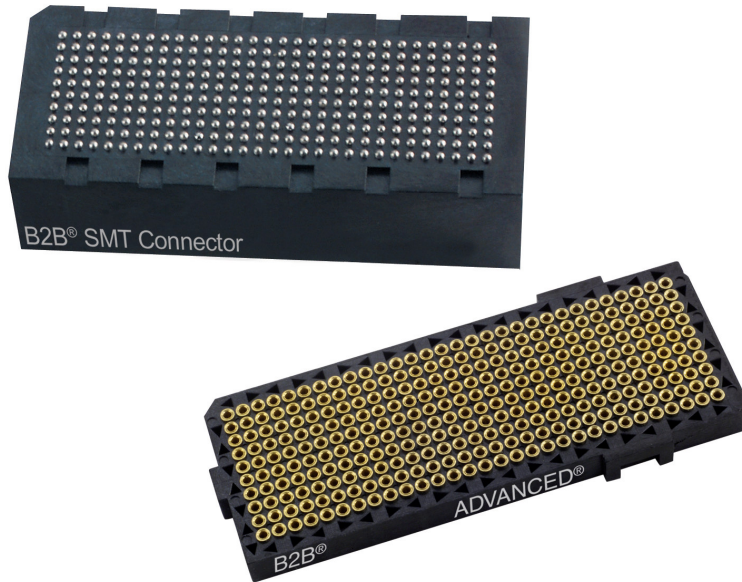




ADVANCED
INTERCONNECTIONS®



1.27mm Pitch
B2B® SMT Connector
19.05mm Mated Height

SIGNAL INTEGRITY
SIMULATION AND MODELING

Rev. 0

www.advanced.com

ISO
9001

Advanced Interconnections Corp.
5 Energy Way, West Warwick, RI 02893 USA
401.823.5200 • 800.424.9850 • Fax: 401.823.8723

Signal Integrity Data Reporting

At Advanced Interconnections Corporation, our Signal Integrity reporting method differs dramatically from the common industry practice of isolating the *aggressor* and *victim* terminals from each other by introducing dedicated ground terminals between them. We believe this method represents a theoretical, best-case, scenario that does not serve the needs of most systems engineers and circuit designers. An unrealistic number of connector terminals must be assigned to ground in order to achieve this scenario.

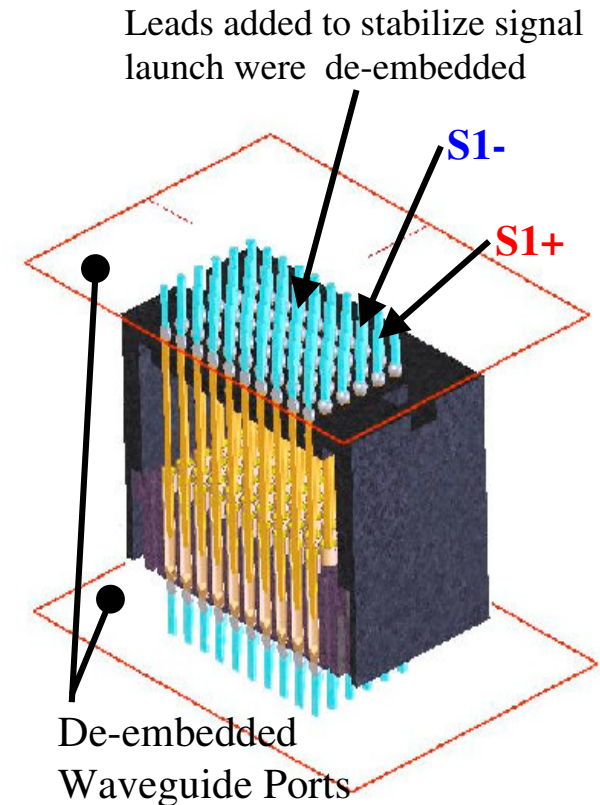
Our standard reporting practice is closely aligned with the decision-making processes of most systems engineers and circuit designers. The reported data addresses our customers I/O assignments (net-list) and helps them determine where to best run high-versus-low frequency signals through our connectors. As such, our reporting method represents a more practical net-list scenario. Utilizing our unbiased SPICE™ and IBIS™ files, system designers are able to create and/or debug their net-list quickly and accurately.

SI Test & Measurement Study

SI Test Setup

- The 19.05 mm B2B was measured from 50 MHz to 20.05 GHz.
- A pin-out of 3 rows and 4 columns was assigned from a 3x4 array:

GND	GND	GND	GND
S1+	S1-	S2+	S2-
GND	GND	GND	GND



SI Test & Measurement Study

Performance Results

- The test and measurement tasks were completed and the recommended Operational Bandwidth for the Socket Adapter System is as follows:
 - Differential: DC to 1.4 GHz @ -15dB and ~ 0.9 to 1.5 Gbit/sec.
 - Differential: DC to 2.2 GHz @ -10dB and ~ 1.4 to 2.4 Gbit/sec.
 - Single-ended: DC to 1.6 GHz @ -15dB and ~ 1.0 to 1.7 Gbit/sec.
 - Single-ended: DC to 2.5 GHz @ -10dB and ~ 1.6 to 2.7 Gbit/sec.

SI Test & Measurement Study

Performance Results – continued

	<i>Return Loss ($S_{\omega, \theta}$)</i>	<i>Insertion Loss ($S_{\phi, \beta}$)</i>	<i>Zo @ 100 psec (10-90%)</i>	<i>Zo @ 200 psec (10-90%)</i>
<i>Differential (Terminals S1+, S1-)</i>	<u>(S1,1)</u> -15.0dB @ 1.4 GHz -10.0dB @ 2.2 GHz	<u>(S2,1)</u> -0.2dB @ 1.4 GHz -0.6dB @ 2.2 GHz	86.0Ω	91.5Ω
<i>Single-ended (Terminals S1+)</i>	<u>(S1,1)</u> <u>-15.0dB @ 1.6 GHz</u> <u>-10.0dB @ 2.5 GHz</u>	<u>(S2,2)</u> <u>- 0.4dB @ 1.6 GHz</u> <u>- 1.0dB @ 2.5 GHz</u>	55.5Ω	53.0Ω
<i>Single-ended (Terminals S1-)</i>	<u>(S3,3)</u> <u>-15.0dB @ 1.6 GHz</u> <u>-10.0dB @ 2.4 GHz</u>	<u>(S4,4)</u> <u>-0.5dB @ 1.6 GHz</u> <u>-1.1dB @ 2.4 GHz</u>	48.5Ω	49.3Ω

SI Test & Measurement Study

Performance Results– continued

	<i>NeXT @ 100 psec (10-90%)</i>	<i>NeXT @ 200 psec (10-90%)</i>	<i>FeXT @ 100 psec (10-90%)</i>	<i>FeXT @ 200 psec (10-90%)</i>
<i>Differential (Terminals S1+, S1-)</i>	4.5%	3.5%	1.0%	0.9%
<i>Single-ended (Terminals S1-)</i>	12.3%	9.1%	1.0%	0.5%

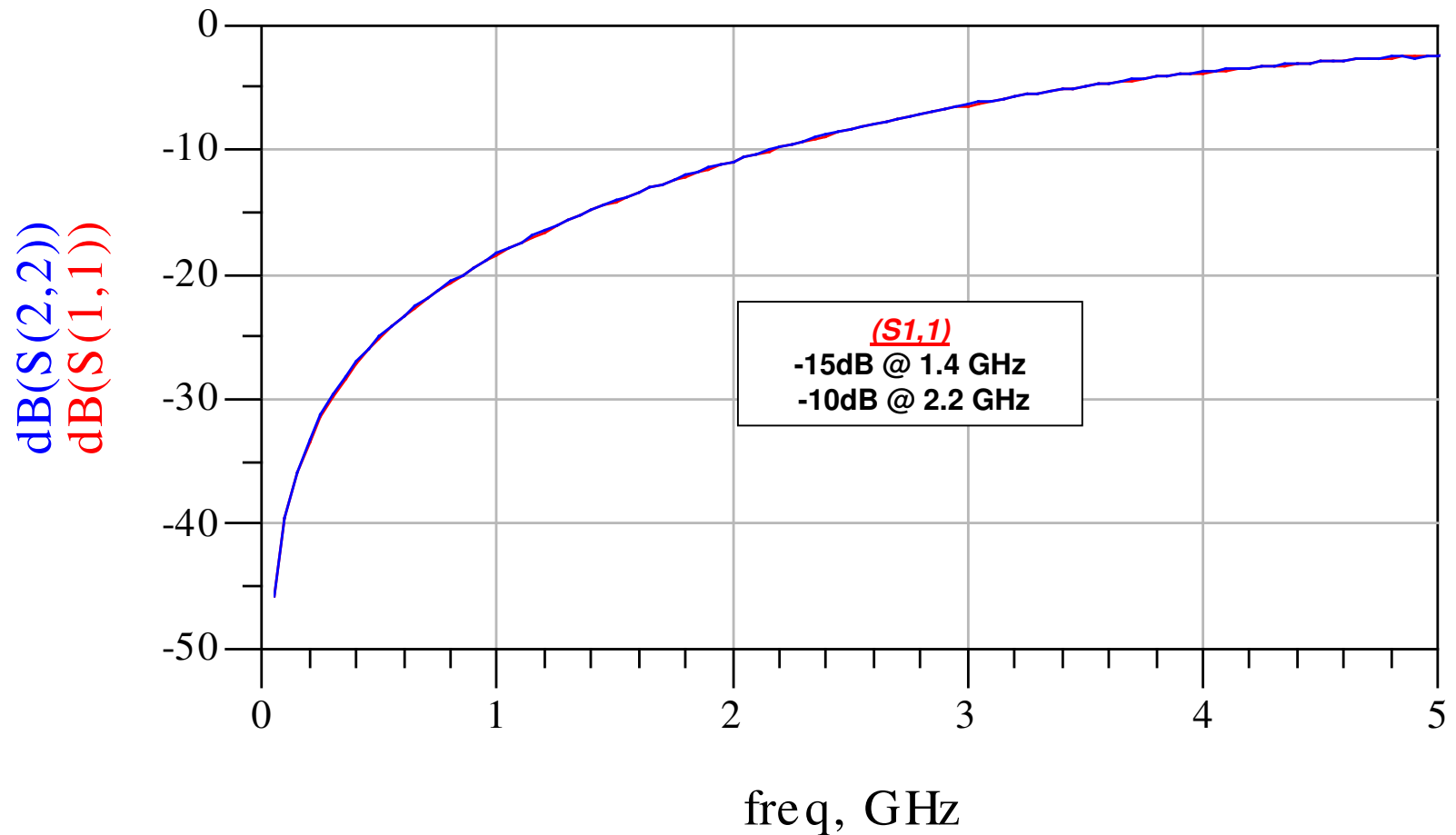
SI Test & Measurement Study

Performance Results– continued

	<i>Eye-Diagram @ 5 Gbit/sec</i>	<i>Eye-Diagram @ 5 Gbit/sec with 6 Gbit/sec Aggressor</i>
<i>Differential (Terminals S1+, S1-)</i>	Peak-to-Peak Jitter = 2 psec Eye-Closure = 6%	Peak-to-Peak Jitter = 4 psec Eye-Closure = 8%
<i>Single-ended (Terminals S1-)</i>	Peak-to-Peak Jitter = 2 psec Eye-Closure = 10%	Peak-to-Peak Jitter = 5 psec Eye-Closure = 12%

