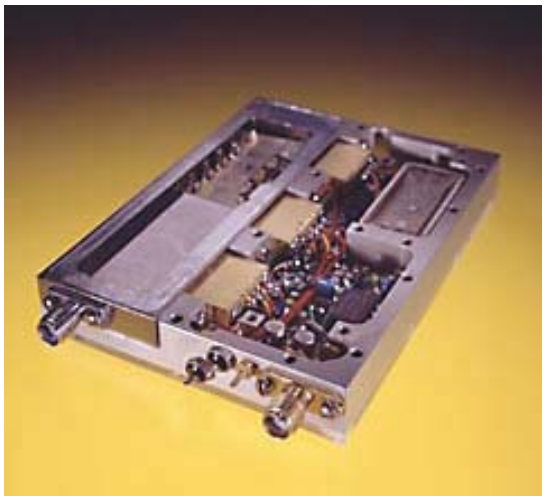
Successive Detection - SDL-Series SDLVAs

Detector Log Video Amplifiers

SDL-328 2.0 – 8.0 GHz
SDL-3618 6.0 – 18.0 GHz



Exceptional Log Linearity

Excellent Frequency Flatness

Fast Rise Time

Quick Recovery Time

Absolute Accuracy ± 1.75 dB (SDL-328)

70 dB Dynamic Range

DESCRIPTION The Microphase SDL-Series SDLVAs combine the best performance features of currently available successive Detection DLVAs and the conventional RF amplifier/Coupler extended range designs. A novel and unusual approach halves the number of successive detection points, thus simplifying gain and frequency compensation vs. temperature. The results improved linearity, frequency flatness temperature stability and absolute accuracy. The key component of this design is a proprietary Differential Schottly Detector-Limiter. These devices, operating over narrow portions of their dynamic ranges, provide both low and high level video signals, which are then differentially-coupled to single, low-gain video amplifier stages, enabling improved rise time and recovery time.

ADVANTAGES The Microphase designed and engineered SDL-Series provide precision accuracy, exceptional log linearity, excellent frequency flatness, with fast rise time and quick recovery time. You get excellent electrical performance, environmental stability and mechanical reliability. Very compact and rugged, all of our products are 100% tested, and readily available.

AVAILABLE OPTIONS

Other frequency ranges available.
Input offset option available to counteract detector RF noise rectification
Linear output option available (sensitivity:7.5 mV/µ watt nom.)
RF Limited output port available

SPECIFICATIONS

Model	SDL-328	SDL-3618
Frequency Range	2.0- 8.0 GHz	6.0- 18.09 GHz
Frequency Flatness	±1.0 dB	±2.0 dB
VSWR	2.0:1 max.	2.0:1 max.
Tangential Signal Sensitivity (TSS)	-73 dBm	-71
Log Range	-70 dBm to 0 dBm	-68 dBm to +2 dBm
Log Slope[1]	25 mV/dB	25 mV/dB
Log Linearity [2]	±1.0dB	±1.5 dB
Absolute Accuracy[3]	±1.75 dB	±3.0 dB
Recovery Time	80 nsec.	60 nsec.
Pulse Width Range	20 nsec. to CW	20 nsec. to CW
Rise Time	10 nsec. max.	10 nsec. max.
Prepagation Delay	10 nsec. max.	10 nsec. max.
Video Load	93 Ohms	93 Ohms
Power	+12V/-12V	+12V/-12V
Size (excluding connectors)	3.50" x " x 2.60" x 0.50"	3.50" x " x 2.60" x 0.50"
Connectors	SMA and Pins	SMA and Pins
Operating Temperature	-54 ° C to + 85° C	-54 ° C to + 85° C

1. Other Log Slopes available
2. At any frequency or temperature
3. Total: Under any combination of frequency, input power level and operating over -54 ° C to + 85° C

These units can be designed to your specification. Please contact Microphase for your special design requirements.

SDLVA Functional Description/Block Diagram

The function of the Detector Log Video Amplifier (DLVA) is to provide a linearized (mV/dB) Video output voltage over a wide Dynamic input RF power range. This is accomplished by combining RF amplification and RF detection in conjunction with Logarithmic Video amplification. The RF detection is accomplished by a uniquely configured microwave Schottky diode operating as a standard AM demodulator. The useful RF dynamic range of the diode (operating as a detector) is from approximately –42 dBm to +18 dBm. Over this RF input dynamic range, the output voltage range extends over 80 dB, from tens of microvolts to hundreds of millivolts. Since the dynamic range of the output voltage is so wide, an amplifier with a logarithmic transfer characteristic is needed to process it. This type of amplifier provides a large gain for the very low-level output signals and an orderly decreasing gain as the signal level increases. In effect, the large input dynamic range is compressed into a usable output dynamic range. To cover the –70 dBm to +10 dBm (70 dB) operating range of this DLVA, three (3) such Detector-Amplifiers are required, each one operating over a smaller portion of its potential 60 dB range. To improve the sensitivity of the Detector to better than the –70 dBm requirement, 54 dB of RF gain is required to bring the –70 dBm signal up to a Detector input of –16 dBm. A more detailed description of the logging function is described in the following text. The purpose of the log amplifier is to compress this wide dynamic range in an orderly fashion such that the output signal amplitude is a linear function of the RF input power changes in dBm. Constant incremental dB changes of input power produce constant incremental changes in the output voltage. Since the voltage dynamic range of a typical log stage is fairly narrow, typically 12 dB to 20 dB, a number of such stages are needed to cover the overall 140 dB minimum video range. In general, using more stages results in smaller deviations from the desired linear input-output characteristic. Log stage requires the same drive level (10 millivolts to 100 millivolts) for a log transfer function, it must be preceded by more or less linear gain or attenuation depending on what part of the video dynamic range it is to cover. All log stages are summed into a common load to give a piece-wise approximation to a linear voltage output versus power input characteristic over a wide RF dynamic range. This design incorporates the conventional three-channel RF amplifier-coupler technique with a proprietary dual-balanced Schottky Detector for improved performance. A unique combination of circuit techniques are used which reduce Schottky diode junction voltage changes with temperature by two (2) orders of magnitude. This makes them suitable for use in direct-coupled log amplifiers operating over wide temperature and dynamic signal ranges. This diode has a useful dynamic range of typically +15 dBm to –42 dBm.

SDLVA