A-INFO

DLVA

Detector Log Video Amplifiers (DLVA)

The need to process high density pulses with narrow pulse widths and large amplitude variations necessitates the use of logarithmic amplifiers in modern receiving systems. In general, the purpose of this class of amplifiers is to condense a large input dynamic range into a much smaller, manageable one through a logarithmic transfer function. As a result of this transfer function, the output voltage of a logarithmic amplifier is directly proportional to the input signal power range in dB.

In most cases, logarithmic amplifiers are used as amplitude detectors. Since output voltage (in mV) is directly proportional to the input signal power (in dB), the amplitude information given by the log amplifier has found more practical usage than that by the linear detectors.

There are three basic types of logarithmic amplifiers,

Detector-Log Video Amplifiers (DLVAs)

Successive Detection Logarithmic Amplifiers

True Log Amplifiers (TLAs)

A detector log video amplifier (DLVA) is a type of logarithmic amplifier in which the envelope of the input RF signal is detected by a standard "linear" diode detector. The output of the detector is compressed in the video amplifier section, making input/output relationship similar to a logarithmic conversion. In general, the DLVA offers the advantage of operating over the widest frequency range, but at the sacrifice of dynamic range.

Limited by the detecting range of square law of the input diode detector, typical dynamic range for a DLVA is approximately 40 dB.

In quite a lot of usages, two log cascades are put in parallel with a RF amplifier incorporated in time of detection of the log cascade, so that the dynamic range can be extended to approx.70dB.

The detected video sections of a DLVA can either be AC coupled, DC coupled, or pseudo DC coupled. Each has its advantages, depending upon the application (i.e., CW operation, temperature compensation, etc.).

The basic configuration of a DLVA is simply a detector diode to convert the RF energy into a DC voltage followed by a video amplifier with a logarithmic transfer function. The combination results in a device which compresses a large RF signal range into a narrow range of video voltage.

We have put considerable effort into designing a DC coupled DLVA with very low baseline drift. Employing a tunnel diode based detector circuit coupled with a very stable DLVA, high-speed miniature DC DLVA with good recovery characteristics is available.

Features

Advanced Microwave Hybrid Integrated Circuits Technology
Frequency Range From 0.5 to 18GHz
Superior Log Linearity
Wide Dynamic Range
Wide Bandwidth
Low Current Consumption
DC-Coupled DLVAs
High Performance
High Reliability
High Repeatability
Compact Size And Light Weight
Custom Design Available

Applications

Radar Systems
Navigation Systems
Laboratory Measurement And Test Equipment
Telecommunications And Data Communications
Military And Instrumentation Systems
Other Commercial Applications

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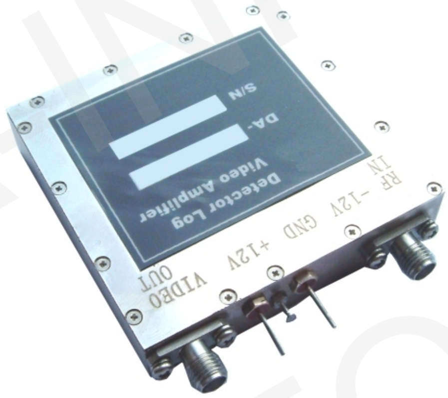

