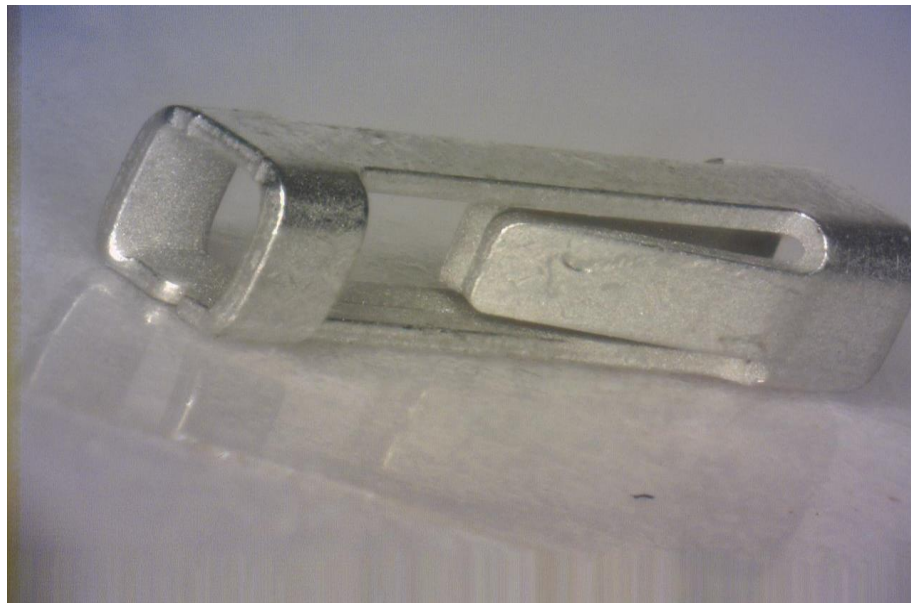




# ZMC Test Document: Part Number 1301 SMT Box Contact

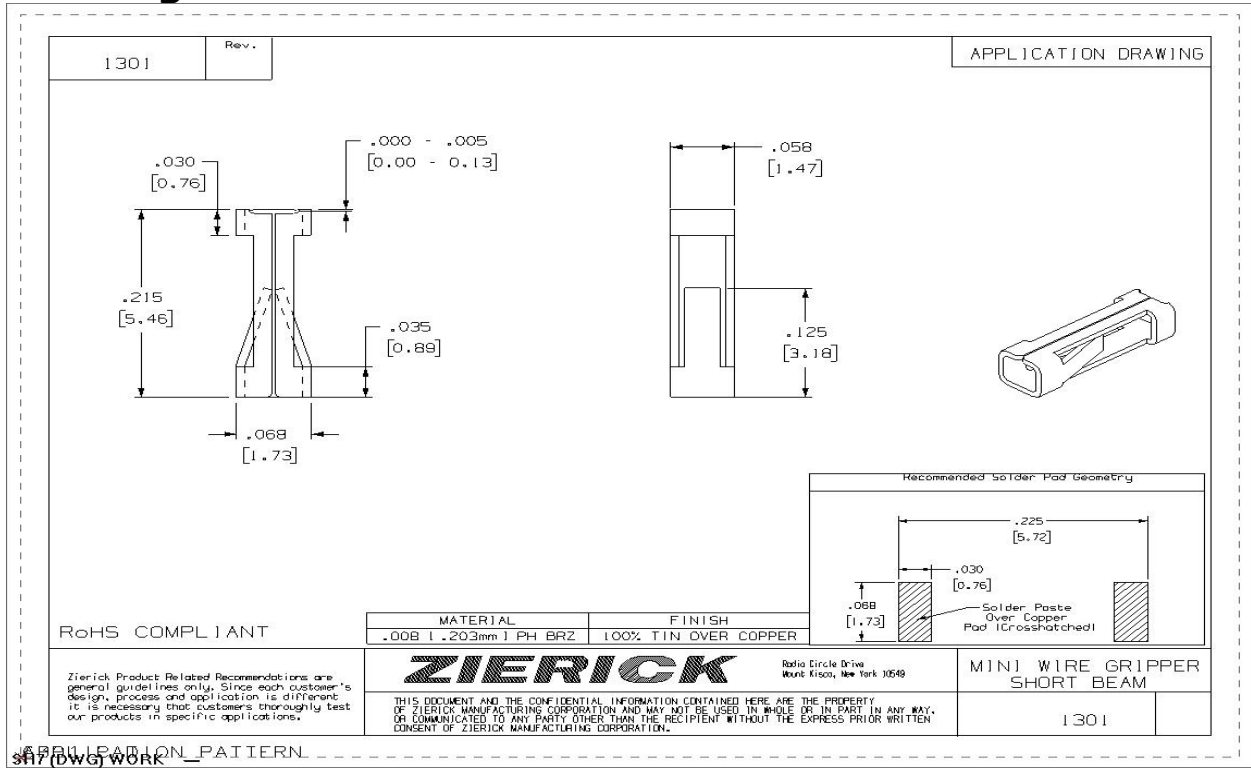
**A newly designed "Box Contact" for 22 gauge and smaller wire or square/round pins.**



