



Product/Process Change Notice - PCN 22_0196 Rev. -

Analog Devices, Inc. One Analog Way, Wilmington, MA 01887, USA

This notice is to inform you of a change that will be made to certain ADI products (see Appendix A) that you may have purchased in the last 2 years. **Any inquiries or requests with this PCN (additional data or samples) must be sent to ADI within 30 days of publication date.** ADI contact information is listed below.

PCN Title: Test Site Transfer of RH, SMD, Class-S, Special Flow, MIL-STD-883 Products from Analog Devices Milpitas to ADGT

Publication Date: 30-Aug-2022

Effectivity Date: 02-Dec-2022 *(the earliest date that a customer could expect to receive changed material)*

Revision Description:

Initial Release

Description Of Change:

Test Site Transfer of RH, SMD, Class-S, Special flow and MIL-STD-883 products from Analog Devices Milpitas to Analog Devices General Trias (ADGT), Philippines.

Reason For Change:

All RH, SMD, Class-S, Special flow and 883 parts from legacy LTC are currently undergoing production testing at the Analog Devices Milpitas (ADML) site. It was a strategic decision from business standpoint to qualify Analog Devices General Trias (ADGT) for electrical testing. After qualification and replication of necessary test and process capability, ADGT will serve as the primary test site facility to serve future demands upon ADML site closure in January, 2023. ADGT will use the same tester platform, test programs, monitors, and controls.

Impact of the change (positive or negative) on fit, form, function & reliability:

There will be no impact on fit, form, function and reliability of the product.

Product Identification *(this section will describe how to identify the changed material)*

No change in material. Tested devices in Analog Devices General Trias will carry the same catalog part, marking and branding. Traceability to test site is maintained through lot number marking. Direct shipping medium remains the same as per ADGT approved list.

Summary of Supporting Information:

Test correlation had been performed per ADI's standard product site to site and/or platform change correlation procedure. See attached Qualification Report.

Supporting Documents

Attachment 1: Type: Qualification Results Summary

ADI_PCN_22_0196_Rev_-_ADI_PCN_22_0196_Rev_-_RH1013M TEST QUALIFICATION REPORT - Rev.docx

Attachment 2: Type: Qualification Results Summary

ADI_PCN_22_0196_Rev_-_ADI_PCN_22_0196_Rev_-_RH1086M TEST QUALIFICATION REPORT - Rev.docx

Attachment 3: Type: Qualification Results Summary

ADI_PCN_22_0196_Rev_-_ADI_PCN_22_0196_Rev_-_RH1498M TEST QUALIFICATION REPORT - Rev .docx

Attachment 4: Type: Test Correlation Report

ADI_PCN_22_0196_Rev_-_RH1013M TEST CORRELATION REPORT.xlsx

Attachment 5: Type: Test Correlation Report

ADI_PCN_22_0196_Rev_-_RH1086M TEST CORRELATION REPORT.xlsx

Attachment 6: Type: Test Correlation Report
ADI_PCN_22_0196_Rev_-_RH1498M TEST CORRELATION REPORT.xlsx

Attachment 7: Type: Other
ADI_PCN_22_0196_Rev_-_RH1498M_GRR_Summary.xlsx

For questions on this PCN, please send an email to the regional contacts below or contact your local ADI sales representatives.
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Americas: PCN_Americas@analog.com	Europe: PCN_Europe@analog.com	Japan: PCN_Japan@analog.com	Rest of Asia: PCN_ROA@analog.com
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Appendix A - Affected ADI Models

Added Parts On This Revision - Product Family / Model Number (106)

LH0070 / 5962-8688201XA	LH0070 / 5962-8688202XA	LT1009 / 5962-8961001XA	LT1016 / 5962-8684501A	LT1016 / 5962-8684501PA
LT1021 / 5962-8860001GA	LT1021 / 5962-8876201GA	LT1021 / 5962-8876202GA	LTC1604S / LTC1604AIG#90117	RH1009 / 5962R8961002V9A
RH1009 / 5962R8961002VHA	RH1009 / 5962R8961002VXC	RH1009 / RH1009MH	RH1009 / RH1009MH#50233	RH1009 / RH1009MH#5AK
RH1009 / RH1009MW	RH1011 / RH1011H	RH1011 / RH1011W	RH1013M / 5962R8876003V9A	RH1013M / 5962R8876003VHA
RH1013M / RH1013MH	RH1013M / RH1013MW	RH1014M / 5962R8967703VDA	RH1014M / RH1014MW	RH1014M / RH1014MW#50197
RH1014M / RH1014MW#5AA	RH1016M / RH1016MW	RH101A / RH101ADICE	RH101A / RH101AW	RH1021-10 / 5962R8860001VGA
RH1021-10 / 5962R8860002V9A	RH1021-10 / 5962R8860002VGA	RH1021-10 / 5962R8860002VHA	RH1021-10 / RH1021BMH-10	RH1021-10 / RH1021CMH-10
RH1021-10 / RH1021CMW-10	RH1021-5 / 5962R8876201VGA	RH1021-5 / 5962R8876202V9A	RH1021-5 / 5962R8876202VGA	RH1021-5 / 5962R8876202VHA
RH1021-5 / 5962R8876203VGA	RH1021-5 / RH1021BMH-5	RH1021-5 / RH1021CMH-5	RH1021-5 / RH1021CMH-5#50289	RH1021-5 / RH1021CMH-5#5AD
RH1021-5 / RH1021CMW-5	RH1021-5 / RH1021CMW-5#50325	RH1021-5 / RH1021CMW-5#5AJ	RH1021-7 / RH1021BMH-7	RH1028M / RH1028MW
RH1034-1.2 / RH1034MH-1.2	RH1034-1.2 / RH1034MW-1.2	RH1056A / RH1056AMH	RH1056A / RH1056AMW	RH1078M / RH1078MH
RH1078M / RH1078MW	RH1086M / 5962R8998102VYA	RH1086M / 5962R8998103V9A	RH1086M / RH1086BKDICE	RH1086M / RH1086BKDICE
RH1086M / RH1086KDICE#7AB-1	RH1086M / RH1086MH	RH108A / RH108AH	RH108A / RH108AW	RH1128M / RH1128MW
RH117 / RH117H	RH118 / RH118W	RH119 / RH119W	RH129 / RH129AH	RH137 / RH137H
RH1498M / 5962R1325001V9A	RH1498M / 5962R1325001VHA	RH1498M / RH1498MW	RH1498M / 5962R1325101VDA	RH1498M / RH1498MW
RH1498M / RH1498MW#50326	RH1498M / RH1498MW#5AF	RH1573K / RH1573KDICE	RH1814M / RH1814MW	RH1959 / RH1959MW
RH1959 / RH1959MW-EMX	RH1965 / RH1965MKDICE	RH27C / RH27AEW	RH27C / RH27CDICE	RH27C / RH27CW
RH27C / RH27EW	RH3080MK / RH3080MG16	RH3080MK / RH3080MG16-EMX	RH3080MK / RH3080MKDICE	RH3083MK / RH3083MKDICE
RH3083MK / RH3083MW	RH3083MK / RH3083MW-EMX	RH37C / RH37CH	RH37C / RH37CW	RH3845MK / RH3845MKDICE
RH3845MK / RH3845MW-1	RH3845MK / RH3845MW-2	RH411 / RH411MKDICE	RH5596S / RH5596HDC#PBF-CSH	RH6016S / RH6016MW
RH6016S / RH6016MW-EMX	RH6105 / RH6105MW	RH6105 / RH6105MW-EMX	RH6200M / RH6200MW	RT2378-20 / RT2378IMS-20
RT6804-1 / RT6804HG-1				

Appendix B - Revision History			
Rev	Publish Date	Effectivity Date	Rev Description
Rev. -	30-Aug-2022	02-Dec-2022	Initial Release

Analog Devices, Inc.

