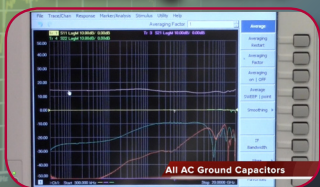


Distributed Amplifier Training Video



See Page 11

17 New Featured Products!

Dual Rank Track-and-Hold Amplifier



HMC1061LC5

- Direct-Coupled I/O, 4 GSPS BW
- Ultra-Clean Output Waveform
- 1.4 mV RMS Sample Noise

See Page 4

14-Bit Analog-to-Digital Converter



HMCAD1062/HMCAD1062B

- 1.8V Single Supply Operation
- SNR = 74 dB & SFDR = 87 dB for $F_s = 125$ MSPS & $F_{in} = 105$ MHz
- 2 Vp-p Differential Analog Input

See Page 5

25 Watt, GaN PA, 2 - 6 GHz



HMC1086F10

- High Output IP3: +46 dBm
- Supply Voltage: +28V @ 1.1 A
- 50 Ohm Matched Input/Output

See Page 6

Hittite Adds New 2 Watt Power Amplifier



Covers 15 to 20 GHz with 25% PAE

A key trend in the microwave radio communications industry today is the constant need for improvement in amplifier efficiency. As newer 'green' basestations are developed, amplifiers, which offer increased RF output performance for less DC input are welcome news for designers. Hittite has launched a new power amplifier

which maintains excellent performance over its operating frequency band with only moderate power dissipation.

The HMC6981LS6 is a four-stage GaAs pHEMT MMIC power amplifier which operates between 15 to 20 GHz. Ideal for covering the 18 GHz licensed microwave radio band, the amplifier provides 26 dB of gain, +34.5 dBm of saturated output power, and 25 % PAE from a +6V supply. With up to +43.5 dBm OIP3 the HMC6981LS6 is ideal for high linearity point-to-point and point-to-multi-point radios.

(Continued on page 8)

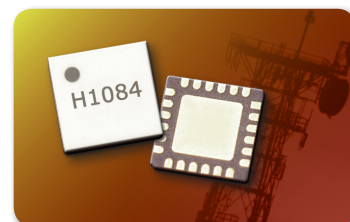
New GaAs MMIC SP4T Reflective Switch

SP4T Reflective Switch, 23 to 30 GHz

The HMC1084LC4 is a reflective Single Pole Four Throw (SP4T) switch which is ideal for demanding applications which require low insertion loss, fast switching speed, broadband performance and high power handling capability.

The HMC1084LC4 GaAs MESFET SP4T switch is rated from 23 GHz to 30 GHz, and is controlled with two complementary inputs of 0-/3V. This switch exhibits fast switching speed of 15 ns (rise and fall times) and consumes much less DC current than pin diode based solutions. With an input signal at 30 GHz, the HMC1084LC4 exhibits 11 dB return loss, 26 dB isolation and only 2.8 dB insertion loss.

(Continued on page 8)



Optical Modulator Driver Solutions

28 Gbps EML & 32 Gbps MZ Drivers



Hittite has added three new products to its optical modulator driver family. The HMC1068, HMC1069 and the HMC7150LP3DE address the stringent lower power and higher density requirements of the next generation long-haul, metro core and metro access fiber optic equipment.

HMC7150LP3DE is an EML (Electro-absorption Modulated Laser) driver, designed for 100G Ethernet LR4 & ER4 applications. The device supports data-rates up to 28.3 Gbps and its high bandwidth yields output signal characteristics of 12 ps rise & fall times. HMC7150LP3DE is ideal for CFP2/CFP4 and QSFP2, or similar form factor pluggable modules, with its compact size and low power consumption. HMC7150LP3DE is available in a 3x3 mm plastic LP3 RoHS compliant SMT package and runs on a positive supply from 3.3V to 6V.

(Continued on page 9)



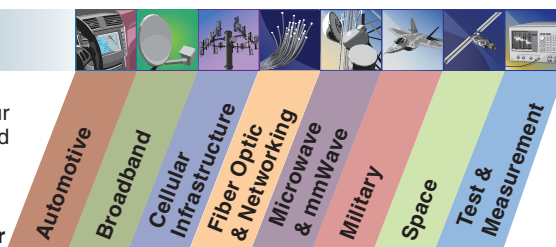
Hittite Exhibiting at MTT-S, Booth #230

Featuring 17 New Products & Five Product Demos.

See Page 10

New Products by Market Application

Hittite Microwave offers over 1,095 products across 36 product lines. Our custom and standard products support a wide range of wireless/wired/optical communications and radar applications for the following markets.



Part Number	Function	Frequency/ Data Rate	Page Number
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Amplifiers

HMC1086	GaN MMIC PA, 25W	2 - 6 GHz	6									
HMC1086F10	GaN MMIC PA, Flange-Mount 25W	2 - 6 GHz	6									
HMC1087	GaN MMIC PA, 8W	2 - 20 GHz	6									
HMC1087F10	GaN MMIC PA, Flange-Mount 8W	2 - 20 GHz	7									
HMC1082LP4E	Medium Power Amplifier, 0.5 Watt	6 - 18 GHz	7									
HMC6981LS6	Power Amplifier, 2 Watt	15 - 20 GHz	1, 8									

Data Converters

HMCAD1062	Quad 14-Bit Data Converter	80 / 105 / 125 MSPS	5									
HMCAD1062B	Dual 14-Bit Data Converter	80 / 105 / 125 MSPS	5									
HMCAD1063	Dual 14-Bit Data Converter	250 / 400 MSPS	5									
HMCAD1073	Dual 16-Bit Data Converter	250 / 400 MSPS	5									
HMC1061LC5	Dual Rank Track-and-Hold Amplifier	18 GHz	4									

