IBIS/HSPICE Model Quality Report

Design ID: **S8FX**
Description: **256Mb, 3V, Multiple I/O Serial Flash Memory**
Marketing device name(s): **N25Q256Ax3EF84x,N25Q256Ax3ESF4x, N25Q256A83ESF4x, N25Q256Ax3E124x, N25Q256A83E124x**
Valid speed grades: **108 MHz (MAX)**
Zip filename: **n25q_256mb_3p0_it.zip**
IBIS filename: **n25q_256mb_3p0_it.ibs** **File rev:** **1.3**
HSpice filename: **N/A** **File rev:** **N/A**
EBD filename (if applicable): **N/A** **File rev:** **N/A**
Die rev: **A1**
Date: **November 26, 2013**
Datasheet Link (from micron.com): **search using the marketing device name and click on the data sheet link**
E-mail modelsupport@micron.com for questions regarding Quality Report.

Device Parameters

VDDQ – Slow: **2.7** **Typical:** **3.0** **Fast:** **3.6**
VDD – Slow: **1.7** **Typical:** **1.8** **Fast:** **1.95**
Junction Temperature (Industrial) - Slow: **85** **Typical:** **25** **Fast:** **-40**
Junction Temperature (Automotive) - Slow: **125** **Typical:** **25** **Fast:** **-40**
VDDQ/VSSQ Decoupling Capacitance: **N/A**
Included in HSPICE DQ/DQS models? **Amount per DQ/DQS model:**
VDDQ/VSSQ Decoupling Capacitance Series Resistance: **N/A**

IBIS Quality Summary

1. ☒ Include the IBIS Quality Specification 2.0 Overall IBIS Quality level. For details on IBIS Quality, reference the quality specification and quality checklist on IBIS quality webpage http://www.eda.org/pub/ibis/quality_wip/.

   Overall IBIS Quality Level: **3S**
   Exceptions:

2. ☒ Include the filename of the IBIS Quality Checklist that accompanies this report.

   Filename: **n25q_65nm_ibis_quality_checklist.xlsx**

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IBIS MODEL Correlation

Datasheet Correlation

1. ☐ For Output or I/O model compare datasheet IOH/IOL data with IBIS pullup/pulldown data.
   N/A
2. ☒ Compare C_comp with datasheet Input C. Provide C_comp comparison table for all models and for all package combinations (i.e. x4, x8 and x16).

Component name: **N25Q256Ax3EF8xx**

		IBIS (pF)		Datasheet (pF)	
		min	max	min	max
DQ0	C_comp	5.09	5.15	NA	NA
	C package	0.27	0.27	NA	NA
	C_total	5.36	5.42	NA	TBD
DQ1	C_comp	5.23	5.28	NA	NA
	C package	0.30	0.30	NA	NA
	C_total	5.54	5.59	NA	TBD
DQ2	C_comp	12.94	17.15	NA	NA
	C package	0.30	0.30	NA	NA
	C_total	13.24	17.45	NA	TBD
DQ3	C_comp	5.07	5.13	NA	NA
	C package	0.30	0.30	NA	NA
	C_total	5.37	5.43	NA	TBD
S#	C_comp	3.62	3.79	NA	NA
	C package	0.27	0.27	NA	NA
	C_total	3.89	4.06	NA	TBD
C	C_comp	1.17	1.21	NA	NA
	C package	0.30	0.30	NA	NA
	C_total	1.47	1.51	NA	TBD
HOLD#	C_comp	5.09	5.11	NA	NA
	C package	0.30	0.30	NA	NA
	C_total	5.39	5.41	NA	TBD
WP#	C_comp	8.55	9.75	NA	NA
	C package	0.30	0.30	NA	NA
	C_total	8.85	10.05	NA	TBD

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Component name: **N25Q256Ax3ESFxx**

		IBIS (pF)		Datasheet (pF)	
		min	max	min	max
DQ0	C_comp	5.09	5.15	NA	NA
	C package	0.38	0.38	NA	NA
	C_total	5.47	5.53	NA	TBD
DQ1	C_comp	5.23	5.28	NA	NA
	C package	0.62	0.62	NA	NA
	C_total	5.85	5.90	NA	TBD
DQ2	C_comp	12.94	17.15	NA	NA
	C package	0.62	0.62	NA	NA
	C_total	13.56	17.77	NA	TBD
DQ3	C_comp	5.07	5.13	NA	NA
	C package	0.64	0.64	NA	NA
	C_total	5.71	5.77	NA	TBD
S#	C_comp	3.62	3.79	NA	NA
	C package	0.37	0.37	NA	NA
	C_total	3.99	4.16	NA	TBD
C	C_comp	1.17	1.21	NA	NA
	C package	0.61	0.61	NA	NA
	C_total	1.78	1.82	NA	TBD
HOLD#	C_comp	5.09	5.11	NA	NA
	C package	0.64	0.64	NA	NA
	C_total	5.73	5.75	NA	TBD
WP#	C_comp	8.55	9.75	NA	NA
	C package	0.62	0.62	NA	NA
	C_total	9.17	10.37	NA	TBD

