
AMPLIMITE* HDP-20 SMT – Version

1. SCOPE

1.1 Content

This specification covers the performance, tests and quality requirements for the following AMPLIMITE* printed circuit board surface mounted connectors.

- HDP-20 right angle front metal shell for both standard temperature processing and surface mount compatible processing.

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.

2. APPLICABLE DOCUMENTS

The following AMP- respective TYCO – documents and DIN - norm form a part of this specification to the extent specified herein. In the events 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.

- a. 109-1: General Requirements for Test Specifications
- b. 109 Series: Test Specifications as indicated in Figure 1
- c. 109-197: AMP Test Specifications vs EIA and IEC Test Methods
- d. IEC60807 – 2 Rectangular connectors with trapezoidal shape metal shells and round contacts.

3. REQUIREMENTS

3.1 Design and Construction

Connectors shall be of the design, construction and physical dimensions specified on the applicable production drawing. The shells has grounding indents on pin side.

Higher position parts have to be fixed with an additional device to assure fixation to PCB during solder process.

3.2 Materials

- a. Contact: Copper alloy, gold over nickel in the mating area and tin plated over Nickel on solder side.
- b. Housing: Glass filled PCT, UL 94V-0 rating
- c. Shell: Steel, tin plated over nickel
- d. Brackets: Diecast, tin plated over nickel
- e. Studs: Steel, nickel plated

3.3 Ratings

- a. Voltage: 1.) 250 volts AC rms or DC per Underwriters Laboratories
2.) 125 volts AC rms or DC per CSA
- b. Current: 4,5 A max. , depending of loaded situation and application. See Figure 4 till 7
- c. Temperature: - 55 to +105°C

3.4 Performance and Test Description

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1. All tests are performed at ambient environmental conditions per IEC 60512 unless otherwise specified.

3.5 Test Requirements and Procedures

Test Description	Requirements	Procedure
Examination of product.	Meets requirements of product drawing and applicable Application Specification	Visual, dimensional and functional per applicable Quality Inspection plan.
ELECTRICAL INSPECTIONS		
Termination resistance, dry circuit	15 milliohms maximum initial. 20 milliohms maximum final	IEC 60512 - 2, 2a Subject mated contacts assembled in housings to 50 mv open circuit at 100 ma maximum. See Figure 3.
Insulation resistance	5000 megohms minimum initial. 1000 megohms minimum final within 5 hours after testing.	IEC 60512 - 2, 3a Test between adjacent contacts of unmated assemblies.
Dielectric withstanding voltage	1 kV (AC) dielectric withstanding voltage. 1 minute hold. 1 milliampere maximum leakage current	IEC 60512 - 2, 4a Test between adjacent contacts of unmated assemblies
Temperature rise vs current	30°C maximum temperature rise at specified current. 70°C maximum ambient.	IEC 60512 - 3, 5a / 5b Measure temperature rise vs current. See Figure 4.
MECHANICAL INSPECTIONS		
Vibration, random.	No discontinuities greater than 1 microsecond. See Note (a)	AMP Spec 109-21-5, Level C, 20 minute duration: Subject mated connectors to 9,26 G's rms with 100 ma current applied. See Figure 3.
Physical shock.	No discontinuities greater than 1 microsecond. See Note.	IEC 60512-6-3. Subject mated connectors to 50 G's half-shine shock pulses of 11 milliseconds duration. 3 shocks in each direction along 3 mutually perpendicular planes, 18 total shocks. See Figure 3.

