TOSHIBA

2:1 Mux/1:2 De-Mux TDS4A212MX Evaluation Board Through Path Board User's Guide

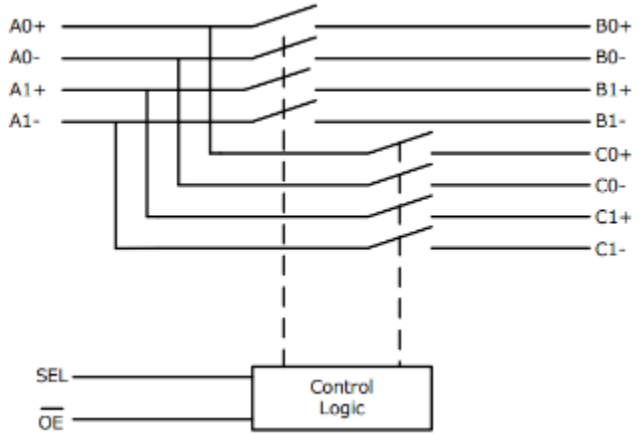
2024-07-16

2:1 Mux/1:2 De-Mux　TDS4A212MX General

➢ General

- 1-32Gbps 1-Lane Tow Differential Channel, 2:1 Mux/1:2 De-Mux
- This Switch can be used for high-speed differential interface such as PCIe®5.0, USB4®Version2, Thunderbolt™4, DisplayPort™.

➢ Block Diagram



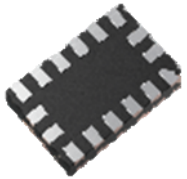
➢ High frequency characterisics (V_{CC} = 1.6 ~ 3.6 V)

Item	Symbol	Condition	Typ.	Unit
-3dB Bandwidth	BW	R_T = 50Ω	**26.2**	GHz
Insertion loss	DDIL	f=10 GHz R_L = 50Ω	**-1.1**	dB
Return loss	DDRL	f=10 GHz R_L = 50Ω	**-17**	dB
OFF isoloation	DDOIRR	f=10 GHz R_L = 50Ω	**-17**	dB
Crosstalk	DDXT	f=10 GHz R_L = 50Ω	-32	dB

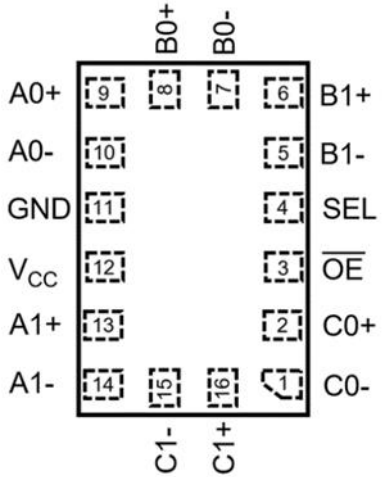
These items can be evaluated on this board.

