New GaN HEMT MMIC Wideband Power Amplifier!

Ideal for Test & Measurement and Military Applications to 10 GHz

The HMC999 is a GaN HEMT MMIC Distributed Power Amplifier Chip which operates between 10 MHz to 10 GHz. This wideband power amplifier provides 11 dB of gain, +38 dBm of output power at 1 dB gain compression and +47 dBm output IP3 at mid-band. When biased with a +48V supply, the HMC999 consumes 1100 mA of quiescent current and achieves approximately 18% power added efficiency at saturation. This compact MMIC power amplifier delivers 10 Watts of saturated output power in a chip area of only 7 mm², equating to a power density of 1.5 W/mm² across 3 decades of bandwidth. The HMC999 is extremely robust and is designed to reliably operate into partially reflective loads and to tolerate very high incident power levels. The HMC999 is matched to 50 Ohms on-chip, and requires minimal external components for bias decoupling and bias injection.

(Continued on page 10)
## New Products by Market Application

Hittite Microwave offers over 950 products across 32 product lines. Our custom and standard products support a wide range of wireless/wired communications and radar applications for the following markets.

### Amplifiers

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Function</th>
<th>Frequency (GHz)</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMC994</td>
<td>Power Amplifier, 0.5 Watt</td>
<td>DC to 32</td>
<td>4</td>
</tr>
<tr>
<td>HMC999</td>
<td>GaN Power Amplifier, 10 Watt</td>
<td>0.01 to 10</td>
<td>1</td>
</tr>
<tr>
<td>HMC998</td>
<td>Power Amplifier, 2 Watt</td>
<td>0.1 to 22</td>
<td>4</td>
</tr>
<tr>
<td>HMC995LP5GE</td>
<td>Power Amplifier, 3 Watt</td>
<td>12 to 16</td>
<td>4</td>
</tr>
</tbody>
</table>

### Attenuators

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Function</th>
<th>Frequency (GHz)</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMC624LFLP4E</td>
<td>6-Bit Digital</td>
<td>0.06 to 0.5</td>
<td>6</td>
</tr>
<tr>
<td>HMC939LP4E</td>
<td>5-Bit Digital</td>
<td>0.1 to 33</td>
<td>7</td>
</tr>
<tr>
<td>HMC941LP4E</td>
<td>5-Bit Digital</td>
<td>0.1 to 33</td>
<td>7</td>
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</tbody>
</table>

### Automatic Gain Control - New Product Line!

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Function</th>
<th>Frequency (GHz)</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMC992LP5E</td>
<td>IF AGC</td>
<td>0.05 to 0.8</td>
<td>1</td>
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</tbody>
</table>

### DC Power Management

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Function</th>
<th>Frequency (GHz)</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMC981</td>
<td>Active Bias Controller</td>
<td>4 to 12</td>
<td>8</td>
</tr>
<tr>
<td>HMC981LP4E</td>
<td>Active Bias Controller</td>
<td>4 to 12</td>
<td>8</td>
</tr>
<tr>
<td>HMC980LP4E</td>
<td>Active Bias Controller</td>
<td>5 to 16.5</td>
<td>8</td>
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</tbody>
</table>

### Filters - Tunable

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Function</th>
<th>Frequency (GHz)</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMC1000LP5E</td>
<td>Band Reject</td>
<td>3.6 to 12.2</td>
<td>7</td>
</tr>
</tbody>
</table>

### Frequency Multipliers

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Function</th>
<th>Frequency (GHz)</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMC917LP3E</td>
<td>x4 Active</td>
<td>1.5 to 2.5</td>
<td>8</td>
</tr>
<tr>
<td>HMC916LP3E</td>
<td>x3 Active</td>
<td>2.66 to 5.33</td>
<td>8</td>
</tr>
<tr>
<td>HMC942LP4E</td>
<td>x2 Active</td>
<td>12.5 to 15.5</td>
<td>8</td>
</tr>
</tbody>
</table>