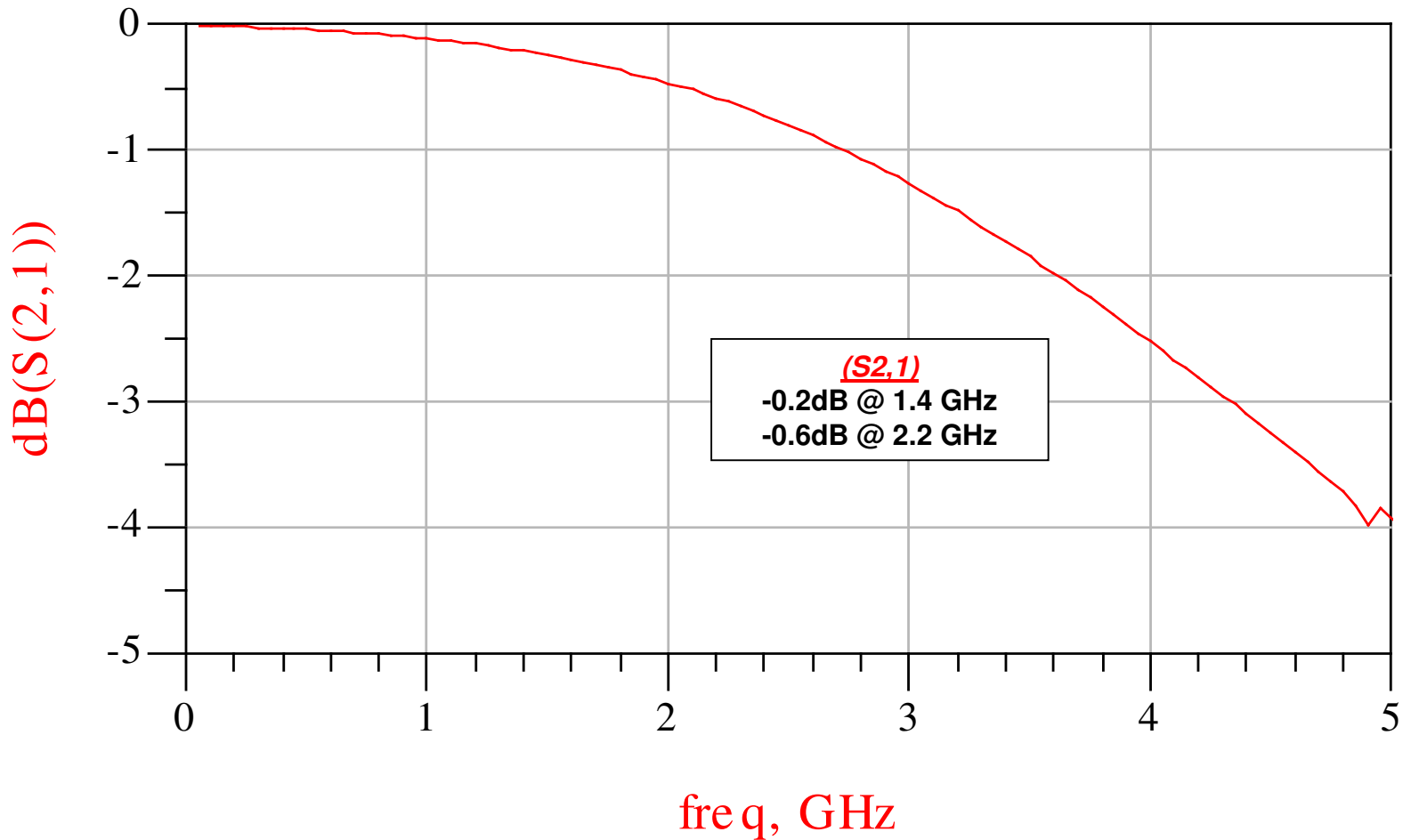
Differential Return Loss

Plot Range: DC to 5 GHz



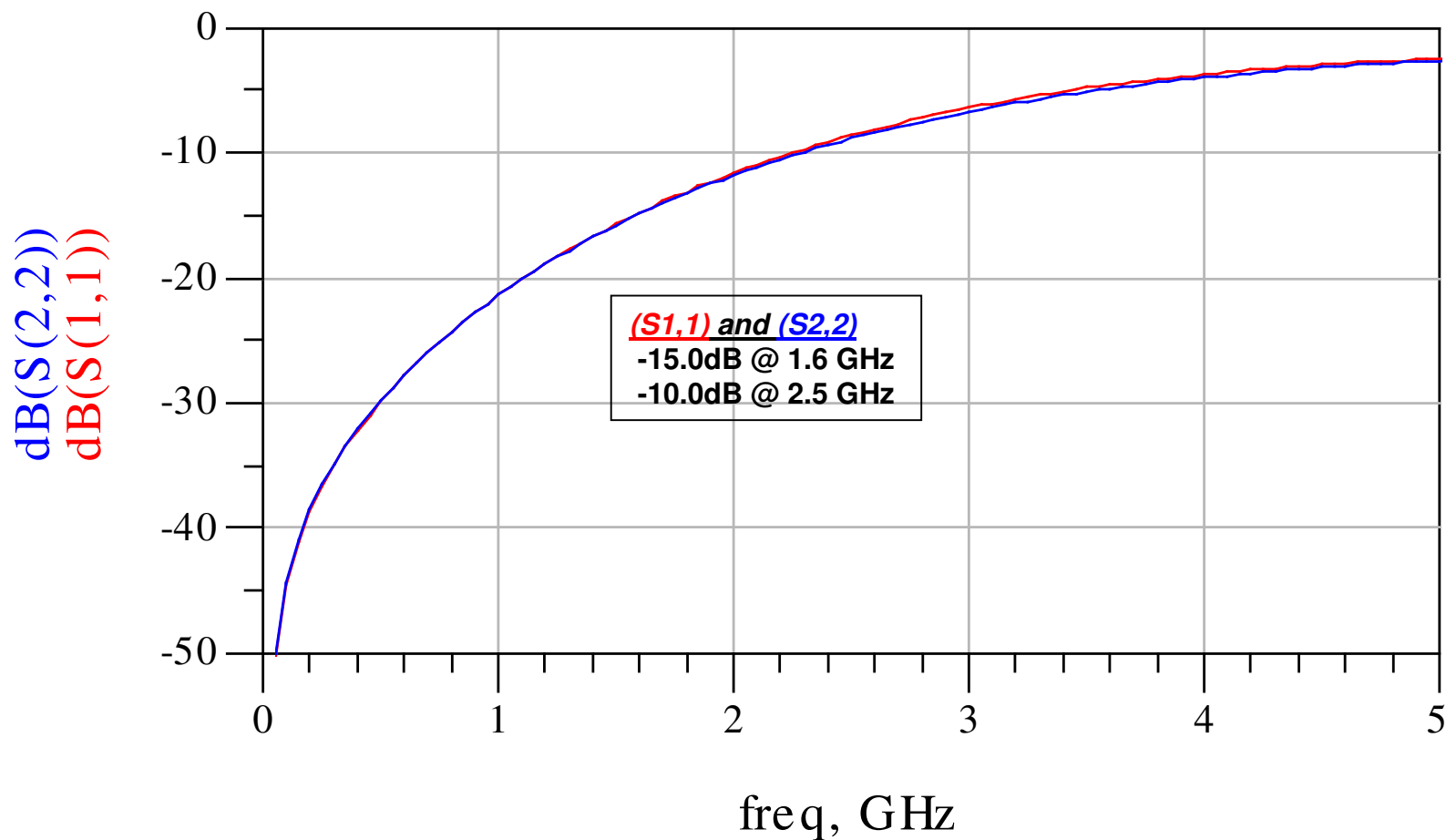
Differential Insertion Loss

Plot Range: DC to 5 GHz



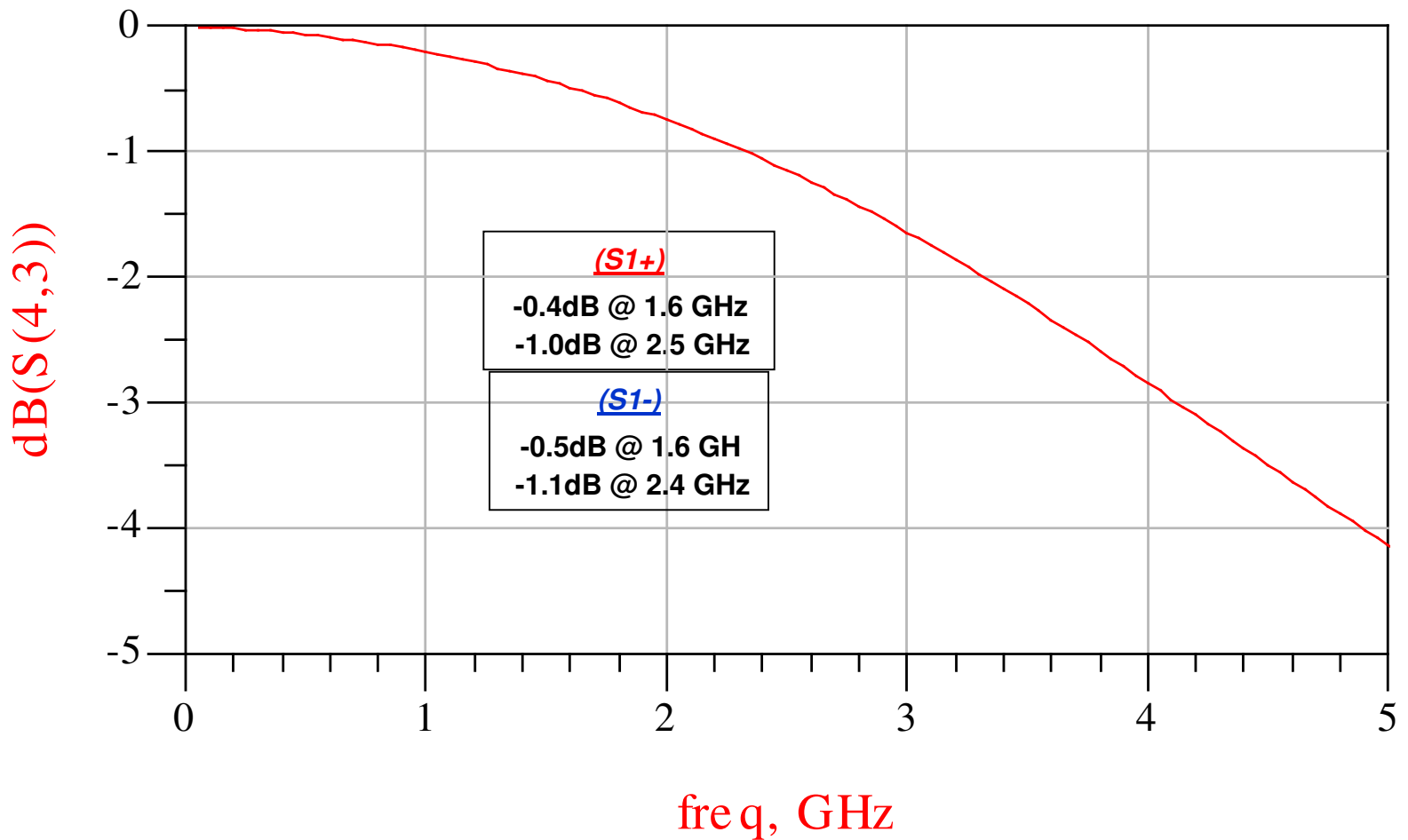
Single-ended Return Loss for S1+ & S1-