Durability	See Note.	AMP Spec 109-27. Mate and unmate assemblies for 200 cycles for 0,8 µm gold plated at a maximum rate of 200 cycles per hour.																						
Mating force.	<table border="1"> <thead> <tr> <th rowspan="2">Size</th> <th rowspan="2">Position</th> <th colspan="2">N Maximum</th> </tr> <tr> <th>W/O Ground Indents</th> <th>With Ground Indents</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>9</td> <td>--</td> <td>70</td> </tr> <tr> <td>2</td> <td>15</td> <td>--</td> <td>95</td> </tr> <tr> <td>3</td> <td>25</td> <td>--</td> <td>115</td> </tr> <tr> <td>4</td> <td>37</td> <td>--</td> <td>140</td> </tr> </tbody> </table> <p>Note: Grounding indents are on the pin side.</p>	Size	Position	N Maximum		W/O Ground Indents	With Ground Indents	1	9	--	70	2	15	--	95	3	25	--	115	4	37	--	140	IEC 60512 - 7, 13b Measure force necessary to unmate connector assemblies at rate of 25 mm per minute
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1	9	--	20																					
2	15	--	25																					
3	25	--	40																					
4	37	--	45																					
Contact Retention Force	Minimum 30 N for pin and min. 12 N for receptacle contact	IEC 60512 – 8, 15d																						

Environmental Inspections		
Thermal shock	See Note	IEC 60068 – 2 – 14, Na Subject mated connectors to 100 cycles between -55 and 105°C
Humidity-temperature cycling	See Note.	IEC 60068 – 2 – 30, Db Condition B. Subject mated connectors to 10 humidity-temperature cycles between 25 and 55°C at 95% RH.

Temperature life.	See note.	IEC 60068 – 2 – 2, Ba Subject mated connectors to temperature life at 105°C for 500 hours.
Mixed flowing gas.	See Note	IEC 60068 – 2 -60, Ke / 4 Subject mated connectors to environmental class III for 20 days. Precondition connectors with 10 durability cycles.
Solderability / Heat resistance		
Component heat resistance to lead-free reflow soldering.	No damage or shrinkage	(Tyco spec. 109-201 / B)
Solderability, lead - free	Solderable area shall have a minimum of 95% solder coverage	60068 – 2 – 20, Ta

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. Qualifikations- und Requalifikationsprüfungen

Test or Examination	Test Group (a)								
	1	2	3	4	5	6	7	8	9
	Test Sequence (b)								
Examination of product	1,9	1,6	1,6	1,3	1,5	1,8	1,3	1,5	1,3
Termination resistance, dry circuit	3,7	2,5	2,5		2,4				
Insulation resistance						2,6			
Dielectric withstanding voltage						3,7			
Temperature rise vs current				2					
Solderability							2		
Vibration	5								
Physical shock	6								
Durability	4	3	3					3	
Mating force	2							2	
Unmating force	8							4	
Thermal shock						4			
Humidity-temperature cycling			4			5			
Temperature life		4							
Mixed flowing gas					3				
Component heat resistance									2

NOTE

(a) See paragraph 4.4.A.
(b) Numbers indicate sequence in which tests are performed.

Figure 2

4. QUALITY ASSURANCE PROVISIONS

4.1 Qualification Testing

A Sample selection

Connector housings and contacts shall be prepared in accordance with applicable Instruction sheets and shall be selected at random from current production. Test groups 2, 3 and 5 shall each consist of 5 mated connector pairs with no grounding indents, no mounting is required. Test group 1 shall consist of 4 mated connector pairs with grounding indents and shall be mounted on a printed circuit board.

Test group 4 shall consist of 1 mated connectors mounted to a printed circuit board.

Test group 6, 7 and 9 shall each consist of 5 unmated connectors, no mounting required.

Test group 8 consist of 5 mated connector pairs for position 9 and 15. Connectors shall have grounding indents, no mounting is required.

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 the 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 the product meets the requirements of Figure 1 Failures attributed to equipment, test setup, or operator deficiencies shall not disqualify the 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 Certification

This product will be recognized under the Component Recognition Program of Underwriter's Inc., Electrical File Number E-XXXXX and it has been certified by the Canadian Standards Association Number LR-YYYYYY.

