

Wideband Linear Amplifier **AH15199B, AH15203A/B**^{NEW}

AH15199B, AH15203A/B 140 Gbaud wideband linear amplifiers have a -6 dB bandwidth of ≥ 135 , ≥ 125 GHz and a maximum linear output amplitude of 2.0 V_{p-p} and can be used either to drive 800GbE/1.6TbE coherent/IMDD optical modulators, or as booster amplifiers for optical communications and high-frequency test equipment. Furthermore, they have a gain characteristic of 10 dB or more even at 112 GHz, the Nyquist frequency of 224 Gbaud signals, so they can also amplify 224 Gbaud PAM4 signals. AH15203A/B with a built-in output bias tee can directly drive optical modulators, such as EMLs, DMLs, and VCSELs, requiring bias.

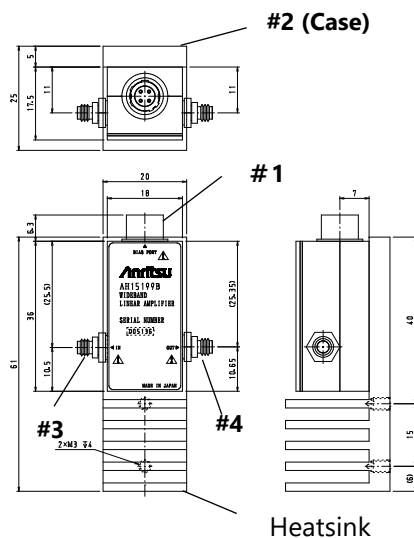
FEATURES

- Operating baud rate: 140 Gbaud typ.
- Linear output level: 2.0 V_{p-p} typ.
- -3 dB Bandwidth: 200 kHz to 105 GHz
- -6 dB Bandwidth: 200 kHz to 135/125 GHz
- Small signal gain: 15.5/15.0 dB typ.
- Power consumption: 1.5 W typ.
- Built-in output bias tee (AH15203A/B only)
- Dedicated power supply – AH15199B-01/AH15203A-01

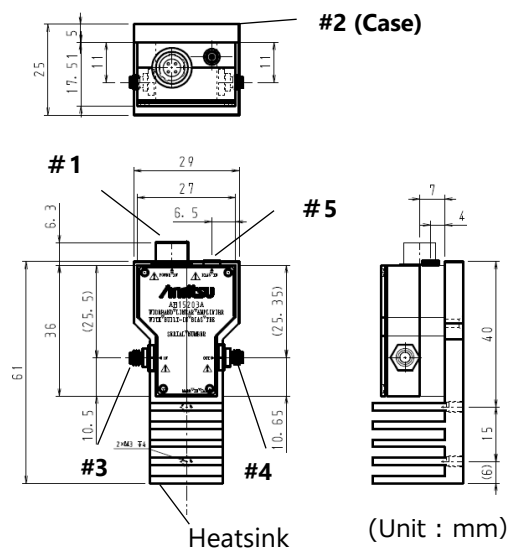
APPLICATIONS

- Driver for 800G/1.6T coherent/IMDD optical modulators
- Booster amplifier for test instruments

DIMENSIONS



AH15199B (Output: AC coupled)



AH15203A (Output: Built-in bias tee)

PIN CONFIGURATION

No.	Symbol	Function	Remarks
1	–	Power Supply	HIROSE; HR10-7R-4S (73)
2	GND	Ground	Case
3	IN	Input Port	W1-Female connector (AH15199B, AH15203A) W1-Male connector (AH15203B)
4	OUT	Output Port	W1-Female connector
5	BIAS	BIAS Supply	MMCX-F connector (AH15203A/B only)

ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Ratings	Unit
Input Signal Voltage	V_{in}	1	V_{p-p}
Operating Ambient Temperature ^{*1}	T_a	5 to 50	°C
Storage Temperature ^{*1}	T_{stg}	-20 to 60	°C
Bias tee maximum current ^{*2}	I_{BT}	150	mA

*Exceeding the absolute maximum ratings may cause device failure.