Plot Range: DC to 5 GHz



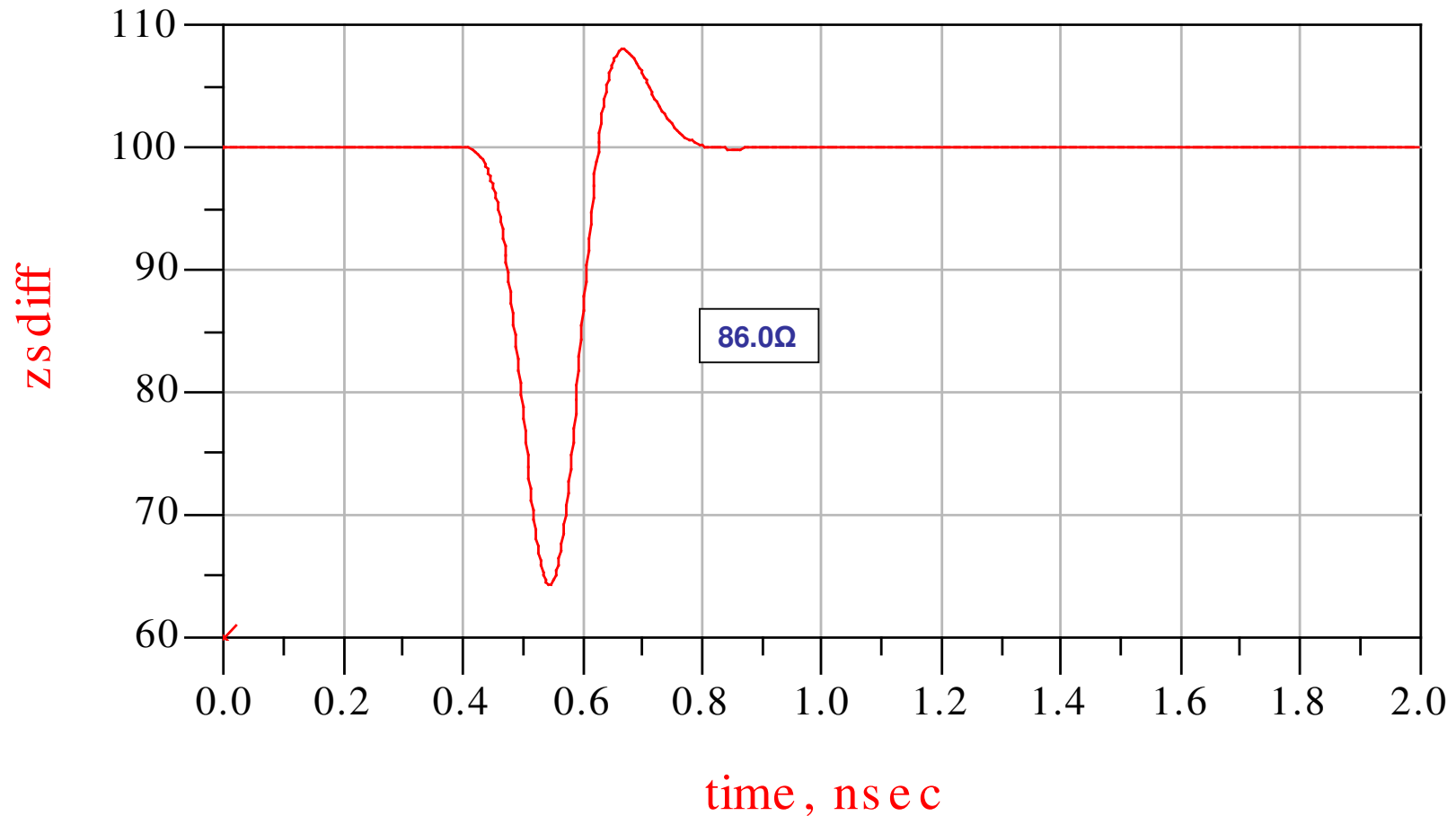
Single-ended Insertion Loss for S1+ & S1-

Plot Range: DC to 5 GHz



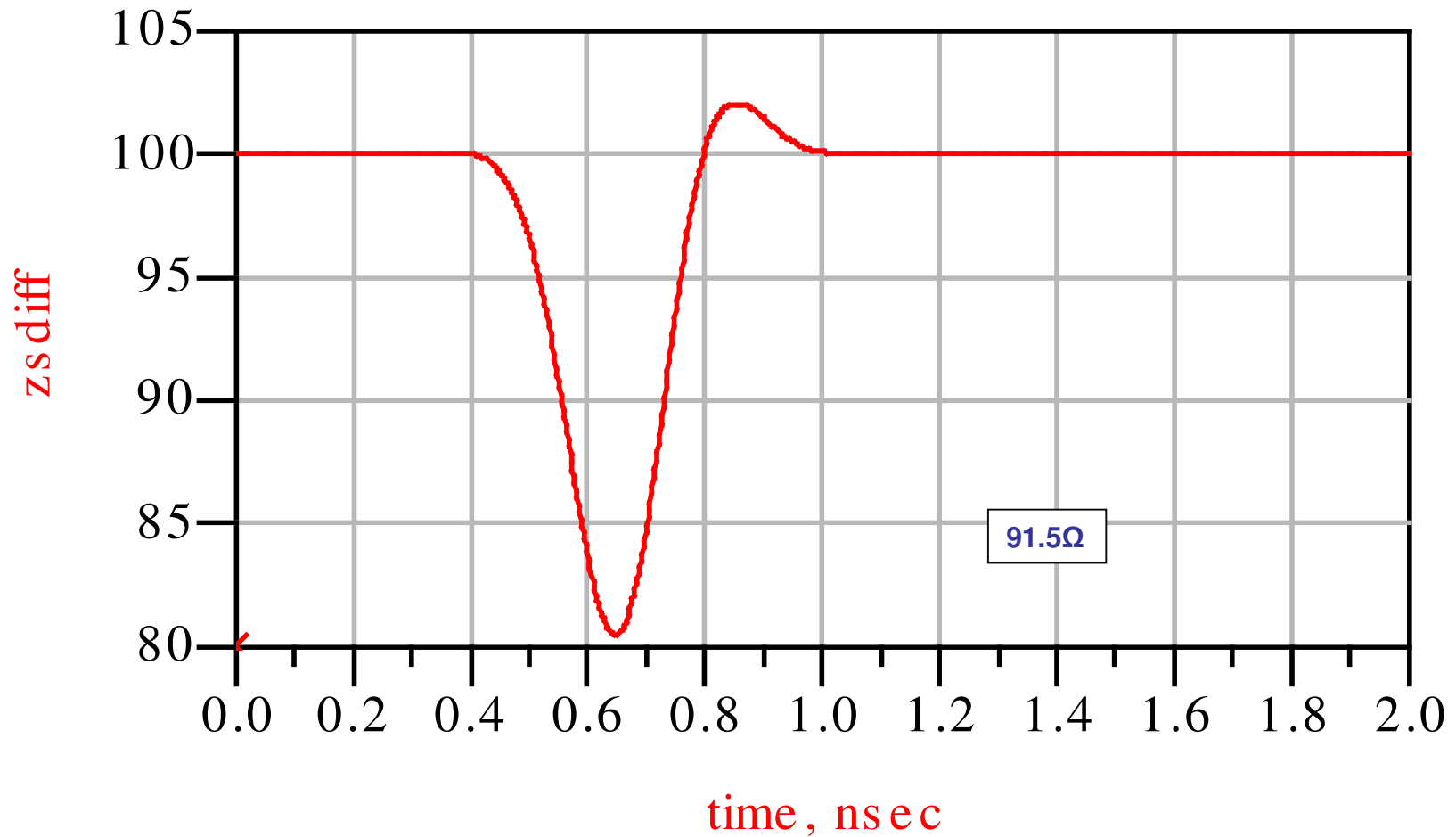
Differential Impedance Profile

100ps risetime (10-90%)