Component name: **N25Q256A83ESFxx**

		IBIS (pF)		Datasheet (pF)	
		min	max	min	max
DQ0	C_comp	5.09	5.15	NA	NA
	C package	0.61	0.61	NA	NA
	C_total	5.70	5.76	NA	TBD
DQ1	C_comp	5.23	5.28	NA	NA
	C package	0.62	0.62	NA	NA
	C_total	5.85	5.90	NA	TBD
DQ2	C_comp	12.94	17.15	NA	NA
	C package	0.62	0.62	NA	NA
	C_total	13.56	17.77	NA	TBD
DQ3	C_comp	5.07	5.13	NA	NA
	C package	0.64	0.64	NA	NA
	C_total	5.71	5.77	NA	TBD
S#	C_comp	3.62	3.79	NA	NA
	C package	0.37	0.37	NA	NA
	C_total	3.99	4.16	NA	TBD
C	C_comp	1.17	1.21	NA	NA
	C package	0.61	0.61	NA	NA
	C_total	1.78	1.82	NA	TBD
HOLD#	C_comp	5.09	5.11	NA	NA
	C package	0.64	0.64	NA	NA
	C_total	5.73	5.75	NA	TBD
WP#	C_comp	8.55	9.75	NA	NA
	C package	0.62	0.62	NA	NA
	C_total	9.17	10.37	NA	TBD
RESET	C_comp	1.10	1.15	NA	NA
	C package	0.36	0.36	NA	NA
	C_total	1.46	1.51	NA	TBD

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Component name: **N25Q256Ax3E12xx**

		IBIS (pF)		Datasheet (pF)	
		min	max	min	max
DQ0	C_comp	5.09	5.15	NA	NA
	C package	3.30	3.30	NA	NA
	C_total	8.39	8.45	NA	TBD
DQ1	C_comp	5.23	5.28	NA	NA
	C package	2.04	2.04	NA	NA
	C_total	7.27	7.32	NA	TBD
DQ2	C_comp	12.94	17.15	NA	NA
	C package	2.00	2.00	NA	NA
	C_total	14.94	19.15	NA	TBD
DQ3	C_comp	5.07	5.13	NA	NA
	C package	3.93	3.93	NA	NA
	C_total	9.00	9.06	NA	TBD
S#	C_comp	3.62	3.79	NA	NA
	C package	1.82	1.82	NA	NA
	C_total	5.44	5.61	NA	TBD
C	C_comp	1.17	1.21	NA	NA
	C package	2.07	2.07	NA	NA
	C_total	3.24	3.28	NA	TBD
HOLD#	C_comp	5.09	5.11	NA	NA
	C package	3.93	3.93	NA	NA
	C_total	9.02	9.04	NA	TBD
WP#	C_comp	8.55	9.75	NA	NA
	C package	2.00	2.00	NA	NA
	C_total	10.55	11.75	NA	TBD

Component name: **N25Q256A83E12xx**

		IBIS (pF)		Datasheet (pF)	
		min	max	min	max
DQ0	C_comp	5.09	5.15	NA	NA
	C package	3.30	3.30	NA	NA
	C_total	8.39	8.45	NA	TBD
DQ1	C_comp	5.23	5.28	NA	NA
	C package	2.04	2.04	NA	NA
	C_total	7.27	7.32	NA	TBD
DQ2	C_comp	12.94	17.15	NA	NA
	C package	2.00	2.00	NA	NA
	C_total	14.94	19.15	NA	TBD
DQ3	C_comp	5.07	5.13	NA	NA
	C package	3.93	3.93	NA	NA
	C_total	9.00	9.06	NA	TBD
S#	C_comp	3.62	3.79	NA	NA
	C package	1.82	1.82	NA	NA
	C_total	5.44	5.61	NA	TBD
C	C_comp	1.17	1.21	NA	NA
	C package	2.07	2.07	NA	NA
	C_total	3.24	3.28	NA	TBD
HOLD#	C_comp	5.09	5.11	NA	NA
	C package	3.93	3.93	NA	NA
	C_total	9.02	9.04	NA	TBD
WP#	C_comp	8.55	9.75	NA	NA
	C package	2.00	2.00	NA	NA
	C_total	10.55	11.75	NA	TBD
RESET	C_comp	1.10	1.15	NA	NA
	C package	2.01	2.01	NA	NA
	C_total	3.11	3.16	NA	TBD

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3. ☐ If slew rate specifications (rise/fall slew) are available from the datasheet, complete HSpice simulations to generate slew rate data and provide a comparison table.

   N/A

4. ☐ Compare ODT data with datasheet.

   N/A

Measurement Correlation

1. ☐ For Output or I/O models compare measured IOH/IOL data with IBIS pullup/pulldown data. If the measurement conditions are different than the IBIS conditions, run HSpice simulations using the same measurement conditions such as VCC, temperature, and process. Include measurement conditions in the pullup/pulldown images.

   N/A

2. ☐ Compare C_comp with measured C_comp. Provide C_comp comparison table for all models and for all package combinations (i.e x4, x8 and x16).

   N/A

3. ☐ If measured clamp current data is available provide an IBIS and measurement comparison for all models.

