To: Bill Ham, DEC X3T10.1/96a109r0
From: Dave Instone
Subject: SSA TDR Measurements

I have done some TDR measurements on some of our Eclipse SSA products. The capacitive load of the module pulls the impedance down below 60 ohms for up to 1.5 nanosecs. Rather alarmed I did some tests on some printed circuit stripline and found that as little as 3 picofarads between the traces caused an identical effet. This equates to 1.5pf to ground on each line.

I also tried the effect of a software filter to limit the effective rise time to 1v/ns. This had virtually no effect on the error caused by the capacitor.

I think you would agree that it is unreasonable to expect the 'silicon' to present a capacitive load less than this. In addition our Eclipses perform correctly with respect to the error rate requirments.

I suggest the following note be added to 7.3:-
The impedances measured may fall below 60 ohm (line to gnd) and 120 ohm (line to line) provided that no single excursion below these limits last for more than 1.5nS and that the lowest point is not less than 20 ohms (line to gnd) and 40 ohms(line to line).

Regards

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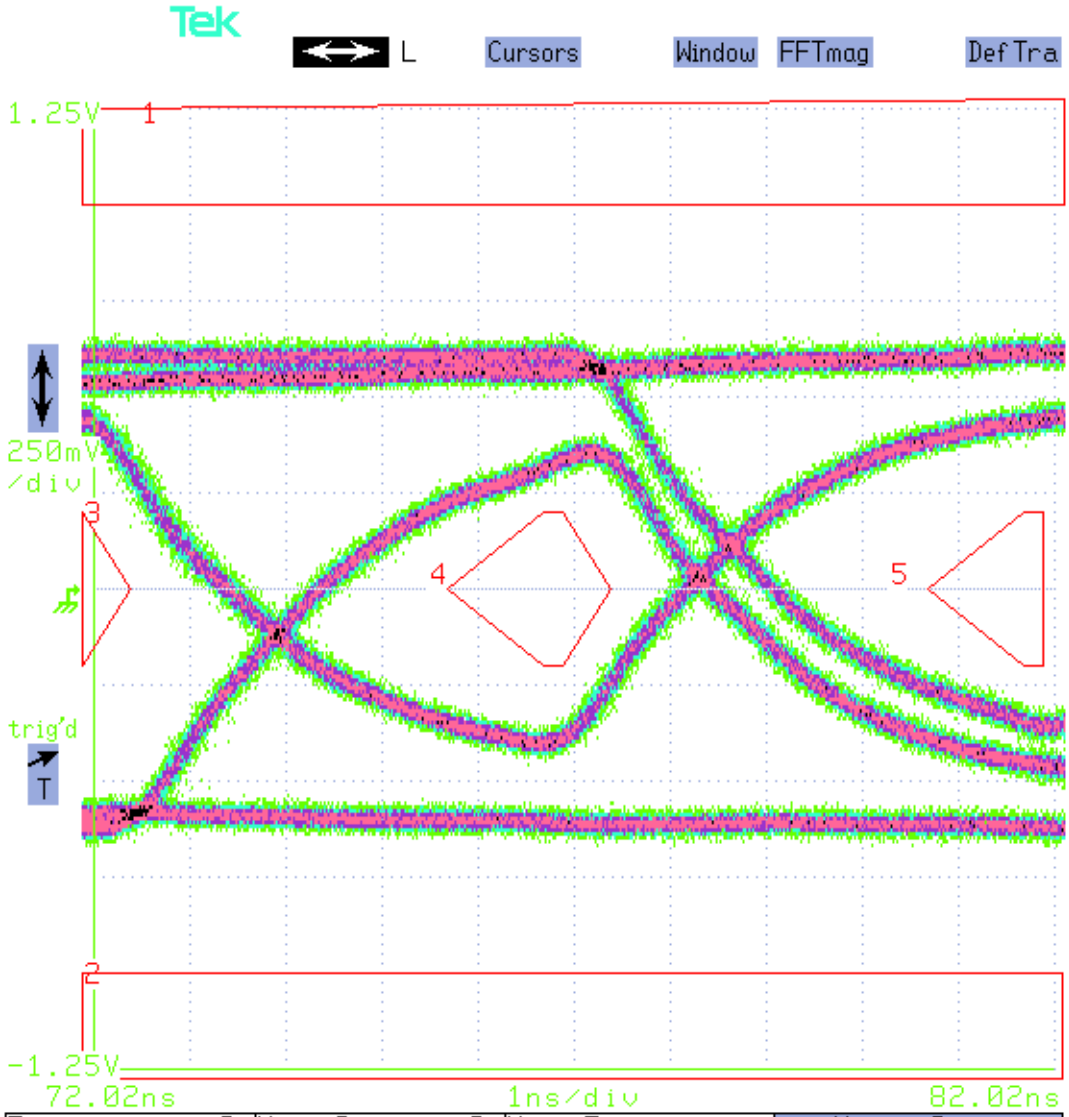
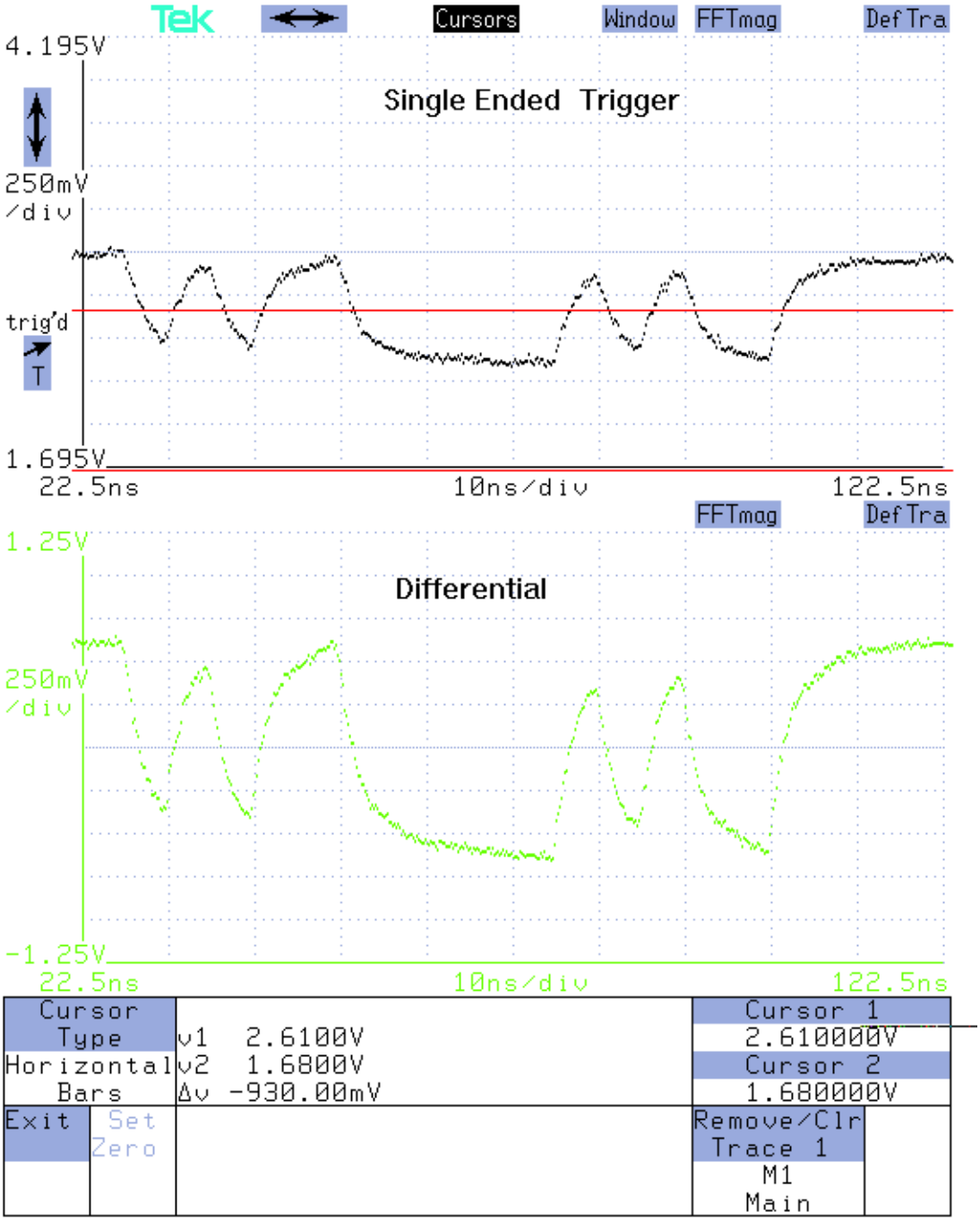
Attachments - winssa.doc

