

ASM1542 Data Sheet

10Gbps Signal Passive Switch

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Environmentally hazardous materials are not used in this product.

Revision History

Rev.	Date	Description
1.0	September 24, 2014	Initial Release
1.1	Nov. 12, 2014	Rename as ASM1542 from ASM1492

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1. General Description

ASM1542 is a 2 differential pairs, 2:1 mux or 1:2 demux passive switch, using for high speed signal switch application, supporting up to 10Gbps data rate with AC coupled signals, offering low attenuation signal quality, low bit-tbit skew and high channel to channel noise isolation. ASM1542 can be used for not only PCIe and SATA but also SuperSpeedPlus USB and Thunderbolt2 interface. For example, ASM1542 can be used on USB3.1 Type-C connector to support the advance function of flip-able.

2. Features

- ◇ Quick switch for high speed, high bandwidth differential protocols
 - ◇ 2 differential pairs
 - ◇ 2:1 mux or 1:2 demux quick switch
 - ◇ Single SEL pin for path selection
- ◇ Up to 10Gbps signals passive switch
- ◇ Compliant with multiple interface
 - ◇ SuperSpeedPlus USB and PCI Express and DisplayPort and SATA Express Signals
- ◇ Low insertion loss <-19dB
- ◇ Low crosstalk -30dB
- ◇ Low OFF isolation -23dB
- ◇ -3dB bandwidth on 7.5GHz
- ◇ Package: 28 pins QFN, Lead free, RoHs compliance.
- ◇ VCC operation: +3.3V

2.1 Function Diagram

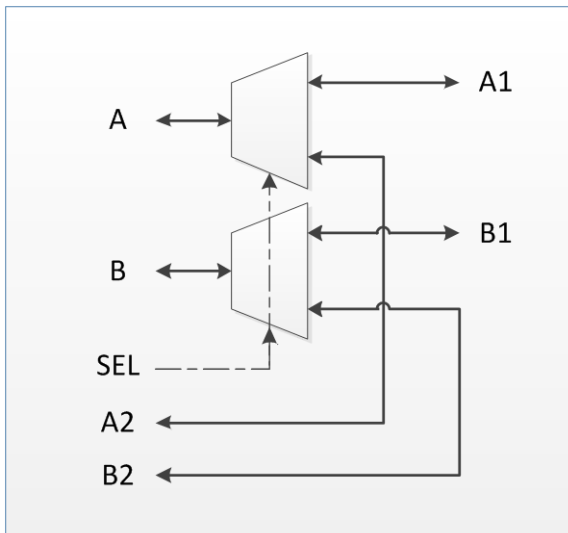


Figure 1: Functional Diagram

2.2 Truth Table

SEL	Function
L	A to A1 & B to B1
H	A to A2 & B to B2

2.3 Pin Configuration

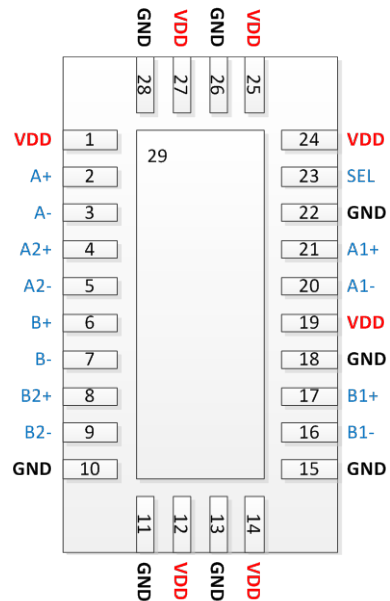


Figure 2: Pin Configuration

2.4 Pin Description

Pin Name	Function Description
A \pm , B \pm , A1 \pm , B1 \pm , A2 \pm , B2 \pm	Data Signals
SEL	Select Input
VDD	3.3V Power
VSS	Ground

