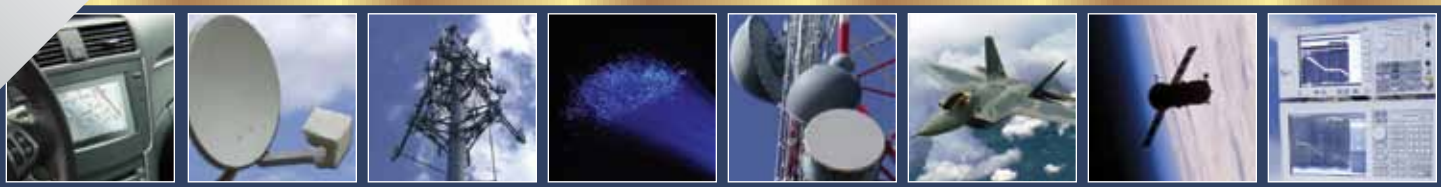


INNOVATION • QUALITY
 Celebrating **25** Years
 SERVICE •

PRODUCT SELECTION GUIDE

ANALOG, DIGITAL & MIXED-SIGNAL ICs, MODULES,
 SUBSYSTEMS & INSTRUMENTATION, DC - 110 GHz



AUTOMOTIVE

Telematics & Sensors

BROADBAND

Cable Modem, CATV, DBS & VoIP
 WiMAX, WiBro, WLAN & UWB

CELLULAR INFRASTRUCTURE

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

FIBER OPTICS

OC-48 to 100G

MICROWAVE & MMWAVE COMMUNICATIONS

Backhaul Radio Links
 Multi-Pt Radios & VSAT

MILITARY

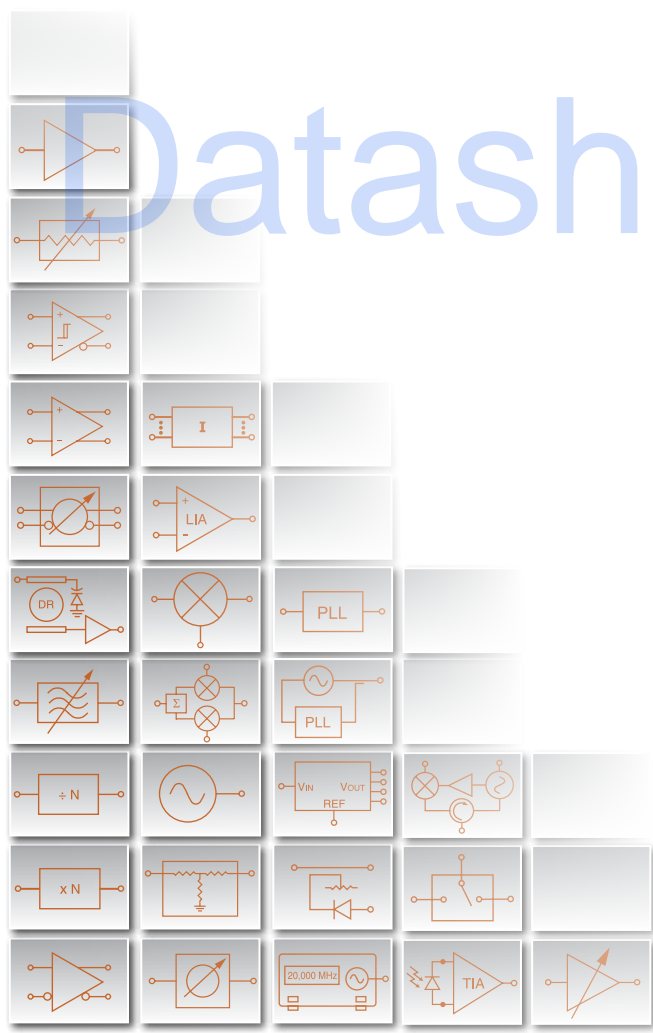
C³I, ECM & EW

SPACE

Payload Electronics

TEST & MEASUREMENT

Commercial & Industrial Sensors
 Test Equipment



Datasheet.Live

INTRODUCING THE SEPTEMBER 2010 SELECTION GUIDE!

Hittite Microwave Corporation is pleased to introduce our September 2010 Product Selection Guide summarizing over 875 products including 68 new products and 4 new product lines; Broadband Time Delay (Digital), DC Power Management, SDLVA and Mux & Demux. This selection guide organizes Hittite's portfolio by product line as well as by market applications. Full specifications for each product are available at www.hittite.com. Click on "My Subscription" to receive the latest product releases.



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Hittite Microwave Corporation has carefully reviewed the product specification information herein and it is believed to be accurate and reliable. However, no responsibility is assumed for inaccuracies or errors. Use of this information and/or any of our products does not convey to the user any patent rights or licenses. Hittite products are designed to be used only within the electrical and environmental limits published in their respective data sheets or custom quoted specifications. Hittite does not authorize the use of any of its products beyond the current published data sheet limits. Such use beyond the currently published electrical and/or environmental data sheet limits voids all Hittite warranties. Hittite reserves the right to change component circuitry, specifications or other information at any time without prior notice. Hittite products are not authorized for use as critical components in life support devices or systems without the express written approval of Hittite Microwave Corporation. Life support devices or systems are devices or systems which (A) are intended for surgical implant into the body or (B) support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided on the labeling, can be reasonably expected to result in a significant injury to the user.

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CUSTOMER SUPPORT

How to Buy:

Hittite Microwave Corporation offers many convenient ways to order products and/or receive pricing and delivery information. Our order entry/MRP system assures customer sample requests and orders will be entered quickly, tracked easily, and completed accurately on-time.

Direct Sales

• HMC Field Sales Offices:

You may contact our corporate or field sales offices listed on the back cover for assistance in purchasing Hittite products.

• Purchase On-line: www.hittite.com

With Hittite Microwave's E-Commerce capability customers can enjoy the convenience of on-line ordering via a secure shopping cart interface. Products can be purchased using either a MasterCard, Visa, American Express or JCB card. Orders are confirmed within one business day with delivery information. Orders ship within 2 business days of confirmation, based on availability.

• Purchase Orders via HMC Corporate Sales:

You may contact Hittite Microwave directly at (978) 250-3343. Purchase orders can be faxed to (978) 250-3373 or sent via email to sales@hittite.com. There is a minimum purchase order value of \$500.00 (U.S. Dollars).

Worldwide Network of Sales Representatives

You may purchase our products through our network of manufacturer representatives.

• **European customers may also purchase products in Euros (€) directly from Hittite Microwave Deutschland GmbH.**

• **Japanese customers may also purchase products in Yen (¥) directly from Hittite KK - Japan.**

OUR QUALITY POLICY:

Hittite Microwave Corporation is Committed to:

- Being a supplier of products of the highest quality.
- Advancing state-of-the-art technology to support our products.
- Enhancing our competitive position with superior products.

Hittite's Quality Policy Recognizes Responsibilities for Every Individual to:

- Take the initiative to promote quality.
- Create an environment where the highest quality standards are maintained.
- Participate in continuous improvement practices.

QUALITY & PRODUCT SUPPORT:

The Quality & Product Support Section of Our Web Site Includes:

- Quality Assurance - Product manufacturing, qualification & screening flows.
- Product Reliability
- Qualification Test Reports

Product Application Support

- Application Engineering Support
- Application Notes
- Mixer Spur Chart Calculator & PLL Phase Noise Calculator
- Package & Layout Drawings - Product outline, PCB land pattern and tape & reel drawings.
- Product Cross Reference - Thousands of ICs cross-referenced to HMC products.
- Published Papers
- S-Parameter Files

Data Sheets

- Complete product data sheets can be found on our web site.

WHAT WE DO

Hittite Microwave is an innovative designer and manufacturer of analog and mixed-signal ICs, modules, subsystems and instrumentation for digital, RF, microwave and millimeterwave applications covering DC to 110 GHz. Our 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, pHEMT, mHEMT, HBT and PIN devices. We offer over 875 products across 28 product lines

Amplifiers	Mixers
Attenuators	Mods. & Demodulators
Broadband Time Delays	Mux & Demux
Comparators	Passives
Data Converters	Phase Shifters
DC Power Conditioning	PLLs
DC Power Management	PLLs with Integrated VCOs
DROs	Power Detectors
Filters - Tunable	Sensors
Freq. Dividers & Detectors	Signal Generators
Freq. Multipliers	Switches
High Speed Digital Logic	Transimpedance Amplifiers
Limiting Amplifiers	VGAs
Interface	VCOs & PLOs

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.

Our custom and standard products support a wide range of wireless / wired communications & radar applications for the following markets:



Automotive

Telematics & Sensors



Broadband

CATV, DBS, WiBro, WiMAX, WLAN, Fixed Wireless & UWB



Cellular Infrastructure

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



Fiber Optic

OC-48 to 100G



Microwave & mmWave Communications

Backhaul Radio Links
Multi-Pt Radios & VSAT



Military

C³I, ECM & EW



Space

Payload Electronics



Test & Measurement

Commercial / Industrial
Sensors & Test Equipment

HMC 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.

AMPLIFIERS - Gain Blocks, Linear & Power & Wideband (Distributed)

Frequency (GHz)	Function	Gain (dB)	OIP3 (dBm)	NF (dB)	P1dB (dBm)	Bias Supply	Package	ECCN Code	Part Number
DC - 10	pHEMT Gain Block	14	30	7	20	+5V @ 76mA	LP2	EAR99	HMC788LP2E
0.4 - 2.7	Power Amplifier 2 Watt	16	48	8.5	33	+5V @ 700mA	LP4	EAR99	HMC921LP4E
12.5 - 15.5	Power Amplifier 2 Watt	30	42	-	34	+7V @ 1200mA	Chip	3A001.b.2.d	HMC949
12.5 - 15.5	Power Amplifier 4 Watt	28	44	-	36	+7V @ 2400mA	Chip	3A001.b.2.d	HMC950
16 - 24	Power Amplifier 1/2 Watt	20.5	34.5	-	26.5	+5V @ 400mA	LP4	3A001.b.2.c	HMC757LP4E
22 - 26.5	Power Amplifier 1/2 Watt	20	32	26	26.5	+5V @ 400mA	LP4	EAR99	HMC863LP4E
24 - 31.5	Power Amplifier 1/2 Watt	22	43	-	34	+5.5V @ 1200mA	LP5	3A001.b.2.c	HMC943LP5E
27.3 - 33.5	Power Amplifier 2 Watt	23	43	-	33	+6V @ 1200mA	Chip	3A001.b.2.d	HMC906
DC - 22	Wideband Power Amplifier	13.5	39	4	28	+10V @ 400mA	LP5	3A001.b.2.c	HMC797LP5E
DC - 40	Wideband Power Amplifier	13	33.5	5	22	+10V @ 175mA	Chip	3A001.b.2.f	HMC930
0.2 - 22	Wideband Power Amplifier	12	36	3.5	26	+10V @ 350mA	LP5	3A001.b.2.c	HMC907LP5E

AMPLIFIER - Limiting (LIA)

Small Signal Bandwidth (GHz)	Function	Differential Gain (dB)	Deterministic Jitter (ps)	Additive Random Jitter (ps rms)	Supply Current	Data Rate (Gbps)	Package	ECCN Code	Part Number
9.5	Limiting Amplifier w/LOS	32	-	0.3	+3.3V @ 47mA	12.5	LP4	EAR99	HMC914LP4E

ATTENUATORS - Analog & Digital

Frequency (GHz)	Function	Insertion Loss (dB)	Attenuation Range (dB)	IIP3 (dBm)	Control Input (Vdc)	Package	ECCN Code	Part Number
0.5 - 6.0	Analog VVA	2.5	0 to 25	35	0 to +5V	LP3	EAR99	HMC973LP3E
0.1 - 30	5-Bit Digital	2.5	0.5 to 15.5	40	0 / +5V	Chip	EAR99	HMC941
0.1 - 40	5-Bit Digital	3.5	1 to 31	40	0 / +5V	Chip	EAR99	HMC939

BROADBAND TIME DELAY - Analog & Digital - New Product Line!

Data / Clock Rate (Gbps / GHz)	Function	Rise / Fall (ps)	Deterministic Jitter (ps)	Differential Output Voltage Swing (Vp-p)	DC Power Consumption (mW)	Vee Power Supply (Vdc)	Package	ECCN Code	Part Number
32 / 24	Analog Time Delay	14 / 14	6	0.15 - 0.6	1568	+3.3	LC4B	3A001.a.11.b	HMC910LC4B
28 / 28	Digital Time Delay	20 / 18	< 2	0.5 - 1.35	610	-3.3	LC5	3A001.a.11.b	HMC856LC5

DC POWER MANAGEMENT - New Product Line!

Supply Voltage Range (V)	Function	VDRAIN Voltage Range (V)	IDRAIN Bias Current (mA)	IGATE Drive Current (mA)	VGATE Voltage Range (V)	Over / Under IDRAIN Current Alarm	Low VDD Alarm	Package	ECCN Code	Part Number
5 to 16.5	Active Bias Controller	3 to 15	0 to 500	-4 to 4	-2.5 to 2.5	Yes	Yes	LP5	EAR99	HMC920LP5E

COMPARATORS - Latched Comparators

Analog Input B/W (GHz) / Clock Rate (Gbps)	Function	Deterministic Jitter (ps)	Propagation Delay (ps)	Output Voltage Swing (Vdc)	DC Power (mW)	Vcc / V _{term} Power Supply (Vdc)	Package	ECCN Code	Part Number
10 / [2]	Latched Comparator-RSPECL	2	85	0.4	140	+3.3 / 3.0	LP3	3A001.a.11.b	HMC674LP3E
10 / [2]	Latched Comparator-RSCML	2	100	0.4	100	0 / 0	LP3	3A001.a.11.b	HMC675LP3E
10 / [2]	Latched Comparator-RSECL	2	100	0.35	120	0 / -2.0	LP3	3A001.a.11.b	HMC676LP3E

[1] Vee = -3.0V & Vcci = +3.3V [2] Note that HMC674/675/676LP3E is a family of Level Latched Comparators

FILTERS - Tunable (Band Pass)

Frequency Range (GHz)	Function	Return Loss (dB)	3 dB Bandwidth (%)	Low Side Rejection Frequency (Rej. >20 dB)	High Side Rejection Frequency (Rej. >20 dB)	Tuning Response (ns)	Package	ECCN Code	Part Number
4 - 7.7	Band Pass	15	9	0.9 x Fcenter	1.13 x Fcenter	200	LP5	EAR99	HMC892LP5E

FREQUENCY DIVIDERS

Input Frequency (GHz)	Function	Input Power (dBm)	Output Power (dBm)	100 kHz SSB Phase Noise (dBc/Hz)	Bias Supply	Package	ECCN Code	Part Number
0.1 - 15	Programmable Divider (N = 1, 2, 4, 8)	-5 to 10	2	-153	+5V @ 105mA	LP3	3A001.a.11.b	HMC862LP3E

FREQUENCY MULTIPLIERS

Input Frequency (GHz)	Function	Output Frequency (GHz)	Input Power (dBm)	Output Power (dBm)	100 kHz SSB Phase Noise (dBc/Hz)	Package	ECCN Code	Part Number
12.5 - 15.5	x2 Active	25 - 31	3	21	-	LP4	EAR99	HMC942LP4E
2.66 - 5.33	x3 Active	8 - 16	5	2	-152	LP3	EAR99	HMC916LP3E
1.5 - 2.5	x4 Active	6 - 10	5	2	-148	LP3	EAR99	HMC917LP3E

SEPTEMBER 2010 - 68 NEW PRODUCTS

HIGH SPEED DIGITAL LOGIC

Data / Clock Rate (Gbps / GHz)	Function	Rise / Fall (ps)	Deterministic Jitter (ps)	Differential Output Voltage Swing (Vp-p)	DC Power Consumption (mW)	Vee Power Supply (Vdc)	Package	ECCN Code	Part Number
28 / 20	1:2 Fanout Buffer *	16 / 15	2	0.6 - 1.1	315	-3.3	LC3C	3A001.a.11.b	HMC850LC3C
45 / 28	1:2 Fanout Buffer *	11 / 11	3	0.4 - 1.2	465	-3.3	LC4B	3A001.a.11.b	HMC842LC4B
13 / 13	1:4 Fanout Buffer *	26 / 25	4	0.6 - 1.4	440	-3.3	LC4B	3A001.a.11.b	HMC940LC4B
13 / 13	2:1 Differential Selector	19 / 20	2	0.5 - 1.3	221	-3.3	LC4B	3A001.a.11.b	HMC858LC4B
13 / 13	4:1 Selector	17 / 17	2	0.5 - 1.3	297	-3.3	LC5	3A001.a.11.b	HMC958LC5
28 / 28	AND / NAND / OR / NOR	15 / 14	2	0.5 - 1.3	241	-3.3	LC3C	3A001.a.11.b	HMC852LC3C
45 / 25	AND / NAND / OR / NOR*	10 / 10	3	0.2 - 0.9	530	-3.3	LC4B	3A001.a.11.b	HMC843LC4B
- / 26	Clock Divide-by-4	19 / 19	-	1.8 - 1.9	287	-3.3	LC3	3A001.a.11.b	HMC959LC3
- / 26	Clock Divide-by-8	19 / 17	-	1.8 - 1.9	310	-3.3	LC3	3A001.a.11.b	HMC859LC3
13 / 13	Dual D-Type Flip-Flop w/ Common Clock	22 / 19	3.5	0.5 - 1.2	439	-3.3	LC4B	3A001.a.11.b	HMC953LC4B
43 / 43	D-Type Flip-Flop *	12 / 12	2	0.2 - 0.85	630	-3.3	LC4B	3A001.a.11.b	HMC841LC4B
28 / 28	XOR / XNOR *	15 / 14	2	0.5 to 3.0	241	-3.3	LC3C	3A001.a.11.b	HMC851LC3C
45 / 25	XOR / XNOR *	11 / 10	3	0.2 - 8.5	512	-3.3	LC4B	3A001.a.11.b	HMC844LC4B

* With Programmable Output Voltage

INTERFACE - RF Switch

Bit Rate (Mbps)	Function	Input	Output Voltage (V)	Output Current (mA)	Bias Supply	Package	ECCN Code	Part Number
10	6-Bit Switch Driver / Controller	TTL / CMOS	-5 / +2.2	1	+5V @ 1.5mA	G32	EAR99	HMC677G32

MIXERS - I/Q Downconverters / Receivers

RF / LO Frequency (GHz)	Function	IF Frequency (GHz)	Conversion Gain (dB)	Noise Figure (dB)	Image Rejection (dB)	IIP3 (dBm)	Package	ECCN Code	Part Number
5 - 9	I/Q Downconverter / Receiver	DC - 3	12	2.2	20	2	LP4	EAR99	HMC951LP4E

MIXERS - I/Q Upconverters / Transmitters

RF / LO Frequency (GHz)	Function	IF Frequency (GHz)	Conversion Gain (dB)	Sideband Rejection (dBc)	Output IP3 (dBm)	Package	ECCN Code	Part Number
5.5 - 8.6	I/Q Upconverter with VGA	DC - 3	16.5	-30	29	LC5	EAR99	HMC925LC5
10 - 16	I/Q Upconverter with VGA	DC - 3	17	-30	14	LC5	EAR99	HMC924LC5

MUX & DEMUX - New Product Line!

Data / Clock Rate (Gbps / GHz)	Function	Rise / Fall (ps)	Deterministic Jitter (ps)	Differential Output Voltage Swing (Vp-p)	DC Power Consumption (mW)	Vee Power Supply (Vdc)	Package	ECCN Code	Part Number
28 / 14	4:1 Mux with Adj. Vout	16 / 16	4	0.7 - 1.25	510	-3.3	LC5	3A001.a.11.b	HMC854LC5
45 / 22.5	4:1 Mux *	11 / 12	3	0.25 - 0.9	1782	+3.3	LC5	3A001.a.11.b	HMC847LC5
28 / 14	1:4 Demux with Adj. Vout	22 / 22	-	0.45 - 1.14	644	-3.3	LC5	3A001.a.11.b	HMC855LC5
45 / 22.5	1:4 Demux with Adj. Vout	25 / 21	4	0.3 - 1.0	1782	+3.3	LC5	3A001.a.11.b	HMC848LC5

* With Programmable Output Voltage & Duty Cycle Control

PASSIVES - Fixed Attenuators

Frequency (GHz)	Function	Attenuation Accuracy (dB)	Nominal Attenuation (dB)	Maximum Input Power (dBm)	Chip Size	Package	ECCN Code	Part Number
DC - 25	Passive	± 0.5	2	27	-	LP2	EAR99	HMC652LP2E
DC - 25	Passive	± 0.5	3	26	-	LP2	EAR99	HMC653LP2E
DC - 25	Passive	± 0.5	4	25	-	LP2	EAR99	HMC654LP2E
DC - 25	Passive	± 0.5	6	26	-	LP2	EAR99	HMC655LP2E

PHASE SHIFTERS - Analog

Frequency (GHz)	Function	Insertion Loss (dB)	Phase Range (deg)	2nd harmonic Pin = 10 dBm (dBc)	Control Voltage Range (Vdc)	Package	ECCN Code	Part Number
2 - 4	Analog	3.5	480° @ 2 GHz 450° @ 4 GHz	-20	0V to +13V	LP5	EAR99	HMC928LP5E
4 - 8	Analog	4	450° @ 4 GHz 430° @ 8 GHz	-25	0V to +13V	LP4	EAR99	HMC929LP4E

PHASE SHIFTERS - Digital

Frequency (GHz)	Function	Insertion Loss (dB)	Phase Range (deg)	IIP3 (dBm)	Control Input (Vdc)	Package	ECCN Code	Part Number
1.2 - 1.4	6-Bit Digital	4	5.625 to 360	45	0 / +5V	LP6	EAR99	HMC936LP6E

POWER DETECTORS

Frequency (GHz)	Function	Dynamic Range (dB)	RSSI Slope (mV / dB)	RF Threshold Level (dBm)	Bias Supply	Package	ECCN Code	Part Number
1 - 23	mmW Power Detector	54 ±3	14.2	-52	+3.3V @ 91mA	LP3	EAR99	HMC948LP3E
DC - 3.9	RMS Detector	60 ±1	37	-69	+5V @ 50mA	LP4	EAR99	HMC1010LP4E
DC - 5.8	RMS Detector	40 ±1	37	-69	+5V @ 42mA	LP4	EAR99	HMC909LP4E

SDLVAs - New Product Line!

Frequency (GHz)	Function	Dynamic Range (dB)	RSSI Slope (mV / dB)	RF Threshold Level (dBm)	Bias Supply	Package	ECCN Code	Part Number
1 - 26	SLDVA	59	11	-52	+3.3V @ 135mA	Chip	EAR99	HMC813

SIGNAL GENERATORS - Precise RF Signal Generation for ATE & Lab Environments

Frequency (GHz)	Function	Frequency Resolution (Hz)	Maximum Power Output (dBm)	100 kHz SSB Phase Noise (dBc/Hz)	Spurious @ 10 GHz (dBc)	Switching Speed @ 100 MHz Steps (µs)	Package	ECCN Code	Part Number
0.01 - 40	Signal Generator	1	+29 @ 1 GHz	-92 @ 10 GHz	-65	500	Rack Mountable / Benchtop	EAR99	HMC-T2240

SWITCHES

Frequency (GHz)	Function	Insertion Loss (dB)	Isolation (dB)	Input P1dB (dBm)	Control Input (Vdc)	Package	ECCN Code	Part Number
DC - 20	SP4T	2.3	45	22	0/ -5V	LP4	EAR99	HMC641LP4E
24 - 30	SP4T	4	33	25	0/ -3V	LC4	EAR99	HMC944LC4
DC - 4	SPDT, Differential	0.8	45	35	0/ +3V to 0/ +5V	LP4	EAR99	HMC922LP4E

SYNTHESIZER MODULE - MicroSynth®

Frequency (GHz)	Function	Frequency Resolution (Hz)	Reference Frequency (MHz)	SSB Phase Noise @ 100 kHz Offset (dBc/Hz)	Output Power (dBm)	Bias Supply	Package	ECCN Code	Part Number
2 - 6	MicroSynth® Synthesizer	0.6	10	-93	17	+20V @ 7mA, +6V @ 330mA	C-20 / SMA	EAR99	HMC-C083

VARIABLE GAIN AMPLIFIERS

Frequency (GHz)	Function	Gain Control Range (dB)	NF * (dB)	OIP3 * (dBm)	P1dB (dBm)	Bias Supply	Package	ECCN Code	Part Number
0.5 - 6.0	Analog	-35 to +15	5	37	21	+5V @ 90mA	LP5	EAR99	HMC972LP5E
0.7 - 2.7	6-Bit Digital	+6.5 to +38	4.4	45	25	+5V @ 218mA	LP5	EAR99	HMC926LP5E

* Maximum Gain State

VCOs

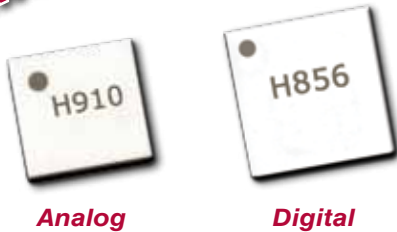
Fo Frequency (GHz)	Function	Fo Output Power (dBm)	10 kHz SSB Phase Noise (dBc/Hz)	100 kHz SSB Phase Noise (dBc/Hz)	Bias Supply	Package	ECCN Code	Part Number
6 - 12	Wideband VCO	1	-65	-95	+5V @ 57mA	LC4B	EAR99	HMC732LC4B
10 - 20	Wideband VCO	3	-60	-90	+5V @ 70mA	LC4B	EAR99	HMC733LC4B

NEW & EXPANDED PRODUCT LINES

Broadband Time Delays & Mux / Demux

Broadband Analog & Digital Time Delays - Data/Clock Rate Up to 32 Gbps/24 GHz!