Cable A

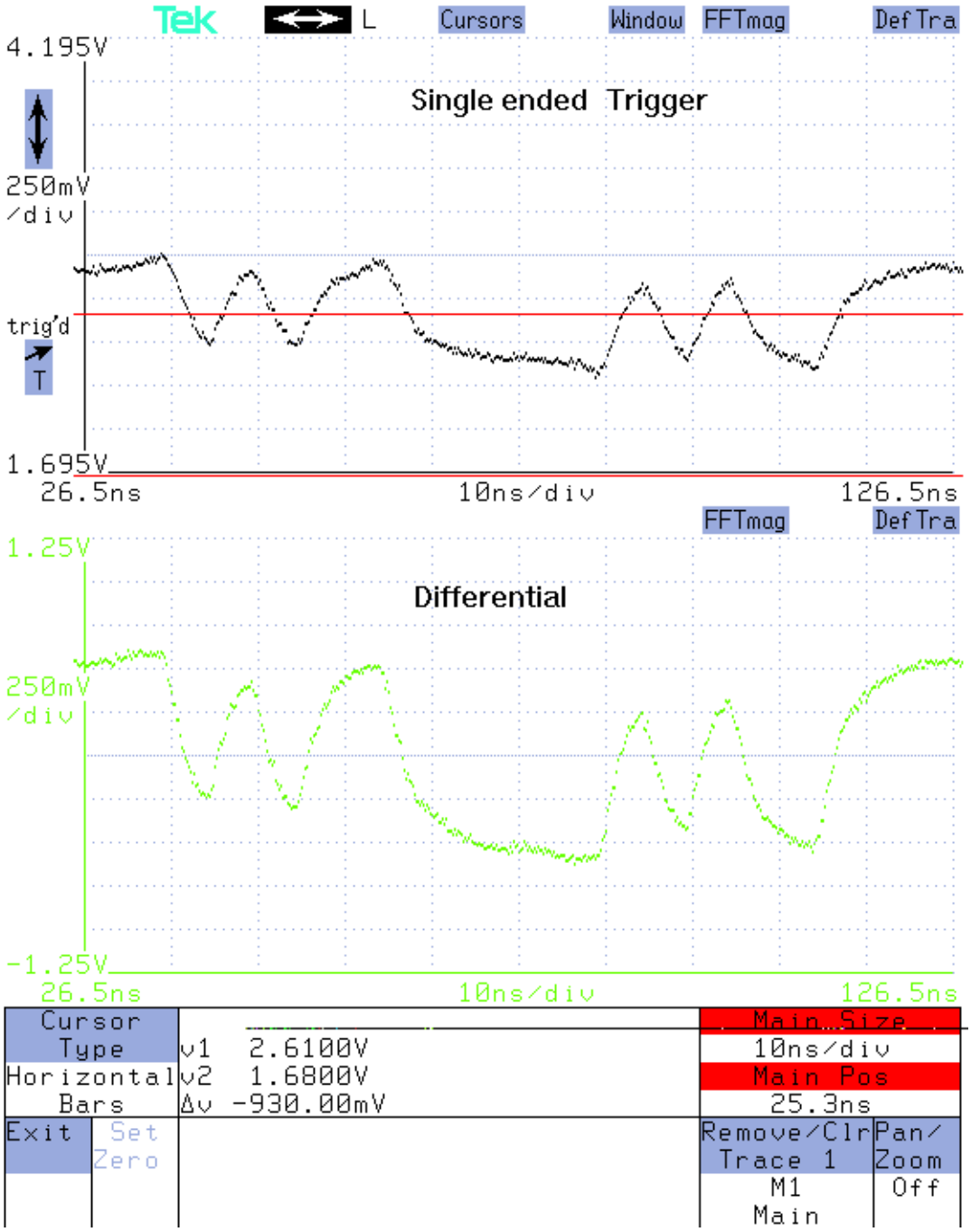


Total	0	Mask3	0	Mask7		Main Size			
Wfms	26	Mask4	0	Mask8		1ns/div			
Mask1	0	Mask5	0	Mask9		Main Pos			
Mask2	0	Mask6		Mask10		71.9ns			
Persist/ Histograms		Mask Testing		Color Grad Scale		Standard Masks		Remove/Clr Trace 3	
Color Grad Continuous		Count Off				User Mask		M1-M2 Main	