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3. AC Characteristics

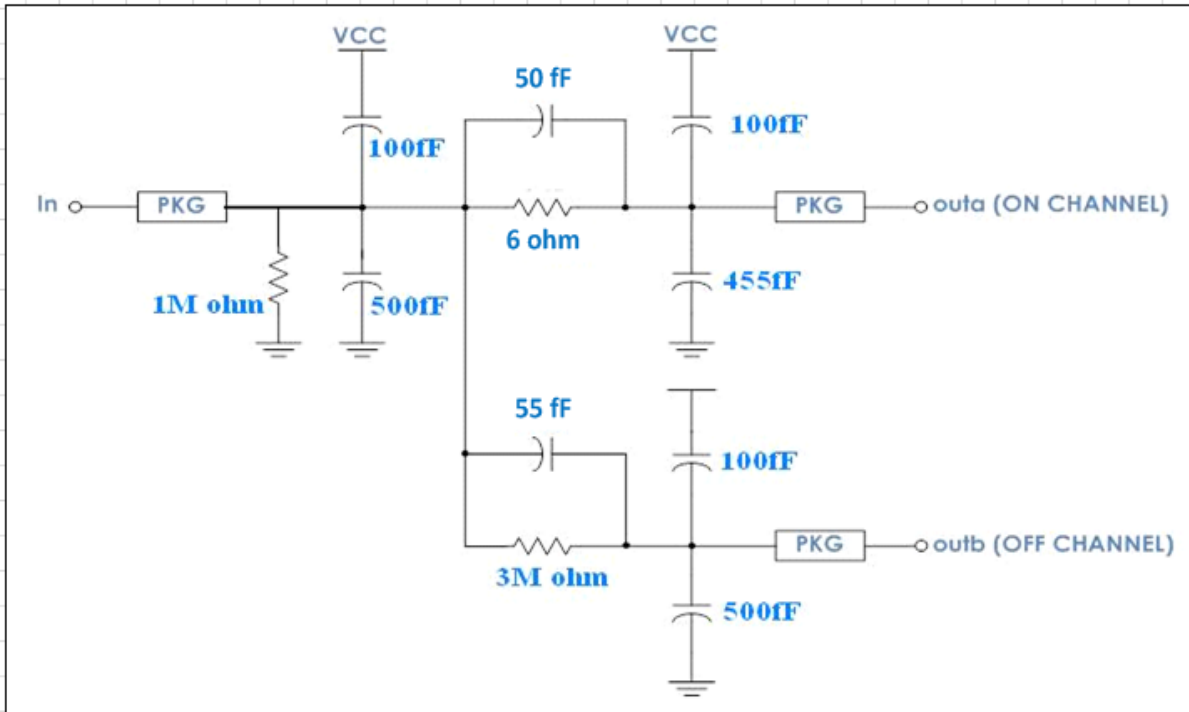


Figure 3: AC Equivalent Circuit

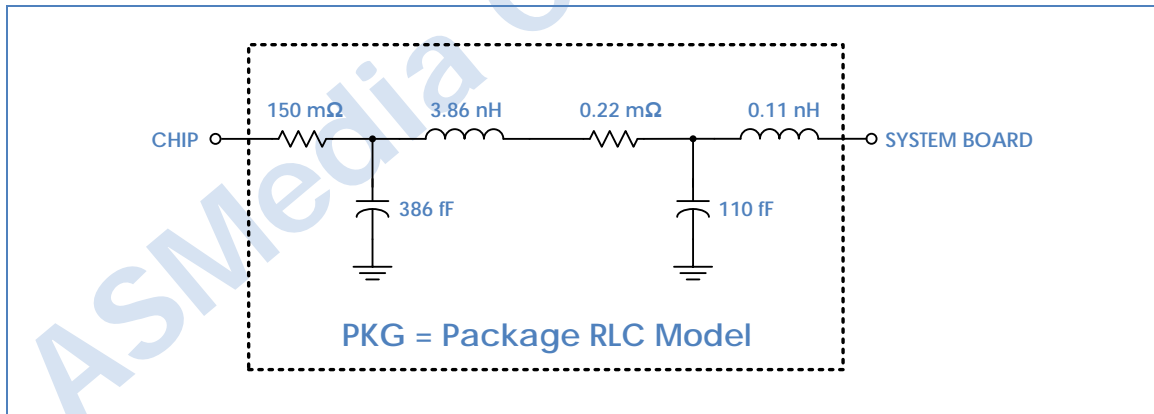


Figure 4: Package RLC Model

4. Electrical Characteristics

4.1 Absolute Maximum Ratings

Stresses the below parameter listed under absolute maximum rating may cause the device permanent damage. This is a stress rating only, and the function operating of the device at these or any other conditions over those parameter in the recommended operating condition is not implied. It is recommended to have a clamp circuit to protect the device with abnormal exhibit voltage spikes while power is switched on or off.

Parameter	Range	Unit
Power Supply	-0.5 ~ VDD+0.5	V
DC Input Voltage	-0.5 ~ VDD+0.5	V
Storage Temperature	JEDEC J-STD-033B MSL 3	

4.2 Recommended Operating Conditions

Symbols	Parameter	Min.	Typ.	Max.	Units
V _{DD}	Power Supply	3.0	3.3	3.6	V
I _{DD}	Quiescent Power Supply Current			1.4	mA
T _J	Operating Junction Temperature		25	125	°C
T _c	Operating Case Temperature		25	85	
ESD	HBM (Human Body Mode)		3		KV
	MM (Machine Mode)		250		V

4.3 AC/DC Electrical Characteristics

4.3.1 DC Electrical Characteristics for SEL pin

Symbols	Description	Test Conditions	Min.	Typ.	Max.	Units
V _{IH}	Input high voltage		2.5	-		V
