Product Description

ATEK160 is a wideband low noise amplifier covering DC to 28 GHz frequency range. Amplifier can be used up to 30 GHz.

ATEK160 provides flat gain and low noise over wideband.

RF input and output matched to 50 ohms internally.

Evaluation Board, bare die, custom package, and module options are available upon request.

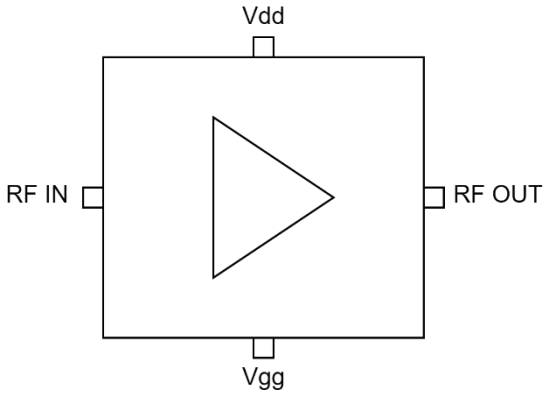
Product Features

- Frequency Range: DC - 28 GHz
- Gain: 16 dB
- Noise Figure: 3 dB
- P1dB: 17 dBm

Applications

- Wideband Receivers
- Telecommunication
- Test and Measurement
- SATCOM
- SDR

Functional Block Diagram



Electrical Specifications

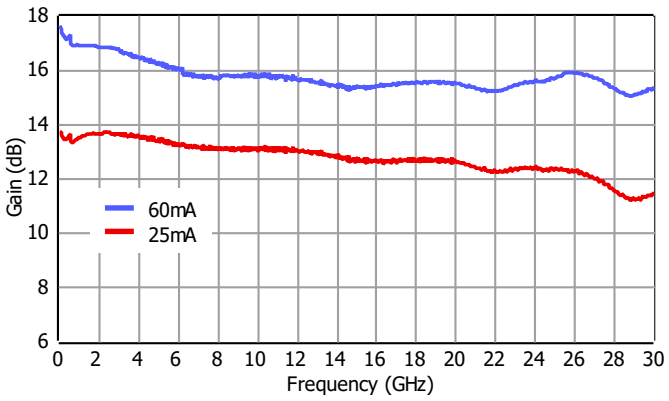
Conditions unless otherwise specified: V_{DD} = 8 V, I_{DQ} = 60 mA, Typical, T = 25 C, CW.

Parameter		Min	Typ	Max	Units
Operational Frequency Range		LF		28	GHz
Gain	0.01 GHz		18		dB
	4 GHz		16.4		
	12 GHz		15.7		
	18 GHz		15.5		
	28 GHz		15.4		
Isolation	0.01 GHz		75		dB
	4 GHz		48		
	12 GHz		35		
	18 GHz		31		
	28 GHz		27		
Input Return Loss			-15		dB
Output Return Loss			-20		dB
Output IP3			TBD		dBm
Output P1dB			17		dBm
Psat			TBD		dBm
Noise Figure			3		dB
DC Supply Voltage (Vdd)			8		V
DC Gate Voltage (Vgg)(Adjustable)		-2		-0.2	V
DC Supply Current			60		mA
Operating Temperature		-40		85	°C

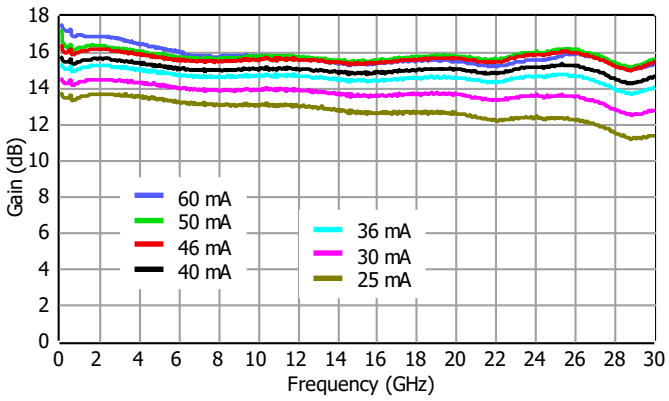
Typical Performance Plots

Conditions unless otherwise specified: V_{DD} = 8 V, I_{DQ} = 60 mA, Typical, T = 25 C, CW.

