

# 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)

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\* Trademark of AMP Incorporated

Product Code : 2131

-	-	-	-	DR	W.Hoffmann	 AMP Deutschland GmbH D-63225 Langen		
-	-	-	-	CHK				
-	-	-	-	APP	Th.Klenner			
-	-	-	-	APP				
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-	-	-	-	DR	TITLE			
-	-	-	-	W.Hoffmann	HIGH	<b>tyco / Electronics / AMP</b>		
-	-	-	-	CHK	PRINTED CIRCUIT BOARD CONN.	AMP Deutschland GmbH		
-	-	-	-	Th.Klenner	D-63225 Langen			
A1	Added de-rating	F. Lupo	24.02.15	APP	NO	REV	LOC	
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## 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.

<b>tyco</b> / <i>Electronics</i> / <b>AMP</b>	AMP Deutschland GmbH D-63225 Langen	PAGE	NO	108-18863	REV	LOC
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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

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### 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.

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Test Description Beschreibung	Requirement Anforderung	Procedure Prüfung
<b>PG 0</b> Entrance examination Eingangskontrolle <b>1.</b> Visual examination/ Sicht - pruefung <b>2.</b> Total resistance/ Gesamtwiderstand	<b>1.</b> Requirement of product drawing/ Zeichnungskonformitaet <b>2.</b> 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
<b>PG 1</b> Dim. inspection/ Massprüfung	For examination see the product drawing/ Pruefen nach Produktzeichnung	Internal control report / Kontrollbericht intern Erstellung EMPB
<b>PG 2</b> Material and surface inspection / Material und Oberflaechepruefung		Spec.118-18009
<b>PG 4</b> Contact overlap / Kontaktueberdeckung	$\leq$ mm	Polished section as theoretical proof/ Theoretischer Nachweis ,je 1 Schliffbild gesteckt
<b>PG 5</b> Load deflection curve / Federkennlinie (Relaxation der Kontaktnormalkraft) <b>1.</b> New condition / Neuzustand <b>2.</b> After temperature storage / nach Temperaturlagerung	<b>1.</b> min. N max. N  <b>2.</b> $\geq 0,5 * F_i$	Measurement with check gauge/ Messung mit Prueflehre 0,8mm (jeweils anderer Federschenkel durch Hilfstab 0,8mm ausgelenkt <b>2.</b> Acc. IEC 60 068-2-2, Test Ba Nach IEC 60 068-2-2, Pruefung Ba +160 C, 1000h <sup>e</sup>
<b>PG 9</b> angular mating / Schraegsteckwinkel <b>1.</b> Visual and dimentional examination / Sicht und Masspruefung <b>2.</b> Gap-size / Öffnungsmaß <b>3.</b> Horizontal mating angular / Stecken unter max. Winkel <b>4.</b> Gap-size / Öffnungsmaß <b>5.</b> same as 1.) / siehe 1.)	<b>1.</b> Requirement of product drawing/ Zeichnungskonformitaet <b>3.</b> 2,5°	<b>1.</b> 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
<p><b>PG 11</b> Mating forces / Steckkräfte</p> <p>1.Mating and unmating forces / Steck – und Ziehkkräfte</p> <p>2.Durability / Steckhaeufigkeit</p> <p>3.Surface control / Oberflaechenpruefung</p>	<p>1. Mating / Stecken: N Unmating / Ziehen: N</p> <p>2. Ag = 5 Steckzyklen/ Ag = 5 mating cycles</p> <p>3. REM analysis after mating / REM Untersuchung nach dem Stecken (beide Steckrichtungen)</p>	<p>Acc. IEC 60 512-7 , Test 13b Nach IEC 60 512-7, Prüfung 13b</p> <p>Acc. IEC 60 512 -5, Test 9a Nach IEC 60 512 -5, Prüfung 9a Examination speed / Pruefgeschwindigkeit = 25mm/min.</p>
<p><b>PG 14</b> Thermal time constant / Thermische Zeitkonstante</p>		<p>1-/2-/3/ times the rated current 1-/2-/3-fachen Nennstrom</p>
<p><b>PG 15</b> Electrical stress test / Elektrischer Stresstest</p> <p>1.Change of temperature / current – endurance test / Temperatur - / Stromwechsel – Dauertest</p> <p>2.Damp heat, cycle / feuchte Waerme, zyklisch</p> <p>3.Change of temperature / current – endurance test / Temperatur - / Stromwechsel – Dauertest</p>	<p><math>R \leq 2,0 \times Ri</math> <math>Ri</math> – initial value / Ausgangswert) <math>\Delta T \leq 20 K</math></p>	<p>Acc. IEC 60 068-2-14Nb / Nach IEC 600 68-2-14Nb</p> <p>1. <math>-40^{\circ}C / 140^{\circ}C (\sqrt{Anb + Ti})</math>, 1 cycle = 6 h, 60 cycles/ 1 Zyklus = 6 h, 60 Zyklen</p> <p>Acc. IEC 60 068-2-30 / Nach IEC 600 68-2-30</p> <p>2. <math>T_u = 25^{\circ}C, T_o = 55^{\circ}</math> rel. Feuchte 95% 1 cycle = 1 day, 21 days/ 1 Zyklus = 1Tag, 21 Tage</p> <p>Acc. IEC 60 068-2-14Nb / Nach IEC 600 68-2-14Nb</p> <p>3. <math>-40^{\circ}C / +150^{\circ}C, (150^{\circ}C -</math> <math>\Delta T</math> ( from derating curve/ aus Derating-Kurve ) 1 cycles = 6 h, 60 cycles/ 1 Zyklus = 6 h, 60 Zyklen</p>
<p>Remarks / Bemerkungen: <b>PG 11</b> 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</p>		