DocId:8985 Parent DocId:None Layout Rev:8

PRODUCT INFORMATION

Generic	RH1498
Part Name	RH1498MW
Package	CERPACK
Lead Count	10
Description	10MHz, 6V/μs, Dual Rail-to-Rail Input and Output Precision C-L
BU/PL	ADEF-MPS

CORRELATION DEVICE RUN

SETUP INFORMATION

Test Site	Tester ID	Test Card ID
ADML	LTX29	TC001723
ADGT	111T88EA	L07645001

Test all good units in ATE-Handler setup using QC program.

Test Site	Program	Temp
ADML	EQ2RRH1498.03	Ambient
ADGT	v22753p05a_eq2rrh1498	

Test Site	Program	Temp
ADML	EQMHRH1498.03	Hot
ADGT	v22753p06a_eqmhrh1498	

Test Site	Program	Temp
ADML	EQMLRH1498.03	Cold
ADGT	v22753p07a_eqmlrh1498	

CORRELATION RESULT

Test Step	Number of Test Parameters	Remarks
Ambient	29	ALL PASSED
Cold	29	ALL PASSED
Hot	29	ALL PASSED

ADML To ADGT Test Transfer Correlation Report For

oad Op Amp

HI ID
HI003128
L07651001

Lot ID	Qty In
L1098378.3	30
	30

Lot ID	Qty In
L1098378.3	30
	30

Lot ID	Qty In
L1098378.3	30
	30

RH1498MW

Qty Out
30
30

Qty Out
30
30

Qty Out
30
30

[Redacted]

[Redacted]

[Redacted]

[Redacted]

RH1498_QA_25C Analysis Data View Report

Test Number	Test Name	Units
145.0	I+ @ +-15V	mA
240.0	A NO LOAD SW- @ VS=+-15V	mV
250.0	A NO LOAD SW+ @ VS=+-15V	mV
260.0	B NO LOAD SW- @ VS=+-15V	mV
270.0	B NO LOAD SW+ @ VS=+-15V	mV
280.0	A 1MA VOL @ VS=+-15V	mV
290.0	A 1MA VOH @ VS=+-15V	mV
300.0	B 1MA VOL @ VS=+-15V	mV
310.0	B 1MA VOH @ VS=+-15V	mV
610.0	A 10MA VOH @ VS=+-15V	mV
630.0	B 10MA VOH @ VS=+-15V	mV
720.0	A GBWP @ VS=+/-15V, 100KHZ, AV=1000	MHZ
730.0	B GBWP @ VS=+/-15V, 100KHZ, AV=1000	MHZ
950.0	A VOS @ VS=+-15V, VCM=-15V	uV
960.0	B VOS @ VS=+-15V, VCM=-15V	uV
1010.0	A IOS @ VS=+-15V,VCM=-15V	nA
1020.0	B IOS @ VS=+-15V,VCM=-15V	nA
1280.0	A IB+ @ VS=+-15V,VCM=+15V	nA
1290.0	B IB+ @ VS=+-15V,VCM=+15V	nA
1550.1	A CMRR, VCM=+-15V	DB
1560.1	B CMRR, VCM=+-15V	DB
1570.1	CMRR MATCH	DB
1600.1	A PSRR, +-2 TO +-16V	DB
1610.1	B PSRR, +-2V TO +-16V	DB
1620.1	PSRR MATCH	DB
3340.1	A FALLING SLEW RATE @ VS=+-15V	V/US
3350.1	A RISING SLEW RATE @ VS=+-15V	V/US
3360.1	B RISING SLEW RATE @ VS=+-15V	V/US
3370.1	B FALLING SLEW RATE @ VS=+-15V	V/US

Overall Correlation Result	Mean Shift $\leq 5\%$	Mean Shift %	Sigma Ratio ≤ 1.3
PASS	PASS	0.006	PASS
PASS	PASS	0.021	PASS
PASS	PASS	0.023	PASS
PASS	PASS	0.018	PASS
PASS	PASS	0.026	PASS
PASS	PASS	0.009	PASS
PASS	PASS	0.004	PASS
PASS	PASS	0.011	PASS
PASS	PASS	0.004	PASS
PASS	PASS	0.001	PASS
PASS	PASS	0.001	PASS
PASS	PASS	0.003	PASS
PASS	PASS	0.003	PASS
PASS	PASS	0.030	PASS
PASS	PASS	0.027	PASS
PASS	PASS	0.010	PASS
PASS	PASS	0.015	PASS
PASS	PASS	0.000	PASS
PASS	PASS	0.001	PASS
PASS	PASS	0.006	PASS
PASS	PASS	0.015	PASS
PASS	PASS	0.030	PASS
PASS	PASS	0.002	PASS
PASS	PASS	0.001	PASS
PASS	PASS	0.003	PASS
PASS	PASS	0.005	PASS
PASS	PASS	0.001	PASS
PASS	PASS	0.001	PASS
PASS	PASS	0.004	PASS

Stdv Ratio	Cpk Result	CPK Value ≥ 1.67	Annotation
0.979	PASS	>10	
0.987	PASS	>10	
1.023	PASS	>10	
1.013	PASS	>10	
1.172	PASS	>10	
1.015	PASS	>10	
0.998	PASS	5.994	
1.027	PASS	>10	
1.003	PASS	5.866	
1.018	PASS	4.188	
1.022	PASS	4.141	
1.017	PASS	8.333	
1.012	PASS	8.504	
0.912	PASS	1.688	
0.988	PASS	1.680	
0.950	PASS	>10	
1.007	PASS	>10	
0.995	PASS	>10	
0.996	PASS	>10	
0.841	PASS	0.774	Comparable Data on both sites
0.839	PASS	0.966	Comparable Data on both sites
1.316	PASS	1.083	Comparable Data on both sites
1.069	PASS	1.071	Comparable Data on both sites
0.958	PASS	1.243	Comparable Data on both sites
1.081	PASS	1.177	Comparable Data on both sites
1.019	PASS	>10	
1.007	PASS	>10	
1.008	PASS	>10	
0.988	PASS	>10	

RH1498_QA_125C Analysis Data View Report

Test Number	Test Name	Units
145	I+ @ +-15V	MA
240	A NO LOAD SW- @ VS=+-15V	MV
250	A NO LOAD SW+ @ VS=+-15V	MV
260	B NO LOAD SW- @ VS=+-15V	MV
270	B NO LOAD SW+ @ VS=+-15V	MV
280	A 1MA VOL @ VS=+-15V	MV
290	A 1MA VOH @ VS=+-15V	MV
300	B 1MA VOL @ VS=+-15V	MV
310	B 1MA VOH @ VS=+-15V	MV
610	A 5MA VOH @ VS=+-15V	MV
630	B 5MA VOH @ VS=+-15V	MV
720	A GBWP @ VS=+/-15V, 100KHZ, AV=1000	MHZ
730	B GBWP @ VS=+/-15V, 100KHZ, AV=1000	MHZ
950	A VOS @ VS=+-15V, VCM=-14.5V	UV
960	B VOS @ VS=+-15V, VCM=-14.5V	UV
1010	A IOS @ VS=+-15V,VCM=-14.5V	nA
1020	B IOS @ VS=+-15V,VCM=-14.5V	nA
1280	A IB+ @ VS=+-15V,VCM=+14.5V	nA
1290	B IB+ @ VS=+-15V,VCM=+14.5V	nA
1550.01	A CMRR, VCM=-14.5 TO 14.5V	DB
1560.01	B CMRR, VCM=-14.5 TO 14.5V	DB
1570.01	CMRR MATCH	DB
1600.01	A PSRR, +-2 TO +-16V	DB
1610.01	B PSRR, +-2V TO +-16V	DB
1620.01	PSRR MATCH	DB
3340.01	A FALLING SLEW RATE @ VS=+-15V	V/US
3350.01	A RISING SLEW RATE @ VS=+-15V	V/US
3360.01	B RISING SLEW RATE @ VS=+-15V	V/US
3370.01	B FALLING SLEW RATE @ VS=+-15V	V/US

