Design ID: various (see the comments within the IBIS file header)

Description: eMMC with Phison PS8226 eMMC 5.1 microcontroller

Marketing device name(s): various (see the comments within the IBIS file header)

Valid speed grades: 200 MHZ DDR @1.8V / 52 MHz DDR @3.3V

Zip filename: ibis_emmc_ps8226_embedded_aat.zip

IBIS filename: emmc_ps8226_embedded_aat.ibs

File rev: 1.3 and later

Date: August 1, 2019

Datasheet Link (from micron.com): please refer to micron.com

E-mail modelsupport@micron.com for questions regarding Quality Report.

Device Parameters

VDDQ (1.8V) **Slow:** 1.7 **Typical:** 1.8 **Fast:** 1.95

VDDQ (3.3V) **Slow:** 2.7 **Typical:** 3.3 **Fast:** 3.6

Junction Temperature (Wireless) **Slow:** 100 **Typical:** 50 **Fast:** -25

Junction Temperature (Industrial) **Slow:** 100 **Typical:** 50 **Fast:** -40

Junction Temperature (Automotive) **Slow:** 120 **Typical:** 50 **Fast:** -40

VDDQ/VSSQ Decoupling Capacitance (Approximate value at 10MHz) – Full Die: 1460pF

VDDQ/VSSQ Decoupling Capacitance ESR – Full Die: 0.20 Ohm

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.ibis.org/quality_wip/checklist.html.

   Overall IBIS Quality Level: 3S

   Exceptions: NO

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

   Filename: emm_ps8226_ibis_quality_checklist.xlsx

IBIS Model Correlation: datasheet

1. ☒ Compare C_comp with datasheet Input Capacitance. Provide C_comp comparison table for all models and for all package combinations (i.e. x4, x8 and x16).

Component name: **MTFCxxxAMAL_153b**

Signal	IBIS pkg min [pF]	IBIS pkg max [pF]	IBIS die min [pF]	IBIS die max [pF]	IBIS tot min [pF]	IBIS tot max [pF]	Spec tot min [pF]	Spec tot max [pF]
CLK	0.944	0.944	2.8	3.15	**3.744**	**4.094**	**NA**	**6.00**
CMD	0.977	0.977	2.8	3.15	**3.777**	**4.127**	**NA**	**6.00**
DAT	1.468	1.706	2.8	3.15	**4.268**	**4.856**	**NA**	**6.00**
DS	1.217	1.217	2.8	3.15	**4.017**	**4.367**	**NA**	**6.00**
RST_n	1.101	1.101	2.8	3.15	**3.901**	**4.251**	**NA**	**6.00**

Component name: **MTFCxxxAPAL_153b**

Signal	IBIS pkg min [pF]	IBIS pkg max [pF]	IBIS die min [pF]	IBIS die max [pF]	IBIS tot min [pF]	IBIS tot max [pF]	Spec tot min [pF]	Spec tot max [pF]
CLK	1.271	1.271	2.8	3.15	**4.071**	**4.421**	**NA**	**6.00**
CMD	1.263	1.263	2.8	3.15	**4.063**	**4.413**	**NA**	**6.00**
DAT	1.556	1.827	2.8	3.15	**4.356**	**4.977**	**NA**	**6.00**
DS	1.574	1.574	2.8	3.15	**4.374**	**4.724**	**NA**	**6.00**
RST_n	1.804	1.804	2.8	3.15	**4.604**	**4.954**	**NA**	**6.00**

Component name: **MTFCxxxAPAL_100b**

Signal	IBIS pkg min [pF]	IBIS pkg max [pF]	IBIS die min [pF]	IBIS die max [pF]	IBIS tot min [pF]	IBIS tot max [pF]	Spec tot min [pF]	Spec tot max [pF]
CLK	2.384	2.384	2.8	3.15	5.184	5.534	**NA**	**6.00**
CMD	2.342	2.342	2.8	3.15	5.142	5.492	**NA**	**6.00**
DAT	2.221	2.792	2.8	3.15	5.021	5.942	**NA**	**6.00**
DS	1.968	1.968	2.8	3.15	4.768	5.118	**NA**	**6.00**
RST_n	2.163	2.163	2.8	3.15	4.963	5.313	**NA**	**6.00**

