AMP

QUALIFICATION TEST REPORT

7100 SERIES DIP SWITCH

501-128 Rev. B

Product Specification:	108-7532, Rev. C
CTL No.:	CTL4534-008-006
	CTL4534-004-004
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Prepared By:	Terrance M. Shingara
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Corporate Test Laboratory Harrisburg, Pennsylvania

Table of Contents

AMP

AMP INCORPORATED

HARRISBURG, PENNSYLVANIA 17105 PHONE: 717-564-0100 TWX: 510-657-4110

CORPORATE TEST LABORATORY

Qualification Test Report
7100 Series DIP Switch

1. Introduction

1.1 Purpose

Testing was performed on AMP* 7100 Series DIP Switch to determine its conformance to the requirements of AMP Product Specification 108-7532, Rev. C.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the 7100 Series DIP Switch, manufactured by the Integrated Circuit Connector Products Division of the Capital Goods Business Sector. The testing was performed between February 12, 1990 and August 20, 1990.

1.3 Conclusion

The 7100 Series DIP Switch meets the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-7532, Rev. C.

* Trademark

1.4 Product Description

The AMP 7100 Series DIP Switch is designed for programming applications where the number of cycles per pole is limited. These single pole, single throw switches have been designed for a life of 2000 cycles per pole, and feature contacts of copper alloy with .000030 gold over nickel plating in the contact area. The housing material is a glass-filled polyester, 94V-0 rated. The rocker is polyester, 94V-0.

1.5 Test Samples

The test samples were randomly selected from normal current production lots, and the following part numbers were used for test:

Test Group	Quantity	Part Number	Description
1 thru 6	3 ea.	3-382396-9	8 pos SPST Standard
7	1	3-382396-9	8 pos SPST Standard
1 thru 6	3 ea.	2-435668-8	8 pos SPST Low Profile
7	1	2-435668-8	8 pos SPST Low Profile

1.6 Qualification Test Sequence

	Test Groups						
Test or Examination	1	2	3	4	5	6	7
Examination of Product	1,7	1,8	1,7	1,5	1,5	1,3	1,4
Termination Resistance, Dry Circuit	3,5			2,4	2,4		
Dielectric Withstanding Voltage		3,7					
Insulation Resistance		2,6					
Electrical Stability			6				
Capacitance			2				
Vibration							2
Physical Shock							3
Terminal Strength, Pull Test			3				
Terminal Strength, Bend Test			4				
Durability	4						
Actuation Force	2,6						
Solderability						2	
Resistance to Soldering Heat			5				
Thermal Shock		4					
Humidity-Temperature Cycling		5					
Mixed Flowing Gas				3			
Temperature Life					3		

The numbers indicate sequence in which tests were performed.

2. Summary of Testing

2.1 Examination of Product - All Groups

All samples submitted for testing were selected from normal current production lots. They were inspected and accepted by the Product Assurance Department of the Capital Goods Business Sector.

2.2 Termination Resistance, Dry Circuit - Groups 1, 4, 5

All termination resistance measurements, taken at 50 milliamperes dc and 50 millivolts open circuit voltage, were less than 50 milliohms initially and 100 milliohms after testing.

Test Group	No. of Samples	Condition	Max.	Mean
1	48	Initial	29.16	19.46
		After Durability	79.68	16.13
4	48	Initial	26.99	18.97
		After Mixed Gas	20.57	16.96
5	48	Initial	26.30	19.21
		After Temperature Life	24.51	18.20

All values in milliohms

2.3 Dielectric Withstanding Voltage - Group 2

No dielectric breakdown or flashover occurred, when a test voltage was applied between adjacent switch circuits.

2.4 Insulation Resistance - Group 2

All insulation resistance measurements were greater than 1000 megohms.

2.5 Electrical Stability - Group 3

The maximum temperature rise above ambient was 6.5°C with 1.0 ampere current applied.

2.6 Capacitance - Group 2

All capacitance measurements were less than 5.0 picofarads.