➢ Package

XQFN 1.6×2.4 mm

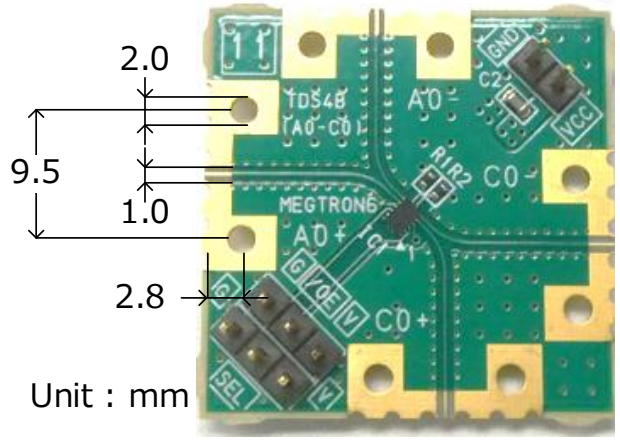


➢ Pin assignment



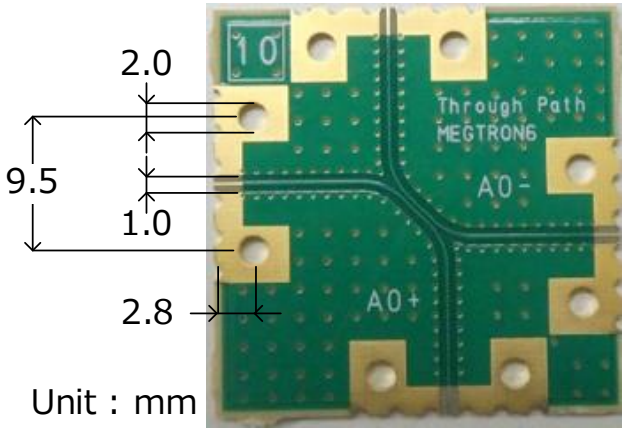
TDS4A212MX Evaluation board Basic information

- This board can measure A0+ ⇔ C0+ path、A0- ⇔ C0- path.
- The differential line on this board is minimized to measure RF signals, but the measurement results include the influence of the board.
  Therefore, a through-path board should be used to remove the board's influence from the measurement results. (See P.5)



➢ TDS4A212MX Evaluation board* (See P.3 P.4)

- Size : 31.11 × 28.87 mm**
- Material : MEGTRON6(Materials for high-frequency signal transmission)
- Evaluated path : A0+ ⇔ C0+ path, A0- ⇔ C0- path
- Evaluated Characterisics : Insetion loss (-3db Bandwidth) , Return loss, OFF isolation



➢ Through Path Board (See P.5)

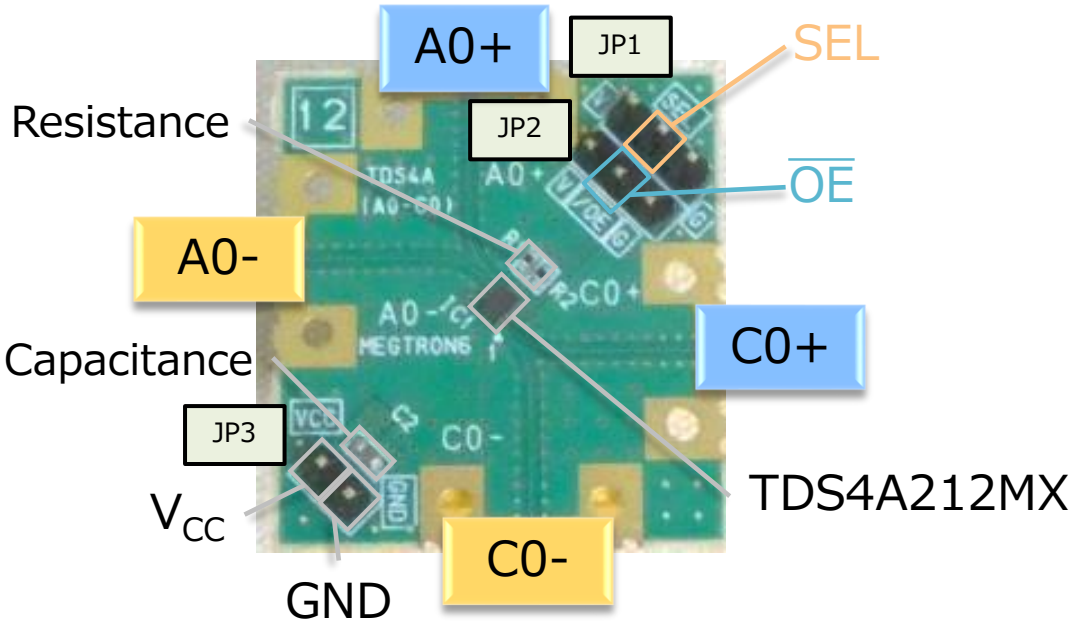
- Size : 28.97 × 28.97 mm**
- Material : MEGTRON6(Materials for high-frequency signal transmission)

*Mounted components are already mounted, but the high-frequency connectors for measurement are not installed.(See P.6)
**Size TDS4A212MX Evaluation board and Through Path Board are different to align the length of line including chip .

