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**Surface Mount Matched Impedance Connector**

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**1. SCOPE**

## 1.1. Content

This specification covers performance, tests and quality requirements for the TE Connectivity (TE) Surface Mount Matched Impedance Connector (MICTOR) for board to board applications using two design styles, right angle and vertical. These two piece connector designs accommodate a variety of printed circuit board thicknesses. Plug assemblies are loaded with .008 inch thick MICTOR contacts which mate with hermaphroditic contacts in the receptacle assembly. Both plug and receptacle assemblies are available in signal counts of 38 to 266 position in 38 pin increments for .025 inch centerline.

## 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 13Dec98. The Qualification Test Report number for this testing is 501-252. This documentation is on file at and available from Engineering Practices and Standards (EPS).

**2. APPLICABLE DOCUMENTS**

The following TE 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.

- 109-1: General Requirements for Test Specifications
- 109 Series: Test Specifications as indicated in Figure 1
- 501-252: Qualification Test Report (Surface Mount Matched Impedance Connector)

**3. REQUIREMENTS**

## 3.1. Design and Construction

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

3.2. Materials

- Contacts:
  - Plug: High reliability copper alloy, nickel underplate all over, mating surfaces plated to meet Level 1 or Level 2 durability performance requirements, solder tails plated tin-lead or matte tin
  - Receptacle: High reliability copper alloy, nickel underplate all over, mating surfaces plated to meet Level 1 or Level 2 durability performance requirements, solder tails plated tin-lead or matte tin
- Ground bus:
  - Plug: Brass, nickel underplate all over, mating surfaces plated to meet Level 1 or Level 2 durability performance requirements, solder tails plated tin-lead or matte tin
  - Receptacle: Phosphor bronze, nickel underplate all over, mating surfaces plated to meet Level 1 or Level 2 durability performance requirements, solder tails plated tin-lead or matte tin
- Housing: Liquid crystal polymer, (LCP), UL94V-0

3.3. Ratings

- Voltage: 30 volts AC
- Current:
  - Signal contacts: Signal application only
  - Ground bus: See Figure 4 for applicable current carrying capability
- Temperature: -55 to 125°C
- Characteristic Impedance: 50 ± 5 ohms at 1 nanosecond

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 Test Specification 109-1.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Examination of product.	Meets requirements of product drawing.	Visual, dimensional and functional per applicable quality inspection plan.
<b>ELECTRICAL</b>		
Termination resistance.	$\Delta R$ 10 milliohms maximum.	TE 109-6-1. Subject mated contacts assembled in housing to 50 mv maximum open circuit at 100 ma maximum. See Figure 3.
Insulation resistance.	10000 megohms minimum.	TE Spec 109-28-1. Test between adjacent signal contacts and between all signal contacts and ground of mated samples.
Dielectric withstanding voltage.	500 volts AC at sea level.	TE Spec 109-29-1. Test between adjacent signal contacts and between all signal contacts and ground of mated samples.

Figure 1 (continued)

Test Description	Requirement	Procedure
<b>MECHANICAL</b>		
Random vibration.	No discontinuities of 1 microsecond or longer duration. See Note.	TE Spec 109-21-5. Subject mated samples to 11.95 G's rms. Ninety minutes in each of 3 mutually perpendicular planes.
Mechanical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	TE Spec 109-26-1. Subject mated samples to 50 G's half-sine shock pulses of 11 milliseconds duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks.
Durability.	See Note.	TE Spec 109-27. Mate and unmate samples for 25 cycles for Level 1 contacts and 500 cycles for Level 2 contacts at maximum rate of 600 cycles per hour.
Mating force.	152 ounces maximum per module (1 module = 38 contacts + 1 ground bus).	TE Spec 109-42, Condition A. Measure force necessary to mate samples at maximum rate of 1 inch per minute.
Unmating force.	19 ounces minimum per module (1 module = 38 contacts + 1 ground bus).	TE Spec 109-42, Condition A. Measure force necessary to unmate samples at maximum rate of 1 inch per minute.
<b>ENVIRONMENTAL</b>		
Thermal shock.	See Note.	TE Spec 109-22. Subject mated samples to 5 cycles between -55 and 125°C.
Humidity/temperature cycling.	See Note.	TE Spec 109-23-3, Condition B. Subject mated samples to 10 cycles between 25 and 65°C at 95% RH.
Temperature life.	See Note.	TE Spec 109-43. Subject mated samples to temperature life at 118°C for 792 hours.
Mixed flowing gas.	See Note.	TE Spec 109-85-2. Subject mated samples to environmental class II for 14 days.
Temperature cycling.	See Note.	TE Spec 109-75-2. Subject mated samples to 1024 cycles between -40 and 60°C at 2 hours per cycle.

