**NEW HIGH POWER SIGNAL GENERATOR, 10 MHZ TO 40 GHZ!**

**Compact Benchtop Instrument Features Low Spurs, High Output Power & Low Cost**

The HMC-T2240 Synthesized Signal Generator was developed to provide the R&D engineer, and the production test engineer with the highest level of performance and functionality, while maintaining reasonable cost. The result is a wideband, high power Synthesized Signal Generator which is priced at only $19,498.00.

The HMC-T2240 provides an output frequency range of 10 MHz to 40 GHz, with greater than +20 dBm of typical output power across its entire operating band. The output power is adjustable with 0.1 dB resolution, and a minimum programmable output power of -40 dBm which equates to a dynamic range of at least 60 dB across the band. With the RF output set to “off”, the RF output leakage of the HMC-T2240 drops to < -80 dBm.

**NEW 28 & 45 Gbps MUX & DEMUX PRODUCT LINE!**

**Data Serialization & Deserialization up to 45 Gbps with only 0.2 ps rms Jitter**

Hittite has launched the first four products in the new Multiplexer (Mux) & Demultiplexer (Demux) product line. These devices support 28 Gbps and 45 Gbps data serialization and deserialization respectively, and are ideal for broadband test & measurement, SONET OC-192, OC-768, and high speed DAC, ADC & FPGA interfacing applications.

The HMC854LC5 and HMC847LC5 are 4:1 multiplexers designed for 28 Gbps and 45 Gbps data serialization. These multiplexers latch the four differential inputs on the transition points of the input clock, and use both the rising and falling edges of the half-rate clock to serialize the data. A quarter-rate clock output, which is synchronous to the data output, is generated on chip.

The HMC854LC5 exhibits fast rise and fall times of only 16 ps, while providing only 0.2 ps rms jitter and 4 ps p-p of deterministic jitter. The HMC854LC5 may be used as a 4:1 multiplexer of 28 Gbps NRZ data, or alternatively as a 2:1 multiplexer supporting 14 Gbps RZ and NRZ data. The HMC847LC5 multiplexer features a control pin to adjust

**HITTITE ANNOUNCES NEW SDLVA PRODUCT LINE!**

**Ideal for EW, ELINT, DF Radar, ECM & IFM Control Systems**

In many Military systems, it is often necessary to capture and analyze narrow pulses which exhibit large variations in amplitude. Traditionally, the Successive Detection Log Video Amplifier (SDLVA) is the component of choice for this task. Most SDLVAs tend to be physically large and power hungry. However, Hittite now offers five new compact SDLVA product solutions which feature outstanding performance over a wide frequency range of 0.1 to 20 GHz.

The HMC913, HMC613LC4B, HMC913LC4B, HMC-C052 and HMC-C078 SDLVAs are supplied in die, 16 mm² QFN SMT packages, and miniature 5.95 cm² hermetic modules respectively. These SDLVAs offer the signal processing capability needed to capture and analyze narrow, high-speed RF pulses over wide dynamic ranges. Their small size and low power requirements allow designers to incorporate this function into systems.
Hittite Microwave offers over 875 products across 29 product lines. Our custom and standard products support a wide range of wireless/wired communications and radar applications for the following markets.

### Broadband
- CATV, DBS, WiMAX, WLAN, Fixed Wireless & UWB

### Cellular Infrastructure
- GSM, GPRS, CDMA, WCDMA, UMTS, TD-SCDMA & 4G/LTE

### Military
- C3I, ECM & EW

### Fiber Optic
- OC-48 to 100G

### Microwave & mmWave Communications
- Backhaul Radio Links
- Multi-Pt Radios & VSAT

### Test & Measurement
- Commercial / Industrial Sensors & Test Equipment

### New Products by Market Application

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**LOW SSB PHASE NOISE WIDEBAND VCOs COVER 6 - 20 GHz**

Hittite has introduced two new wideband VCOs which are ideal for military radar, EW & ECM as well as test and measurement. See page 11.
New Wideband Analog Phase Shifters Tune 2 to 8 GHz

Hittite announces the release of two new wideband analog phase shifters that are designed to deliver superior performance and innovative features, all within a miniature surface mount package. These phase shifters are appropriate for EW receivers, Radar systems, satellite communications and beamforming modules from 2 to 8 GHz.

