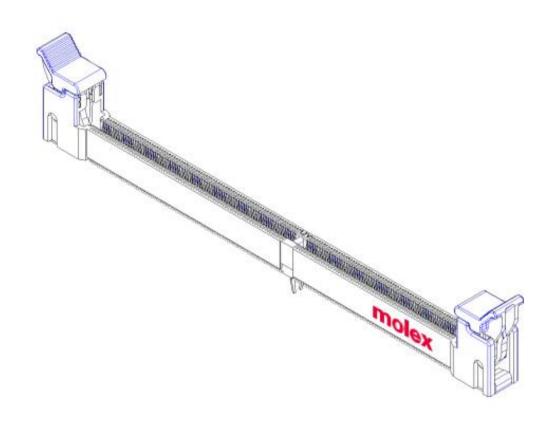


SIGNAL INTEGRITY TEST SUMMARY DDR4 MINIDIMM 0.5MM PITCH VERTICAL CONNECTOR



1.0 SCOPE

This test summary covers the signal integrity performance of DDR4 MiniDIMM 0.5mm Pitch Vertical SMT connector. The measurement was conducted using Molex DDR4 MiniDIMM test fixture. Most of the test fixture effect was removed using AFR in PLTS.

2.0 PRODUCT DESCRIPTION

2.1 PRODUCT NAME AND PART NUMBER

DDR4 DIMM 0. 5mm Pitch Vertical SMT connector, Part # 151105-0003 (Date Code: 15191)

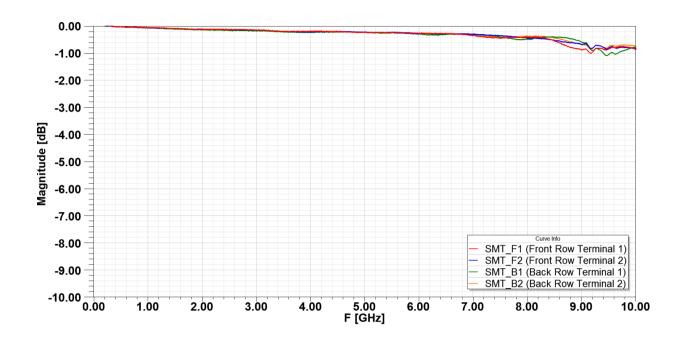
Ī	REVISION:	ECN INFORMATION:	TITLE:	I Into grity Toot Cummor		SHEET No.
	1	EC No: S2016-0386	Signal Integrity Test Summary DDR4 MiniDIMM 0.5MM PITCH Vertical SMT CONNECTOR		1 of 13	
	I	DATE: 2015/10/22			10113	
ſ	DOCUMEN'	T NUMBER:	CREATED / REVISED BY:	CHECKED BY:	APPRO\	/ED BY:
	TS-151105-0001		WHFOO 2015/10/22	CMWONG 2015/10/22	WTCHUA 2	2015/10/22



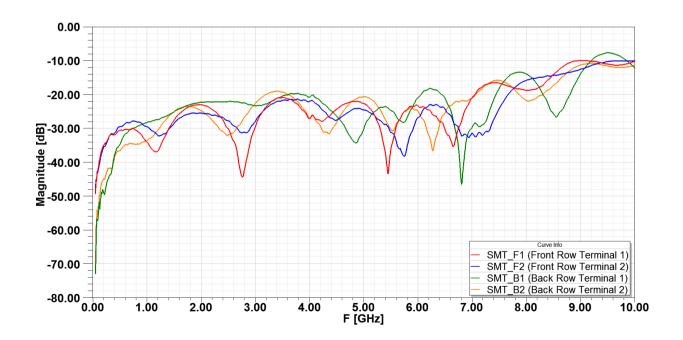
3.0 PERFORMANCE

Frequency Domain

Insertion Loss



Return Loss



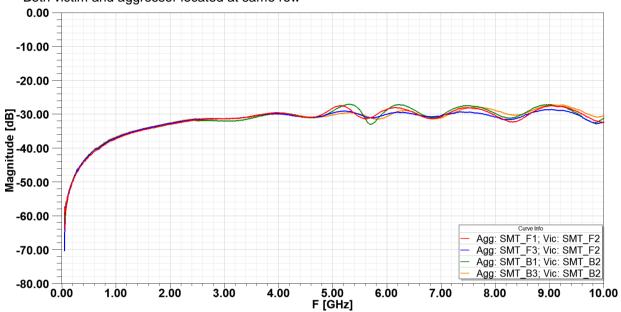
REVISION:	ECN INFORMATION: EC No: \$2016-0386 DATE: 2015/10/22	DDR4	I Integrity Test Summary MiniDIMM 0.5MM PITCH ical SMT CONNECTOR		2 of 13
DOCUMENT NUMBER:		CREATED / REVISED BY: CHECKED BY: APPRO		<u>APPROV</u>	ED BY:
TS-151105-0001		WHFOO 2015/10/22	CMWONG 2015/10/22	WTCHUA 2	015/10/22