Coaxial

0. 5 to 18GHz

P/N	Freq. Range (GHz)	TSS (dBm) Typ	Linearity (dB) Max	Dynamic Range (dBm)	Log Linearity (dB) Max	VSWR Max	Case
DA-0520S41NA	0.5 - 2	-41	±2	-39 - +5	±0.7	2.0:1	DL1
DA-0560S41NB	0.5 - 6	-41	±2	-39 - +5	±1.0	2.5:1	DL1
DA-0518S42NA	0.5 - 2	-42	±2	-39 - +5	±0.7	3.5:1	DL1
DA-2040S42NA	2 - 4	-42	±2	-39 - +5	±0.7	2.0:1	DL1
DA-2040S42NB	2 - 4	-42	±2	-39 - +5	±1.0	2.5:1	DL1
DA-2080S41NA	2 - 8	-41	±2	-39 - +5	±0.7	2.5:1	DL1
DA-2018S41NA	2 - 18	-41	±2.5	-39 - +5	±0.7	3.5:1	DL1
DA-4080S42NA	4 - 8	-42	±2.5	-39 - +5	±0.5	2.5:1	DL1
DA-6012S41NA	6 - 12	-41	±2.5	-39 - +5	±0.5	3.0:1	DL1
DA-6012S42NB	6 - 12	-42	±2.5	-39 - +5	±1.0	2.5:1	DL1
DA-6018S42NA	6 - 18	-42	±2.5	-39 - +5	±0.5	3.5:1	DL1
DA-6018S42NB	6 - 18	-42	±2.5	-39 - +5	±1.0	2.5:1	DL1
DA-8012S41NA	8 - 12	-41	±2.5	-39 - +5	±0.5	2.5:1	DL1
DA-8018S41NA	8 - 18	-41	±2.5	-39 - +5	±0.5	2.5:1	DL1
DA-8018S41NB	8 - 18	-41	±2.5	-39 - +5	±1.0	2.5:1	DL1
DA-1218S42NA	12 - 18	-42	±2.5	-39 - +5	±0.5	2.5:1	DL1
DA-1218S42NB	12 - 18	-42	±2.5	-39 - +5	±1.0	2.5:1	DL1
DA-0520D72N	0.5 - 2	-72	±2	-70 - +5	±1.0	2.2	DL3
DA-2060D72N	2 - 6	-72	±2	-70 - +5	±1.0	2.2	DL3
DA-4080D72N	4 - 8	-72	±2	-70 - +5	±1.0	2.2	DL3
DA-2018D68N	2 - 18	-68	±2.5	-65 - +5	±1.0	2.5	DL3
DA-6012D72N	6 - 12	-73	±2	-70 - +5	±1.0	2.2	DL3
DA-6018D72N	6 - 18	-72	±2	-70 - +5	±1.0	2.3	DL3
DA-8018D72N	8 - 18	-72	±2	-70 - +5	±1.0	2.2	DL3
DA-1218D72N	12 - 18	-72	±2	-70 - +5	±1.0	2.2	DL3
General Specifications	Rise Time: 29ns(Typ) Delay Time: <30ns Log Slope: 50mV/dB Maximum CW Input(No Damage): ≤+20dBm Recovery Time: 500ns(@+15dB) Power Supply: ±12V DC						

Notes:

1. Operating Temperature : -55 °C to +85 °C. Storage Temperature : -60 °C to +90 °C.

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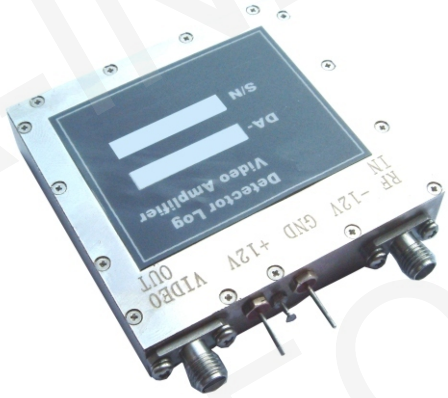
DLVA



Coaxial

0. 5 to 18GHz

Continued

P/N	Freq. Range (GHz)	TSS (dBm) Typ	Linearity (dB) Max	Dynamic Range (dBm)	Log Linearity (dB) Max	VSWR Max	Case
DA-0520S42TA	0.5 - 2	-42	±2	-39 - +5	±0.7	2.0:1	DL1
DA-0560S42TB	0.5 - 6	-42	±2	-39 - +5	±1.0	2.5:1	DL1
DA-0518S42TA	0.5 - 18	-42	±2	-39 - +5	±0.7	3.5:1	DL1
DA-2040S42TA	2 - 4	-42	±2	-39 - +5	±0.7	2.0:1	DL1
DA-2040S42TB	2 - 4	-42	±2	-39 - +5	±1.0	2.5:1	DL1
DA-2080S41TA	2 - 8	-41	±2	-39 - +5	±0.7	2.5:1	DL1
DA-2018S40TA	2 - 18	-40	±2.5	-39 - +5	±0.7	3.5:1	DL1
DA-4080S41TA	4 - 8	-41	±2.5	-39 - +5	±0.5	2.5:1	DL1
DA-6012S41TA	6 - 12	-41	±2.5	-39 - +5	±0.5	3.0:1	DL1
DA-6012S41TB	6 - 12	-41	±2.5	-39 - +5	±1.0	2.5:1	DL1
DA-6018S41TA	6 - 18	-41	±2.5	-39 - +5	±0.5	3.5:1	DL1
DA-6018S41TB	6 - 18	-41	±2.5	-39 - +5	±1.0	2.5:1	DL1
DA-8012S41TA	8 - 12	-41	±2.5	-39 - +5	±0.5	2.5:1	DL1
DA-8018S40TA	8 - 18	-40	±2.5	-39 - +5	±0.5	2.5:1	DL1
DA-8018S41TB	8 - 18	-41	±2.5	-39 - +5	±1.0	2.5:1	DL1
DA-1218S42TA	12 - 18	-42	±2.5	-39 - +5	±0.5	2.5:1	DL1
DA-1218S42TB	12 - 18	-42	±2.5	-39 - +5	±1.0	2.5:1	DL1
General Specifications	Rise Time: 29ns(Typ) Delay Time: <30ns Log Slope: 50mV/dB Maximum CW Input(No Damage): ≤+20dBm Recovery Time: 500ns(@+15dB) Power Supply: ± 12V DC						

