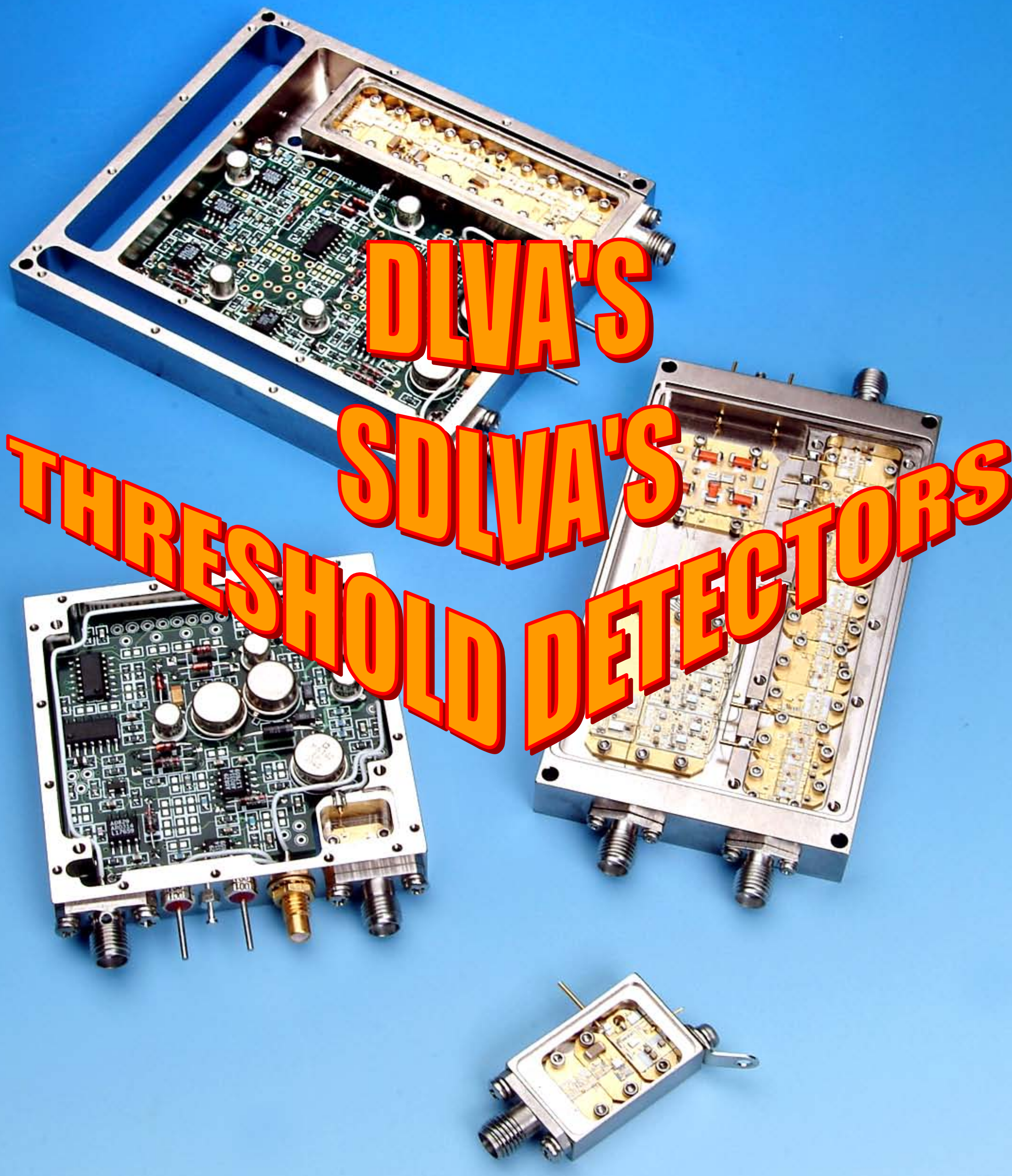
GENESIS MICROWAVE INC.

DLVA'S
SDLVA'S
THRESHOLD DETECTORS



CUSTOM DESIGNS

GENESIS MICROWAVE, INC.

Company Profile

Genesis Microwave, Inc. is a combination of three other entities, Hybrid Assembly Resource (HARI), Genesis and Suntek Microwave. HARI began as a sole proprietorship in 1997 to assemble microwave components and sub-system assemblies, founded by Santiago Cutia, Jr. Genesis began as a sole proprietorship in 2001 to manufacture microwave components (Amplifiers, DLVA's and SDLVA's). In July 2003, both Hybrid and Genesis merged into Genesis Microwave, Inc. In January 2004 Genesis Microwave, Inc. purchased substantially all of the assets of Suntek Microwave, Inc., founded to market, design and manufacture microwave components.

Our management and technical staffs are comprised of the most seasoned microwave technologists in the industry today with professional experience from Lockheed Martin, Avantek, Harris Corporation, TRW Microwave and Signal Technology Corp. Our experience ranges from the early cold war architectures to the current microwave technologies for future military electronics.

Genesis Microwave, Inc. occupies over 5,000 square feet of Engineering and Manufacturing facilities in the Silicon Hills of El Dorado, California. We specialize in the manufacture of state of the art Microwave Amplifiers, Detector Log Video Amplifiers (Extended Dynamic Range and CW Immune), and Successive Detector Log Video Amplifiers, needed for Electronic Support Measures (ESM), Electronic Counter Measures (ECM), and Radar Warning Receiver (RWR). Systems.

Our Quality Manual/programs for processes and procedures are based on combinations of MIL-STD-883, and MIL-I-45208A.

For more information on Genesis Microwave, Inc. and our Products and Services, please visit our website at http://www.genesismicrowave.com

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GENESIS MICROWAVE INC.

