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**NEW PRODUCTS
RELEASED!**

Product Showcase

Low Noise Amplifier Module



HMC-C045

- 1.8 - 4.2 GHz
- Ultra-Low NF: 0.7 dB
- Single +12V Supply

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x2 Active Frequency Multiplier



HMC561

- 8 - 21 GHz Fout
- Low Input Drive: +5 dBm
- High Output Power: +17 dBm

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40W Failsafe Switch



HMC646LP2E

- Low Insertion Loss: 0.4 dB
- High Input IP3: +75 dBm
- Single Control: 0/+3V to 0/+8V

See Page 4

New SiGe & GaAs SC70 Gain Blocks Cover DC - 8 GHz!

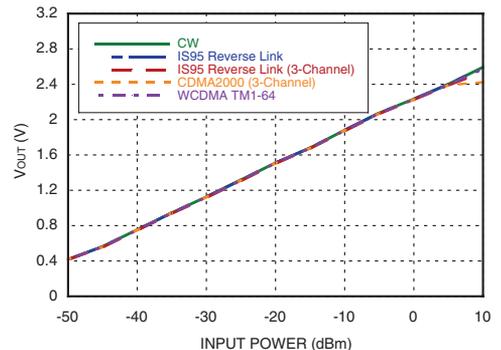
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TRUE RMS POWER DETECTOR IS BEST-IN-CLASS

Covers 100 MHz to 3.9 GHz with 60 to 70 dB Dynamic Range

The first True RMS-responding Power Detector within Hittite's Power Detector product line is now available. The HMC610LP4E is designed to provide wide dynamic range signal power measurement in excess of 60 dB by converting RF signals at its differential input to an accurately scaled linear-in-dB output response, representing the Root-Mean-Square (RMS) of the input waveform.

The HMC610LP4E delivers extremely high dynamic range and conversion accuracy over an input RF frequency range of 100 MHz to 3.9 GHz, and is ideal for the measurement of complex modulated waveforms with large, time varying crest factors of the type found in high capacity



Output Voltage vs. Input Power with Different Waveforms, Fin= 900 MHz

(Continued on page 5)

14 NEW DIGITAL PHASE SHIFTER PRODUCTS RELEASED

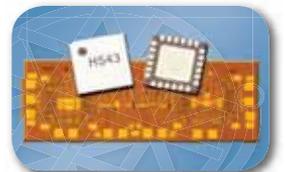
Combine High Linearity & Low RMS Phase Error from 2.5 to 18.5 GHz

Hittite is pleased to introduce a new family of 4-bit, 5-bit and 6-bit Digital Phase Shifters covering frequency bands from 2.5 to 18.5 GHz with 14 products.

The HMC649LP6E is a 6-bit Digital Phase Shifter which is rated from 3 to 6 GHz. The HMC649LP6E exhibits very low RMS phase error of 3 degrees and peak to peak insertion loss variation of only ± 0.8 dB across all phase states. The HMC649LP6E delivers +29 dBm Input P1dB and +44 dBm Input IP3, and is housed in a compact, RoHS compliant 6x6 mm plastic leadless SMT package

The HMC642LC5 is a 6-bit Digital Phase Shifter which is rated from 9 to 12.5 GHz. The HMC642LC5 exhibits a low RMS phase error of 5 degrees and peak to peak insertion loss variation of only ± 1 dB across all phase states. The HMC642LC5 delivers +28 dBm Input P1dB, and +42 dBm Input IP3, and is housed in a RoHS compliant

(Continued on page 6)



HMC543 & HMC543LC4B

NEW DIGITAL VGA PRODUCT LINE COVERS DC - 6 GHz

Offers Outstanding Gain Accuracy & Linearity



Hittite's new Digitally Controlled Variable Gain Amplifiers (VGAs) are alone in the marketplace with their combination of high linearity, wide bandwidth, 0.5 dB gain resolution, dual mode control circuitry, and operation to near DC.

The HMC625LP5E is a DC to 6 GHz Digital VGA which combines the functionality of a 6-bit digital attenuator with an internally matched, wideband amplifier in a single leadless QFN package. This highly integrated solution features a gain control range of -13.5 to +18 dB in 0.5 dB steps, and delivers up to +19 dBm of output P1dB, which is independent of the gain control setting.

