

Product Description

ATEK890P4 is a tunable high pass filter with low in band loss and high rejection. Filter is controlled by 4-bit GPIO control interface. 16 filters covering from 1.00 to 1.95 GHz frequency band.

Filter is developed in highly repeatable MMIC manufacturing process, which results in minimal part to part variation.

Bias and control voltages of the filters are positive, which eliminates the need for negative voltage rails.

Filter is housed in compact 4x4 mm low cost SMD package. Input and output are matched to 50 ohms internally.

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

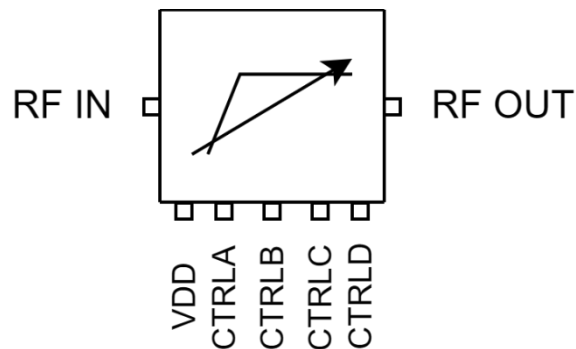
Product Features

- Frequency Range: 1.00 - 1.95 GHz
- Insertion Loss: 2 dB
- Input IP3: 52 dBm
- Positive Supply
- 4x4 mm compact size

Applications

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

Functional Block Diagram



Electrical Specifications

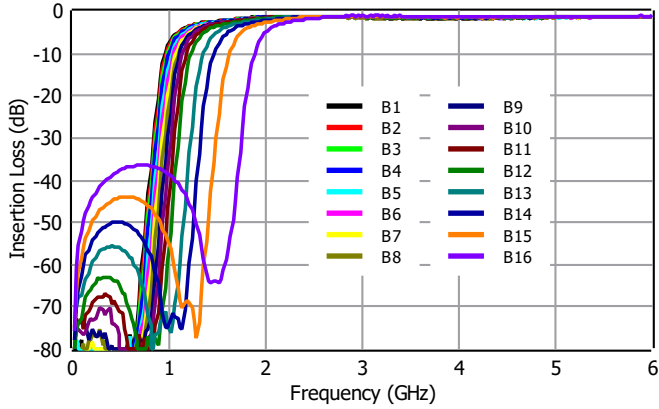
Conditions unless otherwise specified: $V_{DD} = 5V$, Typical, $T = 25\text{ C}$, CW.

Parameter		Min	Typ	Max	Units
Operational Frequency Range			1.00	1.95	GHz
Insertion Loss			2		dB
Input Return Loss			-12		dB
Output Return Loss			-12		dB
Input IP3			52		dBm
Input P1dB			TBD		dBm
Switching Speed	On		130		ns
50% Vctrl to 90% of RF Output	Off		25		
DC Supply Voltage (Vdd)		3	5	5.5	V
DC Supply Current (Idd)			2		mA
DC Supply Current (Ictrl1+Ictrl2+Ictrl3+Ictrl4)			1.5		mA
Control Voltage (CTRL)	Low	-0.1		0.5	V
	High	3		5.5	
Operating Temperature		-40		85	°C

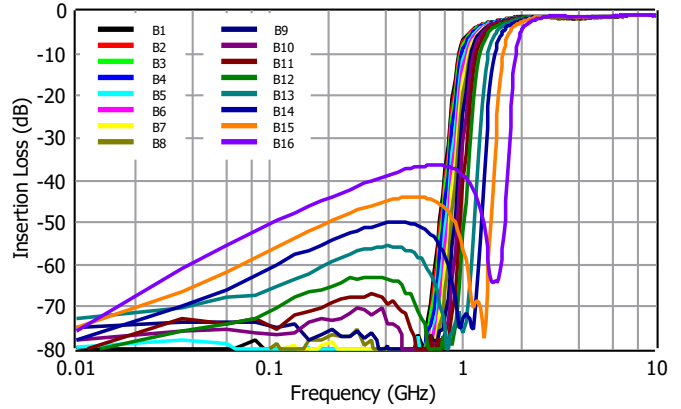
Typical Performance Plots

Conditions unless otherwise specified: $V_{DD} = 5V$, Typical, $T = 25\text{ C}$, CW.

