

DESIGN OBJECTIVE

The product described in this "design objective" document has not yet been tested or fully tested to the performance requirements, standards or other criteria specified therein. TE Connectivity explicitly points out that no liability will be accepted, for whatever reason, neither express nor implied, for conformity of products with the following specified performance characteristics, standards or other criteria. As far as legally permitted, AMP Deutschland GmbH accepts no conditional warranty, no liability, for whatever reason, and is to be exempted from third party claims for eventual samples or preliminary deliveries requested by the customer until final release of this document.

We declare our consent herewith

(Customer's signature)

THIS INFORMATION IS CONFIDENTIAL AND IS DISCLOSED TO
ON CONDITION THAT NO FURTHER DISCLOSURE IS MADE BY
TO OTHER THAN AMP PERSONNEL WITHOUT WRITTEN AUTHORISA-
TION FROM AMP INCORPORATED, HARRISBURG, PA.

* Trademark of AMP Incorporated

Product Code : 2131

-	-	-	-	DR W.Hoffmann		tyco / <i>Electronics</i> / AMP AMP Deutschland GmbH D-63225 Langen			
-	-	-	-						
-	-	-	-	CHK Th.Klenner					
-	-	-	-						
A1	Added de-rating	F. Lupo	24.02.15	APP J.Fischer		NO 108-18863		REV A1	LOC B
A	PSP-Nr. gloest	W.Hoffm.	10.12.02						
2	Diverse Aenderungen	W.Hoffm.	30.04.02	PAGE 1 OF 20	TITLE HIGH CURRENT CONTACT FOR PRINTED CIRCUIT BOARD CONN.				
1	Design Obj.Erst.	W.Hoffm.	31.01.02						
LTR	REVISION RECORD	APP	DATE						

1 SCOPE

- 1.1 Content
- 1.2 Qualification

2 APPLICABLE DOCUMENTS

- 2.1 AMP Documents
- 2.2 Other Documents

3 REQUIREMENTS

- 3.1 Design and Construction
- 3.2 Materials
- 3.3 Ratings
- 3.4 Performance and Test Description
- 3.5 Test Requirements and Procedures
Summary
- 3.6 Qualification and Requalification Test
Sequence
- 3.7 Counterpart (cusp)

4 QUALITY ASSURANCE PROVISIONS

- 4.1 Qualification Testing
- 4.2 Requalification Testing
- 4.3 Acceptance
- 4.4 Quality Conformance Inspection

* Trademark of AMP Incorporated

Product Code : 2131

-	-	-	-	DR	TITLE	HIGH <i>tyco</i> / Electronics / AMP PRINTED CIRCUIT BOARD CONN. AMP Deutschland GmbH D-63225 Langen		
-	-	-	-	W.Hoffmann				
-	-	-	-	CHK				
-	-	-	-	Th.Klenner				
A1	Added de-rating	F. Lupo	24.02.15	APP		NO	REV	LOC
A	PSP-Nr. gloest	W.Hoffm.	10.12.02	J.Fischer		108-18863	A1	B
C	Diverse Änderungen	W.Hoffm.	22.04.02	PAGE				

1 SCOPE

1.1 Content

This specification covers the performance, tests and quality requirements for the board-mounted connector
(compare fig. 1, 2, 3 and 4)

1.2 Qualification

When tests are performed the following specified specifications and standards shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

2 APPLICABLE DOCUMENTS

The following documents 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 or of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

2.1 AMP Documents

A 109-1: General Requirements for Test Specifications

B Customer Drawings and Name
PN 1 534 412
PN 1 534 413
PN 1 418 577
PN 1 418 578
High current contact for PCB

C Product Specifications
108- 18363

D Application Specification
114-

2.2 Other Documents

A Test Guideline for Motor Vehicle Connectors
Edition 04/1996 (working group automotiv OEM's)

B IEC 60 068 Environmental testing procedures
Edition 03/1995

C IEC 60 512 Electromechanical components for electronic equipment, basic testing procedures and measuring methods
Edition 06/1995

3 REQUIREMENTS

3.1 Design and Construction

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

3.2 Materials

Descriptions for material see in production drawings.

3.3 Ratings

A Voltage

**12V, (42V)
Acc.IEC 60 664 –1
(DIN VDE 0110)**

B Current carrying capability

**see applicable current carrying
capability**

C Temperature

-40 to +150° C (silvered) *)

D Durability

5 cycles

*) ambient temperature and heating up by current

3.4 Performance and Test Description

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in Para. 3.5. All tests are performed at ambient environmental conditions per IEC 60 512 unless otherwise specified.