The HMC626LP5E is a high gain DC to 1 GHz Digital VGA which features a gain control range of +8.5 to +40 dB in 0.5 dB steps, and a low 4 dB noise figure in its maximum gain state.

(Continued on page 6)

Order On-line at: www.hittite.com

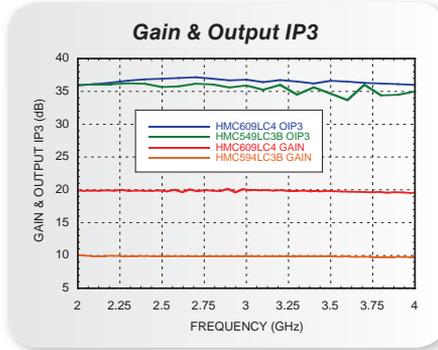
HMC594LC3B & HMC609LC4

GaAs PHEMT MMIC LNAs, 2 - 4 GHz



Features

- Gain Flatness to ± 0.4 dB
- Noise Figure to 3.5 dB
- Gain to 20 dB
- Output IP3 to +36.5 dBm
- 50 Ohm Matched I/Os

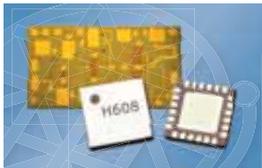


Consistent Gain & IP3

The HMC594LC3B and HMC609LC4 are GaAs PHEMT MMIC Low Noise Amplifiers (LNA) housed in leadless RoHS Compliant SMT packages which operate from 2 to 4 GHz. Both LNAs feature extremely flat performance characteristics, and output IP3 of +36 dBm across the operating band. These versatile LNAs are ideal for compact communication and sensor applications due to their small size, consistent output power and DC blocked RF I/O's. These LNAs are also available in chip form as the HMC594 and HMC609.

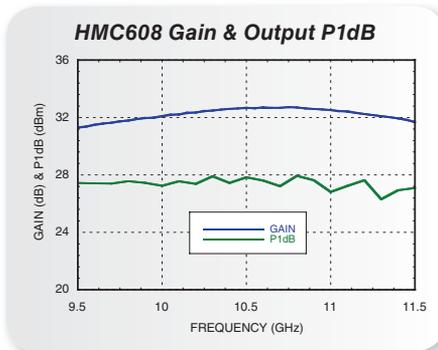
HMC608 & HMC608LC4

MMIC Medium Power Amplifiers, 9.5 - 11.5 GHz



Features

- Output P1dB to +28 dBm
- Output IP3: +33 dBm
- Gain to 33 dB
- Supply: +5V @ 310 mA
- 50 Ohm Matched I/Os
- Chip & SMT Package Available



High Gain & Power Saving Mode

The HMC608 and HMC608LC4 are high dynamic range GaAs PHEMT MMIC Medium Power Amplifiers which feature a high gain mode and a low gain mode of operation. Operating from 9.5 to 11.5 GHz, these amplifiers provide up to 33 dB of gain, +27.5 dBm of saturated power, and +33 dBm output IP3. The RF I/Os are DC blocked and matched to 50 Ohms. The HMC608LC4 house in a 4x4 mm ceramic SMT package.

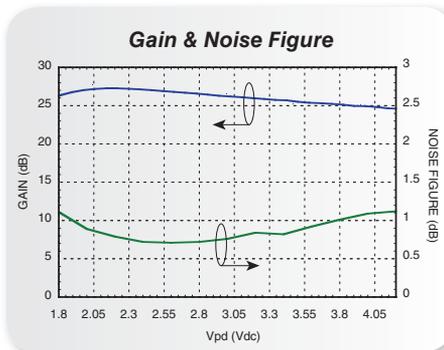
HMC-C045

GaAs PHEMT Low Noise Amplifier Module, 1.8 - 4.2 GHz



Features

- Noise Figure: 0.7 dB @ 2.4 GHz
- High Gain: 26 dB
- Output IP3: +26 dBm
- P1dB Output Power: +15.5 dBm
- Hermetically Sealed Module
- Removable Connectors



0.7 dB Noise Figure

The HMC-C045 is a GaAs PHEMT Low Noise Amplifier in a miniature, hermetic module which operates between 1.8 and 4.2 GHz. This high dynamic range, low noise amplifier module provides 26 dB of gain, sub-1 dB noise figure and up to +26 dBm of output IP3. The DC supply is internally regulated and operates from a single positive supply between +8V and +15V. The amplifier I/Os are internally matched to 50 Ohms and DC blocked for robust performance.