   N/A

4. ☐ If slew rate data (rise/fall slew) is available from measurements, complete HSpice simulations to generate slew rate data and provide a comparison table.

   N/A

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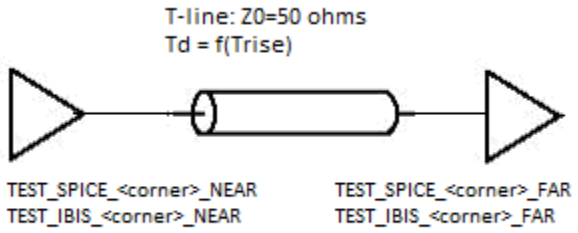
IBIS vs HSPICE Correlation

1. ☒ For all Output or I/O models, run HSpice transient simulations using encrypted netlists and the IBIS model (b-element).
   a. ☒ Use the setup and node naming conventions shown below for the IBIS and HSpice deck file (.sp file). Update the setup diagram if it is different. Indicate the version of HSPICE simulator used for simulations: **Mentor Graphics ELDO 2010.1 (64 bits)**
   b. ☒ Run simulations for all corners cases and at maximum allowable speed grade

Setup



Used test load circuit (DQ0, DQ1/OUT, DQ3/HOLD):

Td = 170p
Cload = 2.30pF

Used test load circuit (DQ2/WP):

Td = 350p
Cload = 45pF, 40pF, 30pF, 20pF, 15pF, 10pF
(variable with the drive strength: from 10pF for 90 ohm to 45pF for 15 ohm)

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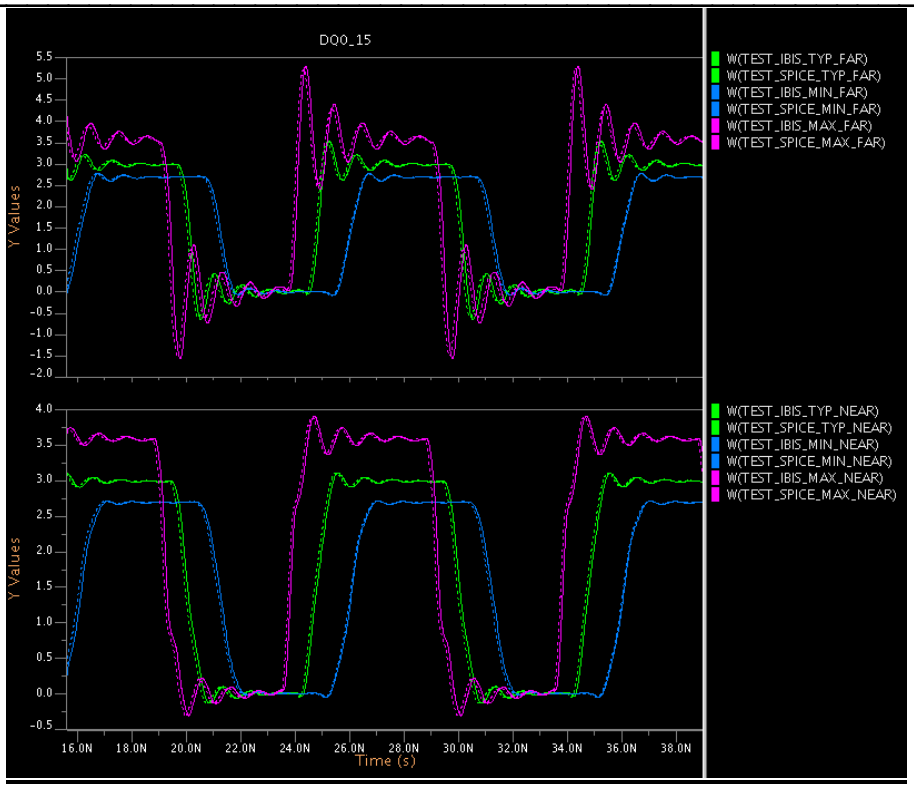