Test Description Beschreibung	Requirement Anforderung	Procedure Prüfung
<p><b>PG 17 Continous flow heater/ Elektr.Durchlaufheizer (EDH)</b></p> <p>Dynamic stress / Dynamische Beanspruchung Installation place: motor, with temperature interference/ Ein - / Anbauort: Motor, mit Temperaturueberlagerung</p> <p><b>PG 17 Interior heater/ Innenraumheizer</b></p> <p>Dynamic stres / Dynamische Beanspruchung</p> <p>Mechanical schock/ Mech. Schock</p>	<p>Acc. DIN 72 300-3, table 2/ gem.DIN 72 300-3 Tabelle 2 Tu = - 40° / To = 110</p> <p>Acc. MB-standard 22 100-4 gem. MB Norm 22 100-4</p> <p>Acc./gem. DIN IEC 60 068 Teil 2-27</p>	<p>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</p> <p>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<sup>2</sup></p> <p>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.</p> <p>10 Shocks/axis / 10 Schocks/Acse Alternation sinusoidal/ Halbwelle sinusfoermig a=50g / 11 ms</p>
<p><b>PG 18 Coast climate stress / Kuestenklimatebeanspruchung</b></p> <p>Only for installing case A / (PTC-heating element only for Tin-plated contacts) Nur für Einbaufall A (PTC-Heizelement und nur fuer verzinte Kontakte)</p>	<p>1.Insulation resistance/ Durchgangswiderstand R ≤2,0 x Rini Ri – initial value / Ausgangswert) 2.Unmating force/Ziehkraft &lt; 1,5 x Fini(Fini – Ausgangswert) „Gesamtdurchgangswiderstand“</p>	<p>1.Acc.IEC 60 068-2-14 Nach IEC 60 068-2-14 Schaerfegrad 1 1 Cycle / Zyklus</p>
<p>Remarks / Bemerkungen:</p>		



Test Description Beschreibung	Requirement Anforderung	Procedure Prüfung
<p><b>PG 19</b> Environmental simulation / Umweltsimulation</p> <p>1. Temperature shock / Temperaturschock</p> <p>2. Change of temperature / Temperaturwechsel</p> <p>3. Storage under dry heat conditions / Lagerung bei trockener Waerme</p> <p>4. Industrial climate (multiple – component climate) / Industrieklima (Mehrkomponentenklima)</p> <p>5. Damp heat, cyclic / Feuchte Waerme, zyklisch</p>	<p>Contact resistance / Durchgangswiderstand</p> <p>unplugged / ungesteckt</p> <p><math>R \leq 4,0 \times R_{ini}</math></p> <p>plugged – in / gesteckt</p> <p><math>R_i</math> – initial value / Ausgangswert</p> <p>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</p>	<p>1. Acc./nach IEC 60 068-2-14 Na</p> <p>-40°C / +130°C je 15min. 144 Zyklen</p> <p>2. Acc. IEC 60 068-2-14 Nb Nach IEC 68 068-2-14 Nb</p> <p>-40°C / +120°C je 3h, Zeit fuer Temp. Wechsel/temperature change max. 2h, 20 Zyklen</p> <p>3. Acc./nach IEC 60 068-2-2, Test/Prüfung Ba</p> <p>120h, 120°C</p> <p>4. Acc./nach IEC 60 068-2-60</p> <p>0,2ppm SO<sub>2</sub>, 0,01ppm H<sub>2</sub>S, 0,2 ppm NO<sub>2</sub> 0,01ppm Cl<sub>2</sub> / 25°C / 75% r.F. /21d, Volume stream=1 m<sup>2</sup>/h Volumenstrom=1m<sup>3</sup>/h</p> <p>5. Acc. IEC 60 068-2-30, Test Db Variante 2 Nach IEC 68 068-2-30, Pruefung Variante 2</p> <p>Relative humidity / Rel. feuchte 95% constant, 10 Zyklen/cycles zu je 24h, T<sub>u</sub> = 25°C, T<sub>o</sub> = 55°C</p> <p>3 Test groups/Pruefgruppen:  a) gesteckt gelagert  1x vorgesteckt  b) gesteckt gelagert,  3 Steckzyklenzahl  c) ungesteckt gelagert</p>
Remarks / Bemerkungen:		