NEW!



Analog

Digital

Features

- ◆ Wide Bandwidth / High Data Rate Operation:
DC - 24 GHz / 28 Gbps
- ◆ Single-Ended or Differential Operation
- ◆ Adjustable Differential Output Voltage Swing
- ◆ Single Supply: +3.3V / -3.3V
- ◆ Small SMT Packages: 16 mm² / 25 mm²

BROADBAND TIME DELAYS - New Product Line!

Data / Clock Rate (Gbps / GHz)	Function	Rise / Fall (ps)	Deterministic Jitter (ps)	Differential Output Voltage Swing (Vp-p)	DC Power Consumption (mW)	Vee Power Supply (Vdc)	Package	ECCN Code	Part Number
28 / 28	Digital Time Delay	20 / 18	< 2	0.5 - 1.35	610	-3.3	LC5	3A001.a.11.b	HMC856LC5
32 / 24	Analog Time Delay	14 / 14	6	0.1 - 0.8	1450	+3.3	LC4B	3A001.a.11.b	HMC910LC4B

Ideal for Clock & Data Synchronization, Transponder Designs, Serial Data Transmission Up to 32 Gbps, Broadband Test & Measurement & RF ATE Applications!

New Multiplexers & Demultiplexers for 28 Gbps & 45 Gbps Data Serialization!

NEW!



Features

- ◆ Differential & Single-Ended Operation
- ◆ 1/2 Rate Clock Input & 1/4 Rate Ref. Clock Output
- ◆ Fast Rise and Fall Times: <22 ps
- ◆ Low Power Consumption: <644 mW
- ◆ Programmable Differential Output Voltage Swing
- ◆ Single Supply: -3.3V

Mux & Demux - New Product Line!

Data / Clock Rate (Gbps/GHz)	Function	Rise / Fall (ps)	Deterministic Jitter (ps)	Differential Output Voltage Swing (Vp-p)	DC Power Consumption (mW)	Vee Power Supply (Vdc)	Package	ECCN Code	Part Number
28 / 14	4:1 Mux with Adj. Vout	16 / 16	4	0.45 - 1.0	510	-3.3	LC5	3A001.a.11.b	HMC854LC5
45 / 22.5	4:1 Mux *	11 / 12	3	0.25 - 0.39	1782	+3.3	LC5	3A001.a.11.b	HMC847LC5
28 / 14	1:4 Demux with Adj. Vout	22 / 22	-	0.45 - 1.14	644	-3.3	LC5	3A001.a.11.b	HMC855LC5
45 / 22.5	1:4 Demux with Adj. Vout	25 / 21	4	0.3 - 1.0	1782	+3.3	LC5	3A001.a.11.b	HMC848LC5

* With Programmable Voltage Output & Duty Cycle Control

Ideal for SONET OC-192, Broadband Test & Measurement, Serial Data Transmission & FPGA Interfacing Applications!

Active Bias Controller for Class-A Amplifiers



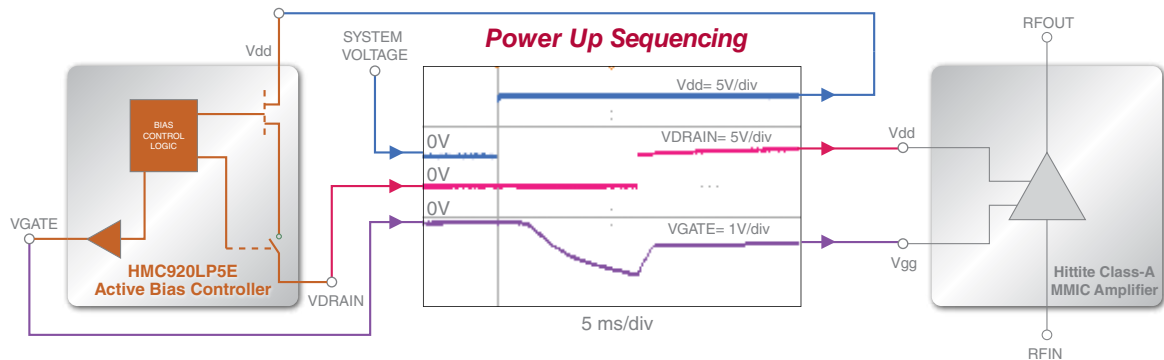
HMC920LP5E
32 Lead 5 x 5 mm SMT Package

Features

- ◆ **Integrated Negative Voltage Generator**
- ◆ **Automated Power-up Sequencing**
- ◆ **Active & Adjustable Output Voltages & Currents:**
Drain Voltage: +3.0 to +15 Vdc
Gate Voltage: -2.5 to +2.5 Vdc
- ◆ **Stable Bias Current Over Temperature, Process Variation & Aging**

DC POWER MANAGEMENT - New Product Line!

Supply Voltage Range (V)	Function	VDRAIN Voltage Range (V)	IDRAIN Bias Current (mA)	IGATE Drive Current (mA)	VGATE Voltage Range (V)	Over / Under IDRAIN Current Alarm	Low VDD Alarm	Package	ECCN Code	Part Number
5 to 16.5	Active Bias Controller	3 to 15	0 to 500	-4 to 4	-2.5 to 2.5	Yes	Yes	LP5	EAR99	HMC920LP5E



Ideal for Power Management & Control in All RF, Microwave, Millimeterwave & Fiber Optic Applications

AMPLIFIERS THAT BENEFIT FROM HMC920LP5E ACTIVE BIAS CONTROLLER

Low Noise Amplifiers	Driver Amplifiers	Linear & Power Amplifiers	Wideband Driver Amplifiers	Wideband Power Amplifiers	Optical Modulator Driver Amplifiers
HMC490LP5E	HMC633LC4	HMC442LM1	HMC460LC5	HMC464LP5E	HMC870LC5
HMC504LC4B	HMC634LC4	HMC442LC3B	HMC462LP5E	HMC619LP5E	HMC871LC5
HMC594LC3B	HMC635LC4	HMC498LC4	HMC463LP5E	HMC637LP5E	
HMC609LC4		HMC499LC4	HMC465LP5E	HMC659LC5	
HMC753LP4E		HMC608LC4	HMC633LC4	HMC797LP5E	
HMC752LC4			HMC634LC4		
HMC772LC4					
HMC902LP3E					

NEW & EXPANDED PRODUCT LINES

Wideband Power Amplifiers and I/Q Upconverters

Wideband Power Amplifiers to 40 GHz!



Features

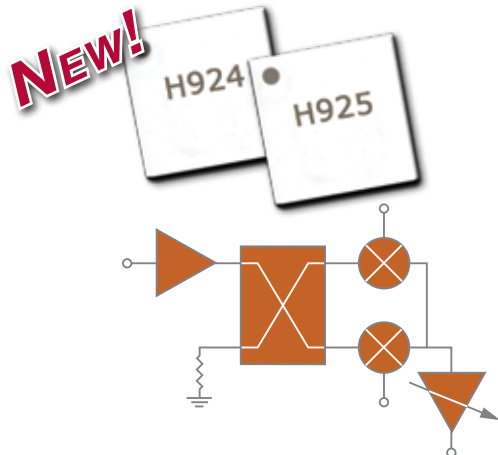
- ◆ Continuous Adjustable Delay Range: 70 ps
- ◆ Differential or Single-Ended Operation
- ◆ Adjustable Differential Output Voltage Swing: 170 - 760 mVp-p @ 24 GHz
- ◆ Delay Control Modulation Bandwidth: 10 MHz
- ◆ Single Supply: +3.3V

AMPLIFIERS - Wideband Power Amplifiers

Frequency (GHz)	Function	Gain (dB)	OIP3 (dBm)	NF (dB)	P1dB (dBm)	Bias Supply	Package	ECCN Code	Part Number
DC - 22	Wideband Power Amp	13.5	39	4	28	+10V @ 400mA	LP5	3A001.b.2.c	HMC797LP5E
DC - 40	Wideband Power Amp	13	33.5	5	22	+10V @ 175mA	Chip	3A001.b.2.f	HMC930
0.2 - 22	Wideband Power Amp	12	36	3.5	26	+10V @ 350mA	LP5	3A001.b.2.c	HMC907LP5E

Ideal for Clock & Data Synchronization, Transponder Designs, Serial Data Transmission Up to 32 Gbps, Broadband Test & Measurement & RF ATE Applications!

I/Q Upconverter with VGA SMTs Covering 5.5 to 16 GHz!



Features

- ◆ Up to 16.5 dB Conversion Gain
- ◆ Excellent Sideband Rejection to -30 dBc
- ◆ Excellent LO/RF Rejection to 22 dBc
- ◆ High Output IP3 to +29 dBm
- ◆ 32 Lead 5x5mm SMT Package: 25mm²

MIXERS - I/Q Upconverters with VGAs

RF / LO Frequency (GHz)	Function	IF Frequency (GHz)	Conversion Gain (dB)	Sideband Rejection (dBc)	Output IP3 (dBm)	Package	ECCN Code	Part Number
5.5 - 8.6	I/Q Upconverter with VGA	DC - 3	16.5	-30	29	LC5	EAR99	HMC925LC5
10 - 16	I/Q Upconverter with VGA	DC - 3	17	-30	14	LC5	EAR99	HMC924LC5

Ideal for Microwave Radio, Broadband Test & Measurement, Military & Satellite Communications!

AMPLIFIERS

Frequency (GHz)	Function	Gain (dB)	OIP3 (dBm)	NF (dB)	P1dB (dBm)	Bias Supply	Package	ECCN Code	Part Number
Low Noise Amplifiers									
0.175 - 0.66	Low Noise	24	37	0.5	19	+5V @ 90mA	LP3	EAR99	HMC616LP3E
0.2 - 4.0	Low Noise, High IP3	13	38	2.3	22	+5V @ 110mA	ST89	EAR99	HMC639ST89E
0.2 - 4.0	Low Noise, High IP3	13	40	2.2	22	+5V @ 155mA	ST89	EAR99	HMC636ST89E
0.23 - 0.66	Low Noise, Dual Channel	22	37	0.5	19	+5V @ 97mA	LP4	EAR99	HMC816LP4E
0.3 - 3.0	Low Noise, High IP3	15	37	1.5	22	+5V @ 90mA	SOT26	EAR99	HMC374E
0.55 - 1.2	Low Noise	16	37	0.5	21	+5V @ 88mA	LP5	EAR99	HMC617LP3E
0.55 - 1.2	Low Noise, Dual Channel	16	37	0.5	20.5	+5V @ 95mA	LP4	EAR99	HMC817LP4E
0.6 - 1.4	Low Noise	32	40	0.9	21.5	+5V @ 254mA	LP4	EAR99	HMC718LP4E
0.7 - 1.2	Low Noise w/ Failsafe Bypass	16	33	0.9	13	+5V @ 57mA	LP3	EAR99	HMC668LP3E
0.7 - 2.2	Low Noise	22	36	1.7	24	+5V @ 227mA	LP3	EAR99	HMC758LP3E
1 - 11	Low Noise	17	30	1.5	18	+5V @ 55mA	LP4	EAR99	HMC753LP4E
1 - 12	Low Noise	17	28	1.5	19	+5V @ 55mA	Chip	EAR99	HMC-ALH444
1.2 - 3.0	Low Noise	26	21	1.3	11.5	+5V @ 21mA	LP3	EAR99	HMC548LP3E
1.3 - 2.9	Low Noise	34	39	1	21.5	+5V @ 272mA	LP4	EAR99	HMC719LP4E
1.7 - 2.2	Low Noise	19	36	0.75	20	+5V @ 117mA	LP3	EAR99	HMC618LP3E
1.7 - 2.2	Low Noise w/ Failsafe Bypass	17	29	1.4	12	+5V @ 86mA	LP3	EAR99	HMC669LP3E
1.7 - 2.2	Low Noise, Dual Channel	20.5	35	0.85	21	+5V @ 112mA	LP4	EAR99	HMC818LP4E
2 - 4	Low Noise	10	36	2.6	21	+6V @ 100mA	Chip	EAR99	HMC594
2 - 4	Low Noise	10	36	3	21	+6V @ 100mA	LC3B	EAR99	HMC594LC3B
2 - 4	Low Noise	20.5	36	3	21	+6V @ 170mA	Chip	EAR99	HMC609
2 - 4	Low Noise	20	36.5	3.5	21.5	+6V @ 170mA	LC4	EAR99	HMC609LC4
2.1 - 2.9	Low Noise	19	33	0.9	19	+5V @ 95mA	LP3	EAR99	HMC715LP3E
2.2 - 12	Low Noise	15	25	1.8	13	+4V @ 45mA	LC4	EAR99	HMC772LC4
2.3 - 2.5	Low Noise	19	12	1.7	6	+3V @ 8.5mA	SOT26	EAR99	HMC286E
2.3 - 2.7	Low Noise	19	29.5	0.75	16.5	+5V @ 59mA	LP2	EAR99	HMC667LP2E
2.3 - 2.7	Low Noise w/ Bypass	20	31	1.1	17	+5V @ 74mA	LP3	EAR99	HMC605LP3E
2.4 - 2.5	Transceiver, Front End	13	10	3	5	+3V @ 24mA	MS8G	EAR99	HMC310MS8GE
3.1 - 3.9	Low Noise	18	33	1	19	+5V @ 65mA	LP3	EAR99	HMC716LP3E
3.3 - 3.8	Low Noise w/ Bypass	19	29	1.2	16	+5V @ 40mA	LP3	EAR99	HMC593LP3E
3.4 - 3.8	Low Noise w/ Bypass	16	18	2	7	+3V @ 9mA	LP3	EAR99	HMC491LP3E
3.5 - 7.0	Low Noise	15.5	28	2.4	16	+5V @ 50mA	Chip	EAR99	HMC392
3.5 - 7.0	Low Noise	16	30	2.5	16	+5V @ 55mA	LC4	EAR99	HMC392LC4
3.5 - 7.0	Low Noise	15	28	3	16	+5V @ 65mA	LH5	EAR99	HMC392LH5
4.8 - 6.0	Low Noise w/ Bypass	15	26	1.5	14	+5V @ 42mA	LP3	EAR99	HMC604LP3E
4.8 - 6.0	Low Noise	16.5	31.5	1.1	18.5	+5V @ 73mA	LP3	EAR99	HMC717LP3E
5 - 6	Low Noise	9	13	2.5	2	+3V @ 6mA	MS8G	EAR99	HMC318MS8GE
5 - 6	Low Noise	12	10	2.5	9	+3V @ 25mA	MS8G	EAR99	HMC320MS8GE
5 - 10	Low Noise	20	28	1.7	16	+3.5V @ 80mA	Chip	EAR99	HMC902
5 - 10	Low Noise	19	28	1.8	16	+3.5V @ 80mA	LP3	EAR99	HMC902LP3E
5 - 20	Low Noise	13	26	2.2	16	+5V @ 30mA	Chip	EAR99	HMC-ALH435
5.6 - 17	Low Noise	19	26	1.6	15	+3.5V @ 80mA	Chip	EAR99	HMC903
5.6 - 17	Low Noise	18	25	1.7	14	+3.5V @ 80mA	LP3	EAR99	HMC903LP3E
6 - 20	Low Noise	22	20	2.3	10	+3V @ 53mA	Chip	EAR99	HMC565
6 - 20	Low Noise	21	20	2.5	10	+3V @ 53mA	LC5	EAR99	HMC565LC5
7 - 13.5	Low Noise	17	24	1.8	12	+3V @ 51mA	Chip	EAR99	HMC564
7 - 14	Low Noise	17	25	1.8	13	+3V @ 51mA	LC4	EAR99	HMC564LC4
7 - 17	Low Noise	21	20	1.8	15	+3V @ 65mA	Chip	EAR99	HMC516
9 - 18	Low Noise	20	25	2	14	+3V @ 65mA	LC5	EAR99	HMC516LC5
12 - 16	Medium Power LNA	23	34	2.5	25	+5V @ 200mA	LP5	EAR99	HMC490LP5E
12 - 17	Medium Power LNA	27	35	2	26	+5V @ 200mA	Chip	EAR99	HMC490
13 - 25	Low Noise	21	13	3.5	5	+3V @ 41mA	Chip	EAR99	HMC342
13 - 25	Low Noise	22	20	3.5	9	+3V @ 43mA	LC4	EAR99	HMC342LC4
14 - 27	Low Noise	19.5	-	2.2	17	+4V @ 90mA	LC4B	5A991.h	HMC504LC4B
14 - 27	Low Noise	18	-	2.5	14	+4V @ 90mA	Chip	5A991.h	HMC-ALH216
14 - 27	Low Noise	20	-	2	14	+4V @ 90mA	Chip	5A991.h	HMC-ALH476
17 - 26	Low Noise	19	23	2.2	11	+3V @ 65mA	Chip	EAR99	HMC517
17 - 26	Low Noise	19	23	2.5	13	+3V @ 67mA	LC4	EAR99	HMC517LC4
17 - 27	Low Noise	25	25	2.2	13	+4V @ 73mA	LC4	EAR99	HMC751LC4
18 - 32	Low Noise	15	23	2.8	12	+3V @ 65mA	Chip	3A001.b.2.d	HMC519
18 - 31	Low Noise	15	23	3.5	11	+3V @ 75mA	LC4	EAR99	HMC519LC4
18 - 40	Low Noise	10	-	3.9	12	+5V @ 45mA	Chip	3A001.b.2.d	HMC-ALH445
20 - 32	Low Noise	15	23	3	12	+3V @ 65mA	Chip	3A001.b.2.d	HMC518

IC PRODUCTS

SMT & Chip (Die) Products

AMPLIFIERS

Frequency (GHz)	Function	Gain (dB)	OIP3 (dBm)	NF (dB)	P1dB (dBm)	Bias Supply	Package	ECCN Code	Part Number
20 - 36	Low Noise	20	18	2.2	8	+3V @ 58mA	LP4	3A001.b.2.d	HMC263LP4E
21 - 29	Low Noise	13	19	2.5	8	+3V @ 35mA	LC3B	EAR99	HMC341LC3B
22 - 26.5	Low Noise	25	-	3	12	+2.5V @ 52mA	Chip	5A991.h	HMC-ALH311
24 - 28	Low Noise	25	26	2.5	13	+3V @ 70mA	LC4	EAR99	HMC752LC4
24 - 30	Low Noise	13	16	2.5	6	+3V @ 30mA	Chip	EAR99	HMC341
24 - 32	Low Noise	21	-	2	7	+5V @ 68mA	Chip	3A001.b.2.d	HMC-ALH364
24 - 36	Low Noise	23	17	2	8	+3V @ 58mA	Chip	3A001.b.2.d	HMC263
24 - 40	Low Noise	12	-	3.5	13	+4V @ 45mA	Chip	3A001.b.2.d	HMC-ALH244
24 - 40	Low Noise	22	-	2	11	+5V @ 66mA	Chip	3A001.b.2.d	HMC-ALH369
24 - 40	Low Noise	11.5	-	4	15	+4V @ 60mA	Chip	3A001.b.2.d	HMC-ALH140
27 - 33	Low Noise	20	-	3	12	+2.5V @ 52mA	Chip	3A001.b.2.d	HMC-ALH313
29 - 36	Low Noise	20	23.5	2.8	12	+3V @ 80mA	Chip	3A001.b.2.d	HMC566
28 - 36	Low Noise	21	24	2.8	12	+3V @ 82mA	LP4	3A001.b.2.d	HMC566LP4E
35 - 45	Low Noise	16	-	2	6	+4V @ 87mA	Chip	3A001.b.2.d	HMC-ALH376
37 - 42	Low Noise	22	-	3.5	12	+2.5V @ 52mA	Chip	3A001.b.2.d	HMC-ALH310
57 - 65	Low Noise	21	-	4	12	+2.5V @ 64mA	Chip	3A001.b.2.f	HMC-ALH382
71 - 86	Low Noise	13	-	5	7	+2.4V @ 30mA	Chip	3A001.b.2.f	HMC-ALH508
71 - 86	Low Noise	14	-	5	7	+2V @ 50mA	Chip	3A001.b.2.f	HMC-ALH509

Broadband Gain Blocks (Listed by P1dB Output Power)

DC - 6	SiGe Gain Block	15.5	22	3	8	+5V @ 25mA	MP86	EAR99	HMC474MP86E
DC - 6	SiGe Gain Block	15	20	3	8	+3V @ 25mA	SC70	EAR99	HMC474SC70E
DC - 6	SiGe Gain Block	20	25	2.5	12	+5V @ 35mA	MP86	EAR99	HMC476MP86E
DC - 6	SiGe Gain Block	19	24	2.5	12	+5V @ 35mA	SC70	EAR99	HMC476SC70E
DC - 10	HBT Gain Block	15	24	4.5	13	+5V @ 56mA	Chip	EAR99	HMC397
DC - 10	HBT Gain Block	15	25	4	13	+5V @ 50mA	Chip	EAR99	HMC405
DC - 6	HBT Gain Block	17	27	6.5	14	+5V @ 50mA	SOT26	EAR99	HMC313E
DC - 8	HBT Gain Block	12	30	6	14	+5V @ 56mA	Chip	EAR99	HMC396
DC - 4	HBT Gain Block	15	28	4.5	15	+5V @ 54mA	Chip	EAR99	HMC395
DC - 6	HBT Gain Block	14.5	32	4.5	15	+5V @ 56mA	LP3	EAR99	HMC311LP3E
DC - 8	HBT Gain Block	15	30	5	15	+5V @ 54mA	SC70	EAR99	HMC311SC70E
DC - 6	HBT Gain Block	16	31.5	4.5	15.5	+5V @ 54mA	ST89	EAR99	HMC311ST89E
DC - 4	SiGe Gain Block	24	31	2.5	16	+5V @ 62mA	SC70	EAR99	HMC478SC70E
DC - 4	SiGe Gain Block	22	32	2	18	+5V @ 62mA	MP86	EAR99	HMC478MP86E
DC - 4	SiGe Gain Block	22	33	3	18	+5V @ 62mA	ST89	EAR99	HMC478ST89E
DC - 5	SiGe Gain Block	15	34	4	18	+8V @ 72mA	MP86	EAR99	HMC479MP86E
DC - 5	SiGe Gain Block	15	34	4	18	+8V @ 75mA	ST89	EAR99	HMC479ST89E
NEW! DC - 10	pHEMT Gain Block	14	30	7	20	+5V @ 76mA	LP2	EAR99	HMC788LP2E
DC - 5	SiGe Gain Block	20	33	3.5	19	+8V @ 79mA	ST89	EAR99	HMC481ST89E
DC - 5	SiGe Gain Block	19	34	2.9	20	+8V @ 82mA	ST89	EAR99	HMC480ST89E
DC - 5	SiGe Gain Block	20	33	3.5	20	+8V @ 74mA	MP86	EAR99	HMC481MP86E
DC - 4	HBT Gain Block	21	33	4	21	+5V @ 82mA	ST89	EAR99	HMC589ST89E
DC - 1	HBT Gain Block	22	37	2.8	22	+5V @ 88mA	ST89	EAR99	HMC580ST89E
DC - 4.5	HBT Gain Block	21	35	3.5	22	+8V @ 110mA	ST89	EAR99	HMC475ST89E
DC - 5	SiGe Gain Block	19	36	4	22.5	+8V @ 110mA	ST89	EAR99	HMC482ST89E
DC - 5	Dual SiGe Gain Block	15	34	4	18	+8V @ 75mA	MS8G	EAR99	HMC469MS8GE
DC - 5	Dual SiGe Gain Block	20	34	3.2	20	+8V @ 80mA	MS8G	EAR99	HMC471MS8GE