Differential Impedance Profile

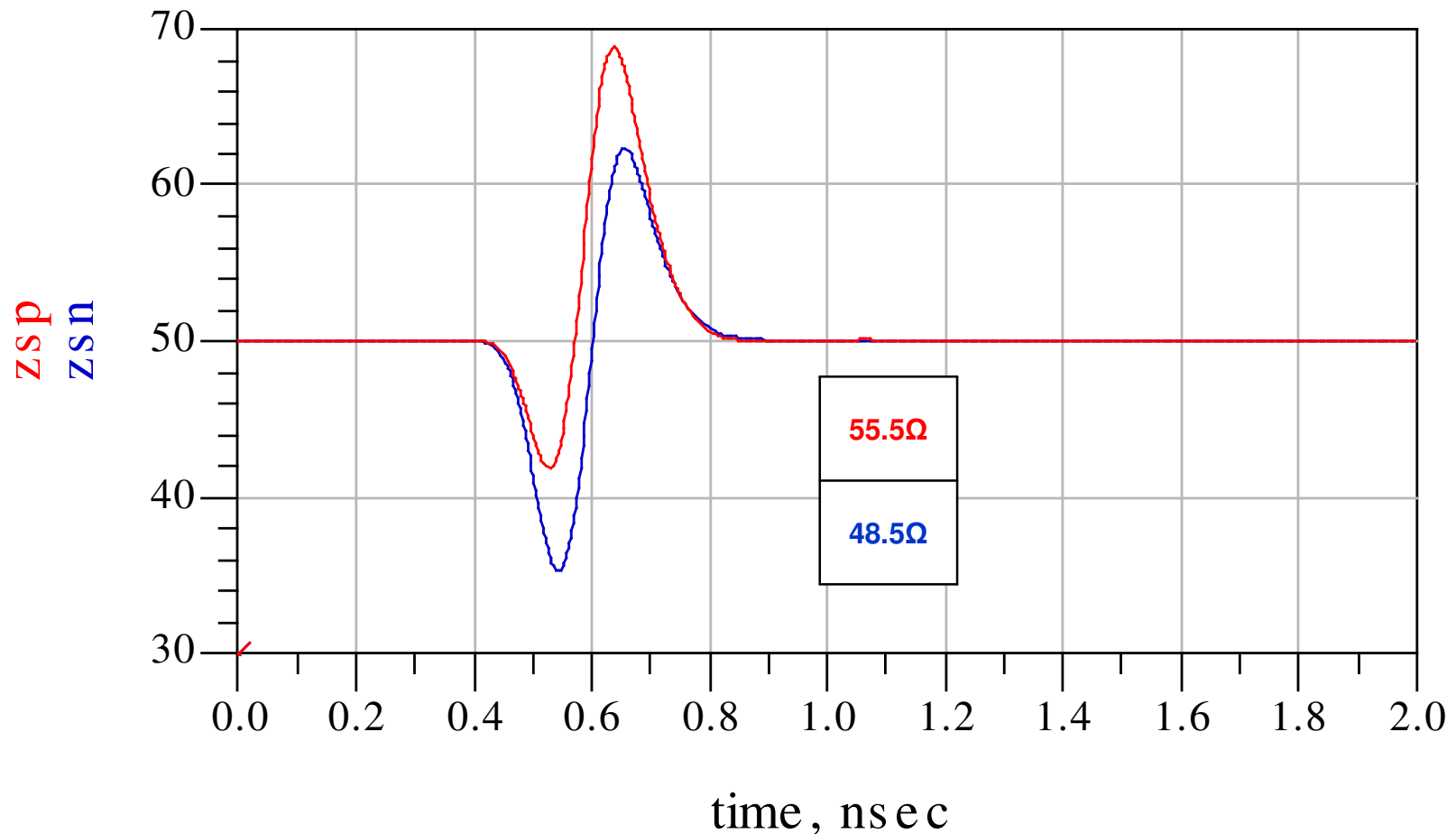
200ps risetime (10-90%)



Single-ended Impedance Profile for S1+ & S1-

Simultaneous Plots at **100 psec** risetime (10-90%)

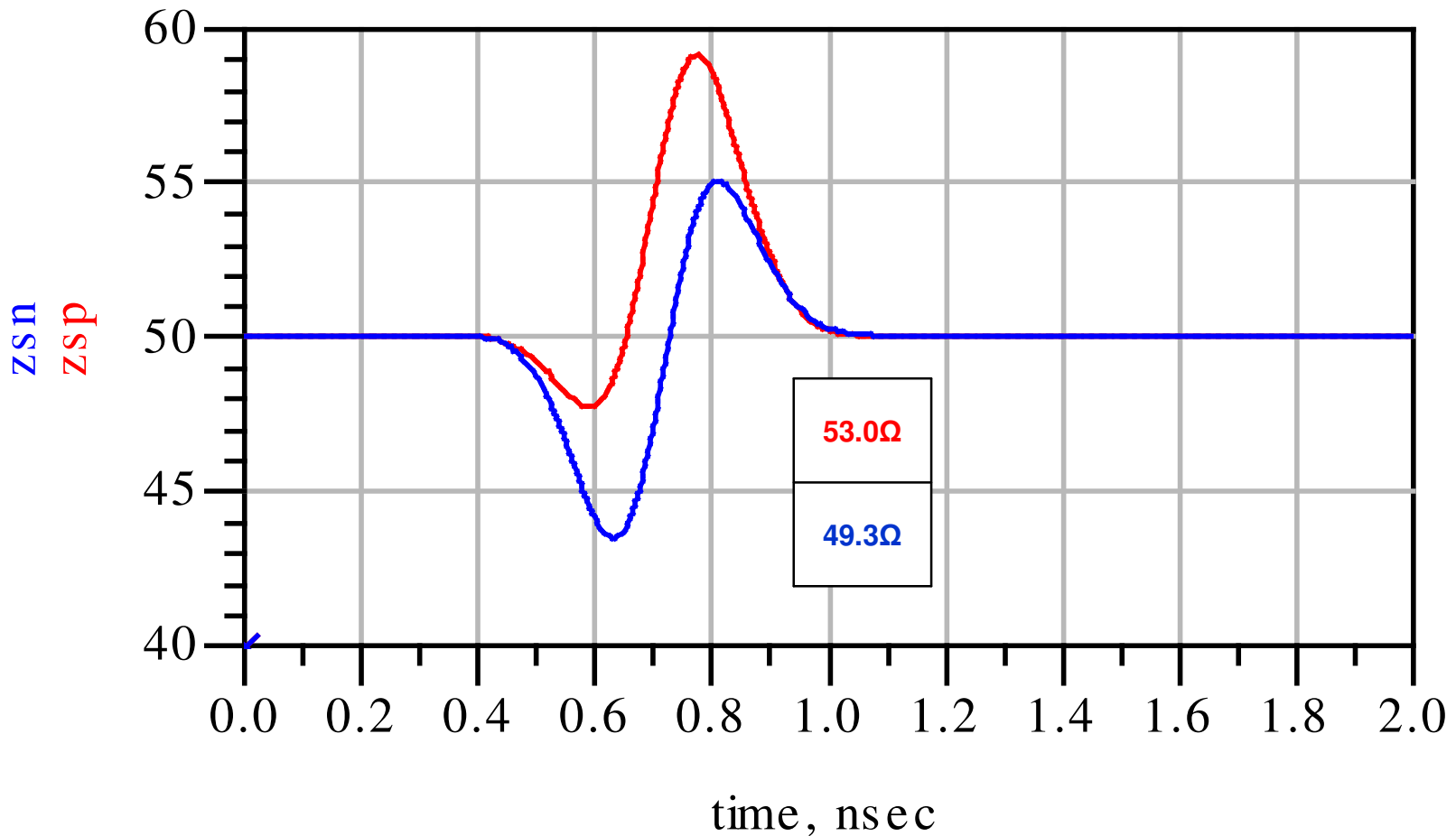
S1+ (Z_{sp} Edge Terminals) vs. **S1-** (Z_{sn} Interior Terminals)



Single-ended Impedance Profile for S1+ & S1-

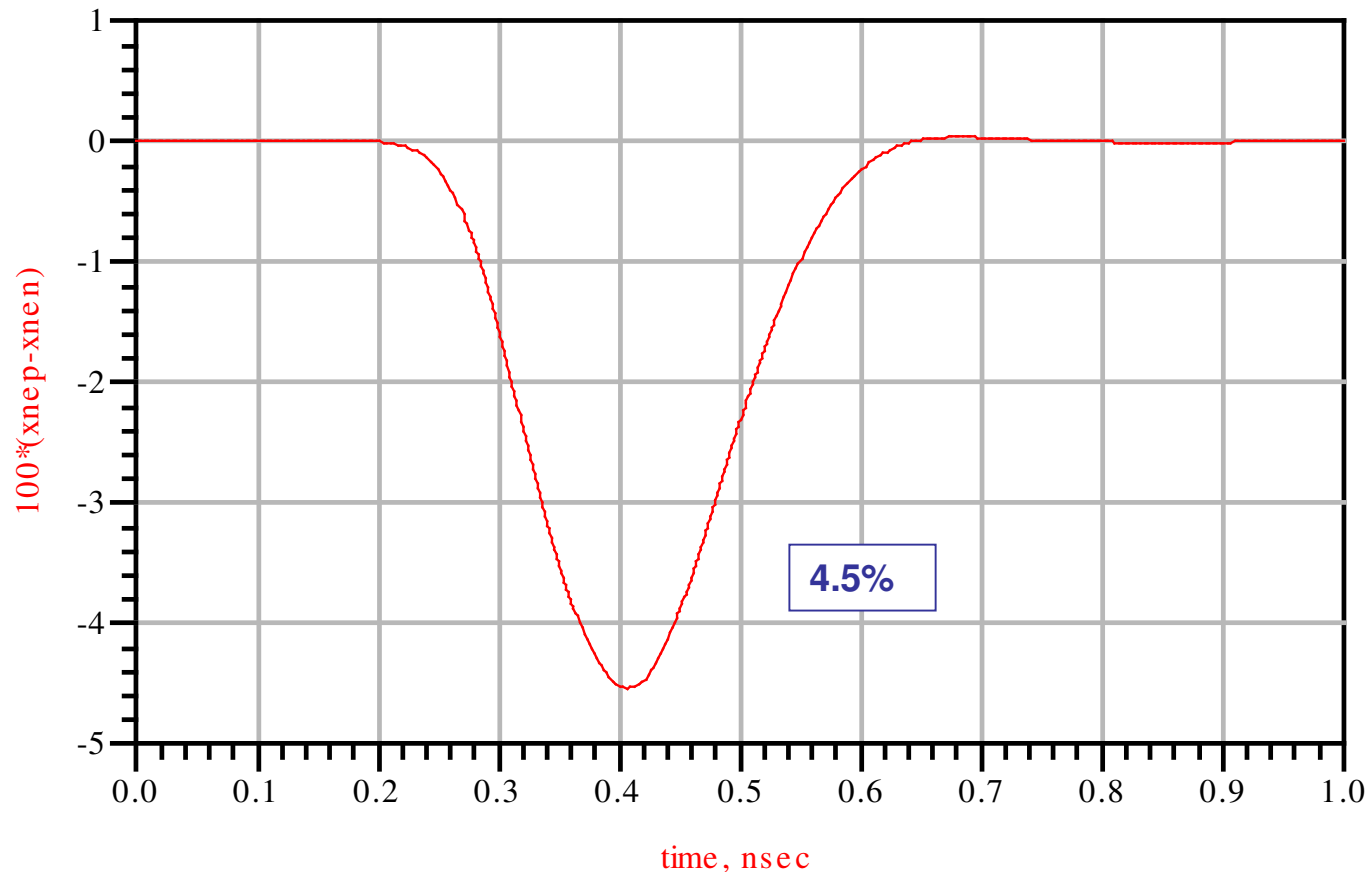
Simultaneous Plots at **200 psec** risetime (10-90%)

