

1098E Complex Vector Attenuator (CVA)

Features

- Frequency range of 810 MHz to 830 MHz and 869 MHz to 894 MHz
- Packaged in a compact 124-pin PQFP

Description

The 1098E is a complex vector attenuator (CVA) packaged in a 124-pin PQFP package. At 800 MHz to 1000 MHz, it is functionally equivalent to the combination of an endless phase shifter and attenuator. It may be used anywhere it is necessary to control the phase and amplitude of a signal without introducing intermodulation distortion, dispersion, or variation in group delay.

Typical performance for the 1098E CVA includes a 40 dBm third-order input intercept, 9 dB minimum loss, 16 dB attenuation range, and input and output VSWR of 1.15:1. Amplitude and phase linearity are typically $\pm 0.5^\circ$ over common bands such as the 869 MHz to 894 MHz AMPS band. Designs for other bands centered from 500 MHz to 3000 MHz are available upon request.

Devices similar to the 1098E are called a number of things—vector modulators, IQ attenuators, and quadrature attenuators, for example. The 1098E component is unique in that it is a surface-mount package and is not to be confused with the vector modulators sold by other companies which, in spite of similar naming conventions, are completely different components.

The other variety of vector modulator is usually intended for modulation purposes and is not suitable for the phase shifting and attenuation functions found exclusively in the 1098E.

While the 1098E is not architecturally similar to the standard phase shifter and attenuator, it serves the same purpose and has several other advantages. For example, there is no limitation on phase change. Phase can increase or decrease continuously without reaching an end point.

The CVA can also go directly from any attenuation and phase in its range to any other attenuation and phase: for example, minimum attenuation at 0° to minimum attenuation at 180° , without a continuous phase transition from 0° to 90° to 180° .

These qualities make the 1098E CVA particularly useful in signal cancellation systems where the phase and amplitude of one signal must be adjusted so that it can completely cancel another signal of arbitrary amplitude and phase. The minimum theoretical insertion loss of the CVA is 6 dB, while typical insertion loss is in the range of 8 dB to 10.5 dB. For applications requiring lower loss, highly linear low-noise surface-mount amplifiers can be supplied.

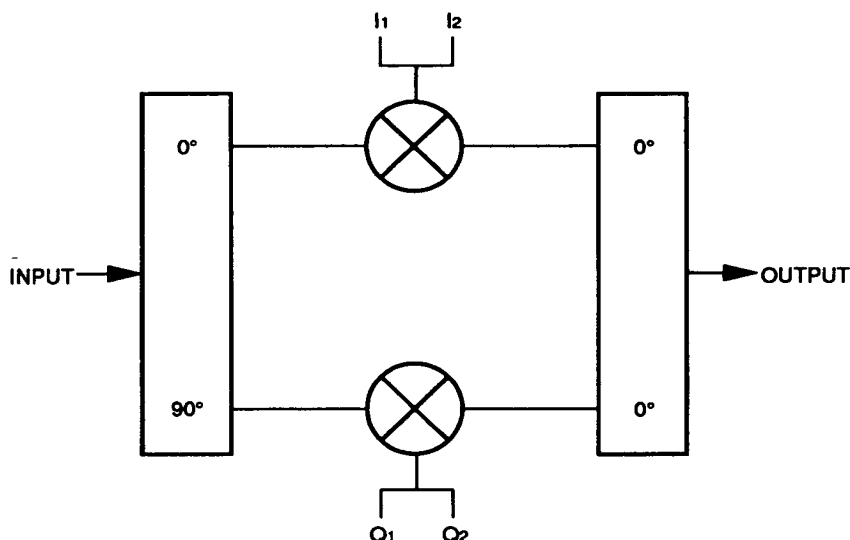


Figure 1. 1098E Block Diagram

Pin Information

Table 1. Pin Descriptions

Pin No.	Symbol	Name/Function
113, 114, 115	INPUT	RF Signal Input
46, 47, 48	OUTPUT	RF Signal Output
4, 8	I1, I2	In-phase Attenuator Control
76, 90	Q1, Q2	Quadrature Attenuator Control

Note: All remaining pins are to be connected to ground.

Absolute Maximum Ratings

Stresses in excess of the Absolute Maximum Ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to Absolute Maximum Ratings for extended periods can adversely affect the device reliability.

Parameter	Symbol	Value	Unit
Temperature Range	TA	-40 to +125	°C
Pin Soldering Temperature/Duration	Ts	200/30 to 60	°C/s
RF Signal Input	INPUT	20	dBm
Attenuator Control	I1, I2, Q1, Q2	50	mA

Electrical Characteristics

Frequency 810 MHz to 830 MHz or 869 MHz to 894 MHz. Temperature at 25 °C.

Parameter	Min	Typ	Max	Unit
Minimum Insertion Loss*	—	8.5	10.5	dB
Attenuation Flatness†	—	±0.1	±0.2	dB
Attenuation Range	15	40	—	dB
Phase Flatness†	—	±0.5	±1.0	°
Input/Output VSWR	—	1.15:1	1.25:1	—
Input Third-Order Intercept	34	40	—	dBm

* Measured with 25 mA into I1 and I2 or Q1 and Q2.

† Specified up to maximum insertion loss of 25 dB.

Ordering Information

Code	Frequency Range*	Part Number
1098E	810 MHz to 830 MHz	C106622137
1098E	869 MHz to 894 MHz	C106622137

* Designs for other bands ranging from 500 MHz to 3000 MHz are available upon request.

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