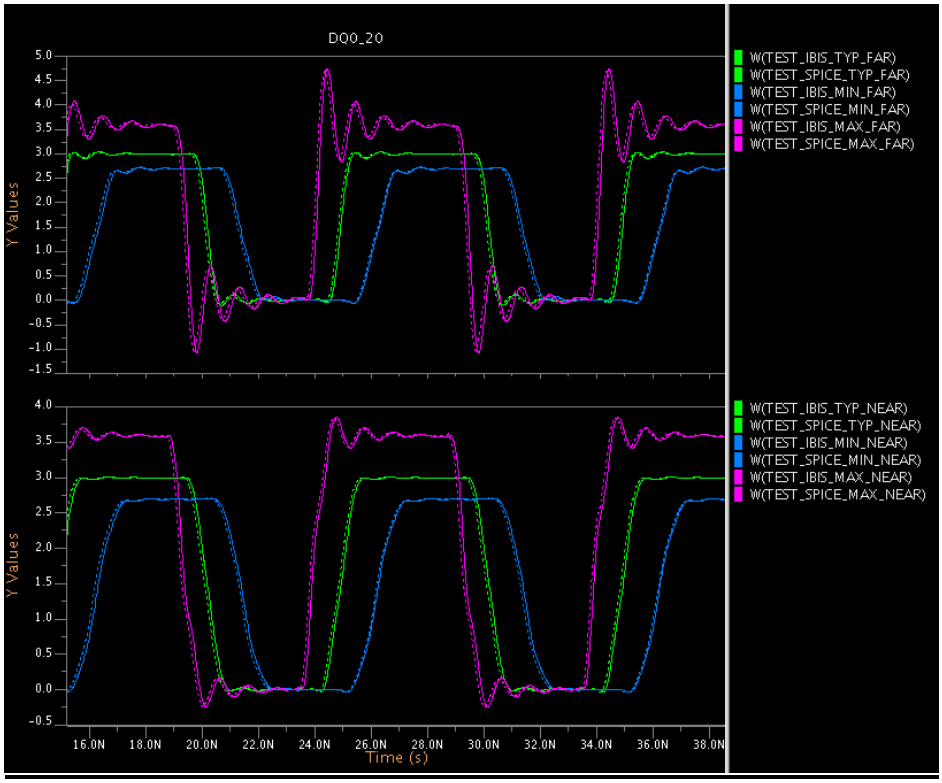

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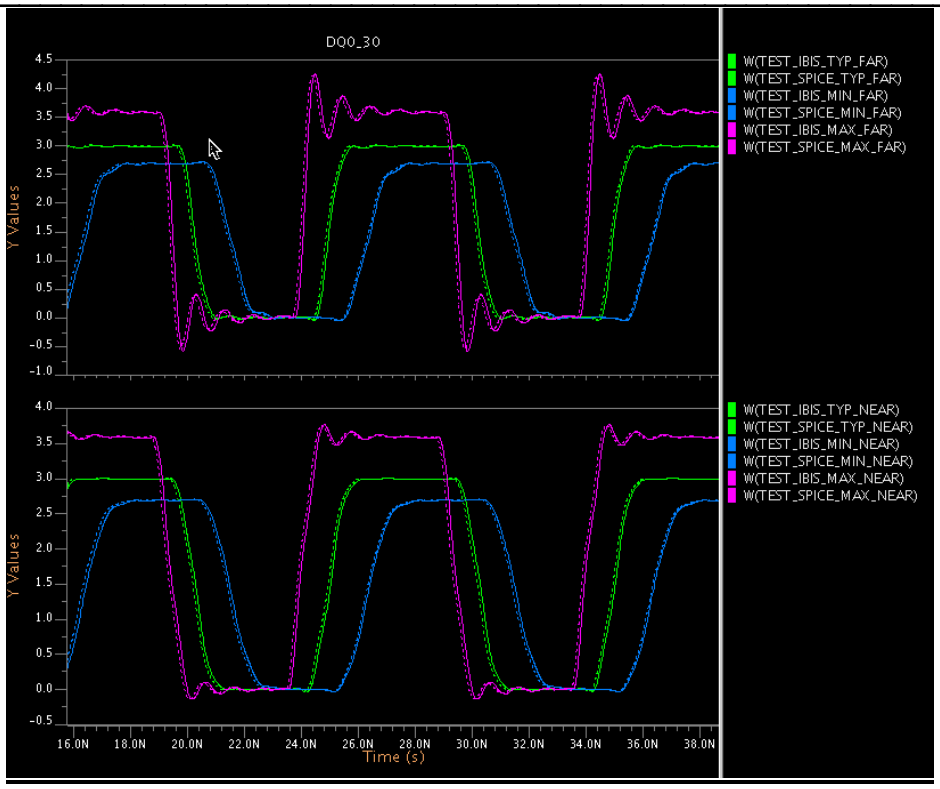