GLOSSARY OF TECHNICAL TERMS

DETECTOR LOG VIDEO AMPLIFIER
A detector log video amplifier (DLVA) is a device, which provides an output voltage proportional to the input RF power level. It compresses a wide dynamic range of power levels into a narrow range of video voltage.

TANGENTIAL SIGNAL SENSITIVITY
Tangential Signal Sensitivity (TSS) occurs when the peak video voltage is 2.5 times the RMS noise voltage. This corresponds to a signal to noise ratio of 8 dB. TSS is dependent on the video bandwidth, detector figure of merit, and the video amplifier noise performance.

RISE TIME
The time between the 10% and 90% points on the leading edge of a pulse.

SETTLING TIME
The time between a predetermined point (usually 10% on the leading edge) and the point where the pulse is settled to the final value within a specified accuracy.

DWELL TIME
The time between the point where the pulse is settled to it's final value, and the end of the pulse.

RECOVERY TIME
The time required to measure a minimum amplitude pulse within a specified accuracy limit after the application of a larger amplitude pulse.

DYNAMIC RANGE
The range of input power levels over which a DLVA operates, i.e. from –40 dBm to 0 dBm.

CW IMMUNITY
The ability of a DLVA to reject continuous wave (CW) signals, or signals of specified time duration.

AC COUPLED DLVA
A DLVA which uses capacitors between stages, or at the input, to provide CW immunity.

BASELINE SHIFT
A shift in DC level caused by capacitor charge variations due to changing duty factor in AC coupled circuits.

DC COUPLED DLVA
A DLVA in which the detector and all stages are directly coupled. Used when processing signals of long pulse duration or CW signals is desired.

PSEUDO AC COUPLED DLVA
A DC coupled DLVA in which a feedback circuit with an integrator is used to simulate AC coupling. It has the advantage of CW rejection over a limited dynamic range without the disadvantage of baseline shift with changing duty factor.

PROPAGATION DELAY
The time between the application of a RF input pulse (usually 50% on the leading edge) to a predetermined point on the video output pulse.

LOG LINEARITY
The maximum deviation in dB (referred to the RF input) from a best fit line over the dynamic range.

LOG SLOPE
The average slope of the best-fit line over the dynamic range.

DC OFFSET
The DC level of the DLVA's video output voltage with no RF input applied.

LOG ACCURACY
The absolute accuracy of the video output voltage referred to the RF input power. The log accuracy is a combined effect of log linearity, log slope, DC offset, and frequency flatness over the specified temperature range.

FUNCTIONAL DESCRIPTION OF A STANDARD DYNAMIC RANGE DLVA

DETECTOR TYPES

A simplified block diagram of a Direct Coupled DLVA is shown in figure 1. The RF input to the DLVA consists of a microwave detector. The detector is not frequency selective, and provides one of the DLVA's advantages, which is near 100% probability of detection over very wide RF bandwidths.

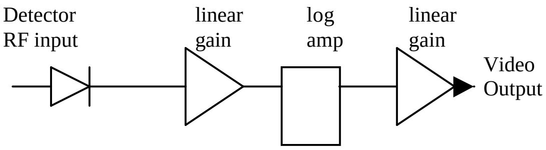

Figure 1. Direct Coupled DLVA Block Diagram

Two types of detectors are commonly used on DLVA's. The biased Schottky detector is used mostly in AC coupled and pseudo AC coupled circuits where CW signal processing is not required. Biased Schottky detectors are usually not used in DC coupled DLVA's due to the drift in forward bias voltage over temperature.

The Tunnel diode, or Back diode detector is used in DC coupled DLVA's because bias current is not required, and the Back diode detector has little effect on the dc performance of the video amplifiers over temperature.

The dynamic range of the DLVA is determined mainly by the detector. At the low end of the dynamic range, the sensitivity of the DLVA is determined by the figure of merit of the detector. The high end of the dynamic range is limited by the detector saturation characteristics. DLVA's can be designed with dynamic range in excess of the detector limits by summing techniques. (Figure 5).

The graphs of figures 2 and 3 show the typical transfer function of a Schottky detector and a Back diode detector, respectively.
The sensitivity limit for the Back diode detector is approximately -45 dBm and the saturation level is approximately 0 dBm.

At **Genesis Microwave**, GaAs gain stages can be integrated to accommodate sensitivity requirements below –45 dBm. The Shottky diode detector has higher limits; however, in practical application it becomes difficult to use all of the dynamic range of the Schottky detector and still maintain good logging accuracy.

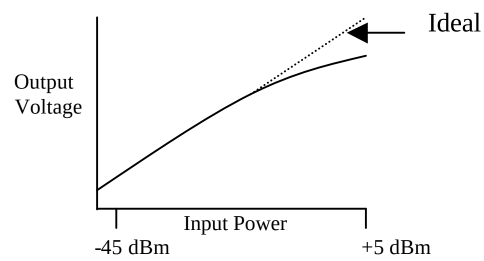

Figure 2. Biased Schottky Detector

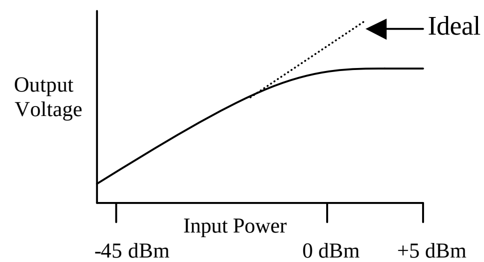

Figure 3. Tunnel Diode Detector

VIDEO AMPLIFIERS

The signal output voltage of a detector at the minimum sensitivity level is in the microvolt region and is not sufficient for logarithmic processing. A linear amplifier following the detector is used to increase the detected voltage to an adequate level. The linear amplifier is usually made up of two or three cascaded stages.