V _{IL}	Input low voltage		-0.5	-	0.8	V
I _{IH}	Input high current	V _{DD} =V _{SEL} =max.	-0.1	-	0.1	μA
I _{IL}	Input low current	V _{DD} =max., V _{SEL} =GND	-0.1	-	0.1	μA
V _{IK}	Clamp diode voltage	V _{DD} =max., I _{SEL} =-18mA	-0.9	-0.8	-0.6	V

4.3.2 DC Electrical Characteristics for Differential Signals

Symbols	Description	Test Conditions	Min.	Typ.	Max.	Units
V _{CM-DIFF}	Differential Common Mode Voltage		0		1.4	V
I _{IH}	Input high current	V _{DD} =V _{IN} =max.	-10		10	μA
I _{IL}	Input low current	V _{DD} =max., V _{IN} =GND	-10		10	μA

4.3.3 Dynamic Electrical Characteristics for Switching

Symbols	Parameter	Conditions	Min.	Typ.	Max.	Units
X _{TALK}	Crosstalk	f=10Gbps		-30		dB
O _{ISO}	OFF Isolation	f=10Gbps		-23		dB
D _{IL}	Differential Insertion Loss	f=10Gbps		-1.6	-1.9	dB
BW	-3dB Bandwidth			7.5		GHz

4.3.4 Capacitance

Parameter	Description	Test Conditions	Typ.	Units
C _{OFF}	Switch output capacitance, Switch OFF	V _{IN} = 0V	1.1	pF
C _{ON}	Switch total capacitance, Switch ON		2	

4.3.5 Switching Characteristics

Symbols	Description	Min.	Typ.	Max.	Units
t _{PD}	Propagation Delay		0.1		ps
t _{PZH} , t _{PZL}	Line Enable Time – SEL to Input/Output	0.5		6	ps
t _{PHZ} , t _{PLZ}	Line Disable Time – SEL to Input/Output	0.5		9	ps
t _{SK}	Skew between opposite transitions of the same output (t _{PHL} – t _{PLH})		0.1		ps