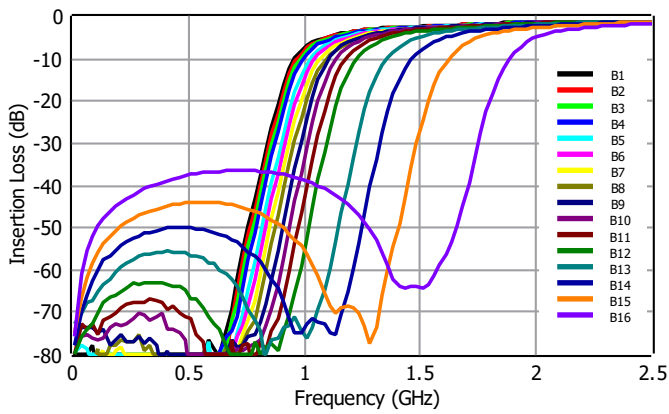
Insertion Loss



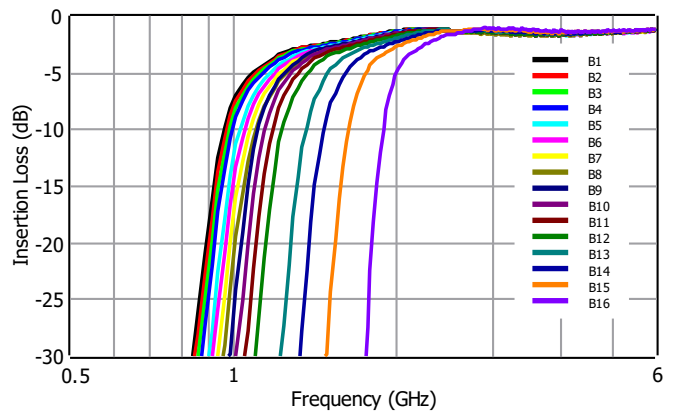
Insertion Loss, Log Scale



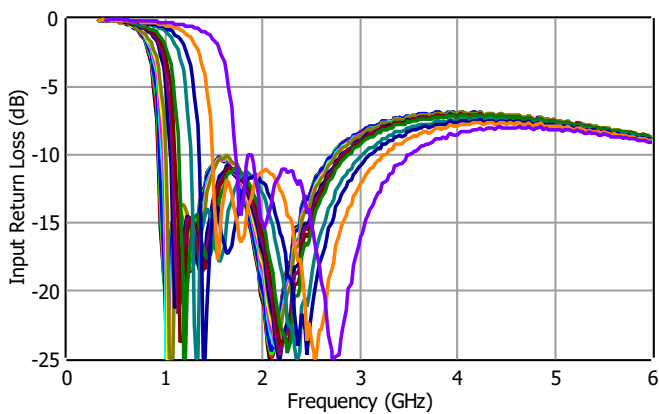
Insertion Loss



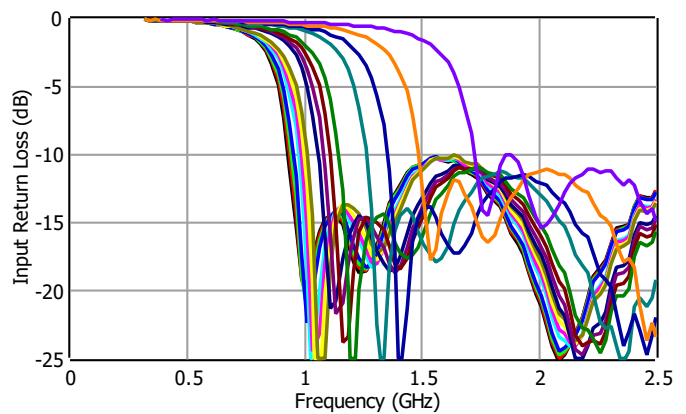
Insertion Loss, Log Scale



Input Return Loss



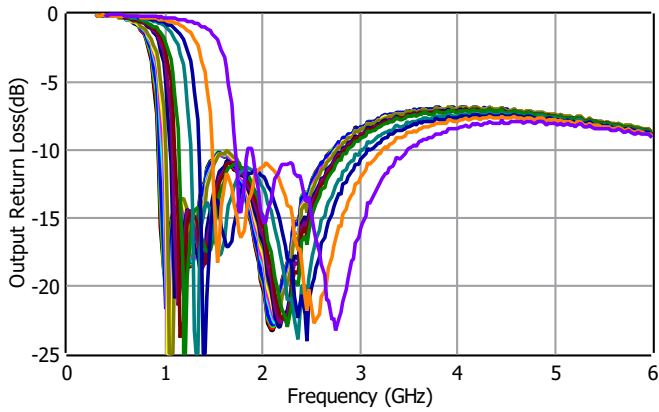
Input Return Loss



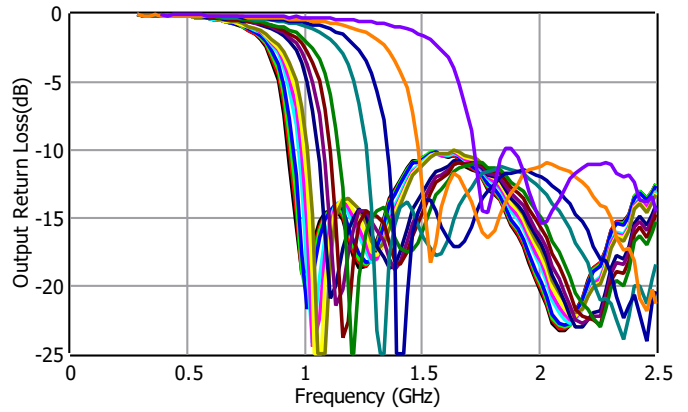
Typical Performance Plots

Conditions unless otherwise specified: $V_{DD} = 5V$, Typical, $T = 25\text{ C}$, CW.