CATV Amplifiers

0.04 - 0.96	Low Noise, Dual Output	5	27	3.5	12	+5V @ 120mA	MS8G	EAR99	HMC549MS8GE
0.05 - 0.96	Low Noise, 75 Ohm	14	39	2.2	19	+5V @ 120mA	ST89	EAR99	HMC599ST89E
DC - 1.0	50 / 75 Ohm Differential Gain Block	16	40	3.5	24	+8V @ 350mA	LP4B	EAR99	HMC771LP4BE
0.04 - 1.0	50 / 75 Ohm Differential Gain Block	16	40	2.5	23.5	+5V @ 270mA	LP4B	EAR99	HMC770LP4BE
0.05 - 3.0	HBT Gain Block	15	40	3.5	18	+5V @ 88mA	ST89	EAR99	HMC740ST89E
0.05 - 3.0	HBT Gain Block	20	42	2.5	18	+5V @ 96mA	ST89	EAR99	HMC741ST89E
DC - 1	HBT Gain Block, 75 Ohm	14	38	5.5	21	+5V @ 160mA	S8G	EAR99	HMC754S8GE

Driver Amplifiers

0.7 - 2.8	HBT Driver Amplifier	18	42	3.8	25	+5V @ 125mA	ST89	EAR99	HMC789ST89E
0.8 - 3.8	Driver Amplifier	18	30	7.5	17	+5V @ 53mA	SOT26	EAR99	HMC308E
3.0 - 4.5	HBT Driver Amplifier	21	36	5	23.5	+5V @ 130mA	MS8G	EAR99	HMC326MS8GE
17.5 - 41	Driver Amplifier	21	27	-	20	+5V @ 295mA	Chip	3A001.b.2.d	HMC-AUH256

Linear & Power Amplifiers

0.4 - 2.5	High IP3 Amp, 1/2 Watt	12.5	42	6	27	+5V @ 150mA	ST89	EAR99	HMC454ST89E
1.6 - 2.2	Medium Power Amplifier	22	40	5.5	27	+3.6V @ 270mA	QS16G	EAR99	HMC413QS16GE
5 - 6	Medium Power Amplifier	18	38	6	26	+5V @ 300mA	MS8G	EAR99	HMC406MS8GE

AMPLIFIERS

Frequency (GHz)	Function	Gain (dB)	OIP3 (dBm)	NF (dB)	P1dB (dBm)	Bias Supply	Package	ECCN Code	Part Number
5 - 7	Medium Power Amplifier	15	40	5.5	25	+5V @ 230mA	MS8G	EAR99	HMC407MS8GE
5 - 18	Medium Power Amplifier	18	28	7	19.5	+5V @ 120mA	LP3	EAR99	HMC451LP3E
5 - 20	Medium Power Amplifier	22	30	6.5	20	+5V @ 127mA	Chip	EAR99	HMC451
5 - 20	Medium Power Amplifier	19	30	7	19	+5V @ 114mA	LC3	EAR99	HMC451LC3
6 - 18	Medium Power Amplifier	15.5	32	4.5	20	+5V @ 95mA	Chip	EAR99	HMC441
6 - 18	Medium Power Amplifier	17	32	4.5	20	+5V @ 95mA	LC3B	EAR99	HMC441LC3B
6.5 - 13.5	Medium Power Amplifier	14	29	4.5	18	+5V @ 95mA	LP3	EAR99	HMC441LP3E
7 - 15.5	Medium Power Amplifier	15	32	4.8	20	+5V @ 95mA	LH5 Hermetic	EAR99	HMC441LH5
7 - 15.5	Medium Power Amplifier	15	30	4.5	19	+5V @ 90mA	LM1	EAR99	HMC441LM1
9.5 - 11.5	Medium Power Amplifier	29.5	33	6	27	+5V @ 310mA	LC4	EAR99	HMC608LC4
12 - 30	Medium Power Amplifier	16	25	7	16	+5V @ 101mA	Chip	EAR99	HMC383
12 - 30	Medium Power Amplifier	15	25	7.5	16.5	+5V @ 100mA	LC4	EAR99	HMC383LC4
16 - 33	Medium Power Amplifier	17	33	-	24	+5V @ 400mA	Chip	5A991.h	HMC-APH596
17 - 24	Medium Power Amplifier	24	34	4	25	+5V @ 250mA	Chip	EAR99	HMC498
17 - 24	Medium Power Amplifier	22	36	4	25	+5V @ 250mA	LC4	EAR99	HMC498LC4
17 - 30	Medium Power Amplifier	20	31	-	22	+4.5V @ 400mA	Chip	EAR99	HMC-APH196
17.5 - 24	Medium Power Amplifier	14	28	6.5	21.5	+5V @ 85mA	LM1	EAR99	HMC442LM1
17.5 - 25.5	Medium Power Amplifier	13	27	8	22	+5V @ 84mA	LC3B	EAR99	HMC442LC3B
17.5 - 25.5	Medium Power Amplifier	15	28	5.5	22	+5V @ 85mA	Chip	EAR99	HMC442
21 - 32	Medium Power Amplifier	16	33	5	24	+5V @ 200mA	Chip	3A001.b.2.b	HMC499
21 - 32	Medium Power Amplifier	17	34	5	23	+5V @ 200mA	LC4	3A001.b.2.b	HMC499LC4
34 - 42	Medium Power Amplifier	18.5	29	6.5	18	+5V @ 120mA	Chip	3A001.b.2.d	HMC-ABH264
37 - 40	Medium Power Amplifier	20	35	-	26	+5V @ 640mA	Chip	3A001.b.2.d	HMC-APH510
37 - 45	Medium Power Amplifier	21	32	-	23	+5V @ 475mA	Chip	3A001.b.2.d	HMC-APH403
50 - 66	Medium Power Amplifier	24	25	-	17	+5V @ 220mA	Chip	3A001.b.2.f	HMC-ABH241
55 - 65	Medium Power Amplifier	13	25	-	16	+5V @ 80mA	Chip	3A001.b.2.f	HMC-ABH209
71 - 76	Medium Power Amplifier	24	-	-	17.5	+4V @ 130mA	Chip	3A001.b.2.f	HMC-AUH318
71 - 76	Medium Power Amplifier	13	-	-	20	+4V @ 240mA	Chip	3A001.b.2.f	HMC-APH633
71 - 86	Medium Power Amplifier	15	-	-	15	+4V @ 130mA	Chip	3A001.b.2.f	HMC-AUH320
81 - 86	Medium Power Amplifier	22	-	-	17.5	+4V @ 160mA	Chip	3A001.b.2.f	HMC-AUH317
81 - 86	Medium Power Amplifier	12	-	-	19	+4V @ 240mA	Chip	3A001.b.2.f	HMC-APH634
0.4 - 2.2	Power Amplifier, 1 Watt	21	49	6.5	30	+5V @ 510mA	ST89	EAR99	HMC452ST89E
0.4 - 2.2	Power Amplifier, 1.6 Watt	20.5	49	6.5	32	+5V @ 725mA	ST89	EAR99	HMC453ST89E
NEW! 0.4 - 2.7	Power Amplifier, 2 Watt	16	48	8.5	33	+5V @ 700mA	LP4	EAR99	HMC921LP4E
0.45 - 2.2	Power Amplifier, 1 Watt	22.5	48	7	30	+5V @ 485mA	QS16G	EAR99	HMC452QS16GE
0.45 - 2.2	Power Amplifier, 1.6 Watt	21.5	51	6.5	33	+5V @ 725mA	QS16G	EAR99	HMC453QS16GE
1.7 - 2.2	Power Amplifier, 1 Watt	27	46	5	30.5	+5V @ 500mA	QS16G	EAR99	HMC457QS16GE
2.3 - 2.8	Power Amplifier, 2 Watt	31	45	5	32.5	+5V @ 430mA	LP4	EAR99	HMC755LP4E
3 - 4	Power Amplifier, 1/2 Watt	21	40	5	27	+5V @ 250mA	MS8G	EAR99	HMC327MS8GE
3.3 - 3.8	Power Amplifier, 1 Watt	31	45.5	5.8	30.5	+5V @ 615mA	LP4	EAR99	HMC409LP4E
5.1 - 5.9	Power Amplifier, 1 Watt	20	43	6	30	+5V @ 750mA	LP3	EAR99	HMC408LP3E
6 - 9.5	Power Amplifier, 1 Watt	21	40	-	30.5	+7V @ 820mA	LP5	3A001.b.2.d	HMC590LP5E
6 - 9.5	Power Amplifier, 2 Watt	18	41	-	33	+7V @ 1340mA	LP5	3A001.b.2.d	HMC591LP5E
6 - 10	Power Amplifier, 1 Watt	25	41	-	31.5	+7V @ 820mA	Chip	3A001.b.2.d	HMC590
6 - 10	Power Amplifier, 2 Watt	23	43	-	33.5	+7V @ 1340mA	Chip	3A001.b.2.d	HMC591
7 - 9	Power Amplifier, 2 Watt	26	40	6.5	33.5	+7V @ 1.3A	Chip	3A001.b.2.b	HMC486
7 - 9	Power Amplifier, 2 Watt	22	40	7	32	+7V @ 1.3A	LP5	3A001.b.2.b	HMC486LP5E
9 - 12	Power Amplifier, 2 Watt	20	36	8	32	+7V @ 1.3A	LP5	3A001.b.2.b	HMC487LP5E
10 - 13	Power Amplifier, 1 Watt	19	38	-	31	+7V @ 750mA	Chip	3A001.b.2.b	HMC592
12 - 16	Power Amplifier, 1 Watt	13	34	9	31	+7V @ 1.3A	LP5	3A001.b.2.b	HMC489LP5E
NEW! 12.5 - 15.5	Power Amplifier, 2 Watt	30	42	-	34	+7V @ 1200mA	Chip	3A001.b.2.d	HMC949
NEW! 12.5 - 15.5	Power Amplifier, 4 Watt	28	44	-	36	+7V @ 1200mA	Chip	3A001.b.2.d	HMC950
15 - 27	Power Amplifier, 1 Watt	17	37	-	29	+5V @ 1.44A	Chip	3A001.b.2.c	HMC-APH462
16 - 24	Power Amplifier, 1 Watt	23	41	-	31	+7V @ 790mA	Chip	3A001.b.2.c	HMC756
16 - 24	Power Amplifier, 1/2 Watt	22	37	-	29	+7V @ 395mA	Chip	3A001.b.2.c	HMC757
NEW! 16 - 24	Power Amplifier, 1/2 Watt	20.5	34.5	-	26.5	+5V @ 400mA	LP4	3A001.b.2.c	HMC757LP4E
18 - 20	Power Amplifier, 1 Watt	17.5	38.5	-	30	+5V @ 900mA	Chip	3A001.b.2.c	HMC-APH478
21 - 24	Power Amplifier, 1 Watt	17	39	-	30.5	+5V @ 950mA	Chip	3A001.b.2.c	HMC-APH518
NEW! 22 - 26.5	Power Amplifier, 1/2 Watt	20	32	26	26.5	+5V @ 400mA	LP4	EAR99	HMC863LP4E
22.5 - 26.5	Power Amplifier, 1 Watt	17	40	-	30	+5V @ 950mA	Chip	3A001.b.2.c	HMC-APH608
24 - 29.5	Power Amplifier, 1/2 Watt	22	-	-	26.5	+6V @ 360mA	Chip	EAR99	HMC863
24 - 29.5	Power Amplifier, 1 Watt	27	40	-	29	+6V @ 750mA	Chip	3A001.b.2.c	HMC864
NEW! 24 - 31.5	Power Amplifier, 1/2 Watt	22	43	-	34	+5.5V @ 1200mA	LP5	3A001.b.2.c	HMC943LP5E

IC PRODUCTS

SMT & Chip (Die) Products

AMPLIFIERS

Frequency (GHz)	Function	Gain (dB)	OIP3 (dBm)	NF (dB)	P1dB (dBm)	Bias Supply	Package	ECCN Code	Part Number
27 - 31.5	Power Amplifier, 1 Watt	14	37	-	28	+5V @ 900mA	Chip	3A001.b.2.c	HMC-APH460
27 - 34	Power Amplifier, 1 Watt	17.5	37	-	29	+5V @ 800mA	Chip	3A001.b.2.d	HMC693
NEW! 27.3 - 33.5	Power Amplifier, 2 Watt	23	43	-	33	+6V @ 1200mA	Chip	3A001.b.2.d	HMC906
37 - 40	Power Amplifier, 1 Watt	15	37	-	28	+5V @ 1.08A	Chip	3A001.b.2.d	HMC-APH473
Wideband (Distributed) Amplifiers									
DC - 20	Wideband LNA	14	28	2.5	16	+8V @ 60mA	Chip	EAR99	HMC460
DC - 20	Wideband LNA	14	29.5	2.5	17	+8V @ 75mA	LC5	EAR99	HMC460LC5
2 - 20	Wideband LNA	15.5	26.5	2.5	15	+5V @ 63mA	Chip	EAR99	HMC462
2 - 20	Wideband LNA	13	25	2.5	14	+5V @ 66mA	LP5	EAR99	HMC462LP5E
2 - 20	Wideband LNA w/AGC	14	28	2.5	19	+5V @ 60mA	Chip	EAR99	HMC463
2 - 20	Wideband LNA w/AGC	13	26	3	18	+5V @ 60mA	LP5	EAR99	HMC463LP5E
2 - 20	Wideband LNA w/AGC	14	28	2.5	18	+5V @ 60mA	LH250	EAR99	HMC463LH250
2 - 20	Wideband LNA	10	-	3.5	10	+2V @ 55mA	Chip	EAR99	HMC-ALH102
2 - 22	Wideband LNA	16	-	1.7	14	+4V @ 45mA	Chip	EAR99	HMC-ALH482
2 - 18	Wideband, Low Phase Noise	14	27	4.5	15	+5V @ 64mA	Chip	EAR99	HMC606
2 - 18	Wideband, Low Phase Noise	13.5	27	7	15	+5V @ 64mA	LC5	EAR99	HMC606LC5
DC - 20	Wideband Driver	17	30	2.5	22	+8V @ 160mA	Chip	EAR99	HMC465
DC - 20	Wideband Driver	15	28	3	23	+8V @ 160mA	LP5	EAR99	HMC465LP5E
DC - 35	Wideband Driver	15	-	-	21	+5V @ 200mA	Chip	3A001.b.2.d	HMC-AUH249
DC - 43	Wideband Driver	14	-	5.4	16.5	+5V @ 180mA	Chip	3A001.b.2.d	HMC-AUH232
0.5 - 65	Wideband Driver	10	-	-	-	+8V @ 60mA	Chip	3A001.b.2.d	HMC-AUH312
2 - 35	Wideband Driver	12.5	27	3	18	+8V @ 80mA	Chip	3A001.b.2.d	HMC562
5 - 17	Wideband Driver	31	30	8	23	+5V @ 180mA	Chip	EAR99	HMC633
5.5 - 17	Wideband Driver	30	30	8	23	+5V @ 180mA	LC4	EAR99	HMC633LC4
5 - 20	Wideband Driver	22	31	7.5	23	+5V @ 180mA	Chip	EAR99	HMC634
5 - 20	Wideband Driver	21	29	7.5	22	+5V @ 180mA	LC4	EAR99	HMC634LC4
18 - 40	Wideband Driver	19.5	29	8	23	+5V @ 280mA	Chip	3A001.b.2.e	HMC635
18 - 40	Wideband Driver	18.5	27	7	22	+5V @ 280mA	LC4	3A001.b.2.d	HMC635LC4
DC - 6	Wideband Power Amplifier	14	45	5	29	+12V @ 400mA	Chip	EAR99	HMC637
DC - 6	Wideband Power Amplifier	13	40	5	29	+12V @ 400mA	LP5	EAR99	HMC637LP5E
DC - 10	Wideband Power Amplifier	12	41	6	28.5	+12V @ 300mA	Chip	EAR99	HMC619
DC - 10	Wideband Power Amplifier	12	41	6	28	+12V @ 300mA	LP5	EAR99	HMC619LP5E
DC - 15	Wideband Power Amplifier	19	35	2	26.5	+8V @ 300mA	Chip	EAR99	HMC659
DC - 15	Wideband Power Amplifier	19	35	2.5	27.5	+8V @ 300mA	LC5	EAR99	HMC659LC5
DC - 18	Wideband Power Amplifier	17	32	3	25	+8V @ 290mA	Chip	EAR99	HMC459
DC - 20	Wideband Power Amplifier	14	36	4	28	+10V @ 400mA	Chip	3A001.b.2.c	HMC559
DC - 22	Wideband Power Amplifier	14	40	2.5	28	+11V @ 400mA	Chip	3A001.b.2.c	HMC797
NEW! DC - 22	Wideband Power Amplifier	13.5	39	4	28	+10V @ 400mA	LP5	3A001.b.2.c	HMC797LP5E
NEW! DC - 40	Wideband Power Amplifier	13	33.5	5	22	+10V @ 175mA	Chip	3A001.b.2.f	HMC930
NEW! 0.2 - 22	Wideband Power Amplifier	12	36	3.5	26	+10V @ 350mA	LP5	3A001.b.2.c	HMC907LP5E
0.2 - 25	Wideband Power Amplifier	13	38	3	27	+11V @ 365mA	Chip	3A001.b.2.c	HMC907
2 - 20	Wideband Power Amplifier	16	30	4	26	+8V @ 290mA	Chip	EAR99	HMC464
2 - 20	Wideband Power Amplifier	14	30	4	26	+8V @ 290mA	LP5	EAR99	HMC464LP5E

AMPLIFIERS - Microwave & Optical Drivers

Frequency (GHz)	Function	Gain (dB)	Group Variation Delay (ps)	Additive Jitter (ps)	P1dB (dBm)	Output Voltage Level (Vp-p)	Package	ECCN Code	Part Number
DC - 20	10 Gbps Modulator Driver	18	±15	0.3	22	2.5 - 8	LC5	EAR99	HMC870LC5
DC - 20	12.5 Gbps EML Modulator Driver	15	±16	0.3	16.5	2.5 - 4	LC5	EAR99	HMC871LC5

AMPLIFIERS - Limiting (LIA)

Data Rate (Gbps)	Function	Small Signal Bandwidth (GHz)	Differential Gain (dB)	Deterministic Jitter (ps p-p)	Additive Random Jitter (ps rms)	Supply Current	Package	ECCN Code	Part Number
NEW! 12.5	Limiting Amplifier w/ LOS	9.5	32	-	0.9	+3.3V @ 47mA	LP4	EAR99	HMC914LP4E
12.5	Limiting Amplifier	11	44	5	0.2	+5V @ 106mA	LP4	EAR99	HMC750LP4E
32	Limiting w/ DC Offset	25	30	5	0.3	+3.3V @ 90mA	LC3C	EAR99	HMC865LC3C
32	Limiting w/o DC Offset	25	29	7	0.3	+3.3V @ 85mA	LC3C	EAR99	HMC866LC3C

AMPLIFIERS - Transimpedance (TIA)

Data Rate (Gbps)	Function	Transimpedance (kΩ)	Input Overload (mApp)	Small Signal Bandwidth (GHz)	Deterministic Jitter (ps)	Noise (pA/√Hz)	Package	ECCN Code	Part Number
0.1 - 1.0	10 kΩ Low Noise TIA	10	20	0.7	<100	4.6	LP3	EAR99	HMC799LP3E
1 - 10	10 Gbps Transimpedance	1.25	3	7.5	<10	11	Chip	EAR99	HMC690

SMT & Chip (Die) Products

ATTENUATORS

Frequency (GHz)	Function	Insertion Loss (dB)	Attenuation Range (dB)	IIP3 (dBm)	Control Input (Vdc)	Package	ECCN Code	Part Number
Attenuators - Analog								
0.45 - 2.2	Analog VVA	1.9	0 to 48	20	0 to +3V	MS8	EAR99	HMC473MS8E
NEW! 0.5 - 6.0	Analog VVA	2.5	0 to 25	35	0 to +5V	LP3	EAR99	HMC973LP3E
DC - 8	Analog VVA	1.5	0 to 32	10	0 to -3V	MS8G	EAR99	HMC346MS8GE
DC - 8	Analog VVA	2	0 to 30	10	0 to -3V	C8	EAR99	HMC346C8
DC - 8	Analog VVA	2	0 to 30	10	0 to -3V	G8 Hermetic	EAR99	HMC346G8
DC - 14	Analog VVA	2	0 to 30	10	0 to -3V	LP3	EAR99	HMC346LP3E
DC - 18	Analog VVA	1.5	0 to 30	10	0 to -3V	LC3B	EAR99	HMC346LC3B
DC - 20	Analog VVA	2.2	0 to 25	10	0 to -3V	Chip	EAR99	HMC346
5 - 26.5	Analog VVA	3.5	0 to 28	32	0 to -3V	LP3C	EAR99	HMC712LP3CE
5 - 30	Analog VVA	2.5	0 to 30	32	0 to -3V	Chip	EAR99	HMC712
5 - 30	Analog VVA	2	0 to 28	28	0 to -3V	LC4	EAR99	HMC812LC4
17 - 27	Analog VVA	1.5	0 to 22	17	-4 to +4V	Chip	5A991.h	HMC-VVD102
36 - 50	Analog VVA	1.5	0 to 22	17	0 to +4V	Chip	5A991.h	HMC-VVD106
70 - 86	Analog VVA	2	0 to 14	-	-5 to +5V	Chip	5A991.h	HMC-VVD104
Attenuators - Digital								
DC - 5	1-Bit Digital	1	10	50	TTL/CMOS	LP3	EAR99	HMC541LP3E
DC - 10	1-Bit Digital	2	10	54	0 / +3 to +5V	LP3	EAR99	HMC800LP3E
DC - 10	1-Bit Digital	1.5	15	53	0 / +3 to +5V	LP3	EAR99	HMC801LP3E
DC - 10	1-Bit Digital	2.5	20	53	0 / +3 to +5V	LP3	EAR99	HMC802LP3E
0.7 - 4.0	2-Bit Digital	0.5	2 to 6	52	0 / +3V	SOT26	EAR99	HMC290E
0.7 - 4.0	2-Bit Digital	0.9	4 to 12	54	0 / +3V	SOT26	EAR99	HMC291E
DC - 6	2-Bit Digital	0.5	2 to 6	50	TTL/CMOS	LP3	EAR99	HMC467LP3E
0.75 - 2.0	3-Bit Digital	1.8	4 to 28	45	0 / +3V	MS8	EAR99	HMC230MS8E
0.7 - 3.7	3-Bit Digital	1.3	2 to 14	51	0 / +3V	MS8	EAR99	HMC288MS8E
DC - 6	3-Bit Digital	0.7	1 to 7	50	TTL/CMOS	LP3	EAR99	HMC468LP3E
DC - 5.5	4-Bit Digital	0.8	1 to 15	50	TTL/CMOS	LP3	EAR99	HMC540LP3E
DC - 6	4-Bit Digital, Serial & Parallel Control	2.5	3 to 45	50	0 / +5V	LP4	EAR99	HMC629LP4E
NEW! 0.1 - 30	5-Bit Digital	2.5	0.5 to 15.5	40	0 / +5V	Chip	EAR99	HMC941
NEW! 0.1 - 40	5-Bit Digital	3.5	1 to 31	40	0 / +5V	Chip	EAR99	HMC939
0.7 - 2.7	5-Bit Digital	2.3	1 to 31	54	0 / +3V	QS16	EAR99	HMC274QS16E
0.7 - 3.0	5-Bit Digital	1.3	0.5 to 15.5	48	0 / +3V	MS10	EAR99	HMC603MS10E
0.7 - 3.0	5-Bit Digital	1.3	0.5 to 15.5	48	0 / +3V	QS16	EAR99	HMC603QS16E
0.7 - 3.7	5-Bit Digital, Serial Control	2.1	1 to 31	48	Serial/CMOS	LP4	EAR99	HMC271ALP4E
0.7 - 3.8	5-Bit Digital	2.1	1 to 31	48	0 / +3V	MS10G	EAR99	HMC273MS10GE
0.7 - 3.8	5-Bit Digital, Serial Control	1.5	0.5 to 15.5	52	Serial/CMOS	LP4	EAR99	HMC305ALP4E
0.7 - 3.8	5-Bit Digital	1.5	0.5 to 15.5	52	0 / +3V	MS10	EAR99	HMC306MS10E
DC - 3	5-Bit Digital	2.0	1 to 31	44	0 / -5V	G16 Hermetic	EAR99	HMC335G16
DC - 3	5-Bit Digital	1.3	1 to 31	45	TTL/CMOS	LP3	EAR99	HMC470LP3E
DC - 4	5-Bit Digital	1.9	1 to 31	44	0 / -5V	QS16G	EAR99	HMC307QS16GE
DC - 4	5-Bit Digital	0.7	0.25 to 7.75	50	TTL/CMOS	LP3	EAR99	HMC539LP3E
DC - 3.8	6-Bit Digital	1.5	0.5 to 31.5	45	TTL/CMOS	LP4	EAR99	HMC472LP4E
DC - 3	6-Bit Digital	3.0	0.5 to 31.5	32	0 / -5V	G16 Hermetic	EAR99	HMC424G16
DC - 3	6-Bit Digital, Serial Control	1.2	0.5 to 31.5	45	Serial/CMOS	LP4	EAR99	HMC542LP4E
DC - 3	6-Bit Digital, Serial Control	1.2	0.5 to 31.5	45	Serial/CMOS	LP4	EAR99	HMC542ALP4E
DC - 6	6-Bit Digital, Serial & Parallel Control	1.8	31.5	55	0 / +5V	LP4	EAR99	HMC624LP4E
DC - 6	6-Bit Digital, Serial & Parallel Control	1.8	15.75	55	TTL/CMOS	LP4	EAR99	HMC792LP4E
DC - 13	6-Bit Digital	4.0	0.5 to 31.5	32	0 / -5V	Chip	EAR99	HMC424
DC - 13	6-Bit Digital	3.2	0.5 to 31.5	32	0 / -5V	LH5 Hermetic	EAR99	HMC424LH5
DC - 13	6-Bit Digital	4.0	0.5 to 31.5	32	0 / -5V	LP3	EAR99	HMC424LP3E
2.4 - 8.0	6-Bit Digital	3.5	0.5 to 31.5	40	0 / +5V	Chip	EAR99	HMC425
2.2 - 8.0	6-Bit Digital	3.2	0.5 to 31.5	40	0 / +5V	LP3	EAR99	HMC425LP3E
0.01 - 0.3	7-Bit Digital	3.3	31.75	40	TTL/CMOS	LP3	EAR99	HMC759LP3E

BROADBAND TIME DELAYS - New Product Line!