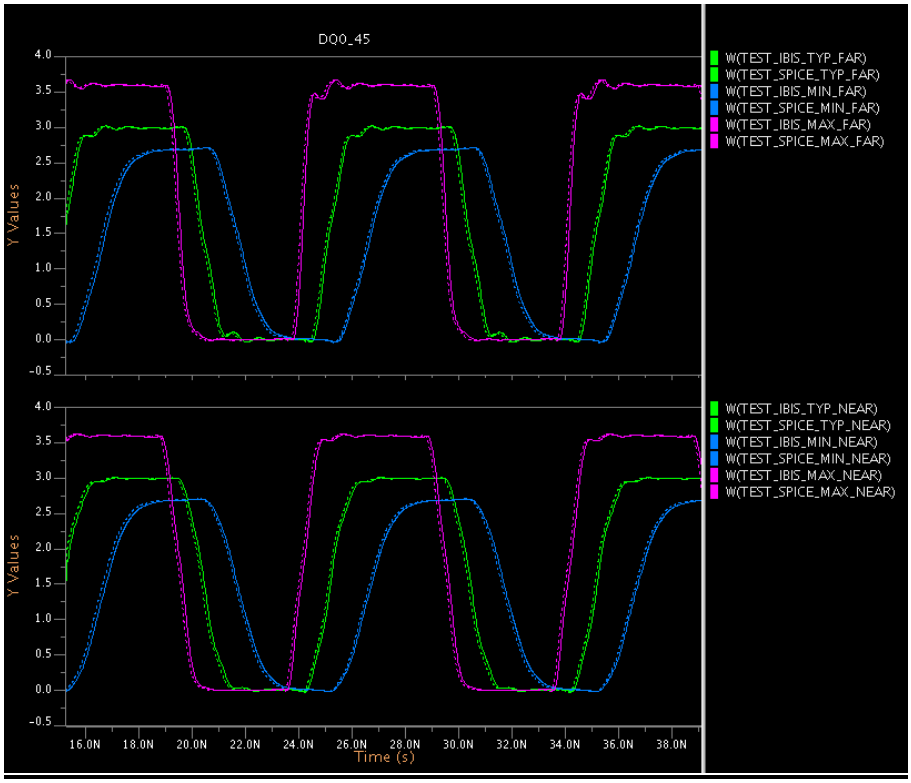

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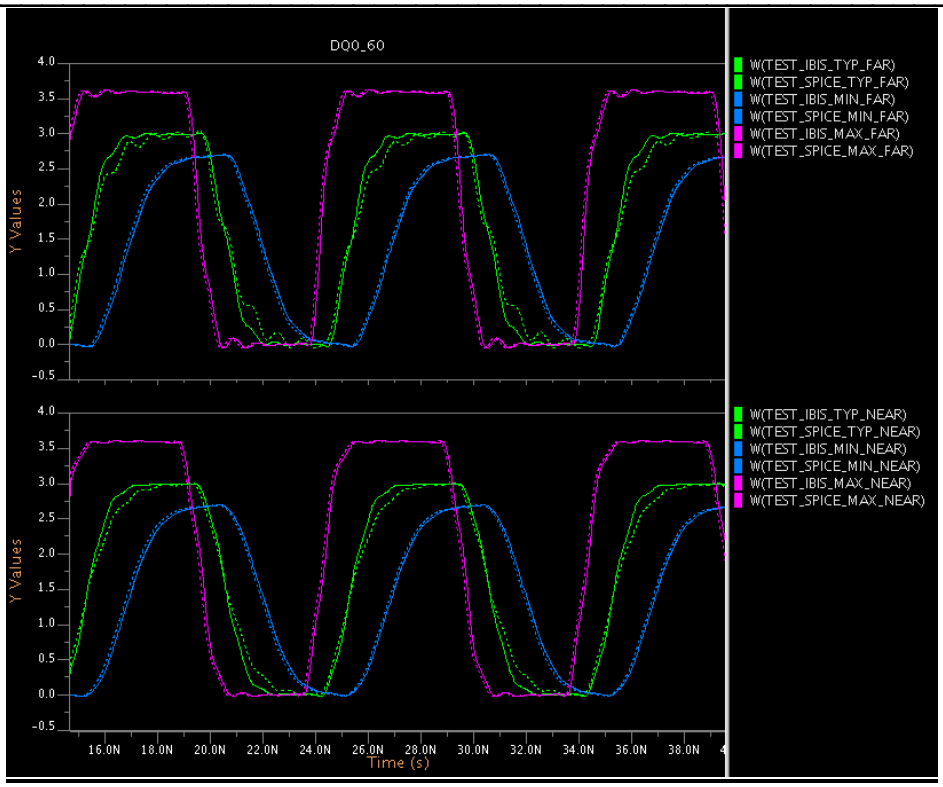

