ON Semiconductor

Test Procedure for the NCN5192GEVB Evaluation Board

Author: Koenraad Van den Eeckhout Revision: v3

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Test equipment required

Oscilloscope, Power supply, Signal generator, Multimeter, communication over SPI

General remarks

When performing measurements on an oscilloscope capture the oscilloscope must be set so that a stable trigger is achieved. Average over the largest possible number of measurements, and limit the bandwidth to eliminate noise. Stop acquisition when taking measurements, so that all measurements are of the same waveform.

A test result page is provided on the end of this document. Fill in the result of each test and print out the page for each board.

When connector pin numberings are supplies, look for a square pad. This is pin 1. The connector pin numbering follows the numbering in figure 1

All SPI communication is done at 100kHz, with all signals active high and data clocked in on the falling clock edge.

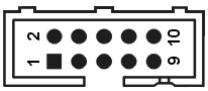

Figure 1: Connector pin numbering

TEST 0: Visual inspection

Perform a brief visual inspection of the board

- Check if the board is properly etched
- Check solder connections (loose pins, tombstoning, etc)

TEST 1: Idle Operation

- Power the board by applying VDD (nominal 3V3) and GND to the test bench. Connect a multimeter in series with the power to measure the current consumption
- Send the following SPI commands:
    - [0x42, 0x1B, 0xE4] (setting the GCR to 0xE4)
    - [0x46, 0xFD, 0x02] (setting the ACR to 0x02)
- Measure the current consumption of the board
- Measure AREF **(IDC4 pin 9**). Use a GND pin on IDC3 pin8 for the negative measure point.
- Measure nRTS (**IDC3 pin 9**).

TEST 2: Transmit Operation

- Place a jumper connecting nRTS to GND (IDC 3 pin 9 to IDC3 pin8)
- Connect an oscilloscope to TxA (IDC2 pin 7) of the test bench. An image similar to figure 2 should be visible.

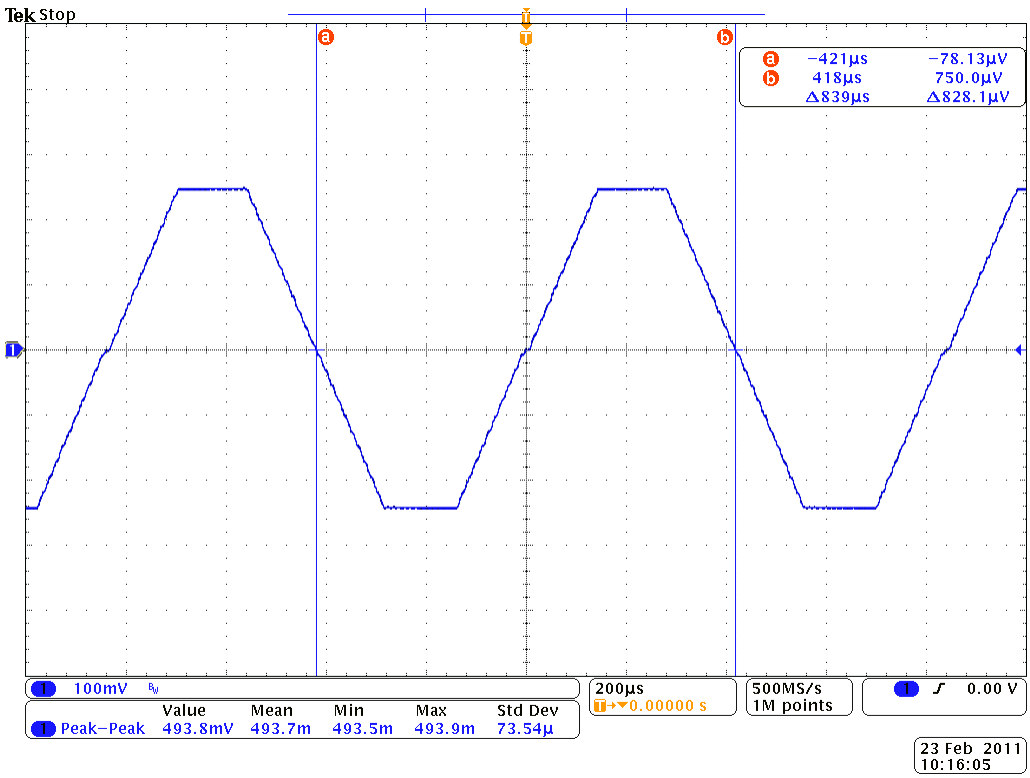

Figure 2: Output waveform (mark)

- Measure peak-to-peak amplitude **VPP,MARK** of the waveform
- Measure the cycle time **TMARK** of the waveform. Measure between two points with the greatest slope so as to provide the most accurate measurement.
- Place a jumper connecting TxD (IDC3 pin 7) to GND (IDC3 pin 8)
- Measure again peak-to-peak amplitude **VPP,SPACE** and cycle time **TSPACE**

TEST 3: Receive Operation

- Remove jumper connecting nRTS to GND (IDC 3 pin 9 to IDC3 pin8)
- Using a signal generator, apply a 1200Hz sine wave to IDC2 pin 3. Set the amplitude to 200mV peak-to-peak.
- Connect a probe to **IDC3 pin 5**. You should see a 1200 Hz sine wave. Measure the peak-to-peak voltage **RXF,MARK**
- Measure the delay **TD,MARK** between the applied sine wave and the measured wave.
- Measure **CD,MARK** on IDC3 pin 3
- Measure **RXD,MARK** on IDC3 pin 5
- Reduce the applied wave amplitude to 40mV. Pin **CD** should now be low.
- Repeat the above measurements for the space frequency 2200Hz.

TEST 3: DAC Operation

- Send the SPI Command [0x54, 0x40, 0x00, 0x00] to set the DAC at VDD/4
- Measure the average value of the output of **pin 5 of IDC1**.

Test Report NCP5193

Test performed by: Date:

NAME	MIN	NOM	MAX	MEASURED	PASS/FAIL
VDD	2V85	3V	3V30		
IDD,Q	300uA	350uA	370uA		
AREF	1V20	1V25	1V30		
nRTS	2V4	3V	3V15		

NAME	MIN	NOM	MAX	MEASURED	PASS/FAIL
VPP,MARK		490mV	500mV	510mV	
TMARK	828us	835us	843us		
VPP,SPACE		490mV	500mV	510mV	
TSPACE	452us	455us	460us		

NAME	MIN	NOM	MAX	MEASURED	PASS/FAIL
VDD,MIN		2V62	2V7	2V78	
nRST	0V	0V	1V		

NAME	MIN	NOM	MAX	MEASURED	PASS/FAIL
RXF,MARK		330mV	350mV	370mV	
TD,MARK		680us	700us	720us	
CD,MARK		2V4	3V	3V15	
RXD,MARK		2V4	3V	3V15	
VDET,MARK	140mV	150mV	160mV		
RXF,SPACE		330mV	350mV	370mV	
TD,SPACE		400us	420us	440us	
CD,MARK		2V4	3V	3V15	
RXD,MARK		0V	0V	0V4	
VDET,SPACE	140mV	150mV	160mV		

NAME	MIN	NOM	MAX	MEASURED	PASS/FAIL
DACOUT		712mV	750mV	825mV	