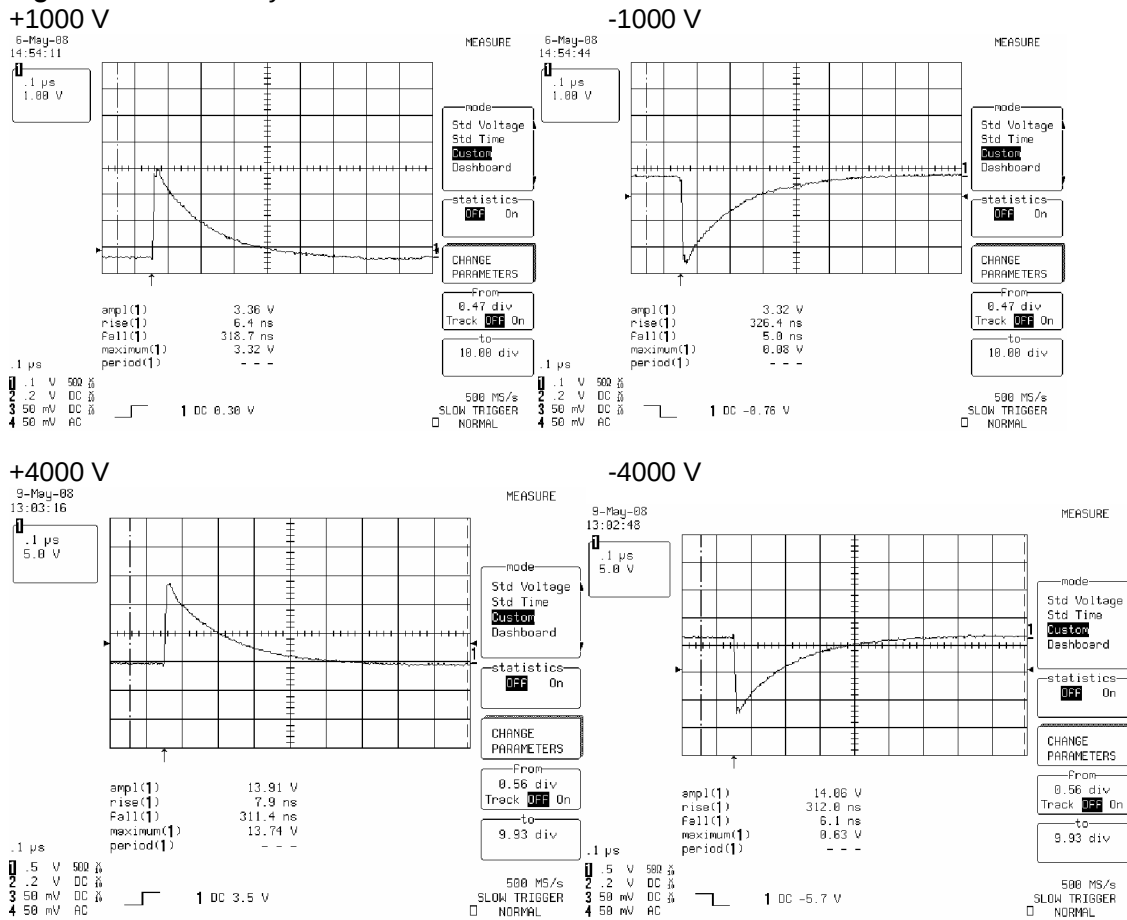
Voltage	Device no.	Curve-trace failures due to ESD	Stand-alone tester result	Comments
1000	1	0	PASS	
2000	2	0	PASS	
4000	3	0	PASS	
8000	4	0	PASS	
8000	5	0	PASS	
8000	6	0	PASS	