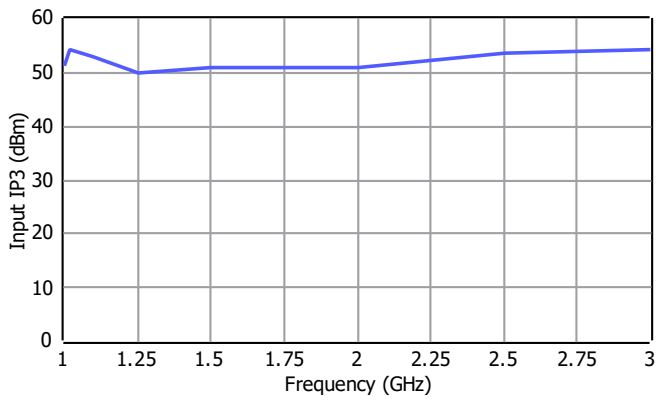
Output Return Loss



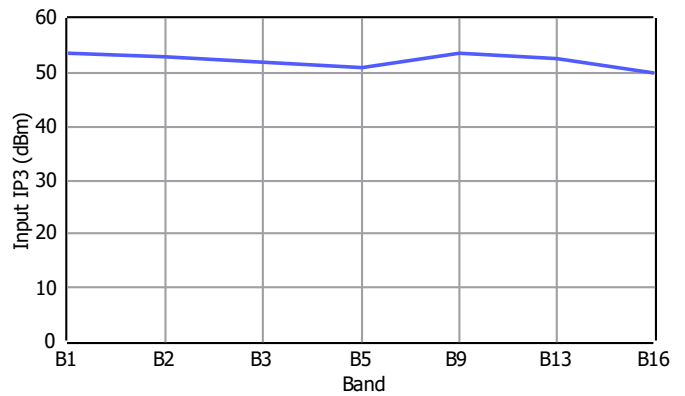
Output Return Loss



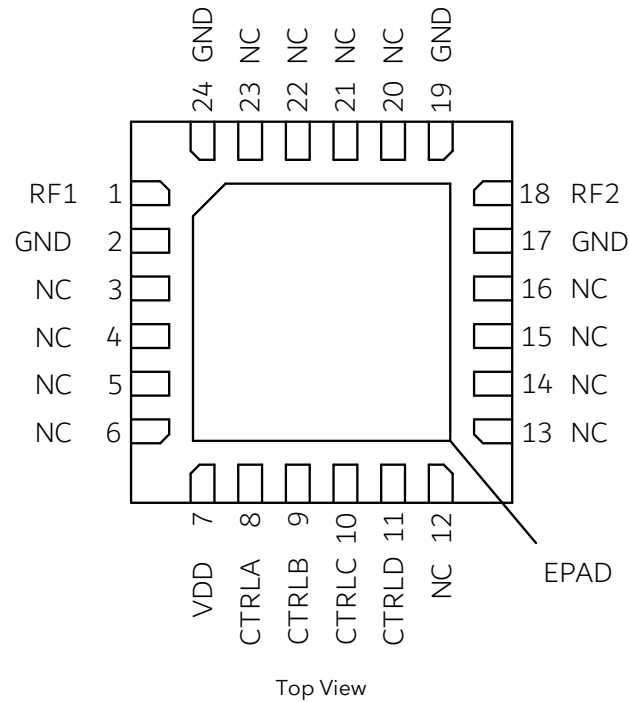
Input IP3 at Band1



Input IP3 vs Bands at 2.5 GHz



Pin Description



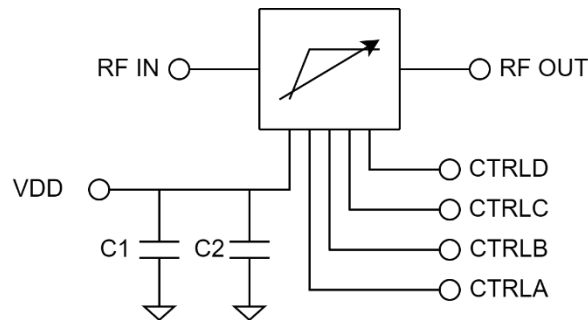
Pin Number	Pin Name	Description
1	RF1	RF input/output pin. AC Coupled.
18	RF2	RF input/output pin. AC Coupled.
7	VDD	Vdd bias pin.
8	CTRLA	Control pin.
9	CTRLB	Control pin.
10	CTRLC	Control pin.
11	CTRLD	Control pin.
3-6, 12-16, 20-23	NC	These pins are not internally connected. Can be grounded on the PCB.
2, 4, 13, 15, 17	GND	Ground.
25	EPAD	Exposed Pad on the bottom of the package should be connected to ground with multiple number of vias to reduce the inductance to the GND.