Overall Correlation Result	Mean Shift ≤ 5%	Mean Shift %	Sigma Ratio ≤ 1.3
PASS	PASS	1.27%	PASS
PASS	PASS	0.64%	PASS
PASS	PASS	2.05%	PASS
PASS	PASS	0.76%	PASS
PASS	PASS	2.21%	PASS
PASS	PASS	0.28%	PASS
PASS	PASS	0.40%	PASS
PASS	PASS	0.38%	PASS
PASS	PASS	0.44%	PASS
PASS	PASS	0.21%	PASS
PASS	PASS	0.22%	PASS
PASS	PASS	0.46%	PASS
PASS	PASS	0.59%	PASS
PASS	PASS	1.24%	PASS
PASS	PASS	3.99%	PASS
PASS	PASS	1.48%	PASS
PASS	PASS	4.92%	PASS
PASS	PASS	1.93%	PASS
PASS	PASS	0.32%	PASS
PASS	PASS	1.89%	PASS
PASS	PASS	1.34%	PASS
PASS	PASS	0.00%	PASS
PASS	PASS	0.06%	PASS
PASS	PASS	0.15%	PASS
PASS	PASS	0.02%	PASS
PASS	PASS	0.87%	PASS
PASS	PASS	0.26%	PASS
PASS	PASS	0.15%	PASS
PASS	PASS	0.88%	PASS

Stdv Ratio	Cpk Result	CPK Value ≥ 1.67	Annotation
1.080	PASS	>10	
0.933	PASS	>10	
1.242	PASS	>10	
0.903	PASS	>10	
0.833	PASS	>10	
0.851	PASS	>10	
0.998	PASS	>10	
0.836	PASS	>10	
1.000	PASS	>10	
0.993	PASS	>10	
0.997	PASS	>10	
0.938	PASS	>10	
0.948	PASS	>10	
0.835	PASS	1.757	
1.055	PASS	1.744	
0.661	PASS	>10	
1.190	PASS	2.506	
1.007	PASS	>10	
0.967	PASS	>10	
1.163	PASS	0.652	Comparable Data on both sites
0.748	PASS	0.928	Comparable Data on both sites
0.996	PASS	0.706	Comparable Data on both sites
0.986	PASS	0.914	Comparable Data on both sites
1.050	PASS	0.825	Comparable Data on both sites
0.998	PASS	1.461	Comparable Data on both sites
1.073	PASS	>10	
0.978	PASS	>10	
0.910	PASS	>10	
1.066	PASS	>10	

RH1498_QA_-55C Analysis Data View Report

Test Number	Test Name	Units
145.00	I+ @ +-15V	MA
240.00	A NO LOAD SW- @ VS=+-15V	MV
250.00	A NO LOAD SW+ @ VS=+-15V	MV
260.00	B NO LOAD SW- @ VS=+-15V	MV
270.00	B NO LOAD SW+ @ VS=+-15V	MV
280.00	A 1MA VOL @ VS=+-15V	MV
290.00	A 1MA VOH @ VS=+-15V	MV
300.00	B 1MA VOL @ VS=+-15V	MV
310.00	B 1MA VOH @ VS=+-15V	MV
610.00	A 5MA VOH @ VS=+-15V	MV
630.00	B 5MA VOH @ VS=+-15V	MV
720.00	A GBWP @ VS=+/-15V, 100KHZ, AV=1000	MHZ
730.00	B GBWP @ VS=+/-15V, 100KHZ, AV=1000	MHZ
950.00	A VOS @ VS=+-15V, VCM=-14.5V	UV
960.00	B VOS @ VS=+-15V, VCM=-14.5V	UV
1010.00	A IOS @ VS=+-15V,VCM=-14.5V	NA
1020.00	B IOS @ VS=+-15V,VCM=-14.5V	NA
1280.00	A IB+ @ VS=+-15V,VCM=+14.5V	NA
1290.00	B IB+ @ VS=+-15V,VCM=+14.5V	NA
1550.01	A CMRR, VCM=-14.5 TO 14.5V	DB
1560.01	B CMRR, VCM=-14.5 TO 14.5V	DB
1570.01	CMRR MATCH	DB
1600.01	A PSRR, +-2 TO +-16V	DB
1610.01	B PSRR, +-2V TO +-16V	DB
1620.01	PSRR MATCH	DB
3340.01	A FALLING SLEW RATE @ VS=+-15V	V/US
3350.01	A RISING SLEW RATE @ VS=+-15V	V/US
3360.01	B RISING SLEW RATE @ VS=+-15V	V/US
3370.01	B FALLING SLEW RATE @ VS=+-15V	V/US

Overall Correlation Result	Mean Shift ≤ 5%	Mean Shift %	Sigma Ratio ≤ 1.3
PASS	PASS	0.072	PASS
PASS	PASS	0.252	PASS
PASS	PASS	0.014	PASS
PASS	PASS	1.574	PASS
PASS	PASS		PASS
PASS	PASS	0.163	PASS
PASS	PASS	0.307	PASS
PASS	PASS	1.059	PASS
PASS	PASS	0.153	PASS
PASS	PASS		PASS
PASS	PASS	0.135	PASS
PASS	PASS		PASS
PASS	PASS	0.006	PASS
PASS	PASS	0.604	PASS
PASS	PASS		PASS
PASS	PASS	0.663	PASS
PASS	PASS	0.538	PASS
PASS	PASS	0.209	PASS
PASS	PASS	0.565	PASS
PASS	PASS	0.127	PASS
PASS	PASS	0.154	PASS
PASS	PASS	0.354	PASS
PASS	PASS	0.183	PASS
PASS	PASS	0.439	PASS
PASS	PASS	0.483	PASS
PASS	PASS	0.249	PASS
PASS	PASS	0.249	PASS
PASS	PASS	0.249	PASS
PASS	PASS	0.249	PASS

Stdv Ratio	Cpk Result	CPK Value ≥ 1.67	Annotation
1.003	PASS	7.182	
0.981	PASS	3.985	
0.989	PASS	3.427	
1.052	PASS	>10	
1.000	PASS	>10	
1.017	PASS	>10	
0.990	PASS	9.631	
0.985	PASS	>10	
0.985	PASS	>10	
1.000	PASS	>10	
0.993	PASS	>10	
1.044	PASS	>10	
1.061	PASS	>10	
1.014	PASS	4.164	
1.028	PASS	>10	
3.037	PASS	>10	
6.507	PASS	>10	
2.668	PASS	>10	
5.331	PASS	>10	
0.992	PASS	5.478	
0.998	PASS	>10	
0.813	PASS	>10	
0.625	PASS	>10	
0.407	PASS	>10	
0.649	PASS	>10	
0.386	PASS	>10	
0.386	PASS	>11	
0.386	PASS	>12	
0.386	PASS	>13	

PRODUCT INFORMATION

Generic	RH1086
Part Name	RH1086MK
Package	TO3
Lead Count	2
Description	0.5A and 1.5A Low Dropout Positive Adjustable Regulators
BU/PL	ADEF-MPS

CORRELATION DEVICE RUN

SETUP INFORMATION

Test Site	Tester ID	Test Card ID
ADML	LTX29	TC1084FT-02
ADGT	68T88EA	TC1084FT-02

Test all good units in Handtest insert setup using QC program.