Data / Clock Rate (Gbps / GHz)	Function	Rise / Fall (ps)	Deterministic Jitter (ps)	Differential Output Voltage Swing (Vp-p)	DC Power Consumption (mW)	Vcc Power Supply (Vdc)	Package	ECCN Code	Part Number
NEW! 32 / 24	Analog Time Delay	14 / 14	6	0.15 - 0.6	1450	+3.3	LC4B	3A001.a.11.b	HMC910LC4B
NEW! 28 / 28	Digital Time Delay	20 / 18	<2	0.5 - 1.35	610	-3.3	LC5	3A001.a.11.b	HMC856LC5

IC PRODUCTS

SMT & Chip (Die) Products

COMPARATORS - High Speed Clocked, Latched and Window Comparators

Analog Input B/W (GHz) / Clock Rate (Gbps)	Function	Deterministic Jitter (ps)	Propagation Delay (ps)	Output Voltage Swing (Vdc)	DC Power (mW)	Vcc / V _{term} Power Supply (Vdc)	Package	ECCN Code	Part Number
Clocked Comparators									
10 / 20	Clocked Comparator-RSPECL	<3	120	0.4	150	+3.3 / +1.3	LC3C	3A001.a.11.b	HMC874LC3C
10 / 20	Clocked Comparator-RSCML	<3	120	0.4	130	0 / 0	LC3C	3A001.a.11.b	HMC875LC3C
10 / 20	Clocked Comparator-RSECL	<3	120	0.4	150	0 / -2.0	LC3C	3A001.a.11.b	HMC876LC3C
Latched Comparators									
10 / [2]	Latched Comparator-RSPECL	2	85	0.4	140	+3.3 / 3.0	LC3C	3A001.a.11.b	HMC674LC3C
NEW! 10 / [2]	Latched Comparator-RSPECL	2	85	0.4	140	+3.3 / 3.0	LP3	3A001.a.11.b	HMC674LP3E
10 / [2]	Latched Comparator-RSCML	2	100	0.4	100	0 / 0	LC3C	3A001.a.11.b	HMC675LC3C
NEW! 10 / [2]	Latched Comparator-RSCML	2	100	0.4	100	0 / 0	LP3	3A001.a.11.b	HMC675LP3E
10 / [2]	Latched Comparator-RSECL	2	100	0.35	120	0 / -2.0	LC3C	3A001.a.11.b	HMC676LC3C
NEW! 10 / [2]	Latched Comparator-RSECL	2	100	0.35	120	0 / -2.0	LP3	3A001.a.11.b	HMC676LP3E
Window Comparators									
10 / -	Window Comparator	2	88	0.4	240	+2 / 0	LC3C	3A001.a.11.b	HMC974LC3C

[1] V_{ee} = -3.0V & V_{cci} = +3.3V

[2] Note that HMC674/675/676LC3C is a family of Level Latched Comparators

DATA CONVERTERS - Track-and-Hold

Input Freq. (GHz)	Function	Single Tone THD/SFDR (dB)	Maximum Clock Rate (GS/s)	Output Noise (mV RMS)	Hold Mode Feed-through Rejection (dB)	Package	ECCN Code	Part Number
DC - 4.5	Track-and-Hold	-66 / 67	3.0	0.95	>60	LC4B	3A001.a.11.b	HMC660LC4B

DC POWER CONDITIONING – High PSRR Quad Linear Voltage Regulators

Input Voltage (V)	Function	Output Voltage (V)	Output Current (mA)	Power Supply Rejection Ratio (PSRR) (dB)		Output Noise Spectral Density (nV/√Hz)		Regulated Outputs	Package	ECCN Code	Part Number
				1 kHz	1 MHz	1 kHz	10 kHz				
3.35 - 5.6	Quad High PSRR	2.5 - 5.2	15 - 100	80	60	7	3	4	LP3	EAR99	HMC860LP3E

DC POWER MANAGEMENT - New Product Line!

Supply Voltage Range (V)	Function	VDRAIN Voltage Range (V)	IDRAIN Bias Current (mA)	IGATE Drive Current (mA)	VGATE Voltage Range (V)	Over / Under IDRAIN Current Alarm	Low VDD Alarm	Package	ECCN Code	Part Number
NEW! 5 to 16.5	Active Bias Controller	3 to 15	0 to 500	-4 to 4	-2.5 to 2.5	Yes	Yes	LP5	EAR99	HMC920LP5E

FILTERS - Tunable (Band Pass & Low Pass)

Band Pass

Frequency Range (GHz)	Function	Return Loss (dB)	3 dB Bandwidth (%)	Low Side Rejection Frequency (Rej. >20 dB)	High Side Rejection Frequency (Rej. >20 dB)	Tuning Response (ns)	Package	ECCN Code	Part Number
1 - 2	Band Pass	10	11	0.8 x Fcenter	1.2 x Fcenter	200	LP5	EAR99	HMC890LP5E
2 - 3.9	Band Pass	10	9	0.9 x Fcenter	1.15 x Fcenter	200	LP5	EAR99	HMC891LP5E
NEW! 4 - 7.7	Band Pass	15	9	0.9 x Fcenter	1.13 x Fcenter	200	LP5	EAR99	HMC892LP5E

Low Pass

Frequency Range (GHz)	Function	Return Loss (dB)	Cutoff Frequency Range (GHz)	Stopband Frequency (Rej. >20 dB)	Tuning Response (ns)	Package	ECCN Code	Part Number
DC - 4.0	Low Pass	10	2.2 - 4.0	1.25 x Fcutoff	150	LP5	EAR99	HMC881LP5E
DC - 7.6	Low Pass	10	4.5 - 7.6	1.23 x Fcutoff	150	LP5	EAR99	HMC882LP5E

FREQUENCY DIVIDERS (PRESCALERS) & DETECTORS

Input Frequency (GHz)	Function	Input Power (dBm)	Output Power (dBm)	100 kHz SSB Phase Noise (dBc/Hz)	Bias Supply	Package	ECCN Code	Part Number
DC - 8	Divide-by-2	-12 to +12	-6	-148	+3V @ 42mA	SOT26	3A001.a.11.b	HMC432E
DC - 10	Divide-by-2	-15 to +10	3	-148	+5V @ 83mA	S8G	3A001.a.11.b	HMC361S8GE
DC - 11	Divide-by-2	-15 to +10	3	-148	+5V @ 105mA	Chip	3A001.a.11.b	HMC361
DC - 12.5	Divide-by-2	-15 to +10	2	-145	+5V @ 105mA	S8G	3A001.a.11.b	HMC364S8GE
DC - 13	Divide-by-2	-15 to +10	1	-145	+5V @ 105mA	Chip	3A001.a.11.b	HMC364
DC - 13	Divide-by-2	-15 to +10	5	-145	+5V @ 110mA	G8 Hermetic	3A001.a.11.b	HMC364G8
DC - 18	Divide-by-2	-15 to +10	-4	-150	+5V @ 77mA	LP3	3A001.a.11.b	HMC492LP3E
DC - 8	Divide-by-3	-12 to +12	-2	-153	+5V @ 69mA	MS8G	3A001.a.11.b	HMC437MS8GE
DC - 4	Divide-by-4	-15 to +10	3.5	-146	+3V @ 13mA	MS8	3A001.a.11.b	HMC426MS8E
DC - 8	Divide-by-4	-12 to +12	-3	-150	+3V @ 53mA	SOT26	3A001.a.11.b	HMC433E
DC - 11	Divide-by-4	-15 to +10	-6	-149	+5V @ 68mA	Chip	3A001.a.11.b	HMC362
DC - 12	Divide-by-4	-15 to +10	-6	-149	+5V @ 68mA	S8G	3A001.a.11.b	HMC362S8GE
DC - 13	Divide-by-4	-15 to +10	2	-151	+5V @ 110mA	Chip	3A001.a.11.b	HMC365
DC - 13	Divide-by-4	-15 to +10	7	-151	+5V @ 120mA	G8 Hermetic	3A001.a.11.b	HMC365G8

FREQUENCY DIVIDERS (PRESCALERS) & DETECTORS

Input Frequency (GHz)	Function	Input Power (dBm)	Output Power (dBm)	100 kHz SSB Phase Noise (dBc/Hz)	Bias Supply	Package	ECCN Code	Part Number
DC - 13	Divide-by-4	-15 to +10	2	-151	+5V @ 110mA	S8G	3A001.a.11.b	HMC365S8GE
DC - 18	Divide-by-4	-15 to +10	-4	-150	+5V @ 96mA	LP3	3A001.a.11.b	HMC493LP3E
10 - 26	Divide-by-4	-15 to +10	-4	-150	+5V @ 96mA	LC3	3A001.a.11.b	HMC447LC3
DC - 7	Divide-by-5	-12 to +12	-1	-153	+5V @ 80mA	MS8G	3A001.a.11.b	HMC438MS8GE
DC - 8	Divide-by-8	-5 to +12	-2	-150	+3V @ 62mA	SOT26	3A001.a.11.b	HMC434E
DC - 12	Divide-by-8	-15 to +10	-9	-153	+5V @ 70mA	Chip	3A001.a.11.b	HMC363
DC - 12	Divide-by-8	-15 to +10	4	-153	+5V @ 90mA	G8 Hermetic	3A001.a.11.b	HMC363G8
DC - 12	Divide-by-8	-15 to +10	-9	-153	+5V @ 70mA	S8G	3A001.a.11.b	HMC363S8GE
DC - 18	Divide-by-8	-15 to +10	-4	-150	+5V @ 105mA	LP3	3A001.a.11.b	HMC494LP4E
0.01 - 6.5	Programmable Divider (N = 1 to 17)	-15 to +10	0	-153	+5V @ 200mA	LP4	3A001.a.11.b	HMC705LP4E
NEW! 0.1 - 15.0	Programmable Divider (N = 1, 2, 4, 8)	-5 to 10	2	-153	+5V @ 105mA	LP3	3A001.a.11.b	HMC862LP3E
0.2 - 2.0	Programmable Divider (N = 1 to 4)	-2 to +10	10	-160	+5V @ 135mA	LP3	3A001.a.11.b	HMC794LP3E
0.4 - 6	Programmable Divider (N = 1 to 6)	0 to +9	5	-156	+3.3V @ 100mA	LP3	3A001.a.11.b	HMC905LP3E
DC - 2.2	5-bit Counter, +2 to 32	-15 to +10	4	-153	+5V @ 194mA	LP4	3A001.a.11.b	HMC394LP4E

Phase / Frequency Detectors

0.01 - 1.3	Phase Frequency Detector	-10 to +10	2 Vpk-pk	-153	+5V @ 96mA	QS16G	3A001.a.11.b	HMC439QS16GE
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FREQUENCY MULTIPLIERS - Active

Input Frequency (GHz)	Function	Output Frequency (GHz)	Input Power (dBm)	Output Power (dBm)	100 kHz SSB Phase Noise (dBc/Hz)	Package	ECCN Code	Part Number
3 - 4	x2 Active	6 - 9	0	17	-140	LP4	EAR99	HMC575LP4E
4.0 - 10.5	x2 Active	8 - 21	5	17	-139	Chip	EAR99	HMC561
4.0 - 10.5	x2 Active	8 - 21	5	14	-139	LP3	EAR99	HMC561LP3E
4 - 11	x2 Active	8 - 22	5	12	-134	LC3B	EAR99	HMC573LC3B
4.5 - 8.0	x2 Active	9 - 16	2	15	-140	LP4	EAR99	HMC368LP4E
4.95 - 6.35	x2 Active	9.9 - 12.7	0	4	-142	LP3	EAR99	HMC369LP3E
6.5 - 12.3	x2 Active	13.0 - 24.6	4	17	-136	Chip	EAR99	HMC814
6.5 - 12.3	x2 Active	13.0 - 24.6	4	17	-136	LC3B	EAR99	HMC814LC3B
9.0 - 14.5	x2 Active	18 - 29	3	17	-132	Chip	EAR99	HMC576
9.0 - 14.5	x2 Active	18 - 29	3	15	-132	LC3B	EAR99	HMC576LC3B
9.5 - 12.5	x2 Active	19 - 25	0	11	-135	Chip	EAR99	HMC448
10.0 - 12.5	x2 Active	20 - 25	0	11	-135	LC3B	EAR99	HMC448LC3B
11 - 23	x2 Active	22 - 46	5	15	-	Chip	EAR99	HMC598
12.0 - 16.5	x2 Active	24 - 33	3	17	-132	Chip	EAR99	HMC578
12.0 - 16.5	x2 Active	24 - 33	3	15	-132	LC3B	EAR99	HMC578LC3B
NEW! 12.5 - 15.5	x2 Active	25 - 31	3	21	-	LP4	EAR99	HMC942LP4E
13.5 - 15.5	x2 Active	27 - 31	0	9	-132	LC3B	EAR99	HMC449LC3B
13.5 - 15.5	x2 Active	27 - 31	5	20	-128	LC4B	EAR99	HMC577LC4B
13.5 - 16.5	x2 Active	27 - 33	0	10	-132	Chip	EAR99	HMC449
16 - 23	x2 Active	32 - 46	3	13	-127	Chip	EAR99	HMC579
NEW! 2.66 - 5.33	x3 Active	8 - 16	5	2	-152	LP3	EAR99	HMC916LP3E
NEW! 1.5 - 2.5	x4 Active	6 - 10	5	2	-148	LP3	EAR99	HMC917LP3E
2.45 - 2.8	x4 Active	9.8 - 11.2	-15	3	-142	LP4	EAR99	HMC443LP4E
2.85 - 3.3	x4 Active	11.4 - 13.2	-15 to +5	7	-140	LP4	EAR99	HMC695LP4E
3.6 - 4.1	x4 Active	14.4 - 16.4	-15	0	-140	LP4	EAR99	HMC370LP4E
14 - 16	x4 Active	56 - 64	2	-6	-	Chip	3A001.b.2.f	HMC-XDH158
1.2375 - 1.4	x8 Active	9.9 - 11.2	-15	6	-136	LP4	EAR99	HMC444LP4E
0.61875 - 0.6875	x16 Active	9.9 - 11	-15	7	-130	LP4	EAR99	HMC445LP4E

FREQUENCY MULTIPLIERS - Passive

Input Frequency (GHz)	Function	Output Frequency (GHz)	Conversion Loss (dB)	1Fo / 4Fo Isolation (dB)	Input Drive (dBm)	Package	ECCN Code	Part Number
0.7 - 2.4	x2 Passive	1.4 - 4.8	15	47 / 38	10 to 20	Chip	EAR99	HMC156
0.7 - 2.4	x2 Passive	1.4 - 4.8	15	47 / 38	10 to 20	C8	EAR99	HMC156C8
0.85 - 2.0	x2 Passive	1.7 - 4.0	15	45 / 40	10 to 20	MS8	EAR99	HMC187AMS8E
1.25 - 3.0	x2 Passive	2.5 - 6.0	15	45 / 45	10 to 20	MS8	EAR99	HMC188MS8E
1.3 - 4.0	x2 Passive	2.6 - 8.0	15	45 / 40	10 to 20	Chip	EAR99	HMC158
1.3 - 4.0	x2 Passive	2.6 - 8.0	15	45 / 40	10 to 20	C8	EAR99	HMC158C8
2 - 4	x2 Passive	4 - 8	13	34 / 40	10 to 15	MS8	EAR99	HMC189AMS8E
4 - 8	x2 Passive	8 - 16	20	45 / 38	10 to 15	Chip	EAR99	HMC204
4 - 8	x2 Passive	8 - 16	17	41 / 40	10 to 15	C8	EAR99	HMC204C8
4 - 8	x2 Passive	8 - 16	17	42 / 50	10 to 15	MS8G	EAR99	HMC204MS8GE
6 - 12	x2 Passive	12 - 24	17	32 / 32	10 to 15	Chip	EAR99	HMC205
10 - 15	x2 Passive	20 - 30	13	30	+13	Chip	5A991.h	HMC-XDB112

IC PRODUCTS

SMT & Chip (Die) Products

FREQUENCY MULTIPLIERS - Passive

Input Frequency (GHz)	Function	Output Frequency (GHz)	Conversion Loss (dB)	1Fo / 4Fo Isolation (dB)	Input Drive (dBm)	Package	ECCN Code	Part Number
12 - 18	x2 Passive	24 - 36	14	50 / 60	11 to 15	Chip	EAR99	HMC331
24 - 30	x3 Passive	72 - 90	19	-	+13	Chip	5A991.h	HMC-XTB110

HIGH SPEED DIGITAL LOGIC

Data / Clock Rate (Gbps / GHz)	Function	Rise / Fall Time (ps)	Deterministic Jitter (ps)	Differential Output Swing (Vp-p)	DC Power (mW)	DC Power Supply (Vdc)	Package	ECCN Code	Part Number
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1:2 Fanout Buffer

13 / 13	1:2 Fanout Buffer*	22 / 20	<1	0.4 - 1.1	240	-3.3	LC3C	3A001.a.11.b	HMC670LC3C
13 / 13	Fast Rise Time 1:2 Fanout Buffer*	19 / 18	2	0.6 - 1.1	300	-3.3	LC3C	3A001.a.11.b	HMC720LC3C
13 / 13	Fast Rise Time 1:2 Fanout Buffer*	19 / 18	2	0.6 - 1.1	300	-3.3	LP3	3A001.a.11.b	HMC720LP3E
13 / 13	Fast Rise Time 1:2 Fanout Buffer	19 / 18	2	1.1	300	-3.3	LC3C	3A001.a.11.b	HMC724LC3C
13 / 13	Fast Rise Time 1:2 Fanout Buffer*	22 / 20	2	0.6 - 1.2	290	+3.3	LC3C	3A001.a.11.b	HMC744LC3C
NEW! 28 / 20	1:2 Fanout Buffer*	16 / 15	2	0.6 - 1.1	315	-3.3	LC3C	3A001.a.11.b	HMC850LC3C
NEW! 45 / 28	1:2 Fanout Buffer*	11 / 11	3	0.4 - 1.2	465	-3.3	LC4B	3A001.a.11.b	HMC842LC4B
NEW! 13 / 13	1:4 Fanout Buffer*	26 / 25	4	0.6 - 1.4	440	-3.3	LC4B	3A001.a.11.b	HMC940LC4B

2:1 Selector

NEW! 13 / 13	2:1 Differential Selector	19 / 20	2	0.5 - 1.3	221	-3.3	LC4B	3A001.a.11.b	HMC858LC4B
13 / 13	2:1 Selector*	17 / 15	2	0.6 - 1.2	250	-3.3	LC3C	3A001.a.11.b	HMC678LC3C
13 / 13	2:1 Selector	17 / 15	2	1.1	250	-3.3	LC3C	3A001.a.11.b	HMC728LC3C
13 / 13	2:1 Selector*	22 / 22	2	0.6 - 1.2	250	+3.3	LC3C	3A001.a.11.b	HMC748LC3C
NEW! 13 / 13	4:1 Selector	17 / 17	2	0.5 - 1.3	297	-3.3	LC5	3A001.a.11.b	HMC958LC5

AND / NAND / OR / NOR

13 / 13	AND / NAND / OR / NOR*	22 / 20	<1	0.4 - 1.1	180	-3.3	LC3C	3A001.a.11.b	HMC672LC3C
13 / 13	Fast Rise Time AND / NAND / OR / NOR*	19 / 18	2	0.6 - 1.1	230	-3.3	LC3C	3A001.a.11.b	HMC722LC3C
13 / 13	Fast Rise Time AND / NAND / OR / NOR*	19 / 18	2	0.6 - 1.1	230	-3.3	LP3	3A001.a.11.b	HMC722LP3E
13 / 13	Fast Rise Time AND / NAND / OR / NOR	19 / 18	2	1.1	230	-3.3	LC3C	3A001.a.11.b	HMC726LC3C
13 / 13	Fast Rise Time AND / NAND / OR / NOR*	22 / 21	2	0.6 - 1.2	230	+3.3	LC3C	3A001.a.11.b	HMC746LC3C
NEW! 28 / 28	AND / NAND / OR / NOR	15 / 14	2	0.5 - 1.3	241	-3.3	LC3C	3A001.a.11.b	HMC852LC3C
NEW! 45 / 25	AND / NAND / OR / NOR*	10 / 10	2	0.2 - 0.9	530	-3.3	LC4B	3A001.a.11.b	HMC843LC4B

Clock Divider

28 / 28	Clock Divide-by-2/4	12 / 14	-	0.6	660	-3.3	LC4B	3A001.a.11.b	HMC791LC4B
NEW! - / 26	Clock Divide-by-4	-	-	0.4 - 1.0	287	-3.3	LC3	3A001.a.11.b	HMC959LC3
NEW! - / 26	Clock Divide-by-8	-	-	0.4 - 1.0	310	-3.3	LC3	3A001.a.11.b	HMC859LC3

D-Type Flip-Flop

13 / 13	D-Type Flip-Flop*	22 / 20	<1	0.4 - 1.1	210	-3.3	LC3C	3A001.a.11.b	HMC673LC3C
NEW! 13 / 13	Dual D-Type Flip-Flop with Common Clock	22 / 19	3.5	0.5 - 1.2	439	-3.3	LC4B	3A001.a.11.b	HMC953LC4B
13 / 13	Fast Rise Time D-Type Flip-Flop*	19 / 17	2	0.7 - 1.3	260	-3.3	LC3C	3A001.a.11.b	HMC723LC3C
13 / 13	Fast Rise Time D-Type Flip-Flop*	19 / 17	2	0.7 - 1.3	260	-3.3	LC3C	3A001.a.11.b	HMC723LP3E
13 / 13	Fast Rise Time D-Type Flip-Flop	19 / 17	2	1.1	260	-3.3	LC3C	3A001.a.11.b	HMC727LC3C
13 / 13	Fast Rise Time D-Type Flip-Flop*	22 / 20	2	0.7 - 1.2	264	+3.3	LC3C	3A001.a.11.b	HMC747LC3C
28 / 28	D-Type Flip-Flop*	15 / 14	2	0.7 - 1.3	260	-3.3	LC3C	3A001.a.11.b	HMC853LC3C
NEW! 43 / 43	D-Type Flip-Flop*	12 / 12	2	0.2 - 0.85	630	-3.3	LC4B	3A001.a.11.b	HMC841LC4B

NRZ-to-RZ Converter

13 / 13	NRZ-to-RZ Converter	15 / 13	2	0.3 - 1.2	594	+3.3	LC3C	3A001.a.11.b	HMC706LC3C
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T Flip-Flop

26 / 26	T Flip-Flop w/ Reset*	18 / 17	2	0.4 - 1.1	270	-3.3	LC3C	3A001.a.11.b	HMC679LC3C
26 / 26	T Flip-Flop w/ Reset	18 / 17	2	1.1	270	-3.3	LC3C	3A001.a.11.b	HMC729LC3C
26 / 26	T Flip-Flop w/ Reset*	18 / 17	2	0.6 - 1.2	270	+3.3	LC3C	3A001.a.11.b	HMC749LC3C

XOR / XNOR

13 / 13	XOR / XNOR*	22 / 20	<1	0.4 - 1.1	180	-3.3	LC3C	3A001.a.11.b	HMC671LC3C
13 / 13	Fast Rise Time XOR / XNOR*	19 / 18	2	0.6 - 1.2	230	-3.3	LC3C	3A001.a.11.b	HMC721LC3C
13 / 13	Fast Rise Time XOR / XNOR*	19 / 18	2	0.6 - 1.2	230	-3.3	LP3	3A001.a.11.b	HMC721LP3E
13 / 13	Fast Rise Time XOR / XNOR	19 / 18	2	1.1	230	-3.3	LC3C	3A001.a.11.b	HMC725LC3C
13 / 13	Fast Rise Time XOR / XNOR*	21 / 19	2	0.6 - 1.2	240	+3.3	LC3C	3A001.a.11.b	HMC745LC3C
NEW! 28 / 28	XOR / XNOR*	15 / 14	2	0.6 - 1.4	241	-3.3	LC3C	3A001.a.11.b	HMC851LC3C
NEW! 45 / 28	XOR / XNOR*	11 / 10	3	0.2 - 8.5	512	-3.3	LC4B	3A001.a.11.b	HMC844LC4B

* These products feature programmable output voltage swing.

