

1250 Peterson Dr., Wheeling, IL 60090

#### TEST SPECIFICATIONS:

#### RTCA/DO-160G (December 8, 2010)

#### RADIO TECHNICAL COMMISSION FOR AERONAUTICS

#### ENVIRONMENTAL CONDITIONS

#### AND

#### TEST PROCEDURE FOR AIRBORNE EQUIPMENT

# THE FOLLOWING **MEETS** SECTION 22 PIN INJECTION TEST PROCEDURE OF THE ABOVE TEST SPECIFICATION

- Formal Name: Single Rail ARINC 429 Differential Line Driver
- Kind of Equipment: ARINC 429 Line Driver
- Test Configuration: Tabletop (Tested at 3.3 Vdc)
- Model Number(s): HI-8597
- Model(s) Tested: HI-8597
- Serial Number(s): 5, 6, 7
- Date of Tests: December 27, 2012
- Test Conducted for: Holt Integrated Circuits, Inc. 23351 Madero Mission Viejo, California 92691

**NOTICE**: "This report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government". Please see the "Additional Description of Equipment Under Test" page listed inside of this report.

© Copyright 1983-2012 D.L.S. Electronic Systems, Inc.

#### COPYRIGHT NOTICE

This report or any portion thereof may not be reproduced or modified in any form without the expressed written consent of D.L.S. Electronic Systems, Inc.



1250 Peterson Dr., Wheeling, IL 60090

Company:Holt Integrated Circuits, Inc.Model Tested:HI-8597Report Number:18651Project No.5676

#### SIGNATURE PAGE

Report Written By:

Anon C Row

Arnom C. Rowe Test Engineer EMC-001375-NE

Report Reviewed By:

far 2

Jack Prawica Lab Manager EMC-002412-NE

Report Approved By:

Brian J. Mattoo

Brian J. Mattson General Manager



1250 Peterson Dr., Wheeling, IL 60090

#### TABLE OF CONTENTS

	Cover Page	I
ii.	Signature Page	2
iii.	Table of Contents	3
iv.	NVLAP Certificate of Accreditation	4
1.0	Introduction	5
2.0	Test Facility	5
3.0	Test Set-Up	6
4.0	Operating Conditions of Test Sample	6
5.0	Performance Monitored	6
6.0	Description of Test Sample	7
7.0	Additional Description of Equipment Under Test	8
8.0	References	8
9.0	Test Results	8
10.0	Conclusion of Susceptibility Tests	8
Appen	dix A Section 22 Pin Injection Lightning Induced Transient Susceptibility	9
$\frac{1.0}{2.0}$	Categories Waveforms and Levels	10
2.0	Test Setup and Apparatus	11
1.0		
411	Test Procedure	.11
4.0 5.0	Test Procedure Limits & Results	11
4.0 5.0 6.0	Limits & Results	11 15 17
4.0 5.0 6.0 Section	Limits & Results Photos Taken During Testing	11 15 17 19 28
4.0 5.0 6.0 Section Section	Test Procedure   Limits & Results   Photos Taken During Testing   1 22 Test Instrumentation / Table 1   1 22 Test Equipment / Table 2	11 15 17 19 28 29
4.0 5.0 6.0 Section Section	Limits & Results Photos Taken During Testing n 22 Test Instrumentation / Table 1 n 22 Test Equipment / Table 2 n 22 Waveform 3 Pin Injection Test Data Sheets	11 15 17 19 28 29 30
4.0 5.0 6.0 Section Section Section	Test Procedure   Limits & Results   Photos Taken During Testing   n 22 Test Instrumentation / Table 1   n 22 Test Equipment / Table 2   n 22 Waveform 3 Pin Injection Test Data Sheets   n 22 Waveform 4 Pin Injection Test Data Sheets	11 15 17 19 28 29 30 43
4.0 5.0 6.0 Section Section Section Section	Test Procedure   Limits & Results   Photos Taken During Testing   n 22 Test Instrumentation / Table 1   n 22 Test Equipment / Table 2   n 22 Waveform 3 Pin Injection Test Data Sheets   n 22 Waveform 4 Pin Injection Test Data Sheets   n 22 Waveform 5A Pin Injection Test Data Sheets	11 15 17 19 28 29 30 43 48
4.0 5.0 6.0 Section Section Section Section Section	Test ProcedureLimits & ResultsPhotos Taken During Testingn 22Test Instrumentation / Table 1n 22Test Equipment / Table 2n 22Waveform 3 Pin Injection Test Data Sheetsn 22Waveform 4 Pin Injection Test Data Sheetsn 22Waveform 5A Pin Injection Test Data Sheetsn 22Waveform 5B Pin Injection Test Data Sheets	11 15 17 19 28 29 30 43 48 53
4.0 5.0 6.0 Section Section Section Section Section Section	Test ProcedureLimits & ResultsPhotos Taken During Testingn 22Test Instrumentation / Table 1n 22Test Equipment / Table 2n 22Waveform 3 Pin Injection Test Data Sheetsn 22Waveform 4 Pin Injection Test Data Sheetsn 22Waveform 5A Pin Injection Test Data Sheetsn 22Waveform 5B Pin Injection Test Data Sheetsn 22Waveform 5B Pin Injection Test Data Sheetsn 22Waveform 3 Pin Injection Test Data Sheetsn 22Waveform 5B Pin Injection Test Data Sheetsn 22Waveform 3 Pin Injection Calibration Data Sheets	11 15 17 19 28 29 30 43 48 53 58
4.0 5.0 6.0 Section Section Section Section Section Section Section	Test ProcedureLimits & ResultsPhotos Taken During Testingn 22Test Instrumentation / Table 1n 22Test Equipment / Table 2n 22Waveform 3 Pin Injection Test Data Sheetsn 22Waveform 4 Pin Injection Test Data Sheetsn 22Waveform 5A Pin Injection Test Data Sheetsn 22Waveform 5B Pin Injection Test Data Sheetsn 22Waveform 3 Pin Injection Test Data Sheetsn 22Waveform 5B Pin Injection Test Data Sheetsn 22Waveform 3 Pin Injection Calibration Data Sheetsn 22Waveform 4 Pin Injection Calibration Data Sheets	11 15 17 19 28 29 30 43 43 43 53 58 63
4.0 5.0 6.0 Section Section Section Section Section Section Section	Test ProcedureLimits & ResultsPhotos Taken During Testingn 22Test Instrumentation / Table 1n 22Test Equipment / Table 2n 22Waveform 3 Pin Injection Test Data Sheetsn 22Waveform 4 Pin Injection Test Data Sheetsn 22Waveform 5A Pin Injection Test Data Sheetsn 22Waveform 5B Pin Injection Test Data Sheetsn 22Waveform 3 Pin Injection Test Data Sheetsn 22Waveform 5B Pin Injection Test Data Sheetsn 22Waveform 3 Pin Injection Calibration Data Sheetsn 22Waveform 4 Pin Injection Calibration Data Sheetsn 22Waveform 5A Pin Injection Calibration Data Sheetsn 22Waveform 5A Pin Injection Calibration Data Sheets	11 15 17 19 28 29 30 43 43 48 53 58 63 70



1250 Peterson Dr., Wheeling, IL 60090



NVLAP-01C (REV. 2009-01-28)



1250 Peterson Dr., Wheeling, IL 60090

#### 1.0 INTRODUCTION:

On December 27, 2012, a series of susceptibility tests were made to demonstrate that the Single Rail ARINC 429 Differential Line Driver, Model Number(s) HI-8597, serial number 5, 6, 7, manufactured by Holt Integrated Circuits, Inc. was tested to the requirements of RTCA/DO-160G (December 8, 2010), Environmental conditions and Test Procedures for Airborne Equipment using the following test procedure): Section 22 Pin Injection.

#### 2.0 TEST FACILITY:

D.L.S. Electronic Systems, Inc. is a full service EMC Testing Laboratory accredited to ISO Guide 17025. NVLAP Certificate and Scope can be viewed at <u>http://www.dlsemc.com/certificate</u>. Our facilities are registered with the FCC, Industry Canada, and VCCI. All tests were performed by personnel of D.L.S. Electronic Systems, Inc. at the following location(s):

#### Main Test Facility: D.L.S. Electronic Systems, Inc. 1250 Peterson Drive Wheeling, Illinois 60090

A list of the test equipment used, along with identification and calibration data, is included in the Table of each Appendix of this report. All primary equipment was calibrated against known reference standards with a verified traceable path to NIST.



#### 3.0 TEST SET-UP:

All susceptibility tests were performed at D.L.S. Electronic Systems, Inc. The Single Rail ARINC 429 Differential Line Driver was placed on a copper bench measuring 20' long and 40" wide. The following describes the various Labs that are used for testing:

LAB <u>H</u>  $20' \log x \ 10' \text{ wide } x \ 8' \text{ high screen shielded enclosure.}$ 

All lines leaving the room were filtered. The auxiliary equipment was located outside the main room.

The tests were run in the following labs:

LAB H Section 22, Lightning Inducted Transient Susceptibility

#### 4.0 OPERATING CONDITIONS OF TEST SAMPLE:

All test measurements were made at a laboratory temperature of  $74^{\circ}F$  at 34% humidity with the following mode of operation:

Power up the device with 3.3 V supply at VDD, while SLP tied to VDD and TX0 and TX1 tied to GND. Supply current will measure approximately 29 mA. Lightning injection will be performed on pins TXOUTA and TXOUTB. The EUT Current is to be between 25 mA and 29 mA before and after the lightning pin injection test.

#### 5.0 PERFORMANCE MONITORED:

The Single Rail ARINC 429 Differential Line Driver performance was monitored as follows:

Any change to the initial supply current measurement after lightning injection will be categorized as out of specification.



#### 6.0 DESCRIPTION OF TEST SAMPLE: (See also Paragraph 7.0)

- 6.1 3.3 V Single Rail ARINC 429 Differential Line Driver with Integrated Lightning Protection.
- 6.2 PHYSICAL DIMENSIONS OF EQUIPMENT UNDER TEST:

Length: 10.3 mm x Width: 10.3 mm x Height: 2.3 mm

6.3 LINE FILTER USED:

NA

6.4 INTERNAL CLOCK FREQUENCIES:

Switching Power Supply Frequencies: NA

Clock Frequencies: NA

#### 6.5 DESCRIPTION OF ALL CIRCUIT BOARDS:

SN5; ARINC 429 Line Driver on a PCB	HI-8597PSIF Rev B Lot#12-08-7060; DC1245
SN6; ARINC 429 Line Driver on a PCB	HI-8597PSIF Rev B Lot#12-08-7060; DC1245
SN7; ARINC 429 Line Driver on a PCB	HI-8597PSIF Rev B Lot#12-08-7060; DC1245



# 7.0 ADDITIONAL DESCRIPTION OF EQUIPMENT UNDER TEST: (See also Paragraph 6.0)

There were no changes made during testing.

#### 8.0 **REFERENCES**:

1. Document No. RTCA/DO-160G, December 8, 2010 Prepared by: SC-135

#### 9.0 TEST RESULTS:

The Single Rail ARINC 429 Differential Line Driver was subject to the test procedure(s) Section 22 Pin Injection. A detailed explanation of how these tests and their measurements were made is shown in Appendix A at the end of this report.

#### 10.0 CONCLUSION OF SUSCEPTIBILITY TESTS:

The Single Rail ARINC 429 Differential Line Driver, Model Number(s) HI-8597, **meets** RTCA/DO-160G (December 8, 2010), Environmental conditions and Test Procedures for Airborne Equipment using test procedure(s) Section 22 Pin Injection. See the Appendix A for a detailed explanation of the test results.



Company:Holt Integrated Circuits, Inc.Model Tested:HI-8597Report Number:18651

Appendix A

# APPENDIX A

# RTCA/DO-160G

# **SECTION 22**

## PARAGRAPH 22.5

## LIGHTNING INDUCED

## TRANSIENT SUSCEPTIBILITY

PIN INJECTION



#### 1.0 PURPOSE OF THE TEST:

These tests verify the capability of the equipment to withstand effects of lightning induced electrical transients. The damage tolerance test was performed using the Pin Injection test method.

#### 2.0 CATEGORIES, WAVEFORMS AND LEVELS:

Category designations for equipment consist of five characters appears as follows:

A3	<u></u>	<u>_Z3</u>	3
Pin Test	Pin Test	Pin Test	Pin
Waveform	Waveform	Waveform	Test
Set	Set	Set	Level

#### X = Tests not performed

The equipment under test was tested to the levels and waveforms consistent with its expected use and aircraft installation. The Single Rail ARINC 429 Differential Line Driver was subjected to Waveform(s) WF3, WF4, WF5A & WF5B using Level 3.



#### 3.0 TEST SETUP AND APPARATUS:

A typical test setup is shown in Figure 22-13.



#### NOTES:

- *1.* The notes from the calibration setup of <u>Figure 22-10</u> apply.
- 2. Test setup and procedures are to be such that the required lightning transients appear differentially between the aircraft power and return/neutral lines. If power and return/neutral originate from a remote load, in the same cable bundle with signals, then the test setup should use an isolated power return to ensure the proper common mode evaluation.
- 3. The power supply is not necessary for tests on un-powered equipment.
- 4. Test procedures assume lightning transients appear common -mode between all pins and case. If the exp ected installation utilizes local power and/or signal returns tied either internally or externally to case or aircraft structure, tests shall be performed with the return(s) tied to the case.
- 5. Return wire lengths shall be kept as short as possible.

Figure 22-13 Pin Injection Test Setup, Signal Pins & Power Pins – Direct Injection Method



#### 3.0 TEST SETUP AND APPARATUS: (CON'T)

The transient generator used produced the Voltage/Current Waveform 3 shown in Figure 22-3 of the test specification. Any method of generating the spike may be used if the waveform complies with Figure 22-3. The generator was connected to the designated pin and case ground of the device under test by means of a short, low inductance lead.