Test Site	Program	Temp
ADML	EQR1086.05	Ambient
ADGT	v22754p04a_eqr1086	

Test Site	Program	Temp
ADML	EQMT1086.05	Cold
ADGT	v22754p03a_eqmt1086	

Test Site	Program	Temp
ADML	EQMT1086.05	Hot
ADGT	v22754p03a_eqmt1086	

CORRELATION RESULT

Test Step	Number of Test Parameters	Remarks
Ambient	18	ALL PASSED
Cold	17	ALL PASSED
Hot	17	ALL PASSED

ADML To ADGT Test Transfer Correlation Report For

HI ID
HI003128
L07651001

Lot ID	Qty In
10913024.3	30
	30

Lot ID	Qty In
10913024.3	30
	30

Lot ID	Qty In
10913024.3	30
	30

Qty Out
30
30

Qty Out
30
30

Qty Out
30
30

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RH1086MK_QA_25C Analysis Data View Report

Test Number	Test Name	Units
100.00	VREF. @ VIN=2.75V; IL=10MA	V
110.00	VREF. @ VIN=16.25V; IL=10MA	V
130.00	VREF. @ VIN=30V; IL=10MA	V
170.00	MIN. LOAD CURRENT @ VIN=26.25V	MA
180.00	MIN. LOAD CURRENT @ VIN=2.75V	MA
190.00	ADJUST PIN CURRENT @ 2.75V; IL=10MA	UA
200.00	ADJUST PIN CURRENT @ 16.25V; IL=10MA	UA
210.00	DELTA IQ @ VIN=2.75V TO 16.25V; IL=10MA	UA
260.00	VREF. @ VIN=16.25V; IL=.5A	V
270.00	ADJUST PIN CURRENT @ VIN=4.25V; IL=10MA	UA
280.00	ADJUST PIN CURRENT @ 4.25V; IL=1.5A	UA
300.00	DROPOUT VOLTAGE AT 10MA	V
330.00	DROPOUT VOLTAGE AT 1.5A	V
350.00	INITIAL SUBSTRATE VOLTAGE, T=0	MV
370.00	CURRENT LIMIT VIN=5V, VOUT=0V	A
400.00	CURRENT LIMIT VIN=25V, VOUT=0V	A
450.00	VREF. @ VIN=4.25V; IL=10MA	V
460.00	SLOW START @ VIN=1.5V; IL=10MA	MA

Overall Correlation Result	Mean Shift ≤ 5%	Mean Shift %	Sigma Ratio ≤ 1.3
PASS	PASS	1.97%	PASS
PASS	PASS	1.90%	PASS
PASS	PASS	1.99%	PASS
PASS	PASS	0.07%	PASS
PASS	PASS	0.09%	PASS
PASS	PASS	0.19%	PASS
PASS	PASS	0.21%	PASS
PASS	PASS	0.13%	PASS
PASS	PASS	1.89%	PASS
PASS	PASS	0.09%	PASS
PASS	PASS	0.00%	PASS
PASS	PASS	0.08%	PASS
PASS	PASS	0.02%	PASS
PASS	PASS	0.11%	PASS
PASS	PASS	0.98%	PASS
PASS	PASS	1.81%	PASS
PASS	PASS	2.02%	PASS
PASS	PASS	0.02%	PASS

Stdv Ratio	Cpk Result	CPK Value ≥ 1.67	Annotation
1.02	PASS	3.13	
1.01	PASS	3.13	
1.00	PASS	3.08	
1.07	PASS	>10	
1.09	PASS	>10	
1.09	PASS	>10	
1.19	PASS	>10	
1.22	PASS	5.86	
1.01	PASS	3.20	
1.11	PASS	>10	
1.20	PASS	>10	
0.98	PASS	>10	
1.00	PASS	>10	
1.02	PASS	>10	
1.00	PASS	4.47	
1.04	PASS	>10	
1.01	PASS	3.12	
1.05	PASS	>10	

RH1086MK_QA_125C Analysis Data View Report

Test Number	Test Name	Units
100.00	VREF. @ VIN=2.75V; IL=10MA	V
110.00	VREF. @ VIN=16.25V; IL=10MA	V
130.00	VREF. @ VIN=30V; IL=10MA	V
170.00	MIN. LOAD CURRENT @ VIN=26.25V	MA
180.00	MIN. LOAD CURRENT @ VIN=2.75V	MA
190.00	ADJUST PIN CURRENT @ 2.75V; IL=10MA	UA
200.00	ADJUST PIN CURRENT @ 16.25V; IL=10MA	UA
210.00	DELTA IQ @ VIN=2.75V TO 16.25V; IL=10MA	UA
260.00	VREF. @ VIN=16.25V; IL=.5A	V
270.00	ADJUST PIN CURRENT @ VIN=4.25V; IL=10MA	UA
280.00	ADJUST PIN CURRENT @ 4.25V; IL=1.5A	UA
300.00	DROPOUT VOLTAGE AT 10MA	V
330.00	DROPOUT VOLTAGE AT 1.5A	V
370.00	CURRENT LIMIT VIN=5V, VOUT=0V	A
400.00	CURRENT LIMIT VIN=25V, VOUT=0V	A
450.00	VREF. @ VIN=4.25V; IL=10MA	V
460.00	SLOW START @ VIN=1.5V; IL=10MA	MA

Overall Correlation Result	Mean Shift ≤ 5%	Mean Shift %	Sigma Ratio ≤ 1.3
PASS	PASS	0.32%	PASS
PASS	PASS	0.30%	PASS
PASS	PASS	0.03%	PASS
PASS	PASS	0.11%	PASS
PASS	PASS	0.15%	PASS
PASS	PASS	0.80%	PASS
PASS	PASS	0.77%	PASS
PASS	PASS	0.31%	PASS
PASS	PASS	0.30%	PASS
PASS	PASS	0.78%	PASS
PASS	PASS	0.73%	PASS
PASS	PASS	0.09%	PASS
PASS	PASS	0.03%	PASS
PASS	PASS	0.35%	PASS
PASS	PASS	2.35%	PASS
PASS	PASS	0.19%	PASS
PASS	PASS	0.14%	PASS

Stdv Ratio	Cpk Result	CPK Value ≥ 1.67	Annotation
0.99	PASS	2.66	
0.99	PASS	2.67	
0.98	PASS	2.62	
0.97	PASS	>10	
1.06	PASS	>10	
1.11	PASS	>10	
1.03	PASS	>10	
0.62	PASS	>10	
0.99	PASS	2.70	
1.05	PASS	>10	
1.03	PASS	>10	
1.00	PASS	>10	
0.97	PASS	>10	
1.01	PASS	6.79	
0.97	PASS	>10	
0.99	PASS	2.65	
0.83	PASS	>10	

RH1086MK_QA_-60C Analysis Data View Report

Test Number	Test Name	Units
100.00	VREF. @ VIN=2.75V; IL=10MA	V
110.00	VREF. @ VIN=16.25V; IL=10MA	V
130.00	VREF. @ VIN=30V; IL=10MA	V
170.00	MIN. LOAD CURRENT @ VIN=26.25V	MA
180.00	MIN. LOAD CURRENT @ VIN=2.75V	MA
190.00	ADJUST PIN CURRENT @ 2.75V; IL=10MA	UA
200.00	ADJUST PIN CURRENT @ 16.25V; IL=10MA	UA
210.00	DELTA IQ @ VIN=2.75V TO 16.25V; IL=10MA	UA
260.00	VREF. @ VIN=16.25V; IL=.5A	V
270.00	ADJUST PIN CURRENT @ VIN=4.25V; IL=10MA	UA
280.00	ADJUST PIN CURRENT @ 4.25V; IL=1.5A	UA
300.00	DROPOUT VOLTAGE AT 10MA	V
330.00	DROPOUT VOLTAGE AT 1.5A	V
370.00	CURRENT LIMIT VIN=5V, VOUT=0V	A
400.00	CURRENT LIMIT VIN=25V, VOUT=0V	A
450.00	VREF. @ VIN=4.25V; IL=10MA	V
460.00	SLOW START @ VIN=1.5V; IL=10MA	MA