The HMC928LP5E provides a continuously variable phase shift of 0 to 450 degrees from 2 to 4 GHz, with extremely low insertion loss variation versus tuning voltage and frequency. The high accuracy HMC928LP5E is monotonic with respect to control voltage and features very low phase error of ±5 degrees over an octave bandwidth. The HMC928LP5E exhibits typical 3.5 dB insertion loss, accepts an analog control voltage from 0 to +13V, and is housed in a leadless surface mount QFN 5x5 mm package.

Released data sheets for the HMC928LP5E and HMC929LP4E may be found at www.hittite.com. Samples and evaluation PC boards are available from stock and can be ordered via the company’s e-commerce site or via direct purchase order.

Features
>400° Phase Shift
Single Positive Voltage Control
Low Insertion Loss to 3.5 dB
Low Phase Error: ±5° Typical

Applications
EW Receivers
Military Radar
Test Equipment
Fiber Optics
Beamforming Modules

The HMC929LP4E provides a continuously variable phase shift of 0 to 430 degrees from 4 to 8 GHz, with extremely consistent insertion loss versus tuning voltage and frequency. The high accuracy HMC929LP4E is monotonic with respect to control voltage and features very low phase error of ±10 degrees across all phase shift ranges over the rated bandwidth. The HMC929LP4E demonstrates a relatively linear phase response as a function of input control voltage. A phase shift range of up to 360 degrees can be achieved with 0 to +9.5 V tuning, and a range of up to 430 degrees can be achieved with 0 to +13 V tuning. The HMC929LP4E is housed in a leadless surface mount QFN 4x4 mm package.

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HMC928LP5E & HMC929LP4E

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HMC902 & HMC902LP3E

**Features**
- Noise Figure to 1.8 dB
- Gain to 21 dB
- Single Supply: +3.5 V @ 80 mA
- High Output IP3: +28 dBm
- 50 Ohm matched Input/Output
- Chip & SMT Package Available

**High Linearity LNAs**
The HMC902 & HMC902LP3E are GaAs MMIC Low Noise Amplifiers, which operate between 5 and 10 GHz. These self-biased LNAs provide up to 21 dB of small signal gain, 1.8 dB noise figure, and output IP3 of +28 dBm, while requiring only 80 mA from a +3.5 V supply. The P1dB output power of +16 dBm enables them to function as LO drivers for balanced, I/Q or image reject mixers. The HMC902 & HMC902LP3E also feature I/Os that are DC blocked and internally matched to 50 Ohms for ease of integration into multi-chip-modules (MCMs).

HMC797 / 907LP5E

**Features**
- High P1dB Output Power up to +28 dBm
- High Gain to 13.5 dB
- High Output IP3 to +39 dBm
- Supply Voltage: +10 V @ 350 mA
- 50 Ohm matched Input/Output

**Wideband Power ICs**
The HMC797LP5E & HMC907LP5E are GaAs MMIC pHEMT Distributed Power Amplifiers which operate from DC to 22 GHz and 0.2 to 22 GHz respectively. These amplifiers provide up to 13.5 dB of gain, 39 dBm output IP3 and +28 dBm of output power at 1 dB gain compression while requiring 400 mA from a +10 V supply. These versatile PAs are ideal for EW, ECM, Radar and test equipment applications. The HMC797LP5E & HMC907LP5E amplifier I/Os are internally matched to 50 Ohms with no external matching.

HMC757LP4E

**Features**
- High Saturated Output Power: +27.5 dBm @ 21% PAE
- High Output IP3: +34.5 dBm
- High Gain: 20.5 dB
- DC Supply: +5V @ 400 mA
- No External Matching Required

**SMT Microwave Radio PAs**
The HMC757LP4E is a three stage GaAs pHEMT MMIC 1 Watt Power Amplifier which is housed in a 16 mm² surface mount package, and operates between 16 and 24 GHz. The HMC757LP4E provides 20.5 dB of gain, +27.5 dBm of saturated output power and 21% PAE from a +5V supply. The RF I/Os are DC blocked and matched to 50 Ohms. The 4x4 mm plastic package eliminates the need for wirebonding, and is ideal for high volume SMT based microwave radio assemblies.
NEW AMPLIFIERS FOR
MICROWAVE RADIO, MILITARY, SPACE & TEST

HMC906

2 Watt Power Amplifier Chip, 27.3 - 33.5 GHz

**Features**
- Saturated Output Power: +34 dBm @ 22% PAE
- High Gain: 23 dB
- High Output IP3: +43 dBm
- Supply Voltage: +6 V @ 1200 mA
- No External Matching Required

