

DATA SHEET

# ACA4789: 1218 MHz 25 dB Gain CATV Power-Doubler Amplifier

## Applications

- Advanced high-power, high-frequency HFC transmission systems
- Output power doubler for deep fiber node in CATV distribution
- High-gain, high-efficiency driver for 4X Class D3.1 PHY DS compliant PDs
- CATV digital edge QAM output driver

## Features

- 50 to 1218 MHz frequency range
- 25 dB gain @ 1218 MHz
- >+55 dBmV RF<sub>OUT</sub> @ 1218 MHz with mixed signal load
- +70 dBmV TCP
- Single +24 V supply
- Operating current = 410 mA
- Advanced circuitry + GaN amplifier technologies
- Halogen free/RoHS compliant

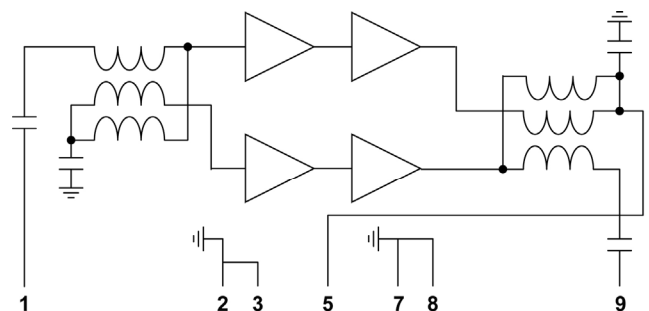


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## Description

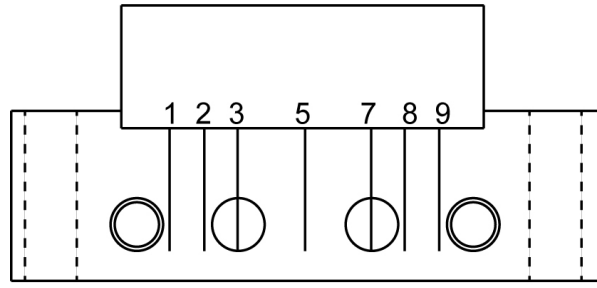
The ACA4789 is a highly linear, high-output power hybrid RF amplifier designed for CATV head-ends and HFC distribution systems. The module consists of two parallel amplifiers that are optimized for exceptionally low distortion, high-output power, and high crash point. A GaN output stage is incorporated to minimize the operating (bias) current, making this an excellent choice for environmentally friendly “green” initiatives.

A functional block diagram is shown in Figure 1. The pin configuration and package are shown in Figure 2. Signal pin assignments and functional pin descriptions are provided in Table 1.



204346-001

Figure 1. ACA4789 Functional Block Diagram



204346-002

**Figure 2. ACA4789 Pinout (Side View)**

**Table 1. ACA4789 Signal Descriptions**

Pin	Name	Description	Pin	Name	Description
1	RFIN	RF input	5	VDD	24 V supply
2	GND	Ground	7, 8	GND	Ground
3	GND or N/C	Ground or no connection	9	RFOUT	RF output

### Electrical and Mechanical Specifications

The absolute maximum ratings of the ACA4789 are provided in Table 2.

The recommended operating conditions are specified in Table 3, and electrical specifications are provided in Table 4.

**Table 2. ACA4789 Absolute Maximum Ratings<sup>1</sup>**

Parameter	Symbol	Min	Typ	Max	Units
Supply voltage	VDD		+24	+28	V
RF power at inputs	P <sub>IN</sub>			+75	dBmV
Storage temperature	T <sub>STG</sub>	-40		+100	°C

<sup>1</sup> Exposure to maximum rating conditions for extended periods may reduce device reliability. There is no damage to device with only one parameter set at the limit and all other parameters set at or below their nominal value. Exceeding any of the limits listed here may result in permanent damage to the device.

**ESD HANDLING:** Although this device is designed to be as robust as possible, electrostatic discharge (ESD) can damage this device. This device must be protected at all times from ESD when handling or transporting. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD handling precautions should be used at all times.