Test Description Beschreibung	Requirement Anforderung	Procedure Prüfung
<b>PG 22A</b> Chemical resistance / Chemische Prüfungen  1. Resistance / Beständigkeit	Additional test / Erweiterter Test  a) Preservative (Wax) Konservierungsmittel (Wachs)  b) Depreservative Entkonservierungsmittel  c) Motoroil/Motoroel SAE 10W-50  d) Internal cleaner Innenreiniger (Meister Propper)  e) Screen cleaner Scheibenreiniger (Scheibenklar Winter 20)  f) Coffaine 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°  rince with water and dry/ mit Wasser spielen 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 Loetbarkeitstest	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, Alterung1
Polished cut image Schliffbild		Cross section within the soldering range Schliff im Loetbereich
Take off the contact from the printed circuit board Abziehen des Kontaktes von der Leiterplatte	Retractile clearly Mating and unmating forces (>>40N) Abreisskraft deutlich groesser als Steck-und Ziehkraefte (>>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
Contact resistance Durchgangswiderstand	2				2,6	2,4
Normal force of the contact Kontaktnormalkraft			3,6			
Gap-Size Kontaktoeffnungsmass			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
Contact resistance Durchgangswiderstand	4,9	2,5	2,4,6,8	2,4,6,8, 11,13	
Mating and Unmating force Steck- und Ziehkraeft	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 Stromerwaermung / Derating	5,10				
Temperature shock Temperatureschock				3	
Change of temperature Temperaturwechsel				5	
Damp heat, cyclic Feuchte Waerme, zyklisch	7			12	
Storage under dry heat conditions Lagerung beirockener Waerme				7	
Salt spray with alternating climate, cyclic Salznebel mit Wechselklima, zyklisch			5		
Industrial climate Industrieklima				10	
Vibration sinusoidal Schwingen, sinusfoermig		3			
Mechanical shock test Mechanisches schocken		4			
Resistance to fluids Medienbestaendigkeit					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**