I/Q Downconverter / Receivers

HMC1065LP4E	I/Q Downconverter/Receiver	27 - 34 GHz	3									
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Mixers

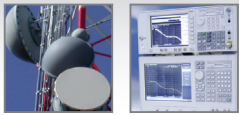
HMC1081	Double Balanced Mixer	50 - 75 GHz	3									
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Optical Modulator Drivers

HMC7150LP3DE	EML Driver	28 Gbps	1, 9									
HMC1068	Optical Modulator Driver	32 Gbps	1, 9									
HMC1069	Optical Modulator Driver, Pre-Stage	32 Gbps	1, 9									

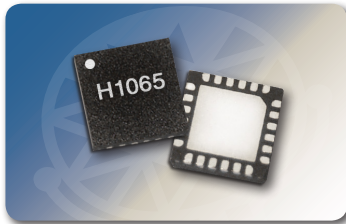
Switch

HMC1084LC4	SP4T	23 - 30 GHz	1, 8									
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New I/Q Downconverter & Mixer Solutions for Microwave Radio, SATCOM & Test Instrumentation

HMC1065LP4E, GaAs MMIC I/Q Downconverter, 27 to 34 GHz



Features

- Conversion Gain: 13 dB
- Image Rejection: 17 dBc
- Input IP3: +2 dBm
- 24 Lead 4x4 mm SMT Package

Applications

- Point-to-Point and Point-to-Multi-Point Radio
- Satellite Communications
- Sensors

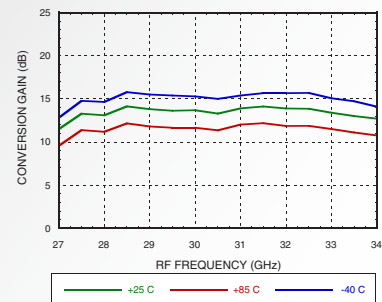
Microwave designers are always looking for ways to reduce space and cost and to find highly integrated solutions to simplify transmit and receive functions wherever practicable. Now Hittite has launched another new downconverter product which does just this. The HMC1065LP4E is a GaAs MMIC I/Q downconverter which is ideal for replacing the front end receiver section of 28 GHz and 32 GHz microwave radio designs.

Housed in a compact, leadless RoHS compliant SMT package, the HMC1065LP4E is a GaAs MMIC image reject low noise converter which delivers small signal conversion gain of 13 dB with 17 dBc of image rejection. The HMC1065LP4E utilizes an RF low noise amplifier to drive the I/Q mixer where the LCO is driven by a x2 multiplier. IF1 and IF2 mixer outputs are provided and an external 90° hybrid is needed to select the required sideband. The HMC1065LP4E GaAs MMIC I/Q downconverter also features a very low noise figure of less than 3 dB and typical input IP3 of 2 dBm.

The key specifications of the HMC1065LP4E are shown in the table below with the recently released HMC6147ALC5A I/Q downconverter, which covers the 38 GHz and 42 GHz microwave radio bands.

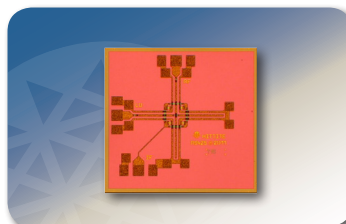
The I/Q mixer design topology used for the HMC1065LP4E and the HMC6147ALC5A is highly advantageous because it reduces the need for filtering of the unwanted sidebands. Both devices provide much smaller alternatives to hybrid style single sideband converter assemblies, and they eliminate the need for wire bonding by allowing the use of surface mount manufacturing techniques.

Conversion Gain vs. Temperature, USB



RF / LO Frequency (GHz)	Function	IF Frequency (GHz)	Conversion Gain (dB)	Noise Figure (dB)	Image Rejection (dBc)	IIP3 (dBm)	Package	Part Number
27 - 34	I/Q Downconverter/Receiver	DC - 4	12	-	17	2	LP4	HMC1065LP4E
37 - 44	I/Q Downconverter	0 - 4	13	3.5	25	2	LC5A	HMC6147ALC5A

HMC1081, GaAs MMIC Mixer, 50 to 75 GHz

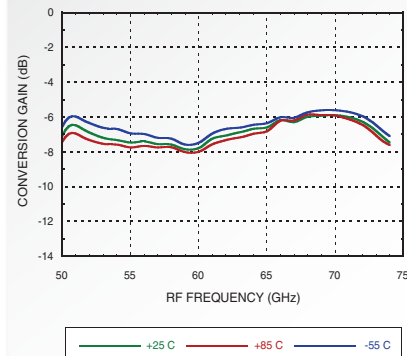


Features

- Passive: No DC Bias Required
- Low LO Power: 12 dBm
- High LO/RF Isolation: 28 dB
- Wide IF Bandwidth: DC to 26 GHz
- Upconversion & Downconversion Applications

The HMC1081 is a double balanced mixer. It can be used as an upconverter or a downconverter, with DC to 26 GHz at the IF port and 50 to 75 GHz at the LO and RF port. This passive MMIC mixer is fabricated with GaAs Schottky Diode technology. All bond pads and the die backside are Ti/Au metalized. All data is measured with the chip in a 50 Ohm environment and contacted with Wirebonds.