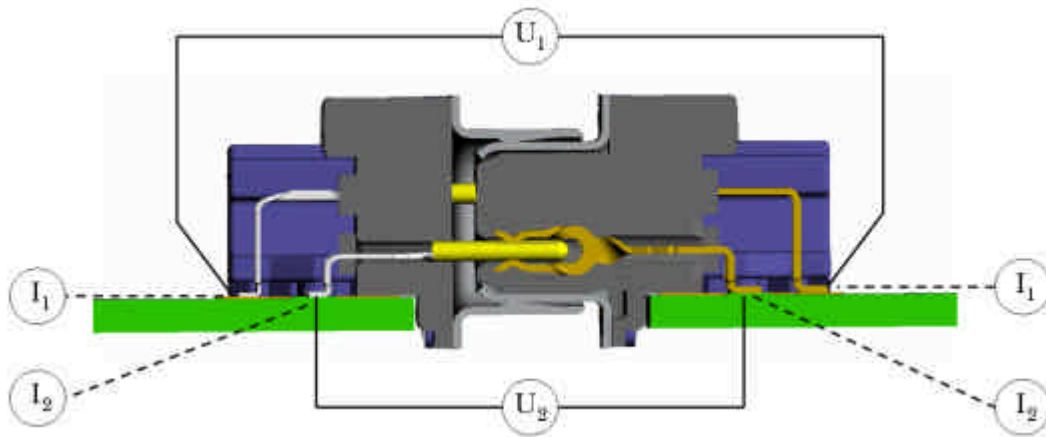


Figure 3: Termination resistance measurement

NOTE

To determine the acceptable current carrying capacity for the 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 as shown in Figure 4A.

Specification test according to AMP-spec. 108-94000
HD-20 Sub-D Connector in SMT Technology

HD-20 Sub-D Connector 9-positions

FEMALE (PN)
MATERIAL
CONDUCTOR
TOOLING USED
MALE (PN)
MATERIAL
CONDUCTOR
HOUSING
TEST SETUP

- 9-pos. Sub-D Rec.-Header (3-1740 194-2, Rev. A2)
 - CuMg / Au
 - stranded wire, 0.5mm²
 - 9-pos. Sub-D Pinheader (0-1740 195-2, Rev. A2)
 - CuMg / Au
 - stranded wire, 0.5mm²
- Current temperature rise, derating acc. to IEC 60512-3, test 5a/5b.
5 Test samples current load $I_{max} = 4,5A$ for each contact.

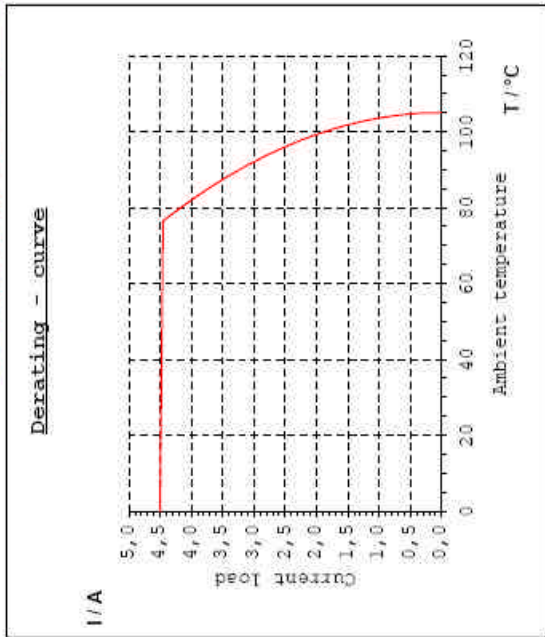
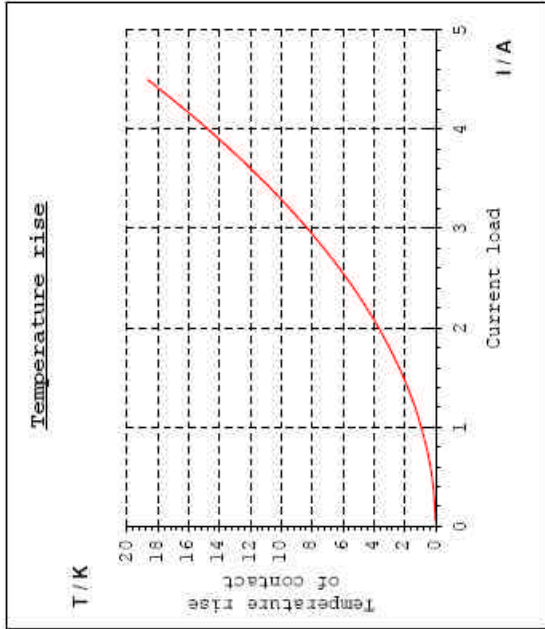
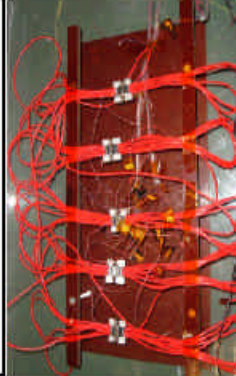