## **Uses and Advantages**

- Zierick's newest box contact offers low insertion forces along with a high pressure contact area to assure a reliable connection
- Extremely low profile – can be mounted horizontally or vertically
- The contact is forgiving of placement misalignment
- Designed to work with customers' existing "pick and place" automation and a special feeder – No time consuming hand placement or costly fixtures required
- Can be automated using standard tape feeders
- Underwriters Laboratory Tested and Recognized for over 6 Amps

# Zierick Part Number: 1301 Surface Mount Box Contact for 22 Gauge or Smaller Wire and Pins



## Scope of This Document

This document contains the following test data:

X	Contact Resistance Before and After Thermal Shock
X	Heat Rise
X	Insertion and Withdrawal Force

## Executive Summary

- Data indicate low Contact Resistance both before and after Thermal Shock exposure. There was no visual or statistical degradation on any part as per specifications after Thermal Shock testing. This connector was tested for 25 Thermal Shock cycles. (Table 1)
- Heat Rise Testing (U.L. and EIA Spec) indicates the connector will easily accept amperage up to 6 amps. (Table 2)
- Insertion and Withdrawal Forces (Table 3A-B) are impressively stable for this size contact.

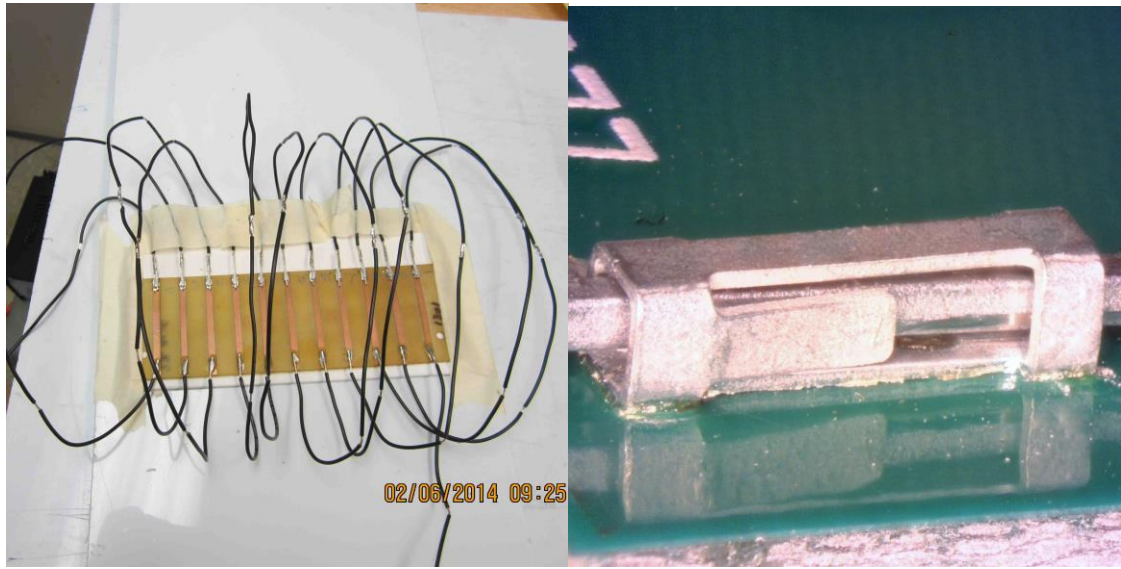
## **A. Low-Level Contact Resistance (LLCR) Before and After Thermal Shock Environmental Testing**