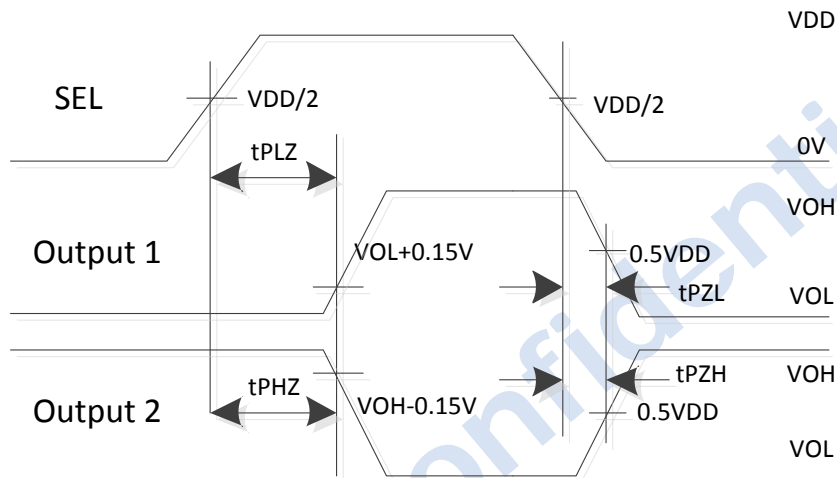


Figure 5: Timing waveforms

5. Test Condition

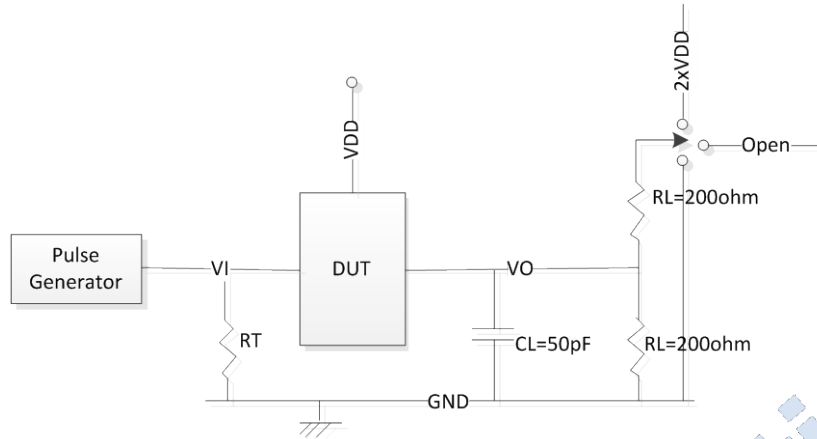


Figure 6: Test Circuit for Timing Characteristics

Notes:

1. CL is the load capacitance: Includes jig and probe capacitance.
2. RT is the termination resistance: should be equal to ZOUT of the pulse generator