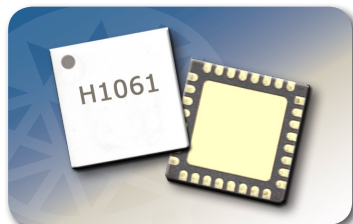
Conversion Gain vs. Temperature
LO = 75 GHz, LSB





New T/H Amplifier for Synthesizer & Signal Acquisition Applications

HMC1061LC5, Dual Rank Track-and-Hold Amplifier, 18 GHz Bandwidth



Enhances Bandwidth & Linearity of A/D Converters

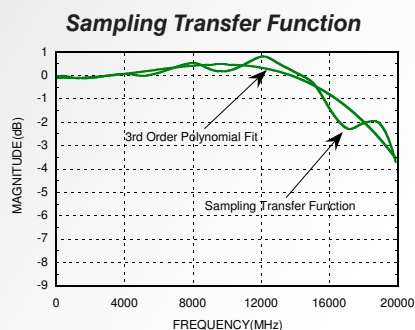
The HMC1061LC5 is a SiGe monolithic, fully differential, dual rank, Track-and-Hold (T/H) amplifier that provides unprecedented bandwidth and dynamic-range performance to wideband sampled signal systems. The T/H amplifier offers precision signal sampling over 18 GHz bandwidth, with 9 - 10-bit linearity from DC to beyond 5 GHz input frequency, 1.5 mV noise, and <70 fs random aperture jitter. The device can be clocked to 4 GSPS with minimal dynamic range loss. The T/H amplifier can be used to expand the bandwidth and/or high-frequency linearity of high-speed A/D conversion and signal acquisition systems.

Features

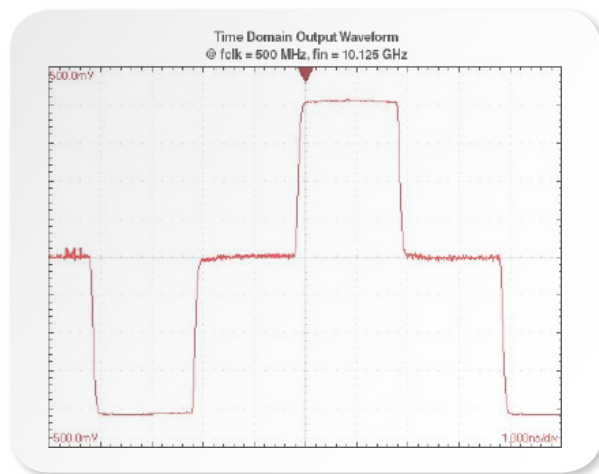
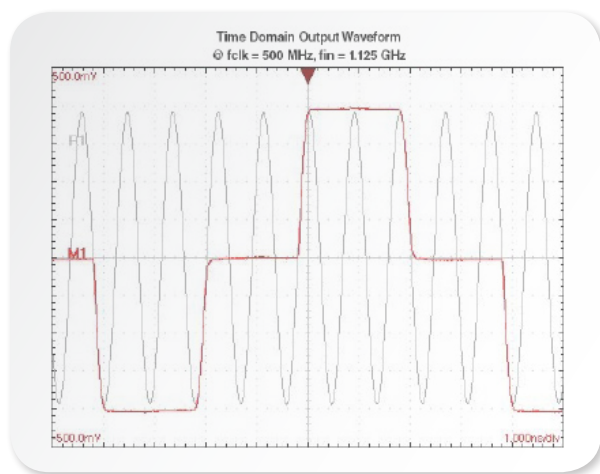
- 68 dB SFDR (4 GHz / 0.5 Vp-p Input)
- 56 dB SFDR (4 GHz / 1 Vp-p Input)
- Direct-Coupled I/O
- Ultra-Clean Output Waveform
- 1.4 mV RMS Sample Noise

Applications

- RT ATE Application
- Digital Sampling Oscilloscopes
- RF Demodulation Systems
- Digital Receiver System
- High Speed Peak Detectors
- Software Defined Radio
- Sensors & Wideband Communications Systems



The HMC1061LC5 ultra-wideband dual rank T/H amplifier is optimized for use in microwave data conversion applications requiring maximum sampling bandwidth, high linearity over a very wide bandwidth, and low noise. A key application of this device is front end sampling for high speed A/D converters to enhance their input bandwidth and/or high frequency linearity. Although several high speed A/D converters offer enhanced sample rates, few of them offer input bandwidth beyond a few GHz. In addition, maintenance of good sampling linearity at frequencies beyond the UHF band is technologically challenging and most A/D converters suffer rapidly degraded linearity above 1 or 2 GHz signal frequency. The HMC1061LC5 can address these limitations with its 18 GHz input bandwidth and excellent broadband linearity. Once sampling takes place within the T/H amplifier, the low bandwidth held output waveform can be processed by an A/D with substantially reduced bandwidth. In addition, A/D converter linearity performance limitations at high input frequencies are also mitigated because the settled waveform is processed with the optimal baseband linearity of the A/D converter.