Control Interface

CTRLD	CTRLC	CTRLB	CTRLA	Filter State	Typical 3dB Cutoff Frequency (GHz)
LOW	LOW	LOW	LOW	Band1	1.00
LOW	LOW	LOW	HIGH	Band2	1.03
LOW	LOW	HIGH	LOW	Band3	1.05
LOW	LOW	HIGH	HIGH	Band4	1.06
LOW	HIGH	LOW	LOW	Band5	1.10
LOW	HIGH	LOW	HIGH	Band6	1.12
LOW	HIGH	HIGH	LOW	Band7	1.15
LOW	HIGH	HIGH	HIGH	Band8	1.17
HIGH	LOW	LOW	LOW	Band9	1.17
HIGH	LOW	LOW	HIGH	Band10	1.2
HIGH	LOW	HIGH	LOW	Band11	1.24
HIGH	LOW	HIGH	HIGH	Band12	1.3
HIGH	HIGH	LOW	LOW	Band13	1.43
HIGH	HIGH	LOW	HIGH	Band14	1.58
HIGH	HIGH	HIGH	LOW	Band15	1.7
HIGH	HIGH	HIGH	HIGH	Band16	1.95

Applications Information

Signal entering from RF input goes to RF output with high pass filtering. Typical application schematic to operate the filter is given below.



