
DDR2 Solder Tail DIMM Socket, Standard and Low Profile

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the Tyco Electronics 240 position Standard and Low Profile Dual In-Line Memory Module (DIMM™) sockets used to connect a DIMM module to a motherboard.

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 for the Standard product was completed on 23Feb05, successful qualification testing for the Low Profile product was completed on 06Sep06. The Qualification Test Report number for this testing is 501-605. 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 Documents

- 109-197: Test Specification (AMP Test Specifications vs EIA and IEC Test Methods)
- 114-13087: Application Specification (Dual In-Line Memory Module (DIMM) Sockets-DDR2-Solder Tail)
- 501-605: Qualification Test Report (DDR2 Solder Tail DIMM Socket, Standard and Low Profile)

2.2. Industry Standards

- EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications
- Intel 240 Pin DDR2 Memory Connector Specification

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.

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. $\Delta R \pm 20$ 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.	1 megohm minimum.	EIA-364-21. Test between adjacent contacts of unmated specimens.
Withstanding voltage.	1 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 0.5 ampere. Place a thermocouple through a small hole in the housing as close to the contact as possible.
Signal loop inductance (L11).	2.5 nH minimum, 3.5 nH maximum at 266, 333 and 400 MHz.	Intel 240 Pin DDR2 Memory Connector Specification.
Signal to ground capacitance (C11).	0.3 pF minimum, 0.6 pF maximum at 266, 333 and 400 MHz.	Intel 240 Pin DDR2 Memory Connector Specification.
Mutual inductance between adjacent signals (L12).	0.9 nH maximum at 266, 333 and 400 MHz.	Intel 240 Pin DDR2 Memory Connector Specification.

Figure 1 (continued)

Test Description	Requirement	Procedure
Coupling capacitance between adjacent signals (C12).	0.3 pF maximum at 266, 333 and 400 MHz.	Intel 240 Pin DDR2 Memory Connector Specification.
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. Processing criteria: solder 245 ± 5° C for 5 seconds.
Solderability, lead free (when applicable).	95% coverage. No physical damage; contact gap within manufacturer's tolerance.	EIA 364-52, Class 1, Category 3. One, 30 second exposure at 190° C oven. Processing criteria: solder 260 ± 5° C for 5 seconds.
Vibration, random (standard product).	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-28. Module weight 35 ± 5 g with the center of gravity 20 to 25 mm 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 20Hz (slope): (0.01g ² /Hz) at 5 Hz, (0.02g ² /Hz) at 20 Hz; 20 to 500Hz (flat): (0.02g ² /Hz) at 20 Hz; Input acceleration is 3.13 g RMS; Random control limit tolerance: ± 3 dB. See Figure 4.
Vibration, random (low profile product).	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-28. Module weight 11.5 g with the center of gravity 11 mm 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 20Hz (slope): (0.01g ² /Hz) at 5 Hz, (0.02g ² /Hz) at 20 Hz; 20 to 500Hz (flat): (0.02g ² /Hz) at 20 Hz; Input acceleration is 3.13 g RMS; Random control limit tolerance: ± 3 dB. See Figure 4.

Figure 1 (continued)

Test Description	Requirement	Procedure
Mechanical shock (standard product).	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-27. Module weight 35 ± 5 g with the center of gravity 20 to 25 mm 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 six directions, applied to three sample boards. See Figure 4.
Mechanical shock (low profile product).	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-27. Module weight 11.5 g with the center of gravity 11 mm 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 six directions, applied to three sample boards. 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 1 st and 20 th cycles and subsequent tests. Use a separate board for the 2 nd through 19 th cycles.
Mating force.	Total force less than 106.75 N [24 lbf] with latches.	EIA-364-05. Measure force necessary to mate specimens with a 1.37 mm steel gage at a maximum rate of 5 mm [.2 in] per minute. Machined dummy modules are acceptable; all edge radii's .005 inch maximum. See Figure 5.
Unmating force.	38.25 N [8.6 lbf] maximum per ejector. See Note.	EIA-364-13. Measure force necessary to unmate specimens from a 1.37 mm steel gage at a maximum rate of 5 mm [.2 in] per minute. See Figure 5.

Figure 1 (continued)

Test Description	Requirement	Procedure
Unmating force per contact 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) module card at a maximum rate of 5 mm [.2 in] per minute.
Contact retention.	2.94 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.	< 50.7 N [11.4 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 [.1 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 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 mated specimens to 10 cycles between -55 and 85°C.
Humidity-temperature cycling.	See Note.	EIA-364-31, Method III. Subject mated 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, Test Time Condition C. Subject mated specimens to 105°C for 240 hours.
Mixed flowing gas.	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. Store module cards at laboratory ambient during unmated exposure.