### Mux / Demux

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Function</th>
<th>Frequency (GHz)</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMC954LC4B</td>
<td>2:1 Mux w/ Programmable Output Voltage</td>
<td>32 / 16</td>
<td>11</td>
</tr>
<tr>
<td>HMC955LC4B</td>
<td>1:2 Demux w/ High Speed Invert &amp; Programmable Output Voltage</td>
<td>32 / 16</td>
<td>11</td>
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</table>

### Phase Shifters

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Function</th>
<th>Frequency (GHz)</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMC934LP5E</td>
<td>Analog</td>
<td>1 to 2</td>
<td>6</td>
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</tbody>
</table>

### Phase Locked Loop

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Function</th>
<th>Frequency (GHz)</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMC703LP4E</td>
<td>Fractional-N with Sweeper</td>
<td>DC to 8</td>
<td>6</td>
</tr>
</tbody>
</table>
New Products by Market Application

Hittite Microwave offers over 950 products across 32 product lines. Our custom and standard products support a wide range of wireless/wired communications and radar applications for the following markets.

<table>
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<th>Frequency (GHz)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>HMC829LP6GE</td>
<td>Wideband RF VCO</td>
<td>0.045 to 4.2</td>
<td>3</td>
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</tbody>
</table>

**PLLs with Integrated VCOs**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Function</th>
<th>Frequency (GHz)</th>
<th>Page Number</th>
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</thead>
<tbody>
<tr>
<td>HMC-T2270</td>
<td>Signal Generator</td>
<td>0.01 to 70</td>
<td>1</td>
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</table>

**Signal Generators**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Function</th>
<th>Frequency (GHz)</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMC975</td>
<td>SPDT, High Isolation</td>
<td>2 to 50</td>
<td>5</td>
</tr>
<tr>
<td>HMC970</td>
<td>SPDT, High Isolation</td>
<td>8 to 21</td>
<td>5</td>
</tr>
<tr>
<td>HMC971</td>
<td>SPDT, High Isolation</td>
<td>18 to 40</td>
<td>5</td>
</tr>
</tbody>
</table>

**Switches**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Function</th>
<th>Frequency (GHz)</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMC996LP4E</td>
<td>Analog</td>
<td>5 to 12</td>
<td>4</td>
</tr>
<tr>
<td>HMC997LC4</td>
<td>Analog</td>
<td>17 to 27</td>
<td>4</td>
</tr>
</tbody>
</table>

Industry Leading Wideband PLL with Integrated VCO; 45 - 4000 MHz

**Low Phase Noise and Low Spurious Ideal for High Data Rate and Software Defined Radios**

The HMC829LP6GE, is an industry leading, low noise, wideband, Fractional-N Phase-Locked-Loop (PLL) that features an integrated Voltage Controlled Oscillator (VCO) with a fundamental frequency of 2800 MHz to 4200 MHz, and an integrated VCO output divider (divide by 1/2/4/6.../60/62). This allows the HMC829LP6GE to generate frequencies from 45 MHz to 1050 MHz, from 1400 MHz to 2100 MHz, and from 2800 MHz to 4200 MHz. The HMC829LP6GE is ideal for very high data rate radios, DDS replacement, phased array applications, CATV equipment and cellular/4G/WiMax infrastructure applications.

The HMC829LP6GE also features an integrated phase detector and delta-sigma modulator which are capable of operating at up to 100 MHz to permit wider loop-bandwidths with excellent spectral performance. Industry leading phase noise and spurious performance across all frequencies minimizes blocker effects and simultaneously improves receiver sensitivity and transmitter spectral purity. The HMC829LP6GE features a superior noise floor of less than -170 dBc/Hz, which makes it ideal as a local oscillator source for RF mixers, as a clock source for high-frequency data converters, or as a tunable reference source for ultra-low spurious applications requiring spurs less than -100 dBc/Hz.

Additional features of the HMC829LP6GE include RF output power control from 0 to 6 dB (2 dB steps), an output mute function, and a delta-sigma modulator Exact Frequency Mode which enables users to generate output frequencies with 0 Hz frequency error.

