

<b>PCN Number:</b>	20161114000	<b>PCN Date:</b>	Nov 15, 2016
<b>Title:</b>	ADC32xx/34xx Product Family Design Change		
<b>Customer Contact:</b>	<a href="#">PCN Manager</a>	<b>Dept:</b>	Quality Services
<b>Proposed 1<sup>st</sup> Ship Date:</b>	Nov 15, 2016	<b>Estimated Sample Availability:</b>	Date provided at sample request
<b>Change Type:</b>			
<input type="checkbox"/>	Assembly Site	<input type="checkbox"/>	Assembly Process
<input checked="" type="checkbox"/>	Design	<input type="checkbox"/>	Electrical Specification
<input type="checkbox"/>	Test Site	<input type="checkbox"/>	Packing/Shipping/Labeling
<input type="checkbox"/>	Wafer Bump Site	<input type="checkbox"/>	Wafer Bump Material
<input type="checkbox"/>	Wafer Fab Site	<input type="checkbox"/>	Wafer Fab Materials
<input type="checkbox"/>	Software	<input type="checkbox"/>	Part number change
<input type="checkbox"/>		<input type="checkbox"/>	Assembly Materials
<input type="checkbox"/>		<input type="checkbox"/>	Mechanical Specification
<input type="checkbox"/>		<input type="checkbox"/>	Test Process
<input type="checkbox"/>		<input type="checkbox"/>	Wafer Bump Process
<input type="checkbox"/>		<input type="checkbox"/>	Wafer Fab Process

### PCN Details

#### Description of Change:

Texas Instruments Incorporated is announcing an information only notification for a design change on the ADC32xx/34xx product family of devices.

The following observations are made when a device listed in the product affected table (below) is used for 1st time on the board.

1. ADC's gain error (1) shows a 'glitch' when a fresh device is tested.
  - a. For quad channel part (ADC34xx/34Jxx), channel A and D show the glitch together, while channel B and C show it together. For dual channel part (ADC32xx/32Jxx), glitch occurs at the same time for channel A and B.
  - b. When glitch occurs, the gain error increases by ~0.5%.
  - c. The glitch shows a very slow settling profile with a time constant of 'hours'.
  - d. Once settled, the glitch doesn't occur again, i.e. the glitch occur only once for a given device.
  - e. This issue doesn't cause any impact on AC performance.
  - f. The issue affects only time-domain applications.
2. Lab test show that glitch in gain error is a result of glitch in ADC's reference voltage as shown in figure 1

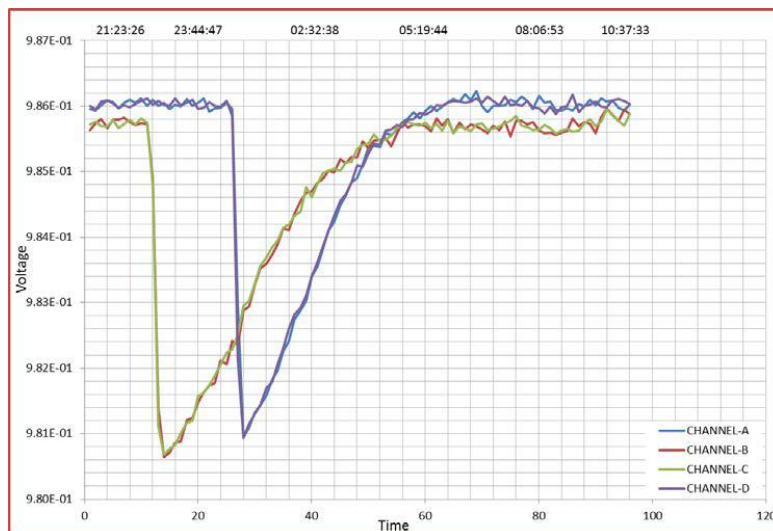
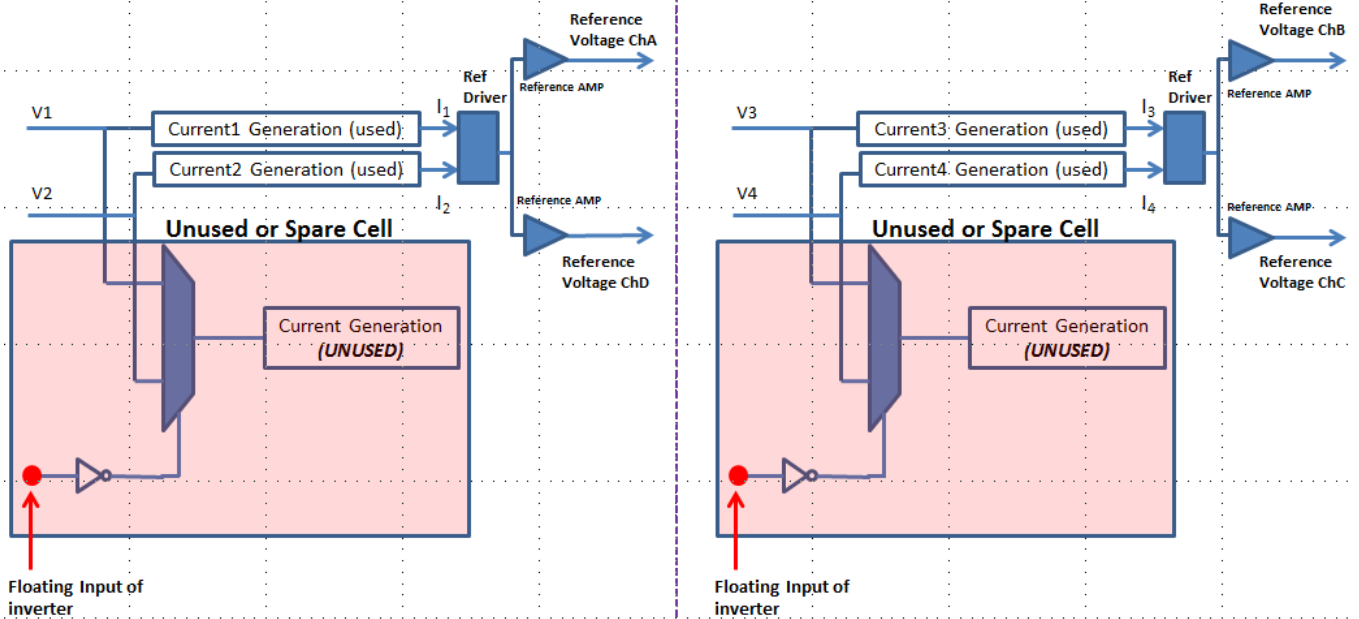