**Ka Band Power Amplifier**

The HMC906 is a GaAs pHEMT MMIC 2 Watt Power Amplifier which operates between 27.3 and 33.5 GHz. The HMC906 provides 23 dB of gain, and +34 dBm of saturated output power at 22% PAE from a +6 V supply. The RF I/Os are DC blocked and matched to 50 Ohms for ease of integration into Multi-Chip-Modules (MCMs). All data is taken with the chip in a 50 Ohm test fixture connected via 0.025 mm (1 mil) diameter wire bonds of length 0.31 mm (12 mils).

HMC930

0.25 Watt Power Amplifier Chip, DC - 40 GHz

**Features**
- High P1dB Output Power: +22 dBm
- High Psat Output Power: 24 dBm
- High Gain: 13 dB
- High Output IP3: +33.5 dBm
- Supply Voltage: +10 V @ 175 mA
- 50 Ohm matched Input/Output

**Ideal for Test Equipment**

The HMC930 is a GaAs MMIC pHEMT Distributed Power Amplifier which operates between DC and 40 GHz. The amplifier provides 13 dB of gain, +33.5 dBm output IP3 and +22 dBm of output power at 1 dB gain compression while requiring 175 mA from a +10 V supply. The HMC930 exhibits a slightly positive gain slope from 8 to 32 GHz, making it ideal for EW, ECM, Radar and test equipment applications. The HMC930 amplifier I/Os are internally matched to 50 Ohms facilitating integration into Multi-Chip-Modules (MCMs).

HMC-APH634

Medium Power Amplifier Chip, 81 - 86 GHz

**Features**
- High Gain: 12 dB
- High P1dB: +19 dBm
- Supply Voltage: +4V
- 50 Ohm Matched Input/Output
- Die Size: 2.57 x 1.70 x 0.05 mm

**E-Band Radio MMIC PA**

The HMC-APH634 is a GaAs HEMT MMIC Medium Power Amplifier which operates between 81 and 86 GHz. The HMC-APH634 provides 12 dB of gain, and an output power of up to +20 dBm at 1 dB compression from a +4 V supply. The HMC-APH634 RF I/Os are DC blocked and internally matched to 50 ohms making it ideal for MCM and hybrid microcircuit applications.
**HMC869LC5**

**I/Q Receiver with LO Amplifier SMT, 12 - 16 GHz**

**Features**
Conversion Gain: 14 dB  
Image Rejection: 32 dB  
LO to RF Isolation: 45 dB  
Noise Figure: 2.8 dB  
5x5 mm Ceramic SMT Package

**Conversion Loss vs. Input IP3**

**Low Noise Receiver**

The HMC869LC5 is a highly integrated MMIC I/Q downconverter in a compact SMT package. This device provides a conversion gain of 14 dB with a noise figure of 2.8 dB and a 32 dB of image rejection. The HMC869LC5 utilizes an LNA followed by an image reject mixer which eliminates the need for a filter following the LNA, and removes thermal noise at the image frequency. I and Q mixer outputs are provided and only +2 dBm LO drive is required.

---

**HMC775LC5**

**I/Q Mixer with LO Amplifier SMT, 10 - 16 GHz**

**Features**
Wide IF Bandwidth: DC - 3.5 GHz  
Image Rejection: 25 dB  
LO to RF Isolation: 45 dB  
High Input IP3: +25 dBm  
Upconversion & Downconversion Applications

**Conversion Gain & Output IP3**

**Upconversion & Downconversion**

The HMC775LC5 is a compact MMIC I/Q mixer in a leadless ceramic SMT package, which can be used as either an Image Reject Mixer or a Single Sideband Upconverter. The mixer utilizes two standard Hittite double balanced mixer cells and a 90 degree hybrid fabricated in a GaAs MESFET process. This product is a much smaller alternative to hybrid style Image Reject Mixers and Single Sideband Upconverter assemblies. The HMC775LC5 operates with an LO drive level as low as 0 dBm and requires no external matching.