Test Description Beschreibung	Requirement Anforderung	Procedure Prüfung
PG 0 Entrance examination Eingangskontrolle 1. Visual examination/ Sicht - pruefung 2. Total resistance/ Gesamtwiderstand	1. Requirement of product drawing/ Zeichnungskonformitaet 2. Gesamtdurchgangswiderstand $R_{ges} \leq m\Omega$	Acc. IEC 60 512-2, Test 1a and 2a Nach IEC 60 512, Pruefung 1a und 2a Measuring points, see Picture No. 6 / Messpunkte siehe Abb. 6
PG 1 Dim. inspection/ Massprüfung	For examination see the product drawing/ Pruefen nach Produktzeichnung	Internal control report / Kontrollbericht intern Erstellung EMPB
PG 2 Material and surface inspection / Material und Oberflaechepruefung		Spec.118-18009
PG 4 Contact overlap / Kontaktueberdeckung	$\leq$ mm	Polished section as theoretical proof/ Theoretischer Nachweis ,je 1 Schliffbild gesteckt
PG 5 Load deflection curve / Federkennlinie (Relaxation der Kontaktnormalkraft) 1. New condition / Neuzustand 2. After temperature storage / nach Temperaturlagerung	1. min. N max. N 2. $\geq 0,5 * F_i$	Measurement with check gauge/ Messung mit Prueflehre 0,8mm (jeweils anderer Federschenkel durch Hilfstab 0,8mm ausgelenkt) 2. Acc. IEC 60 068-2-2, Test Ba Nach IEC 60 068-2-2, Pruefung Ba +160 C, 1000h ⁹
PG 9 angular mating / Schraegsteckwinkel 1. Visual and dimentional examination / Sicht und Masspruefung 2. Gap-size / Öffnungsmaß 3. Horizontal mating angular / Stecken unter max. Winkel 4. Gap-size / Öffnungsmaß 5. same as 1.) / siehe 1.)	1. Requirement of product drawing/ Zeichnungskonformitaet 3. 2,5°	1. Acc. IEC 60 512-2, test 1a and 1b Nach IEC 60 512-2, Pruefung 1a und 1b
Remarks / Bemerkungen:		

Test Description Beschreibung	Requirement Anforderung	Procedure Prüfung
PG 11 Mating forces / Steckkräfte 1. Mating and unmating forces / Steck – und Ziehkkräfte 2. Durability / Steckhaefigkeit 3. Surface control / Oberflächenprüfung	1. Mating / Stecken: N Unmating / Ziehen: N 2. Ag = 5 Steckzyklen/ Ag = 5 mating cycles 3. REM analysis after mating / REM Untersuchung nach dem Stecken (beide Steckrichtungen)	Acc. IEC 60 512-7 , Test 13b Nach IEC 60 512-7, Prüfung 13b Acc. IEC 60 512 -5, Test 9a Nach IEC 60 512 -5, Prüfung 9a Examination speed / Pruefgeschwindigkeit = 25mm/min.
PG 14 Thermal time constant / Thermische Zeitkonstante		1-/2-/3/ times the rated current 1-/2-/3-fachen Nennstrom
PG 15 Electrical stress test / Elektrischer Stresstest 1. Change of temperature / current – endurance test / Temperatur - / Stromwechsel – Dauertest 2. Damp heat, cycle / feuchte Waerme, zyklisch 3. Change of temperature / current – endurance test / Temperatur - / Stromwechsel – Dauertest	$R \leq 2,0 \times R_i$ R_i – initial value / Ausgangswert) $\Delta T \leq 20 \text{ K}$	Acc. IEC 60 068-2-14Nb / Nach IEC 600 68-2-14Nb 1. $-40^\circ\text{C} / 140^\circ\text{C} (\sqrt{A_{nb}} + T_l)$, 1 cycle = 6 h, 60 cycles/ 1 Zyklus = 6 h, 60 Zyklen Acc. IEC 60 068-2-30 / Nach IEC 600 68-2-30 2. $T_u = 25^\circ\text{C}$, $T_o = 55^\circ$ rel. Feuchte 95% 1 cycle = 1 day, 21 days/ 1 Zyklus = 1Tag, 21 Tage Acc. IEC 60 068-2-14Nb / Nach IEC 600 68-2-14Nb 3. $-40^\circ\text{C} / +150^\circ\text{C}, (150^\circ\text{C} -$ ΔT (from derating curve/ aus Derating-Kurve) 1 cycles = 6 h, 60 cycles/ 1 Zyklus = 6 h, 60 Zyklen
Remarks / Bemerkungen: PG 11 depends on tab thickness and different plug connections, / Abhaengig von Dicke des Flachstecker und unterschiedlichen Steckverbindungen / depends on tab thickness and different plug connections actual/ aktuell: 0,5 =20 N; 0,5 schraeg = t.b.d0,8 = 30 N; 0,8 schraeg = 40 N 0,8 = 30 N; 0,8 schraeg = 40 N		