*1 No Condensation

*2 AH15203A/B

ELECTRICAL CHARACTERISTICS

NEW
($T_a=25^{\circ}\text{C}$, $Z_{in}=50\ \Omega$, $Z_{out}=50\ \Omega$)

Item	Test Condition	AH15199B			AH15203A/B			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	
Baud Rate ^{*1}	—	—	140	—	—	140	—	Gbaud
Maximum Linear Output Voltage ^{*1}	$V_{in} = 0.35 V_{p-p}$	—	2.0	—	—	2.0	—	V_{p-p}
Jitter ^{*1,2}	—	—	300	500	—	300	500	fs
T_r/T_f ^{*1}	20% to 80%	—	5	—	—	5	—	ps
Small Signal Gain	@1 GHz	—	15.5	—	—	15.0	—	dB
Bandwidth	-3 dB (low end)	—	200	500	—	200	500	kHz
	-3 dB (high end)	—	105	—	—	105	—	GHz
	-6 dB (high end)	—	135	—	—	125	—	GHz
Input Return Loss	<35 GHz	10	18	—	10	18	—	dB
	<65 GHz	5	12	—	5	12	—	dB
Output Return Loss	<35 GHz	10	18	—	10	18	—	dB
	<65 GHz	5	12	—	5	12	—	dB
Built-in bias tee ^{*3}	-3 dB	—	—	—	10	15	—	kHz
Output Polarity	—	Inverted			Inverted			—

*1 Measured under following conditions:

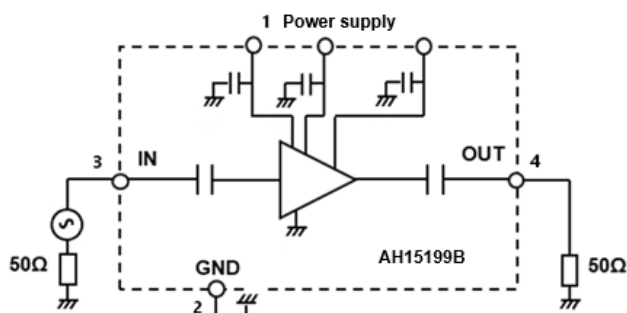
-Measured using ≥ 100 GHz sampling head with intrinsic jitter of less than 200fs.

-Powered by AH15199B-01/AH15203A-01 dedicated power supply.

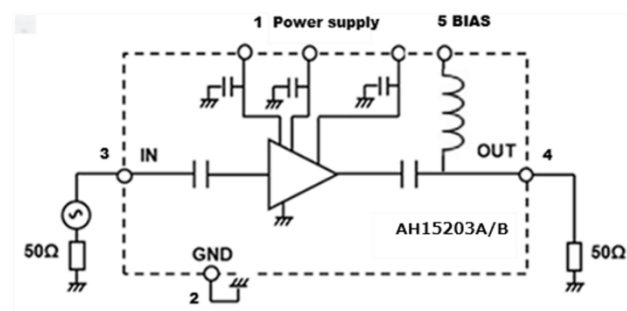
*2 Jitter (add) = $\sqrt{\text{Jitter (out)}^2 - \text{Jitter (in)}^2}$

*3 Supply voltage max. ± 5 V, DC resistance about $3\ \Omega$

BLOCK DIAGRAM



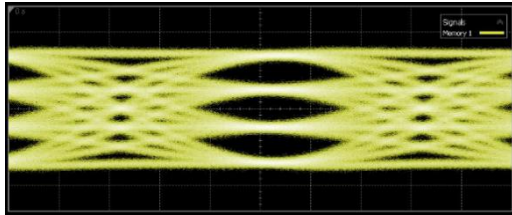
AH15199B Block Diagram



AH15203A/B Block Diagram

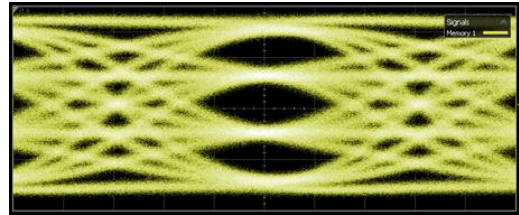
OUTPUT WAVEFORMS (AH15199B)