**Typical Closed Loop Integer Phase Noise**

![Typical Closed Loop Integer Phase Noise Graph](image-url)
New Variable Gain and Power Amplifiers for Microwave Radio, Military and Test

HMC994 & HMC998

**0.5 & 2 Watt Power Amplifier Chips, DC to 32 GHz**

**Powerful Wideband Amplifiers**

The HMC994 & HMC998 are GaAs MMIC PHEMT Distributed Power Amplifier dies which operate between DC to 32 GHz & 0.1 to 22 GHz respectively. The amplifiers provide up to 14 dB of gain, up to 41 dBm output IP3 and up to +31 dBm of output power at 1 dB gain compression while requiring as low as 250 mA from a +10V supply. The HMC994 exhibits a positive gain slope from 5 to 25 GHz making it ideal for EW, ECM, radar and test equipment applications. The amplifiers’ I/Os are internally matched to 50 Ohms facilitating integration into Multi-Chip Modules (MCMs).

**Features**

- High Output P1dB to +31 dBm
- High Output Psat to +33 dBm
- High Gain to 14 dB
- High Output IP3 to +41 dBm
- Supply Voltage: Vdd = +10V to +15V

HMC995LP5GE

**3 Watt Power Amplifier SMT, 12 to 16 GHz**

**High Power & High Gain**

The HMC995LP5GE is a 4 stage GaAs pHEMT MMIC 3 Watt Power Amplifier with an integrated temperature compensated power detector which operates between 12 and 16 GHz. It provides 27 dB of gain, 35.5 dBm of saturated output power, and 24% PAE from a +7V supply and is also ideal for 13.75 to 14.5 GHz Ku Band VSAT transmitters as well as SATCOM applications. The HMC995LP5GE amplifier I/Os are internally matched to 50 Ohms and is packaged in a leadless QFN 5 x 5 mm surface mount package requiring no external matching components.

**Features**

- Saturated Output Power: +35.5 dBm @ 24% PAE
- High Output IP3: +41 dBm
- High Gain: 27 dB
- DC Supply: +7V @ 1200 mA
- No External Matching Required

HMC996LP4E & HMC997LC4

**Analog Variable Gain Amplifiers, 5 - 27 GHz**

**Versatile Gain Driver Amplifiers**

The HMC996LP4E & HMC997LC4 are GaAs PHEMT MMIC analog variable gain driver amplifiers which operate from 5 to 12 GHz & 17 to 27 GHz respectively. Ideal for microwave radio applications, these amplifiers provides up to 20.5 dB of gain, output P1dB of up to +24 dBm and up to +34 dBm of output IP3 at maximum gain, while requiring less than 170 mA from a +5V supply. A gain control voltage pin is provided to allow variable gain with up to 22 dB of range. Gain flatness is excellent making these amplifiers ideal for EW, ECM and radar applications.

**Features**

- Wide Gain Control Range to 22 dB
- Single Analog Control Voltage
- Output IP3 @ Max Gain to +34 dBm
- Output P1dB to +24 dBm
- No External Matching Required
New PIN Switches for Microwave Radio, Military and Test Equipment

HMC971

2 Watt PIN MMIC High Isolation SPDT Switch, 18 to 40 GHz

High Power, High Isolation

The HMC971 is a broadband high isolation all-shunt PIN SPDT MMIC chip. Operating from 18 to 40 GHz, the switch features 60 dB isolation at lower frequencies and 40 dB at higher frequencies. The HMC971 also exhibits extremely low insertion loss of less than 2 dB at 40 GHz and is capable of over 2 Watts power handling. The switch operates using complementary negative control voltage logic lines of 0/-10V.