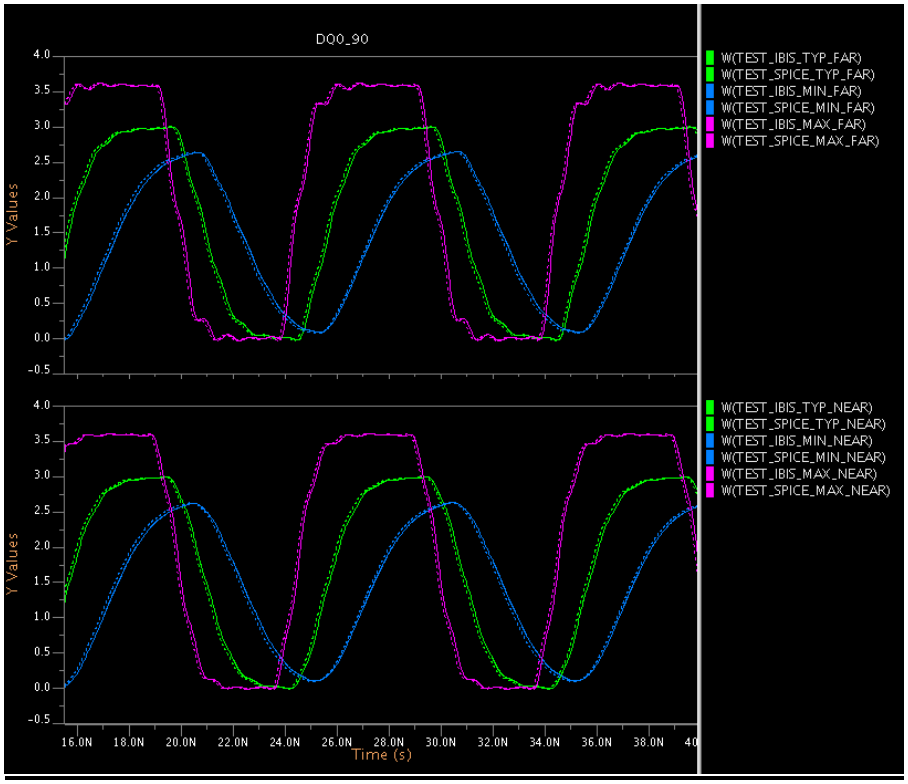

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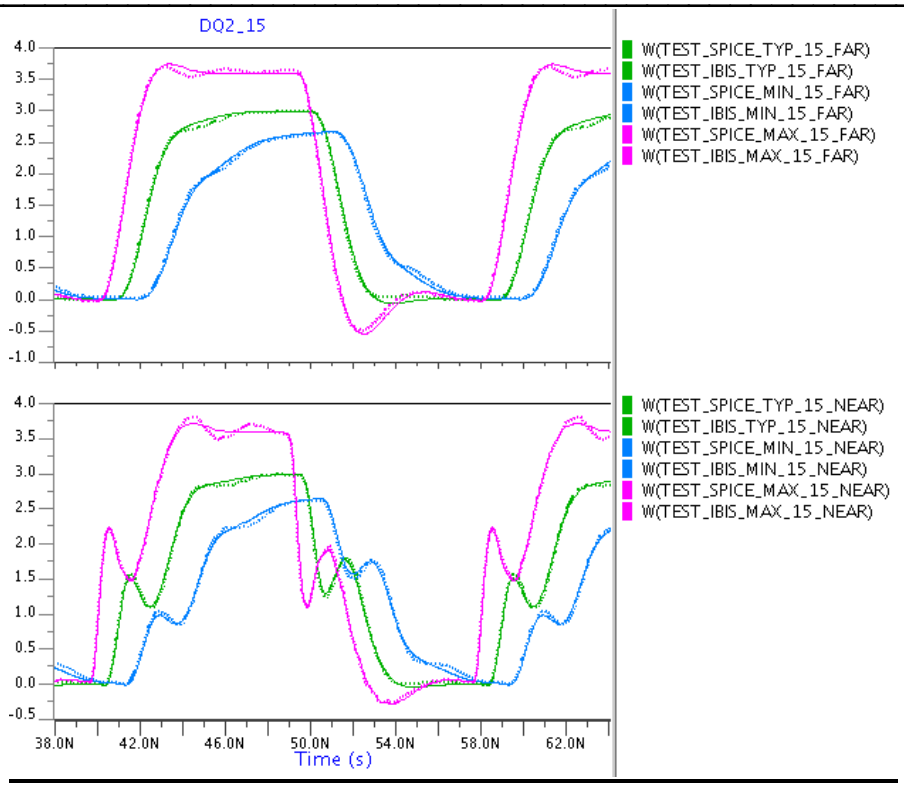