S1+ (Z_{sp} Edge Terminals) vs. **S1-** (Z_{sn} Interior Terminals)



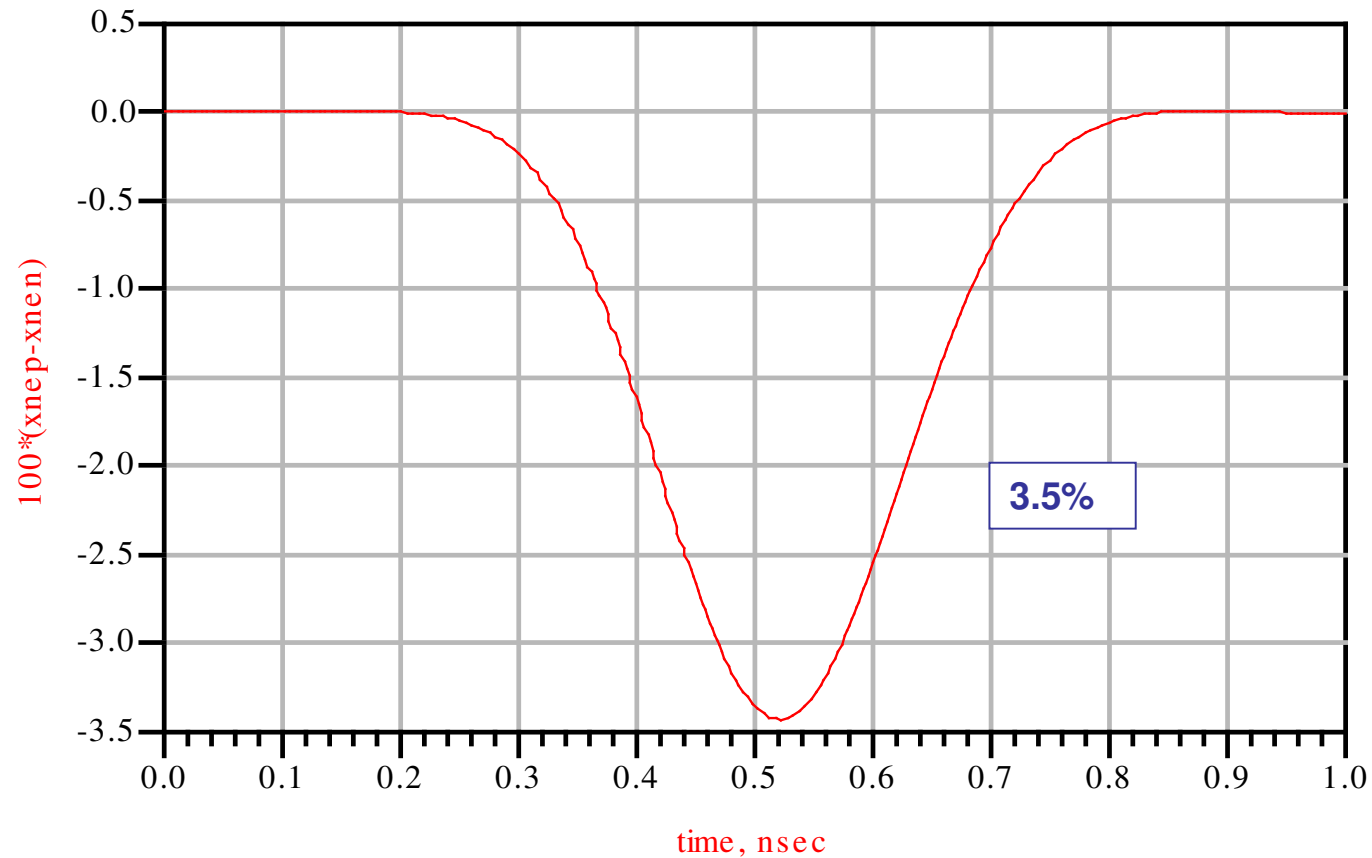
Differential Near-end Crosstalk (NeXT)

Percent Differential NeXT @ 100ps risetime (10-90%)



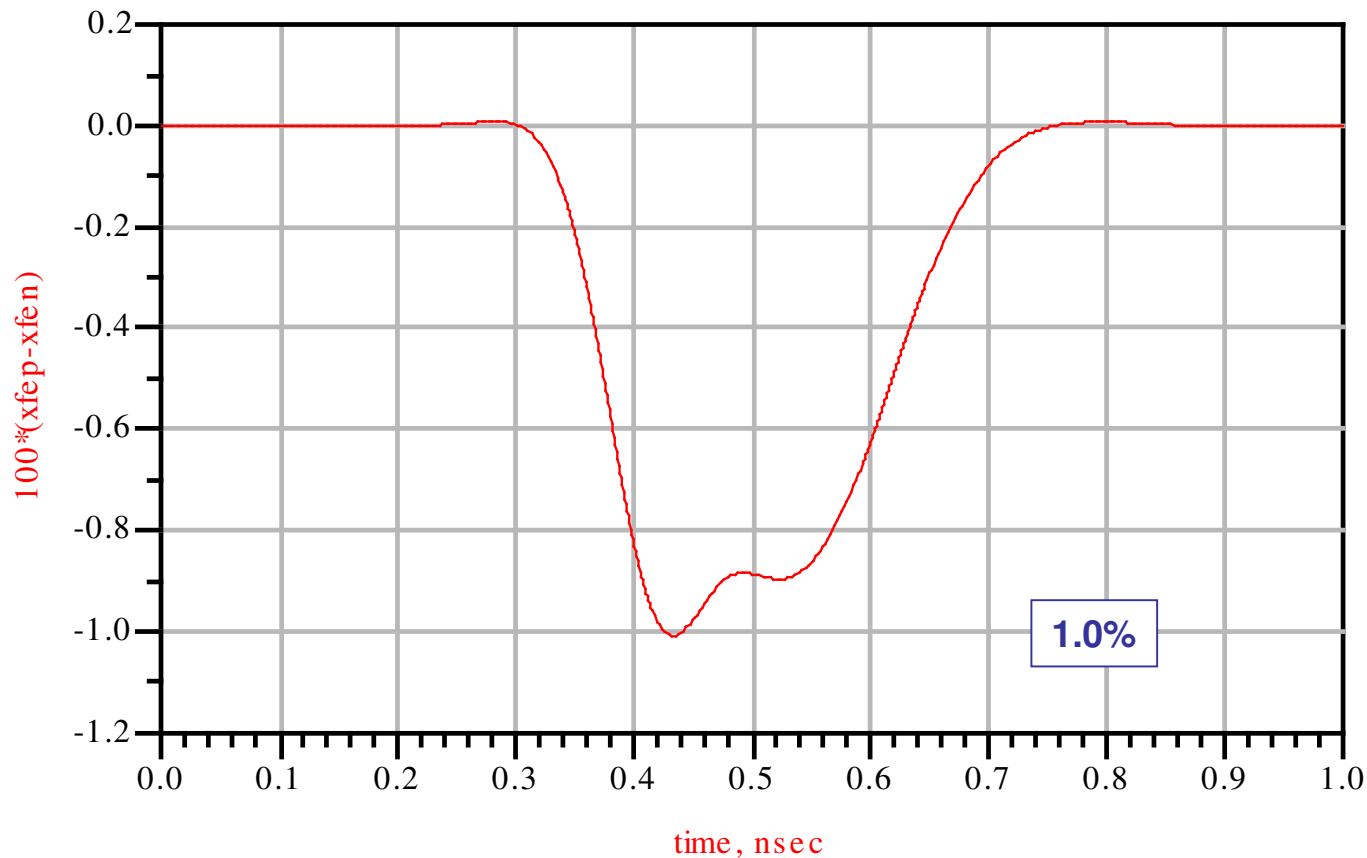
Differential Near-end Crosstalk (NeXT)

Percent Differential NeXT @ 200ps risetime (10-90%)