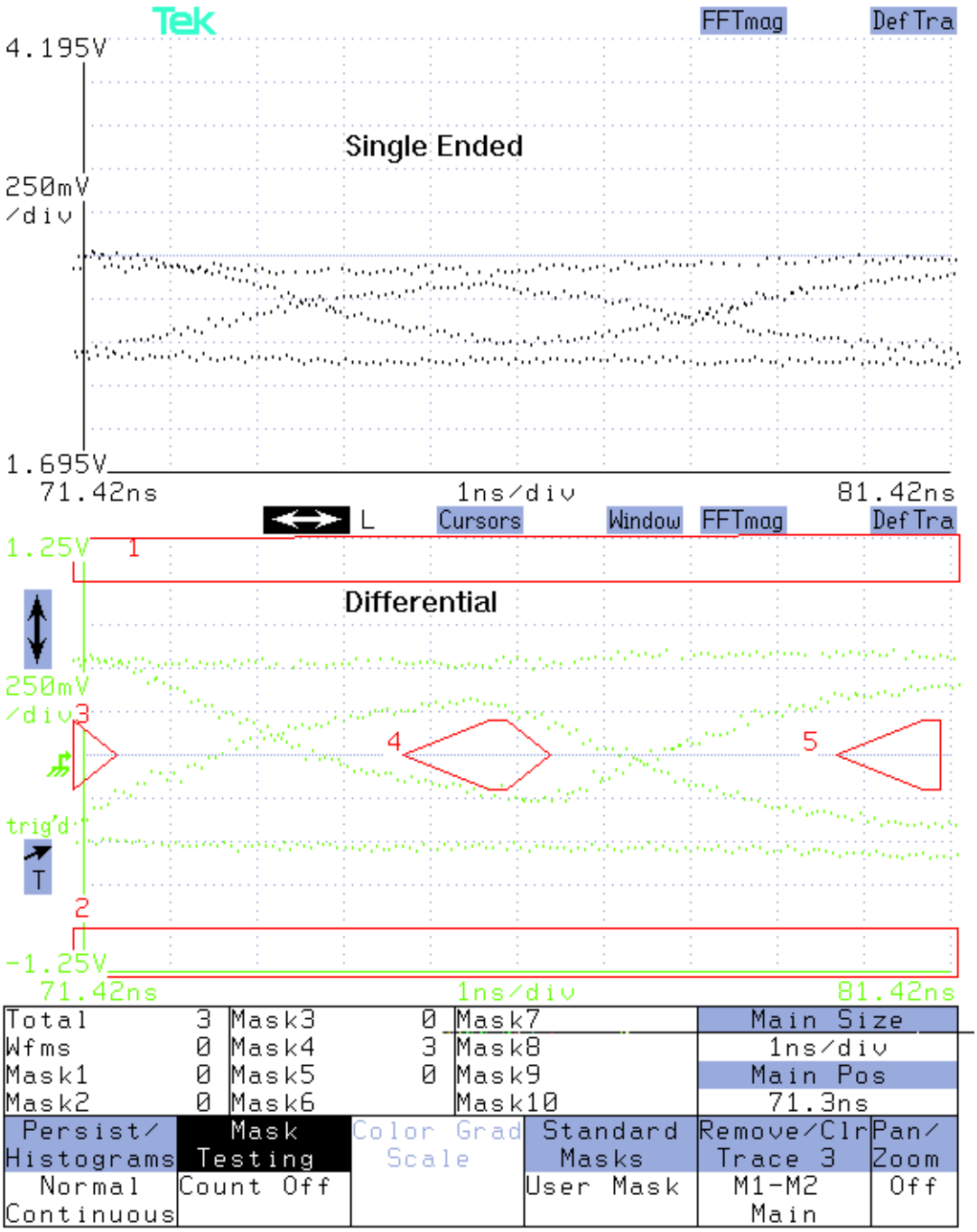
Cable A


Tek
Cursors
Window
FFTmag
DefTra
4.195V
Single Ended Trigger
250mV
/div
trig'd
T
1.695V
22.5ns
10ns/div
122.5ns
FFTmag
DefTra
1.25V
Differential
250mV
/div
-1.25V
22.5ns
10ns/div
122.5ns
Cursor Type
Horizontal Bars
v1 2.6100V
v2 1.6800V
Δv -930.00mV
Cursor 1
2.610000V
Cursor 2
1.680000V
Exit
Set Zero
Remove/Clr Trace 1
M1
Main