---

**HMC924 / 925LC5**

**I/Q Upconverter with Integrated VGA SMTs, 5.5 to 16 GHz**

**Features**
High Conversion Gain: 15 dB  
Excellent Sideband Rejection: -30 dBc  
LO / RF Rejection: 15 dBc  
High Output IP3: +14 dBm  
5x5 mm Ceramic Packages

**Conversion Gain & Output IP3**

**Variable Conversion Gain**

The HMC924LC5 and HMC925LC5 are compact MMIC I/Q upconverters in leadless SMT packages which are rated from 10 to 16 GHz and 5.5 to 8.6 GHz respectively. These products utilize an integrated RF VGA preceded by an I/Q mixer where the LO is driven by a driver amplifier. The RF VGA provides up to 20 dB of conversion gain control. The I/Q mixer topology reduces the need for filtering of the unwanted sideband, and is a much smaller alternative to hybrid style upconverter assemblies.
New Amplifiers & Control Products for Broadband, Cellular, Military & Test

**HMC788LP2E**

**pHEMT Gain Block Amplifier SMT, DC - 10 GHz**

**Features**
- P1dB Output Power: +20 dBm
- Output IP3: +30 dBm
- Gain: 14 dB
- 50 Ohm I/O’s
- Single Supply: +5 V @ 76 mA

**Ideal LO Driver Amplifier**

The HMC788LP2E is a GaAs pHEMT Gain Block MMIC SMT DC to 10 GHz amplifier. This 2x2 mm DFN packaged amplifier can be used as either a cascadable 50 Ohm gain stage or to drive the LO port of many of Hittite’s single and double-balanced mixers with up to +20 dBm output power. The HMC788LP2E offers 14 dB of gain and an output IP3 of +30 dBm while requiring only 76 mA from a +5 V supply. The Darlington feedback pair exhibits reduced sensitivity and excellent gain stability over temperature.

**HMC921LP4E**

**2 Watt Power Amplifier SMT, 0.4 - 2.7 GHz**

**Features**
- High Output IP3: +48 dBm
- High Output P1dB: +33 dBm
- High Gain: 16 dB @ 900 MHz
- Single Supply: +5 V
- 32% PAE @ +33 dBm Pout
- Adjustable Bias Current

**Cellular/4G Power Amplifier**

The HMC921LP4E is a high linearity GaAs HBT MMIC 2 watt power amplifier operating from 0.4 to 2.7 GHz and is housed in a RoHS compliant 4x4 mm QFN leadless package. The HMC921LP4E utilizes a minimum number of external components and operates from a single +5 V supply. This versatile power amplifier can be biased for both low quiescent current and high quiescent current modes by adjusting a single external resistor.

**HMC922LP4E**

**Non-Reflective Differential SPDT Switch, DC - 4 GHz**

**Features**
- Differential SPDT Functionality
- Low Insertion Loss: 0.8 dB
- High IP3: +50 dBm
- High Input P1dB: +35 dBm
- Positive Control: 0/+3 V to 0/+5 V

**Excellent for MIMO Applications**

The HMC922LP4E is a DC to 4 GHz high isolation GaAs MMIC non-reflective Differential SPDT switch in a low cost leadless surface mount package. The switch is ideal for antenna diversity & selector selection, broadband switch matrices, test & measurement equipment, military and space applications yielding up to 60 dB isolation, low 0.8 dB insertion loss and +50 dBm input IP3. The HMC922LP4E offers excellent linearity and is the only known MMIC switch of its kind.
NEW HIGH SPEED DIGITAL LOGIC FAMILY SUPPORTS 45 Gbps

Hittite has launched four new logic devices which support 43-45 Gbps data transmission and clock rates up to 43 GHz. These devices are ideal for a wide range of applications, and support many of the new and emerging optical, networking, and storage area network (SAN) standards including: 100 GbE, 40G (D)QPSK and 100G DP-QPSK.

The HMC841LC4B is a D-Type Flip-Flop which supports single-ended or differential operation, and data transmission rates up to 43 Gbps. The device operates with clock signals up to 43 GHz, and the input is broadband from DC to 43 GHz. During normal operation, data is transferred to the outputs on the positive edge of the clock; reversing the clock inputs accommodates negative-edge triggered applications. The HMC842LC4B is a 1:2 Fanout Buffer designed to support data transmission rates up to 45 Gbps, and clock signals up to 28 GHz. The HMC842LC4B also features two separate control pins to allow for independent programming of the output voltage swings on each channel.