Test Description Beschreibung	Requirement Anforderung	Procedure Prüfung
PG 17 Continous flow heater/ Elektr.Durchlaufheizer (EDH) Dynamic stress / Dynamische Beanspruchung Installation place: motor, with temperature interference/ Ein - / Anbauort: Motor, mit Temperaturueberlagerung	Acc. DIN 72 300-3, table 2/ gem.DIN 72 300-3 Tabelle 2 $T_u = -40^{\circ} / T_o = 110$	Acc./gem. DIN 72 300-3 1.Sinusoidal Vibration point 5.1.2.1.2 curve 1/ Schwingen,sinusfoermig Pkt. 5.1.2.1.2 Kurve 1 2.Vibration, noise controlled point 5.1.2.1.3/ Schwingen, rauschfoermig Pkt. 5.1.2.1.3 22 h per space axis 22 Std. je Raumachse 10 – 1500 Hz RMS = 120m/s ² Acc./gem. MB-standard 22 100-4, Punkt 2.1.3 Electronics assembly group Elektronikbaugruppen 10 Hz – 300 Hz 10-18Hz / 3mm 18 – 300 Hz / 4g constant stress on 3 levels, each 24 hours 1 Okt./min./ Beanspruchung in 3 Ebenen je 24 Std. 1Okt. / min.
PG 17 Interior heater/ Innenraumheizer Dynamic stres / Dynamische Beanspruchung	Acc. MB-standard 22 100-4 gem. MB Norm 22 100-4	Acc./gem. MB-standard 22 100-4, Punkt 2.1.3 Electronics assembly group Elektronikbaugruppen 10 Hz – 300 Hz 10-18Hz / 3mm 18 – 300 Hz / 4g constant stress on 3 levels, each 24 hours 1 Okt./min./ Beanspruchung in 3 Ebenen je 24 Std. 1Okt. / min.
Mechanical schock/ Mech. Schock	Acc./gem. DIN IEC 60 068 Teil 2-27	10 Shocks/axis / 10 Schocks/Acse Alternation sinusoidal/ Halbwelle sinusfoermig a=50g / 11 ms
PG 18 Coast climate stress / Kuestenklimatebeanspruchung Only for installing case A / (PTC-heating element only for Tin-plated contacts) Nur für Einbaufall A (PTC-Heizelement und nur fuer verzinnte Kontakte)	1.Insulation resistance/ Durchgangswiderstand $R \leq 2,0 \times R_{ini}$ R_i – initial value / Ausgangswert) 2.Unmating force/Ziehkraft < 1,5 x F_{ini} (F_{ini} – Ausgangswert) „Gesamtdurchgangswiderstand“	1.Acc.IEC 60 068-2-14 Nach IEC 60 068-2-14 Schaerfegrad 1 1 Cycle / Zyklus
Remarks / Bemerkungen:		

Test Description Beschreibung	Requirement Anforderung	Procedure Prüfung
PG 19 Environmental simulation / Umweltsimulation 1. Temperature shock / Temperaturschock 2. Change of temperature / Temperaturwechsel 3. Storage under dry heat conditions / Lagerung bei trockener Waerme 4. Industrial climate (multiple – component climate) / Industrieklima (Mehrkomponentenklima) 5. Damp heat, cyclic / Feuchte Waerme, zyklisch	Contact resistance / Durchgangswiderstand unplugged / ungesteckt $R \leq 4,0 \times R_{ini}$ plugged – in / gesteckt R_i – initial value / Ausgangswert The first half of the sample quantity should be plugged in from upper side, the second half of the sample quantity should be plugged in from the bottom side / Die 1te Haelfte der Muster von oben und 2te Haelfte von unten stecken	1. Acc./nach IEC 60 068-2-14 Na -40°C / +130°C je 15min. 144 Zyklen 2. Acc. IEC 60 068-2-14 Nb Nach IEC 68 068-2-14 Nb -40°C / +120°C je 3h, Zeit fuer Temp. Wechsel/temperature change max. 2h, 20 Zyklen 3. Acc./nach IEC 60 068-2-2, Test/Prüfung Ba 120h, 120°C 4. Acc./nach IEC 60 068-2-60 0,2ppm SO₂, 0,01ppm H₂S, 0,2 ppm NO₂ 0,01ppm Cl₂ / 25°C / 75% r.F. /21d, Volume stream=1 m²/h Volumenstrom=1m³/h 5. Acc. IEC 60 068-2-30, Test Db Variante 2 Nach IEC 68 068-2-30, Pruefung Variante 2 Relative humidity / Rel. feuchte 95% constant, 10 Zyklen/cycles zu je 24h, T_u = 25°C, T_o = 55°C 3 Test groups/Pruefgruppen: a) gesteckt gelagert 1x vorgesteckt b) gesteckt gelagert, 3 Steckzyklenzahl c) ungesteckt gelagert
Remarks / Bemerkungen:		

Test Description Beschreibung	Requirement Anforderung	Procedure Prüfung
PG 22A Chemical resistance / Chemische Prüfungen 1. Resistance / Beständigkeit	Additional test / Erweiterter Test a) Preservative (Wax) Konservierungsmittel (Wachs) b) Depreservative Entkonservierungsmittel c) Motoroil/Motoröl SAE 10W-50 d) Internal cleaner Innenreiniger (Meister Propper) e) Screen cleaner Scheibenreiniger (Scheibenklar Winter 20) f) Coffee and sugar containing refreshment drinks (Cola) Koffein- und zuckerhaltiges Erfrischungsgetränk (Cola) g) Glass cleaner Glasreiniger (Sidolin)	Acc. VDA –Test Sheet 621 Nach VDA Prüfblatt 621 5 min. diving / 5 min tauchen abtropfen 48Std. / 50° rinse with water and dry/ mit Wasser spülen und trocknen
Remarks / Bemerkungen: PG 22 A Valuation criterion: visual examination of the contacts (without Tab) / Bewertungskriterium: Sichtkontrolle der Kontakte (ohne Tab)		

Further Tests for SMC-Variant Weitere Prüfungen fuer SMC-Variante		
Solderability test Lötfähigkeitstest	Acc./gem. IEC 60068-2-20 Ta	Acc./ IEC 60068-2-20, Ta, test technique 1 ageing 3 Nach IEC 60068-2-20 Ta, Prüfmethode 1, Alterung 1
Polished cut image Schliffbild		Cross section within the soldering range Schliff im Lötgebiet
Take off the contact from the printed circuit board Abziehen des Kontaktes von der Leiterplatte	Retractable clearly Mating and unmating forces (>>40N) Abreisskraft deutlich grösser als Steck- und Ziehkräfte (>>40N)	Similarly too IEC 60512- 9,17c Analog zu IEC 60512-9,17c
Remarks / Bemerkungen:		