Features
- +34 dBm Input P1dB
- High Isolation: 50 dB @ 20 GHz
- Low Insertion Loss: 1.4 dB Typical @ 30 GHz
- All-Shunt Reflective Topology
- Die Size: 2.21 x 1.26 x 0.1 mm

HMC970

2 Watt PIN MMIC High Isolation SPDT Switch, 8 to 21 GHz

High Linearity, Low Loss

The HMC970 is a broadband high isolation all-shunt high IP3 design, reflective PIN SPDT MMIC chip. Covering 8 to 21 GHz, the switch features 40 dB isolation and 1.2 dB insertion loss. The HMC970 is capable of switching 2 Watt of power from 8 to 21 GHz. This switch operates from a positive (30 mA) supply current and a negative (-10V) supply voltage and includes on chip bias network, thus requiring no RF chokes to apply DC bias. Bias control signals for the switch consists of a reverse bias voltage of -10V typical for ON state and a forward bias current of 30 mA for the OFF state.

Features
- High Isolation: 40 dB
- Low Insertion Loss: 1.2 dB
- All-Shunt Reflective Topology
- High Linearity: +50 dBm Input IP3
- Die Size: 2.21 x 1.45 x 0.1 mm

HMC975

0.5 Watt PIN MMIC High Isolation SPDT Switch, 2 to 50 GHz

Excellent 45 dB Isolation

The HMC975 is a broadband high isolation series shunt reflective PIN SPDT MMIC chip. Covering 2 to 50 GHz, the switch features 45 dB isolation and 0.9 dB insertion loss at 26 GHz. This switch is capable of switching 1/2 Watt of power from 12 to 50 GHz. It operates from a positive (30 mA) supply current and a negative (-10V) supply voltage. Bias control signals for the switch consists of a reverse bias voltage of -10V typical for ON state and a forward bias current of 30 mA for the OFF state.

Features
- High Isolation: 45 dB @ 26 GHz
- Low Insertion Loss: 0.9 dB @ 26 GHz
- Reflective Design
- Die Size: 1.75 x 1.1 x 0.1 mm

VISIT US AT: www.hittite.com
New Control & Clock Generation Devices for Cellular Infrastructure and Fiber Optic & Networking

HMC624LFLP4E
0.5 dB LSB GaAs MMIC 6-Bit Digital Attenuator, 60 to 500 MHz

Features
• 0.5 dB LSB Steps to 31.5 dB
• Power-Up State Selection
• High Input IP3: +55 dBm
• Low Insertion Loss: 1.2 dB
• TTL/CMOS Compatible, Serial, Parallel or Latched Control

HMC934LP5E
Analog Phase Shifter SMT, 1 to 2 GHz

Features
• Octave Bandwidth: 1 to 2 GHz
• 400° Phase Shift
• Low Insertion Loss: 3.5 dB
• Low Phase Error: +3.5 / -2 deg
• Single Positive Voltage Control
• 32 Lead 5 x 5 mm SMT Package: 25 mm²

HMC703LP4E
8 GHz Fractional-N PLL with Sweeper

Features
• Wideband: DC to 8 GHz RF Input
• Industry Leading Phase Noise: -112 dBc/Hz @ 8 GHz Fractional, 50 kHz Offset
• Figure of Merit:
  -230 dBc/Hz Frac. Mode
  -233 dBc/Hz Int. Mode

Extreme Accuracy
The HMC624LFLP4E is a 6-bit GaAs IC Digital Attenuator in a low cost leadless SMT package. This versatile digital attenuator is suitable for a wide variety of IF applications. The dual mode control interface is CMOS/TTL compatible, and accepts either a three wire serial input or a 6 bit parallel word. The HMC624LFLP4E also features a user selectable power-up state and a serial output port for cascading other Hittite serial controlled components. The HMC624LFLP4E is housed in a RoHS compliant 4 x 4 mm QFN leadless package, and requires no external matching components.

Excellent Phase Flatness
The HMC934LP5E is an Analog Phase Shifter which is controlled via an analog control voltage from 0 to +13V. The HMC934LP5E provides a continuously variable phase shift of 0 to 400 degrees from 1 to 2 GHz, with extremely consistent low insertion loss versus phase shift and frequency. The high accuracy HMC934LP5E is monotonic with respect to control voltage and features a typical low phase error of +3.5 / -2 degrees. The HMC934LP5E is housed in a RoHS compliant 5 x 5 mm QFN leadless package.