<u>NOTES</u>:

1. Voltage and current are not required to be in phase.

2. The waveshape may have either a damped sine or cosine waveshape.

Figure 22-3 Voltage/Current Waveform 3



#### 3.0 TEST SETUP AND APPARATUS: (CON'T)

The transient generator used produced the Voltage Waveform 4 shown in <u>Figure 22-4</u> of the test specification. Any method of generating the spike may be used if the waveform complies with <u>Figure 22-4</u>. The generator was connected to the designated pin and case ground of the device under test by means of a short, low inductance lead.



#### Figure 22-4 Voltage Waveform 4



#### 3.0 TEST SETUP AND APPARATUS: (CON'T)

The transient generator used produced the Current/Voltage Waveform 5 shown in Figure 22-5 of the test specification. Any method of generating the spike may be used if the waveform complies with Figure 22-5. The generator was connected to the designated pin and case ground of the device under test by means of a short, low inductance lead.



Figure 22-5 Current/Voltage Waveform 5



#### 4.0 TEST PROCEDURE:

Pin injection testing is a technique whereby the chosen transient waveform(s) is applied directly to each pin and case ground of the designated pins. Waveform 3 (1MHz damped sine), Waveform 4 (6.4 x 69us double exponential) and Waveform 5A ( 40 x 120 us) and Waveform 5B ( 50 x 500 us) were each applied at level 3 positive and negative polarities, to the Single Rail ARINC 429 Differential Line Driver pins called out in Table 22-1 & 22-2 of RTCA/DO-160G. The Single Rail ARINC 429 Differential Line Driver was not powered up and none of the cables were connected throughout Pin Injection test.

For each waveform at each level, ten positive and ten negative discharges were applied at minimum intervals of 10 seconds. The actual wave shape applied to each pin was measured with a 1000x oscilloscope probe within 5cm of the pin. All wave shapes were recorded.



#### 4.0 TEST PROCEDURE:

The following test setup was used for calibration.



#### <u>NOTES</u>:

- 1. Tests of active ac power circuits may require transformer coupling of the applied transients to the power lines and transients should be synchronized to the peak of the ac waveform.
- 2. A power blocking device may be used to isolate voltages at the pins of the EUT from the low generator impedance and must be present during calibration since they may adversely affect the waveform calibration. Typical power blocking devices are bipolar suppression devices for Waveforms 4 and 5 or a series capacitor for Waveform 3. The bipolar suppression device is selected with a voltage rating close to the expected EUT operating voltage but may have a nominal value to allow testing with one calibrated setup. A voltage rating that represents a significant percentage of the applied transient will affect waveform calibration. The capacitor is selected to achieve the calibration current; too large a value may produce unwanted resonance during test.
- 3. The Power Blocking Device is not necessary for tests on un -powered equipment.

#### Figure 22-10 Pin Injection Calibration Setup, Signal Pins & Power Pins - Direct Injection Method



#### 5.0 LIMITS & RESULTS:

#### 5.1 LIMITS:

The Waveform used for the test is taken from the following table:

	Waveforms						
	3/3	4/1	5A/5A				
Level	Voc/Isc	Voc/Isc	Voc/Isc				
1	100/4	50/10	50/50				
2	250/10	125/25	125/125				
3	600/24	300/60	300/300				
4	1500/60	750/150	750/750				
5	3200/128	1600/320	1600/1600				

#### Table 22-2 Generator Setting Levels for Pin Injection

#### <u>NOTES:</u>

- 1. Voc = Peak Open Circuit Voltage (Volts) available at the calibration point shown in Figure 22-10, Figure 22-11, or Figure 22-12.
- 2. Isc = Peak Short Circuit Current (Amps) available at the calibration point shown in Figure 22-10, Figure 22-11, or Figure 22-12.

3. Amplitude Tolerances +10%, -0%.

4. The ratio of Voc to Isc is the generator source impedance to be used during the calibration procedure.

5. Waveforms 3, 4 and 5A are identified in Figure 22-3, Figure 22-4 and Figure 22-5.



#### 5.0 LIMITS & RESULTS (CON'T):

#### 5.2 RESULTS:

The unit under test was powered up and monitored for susceptibility during testing. The actual wave shapes were applied to the pins and recorded. For each waveform, the wave shape greatly varied from pin to pin due to the different impedances seen by the generator, from the pins and any resistors or capacitors. On any given pin, the wave shape did not significantly vary between the first and tenth discharges. At regular intervals and after all events, the generators' open circuit calibration wave shape and source impedance were re-verified. In all cases, the generator maintained its' performance. There were no events noted during testing, indicating possible damage to circuitry through these pins. The post operation was verified and the Single Rail ARINC 429 Differential Line Driver passed the requirements of Section 22 (Pin Injection).

The Single Rail ARINC 429 Differential Line Driver meets the following conditions:

#### Lab used: H

#### Summary:

There were no issues observed during Pin Injection Testing. The pre-test current draw of each board was 29 mA. The post-test current draw of each board was 29 mA indicating no damage. PCB#5, PCB#6, PCB#7 were the 3 boards subjected to the pin injection testing.

PCB#5--Category A3 PCB#6--Category B3 PCB#7--Category Z3 (WF3 and WF5B)

See the data sheets at the end of this appendix for the test results.



Holt Integrated Circuits, Inc. HI-8597 18651 Appendix A RTCA/DO-160G Section 22 Lightning Induced Transient

#### 6.0 PHOTOS TAKEN DURING TESTING



WF3 Pin Injection--Test



Holt Integrated Circuits, Inc. HI-8597 18651 Appendix A RTCA/DO-160G Section 22 Lightning Induced Transient

#### 6.0 PHOTOS TAKEN DURING TESTING



WF4 Pin Injection--Test



Holt Integrated Circuits, Inc. HI-8597 18651 Appendix A RTCA/DO-160G Section 22 Lightning Induced Transient

#### 6.0 PHOTOS TAKEN DURING TESTING



WF5A/5B Pin Injection--Test



Holt Integrated Circuits, Inc. HI-8597 18651 Appendix A RTCA/DO-160G Section 22 Lightning Induced Transient

#### 6.0 PHOTOS TAKEN DURING TESTING



WF3 Pin Injection--OC Calibration



Holt Integrated Circuits, Inc. HI-8597 18651 Appendix A RTCA/DO-160G Section 22 Lightning Induced Transient

#### 6.0 PHOTOS TAKEN DURING TESTING



WF3 Pin Injection--SC Calibration



Holt Integrated Circuits, Inc. HI-8597 18651 Appendix A RTCA/DO-160G Section 22 Lightning Induced Transient

#### 6.0 PHOTOS TAKEN DURING TESTING



WF4 Pin Injection--OC Calibration



Holt Integrated Circuits, Inc. HI-8597 18651 Appendix A RTCA/DO-160G Section 22 Lightning Induced Transient

#### 6.0 PHOTOS TAKEN DURING TESTING



### WF4 Pin Injection--SC Calibration



Holt Integrated Circuits, Inc. HI-8597 18651 Appendix A RTCA/DO-160G Section 22 Lightning Induced Transient

#### 6.0 PHOTOS TAKEN DURING TESTING



### WF5A/5B Pin Injection--OC Calibration



Holt Integrated Circuits, Inc. HI-8597 18651 Appendix A RTCA/DO-160G Section 22 Lightning Induced Transient

#### 6.0 PHOTOS TAKEN DURING TESTING



### WF5A/5B Pin Injection--SC Calibration



1250 Peterson Dr., Wheeling, IL 60090

#### **SECTION 22**

#### TEST INSTRUMENTATION

### Lightning Induced Transient Susceptibility

#### TABLE 1

Equipment	Manufacturer	Model Number	Serial Number	Range	Cal. On	Cal. Due
Oscilloscope	Agilent	54846A	US40240434	2.25 GHz	06/25/2012	06/25/2013
Current Probe	PEM	CWT 3R	10134-11407	16 MHz	07/17/2012	07/17/2013

All primary equipment is calibrated against known reference standards with a verified traceable path NIST.



1250 Peterson Dr., Wheeling, IL 60090

#### SECTION 22

#### TEST EQUIPMENT

### Lightning Induced Transient Susceptibility

#### TABLE 2

Equipment	Manufacturer	Model Number	Serial Number	Range
Transient Generator	EMC Partner	MIG0600MS	DLS#795	N/A
Transient Generator	EMC Partner	MIG-OS-MB	DLS#796	N/A

NOTE: The above test equipment is verified upon use.



1250 Peterson Dr., Wheeling, IL 60090

Company:Holt Integrated Circuits, Inc.Model Tested:HI-8597Report Number:18651Standard:RTCA/DO-160G Section 22 Lightning Induced Transient

## PIN INJECTION TEST DATA SHEETS

### WAVEFORM 3



1250 Peterson Dr., Wheeling, IL 60090



Acquisition	Sampling mode re Memory depth ma Sampling rate aut Averaging off 9-bit BW Filter of	al time Config nual Memory omatic Sampli f Interpolation	juration 4GSa/s depth 32768pts ing rate 2.00 Gi i on	s Sa/s		
Channel 1	Scale 200 V/div Offset 94 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00					
Channel 2	Scale 10.0 A/div Offset 4.8 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00					
Time base	Scale 1.00 µs/div	Position 3.58	30000 µs Refer	ence center		
Trigger	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level 127 V Slope rising					
Measure	V max(1) V max(2) V min(1) V min(2)	current 402 V 9.73 A -409 V -8.15 A	mean 402 V 9.73 A -409 V -8.15 A	std dev 0 V 0.0 A 0 V 0.0 A	min 402 V 9.73 A -409 V -8.15 A	max 402 V 9.73 A -409 V -8.15 A
Marker	V max(1) V max(2) V min(1) V min(2)	current 402 V 9.73 A -409 V -8.15 A	mean 402 V 9.73 A -409 V -8.15 A	A(1) = B(1) = Δ = 1/ΔX =	X 1.8164 дs 3.0164 дs 1.2000 дs 833.33 kHz	Y -409 V 56 V 465 V



1250 Peterson Dr., Wheeling, IL 60090



Acquisition	Sampling mode real time Memory depth manual Me Sampling rate automatic S Averaging off 9-bit BW Filter off Interpo	Configuration 4GSa/ mory depth 32768pt Sampling rate 2.00 G plation on	s s iSa/s				
Channel 1	Scale 200 V/div Offset 94 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00						
Channel 2	Scale 10.0 A/div Offset 4.8 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00						
Time base	Scale 1.00 µs/div Positio	n 3.580000 µs Refe	rence center				
Trigger	Mode edge Sweep trigge Hysteresis normal Holdoff Source channel 1 Trigger	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level 127 V Slope rising					
Measure	curre V max(1) 405 V V max(2) 9.54 V min(1) -409 V V min(2) -7.71	nt mean 391 V A 8.44 A -386 V A -8.10 A	std dev 20 V 1.55 A 32 V 560 mA	min 376 V 7.34 A -409 V -8.49 A	max 405 V 9.54 A -364 V -7.71 A		
Marker	curre V max(1) 405 V V max(2) 9.54 V min(1) -409 V V min(2) -7.71	nt mean 391 V A 8.44 A -386 V A -8.10 A	A(1) = B(2) = Δ = 1/ΔX =	Х 1.81635 дs 3.01635 дs 1.20000 дs 833.33333 kHz	Y -409 V 6.50 A 415.50 U		

Saved: 27 DEC 2012 14:47:32



1250 Peterson Dr., Wheeling, IL 60090



Acquisition	Sampling mode re Memory depth ma Sampling rate aut Averaging off 9-bit BW Filter off	al time Config nual Memory o omatic Sampli	uration 4GSa/s Jepth 32768pts ng rate 2.00 G! on	: Ga/s		
Channel 1	Scale 200 V/div Offset 122 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00					
Channel 2	Scale 10.0 A/div Offset 6.2 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00					
Time base	Scale 1.00 µs/div	Position 3.58	10000 µs Refer	ence center		
Trigger	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level 129 V Slope rising					
Measure	V max(1) V max(2) V min(1) V min(2)	current 404 V 9.47 A -401 V -7.75 A	mean 404 V 9.47 A -401 V -7.75 A	std dev 0 V 0.0 A 0 V 0.0 A	min 404 V 9.47 A -401 V -7.75 A	max 404 V 9.47 A -401 V -7.75 A
Marker	V max(1) V max(2) V min(1) V min(2)	current 404 V 9.47 A -401 V -7.75 A	mean 404 V 9.47 A -401 V -7.75 A	A(1) = B(1) = Δ = 1/ΔX =	X 1.81635 дs 3.01635 дs 1.20000 дs 833.333 kHz	Y -392 V 56 V 448 V



1250 Peterson Dr., Wheeling, IL 60090



Acquisition	Sampling mode re Memory depth ma Sampling rate aut Averaging off 9-bit BW Filter of	al time Config nual Memory omatic Sampl f Interpolatior	guration 4GSa/s depth 32768pts ling rate 2.00 GS n on	s Sa/s		
Channel 1	Scale 200 V/div ( Attenuation 1.000 Ext adapter None Ext gain 1.00E+0	Scale 200 V/div Offset 122 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00				
Channel 2	Scale 10.0 A/div Attenuation 100.0 Ext adapter None Ext gain 1.00E+00	Scale 10.0 A/div Offset 6.2 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00				
Time base	Scale 1.00 µs/div	Position 3.5	80000 µs Refer	ence center		
Trigger	Mode edge Swee Hysteresis normal Source channel 1	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level 129 V Slope rising				
Massura		current	MORP	vab bto	min	may
measure	V max(1)	403 V	403 V	310 0ev 1 V	403 V	404 V
	V max(2)	9.33 A	9.40 A	100 mA	9.33 A	9.47 A
	V min(1)	-402 V	-401 V	1 V	-402 V	-401 V
	V min(2)	-7.74 A	-7.74 A	10 mA	-7.75 A	-7.74 A
Marker		current	mean		Х	γ
	V max(1)	403 V	403 V	A(1) =	1.81635 дз	-392 V
	V max(2)	9.33 A	9.40 A	B(1) =	3.01635 дз	56 V
	V min(1)	-402 V	-401 V	Δ =	1.20000 µs	448 V
	V min(2)	-7.74 A	-7.74 A	1/4X =	833.333 kHz	

