

# Automotive Qualification Results Summary for ADuM1400W/ADuM1401W/ADuM1402W Die Revision, Assembly Site Transfer, Test Platform Migration, Data Sheet and MSL Rating Change

QUALIFICATION PLAN / STATUS			
TEST	SPECIFICATION	SAMPLE SIZE	RESULTS
High Temperature Operating Life (HTOL)*	JEDEC <i>JESD22-A108</i>	<b>8x77 1x45</b>	<b>Pass</b>
Highly Accelerated Stress Test (HAST)*	JEDEC <i>JESD22-A110</i>	<b>9x77</b>	<b>Pass</b>
Temperature Cycle (TC)*	JEDEC <i>JESD22-A104</i>	<b>9x77</b>	<b>Pass</b>
Autoclave (AC)*	JEDEC <i>JESD22-A102</i>	<b>9x77</b>	<b>Pass</b>
High Temperature Storage Life (HTSL)	JEDEC <i>JESD22-A103</i>	<b>9x77</b>	<b>Pass</b>
Solder Heat Resistance (SHR)*	JEDEC/IPC <i>J-STD-020</i>	<b>3x10</b>	<b>Pass</b>
Latch-Up	JEDEC <i>JESD78</i>	<b>1x9</b>	<b>Pass ±100mA @ +8.25V</b>
Electrostatic Discharge <i>Human Body Model</i>	ESDA/JEDEC <i>JS-001</i>	<b>1x18</b>	<b>Pass ±4000V</b>
Electrostatic Discharge <i>Field-Induced Charged Device Model</i>	JEDEC <i>JESD22-C101</i>	<b>1x18</b>	<b>Pass ±1250V</b>

\* Pre- and post-stress electrical test was performed at room and hot temperatures. These samples were subjected to preconditioning (per J-STD-020 Level 3) prior to the start of the stress test. Level 3 preconditioning consists of the following: Bake: 24 hrs @ 125°C, Unbiased Soak: 192 hrs @ 30°C, 60%RH, Reflow: 3 passes through an oven with a peak temperature of 260°C.

# TEST PRODUCT QUALIFICATION REPORT

**TITLE:**

ADuM1400W/ADuM1401W/ADuM1402W SOIC\_W  
Test Platform Migration from CTS 5040 to Teradyne  
Microflex

**PCN NUMBER:**

16\_0209

**REVISION:**

A

**DATE:**

November 08, 2016

## SUMMARY

The ADuM1400W/ADuM1401W/ADuM1402W are quad-channel digital isolators based on Analog Devices, Inc., *iCoupler*® technology. Combining high speed CMOS and monolithic air core transformer technology, these isolation components provide outstanding performance characteristics superior to alternatives, such as optocoupler devices. This product is being tested on the CTS5040 which is a constrained ADI manufactured tester. The proposed change is to add a new test capability on Microflex which is being manufactured by Teradyne.

There is no change to the form, fit, function, quality or reliability of the transferred parts.

This report documents the result of the evaluations done to qualify the Teradyne Microflex as an additional platform for testing the ADuM1400W/ADuM1401W/ADuM1402W devices.

## TEST AND PRODUCT INFORMATION

Devices(Generics):	ADuM1400/ADuM1401/ADuM1402
Package:	SOIC_W
Leads:	16
Parts Affected:	ADUM1400WSRWZ ADUM1400WSRWZ-RL ADUM1400WTRWZ ADUM1400WTRWZ-RL  ADUM1401WSRWZ ADUM1401WSRWZ-RL ADUM1401WSRWZ55 ADUM1401WSRWZ55-RL ADUM1401WTRWZ ADUM1401WTRWZ-RL ADUM1401WTRWZ55 ADUM1401WTRWZ55-RL  ADUM1402WSRWZ ADUM1402WSRWZ-RL ADUM1402WSRWZ55 ADUM1402WSRWZ55-RL ADUM1402WTRWZ ADUM1402WTRWZ-RL
Current Platform:	CTS5040 with MT9308_PB_RW handler
New Platform:	Teradyne Microflex with MT9308_PB_RW handler

**Description and Test Results** (Taken from the Test Platform Migration Criteria)

Table 1 & Table 2 provide a description of the qualification tests conducted and corresponding test results for ADuM1400W/ADuM1401W/ADuM1402W. All the units have undergone electrical tests on both the CTS5040 and Teradyne MicroFlex test platforms. Any device that did not meet the electrical qualification requirements, without further analysis and data to prove passing the qualification would be considered failed.