The HMC843LC4B can be configured to provide AND/NAND/ OR or NOR functions, supports 45 Gbps data transmission rates and 25 GHz clock frequencies and is ideal for use in NRZ-to-RZ conversion applications in Fiber Optic systems. The HMC844LC4B may be configured as an XOR/XNOR gate and also supports 45 Gbps data transmission rates and 25 GHz clock frequencies.

All four logic devices support single-ended or differential operation, and the differential input and output signals are terminated with 50 Ohms to ground on-chip and may be either AC or DC coupled. Propagation delays are typically 10 ps, while rise and fall times are less than 12 ps. The HMC841LC4B, HMC842LC4B, HMC843LC4B and the HMC844LC4B exhibit between 2 ps and 3 ps p-p of deterministic jitter, and less than 300 fs of additive random jitter. Ideal for signal loss compensation or signal level optimization, an output level control pin feature allows for signal loss compensation or signal level optimization. Typical deterministic jitter is 2 ps, while random jitter is 0.2 ps rms. All four devices operate from a single -3.3 V DC supply and are available in ceramic RoHS compliant SMT packages.

Samples and evaluation PC boards for all SMT packaged products are available from stock and can be ordered via the Hittite’s e-commerce site or via direct purchase order.

<table>
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<tr>
<th>Part Number</th>
<th>Data / Clock Rate (Gbps / GHz)</th>
<th>Function</th>
<th>Rise / Fall Time (ps)</th>
<th>Differential Output Swing (Vp-p)</th>
<th>DC Power Consumption (mW)</th>
<th>DC Power Supply (Vdc)</th>
<th>Package</th>
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<td>1:2 Fanout Buffer*</td>
<td>11 / 11</td>
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<td>-3.3</td>
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<tr>
<td>HMC850LC3C</td>
<td>28 / 20</td>
<td>1:2 Fanout Buffer*</td>
<td>16 / 15</td>
<td>0.6 - 1.1</td>
<td>315</td>
<td>-3.3</td>
<td>LC3C</td>
</tr>
<tr>
<td>HMC-C062</td>
<td>50 / 30</td>
<td>1:2 Fanout Buffer</td>
<td>9.5 / 11</td>
<td>0.2 - 0.85</td>
<td>455</td>
<td>-3.3</td>
<td>C-13</td>
</tr>
<tr>
<td>HMC940LC4B</td>
<td>13 / 13</td>
<td>1:4 Fanout Buffer*</td>
<td>26 / 25</td>
<td>0.6 - 1.4</td>
<td>440</td>
<td>-3.3</td>
<td>LC4B</td>
</tr>
<tr>
<td>HMC843LC4B</td>
<td>45 / 25</td>
<td>AND / NAND / OR / NOR</td>
<td>10 / 10</td>
<td>0.2 - 0.9</td>
<td>530</td>
<td>-3.3</td>
<td>LC4B</td>
</tr>
<tr>
<td>HMC791LC4B</td>
<td>28 / 28</td>
<td>Clock Divider</td>
<td>12 / 14</td>
<td>0.6</td>
<td>660</td>
<td>-3.3</td>
<td>LC4B</td>
</tr>
<tr>
<td>HMC853LC3C</td>
<td>28 / 28</td>
<td>D-Type Flip-Flop</td>
<td>15 / 14</td>
<td>0.7 - 1.3</td>
<td>260</td>
<td>-3.3</td>
<td>LC3C</td>
</tr>
<tr>
<td>HMC841LC4B</td>
<td>43 / 43</td>
<td>D-Type Flip-Flop*</td>
<td>12 / 12</td>
<td>0.2 - 0.85</td>
<td>630</td>
<td>-3.3</td>
<td>LC4B</td>
</tr>
<tr>
<td>HMC844LC4B</td>
<td>45 / 25</td>
<td>XOR / XNOR*</td>
<td>11 / 10</td>
<td>0.2 - 0.85</td>
<td>530</td>
<td>-3.3</td>
<td>LC4B</td>
</tr>
<tr>
<td>HMC8651LC3C</td>
<td>28 / 28</td>
<td>XOR / XNOR*</td>
<td>15 / 14</td>
<td>0.5 - 1.3</td>
<td>241</td>
<td>-3.3</td>
<td>LC3C</td>
</tr>
</tbody>
</table>

* With programmable output voltage
NEW PRODUCTS FOR FIBER OPTIC & TEST EQUIPMENT

NEW HIGH POWER SIGNAL GENERATOR, 10 MHz TO 40 GHz! ... (continued from page 1)

The HMC-T2240 is also extremely flexible and quiet in the frequency domain. The HMC-T2240 provides a frequency resolution of 1 Hz, and a very low single sideband phase noise of -96 dBm/Hz at 10 kHz offset with an output frequency of 10 GHz. This instrument delivers extremely fast frequency switching speeds of only 500 µs, making it ideal for frequency hopping and threat simulation applications.