Component name: **MTFCxxxAMAL_100b**

Signal	IBIS pkg min [pF]	IBIS pkg max [pF]	IBIS die min [pF]	IBIS die max [pF]	IBIS tot min [pF]	IBIS tot max [pF]	Spec tot min [pF]	Spec tot max [pF]
CLK	1.691	1.691	2.8	3.15	**4.491**	**4.841**	**NA**	**6.00**
CMD	1.665	1.665	2.8	3.15	**4.465**	**4.815**	**NA**	**6.00**
DAT	1.491	2.103	2.8	3.15	**4.291**	**5.253**	**NA**	**6.00**
DS	1.312	1.312	2.8	3.15	**4.112**	**4.462**	**NA**	**6.00**
RST_n	1.500	1.500	2.8	3.15	**4.3**	**4.65**	**NA**	**6.00**

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

Model	IBIS slew rate RISE [V/ns] min	IBIS slew rate RISE [V/ns] typ	IBIS slew rate RISE [V/ns] max	SPEC slew rate RISE [V/ns] min	SPEC slew rate RISE [V/ns] max
DAT 50 ohm 1.8V	1.49	2.11	3.34	1.125	
DAT 40 ohm 1.8V	1.79	2.57	4.12	1.125	

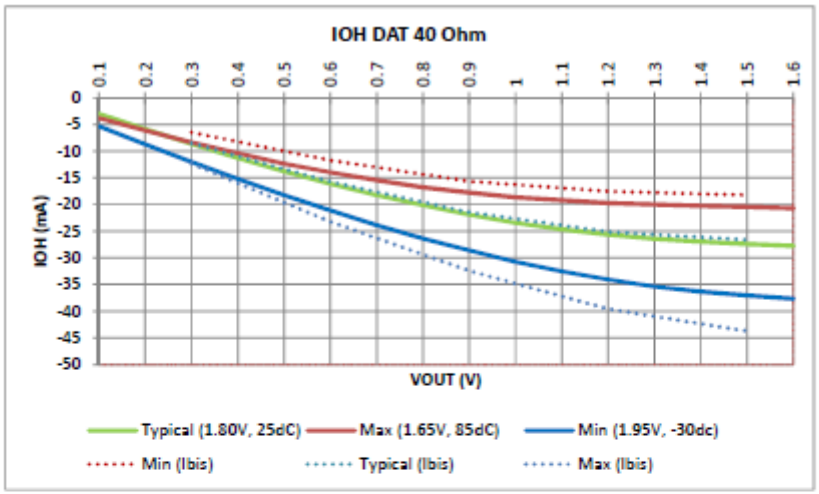
Model	IBIS slew rate FALL [V/ns] min	IBIS slew rate FALL [V/ns] typ	IBIS slew rate FALL [V/ns] max	SPEC slew rate FALL [V/ns] min	SPEC slew rate FALL [V/ns] max
DAT 50 ohm 1.8V	1.38	2.04	3.38	1.125	
DAT 40 ohm 1.8V	1.66	2.47	4.15	1.125	