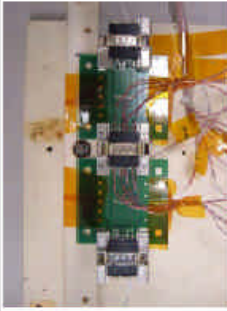


Figure 4

Specification test according to AMP-spec. 108-94000
HD-20 Sub-D Connector in SMT Technology



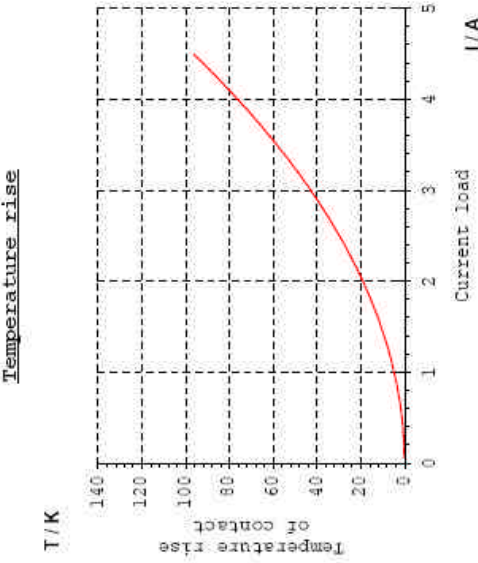
PRÜFLABOR BENSHEIM
7. November 2005



HD-20 Sub-D Connector 9-positions

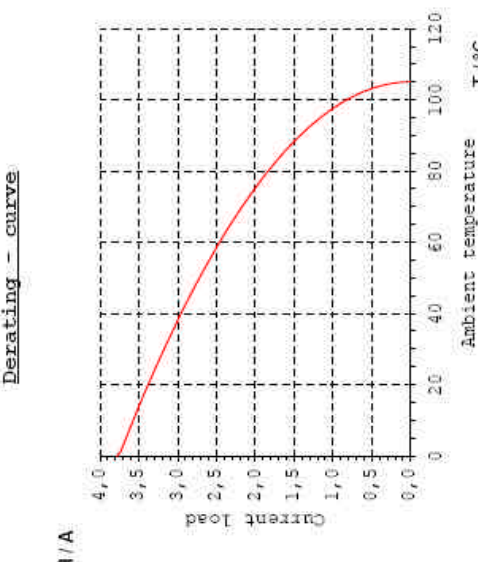
FEMALE (FN) : 9-pos. Sub-D Rec.-Header (3-1740 194-2, Rev. A2)
MATERIAL : CuMg / Au
CONDUCTOR : PCB, FR4 thickness 1.6mm; Cu layer 35 µm x 1 mm; lead-free HAL
TOOLING USED :
MALE (FN) : 9-pos. Sub-D Pinheader (0-1740 195-2, Rev. A2)
MATERIAL : CuMg / Au
CONDUCTOR : PCB, FR4 thickness 1.6mm; Cu layer 35 µm x 1 mm; lead-free HAL
HOUSING :
TEST SETUP : Current temperature rise, derating similar to IEC 60512-3, test 5a/5b.
 1 Test sample current load $I_{max} = 4,5A$ for each contact.