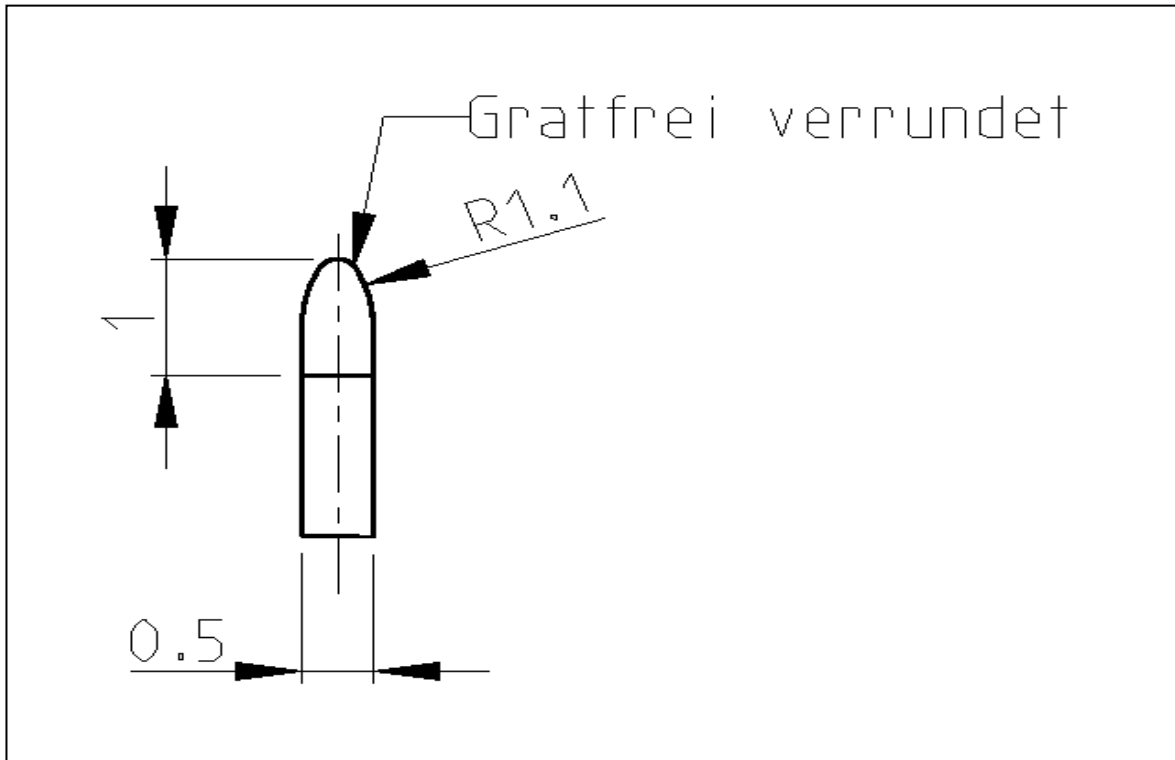
###### B Test Sequence

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

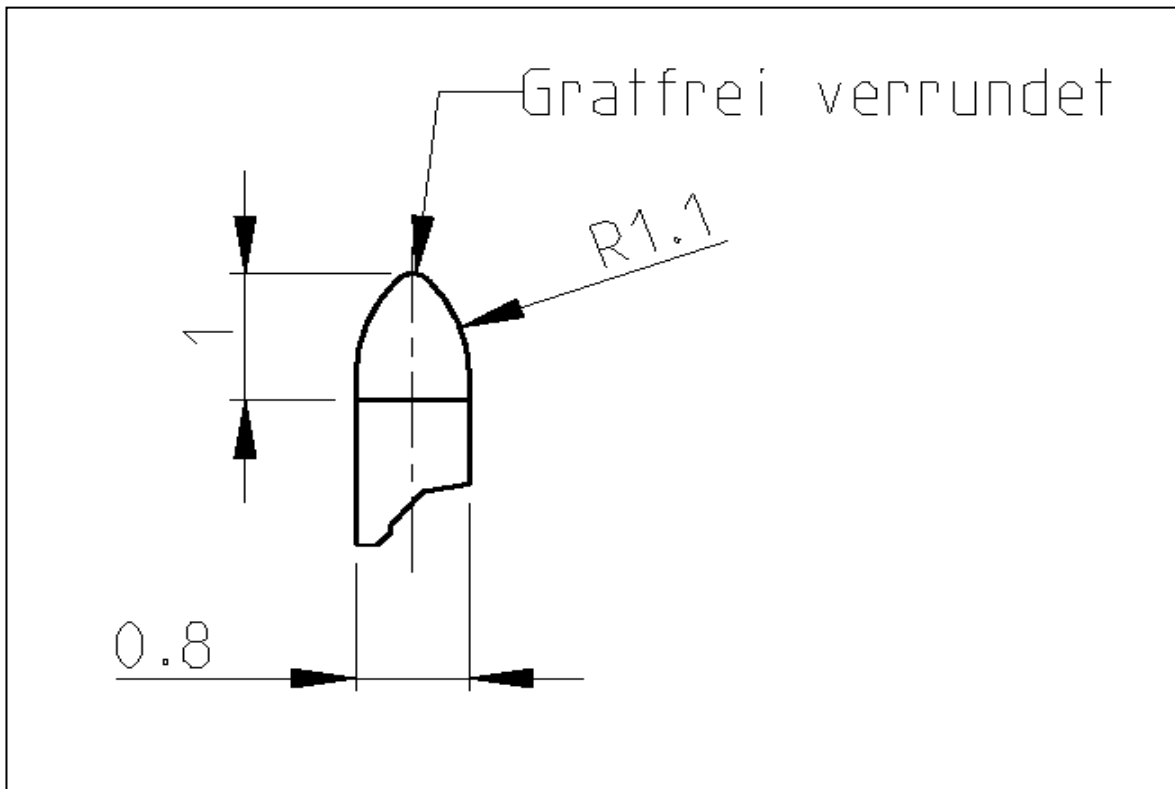
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3.7. Counterpart  
Counter part / Gegenstueck Tabspitze 0.5

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.