A Selection of Track-and-Hold Amplifiers

Input Frequency (GHz)	Function	Single Tone THD/SFDR (dB)	Max Clock Rate (GS/s)	Output Noise (mV RMS)	Hold Mode Feed through Rejection (dB)	Package	Part Number
0.02 - 4.5	Track-and-Hold	-66 / 67	3	0.95	>60	LC4B	HMC660LC4B
DC - 18	Track-and-Hold	-65 / 67	4	1.05	>60	LC4B	HMC661LC4B
DC - 5	Track-and-Hold	-65 / 67	4	0.86	>60	LC4B	HMC760LC4B
DC - 18	Track-and-Hold	-66 / 68	4	1.45	>65	LC5	HMC1061LC5



New Data Converters for Communications High Speed/Frequency Test Equipment

HMCAD1063, HMCAD1073 Dual Channel Analog-to-Digital Converters, 250 & 400 MSPS



Features

- 14-Bit: 85 dB SFDR & 72 dB SNR at $F_{in} = 125$ MHz, $F_S = 400$ MSPS
- 16-Bit: 90 dB SFDR & 76 dB SNR at $F_{in} = 125$ MHz, $F_S = 400$ MSPS
- Dynamic Power Scaling vs. Sample Rate

Applications

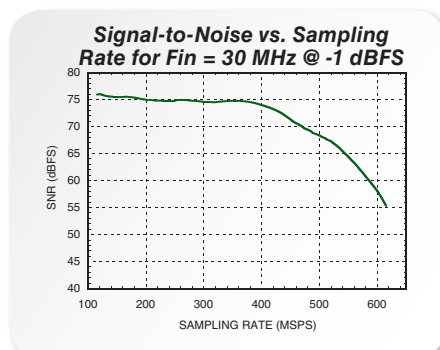
- Communications Testing
- Diversity Radio & Smart Antenna Systems
- Spectrum Analyzer
- High Speed Data Acquisition

The HMCAD1063 and HMCAD1073 are dual 14-Bit & 16-Bit wideband Analog-to-Digital Converters (ADC), which achieve excellent linearity performance at high IF frequencies.

The HMCAD1063 and the HMCAD1073 are based on a proprietary structure, and employ internal reference circuitry, a serial control interface, and parallel LVDS output data. A data synchronization clock is supplied for data capture at the receiver. Internal digital fine gain can be set separately for the ADC channels to calibrate for gain errors.

HMCAD1063 and HMCAD1073 provide two data processing configurations. In Direct Mode, there is one LVDS pair assigned to each output bit. In Multiplexed Mode, a multiplexer is inserted for each ADC output bit and the LVDS interface. This configuration reduces the number of active LVDS pairs, as each LVDS pair will handle an output bit from both channel 0 and channel 1.

Fast Amplitude Detect (FAD), 2 and 4-Bit outputs provide the amplitude of the input signal at very low latency.



Sample Rate	Function / Mode	Resolution (bits)	# of Channels	Power Dissipation [2][3]	SNR (dBFS)	SFDR (dBc)	Part Number
400 MSPS	Dual Channel	14	1	490 mW / Channel	72	85	HMCAD1063
400 MSPS	Dual Channel	16	2	1100 mW / Channel	76	90	HMCAD1073

HMCAD1062/HMCAD1062B, 14-Bit Analog-to-Digital Converters, 80/105/125 MSPS



Features

- 1.8V Single Supply Operation
- SNR = 74 dB & SFDR = 87 dB for $F_S = 125$ MSPS & $F_{in} = 105$ MHz
- 2 Vp-p Differential Analog Input

Applications

- Communications
- Signal Analyzers
- High End Ultrasound
- Communications Testing

4 or 2-Channel, High Performance, Low Power ADC

The HMCAD1062/HMCAD1062B is a high-performance Analog-to-Digital Converter (ADC), that can sample at rates up to 125 MSPS with very low power consumption. The device is supplied a very small, 7x7 mm 48-pin QFN package owing to the serialized data outputs. The device also includes a full crosspoint switch at the analog inputs which allows for great system design and configuration flexibility. At the clock input a low-jitter, programmable divider is available to help simplify the user's system clock architecture. The HMCAD1062 is the 4-channel version, while the HMCAD1062B offers two channels.

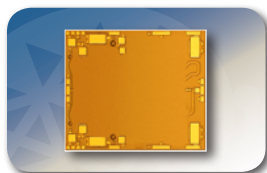


Sample Rate	Function / Mode	Resolution (bits)	# of Channels	Power Dissipation	SNR (dBFS)	SFDR (dBc)	Part Number
80 / 105 / 125 MSPS	Quad Channel	14	4	490 / 605 / 740 mW	74	87	HMCAD1062
80 / 105 / 125 MSPS	Dual Channel	14	2	300 / 380 / 455 mW	74	87	HMCAD1062B



New GaN MMIC Power Amplifiers for General Communications, Test Instrumentation & Radar

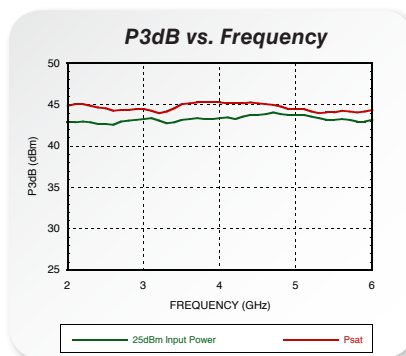
HMC1086, 25 Watt GaN MMIC Power Amplifier, 2 to 6 GHz



Features

- High Output IP3: +48 dBm
- High Psat: +44.5 dBm
- Power Gain at Psat: 14 dB
- Small Signal Gain: 22 dB
- Supply Voltage: +28V @ 1.1 A
- 50 Ohm Matched Input/Output

The HMC1086 is a 25 W Gallium Nitride (GaN) power amplifier MMIC which operates between 2 and 6 GHz. This amplifier typically provides 22 dB of small signal gain, +44.5 dBm of saturated output power, and +48 dBm output IP3 at +33 dBm output power per tone. The HMC1086 draws 1100 mA quiescent current from a +28V DC supply. The RF I/Os are DC blocked and matched to 50 Ohms for ease of integration into Multi-Chip-Modules (MCM). All electrical performance data was acquired with the die eutectically attached to 1.02 mm (40 mil) thick CuMo carrier with multiple 1.0 mil diameter ball bonds connecting the die to 50 Ohms transmission lines on alumina.