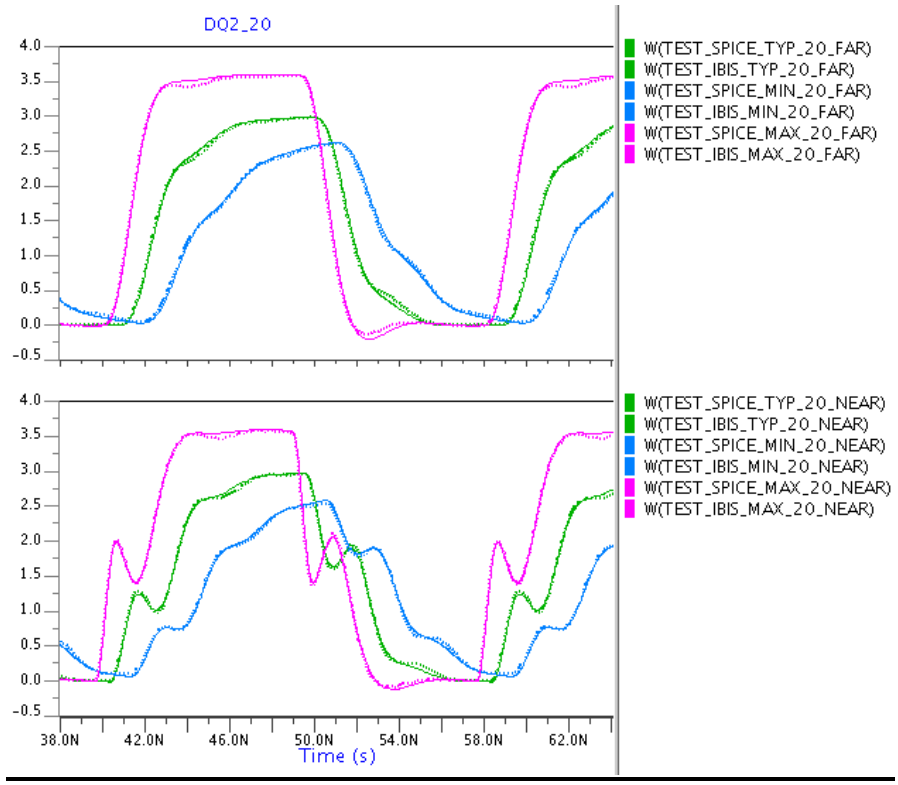

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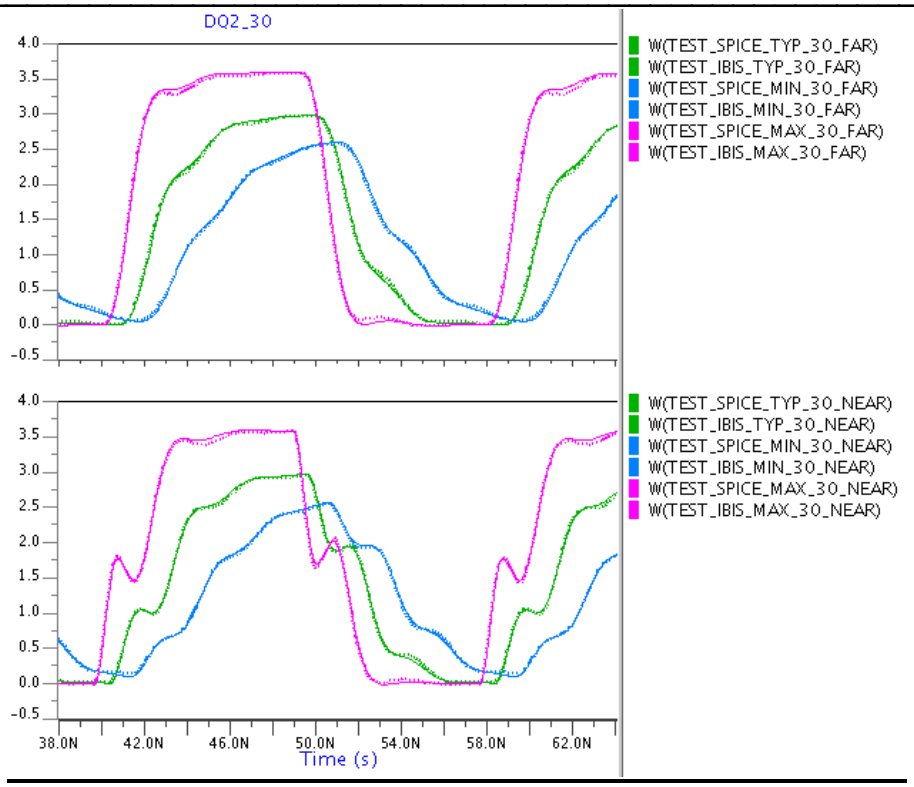