Overall Correlation Result	Mean Shift ≤ 5%	Mean Shift %	Sigma Ratio ≤ 1.3
PASS	PASS	0.84%	PASS
PASS	PASS	0.86%	PASS
PASS	PASS	0.80%	PASS
PASS	PASS	0.24%	PASS
PASS	PASS	0.22%	PASS
PASS	PASS	0.37%	PASS
PASS	PASS	0.47%	PASS
PASS	PASS	1.04%	PASS
PASS	PASS	0.85%	PASS
PASS	PASS	0.40%	PASS
PASS	PASS	0.48%	PASS
PASS	PASS	0.13%	PASS
PASS	PASS	0.02%	PASS
PASS	PASS	0.72%	PASS
PASS	PASS	2.12%	PASS
PASS	PASS	0.91%	PASS
PASS	PASS	0.12%	PASS

Stdv Ratio	Cpk Result	CPK Value ≥ 1.67	Annotation
1.053	PASS	3.457	
1.050	PASS	3.471	
1.056	PASS	3.420	
1.155	PASS	>10	
1.109	PASS	>10	
1.260	PASS	>10	
1.233	PASS	>10	
0.684	PASS	>10	
1.058	PASS	3.597	
1.205	PASS	>10	
1.239	PASS	>10	
1.325	PASS	>10	
1.131	PASS	>10	
1.125	PASS	5.044	
0.922	PASS	>10	
1.074	PASS	3.506	
1.229	PASS	>10	

PRODUCT INFORMATION

Generic	RH1013
Part Name	RH1013MW
Package	CERPACK
Lead Count	10
Description	Dual Precision Operational Amplifier
BU/PL	ADEF-MPS

CORRELATION DEVICE RUN

SETUP INFORMATION

Test Site	Tester ID	Test Card ID
ADML	LTX29	LT1013-02
ADGT	68T88EA	LT1013-02

Test all good units in
Handtest Insert setup
using QC program.

Test Site	Program	Temp
ADML	EQ2RRH1013.02	Ambient_25C
ADGT	v22752p05a_eq2rrh1013	

Test Site	Program	Temp
ADML	EQT3530.04	Cold_-55C
ADGT	v22752p07a_eqmlrh1013	

Test Site	Program	Temp
ADSG	EQMHRH1013.03	Hot_125C
ADGT	v22752p06a_eqmhrh1013	

CORRELATION RESULT

Test Step	Number of Test Parameters	Remarks
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Ambient	33	ALL PASSED
Cold	25	ALL PASSED
Hot	25	ALL PASSED

ADML To ADGT Test Transfer Correlation Report For

HI ID
M- 1013- W10
M- 1013- W10

Lot ID	Qty In
1079528.3	30
	30

Lot ID	Qty In
1079528.3	30
	30

Lot ID	Qty In
1079528.3	30
	30

RH1013MW

Qty Out
30
30

Qty Out
30
30

Qty Out
30
30

[Redacted]

[Redacted]

[Redacted]

[Redacted]

RH1013_QA_25C Analysis Data Vi

Test Number	Test Name	Units	Overall Correlation Result
10100	I+ @ +-15V	UA	PASS
30000	A VOS	UV	PASS
31000	B VOS	UV	PASS
32000	A IB-	NA	PASS
33000	B IB-	NA	PASS
34000	A IB+	NA	PASS
35000	B IB+	NA	PASS
36000	A IOS	NA	PASS
37000	B IOS	NA	PASS
46001	A CMRR	DB	PASS
47001	B CMRR	DB	PASS
48001	A PSRR	DB	PASS
49001	B PSRR	DB	PASS
62000	A NO-LOAD VOL	MV	PASS
63000	A NO-LOAD VOH	V	PASS
64000	B NO-LOAD VOL	MV	PASS
65000	B NO-LOAD VOH	V	PASS
66000	A 600 OHM VOL	MV	PASS
67000	A 600 OHM VOH	V	PASS
68000	B 600 OHM VOL	MV	PASS
69000	B 600 OHM VOH	V	PASS
80000	A VOS	UV	PASS
81000	B VOS	UV	PASS
82000	A IB-	NA	PASS
83000	B IB-	NA	PASS
84000	A IB+	NA	PASS
85000	B IB+	NA	PASS
86000	A IOS	NA	PASS
87000	B IOS	NA	PASS
90001	A RISING SLEW RATE	V/US	PASS
91001	A FALLING SLEW RATE	V/US	PASS
92001	B RISING SLEW RATE	V/US	PASS
93001	B FALLING SLEW RATE	V/US	PASS

Mean Shift ≤ 5%	Mean Shift %	Sigma Ratio ≤ 1.3	Stdv Ratio	Cpk Result
PASS	0.32%	PASS	0.939	PASS
PASS	0.52%	PASS	0.937	PASS
PASS	1.49%	PASS	0.978	PASS
PASS	0.18%	PASS	0.838	PASS
PASS	0.01%	PASS	0.934	PASS
PASS	0.33%	PASS	1.210	PASS
PASS	0.38%	PASS	0.821	PASS
PASS	0.85%	PASS	0.974	PASS
PASS	0.43%	PASS	1.114	PASS
PASS	0.38%	PASS	1.151	PASS
PASS	0.02%	PASS	0.990	PASS
PASS	0.82%	PASS	0.888	PASS
PASS	0.89%	PASS	1.088	PASS
PASS	4.02%	PASS	0.204	PASS
PASS	0.10%	PASS	0.906	PASS
PASS	3.22%	PASS	0.160	PASS
PASS	0.11%	PASS	0.987	PASS
PASS	3.56%	PASS	0.569	PASS
PASS	0.19%	PASS	0.951	PASS
PASS	3.06%	PASS	0.547	PASS
PASS	0.14%	PASS	0.951	PASS
PASS	0.40%	PASS	0.892	PASS
PASS	1.18%	PASS	0.969	PASS
PASS	0.04%	PASS	0.765	PASS
PASS	0.02%	PASS	0.801	PASS
PASS	0.49%	PASS	0.938	PASS
PASS	0.38%	PASS	0.891	PASS
PASS	1.38%	PASS	1.233	PASS
PASS	1.34%	PASS	1.272	PASS
PASS	0.38%	PASS	0.929	PASS
PASS	0.57%	PASS	0.922	PASS
PASS	0.49%	PASS	0.919	PASS
PASS	0.70%	PASS	0.928	PASS

CPK Value ≥ 1.67	Annotation
>10	
2.807	
2.251	
>10	
>10	
>10	
>10	
>10	
>10	
1.056	Comparable data on both sites
1.759	
1.681	
1.516	Comparable data on both sites
>10	
>10	
>10	
>10	
>10	
>10	
>10	
>10	
4.584	
3.240	
>10	
>10	
>10	
>10	
>10	
>10	
>10	
9.956	
9.516	
8.884	

RH1013_QAH_125C Analysis Data View Report

Test Number	Test Name	Units
10100	I+ @ +-15V	UA
30000	A VOS	UV
31000	B VOS	UV
32000	A IB-	NA
33000	B IB-	NA
34000	A IB+	NA
35000	B IB+	NA
36000	A IOS	NA
37000	B IOS	NA
46001	A CMRR	DB
47001	B CMRR	DB
48001	A PSRR	DB
49001	B PSRR	DB
66000	A 600 OHM VOL	MV
67000	A 600 OHM VOH	V
68000	B 600 OHM VOL	MV
69000	B 600 OHM VOH	V
80000	A VOS	UV
81000	B VOS	UV
82000	A IB-	NA
83000	B IB-	NA
84000	A IB+	NA
85000	B IB+	NA
86000	A IOS	NA
87000	B IOS	NA

