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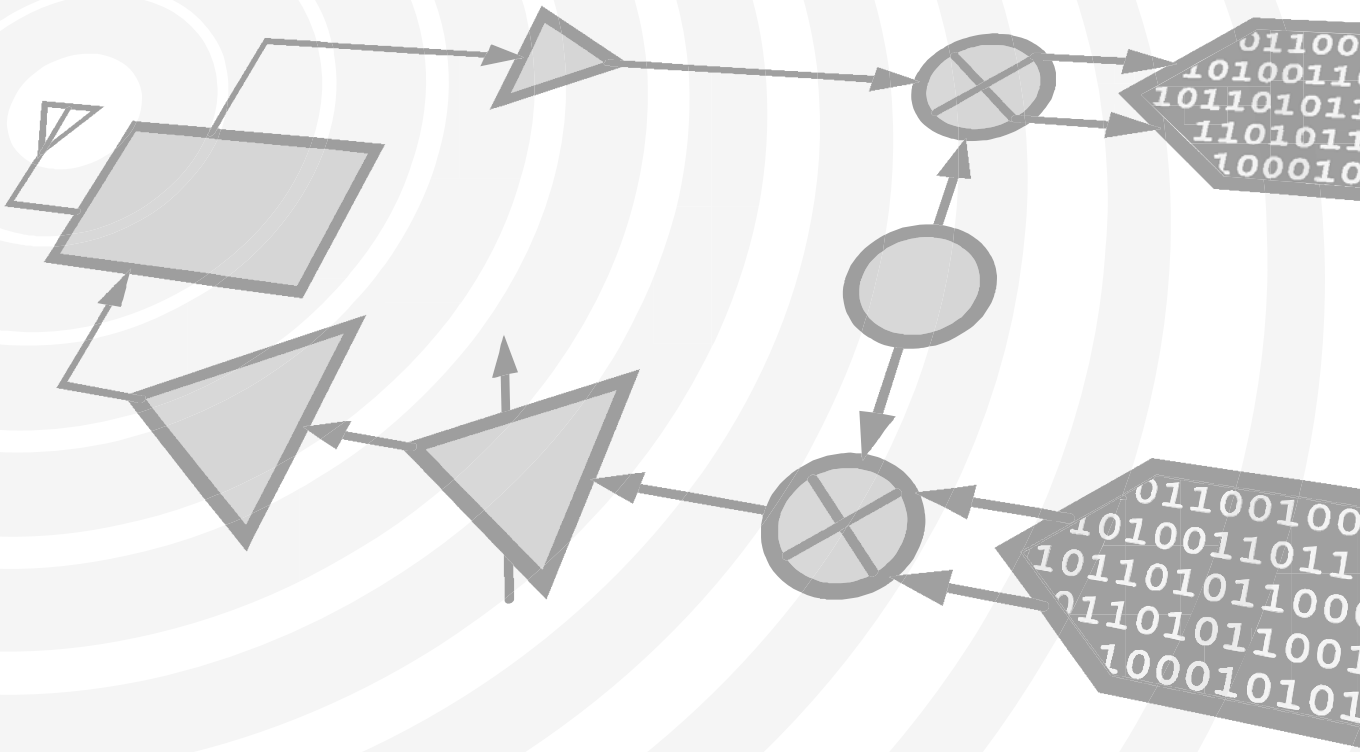

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HMC913

SUCCESSIVE DETECTION LOG VIDEO AMPLIFER (SDLVA), 0.6 - 20 GHz

Typical Applications

The HMC913 is ideal for:

- EW, ELINT & IFM Receivers
- DF Radar Systems
- ECM Systems
- Broadband Test & Measurement
- Power Measurement & Control Circuits
- Military & Space Applications