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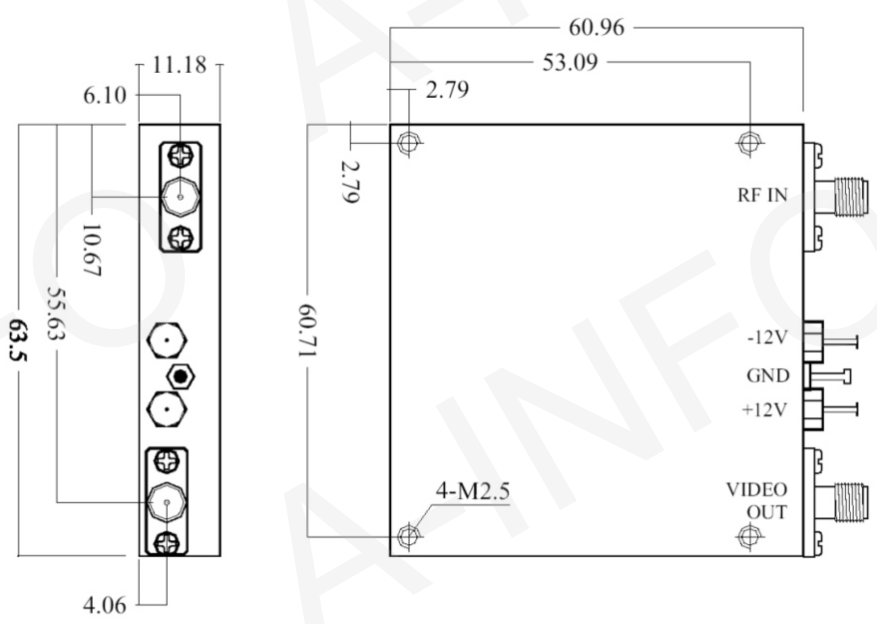
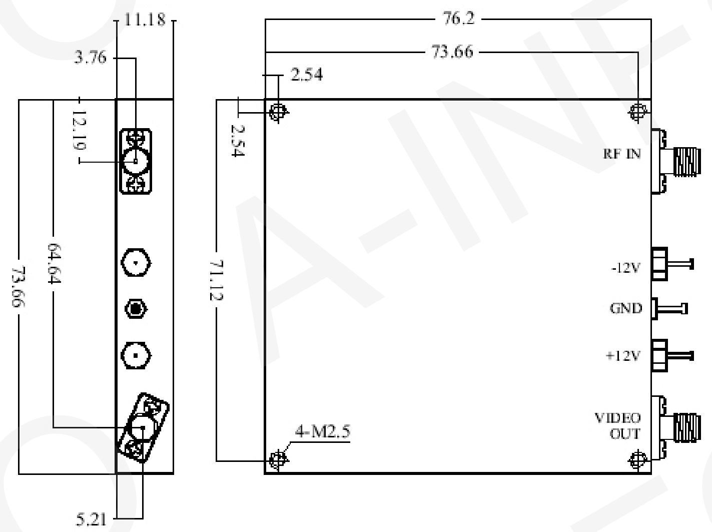
Outline Drawings(Size: mm)



DL1



DL3

Terms and Definitions

Operational Bandwidth is the range of input frequency over which the technical specifications of the amplifier are met.

Log Slope is the straight line slope of the input/output transfer characteristics of the detected signal over the dynamic range. The log slope is expressed in millivolts per dB of a best-fit straight line as derived by a least-squares approximation of all data points

Log Linearity is the maximum deviation in dB of all measured points from the calculated best-fit straight line. The dynamic range can be as high as 75dB, depending upon

Dynamic Range is the range of the input signals in dB over which the output linearity requirement is met.

Maximum Input Power is the maximum power that the logarithmic amplifier can withstand without damage.

DC offset is the residual DC output of a logarithmic amplifier when the input is terminated with 50ohm.

Tangential Signal Sensitivity (TSS) defines the input level that results in an output signal-to-noise ratio of 6 dB. TSS, which is directly related to noise figure and bandwidth, aids in defining the lower limit of the input dynamic range of a logarithmic amplifier. TSS is also a convenient way of specifying a logarithmic amplifier's noise performance, since noise

Rise Time is defined as the time difference between the 10% point and 90% point on the rising leading edge of the output video pulse.

Recovery Time for a logarithmic amplifier is defined in many ways by system engineers. The most common is to use multiple pulses and characterize the time between the 90% point on the trailing edge of the first pulse and the 10% point on the leading edge of the