Frequency Domain (continued)

Near End Cross-Talk (Same Side)

- 1:1 S/G ratio
- Both victim and aggressor located at same row



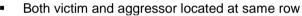
Far End Cross-Talk (Same Side)

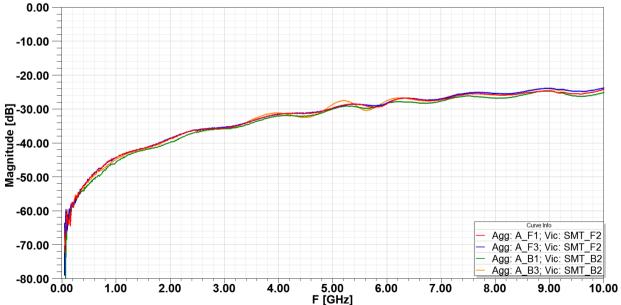
ECN INFORMATION:

TITLE:

1:1 S/G ratio

REVISION:





1	EC No: S2016-0386 DATE: 2015/10/22	DDR4	I Integrity Test Summary MiniDIMM 0.5MM PITCH ical SMT CONNECTOR	
DOCUMEN	IT NUMBER:	CREATED / REVISED BY:	CHECKED BY:	APPROVED BY:
TS-151105-0001		WHFOO 2015/10/22	CMWONG 2015/10/22	WTCHUA 2015/10/22

TEMPLATE FILENAME: SPM[SIZE_A](V.1).DOC

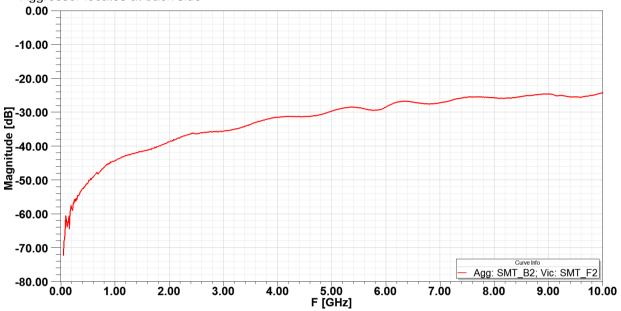
SHEET No.



Frequency Domain (continued)

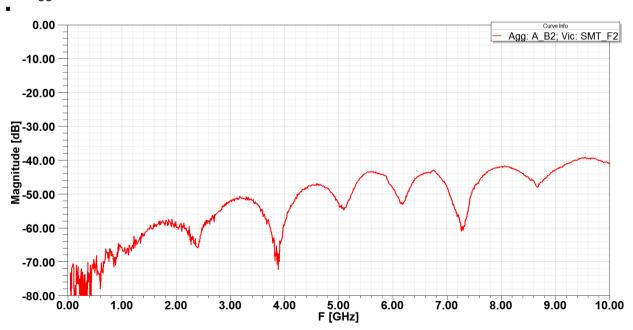
Near End Cross-Talk (Opposite Side)

- 1:1 S/G ratio
- Victim locates at front side
- Aggressor locates at back side



Far End Cross-Talk (Opposite Side)

- 1:1 S/G ratio
- Victim locates at front side
- Aggressor locates at back side.