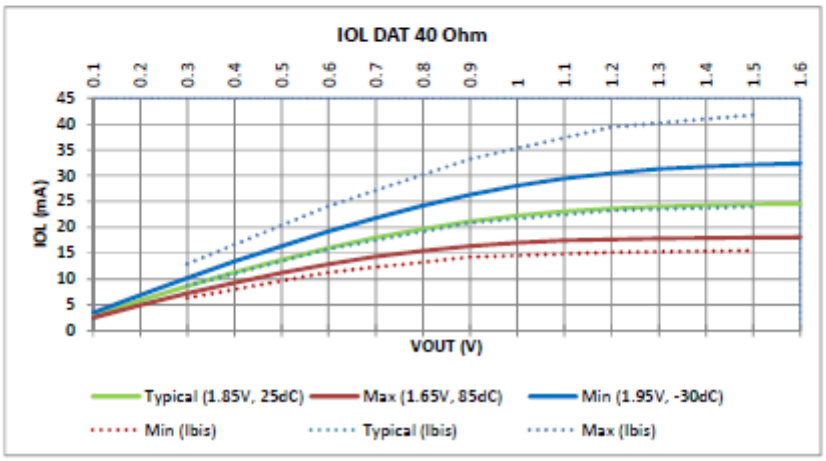
IBIS Model Correlation: measurements

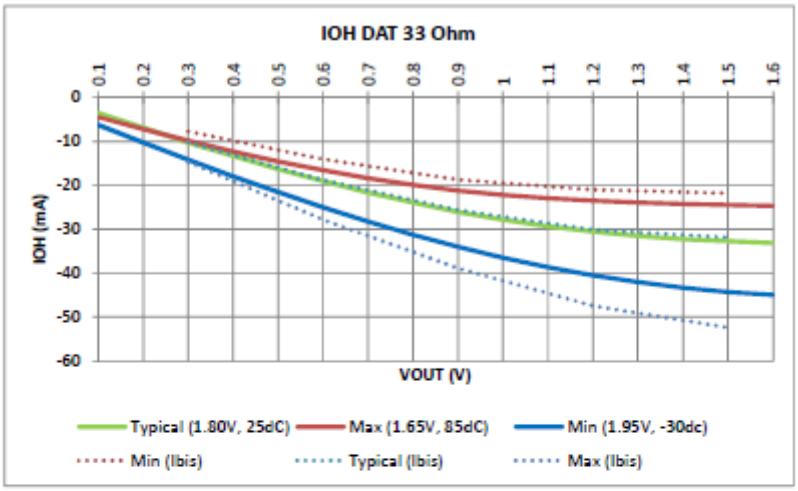
1. ☒ For Output or I/O models compare measured IOH/IOL data with IBIS pullup/pulldown data. If the measurement conditions are different from the IBIS conditions, run Spice simulations using the same measurement conditions such as VCC, temperature, and process. Include measurement conditions in the image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

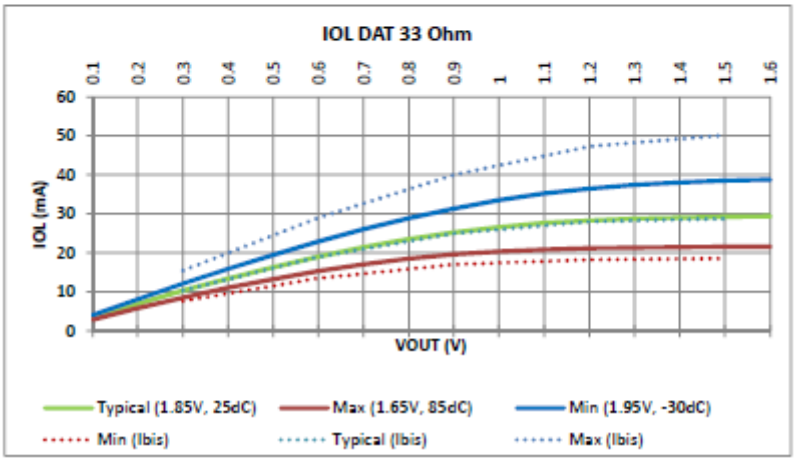
   i. Pullup/Pulldown comparison. Measurement conditions:
   VCCQ(min,typ,max) = 1.65 , 1.85 , 1.95
   Temp(min,typ,max) = -30 , 25 , 85

