Fully Buffered and DDR3 DIMM Soldertail Sockets

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the Tyco Electronics Fully Buffered and DDR3 Dual In-Line Memory Module (DIMM) Soldertail Socket.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 1 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

1.3. Qualification Test Results

Successful qualification testing on the subject product line was completed on 09Feb05. The Qualification Test Report number for this testing is 501-601. This documentation is on file at and available from Engineering Practices and Standards (EPS).

2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the latest edition of the document applies. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

2.1. Tyco Electronics Document

501-601: Qualification Test Report (Fully Buffered and DDR3 DIMM Soldertail Sockets)

2.2. Industry Standard

EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications

| 2.3. Reference Document

109-197: Test Specification (AMP Test Specifications vs EIA and IEC Test Methods)

3. REQUIREMENTS

3.1. Design and Construction

Product shall be of the design, construction and physical dimensions specified on the applicable product drawing.

3.2. Materials

Materials used in the construction of this product shall be as specified on the applicable product drawing.

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3.3. Ratings

- Voltage: 25 volts AC
- Current: Signal application only
- Temperature: -55 to 105°C

3.4. Performance and Test Description

Product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1. Unless otherwise specified, all tests shall be performed at ambient environmental conditions per EIA-364.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Initial examination of product.	Meets requirements of product drawing.	EIA-364-18. Visual and dimensional (C of C) inspection per product drawing.
Final examination of product.	Meets visual requirements.	EIA-364-18. Visual inspection.
	ELECTRICAL	
Low level contact resistance.	30 milliohms maximum initial. ΔR 10 milliohms maximum.	EIA-364-23. Subject specimens mated with bussed module boards to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage. See Figure 3.
Insulation resistance.	1000 megohms minimum.	EIA-364-21. Test between adjacent contacts of unmated specimens.
Withstanding voltage.	One minute hold with no breakdown or flashover.	EIA-364-20, Condition I. 500 volts AC at sea level. Test between adjacent contacts of unmated specimens.
Current carrying capacity.	Less than 30°C temperature rise.	EIA 364-70. Connect 10 consecutive contacts on 1 side of the specimen in series and load with .5 ampere. Place a thermocouple through a small hole in the housing as close to the contact as possible.
	MECHANICAL	
Reseating.	See Note.	Manually unplug and plug module card 3 times.
Solderability, tin-lead.	Solderable area shall have a minimum of 95% solder coverage.	EIA-364-52, Class 1, Category 3. Subject contacts to solderability.

Figure 1 (continued)

Test Description	Requirement	Procedure
Solderability, lead free (when applicable).	95% coverage. No physical damage; contact gap within manufacturer's tolerance.	EIA-364-52, Class 1, Category 3. 30 second exposure at 190˚C oven. Processing criteria: solder 260 ± 5˚C for 5 seconds.
Vibration, random.	See Note.	EIA-364-28. Module weight 90 ± 5g for Fully Buffered DIMM and 35 ± 5g for DDR3 DIMM with the center of gravity 22 mm [.9 in] from the module mating edge. Duration: 10 minutes per axis for all 3 axes on all samples. Frequency Range: 5 to 500 Hz. 5 to 20 Hz (slope): (0.01g^2/Hz) at 5 Hz, (0.02g^2/Hz) at 20 Hz; 20 to 500 Hz (flat): (0.02g^2/Hz) at 20 Hz; Input acceleration is 3.13 g RMS; Random control limit tolerance: ± 3 dB. See Figure 4.
Mechanical shock.	See Note.	EIA-364-27. Module weight 90 ± 5g for Fully Buffered DIMM and 35 ± 5g for DDR3 DIMM with the center of gravity 22 mm [.9 in] from the module mating edge. Profile: Trapezoidal shock of 50 g ± 10% Duration: 10 ms Minimum Velocity change: 170 inches/sec ± 10%. Quantity: Three drops in each of 6 directions. See Figure 4.
Durability.	Rating of 25 cycles as determined by EIA-TS-364-1000.1. See Note.	EIA-364-9. Mate and unmate specimens for 20 cycles at a maximum rate of 500 cycles per hour. Use the same board for the 1st and 20th cycles and subsequent tests. Use a separate board for the 2nd through the 19th cycles.
Mating force (test group 5).	< 106.75 N [24 lbf].	EIA-364-05. Measure force necessary to mate specimens with a 1.37 mm [.054 in] steel gage at a maximum rate of 5 mm [.2 in] per minute. See Figure 5.