Temperature rise



Current load (I/A)	Temperature rise of contact (T/K)
0	0
1	~5
2	~15
3	~35
4	~75
4.5	~100

Derating - curve



Ambient temperature (T/°C)	Current Load (I/A)
0	4.5
20	~3.5
40	~2.5
60	~1.5
80	~0.8
100	~0.4
120	0

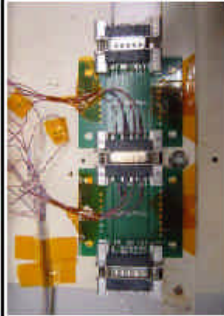
Figure 5

Specification test according to AMP-spec. 108-94000
 HD-20 Sub-D Connector in SMT Technology

HD-20 Sub-D Connector 15-positions



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 7. November 2005



- FEMALE (FN) : 15-pos. Sub-D Rec.-Header (3-1740 196-2, Rev. A2)
- MATERIAL : CuMg / Au
- CONDUCTOR : PCB, FR4 thickness 1.6mm; Cu layer 35 µm x 1 mm; lead-free HAL
- TOOLING USED :
- MALE (FN) : 15-pos. Sub-D Pinheader (0-1740 197-2, Rev. A2)
- MATERIAL : CuMg / Au
- CONDUCTOR : PCB, FR4 thickness 1.6mm; Cu layer 35 µm x 1 mm; lead-free HAL
- HOUSING :
- TEST SETUP : Current temperature rise, derating similar to IEC 60512-3, test 5a/5b.
 1 Test sample current load $I_{max} = 4,5A$ for each contact.

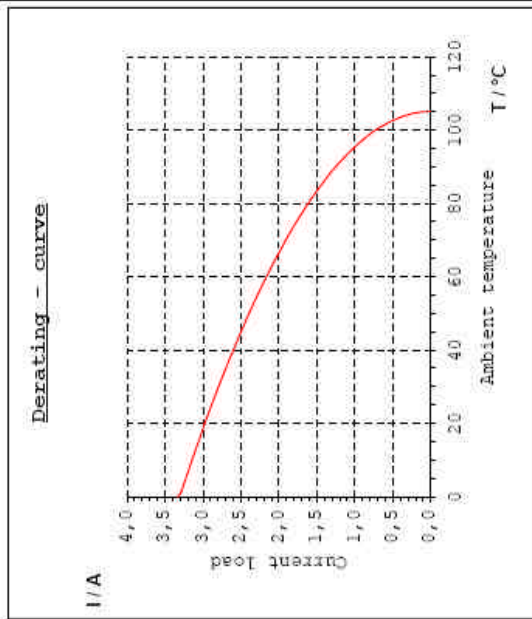
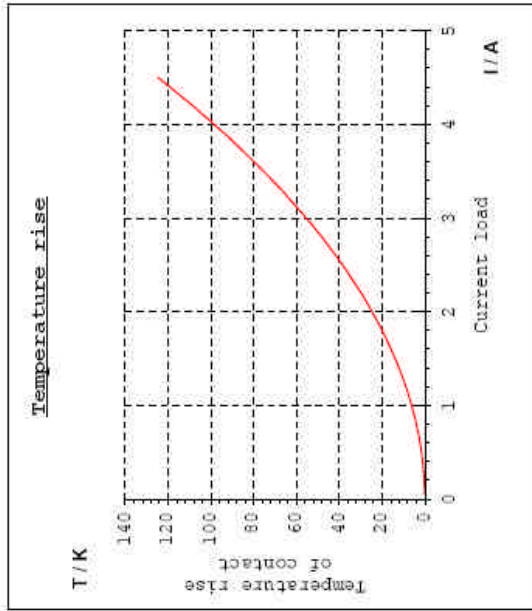