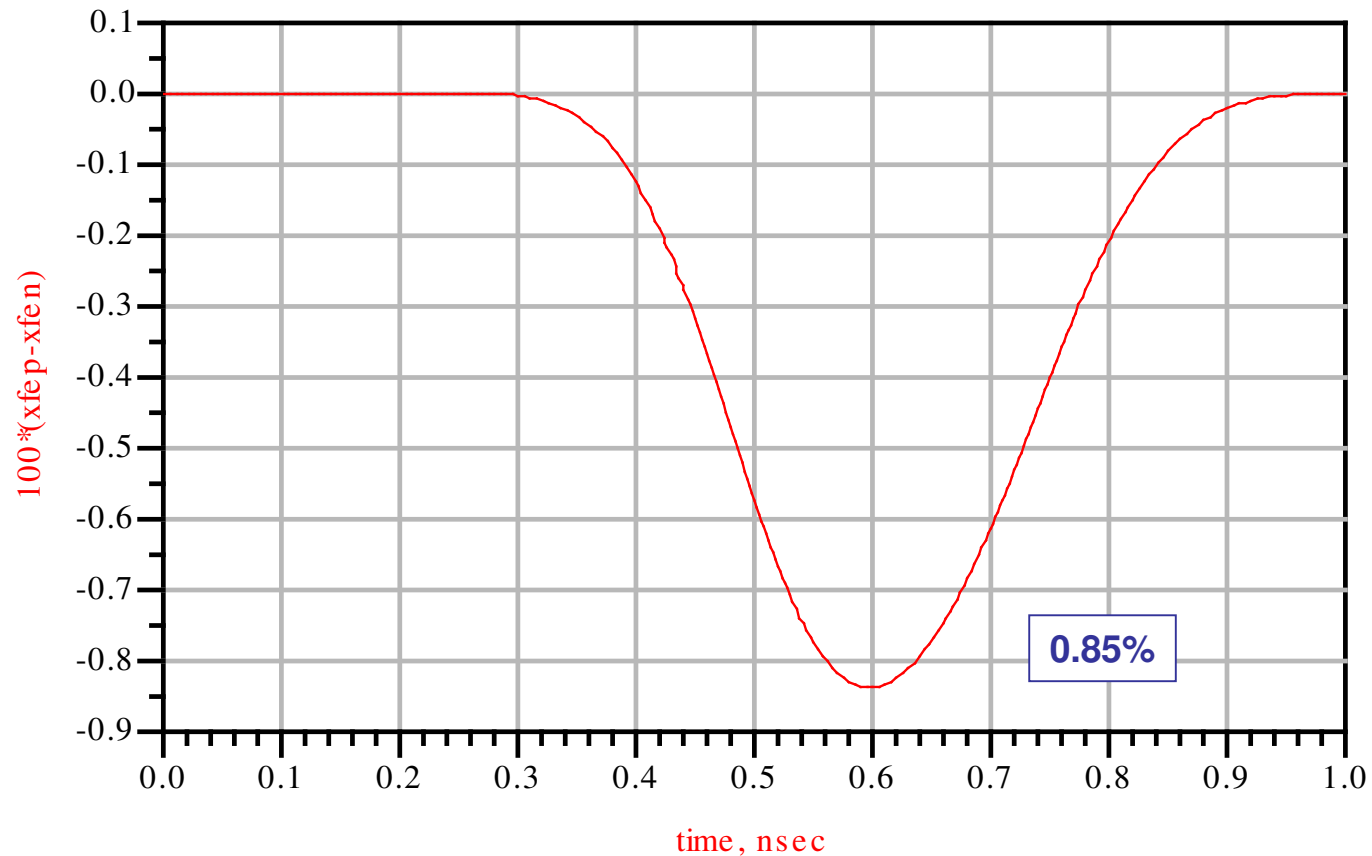
Differential Far-end Crosstalk (FeXT)

Percent Differential FeXT @ 100ps risetime (10-90%)



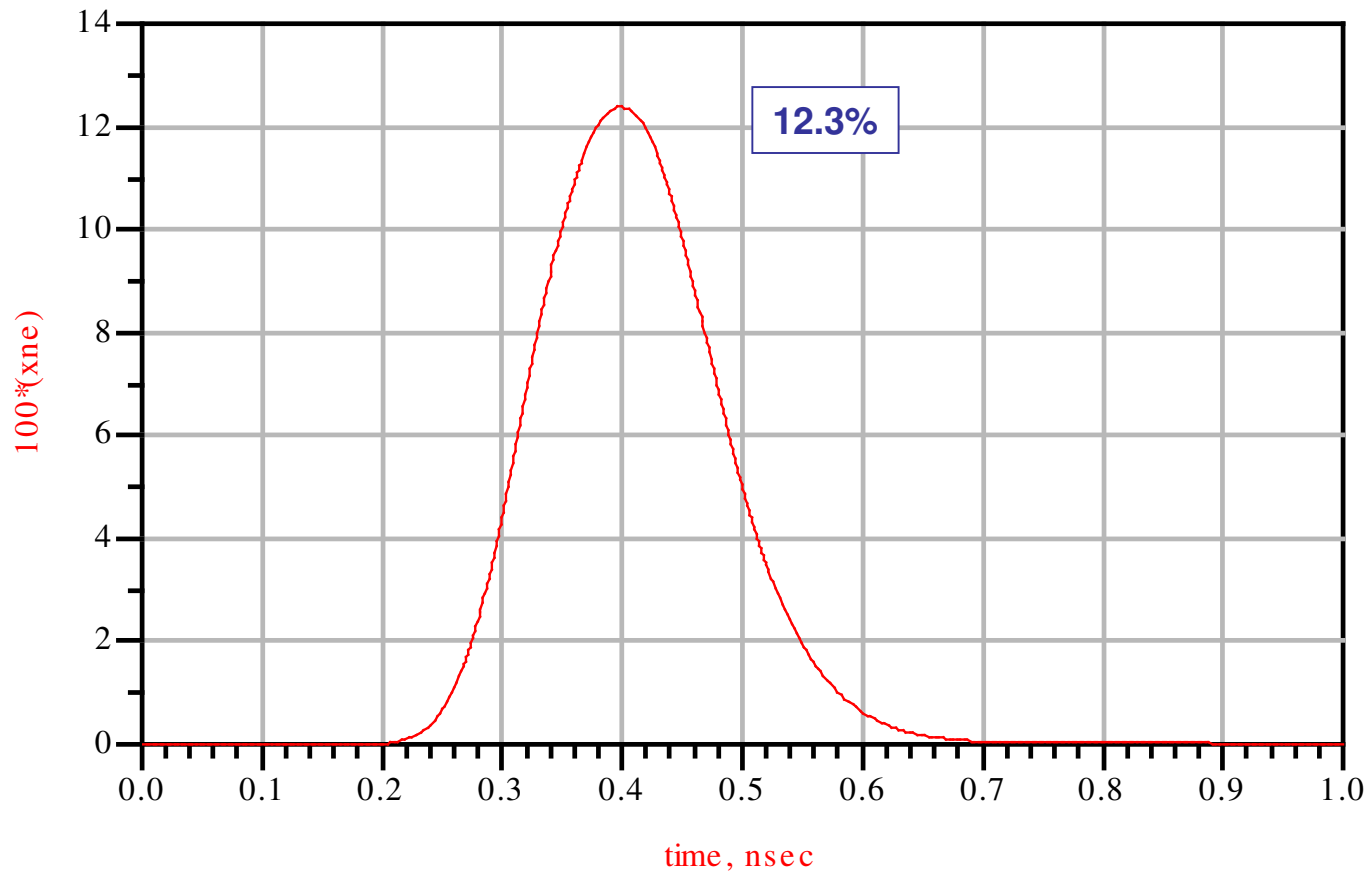
Differential Far-end Crosstalk (FeXT)

Percent Differential FeXT @ 200ps risetime (10-90%)



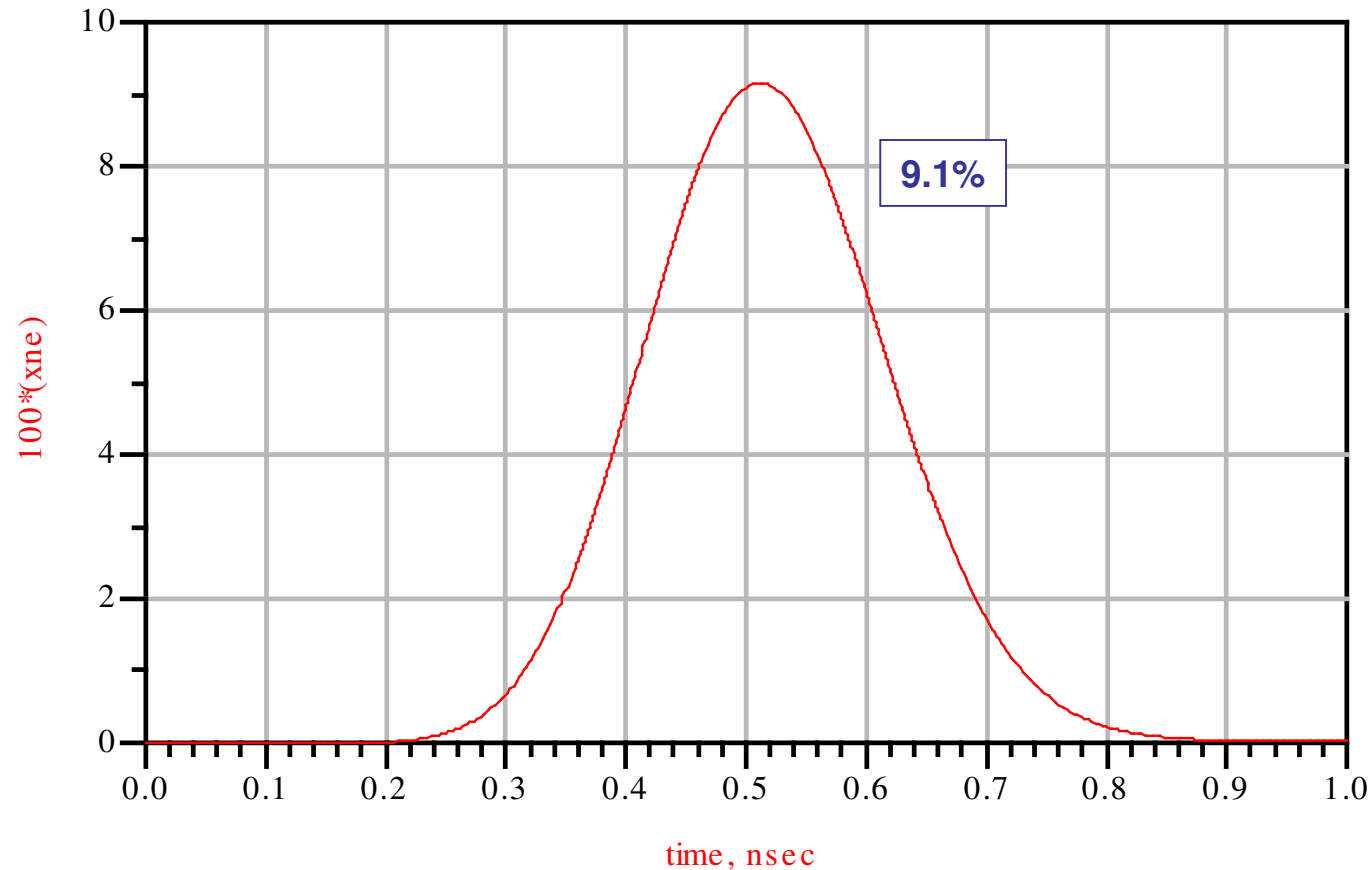
Single-ended Near-end Crosstalk (NeXT)