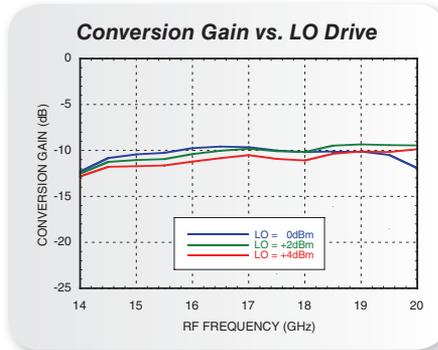
HMC258LC3B

Sub-Harmonic Mixer, 14.5 - 19.5 GHz



Features

- Sub-harmonically Pumped (x2) LO
- Integrated LO Amplifier:
0 dBm LO Drive
- High 2LO/RF Isolation: >45 dB
- Wide IF Bandwidth: DC - 3.5 GHz
- No External Matching Required

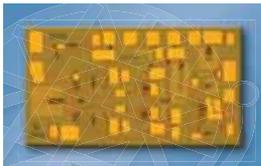


Ideal for Microwave Radio

The HMC258LC3B is a 14.5 - 19.5 GHz surface mount sub-harmonically pumped (x2) MMIC mixer with an integrated LO amplifier in a SMT leadless ceramic package. At 45 dB the 2LO to RF isolation eliminates the need for additional filtering. The integrated LO amplifier is a single bias (+5V) two stage design with only 0 dBm drive requirement. The HMC258LC3B requires no external matching components, and is compatible with RoHS SMT manufacturing techniques.

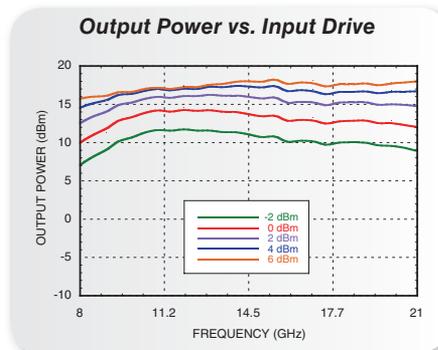
HMC561

GaAs MMIC x2 Active Frequency Multiplier, 8 - 21 GHz Output



Features

- High Output Power: +17 dBm
- Low Input Power Drive: 0 to +6 dBm
- High Fo Isolation:
15 dBc @ Fout = 16 GHz
- Low SSB Phase Noise:
-139 dBc/Hz @ 100 kHz



Wideband, Low Input Drive

The HMC561 is a x2 active broadband frequency multiplier chip utilizing GaAs PHEMT technology. When driven by a +5 dBm signal, the multiplier provides +17 dBm typical output power from 8 to 21 GHz and the Fo and 3Fo isolations are 15 dBc at 16 GHz. The HMC561 is ideal for use in LO multiplier chains for Pt to Pt & VSAT Radios yielding reduced parts count vs. traditional approaches. The low additive SSB Phase Noise of -139 dBc/Hz at 100 kHz offset helps maintain good system noise performance.

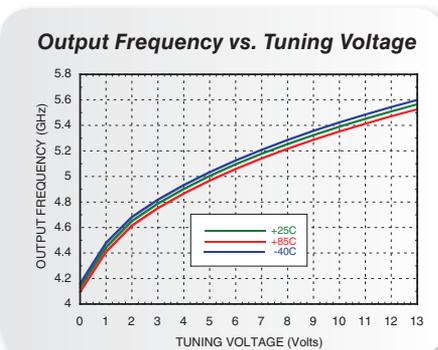
HMC512LP5E

MMIC VCO with Fo/2 & ÷4 Outputs, 9.6 - 10.8 GHz



Features

- Triple Output: Fo = 9.6 - 10.8 GHz
Fo/2 = 4.8 - 5.4 GHz
Fo/4 = 2.4 - 2.7 GHz
- Pout: +9 dBm
- Low SSB Phase Noise:
-110 dBc/Hz @ 100 kHz
- No External Resonator Needed