<b>Test Specifications:</b>	<b>Part Number: 1301</b>
Description:	This test determines a baseline for LLCR and shows any degradation after Thermal Shock testing
Follows Standards:	EIA-364-23 (LLCR), EIA-364-32C (Thermal Shock)
Connection Type:	0.025" Square Pin soldered to PVC-covered, stranded wire, UL 1569 CSA 22 AWG
Temp Range:	-55° to 85° Celsius
Cycles:	25

### **Test Method**

The box contact is reflowed to a pad on the PCB. A lead wire is soldered to a 0.025 pin. The pin is then inserted into the box contact. Contact Resistance tests were performed per EIA spec before and after 25 Thermal Shock cycles.

### **Test Setup**



**Test Data - Table 1**

Sample Number	Initial Low Level Contact Resistance, (Before T-Shock) mOhms	Final Low Level Contact Resistance, (After T-Shock) mOhms
1	13.0	13.1
2	12.3	12.1
3	12.2	12.3
4	12.2	11.7
5	12.0	12.0
6	13.1	13.1
7	14.2	14.3
8	16.6	13.7
9	13.2	13.3
10	13.6	13.3
<b>Average</b>	<b>13.2</b>	<b>12.9</b>

**Conclusions/Interpretations**

- LLCR: Initial Contact Resistance is well within range for this type of connector.
- Thermal Shock Resistance: There is no statistical increase in LLCR after 25 Thermal Shock cycles.
- Thermal Shock Mechanical: Typical conditions seen after Thermal Shock conditions include cracking/delamination of finishes, changes in mating and unmating characteristics, hardening or softening of insulation material and opening of seals and seams.

There were NO mechanical failures observed (as described by EIA Standard) after Thermal Shock treatment.

**B. Heat Rise Testing**

This part has been Recognized by Underwriters Laboratory to Specification 1977 (USR) & C22.2 No.182.3 (CNR) as listed in U.L. file #E361770. These connectors have a U.L. rating of at least 6 amps using a .025 round or square pin or wire conductor.

Zierick Mfg. internally tests to EIA standards and the results are presented below.

<b>Test Specifications</b>	<b>Part Number:</b> <b>1301</b>
Description:	Tests approximate Peak Ampacity
Follows Standard:	EIA/ECA-364-70B, Test Condition 5, Test Method 3, Free Air
Connection Type:	0.025" Square Pin soldered to PVC-covered, stranded wire, UL 1569 CSA, 22 AWG
Ambient Temp, degrees	22.7° C

**Test Method**

The setup and photo for this test is the same as for the LLCR. Wire temperature was measured 3" before the array. Contact temperature measured at each sample.

**Test Data - Table 2**

Current, Amps=	1A	2A	3A	4A	5A	6A	7A
Sample Number	Temp Rise, degrees C above ambient	Temp Rise, degrees C above ambient	Temp Rise, degrees C above ambient	Temp Rise, degrees C above ambient	Temp Rise, degrees C above ambient	Temp Rise, degrees C above ambient	Temp Rise, degrees C above ambient
<b>Wire</b>	1.3	2.6	5.1	5.4	7.2	10.9	14.4
<b>1</b>	1.6	4.0	8.6	12.0	17.2	24.5	32.4
<b>2</b>	1.4	3.9	7.2	12.8	25.6	25.6	37.0
<b>3</b>	1.4	4.1	7.3	14.4	18.2	28.2	40.4
<b>4</b>	1.5	4.4	8.6	15.0	19.1	27.8	37.2
<b>5</b>	1.4	4.2	7.9	14.6	18.2	25.6	38.9
<b>6</b>	1.5	4.3	6.8	14.8	19.4	28.8	40.0
<b>7</b>	1.4	4.4	6.8	13.8	19.1	29.5	39.2
<b>8</b>	1.4	4.5	7.6	14.1	19.0	29.4	37.4
<b>9</b>	1.5	4.5	7.2	12.6	18.5	27.0	39.4
<b>10</b>	1.5	4.4	7.9	13.0	19.2	28.1	43.4
<b>Average</b>	<b>1.5</b>	<b>4.3</b>	<b>7.6</b>	<b>13.7</b>	<b>19.4</b>	<b>27.5</b>	