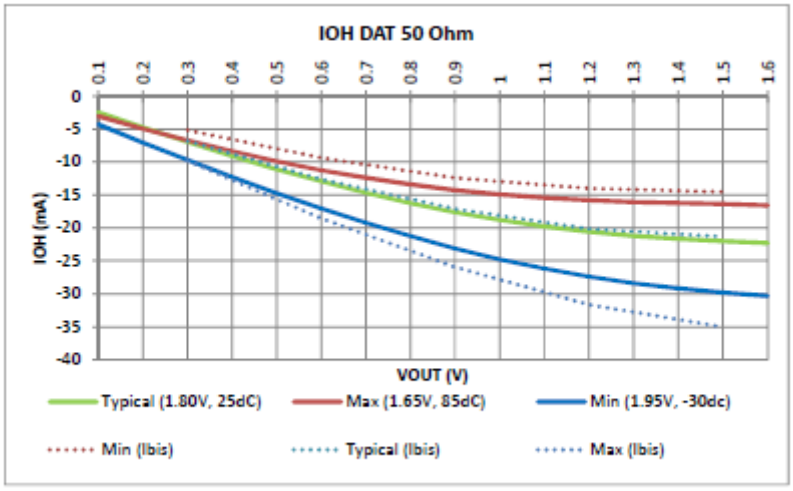
   ii. Pullup/Pulldown comparison. Simulation conditions:
   VCCQ(min,typ,max) = 1.7 , 1.8 , 1.95
   Temp(min,typ,max) = -25 , 35 , 85