Saved: 27 DEC 2012 15:36:23



1250 Peterson Dr., Wheeling, IL 60090



Acquisition	Sampling mode re Memory depth ma Sampling rate aut Averaging off 9-bit BW Filter of	al time Config nual Memory omatic Sampli f Interpolation	juration 4GSa/s depth 32768pts ing rate 2.00 GS i on	: Ga/s			
Channel 1	Scale 200 V/div ( Attenuation 1.000 Ext adapter None Ext gain 1.00E+01	Scale 200 V/div Offset 122 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00					
Channel 2	Scale 10.0 A/div Offset 6.2 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00						
Time base	Scale 1.00 дs/div	Position 3.58	30000 µs Refer	ence center			
Trigger	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level 129 V Slope rising						
Measure	V max(1) V max(2) V min(1) V min(2)	current 406 V 9.49 A -423 V -8.04 A	mean 386 V 8.07 A -384 V -8.31 A	std dev 18 V 1.23 A 34 V 240 mA	min 376 V 7.30 A -423 V -8.49 A	max 406 V 9.49 A -364 V -8.04 A	
Marker	V max(1) V max(2) V min(1) V min(2)	current 406 V 9.49 A -423 V -8 04 A	mean 386 V 8.07 A -384 V -8 31 A	A(1) = B(1) = Δ = 1/ΔX =	X 1.81635 дв 3.01635 дв 1.20000 дв 833 333 647	Y -404 V 56 V 460 V	

Saved: 27 DEC 2012 15:52:11



1250 Peterson Dr., Wheeling, IL 60090



Acquisition	Sampling mode re Memory depth ma Sampling rate aut Averaging off	al time Confi <u>c</u> nual Memory omatic Sampl	juration 4GSa/s depth 32768pts ing rate 2.00 GS	s Sa/s			
	9-bit BW Filter of	f Interpolation	on				
Channel 1	Scale 200 V/div ( Attenuation 1.000 Ext adapter None Ext gain 1.00E+0	Scale 200 V/div Offset -24 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00					
Channel 2	Scale 10.0 A/div Offset -1.1 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00						
Time base	Scale 1.00 µs/div	Position 3.58	30000 µs Refer	ence center			
Trigger	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level 129 V Slope rising						
Measure		current	Mean	std dev	min	max	
mododio	V max(1)	406 V	406 V	οv	406 V	406 V	
	V max(2)	9.84 A	9.84 A	0.0 A	9.84 A	9.84 A	
	V min(1)	-414 V	-414 V	0 V	-414 V	-414 V	
	V min(2)	-7.69 A	-7.69 A	0.0 A	-7.69 A	-7.69 A	
Marker		current	mean		х	Y	
	V max(1)	406 V	406 V	A(1) =	1.81635 µs	-404 V	
	V max(2)	9.84 A	9.84 A	B(1) =	3.01635 µs	56 V	
	V min(1)	-414 V	-414 V	∆ =	1.20000 µs	460 V	
	V min(2)	-7.69 8	-7.69 8	1/68 =	833.333 kHz		




Acquisition	Sampling mode re Memory depth ma Sampling rate aut Averaging off 9-bit BW Filter of	al time Config nual Memory omatic Sampli f Interpolation	juration 4GSa/s depth 32768pts ing rate 2.00 GS i on	: Ga/s					
Channel 1	Scale 200 V/div ( Attenuation 1.000 Ext adapter None Ext gain 1.00E+0	Scale 200 V/div Offset 94 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00							
Channel 2	Scale 10.0 A/div Offset 4.8 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00								
Time base	Scale 1.00 дs/div	Scale 1.00 μs/div Position 3.580000 μs Reference center							
Trigger	Mode edge Swee Hysteresis normal Source channel 1	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level 127 V Slope rising							
Measure	V max(1) V max(2) V min(1) V min(2)	current 381 V 7.45 A -364 V -8.53 A	mean 381 V 7.45 A -364 V -8.53 A	std dev 0 V 0.0 A 0 V 0.0 A	min 381 V 7.45 A -364 V -8.53 A	max 381 V 7.45 A -364 V -8.53 A			
Marker	V max(1) V max(2) V min(1) V min(2)	current 381 V 7.45 A -364 V -8 53 A	Mean 381 V 7.45 A -364 V -8 53 A	A(1) = B(1) = Δ = 1/ΔX =	X 1.8164 µs 3.0164 µs 1.2000 µs 833 33 kHz	Y 374 V 56 V -318 V			

Saved: 27 DEC 2012 14:39:36





Acquisition	Sampling mode real time Confi Memory depth manual Memory Sampling rate automatic Samp Averaging off 9-bit BW Filter off Interpolatio	iguration 4GSa/ depth 32768pt: Iling rate 2.00 G n on	s s Sa/s						
Channel 1	Scale 200 V/div Offset 94 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00								
Channel 2	Scale 10.0 A/div Offset 4.8 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00								
Time base	Scale 1.00 µs/div Position 3.5	Scale 1.00 μs/div Position 3.580000 μs Reference center							
Trigger	Mode edge Sweep triggered Hysteresis normal Holdoff time Source channel 1 Trigger leve	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level 127 V Slope rising							
Measure	current V max(1) 376 V V max(2) 7.34 A V min(1) -364 V V min(2) -8.49 A	mean 376 V 7.34 A -364 V -8.49 A	std dev 0 V 0.0 A 0 V 0.0 A	min 376 V 7.34 A -364 V -8.49 A	max 376 V 7.34 A -364 V -8.49 A				
Marker	current V max(1) 376 V V max(2) 7.34 A V min(1) -364 V V min(2) -8.49 A	mean 376 V 7.34 A -364 V -8.49 A	A(1) = B(2) = Δ = 1/ΔX =	Х 1.81635 дs 3.01635 дs 1.20000 дs 833.33333 kHz	Y 374 V 6.50 A -367.50 U				





Acquisition	Sampling mode re Memory depth ma Sampling rate aut Averaging off 9-bit BW Filter of	al time Confi <u>c</u> nual Memory omatic Sampl f Interpolatior	guration 4GSa/s depth 32768pts ing rate 2.00 G! n on	s Sa/s				
Channel 1	Scale 200 V/div Offset 94 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00							
Channel 2	Scale 10.0 A/div Offset 4.8 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00							
Time base	Scale 1.00 μs/div Position 3.580000 μs Reference center							
Trigger	Mode edge Swee Hysteresis normal Source channel 1	p triggered Holdoff time Trigger level	60 ns Coupling 129 V Slope ris	DC sing				
Measure	V max(1) V max(2) V min(1) V min(2)	current 375 V 7.34 A -366 V -8.29 A	mean 375 V 7.34 A -366 V -8.29 A	std dev 0 V 0.0 A 0 V 0.0 A	min 375 V 7.34 A -366 V -8.29 A	max 375 V 7.34 A -366 V -8.29 A		
Marker	V max(1) V max(2) V min(1) V min(2)	current 375 V 7.34 A -366 V -8.29 A	mean 375 V 7.34 A -366 V -8.29 A	A(1) = B(1) = Δ = 1/ΔX =	X 1.81635 дв 3.01635 дв 1.20000 дв 833.333 kHz	Y 363 V 56.0 V -307 V		





Acquisition	Sampling mode re Memory depth mar Sampling rate auto Averaging off 9-bit BW Filter off	al time Config nual Memory o omatic Sampli Interpolation	uration 4GSa/: Jepth 32768pts ng rate 2.00 G on	s : Sa/s				
Channel 1	Scale 200 V/div Offset 122 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00							
Channel 2	Scale 10.0 A/div Offset 6.2 A Coupling DC Impedance 1 M Ohm Attenuation 100.0 :1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00							
Time base	Scale 1.00 μs/div Position 3.580000 μs Reference center							
Trigger	Mode edge Sweep Hysteresis normal Source channel 1	o triggered Holdoff time f Trigger level	50 ns Coupling 129 V Slope ri	DC sing				
Measure	V max(1) V max(2) V min(1) V min(2)	current 377 V 7.41 A -365 V -8.41 A	mean 377 V 7.41 A -365 V -8.41 A	std dev 0 V 0.0 A 0 V 0.0 A	min 377 V 7.41 A -365 V -8.41 A	max 377 V 7.41 A -365 V -8.41 A		
Marker	V max(1) V max(2) V min(1) V min(2)	current 377 V 7.41 A -365 V -8.41 A	mean 377 V 7.41 A -365 V -8.41 A	A(1) = B(1) = Δ = 1/ΔX =	Х 1.81635 дв 3.01635 дв 1.20000 дв 833.333 kHz	Y 362 V 56 V -306 V		





Acquisition	Sampling mode re Memory depth mai Sampling rate auto Averaging off 9-bit BW Filter off	al time Config nual Memory ( omatic Sampli Interpolation	uration 4GSa/s depth 32768pts ing rate 2.00 Gt on	s Sa/s				
Channel 1	Scale 200 V/div Offset 122 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00							
Channel 2	Scale 10.0 A/div Offset 6.2 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00							
Time base	Scale 1.00 μs/div Position 3.580000 μs Reference center							
Trigger	Mode edge Sweej Hysteresis normal Source channel 1	o triggered Holdoff time I Trigger level	60 ns Coupling 129 V Slope ris	DC sing				
Measure	V max(1) V max(2) V min(1) V min(2)	current 376 V 7.30 A -364 V -8.39 A	mean 376 V 7.36 A -365 V -8.44 A	std dev 0 V 90 mA 1 V 80 mA	min 376 V 7.30 A -366 V -8.49 A	max 376 V 7.43 A -364 V -8.39 A		
Marker	V max(1) V max(2) V min(1) V min(2)	current 376 V 7.30 A -364 V -8.39 A	mean 376 V 7.36 A -365 V -8.44 A	A(1) = B(1) = Δ = 1/ΔX =	Х 1.81635 дв 3.01635 дв 1.20000 дв 833.333 kHz	Y 362 V 56 V -306 V		



1250 Peterson Dr., Wheeling, IL 60090



Acquisition	Sampling mode real Memory depth manu Sampling rate auton Averaging off 9-bit BW Filter off I	time Config al Memory c natic Sampli nterpolation	uration 4GSa/ Jepth 32768pt ng rate 2.00 G on	s s Sa/s					
Channel 1	Scale 200 V/div Offset -24 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00								
Channel 2	Scale 10.0 A/div 0/ Attenuation 100.0 : Ext adapter None E Ext gain 1.00E+00 E	Scale 10.0 A/div Offset -1.1 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter Nome Ext coupler Nome Ext gain 1.00E+00 Ext offset 0.0E+00							
Time base	Scale 1.00 дs/div P	Scale 1.00 μs/div Position 3.580000 μs Reference center							
Trigger	Mode edge Sweep t Hysteresis normal H Source channel 1 T	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level 129 V Slope rising							
Measure	V max(1) V max(2) V min(1) - V min(2) -	current 379 V 7.39 A 368 V 8.74 A	mean 401.9 V 9.301 A -405.4 V -7.915 A	std dev 8.2 V 683 mA 13.3 V 313 mA	min 379 V 7.39 A -414 V -8.74 A	max 409 V 9.84 A -368 V -7.69 A			
Marker	V max(1) V max(2) V min(1) - V min(2) -	current 379 V 7.39 A 368 V 8.74 A	mean 401.9 V 9.301 A -405.4 V -7.915 A	A(1) = B(1) = Δ = 1/ΔX =	X 1.81635 дs 3.01635 дs 1.20000 дs 833.333 kHz	Y 365 V 56 V -309 V			

Saved: 27 DEC 2012 16:02:16



1250 Peterson Dr., Wheeling, IL 60090

## PIN INJECTION TEST DATA SHEETS

### WAVEFORM 4



				Saved: 27	DEC 2012	14:57:47		
<u>F</u> ile	<u>C</u> ontrol	<u>S</u> etup	<u>M</u> easure	<u>A</u> nalyze	<u>U</u> tilities	<u>H</u> elp		2:57 PM
Acquis 100 MS	∶ition is s† ¦a∕s	topped.		$\sim$	~~~~	~~_		Ð
0	🔽 100 V/div	22	2) 🖓 🔁	Vdiv 💦	3 On		1 On	
D.L.S RTC Sect Test	S Electonic A/DO-1600 ion 22 Pin I	Systems a njection					Holt Integre	ted Circuits Inc. 
Ay				<hr/>				PCB#5 Pin TxOUTA WF4 Gen:300
ſ↑   Meas	Urements M V max (1) V max (2) V min (1) V min (1)	arkers S currer 8.3 V 1.3 A -280.4	Image: Provide state state     20.0       cales	ця/div <mark>о</mark> ^ in IV 2 A 1.9 V	std dev 1.7 V 100 mA 800 mV	Min 6.0 V 1.1 A -281.4 -2	Max 8.3 V 1.3 R V -280.4	-79.2 V 1

Acquisition	Sampling mode re Memory depth mai Sampling rate aut Averaging off 9-bit BW Filter off	al time Configur nual Memory de omatic Sampling <sup>:</sup> Interpolation o	ation 4GSa/s pth 32768pts ; rate 100 MSa, n	/s					
Channel 1	Scale 100 V/div Offset -109 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00								
Channel 2	Scale 20.0 A/div Offset -22.6 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00								
Time base	Scale 20.0 µs/div	Scale 20.0 µs/div Position 34.400000 µs Reference center							
Trigger	Mode edge Sweer Hysteresis normal Source channel 1	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level -79.2 V Slope falling							
Measure	V max(1) V max(2) V min(1) V min(2)	current 8.3 V 1.3 A -280.4 V -6.8 A	mean 7.1 V 1.2 A -280.9 V -6.9 A	std dev 1.7 V 100 mA 800 mV 100 mA	Min 6.0 V 1.1 A -281.4 V -7.0 A	max 8.3 V 1.3 A -280.4 V -6.8 A			
Marker	V max(1) V max(2) V min(1) V min(2)	current 8.3 V 1.3 A -280.4 V -6.8 A	mean 7.1 V 1.2 A -280.9 V -6.9 A	X A(1) = -93 B(1) = 6. Δ = 7. 1/ΔX = 14	3.5 ns 0665 дs 0000 дs 12.857 kHz	Y -278.0 V 56.0 V 334.0 V			



			Saved: 27	DEC 2012	15:00:35			
<u>F</u> ile <u>C</u> ontrol	<u>S</u> etup	<u>M</u> easure	<u>A</u> nalyze	<u>U</u> tilities	<u>H</u> elp		3:00 F	PM
Acquisition is : 100 MSa/s	stopped.		$\sim$	~~~~	$\sim$			Ð
100 V/di	v ~	2) 🔽 20.0 A	v/div ⊇∼	3 On		(1) On		
D.L.S Electoni RTCA/DO-160 Section 22 Pin Test	c Systems G Injection					Holt Integra	ted Circuits Inc.	f∎ ← T
AY							PCB#5 Pin TxOUTB WF4 Gen:300	
Measurements V max (1 V max (2 V max (2 V min (1 V min (1 V min (1	Markers S curren ) 6.7 V ) 1.3 A ) -283.9 ) -7.1 A	■ 20.0   cales    t mea   6.7 1.3   V -283   -7.1	цs/div <mark>о о</mark> v : А 9 v	std dev 0.0 V 0.0 A 0.0 V 0.0 A 0.0 V 0.0 A	000 дз ◀ 0 6.7 V 1.3 A -283.9 V -7.1 A	Max 6.7 V 1.3 A -283.9 -7.1 A	67.2 V	?