REVISION:	ECN INFORMATION: EC No: \$2016-0386 DATE: 2015/10/22	DDR4	I Integrity Test Summary MiniDIMM 0.5MM PITCH ical SMT CONNECTOR		4 of 13
DOCUMEN'	T NUMBER:	CREATED / REVISED BY: CHECKED BY: APPRO		<u>APPROV</u>	<u>ED BY:</u>
TS-151105-0001		WHFOO 2015/10/22	CMWONG 2015/10/22	WTCHUA 2	2015/10/22

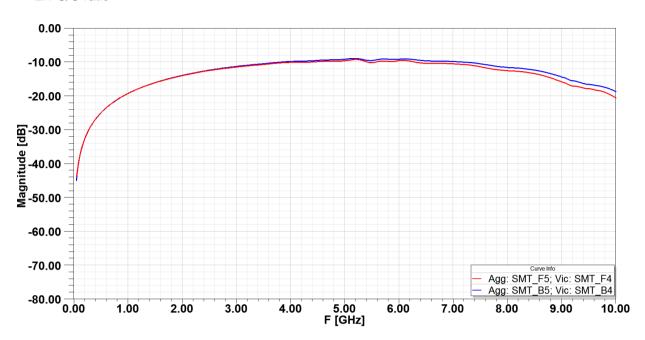
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TEST SUMMARY

Frequency Domain (continued)

Near End Cross-Talk (Same Side)

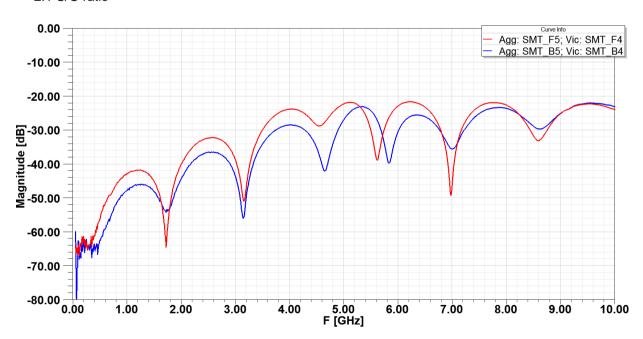
2:1 S/G ratio



Far End Cross-Talk (Same Side)

ECN INFORMATION:

2:1 S/G ratio



1	EC No: S2016-0386 DATE: 2015/10/22	Signal Integrity Test Summary DDR4 MiniDIMM 0.5MM PITCH Vertical SMT CONNECTOR		
DOCUMEN	T NUMBER:	CREATED / REVISED BY:	CHECKED BY:	APPROVED BY:
TS-	-151105-0001	WHFOO 2015/10/22	CMWONG 2015/10/22	WTCHUA 2015/10/22
	TEMPLATE FILENAME: SPM[SIZE_A](V.1).DC			

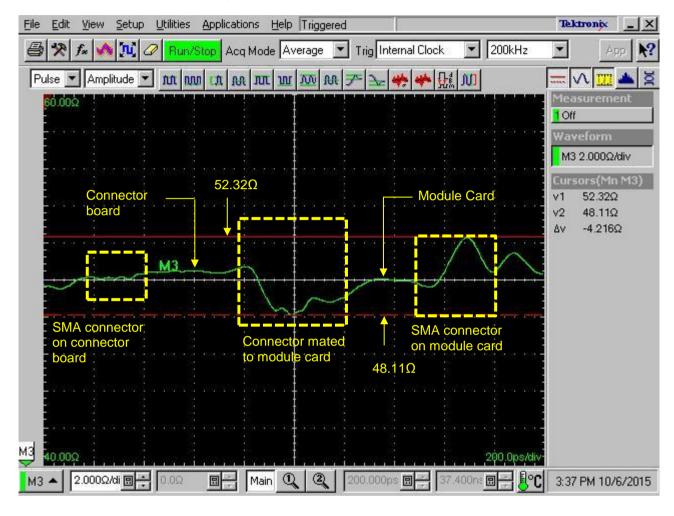
SHEET No.



Time Domain

TDR Impedance

- SMT_F1 Front Row Terminal
- Referenced rise-time of 100ps [10%~90%] launched at connector footprint