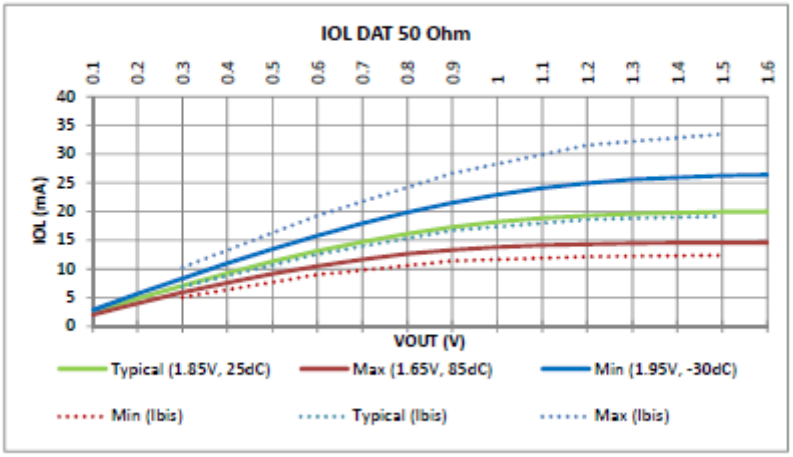


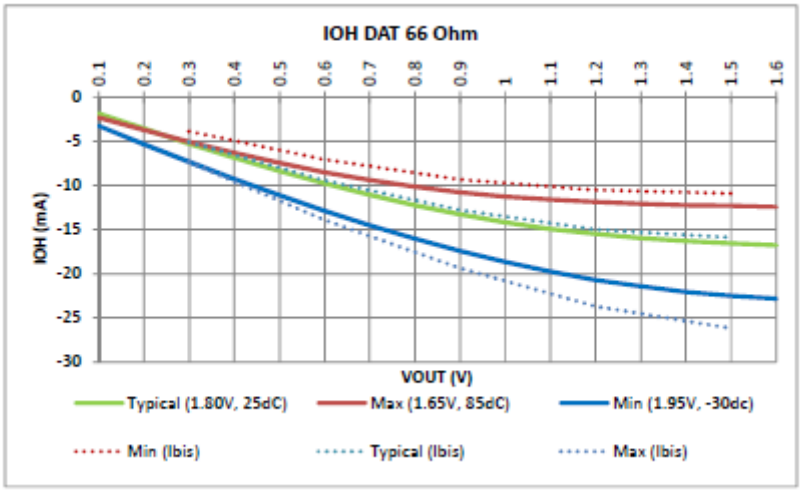


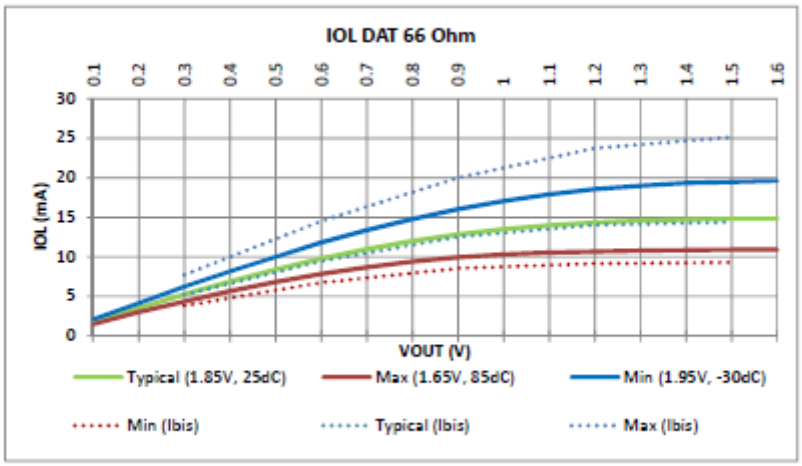








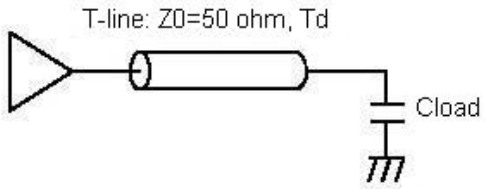




IBIS Model Correlation: IBIS vs Spice

1. ☒ For all Output or I/O models, run Spice 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 Spice files. Update the setup diagram if it is different. Indicate the version of Spice simulator used for simulations: **Cadence Spectre**
   b. ☒ Run simulations for all corners cases and at fastest speed grades, testing ODT models as loads when applicable

SETUP:



Td=30pS , Cload = 4pF
simulation frequency @1.8V = 250 Mbps
simulation frequency @3.3V = 104 Mbps

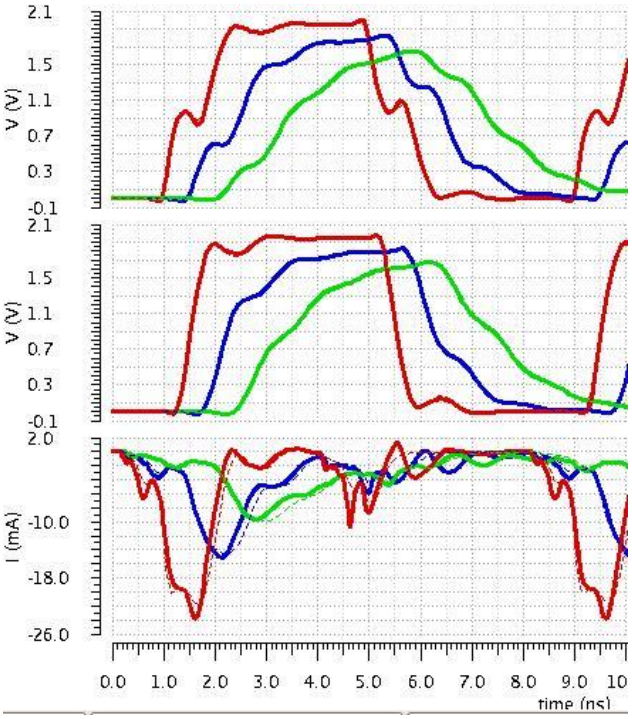
Solid lines=Spice, dashed lines=IBIS model