**NOTE**

*Shall meet visual requirements, show no physical damage and shall meet requirements of additional tests as specified in Test Sequence 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
	Test Sequence (b)				
Examination of product	1,9	1,5	1,5	1,8	1,5
Termination resistance	3,7	2,4	2,4		2,4
Insulation resistance				2,6	
Dielectric withstanding voltage				3,7	
Random vibration	5				
Mechanical shock	6				
Durability	4				
Mating force	2				
Unmating force	8				
Thermal shock				4	
Humidity/temperature cycling				5	
Temperature life		3(c)			
Mixed flowing gas			3(c)		
Temperature cycling					3(c)

**NOTE**

- (a) See paragraph 4.1.A.
- (b) Numbers indicate sequence in which tests are performed.
- (c) Precondition samples with 3 cycles durability.

Figure 2

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#### 4. QUALITY ASSURANCE PROVISIONS

##### 4.1. Qualification Testing

###### A. Sample Selection

Samples shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. Test groups 1, 2, 3 and 5 shall consist of 3 mated pairs (plug and receptacle) of vertical and right angle assemblies. Samples shall be mounted on .062 inch thick printed circuit boards. Housings shall be fully populated with signal contacts and bus bars. Test group 4 shall consist of 5 mated pairs (plug and receptacle) of vertical and right angle assemblies. Housings shall be fully populated with signal contacts and bus bars and shall not be mounted on printed circuit boards.

###### B. Test Sequence

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

##### 4.2. Requalification Testing

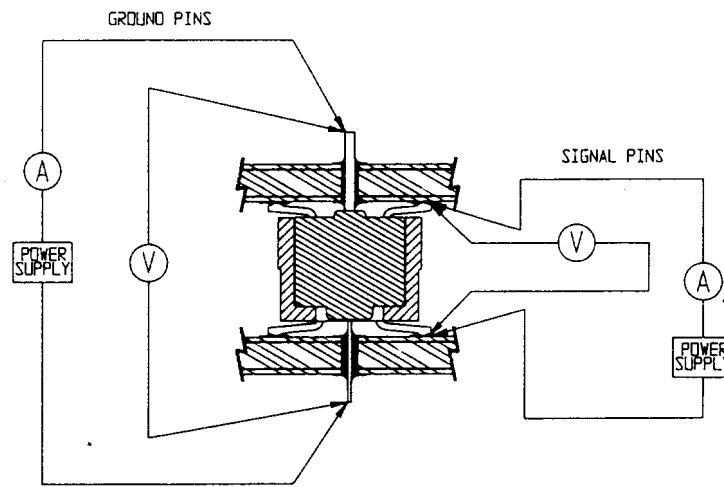
If changes significantly affecting form, fit or function are made to product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of original testing sequence as determined by development/product, quality and reliability engineering.