Microwave and millimeterwave engineers and technicians will be hard pressed to find a more economical signal generator solution for measuring IP3 performance in a production test environment. Having the ability to procure 2 sweepers for the core of a third order intermodulation distortion test stand at K-band for only $19,498.00 each, should eliminate any barriers that force the engineering and production test departments to vie for equipment availability.

An installation disk that accompanies each unit includes all drivers required to remotely control the device as well as an intuitive graphical user interface which is compatible with Windows XP®, Windows Vista®, or Windows 7® operating systems. User control is facilitated via pull down menus that allow programming of single or swept modes in frequency and/or power.

The HMC-T2240 Synthesized Signal Generator uniquely combines the attributes of wide operating bandwidth, high output power and low spurious products. Contact Hittite today at TE@hittite.com to request your on-site product demonstration.

data output cross-point and duty cycle. The HMC847LC5 multiplexer exhibits only 0.27 ps rms jitter and 3 ps p-p of deterministic jitter, while rise and fall times are 11 and 12 ps, respectively.

The HMC855LC5 and HMC858LC5 are designed for data deserialization at up to 28 Gbps and 45 Gbps respectively. These demultiplexers use both the rising and falling edges of the half-rate input clock to sample the input data in sequence D0 through D3, and then latch the data onto the differential outputs. A quarter-rate clock output generated on-chip can be used to clock the data into other devices. Both the HMC855LC5 and HMC858LC5 demultiplexers support fast rise and fall times of less than 25 ps.

All clock and data inputs/outputs are CML and terminated on-chip with 50 Ohms to either Vcc or ground, and may be DC or AC coupled. Inputs and outputs may be operated either differentially or single-ended. The differential output voltage swing of these devices is programmable via a control pin, which allows for signal loss compensation or signal level optimization.

The HMC847LC5, HMC848LC5, HMC854LC5 and HMC-855LC5 are housed in ceramic 5 x 5 mm SMT packages (RoHS compliant), and are specified for operation from -40 °C to +85 °C.

NEW 28 & 45 Gbps MUX & DEMUX PRODUCT LINE! ... (continued from page 1)

Hittite's Multiplexer & Demultiplexer ICs - Typical Performance

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Data / Clock Rate (Gbps / GHz)</th>
<th>Function</th>
<th>Rise / Fall Time (ps)</th>
<th>Diff. Output Swing (Vp-p)</th>
<th>DC Power Consumption (mW)</th>
<th>DC Power Supply (Vdc)</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMC847LC5</td>
<td>28 / 14</td>
<td>4:1 Mux with Adj. Vout</td>
<td>16 / 16</td>
<td>0.7 - 1.25</td>
<td>510</td>
<td>-3.3</td>
<td>LC5</td>
</tr>
<tr>
<td>HMC848LC5</td>
<td>45 / 22.5</td>
<td>1:4 Mux with Adj. Vout</td>
<td>22 / 22</td>
<td>0.45 - 1.14</td>
<td>644</td>
<td>-3.3</td>
<td>LC5</td>
</tr>
<tr>
<td>HMC854LC5</td>
<td>45 / 22.5</td>
<td>1:4 Demux with Adj. Vout</td>
<td>25 / 21</td>
<td>0.3 - 1.0</td>
<td>1782</td>
<td>+3.3</td>
<td>LC5</td>
</tr>
</tbody>
</table>

*With programmable output voltage & duty cycle control

VISIT US AT:  www.hittite.com

SEPTEMBER 2010
Hittite Announces New SDLVA Product Line! ... (continued from page 1)

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

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

that would have utilized alternative signal processing methodologies due to size, cost, or space constraints.

The dynamic range of Hittite’s monolithic SDLVAs can be further extended by utilizing two SDLVAs in a parallel configuration. The sensitivity of the SDLVA can be increased with a broadband, low-noise amplifier such as the HMC870LC5 preceding it. This allows the detection of lower power levels. Similarly, higher power levels can be detected with an attenuator such as the HMC656LP2E preceding the SDLVA. The video signal combining is performed by operational amplifiers with a clipping feature.