Overall Correlation Result	Mean Shift ≤ 5%	Mean Shift %	Sigma Ratio ≤ 1.3
PASS	PASS	0.37%	PASS
PASS	PASS	4.80%	PASS
PASS	PASS	4.07%	PASS
PASS	PASS	1.01%	PASS
PASS	PASS	2.20%	PASS
PASS	PASS	2.15%	PASS
PASS	PASS	0.73%	PASS
PASS	PASS	4.92%	PASS
PASS	PASS	4.12%	PASS
PASS	PASS	0.87%	PASS
PASS	PASS	0.20%	PASS
PASS	PASS	0.58%	PASS
PASS	PASS	1.37%	PASS
PASS	PASS	4.71%	PASS
PASS	PASS	0.18%	PASS
PASS	PASS	4.91%	PASS
PASS	PASS	0.08%	PASS
PASS	PASS	0.12%	PASS
PASS	PASS	1.75%	PASS
PASS	PASS	0.63%	PASS
PASS	PASS	2.68%	PASS
PASS	PASS	2.16%	PASS
PASS	PASS	0.54%	PASS
PASS	PASS	4.53%	PASS
PASS	PASS	4.36%	PASS

Stdv Ratio	Cpk Result	CPK Value ≥ 1.67	Annotation
0.973	PASS	9.590	
0.497	PASS	5.031	
0.688	PASS	3.692	
1.225	PASS	>10	
1.254	PASS	>10	
0.646	PASS	>10	
0.984	PASS	>10	
0.833	PASS	>10	
1.079	PASS	8.376	
0.763	PASS	1.280	Comparable data on both sites
0.999	PASS	0.966	Comparable data on both sites
0.922	PASS	1.964	
0.877	PASS	1.655	
0.289	PASS	>10	
0.988	PASS	>10	
0.271	PASS	>10	
1.006	PASS	>10	
0.683	PASS	>10	
0.548	PASS	>10	
0.819	PASS	>10	
1.204	PASS	>10	
0.777	PASS	>10	
0.926	PASS	>10	
0.553	PASS	>10	
1.118	PASS	8.354	

RH1013_QA_-55C Analysis Data View Report

Test Number	Test Name	Units
10100	I+ @ +-15V	UA
30000	A VOS	UV
31000	B VOS	UV
32000	A IB-	NA
33000	B IB-	NA
34000	A IB+	NA
35000	B IB+	NA
36000	A IOS	NA
37000	B IOS	NA
46001	A CMRR	DB
47001	B CMRR	DB
48001	A PSRR	DB
49001	B PSRR	DB
66000	A 600 OHM VOL	MV
67000	A 600 OHM VOH	V
68000	B 600 OHM VOL	MV
69000	B 600 OHM VOH	V
80000	A VOS	UV
81000	B VOS	UV
82000	A IB-	NA
83000	B IB-	NA
84000	A IB+	NA
85000	B IB+	NA
86000	A IOS	NA
87000	B IOS	NA

Overall Correlation Result	Mean Shift ≤ 5%	Mean Shift %	Sigma Ratio ≤ 1.3
PASS	PASS	0.11%	PASS
PASS	PASS	2.18%	PASS
PASS	PASS	4.79%	PASS
PASS	PASS	0.21%	PASS
PASS	PASS	3.03%	PASS
PASS	PASS	1.33%	PASS
PASS	PASS	0.08%	PASS
PASS	PASS	3.90%	PASS
PASS	PASS	0.95%	PASS
PASS	PASS	0.92%	PASS
PASS	PASS	1.14%	PASS
PASS	PASS	1.08%	PASS
PASS	PASS	0.65%	PASS
PASS	PASS	2.06%	PASS
PASS	PASS	0.27%	PASS
PASS	PASS	1.79%	PASS
PASS	PASS	0.23%	PASS
PASS	PASS	2.77%	PASS
PASS	PASS	3.60%	PASS
PASS	PASS	1.80%	PASS
PASS	PASS	4.59%	PASS
PASS	PASS	1.83%	PASS
PASS	PASS	0.57%	PASS
PASS	PASS	4.69%	PASS
PASS	PASS	4.81%	PASS

Stdv Ratio	Cpk Result	CPK Value ≥ 1.67	Annotation
0.812	PASS	>10	
0.956	PASS	4.674	
0.731	PASS	3.551	
1.045	PASS	>10	
1.218	PASS	6.462	
1.270	PASS	>10	
1.041	PASS	8.834	
1.291	PASS	2.683	
1.172	PASS	1.689	
1.107	PASS	2.477	
0.867	PASS	3.211	
1.070	PASS	1.568	Comparable data on both sites
1.134	PASS	1.415	Comparable data on both sites
0.461	PASS	>10	
0.737	PASS	>10	
0.354	PASS	>10	
0.748	PASS	>10	
0.602	PASS	6.611	
0.741	PASS	4.572	
1.050	PASS	7.655	
1.077	PASS	4.202	
1.175	PASS	9.339	
0.996	PASS	>10	
1.136	PASS	2.901	
1.242	PASS	2.154	

TEST PRODUCT QUALIFICATION REPORT

TITLE:

RH1498 Test Site Transfer from Analog Devices Milpitas to
Analog Devices General Trias Philippines

PCN Number:

PCN 22_0196

REVISION:

A

DATE:

September, 2022

CONTENTS:

Summary

Table 1 – RH1498 Test Details

Table 2 – Qualification Activities and Acceptance Criteria

Table 3 – Correlation Device Run Results

Table 4 – Product Site Transfer Correlation

Table 5 – GR&R Result

PROJECT BACKGROUND:

The RH1498 is currently undergoing production testing at the Analog Devices Milpitas (ADML). It was a strategic decision from business standpoint to qualify Analog Devices General Trias (ADGT) as primary site for these products. ADGT is situated in Gateway Business Park, General Trias, Cavite, Philippines. The manufacturing facility have 1 Million square foot building in a 15 hectares land area. It houses ~900 Testers and ~1000 handlers with 4,850 total employees which includes 1,000 engineers composed of Test, Product, Failure Analysis, Reliability, Design and Layout Engineers. ADGT passed and qualified on different certifications such as: IATF 16949, ISO 9001, ISO 14001, OHSAS 18001, ANSI ESD S20.20, IEC 61340-5-1. The plant produces 375 Million test output per quarter and caters different testing capability such as Package Testing, WLCSP Testing and Die Preparation, Wafer Trim and Probe and Mil-Aerospace Assembly & Test. In terms of product test capability, ADGT caters testing for Automotive, RF, Power, MEMS, μ solators, Mixed Signal High Speed Precision Converters and Mil-Aerospace products.

After qualification and replication of necessary test capability, ADGT will serve as the primary test site facility to serve future demands.

SUMMARY:

The RH1498M is a dual, rail-to-rail input and output precision C-Load™ op amp with a 10MHz gain-bandwidth product and a 6V/ μ s slew rate. The RH1498 is designed to maximize input dynamic range by delivering precision performance over the full supply voltage. Using a patented technique, the input stages of the RH1498 are trimmed, one at the negative supply and the other at the positive supply. The resulting guaranteed common mode rejection is much better than other rail-to-rail input op amps. When used as a unity-gain buffer in front of single supply 12-bit A-to-D converters, the RH1498 is guaranteed to add less than 1LSB of error even in single 5V supply systems. With 110dB of supply rejection, the RH1498 maintains its performance over a supply range of 4.5V to 36V. The inputs can be driven beyond the supplies without damage or phase reversal of the output. These op amps remain stable while driving capacitive loads up to 10,000pF. The wafer lots are processed to Linear Technology's inhouse Class S flow to yield circuits usable in stringent military and space applications.