Figure 1 (continued)

Test Description	Requirement	Procedure
Thermal disturbance.	See Note.	Subject mated specimens to 10 cycles between $15 \pm 3^{\circ}\text{C}$ and $85 \pm 3^{\circ}\text{C}$ as measured on the part. Ramps shall be a minimum of 1°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
	Test Sequence (b)										
Initial examination of product	1	1	1	1	1	1	1	1	1	1	1
Low level contact resistance	2,6,8	2,7,9,13	2,4,6,8	2,5,7,9,11							
Insulation resistance		3,10									
Withstanding voltage		4,11									
Current carrying capacity									2		
Signal loop inductance (L11)								2			
Signal to ground capacitance (C11)								4			
Mutual inductance between adjacent signals (L12)								3			
Coupling capacitance between adjacent signals (C12)								5			
Reseating	7	12		10							
Solderability (per plating type)						2					
Vibration, random			5								
Mechanical shock			7								
Durability	4(c)	5(c)	3	3(c)							
Mating force					2						
Unmating force					3						
Unmating force per contact pair										3	
Contact retention							3				
Fork lock retention							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(d)							
Mixed flowing gas				6(e)							
Thermal disturbance				8							
Final examination of product	9	14	9	12	5	3	4	6	3	4	3

- NOTE**
- (a) See paragraph 4.1.A.
 - (b) Numbers indicate sequence in which tests are performed.
 - (c) Durability preconditioning only 5 cycles required same card, all cycles.
 - (d) Temperature life preconditioning, 120 hour duration.
 - (e) Store module cards at laboratory ambient during unmated exposure.

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, 9 and 10 shall each consist of 5 specimens. Test groups 3 and 4 shall each consist of 6 specimens. Test group 8 shall consist of 2 specimens. Test group 6 shall consist of 10 specimens. Test group 11 shall consist of 4 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.