Hittite’s SDLVA advantages include a wide 20 GHz operating frequency with excellent frequency flatness and temperature performance coupled with superior rise and fall times. Hittite’s SDLVAs have very low power consumption, excellent part-to-part tracking and are available in significantly smaller form factors than competing solutions.

Hittite’s SDLVA Product Line - Typical Performance

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Function</th>
<th>Frequency (GHz)</th>
<th>Dynamic Range (dB)</th>
<th>RSSI Slope (mV/db)</th>
<th>RF Threshold Level (dBm)</th>
<th>Bias Supply</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMC913</td>
<td>SDLVA</td>
<td>0.6 - 20</td>
<td>59</td>
<td>14</td>
<td>-54</td>
<td>+3.3V @ 80 mA</td>
<td>Chip</td>
</tr>
<tr>
<td>HMC913LC4B</td>
<td>SDLVA</td>
<td>0.6 - 20</td>
<td>59</td>
<td>14</td>
<td>-54</td>
<td>+3.3V @ 80 mA</td>
<td>LC4B</td>
</tr>
<tr>
<td>HMC-C076</td>
<td>SDLVA w/RF Limited Output</td>
<td>2 - 20</td>
<td>50</td>
<td>42</td>
<td>-45</td>
<td>+12V @ 370 mA</td>
<td>-7V @ 20 mA</td>
</tr>
</tbody>
</table>

HMC913 - Frequency Flatness Performance over Input Power

HMC-C074 and the HMC-C075 are low and high gain Power Amplifier modules which are specified for operation between 10 MHz and 6 GHz, and exhibit 13 dB and 24 dB of gain while consuming only 450 mA and 740 mA respectively from a +15 V supply. The HMC-C074 and the HMC-C075 provide +40 dBm and +42 dBm output IP3 and +29 dBm and +29.5 dBm of output power at 1 dB gain compression respectively.

Excellent Gain flatness of ±0.75 dB from 10 MHz - 6 GHz makes these amplifier modules ideal candidates for EW, ECM, radar and test equipment applications. The amplifier I/Os are internally matched to 50 Ohms and are DC blocked. Integrated voltage regulators allow for flexible biasing of both the negative and positive supply pins, while internal bias sequencing circuitry allows robust operation.

These PA modules are also ideal for boosting the output power of many of Hittite’s connectorized module products. Released data sheets may be found at www.hittite.com.

New 1W Power Amplifier Modules for Telecom, Test & Military Applications

Features
Gain to 24 dB
High P1dB Output
Power: ±29.5 dBm
High Output IP3 to ±42 dBm
Excellent Gain Flatness: ±0.75 dB
Regulated Supply & Bias Sequencing
Field Replaceable SMA Connectors

Applications
Telecom Infrastructure
Test Instrumentation
Military & Space

The HMC-C074 and the HMC-C075 are low and high gain Power Amplifier modules which are specified for operation between 10 MHz and 6 GHz, and exhibit 13 dB and 24 dB of gain while consuming only 450 mA and 740 mA respectively from a +15 V supply. The HMC-C074 and the HMC-C075 provide +40 dBm and +42 dBm output IP3 and +29 dBm and +29.5 dBm of output power at 1 dB gain compression respectively.

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What We Do

Hittite Microwave is an innovative designer and manufacturer of analog, digital and mixed-signal ICs, Modules, Subsystems and Instrumentation for digital, RF, microwave and millimeterwave applications covering DC to 110 GHz. Our Digital/RFIC/MMIC products are developed using state-of-the-art GaAs, GaN, InGaP/GaAs, InP, SOI, SiGe, CMOS and BiCMOS semiconductor processes utilizing MESFET, HEMT, mHEMT, HBT and PIN devices.

We design and supply custom ICs, Modules, Subsystems and Instrumentation, combining multiple functions for specific requirements. We select the most appropriate semiconductor and package technologies, uniquely balancing digital and analog integration techniques.

Hittite Microwave is ISO 9001:2000 and AS9100 B certified. Every component is backed by every Hittite employee and subcontractor’s commitment to total quality, thus providing our customers with products that meet or exceed all requirements, are delivered on-time and function reliably throughout their useful life.