Acquisition	Sampling mode re Memory depth ma Sampling rate aut Averaging off 9-bit BW Filter off	al time Configu nual Memory de omatic Samplin f Interpolation d	ration 4GSa/s epth 32768pts g rate 100 MSa on	1/s					
Channel 1	Scale 100 V/div Offset -109 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00								
Channel 2	Scale 20.0 A/div Attenuation 100.0 Ext adapter None Ext gain 1.00E+00	Scale 20.0 A/div Offset -22.6 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00							
Time base	Scale 20.0 µs/div	Scale 20.0 µs/div Position 34.400000 µs Reference center							
Trigger	Mode edge Swee Hysteresis normal Source channel 1	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level -67.2 V Slope falling							
Measure		current	mean	std dev	min	max			
	V max(1)	6.7 V	6.7 V	0.0 V	6.7 V	6.7 V			
	V max(2)	1.3 A	1.3 A	0.0 A	1.3 A	1.3 A			
	V min(1)	-283.9 V	-283.9 V	0.0 V	-283.9 V	-283.9 V			
	V min(2)	-7 <b>.</b> 1 A	-7 <b>.</b> 1 A	0.0 A	-7.1 A	-7 <b>.</b> 1 A			
Marker		current	mean	Х		Y			
	V max(1)	6.7 V	6.7 V	A(1) = -93	33.5 ns	-278.0 V			
	V max(2)	1.3 A	1.3 A	B (1) = -6	.0665 µs	56.0 V			
	V min(1)	-283.9 V	-283.9 V	Δ = 7.	.0000 µs	334.0 V			
	V min(2)	-7.1 A	-7.1 8	1/AX = 14	12.857 kHz				



<u>File Control Setup</u>	<u>M</u> easure	<u>A</u> nalyze	<u>U</u> tilities	<u>H</u> elp		2:56 PM
Acquisition is stopped. 100 MSa/s		~~~~~		$\sim$		<b>n</b> 🖻
0 0n 100 V/div	2) 🖓 20.0 A	/div	3 <sup>On</sup>		On L	
D.L.S Electonic System RTCA/DO-160G Section 22 Pin Injection Test	S AX			He	olt Integrated Circ	uits Inc.
					PCB <del>i</del> Pin T WF4 Gen:	®¥ ← T \$9 \$5 ×OUTA 300
1 <b>0</b>	<u>H</u> 20.0	us/div 🕠 ∿	1 34.40000	Одз 🖣 О 🕨	<b>1</b> 34.8 ∨	<b>₽</b> ↑
Measurements Markers Curro V max (1) 279 V max (2) 7.7 f V min (1) -4.0 V V min (2) -800 V	Scales Int mea IV 281 I 7.5 V -4.5 IA -700	n .6 V A V mA	std dev 2.5 V 100 mA 400 mV 100 mA	min 279.4 V 7.4 A -4.8 V -800 mA	max 285.2 V 7.7 A -4.0 V -600 mA	?

Acquisition	Sampling mode re Memory depth mai Sampling rate aut Averaging off 9-bit BW Filter off	al time Configur nual Memory de omatic Sampling Interpolation o	ation 4GSa/s pth 32768pts ) rate 100 MSa, n	/s				
Channel 1	Scale 100 V/div Offset 147 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00							
Channel 2	Scale 20.0 A/div Offset 29.4 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00							
Time base	Scale 20.0 µs/div Position 34.400000 µs Reference center							
Trigger	Mode edge Swee; Hysteresis normal Source channel 1	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level 34.8 V Slope rising						
Measure	V max(1) V max(2) V min(1) V min(2)	current 279.4 V 7.7 A -4.0 V -800 mA	mean 281.6 V 7.5 A -4.5 V -700 mA	std dev 2.5 V 100 mA 400 mV 100 mA	min 279.4 V 7.4 A -4.8 V -800 mA	max 285.2 V 7.7 A -4.0 V -600 mA		
Marker	V max(1) V max(2) V min(1) V min(2)	current 279.4 V 7.7 A -4.0 V -800 MA	mean 281.6 V 7.5 A -4.5 V -700 mA	X A(1) = -93: B(1) = 6. ∆ = 7. 1/∆X = 14:	3.5 ns 0665 дs 0000 дs 2.857 kHz	Y 278.0 V 56.0 V -222.0 V		



	Saved: 27	DEC 2012 15:08:20	
<u>File</u> <u>C</u> ontrol <u>S</u> etup	<u>M</u> easure <u>A</u> nalyze	<u>U</u> tilities <u>H</u> elp	3:08 PM
Acquisition is stopped. 100 MSa/s		~~~~	ÐÐ
100 V/div	20.0 A/div	0 <sup>0</sup>	0n
DLS Electonic Systems RTCA/DO-160G Section 22 Pin Injection Test			Holt Integrated Circuits Inc.
			← T ← T ← T ← T ← T ← T
	B×		WF4 Gen:300
	н 20.0 µs/div 🕦	🗸 📩 34.400000 дз 💽	
V max(1) 281.9 V max(1) 281.9 V max(2) 7.4 R V min(1) -4.7 V V min(2) -700 mf	v 281.4 V V 281.4 V 7.3 R -5.2 V A -800 mA	std dev min 700 mV 280.9 100 mA 7.3 A 700 mV -5.7 V 200 mA -1.0 A	Max 281.9 V 281.9 V 7.4 R - 4.7 V − 700 mR

Acquisition	Sampling mode re Memory depth mai Sampling rate aut Averaging off 9-bit BW Filter off	al time Configu nual Memory d omatic Samplin f Interpolation	iration 4GSa/s epth 32768pts ig rate 100 MS on	a/s						
Channel 1	Scale 100 V/div 0 Attenuation 1.000 Ext adapter None Ext gain 1.00E+00	Scale 100 V/div Offset 184 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00								
Channel 2	Scale 20.0 A/div Attenuation 100.0 Ext adapter None Ext gain 1.00E+00	Scale 20.0 A/div Offset 36.2 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00								
Time base	Scale 20.0 µs/div	Scale 20.0 µs/div Position 34.400000 µs Reference center								
Trigger	Mode edge Swee; Hysteresis normal Source channel 1	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level 119.8 V Slope rising								
Measure	V max(1) V max(2) V min(1) V min(2)	current 281.9 V 7.4 A -4.7 V -700 mA	mean 281.4 V 7.3 A -5.2 V -800 mA	std dev 700 mV 100 mA 700 mV 200 mA	min 280.9 V 7.3 A -5.7 V -1.0 A	max 281.9 V 7.4 A -4.7 V -700 mA				
Marker	V max(1) V max(2) V min(1) V min(2)	current 281.9 V 7.4 A -4.7 V -700 mA	mean 281.4 V 7.3 A -5.2 V -800 mA	X A──(1) = -93 B(1) = 6. ∆ = 7. 1/∆X = 14	3.5 ns 0665 дs 0000 дs 2.857 kHz	Y 275.0 V 0.0 V -275.0 V				



1250 Peterson Dr., Wheeling, IL 60090

## PIN INJECTION TEST DATA SHEETS

### WAVEFORM 5A



<u>F</u> ile	<u>C</u> ontrol	<u>S</u> etup	<u>M</u> easure	<u>A</u> nalyze	<u>U</u> tilities	<u>H</u> elp		3:16 Pt	M
Acquisit	tion is st	opped.							Ξ
25.0 HSa	a/s				 ()n		🔿 ()n		-
	TUU V/div	$\overline{\sim}$	2) 🖾 🗗	/div	<b>U</b>		<b>9</b> 🗂		
D.L.S E	Electonic	Systems	; A <mark>X</mark>				Holt Integrate	d Circuits Inc.	
RTCA	/DØ-160G						-		
Sectio	in 22 Pin Ir	ijection							
lest									
	****						None and a second s	**************************************	2
				-	1			←	
يىل بىنىل بىنىل يىنى	۱۰۰۰ میل میں میں میں میں میں	(· سبا · سبز · سبا · س		سار سنار سنار سنار کی	10 - Jane - Jane - Jane - Jane - Ja				
Ay				$\checkmark$	+				
								PCB#6	
								Pin TxOUTA	
								WF5A Con:300	
			EX		-			Gen.300	
1Ť	00	9	<b>H</b> 100	µs/div ∿ ≏	150.400	0 🕨 ад 0000	T -75	2V 📮 🗈	
Measur	ements M	arkers S	cales )						
		currer	it me	an	std dev	min	max		?
	V max(1) V max(2)	5.3 V 730 mi		4 v OmA	100 MV 80 mA	5.3 V 620 mA	5.5 V 730 mA		
	V min(1) V min(2)	-304.6	V -30	4.4 V 21 A	300 mV 60 mA	-304.6 V -5 26 A	-304.1 V		

Acquisition	Sampling mode re Memory depth ma Sampling rate aut Averaging off 9-bit BW Filter off	al time Configur nual Memory de omatic Sampling Interpolation o	ation 4GSa/s pth 32768pts grate 25.0 MSa n	a/s						
Channel 1	Scale 100 V/div Offset -105 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00									
Channel 2	Scale 5.0 A/div O Attenuation 100.0 Ext adapter None Ext gain 1.00E+00	Scale 5.0 A/div Offset -5.10 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00								
Time base	Scale 100 µs/div	Scale 100 µs/div Position 150.40000 µs Reference center								
Trigger	Mode edge Swee; Hysteresis normal Source channel 1	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level -75.2 V Slope falling								
Measure	V max(1) V max(2) V min(1) V min(2)	current 5.3 V 730 mA -304.6 V -5.17 A	mean 5.4 V 680 mA -304.4 V -5.21 A	std dev 100 mV 80 mA 300 mV 60 mA	min 5.3 V 620 mA -304.6 V -5.26 A	max 5.5 V 730 mA -304.1 V -5.17 A				
Marker	V max(1) V max(2) V min(1) V min(2)	current 5.3 V 730 mA -304.6 V -5.17 A	mean 5.4 V 680 mA -304.4 V -5.21 A	$\begin{array}{r} 8 \longrightarrow (1) = -4.6 \\ 8 \longrightarrow (2) = -4.6 \\ \Delta = 0.0 \\ 1/\Delta X = \end{array}$	i01 дs i01 дs I s	Y -305.0 V -5.24 A 299.76 U				



<u>F</u> ile	<u>C</u> ontrol	<u>S</u> etup	<u>M</u> easure	<u>A</u> nalyze	<u>U</u> tilities	<u>H</u> elp		3:18 F	PM
Acquisi 25 A MS	ition is st Sa/s	opped.		<u></u>				Π	Ð
0	n 100 V/div	2~	2) <sup>On</sup> 5.0A	/div	3 <sup>On</sup>		0n		
D.L.S RTC4 Sectio Test	Electonic VDO-160G on 22 Pin Ir	Systems à njection	3 A 🕅				Holt Integrated	Circuits Inc.	
······	lan inn inn inn inn inn i	<u>на страна стр</u>			- june june june j		an lan jan jan jan jan jan jan jan jan	97	¶⊉ ⊢T
Av							F	PCB#6 Pin TXOUTB	
			B×		+		V C	VF5A Gen:300	
↑ Measu	Jrements M	arkers S	H 100	µs/div № ∩	150.400	0000 дз 🚺 0	► -75.2	× <b>→</b> ↑	
	V max(1) V max(2) V min(1) V min(2)	curren 4.0 V 640 ml -305.0 -5.21 f	nt me 4. 1 64 V -30 1 -5.	an J V J mA 5.0 V 21 A	std dev 0.0 V 0.0 A 0.0 V 0.0 V 0.0 A	min 4.0 V 640 mA -305.0 V -5.21 A	max 4.0 V 640 mA -305.0 V -5.21 A		2