6. Conclusion

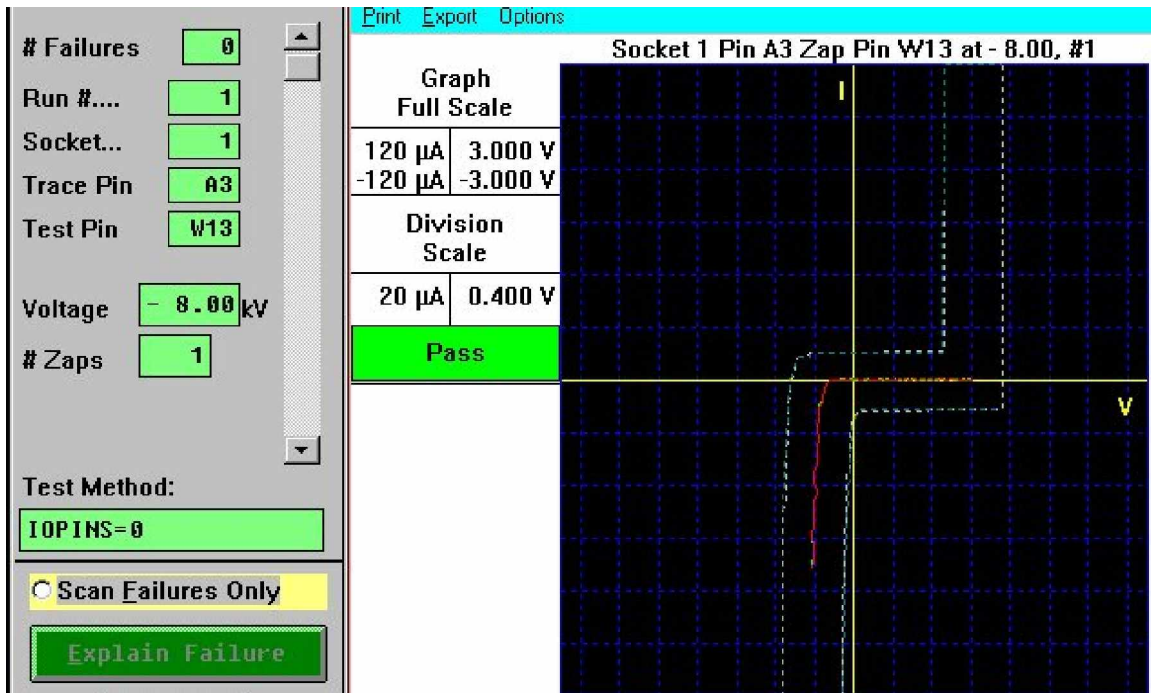
Under the conditions stated in this report, the EVLA device has a Human Body Model threshold of greater than 8000 V.

7. Appendix

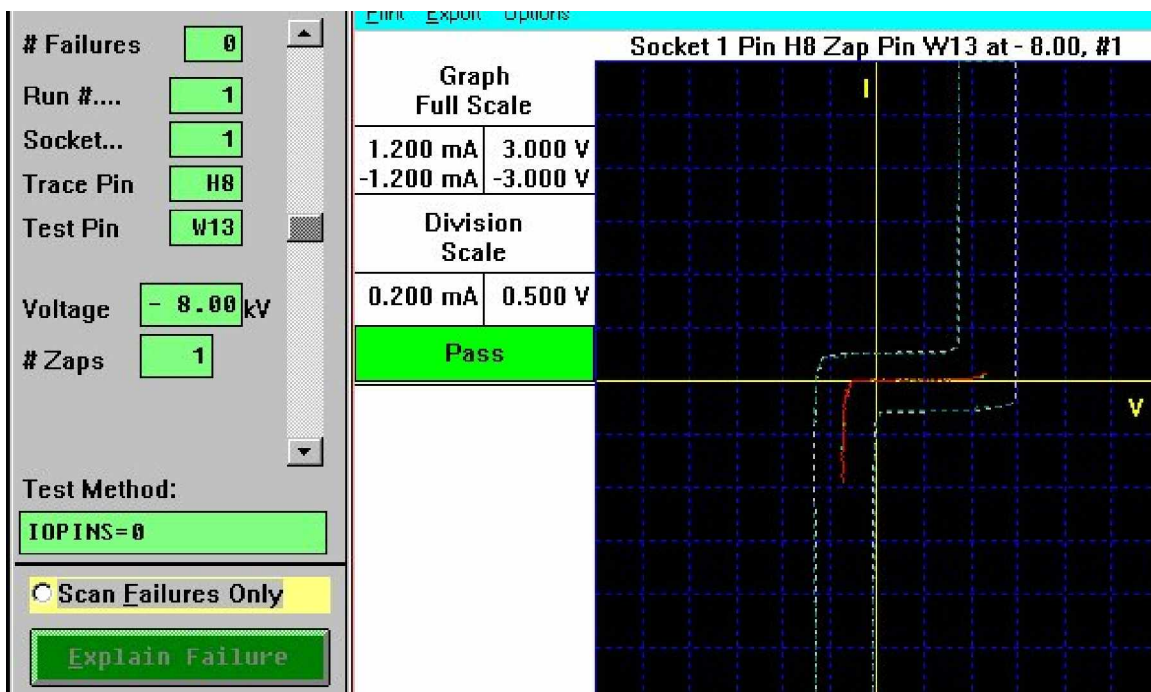
Figure 1. Human Body Model waveform taken in a standard DIP socket.



Curve-traces of representative pins (green is before zap, red is after zap, white is 10% envelope)



Device 6 pin A3 SENSEOUT_pad after all stressing at 8kV – there is no failure so the post-zap trace is superimposed on the pre-zap trace.



Device 6 pin H8 2.5 VCC after all stressing at 8kV – there is no failure so the post-zap trace is superimposed on the pre-zap trace.