Figure 1 (continued)

Test Description	Requirement	Procedure
Mating force (test group 12).	< 98.7 N [22 lbf].	Use a 1.27 mm [.050 in] steel gage at a maximum rate of 5 mm [.2 in] per minute. See Figure 5.
Wrong card insertion.	> 222.4 N [50 lbf]. Applies only to fully buffered DIMM product.	EIA-364-5. Measure force necessary to mate specimens with a DDR2 module card with a FB-DIMM key location.
Latch opening force.	32.4 N [7.3 lbf] maximum per ejector. See Note.	EIA-364-13. Measure force necessary to unmate specimens from a 1.4 mm [.054 in] steel gage at a maximum rate of 5 mm [.2 in] per minute. See Figure 5.
Unmating force per pin pair.	0.14 N [14 gf] minimum.	EIA-364-13. With both latches removed, measure force necessary to unmate specimens from a nominal (1.27 mm [.5 in]) module card at a maximum rate of 5 mm [.2 in] per minute.
Contact retention.	3 N [300 gf] minimum per pin. No movement of contact more than 0.38 mm [.015 in].	EIA-364-29.
Fork lock retention (where applicable).	13.3 N [3 lbf] minimum per fork lock. Maximum movement of 0.38 mm [.015 in].	EIA-364-29.
Connector insertion force into PCB.	< 33.21 N [7.47 lbf] per fork lock.	Press socket onto board at a rate of 5 mm [.2 in] per minute. Measure force at nominal fork lock hole diameter 2.45 mm [.097 in].
Maximum force on connector.	Less than 0.076 mm [0.003 in] movement.	Apply 68.1 kg [150 lb] to the top of a 1.37 mm [.054 in] steel gage after the gage has been fully seated and is bottomed out. Maintain force for 30 seconds. See Figure 5.
Contact backout wipe.	No discontinuity.	Fully seat daisy chain module. Pull module upward until stopped by latches while monitoring for discontinuities.
	ENVIRONMENTAL	
Solvent resistance.	See Note.	EIA 364-11.
Thermal shock.	See Note.	EIA-364-32, Test Condition I. Subject specimens to 10 cycles between -55 and 85˚C.

Figure 1 (continued)

Test Description	Requirement	Procedure
Humidity-temperature cycling.	See Note.	EIA-364-31, Method III. Subject specimens to 24 cycles (3 days) between 25°C at 80% RH and 65°C at 50% RH. Ramp times shall be .5 hour with 1 hour dwell time.
Temperature life.	See Note.	EIA-364-17, Method A, Test Condition 4. Subject mated specimens to 105°C for 240 hours.
Mixed flowing gas, 30 microinch minimum gold plating.	See Note.	EIA-364-65, Class IIA (4 gas). Three specimens unmated for 5 days, mated for 5 days. Three specimens mated for 10 days.
Mixed flowing gas, 15 microinch minimum gold plating.	See Note.	EIA-364-65, Class IIA (4 gas). Three specimens mated for 10 days.
Thermal disturbance.	See Note.	Subject mated specimens to 10 cycles between 15 ± 3°C and 85 ± 3°C as measured on the part. Ramps shall be a minimum of 2°C per minute. Dwell times shall ensure that the contacts reach the temperature extreme (5 minutes minimum). Humidity not controlled.

NOTE

Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence shown in Figure 2.