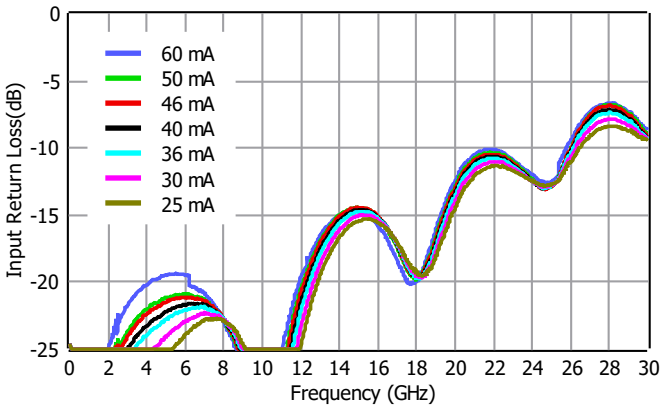
Gain



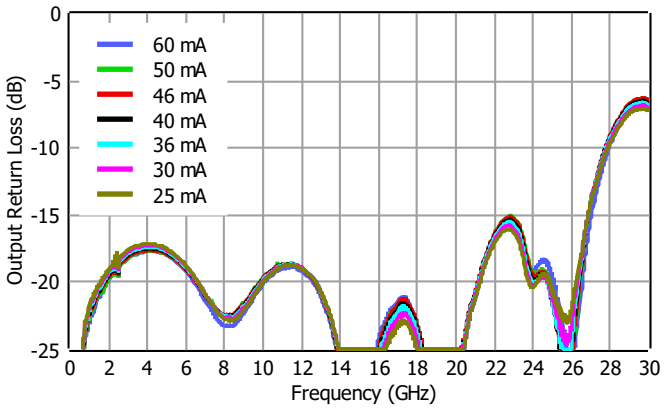
Gain



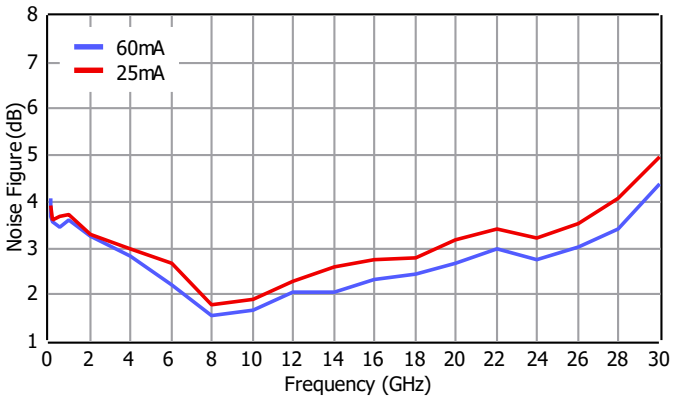
Input Return Loss



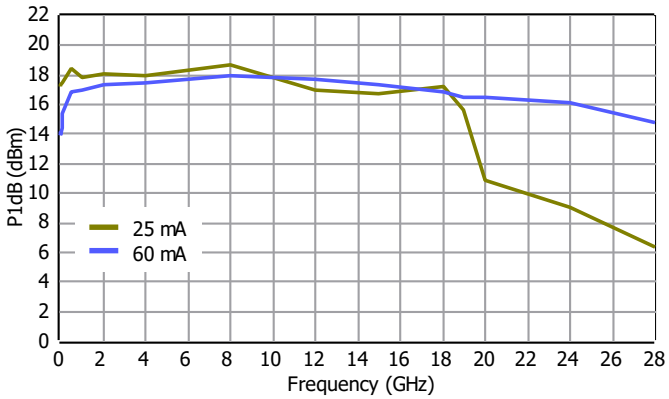
Output Return Loss



Noise Figure



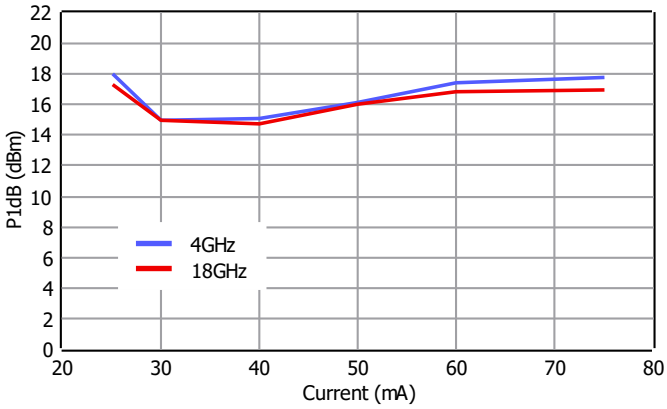
Output P1dB



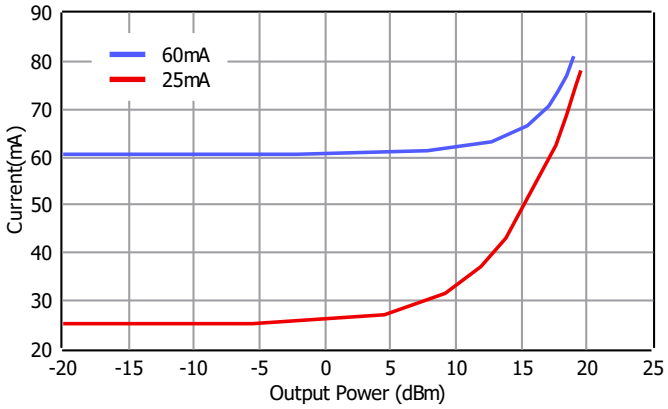
Typical Performance Plots

Conditions unless otherwise specified: V_{DD} = 8 V, I_{DQ} = 60 mA, Typical, T = 25 C, CW.