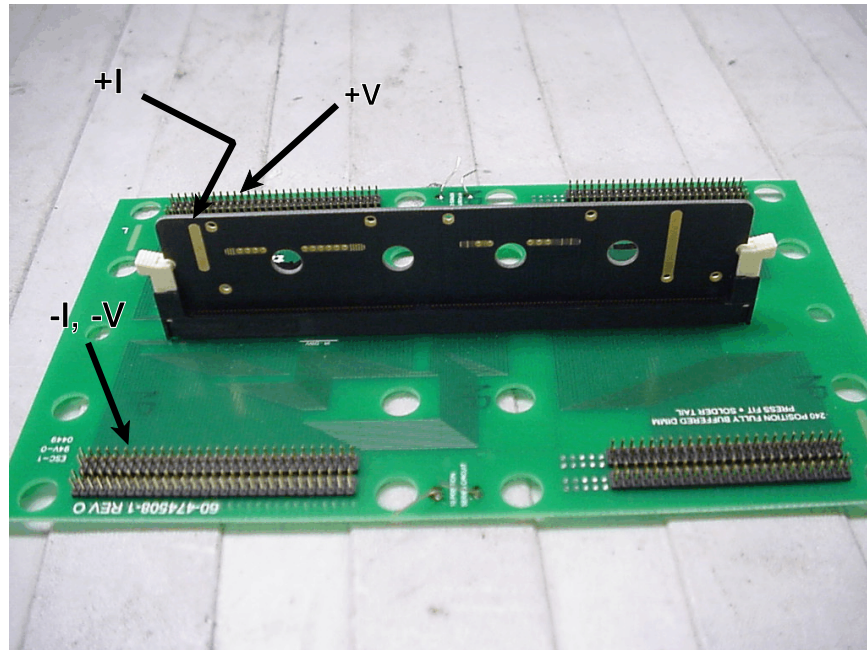


Figure 3
Low Level Contact Resistance Measurement Points

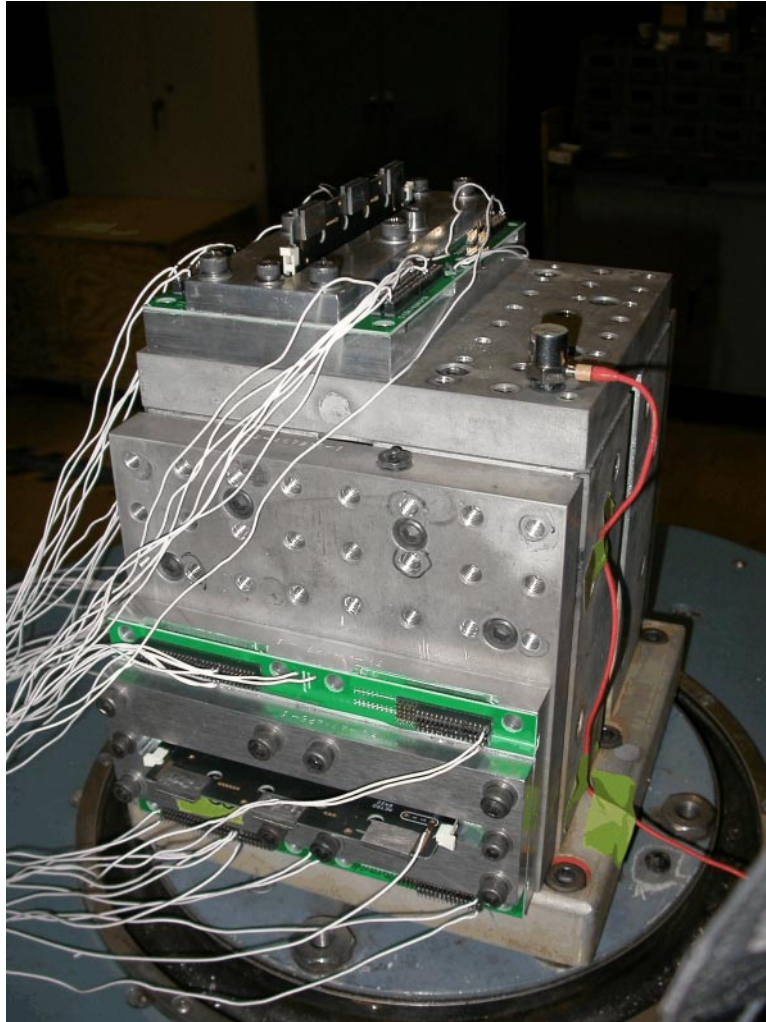


Figure 4
Vibration and Mechanical Shock