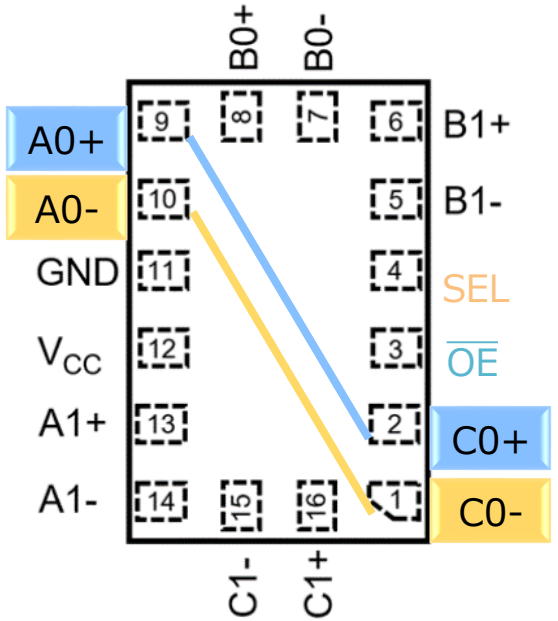
TDS4A212MX Evaluation board General

- This board can measure A0+ ⇔ C0+、A0- ⇔ C0- as a representative path.

➢ Board Top View



➢ TDS4A212MX Top View



✓ Instructions for use are explained on the next page.

➢ Pin Connections

TDS4A212MX		Board
Pin No.	Pin Name	Connection
1	C0-	Connector
2	C0+	Connector
3	$\overline{OE}$	JP2
4	SEL	JP1
5	B1-	OPEN
6	B1+	OPEN
7	B0-	50Ω
8	B0+	50Ω
9	A0+	Connector
10	A0-	Connector
11	GND	GND
12	V_{CC}	JP3
13	A1+	OPEN
14	A1-	OPEN
15	C1-	OPEN
16	C1+	OPEN

TDS4A212MX　Evaluation board Instructions for use

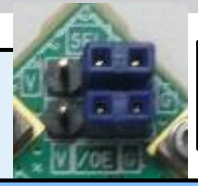
- Measure with a network analyzer.
- Connect control input to H or L with a jumper pin.
- Supply V_{CC} after control input is connected.
- Supply V_{CC} and GND from JP3.
- For connections, refer to the truth table on the right.

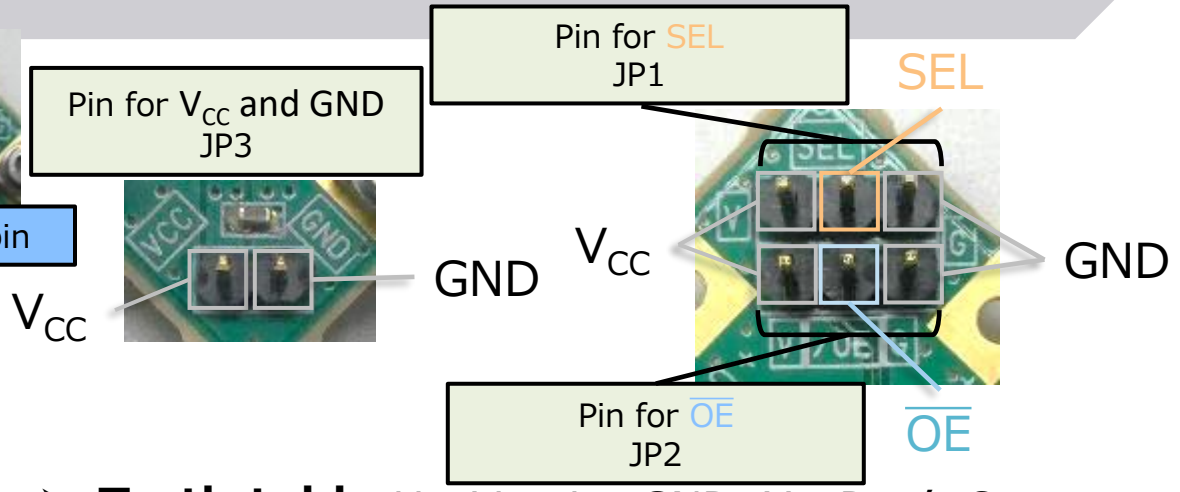
① Measure insertion loss (-3db Bandwidth)
With $\overline{OE}$ connected to GND and the switch active, connect SEL to V_{CC} and A ⇔ C path.
→You can measurement insertion loss from the signal power.