3.6 Qualification and Requalification Test Sequence

3.6 Qualifikations- und Requalifikationsprüfungen

Test / Prüfung						
	PG 0	PG 4	PG 5	PG 9	PG 11	PG 14
Visual- and dimensional examination Sicht- und Maßprüfung	1,3	1	1,5,7	1,5	1,8,9	1,5
Contact resistance Durchgangswiderstand	2				2,6	2,4
Normal force of the contact Kontaktnormalkraft			3,6			
Gap-Size Kontaktöffnungsmass			2,5	2,4	3,7	
Horizontal mating angular max. Stecken unter max. Winkel				3		
Mating and Unmating force Steck und Ziehkraefte					4,8	
Storage under dry heat conditions Lagerung bei trockener Waerme			4			
Durability Steckhaeufigkeit					5	
Thermal time constant Thermische Zeitkonstante						3
Contact overlap Kontaktueberdeckung		2				

- 1) See Para. / Siehe Abs. 4.1 A
- 2) Numbers indicate sequence in which tests are performed / Die Zahlen geben die Reihenfolge an, in der die Prüfungen erfolgen.

Test / Prüfung	PG 15	PG 17	PG 18	PG 19	PG 22A
Visual- and dimensional examination Sicht- und Maßprüfung	1,12	1,6	1,9	1,9,14	1
Contact resistance Durchgangswiderstand	4,9	2,5	2,4,6,8	2,4,6,8, 11,13	
Mating and Unmating force Steck- und Ziehkraft	2		3,7		
Normal force of the contact Kontaktnormalkraft	3,11				
Change of temperature / current – endurance Test Temperatur - / Stromwechsel – Dauertest	6,8				
Current Carrying Capacity / Derating Stromerwärmung / Derating	5,10				
Temperature shock Temperatureschock				3	
Change of temperature Temperaturwechsel				5	
Damp heat, cyclic Feuchte Wärme, zyklisch	7			12	
Storage under dry heat conditions Lagerung bei trockener Wärme				7	
Salt spray with alternating climate, cyclic Salznebel mit Wechselklima, zyklisch			5		
Industrial climate Industrieklima				10	
Vibration sinusoidal Schwingen, sinusförmig		3			
Mechanical shock test Mechanisches schocken		4			
Resistance to fluids Medienbeständigkeit					2

1) See Para. / Siehe Abs. 4.1 A

2) Numbers indicate sequence in which tests are performed / Die Zahlen geben die Reihenfolge an, in der die Prüfungen erfolgen.

4 QUALITY ASSURANCE PROVISIONS

4.1 Qualification Testing

A Sample Selection

The samples shall be prepared in accordance with product drawings. They shall be selected at random from current production.

For Test Sequence

Contact with Spring for Tab 0,8
Contact with Spring for Tab 0,5
Contact without Spring for Tab 0,8
Contact without Spring for Tab 0,5

Test Group / Prüfgruppe 0 : **14x1 contacts / Einzelkontakte**

Test Group / Prüfgruppe 1 : **14x1 contacts / Einzelkontakte**

Test Group / Prüfgruppe 2 : **14x5 contacts / Einzelkontakte**

Test Group / Prüfgruppe 4 : **1 contacts / Einzelkontakte / theoretical proof (CAD)**
/theoretischer Nachweis (CAD)

Test Group / Prüfgruppe 5 : **4x60contacts / Einzelkontakte**

Test Group / Prüfgruppe 9 : **14x1 contacts / Einzelkontakte**

Test Group / Prüfgruppe 11 : **8x10contacts / Einzelkontakte**

Test Group / Prüfgruppe 14 : **4x3contacts / Einzelkontakte**

Test Group / Prüfgruppe 15 : **4x12contacts / Einzelkontakte**

Test Group / Prüfgruppe 17
Innenraumheizer : **12x4 assembly group / Baugruppen**

Test Group / Prüfgruppe 17
Elektr. Durchlaufheizer : **12 assembly group / Baugruppen**