##### 4.3. Acceptance

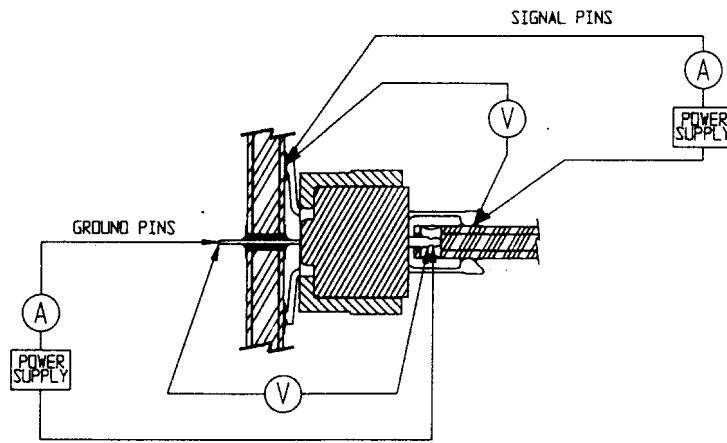
Acceptance is based on verification that product meets requirements of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Testing to confirm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

##### 4.4. Quality Conformance Inspection

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

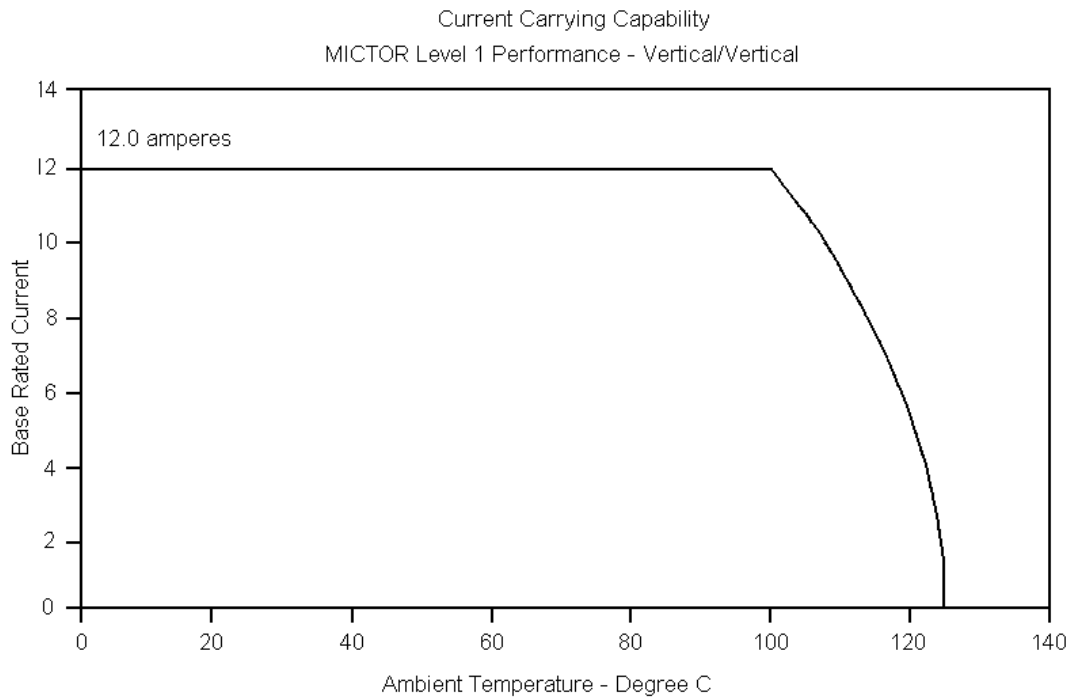


Vertical Design

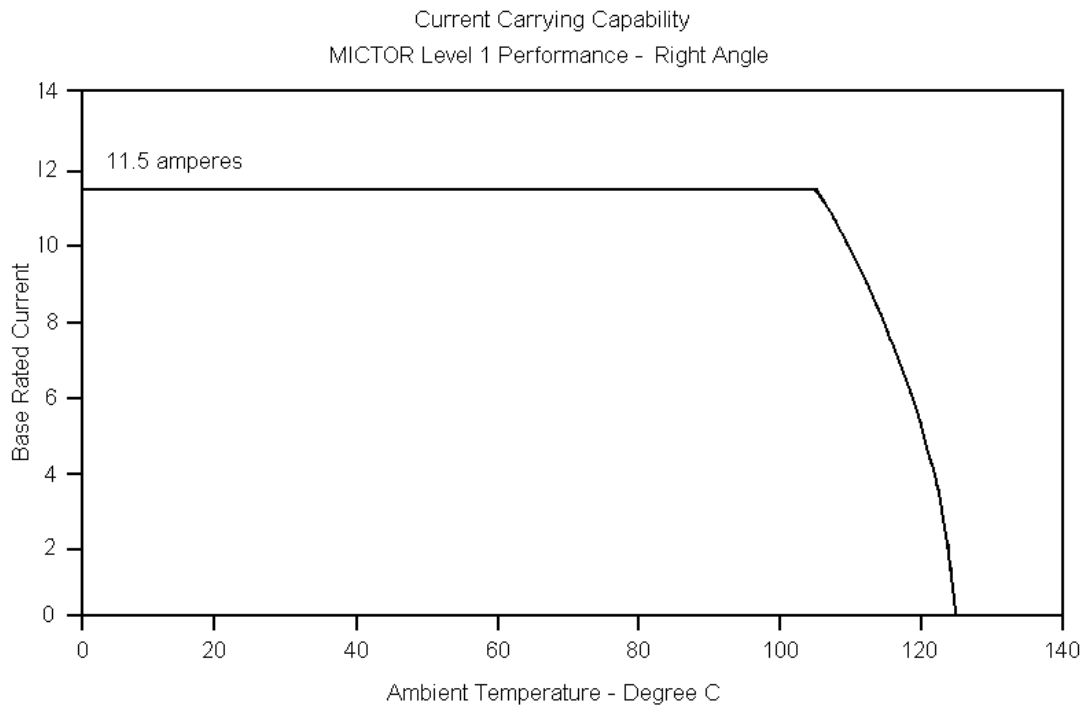


Right Angle Design

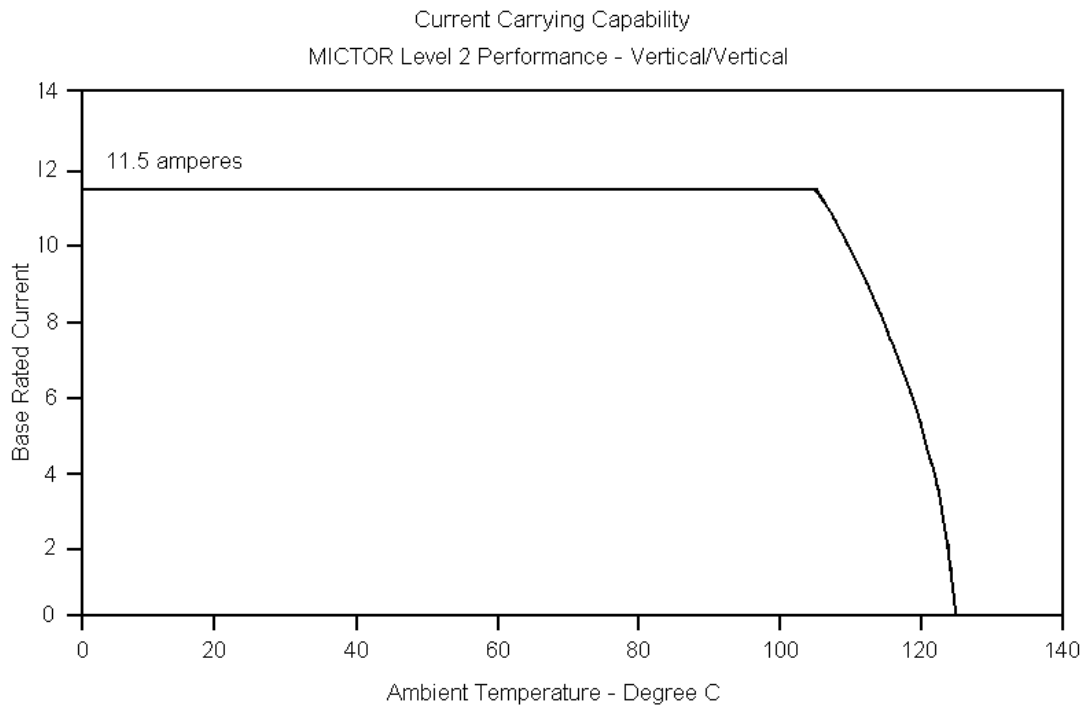
Figure 3  
Termination Resistance Measurement Points