Figure 1 (end)

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)												
	1	2	3	4	5	6	7	8	9	10	11	12	13
	Test Sequence (b)												
Initial examination of product	1	1	1	1	1	1	1	1	1	1	1	1	1
Low level contact resistance	2,6,8	2,7,9,13	2,4,7	2,5,7,9,11									2,5,7,9,11
Insulation resistance		3,10											
Withstanding voltage		4,11											
Current carrying capacity									2				
Reseating	7	12		10									10
Solderability						2(c)							
Vibration, random			5										
Mechanical shock			6										
Durability	4(d)	5(d)	3	3(d)									3(d)
Mating force					2							2	
Wrong card insertion								2					
Latch opening force					3								
Unmating force per pin pair										3			
Contact retention							3						
Fork lock retention (where applicable)							2						
Connector insertion force into PCB										2			
Maximum force on connector					4								
Contact backout wipe	3												
Solvent resistance											2		
Thermal shock		6											
Humidity-temperature cycling		8											
Temperature life	5			4(e)									4(e)
Mixed flowing gas				6(f)									6(g)
Thermal disturbance				8									8
Final examination of product	9	14	8	12	5	3	4		3	4	3	3	12

NOTE

(a) See paragraph 4.1.A.
(b) Numbers indicate sequence in which tests are performed.
(c) Test to both tin-lead and lead free methods.
(d) Durability preconditioning only 5 cycles required same card, all cycles.
(e) Temperature life preconditioning, 120 hour duration.
(f) Three specimens unmated for 5 days, mated for 5 days. Three specimens mated for 10 days.
(g) Three specimens mated for 10 days.

Figure 2

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. Test groups 1, 2, 5, 7, 8, 9 and 10 shall each consist of 5 specimens. Test groups 3 and 4 shall each consist of 6 specimens. Test group 6 shall consist of 10 specimens. Test group 11 shall consist of 4 specimens. Test group 12 shall consist of 12 specimens. Test group 13 shall consist of 3 specimens.

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 2.

4.2. Requalification Testing

If changes significantly affecting form, fit or function are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

4.3. Acceptance

Acceptance is based on verification that the product meets the requirements of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

4.4. Quality Conformance Inspection

The applicable quality inspection plan shall specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.