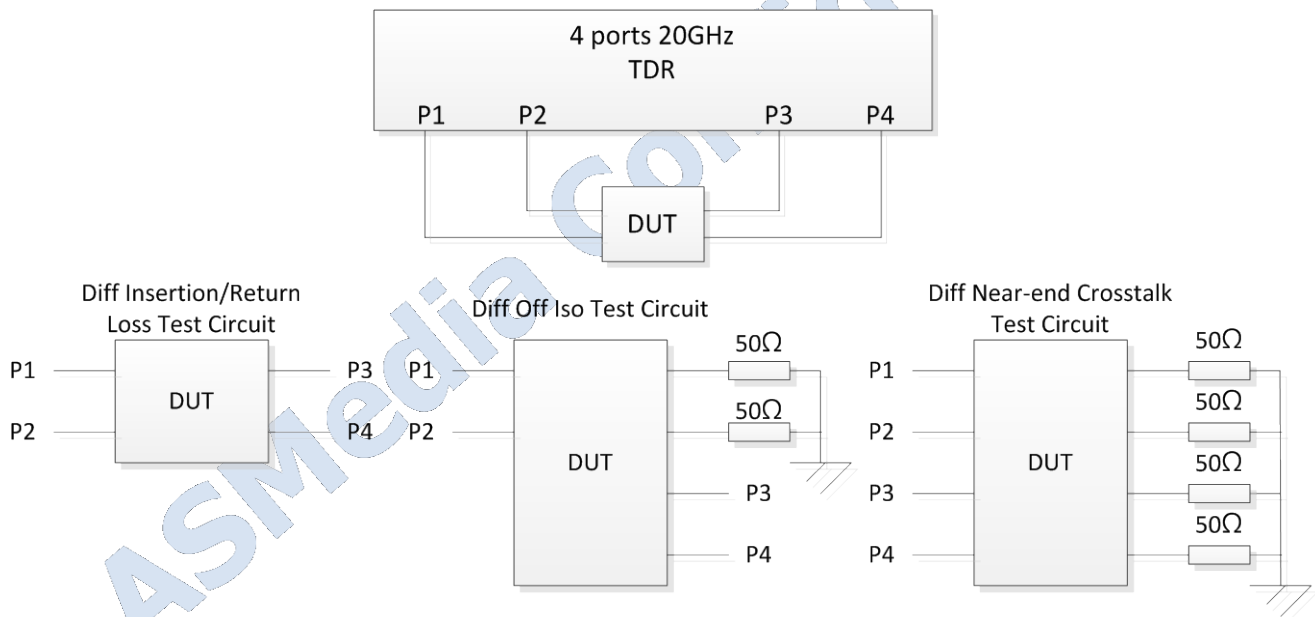


Figure 7: Test Circuit for Electrical Characteristics

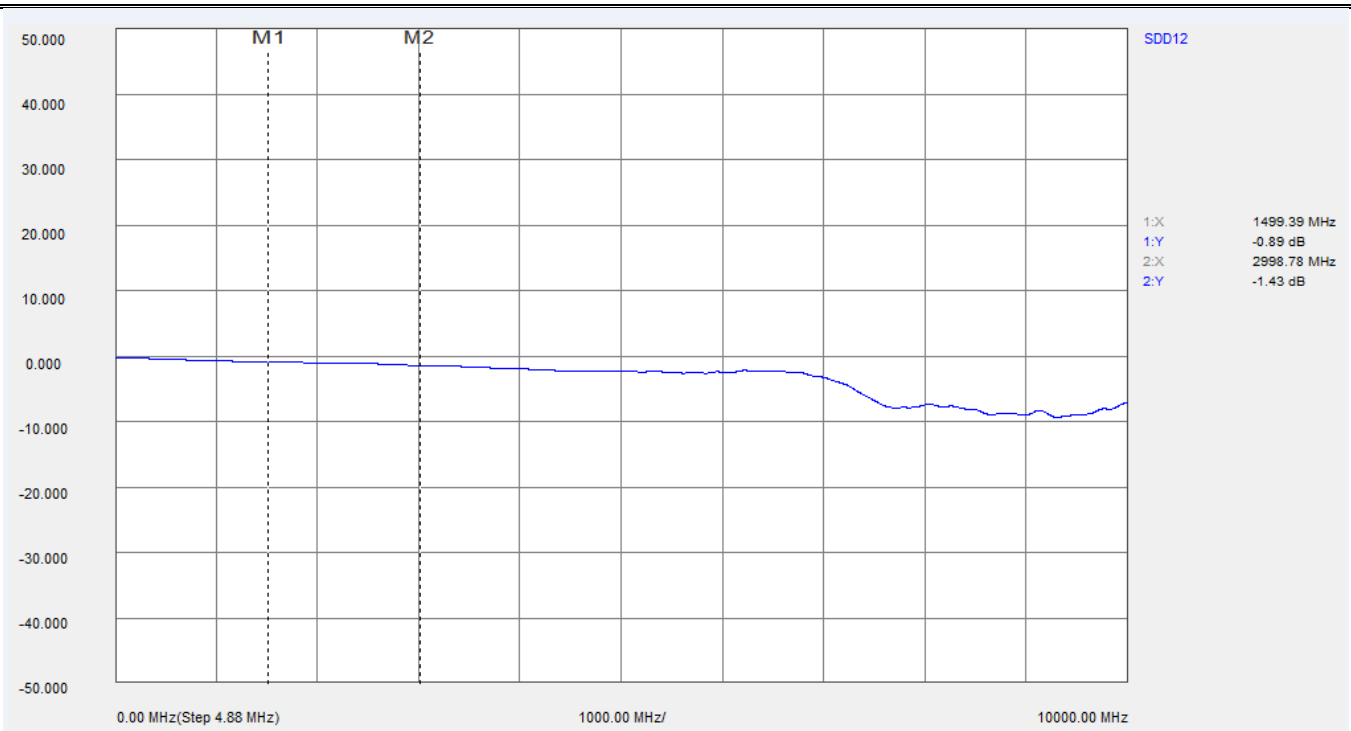


Figure 8: Test Waveform for the Insertion Loss