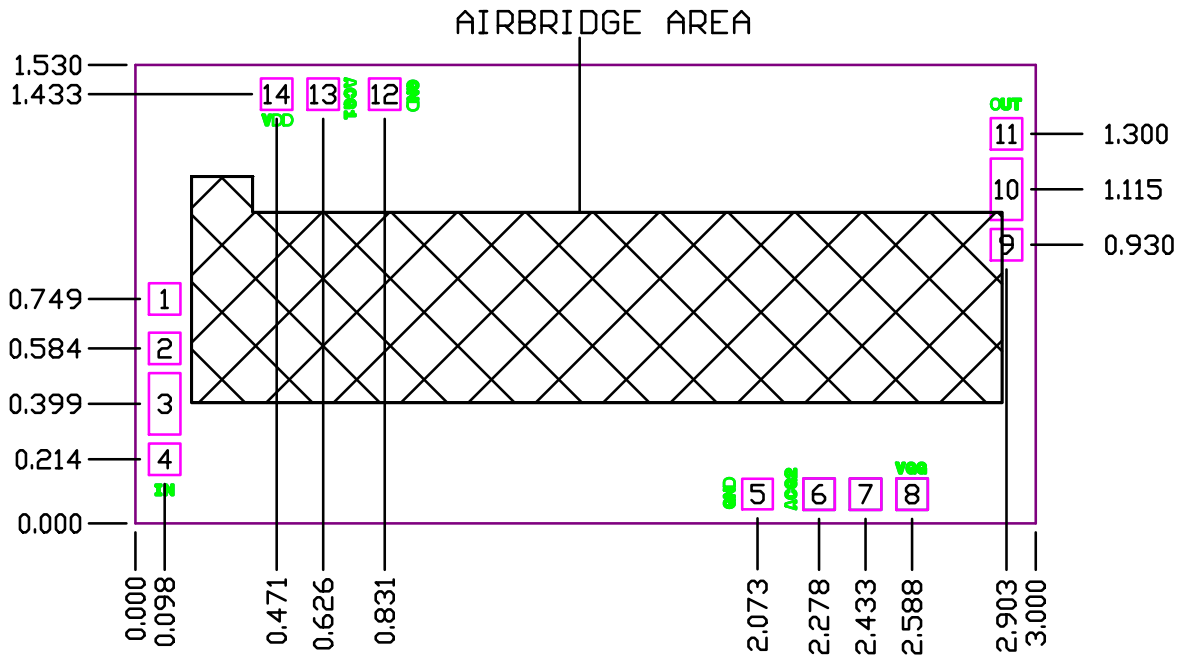
Output P1dB vs Current



Current vs Output Power at 8 GHz



Pad Description and Mechanical Dimensions

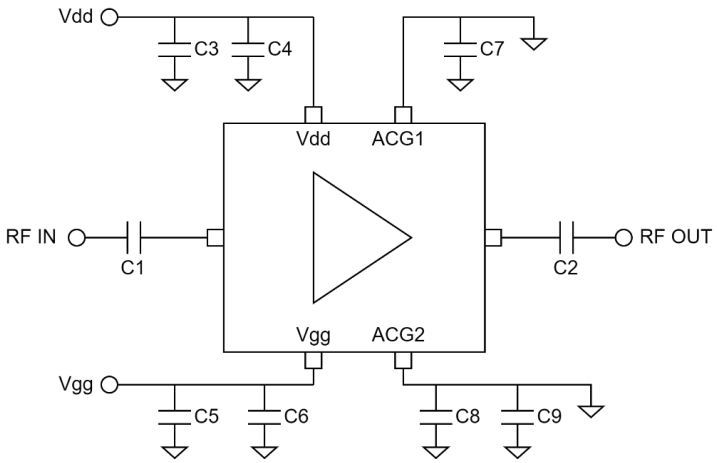


Units: millimeters
Thickness: 0.10
Die x, y size tolerance: ±0.05
Backside of die is ground

Pad Number	Pad Name	Pad Size (mm)	Description
3	RFIN	0.105x0.205	RF input pad. Wideband DC Block capacitor is required.
10	RFOUT	0.105x0.205	RF output pad. Wideband DC Block capacitor is required
14	VDD	0.105x0.105	Drain Bias Pad.
8	VGG	0.105x0.105	Gate Bias Pad.
13	ACG1	0.105x0.105	AC Ground Pad. External shunt capacitor is required.
6	ACG2	0.105x0.105	AC Ground Pad. External shunt capacitor is required.
1, 7	DNC	0.105x0.105	These pads are used for internal purposes. They should be left open/floating
2, 4, 5, 9, 11, 12	GND	0.105x0.105	Ground.
	Die Bottom		Ground.

Applications Information

Signal entering from RF IN goes to RF OUT with an amplification.
Typical application schematic to operate the amplifier is given below.



C1 and C2 are DC block capacitors. It is recommended to use wideband low loss DC block capacitors to achieve the best performance. Using low profile capacitors is also possible, which will result in additional loss.

Choosing higher values for C1 and C2 will allow amplifier to operate at lower frequencies, compared to the plots that are given in this datasheet.

C3, C4, C5 and C6 are used to filter out the ripples and unwanted signals coming from the Vdd and Vgg supply. Using additional capacitors in parallel to C3, C4, C5 and C6 will improve this filtering. If this filtering is of no concern, then amplifier can be operated without C3, C4, C5 and C6.