**Conclusions/Interpretations**

The Heat Rise (Ampacity) test was conducted in open air. All test contacts handled at least 6 Amps before exceeding the accepted increase of 30 degrees C.

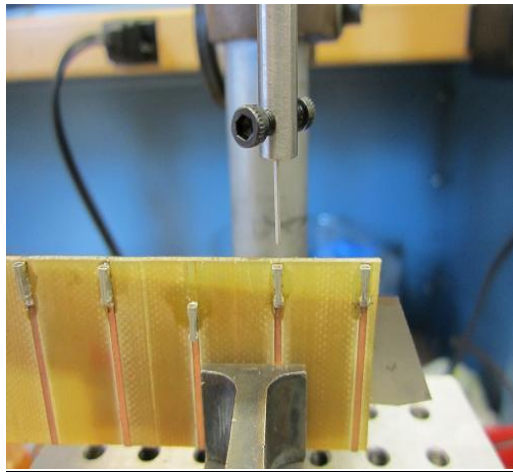
## **C. Insertion/Withdrawal Force Test**

<b>Test Specifications</b>	<b>Part Number:</b>	<b>1301</b>
Description:	Insertion and withdrawal force from box connector	
Follows Standard:	EIA 364-05B	
Connection Type:	0.025" Square Pin or a 0.025 Round Pin	

### **Test Method**

The contact is soldered to a standard PCB. The wire is soldered to a 0.025 pin and is inserted into the contact. The force of insertion is measured with a calibrated force gauge. Withdrawal data similarly measured. Tests were performed with the seam side of the connector soldered to the PCB.

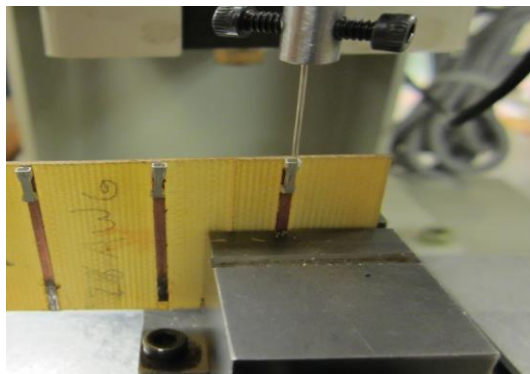
### **Test Setup-Square Pin**



### **Test Data Table 3A - Square Pin**

Sample Number	Insertion Force X-Axis, Lbs	Withdraw Force X-Axis, Lbs
1	1.0	0.9
2	1.1	1.2
3	1.2	1.1
4	1.0	1.0
5	1.2	1.2
<b>Average</b>	<b>1.1</b>	<b>1.1</b>

### **Test Setup- Round Pin**



### **Test Data Table 3B - Round Pin**

Sample Number	Insertion Force X-Axis, Lbs	Withdraw Force X-Axis, Lbs
1	0.7	0.3
2	0.8	0.4
3	0.6	0.4
4	0.9	0.7
5	0.8	0.7
<b>Average</b>	<b>0.76</b>	<b>0.50</b>

### **Conclusions/Interpretations**

The recorded forces will not stress a standard PCB, a wire or a typical pin.

## **E. Fact**

All electronic connectors and components on a PCB are part of an engineered system. Variations in the wire, the type of board, proximity of other components and the soldering/manufacturing processes will influence test results.

Zierick's Engineers are available to discuss the specifics of your application.

## **F. Final Thoughts**

An excellent choice when the application calls for a "low profile" connector with reasonable insertion and withdrawal forces. The six amp current capacity is impressive for such a small part.

## **G. Contact Zierick**

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**Website: [www.zierick.com](http://www.zierick.com)**