INTERFACE - RF Switch, Attenuator & Phase Shifter Digital Drivers

Bit Rate (mbps)	Function	Input	Output Voltage (V)	Output Current (mA)	Bias Supply	Package	ECCN Code	Part Number
10	6-Bit Switch Driver / Controller	TTL/CMOS	-5 / +2.2	1	+5V @ 1.5mA	LP5	EAR99	HMC677LP5E
NEW! 10	6-Bit Switch Driver / Controller	TTL/CMOS	-5 / +2.2	1	+5V @ 1mA	G32	EAR99	HMC677G32

I/Q MIXERS / IRMS

RF / LO Frequency (GHz)	Function	IF Frequency (GHz)	Conversion Gain (dB)	Image Rejection (dB)	IIP3 (dBm)	Package	ECCN Code	Part Number
I/Q Mixers / IRMs								
3 - 7	I/Q Mixer / IRM	DC - 3.5	-7.5	33	23	Chip	EAR99	HMC620
3 - 7	I/Q Mixer / IRM	DC - 3.5	-7.5	32	22	LC4	EAR99	HMC620LC4
4 - 8.5	I/Q Mixer / IRM	DC - 3.5	-7.5	40	23	Chip	EAR99	HMC525
4 - 8.5	I/Q Mixer / IRM	DC - 3.5	-7.5	40	23	LC4	EAR99	HMC525LC4
5.9 - 12.0	I/Q Mixer / IRM	DC - 1.5	-8	30	18	Chip	EAR99	HMC256
6 - 10	I/Q Mixer / IRM	DC - 3.5	-7	40	22	Chip	EAR99	HMC520
6 - 10	I/Q Mixer / IRM	DC - 3.5	-7	40	23	LC4	EAR99	HMC520LC4
6 - 10	I/Q Mixer / IRM	DC - 3.5	-7.5	40	28	Chip	EAR99	HMC526
6 - 10	I/Q Mixer / IRM	DC - 3.5	-7.5	40	28	LC4	EAR99	HMC526LC4
8.5 - 13.5	I/Q Mixer / IRM	DC - 3.5	-7.5	40	24	Chip	EAR99	HMC521
8.5 - 13.5	I/Q Mixer / IRM	DC - 2	-7.5	35	28	Chip	EAR99	HMC527
8.5 - 13.5	I/Q Mixer / IRM	DC - 2	-7.5	34	28	LC4	EAR99	HMC527LC4
8.5 - 13.6	I/Q Mixer / IRM	DC - 3.5	-7.5	38	24	LC4	EAR99	HMC521LC4
10 - 16	I/Q Mixer / IRM, 0 LO	DC - 3.5	-8	25	25	LC5	EAR99	HMC775LC5
11 - 16	I/Q Mixer / IRM	DC - 3.5	-7.5	35	24	Chip	EAR99	HMC522
11 - 16	I/Q Mixer / IRM	DC - 3.5	-7.5	35	24	LC4	EAR99	HMC522LC4
11 - 16	I/Q Mixer / IRM	DC - 3.5	-8	35	27	Chip	EAR99	HMC528
11 - 16	I/Q Mixer / IRM	DC - 3.5	-8	35	26	LC4	EAR99	HMC528LC4
15 - 23	I/Q Mixer / IRM	DC - 3.5	-8	25	25	LC4	EAR99	HMC523LC4
15 - 23.6	I/Q Mixer / IRM	DC - 3.5	-8	27	25	Chip	EAR99	HMC523
19 - 33	I/Q Mixer / IRM	DC - 5	-8	25	17	Chip	5A001.h	HMC-MDB172
22 - 32	I/Q Mixer / IRM	DC - 3.5	-10	23	20	Chip	EAR99	HMC524
22 - 32	I/Q Mixer / IRM	DC - 4.5	-10	20	20	LC3B	EAR99	HMC524LC3B
31 - 38	I/Q Mixer / IRM	DC - 3.5	-10.5	17	21	Chip	EAR99	HMC555
35 - 45	I/Q Mixer / IRM	DC - 5	-8	25	17	Chip	5A991.h	HMC-MDB171
36 - 41	I/Q Mixer / IRM	DC - 3.5	-11	18	23	Chip	EAR99	HMC556
55 - 64	I/Q Mixer / IRM	DC - 3	-9	30	16	Chip	5A991.h	HMC-MDB207
26 - 33 RF	Sub-Harmonic, I/Q Mixer / IRM	DC - 3	-11	22	16	Chip	EAR99	HMC404
54 - 64 RF	Sub-Harmonic, I/Q Mixer / IRM	DC - 3	-12.5	30	7	Chip	5A991.h	HMC-MDB218

I/Q DOWNCONVERTER / RECEIVERS

RF / LO Frequency (GHz)	Function	IF Frequency (GHz)	Conversion Gain (dB)	Noise Figure (dB)	Image Rejection (dB)	IIP3 (dBm)	Package	ECCN Code	Part Number
NEW! 5 - 9	I/Q Downconverter / Receiver	DC - 3	12	2.2	20	2	LP4	EAR99	HMC951LP4E
7 - 9	I/Q Downconverter / Receiver	DC - 3.5	10	2.5	35	1.5	LC5	EAR99	HMC567LC5
9 - 12	I/Q Downconverter / Receiver	DC - 3.5	14	2	33	-1	LC5	EAR99	HMC568LC5
9 - 12	I/Q Downconverter / Receiver	DC - 3.5	11	2.2	25	2	LC5	EAR99	HMC908LC5
12 - 16	I/Q Downconverter / Receiver	DC - 3.5	14	2.8	32	-1	LC5	EAR99	HMC869LC5
17 - 21	I/Q Downconverter / Receiver	DC - 3.3	11	2.2	21	2	LC5	EAR99	HMC904LC5
17 - 21	I/Q Downconverter / Receiver	DC - 3.5	10	3	17	3	Chip	EAR99	HMC570
17 - 21	I/Q Downconverter / Receiver	DC - 3.5	10	3	18	2	LC5	EAR99	HMC570LC5
21 - 25	I/Q Downconverter / Receiver	DC - 3.5	11	3	24	5	Chip	EAR99	HMC571
21 - 25	I/Q Downconverter / Receiver	DC - 3.5	10	2	20	5	LC5	EAR99	HMC571LC5
24 - 28	I/Q Downconverter / Receiver	DC - 3.5	8	3.5	20	5	Chip	EAR99	HMC572
24 - 28	I/Q Downconverter / Receiver	DC - 3.5	8	3.5	18	5	LC5	EAR99	HMC572LC5

I/Q UPCONVERTER / TRANSMITTERS

RF / LO Frequency (GHz)	Function	IF Frequency (GHz)	Conversion Gain (dB)	Sideband Rejection (dBc)	OIP3 (dBm)	Package	ECCN Code	Part Number
NEW! 5.5 - 8.6	I/Q Upconverter / Transmitter w/ VGA	DC - 3	16.5	-30	29	LC5	EAR99	HMC925LC5
NEW! 10 - 16	I/Q Upconverter / Transmitter w/ VGA	DC - 3	17	-30	14	LC5	EAR99	HMC924LC5
11 - 17	I/Q Upconverter / Transmitter	DC - 2	13	-20	26	LC5	EAR99	HMC709LC5
16 - 21	I/Q Upconverter / Transmitter	DC - 3.5	12	-20	30	LC5	EAR99	HMC710LC5
17.7 - 23.6	I/Q Upconverter / Transmitter	DC - 3.5	15	-35	35	LC5	EAR99	HMC819LC5
21 - 27	I/Q Upconverter / Transmitter	DC - 3.75	12	-20	27	LC5	EAR99	HMC815LC5

IC PRODUCTS

SMT & Chip (Die) Products

MIXERS

RF Frequency (GHz)	Function	IF Frequency (GHz)	Conversion Gain (dB)	LO / RF Isolation (dB)	IIP3 (dBm)	Package	ECCN Code	Part Number
High IP3 Mixers								
0.45 - 0.5	High IP3, SGL-END	DC - 0.15	-9.5	20	32	MS8	EAR99	HMC387MS8E
0.4 - 0.65	High IP3, 0 LO	DC - 0.25	-9	7	33	MS8G	EAR99	HMC585MS8GE
0.5 - 2.7	High IP3, DBL-BAL, +2 LO	DC - 1	-8	28	28	LP4	EAR99	HMC915LP4E
0.7 - 1.0	High IP3, SGL-END	DC - 0.25	-8.5	24	35	MS8	EAR99	HMC399MS8E
0.7 - 1.0	High IP3, DBL-BAL, 0 LO	DC - 0.45	-7	23	32	LP4	EAR99	HMC684LP4E
0.7 - 1.1	High IP3, DBL-BAL, 0 LO	0.05 - 0.25	-7.5	24	40	LP4	EAR99	HMC786LP4E
0.7 - 1.2	High IP3, DBL-BAL	DC - 0.3	-9	42	25	S8	EAR99	HMC351S8E
0.7 - 1.5	High IP3, 0 LO	DC - 0.35	-9	20	33	MS8G	EAR99	HMC483MS8GE
0.7 - 1.5	High IP3, DBL-BAL, 0 LO	DC - 0.5	-7.5	24	34	LP4	EAR99	HMC686LP4E
0.8 - 1.2	High IP3, DBL-BAL, 0 LO	DC - 0.3	-8	27	27	LP4	EAR99	HMC551LP4E
1.5 - 3.5	High IP3, DBL-BAL	DC - 1	-8	38	25	MS8	EAR99	HMC316MS8E
1.6 - 3.0	High IP3, DBL-BAL, 0 LO	DC - 1	-8	30	25	LP4	EAR99	HMC552LP4E
1.7 - 2.2	High IP3, SGL-END	DC - 0.3	-8.8	30	36	MS8	EAR99	HMC400MS8E
1.7 - 2.2	High IP3, 0 LO	0.05 - 0.3	-9.2	9	35	MS8G	EAR99	HMC485MS8GE
1.7 - 2.2	High IP3, DBL-BAL, 0 LO	DC - 0.5	-8	30	35	LP4	EAR99	HMC685LP4E
1.7 - 2.2	High IP3, DBL-BAL, 0 LO	DC - 0.5	-8	31	34	LP4	EAR99	HMC687LP4E
1.7 - 2.2	High IP3, DBL-BAL, 0 LO	0.05 - 0.30	-8	30	38	LP4	EAR99	HMC785LP4E
1.7 - 3.0	High IP3, SGL-BAL	DC - 0.8	-9	30	30	MS8	EAR99	HMC304MS8E
1.7 - 4.0	High IP3, DBL-BAL, +4 LO	DC - 1.0	-8	32	25	LP4	EAR99	HMC215LP4E
1.8 - 2.2	High IP3, SGL-END	DC - 0.5	-8.5	25	31	MS8	EAR99	HMC402MS8E
2.2 - 2.7	High IP3, DBL-BAL, 0 LO	DC - 0.45	-7.5	25	31	LP4	EAR99	HMC688LP4E
2.2 - 2.7	High IP3, DBL-BAL, 0 LO	DC - 0.45	-7.5	26	31	LP4	EAR99	HMC689LP4E
2.3 - 4.0	High IP3, +4 LO	DC - 1	-10	15	35	LP4	EAR99	HMC615LP4E
2.4 - 4.0	High IP3, SGL-END	DC - 1	-10	30	34	MS8	EAR99	HMC214MS8E
3.3 - 3.9	High IP3, DBL-BAL, 0 LO	DC - 0.6	-8.5	28	30	LP4	EAR99	HMC666LP4E
6 - 12	High IP3, DBL-BAL	DC - 4	-8	40	30	LC3	EAR99	HMC663LC3
9 - 15	High IP3, DBL-BAL	DC - 2.5	-7.5	40	24	MS8G	EAR99	HMC410AMS8GE
Downconverter RFICs								
0.7 - 1.0	Downconverter	0.05 - 0.25	12.5	25	15	QS16	EAR99	HMC420QS16E
0.7 - 1.0	High IP3, Dual Downconverter	0.06 - 0.5	7.5	16	23	LP6C	EAR99	HMC683LP6CE
0.9 - 1.6	Hi-IP3 Downconverter w/RF Amplifier	0.05 - 0.5	30	45	6	LP4	EAR99	HMC621LP4E
0.8 - 0.96	Hi-IP3 Dual Downconverter	0.05 - 0.3	9	4	26	LP6	EAR99	HMC581LP6E
0.8 - 1.0	Hi-IP3 Downconverter	0.05 - 0.25	13.8	28	15	QS16G	EAR99	HMC377QS16GE
0.8 - 2.7	Hi-IP3 Wideband Downconverter	0.001 - 0.6	-1	48	26	LP4	EAR99	HMC334LP4E
1.4 - 2.3	Hi-IP3 Downconverter	0.05 - 0.3	9	33	19	QS16G	EAR99	HMC421QS16E
1.7 - 2.2	Hi-IP3 Downconverter	0.05 - 0.3	11	25	19	QS16G	EAR99	HMC380QS16GE
1.7 - 2.2	Hi-IP3 Dual Downconverter	50 - 300	9	10	27	LP6	EAR99	HMC381LP6E
1.7 - 2.2	Hi-IP3, Dual Downconverter	0.06 - 0.4	6	25	25	LP6C	EAR99	HMC682LP6CE
1.8 - 2.7	Hi-IP3 Downconverter w/RF Amplifier	0.05 - 0.65	33	45	11	LP4	EAR99	HMC623LP4E
0 to +7 dBm LO Double & Single Balanced Mixers								
0.6 - 1.3	Low LO, DBL-BAL	DC - 0.4	-8	35	15	MS8	EAR99	HMC423MS8E
0.7 - 1.2	0 LO, DBL-BAL	0.25 - 0.45	10	36	23	LP4	EAR99	HMC665LP4E
1.8 - 3.9	+3 LO, DBL-BAL	0.2 - 0.55	9	33	23	LP4	EAR99	HMC622LP4E
1.2 - 2.6	Low LO, DBL-BAL	DC - 1	-8	30	15	MS8	EAR99	HMC422MS8E
3 - 3.8	Low LO, SGL-BAL	DC - 1	-8.5	15	10	SOT26	EAR99	HMC333E
4 - 7	0 LO, DBL-BAL	DC - 2.5	-7	32	15	MS8G	EAR99	HMC488MS8GE
4.5 - 6.0	+7 LO, DBL-BAL	DC - 1.6	-7	30	18	MS8	EAR99	HMC218MS8E
+10 dBm LO Double & Single Balanced Mixers								
0.7 - 2.0	+10 LO, DBL-BAL	DC - 0.3	-9	45	17	S8	EAR99	HMC207S8E
0.7 - 2.0	+10 LO, DBL-BAL	DC - 0.5	-9	24	17	MS8	EAR99	HMC208MS8E
1.5 - 4.5	+10 LO, DBL-BAL	DC - 1.5	-8.5	40	19	MS8	EAR99	HMC213AMS8E
1.7 - 3.0	+10 LO, SGL-BAL	DC - 0.8	-9	30	21	MS8	EAR99	HMC272MS8E
1.7 - 3.5	+10 LO, SGL-BAL	DC - 0.9	-9	30	21	SOT26	EAR99	HMC285E
4.5 - 8.0	+10 LO, DBL-BAL	DC - 2	-8.2	35	16	C8	EAR99	HMC168C8
5 - 12	+10 LO, DBL-BAL	DC - 4	-7.5	25	17	MS8	EAR99	HMC220MS8E
7 - 10	+10 LO, DBL-BAL	DC - 2	-9	32	16	C8	EAR99	HMC171C8
+13 dBm LO Double & Single Balanced Mixers								
0.7 - 1.2	+13 LO, SGL-BAL	DC - 0.3	-9	26	21	MS8	EAR99	HMC277MS8E
1.7 - 4.5	+13 LO, DBL-BAL	DC - 1	-8	30	20	MS8	EAR99	HMC175MS8E
1.7 - 4.5	+13 LO, Dual Channel	DC - 1.5	-8	-	23	LP5	EAR99	HMC340ALP5E
2.5 - 4.0	+13 LO, DBL-BAL	DC - 2	-9	45	18	C8	EAR99	HMC170C8
4.5 - 9.0	+13 LO, DBL-BAL	DC - 2.5	-8.5	25	21	MS8	EAR99	HMC219MS8E

MIXERS

RF Frequency (GHz)	Function	IF Frequency (GHz)	Conversion Gain (dB)	LO / RF Isolation (dB)	IIP3 (dBm)	Package	ECCN Code	Part Number
6 - 26	+13 LO, DBL-BAL	DC - 10	-9	32	20	Chip	EAR99	HMC773
6 - 26	+13 LO, DBL-BAL	DC - 8	-9	38	22	LC3B	EAR99	HMC773LC3B
7 - 14	+13 LO, DBL-BAL	DC - 5	-7	48	22	Chip	EAR99	HMC553
7 - 14	+13 LO, DBL-BAL	DC - 5	-7	50	22	LC3B	EAR99	HMC553LC3B
7 - 34	+13 LO, DBL-BAL	DC - 8	-11	35	22	LC3B	EAR99	HMC774LC3B
7 - 43	+13 LO, DBL-BAL	DC - 10	-9	35	22	Chip	EAR99	HMC774
9 - 15	+13 LO, DBL-BAL	DC - 2.5	-7.5	40 - 50	17	MS8G	EAR99	HMC412MS8GE
10 - 15	+13 LO, SGL-BAL	DC - 3	-9	27	16	MS8G	EAR99	HMC411MS8GE
11 - 20	+13 LO, DBL-BAL	DC - 6	-7	46	18	Chip	EAR99	HMC554
11 - 20	+13 LO, DBL-BAL	DC - 6	-7	46	18	LC3B	EAR99	HMC554LC3B
14 - 26	+13 LO, DBL-BAL	DC - 8	-7.5	39	20	Chip	EAR99	HMC260
14 - 26	+13 LO, DBL-BAL	DC - 8	-7.5	38	20	LC3B	EAR99	HMC260LC3B
16 - 30	+13 LO, DBL-BAL	DC - 8	-8	40	21	LC3B	EAR99	HMC292LC3B
17 - 31	+13 LO, DBL-BAL	DC - 6	-8	32	19	LM3C	EAR99	HMC292LM3C
18 - 32	+13 LO, DBL-BAL	DC - 8	-7.5	38	19	Chip	EAR99	HMC292
24 - 32	+13 LO, DBL-BAL	DC - 8	-10	38	19	LC3B	EAR99	HMC329LC3B
24 - 40	+13 LO, DBL-BAL	DC - 18	-8	35	21	Chip	EAR99	HMC560
24 - 40	+13 LO, DBL-BAL	DC - 17	-10	35	21	LM3	EAR99	HMC560LM3
25 - 40	+13 LO, DBL-BAL	DC - 8	-9.5	42	19	Chip	EAR99	HMC329
26 - 40	+13 LO, DBL-BAL	DC - 8	-8	37	19	LM3	EAR99	HMC329LM3
54 - 64	+13 LO, DBL-BAL	DC - 5	-8	30	13	Chip	5A991.h	HMC-MDB169

+15 to +20 dBm LO Double & Single Balanced Mixers

70 - 90	+14 LO, DBL-BAL	DC - 18	-12	-	-	Chip	5A991.h	HMC-MDB277
1.8 - 5.0	+15 LO, DBL-BAL	DC - 3	-7	42	18	Chip	EAR99	HMC128
1.8 - 5.0	+15 LO, DBL-BAL	DC - 2	-10	40	18	G8 Hermetic	EAR99	HMC128G8
2.5 - 7	+15 LO, DBL-BAL	DC - 3	-7	48	22	Chip	EAR99	HMC557
2.5 - 7	+15 LO, DBL-BAL	DC - 3	-7	48	22	LC4	EAR99	HMC557LC4
4 - 8	+15 LO, DBL-BAL	DC - 3	-7	40	17	Chip	EAR99	HMC129
4 - 8	+15 LO, DBL-BAL	DC - 3	-8	30	18	G8 Hermetic	EAR99	HMC129G8
4 - 8	+15 LO, DBL-BAL	DC - 3	-7	40	17	LC4	EAR99	HMC129LC4
5.5 - 14	+15 LO, DBL-BAL	DC - 6	-7	45	24	Chip	EAR99	HMC558
5.5 - 14	+15 LO, DBL-BAL	DC - 6	-7	45	24	LC3B	EAR99	HMC558LC3B
6 - 11	+15 LO, DBL-BAL	DC - 2	-7	40	17	Chip	EAR99	HMC130
6 - 15	+15 LO, DBL-BAL	DC - 2	-8.5	35	20	C8	EAR99	HMC141C8 / 142C8
6 - 18	+15 LO, DBL-BAL	DC - 6	-10	25	21	Chip	EAR99	HMC141 / 142
7 - 14	+15 LO, DBL-BAL	DC - 2	-10	35	20	LH5 Hermetic	EAR99	HMC141LH5
14 - 23	+15 LO, DBL-BAL	DC - 2	-10.5	38	18	Chip	EAR99	HMC203
3 - 10	+17 LO, DBL-BAL	DC - 4	-9	55	23	LC3B	EAR99	HMC787LC3B
5 - 20	+20 LO, DBL-BAL	DC - 3	-10	30	25	Chip	EAR99	HMC143 / 144
6 - 20	+20 LO, DBL-BAL	DC - 3	-10	35	23	LC4	EAR99	HMC144LC4
6 - 20	+20 LO, DBL-BAL	DC - 3	-10	35	24	LH5 Hermetic	EAR99	HMC144LH5

Sub-Harmonic Mixers

14 - 20	Sub-Harmonic	DC - 3	-10	40	7	LM3	EAR99	HMC258LM3
14 - 21	Sub-Harmonic	DC - 3	-10	40	7	Chip	EAR99	HMC258
14.5 - 19.5	Sub-Harmonic	DC - 3.5	-10	45	5	LC3B	EAR99	HMC258LC3B
17 - 25	Sub-Harmonic	DC - 3	-9	27	10	Chip	EAR99	HMC337
17.7 - 23.6	Sub-Harmonic, Upconverter	DC - 3.5	15	40	13	LC5	EAR99	HMC711LC5
20 - 30	Sub-Harmonic	DC - 6	-10	40	13	Chip	EAR99	HMC264
21 - 31	Sub-Harmonic	DC - 6	-9	40	13	LC3B	EAR99	HMC264LC3B
20 - 30	Sub-Harmonic	DC - 4	-9	30	10	LM3	EAR99	HMC264LM3
20 - 31	Sub-Harmonic, Downconverter	0.7 - 3.0	3	28	8	LM3	EAR99	HMC265LM3
20 - 32	Sub-Harmonic, Downconverter	0.7 - 3.0	3	30	10	Chip	EAR99	HMC265
20 - 40	Sub-Harmonic	1 - 3	-12	24	13	Chip	EAR99	HMC266
24 - 34	Sub-Harmonic	DC - 3	-11	33	13	LC3B	5A991.b	HMC338LC3B
24 - 34	Sub-Harmonic	DC - 4	-10	30	22	LC4	EAR99	HMC798LC4
26 - 33	Sub-Harmonic	DC - 2.5	-9	33	11	Chip	5A991.b	HMC338
33 - 42	Sub-Harmonic	DC - 3	-10	37	10	Chip	EAR99	HMC339

DEMODULATORS - I/Q Demodulator

Input Frequency (GHz)	Function	IF Frequency (GHz)	Conversion Gain (dB)	Noise Figure (dB)	IIP3 / IIP2 (dBm)	Package	ECCN Code	Part Number
0.1 - 4.0	I/Q Demodulator	DC - 0.6	-3.5	15	+25 / +60	LP4	EAR99	HMC597LP4E

IC PRODUCTS

SMT & Chip (Die) Products

MODULATORS - Bi-Phase Modulator

Input Frequency (GHz)	Function	Loss (dB)	Amp / Phase Balance (dB/Deg)	Carrier Suppression (dBc)	Bias Control (mA)	Package	ECCN Code	Part Number
1.8 - 5.2	Bi-Phase	8	0.2 / 2.5	30	+/- 5	Chip	EAR99	HMC135
4 - 8	Bi-Phase	8	0.1 / 4.0	30	+/- 5	Chip	EAR99	HMC136
6 - 11	Bi-Phase	9	0.25 / 10.0	20	+/- 5	Chip	EAR99	HMC137

MODULATORS - Direct Quadrature Modulator

Input Freq. (GHz)	Function	OIP3 (dBm) / Carrier Suppression (dBc)	Modulation Bandwidth (MHz)	Output Noise Floor (dBc/Hz)	Bias Supply	Package	ECCN Code	Part Number
0.02 - 2.7	Direct Quadrature	23 / 42	DC - 700	-162	+5V @ 160mA	LP4	EAR99	HMC696LP4E
0.1 - 4	Direct Quadrature	23 / 42	DC - 700	-159	+5V @ 170mA	LP4	EAR99	HMC497LP4E
0.25 - 3.8	Direct Quadrature	14 / 38	DC - 250	-158	+3.3V @ 108mA	LP3	EAR99	HMC495LP3E
0.45 - 4.0	Direct Quadrature	22 / 43	DC - 700	-165	+5V @ 168mA	LP4	EAR99	HMC697LP4E
0.05 - 2.7	Direct Quadrature with VGA	25 / 50	DC - 440	-159	+5V @ 120mA	LP5	3A001.a.11.b	HMC795LP5E
4 - 7	Direct Quadrature	17 / 34	DC - 250	-157	+3V @ 93mA	LP3	EAR99	HMC496LP3E

MODULATORS - Vector Modulators

Frequency (GHz)	Function	Gain Range (dB)	Continuous Phase Control (deg)	IP3 / Noise Floor (Ratio)	IIP3 @ Max. Gain (dBm)	Package	ECCN Code	Part Number
0.7 - 1.0	Vector	-50 to -10	360	186.5	34	LP3	EAR99	HMC630LP3E
1.8 - 2.7	Vector	-50 to -10	360	186	35	LP3	EAR99	HMC631LP3E
1.8 - 2.2	Vector	-50 to -10	360	185	33	LP3	EAR99	HMC500LP3E

MUX & DEMUX - New Product Line!