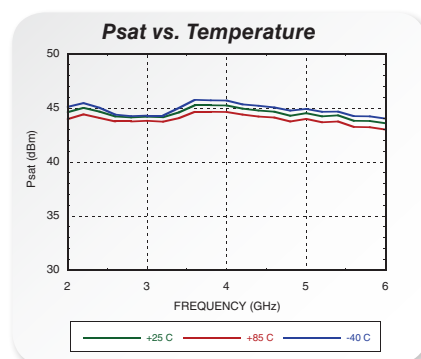
HMC1086F10, 25 Watt GaN Flange Mount MMIC Power Amplifier, 2 to 6 GHz



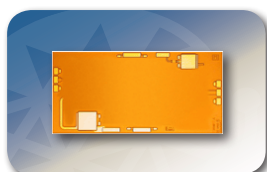
Features

- High Psat: +44.5 dBm
- Power Gain at Psat: 11 dB
- High Output IP3: +46 dBm
- Small Signal Gain: 23 dB
- 50 Ohm Matched Input/Output

The HMC1086F10 is a 25 W Gallium Nitride (GaN) MMIC Power Amplifier which operates between 2 and 6 GHz, and is provided in a 10-lead flange mount package. The amplifier typically provides 23 dB of small signal gain, +44.5 dBm saturated output power, and delivers +46 dBm output IP3 at +33 dBm output power per tone. The amplifier draws 1100 mA quiescent current from a +28V DC supply. The RF I/Os are DC blocked and matched to 50 Ohms for ease of use.



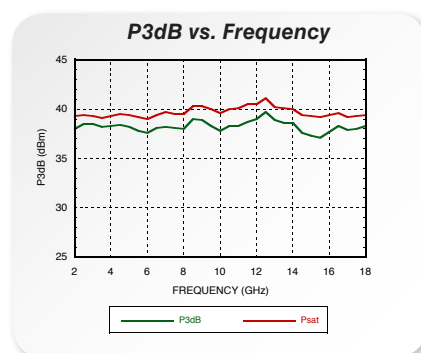
HMC1087, 8 Watt GaN MMIC Power Amplifier, 2 to 20 GHz



Features

- High Psat: +39 dBm
- Power Gain at Psat: 5.5 dB
- High Output IP3: +45 dBm
- Small Signal Gain: 11 dB
- Supply Voltage: +28V @ 850 mA
- 50 Ohm Matched Input/Output

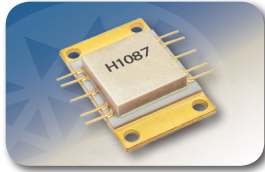
The HMC1087 is an 8 W Gallium Nitride (GaN) MMIC power amplifier which operates between 2 and 20 GHz. This amplifier typically provides 11 dB of small signal gain, +39 dBm of saturated output power, and +45 dBm output IP3 at +29 dBm output power per tone. The HMC1087 draws 850 mA quiescent current from a +28V DC supply. The RF I/Os are matched to 50 Ohms for ease of integration into Multi-Chip-Modules (MCMs). All electrical performance data was acquired with the die eutectically attached to 1.02 mm (40 mil) thick CuMo carrier with multiple 1.0 mil diameter ball bonds connecting the die to 50 Ohm transmission lines on alumina.





Versatile Driver Amplifier for Microwave Radio & VSAT

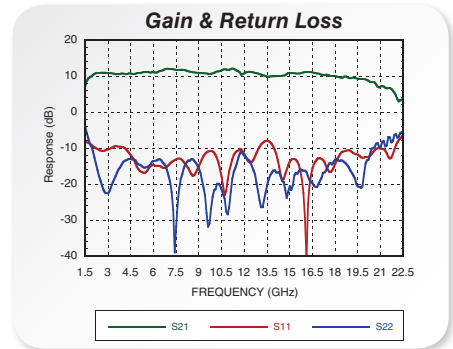
HMC1087F10, 8 Watt GaN Flange Mount MMIC Power Amplifier, 2 to 20 GHz



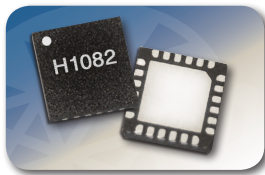
Features

- High Psat: +38.5 dBm
- Power Gain at Psat: 6.5 dB
- High Output IP3: +43.5 dBm
- 50 Ohm Matched Input/Output

The HMC1087F10 is an 8 W Gallium Nitride (GaN) MMIC power amplifier which operates between 2 and 20 GHz, and is provided in a 10-lead flange mount package. This amplifier typically provides 11 dB of small signal gain, +39 dBm of saturated output power, and +43.5 dBm output IP3 at +28 dBm output power per tone. The amplifier draws 850 mA quiescent current from a +28V DC supply. The RF I/Os are matched to 50 Ohms for ease of use.