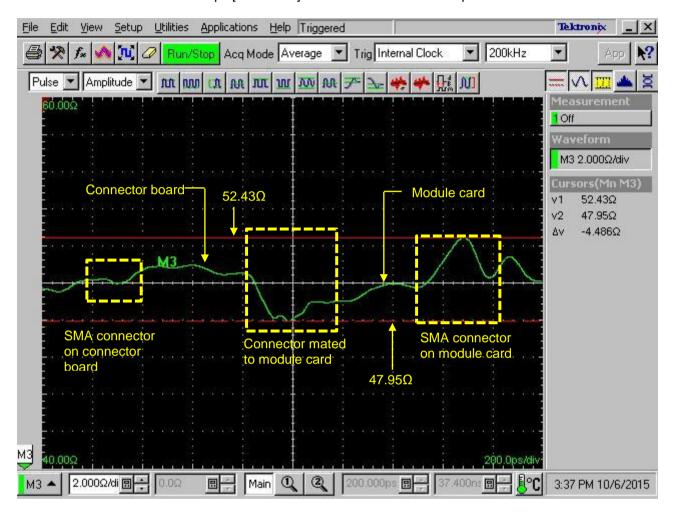
1 ECN INFORMATION: S2016-038 DATE: 2015/10/2	Signa DDR4 Ver	Il Integrity Test Summary MiniDIMM 0.5MM PITCH tical SMT CONNECTOR	<i>'</i>	SHEET No. 6 of 13
DOCUMENT NUMBER:	CREATED / REVISED BY:	CHECKED BY:	<u>APPROVI</u>	ED BY:
TS-151105-0001	WHFOO 2015/10/22	CMWONG 2015/10/22	WTCHUA 20	015/10/22



Time Domain (continued)

TDR Impedance

- SMT F2 Front Row Terminal
- Referenced rise-time of 100ps [10%~90%] launched at connector footprint



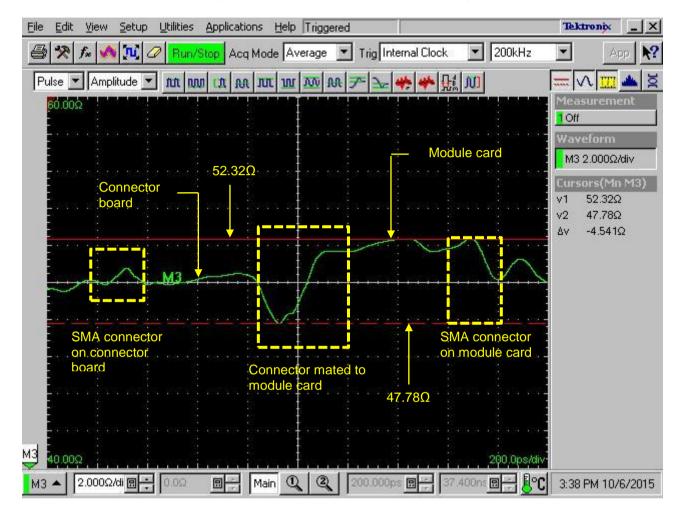
1 <u>EC No:</u> Si	FORMATION: 2016-0386 015/10/22	DDR4	I Integrity Test Summary MiniDIMM 0.5MM PITCH ical SMT CONNECTOR		7 of 13
DOCUMENT NUMBER:		CREATED / REVISED BY: CHECKED BY: APPROV		/ED BY:	
TS-151105	-0001	WHFOO 2015/10/22	CMWONG 2015/10/22	WTCHUA 2	2015/10/22



Time Domain (continued)

TDR Impedance

- SMT_B1 –Back Row Terminal
- Referenced rise-time of 100ps [10%~90%] launched at connector footprint



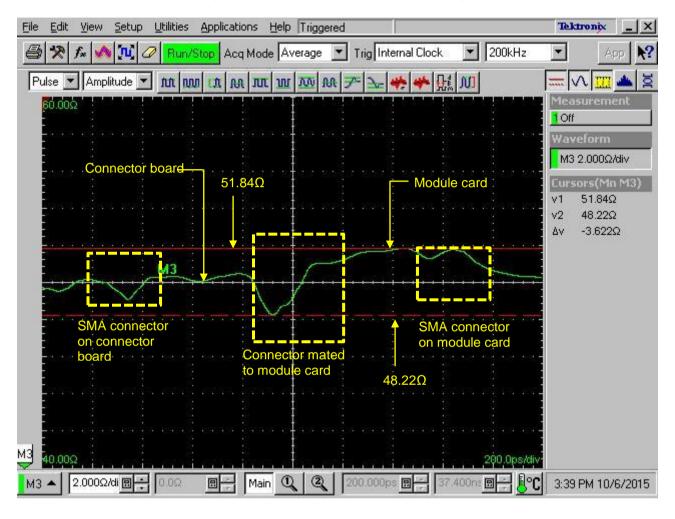
1 ECN INFORMATION: EC No: \$2016-0386 DATE: 2015/10/22	DDR4	I Integrity Test Summary MiniDIMM 0.5MM PITCH ical SMT CONNECTOR		8 of 13
DOCUMENT NUMBER:	CREATED / REVISED BY: CHECKED BY: APPROVE		'ED BY:	
TS-151105-0001	WHFOO 2015/10/22	CMWONG 2015/10/22	WTCHUA 2	2015/10/22