Data / Clock Rate (Gbps / GHz)	Function	Rise / Fall (ps)	Deterministic Jitter (ps)	Differential Output Voltage Swing (Vp-p)	DC Power Consumption (mW)	Vee Power Supply (Vdc)	Package	ECCN Code	Part Number
NEW! 28 / 14	4:1 Mux w/ Adj. Vout	16 / 16	4	0.7 - 1.25	510	-3.3	LC5	3A001.a.11.b	HMC854LC5
NEW! 45 / 22.5	4:1 Mux*	11 / 12	3	0.25 - 0.9	1782	+3.3	LC5	3A001.a.11.b	HMC847LC5
NEW! 28 / 14	1:4 Demux w/ Adj. Vout	22 / 22	-	0.45 - 1.14	644	-3.3	LC5	3A001.a.11.b	HMC855LC5
NEW! 45 / 22.5	1:4 Demux w/ Adj. Vout	25 / 21	4	0.3 - 1.0	1782	+3.3	LC5	3A001.a.11.b	HMC848LC5

* With Programmable Output Voltage & Duty Cycle Control

PASSIVES - Fixed Attenuators

Frequency (GHz)	Function	Attenuation Accuracy (dB)	Nominal Attenuation (dB)	Maximum Input Power (dBm)	Chip Size	Package	ECCN Code	Part Number
DC - 50	Thru Line	±0.2	0.15	-	17 x 18	Chip	EAR99	HMC650
DC - 50	Thru Line	±0.3	0.15	-	23 x 18	Chip	EAR99	HMC651
DC - 50	Passive	±0.2	2	27	17 x 18	Chip	EAR99	HMC652
NEW! DC - 25	Passive	±0.5	2	27	-	LP2	EAR99	HMC652LP2E
DC - 50	Passive	±0.2	3	26	17 x 18	Chip	EAR99	HMC653
NEW! DC - 25	Passive	±0.5	3	26	-	LP2	EAR99	HMC653LP2E
DC - 50	Passive	±0.2	4	25	17 x 18	Chip	EAR99	HMC654
NEW! DC - 25	Passive	±0.5	4	25	-	LP2	EAR99	HMC654LP2E
DC - 50	Passive	±0.2	6	26	17 x 18	Chip	EAR99	HMC655
NEW! DC - 25	Passive	±0.5	6	26	-	LP2	EAR99	HMC655LP2E
DC - 50	Passive	±0.1	10	25	17 x 18	Chip	EAR99	HMC656
DC - 25	Passive	±1.5	10	25	N/A	LP2	EAR99	HMC656LP2E
DC - 50	Passive	±0.4	15	25	17 x 18	Chip	EAR99	HMC657
DC - 25	Passive	±2	15	25	N/A	LP2	EAR99	HMC657LP2E
DC - 50	Passive	±0.5	20	25	23 x 18	Chip	EAR99	HMC658
DC - 25	Passive	±2	20	25	N/A	LP2	EAR99	HMC658LP2E

PHASE SHIFTERS - Analog

Frequency (GHz)	Function	Insertion Loss (dB)	Phase Range (deg)	2nd harmonic Pin = 10 dBm (dBc)	Control Voltage Range (Vdc)	Package	ECCN Code	Part Number
NEW! 2 - 4	Analog	3.5	480° @ 2 GHz 450° @ 4 GHz	-20	0V to +13V	LP5	EAR99	HMC928LP5E
NEW! 4 - 8	Analog	4	450° @ 4 GHz 430° @ 8 GHz	-25	0V to +13V	LP4	EAR99	HMC929LP4E
5 - 18	Analog	4	500° @ 5 GHz 100° @ 18 GHz	80	0V to +10V	Chip	EAR99	HMC247
6 - 15	Analog	7	750° @ 6 GHz 500° @ 15 GHz	40	0V to +5V	LP4	EAR99	HMC538LP4E

PHASE SHIFTERS - Digital

Frequency (GHz)	Function	Insertion Loss (dB)	Phase Range (deg)	IIP3 (dBm)	Control Input (Vdc)	Package	ECCN Code	Part Number
8 - 12	4-Bit Digital	5	22.5 to 360	40	0 / -3V	Chip	EAR99	HMC543

PHASE SHIFTERS - Digital

Frequency (GHz)	Function	Insertion Loss (dB)	Phase Range (deg)	IIP3 (dBm)	Control Input (Vdc)	Package	ECCN Code	Part Number
8 - 12	4-Bit Digital	6.5	22.5 to 360	37	0 / -3V	LC4B	EAR99	HMC543LC4B
15 - 18.5	5-Bit Digital	7	11.25 to 360	40	0 / -3	Chip	EAR99	HMC644
15 - 18.5	5-Bit Digital	7	11.25 to 360	40	0 / -3	LC5	EAR99	HMC644LC5
NEW! 1.2 - 1.4	6-Bit Digital	4	5.625 to 360	45	0 / +5V	LP6	EAR99	HMC936LP6E
2.5 - 3.1	6-Bit Digital	4	5.625 to 360	54	0 / +5	Chip	EAR99	HMC647
2.5 - 3.1	6-Bit Digital	4	5.625 to 360	54	0 / +5	LP6	EAR99	HMC647LP6E
2.9 - 3.9	6-Bit Digital	4	5.625 to 360	45	0 / +5	Chip	EAR99	HMC648
2.9 - 3.9	6-Bit Digital	5	5.625 to 360	45	0 / +5	LP6	EAR99	HMC648LP6E
3 - 6	6-Bit Digital	6.5	5.625 to 360	44	0 / +5	Chip	EAR99	HMC649
3 - 6	6-Bit Digital	8	5.625 to 360	44	0 / +5	LP6	EAR99	HMC649LP6E
9 - 12	6-Bit Digital	6.5	5.625 to 360	38	0 / -3	Chip	EAR99	HMC643
9 - 12	6-Bit Digital	7	5.625 to 360	38	0 / -3	LC5	EAR99	HMC643LC5
9 - 12.5	6-Bit Digital	6.5	5.625 to 360	41	0 / +5	Chip	EAR99	HMC642
9 - 12.5	6-Bit Digital	7	5.625 to 360	41	0 / +5	LC5	EAR99	HMC642LC5

PHASE LOCKED LOOP - Synthesizer ICs

Frequency (GHz)	Function	Max. PFD Freq. (MHz)	Max. Reference Freq. (MHz)	Figure of Merit (Frac/Int) (dBc/Hz)	Frequency Resolution w/ 50 MHz Ref.	Bias Supply	Package	ECCN Code	Part Number
10 kHz - 8 GHz	Fractional-N w/ Int. Sweeper	75	200	-221 / -227	3 Hz	+5V @ 37mA +3.3V @ 90mA	LP6C	3A001.a.11.b	HMC701LP6CE
10 kHz - 14 GHz	Fractional-N w/ Int. Sweeper	75	200	-221 / -227	6 Hz	+5V @ 37mA +3.3V @ 136mA	LP6C	3A001.a.11.b	HMC702LP6CE
10 MHz - 8 GHz	Fractional-N	70	200	-221 / -226	3 Hz	+5V @ 7mA +3.3V @ 95mA	LP4	3A001.a.11.b	HMC700LP4E
80 MHz - 7 GHz	Integer-N	1300	1300	-233	50 MHz	+5V @ 310mA	LP5	3A001.a.11.b	HMC698LP5E
160 MHz - 7 GHz	Integer-N	1300	1300	-233	50 MHz	+5V @ 310mA	LP5	3A001.a.11.b	HMC699LP5E
10 MHz - 2.8 GHz	Integer-N	1300	1300	-233	50 MHz	+5V @ 250mA	QS16G	3A001.a.11.b	HMC440QS16GE

PLLs with INTEGRATED VCOS

Frequency (GHz)	Function	Closed Loop SSB Phase Noise @ 10 kHz Offset	Open Loop VCO Phase Noise @ 1 MHz Offset	Pout (dBm)	RMS Jitter Fractional Mode (fs)	Integrated PN Fractional Mode (deg rms)	Package	ECCN Code	Part Number
0.66 - 3.3	Tri-Band RF VCO	-115 dBc/Hz	-142 dBc/Hz	10	190	0.10	LP6C	3A001.a.11.b	HMC822LP6CE
0.78 - 0.87	RF VCO	-120 dBc/Hz	-147 dBc/Hz	12	190	0.05	LP6C	3A001.a.11.b	HMC824LP6CE
0.795 - 3.78	Tri-Band RF VCO	-111 dBc/Hz	-143 dBc/Hz	7.5	120	0.07	LP6C	3A001.a.11.b	HMC838LP6CE
0.86 - 4.16	Tri-Band RF VCO	-113 dBc/Hz	-140 dBc/Hz	10	190	0.12	LP6C	3A001.a.11.b	HMC821LP6CE
0.99 - 1.105	RF VCO	-118 dBc/Hz	-145 dBc/Hz	10	190	0.07	LP6C	3A001.a.11.b	HMC826LP6CE
1.05 - 4.82	Tri-Band RF VCO	-110 dBc/Hz	-140 dBc/Hz	7	120	0.09	LP6C	3A001.a.11.b	HMC839LP6CE
1.095 - 5.10	Tri-Band RF VCO	-110 dBc/Hz	-139 dBc/Hz	10	190	0.17	LP6C	3A001.a.11.b	HMC820LP6CE
1.285 - 1.415	RF VCO	-116 dBc/Hz	-142 dBc/Hz	10	190	0.10	LP6C	3A001.a.11.b	HMC828LP6CE
1.815 - 2.01	RF VCO	-112 dBc/Hz	-141 dBc/Hz	9	190	0.13	LP6C	3A001.a.11.b	HMC831LP6CE
3.365 - 3.705	RF VCO	-107 dBc/Hz	-135 dBc/Hz	0	190	0.25	LP6C	3A001.a.11.b	HMC836LP6CE
7.3 - 8.2	Microwave VCO	-102 dBc/Hz	-140 dBc/Hz	15	196	0.55	LP6C	3A001.a.11.b	HMC764LP6CE
7.8 - 8.8	Microwave VCO	-102 dBc/Hz	-139 dBc/Hz	13	193	0.58	LP6C	3A001.a.11.b	HMC765LP6CE
11.5 - 12.5	Microwave VCO	-100 dBc/Hz	-134 dBc/Hz	11	181	0.78	LP6C	3A001.a.11.b	HMC783LP6CE
12.4 - 13.4	Microwave VCO	-98 dBc/Hz	-134 dBc/Hz	8	175	0.81	LP6C	3A001.a.11.b	HMC807LP6CE

* Figure of merit (FOM) of synthesizer is -225/-226 dBc/Hz (fractional/integer).

POWER DETECTORS

Frequency (GHz)	Function	Dynamic Range (dB)	RSSI Slope (mV/dB)	RF Threshold Level (dBm)	Bias Supply	Package	ECCN Code	Part Number
Log Detector/Controller								
50 Hz - 3.0	Log Detector / Controller	74 ±3	19	-66	+3.3V @ 29mA	LP4	EAR99	HMC612LP4E
0.001 - 8.0	Log Detector / Controller	70 ±3	-25	-61	+5V @ 113mA	LP4	EAR99	HMC602LP4E
0.001 - 10.0	Log Detector / Controller	73 ±3	-25	-65	+5V @ 103mA	Chip	EAR99	HMC611
0.001 - 10.0	Log Detector / Controller	70 ±3	-25	-65	+5V @ 106mA	LP4	EAR99	HMC611LP4E
0.01 - 4.0	Log Detector / Controller	70 ±3	19	-68	+3.3V @ 30mA	LP4	EAR99	HMC601LP4E
0.05 - 4.0	Log Detector / Controller	70 ±3	19	-69	+3.3V @ 29mA	LP4	EAR99	HMC600LP4E
0.05 - 8.0	Log Detector / Controller	54 ±1	17.5	-55	+5V @ 17mA	LP3	EAR99	HMC713LP3E
0.1 - 2.7	Log Detector / Controller	54 ±1	17.5	-52	+5V @ 17mA	MS8	EAR99	HMC713MS8E
8 - 30	Log Detector	54 ±3	13.3	-55	+3.3V @ 88mA	LP3	EAR99	HMC662LP3E
NEW! 1 - 23	mmW Power Detector	56 ±3	14.2	-52	+3.3V @ 91mA	LP3	EAR99	HMC948LP3E
NEW! DC - 3.9	RMS Power Detector	60 ±1	37	-69	+5V @ 50mA	LP4	EAR99	HMC1010LP4E
NEW! DC - 5.8	RMS Power Detector	40 ±1	37	-69	+5V @ 42mA	LP4	EAR99	HMC909LP4E

IC PRODUCTS

SMT & Chip (Die) Products

SDLVAs - Successive Detection Log Video Amplifier - *New Product Line!*

Frequency (GHz)	Function	Dynamic Range (dB)	RSSI Slope (mV/dB)	RF Threshold Level (dBm)	Bias Supply	Package	ECCN Code	Part Number
0.1 - 20	SDLVA	59	14	-54	+3.3V @ 83mA	LC4B	EAR99	HMC613LC4B
0.6 - 20	SDLVA	59	14	-54	+3.3V @ 80mA	Chip	EAR99	HMC913
0.6 - 20	SDLVA	59	14	-54	+3.3V @ 80mA	LC4B	EAR99	HMC913LC4B
NEW! 1 - 26	SDLVA	59	11	-52	+3.3V @ 135mA	Chip	EAR99	HMC813

SWITCHES

Frequency (GHz)	Function	Insertion Loss (dB)	Isolation (dB)	Input P1dB (dBm)	Control Input (Vdc)	Package	ECCN Code	Part Number
SPST & SPDT Switches								
DC - 6	SPST, Failsafe	0.7	25	27	0 / +2.2 to +5V	SOT26	EAR99	HMC550E
DC - 6	SPST, Hi Isolation	1.4	52	27	0 / -5V	G7 Hermetic	EAR99	HMC231G7
DC - 2.5	SPDT, Reflective	0.4	36	29	0 / -5V	S8	EAR99	HMC239S8E
DC - 3	SPDT, Reflective	0.4	27	30	0 / +3V	MS8	EAR99	HMC190AMS8E
DC - 3	SPDT, Hi Isolation	0.7	50	23	0 / +5V	MS8	EAR99	HMC194MS8E
DC - 3	SPDT, Reflective	0.4	28	30	0 / +3V	SOT26	EAR99	HMC197AE
DC - 3	SPDT, Reflective	0.4	28	30	0 / +3V	SOT26	EAR99	HMC221AE
DC - 3	SPDT, Reflective	0.3	31	34	0 / +3 to +8V	SOT26	EAR99	HMC545E
DC - 3.5	SPDT, Hi Isolation	0.5	45	25	0 / +5V	MS8G	EAR99	HMC284MS8GE
DC - 4	SPDT, Reflective	0.5	28	29	0 / -5V or +5V / 0	Chip	EAR99	HMC240
DC - 4	SPDT, Hi Isolation	0.9	65	31	0 / +5V	LP4C	EAR99	HMC349LP4CE
DC - 4	SPDT, Hi Isolation	0.9	57	31	0 / +5V	MS8G	EAR99	HMC349MS8GE
DC - 4	SPDT, Hi Isolation	1.1	47	31	0 / +5V	MS8G	EAR99	HMC435MS8GE
DC - 6	SPDT, Hi Isolation	1.4	50	26	0 / -5V	G7 Hermetic	EAR99	HMC232G7
DC - 6	SPDT, Hi Isolation	1.4	43	26	0 / -5V	G8 Hermetic	EAR99	HMC232G8
DC - 6	SPDT, Hi Isolation	1.4	43	26	0 / -5V	G8 Hermetic	EAR99	HMC233G8
DC - 6	SPDT, Hi Isolation	1.6	42	25	0 / +5V	MS8G	EAR99	HMC336MS8GE
DC - 6	SPDT, Hi Isolation	1.4	46	27	0 / -5V	G7	EAR99	HMC607G7
DC - 6	SPDT, Hi Isolation	0.8	60	35	0 / +3 to +5V	LP4C	EAR99	HMC849LP4CE
DC - 8	SPDT, Hi Isolation	1.4	50	26	0 / -5V	C8	EAR99	HMC232C8
DC - 8	SPDT, Hi Isolation	1.5	45	26	0 / -5V	C8	EAR99	HMC234C8
DC - 8	SPDT, Hi Isolation	1.2	48	23	0 / -5V	MS8G	EAR99	HMC270MS8GE
DC - 8	SPDT, Hi Isolation	2.0	44	23	0 / -5V	C8	EAR99	HMC347C8
DC - 8	SPDT, Hi Isolation	2.2	35	23	0 / -5V	G8 Hermetic	EAR99	HMC347G8
DC - 12	SPDT, Hi Isolation	1.5	55	27	0 / -5V	LP4	EAR99	HMC232LP4E
DC - 15	SPDT, Hi Isolation	1.4	50	26	0 / -5V	Chip	EAR99	HMC232
DC - 15	SPDT, Hi Isolation	1.6	44	23	0 / -5V	LP3	EAR99	HMC347LP3E
DC - 15	SPDT, Hi Isolation	1.7	60	26	0 / -5V	Chip	EAR99	HMC607
DC - 20	SPDT, Hi Isolation	1.7	45	23	0 / -5V	Chip	EAR99	HMC347
DC - 20	SPDT, Hi Isolation	1.8	47	23	0 / -5V	LP3	EAR99	HMC547LP3E
55 - 86	SPDT, Reflective	2	30	-	-5 / +5	Chip	5A991.h	HMC-SDD112
0.1 - 2.1	SPDT, 40W, Failsafe	0.4	22	46	0 / +3V to +8V	LP2	EAR99	HMC646LP2E
0.2 - 2.2	SPDT, 10W, Failsafe	0.4	40	> 40	0 / +3 to +8V	MS8G	EAR99	HMC546MS8GE
0.2 - 2.7	SPDT, 10W, Failsafe	0.4	35	43	0 / +3 to +8V	LP2	EAR99	HMC546LP2E
0.824 - 0.894	SPDT, 10W, T/R	0.6	22	> 40	0 / +5V	SOT26	EAR99	HMC446E
DC - 2.5	SPDT, CATV	0.6	58	28	0 / +5V	LP3	EAR99	HMC348LP3E
DC - 3	SPDT T/R	0.5	25	39	TTL/CMOS	MS8	EAR99	HMC174MS8E
DC - 3	SPDT, 5W, T/R	0.3	30	39	0 / +3 to +10V	MS8	EAR99	HMC574MS8E
DC - 3	SPDT, 3W, T/R	0.3	30	37	0 / +3 to +10V	SOT26	EAR99	HMC595E
DC - 4	SPDT T/R	0.25	23	39	0 / +3 to +5V	SOT26	EAR99	HMC544E
DC - 4	SPDT, 10W, T/R	0.4	30	40	0 / +3 to +8V	MS8G	EAR99	HMC784MS8GE
DC - 6	SPDT T/R	0.5	27	37	0 / +3 to +5V	MS8G	EAR99	HMC536MS8GE
DC - 6	SPDT T/R	0.6	27	37	0 / +3 to +5V	LP2	EAR99	HMC536LP2E
5 - 6	SPDT T/R	1.2	31	33	TTL/CMOS	MS8	EAR99	HMC224MS8E
Multi-Throw Switches								
DC - 3.5	SP3T	0.5	44	26	TTL/CMOS	QS16	EAR99	HMC245QS16E
DC - 2	SP4T	0.8	32	24	0 / -5V	S14	EAR99	HMC182S14E
DC - 3.5	SP4T	0.5	45	25	TTL/CMOS	QS16	EAR99	HMC241QS16E
DC - 4	SP4T	0.6	47	26	TTL/CMOS	LP3	EAR99	HMC241LP3E
DC - 4	SP4T	0.7	40	25	TTL/CMOS	G16 Hermetic	EAR99	HMC244G16
DC - 8	SP4T	1.8	42	21	0 / -5V	Chip	EAR99	HMC344
DC - 8	SP4T	2.0	45	26	0 / -5V	LC3	EAR99	HMC344LC3
DC - 8	SP4T	1.8	40	21	0 / -5V	LP3	EAR99	HMC344LP3E
DC - 8	SP4T	2.2	32	21	0 / 5V	LP3	EAR99	HMC345LP3E
DC - 12	SP4T	1.8	42	27	0 / -5V	LH5 Hermetic	EAR99	HMC344LH5
DC - 18	SP4T	2.1	42	24	0 / -5V	Chip	EAR99	HMC641