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Figure 1 / Bild 1

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

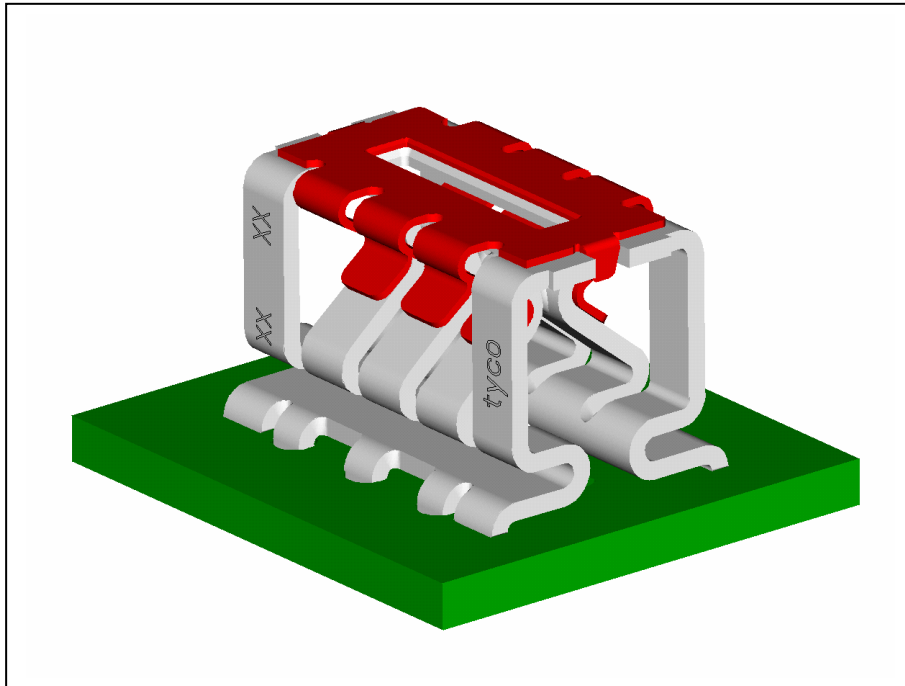


Figure 2 / Bild 2

Contact without Spring / Kontakt ohne Ueberfeder (Drahtversion)