Excellent Phase Noise

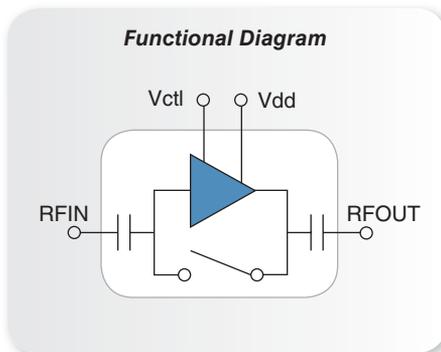
The HMC512LP5E is a GaAs InGaP HBT MMIC VCO. The HMC512LP5E integrates a resonator, negative resistance device, varactor diode and features half frequency and divide-by-4 outputs. The VCOs phase noise performance is excellent over temperature, shock, and process due to the oscillator's monolithic structure. Power output is +9 dBm typical from a +5V supply. The prescaler and RF/2 functions can be disabled to conserve current if not required. This MMIC VCO is packaged in a leadless QFN 5x5 mm SMT, and requires no external matching components.

HMC605LP3E & HMC593LP3E MMIC LNAs w/ Bypass Mode, 2.3 to 3.8 GHz



Features

- Integrated Bypass Path
- 1 dB Noise Figure
- Output IP3 to +35 dBm
- Gain: 19 to 20 dB
- 50 Ohm Matched I/Os



Ideal for WiBro & WiMAX

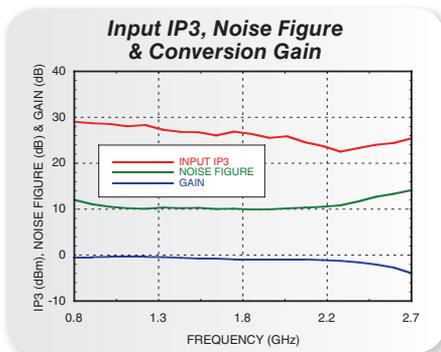
The HMC605LP3E and HMC593LP3E are high dynamic range GaAs MMIC Low Noise Amplifiers that integrate a low loss bypass mode on the IC. These LNAs are ideal for WiBro & WiMAX receivers operating from 2.3 to 2.7 GHz and 3.3 to 3.8 GHz and provides 1.0 dB noise figure, 20 dB of gain and +31 dBm IP3, with no external matching or switching components required. A single control line is used to switch between LNA mode and a low 2.0 dB loss bypass mode, which reduces the current consumption to 10 μ A.

HMC334LP4E SiGe Wideband Downconverter, 0.8 - 2.7 GHz



Features

- SSB Noise Figure: 10 dB
- Conversion Loss: 0 dB
- LO to RF Isolation: 48 dB
- Single-Ended LO Drive: 0 dBm
- Input IP3: +26 dBm



Low Noise, Excellent Linearity

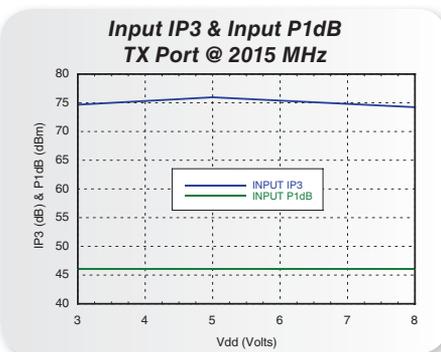
The HMC334LP4E is a low noise, wideband downconverter RFIC which is ideal for Cellular/3G and WiMAX/4G applications from 0.8 to 2.7 GHz. The LO input accepts drive levels from -6 to +6 dBm while the RFIC provides 48 dB of LO to RF isolation, and 0 dB conversion loss. The HMC334LP4E will support an IF output bandwidth of up to 600 MHz and provides excellent performance in the presence of high level "Blocker" signals, making it ideal for receiver applications in demanding environments.

HMC646LP2E GaAs MMIC 40W Failsafe Switch, 0.1 - 2.1 GHz



Features

- +46 dBm Input P0.1dB @ 10% D.C.
- Low Insertion Loss: 0.4 dB
- High Input IP3: +75 dBm
- Single Control: 0/+3V to 0/+8V
- Tx Path "on" When Unpowered
- 2x2mm DFN Package



High Power, Failsafe Operation

The HMC646LP2E is an SPDT switch in a leadless DFN surface mount plastic package for use in T/R and LNA protection applications which require very low distortion and high power handling of up to 40 watts with less than 10% duty cycle. This robust switch can control signals from 100 - 2100 MHz and is ideal for TD-SCDMA & 3G repeaters, mobile 2-way radio, automotive telematics, and satellite subscriber terminal applications. The design provides exceptional P0.1dB of +46 dBm and +75 dBm IIP3 on the Transmit (Tx) port. The failsafe topology provides a low loss path from Tx to COM, when no DC power is available.