The log amplifier consists of an array of log stages whose outputs are summed together. Figure 4 shows the transfer function of a single log stage. Each log stage operates over the range of 18 mv to 100 mv at its input. This corresponds to a dynamic range of 7.5 dB referred to the RF input. When the output of each of the log stages is summed together, the result is that the individual transfer functions are stacked to produce the overall transfer function of the DLVA as shown in figure 5.

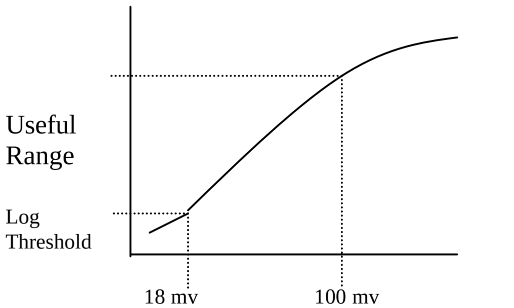

Figure 4. Single Log stage transfer Function

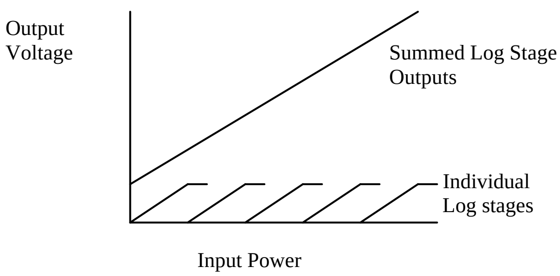

Figure 5. Transfer Response

The linear gain following the log stages is used to set the slope of the transfer function, and provide the capability to drive a video load.

PSEUDO AC COUPLED DLVA

Figure 6 shows a simplified block diagram of a pseudo AC coupled DLVA. The integrating feedback network is immune to pulses, but samples the DC level at the output of the pre-log linear stages and feeds back a correction signal to the input of the first linear amplifier. The correction signal will cancel the effects of DC drift over temperature, and will provide CW immunity over a limited dynamic range of input signals.

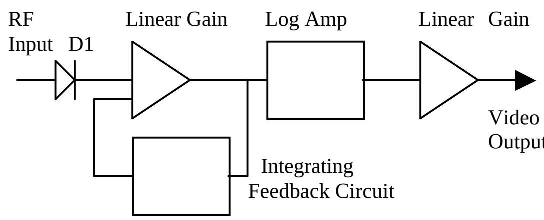

Figure 6. Pseudo AC coupled DLVA

The main advantage of the Pseudo AC coupled DLVA is DC stability and CW immunity without the effects of baseline shift and poor recovery time associated with AC coupled circuits.

FUNCTIONAL DESCRIPTION OF MEDIUM AND EXTENDED RANGE DLVA'S

The dynamic range of a DLVA is limited by the sensitivity of the detector at one end, and by the saturation characteristics of the detector at the other end. Sensitivity can be improved by using a pre-amplifier in front of the detector, and the detector saturation problem can be overcome by using more than one detector.

The block diagram of figure 7 shows how this is implemented. Detector D1 has RF pre-amplification to raise the signal level above the sensitivity limit of the detector. The log video amplifier following D1 is designed to saturate before the detector goes into compression. This allows a dynamic range of about 30 – 35 dB. Since the two log video channels are summed together, the total dynamic range can be about 60 – 70 dB.

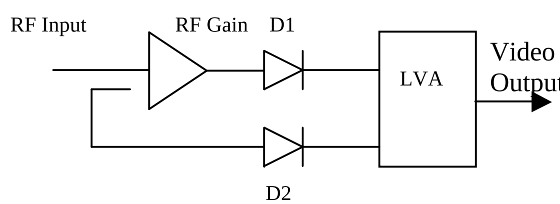

Figure 7. Extended Range DLVA

This concept can be used to extend the dynamic range even further as shown in the block diagram of figure 8.

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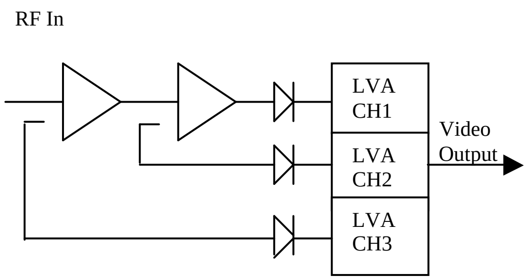

Figure 8. Extended Range DLVA with 3 Detectors

Here three detectors are used, and the total dynamic range of the DLVA can be 90 dB or greater.

The extended dynamic range of the DLVA is limited at the low end by the thermal noise floor, the RF bandwidth, and the noise figure of the of the RF amplifier.

The dynamic range is limited at the high end by the amount of power available, and the burnout limit of the RF components.

SUCCESSIVE DETECTION LOG VIDEO AMPLIFIER (SDLVA)

Another variation of the Extended Range DLVA is the SDLVA. In the SDLVA the RF gain is increased such that the detector is operated in the “linear” region instead of in the square law region, and is operated over a narrower dynamic range, which means that more detectors are needed to cover the same dynamic range.

The block diagram of figure 9 shows how this is done.

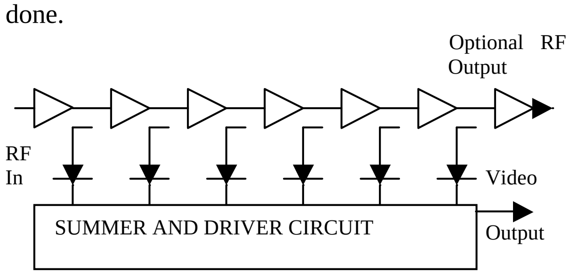

Figure 9 Successive Detection Log Video Amplifier

Logging is accomplished through a piece-wise approximation by summing the output voltage of each detector. Each detector is operated over about 10-12 dB dynamic range, which is determined by the limiting characteristics of the RF stages, and the detectors.