Features

High Logging Range: 59 dB
(-54 to +5 dBm) @ 18 GHz

Output Frequency Flatness: ±1.5 dB

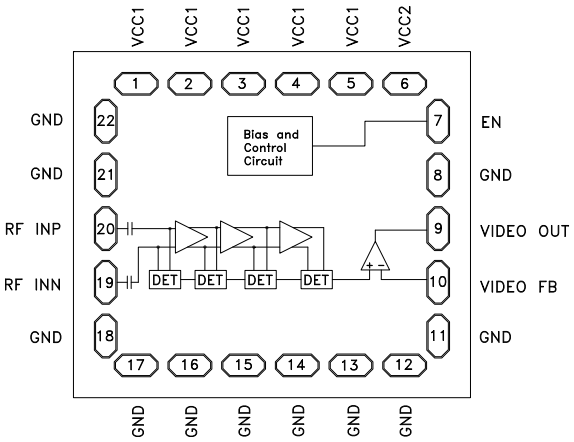
Log Linearity: ±1 dB

Fast Rise/Fall Times: 5/10 ns

Single Positive Supply: +3.3V

ESD Sensitivity (HBM): Class 1A

Functional Diagram



General Description

The HMC913 is a Successive Detection Log Video Amplifier (SDLVA) which operates from 0.6 to 20 GHz. The HMC913 provides a logging range of 59 dB. This device offers typical fast rise/fall times of 5/10 ns and a superior delay time of only 14 ns. The HMC913 log video output slope is typically 14 mV/dB. Maximum recovery times are less than 30 ns. Ideal for high speed channelized receiver applications, the HMC913 operates from a single +3.3 V supply, and consumes only 80 mA. All data shown herein is measured with the chip in a 50 Ohm environment and contacted with RF probes.

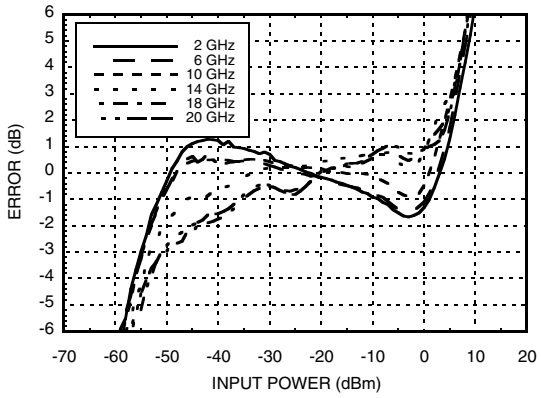
Electrical Specifications, T_A = +25 °C, Vcc1 = Vcc2 = 3.3V [1]

Parameter	Conditions	Typ.	Units
Input Frequency Range [1][2]		0.6 - 20	GHz
Frequency Flatness	Pin = -25 dBm	±1.5	dB
Log Linearity	Pin = -50 to +3 dBm	±1	dB
Log Linearity over Temperature (-55 °C to +85 °C)	Pin = -25 dBm	±1.5	dB
Minimum Logging Range	to ±3 dB error @ 18 GHz	-54 @ 18 GHz	dBm
Maximum Logging Range	to ±3 dB error @ 18 GHz	+5 @ 18 GHz	dBm
Input Return Loss		5.5	dB
Log Video Minimum Output Voltage		1	V
Log Video Maximum Output Voltage		1.8	V
Log Video Output Rise Time	10% to 90%	5	ns
Log Video Output Fall Time	90% to 10%	10	ns
Log Video Recovery Time		25	ns
Log Video Output Slope		14	mV/dB
Log Video Output Slope Variation over Temperature	@ 10 GHz	5	µV/dB°C
Log Video Propagation Delay		14	ns
Supply Current (Icc1 + Icc2)	@ Pin = -30 dBm	80	mA

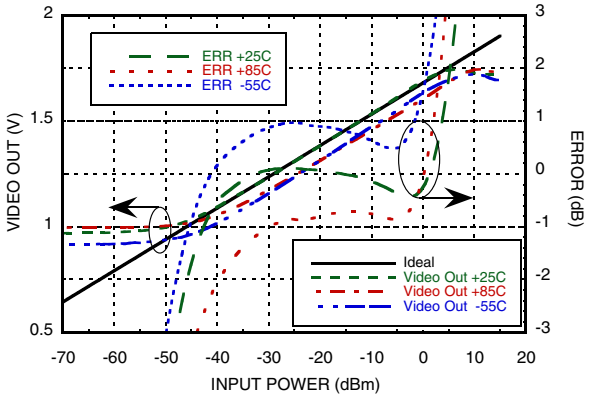
[1] Electrical specs and performance plots are given for single-ended operation

[2] Video output load should be 1K Ohm or higher.