HMC1082LP4E, 0.5 Watt Power Amplifier with Power Detector, 5.5 to 18 GHz



Features

- Gain: 22 dB
- P1dB: +24.5 dBm
- Saturated Power: +26.5 dBm @ 27% PAE
- Integrated Power Detector

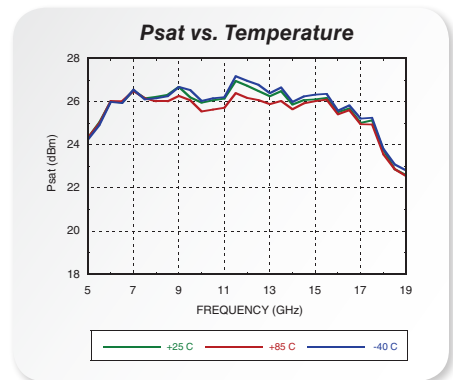
Applications

- Microwave Radio & VSAT
- Sensors & Surveillance
- LO Driver for Frequency Conversion

The HMC1082LP4E is a GaAs pHEMT MMIC driver amplifier with an integrated temperature compensated on-chip power detector which operates between 5.5 and 18 GHz. Housed in a leadless 4x4 mm ceramic surface mount package, the amplifier provides up to 22 dB of gain, +35 dBm Output IP3, and +24.5 dBm of output power at 1 dB gaincompression, while requiring 220 mA from a +5V supply. The HMC1082LP4E is capable of supplying up to +26.5 dBm of saturated output power (Psat) with 27 % PAE.

The HMC1082LP4E is an ideal driver amplifier for microwave radio applications from 5.5 to 18 GHz. The amplifier may also be used for 13.75 to 14.5 GHz Ku Band VSAT transmitters, or as an LO driver for many of Hittite's high performance mixers. The amplifier's I/Os are DC blocked and matched to 50 Ohms with no external matching required.

The HMC1082LP4E complements Hittite's full range of medium power amplifiers, which cover all of the licensed microwave radio bands from 6 to 42 GHz. A selection of Hittite's medium power amplifiers is shown in the table below.



Frequency (GHz)	Function	Gain (dB)	OIP3 (dBm)	NF (dB)	P1dB (dBm)	Bias Supply	Package	Part Number
5 - 20	Medium Power Amplifier	19	30	7	19	+5V @ 114 mA	LC3	HMC451LC3
6 - 18	Medium Power Amplifier, 0.5 Watt	22	+35	-	25	+5V @ 220 mA	LP4	HMC1082LP4E
6.5 - 13.5	Medium Power Amplifier	14	29	4.5	18	+5V @ 95 mA	LP3	HMC441LP3
12 - 16	Medium Power Amplifier LNA	23	34	2.5	25	+5V @ 200 mA	LP5	HMC490LP5E
16 - 24	Power Amplifier, 0.5 Watt	20.5	34.5	-	26.5	+5V @ 400 mA	LP4	HMC757LP4E
21 - 32	Medium Power Amplifier	17	34	5	23	+5V @ 200 mA	LC4	HMC499LC4
22 - 26.5	Power Amplifier, 0.5 Watt	21.5	33	7	26.5	+6V @ 350 mA	LP4	HMC863LP4E
28 - 36	Low Noise	21	24	2.8	12	+3V @ 82 mA	LP4	HMC566LP4E
34 - 46.5	Medium Power Amplifier	22	34	-	24	+6V @ 250 mA	Chip	HMC1016



New PA & SP4T Switch for Microwave Radio, SATCOM, Test Equipment & Sensors

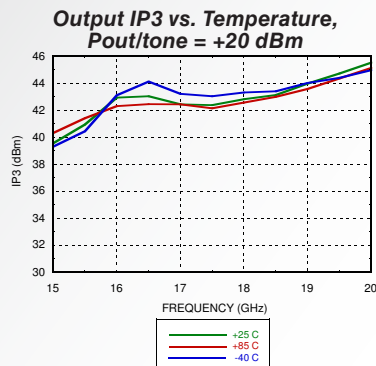
Hittite Adds New GaAs pHEMT MMIC 2 Watt Power Amplifier (continued from page 1)

Features

- High P1dB +33.5 dBm
- High Psat +34.5 dBm
- High Gain: 26 dB
- 50 Ohm Matched Input/Output
- 16 Lead 6x6 mm SMT Package

The HMC6981LS6 is housed in a ceramic RoHS compliant 6x6 mm QFN leadless air cavity package which exhibits low thermal resistance and is compatible with surface mount manufacturing techniques. The RF I/Os are internally matched to 50 Ohms.

The HMC6981LS6 complements Hittite's extensive line of power amplifiers which provide frequency coverage for all of the licensed microwave radio bands from 6 to 42 GHz. (See table below).



Frequency (GHz)	Function	Gain (dB)	OIP3 (dBm)	NF (dB)	P1dB (dBm)	Bias Supply	Package	Part Number
6 - 9.5	Power Amplifier, 2 Watt	18	41	-	33	+7V @ 1340 mA	LP5	HMC591LP5
9-14	Power Amplifier, 2 Watt w/Power Detector	33	43	-	34	+6V @ 1400 mA	LP5G	HMC952LP5GE
12 - 16	Power Amplifier, 3 Watt w/Power Detector	27	41	-	34.5	+7V @ 1200 mA	LP5G	HMC995LP5GE
12.5 - 15.5	Power Amplifier, 2 Watt	27	40	-	32	+6V @ 1200 mA	LP5	HMC965LP5E
15 - 20	Power Amplifier, 2 Watt	26	+43.5	-	33.5	+6V @ 1100 mA	LS6	HMC6981LS6
16 - 24	Power Amplifier, 1/2 Watt	21	41	-	34	+5V @ 400 mA	LP4	HMC757LP4E
24 - 31.5	Power Amplifier, 1.5 Watt	21	41	-	34	+5.5V @ 1200 mA	LP5	HMC943LP5E
34 - 46.5	Medium Power Amplifier	22	34	-	24	+6V @ 250 mA	Chip	HMC1016

New GaAs MMIC SP4T Reflective Switch (continued from page 1)

Features

- Broadband: 23 - 30 GHz
- High Isolation: 26 dB
- High Power Handling: >+27 dBm

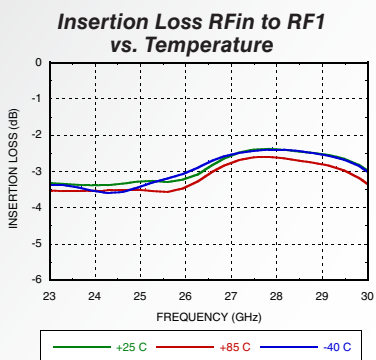
Applications

- Telecom Infrastructure
- Microwave Radio
- Test Instrumentation
- SATCOM and Sensors

Housed in a leadless 4x4 mm SMT package, and compatible with surface mount manufacturing techniques, this compact switch is best used in microwave radio, SATCOM and sensor applications.