Since logging stages and linear gain stages are not required, this approach has the advantage of faster pulse response parameters such as, rise time, delay time, and recovery time.

The price paid for this faster response time is degraded logging accuracy because of the technique of piece-wise approximation coupled with the difficulty of maintaining precise RF limit levels over temperature and frequency. Also, the complexity of the RF design makes this a more difficult and costly approach.

TECHNICAL NOTES

TANGENTIAL SENSITIVITY

CALCULATION AND MEASUREMENT TECHNIQUES

Tangential signal sensitivity (TSS) has become universally defined as a signal power which produces an 8 dB signal to noise voltage ratio.

The TSS of a single detector DLVA (without benefit of preamplification) is dependent upon the figure of merit of the detector, the bandwidth and noise figure of the video amplifier, and other factors to be discussed later.

The signal power Ptss capable of satisfying the 8 dB TSS criteria can be shown to be:

$$Ptss = \frac{2.5\,(4KTBF)^{1/2}}{M}$$

Where:
The constant 2.5 corresponds to an 8 dB voltage ratio.

K = Boltzmann’s constant = 1.38 x 10^{-23} joules/degree Kelvin.
T = temperature of the equivalent amplifier and detector resistance in degrees Kelvin.
B = bandwidth of the detector amplifier combination in Hz.

F = amplifier noise figure expressed as a proven ratio.
M = the diode figure of merit.

The diode figure of merit is a parameter relating to the ratio of open circuit voltage sensitivity K to the square root of the equivalent resistance of the diode Rv. The simplified expression for M is:

$$M = K / (Rv)^{1/2}$$

Typical values for Tunnel diodes range from 40 to 100.
A sample calculation where:
K = 800
Rv = 150
B = 10 MHz
F = 10
And temperature is +25C (298K)
Indicates Ptss = -43 dBm

Detector K factor and video resistance will vary according to the RF frequency and the diode manufacturing process and in the case of biased Schottky detectors will also depend on the amount of bias current.

The noise figure of the amplifier will vary according to the ingenuity of the designer and compromising performance criteria. However, a good rule of thumb is that a noise figure of 10 dB is achievable for DC coupled video amplifiers. A noise figure of 3 dB can be approached for AC coupled or pseudo AC coupled amplifiers.

EFFECT OF VIDEO BANDWIDTH ON TSS

Once the tangential signal sensitivity for a given video bandwidth has been calculated, the effect of changing the video bandwidth is easily determined by the equation:

$$\Delta Tss = 10 \log (VBW_1 / VBW_2)^{1/2}$$

VSWR vs TSS TRADE-OFFS

The VSWR of a detector is indirectly dependent on the K factor, as well as the RF bandwidth and the matching structure of the RF input to the detector. The video load resistance also has an effect on the VSWR.

Most detectors of a bandwidth of an octave or less have a VSWR in the range of 2.0:1 to 3.0:1 at power levels below –20 dBm. At higher power levels the impedance match deteriorates. In some cases, the change in input impedance could cause the VSWR to approach 8.0:1 or 9.0:1. Operating the detector as a current source into a virtual ground can reduce this effect.

One method of improving the VSWR is to use an isolator in front of the detector; however, this becomes more difficult as the bandwidth is increased, and size constraints may make it impractical in the lower frequency bands.

Another method is to pad the input to the detector. This method can be used over a broader RF bandwidth and in a smaller size; however, the price is higher in terms of insertion loss. Most methods of improving VSWR result in degradation of TSS due to insertion loss.

One exception to this is the use of a preamplifier to provide isolation and improve TSS simultaneously; however, there is a price to pay in terms of frequency flatness and gain variations over temperature.

The good news is that for every 1dB of insertion loss, the return loss will be improved by 2 dB. In some cases where the source VSWR is high, this may be acceptable because the mismatch between the source and the detector could cause a considerable degradation in TSS due to reflected power.

Since the VSWR of the detector is also a function of power, the log linearity and log accuracy can also be adversely affected for the same reason.

MEASUREMENT OF TSS

Tangential signal sensitivity is defined as a signal-to-noise ratio of 8 dB. One method of measuring TSS is to measure the RMS noise with a RMS voltmeter. This becomes more difficult as the video bandwidth increases because the bandwidth of the RMS voltmeter must be greater than the bandwidth of the circuit to be measured; otherwise, the noise would be limited by the voltmeter itself.

Another more common method of measuring Tss involves using a wide bandwidth oscilloscope to measure both the signal and the noise at the same time.

TSS occurs when the "bright band noise" on the peak of the pulse becomes tangent with or just touches, the "bright band noise" on the baseline. The photograph of figure 10 shows the video pulse at tangential signal sensitivity.

It should be pointed out that this method is subjective and dependent on outside influences such as the brightness of the trace on the oscilloscope. However, it does provide a very close approximation, and is the most commonly used method due to its simplicity.

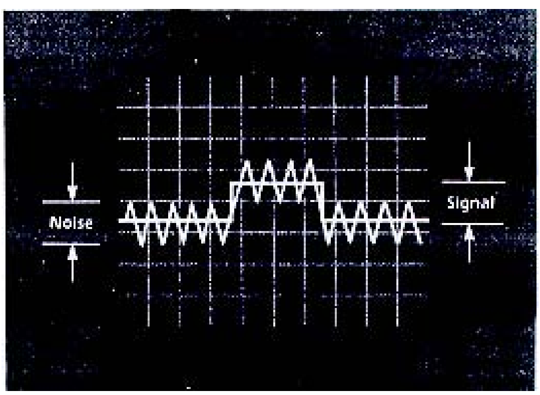

Figure 10. Video Pulse at Tangential Signal Sensitivity

TSS CALCULATIONS FOR EXTENDED RANGE DLVA'S

When RF pre-amplification is used, the TSS of the DLVA is enhanced. TSS is now dependent of RF bandwidth, and the gain and noise figure of the RF amplifier. As a general rule the TSS will improve in direct proportion to the RF gain in front of the detector. However, there is a point at which further increases in gain will not improve TSS. In order to determine that limit, the following equation is used:

Maximum MDS =

$$-114 + NF + 10 \text{ Log } (2 \times BW \times VBW)^{1/2}$$

Where: MDS = minimum discernable signal
NF = Noise figure of the RF amplifier
BW = RF bandwidth
VBW = Video bandwidth
-114 dBm = noise floor

After the best possible MDS has been determined, 4 dB must be added to convert to the best possible TSS. A sample calculation will be made to determine the best possible TSS of a 4-8 GHz DLVA with an RF amplifier noise figure of 8 dB, and a video bandwidth of 10 MHz.

$$TSS = -114 + 8 + 10 \text{ Log } (2 \times 4000 \times 10)^{1/2} + 4 \text{ dB}$$
$$= -77.4 \text{ dBm}$$

This represents the best possible TSS regardless of how much RF gain is used. The gain required to achieve this TSS is the difference between this number and the Maximum TSS of the detector without pre-amplification. Therefore, the net gain from the input of the preamplifier to the input of the detector must be 34.4 dB for the detector and video amplifier calculated previously.

The above calculations may be used to increase the sensitivity of the single input DLVA. Additional detectors must be used to increase the dynamic range of the DLVA. When additional detectors are used, the TSS will be degraded because of the noise contribution of the additional detector(s) and their associated video circuitry.

In some cases, this is not significant because the gain in the added channels is much lower; therefore, the noise contribution is much less than that of the most sensitive channel.

As a general rule, the worst case TSS will occur when the video gain in the added channels is equal to the gain in the most sensitive channel. In this case there will be twice the amount of noise for a 2 detector DLVA, and three times the amount of noise for a 3 detector DLVA. The degradation in TSS is found by the equation:

$$\text{Degradation} = 10 \text{ Log } (\text{number of detectors})^{1/2}$$

RECOVERY TIME MEASUREMENT TECHNIQUES

Recovery time is the time required to measure a pulse of minimum or greater amplitude within a specified accuracy limit, after the application of a larger amplitude pulse.

The worst case is usually when the first pulse is at the maximum input power level, and the second pulse is at the minimum input power level, although this is not always true as will be explained later.

Recovery time can be a very difficult and complicated measurement to make depending on the accuracy specified. Figure 11 shows the trailing edge and recovery time of a DLVA video output pulse. The oscilloscope photo is difficult to read for purposes of determining if the output has truly settled to its final value. If the vertical sensitivity is tuned up on the oscilloscope such that small variations on the baseline are visible, there is the probability that the waveform will be distorted due to overdrive on the oscilloscope. In addition, depending on the amplitude of the second pulse, it may not be necessary for the baseline to settle to its final value in order to recover the second pulse.

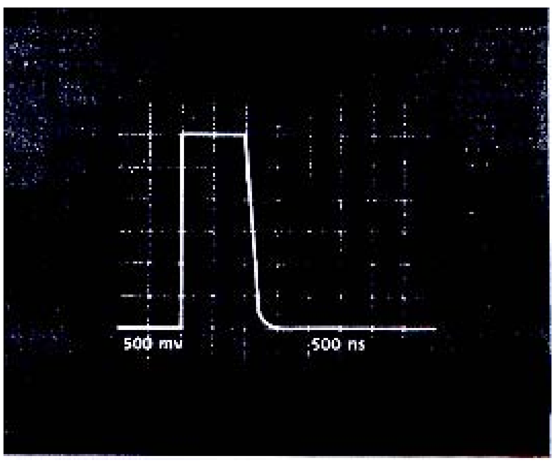

Figure 11 Trailing Edge and Recovery Time

THE TWO PULSE METHOD

Figure 12 shows the recovery time from the first large amplitude pulse with a second smaller large amplitude pulse following it. The addition of the second pulse makes it possible to accurately measure the recovery time by measuring the amplitude of the second pulse.

One way to do this is to sample the peak of the second pulse and measure it directly on a DVM.

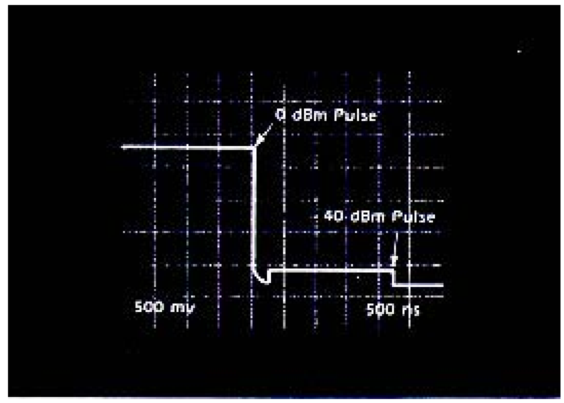

Figure 12. Two Pulse Method of Recovery Time Measurement.

Figure 13 shows the test set-up for measuring recovery time with two pulses and a sample/hold circuit for accurately measuring the amplitude of the second pulse.

Using this method, the amplitude of the second pulse can be accurately measured at any distance from the first pulse, and at any input power level for either pulse, without overdriving the vertical amplifiers in the oscilloscope.

CAUSES OF RECOVERY TIME

The input power level to the detector and its duration are the most important factors in determining recovery time; and to a lesser degree the design of the video amplifiers following the detector. In most DLVA's the change in recovery time can be seen as the pulse width is varied.