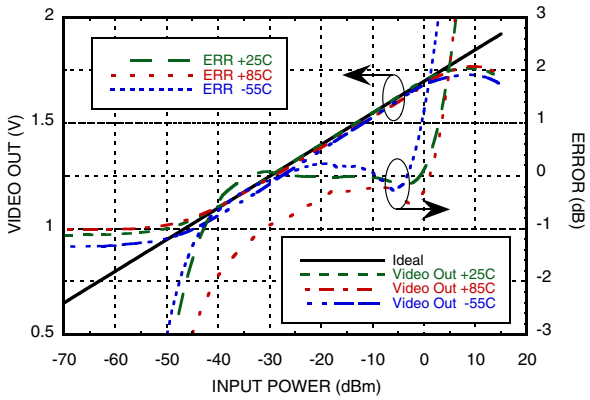
Error Flatness vs. Input Power Over Frequency [1][2]



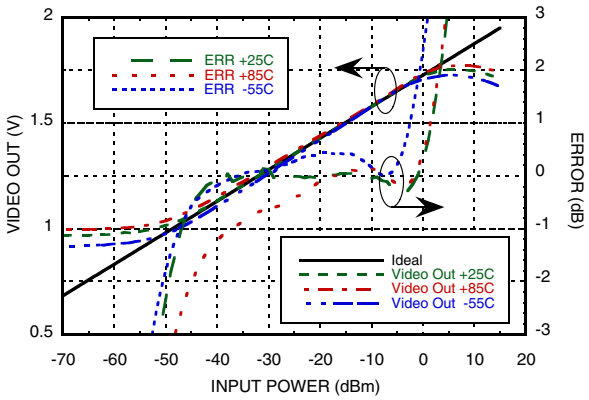
VIDEO OUT & Error vs. Input Power, Fin = 500 MHz [1]



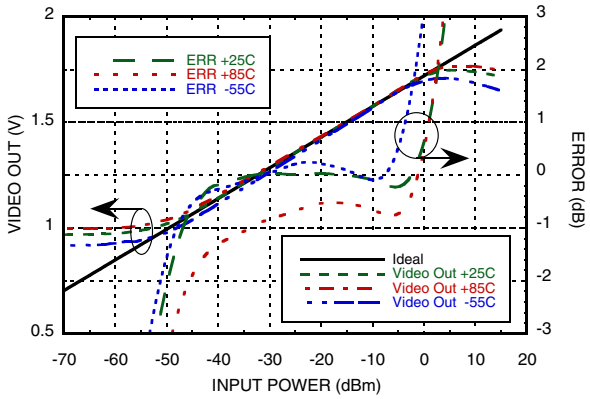
VIDEO OUT & Error vs. Input Power, Fin = 1 GHz [1]



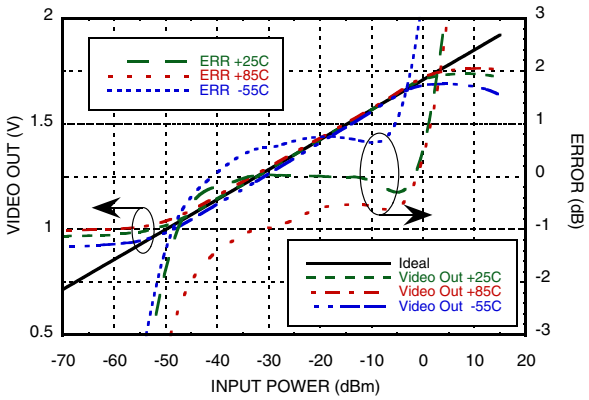
VIDEO OUT & Error vs. Input Power, Fin = 2 GHz [1]



VIDEO OUT & Error vs. Input Power, Fin = 6 GHz [1]



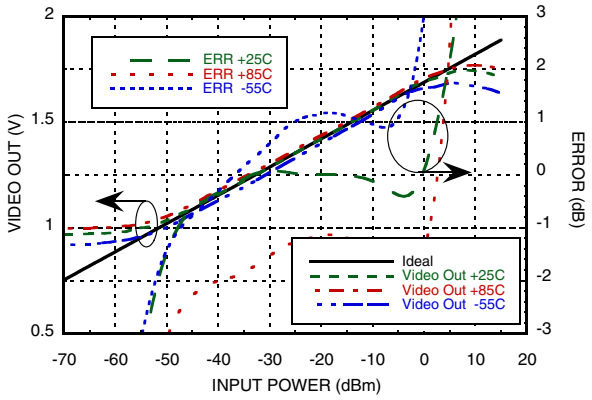
VIDEO OUT & Error vs. Input Power, Fin = 10 GHz [1]