Acquisition	Sampling mode re- Memory depth mar Sampling rate auto Averaging off 9-bit BW Filter off	al time Configura nual Memory dep omatic Sampling Interpolation or	ation 4GSa/s oth 32768pts rate 25.0 MSa n	/s					
Channel 1	Scale 100 V/div Offset -105 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00								
Channel 2	Scale 5.0 A/div O Attenuation 100.0 Ext adapter None Ext gain 1.00E+00	Scale 5.0 A/div Offset -5.10 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00							
Time base	Scale 100 μs/div Position 150.40000 μs Reference center								
Trigger	Mode edge Sweep Hysteresis normal Source channel 1	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level -75.2 V Slope falling							
Measure	V max(1) V max(2) V min(1) V min(2)	current 4.0 V 640 mA -305.0 V -5.21 A	mean 4.0 V 640 mA -305.0 V -5.21 A	std dev 0.0 V 0.0 A 0.0 V 0.0 V 0.0 A	min 4.0 V 640 mA -305.0 V -5.21 A	max 4.0 V 640 mA -305.0 V -5.21 A			
Marker	V max(1) V max(2) V min(1) V min(2)	current 4.0 V 640 mA -305.0 V -5.21 A	mean 4.0 V 640 mA -305.0 V -5.21 A	R(1) = -4.60 B(2) = -4.60 Δ = 0.0 1/ΔX =	01 дs 01 дs s	Y -305.0 V -5.24 A 299.76 U			



File   Control   Setup   Measure   Analyze   Utilities   Help     Rcquisition is stopped.   25.0 Msa/s   25.0 Msa	3:14 PM
Rcquisition is stopped.     25.0 MSa/s     D D 100 V/div     D D.L.S Electonic Systems     RTCA/DO-160G     Section 22 Pin Injection     Test	Dit Integrated Circuits Inc.
O UNDER CONTRACTOR OF CO	On Dit Integrated Circuits Inc.
D.L.S Electonic Systems A RTCA/DO-160G Section 22 Pin Injection Test	olt Integrated Circuits Inc.
	PCB#6 Pin TxOUTA WF5A Gen:300
1 DD μs/div το ν 150.400000 μs 📢 D 🕨	<b>1 43.8 ∨</b>
Measurements     Markers     Scales       current     mean     std dev     min       V max(1)     306.8     305.5     1.8     V     304.2     V       V max(2)     5.50     A     5.56     80     mA     5.50     A     5.76     N     9.50     A     1.1     V     -6.1     -6.1     V     -6.1     V     -6.1     -6.1     V     -6.1     -6.1	Max ₽2 305.8 V 5.61 A −4.6 V

Acquisition	Sampling mode real Memory depth manu Sampling rate autom Averaging off 9-bit BW Filter off Ir	time Configu al Memory d atic Samplin hterpolation	iration 4GSa/s epth 32768pts ig rate 25.0 MS on	ia/s						
Channel 1	Scale 100 V/div Off Attenuation 1.000 k Ext adapter None E) Ext gain 1.00E+00 E	Scale 100 V/div Offset 184 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00								
Channel 2	Scale 5.0 A/div Offs Attenuation 100.0 : Ext adapter None Ex Ext gain 1.00E+00 E	Scale 5.0 A/div Offset 9.25 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00								
Time base	Scale 100 µs/div Po	Scale 100 μs/div Position 150.40000 μs Reference center								
Trigger	Mode edge Sweep t Hysteresis normal Hy Source channel 1 Ti	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level 43.8 V Slope rising								
Measure	V max(1) V max(2) V min(1) - V min(2) -	current 306.8 V 5.50 A 6.1 V 430 mA	mean 305.5 V 5.56 A -5.4 V -530 mA	std dev 1.8 V 80 mA 1.1 V 140 mA	min 304.2 V 5.50 A -6.1 V -630 mA	max 3D6.8 V 5.61 A -4.6 V -430 mA				
Marker	V max(1) V max(2) V min(1) - V min(2) -	current 306.8 V 5.50 A 6.1 V 430 mA	mean 305.5 V 5.56 A -5.4 V -530 mA	$A \longrightarrow (1) = -9$ $B \longrightarrow (2) = -6$ $\Delta = -7$ $1/\Delta X = -1$	33.5 ns .0665 μs .0000 μs 42.85714 kHz	Y 300.0 V 4.96 A -295.04 U				



<u>File Control Setup</u>	<u>M</u> easure	<u>A</u> nalyze	<u>U</u> tilities	<u>H</u> elp		3:20 PM
Acquisition is stopped.						n A
			A On		ծ Որ	
	2) 🖾 🗗		ŨĔ		) E	
D.L.S Electonic System	G A <mark>X</mark>			F	lolt Integrated Circ	uits Inc.
RTCA/DØ-160G					_	
Section 22 Pin Injection						
Arr		$\sim$	+			
						← T
			and the second se			
					PCB#	6 
					PIN D WESA	
					Gen:3	00
	H 100,	ts/div _∿  ∿	150.400		<b>E3.8 V</b>	<b>.</b>
Measurements Markers 9	icales					
curre V max(1) <u>304.</u> 6	nt mea V 304	n .6 V	std dev D.D V	M1n 304.6 V	Max 304.6 V	?
V max(2) 5.47 V min(1) -5.4.0	A 5.4	7,8	0.0 A	5.47 A	5.47 A	
V min(1) -5.1 V V min(2) -480 m	A -480	mA	0.0 A	-480 mA	-480 mA	

Acquisition	Sampling mode re Memory depth ma Sampling rate aut Averaging off 9-bit BW Filter off	al time Configur nual Memory de omatic Sampling Interpolation o	ation 4GSa/s pth 32768pts grate 25.0 MSa n	a/s					
Channel 1	Scale 100 V/div Offset 201 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00								
Channel 2	Scale 5.0 A/div Offset 10.35 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00								
Time base	Scale 100 μs/div Position 150.40000 μs Reference center								
Trigger	Mode edge Swee Hysteresis normal Source channel 1	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level 69.8 V Slope rising							
Measure	V max(1) V max(2) V min(1) V min(2)	current 304.6 V 5.47 A -5.1 V -480 mA	mean 304.6 V 5.47 A -5.1 V -480 mA	std dev 0.0 V 0.0 A 0.0 V 0.0 A	min 304.6 V 5.47 A -5.1 V -480 mA	max 304.6 V 5.47 A -5.1 V -480 mA			
Marker	V max(1) V max(2) V min(1) V min(2)	current 304.6 V 5.47 A -5.1 V -480 mA	mean 304.6 V 5.47 A -5.1 V -480 mA	$\begin{array}{r} & \times \\ A (1) &= -4.6 \\ B (2) &= -4.6 \\ \Delta &= 0.0 \\ 1/\Delta X &= \end{array}$	01 дs 01 дs s	Y 298.0 V 5.21 A -292.79 U			



1250 Peterson Dr., Wheeling, IL 60090

## PIN INJECTION TEST DATA SHEETS

### WAVEFORM 5B



File	Control	Setun	Measure	Analyze	Utilities	Help		4.16	PM
Acquisi	ition is st	opped.		<u></u>	<u>_</u>	Telb		Π	」    面
5.00 MS	Sa/s 10 100 \//46				 🔊 On		🔊 On		
		$\sim$							
D.L.S	Electonic	Systems	3 Ak				Holt Integrate	ed Circuits Inc.	
Secti	AVDU-1600 on 22 Pin li	i niection							
Test		.,							
							and the later of the local day		ţ₽
				the second s				Bv	←T
			-		······································				
A			-   {						
HY								PCB#7	
								Pin TxOUTA	
								WF5B	
			Bk 🔺		<u>+</u>			Gentadu	
1		9	<b>H</b> 500	μs/div _∿_≏	2 1 770.400	0 🕨 ад 0000	Image: Contract of the second seco	0.2V 🗧 🕯	t
Measu	urements 🕅	arkers S	cales						
	V max( <mark>1</mark> )	curren 4.6 V	nt me 4.	an 6 V	std dev 0.0 V	мin 4.6 V	max 4.6 V		2
	V max(2) V min( <u>1)</u>	670 м -301 <u>.3</u>	1 67 V <u>-30</u>	0 mA 1.3 V	0.0 A 0.0 V	670 mA -301 <u>.3 \</u>	670 mA V -301 <u>.3 V</u>		
	V min(2)	-5.28 1	i -5.	28 A	0.0 A	-5.28 A	-5.28 A		

Acquisition	Sampling mode re Memory depth ma Sampling rate aut Averaging off 9-bit BW Filter off	al time Configur nual Memory dep omatic Sampling Interpolation of	ation 4GSa/s pth 32768pts   rate 5.00 MSa n	1/s						
Channel 1	Scale 100 V/div Offset -119 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00									
Channel 2	Scale 5.0 A/div O Attenuation 100.0 Ext adapter None Ext gain 1.00E+00	Scale 5.0 A/div Offset -5.95 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00								
Time base	Scale 500 µs/div	Position 770.40	000 µs Referer	nce center						
Trigger	Mode edge Sweej Hysteresis normal Source channel 1	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level -60.2 V Slope falling								
Measure		current	mean	std dev	min	max				
	V max(1)	4.6 V	4.6 V	0.0 V	4.6 V	4.6 V				
	V max(2)	670 mA	670 mA	0.0 A	670 mA	670 mA				
	V min(1)	-301.3 V	-301.3 V	0.0 V	-301.3 V	-301.3 V				
	V min(2)	-5.28 A	-5.28 A	0.0 A	-5.28 A	-5.28 A				
Marker		current	mean	Х		Y				
	V max(1)	4.6 V	4.6 V	A(1) = -229	.605 µs	-300.0 V				
	V max(2)	670 mA	670 mA	B (2) = -229	.605 µs	-5.00 A				
	V min(1)	-301.3 V	-301.3 V	Δ = 0.0	s	295.00 U				
	V min(2)	-5.28 A	-5.28 A	1/AX =						



		- ·			1.1.111				
Elle	Control	<u>S</u> etup	Measure	Analyze	<u>U</u> tilities	Help		4:47 1	-M
Hequisi 5.00 MS	ition is st Ga/s	opped.						Π	Ð
<b>0</b>	0 100 V/div	- 1	n On Eng	Zdio 🔍	🙈 <u>On</u>		<u>n On</u>		
		$\sim$	<b>Q N</b>	$\sim$					
D.L.S	Electonic	Systems	s Ak				Holt Integrate	d Circuits Inc.	
RTCA	VDQ-160G	1							
Section	on 22 Pin Ir	njection							
lest									
			and former fractions						ţ₽
									← T
			-					— — — — — By	
					+				
AY								DOD #2	
								WESB	
								Gen:300	
			BK 🔺		1		·	cicimoto	
1	002		H 500	) µs/div 🛛 🐧 🧌	v 📫 770.400	0 🕨 гд 0000	D 🔳 -60	).2V 🔶 🕇	1
Measu	rements	arkers S	cales						
1.0000		currer	nt me	an	std dev	min	max		?
	V max(1) V max(2)	4.2 V 570 mi	4. 1 57	2V 10m9	U.U V 0 0 0	4.2 V 570 mA	4.2 V 570 mA		
	V min(1)	-300.9	V -30	0.9 V	0.0 Ÿ	-300.9 V	-300.9 V		
	<u>V Min(2)</u>	-5.25 6	1 -5.	25 H	U.U A	-5.25 A	-5.25 A		

Acquisition	Sampling mode re Memory depth man Sampling rate auto Averaging off 9-bit BW Filter off	al time Configur nual Memory de omatic Sampling Interpolation o	ation 4GSa/s pth 32768pts ) rate 5.00 MSa n	1/s				
Channel 1	Scale 100 V/div 0 Attenuation 1.000 Ext adapter None Ext gain 1.00E+00	Scale 100 V/div Offset -119 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00						
Channel 2	Scale 5.0 A/div Offset -5.95 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00							
Time base	Scale 500 µs/div	Position 770.40	000 µs Referen	nce center				
Trigger	Mode edge Sweep Hysteresis normal Source channel 1	o triggered Holdoff time 60 Trigger level -6	ns Coupling D 60.2 V Slope fa	C Iling				
Measure	V max(1) V max(2) V min(1) V min(2)	current 4.2 V 570 mA -300.9 V -5.25 A	mean 4.2 V 570 mA -300.9 V -5.25 A	std dev 0.0 V 0.0 A 0.0 V 0.0 A	min 4.2 V 570 mA -300.9 V -5.25 A	max 4.2 V 570 mA -300.9 V -5.25 A		
Marker	V max(1) V max(2) V min(1) V min(2)	current 4.2 V 570 mA -300.9 V -5.25 A	mean 4.2 V 570 mA -300.9 V -5.25 A	$\begin{array}{r} & X \\ R (1) &= -229 \\ B (2) &= -229 \\ \Delta &= 0.0 \\ 1/\Delta X &= \end{array}$	).605 дs ).605 дs ) s	Y -300.0 V -5.00 A 295.00 U		



<u>F</u> ile	<u>C</u> ontrol	<u>S</u> etup	<u>M</u> easure	<u>A</u> nalyze	<u>U</u> tilities	<u>H</u> elp		4:13 PM
Acquis. E nn M	ition is st Sa/o	opped.				<b>7</b>		
<b>A</b> 0	n 10017746-		On BOA		🙈 On	<u> </u>	n 🔿 🖉	
		$\sim$					_ 1	
D.L.S	6 Electonic	Systems	s 🐴		+		Holt Integrate	d Circuits Inc.
RTC	A/DO-1600	à 						
Test	ion 22 Pin II	njecuon						
Ay					+			
			-					
					+			_
				·				BY
						-		
								PCB#7
								Pin TxOUTA
								WF5B Con:300
					-			Geji.300
1	00	14	<b>H</b> 500	µs/div 🕠 ∿	, 📫 770.400	000 дз 🖣 0	► 143.	8V ෫ 🗅
Meas	urements 🛛 🕅	arkers S	cales					
	V may (1)	currei 299 6	nt me- V 200	an 96V	std dev	min 20065	max 299.6.V	?
	V max (2)	5.35	A 5.	35 A	0.0 Å	5.35 A	5.35 A	
	V Min(1) V min(2)	-5.5 V -410 mi	-5. A -41	ov DmA	0.0 V 0.0 A	-5.5 V -410 mA	-5.5 V -410 mA	