Offering over 875 standard products across 29 product lines

Amplifiers
Attenuators
Broadband Time Delays
Comparators
Data Converters
DC Power Conditioning
DC Power Management
DROs
Filters - Tunable
Freq. Dividers & Detectors
Freq. Multipliers
High Speed Digital Logic
Limiting Amplifiers
Interface
Mixers

Mods. & Demodulators
Mux & Demux
Passives
Phase Shifters
PLLs
PLLs with Integrated VCOs
Power Detectors
SDLVAs
Sensors
Signal Generators
Switches
Transimpedance Amplifiers
VGA
VCOs & PLOs

Features
Wide Tuning Bandwidth
Pout: +3 dBm
Low SSB Phase Noise:
-90 dBC/Hz @100 kHz
No External Resonator Needed
Single Positive Supply:
+5V @ 70 mA

Applications
Industrial/Medical Equipment
Test & Measurement Equipment
Military Radar, EW & ECM

Hittite to Add 2 New Representatives!

With headquarters in Arizona, Technologies West (RMS) now offers instrumentation and connectorized module product support to Hittite customers in Arizona, Colorado, Idaho, Montana, New Mexico, Utah and Wyoming and may be contacted at:

Technologies West (RMS)
Phone: 602-312-3789 • E-mail: dan@tw-rms.com

With headquarters in Minnesota, Matrix Marketing Group now offers full product support to Hittite customers in Minnesota, N. & S. Dakota and W. Wisconsin and may be contacted at:

Matrix Marketing Group
Phone: 952-400-1070 • E-mail: info@matrixmkt.com

New Compact, Low SSB Phase Noise Wideband VCOs Cover 6 - 20 GHz

Hittite has introduced two wideband VCOs the HMC732LC4B and HMC733LC4B which operate between 6 to 12 GHz and 10 to 20 GHz respectively. While complementing and extending the frequency range of Hittite’s GaAs HBT wideband VCO offerings, they are ideal for Military Radar, EW & ECM, as well as Test and Measurement.

The HMC732LC4B and HMC733LC4B integrate a resonator, negative resistance device, and varactor diode in a single 4x4 mm RoHS compliant SMT package. The Vtune port of the VCOs accept an analog tuning voltage from 0 to +23 V, and accommodates a very fast tuning bandwidth. The HMC732LC4B has SSB phase noise of -65 dBC/Hz at 10 kHz and -95 dBC/Hz at 100 kHz, whereas the HMC733LC4B has SSB phase noise of -60 dBC/Hz and -90 dBC/Hz at 10 kHz and 100 kHz, respectively. Both provide a single ended RF output which is matched to 50 Ohms.

The HMC732LC4B and HMC733LC4B combine the attributes of low phase noise, compact size, and wide tuning range, making them ideal for applications where tuning range and high performance are of primary importance. The HMC732LC4B and HMC733LC4B operate from a single +5 V power supply, while drawing 54 mA and 70 mA of current, respectively. Their SMT footprint requires up to 90% less PC board area when compared to traditional MCM and discrete hybrid VCO approaches.

Frequency vs. Tuning Voltage, Vcc = +5V

Hittite to Attend EuMW 2010!

Hittite Microwave will be exhibiting at the 2010 European Microwave Week to be held in Paris, France on September 28 through September 30, 2010, Booth #57.

Hittite will feature over 100 new products and will conduct live demonstrations of the HMC-T2240 10 MHz to 40 GHz Synthesized Signal Generator, and the HMC-C070 MicroSynth® Integrated Synthesizer Module. For more information about these and other new products please visit us at www.hittite.com.

What We Do

Hittite Microwave is an innovative designer and manufacturer of analog, digital and mixed-signal ICs, Modules, Subsystems and Instrumentation for digital, RF, microwave and millimeterwave applications covering DC to 110 GHz. Our Digital/RFIC/MMIC products are developed using state-of-the-art GaAs, GaN, InGaP/GaAs, InP, SOI, SiGe, CMOS and BiCMOS semiconductor processes utilizing MESFET, HEMT, mHEMT, HBT and PIN devices.

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Amplifiers
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Broadband Time Delays
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Data Converters
DC Power Conditioning
DC Power Management
DROs
Filters - Tunable
Freq. Dividers & Detectors
Freq. Multipliers
High Speed Digital Logic
Limiting Amplifiers
Interface
Mixers

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Mux & Demux
Passives
Phase Shifters
PLLs
PLLs with Integrated VCOs
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SDLVAs
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VGA
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