Additionally, the HMC1084LC4 switch is capable of handling high power levels in excess of +27 dBm, which make it ideal for a wide range of applications including telecom infrastructure, sensors, antenna arrays and test instrumentation.

The HMC1084LC4 complements Hittite's extensive line of single, double and multi-throw MMIC switches with frequency coverage from DC to 86 GHz.



Frequency (GHz)	Function	Insertion Loss (dB)	Isolation (dBm)	Input P1dB (dBm)	Control Input (Vdc)	Package	Part Number
DC - 20	SP4T	2.3	45	22	0 / -5V	LP4	HMC641LP4E
18 - 40	SPD, PIN MMIC, 2W	1.4	40	34	-10 / +1.5 (30 mA)	Chip	HMC971
23 - 30	SP4T	2.8	35	25	0 / -3	LC4	HMC944LC4
23 - 30	SP4T	2.8	30	-	0 / -3	LC4	HMC1084LC4
55 - 86	SPDT, PIN MMIC	2	30	-	-5 / +5	Chip	HMC-SDD12



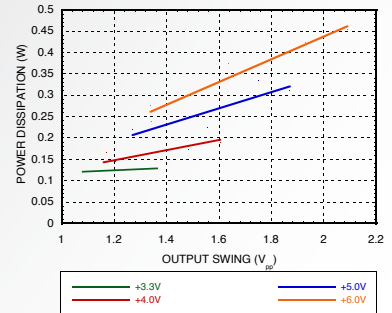
Optical Modulator Driver Solutions (continued from page 1)

The wide supply operating range enables designers to lower the power consumption of their modules by selecting the optimum supply voltage based on their EML characteristics. The device has 50 Ohm matched inputs/outputs and must be used in AC-coupled configuration. The optimum bias condition is set with external bias voltages. The output signal cross-point and amplitude are adjustable via device control pins.

The HMC1068 and HMC1069 are optical modulator drivers in die form and are ideal for driver integrated transmitter optical sub-assembly modules for 100G systems. Both devices support data rates up to 32 Gbps with excellent time domain performance and the small size and low power consumption enables designers to meet their power budgets in highly integrated designs. HMC1068 can deliver up to 3 Vp-p output voltage swing without the need for an external bias-tee and is ideal for Electro-Absorption (EA) type modulators. HMC1069 can deliver higher voltage up to 8 Vp-p output swings and is optimized to meet the electrical characteristics of the Mach-Zender (MZ) type optical modulators.

The HMC1069 is biased through an external bias-tee at its RF output. Both drivers provide around 14 to 15 dB gain and depending on the application, can be used as single stage or in cascade configuration for higher gain. The HMC1068 and HMC1069 support wide supply voltage range, which gives designers the advantage and the flexibility to optimize and lower the power consumption of their system for different optical modulators. These devices have 50 Ohm matched inputs/outputs and must be used AC-coupled. The peak-detector feature is incorporated in all three devices which can be used for monitoring the output voltage swing level during normal operation. As fiber-optic systems migrate toward smaller form factors, more highly integrated building blocks will be needed. The HMC1068 and the HMC1069 die products address the next generation optical modulator designs where the drivers are integrated in the same module assembly with the optical modulator.

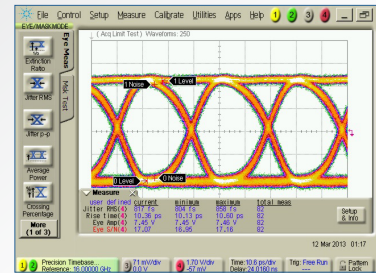
HMC7150LP3DE Power Dissipation vs. Output Swing Over Supply



HMC1068 & HMC1069 in Cascade Configuration MZ Modulator Driver Application.



32 Gbps NRZ Output Eye Diagram @ 6V Supply



Vdd = 6V, Idd = 158 mA (Under RF Drive)
Vout: 7.45 Vp-p
Vctl = 0.80V

Data Rate Max. (Gbps)	Function	Gain (dB)	Group Variation Delay (ps)	Additive Jitter (ps)	Output Voltage Level (Vp-p)	Package	Part Number
28.3	EML Driver	11	±7	0.27	2.2	LP3D	HMC7150LP3DE
32	Optical Modulator Driver	15	±5	0.3	3	Chip	HMC1068
32	Optical Modulator Driver, Pre-Stage	15	±5	0.3	7.5	Chip	HMC1069



Hittite to Feature 17 New Products at MTT-S 2013

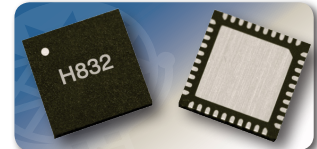
Washington State Convention Center, June 4 - 6, 2013



Hittite will feature 17 new products at the 2013 IEEE MTT-S International Microwave Symposium (IMS 2013) and Exhibition held at the Washington State Convention Center, Seattle, Washington, June 4-6, 2013. During the exhibition, these and other Hittite Microwave products will be on display. A live product demonstration area will showcase some of the company's latest products in our corporate exhibit booth #230. Products to be showcased in the live product demonstration area include:

Wideband PLL with Integrated VCO

The HMC832LP6GE is a 3.3V wideband fractional-N PLL with integrated VCO that generates continuous fractional frequencies between 25 MHz and 3 GHz. The HMC832LP6GE offers low power consumption of 560 mW while featuring industry leading phase noise and spurious performance. It is the ultimate choice for designers looking for a single, superior performance, multi-application device that can cover a wide frequency range. Industry leading spurious performance simplifies radio design and enables radio designers to achieve maximum performance.