SMT & Chip (Die) Products

SWITCHES

	Frequency (GHz)	Function	Insertion Loss (dB)	Isolation (dB)	Input P1dB (dBm)	Control Input (Vdc)	Package	ECCN Code	Part Number
NEW!	DC - 20	SP4T	2.1	42	23	0 / -5V	LC4	EAR99	HMC641LC4
NEW!	DC - 20	SP4T	2.3	45	22	0 / -5V	LP4	EAR99	HMC641LP4E
NEW!	24 - 30	SP4T	4	33	25	0 / -3V	LC4	EAR99	HMC944LC4
	DC - 3	SP6T	0.8	41	24	TTL/CMOS	QS24	EAR99	HMC252QS24E
	DC - 2	SP8T	1.3	30	20	0 / -5V	QS24	EAR99	HMC183QS24E
	DC - 2.5	SP8T	1.1	36	23	TTL/CMOS	QS24	EAR99	HMC253QS24E
	DC - 3.5	SP8T	1.2	36	24	TTL/CMOS	LC4	EAR99	HMC253LC4
	DC - 8	SP8T	2.3	40	23	0 / 5V	LP4	EAR99	HMC321LP4E
	DC - 10	SP8T	2	38	23	0 / -5V	Chip	EAR99	HMC322
	DC - 8	SP8T	2.5	25	23	0 / -5V	LP4	EAR99	HMC322LP4E
Bypass, Diversity, Matrix & Transfer Switches									
	DC - 2.5	Bypass DPDT	0.3	25	23	0 / +5V	MS8	EAR99	HMC199MS8E
NEW!	DC - 4	SPDT, Differential	0.8	45	35	0 / +3V to	LP4	EAR99	HMC922LP4E
	5 - 6	DPDT, Diversity	1.2	20	30	0 / +5V	MS8G	EAR99	HMC393MS8GE
	0.2 - 3.0	4x2 Matrix	6	44	26	0 / +5V	LP4	EAR99	HMC276LP4E
	0.2 - 3.0	4x2 Matrix	6.5	43	22	0 / +3 to +5V	LP4	EAR99	HMC596LP4E
	0.7 - 3.0	4x2 Matrix	5.8	33	26	0 / +5V	QS24	EAR99	HMC276QS24E
	DC - 8.0	Transfer	1.2	42	26	0 / +5V	LP3	EAR99	HMC427LP3E

VARIABLE GAIN AMPLIFIERS

	Frequency (GHz)	Function	Gain Control Range (dB)	NF * (dB)	OIP3 * (dBm)	P1dB (dBm)	Bias Supply	Package	ECCN Code	Part Number
NEW!	0.5 - 6.0	Analog	-35 to +15	5	37	21	+5V @ 90mA	LP5	EAR99	HMC972LP5E
	2.3 - 2.5	Analog	-8 to 22	2.5	7	3	+3V @ 9mA	MS8	EAR99	HMC287MS8E
	6 - 17	Analog	23	5	30	22	+5V @ 170mA	Chip	EAR99	HMC694
	6 - 17	Analog	23	6	30	22	+5V @ 175mA	LP4	EAR99	HMC694LP4E
	0.03 - 0.4	5-Bit digital, Differential Outputs	-4 to +19	5	40	25	+5V @ 240mA	LP4	EAR99	HMC680LP4E
	0.05 - 0.8	5-Bit Digital	-8 to 15	5	35	18	+5V @ 65mA	LP4	EAR99	HMC628LP4E
	0.07 - 4.0	6-Bit Digital, Serial & Parallel Control	-19.5 to 12	4	39	23	+5V @ 150mA	LP5	EAR99	HMC742LP5E
	0.7 - 1.2	6-Bit Digital, Serial & Parallel Control	-2.5 to +29	0.8	38.5	21	+5V @ 236mA	LP5	EAR99	HMC707LP5E
NEW!	0.7 - 2.7	6-Bit Digital	+6.5 to +38	4.4	45	25	+5V @ 218mA	LP5	EAR99	HMC926LP5E
	1.7 - 2.2	6-Bit Digital, Serial & Parallel Control	-2.5 to +29	1.0	37.5	21.5	+5V @ 252mA	LP5	EAR99	HMC708LP5E
	DC - 1	6-Bit Digital, Serial & Parallel Control	-11.5 to 20	4.3	36	20	+5V @ 90mA	LP5	EAR99	HMC627LP5E
	DC - 1	6-Bit Digital, Parallel Control	8.5 to 40	2.8	36	20	+5V @ 176mA	LP5	EAR99	HMC626LP5E
	DC - 1	6-Bit Digital, Serial Control	13.5 to 45	2.7	36	20	+5V @ 176mA	LP5	EAR99	HMC681LP5E
	DC - 6	6-Bit Digital, Serial & Parallel Control	-13.5 to 18	6	33	19	+5V @ 88mA	LP5	EAR99	HMC625LP5E
	DC - 4	12-Bit Digital, Serial Control	-45 to +18	6	33	18	+5V @ 82mA	LP6C	EAR99	HMC743LP6CE

* Maximum Gain State

VOLTAGE CONTROLLED OSCILLATORS*

Fo Frequency (GHz)	Function	Fo Output Power (dBm)	10 kHz SSB Phase Noise (dBc/Hz)	100 kHz SSB Phase Noise (dBc/Hz)	Bias Supply	Package	ECCN Code	Part Number
VCOs with Buffer Amplifier								
2.05 - 2.25	VCO with Buffer	3.5	-89	-112	+3V @ 35mA	LP4	EAR99	HMC384LP4E
2.25 - 2.5	VCO with Buffer	4.5	-89	-115	+3V @ 35mA	LP4	EAR99	HMC385LP4E
2.6 - 2.8	VCO with Buffer	5	-88	-115	+3V @ 35mA	LP4	EAR99	HMC386LP4E
2.75 - 3.0	VCO with Buffer	4.5	-89	-114	+3V @ 37mA	LP4	EAR99	HMC416LP4E
3.15 - 3.4	VCO with Buffer	4.9	-88	-113	+3V @ 39mA	LP4	EAR99	HMC388LP4E
3.35 - 3.55	VCO with Buffer	4.7	-89	-112	+3V @ 41mA	LP4	EAR99	HMC389LP4E
3.55 - 3.9	VCO with Buffer	4.7	-87	-112	+3V @ 42mA	LP4	EAR99	HMC390LP4E
3.9 - 4.45	VCO with Buffer	5	-81	-106	+3V @ 30mA	LP4	EAR99	HMC391LP4E
4.45 - 5.0	VCO with Buffer	4	-79	-105	+3V @ 30mA	LP4	EAR99	HMC429LP4E
5.0 - 5.5	VCO with Buffer	2	-80	-103	+3V @ 27mA	LP4	EAR99	HMC430LP4E
5.5 - 6.1	VCO with Buffer	2	-80	-102	+3V @ 27mA	LP4	EAR99	HMC431LP4E
5.8 - 6.8	VCO with Buffer	10	-82	-105	+3V @ 100mA	MS8G	EAR99	HMC358MS8GE
6.1 - 6.72	VCO with Buffer	4.5	-73	-101	+3V @ 31mA	LP4	EAR99	HMC466LP4E
6.8 - 7.4	VCO with Buffer	11	-80	-106	+3V @ 80mA	LP4	EAR99	HMC505LP4E
7.1 - 7.9	VCO with Buffer	14	-80	-101	+3V @ 85mA	LP4	EAR99	HMC532LP4E
7.8 - 8.7	VCO with Buffer	14	-80	-103	+3V @ 77mA	LP4	EAR99	HMC506LP4E
8.6 - 10.2	VCO with ±4	18	-70	-100	+5V @ 220mA	LP5	3A001.a.11.b	HMC734LP5E
10.5 - 12.2	VCO with ±4	17	-75	-100	+5V @ 220mA	LP5	3A001.a.11.b	HMC735LP5E
13.2 - 13.5	VCO with ±8	-8	-83	-110	+5V @ 230mA	QS16G	3A001.a.11.b	HMC401QS16GE
14.0 - 15.0	VCO with ±8	6	-75	-110	+5V @ 260mA	QS16G	3A001.a.11.b	HMC398QS16GE
23.8 - 24.8	VCO with ±16	12	-70	-95	+5V @ 220mA	LP4	3A001.a.11.b	HMC533LP4E

IC PRODUCTS

SMT & Chip (Die) Products

VOLTAGE CONTROLLED OSCILLATORS*

Fo Frequency (GHz)	Function	Fo Output Power (dBm)	10 kHz SSB Phase Noise (dBc/Hz)	100 kHz SSB Phase Noise (dBc/Hz)	Bias Supply	Package	ECCN Code	Part Number
Wideband VCOs								
4 - 8	Wideband VCO	5	-75	-100	+5V @ 55mA	LC4B	EAR99	HMC586LC4B
5 - 10	Wideband VCO	5	-65	-95	+5V @ 55mA	LC4B	EAR99	HMC587LC4B
NEW! 6 - 12	Wideband VCO	1	-65	-95	+5V @ 57mA	LC4B	EAR99	HMC732LC4B
8 - 12.5	Wideband VCO	5	-65	-93	+5V @ 55mA	LC4B	EAR99	HMC588LC4B
NEW! 10 - 20	Wideband VCO	3	-60	-90	+5V @ 70mA	LC4B	EAR99	HMC733LC4B

* HMC VCOs integrate resonator, negative resistance generator and tuning varactor circuits on-chip. No external components are required.

VOLTAGE CONTROLLED OSCILLATORS WITH Fo/2 OUTPUT

Fo Frequency (GHz)	Fo/2 Frequency (GHz)	Function	Fo Output Power (dBm)	10 kHz SSB Phase Noise (dBc/Hz)	100 kHz SSB Phase Noise (dBc/Hz)	Bias Supply	Package	ECCN Code	Part Number
VCOs with Fo/2									
6.65 - 7.65	3.325 - 3.825	VCO with Fo/2	13	-90	-115	+5V @ 230mA	LP5	EAR99	HMC507LP5E
7.3 - 8.2	3.65 - 4.1	VCO with Fo/2	15	-90	-116	+5V @ 240mA	LP5	EAR99	HMC508LP5E
7.8 - 8.8	3.9 - 4.4	VCO with Fo/2	13	-90	-115	+5V @ 250mA	LP5	EAR99	HMC509LP5E
9.05 - 10.15	4.525 - 5.075	VCO with Fo/2	13	-88	-115	+5V @ 265mA	LP5	EAR99	HMC511LP5E
14.5 - 15.0	7.25 - 7.5	VCO with Fo/2	9	-80	-105	+4.2V @ 150mA	LP4	EAR99	HMC736LP4E
14.9 - 15.5	7.45 - 7.75	VCO with Fo/2	9	-80	-105	+4.2V @ 150mA	LP4	EAR99	HMC737LP4E
VCOs with Fo/2 & +4									
8.45 - 9.55	4.225 - 4.775	VCO with Fo/2 & +4	13	-92	-116	+5V @ 315mA	LP5	3A001.a.11.b	HMC510LP5E
9.5 - 10.8	4.75 - 5.4	VCO with Fo/2 & +4	11	-85	-110	+5V @ 350mA	LP5	3A001.a.11.b	HMC530LP5E
9.6 - 10.8	4.8 - 5.4	VCO with Fo/2 & +4	9	-85	-111	+5V @ 330mA	LP5	3A001.a.11.b	HMC512LP5E
10.43 - 11.46	5.215 - 5.73	VCO with Fo/2 & +4	7	-85	-110	+3V @ 275mA	LP5	3A001.a.11.b	HMC513LP5E
10.6 - 11.8	5.3 - 5.9	VCO with Fo/2 & +4	11	-82	-110	+5V @ 350mA	LP5	3A001.a.11.b	HMC534LP5E
11.1 - 12.4	5.55 - 6.2	VCO with Fo/2 & +4	9	-83	-110	+5V @ 350mA	LP5	3A001.a.11.b	HMC582LP5E
11.17 - 12.02	5.585 - 6.01	VCO with Fo/2 & +4	7	-87	-110	+3V @ 275mA	LP5	3A001.a.11.b	HMC514LP5E
11.5 - 12.5	5.75 - 6.25	VCO with Fo/2 & +4	10	-83	-110	+5V @ 200mA	LP5	3A001.a.11.b	HMC515LP5E
11.5 - 12.8	5.75 - 6.4	VCO with Fo/2 & +4	11	-80	-110	+5V @ 350mA	LP5	3A001.a.11.b	HMC583LP5E
12.4 - 13.4	6.2 - 6.7	VCO with Fo/2 & +4	8	-83	-110	+5V @ 260mA	LP5	3A001.a.11.b	HMC529LP5E
12.5 - 13.9	6.25 - 6.95	VCO with Fo/2 & +4	10	-81	-110	+5V @ 330mA	LP5	3A001.a.11.b	HMC584LP5E
13.6 - 14.9	6.8 - 7.45	VCO with Fo/2 & +4	7	-82	-110	+5V @ 260mA	LP5	3A001.a.11.b	HMC531LP5E
14.25 - 15.65	7.125 - 7.825	VCO with Fo/2 & +4	9	-80	-107	+5V @ 350mA	LP5	3A001.a.11.b	HMC632LP5E
20.9 - 23.9	10.45 - 11.95	VCO with Fo/2 & ÷16	9	-65	-95	+5V @ 200mA	LP4	3A001.a.11.b	HMC738LP4E
23.8 - 26.8	11.9 - 13.4	VCO with Fo/2 & ÷16	8	-64	-93	+5V @ 200mA	LP4	3A001.a.11.b	HMC739LP4E

PHASE LOCKED OSCILLATOR

Fo Frequency (GHz)	Function	Fo Output Power (dBm)	10 kHz SSB Phase Noise (dBc/Hz)	100 kHz SSB Phase Noise (dBc/Hz)	Bias Supply	Package	ECCN Code	Part Number
14.7 - 15.4	Phase Locked Oscillator	9	-80	-110	+5V @ 340mA +12V @ 28mA	LP4	3A001.a.11.b	HMC535LP4E

Robust, High Performance RF to Light Solutions

Our hermetic module product line is expanding with two new module families. The new *SDLVA* joins our already popular amplifier, attenuator, DRO, high speed digital logic, frequency multiplier, MicroSynth® integrated synthesizer, mixer, phase shifter, prescaler, switch & VCO product portfolio. Utilizing our standard MMIC products, we take advantage of our design, manufacturing and quality knowledge base. Contact us to discuss your custom module requirements.



FEATURES:

- ◆ **Off-The-Shelf Availability**
- ◆ **Field Replaceable Connectors**
- ◆ **Hermetically Sealed**
- ◆ **Military & Space Upscreening**
- ◆ **Internal DC Power Regulation**
- ◆ **Customization Offered**

AMPLIFIERS

Frequency (GHz)	Function	Gain (dB)	OIP3 (dBm)	NF (dB)	P1dB (dBm)	Bias Supply	Package / Connector	ECCN Code	Part Number
1 - 12	Low Noise	16	30	1.8	16	+6V @ 60mA	C-10B / SMA	EAR99	HMC-C059
1.8 - 4.2	Low Noise	26	26	0.7	15.5	+8V @ 112mA	C-10 / SMA	EAR99	HMC-C045
5 - 9	Low Noise	24	25	1.4	15	+12V @ 105mA	C-10 / SMA	EAR99	HMC-C048
29 - 36	Low Noise	20	22	2.9	11	+3V @ 80mA	C-10 / 2.92mm	3A001.b.4.c	HMC-C027
2 - 20	Wideband LNA	15	25	2.5	14	+12V @ 65mA	C-1 / SMA	EAR99	HMC-C001
2 - 20	Wideband LNA	14	26	2	18	+12V @ 60mA	C-2 / SMA	EAR99	HMC-C002
2 - 20	Wideband LNA	14	27	2	16	+8V @ 75mA	C-2B / SMA	EAR99	HMC-C022
7 - 17	Wideband LNA	22	25	2	14	+8V @ 93mA	C-1 / SMA	EAR99	HMC-C016
17 - 27	Wideband LNA	18	25	3	14	+8V @ 96mA	C-1B / 2.92mm	EAR99	HMC-C017
0.01 - 15	Wideband Driver	16	33	3	23	+12V @ 195mA	C-3 / SMA	3A001.b.4.f	HMC-C004
0.01 - 15	Wideband Driver	15	30	3	23	+12V @ 225mA	C-3B / SMA	3A001.b.4.f	HMC-C024
2 - 35	Wideband Driver	12	29	3	18	+11V @ 92mA	C-10 / 2.92mm	3A001.b.4.c	HMC-C038
0.01 - 6.0	Power Amplifier, 1 Watt	13	40	5	29.5	-5V @ 5mA +15V @ 450mA	C-17 / SMA	EAR99	HMC-C074
0.01 - 6.0	Power Amplifier, 1 Watt	24	42	5	29.5	-5V @ 5mA +15V @ 740mA	C-17 / SMA	EAR99	HMC-C075
0.05 - 15	Wideband Power Amplifier, 1/2 Watt	12	36	4	28	+11V @ 360mA	C-10B / SMA	3A001.b.4.f	HMC-C036
0.05 - 15	Wideband Power Amplifier, 1/2 Watt	12	36	4	28	+11V @ 360mA	C-12 / SMA	3A001.b.4.f	HMC-C037
2 - 20	Wideband Power Amplifier	15	34	4	26	+12V @ 310mA	C-2 / SMA	3A001.b.4.f	HMC-C003
2 - 20	Wideband Power Amplifier	15	34	4	26	+12V @ 310mA	C-2B / SMA	3A001.b.4.f	HMC-C023
2 - 20	Wideband Power Amplifier	31	33	3	26	+12V @ 400mA	C-3B / SMA	3A001.b.4.f	HMC-C026
17 - 24	Wideband Power Amplifier	22	33	3.5	24	+8V @ 250mA	C-10 / 2.92mm	EAR99	HMC-C020
21 - 31	Wideband Power Amplifier	15	32	5	24	+8V @ 215mA	C-10 / 2.92mm	3A001.b.4.c	HMC-C021
0.8 - 2.0	10 Watt Power Amplifier	43	56	12	40	+12V @ 6.5A	C-7 / SMA	EAR99	HMC-C013

AMPLIFIERS - Low Phase Noise

Frequency (GHz)	Function	Gain / NF (dB)	OIP3 (dBm)	10 kHz Phase Noise (dBc/Hz)	P1dB / Psat (dBm)	Bias Supply	Package / Connector	ECCN Code	Part Number
1.5 - 5.0	Low Phase Noise	14 / 4.5	26.5	-171	17 / 22	+7V @ 170mA	C-16 / SMA	EAR99	HMC-C077
2 - 18	Low Phase Noise	13.5 / 5	22.5	-160	15 / 18.5	+5V @ 80mA	C-1 / SMA	EAR99	HMC-C050
4 - 8	Low Phase Noise	9 / 6	33	-168	22 / 25	+7V @ 300mA	C-16 / SMA	EAR99	HMC-C079
6 - 12	Low Phase Noise	11 / 4.5	34	-176	20 / 22	+7V @ 170mA	C-16 / SMA	EAR99	HMC-C072
7 - 11	Low Phase Noise	9 / 6	33	-170	22 / 25	+7V @ 300mA	C-16 / SMA	EAR99	HMC-C076

CONNECTORIZED MODULES

Robust, High Performance RF to Light Solutions

ATTENUATORS - Analog & Digital

Frequency (GHz)	Function	Loss (dB)	Attenuation Range (dB)	IIP3 (dBm)	Control Input (Vdc)	Package / Connector	ECCN Code	Part Number
DC - 20	Analog VVA	5.5	35	10	-5	C-10 / SMA	EAR99	HMC-C053
DC - 13	6-Bit Digital, Serial Control	3.6	0.5 to 31.5	32	Serial/CMOS	C-6 / SMA	EAR99	HMC-C018
DC - 13	6-Bit Digital	3.2	0.5 to 31.5	38	0 / +5V	C-6 / SMA	EAR99	HMC-C025

DIELECTRIC RESONATOR OSCILLATORS (DRO)

Frequency (GHz)	Function	Output Power (dBm)	10 kHz SSB Phase Noise (dBc/Hz)	100 kHz SSB Phase Noise (dBc/Hz)	Frequency Drift (ppm/°C)	Bias Supply	Package	ECCN Code	Part Number
8.0 - 8.3	Dielectric Resonator Oscillator	14.5	-122	-140	2	+6 to +15V @ 125mA	C-18 / SMA	EAR99	HMC-C200

FREQUENCY DIVIDERS (PRESCALERS)

Input Freq. (GHz)	Function	Input Power (dBm)	Output Power (dBm)	100 kHz SSB Phase Noise (dBc/Hz)	Bias Supply	Package / Connector	ECCN Code	Part Number
DC - 18	Divide-by-2	-15 to +10	-4	-150	+5V @ 75mA	C-1 / SMA	3A001.a.11.b	HMC-C005
DC - 18	Divide-by-4	-15 to +10	-4	-150	+5V @ 93mA	C-1 / SMA	3A001.a.11.b	HMC-C006
0.5 - 8	Divide-by-5	-15 to +10	-1	-155	+5V @ 80mA	C-1 / SMA	3A001.a.11.b	HMC-C039
DC - 18	Divide-by-8	-15 to +10	-4	-150	+5V @ 98mA	C-1 / SMA	3A001.a.11.b	HMC-C007
0.5 - 17	Divide-by-10	-15 to +10	-1	-155	+5V @ 152mA	C-1 / SMA	3A001.a.11.b	HMC-C040

FREQUENCY MULTIPLIERS - Active

Input Freq. (GHz)	Function	Output Freq. (GHz)	Input Power (dBm)	Output Power (dBm)	100 kHz SSB Phase Noise (dBc/Hz)	Package / Connector	ECCN Code	Part Number
3 - 5	x2 Active	6 - 10	3	17	-140	C-10 / SMA	EAR99	HMC-C031
9.0 - 14.5	x2 Active	18 - 29	3	16	-132	C-10 / 2.92mm	EAR99	HMC-C032
12.0 - 16.5	x2 Active	24 - 33	3	17	-132	C-10 / 2.92mm	EAR99	HMC-C033
16 - 23	x2 Active	32 - 46	3	13	-130	C-10 / 2.92mm	EAR99	HMC-C034
4.0 - 10.5	x2 Active	8 - 21	6	14	-142	C-10 / SMA	EAR99	HMC-C056

HIGH SPEED DIGITAL LOGIC

Data / Clock Rate (Gbps / GHz)	Function	Rise / Fall Time (ps)	Deterministic Jitter (ps)	Differential Output Swing (Vp-p)	DC Power (mW)	Vee Power Supply (Vdc)	Package / Connector	ECCN Code	Part Number
50 / 25	AND / NAND / OR / NOR	9 / 10	2	0.5	560	-3.3	C-13 / 1.85mm	3A001.a.11.b	HMC-C065
50 / 30	1:2 Fanout Buffer	9.5 / 11	2	0.5	455	-3.3	C-13 / 1.85mm	3A001.a.11.b	HMC-C062
43 / 43	D-Type Flip-Flop	9 / 10	1.5	0.5	580	-3.3	C-13 / 1.85mm	3A001.a.11.b	HMC-C060
50 / 25	D-Type Flip-Flop Double Edge Triggered	9 / 11	1.5	0.5	690	-3.3	C-13 / 1.85mm	3A001.a.11.b	HMC-C061
50 / 25	XOR / XNOR	6.5 / 10	2	0.5	550	-3.3	C-13 / 1.85mm	3A001.a.11.b	HMC-C064

I/Q MIXERS

RF / LO Frequency (GHz)	Function	IF Frequency (GHz)	Conversion Gain (dB)	Image Rejection (dB)	IIP3 (dBm)	Package / Connector	ECCN Code	Part Number
4 - 8.5	I/Q Mixer / IRM	DC - 3.5	-7.5	35	23	C-4 / SMA	EAR99	HMC-C009
6 - 10	I/Q Mixer / IRM	DC - 3.5	-7.5	35	25	C-4 / SMA	EAR99	HMC-C041
8.5 - 13.5	I/Q Mixer / IRM	DC - 2	-8	28	25	C-4 / SMA	EAR99	HMC-C042
11 - 16	I/Q Mixer / IRM	DC - 3.5	-9	30	28	C-4 / SMA	EAR99	HMC-C043
15 - 23	I/Q Mixer / IRM	DC - 3.5	-8	30	25	C-4 / 2.92mm & SMA	EAR99	HMC-C044
20 - 31	I/Q Mixer / IRM	DC - 4.5	-10	24	22.5	C-4B / 2.92mm & SMA	EAR99	HMC-C046
30 - 38	I/Q Mixer / IRM	DC - 3.5	-10.5	15	19	C-4 / 2.92mm & SMA	EAR99	HMC-C047