DAT_1v8_66_ohm

Voltage waveform of the near end

Voltage waveform of the far end

Current waveform of the power source

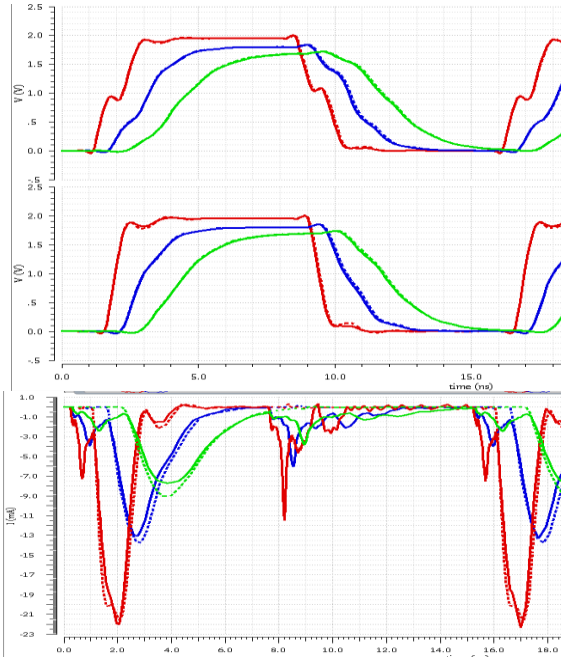


DAT_1v8_66_ohm_slow

Voltage waveform of the near end

Voltage waveform of the far end

Current waveform of the power source

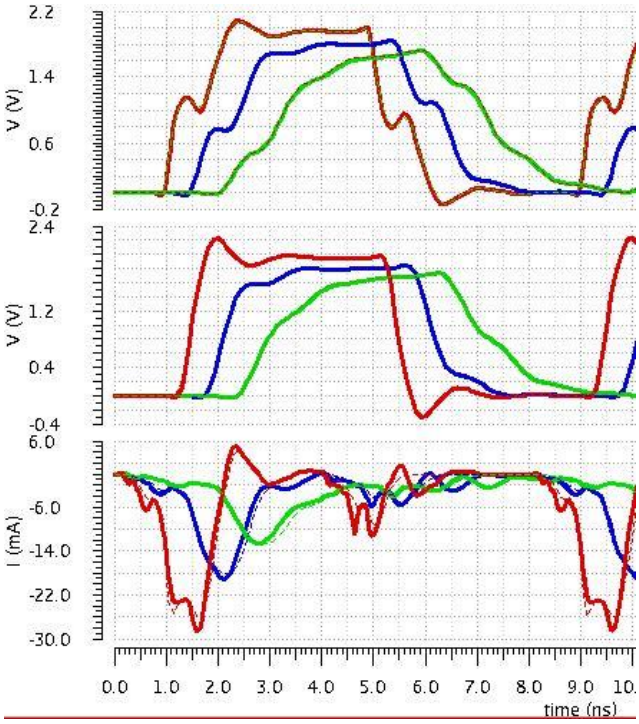


DAT_1v8_50_ohm

Voltage waveform of the near end

Voltage waveform of the far end

Current waveform of the power source

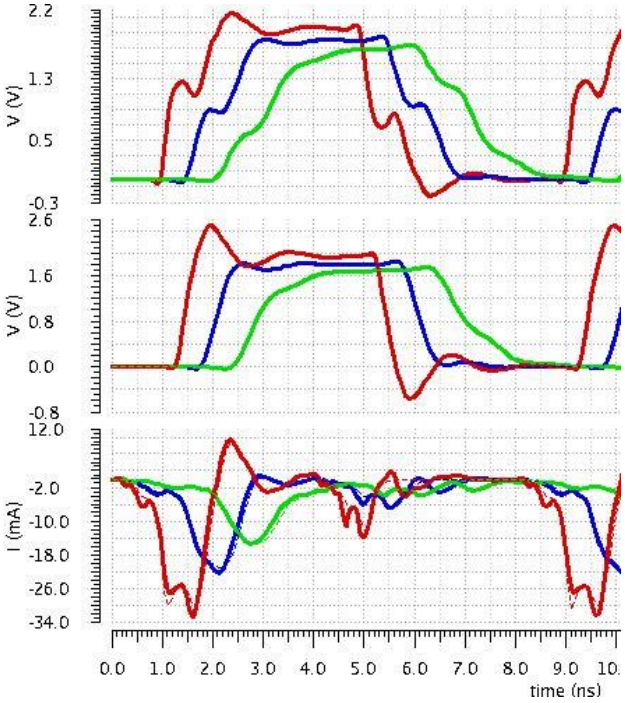


DAT_1v8_40_ohm

Voltage waveform of the near end

Voltage waveform of the far end

Current waveform of the power source