112 Gbaud PAM4



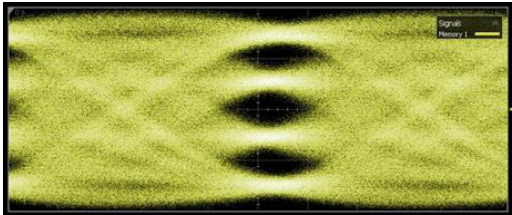
Outer OMA: 1.24 V R_{LM} : 0.96

112 Gbaud PAM4



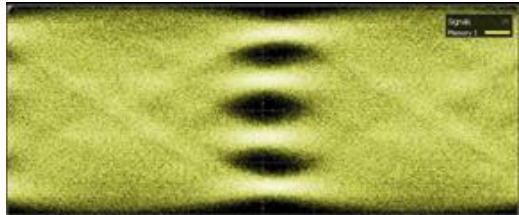
Outer OMA: 2.09 V R_{LM} : 0.92

140 Gbaud PAM4



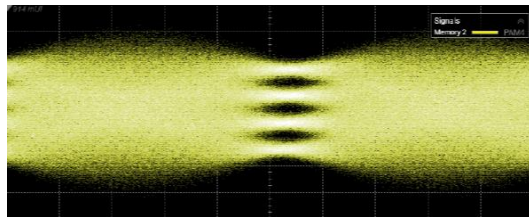
Outer OMA: 2.00 V R_{LM} : 0.92

160 Gbaud PAM4



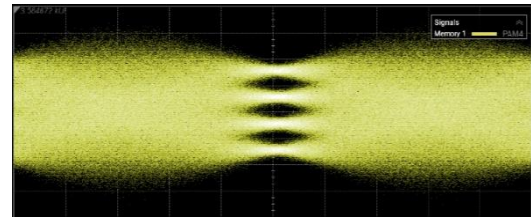
Outer OMA: 2.00 V R_{LM} : 0.92

224 Gbaud PAM4 (Single)



Outer OMA: 0.557 V

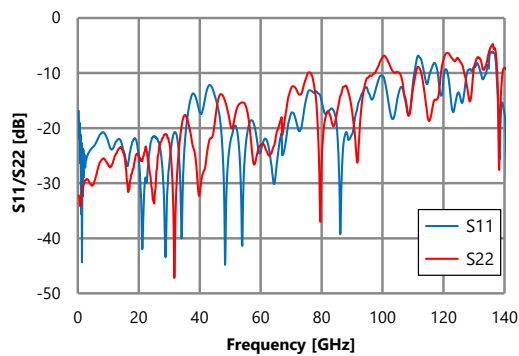
224 Gbaud PAM4 (differential)



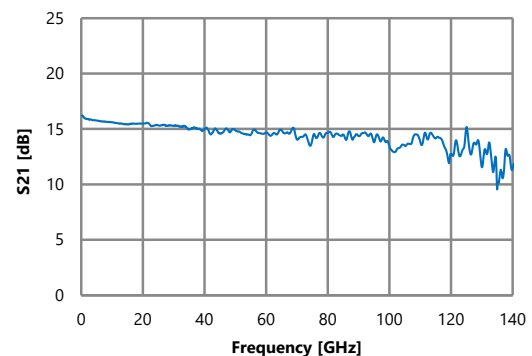
Outer OMA: 1.00 V

Calibrated waveforms with AWG system

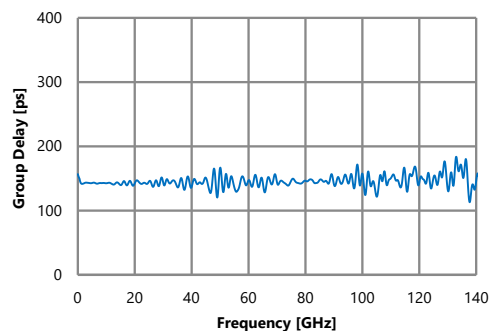
FREQUENCY RESPONSE (AH15199B)