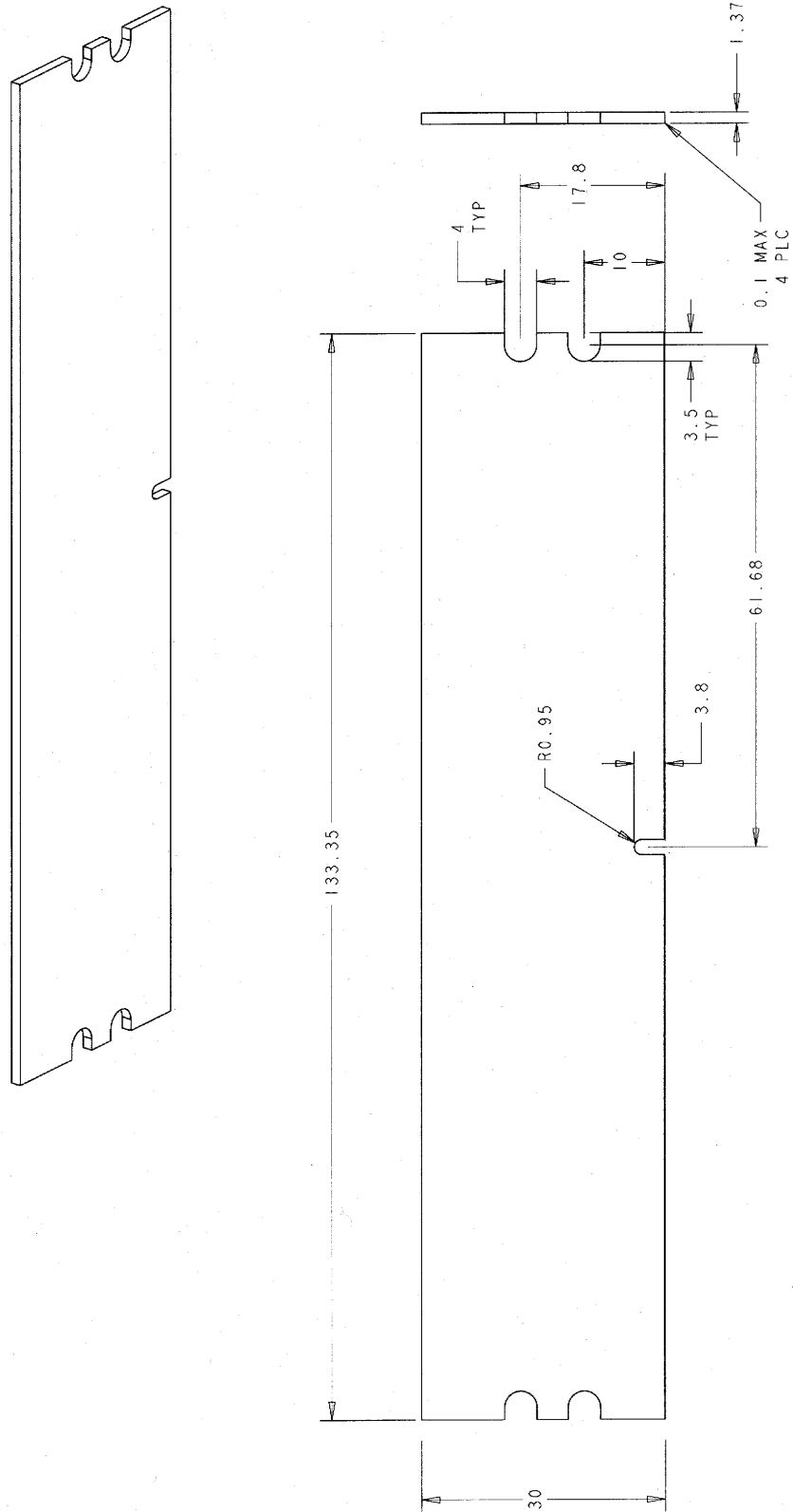


Figure 5A
Steel Gage For Standard Product

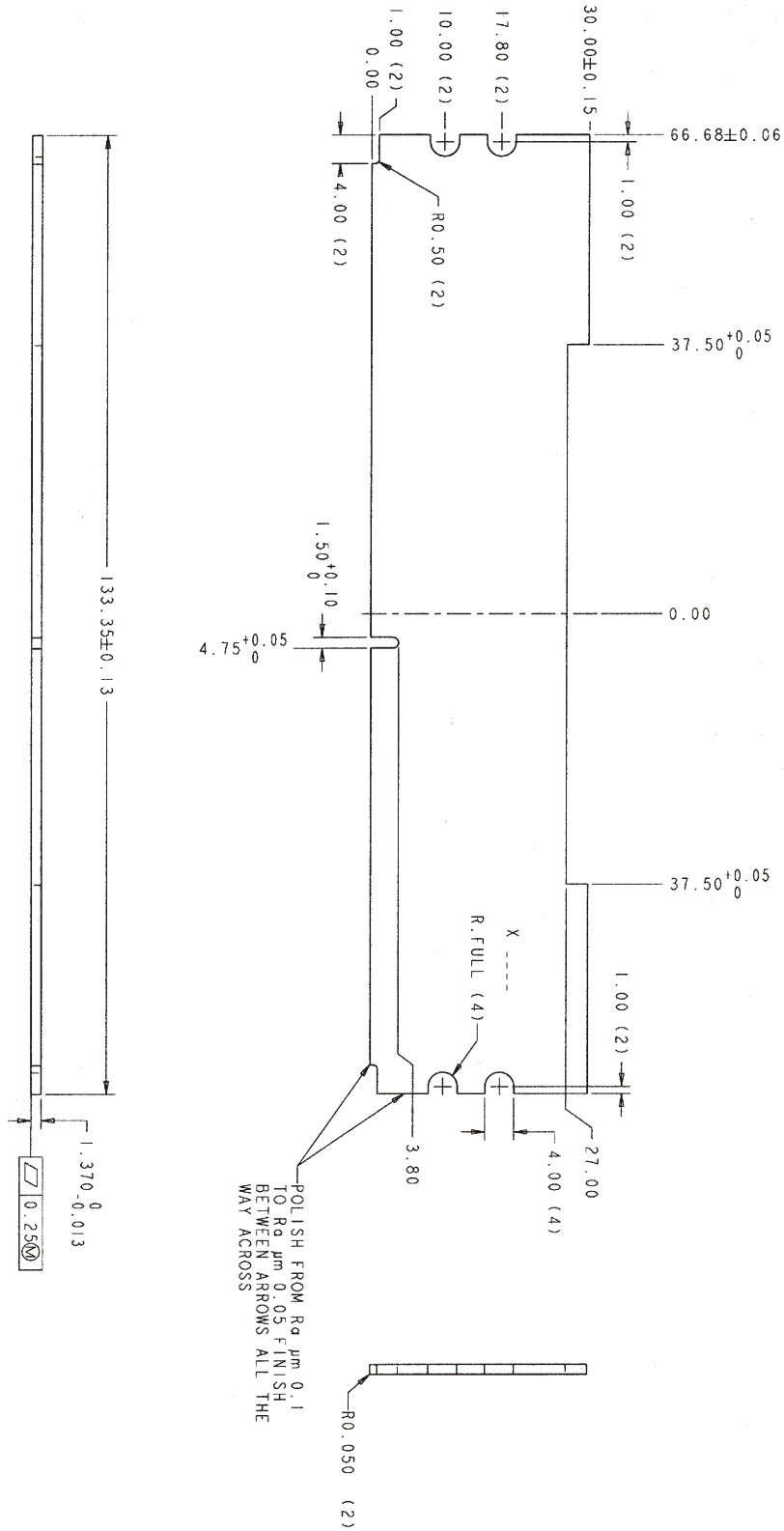


Figure 5B
Steel Gage For Low Profile Product