HMC311 / 474 / 476 / 478SC70E SC70 Packaged Gain Blocks, DC to 8 GHz



Features

- Output P1dB to +16 dBm
- Output IP3 to +31 dBm
- Gain to 23 dB
- Cascadable 50 Ohm I/Os
- Single Supply: +3V to +12V

Applications

- Cellular / 3G
- WiBro / WiMAX / 4G
- Microwave Radio & Test Equipment

New SiGe & GaAs Gain Blocks Feature 2.0 x 2.1mm Footprint

The HMC311SC70E, HMC474SC70E, HMC476SC70E and HMC478SC70E are a family of SiGe and GaAs Heterojunction Bipolar Transistor (HBT) Gain Block MMIC SMT amplifiers covering DC to 8 GHz.

These amplifiers can be used as cascadable 50 Ohm RF/IF gain stages as well as LO or PA drivers with up to +17 dBm output power. The Darlington topology results in reduced sensitivity to normal process variations and excellent gain stability over temperature while requiring a minimal number of external bias components. The HMC311SC70E offers 15 dB of gain with a +30 dBm output IP3 at 850 MHz while requiring only 62 mA from a single positive supply. All four of these new gain blocks are housed in industry standard and footprint compatible SC70 6-Lead packages.

New SC70 Packaged Gain Block Products

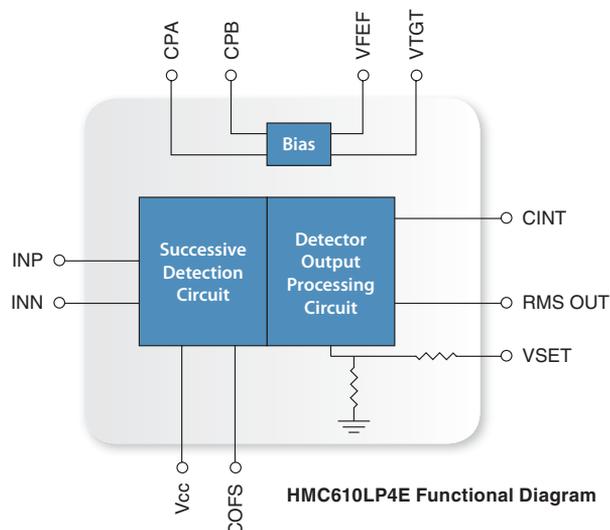
Part Number	Frequency (GHz)	Function	Gain (dB)	OIP3 (dBm)	NF (dB)	P1dB (dBm)	Bias Supply
HMC474SC70E	DC - 6	SiGe Gain Block	15	20	3	8	+3V @ 25mA
HMC476SC70E	DC - 6	SiGe Gain Block	19	24	2.5	12	+5V @ 35mA
HMC311SC70E	DC - 8	HBT Gain Block	15	30	5	15	+5V @ 54mA
HMC478SC70E	DC - 4	SiGe Gain Block	24	31	2.5	16	+5V @ 64mA

TRUE RMS DETECTOR IS BEST-IN-CLASS ... (continued from page 1)



wireless and wire-line communication networks. The HMC610LP4E features a best-in-class ± 1 dB dynamic range in excess of 70 dB at 900 MHz (-62 to +10 dBm) and 69 dB at 2.2 GHz (-59 to +10 dBm). At 2.7 and 3.5 GHz, the HMC610LP4E exhibits ± 1 dB dynamic ranges of 63 and 46 dB respectively, with excellent stability of ± 0.5 dB error over its -40°C to +85°C operating temperature range. When used in RMS detector mode, the HMC610LP4E provides a nominal logarithmic slope of 37 mV/dB and a nominal intercept of -70 dBm for frequencies up to 2 GHz.