C1 and C2 are used to filter out the ripples and unwanted signals coming from the Vdd supply. Using additional capacitors in parallel to C1 and C2 will improve this filtering. If this filtering is of no concern, then filters can be operated without C1 and C2.

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

Large signal data is generated with connectorized evaluation PCB measurements. Then the PCB trace and connector transition losses are de-embedded, to generate plots shown in this document.

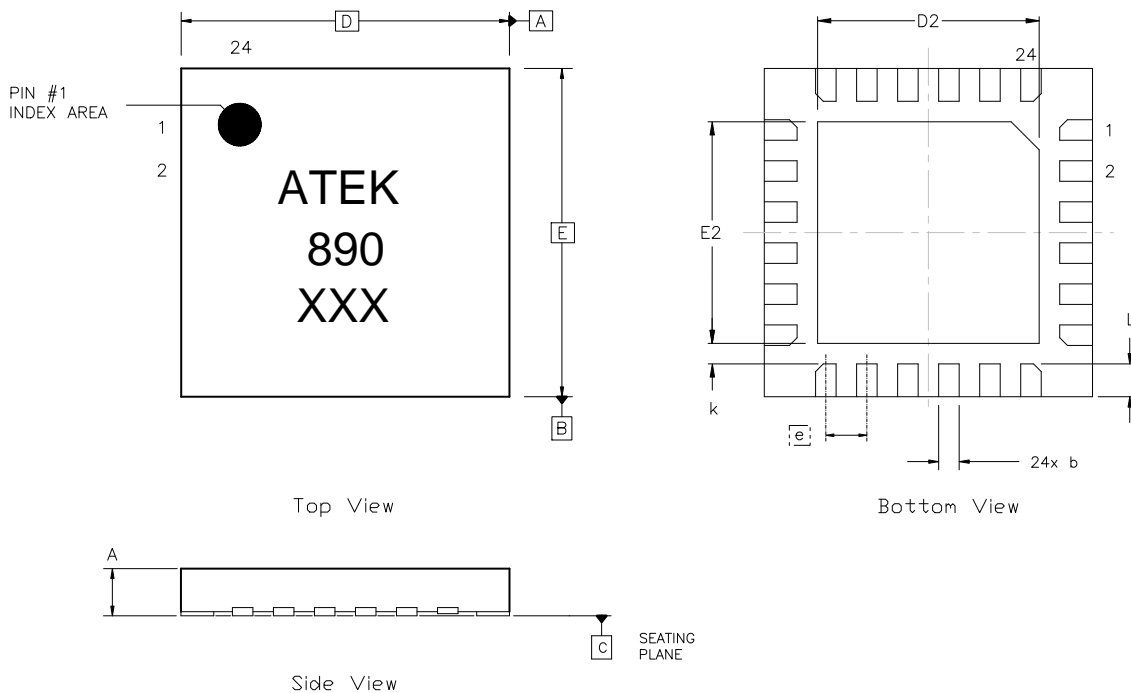
The NC pins of the filter are connected to the GND on the PCBs used to generate the plots shown in this document.

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.

Mechanical and Marking Information



NOTES:
1) ALL DIMENSIONS IN MM

SYMBOL	MIN	MAX	SYMBOL	MIN	MAX
A, V	0.80	1.00	E2	2.60	2.80
b	0.18	0.30	e	0.50	BSC
D	4.00	BSC	k	0.20	-
D2	2.60	2.80	L	0.35	0.45
E	4.00	BSC			

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	11.01.2025	Initial Release	
1.1	12.01.2025	Format and Content Fixed	
1.2	15.01.2025	Control Interface Table Updated	
1.3	03.02.2025	Switching Speed Data Added	