Industry Leading PLL
The HMC703LP4E Fractional-N PLL is built upon the high performance PLL platform also contained in the HMC704LP4E and Hittite’s latest generation of PLL + VCO products. This platform has the best phase noise and spurious performance in the industry enabling higher order modulation schemes while minimizing blocker effects in high performance radios. The HMC703LP4E offers frequency sweep and modulation features, external triggering, double-buffering, exact frequency control, phase modulation and more.
New Tunable Filters and Digital Attenuators for Wideband Applications

HMC1000LP5E

Features
- Tunable Stopband Frequency: 3.6 to 12.2 GHz
- Tunable Stopband Rejection: 25 dB Typical
- Four Frequency Control Modes
- Single Chip Replacement for Mechanically Tuned Designs

Absorptive MMIC Filter
The HMC1000LP5E is a MMIC band reject filter which features a user selectable band stop frequency. The -20 dB filter bandwidth is < 10% and the rejection frequency can be varied between 3.6 and 12.2 GHz by applying an analog tune voltage between 0 and 14V. This tunable filter can be used as a much smaller SMT alternative to physically large switched filter banks and cavity tuned filters. The HMC1000LP5E has excellent microphonics due to the monolithic design and provides a dynamically adjustable solution in advanced communications applications.

HMC939LP4E

Features
- 1.0 dB LSB Steps to 31 dB
- Single Positive Control Line Per Bit
- ±1.0 dB Typical Bit Error
- High Input IP3: +43 dBm
- 24 Lead 4 x 4 mm SMT Package: 16 mm²

1.0 dB LSB 5-Bit Digital Attenuator SMT, 0.1 to 33 GHz

Wideband Step Attenuator
The HMC939LP4E is a broadband 5-bit GaAs IC digital attenuator in a low cost leadless surface mount package. Covering 0.1 to 33 GHz, the insertion loss is less than 5 dB typical. The attenuator bit values are 1.0 (LSB), 2, 4, 8, 16 for a total attenuation of 31 dB. Attenuation accuracy is excellent at ±0.4 dB typical step error with an IIP3 of +43 dBm. Five control voltage inputs, toggled between +5V and 0V, are used to select each attenuation state.

HMC941LP4E

Features
- 0.5 dB LSB Steps to 15.5 dB
- Single Positive Control Line Per Bit
- ±0.5 dB Typical Bit Error
- High Input IP3: +45 dBm
- 24 Lead 4 x 4 mm SMT Package: 16 mm²

0.5 dB LSB GaAs MMIC 5-Bit Digital Attenuator, 0.1 to 33 GHz

Ideal for Test Equipment
The HMC941LP4E is a broadband 5-bit GaAs IC digital attenuator in a low cost leadless surface mount package. Covering 0.1 to 33 GHz, the insertion loss is less than 4 dB typical. The attenuator bit values are 0.5 (LSB), 1, 2, 4, 8, for a total attenuation of 15.5 dB. Attenuation accuracy is excellent at ±0.3 dB typical step error with high IIP3 of +45 dBm. Five CMOS compatible control voltage inputs, toggled between +5V and 0V, are used to select each attenuation state.
New Active Bias Controllers and Frequency Multipliers for Transceiver Applications

New Compact SMT Active Bias Controllers for Class-A Amplifiers!

Hittite has expanded its DC Power Management product line by introducing three new, completely monolithic Class-A amplifier biasing and monitoring solutions. The HMC980LP4E, HMC981 and HMC981LP3E are ideal for power management and control in cellular infrastructure, microwave & millimeterwave communications, fiber optic & networking, consumer, military, space and test equipment applications.