The HMC610LP4E output fall time is 500 ns (1.9 to 0.2V), while the rise time is about 10 ns (0.2 to 1.9V), and this is ideal to support the proper detection of complex waveforms with QAM, QPSK and OFDM modulation schemes. The HMC610LP4E is also capable of operating accurately up to 3.9 GHz, and with any type of input signal waveform or modulation scheme applied to its input. For example, tests with single and multiple carrier versions of WCDMA, CDMA2000 and IS95 reverse link show that the HMC610LP4E exhibits less than 0.3 dB of error up to input power levels of +5 dBm. The HMC610LP4E RF input is externally matched to 50 Ohms, and the device operates from a +5V single supply while consuming 65mA.



Also released is the HMC611LP4E Logarithmic Detector/Controller which delivers extremely high dynamic range and conversion accuracy over an input frequency range of 1 MHz to 10 GHz. The HMC611LP4E features ± 1 dB dynamic range of greater than 60 dB from 900 MHz to 5.8 GHz. Ideal for applications such as RF transmitter power amplifier control, RSSI measurement in cellular basestations, radio link and radar, the HMC611LP4E exhibits output rise and fall times of about 8ns.

The HMC610LP4E and HMC611LP4E are housed in 4x4 mm plastic QFN packages, and are specified for operation over the -40°C to +85°C temperature range. Detailed datasheets for these products may be found at www.hittite.com. Product and evaluation kits are available from stock.



14 New Digital Phase Shifter Products Released ... (continued from page 1)

5x5 mm ceramic leadless SMT package.

Both the HMC649LP6E and the HMC642LC5 provide 360 degrees of phase coverage with a LSB of 5.625 degrees. These high accuracy phase shifters are controlled by a single positive control line per bit toggled between 0 and +5V, making them ideal for receive and transmit applications in EW Receivers, radar, satellite communications, and beamforming subassemblies. For MCM and hybrid micro-

circuit applications, each of these unique phase shifters are also available in chip form.

Hittite's line of Digital Phase Shifters are internally matched to 50 Ohms with no external components and are designed for optimum performance based on commonly available bias and control voltages. The table below highlights some of the key performance aspects of these new digital phase shifters.

New Digital Phase Shifter Products

Part Number	Frequency (GHz)	Function	Insertion Loss (dB)	Phase Range (deg)	Input IP3 (dBm)	Control Input (Vdc)	Package
HMC543	8 - 12	4-Bit Digital	6.5	22.5 to 360	40	0 / -3	Chip
HMC543LC4B	8 - 12	4-Bit Digital	6.5	22.5 to 360	40	0 / -3	LC4B
HMC644	15 - 18.5	5-Bit Digital	6.5	11.25 to 360	40	0 / -3	Chip
HMC644LC5	15 - 18.5	5-Bit Digital	7	11.25 to 360	40	0 / -3	LC5
HMC647	2.5 - 3.1	6-Bit Digital	4	5.625 to 360	52	0 / +5	Chip
HMC647LP6E	2.5 - 3.1	6-Bit Digital	4	5.625 to 360	52	0 / +5	LP6
HMC648	2.9 - 3.9	6-Bit Digital	4	5.625 to 360	46	0 / +5	Chip
HMC648LP6E	2.9 - 3.9	6-Bit Digital	4.5	5.625 to 360	46	0 / +5	LP6
HMC649	3 - 6	6-Bit Digital	6.5	5.625 to 360	45	0 / +5	Chip
HMC649LP6E	3 - 6	6-Bit Digital	7.5	5.625 to 360	45	0 / +5	LP6
HMC643	9 - 12	6-Bit Digital	6.5	5.625 to 360	38	0 / -3	Chip
HMC643LC5	9 - 12	6-Bit Digital	7	5.625 to 360	38	0 / -3	LC5
HMC642	9 - 12.5	6-Bit Digital	6	5.625 to 360	42	0 / +5	Chip
HMC642LC5	9 - 12.5	6-Bit Digital	6.5	5.625 to 360	42	0 / +5	LC5

New Digital VGA Product Line Covers DC - 6 GHz ... (continued from page 1)

The HMC627LP5E is a DC to 1 GHz Digital VGA which features a gain control range of -11.5 to +20 dB in 0.5 dB steps, with 4.3 dB noise figure in its maximum gain state and +36 dBm output IP3 in all states.