Figure 6

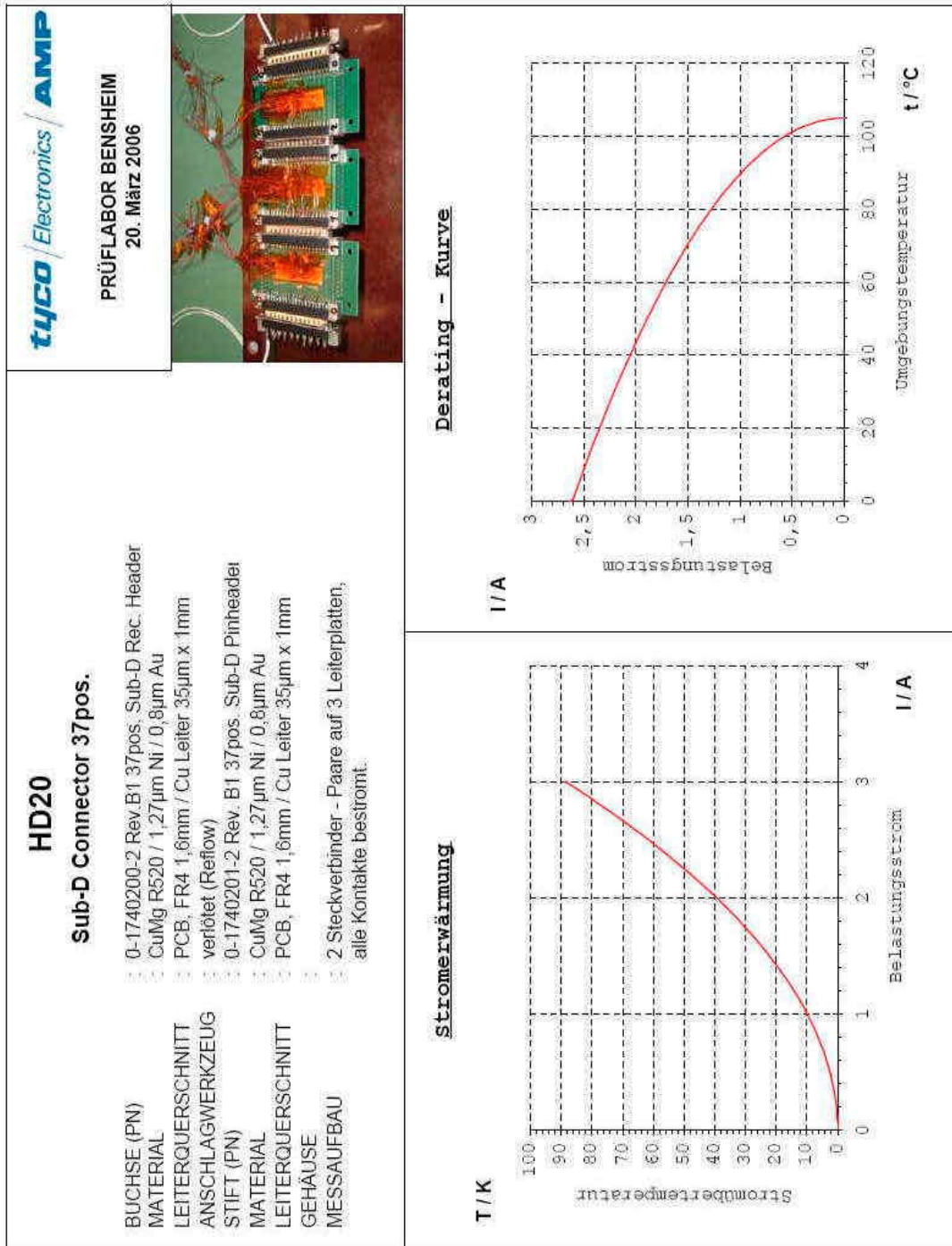


Figure 7