TEST AND PRODUCT INFORMATION:

Device: RH1498M
Package: 10-LEADS CERPAC
Leads: 10 leads
FG Partname: RH1498MW
Tester Platform: LTX

The RH1498M is planned to be tested in Analog Devices General Trias (ADGT) using the following as shown in the Table 1 below:

Table 1: RH1498M Test Details

Parameters	ADML	ADGT	Remarks
Tester Platform	LTX TS80/TS88/MV88	LTX TS80/TS88/MV88	No change
Test Flow	Spec ID #05-08-5207	Spec ID #05-08-5207	No Change
Handtest Insert	M-1498-W10	L-80698	No change (Apply ADI Hardware naming standard)
Performance Board	LT1498 Testcard	L-01378	No change (Apply ADI Hardware naming standard)
Test Program	Spec ID #04-12-0232	v22753a_rh1498	No change (Apply ADI Program Filename Standard)

There is no change to the form, fit and function of the product.

This report documents the successful completion of the product test transfer requirements of RH1498M at ADGT.

DESCRIPTION AND TEST RESULTS:

The list of tables provides the description of the qualification tests performed with corresponding test results for RH1498M. All the available units have completed electrical tests on both the sending and receiving sites with the same test platform. Any device that will not meet the electrical qualification requirements will mean failure of the qualification and need to require solid corrective actions and a repeat of the qualification process. Qualification activities performed, and acceptance criteria is shown on Table 2:

Table 2: Qualification Activities and Acceptance Criteria

Qualification Activity	Sample Quantity	Accept Criteria
Correlation device run	5 correlation device units	*100% Passing correlation devices
Correlation Units Run	Test and datalog at >=10 serialized bin 1 units (or readbacks standards if available).	*CpK≥1.67 * For tightened limits, Mean Shift Criteria and sigma-spread criteria to apply * Mean Shift Criteria $(ABS(SS_mean - RS_Mean) / Limit\ Range) \times 100 \leq 5\%$ * Sigma-spread criteria $(RS_Sigma / SS_Sigma) \leq 1.3$
GR&R	10 Bin 1 units tested on 1 board and 3 testers	R&R % =<10%

- SS = Sending Site
- RS = Receiving Site

To validate full set-up functionality such as hardware, software, test fixtures and tester platform, 5 correlation devices of RH1498M were tested both in ADML and ADGT. Data between sites were analyzed and summarized in Table 3.

Table 3: Correlation Device Run result

Generic	Package	No. of correlation device	ALL correlation devices passed?
RH1498M	10-LEADS CERPAC	5 units	YES

The RH1498M was qualified by testing and datalog >= 10 serialized Bin1 units both in ADML and ADGT. This is to measure variation in hardware, tester and set-up condition thru mean shift and sigma spread. And to ensure the parameter measurement are still within the accepted range of variations. Data between sites were analyzed and summarized in Table 4.

Table 4: Product Site Transfer Correlation

Temperature	Generic	Package	Lot Number	Quantity	Sending Site	Receiving Site	Total No. of Correlation Parameters	Result
Ambient	RH1498M	10-LEADS CERPAC	L1098378.3	30	ADML	ADGT	29	ALL PASSED
Hot	RH1498M	10-LEADS CERPAC	L1098378.3	30	ADML	ADGT	29	ALL PASSED
Cold	RH1498M	10-LEADS CERPAC	L1098378.3	30	ADML	ADGT	29	ALL PASSED

To gather test performance data to allow estimation of the overall test repeatability and reproducibility from the production test solution, GR&R was performed on 10 serialized units tested on 1 test board and 3 test systems. GR&R result was analyzed and summarized in Table 6.

Table 5: *GR&R Result*

Generic	Package	Lot Number	No. of Units	No. of Test Boards	No. of Testers	All parameters passed R&R % =<10%?
RH1498M	10-LEADS CERPAC	L1098378.3	10	1	3	Yes – ALL PASSED

APPROVALS:

Technical Review Board No. [65939](#) - ADMP to ADGT Test Transfer

ADDITIONAL INFORMATION:

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

Customer Service: <https://www.analog.com/en/support/technical-support.html>

TEST PRODUCT QUALIFICATION REPORT

TITLE:

RH1086 Test Site Transfer from Analog Devices Milpitas to
Analog Devices General Trias Philippines

PCN Number:

PCN 22_0196

REVISION:

A

DATE:

September, 2022

CONTENTS:

Summary

Table 1 – RH1086 Test Details

Table 2 – Qualification Activities and Acceptance Criteria

Table 3 – Correlation Device Run Results

Table 4 – Product Site Transfer Correlation

Table 5 – GR&R Result

PROJECT BACKGROUND:

The RH1086 is currently undergoing production testing at the Analog Devices Milpitas (ADML). It was a strategic decision from business standpoint to qualify Analog Devices General Trias (ADGT) as a primary test site for these products. ADGT is situated in Gateway Business Park, General Trias, Cavite, Philippines. The manufacturing facility have 1 Million square foot building in a 15 hectares land area. It houses ~900 Testers and ~1000 handlers with 4,850 total employees which includes 1,000 engineers composed of Test, Product, Failure Analysis, Reliability, Design and Layout Engineers. ADGT passed and qualified on different certifications such as: IATF 16949, ISO 9001, ISO 14001, OHSAS 18001, ANSI ESD S20.20, IEC 61340-5-1. The plant produces 375 Million test output per quarter and caters different testing capability such as Package Testing, WLCSP Testing and Die Preparation, Wafer Trim and Probe and Mil-Aerospace Assembly & Test. In terms of product test capability, ADGT caters testing for Automotive, RF, Power, MEMS, μ solators, Mixed Signal High Speed Precision Converters and Mil-Aerospace products.

After qualification and replication of necessary test capability, ADGT will serve as the primary test site facility to serve future demands.

SUMMARY:

The RH1086M positive adjustable regulator is designed to provide 0.5A for the H package and 1.5A for the K package with higher efficiency than currently available devices. All internal circuitry is designed to operate down to 1V input-output differential, and the dropout voltage is fully specified as a function of load current. Dropout is guaranteed at a maximum of 1.5V at maximum output current, decreasing at lower load currents. On-chip trimming adjusts the output voltage to 1%. Current limit is also trimmed, minimizing the stress on both the regulator and power source circuitry under overload conditions.

The RH1086M is pin compatible with older 3-terminal regulators. A 10 μ F output capacitor is required on this new device. However, this is usually included in most regulator designs.

The wafer lots are processed to ADI in-house Class S flow-to-yield circuits usable in stringent military applications.

TEST AND PRODUCT INFORMATION:

Device: RH1086M

Package: 2-LEAD TO-3 METAL CAN

Leads: 2 leads

FG Partname: RH1086MK

Tester Platform: LTX

The RH1086M is planned to be tested in Analog Devices General Trias (ADGT) using the following as shown in the Table 1 below:

Table 1: RH1086M Test Details

Parameters	ADML	ADGT	Remarks
Tester Platform	LTX TS80/TS88/MV88	LTX TS80/TS88/MV88	No change
Test Flow	Spec ID #05-08-5131	Spec ID #05-08-5131	No Change
Handtest Insert	M-1084-K2	L-65809	No change (Apply ADI Hardware naming standard)
Performance Board	LT1084 Testcard	L-03036	No change (Apply ADI Hardware naming standard)
Test Program	Spec ID #04-12-1086	v22754a_rh1086mk	No change (Apply ADI Program Filename Standard)

There is no change to the form, fit and function of the product.

This report documents the successful completion of the product test transfer requirements of RH1086 at ADGT.