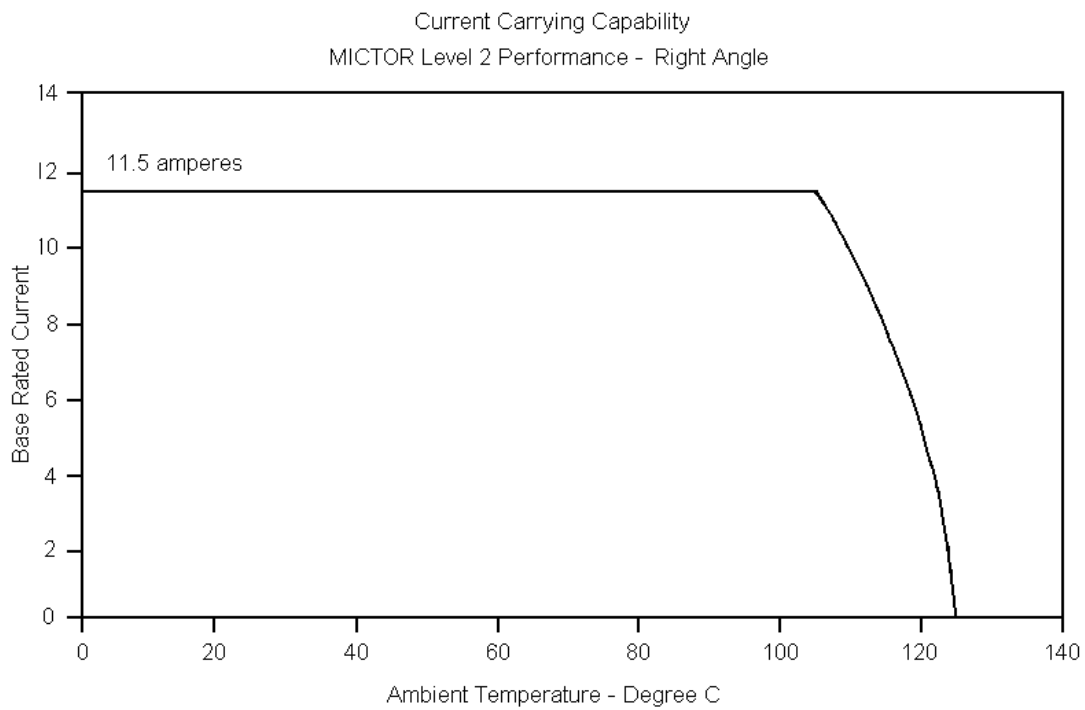
**Figure 4A**  
Derating Curve, Test Group 1



**Figure 4B**  
Derating Curve, Test Group 2



**Figure 4C**  
Derating Curve, Test Group 3



**Figure 4D**  
Derating Curve, Test Group 4



Number of Bus Blades Energized	Right Angle	Vertical/Vertical
	Seven Position 20 AWG Wire	
Single	1	1
Two Adjacent or Separated	.921	.925
Three Adjacent	.816	.823
Three Separated	.886	.891
Four Adjacent	.759	.768
Four Separated (57%)	.842	.849
Five	.715	.725
Six	.685	.697
Seven (100%)	.684	.676

**NOTE**

To determine acceptable current carrying capacity for percentage connector loading and wire gage indicated, use the Multiplication Factor (F) from the above chart and multiply it times the Base rated Current for a single circuit at the maximum ambient operating temperature shown in Figures 4A, 4B, 4C or 4D.

Figure 4E  
Current Rating