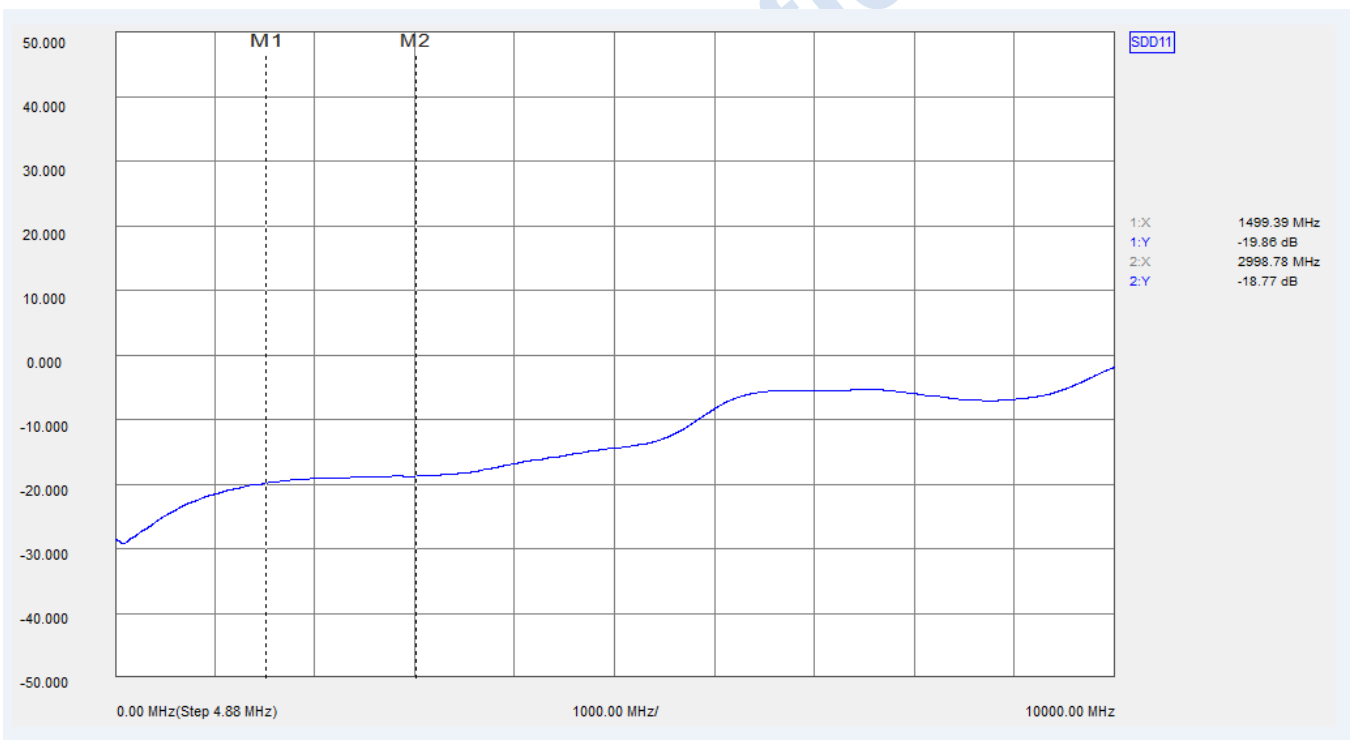


Figure 9: Test Waveform for the Return Loss

6. Package Information

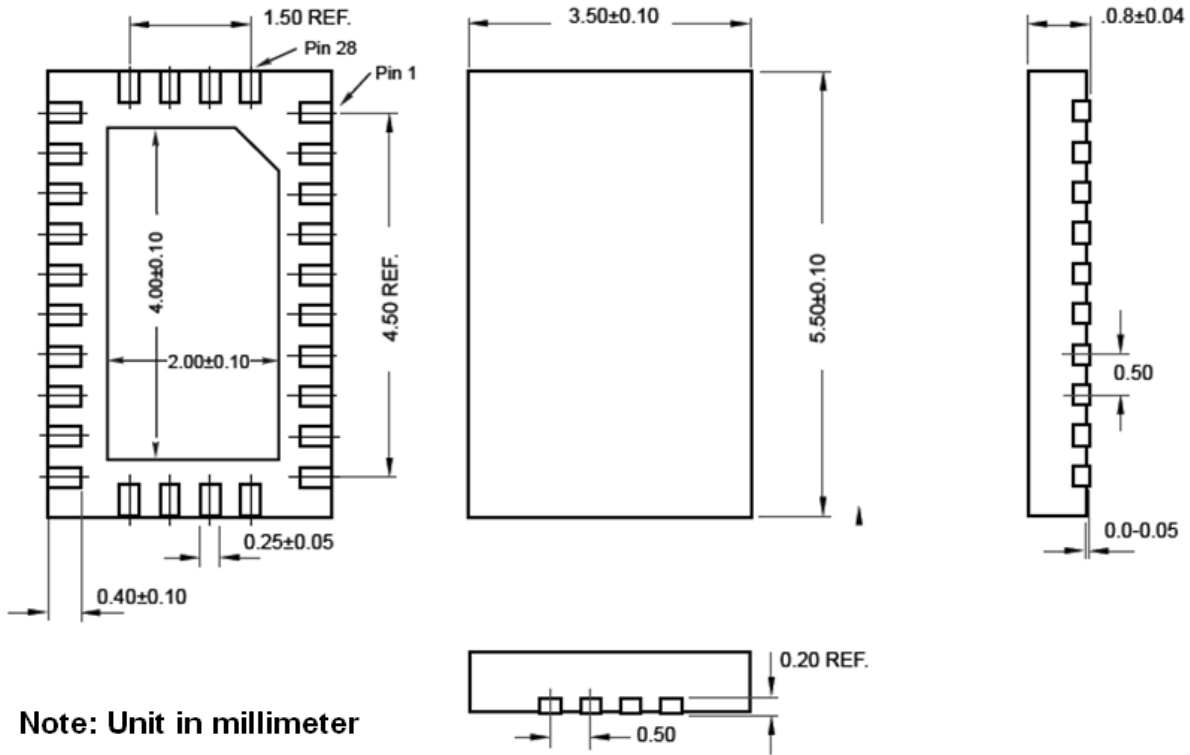
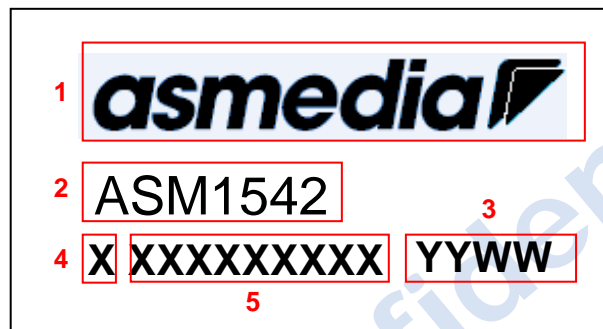


Figure 10: Mechanical Specification – QFN28

7. Top Marking Information



1. ASMedia Logo
2. ASM1542: Product Name
3. YYWW: Date Code
4. X: Version of Marking Rule
5. XXXXXXXXXXXX: Serial No. reserved for vendor