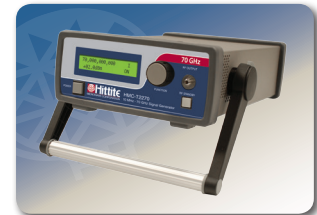


Wideband Transceiver

Hittite's high performance 3 GHz Direct Conversion Receiver, EKIT01-HMC6383, combines new wideband components and techniques to achieve excellent system level performance: 700 to 3000 MHz RF Input, Programmable IF Bandwidth of 7 to 100 MHz and programmable accuracy of $\pm 2.5\%$. This unique radio design platform also provides wideband input frequency coverage from 700 MHz to 3000 MHz with 90 dB of distributed programmable gain, and high linearity in excess of 60 dBm input IP2. The integrated, seamless, image rejection calibration algorithm achieves 80 dB of image rejection.

Signal Generator Family

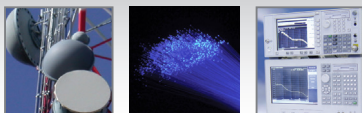
Hittite's powerful signal generators are designed to support the exploding market for communication and sensor equipment operating between 10 MHz and millimeterwave frequencies. With output frequencies up to 70 GHz, these signal generators exhibit phase noise as low as -99 dBc/Hz, spurious output to -70 dBc, and up to +28 dBm of output power. On display will be the HMC-T2220, HMC-T2220B and HMC-T2240 synthesized signal generators.



Wideband Direct Quadrature Modulator with Power Detector

The HMC1197LP7FE is a new direct quadrature modulator with integrated Fractional-N PLL/VCO RFIC which is ideal for transmit applications in wireless infrastructure equipment such as base transceiver stations, remote radio units, small cells and repeaters from 100 to 4000 MHz. The HMC1197LP7FE's wideband operation, excellent noise and linearity performance makes it suitable for a wide range of transmission standards, including single and multicarrier CDMA, UMTS, CDMA2000, GSM/EDGE, W-CDMA, TD-SCDMA, and WiMAX/LTE applications. The HMC1197LP7FE incorporates a feature-rich, industry leading PLL and wideband VCO. The HMC1197LP7FE offers an easy-to-use, complete direct conversion solution thereby reducing cost, area, and power consumption.

The HMC1197LP7FE will be demonstrated with Hittite's new True-RMS Power Detector with integrated envelope detector & peak hold RFIC ideal for RF transmit or receive applications requiring repeatable measurement of average signal power along with instantaneous measurement of wave shape to accurately determine crest factor of a modulated signal.



Training Video: Distributed Amplifier Biasing & Optimization



Hittite's distributed amplifiers are some of the best in the industry. Hittite offers over 40 high performance distributed amplifier products which span the frequency range from DC to 65 GHz with a wide range of output power levels. Available in chip, leadless plastic, ceramic SMT packages and connectorized module formats, these amplifiers are ideal for test and measurement equipment or for wideband commercial, scientific and military transmitter and receiver systems. They are also excellent as LO drivers for many of Hittite's mixer products. Hittite's distributed amplifier product line also includes some very unique distributed LNAs.

To understand all of the factors associated with biasing these amplifiers, Hittite has developed a training video. The video explains key considerations and techniques required to correctly bias and optimize Hittite's distributed amplifiers for maximum performance over their intended operating frequency ranges. Topics covered include: drain biasing, biasing vg2, AC Ground capacitors, RF input/output broadband blocks, and recommended biasing sequence.

The video also features a live bench demonstration which examines the effects of removing various types of "AC Ground" capacitors from an ideally biased HMC797, DC-22 GHz wideband power amplifier. To access the video, please go to the Hittite website at www.hittite.com and click on the Wideband (Distributed) Amplifier tab. The video is linked to each wideband (distributed) amplifier by clicking on the "product application video" link.

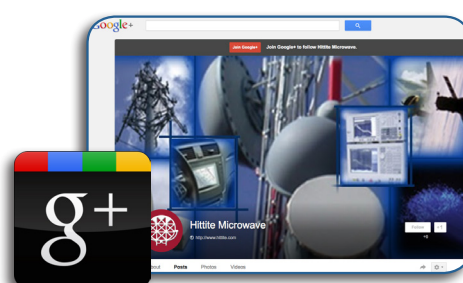
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Hittite customers can now connect through Twitter, Google+, LinkedIn, and YouTube. Receive Hittite's latest news including product announcements, product training videos, technical information, literature and live trade show updates.



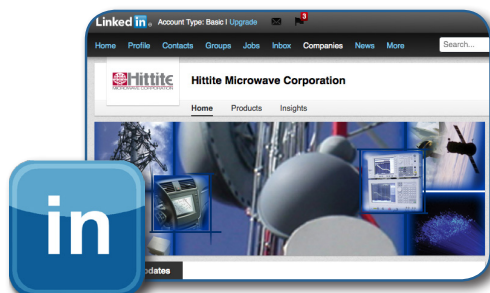
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