Percent Single-ended NeXT @ 100ps risetime (10-90%)



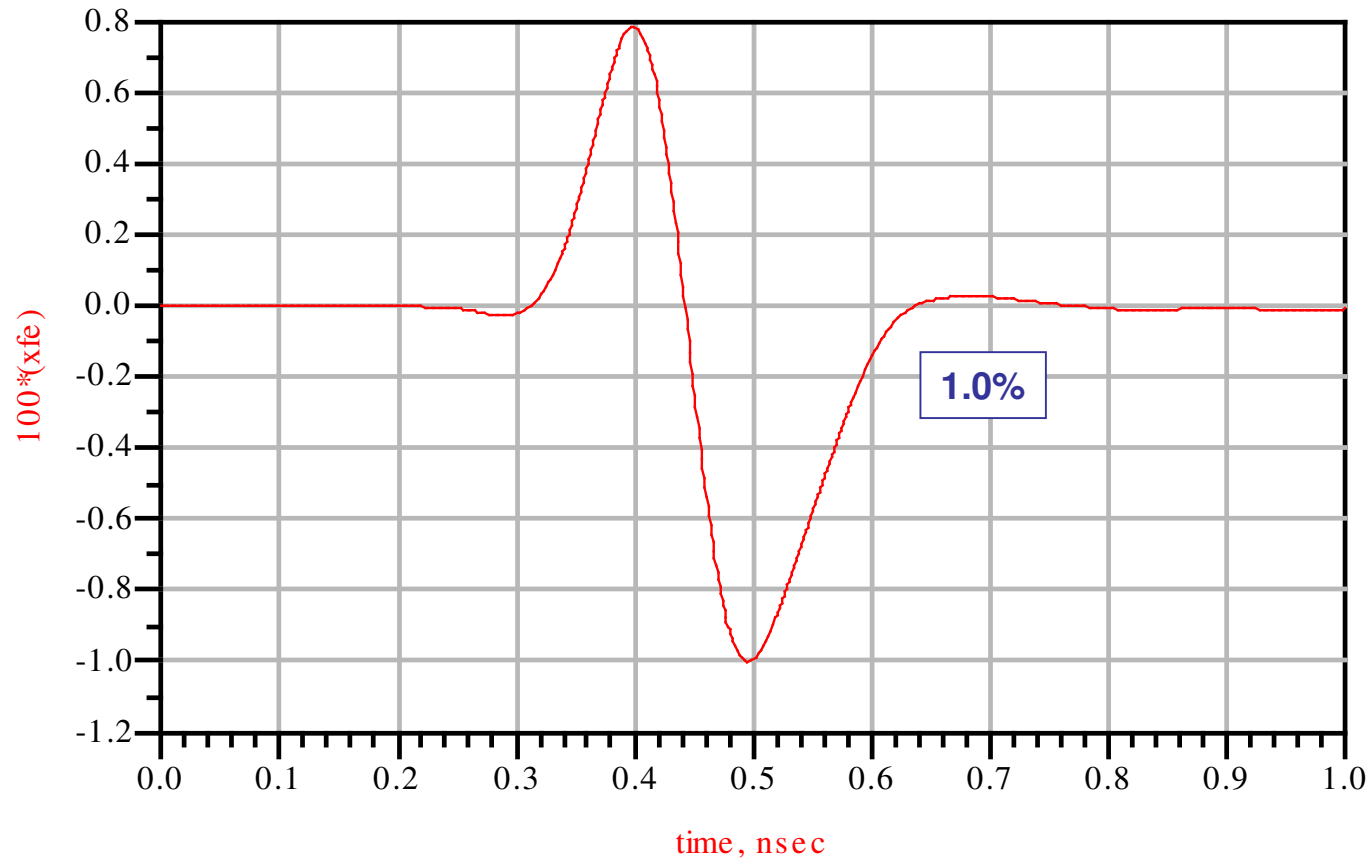
Single-ended Near-end Crosstalk (NeXT)

Percent Single-ended NeXT @ 200ps risetime (10-90%)



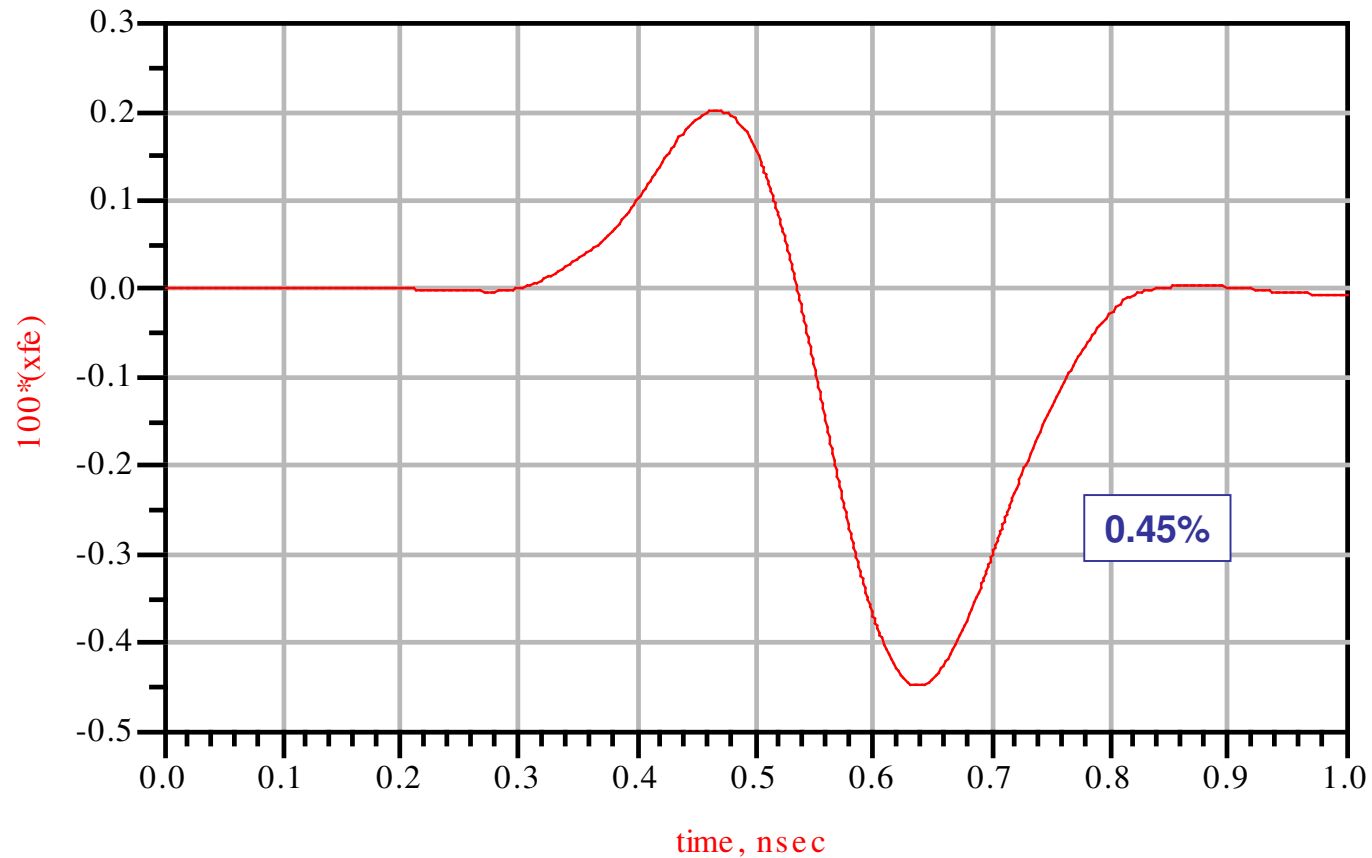
Single-ended Far-end Crosstalk (FeXT)

Percent Single-ended FeXT @ 100ps risetime (10-90%)



Single-ended Far-end Crosstalk (FeXT)

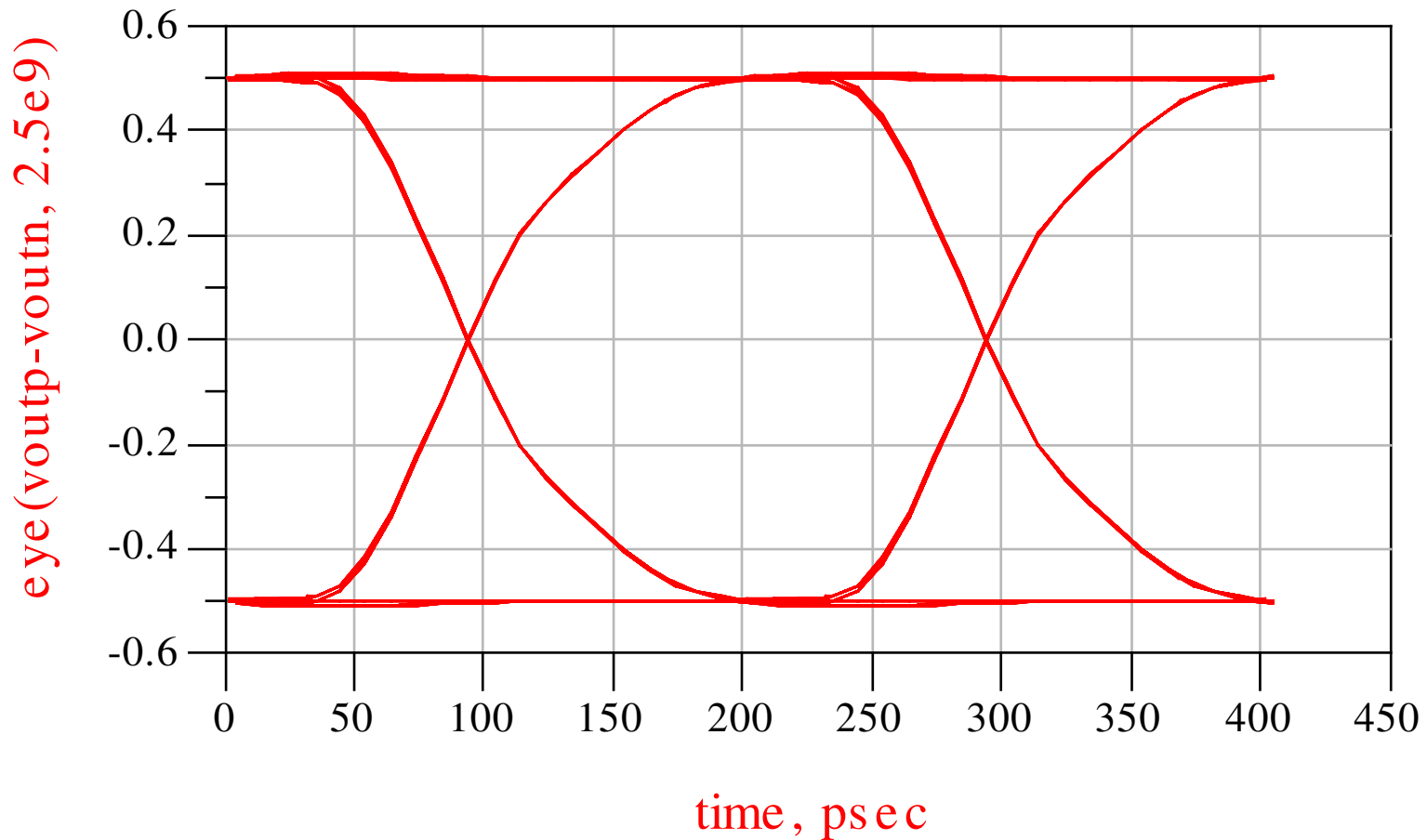
Percent Single-ended FeXT @ 200ps risetime (10-90%)