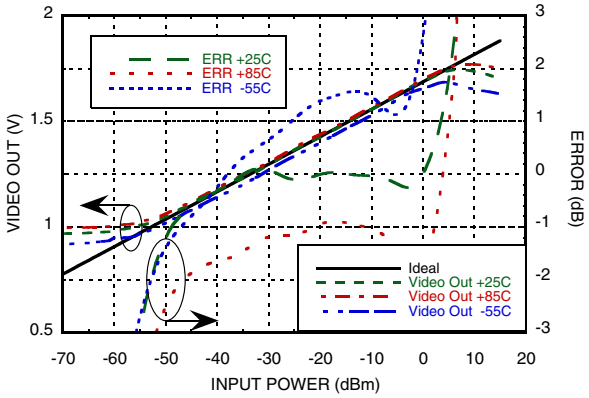
[1] Electrical specs and performance plots are given for single-ended operation
[2] An average ideal line is used to calculate error curves.

SUCCESSIVE DETECTION LOG VIDEO AMPLIFER (SDLVA), 0.6 - 20 GHz

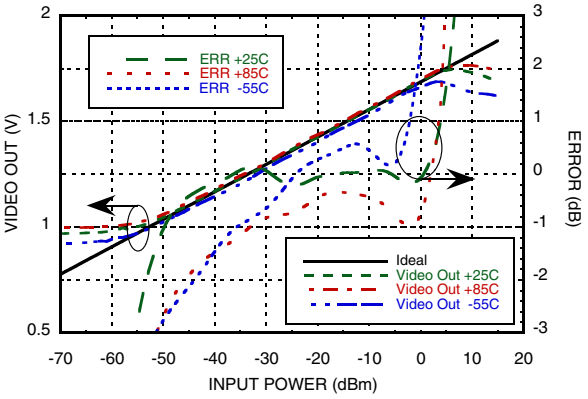
VIDEO OUT & Error vs. Input Power, Fin = 14 GHz [1]



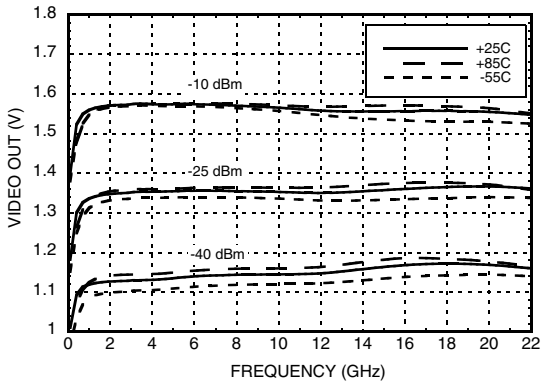
VIDEO OUT vs. Error vs. Input Power, Fin = 18 GHz [1]



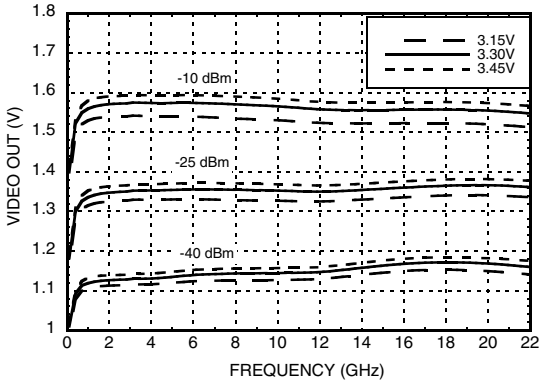
VIDEO OUT & Error vs. Input Power, Fin = 20 GHz [1]



VIDEO OUT vs. Frequency Over Input Power & Temperature [1]