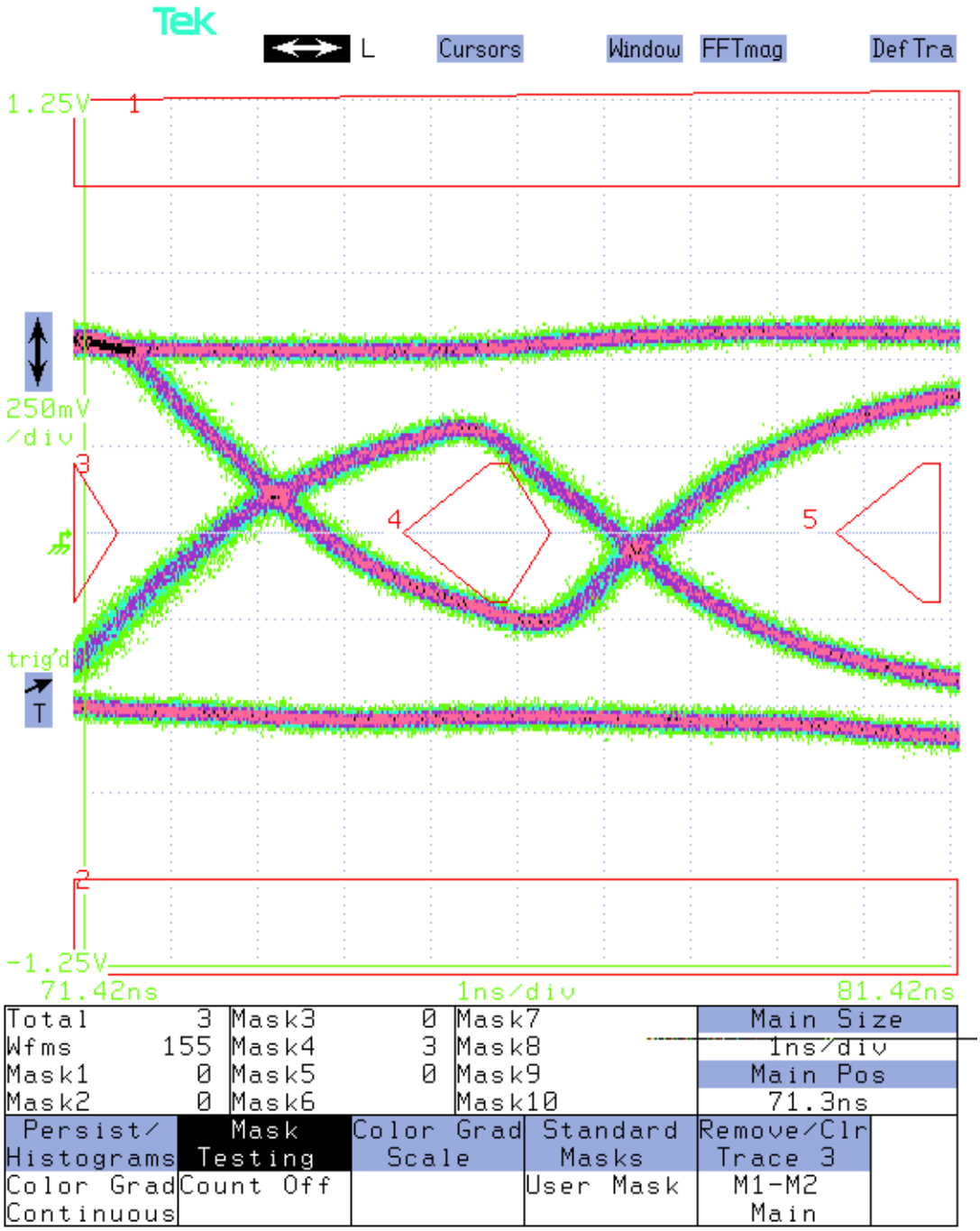
Cable B


Tek
L
Cursors
Window
FFTmag
DefTra
4.195V
Single ended Trigger
250mV
/div
trig'd
T
1.695V
26.5ns
10ns/div
126.5ns
FFTmag
DefTra
1.25V
Differential
250mV
/div
-1.25V
26.5ns
10ns/div
126.5ns
Cursor Type
Horizontal Bars
v1 2.6100V
v2 1.6800V
Δv -930.00mV
Main Size
10ns/div
Main Pos
25.3ns
Exit
Set Zero
Remove/Clr Trace 1
M1 Main
Pan/Zoom
Off

Cable B


Tek
FFTmag
DefTra
4.195V
Single Ended
250mV
/div
1.695V
71.42ns
1ns/div
81.42ns
L
Cursors
Window
FFTmag
DefTra
1.25V
1
Differential
250mV
/div
3
4
5
trig'd
T
2
-1.25V
71.42ns
1ns/div
81.42ns
Total 3
Wfms 0
Mask1 0
Mask2 0
Mask3 0
Mask4 3
Mask5 0
Mask6
Mask7
Mask8
Mask9
Mask10
Main Size
1ns/div
Main Pos
71.3ns
Persist/ Histograms
Normal Continuous
Mask Testing
Count Off
Color Grad Scale
Standard Masks
User Mask
Remove/Clr Trace 3
M1-M2 Main
Pan/ Zoom
Off

Cable B


Tek
L
Cursors
Window
FFTmag
DefTra
1.25V
1
250mV
/div
3
4
5
trig'd
T
2
-1.25V
71.42ns
1ns/div
81.42ns
Total 3
Wfms 155
Mask1 0
Mask2 0
Mask3 0
Mask4 3
Mask5 0
Mask6
Mask7
Mask8
Mask9
Mask10
Main Size
1ns/div
Main Pos
71.3ns
Persist/ Histograms
Color Grad Continuous
Mask Testing
Count Off
Color Grad Scale
Standard Masks
User Mask
Remove/Clr Trace 3
M1-M2 Main