② Measure return loss
The port connection method is the same as ①.
→You can measure return loss from return power.

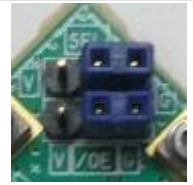
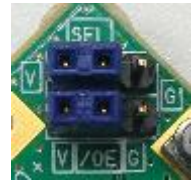
③ Measure OFF isolation
With $\overline{OE}$ connected to GND and the switch active, connect SEL to GND and disconnect A ⇔ C path.
→You can measurement OFF isolation from the signal power.

④ Disconnect the switch
Connect $\overline{OE}$ to V_{CC} , the switch is disconnected.
→the ports are disconnected.





➢ **Truth table** H : V_{CC}, L : GND, X : Don't Care

Item	Control Input $\overline{OE}$	Control Input SEL	Function	View
①②	L	H	An+ Port = Cn+ Port An- Port = Cn- Port	
③	L	L	An+ Port = Bn+ Port An- Port = Bn- Port	
④	H	X (Connect to H or L)	Disconnect	

Through Path Board Instructions for use

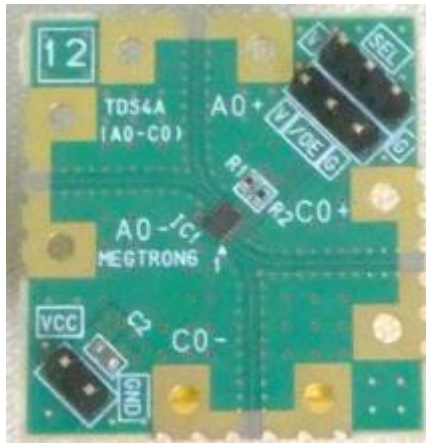
➢ Trrough Path Board General

- The TDS4A212MX evaluation board mesurement results include the influence of the board.

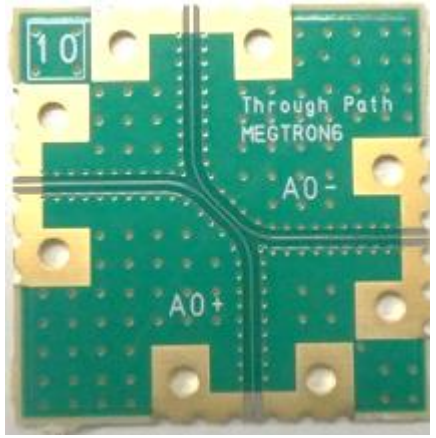
→ Measure only evaluation board to remove the influence of the board.

- Measure Through Path Board.
- As shown in the image below, subtract the Through Path Board measurement results from the TDS4A212MX evaluation board mesurement results to get TDS4A212MX measurement results.