2.7 Vibration - Group 7

No discontinuities of the contacts were detected during vibration. Following vibration, no cracks, breaks, or loose parts on the switch assemblies were visible.

2.8 Physical Shock - Group 7

No discontinuities of the contacts were detected during physical shock. Following physical shock testing, no cracks, breaks, or loose parts on the switch assemblies were visible.

2.9 Terminal Strength, Pull Test - Group 3

No physical damage occurred to the samples as a result of terminal strength, pull test.

2.10 Terminal Strength, Bend Test - Group 3

No physical damage occurred to the samples as a result of terminal strength, bend test.

2.11 Durability - Group 1

No physical damage occurred to the samples as a result of 2000 actuations.

2.12 Actuation Force - Group 1

All actuation force measurements were between 6 and 24 ounces. After durability and a 3 pound actuation load, the switches operated normally.

2.13 Solderability - Group 6

The contact leads had a minimum of 95% solder coverage.

2.14 Resistance to Soldering Heat - Group 3

No physical damage occurred to the samples as a result of exposure to soldering heat.

2.15 Thermal Shock - Group 2

No evidence of physical damage to either the contacts or the switch was visible as a result of thermal shock.

2.16 Humidity-Temperature Cycling - Group 2

No evidence of physical damage to either the contacts or the switch was visible as a result of exposure to humidity temperature cycling.

2.17 Mixed Flowing Gas - Group 4

No evidence of physical damage to either the contacts or the switch was visible as a result of exposure to the pollutants of mixed flowing gas.

2.18 Temperature Life - Group 5

No evidence of physical damage to either the contacts or the switch was visible as a result of exposure to an elevated temperature.

3. Test Methods

3.1 Examination of Product

Product drawings and inspection plans were used to examine the samples. They were examined visually and functionally.

3.2 Termination Resistance, Low Level

Termination resistance measurements at low level current were made, using a four terminal measuring technique (Figure 1). The test current was maintained at 100 milliamperes dc, with an open circuit voltage of 50 millivolts dc.

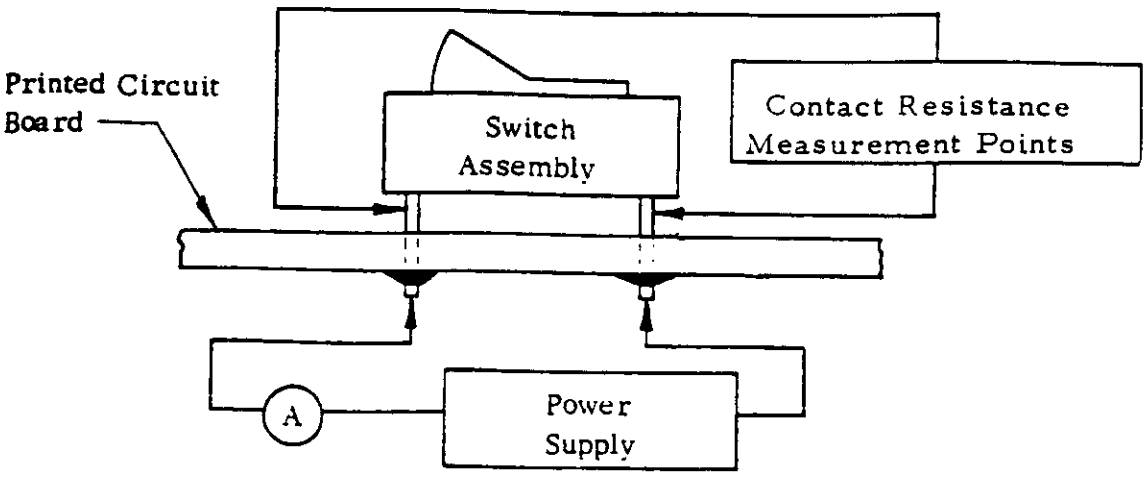

Figure 1
Typical Termination Resistance Measurement Points

3.3 Dielectric Withstanding Voltage

A test potential of 500 vdc was applied between the adjacent and opposite switch contacts. This potential was applied for one minute and then returned to zero.