Hittite’s bias control solutions automatically adjust the gate voltage of both enhancement and depletion mode amplifiers to achieve a constant bias current over part-to-part and temperature variations. This auto-gate bias adjustment provides a significant advantage compared with discrete-based solutions since it eliminates manual calibration. Additionally, the HMC980LP4E, HMC981 and HMC981LP3E offer significant PCB area reduction by integrating negative voltage generator, automatic gate adjustment and power-up sequencing circuit blocks in a single monolithic device.

Hittite’s DC Power Management Product Line

<table>
<thead>
<tr>
<th>Supply Voltage Range (V)</th>
<th>VDRAIN Voltage Range (V)</th>
<th>IDRAIN Bias Current (mA)</th>
<th>VGATE Voltage Range (V)</th>
<th>Over/Under IDRAIN Current Alarm</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 to 16.5</td>
<td>3 to 15</td>
<td>0 to 500</td>
<td>-2.5 to +2.5</td>
<td>Yes</td>
<td>HMC920LP5E</td>
</tr>
<tr>
<td>5 to 16.5</td>
<td>5 to 16.5</td>
<td>50 to 1600</td>
<td>-2.46 to +2.04</td>
<td>Yes</td>
<td>HMC980LP4E</td>
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<tr>
<td>4 to 12</td>
<td>4 to 12</td>
<td>20 to 200</td>
<td>-2.5 to +2.0</td>
<td>n/a</td>
<td>HMC981</td>
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<tr>
<td>4 to 12</td>
<td>4 to 12</td>
<td>0 to 200</td>
<td>-2.5 to +2.5</td>
<td>n/a</td>
<td>HMC981LP3E</td>
</tr>
</tbody>
</table>

SMT Multipliers Are Ideal for Military and Microwave Radio Subsystems

The HMC917LP3E and HMC916LP3E are Active Multiplier MMICs with output frequencies ranging from 6 to 16 GHz. When driven by +5 dBm signals, these compact multiplier MMICs deliver +2 dBm of output power, and exhibit additive SSB (single sideband) phase noise as low as -152 dBc/Hz at 100 kHz offset from the carrier.

The HMC942LP4E is a high power x2 Active Frequency Multiplier which provides an output frequency range of 25 to 31 GHz. When driven by a +4 dBm signal, this powerful multiplier delivers output power as high as +21 dBm, and maintains an outstanding -55 dBc of fundamental signal isolation at the output port.

These low noise multipliers are ideal for driving the LO port of many of Hittite’s high performance mixer and converter products, and complement Hittite’s broad line of active and passive multipliers with output frequencies to 90 GHz.

<table>
<thead>
<tr>
<th>Input Frequency (GHz)</th>
<th>Output Frequency (GHz)</th>
<th>Input Power (dBm)</th>
<th>Output Power (dBm)</th>
<th>100 kHz SSB Phase Noise (dBc/Hz)</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5 - 2.5</td>
<td>6 - 10</td>
<td>5</td>
<td>2</td>
<td>-148</td>
<td>HMC917LP3E</td>
</tr>
<tr>
<td>2.66 - 5.33</td>
<td>8 - 16</td>
<td>5</td>
<td>2</td>
<td>-152</td>
<td>HMC916LP3E</td>
</tr>
<tr>
<td>12.5 - 15.5</td>
<td>25 - 31</td>
<td>3</td>
<td>21</td>
<td>-</td>
<td>HMC942LP4E</td>
</tr>
</tbody>
</table>
Programmable Direct Conversion Receiver is Ideal for Multi-Carrier, Multi-Standard Radios

Excellent Linearity, Noise Figure & Programmability

The HMC6383 is a high-performance, flexible radio design platform that can be configured on-the-fly. Fully field programmable, the HMC6383 platform is designed to serve as a receiver subsystem building block for various applications including cellular base stations, microwave radio, adaptive IF strips, wireless LAN, software defined radio and test equipment.