DESCRIPTION AND TEST RESULTS:

The list of tables provides the description of the qualification tests performed with corresponding test results for RH1086M. All the available units have completed electrical tests on both the sending and receiving sites with the same test platform. Any device that will not meet the electrical qualification requirements will mean failure of the qualification and need to require solid corrective actions and a repeat of the qualification process. Qualification activities performed, and acceptance criteria is shown on Table 2:

Table 2: Qualification Activities and Acceptance Criteria

Qualification Activity	Sample Quantity	Accept Criteria
Correlation device run	5 correlation device units	*100% Passing correlation devices
Correlation Units Run	Test and datalog at >=10 serialized bin 1 units (or readbacks standards if available).	*CpK≥1.67 * For tightened limits, Mean Shift Criteria and sigma-spread criteria to apply * Mean Shift Criteria $(ABS(SS_mean - RS_Mean) / Limit\ Range) \times 100 \leq 5\%$ * Sigma-spread criteria $(RS_Sigma / SS_Sigma) \leq 1.3$
GR&R	10 Bin 1 units tested on 1 board and 3 testers	R&R % =<10%

- SS = Sending Site
- RS = Receiving Site

To validate full set-up functionality such as hardware, software, test fixtures and tester platform, 5 correlation devices of RH1086M were tested both in ADML and ADGT. Data between sites were analyzed and summarized in Table 3.

Table 3: Correlation Device Run result

Generic	Package	No. of correlation device	ALL correlation devices passed?
RH1086M	2-LEAD TO-3 METAL CAN	5 units	YES

The RH1086M was qualified by testing and datalog >= 10 serialized Bin1 units both in ADML and ADGT. This is to measure variation in hardware, tester and set-up condition thru mean shift and sigma spread. And to ensure the parameter measurement are still within the accepted range of variations. Data between sites were analyzed and summarized in Table 4.

Table 4: Product Site Transfer Correlation

Temperature	Generic	Package	Lot Number	Quantity	Sending Site	Receiving Site	Total No. of Correlation Parameters	Result
Ambient	RH1086M	2-LEAD TO-3 METAL CAN	L935918.3	30	ADML	ADGT	18	ALL PASSED
Hot	RH1086M	2-LEAD TO-3 METAL CAN	L935918.3	30	ADML	ADGT	17	ALL PASSED
Cold	RH1086M	2-LEAD TO-3 METAL CAN	L935918.3	30	ADML	ADGT	17	ALL PASSED

To gather test performance data to allow estimation of the overall test repeatability and reproducibility from the production test solution, GR&R was performed on 10 serialized units tested on 1 test board and 3 test systems. GR&R result was analyzed and summarized in Table 6.

Table 6: GR&R Result

Generic	Package	Lot Number	No. of Units	No. of Test Boards	No. of Testers	All parameters passed R&R % =<10%?
RH1086M	2-LEAD TO-3 METAL CAN	L935918.3	10	1	3	Yes – ALL PASSED

APPROVALS:

Technical Review Board No. [65939](#) - ADMP to ADGT Test Transfer

ADDITIONAL INFORMATION:

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

Customer Service: <https://www.analog.com/en/support/technical-support.html>

TEST PRODUCT QUALIFICATION REPORT

TITLE:

RH1013 Test Site Transfer from Analog Devices Milpitas to
Analog Devices General Trias Philippines

PCN Number:

PCN 22_0196

REVISION:

A

DATE:

September, 2022

CONTENTS:

Summary

Table 1 – RH1013 Test Details

Table 2 – Qualification Activities and Acceptance Criteria

Table 3 – Correlation Device Run Results

Table 4 – Product Site Transfer Correlation

Table 5 – GR&R Result

PROJECT BACKGROUND:

The RH1013 is currently undergoing production testing at the Analog Devices Milpitas (ADML). It was a strategic decision from business standpoint to qualify Analog Devices General Trias (ADGT) as a primary test site for these products. ADGT is situated in Gateway Business Park, General Trias, Cavite, Philippines. The manufacturing facility have 1 Million square foot building in a 15 hectares land area. It houses ~900 Testers and ~1000 handlers with 4,850 total employees which includes 1,000 engineers composed of Test, Product, Failure Analysis, Reliability, Design and Layout Engineers. ADGT passed and qualified on different certifications such as: IATF 16949, ISO 9001, ISO 14001, OHSAS 18001, ANSI ESD S20.20, IEC 61340-5-1. The plant produces 375 Million test output per quarter and caters different testing capability such as Package Testing, WLCSP Testing and Die Preparation, Wafer Trim and Probe and Mil-Aerospace Assembly & Test. In terms of product test capability, ADGT caters testing for Automotive, RF, Power, MEMS, μ solators, Mixed Signal High Speed Precision Converters and Mil-Aerospace products.

After qualification and replication of necessary test capability, ADGT will serve as the primary test site facility to serve future demands.

SUMMARY:

The RH1013M is the first precision dual operational amplifier which directly upgrades designs in the industry standard 8-pin DIP LM158/MC1558/OP-221 pin configuration. Low offset voltage (300 μ V max), low drift ($\leq 2.5\mu$ V/ $^{\circ}$ C), low offset current (≤ 1.5 nA), and high gain (1.2 million min) combine to make the RH1013M two truly precision amplifiers in one package. The wafer lots are processed to Analog Devices' in-house Class S flow to yield circuits usable in stringent military applications.

TEST AND PRODUCT INFORMATION:

Device: RH1013M
Package: 10-LEADS CERPAC
Leads: 10 leads
FG Partname: RH1013MW
Tester Platform: LTX

The RH1013M is planned to be tested in Analog Devices General Trias (ADGT) using the following as shown in the Table 1 below:

Table 1: RH1013M Test Details

Parameters	ADML	ADGT	Remarks
Tester Platform	LTX TS80/TS88/MV88	LTX TS80/TS88/MV88	No change
Test Flow	Spec ID #05-08-5736	Spec ID #05-08-5736	No Change
Handtest Insert	M-1013-DIP8	L-65705	No change (Apply ADI Hardware naming standard)
Performance Board	LT1013 Testcard	L-01049	No change (Apply ADI Hardware naming standard)
Test Program	Spec ID #04-12-1013	v22752a_rh1013	No change (Apply ADI Program Filename Standard)

There is no change to the form, fit and function of the product.

This report documents the successful completion of the product test transfer requirements of RH1013M at ADGT.

DESCRIPTION AND TEST RESULTS:

The list of tables provides the description of the qualification tests performed with corresponding test results for RH1013M. All the available units have completed electrical tests on both the sending and receiving sites with the same test platform. Any device that will not meet the electrical qualification requirements will mean failure of the qualification and need to require solid corrective actions and a repeat of the qualification process. Qualification activities performed, and acceptance criteria is shown on Table 2:

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To validate full set-up functionality such as hardware, software, test fixtures and tester platform, 5 correlation devices of RH1013M were tested both in ADML and ADGT. Data between sites were analyzed and summarized in Table 3.

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RH1013M	10-LEADS CERPAC	5 units	YES

The RH1013M was qualified by testing and datalog >= 10 serialized Bin1 units both in ADML and ADGT. This is to measure variation in hardware, tester and set-up condition thru mean shift and sigma spread. And to ensure the parameter measurement are still within the accepted range of variations. Data between sites were analyzed and summarized in Table 4.

Table 4: Product Site Transfer Correlation

Temperature	Generic	Package	Lot Number	Quantity	Sending Site	Receiving Site	Total No. of Correlation Parameters	Result
Ambient	RH1013M	10-LEADS CERPAC	L1079528.3	30	ADML	ADGT	33	ALL PASSED
Hot	RH1013M	10-LEADS CERPAC	L1079528.3	30	ADML	ADGT	25	ALL PASSED
Cold	RH1013M	10-LEADS CERPAC	L1079528.3	30	ADML	ADGT	25	ALL PASSED

To gather test performance data to allow estimation of the overall test repeatability and reproducibility from the production test solution, GR&R was performed on 10 serialized units tested on 1 test board and 3 test systems. GR&R result was analyzed and summarized in Table 6.

Table 5: *GR&R Result*

Generic	Package	Lot Number	No. of Units	No. of Test Boards	No. of Testers	All parameters passed R&R % =<10%?
RH1013M	10-LEADS CERPAC	L1079528.3	10	1	3	Yes – ALL PASSED

APPROVALS:

Technical Review Board No. [65939](#) - ADMP to ADGT Test Transfer

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