Table 1: Test Product Correlation Criteria

Model	Package	Testing Site	CTS5040 Test Lot Size	MicroFlex Test Lot Size	Mean Shift [(platform1 – platform2 ) / SW GB] < 1
ADuM1400WSRWZ	SOIC_W	ADGT	100	100	Reviewed and Passed
ADuM1400WTRWZ	SOIC_W	ADGT	100	100	Reviewed and Passed
ADuM1401WSRWZ	SOIC_W	ADGT	100	100	Reviewed and Passed
ADuM1401WTRWZ	SOIC_W	ADGT	100	100	Reviewed and Passed
ADuM1402WSRWZ	SOIC_W	ADGT	100	100	Reviewed and Passed
ADuM1402WTRWZ	SOIC_W	ADGT	100	100	Reviewed and Passed

Table 2: Test Product Guard banding (GB) Criteria

Model	Package	Testing Site	CTS5040 Test Lot Size	MicroFlex Test Lot Size	GB (5.5* Sigma + Delta Means) NI_STS_GP GB = or < SW GB or Microflex GB
ADuM1400WSRWZ	SOIC_W	ADGT	100	100	Reviewed and Passed
ADuM1400WTRWZ	SOIC_W	ADGT	100	100	Reviewed and Passed
ADuM1401WSRWZ	SOIC_W	ADGT	100	100	Reviewed and Passed
ADuM1401WTRWZ	SOIC_W	ADGT	100	100	Reviewed and Passed
ADuM1402WSRWZ	SOIC_W	ADGT	100	100	Reviewed and Passed
ADuM1402WTRWZ	SOIC_W	ADGT	100	100	Reviewed and Passed

Table 3 shows results of the qualification lots run for the ADuM1400W/ADuM1401W/ADuM1402W. The qualification lots have undergone electrical test on both CTS5040 and Teradyne MicroFlex test platforms. Any deviation on the lot qualification run criteria without further analysis and data to prove a passing qualification would be considered a failed qualification lot run.

Table 3: Test Product Qualification Results

Model	Package	Lot number	Lot Size	Good units passed on both test platforms?	Reject units failed on the same test parameter for both test platforms?
ADuM1400WSRWZ	SOIC_W	AM69292.1	300	Yes	Yes
ADuM1400WSRWZ	SOIC_W	AM89286.1	300	Yes	Yes
ADuM1400WTRWZ	SOIC_W	LS982369.6	300	Yes	Yes
ADuM1400WTRWZ	SOIC_W	LS982369.7	300	Yes	Yes
ADuM1401WSRWZ	SOIC_W	AK15800.19	100	Yes	Yes
ADuM1401WTRWZ	SOIC_W	LS994330.3	300	Yes	Yes
ADuM1401WTRWZ	SOIC_W	LS994330.4	300	Yes	Yes
ADuM1402WSRWZ	SOIC_W	AM89287.1	300	Yes	Yes
ADuM1402WSRWZ	SOIC_W	AM89287.2	300	Yes	Yes
ADuM1402WTRWZ	SOIC_W	AM66480.1	150	Yes	Yes
ADuM1402WTRWZ	SOIC_W	AM66480.2	150	Yes	Yes

**Approvals**

Technical Review Board (TRB)

**Supporting Document**

TRB# 10824

TEST

PRODUCT

QUALIFICATION

REPORT

**TITLE:**

ADuM1400W/ADuM1401W/ADuM1402W SOIC\_W  
High Voltage Test Platform Migration from Harris-  
Tuvey to MPS at ADGT

**PCN NUMBER:**

**16\_0209**

**REVISION:**

A

**DATE:** November 8, 2016

## SUMMARY

The ADuM1400W/ADuM1401W/ADuM1402W are quad-channel digital isolators based on Analog Devices, Inc., *iCoupler*® technology. Combining high speed CMOS and monolithic air core transformer technology, these isolation components provide outstanding performance characteristics superior to alternatives, such as optocoupler devices. In accordance with UL and VDE standards, these products are high voltage tested using the Harris-Tuvey 9464 test platform, an aging and limited manufacturing test platform. The proposed change is to add new high voltage test capability using the MPS PD test platform manufactured by MPS Mess- & Prüfsysteme GmbH.

This report documents the result of the evaluations done to qualify the MPS PD tester as an additional high voltage test platform for the ADuM1400W/ADuM1401W/ADuM1402W.