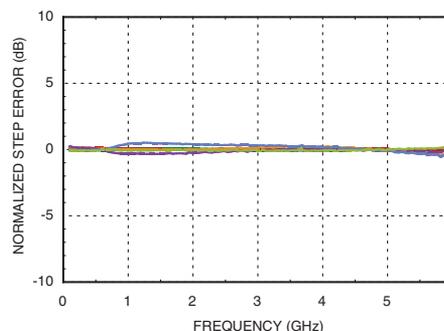
Each of these wide dynamic range DVGAs operates from a single supply of +5V and delivers high output IP3 which is independent of gain control setting, and without the use of any internal negative voltage generation circuitry. These unique DVGAs exhibit precise gain control and excellent return losses in each of their 64 gain states, making them ideal for IF and RF applications in Cellular/3G and WiMAX/4G infrastructure, Test and Measurement Equipment, and Microwave Radios.

The HMC625LP5E and the HMC627LP5E also feature a dual mode TTL/CMOS compatible control interface. This ultimately flexible interface allows the DVGA to be controlled with either a 3-wire serial control interface, or a 6-bit parallel word. Both DVGAs enable the user to select one of four power-up gain state settings, while a serial output port allows these devices to be cascaded with other serially controlled

Hittite components.

These new Digital VGAs help designers achieve their goals for reduced parts count, consistent performance, and reduced PC board area. All three DVGAs are housed in RoHS compliant 5x5 mm QFN leadless packages, and require no external matching components other than low cost decoupling capacitors.

HMC625LP5E Normalized Gain Step Error vs. Frequency



New Digital Variable Gain Amplifier (DVGA) Product Line

Part Number	Frequency (GHz)	Function	Gain Control Range (dB)	NF* (dB)	Output IP3 (dBm)	P1dB (dBm)	Bias Supply	Package
HMC625LP5E	DC - 1	Digital, 0.5 dB LSB, Serial & Parallel Control	-11.5 to 20	4.3	36	20	+5V @ 90mA	LP5
HMC626LP5E	DC - 1	Digital, 0.5dB LSB, 43 dB Gain	8.5 to 40	4	36	20	+5V @ 176mA	LP5
HMC627LP5E	DC - 6	Digital, 0.5 dB LSB, Serial & Parallel Control	-13.5 to 18	6	33	19	+5V @ 88mA	LP5

*Max Gain State

OFF-THE-SHELF

HITTITE EXPANDS SALES SUPPORT IN JAPAN

Hittite is pleased to announce the expansion of **Saint Technologies'** coverage of Hittite customers in Japan. Saint has provided outstanding service to our Japanese customers and we look forward to their continued success.

Hittite is also pleased to welcome AMT Incorporated who will provide additional customer support to select Hittite customers in Japan. AMT may be contacted at:

AMT Incorporated
Phone: +81-742-30-0070
Fax: +81-742-30-0200
sales@ad-mtech.com

HITTITE ADDS 2 NEW REPRESENTATIVES

Braemac to Cover Australia & New Zealand

Braemac specializes in a wide variety of electronic products including: fiber optics, electromechanical, passives and semiconductors. With headquarters in Marleston Australia, Braemac offers full support to Hittite customers in Australia and New Zealand. Braemac may be contacted at:

Braemac (SA) Pty. Ltd.
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Straube / Lindberg to Cover CO, ID, UT, MT & WY

Straube/Lindberg Associates, specializing in RF/microwave component products, has been appointed to support Hittite customers in Colorado, Idaho, Montana, Utah and Wyoming. Straube/Lindberg may be contacted at:

Straube / Lindberg Associates
Phone: 303-426-0890
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NEW PRODUCT SELECTION GUIDES

The October 2007 Product Selection Guide will summarize new products, introduced since the release of the June 2007 Product Selection Guide. This popular publication will be available after October 1st.



The September 2007 Chinese language Product Selection Guide is available now. To request a copy, visit www.hittite.com or contact your local Hittite sales representative.

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<i>LNAs</i>	<i>Switches</i>	<i>IRMs</i>	<i>Freq. Detectors</i>
<i>Wideband Amplifiers</i>	<i>Transceivers</i>	<i>Modulators</i>	<i>Freq. Multipliers</i>
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We also design and supply highly integrated custom ICs, modules and subsystems that combine multiple functions for specific requirements. We select the most appropriate semiconductor and package technologies, uniquely balancing digital and analog integration techniques.

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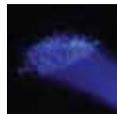
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