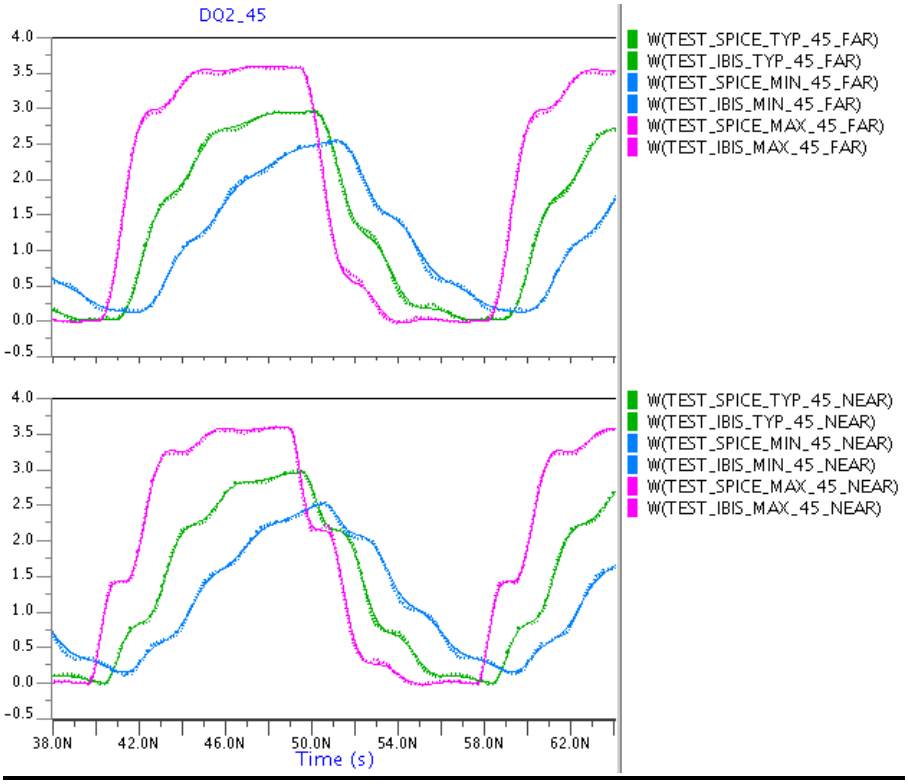

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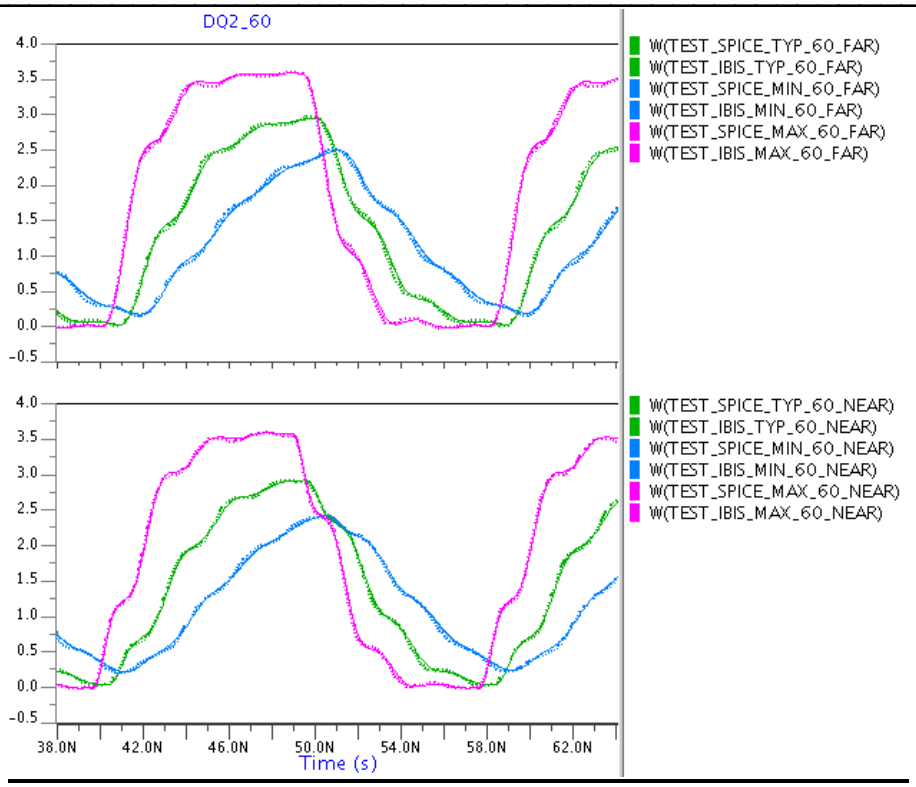

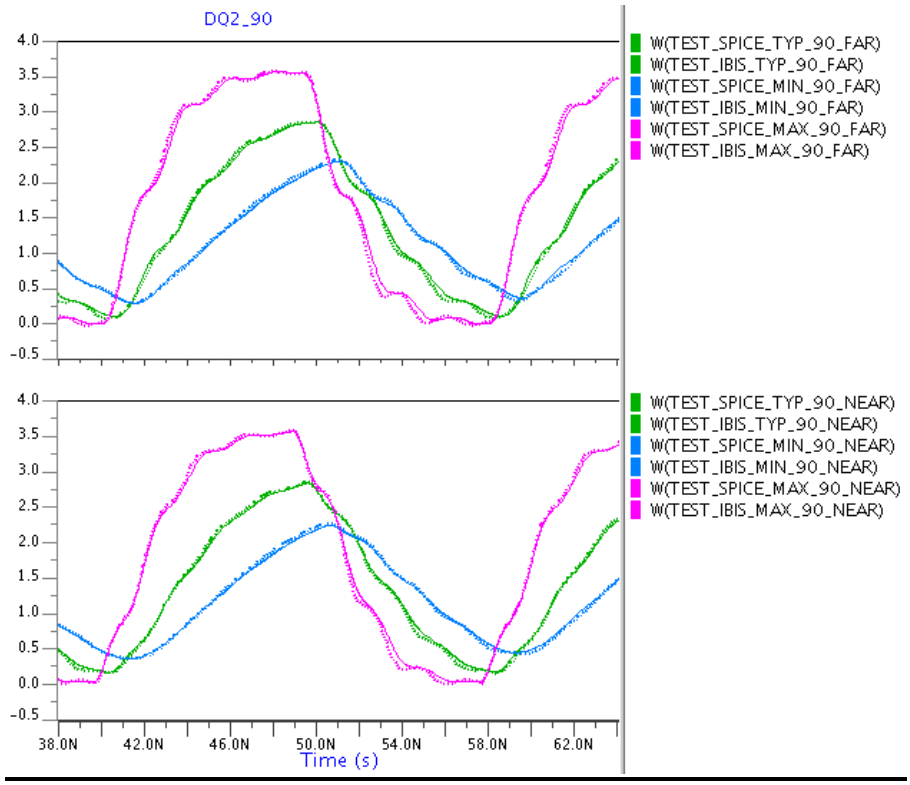

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Comments:

IBIS vs SPICE correlation waveforms for DQ1 and HOLD/DQ3 buffers have been omitted because very similar to the DQ0 ones

Document Revision History

Rev **1.0** - Date **November 26, 2013**

a. IBIS revision **1.3**
b. Spice revision **N/A**

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