Test Group / Prüfgruppe 18 : **14x3 contacts / Einzelkontakte**

Test Group / Prüfgruppe 19 : **4x20contacts / Einzelkontakte**

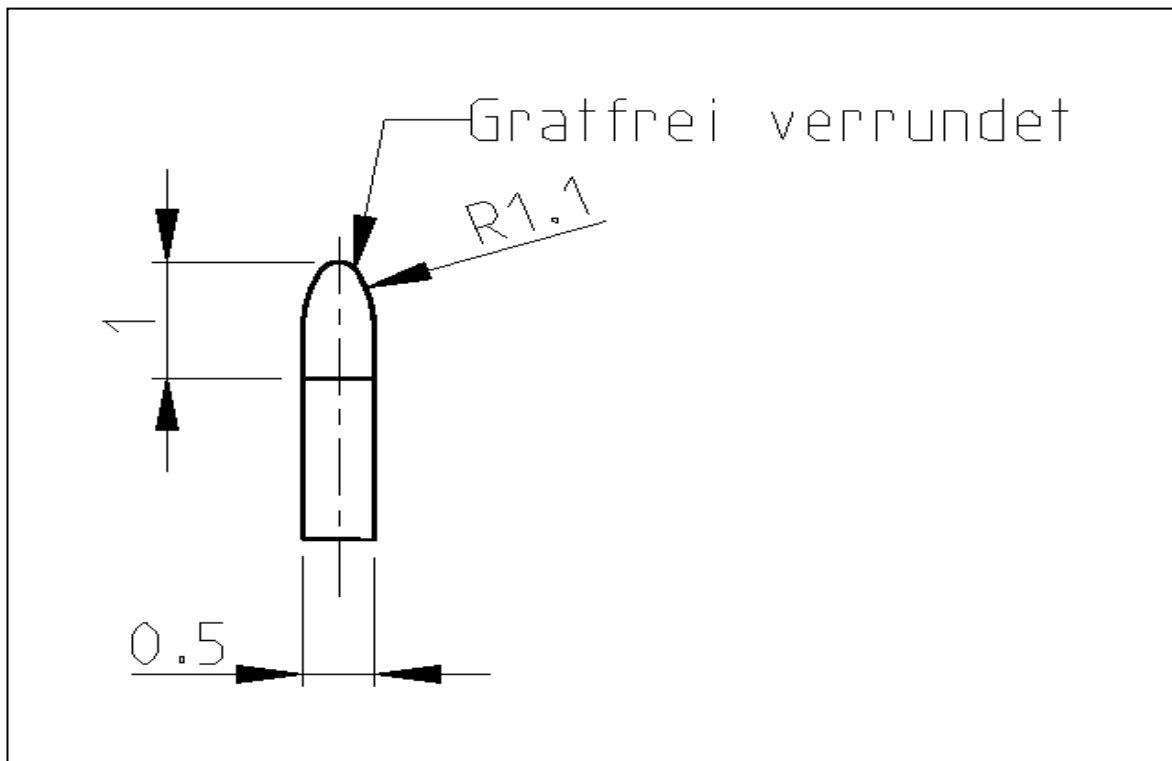
Test Group / Prüfgruppe 22A : **2x36 contacts / Einzelkontakte**

B Test Sequence

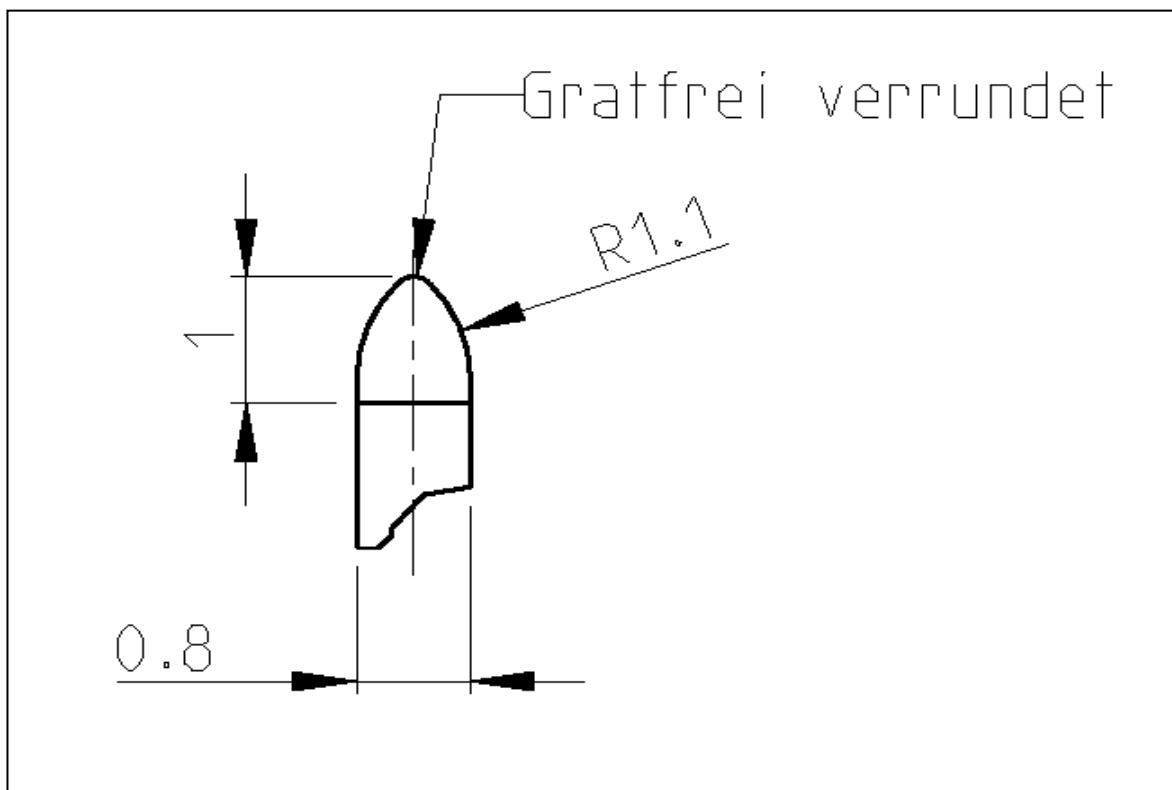
Qualification inspection shall be verified by testing samples as specified in Para. 3.6.