S11/S22



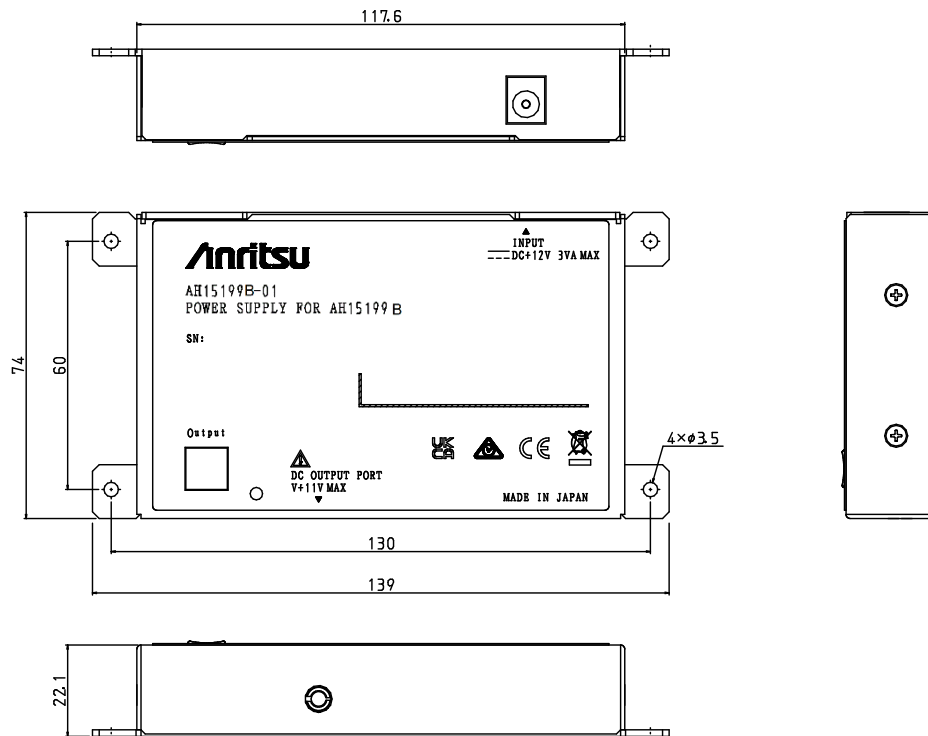
S21



Group Delay

DEDICATED POWER SUPPLY (AH15199B-01/AH15203A-01)

DIMENSIONS



(Unit: mm)

SPECIFICATIONS

Electrical characteristics ($T_a = 25^\circ\text{C}$)

$V_{in} = +12 \text{ V DC}$ [AC adapter (100 to 240 V AC, 50/60 Hz)]

Item	Symbol	Min.	Max.	Unit
Output Voltage	V_{DC}	—	11	V
Output Current	I_{DC}	—	0.2	A
Power Consumption	P_t	—	3	VA
Operating Ambient Temperature ^{*1}	T_a	5	40	$^\circ\text{C}$
Storage Temperature ^{*1}	T_{stg}	-20	60	$^\circ\text{C}$

^{*1} No Condensation



Photo: AH15199B-01

ORDERING INFORMATION

Please specify the model, name and quantity when ordering.

Model	Name
AH15199B	Wideband Linear Amplifier
AH15199B-01	Power Supply for AH15199B (Be sure to specify) — Standard Accessories — AC Adapter: 1 pc Dedicated DC Power Cable: 1 pc
AH15203A	Wideband Linear Amplifier with built-in Bias Tee (Input Female connector) — Standard Accessories — MMCX to BNC Adapter Cable: 1 pc
AH15203B	Wideband Linear Amplifier with built-in Bias Tee (Input Male connector) — Standard Accessories — MMCX to BNC Adapter Cable: 1 pc
AH15203A-01	Bias Controller for AH15203 (Be sure to specify together with AH15203A or AH15203B) — Standard Accessories — AC Adapter: 1 pc Dedicated DC Power Cable: 1 pc



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<https://www.anritsu.com/en-us/sensing-devices/guide/electrondevices-handling>



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