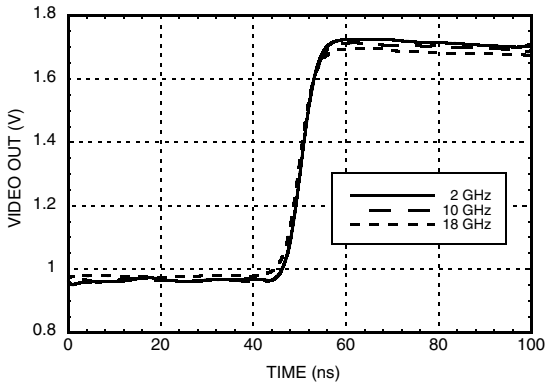
VIDEO OUT vs. Frequency Over Input Power & Bias Voltage [1]



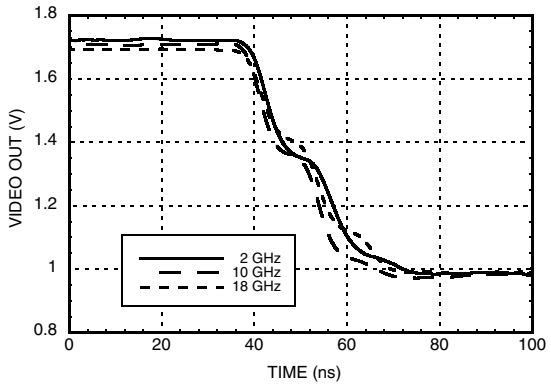
[1] Electrical specs and performance plots are given for single-ended operation

SUCCESSIVE DETECTION LOG VIDEO AMPLIFER (SDLVA), 0.6 - 20 GHz

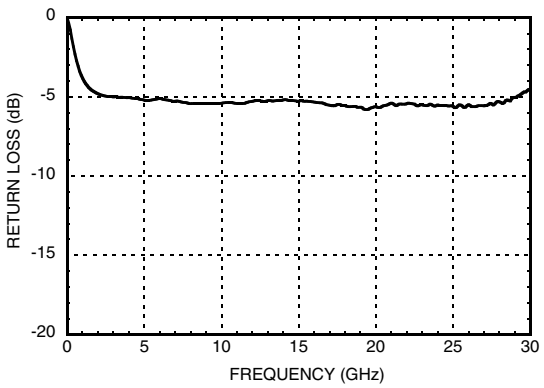
Rise Time for Various Frequencies @ 0 dBm [1]



Fall Time for Various Frequencies @ 0 dBm [1]



Input Return Loss vs. Frequency [1]



[1] Electrical specs and performance plots are given for single-ended operation

SUCCESSIVE DETECTION LOG VIDEO AMPLIFER (SDLVA), 0.6 - 20 GHz

Absolute Maximum Ratings

Vcc	+3.6V
ENBL	+3.6V
RF Input Power	+15 dBm
Channel Temperature	125 °C
Continuous Pdiss (T=85°C) Derate 12.63 mW/°C above 85°C	0.51 W
Thermal Resistance R_{th} (Junction to die bottom)	33.94 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C
ESD Sensitivity (HBM)	Class 1A

Die Packaging Information [1]

Standard	Alternate
WP-3 (Waffle Pack)	[2]

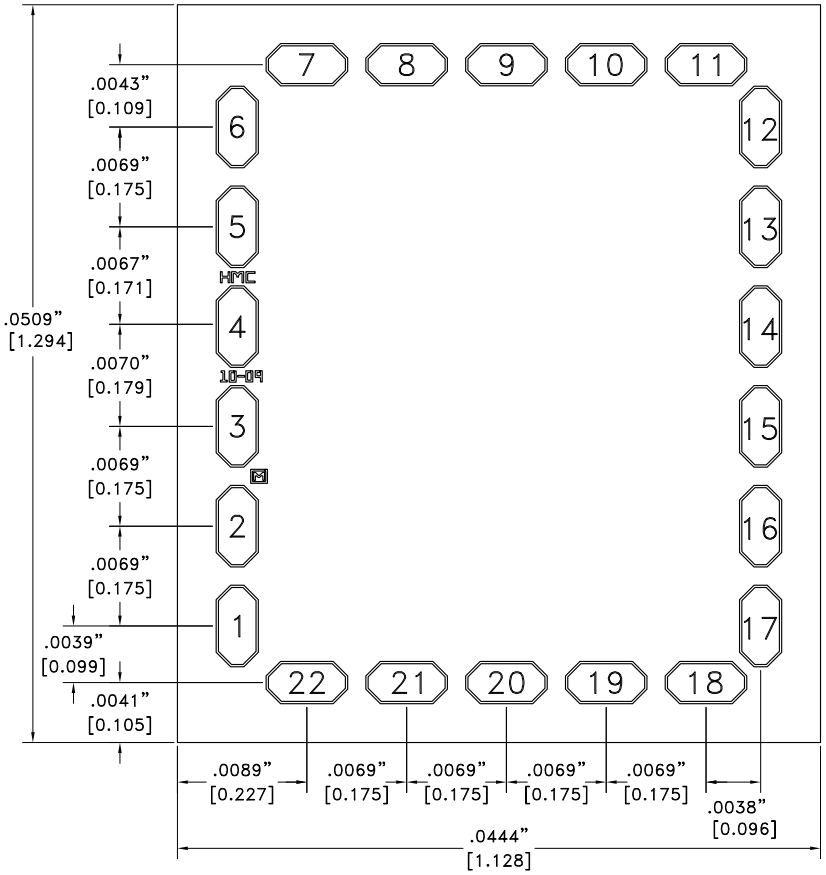
[1] Refer to the "Packaging Information" section for die packaging dimensions.