3.7. Counterpart
Counter part / Gegenstueck Tabspitze 0.5

3.7 Gegenstueck



Counterpart / Gegenstueck Tabspitze 0.8



4.2 Requalification Testing

If changes significantly affecting form, fit, or function are made to the product or to the 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 Para. 3.5. 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 Quality Conformance Inspection

The applicable AMP quality inspection plan will 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 1 / Bild 1

Contact with Spring and PCB / Kontakt mit Ueberfeder und Leiterplatte (Drahtversion)

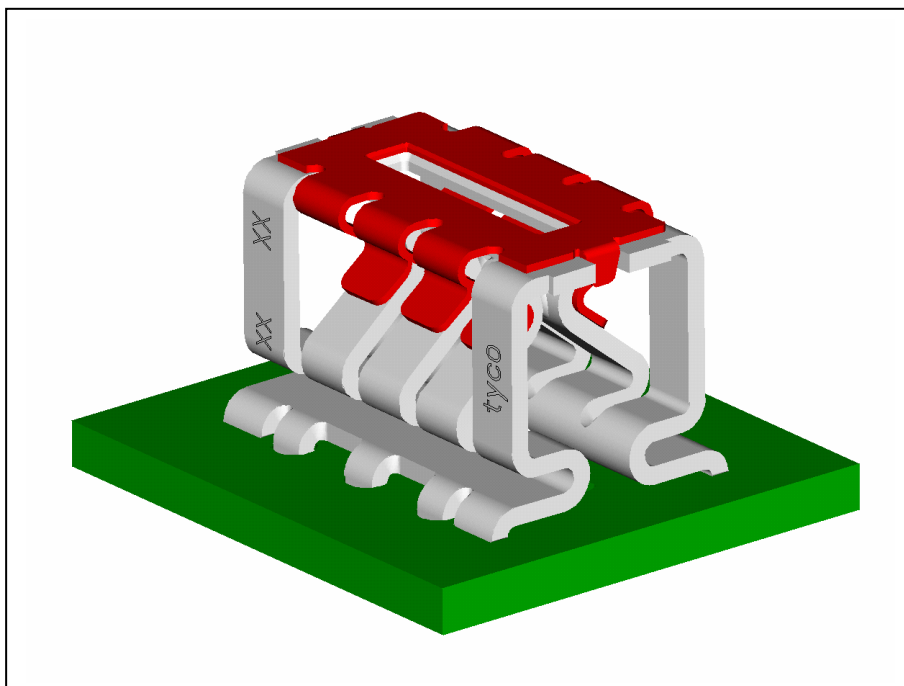


Figure 2 / Bild 2

Contact without Spring / Kontakt ohne Ueberfeder (Drahtversion)

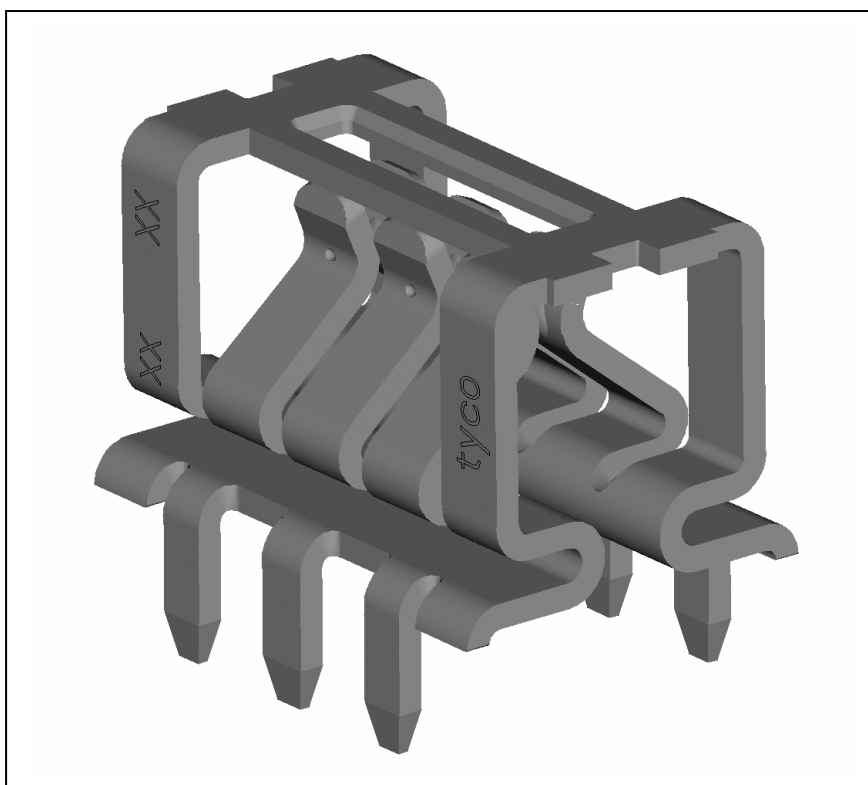


Figure 3 / Bild 3

Contact with Spring and PCB / Kontakt mit Ueberfeder und Leiterplatte (SMC-Version)