Utilizing robust direct conversion receiver architecture, the HMC6383 features:

- Precisely programmable 3 dB bandwidth, anywhere from 3.5 MHz to 50 MHz baseband (7 MHz to 100 MHz RF) within ±2.5% bandwidth accuracy
- Wideband input frequency coverage anywhere from 700 MHz to 3000 MHz
- 90 dB of distributed programmable gain
- High linearity (> 60 dBm IP2)
- Integrated, seamless, image rejection calibration algorithm with ~70 dB of image rejection

The HMC6383 platform enables users to offer identical hardware receiver platforms across various standards, jurisdictions, and bands of operation, while pre-programming or field programming the receiver to suit each individual deployment. This capability significantly reduces the cost and complexity of manufacturing, deploying, and supporting standard and region-specific equipment.

The HMC6383 evaluation development kit includes a full software suite for complete configuration and control. This flexibility enables system designers to observe and understand the effects and implications of any parameter on their overall system design performance. Please contact sales@hittite.com for price and delivery.

Market leading performance, combined with a robust fully configurable design, makes the HMC6383 evaluation platform a logical starting point in designing a modular, highly-configurable, multi-standard, multi-carrier receiver.
New Automatic Gain Control Product Line! ... (continued from page 1)

as the attenuation is increased. The HMC992LP5E differentiates itself from these traditional VVAs by providing a constant OIP3 of +40 dBm over the entire attenuation range. The integrated power detector features excellent temperature stability, and the HMC992LP5E provides highly accurate power control in AGC closed loop operation which is independent of part-to-part and temperature variations.

The HMC992LP5E provides a flexible architecture, and can be configured with one or two attenuators, depending upon the dynamic range requirements of the application. It can also be used as a standalone, high performance VVA in an open loop configuration or as a compact IF-AGC solution in closed loop operation. Housed in a RoHS compliant 5 x 5 mm QFN leadless package, the HMC992LP5E requires only DC blocking capacitors and resistors and is specified for operation from -40 °C to +85 °C. Samples and evaluation PC boards for all SMT packaged products are available from stock and can be ordered via Hittite’s e-commerce site or via direct purchase order. Released data sheets may be found at www.hittite.com.

Powerful New Signal Generator … (continued from page 1)

reasonable cost. The result is a high powered Signal Generator which is priced at only $34,998.

The HMC-T2270 is a 10 MHz to 70 GHz signal generator that delivers up to +29 dBm of CW output power in 0.1 dB steps over a 60 dB dynamic range. Harmonic rejection is better than -40 dBc at 30 GHz output, while spurious products are better than -65 dBc at all integer frequencies. Phase noise is -113 dBc/Hz at 10 kHz offset from 1 GHz and -79 dBc/Hz at 100 kHz offset from 67 GHz, with insignificant deviation over the temperature range of 0 to +35 °C.

The HMC-T2270 exhibits frequency resolution of 1 Hz and fast switching speed of only 500 µs, making it ideal for frequency hopping and threat simulation applications. Furthermore, the broad frequency coverage of the HMC-T2270 will be attractive to OEMs involved in the development of new and emerging automotive sensors, millimeterwave communications and medical equipment, as well as those taking advantage of the unlicensed communication spectrum between 57 and 66 GHz.

Built on a foundation of Hittite’s innovative and market leading MMIC products, the HMC-T2270 is a versatile signal generator which is compatible with many different control interfaces (USB, GPIB and Ethernet) ensuring carefree integration in any test environment. An installation disk that accompanies each unit includes all of the drivers required to remotely control the instrument, as well as a user friendly LabWindows™ based GUI interface compatible with Windows XP®, Windows Vista® and 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. Integration of multiple HMC-T2270 instruments within a single test rack is simple and affordable.

The HMC-T2270 is compact and lightweight, making it well suited for integration within various test environments while improving overall productivity and equipment utilization. The HMC-T2270 Signal Generator can be ordered via Hittite’s e-commerce site or direct purchase order at www.tm-hittite.com. Contact te@hittite.com to request your on-site product demonstration.
New 32 Gbps 2:1 Multiplexer & 1:2 Demultiplexer Products!