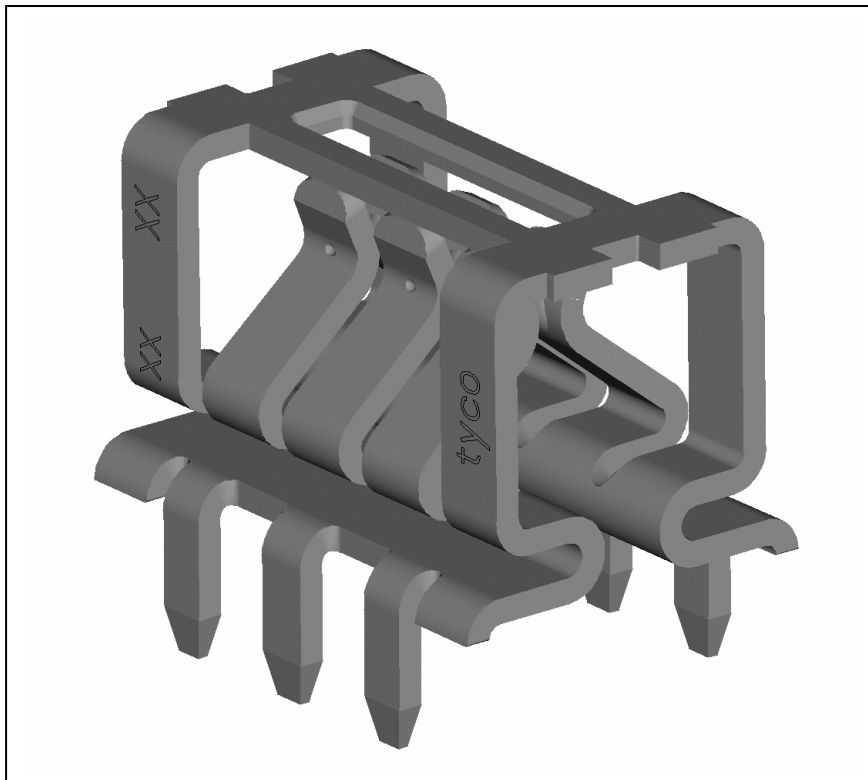




Figure 3 / Bild 3

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

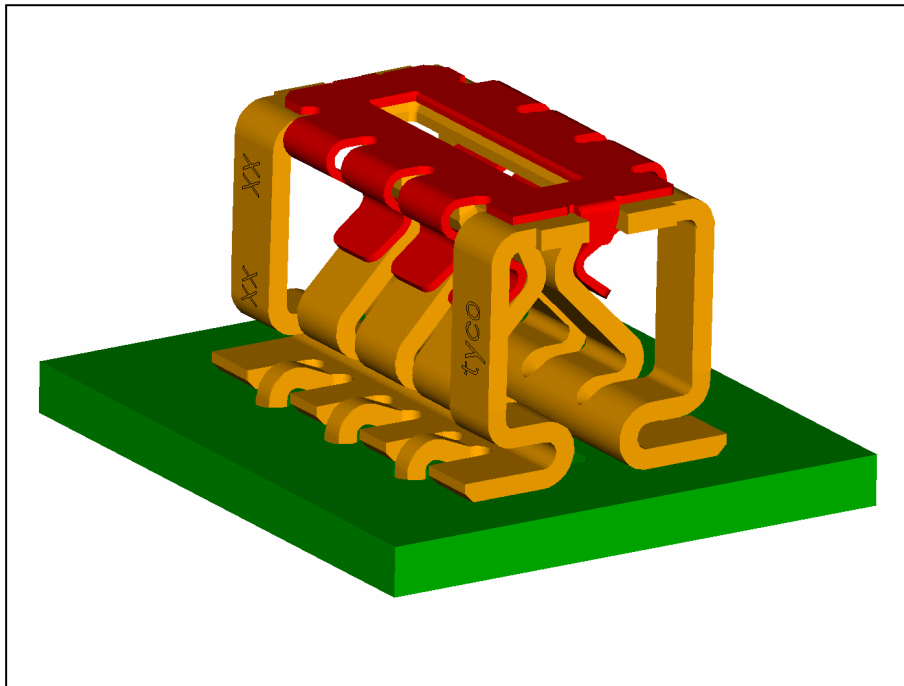