Time Domain (continued)

TDR Impedance

- SMT_B2 Back Row Terminal
- Referenced rise-time of 100ps [10%~90%] launched at connector footprint

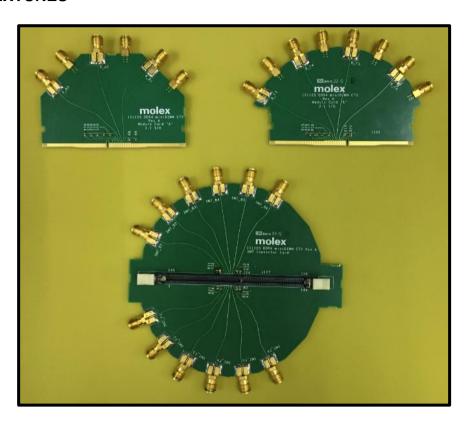


REVISION:	ECN INFORMATION: EC No: \$2016-0386 DATE: 2015/10/22	DDR4	I Integrity Test Summary MiniDIMM 0.5MM PITCH ical SMT CONNECTOR		9 of 13
	T NUMBER:	CREATED / REVISED BY: CHECKED BY: APPROV			
TS-151105-0001		WHFOO 2015/10/22	CMWONG 2015/10/22	WTCHUA 2	2015/10/22

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TEST SUMMARY

4.0 TEST FIXTURES



Molex DDR4 Test Fixture Board Information

Material: TU-872-LK Thickness: 1.4mm

High Speed Traces: High-Speed Signals on Top Layer (referenced to Layer 2) and Bottom Layer

(referenced to Layer 3)

0.1016mm dielectric thickness between Top Layer & Layer 2; Layer 3 & Bottom

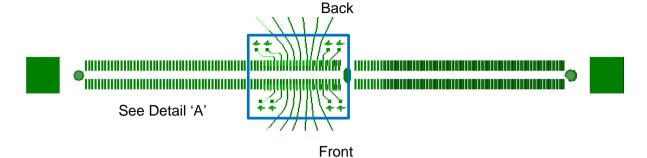
Layer

50.8mm single-ended length (both main and module board)

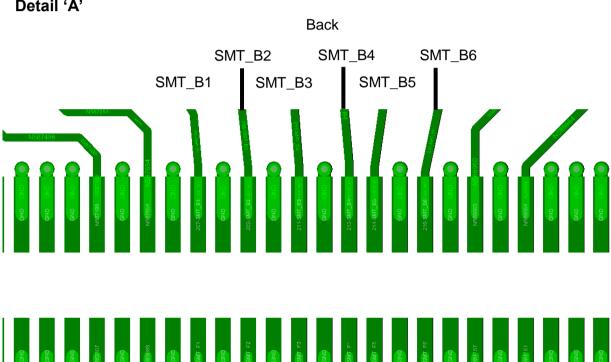
REVISION:	ECN INFORMATION: EC No: \$2016-0386 DATE: 2015/10/22	DDR4	I Integrity Test Summary MiniDIMM 0.5MM PITCH ical SMT CONNECTOR		10 of 13
DOCUMENT NUMBER:		CREATED / REVISED BY: CHECKED BY: APPRO		/ED BY:	
TS-151105-0001		WHEOO 2015/10/22	CMWONG 2015/10/22	WTCHIIA 2	015/10/22

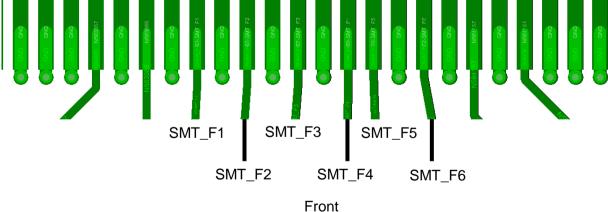


Mainboard Footprint Detail



Detail 'A'



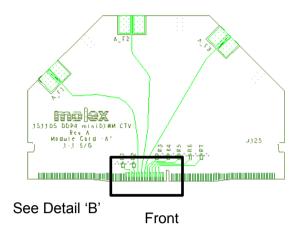


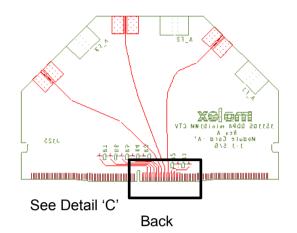
REVISION:	ECN INFORMATION:	TITLE:	SHEET No.
4	EC No: \$2016-0386	Signal Integrity Test Summary DDR4 MiniDIMM 0.5MM PITCH	11 of 13
	DATE: 2015/10/22	Vertical SMT CONNECTOR	110113