Hittite Adds Two New Serialization & Deserialization Products With Programmable Output Voltage

Hittite has added two new products to the Multiplexer (Mux) & Demultiplexer (Demux) product line. These versatile devices support demanding data serialization and deserialization applications and are ideal for broadband test & measurement, SONET OC-192, OC-768, and high speed DAC, ADC & FPGA interfacing applications.

The HMC954LC5 is a 2 to 1 multiplexer designed for 32 Gbps data serialization. This fast mux latches the two differential inputs on a rising edge of the input clock. The device uses both rising and falling edges of the half-rate clock to serialize the data. The HMC954LC4B also features an output level control pin, VR, which allows for loss compensation or signal-level optimization. The HMC954LC5 delivers fast rise and fall times of only 15 ps, while exhibiting only 0.2 ps rms jitter and 2 ps peak to peak deterministic jitter.

The HMC955LC4B is a 1 to 2 Demux designed to support data transmission rates up to 32 Gbps. This demux uses both rising and falling edges of the half-rate clock to sample data in sequence 01-02 and latches data on the rising edge into differential outputs. The demux has high-speed clock synchronous invert input that allows for data scrambling.

The HMC955LC4B features an output level control pin, VR, which allows for loss compensation or signal-level optimization. HMC955LC4B exhibits fast rise and fall times of only 19 ps, while providing only 0.2 ps rms jitter and 3 ps peak to peak deterministic jitter.

All differential inputs to the HMC954LC4B and HMC955LC4B are CML and terminated on-chip with 50 Ohms to the positive supply (ground) and may be AC or DC coupled. The differential CML outputs are source terminated to 50 Ohms and may also be AC or DC coupled. Outputs can be connected directly to a 50 Ohm ground-terminated system or drive devices with CML logic input.

The HMC954LC4B and the HMC955LC4B operate from a single -3.3V supply and are housed in ceramic ROHS-compliant 4 x 4 mm SMT packages.

### Data / Clock Rate (Gbps/GHz) Function Rise / Fall Time (ps) Differential Output Swing (Vp-p) DC Power Consumption (mW) DC Power Supply (Vdc) Part Number

<table>
<thead>
<tr>
<th></th>
<th>2:1 Mux w/ Programmable Output Voltage</th>
<th>15 / 15</th>
<th>1.28</th>
<th>479</th>
<th>-3.3</th>
<th>HMC954LC4B</th>
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</thead>
<tbody>
<tr>
<td>32 / 16</td>
<td>1:2 Demux w/High Speed Invert &amp; Programmable Output Voltage</td>
<td>19 / 19</td>
<td>1.00</td>
<td>660</td>
<td>-3.3</td>
<td>HMC955LC4B</td>
</tr>
</tbody>
</table>

**HMC954LC4B Eye Diagram, 32 Gbps**

Test Conditions:
- Single-ended 200 mV, 16 Gbps data input;
- 16 GHz clock input pattern generated with a 2^7-1 PN, 16 Gbps PRBS pattern resulting in a quasi PN 32 Gbps output measured with Tektronix CSA 8000

**HMC955LC4B Eye Diagram, 16 Gbps**

Test Conditions:
- Single-ended 200 mV, 32 Gbps data input;
- 16 GHz clock input pattern generated with a 2^7-1 quasi PN, 32 Gbps PRBS pattern resulting in 16 Gbps, 2^7-1 quasi PN output measured with Tektronix CSA 8000

New www.tm-hittite.com Instrumentation Website from Hittite!

Features Six Signal Generator Products, Coverage to 70 GHz & Prices Starting at $3,998!

Hittite’s new instrumentation website, www.tm-hittite.com, includes a dynamic homepage featuring full product specifications for Hittite’s Signal Generator family. Comprehensive “Splash Pages” contain in-depth product information and technical content for each high performance instrumentation product and allow visitors to find the right product for their requirements. New accessory, certification and product support pages feature invaluable reference materials.

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