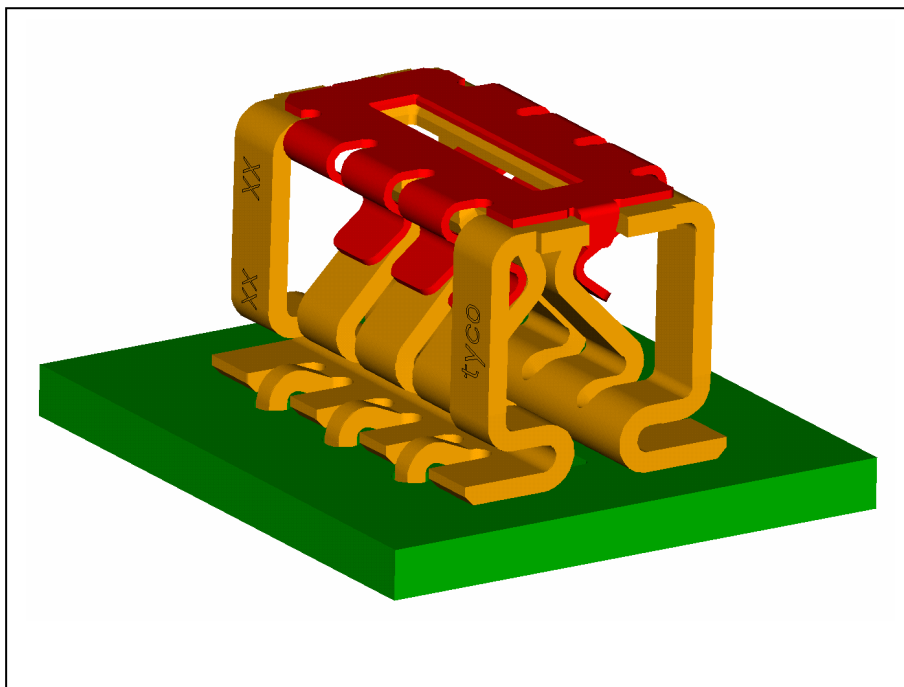


Figure 4 / Bild 4

Contact without Spring / Kontakt ohne Ueberfeder (SMC-Version)

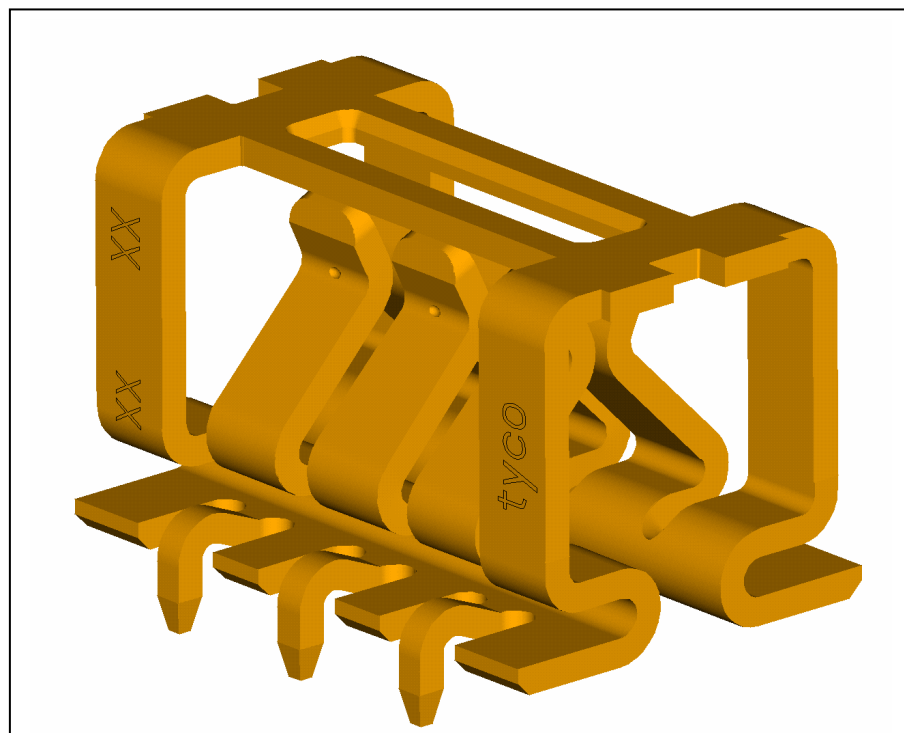
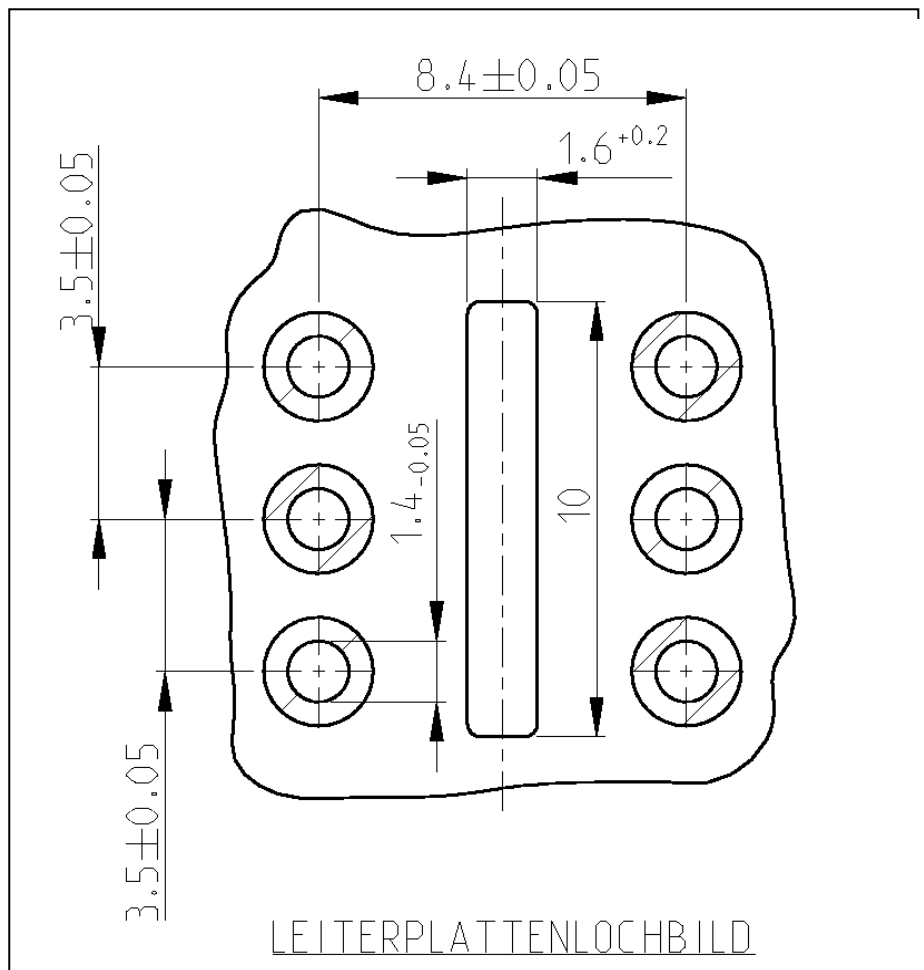