Figure 4 / Bild 4

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

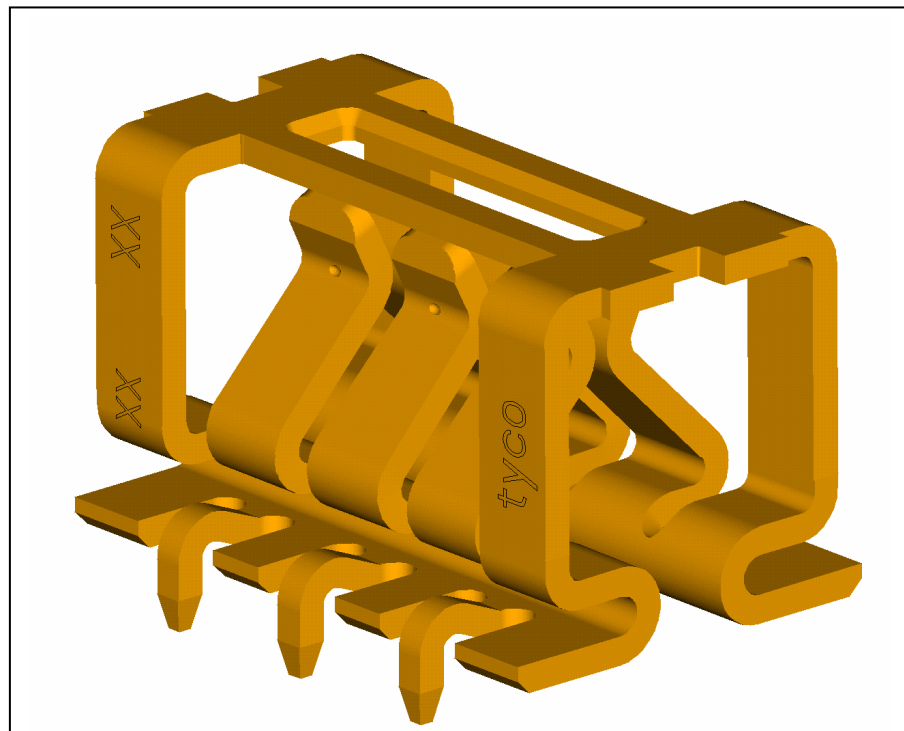
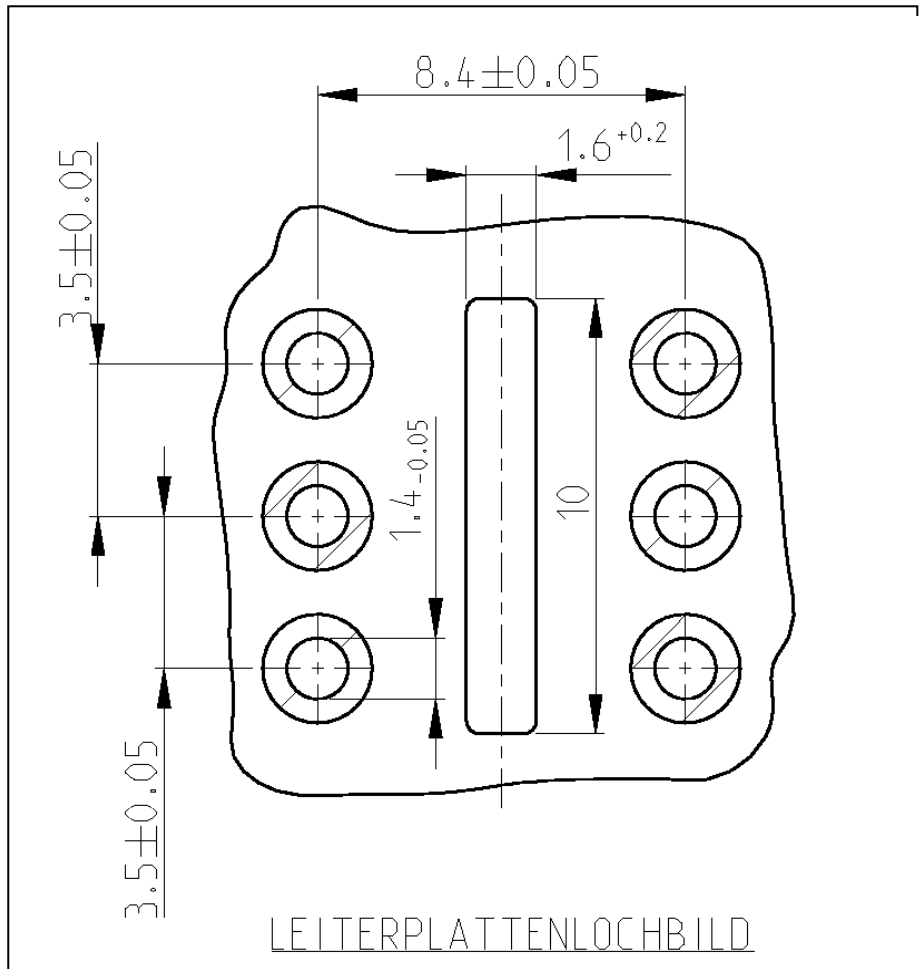