➢ Image of measure



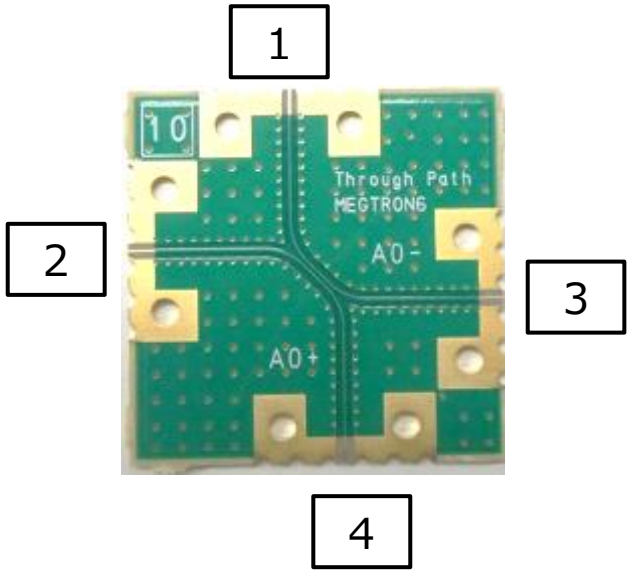
TDS4A212MX
Evaluation board
measurement results



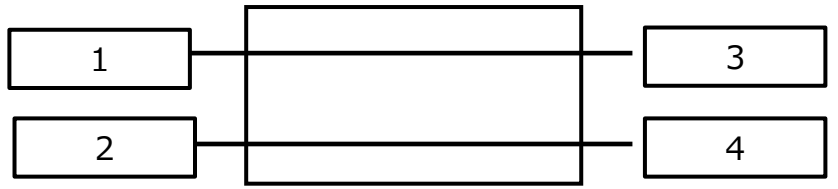
Through Path Board
measurement
results

TDS4A212MX
Measurement
results

➢ Board Top View



➢ Board circuit

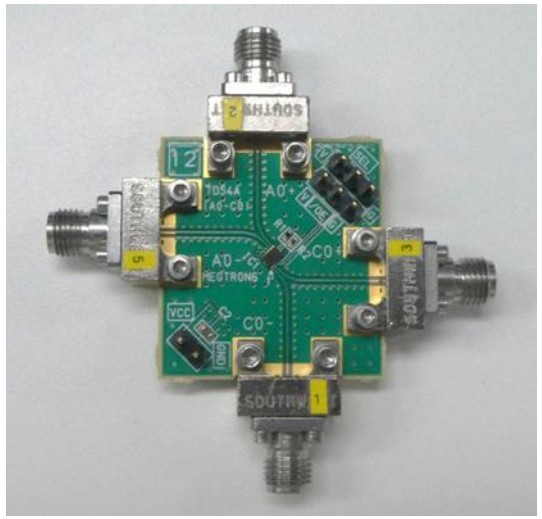


Connector we recommend(End launch connector)

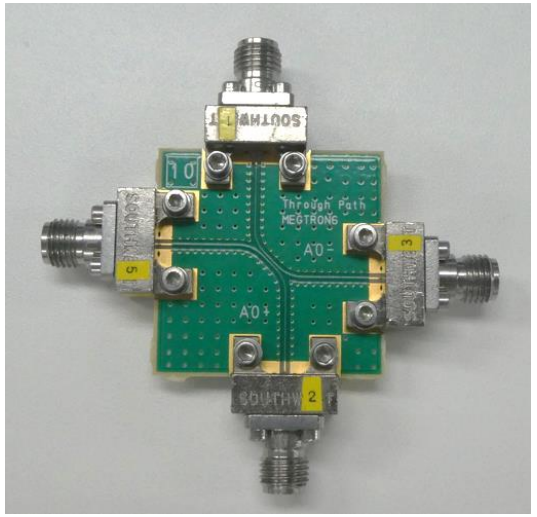
➢ **End launch connector Genral**

Model : 1092-04A-6
Manufacturer : Southwest Microwave
Frequency : 18, 27, 36, 40 GHz
Style : 2.92mm End Launch（K）

➢ **Image**



TDS4A212MX
Evaluation board



Through Path Board

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