Acquisition	Sampling mode rea Memory depth mar Sampling rate auto Averaging off 9-bit BW Filter off	al time Config nual Memory omatic Sampli Interpolation	juration 4GSa/s depth 32768pts ing rate 5.00 MS i on	àa∕s				
Channel 1	Scale 100 V/div 0 Attenuation 1.000 Ext adapter None Ext gain 1.00E+00	Scale 100 V/div Offset 184 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00						
Channel 2	Scale 5.0 A/div 0 Attenuation 100.0 Ext adapter None Ext gain 1.00E+00	Scale 5.0 A/div Offset 9.25 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00						
Time base	Scale 500 µs/div I	Position 770.	40000 µs Refer	ence center				
Trigger	Mode edge Sweep Hysteresis normal Source channel 1	) triggered Holdoff time Trigger level	60 ns Coupling 43.8 V Slope ri	DC sing				
Measure	V max(1) V max(2) V min(1) V min(2)	current 299.6 V 5.35 A -5.5 V -410 mA	mean 299.6 V 5.35 A -5.5 V -410 mA	std dev 0.0 V 0.0 A 0.0 V 0.0 V 0.0 A	min 299.6 V 5.35 A -5.5 V -410 mA	max 299.6 V 5.35 A -5.5 V -410 mA		
Marker	V max(1) V max(2) V min(1) V min(2)	current 299.6 V 5.35 A -5.5 V -410 mA	mean 299.6 V 5.35 A -5.5 V -410 mA	A(1) = -9 B(2) = 6 Δ = 7 1/ΔX = 1	34 ns .066 дs .000 дs 42.85714 kHz	Y 300 V 4.96 A -295.04 U		



			Saved: 27	DEC 2012	16:51:11		
<u>F</u> ile <u>C</u> or	itrol <u>S</u> etup	<u>M</u> easure	<u>A</u> nalyze	<u>U</u> tilities	<u>H</u> elp		4:51 PM
Acquisition 5.00 MSa/s	is stopped.		$\sim$				<b>D</b> D
1 On 🔽	V/div ~	2) 🖸 <mark>5.0 A/</mark>	'div	3 🗆		🌒 🗖	
D.L.S Elec RTCA/DO Section 2: Test	tonic System I-160G ? Pin Injection					Holt Integrated	Circuits Inc.
		Bĸ				Pi Pi Pi G	CB#7 n TxOUTB fF5B en:300
T C Measureme V n V n V n V n V n	Markers nts Markers nax (1) 300.1 nax (2) 5.30 nin (1) -5.5 ' nin (2) -490	Scales     500       ent     mea       0     V     300       A     5.3       V     -5.2       V     -5.2       MA     -490	µs/div № へ n 1.0 V 80 A 5 V 1 mA	std dev 0.0 V 0.0 A 0.0 A 0.0 A 0.0 A 0.0 A	мin 300.0 V 5.30 A -5.5 V -490 мА	Max 300.0 V 5.30 A -5.5 V -490 mA	✓ ▲ ↑

Acquisition	Sampling mode re Memory depth mai Sampling rate aut Averaging off 9-bit BW Filter off	al time Configur nual Memory de omatic Sampling <sup>:</sup> Interpolation o	ation 4GSa/s pth 32768pts prate 5.00 MSa n	1/s				
Channel 1	Scale 100 V/div 0 Attenuation 1.000 Ext adapter None Ext gain 1.00E+00	Scale 100 V/div Offset 185 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00						
Channel 2	Scale 5.0 A/div O Attenuation 100.0 Ext adapter None Ext gain 1.00E+00	Scale 5.0 A/div Offset 9.50 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00						
Time base	Scale 500 µs/div	Position 770.40	000 µs Referer	nce center				
Trigger	Mode edge Swee; Hysteresis normal Source channel 1	o triggered Holdoff time 60 Trigger level 21	ns Coupling D 19.3 V Slope ris	C sing				
Measure	V max(1) V max(2) V min(1) V min(2)	current 300.0 V 5.30 A -5.5 V -490 mA	mean 300.0 V 5.30 A -5.5 V -490 mA	std dev 0.0 V 0.0 A 0.0 V 0.0 A	min 300.0 V 5.30 A -5.5 V -490 mA	max 300.0 V 5.30 A -5.5 V -490 mA		
Marker	V max(1) V max(2) V min(1) V min(2)	current 300.0 V 5.30 A -5.5 V -490 mA	mean 300.0 V 5.30 A -5.5 V -490 mA	$A \longrightarrow (1) = -229$ $B \longrightarrow (2) = -229$ $\Delta = 0.0$ $1/\Delta X =$	).605 дз ).605 дз ) s	Y 300.0 V 4.79 A -295.21 U		



1250 Peterson Dr., Wheeling, IL 60090

# **PIN INJECTION**

# WAVEFORM 3 CALIBRATION DATA SHEETS



1250 Peterson Dr., Wheeling, IL 60090



Saved: 27 DEC 2012 11:03:46

Acquisition	Sampling mode real time Configuration 4GSa/s Memory depth manual Memory depth 32768pts Sampling rate automatic Sampling rate 2.00 GSa/s Averaging off 9-bit BW Filter off Interpolation on						
Channel 1	Scale 200 V/div Offset 0 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00						
Time base	Scale 1.00 дs/div Position 2.430000 дs Reference center						
Trigger	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level 108 V Slope rising						
Marker	X Y A(1) = 1.16635 μs -279 V B(1) = 2.36635 μs -600 V Δ = 1.20000 μs -321 V 1/ΔX = 833.333 kHz						



1250 Peterson Dr., Wheeling, IL 60090



Saved: 27 DEC 2012 11:02:56

Acquisition	Sampling mode real time Configuration 46537s Memory depth manual Memory depth 32768pts Sampling rate automatic Sampling rate 2.00 GSa/s Averaging off 9-bit BW Filter off Interpolation on						
Channel 1	Scale 200 V/div Offset 176 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00						
Time base	Scale 1.00 $\mu s/div$ Position 2.610000 $\mu s$ Reference center	1					
Trigger	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level 108 V Slope rising						
Marker	A(1) = B(1) = Δ = 1/ΔX =	Х 1.16635 дз 2.36635 дз 1.20000 дз 833.333 kHz	Y 256 V 600 V 344 V				





Saved: 27 DEC 2012 11:18:04

Acquisition	Sampling mode real time Configuration 4GSa/ Memory depth manual Memory depth 32768pl Sampling rate automatic Sampling rate 2.00 C Averaging off 9-bit BW Filter off Interpolation on	's 's àSa/s				
Channel 2	Scale 10.0 A/div Offset 1.9 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00					
Time base	Scale 1.00 µs/div Position 2.430000 µs Refe	rence cente	r			
Trigger	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Couplin Source channel 2 Trigger level 5.20 A Slope	g DC rising				
Marker		A(2) = B(2) = Δ = 1/ΔX =	X 1.16635 дs 2.36635 дs 1.20000 дs 833.333 kHz	Y -24.00 A -600.00 A -576.00 A		





Saved: 27 DEC 2012 11:18:55

Acquisition	Sampling mode real time Configuration 4GSa/s Memory depth manual Memory depth 32768pts Sampling rate automatic Sampling rate 2.00 G Averaging off 9-bit BW Filter off Interpolation on	s s Sa/s			
Channel 2	Scale 10.0 A/div Offset 5.8 A Coupling DC Im Attenuation 100.0 : 1 Atten units ratio Skew ( Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00	pedance 1M D.O s	1 Ohm		
Time base	Scale 1.00 дs/div Position 2.430000 дs Refer	ence cente	r		
Trigger	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling Source channel 2 Trigger level 5.20 A Slope r	DC ising			
Marker		A(2) = B(2) = Δ = 1/ΔX =	X 1.16635 2.36635 1.20000 833.333	дs дs дs kHz	Y 24.00 A -600.00 A -624.00 A



1250 Peterson Dr., Wheeling, IL 60090

# **PIN INJECTION**

# WAVEFORM 4 CALIBRATION DATA SHEETS



1250 Peterson Dr., Wheeling, IL 60090

<u>F</u> ile	<u>C</u> ontrol	<u>S</u> etup	<u>M</u> easure	<u>A</u> nalyze	<u>U</u> tilities	<u>H</u> elp		11:54,	AM
	Acquisiti 100 MSa/s	ion is sto ;	opped.	~~~~~		~~~~	$\sim$		Ð
	0n	100 V/div	∎≍ 0	) Dn		3) 🗖			
4	D.L.S.E	Electonic	Systems	Ax			Holt Inte	egrated Circuits Inc.	
Ţ	Section	n 22 Pin Ir ation	njection						
ĪĪ	Ase			···· ··· ·					<del>(</del> 11
ŦŦ									• ← T
	+1+				······+····				
								WF4_Level 3By	
<u>-∼</u> - ↑ ⊼								OC Calibration	
								T1=6.4uS +-20%	
<u>1</u>				10.0 µs/div	• ∿ <mark>1</mark> 7.2	288183 µs			
More (1 of 2)	Markers	Scales				U.			
Clear All						-(1) = -1.07 -(1) = 5.65 $\Delta = 6.72$ 1/49 = -149	56 дв 17 дв 73 дв 640 гла	0.0 V -300.0 V -300.0 V	Ľ

Saved: 27 DEC 2012 11:54:30

Acquisition	Sampling mode real time Configuration 4GSa/ Memory depth manual Memory depth 32768pt Sampling rate automatic Sampling rate 250 M Averaging off 9-bit BW Filter off Interpolation on	's is Sa/s					
Channel 1	Scale 100 V/div Offset -136 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00						
Time base	Scale 10.0 µs/div Position 7.288183 µs Refe	Scale 10.0 μs/div Position 7.288183 μs Reference center					
Trigger	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling Source channel 1 Trigger level -98.0 V Slope	g DC a falling					
Marker		Х А──(1) = -1.0756 дs B(1) = 5.6517 дs Δ = 6.7273 дs 1/ΔX = 148.649 kHz	Y 0.0 V -300.0 V -300.0 V				



1250 Peterson Dr., Wheeling, IL 60090



Saved: 27 DEC 2012 11:53:47

Acquisition	Sampling mode real time Configuration 465a/s Memory depth manual Memory depth 32768pts Sampling rate automatic Sampling rate 100 MSa/s Averaging off 9-bit BW Filter off Interpolation on				
Channel 1	Scale 100 V/div Offset -88 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00				
Time base	Scale 20.0 μs/div Position 39.688183 μs Reference cent	er			
Trigger	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level -98.0 V Slope falling				
Marker	R(1) = B(1) = Δ = 1/ΔX =	X 51.7 ns 75.1426 дs 75.0909 дs 13.31719 kHz	Y 0.0 V -150.0 V -150.0 V		



1250 Peterson Dr., Wheeling, IL 60090

<u>F</u> ile	<u>C</u> ontrol	<u>S</u> etup	<u>M</u> easure	<u>A</u> nalyze	<u>U</u> tilities	<u>H</u> elp			11:50 AM
	HCQUISIT: 50.0 MSa/	ion is sto 's	pped.			<u> </u>	$\sim$		<u>n</u> e
<b>F</b>	<b>0</b> ⊡	100 V/div	~ (		(	3) 🗆		4 🗖	
<u>-</u>	D.L.S.E	Electonic	Systems	AX			Holt Integ	rated Circuits Ir	1C.
$\mathbf{z}$	Sectio	n 22 Pin Ir	jection						
ŤŦ		auun ————			<u></u>				— —Вү
H							·····		
+  + 174→									
<b>1</b> _1					+				← T
Γ'n	<u> </u>							WF4 Level	3 🖞
± <sup>-2</sup> <sup>-</sup>								OC Calibra	tion
L								T2=69uS + T1=6.4uS +	-20% 20%
<u>1</u> ⊐∫−1:					Bx +			Gen=300	
More				10.0 µs/div	∿ ∿ <mark>⊺</mark> 10	).270000 дs	<b>∢</b> 0≯	T 29.0 V	€⊓
(1of 2)	Markers	Scales	_		A	-(1) = -457	.4 ns	V N.V	?
All	$\Pi$					-(1) = 5.90 $\Delta = 6.4$	881 дs 455 дs	300.0 V 300.0 V	

Saved: 27 DEC 2012 11:50:53

Acquisition	Sampling mode real time Configuration 4GSa/ Memory depth manual Memory depth 32768pt Sampling rate automatic Sampling rate 250 M Averaging off 9-bit BW Filter off Interpolation on	s s Sa/s			
Channel 1	Scale 100 V/div Offset 112 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00				
Time base	Scale 10.0 µs/div Position 10.270000 µs Ref	erence center			
Trigger	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling Source channel 1 Trigger level 29.0 V Slope	) DC rising			
Marker		X A(1) = -457.4 ns B(1) = 5.9881 μs Δ = 6.4455 μs 1/ΔX = 155.148 kHz	Y 0.0 V 300.0 V 300.0 V		



1250 Peterson Dr., Wheeling, IL 60090



Saved: 27 DEC 2012 11:52:43

Acquisition	Sampling mode real time Configuration 4GSa/s Memory depth manual Memory depth 32768pts Sampling rate automatic Sampling rate 100 MSa/s Averaging off 9-bit BW Filter off Interpolation on				
Channel 1	Scale 100 V/div Offset 112 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00				
Time base	Scale 20.0 µs/div Position 39.688183 µs Reference cen	ter			
Trigger	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level 137.0 V Slope rising				
Marker	θ(1) = B(1) = Δ = 1/ΔX =	X 51.7 ns 75.1426 дs 75.0909 дs 13.31719 kHz	Y 0.0 V 150.0 V 150.0 V		