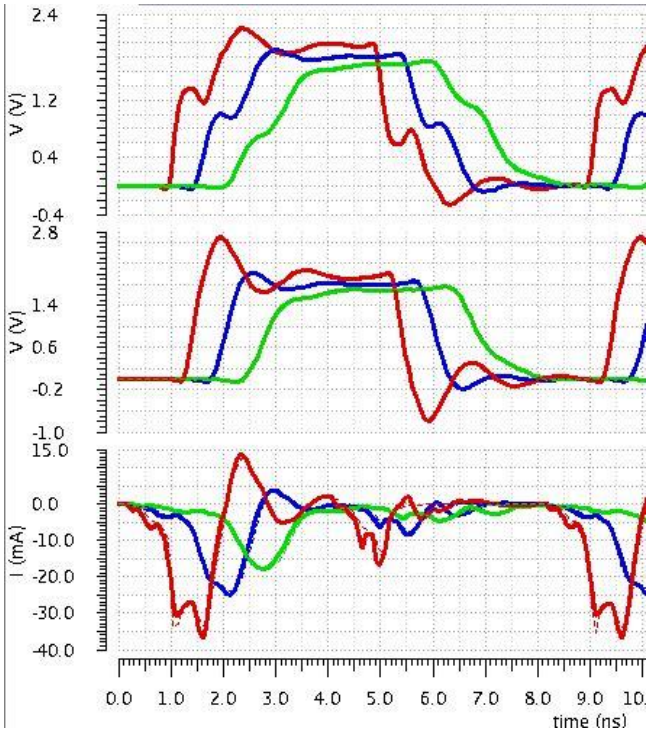


DAT_1v8_33_ohm

Voltage waveform of the near end

Voltage waveform of the far end

Current waveform of the power source

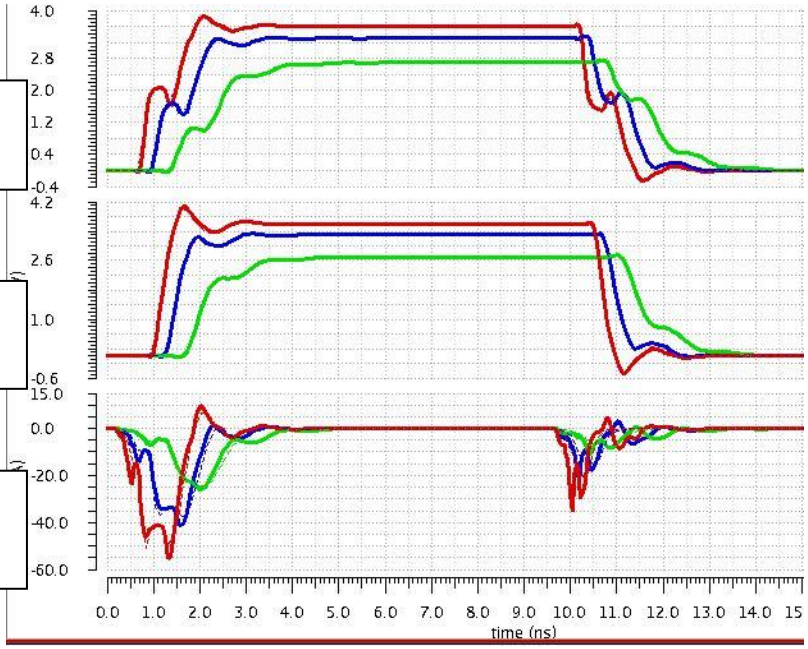


DAT_3v3_46_ohm

Voltage waveform of the near end

Voltage waveform of the far end

Current waveform of the power source



Comments

No comments.

Document Revision History

Rev **1.0** - Date **June 20, 2017**
a. IBIS revision **1.0**

Rev **1.1** - Date **January 8, 2018**
a. IBIS revision **1.1**

Rev **1.2** - Date **February 7, 2018**
a. IBIS revision **1.2**

Rev **1.3** - Date **August 1, 2019**
a. IBIS revision **1.3**