[2] For alternate packaging information contact Hittite Microwave Corporation.

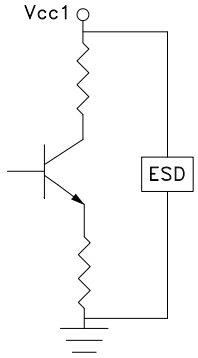
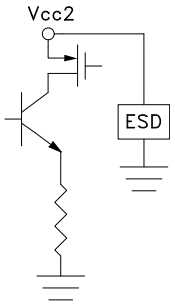
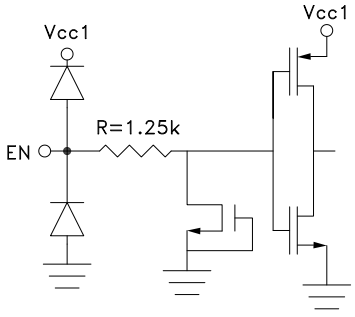
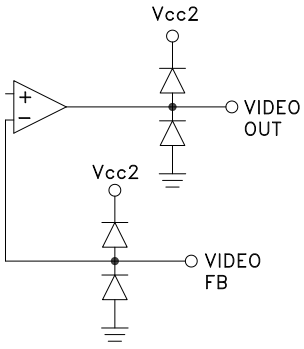
NOTES:
1. ALL DIMENSIONS IN INCHES [MILLIMETERS]
2. DIE THICKNESS IS 0.011 (0.279)
3. TYPICAL BOND PAD IS 0.0024 SQUARE
4. BOND PAD METALLIZATION: ALUMINUM
5. NO BACKSIDE METAL
6. NO CONNECTION REQUIRED FOR UNLABELED BOND PADS
7. OVERALL DIE SIZE IS ±.002