Figure 1 Glitch on ADC reference voltage

### 3. Root cause

Figure 2 explains the circuitry inside a quad channel device (ADC34xx/34Jxx) which causes the problem. For the dual channel device (ADC32xx/32Jxx), channel A&D represent the two channels. Channel **A and D** for quad channel device  
 Channel **B and C** for quad channel device  
 (Channel **A and B** for dual channel device)



**Figure 2 Reference Voltage generation inside ADC3xxx/3xJxx devices**

- Bias Voltages (V1,V2) and (V3,V4) are used to generate currents for reference driver for channel A&D, and channel B&C respectively.
- Inside device, there are two unused cells to generate current (one for channel A&D, other for channel B&C). The bias voltage of these unused cells is chosen by multiplexer. The selection line of multiplexer is driven by a floating input inverter.
- This floating gate of inverter in unused cell causes V1 and V2 to short temporarily, resulting in glitch in reference output of CHA and CHD. Same phenomenon is seen by CHB and CHC.

### 4. Solution

The floating gate of inverter in unused cell is connected to deterministic state (AVDD supply) in new Silicon. While it solves the problem, it doesn't impact any parameter (performance, power or timing) of device in any possible way since the unused cell is not used anywhere in design for any purpose.

This change did not necessitate a manufacturing or silicon process requalification. However, a full test yield and bin analysis was performed on a representative device from each product family. None of the evaluated devices showed any meaningful differences from the current yield and bin distributions.

Affected devices are listed in the product affected section of this document.

#### Reason for Change:

To fix design glitch

**Anticipated impact on Form, Fit, Function, Quality or Reliability (positive / negative):**

The design improvement does not affect the specified form fit or function of the device and therefore it represents an application drop-in replacement. There will be no accompanying changes to the device specifications.

**Changes to product identification resulting from this PCN:**

There is no change to the device marking. The Die Rev designator for the affected devices will change as shown in the table and sample label below:

Current	New
Die Rev [2P]	Die Rev [2P]
A	B

Sample product shipping label (not actual product label)

**Product Affected:**

ADC3221IRGZR	ADC32J22IRGZT	ADC3421IRTQR	ADC34J22IRGZ25
ADC3221IRGZT	ADC32J23IRGZ25	ADC3421IRTQT	ADC34J22IRGZR
ADC3222IRGZR	ADC32J23IRGZR	ADC3422IRTQ25	ADC34J22IRGZT
ADC3222IRGZT	ADC32J23IRGZT	ADC3422IRTQR	ADC34J23IRGZ25
ADC3223IRGZ25	ADC32J24IRGZ25	ADC3422IRTQT	ADC34J23IRGZR
ADC3223IRGZR	ADC32J24IRGZR	ADC3423IRTQ25	ADC34J23IRGZT
ADC3223IRGZT	ADC32J24IRGZT	ADC3423IRTQR	ADC34J24IRGZ25
ADC3224IRGZ25	ADC32J25IRGZ25	ADC3423IRTQT	ADC34J24IRGZR
ADC3224IRGZR	ADC32J25IRGZR	ADC3424IRTQ25	ADC34J24IRGZT
ADC3224IRGZT	ADC32J25IRGZT	ADC3424IRTQR	ADC34J25IRGZ25
ADC3241IRGZ25	ADC32J42IRGZ25	ADC3424IRTQT	ADC34J25IRGZR
ADC3241IRGZR	ADC32J42IRGZR	ADC3441IRTQ25	ADC34J25IRGZT
ADC3241IRGZT	ADC32J42IRGZT	ADC3441IRTQR	ADC34J42IRGZ25
ADC3242IRGZ25	ADC32J43IRGZ25	ADC3441IRTQT	ADC34J42IRGZR
ADC3242IRGZR	ADC32J43IRGZR	ADC3442IRTQ25	ADC34J43IRGZ25
ADC3242IRGZT	ADC32J43IRGZT	ADC3442IRTQR	ADC34J43IRGZR
ADC3243IRGZ25	ADC32J44IRGZ25	ADC3442IRTQT	ADC34J43IRGZT
ADC3243IRGZR	ADC32J44IRGZR	ADC3443IRTQ25	ADC34J44IRGZ25
ADC3243IRGZT	ADC32J44IRGZT	ADC3443IRTQR	ADC34J44IRGZR
ADC3244IRGZ25	ADC32J45IRGZ25	ADC3443IRTQT	ADC34J44IRGZT
ADC3244IRGZR	ADC32J45IRGZR	ADC3444IRTQ25	ADC34J45IRGZ25
ADC3244IRGZT	ADC32J45IRGZT	ADC3444IRTQR	ADC34J45IRGZR
ADC32J22IRGZR	ADC3421IRTQ25	ADC3444IRTQT	ADC34J45IRGZT

For questions regarding this notice, e-mails can be sent to the regional contacts shown below, or you can contact your local Field Sales Representative.

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