Saved: 27 DEC 2012 12:01:56

Acquisition	Sampling mode real time Configuration 4GSa. Memory depth manual Memory depth 32768pi Sampling rate automatic Sampling rate 50.0 M Averaging off 9-bit BW Filter off Interpolation on	's is MSa/s			
Channel 2	Scale 20.0 A/div Offset -28.0 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00				
Time base	Scale 50.0 µs/div Position 86.788183 µs Reference center				
Trigger	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Couplin Source channel 2 Trigger level -13.8 A Slope	g DC e falling			
Marker		X A(2) = -7.2123 μs B(2) = -7.2123 μs Δ = 0.0 s 1/ΔX =	Y 0.0 A -60.0 A -60.0 A		



11:59 AM <u>F</u>ile <u>C</u>ontrol Setup <u>Measure</u> Analyze <u>U</u>tilities <u>H</u>elp Acquisition is stopped. лè 50.0 MSa/s  $\sim \sim \sim$ 4) On 2) 🖓 3 <sup>On</sup>  $\frac{2}{2}$ 20.0 A/div D.L.S Electonic Systems Holt Integrated Circuits Inc. RTCA/DO-160G Section 22 Pin Injection Verification Ъ WF4 Level 3 300V/60A OC Calibration T2=69uS +-20% T1=6.4uS +-20% Gen=300 Η 50.0 дз/div 🛛 ∿ 📫 1 52.788183 µs 0 15.2 A More (1 of 2) Markers Scales ? ).0 H 50.0 A 60.0 A Clear All

Acquisition	Sampling mode real time Configuration 4GSa. Memory depth manual Memory depth 32768pi Sampling rate automatic Sampling rate 50.0 M Averaging off 9-bit BW Filter off Interpolation on	/s ts dSa/s			
Channel 2	Scale 20.0 A/div Offset 22.4 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00				
Time base	Scale 50.0 дs/div Position 52.788183 дs Ref	erence center			
Trigger	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Couplin Source channel 2 Trigger level 15.2 A Slope	g DC rising			
Marker		Х А(2) = -1.0756 дв В(2) = 5.6517 дв Δ = 6.7273 дв 1/ΔХ = 148.649 kHz	Y D.D A 60.D A 60.D A		



1250 Peterson Dr., Wheeling, IL 60090

# **PIN INJECTION**

## WAVEFORM 5A CALIBRATION DATA SHEETS



1250 Peterson Dr., Wheeling, IL 60090



Saved: 27 DEC 2012 12:15:53

Acquisition	Sampling mode real time Configuration 4GSa/s Memory depth manual Memory depth 32768pts Sampling rate automatic Sampling rate 50.0 MSa/s Averaging off 9-bit BW Filter off Interpolation on					
Channel 1	Scale 100 V/div Offset -92 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00					
Time base	Scale 50.0 μs/div Position 118.20000 μs Reference center					
Trigger	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level -81.0 V Slope falling					
Measure	current V max(1) 5.7 V V min(1) -308.8 V V max(2) Source off V min(2) Source off	mean 5.3 V -308.3 V 	std dev 700 mV 800 mV	min 4.8 V -308.8 V	max 5.7 V -307.7 V	
Marker	current V max(1) 5.7 V V min(1) -308.8 V V max(2) Source off V min(2) Source off	Mean 5.3 V -308.3 V 	A(1) = -5 B(1) = 33 - Δ = 33 - 1/ΔX = 20	.1338 дs 2.3662 дs 7.5000 дs 6.66667 kHz	Y 0.0 V -300.0 V -300.0 V	



1250 Peterson Dr., Wheeling, IL 60090



Saved: 27 DEC 2012 12:14:16

Acquisition	Sampling mode real time Configuration 4GSa/s Memory depth manual Memory depth 32768pts Sampling rate automatic Sampling rate 50.0 MSa/s Averaging off 9-bit BW Filter off Interpolation on					
Channel 1	Scale 100 V/div Offset -92 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00					
Time base	Scale 50.0 дs/div Posit	ion 118.20000 дs Referer	nce center			
Trigger	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level -81.0 V Slope falling					
Measure	cur V max(1) 5.7 V min(1) -308 V max(2) Sou V min(2) Sou	rent mean V 5.3 V .8 V -308.3 V rce off rce off	std dev 700 mV 800 mV	min 4.8 V -308.8 V	max 5.7 V -307.7 V	
Marker	cur V max(1) 5.7 V min(1) -308 V max(2) Sou V min(2) Sou	rent Mean V 5.3 V .8 V -308.3 V rce off rce off	A(1) = B(1) = Δ = 1/ΔX =	X 2.032 дs 117.3662 дs 115.3338 дs 8.670483 kHz	Y 0.0 V -150.0 V -150.0 V	


1250 Peterson Dr., Wheeling, IL 60090

File	Control	<u>S</u> etup	Measure	Analyze	Utilities	Help		12:12 F	M
Acquis 25.0 M	ition is s Ba/s	topped.			-			Π	Ð
0	🔽 100 V/div	~	2 <sup>On</sup>		3 On		4 🖸		
D.L.S RTC Sect Verif	S Electonic X/DO-160 ion 22 Pin ication	Systems G Injection	5 AX				Holt Integr	ated Circuits Inc.	
Ay								+ + + + + + + + + + + + + +	Ľ
f Meas	surements N	arkers S	E 100	μs/div <mark>o</mark> Λ	(1) = -6 (1) = 4 (1) = 4	0000 µs ◀ 5.1338 µs 29.8662 µs 36.0000 µs	♥	106.0V	?

Saved: 27 DEC 2012 12:12:41

Acquisition	Sampling mode real time Configuration 4GSa/s Memory depth manual Memory depth 32768pts Sampling rate automatic Sampling rate 25.0 MSa/s Averaging off 9-bit BW Filter off Interpolation on											
Channel 1	Scale 100 V/div Offset 153 V C Attenuation 1.000 k : 1 Atten u Ext adapter None Ext coupler N Ext gain 1.00E+00 Ext offset 0.	Coupling DC Impe nits ratio Skew 0. Ione OE+00	dance 1M Oh O s	m								
Time base	Scale 100 µs/div Position 163.	le 100 μs/div Position 163.70000 μs Reference center										
Trigger	Mode edge Sweep triggered Hysteresis normal Holdoff time Source channel 1 Trigger level	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level 106.0 V Slope rising										
Measure	current V max(1) 308.4 V V min(1) -5.2 V V max(2) Source off V min(2) Source off	mean 307.9 V -4.5 V	std dev 800 mV 1.0 V	min 307.4 V -5.2 V	max 308.4 V -3.8 V							
Marker	current V max(1) 308.4 V V min(1) -5.2 V V max(2) Source off V min(2) Source off	mean 307.9 V -4.5 V	A(1) = - B(1) = Δ = 1/ΔX =	X 6.1338 дs 29.8662 дs 36.0000 дs 27.77778 kHz	Y 60.0 V 300.0 V 240.0 V							



1250 Peterson Dr., Wheeling, IL 60090

File Control Setup	Measure	Analyze	Utilities	Help	12:13 PM
Acquisition is stopped.	modouro	Enciryco	<u>0</u> 411400		
25.U MSa/s	 On	~ <u>~~</u> ~~	<u>~~</u> ~~ 🔊 On	$\sim$	
	<b>V</b>				
D.L.S Electonic System	is 🏧				Holt Integrated Circuits Inc.
Section 22 Pin Injection					
Verification					
			+		
ىمارىسىر «سىز» سىز» سىز» سىز» سىز» سىز» سىز» سىز	······································				, ուվ տավ տավ տավ տավ տավ տավ տավ տավ տավ տա
					←T
Ay					
					₹
					WF5A 300V//300A
					T1=40us +/-20%
			B×		T2=120µs +/-20%
	<b>H</b> 50.0	) μs/div 🛛 ∿ ∩	118.20	0000 дз 🔳	0 ▶ <u>T</u> 106.0 V 🔷 ↑
Measurements Markers	Scales				
		Ę	)(1) = 2	ς 2.032 με	9 60.0 V
			Δ = 1 Δ = 1	113.699 дз 111.667 дз	150.0 V 90.0 V

Saved: 27 DEC 2012 12:13:09

Acquisition	Sampling mode real time Configuration 4GSa/s Memory depth manual Memory depth 32768pts Sampling rate automatic Sampling rate 50.0 MSa/s Averaging off 9-bit BW Filter off Interpolation on										
Channel 1	Scale 100 V/div O Attenuation 1.000 Ext adapter None Ext gain 1.00E+00	ffset 153 V Co k : 1 Atten un Ext coupler No Ext offset 0.0	oupling DC Imped its ratio Skew 0.1 one JE+00	lance 1M O D s	hm						
Time base	Scale 50.0 µs/div	50.0 μs/div Position 118.20000 μs Reference center									
Trigger	Mode edge Sweep Hysteresis normal Source channel 1	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level 106.0 V Slope rising									
Measure	V max(1) V min(1) V max(2) V min(2)	current 308.4 V -5.1 V Source off Source off	mean 308.4 V -5.1 V 	std dev 0.0 V 0.0 V	min 308.4 V -5.1 V	max 308.4 V -5.1 V					
Marker	V max(1) V min(1) V max(2) V min(2)	current 308.4 V -5.1 V Source off Source off	mean 308.4 V -5.1 V	A(1) = B(1) = Δ = 1/ΔX =	Х 2.032 дs 113.699 дs 111.667 дs 8.95522 kHz	Y 60.0 V 150.0 V 90.0 V					



1250 Peterson Dr., Wheeling, IL 60090



Saved: 27 DEC 2012 12:29:30

Acquisition	Sampling mode real time Configuration 4GSa/s Memory depth manual Memory depth 32768pts Sampling rate automatic Sampling rate 50.0 MSa/s Averaging off 9-bit BW Filter off Interpolation on											
Channel 2	Scale 100 A/div O Attenuation 100.0 Ext adapter None Ext gain 1.00E+00	lffset -98.6 A : 1 Atten unil Ext coupler N Ext offset 0.0	Coupling DC Im ts ratio Skew 0. one DE+00	npedance 1M Oh .0 s	m							
Time base	Scale 50.0 µs/div	50.0 μs/div Position 118.20000 μs Reference center										
Trigger	Mode edge Sweep Hysteresis normal Source channel 2	) triggered Holdoff time 6 Trigger level (	i0 ns Coupling I -95.8 A Slope f	DC alling								
Measure	V max(1) V min(1) V max(2)	current Source off Source off 6 7 A	mean 	std dev	min 	мах 						
	V min(2)	-306.5 A	-306.5 A	0.0 A	-306.5 A	-306.5 A						
Marker	V max(1) V min(1) V max(2) V min(2)	current Source off Source off 6.7 A -3D6.5 A	mean  6.7 A -306.5 A	X A(2) = -5. B(2) = 32 Δ = 37 1/ΔX = 26	1338 дs .3662 дs .5000 дs .66667 kHz	Y D.0 A -300.0 A -300.0 A						



1250 Peterson Dr., Wheeling, IL 60090

<u>F</u> ile <u>C</u> ontrol	<u>S</u> etup	<u>M</u> easure	<u>A</u> nalyze	<u>U</u> tilities	<u>H</u> elp			12:28 PM
Acquisition is s 50.0 MSa/o	topped.				<u> </u>			лe
0 0n		2) 🖓 100 A	/div	3 <sup>On</sup>		() On		
D.L.S Electonic RTCA/DO-160 Section 22 Pin Verification	: Systems <sup>e</sup> G Injection					Holt Inte	egrated Circi	uits Inc.
A							WF5A 300V/300A T1=40us + T2=120us	← T ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
1 Deasurements	2 🞒 Markers 🛛 Sc	H 50.0	µs/div 🕠 🔨	118.200	0000 дз 🚺	0 <b>•</b> <u>i</u>	79.2 A	<b>₽</b> 1
			A B	(2) = -5 (2) = 3 $\Delta = 3$ 1/48 - 2	{ 5.1338 μs 32.3662 μs 37.5000 μs 26.66667 μH;	Y 0.0 A 300.0 A 300.0 A		?

Saved: 27 DEC 2012 12:28:43

Acquisition	Sampling mode rea Memory depth mar Sampling rate auto Averaging off 9-bit BW Filter off	Sampling mode real time Configuration 4GSa/s Memory depth manual Memory depth 32768pts Sampling rate automatic Sampling rate 50.0 MSa/s Averaging off 9-bit BW Filter off Interpolation on									
Channel 2	Scale 100 A/div C Attenuation 100.0 Ext adapter None Ext gain 1.00E+00	lffset 195.4 A : 1 Atten unit Ext coupler No Ext offset 0.0	Coupling DC Im s ratio Skew 0. one )E+00	pedance 1M Oł Os	m						
Time base	Scale 50.0 µs/div	Scale 50.0 μs/div Position 118.20000 μs Reference center									
Trigger	Mode edge Sweep Hysteresis normal Source channel 2	o triggered Holdoff time 6 Trigger level 7	0 ns Coupling D 79.2 A Slope ris	)C ing							
Measure		current	mean	std dev	min	max					
	V max(1)	Source off									
	V min(1)	Source off									
	V max(2)	313.8 A	313.8 A	0.0 A	313.8 A	313.8 A					
	V min(2)	-4.6 A	-4.6 A	0.0 A	-4.6 A	-4.6 A					
Marker		current	mean	Х		Y					
	V max(1)	Source off		- A(2) = -5.	.1338 µs	0.0 A					
	V min(1)	Source off		-B(2) = 32	.3662 дз	300.0 A					
	V max(2)	313.8 A	313.8 A	Δ = 37	.5000 µs	300.0 A					
	V min(2)	-4.6 A	-4.6 A	1/AX = 26	.66667 kHz						