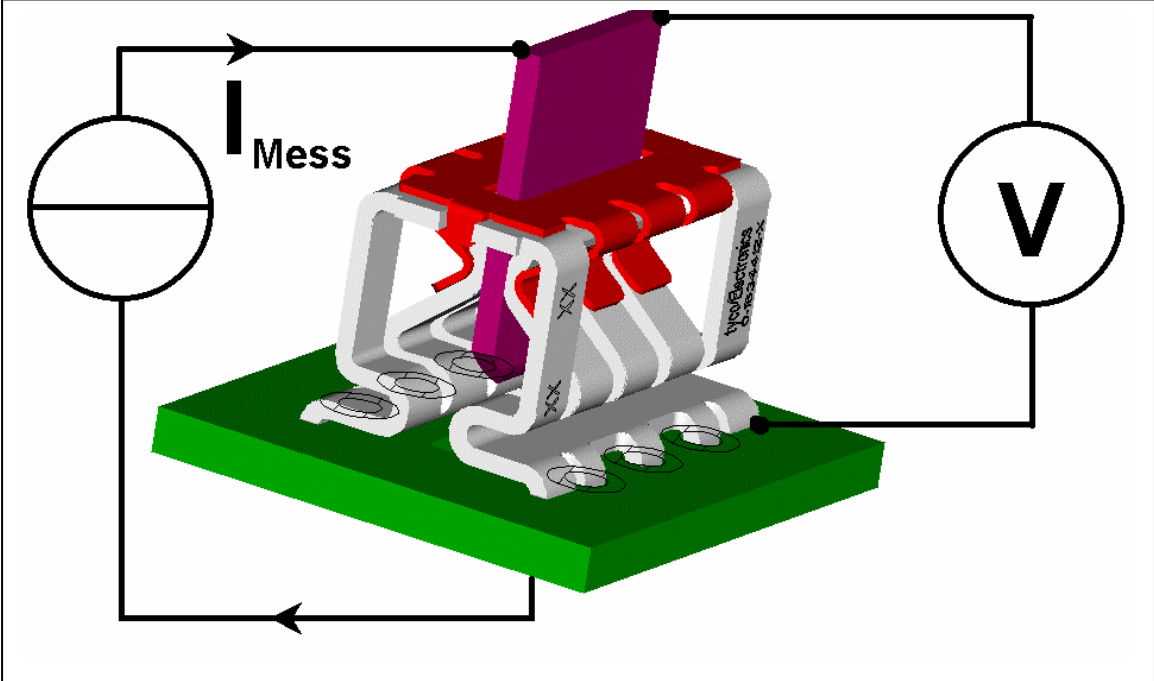
Figure 5 / Bild 5

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  $\mu\text{m}$   
Kupferschichtdicke: 50-70  $\mu\text{m}$
- 4 PLATING: 5-20  $\mu\text{m}$  ELECTRODEPOSITED Sn OR SnPb 60/40-93/7 OR EQUIVALENT HAL TREATMENT  
Oberfläche: 5-20  $\mu\text{m}$  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**

**Hochstromkontakt**

(mit Überfeder)

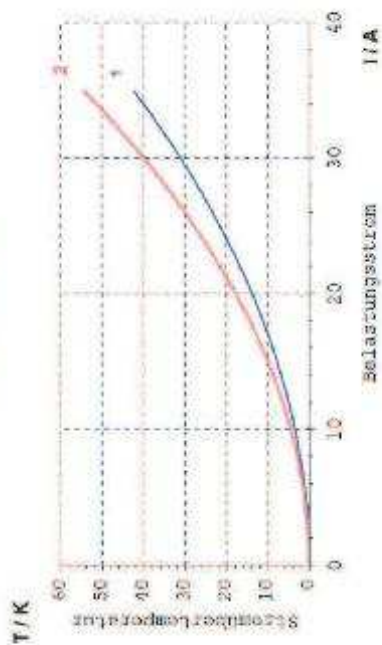
- BUCHSE (PN) : 1-1534413-2 (Rev C - Prod. Datum: 03.04.03)
- MATERIAL : CuNiSi
- LEITERQUERSCHNITT : 4mm<sup>2</sup>
- WERKZEUG : 11-275388
- STIFT : Tabs unispritzl EGL-PC01542-07 (Prod. Datum: 02.04.03)
- MATERIAL : Stahl Utz2 DIN 1624 / verzinkt über Nickel
- LEITERQUERSCHNITT : 4mm<sup>2</sup>
- GEHÄUSE : 12 Testmuster (4 Testmuster/Leiterplatte)
- MESSAUFBAU : Alle Kontakte belastet und gemessen

**tyco Electronics** / **AMP**  
**TEST LABOR**

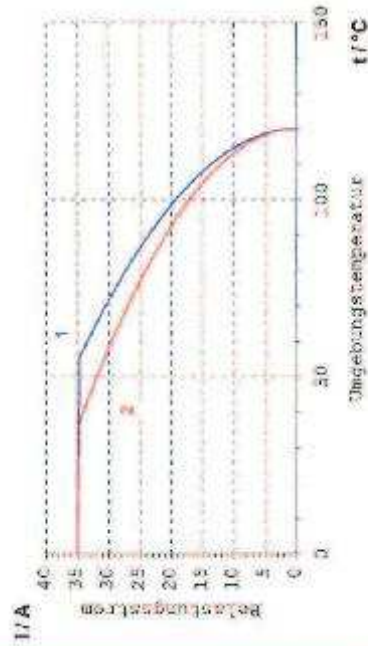


Kurve1: vor 1. Temp./Stromwechsel-Dauerfest  
 Kurve2: nach 2. Temp./Stromwechsel-Dauerfest

**Stromerwärmung**



**Derating - Kurve**



单击下面可查看定价，库存，交付和生命周期等信息

[>>TE Connectivity\(泰科\)](#)