**Table 3. ACA4789 Recommended Operating Conditions<sup>1</sup>**

Parameter	Symbol	Min	Typ	Max	Units
RF input/output frequency	f	50		1218	MHz
Supply voltage	V <sub>DD</sub>		+24		V <sub>DC</sub>
Case temperature	T <sub>C</sub>	-40		+100	°C

<sup>1</sup> The device may be operated safely over these conditions; however, parametric performance is guaranteed only over the conditions defined in the electrical specifications.

**Table 4. Electrical Specifications**

(T<sub>MB</sub> = +30 °C, V<sub>DD</sub> = +24 V<sub>DC</sub>, f = 50 to 1218 MHz, 75 Ω Loading)

Parameter	Symbol	Min	Typ	Max	Unit	Comments
Gain (1218 MHz)		24.5	25.5	26.5	dB	f = 1218 MHz
Cable equivalent slope			2.0		dB	
Gain flatness to 1218 MHz <sup>2</sup>			0.1		dB	
Noise figure	NF		5.5		dB	Typ at 500 MHz
Composite triple beat <sup>1</sup>	CTB		-73	-68	dBc	
Composite second order <sup>1,4</sup>	CSO		-70	-63	dBc	
Cross modulation <sup>1</sup>	XMOD		-65		dBc	
Composite intermodulation noise <sup>1</sup>	CIN		-60	-57	dBc	
Composite carrier to noise ratio <sup>1</sup>	CCNR		60		dB	
Modulation error ratio <sup>3</sup>	MER		41		dB	
Bit error rate <sup>3</sup>	BER		1e-06		Bits/second	
Input return loss:	IRL					
50 to 550 MHz			-23	-19	dB	
550 to 870 MHz			-20	-17	dB	
870 to 1218 MHz			-18	-16	dB	
Output return loss:	ORL					
50 to 250 MHz			-23	-18	dB	
250 to 870 MHz			-20	-17	dB	
870 to 1218 MHz			-18	-16	dB	
Supply current			410		mA	



Notes: All specifications as measured on evaluation assembly.

- <sup>1</sup> Parts measured with 77 NTSC analog channels plus 111 equivalent digital SC-256-QAM channels to 1215 MHz, +55 dBmV output power measured at the highest reference channel and 10 dB tilt referenced to 1218 MHz.
- <sup>2</sup> Peak deviation in gain over 10 MHz from 50 MHz to 1218 MHz.
- <sup>3</sup> +52 dBmV output power referenced to 1218 MHz, 190 QAM channels, 10 dB tilt, 70 dBmV TCP.
- <sup>4</sup> Worst-case CSO measured at Ch 5 (77.25 MHz).

### Package Dimensions

The ACA4789 is packaged in a standard SOT-115J design. Figure 3 shows the typical part marking. Figure 4 shows the package dimensions.

### Package and Handling Information

The ACA4789 is packaged and shipped in boxes containing plastic anti-static trays indented to accommodate individual units. Each shipping box contains 100 units.