C7, C8, and C9 are AC ground capacitors. Measurement results in this document are generated with ACG capacitors.

Recommended power up sequence:

1. Set Vgg to -2V
2. Set Vdd to 8V (nominal bias).
3. Increase Vgg from -2V toward -0.3V to achieve target Idq value. (Adjust Vgg between -2 to -0.5V to achieve Idd= 60 mA typical).
4. Apply RF.

Recommended power down sequence:

1. Remove RF
2. Set Vgg to -2V
3. Set Vdd to 0V

Do not apply Vdd supply when Vgg supply is not present. Applying Vdd without the presence of Vgg will damage the device. Applying Vdd when Vgg=0V will damage the device.

Small signal plots are gathered with probe PCB measurements, to generate the data shown in this document.

Large signal and noise figure datas are generated with connectorized evaluation PCB measurements. Then the input loss of the PCB is de-embedded from the measurement data across frequency, to generate the NF data shown in this document. Similarly, output losses are de-embedded to generate large signal data.

Absolute Maximum Ratings

Parameter	Value/Range
Supply Voltage (Vdd)	TBD
RF Input Power	TBD
Storage Temperature	−55 to +125°C

Operation of this device outside the parameter ranges given above may cause damage. These conditions should not be applied simultaneously.

Handling Precautions

Caution!
ESD-Sensitive Device
Handle Accordingly

Contact Information

For the latest specifications, additional product information, support, and sales.
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Revisions

Revision No	Revision Date	Revision Reason	Section / Page No
1.0	01.08.2024	Initial Release	
1.1	16.07.2025	Mechanical Drawing Updated	
1.2	18.07.2025	Mechanical Drawing Updated	