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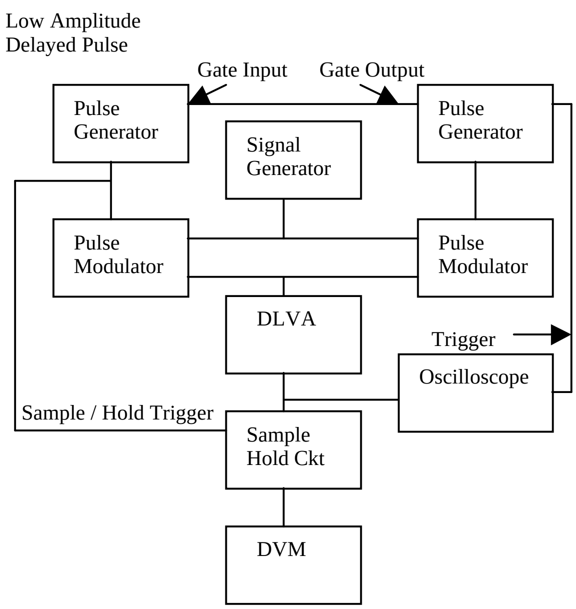

Figure 13 Recovery Time Test Set-up

INTEGRATION TECHNIQUES

MONOLITHIC BULIDING BLOCKS

Genesis Microwave has several monolithic log video amplifiers for use in its DLVA's. These monolithic blocks can be used in various combinations to design virtually any DLVA and still maintain the advantages of size reduction and improved reliability.

THIN AND THICK FILM HYBRIDS

Genesis Microwave is also equipped with a hybrid facility for both thin and thick film hybrids. This facilitates further size reduction and reliability.

INTEGRAL RF AMPLIFIERS FOR EXTENDED RANGE DLVA'S

Genesis Microwave encompasses all of the component technologies necessary to vertically integrate extended range DLVA's (ERDLVA's). The company's GaAs MMIC amplifier and power distribution and processing capabilities enable the smallest and most reliable integrated subsystems available.

BIBLIOGRAPHY

1. R.B. Mouw and F.M. Schumacher, "Tunnel Diode Detectors," *Microwave Journal*, (January 1966).
2. Russell O. Wright, "The backward Diode – When and How to Use it," *MicroWaves*, pp. 22-27, (December 1964).

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GENESIS MICROWAVE INC.

SDLVA

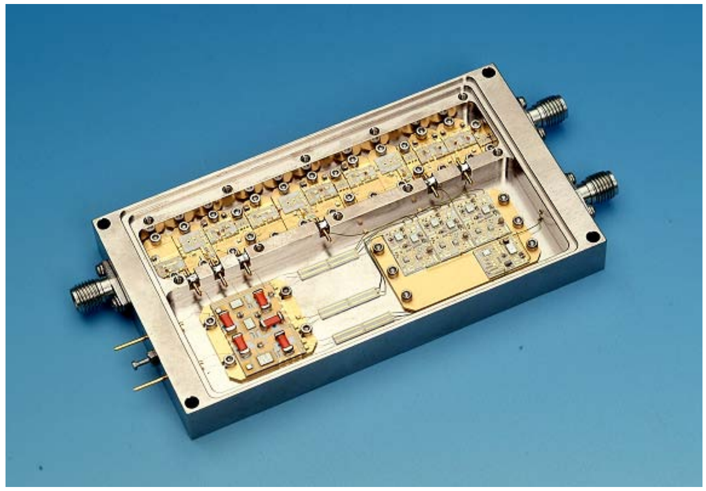
SUCCESSIVE DETECTION

FEATURES

* LIMITED RF OUPUT OPTION
* LOW POWER CONSUMPTION
* FAST PULSE RESPONSE
* SMALL PACKAGE
* THIN FILM CONSTRUCTION

APPLICATIONS

* RADAR WARNING RECEIVERS
* DIRECTION FINDING RECEIVERS
* IFM RECEIVERS
* CW OR PULSE MEASUREMENT
* PHASE ARRAY ANTENNA SYSTEMS



SPECIFICATIONS

MODEL	GMDA-S0502-70	GMDA-S0206-70	GMDA-S0618-70
Frequency Range	0.5 TO 2.0GHz	2.0 – 6.0 GHz	6.0 – 18 GHz
Logging Range	-70 to 0dBm	-70 to 0dBm	-65 to +5dBm
Logging Accuracy*	+/- 2.5 dB	+/- 2.5 dB	+/- 3.0 dB
Rise Time	10 ns	10 ns	10 ns
Recovery Time	50 ns	50 ns	50 ns
Input VSWR	2.0:1	2.0:1	2.5:1
TSS	-75dBm	-75dBm	-70dBm
DC Power **	450 MA @ 12 to15 V 80MA @ -12 to -15 V	700 MA @ 12 to15 V 80MA @ -12 to -15 V	

*Logging accuracy includes the effects of Log Linearity, Frequency Flatness, and Temperature.
** DC power is higher with limited RF output.
DIMENSIONS 3.6” x 2.0” x 0.4”

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GENESIS MICROWAVE INC.

Broadband SDLVA

FEATURES

* LIMITED RF OUPUT
* LOW POWER CONSUMPTION
* FAST PULSE RESPONSE
* SMALL PACKAGE
* THIN FILM CONSTRUCTION

APPLICATIONS

* RADAR WARNING RECEIVERS
* DIRECTION FINDING RECEIVERS
* IFM RECEIVERS
* CW OR PULSE MEASUREMENT
* PHASE ARRAY ANTENNA SYSTEMS

SPECIFICATIONS

MODEL	GMDA-S0218-65
Frequency Range	2.0 – 18GHz
Limited RF output	+12dBm +/- 2.0dB
Input / output VSWR	2.0:1
Harmonics	-10dBc
Logging Range / Slope	-55 to +10dBm @ 15 to 25mV / dB (specified)
Logging Accuracy*	+/- 3.0 dB
Rise Time	5ns typical, 10ns Max
Recovery Time	40ns
TSS	-65dBm
DC Power	600mA @ 12 to15V 100mA @ -12 to -15V

*Logging accuracy includes the effects of Log Linearity, Frequency Flatness, and Temperature.