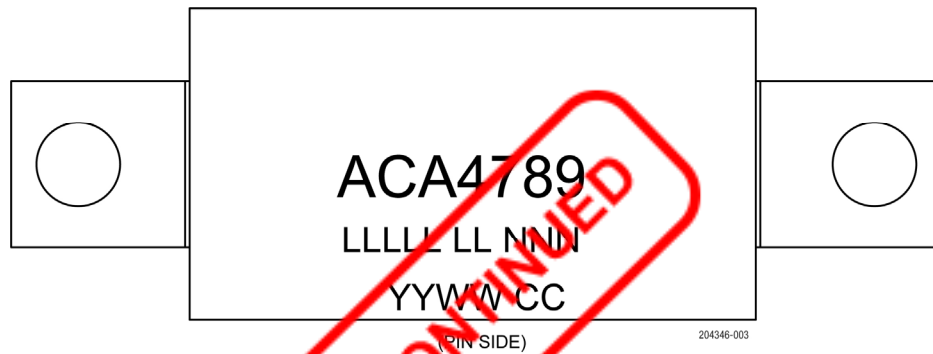


Figure 3. Typical Part Marking

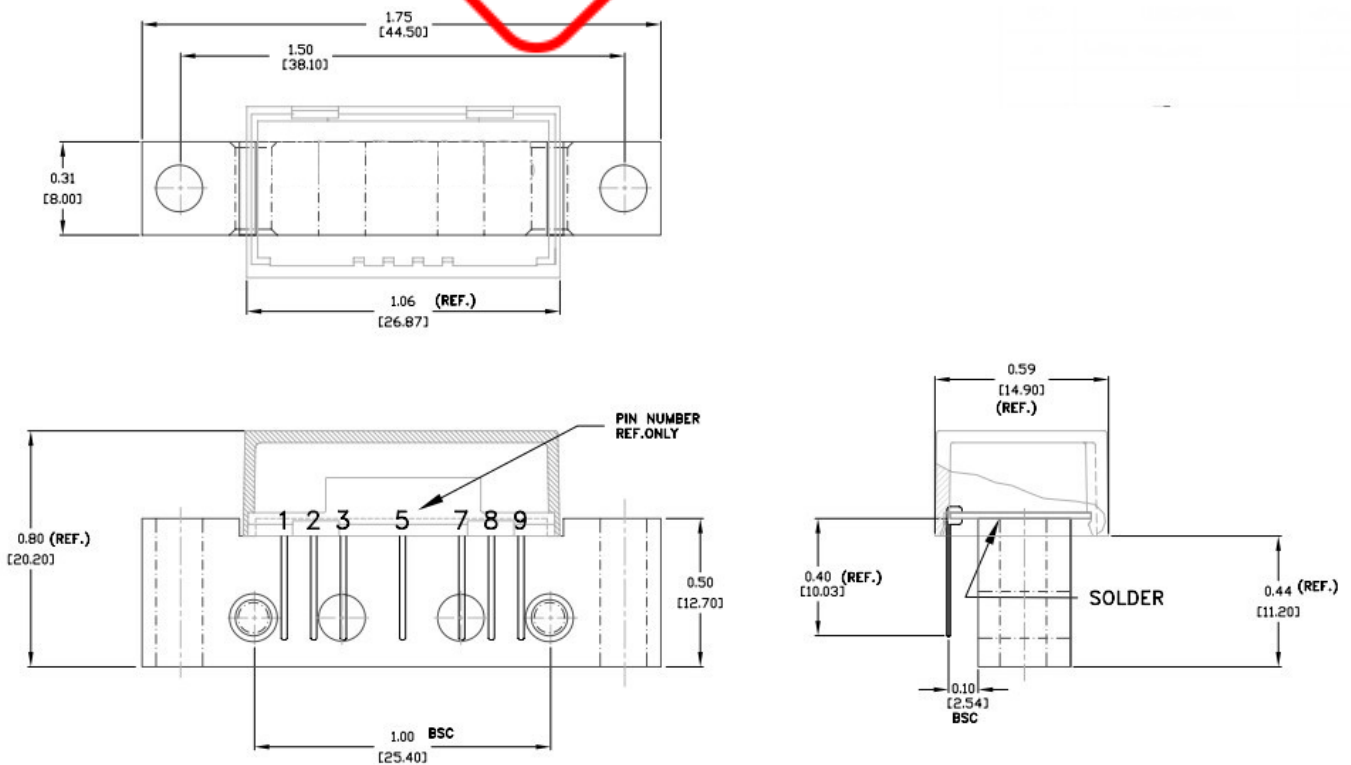


Figure 4. ACA4789 Package Dimensions

## Ordering Information

Part Number	Product Description	Packaging
ACA4789V0	1218 MHz 25 dB Gain CATV Power-Doubler Amplifier	100-piece box



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