1250 Peterson Dr., Wheeling, IL 60090

## **PIN INJECTION**

## WAVEFORM 5B CALIBRATION DATA SHEETS



1250 Peterson Dr., Wheeling, IL 60090

<u>F</u> ile <u>C</u> ontrol <u>S</u> etup	<u>M</u> easure	<u>A</u> nalyze	<u>U</u> tilities	<u>H</u> elp	12:39 PM
Acquisition is stopped. 25.0 MSa/s		~~~r	~~~~		<u>n</u> e
0n 100 V/div 🗠 🗠	2 <sup>On</sup>		3) On		0n
D.L.S Electonic Systems RTCA/DO-160G Section 22 Pin Injection Verification					Holt Integrated Circuits Inc.
	······································	<u></u>			Ţ
					+ T
ուսիստիստիստիստիստիստիստիստի					
					By
					WF5B 300V/300A T1=50us +/-20%
	<b>FI</b> 100	us/div 🕠 🔿	<u> </u>	DOO us 🔳	
Measurements Markers S	cales )	••••••••••••••••••••••••••••••••••••••	)(1) = 4	{ 4.801 μs 45.199 μs	Y 0.0 V -300.0 V -300.0 U

Saved: 27 DEC 2012 12:39:30

Acquisition	Sampling mode real time Configuration 4GSa/s Memory depth manual Memory depth 32768pts Sampling rate automatic Sampling rate 25.0 MSa/s Averaging off 9-bit BW Filter off Interpolation on									
Channel 1	Scale 100 V/div O Attenuation 1.000 Ext adapter None Ext gain 1.00E+00	ffset – 181 VC k: 1 Atten uni Ext coupler No Ext offset 0.01	oupling DC Impe ts ratio Skew 0.1 ine E+00	dance 1M ( )s	) hm					
Time base	Scale 100 µs/div I	cale 100 μs/div Position 15.200000 μs Reference center								
Trigger	Mode edge Sweep Hysteresis normal Source channel 1	4ode edge Sweep triggered łysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level -109.0 V Slope falling								
Measure	V max(1) V min(1) V max(2) V min(2)	current 5.4 V -305.0 V Source off Source off	mean 5.4 V -305.0 V 	std dev 0.0 V 0.0 V	min 5.4 V -305.0 V	max 5.4 V -305.0 V				
Marker	V max(1) V min(1) V max(2) V min(2)	current 5.4 V -305.0 V Source off Source off	mean 5.4 V -305.0 V	A(1) = B(1) = Δ = 1/ΔX =	X -4.801 дs 45.199 дs 50.000 дs 20.0000 kHz	Y 0.0 V -300.0 V -300.0 V				



1250 Peterson Dr., Wheeling, IL 60090

<u>File</u> <u>Control</u> <u>S</u> etup	<u>M</u> easure	<u>A</u> nalyze	<u>U</u> tilities	<u>H</u> elp	12:40 PM
Acquisition is stopped. 10.0 MSa/s				~~~	<b>n</b> ð
100 V/div 🔛	2 🖸		3 <sup>On</sup>		0n
D.L.S Electonic System RTCA/DO-160G Section 22 Pin Injection Verification	fs				Holt Integrated Circuits Inc.
			+		Ų
					••••••••••••••••••••••••••••••••••••••
			+   +   +   +		WF5B 300V/300A T1=50us +/-20% T2=500us +/-20%
	<u>H</u> 200	цs/div 🕠 🔨	548.200	0000 дз 🔳	0 ▶ <u>109.0 ∨</u> ↑
Measurements Markers	Scales	A B	$((1) = 1)$ $((1) = 5)$ $\Delta = -5$	( .531 µs 81.531 µs 80.000 µs	Y 2.0 V -150.0 V -150.0 V

Saved: 27 DEC 2012 12:40:50

Acquisition	Sampling mode real time Configuration 4GSa/s Memory depth manual Memory depth 32768pts Sampling rate automatic Sampling rate 10.0 MSa/s Averaging off 9-bit BW Filter off Interpolation on									
Channel 1	Scale 100 V/div O Attenuation 1.000 Ext adapter None Ext gain 1.00E+00	lffset – 181 V C k : 1 Atten un Ext coupler No IExt offset 0.0	Coupling DC Impe its ratio Skew 0.1 one IE+00	dance 1M ( D s	Dhm					
Time base	Scale 200 μs/div Position 548.20000 μs Reference center									
Trigger	Mode edge Sweep Hysteresis normal Source channel 1	Mode edge Sweep triggered Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level -109.0 V Slope falling								
Measure	V max(1) V min(1) V max(2) V min(2)	current 5.1 V -303.7 V Source off Source off	mean 5.1 V -303.7 V	std dev 0.0 V 0.0 V	min 5.1 V -303.7 V	max 5.1 V -303.7 V				
Marker	V max(1) V min(1) V max(2) V min(2)	current 5.1 V -303.7 V Source off Source off	mean 5.1 V -303.7 V	A(1) = B(1) = Δ = 1/ΔX =	Х 1.531 дs 581.531 дs 580.000 дs 1.724138 kHz	Y 0.0 V -150.0 V -150.0 V				



1250 Peterson Dr., Wheeling, IL 60090

<u>F</u> ile <u>C</u> o	ntrol <u>S</u> etup	<u>M</u> easure	<u>A</u> nalyze	<u>U</u> tilities	<u>H</u> elp			12:38	3 PM
Acquisitio 10.0 MSa/s	n is stopped.		~~~		$\sim\sim$			Ω	Ð
1) 🖓 🏧	0 V/div 💦	2 🗖		3 🗂		0n 🗖			
D.L.S Ele RTCA/D Section 2 Verification	ctonic System D-160G 2 Pin Injection on	S	f			Holt Ir	itegrated C	ircuits Inc.	
A									5
							WF5B 300V/30 T1=50u T2=500	10A s +/-20% us +/-20%	Ţ
1		<b>H</b> 100	дs/div № ∿	/ 15.200	000 дз 🛛 🖣	0 🕨	<b>T</b> 78.0 ∨		t
Measurem	ents Markers	Scales	A	((1) = -4) ((1) = 4) ((1) = 4)	{ 1.801 μs 15.199 μs 10.000 μs	Y 0.0 V 300.0 300.0	v v		?

Saved: 27 DEC 2012 12:38:11

Acquisition	Sampling mode real time Config Memory depth manual Memory of Sampling rate automatic Samplin Averaging off 9-bit BW Filter off Interpolation	uration 4GSa/s Jepth 32768pts ng rate 25.0 MSa on	/s				
Channel 1	Scale 100 V/div Offset 204 V Coupling DC Impedance 1M Ohm Attenuation 1.000 k : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00						
Time base	Scale 100 µs/div Position 15.20	)0000 µs Referen	ice center				
Trigger	Mode edge Sweep triggered Hysteresis normal Holdoff time 6 Source channel 1 Trigger level	60 ns Coupling DI 78.0 V Slope risi	C				
Measure	current V max(1) 305.7 V V min(1) -4.2 V V max(2) Source off V min(2) Source off	mean 305.7 V -4.2 V 	std dev 0.0 V 0.0 V	min 305.7 V -4.2 V	max 305.7 V -4.2 V		
Marker	current V max(1) 305.7 V V min(1) -4.2 V V max(2) Source off V min(2) Source off	mean 305.7 V -4.2 V	A(1) = B(1) = Δ = 1/ΔX =	Х -4.801 дs 45.199 дs 50.000 дs 20.0000 kHz	Y 0.0 V 300.0 V 300.0 V		



1250 Peterson Dr., Wheeling, IL 60090

Filo	Control	Sotup	Moscuro	Anelyzo	Litilitiae	Help			12-37 DM
Acquis	ition is s	topped.	Measure	Analyze	Oundes	пер			12.37 FM
10.0 M	Sa/s			$\sim$	<u>s</u> yn	$\sim\sim$			<u>m</u> la
	100 V/div	$\sim$	<b>2</b> 🗖		3 🗖		4) 🗖		
D.L.S	6 Electonic	: System <sup>8</sup>	×				Holt Inte	egrated Circu	its Inc.
RTC	A/DO-160	G							
Secti	ion 22 Pin I icetion	Injection					l		
	ICAUUII								
			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~						
			<b>_</b>			·····			
									— — Вм
									<u>с</u> т
- Antonio - Antonio					÷			WF5B	<del>أ</del> رً.
								300V/300A	
								T1=50us +/	-20%
							B	x 12-300µ3 •	7-2078
TT.		24	<u>H</u> 100	µs/div № ^	261.20	0000 дз 🔳 0		T 78.0 V	l <b>≜</b> †
Meas	urements 🚺	1arkers S	cales						
					)(1) = 2	К 2.865 ша	Y 0.0 V		?
					(1) = 5	569.866 дз 567 ОО1 дз	150.0 V 150.0 V		
					17AX = 1	1 763665 24-	200.0 1		

Saved: 27 DEC 2012 12:37:40

Acquisition	Sampling mode rea Memory depth man Sampling rate auto Averaging off 9-bit BW Filter off	al time Configu Jual Memory di Juatic Samplin Interpolation	ıration 4GSa/s epth 32768pts ig rate 25.0 MSa. on	/s		
Channel 1	Scale 100 V/div O Attenuation 1.000 Ext adapter None I Ext gain 1.00E+00	ffset 204 V Co k : 1 Atten un Ext coupler No Ext offset 0.0	oupling DC Imped its ratio Skew 0.1 one JE+00	lance 1M O O s	hm	
Time base	Scale 100 µs/div F	Position 261.2	0000 µs Referen	ce center		
Trigger	Mode edge Sweep Hysteresis normal Source channel 1	triggered Holdoff time 6 Trigger level 7	0 ns Coupling D0 78.0 V Slope risir	) Jg		
Measure	V max(1) V min(1) V max(2) V min(2)	current 305.7 V -3.9 V Source off Source off	mean 305.7 V -3.9 V 	std dev 0.0 V 0.0 V	min 305.7 V -3.9 V	max 305.7 V -3.9 V
Marker	V max(1) V min(1) V max(2) V min(2)	current 305.7 V -3.9 V Source off Source off	mean 305.7 V -3.9 V	A(1) = B(1) = Δ = 1/ΔX =	Х 2.865 дs 569.866 дs 567.001 дs 1.763665 kHz	Y 0.0 V 150.0 V 150.0 V



1250 Peterson Dr., Wheeling, IL 60090



Saved: 27 DEC 2012 12:33:20

Acquisition	Sampling mode real time Configuration 4GSa/s Memory depth manual Memory depth 32768pts Sampling rate automatic Sampling rate 10.0 MSa/s Averaging off 9-bit BW Filter off Interpolation on							
Channel 2	Scale 100 A/div Offset -98.6 A Coupling DC Impedance 1M Ohm Attenuation 100.0 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00							
Time base	Scale 200 µs/div I	Position 456.2	:0000 µs Refer	ence center				
Trigger	Mode edge Sweep Hysteresis normal Source channel 2	otriggered Holdofftime 6 Triggerlevel	0 ns Coupling -95.8 A Slope I	DC falling				
Measure		current	mean	std dev	min	Max		
	V max(1)	Source off						
	V min(1)	Source off					•	
	V max(2)	6.0 A	6.D A	0.0 A	6.D A	6.0 A		
	V min(2)	-305.7 A	-305.7 A	0.0 A	-305.7 A	-305.7 A		
Marker		current	mean	Х		Y		
	V max(1)	Source off		A(2) = -5.	.1338 µs	0.0 A		
	V min(1)	Source off		B(2) = 32	.3662 дз	-300.0 A		
	V max(2)	6.0 A	6.D A	∆ = 37	.5000 µs	-300.0 A		
	V min(2)	-305.7 A	-305.7 A	1/AX = 26	.66667 kHz			



1250 Peterson Dr., Wheeling, IL 60090

<u>File Control Setup</u>	<u>M</u> easure	<u>A</u> nalyze	<u>U</u> tilities	<u>H</u> elp	12:34 PM
Acquisition is stopped. 10.0 MSa/s		$\sim \sim$	~~~~	$\sim$	• •
0 <sup>On</sup>	2) 🖓 100 A	/div	3 On		0n
D.L.S Electonic Systems RTCA/DO-160G	S AX				Holt Integrated Circuits Inc.
Section 22 Pin Injection Verification					
			·		Вү
			<u>+</u>		ուսակումասկանակումյունությունությունությունություն
				•••••••	← T
Age			+ 		لوالي المراجع (1995) WF5B
					300V/300A T1=50us +/-20% T2=500us +/-20%
	<b>H</b> 200	цs/div _∿ ∧	456.20	0000 дз 🔳	0 ▶ 🛐 <u>91.2</u> A 🗲 ↑
Measurements Markers S	cales			<	V 2
		A	(2) = - Δ =	5.1338 дз 32.3662 дз 37.5000 дз	Ó.O A 300.0 A 300.0 A

Saved: 27 DEC 2012 12:34:20

Acquisition	Sampling mode rea Memory depth mar Sampling rate auto Averaging off 9-bit BW Filter off	al time Configu hual Memory d omatic Samplir Interpolation	uration 4GSa/s epth 32768pts ng rate 10.0 MS on	ia/s		
Channel 2	Scale 100 A/div O Attenuation 100.0 Ext adapter None Ext gain 1.00E+00	lffset 182.4 A : 1 Atten unil Ext coupler N Ext offset 0.0	Coupling DC In ts ratio Skew O one DE+00	npedance 1M Oh .0 s	IM	
Time base	Scale 200 µs/div I	Position 456.2	:0000 µs Refere	ence center		
Trigger	Mode edge Sweep Hysteresis normal Source channel 2	) triggered Holdoff time 6 Trigger level !	i0 ns Coupling I 91.2 A Slope ri:	DC sing		
Measure	V max(1)	current Source off	mean	std dev	min	Max
	V min(1) V max(2) V min(2)	Source off 308.6 A -4.1 A	308.6 A -4.1 A	0.0 A 0.0 A	308.6 A -4.1 A	308.6 A -4.1 A
Marker	V max(1) V min(1) V max(2) V min(2)	current Source off Source off 308.6 A -4.1 A	mean  308.6 A -4.1 A	X Α(2) = -5. Β(2) = 32 Δ = 37 1/ΔX = 26	1338 дs 2.3662 дs 2.5000 дs 5.66667 kHz	Y 0.0 A 300.0 A 300.0 A