DOCUMENT NUMBER: CREATED / REVISED BY: **CHECKED BY: APPROVED BY:** TS-151105-0001 CMWONG 2015/10/22 WHFOO 2015/10/22 WTCHUA 2015/10/22

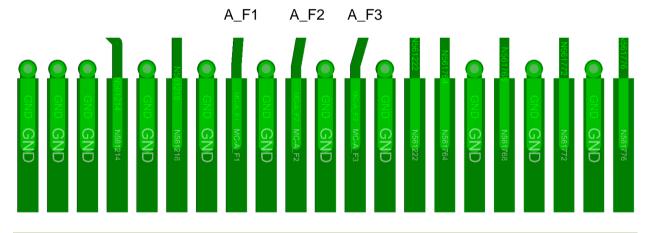


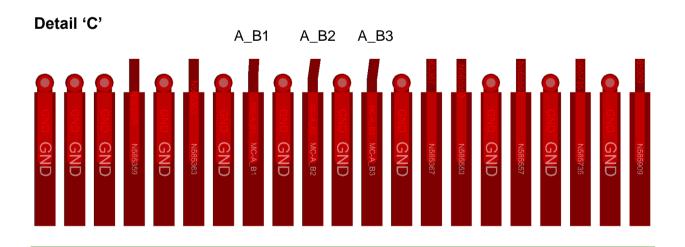
Module 'A' Card Footprint Detail





Detail 'B'





TITLE:

Signal Integrity Test Summary
DDR4 MiniDIMM 0.5MM PITCH
Vertical SMT CONNECTOR

SHEET No.

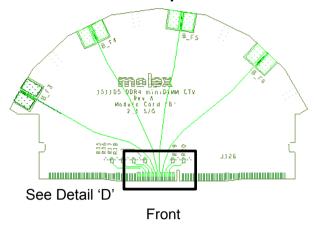
12 of 13

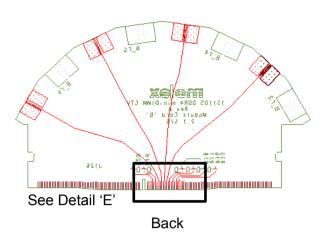
 DOCUMENT NUMBER:
 CREATED / REVISED BY:
 CHECKED BY:
 APPROVED BY:

 TS-151105-0001
 WHFOO 2015/10/22
 CMWONG 2015/10/22
 WTCHUA 2015/10/22

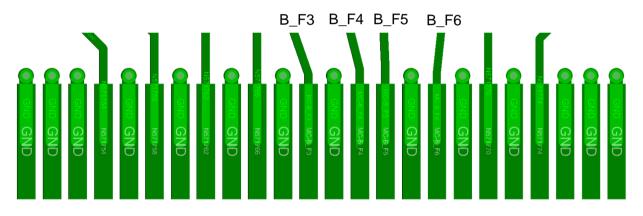


Module 'B' Card Footprint Detail

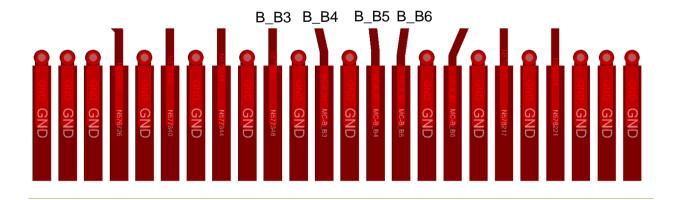




Detail 'D'



Detail 'E'



REVISION: ECN INF

DOCUMENT NUMBER:

ECN INFORMATION:

TITLE:

Signal Integrity Test Summary DDR4 MiniDIMM 0.5MM PITCH Vertical SMT CONNECTOR SHEET No.

13 of **13**

1

<u>EC No:</u> **S2016-0386** <u>DATE:</u> **2015/10/22**

CREATED / REVISED BY:

CHECKED BY:

APPROVED BY:

TS-151105-0001

WHFOO 2015/10/22

CMWONG 2015/10/22

WTCHUA 2015/10/22