Differential Eye-Diagram

Eye Opening @ 5 Gbit/sec.

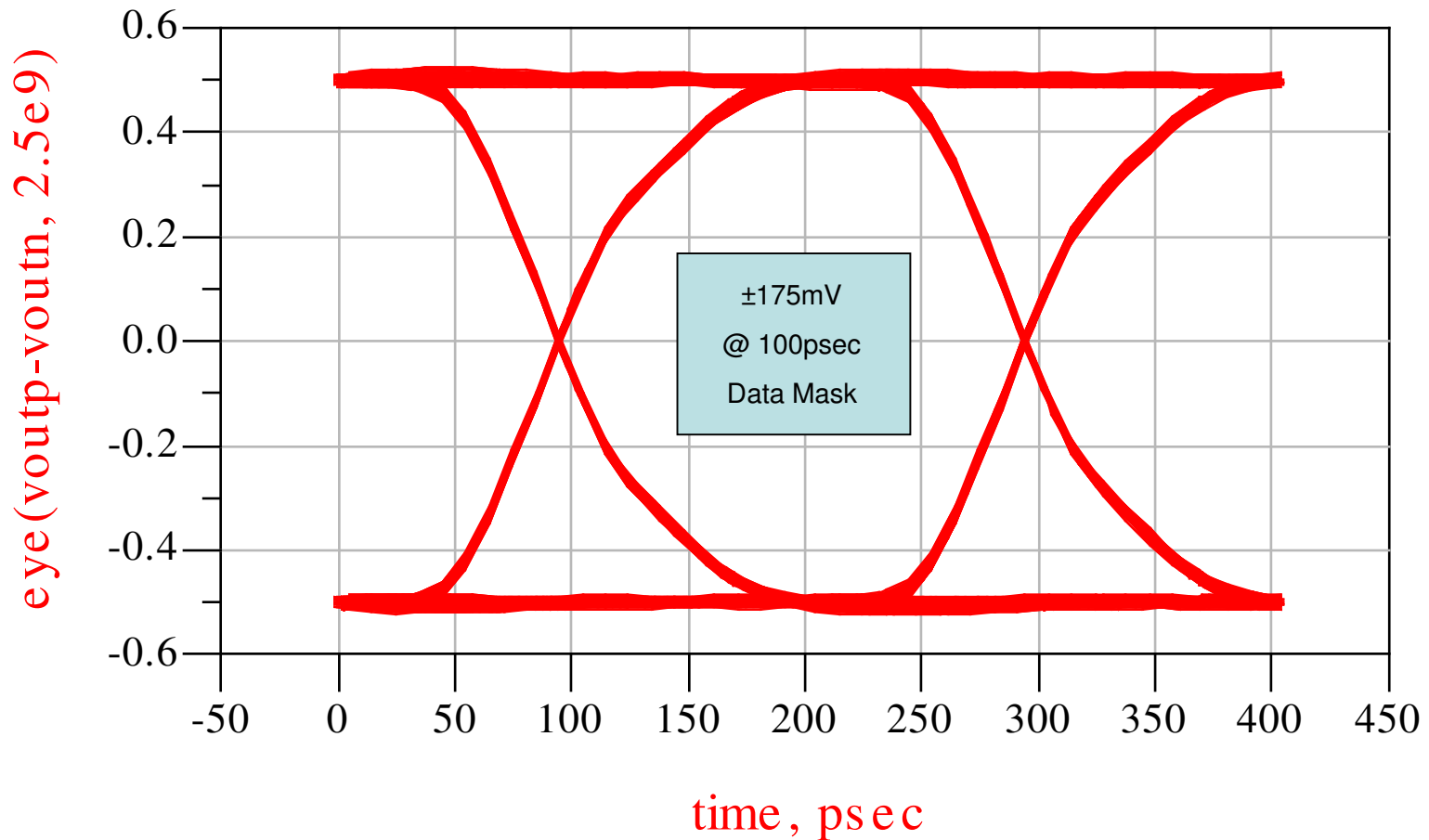
Peak-to-peak jitter is 2 psec and Eye-Closure is 6%



Differential Eye-Diagram w/Aggressor

Eye Opening @ 5 Gbit/sec with a 6 Gbit/sec Aggressor

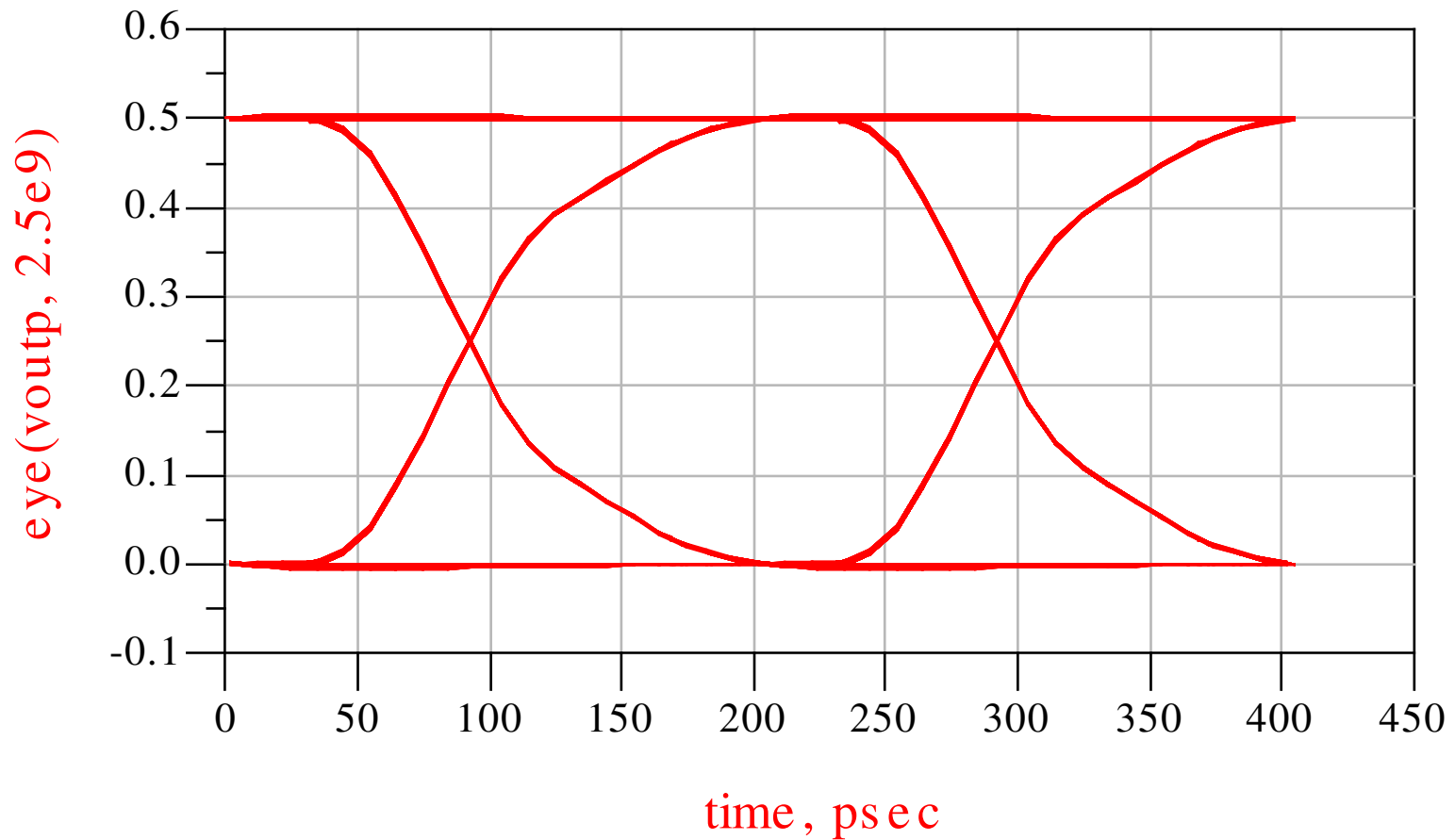
Peak-to-peak jitter is 4 psec and Eye-Closure is 8%



Single-ended Eye-Diagram

Eye Opening @ 5 Gbit/sec.

Peak-to-peak jitter is 2 psec and Eye-Closure is 10%



Single-ended Eye-Diagram w/Aggressor

Eye Opening @ 5 Gbit/sec with a 6 Gbit/sec Aggressor

Peak-to-peak jitter is 5 psec and Eye-Closure is 12%