DIMENSIONS 4.24” x 0.994” x 0.50”

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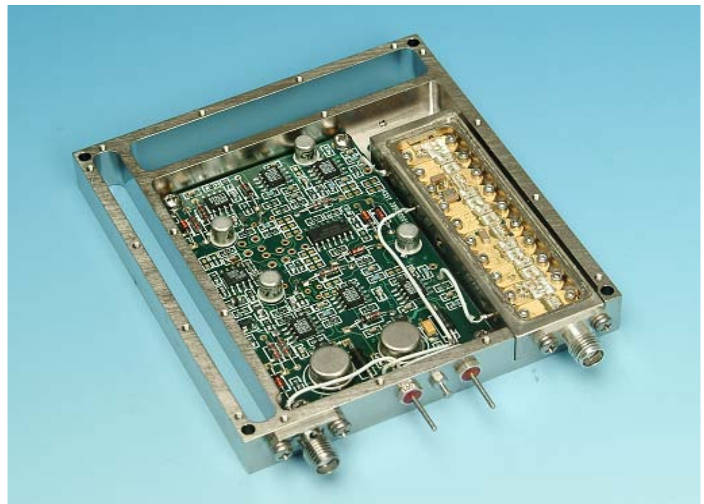
GENESIS MICROWAVE INC.

EXTENDED DYNAMIC RANGE DLVA



FEATURES

- WIDE DYNAMIC RANGE
- WIDE FREQUENCY RANGE
- FAST PULSE RESPONSE
- SMALL PACKAGE
- HYBRID CONSTRUCTION

APPLICATIONS

- RADAR WARNING RECEIVERS
- DIRECTION FINDING RECEIVERS
- IFM RECEIVERS
- CW OR PULSE MEASUREMENT

SPECIFICATIONS

MODEL	GMDA-E0520-70	GMDA-E0206-70	GMDA-E0618-75
Frequency Range	0.5 – 2.0 GHz	2.0 – 6.0 GHz	6.0 – 18 GHz
Logging Range	-60 to 10dBm	-60 to 10dBm	-70 to 5dBm
Logging Accuracy*	+/- 2.0 dB	+/- 2.0 dB	+/- 2.5 dB
Rise Time	25 ns	25 ns	25 ns
Recovery Time	500 ns	500 ns	500 ns
Input VSWR	2.0:1	2.0:1	2.5:1
TSS	-65 dBm	-65 dBm	-75 dBm

*Logging Accuracy includes the effects of Log Linearity, Frequency Flatness, and Temperature.

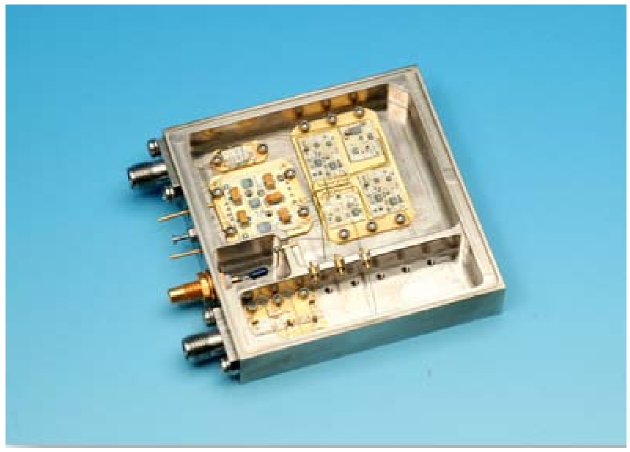
DC POWER 300 MA @ 12 to 15 VDC
100 MA @ -12 to –15 VDC

DIMENSIONS 3.0 “ X 2.9” X 0.5” For 6-18 GHz unit only

GENESIS MICROWAVE, INC. 4921 Robert J. Mathews Pkwy, El Dorado Hills CA 95762. Tel. 916-941-9125 FAX 916-941-9584
Design and specifications subject to change without notice

GENESIS MICROWAVE INC.

MEDIUM DYNAMIC RANGE
DLVA



FEATURES

* 50 dB RANGE
* DIRECT COUPLED
* FAST PULSE RESPONSE
* SMALL PACKAGE
* HYBRID CONSTRUCTION
* BIAS INPUT FOR NOISE CANCELING

APPLICATIONS

* DF RECEIVERS
* RADAR WARNING RECEIVERS
* IFM RECEIVERS

SPECIFICATIONS

MODEL	GMDA-D1001-2
Frequency Range	0.5 – 18.0GHz
Logging Range	-38 to +12dBm
Logging Linearity	+/- 1.0dB
TSS	-42dBm
Rise time	25ns
Recovery Time	500ns
Input VSWR	2.0:1

DC POWER +180 MA @ + 15 VDC
-70 MA @ -15VDC

DIMENSIONS 2.3” X 2.3” X 0.45”

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GENESIS MICROWAVE INC.