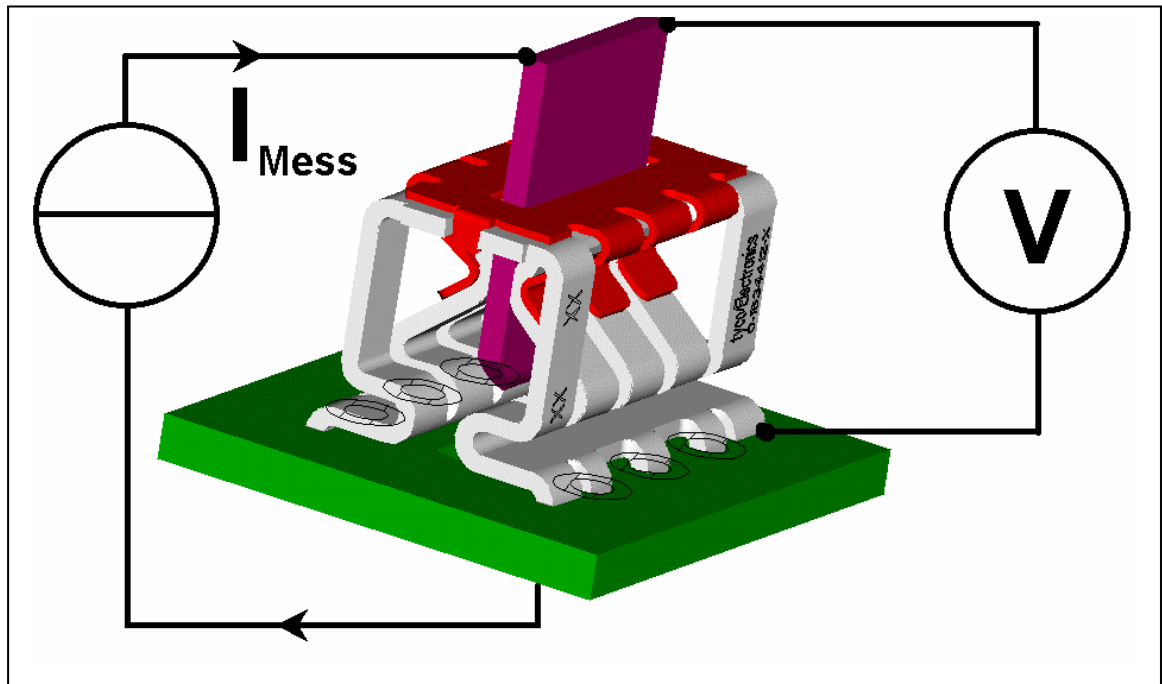
Figure 5 / Bild 5

PC Board Layout / Leiterplatten-Lochbild



- 1 BASE MATERIAL QUALITY: FR-4
Qualität des Basismaterials: FR-4
- 2 PCB THICKNESS: 1,5 –1,8 (BASE MATERIAL INCL. COPPER CLADDING, SINGLE OR DOUBLE SIDED)
Leiterkartendicke: 1,5 –1,8 (Basismaterial incl. Kupferkaschierung, ein- oder doppelseitig)
- 3 COPPER COATING THICKNESS: 50-70 μm
Kupferschichtdicke: 50-70 μm
- 4 PLATING: 5-20 μm ELECTRODEPOSITED Sn OR SnPb 60/40-93/7 OR EQUIVALENT HAL TREATMENT
Oberfläche: 5-20 μm galvanisch Sn oder SnPb 60/40-93/7 oder entsprechende HAL Verzinnung
- 5 NO Ni UNDERPLATING
Keine Ni Sperrschicht

Widerstandsmessung
Resistance measurement
Figure 6 / Bild 6



Annex 1.
Derating curve for PN 1-1534413-2