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

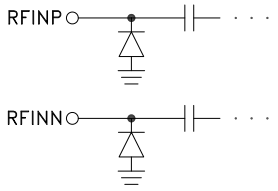
Outline Drawing



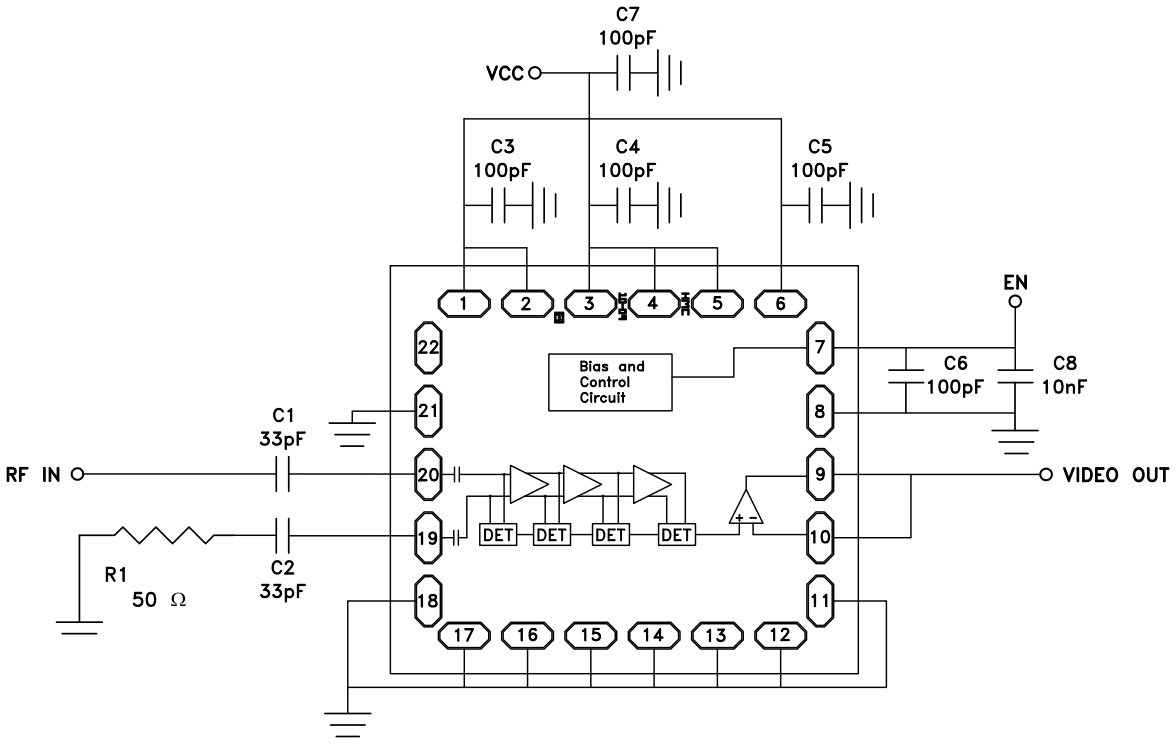
Pad Descriptions

Pad Number	Function	Description	Interface Schematic
1 - 5	VCC1	Bias Supply. Connect Supply Voltage to these pins with appropriate filtering. To ensure proper start-up supply rise time should be faster than 100usec	
6	VCC2	Bias Supply. Connect supply voltage to these pins with appropriate filtering. To ensure proper start-up supply rise time should be faster than 100usec	
7	EN	Enable pin connected to VCC1 or VCC2 for normal operation. Total supply current reduced to less than 3mA when EN is set to 0V.	
8, 11 - 18, 21, 22 Die Bottom	GND	These pins and the die bottom must be connected to a high quality RF/DC ground.	
9, 10	VIDEO OUT, VIDEO FB	Video out and feedback. These pins should be shorted to each other (see application circuit). Video out load should be at least 1K Ohm or higher.	

Pad Descriptions *(Continued)*

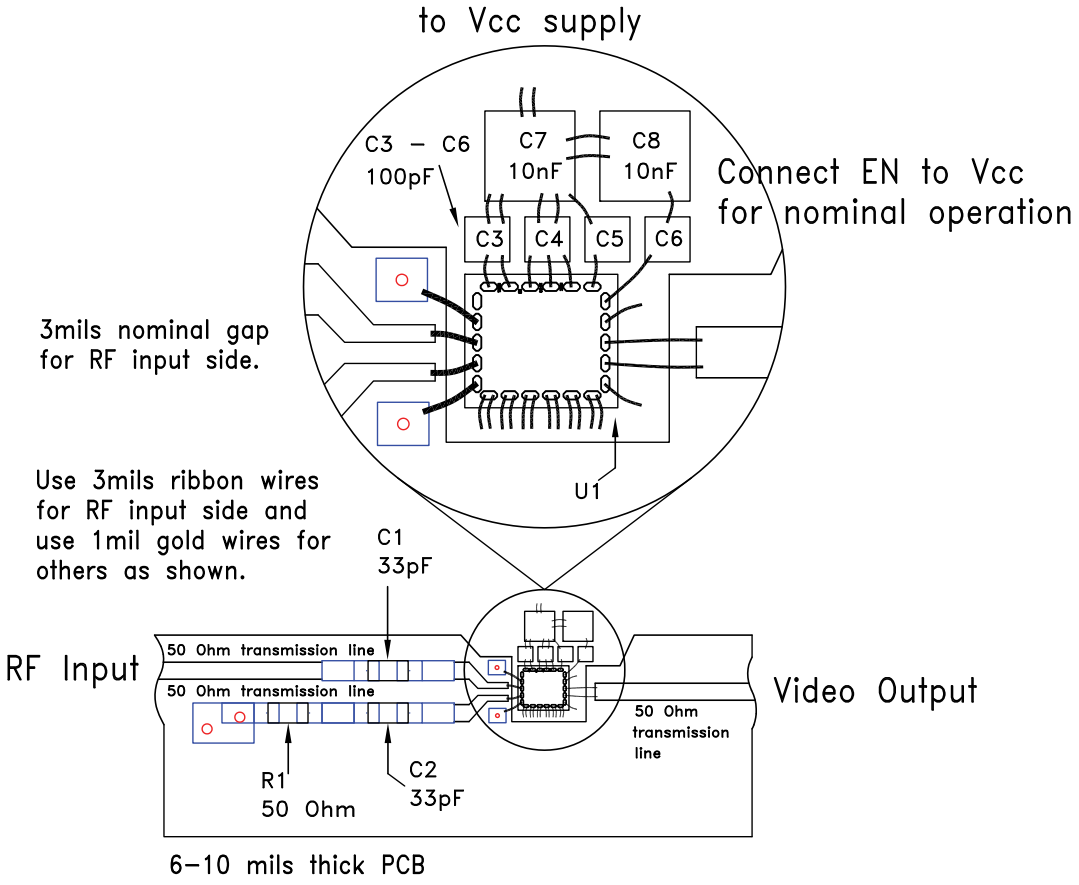
Pad Number	Function	Description	Interface Schematic
19, 20	RFINN, RFINP	RF Input pins Connect RF to RFINP and AC couple RFINN to ground via 50 Ohm for single ended operation.	