DC COUPLED
DLVA

FEATURES

- EXCELLENT LOG LINEARITY
- WIDE FREQUENCY RANGE
- FAST PULSE RESPONSE
- SMALL PACKAGE
- HYBRID CONSTRUCTION

APPLICATIONS

- RADAR WARNING RECEIVERS
- DRECTION FINDING RECEIVERS
- IFM RECEIVERS
- CW OR PULSE MEASUREMENT

SPECIFICATIONS

MODEL	GMDA-D0518-40	GMDA-D0520-40	GMDA-D0206-40	GMDA – D0618-40
Frequency Range	0.5 – 18 GHz	0.5 – 2.0 GHz	2.0 – 6.0 GHz	6.0 – 18 GHz
Logging Range	-39 to 0 dBm	-40 to 0 dBm	-40 to 0 dBm	-39 to 0 dBm
Logging linearity *	+/- 0.5 dB	+/- 0.5 dB	+/- 0.5 dB	+/- 0.5 dB
Rise Time	25 ns	25 ns	25 ns	25 ns
Recovery Time	500 ns	500 ns	500 ns	500 ns
Input VSWR	3.5:1	2.0:1	2.0:1	3.0:1
TSS	-40 dBm	-43 dBm	-43 dBm	-40 dBm

*Measured @ band center, referenced to best fit line

DC POWER +/- 60 MA @ +/- 12 to +/- 15 VDC

DIMENSIONS 2.30 " X 2.30" X 0.45

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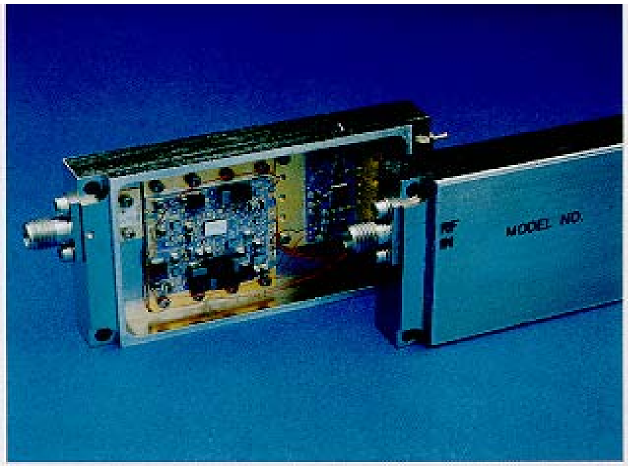
GENESIS MICROWAVE INC.

CW IMMUNE
(PSEUDO – AC COUPLED)
DLVA

FEATURES

* EXCELLENT LOG LINEARITY
* WIDE FREQUENCY RANGE
* FAST PULSE RESPONSE
* SMALL PACKAGE
* HYBRID CONSTRUCTION



APPLICATIONS

* RADAR WARNING RECEIVERS
* DF RECEIVERS
* IFM RECEIVERS
* PULSE ON CW MEASUREMENT

SPECIFICATIONS

MODEL	GMDA-D0218-45	GMDA-D0520-45	GMDA-D0206-45	GMDA -D0618-45
Frequency Range	2.0 – 18GHz	0.5 – 2.0GHz	2.0 – 6.0GHz	6.0 – 18GHz
Logging Range	-40 to 5dBm	-40 to 5dBm	-40 to 5dBm	-40 to 5dBm
Logging linearity *	+/- 0.5dB	+/- 0.5dB	+/- 0.5dB	+/- 0.5dB
Rise Time	20ns	20ns	20ns	20ns
Recovery Time	500ns	500ns	500ns	500ns
Input VSWR	3.0:1	2.0:1	2.0:1	2.5:1
TSS	-43dBm	-45dBm	-45dBm	-43dBm

*Best fit @ band center

DC POWER +80 MA @ +12 to + 15 VDC
-80 MA @ -12 to -15VDC

DIMENSIONS 2.8 " X 2.2" X 0.5"

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GENESIS MICROWAVE INC.

THRESHOLD DETECTOR

FEATURES

- TTL OUTPUT
- DIRECT COUPLED
- SMALL PACKAGE
- HYBRID CONSTRUCTION

APPLICATIONS

- BIT TESTING
- SYSTEM SIGNAL GATING
- SPECIFIC POWER LEVEL INFORMATION

SPECIFICATIONS

MODEL	GMTA-0218
Frequency Range	2.0 – 18 GHz
Frequency Flatness	+/- 1.5 dB
Thresh Level Range*	-23 dBm
Threshold Uncertainty	+/- 1.0 dB
Input VSWR	2.5:1

*Other threshold ranges available

DC POWER 50 MA @ 12-15 VDC
DIMENSIONS 1.00” X 0.65” X 0.31”

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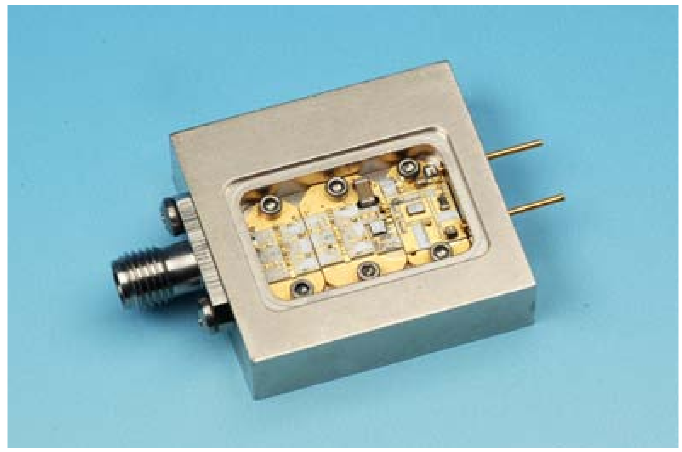
GENESIS MICROWAVE INC.

THRESHOLD DETECTOR



FEATURES

- TTL OUTPUT
- DIRECT COUPLED
- SMALL PACKAGE
- HYBRID CONSTRUCTION

APPLICATIONS

- BIT TESTING
- SYSTEM SIGNAL GATING
- SPECIFIC POWER LEVEL INFORMATION

SPECIFICATIONS

MODEL	GMTA-0818
Frequency Range	8.0 – 18GHz
Frequency Flatness	+/- 1.5dB
Thresh Level *	-42dBm
Threshold Uncertainty	+/- 1.0dB
Input VSWR	2.5:1

*Other threshold levels available

DC POWER 50 MA @ 12-15 VDC
DIMENSIONS 1.15” X 1.10” X 0.37”

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Design and specifications subject to change without notice