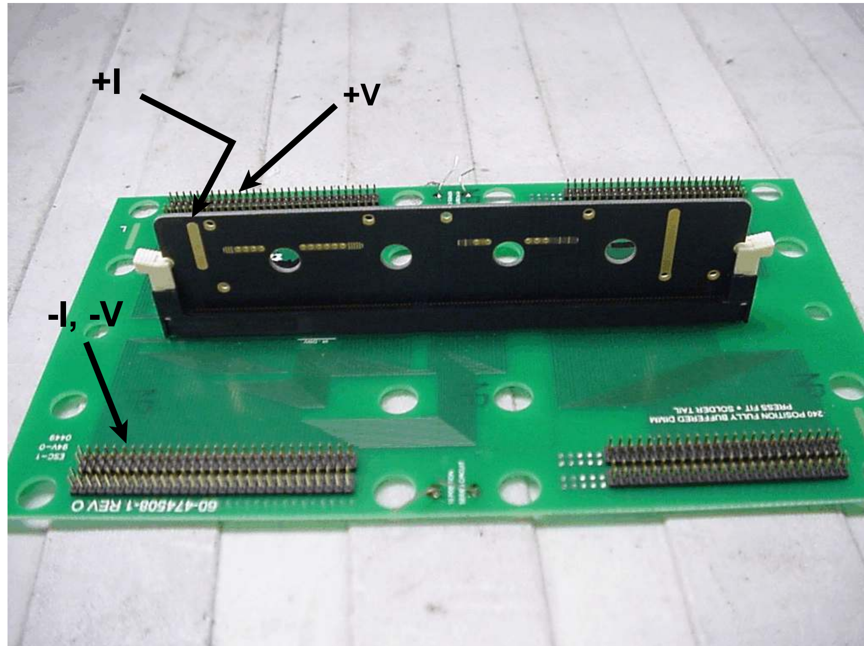


Figure 3
Low Level Contact Resistance

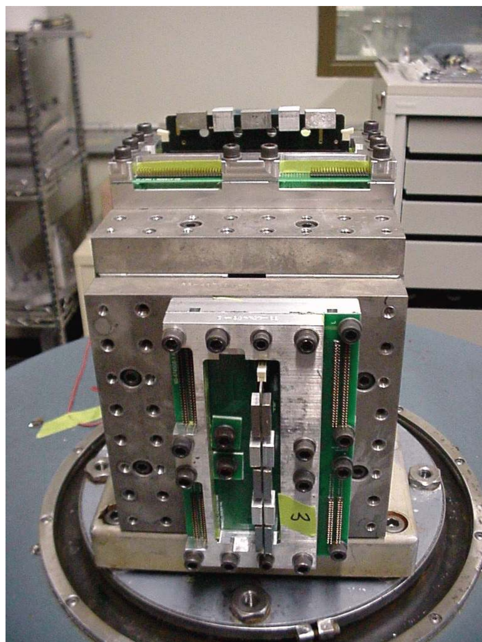
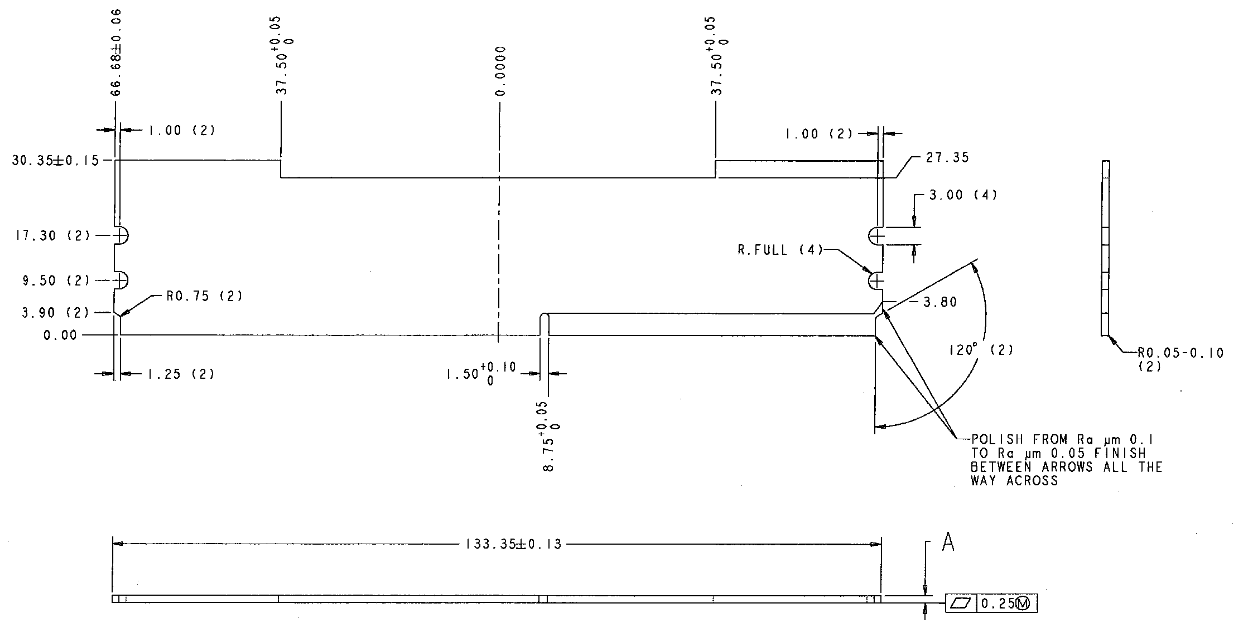


Figure 4
Vibration and Mechanical Shock



NOTE

1. *Material 100-99 AISI A2.*
2. *Heat treat 111-99 Rc 60-62*

Drawing Number	Description	"A" Dimension
39-152462-100-3	Maximum Card	1.37 +0.013/-0.000 mm
39-152462-100-4	Nominal Card	1.27 +0.013/-0.000 mm

Figure 5
Fully Buffered DIMM Steel Insertion Gages