Application Circuit



Note: Video output load should be 1K Ohm or higher.

Assembly Diagram



List of Materials for Assembly Diagram

Item	Description
C1, C2	33 pF Capacitor, 0402 Pkg.
C3 - C6	100 pF SLC Capacitor, SA1212BX101M16VHXF
C7 - C8	10 nF SLC Capacitor, MVB3030X103ZGH5N
R1	50 Ohm Resistor, 0402 Pkg.
U1	HMC913 Die

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Mounting & Bonding Techniques for MMICs

The die should be attached directly to the ground plane with epoxy (see HMC general Handling, Mounting , Bonding Note).

50 Ohm Microstrip transmission lines on 0.254mm (10 mil) thick alumina thin film substrates are recommended for bringing RF to and from the chip (Figure 1).

Microstrip substrates should be placed as close to the die as possible in order to minimize bond wire length. Typical die-to-substrate spacing is 0.076mm to 0.152 mm (3 to 6 mils).

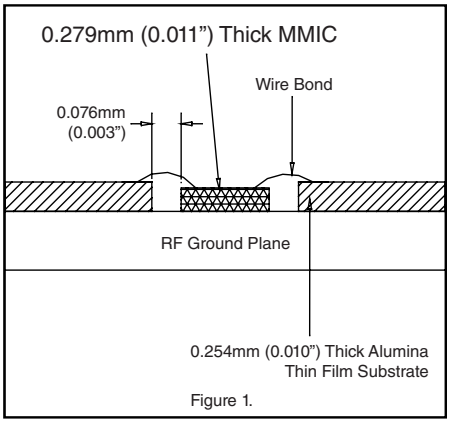


Figure 1.

Handling Precautions

Follow these precautions to avoid permanent damage.

Storage: All bare die are placed in either Waffle or Gel based ESD protective containers, and then sealed in an ESD protective bag for shipment. Once the sealed ESD protective bag has been opened, all die should be stored in a dry nitrogen environment.

Cleanliness: Handle the chips in a clean environment. DO NOT attempt to clean the chip using liquid cleaning systems.

Static Sensitivity: Follow ESD precautions to protect against ESD strikes.

Transients: Suppress instrument and bias supply transients while bias is applied. Use shielded signal and bias cables to minimize inductive pick-up.

General Handling: The chip may be handled by a vacuum collet or with a sharp pair of tweezers.

Mounting

Epoxy Die Attach: Apply a minimum amount of epoxy to the mounting surface so that a thin epoxy fillet is observed around the perimeter of the chip once it is placed into position. Cure epoxy per the manufacturer's schedule.

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
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http://moschip.ru/get-element

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Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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