Test product qualification was performed according to Analog Devices Specifications (TST00094/TST00095 – Test Platform Migration Specification).

## TEST AND PRODUCT INFORMATION

Device(Generic):	ADuM1400/ADuM1401/ADuM1402	
Package:	SOIC_W	
Leads:	16	
Parts Affected:	ADUM1400WSRWZ ADUM1400WSRWZ-RL ADUM1400WTRWZ ADUM1400WTRWZ-RL  ADUM1401WSRWZ ADUM1401WSRWZ-RL ADUM1401WSRWZ55 ADUM1401WSRWZ55-RL ADUM1401WTRWZ ADUM1401WTRWZ-RL ADUM1401WTRWZ55 ADUM1401WTRWZ55-RL	ADUM1402WSRWZ ADUM1402WSRWZ-RL ADUM1402WSRWZ55 ADUM1402WSRWZ55-RL ADUM1402WTRWZ ADUM1402WTRWZ-RL
Current Platform:	Harris-Tuvey with Atrium 5050FHV handler	
New Platform:	MPS with Atrium VMAX handler	

## Description and Test Results

The high voltage test platform is required to proof test the insulation performance of our products to the regulatory agency standards. The tests conducted on the high voltage test platform are:

### Dielectric Insulation Test

In accordance with **UL 1577**, each ADuM1400W/ADuM1401W/ADuM1402W is proof tested by applying an insulation test voltage  $\geq 3000$  Vrms for 1 sec (current leakage detection limit = 5  $\mu$ A).

### Partial Discharge Test

In accordance with **DIN V VDE V 0884-10** (VDE V 0884-10):2006-12, each ADuM1400W/ADuM1401W/ADuM1402W is proof tested by applying an insulation test voltage  $\geq 1050$  V peak for 1 sec (partial discharge detection limit = 5 pC).

The Harris-Tuvey high voltage test platform does not provide data logs for units tested; only a pass or fail result is provided. The MPS test platform will provide data logs for leakage current and partial discharge measurements that will be recorded and maintained over time.

The **ADuM1400W, ADuM1401W, and ADuM1402W** use the same package, coil and isolation process. The four lots listed below, along with additional test results from multiple products using the 16-lead SOIC\_W package, were used to qualify the three generics on the MPS test platform.

The results of the qualification lots run for the ADuM140x family are shown in Table 1. The qualification lots have undergone high voltage testing on both Harris-Tuvey and MPS test platforms. Any deviation on the lot qualification run criteria without further analysis and data to prove a passing qualification would be considered a failed qualification lot run.

All units that passed on the Harris-Tuvey platform also passed on the MPS platform and all units rejected by the Harris-Tuvey platform were also rejected by the MPS test platform thereby demonstrating correlation of both good and bad units between platforms.

**Table 1: Test Product Qualification Lots**

Generic	Package	Lot number	Lot Size	Good units passed on both test platforms?	Reject units failed on the same test parameter for both test platforms?
ADUM1400	SOIC_W	AN41532.4	100	<b>Yes</b>	<b>Yes</b>
ADUM1400	SOIC_W	SA71812.2	100	<b>Yes</b>	<b>Yes</b>
ADUM1401	SOIC_W	AN41834.3	100	<b>Yes</b>	<b>Yes</b>
ADUM1401	SOIC_W	SA71809.2	100	<b>Yes</b>	<b>Yes</b>
ADUM1401	SOIC_W	SA71810.2	100	<b>Yes</b>	<b>Yes</b>
ADUM1402	SOIC_W	AN41849.3	100	<b>Yes</b>	<b>Yes</b>

**Approvals**

Product Line Manager

Test Development Manager

Test Product Manager

Quality Manager

**Supporting Document**

Technical Review Board: TRB #11654 - ADuM1400/01/02 MPS Migration

**Additional Information**

Homepage: <http://www.analog.com/en/index.html>

Datasheet: [http://www.analog.com/media/en/technical-documentation/data-sheets/ADuM1400\\_1401\\_1402.pdf](http://www.analog.com/media/en/technical-documentation/data-sheets/ADuM1400_1401_1402.pdf)

## Material Set Change:

Package Material Set		Carsem	ASE Chungli
SOIC_W	Die Attach	Ablestik 84-1LMISR4	Hitachi EN4900GC
	Mold Compound	Sumitomo 6600H	Sumitomo G700LY
	Wire	1.3 mil Gold Wire	1.3mil Gold Wire