3.4 Insulation Resistance

Insulation resistance was measured between adjacent and opposite contacts, using a test voltage of 100 volts dc. This voltage was applied for two minutes before the resistance was measured.

3.5 Electrical Stability

Switch temperature was measured while energized at the specified current of 1.0 ampere. Thermocouples were attached to the switch legs to measure their temperatures. This temperature was then subtracted from the ambient temperature to find the temperature rise. When three readings at five minute intervals were the same, the readings were recorded.

3.6 Capacitance

Capacitance was measured between the adjacent closed switch contacts, using a test frequency of 100 kilohertz.

3.7 Vibration, Sine

Closed switches were subjected to sinusoidal vibration, having a simple harmonic motion with an amplitude of 0.06 inch, double amplitude. The vibration frequency was varied logarithmically between the limits of 10 and 2000 Hz and returned to 10 Hz in 20 minutes. This cycle was performed 12 times in each of three mutually perpendicular planes, for a total vibration time of 12 hours. Switches were monitored for discontinuities greater than ten microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.8 Physical Shock

Closed switches were subjected to a physical shock test, having a half sine waveform of 50 gravity units (g peak) and a duration of 11 milliseconds. Three shocks in each direction were applied along the three mutually perpendicular planes, for a total of 18 shocks. The switches were monitored for discontinuities greater than ten microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.9 Terminal Strength, Pull Test

Ten random switch legs had an axial load of two pounds applied.

3.10 Terminal Strength, Bend Test

Ten random switch legs were subjected to one 45° bend cycle. The cycle consisted of bending the leg 45°, returning to normal, then bending 45°in the opposite direction.

3.11 Durability

Switches were cycled 2000 times with a 24 vdc, 25 ma. resistive load.

3.12 Actuation Force

Force required to close/open each contact was applied to each switch rocker. This force was measured. After durability, a three pound actuation force was applied, and each switch was inspected for damage.

3.13 Solderability

Switch assembly contact solder tails were subjected to a solderability test by immersing them in an active flux for 5 to 10 seconds, allowed to drain for 10 to 60 seconds, then held over molten solder without contact for 2 seconds. The solder tails were then immersed in the molten solder at a rate of approximately one inch per second, held for 3 to 5 seconds, then withdrawn. After cleaning in isopropyl alcohol, the samples were visually examined for solder coverage. The solder used for testing was 60/40 tin lead composition and was maintained at a temperature of 245°C.

3.14 Resistance to Soldering Heat

Switches were inserted into PC boards and immersed in a solder bath for 10 seconds. The solder bath was maintained at 260°C. The switch legs were immersed in a type "R" flux before testing.

3.15 Thermal Shock

Switches were subjected to five cycles of temperature extremes, with each cycle consisting of 30 minutes at each temperature. The temperature extremes were -55°C and 105°C. The transition between temperatures was less than one minute.

3.16 Humidity-Temperature Cycling

Switches were exposed to 10 cycles of humidity-temperature cycling. Each cycle lasted 24 hours and consisted of cycling the temperature between 25°C and 65°C twice, while the relative humidity was held at 95%.

3.17 Mixed Flowing Gas, Class II

Switches were exposed for 20 days to an mixed flowing gas Class II exposure. Class II exposure is defined as a temperature of 30°C, and a relative humidity of 70% with the pollutants of Cl_2 at 10 ppb, NO_2 at 200 ppb, and H_2S at 10 ppb.

3.18 Temperature Life

Switches were exposed to a temperature of 85°C for 96 hours.

4. Validation

Prepared by:

Terrance M. Shingara 8/28/90
Terrance M. Shingara
Test Engineer
Design Assurance Testing
Corporate Test Laboratory

Reviewed by:

Richard A. Groft 8/29/90
Richard A. Groft
Supervisor
Design Assurance Testing
Corporate Test Laboratory

Approved by:

Jerry L. Gray 9/7/90
Jerry Gray
Manager
Quality Assurance
Integrated Circuit Connector Division