MIXERS

RF Frequency (GHz)	Function	IF Frequency (GHz)	Conversion Gain (dB)	LO/RF Isolation (dB)	IIP3 (dBm)	Package / Connector	ECCN Code	Part Number
7 - 14	+13 LO, DBL-BAL	DC - 5	-7	48	20	C-11 / SMA	EAR99	HMC-C049
11 - 20	+13 LO, DBL-BAL	DC - 6	-7	43	18	C-11 / SMA	EAR99	HMC-C051
16 - 32	+13 LO, DBL-BAL	DC - 8	-8	35	19	C-11 / 2.92mm & SMA	EAR99	HMC-C014
23 - 37	+13 LO, DBL-BAL	DC - 13	-9	35	19	C-11 / 2.92mm & SMA	EAR99	HMC-C035
24 - 38	+13 LO, DBL-BAL	DC - 8	-8.5	35	20	C-11 / 2.92mm & SMA	EAR99	HMC-C015

Robust, High Performance RF to Light Solutions

CONNECTORIZED MODULES

PHASE SHIFTERS - Analog

Frequency (GHz)	Function	Insertion Loss (dB)	Phase Range (deg)	2nd harmonic Pin = 10 dBm (dBC)	Control Voltage Range (Vdc)	Package / Connector	ECCN Code	Part Number
6 - 15	Analog	7	750° @ 6 GHz 450° @ 15 GHz	40	0V to +5V	C-1 / SMA	EAR99	HMC-C010

PHASE SHIFTERS - Digital

Frequency (GHz)	Function	Insertion Loss (dB)	Phase Range (deg)	IIP3 (dBm)	Control Voltage Range (Vdc)	Package / Connector	ECCN Code	Part Number
8 - 12	4-Bit Digital	7	22.5 to 360	38	0V to +5V	C-6 / SMA	EAR99	HMC-C055

SDLVAs - Successive Detection Log Video Amplifier - *New Product Line!*

Frequency (GHz)	Function	Dynamic Range (dB)	RSSI Slope (mV / dB)	RF Threshold Level (dBm)	Bias Supply	Package / Connector	ECCN Code	Part Number
1 - 20	SDLVA	59	14	-67	+12V @ 86mA	C-10 / 2.92mm	EAR99	HMC-C052
2 - 20	SDLVA * with Limited RF Output	50	45	-45	+12V @ 370mA -5V @ 20mA	C-21 / SMA	EAR99	HMC-C078

SWITCHES - SPST, SPDT & SP4T

Frequency (GHz)	Function	Insertion Loss (dB)	Isolation (dB)	Input P1dB (dBm)	Switching Speed (ns)	Package / Connector	ECCN Code	Part Number
DC - 20	SPST, Hi Isolation	3	100	23	8.5	C-9 / SMA	EAR99	HMC-C019
DC - 18	SPDT, Hi Isolation	2	55	27	3	C-14 / SMA	EAR99	HMC-C058
DC - 20	SPDT, Hi Isolation	2	40	23	5	C-5 / SMA	EAR99	HMC-C011
DC - 20	SP4T, Hi Isolation	3	40	24	14	C-15 / SMA	EAR99	HMC-C071

SYNTHESIZER MODULE - MicroSynth®

Frequency (GHz)	Function	Min. Step Size Resolution (Hz)	Reference Frequency (MHz)	SSB Phase Noise @ 100 kHz Offset (dBc/Hz)	Output Power (dBm)	Bias Supply	Package	ECCN Code	Part Number
NEW! 2 - 6	MicroSynth® Synthesizer	0.6	10	-93	17	+20V @ 7mA +6V @ 330mA	C-20 / SMA	EAR99	HMC-C083
5.5 - 10.5	MicroSynth® Synthesizer	1.2	10	-92	21	+20V @ 20mA +6V @ 300mA +3.6V @ 100mA	C-20 / SMA	EAR99	HMC-C070

VOLTAGE CONTROLLED OSCILLATORS

Frequency (GHz)	Function	Output Power (dBm)	10 kHz SSB Phase Noise (dBc/Hz)	100 kHz SSB Phase Noise (dBc/Hz)	Bias Supply	Package / Connector	ECCN Code	Part Number
4 - 8	Wideband VCO	20	-75	-95	+12V @ 185mA	C-1 / SMA	EAR99	HMC-C028
5 - 10	Wideband VCO	20	-64	-93	+12V @ 195mA	C-1 / SMA	EAR99	HMC-C029
8 - 12.5	Wideband VCO	21	-59	-83	+12V @ 195mA	C-1 / SMA	EAR99	HMC-C030
38.4 - 43.2	Wideband VCO	13	-74	-98	+5V @ 350mA	C-19 / 2.4mm	EAR99	HMC-C073



C-20



C-11



C-12

INSTRUMENTATION

Expanded Synthesized Signal Generator Family to 40 GHz

\$3,998

HMC-T2000
700 MHz to 8 GHz



\$7,998

HMC-T2100
10 MHz to 20 GHz



\$14,998

HMC-T2100B
10 MHz to 20 GHz
Battery Powered

Our Signal Generator Products

- ◆ **Versatile:** High Output Power Simplifies Test Set-Ups
- ◆ **Efficient:** Fast Frequency Switching of <math><500 \mu\text{s}</math>
- ◆ **Flexible:** Manual or USB / GPIB / Ethernet Control

NEW!

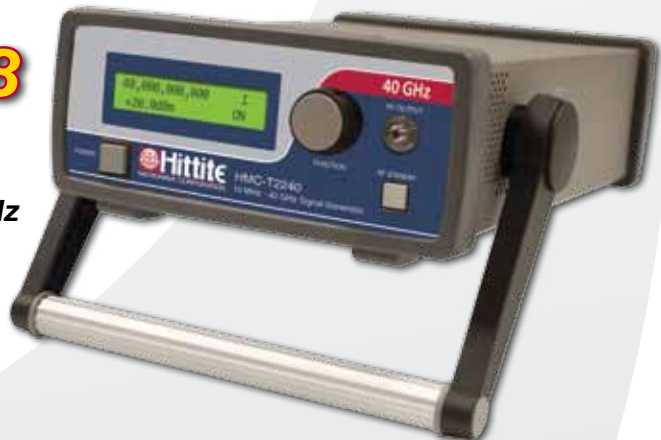
Delivery From Stock, Order Today!

HMC-T2240
10 MHz to 40 GHz

\$19,498

Performance

- ◆ **High Output Power:** +29 dBm @ 1 GHz
- ◆ **Excellent 10 GHz SSB Phase Noise:**
-96 dBc/Hz @ 10 kHz Offset
- ◆ **Spurious:** -65 dBc @ 10 GHz
- ◆ **Resolution:** 0.1 dB & 1 Hz

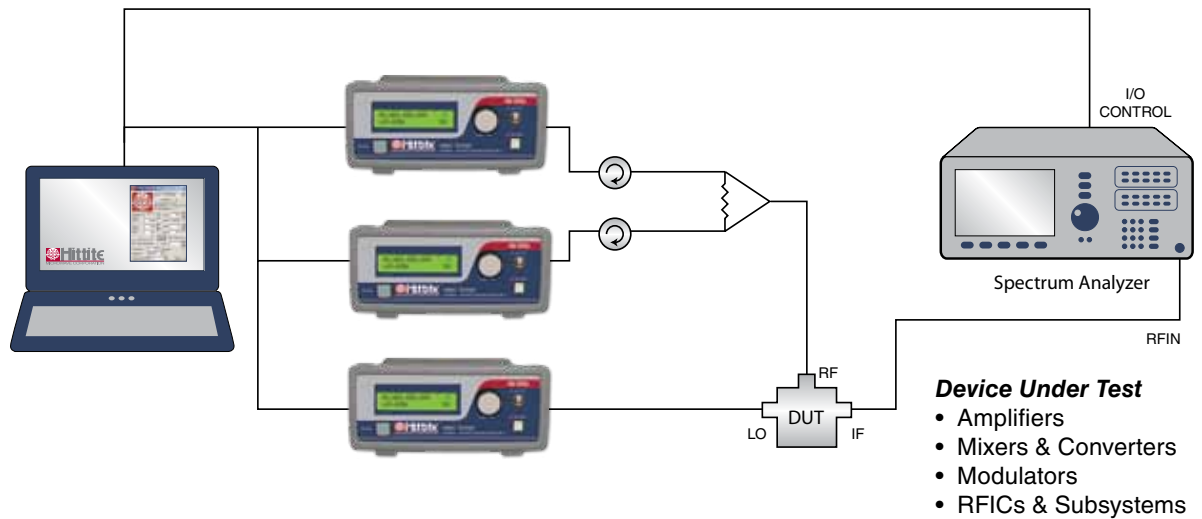


Expanded Synthesized Signal Generator Family to 40 GHz

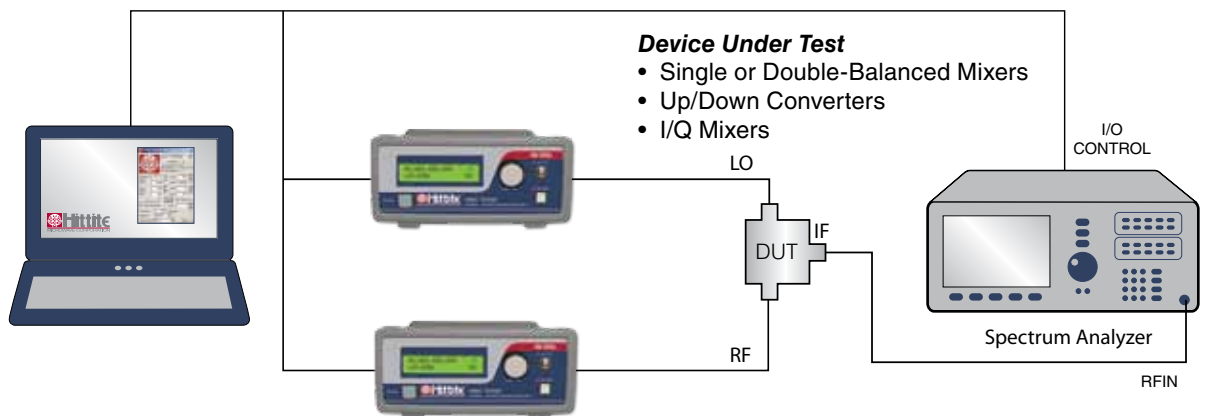
SIGNAL GENERATORS - Precise RF Signal Generation for ATE & Lab Environments

Frequency (GHz)	Function	Frequency Resolution (MHz)	Maximum Power Output (dBm)	100 kHz SSB Phase Noise (dBc/Hz)	Spurious @ 1 GHz (dBc)	Switching Speed @ 100 MHz Steps (µs)	Package	ECCN Code	Part Number
0.01 - 20	Signal Generator	0.01	+27 @ 2 GHz +25 @ 10 GHz	-113 @ 1 GHz -93 @ 10 GHz	-80	<300	Rack Mountable / Benchtop	EAR99	HMC-T2100
0.01 - 20	Portable Signal Generator	0.01	+27 @ 2 GHz +25 @ 10 GHz	-113 @ 1 GHz -93 @ 10 GHz	-80	300	Portable / Benchtop	EAR99	HMC-T2100B
NEW! 0.01 - 40	Signal Generator	1	+29 @ 1 GHz	-92 @ 10 GHz	-64	500	Rack Mountable / Benchtop	EAR99	HMC-T2240
0.7 - 8.0	Signal Generator	1	+17 @ 2 GHz +15 @ 4 GHz	-78 @ 1 GHz -87 @ 4 GHz	-57	<200	Rack Mountable / Benchtop	EAR99	HMC-T2000

Two Tone Third Order Intercept Test Set-up



Efficient Mixer Conversion Loss, Isolation & MxN Spurious Test Set-up



HMC-T2000, HMC-T2100 & HMC-T2240 Rack Mount Kit Available!



Dual Rack Mounting Plate 19" 2u Chassis

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MARKET & APPLICATION GUIDE

A selection of components, see the full product listing starting on page 10.

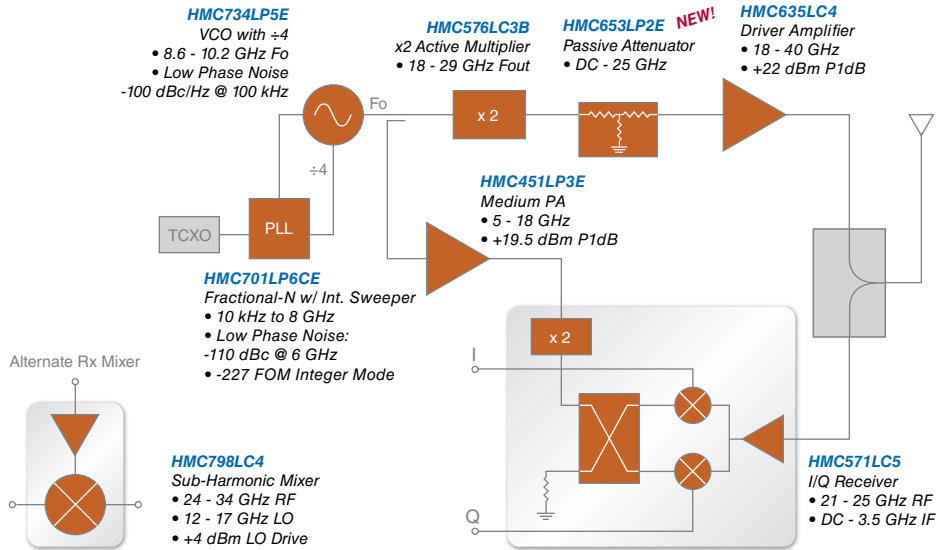
AUTOMOTIVE; DC - 6 GHz and 6 - 80 GHz

Function	DC - 6 GHz			6 - 80 GHz		
	Chip	SMT		Chip	SMT	
Active Bias Controller	HMC920LP5E	HMC920LP5E	HMC920LP5E	HMC920LP5E	HMC920LP5E	HMC920LP5E
Amplifiers	HMC396	HMC311LP3E	HMC474MP86E	HMC562	HMC383LC4	HMC464LP5E
Gain Blocks & Drivers	HMC405 HMC397	HMC311ST89E HMC313E HMC770LP4BE HMC788LP2E	HMC478MP86E HMC480ST89E	HMC465 HMC606	HMC442LC3B HMC451LC3 HMC462LP5E HMC463LP5E	HMC465LP5E HMC489LP5E HMC490LP5E HMC635LC4
Low Noise Amplifier	HMC392 HMC609 HMC594	HMC374E HMC392LH5 HMC548LP3E HMC667LP2E HMC758LP3E	HMC594LC3B HMC604LP3E HMC605LP3E HMC617LP3E	HMC565 HMC518 HMC263 HMC566 HMC-ALH508 HMC-ALH509	HMC341LC3B HMC504LC4B HMC516LC5 HMC519LC4	HMC517LC4 HMC565LC5
Linear & Power Amplifier	HMC459 HMC559 HMC606	HMC318MS8GE HMC320MS8GE HMC327MS8GE	HMC407MS8GE HMC409LP4E HMC606LC5	HMC464 HMC562 HMC592 HMC693 HMC-ABH264	HMC383LC4 HMC464LP5E HMC863LP4E HMC943LP5E	HMC489LP5E HMC498LC4 HMC499LC4 HMC757LP4E
Attenuator: Analog	HMC346	HMC346C8	HMC973LP3E	HMC712 HMC-VVD102 HMC-VVD104 HMC-VVD106	HMC812LC4	HMC712LP3CE
Attenuator: Digital		HMC425LP3E HMC467LP3E HMC468LP3E HMC540LP3E HMC629LP4E	HMC759LP3E HMC792LP4E	HMC939 HMC941	HMC424LP3E	
Frequency Divider & Detector	HMC361 HMC362	HMC432E HMC433E HMC862LP3E	HMC437MS8GE HMC438MS8GE HMC794LP3E	HMC363 HMC365	HMC447LC3 HMC492LP3E	HMC493LP3E HMC494LP4E
Frequency Multipliers: Active	HMC561	HMC369LP3E HMC370LP4E HMC443LP4E HMC695LP4E	HMC444LP4E HMC575LP4E HMC561LP3E	HMC449 HMC576 HMC579 HMC-XDH158	HMC370LP4E HMC449LC3B HMC573LC3B	HMC576LC3B HMC577LC4B HMC578LC3B
Frequency Multipliers: Passive	HMC156 HMC158	HMC156C8 HMC187AMS8E	HMC156C8 HMC188MS8E	HMC205 HMC331 HMC-XTB110 HMC-XTB112	HMC204MS8GE	
Mixer Fundamental	HMC128 HMC129 HMC557	HMC175MS8E HMC213AMS8E HMC218MS8E	HMC285E HMC488MS8GE HMC557LC4 HMC615LP4E	HMC292 HMC554 HMC560 HMC-MDB169 HMC-MDB277	HMC144LC4 HMC260LC3B HMC292LC3B	HMC329LC3B HMC554LC3B HMC560LM3
Mixers: I/Q, IRM, Sub-Harmonic & I/Q Upconverters/ Downconverters	HMC525 HMC620	HMC340ALP5E HMC525LC4	HMC620LC4	HMC339 HMC404 HMC556 HMC572 HMC-MDB171 HMC-MDB172 HMC-MDB207 HMC-MDB218	HMC258LM3 HMC264LC3B HMC265LM3 HMC338LC3B HMC709LC5 HMC815LC5 HMC869LC5	HMC522LC4 HMC523LC4 HMC528LC4 HMC572LC5 HMC710LC5 HMC798LC4
Modulator		HMC495LP3E HMC696LP4E HMC697LP4E	HMC497LP3E HMC696LP4E HMC697LP4E		HMC496LP3E	
PLLs: Synthesizer ICs		HMC698LP5E HMC699LP5E	HMC700LP4E HMC701LP6CE		HMC698LP5E HMC699LP5E	HMC701LP6CE HMC702LP6CE
Power Detector	HMC611	HMC601LP4E HMC713LP3E	HMC909LP4E HMC1010LP4E		HMC602LP4E HMC713MS8E	HMC611LP4E HMC662LP3E HMC948LP3E
Switch: SPST, SPNT, SPDT, SPDT T/R, Bypass, Diversity, Matrix & Transfer	HMC240 HMC322 HMC344 HMC641	HMC321LP4E HMC332E HMC336MS8GE HMC544E	HMC536MS8GE HMC550E HMC784MS8GE HMC849LP4CE	HMC232 HMC347 HMC607 HMC-SDD112	HMC232LP4E HMC321LP4E HMC344LP3E HMC641LP3E	HMC347LP3E HMC427LP3E HMC547LP3E
VGAs: Digital		HMC625LP4E HMC743LP6CE	HMC742LP5E			
VCO * Requires x2 or x4		HMC388LP4E HMC389LP4E HMC390LP4E	HMC391LP4E HMC431LP4E HMC586LC4B		HMC515LP5E* HMC531LP5E* HMC534LP4E HMC736LP4E	HMC535LP5E HMC587LC4B HMC588LC4B HMC737LP4E

AUTOMOTIVE

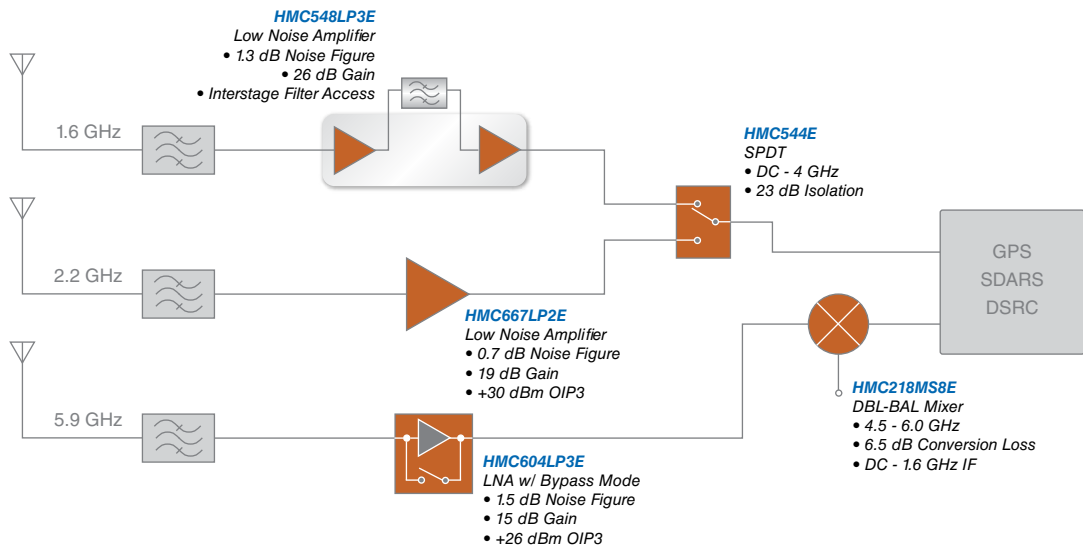
24 GHz FMCW AUTOMOTIVE SENSOR

AUTOMOTIVE



Typical Automotive application is illustrated.
See the full product listing for alternatives to the HMC products shown in each functional block.

GPS, SDARS & DSRC RF FRONT-END FOR TELEMATICS



Typical Automotive application is illustrated.
See the full product listing for alternatives to the select HMC products shown in each functional block.

MARKET & APPLICATION GUIDE

A selection of components, see the full product listing starting on page 10.

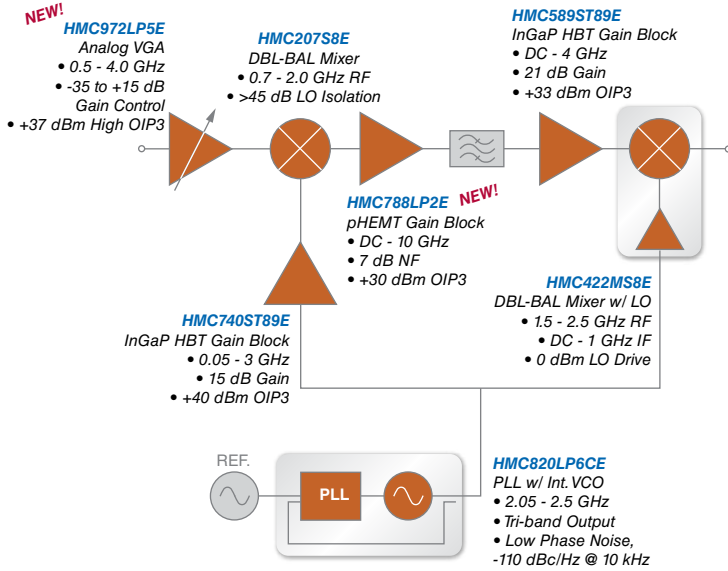
BROADBAND, DC - 11 GHz – CATV, DBS, VoIP, WiMAX, WiBro & WLAN

Function	0.005 - 2.15 GHz CATV & DBS	1.8 - 2.7 GHz WiMAX / WiBro	3.3 - 3.9 GHz WiMAX / WiBro	4.9 - 5.9 GHz WiMAX / Fixed
Active Bias Controller	HMC920LP5E	HMC920LP5E	HMC920LP5E	HMC920LP5E
Low Noise Amplifier	HMC548LP3E HMC549MS8GE HMC599ST89E	HMC286E HMC287MS8GE HMC605LP3E HMC636ST89E HMC639ST89E HMC715LP3E	HMC476SC70E HMC491LP3E HMC593LP3E HMC636ST89E HMC639ST89E HMC716LP3E	HMC318MS8GE HMC320MS8GE HMC476SC70E HMC604LP3E HMC717LP3E
Driver Amplifier & Gain Block	HMC311SC70E HMC454ST89E HMC474SC70E HMC475ST89E HMC476SC70E HMC589ST89E HMC770LP4BE HMC788LP2E	HMC308E HMC311SC70E HMC474SC70E HMC475ST89E HMC476SC70E HMC589ST89E HMC755LP4E HMC788LP2E	HMC311SC70E HMC326MS8GE HMC327MS8GE HMC474SC70E HMC475ST89E HMC476SC70E HMC788LP2E	HMC311SC70E HMC406MS8GE HMC407MS8GE HM415LP3E HMC474SC70E HMC476SC70E HMC788LP2E
Linear & Power Amplifier	HMC453QS16GE HMC636ST89E	HMC454ST89E HMC636ST89E HMC921LP4E	HMC409LP4E HMC636ST89E	HMC408LP3E
Attenuator: Analog	HMC473MS8E	HMC346MS8GE HMC973LP3E	HMC346MS8GE HMC973LP3E	HMC346MS8GE HMC973LP3E
Attenuator: Digital	HMC467LP3E HMC468LP3E HMC542LP4E HMC624LP4E HMC629LP4E HMC759LP3E	HMC305ALP4E HMC540LP3E HMC542LP4E HMC624LP4E HMC629LP4E HMC792LP4E	HMC424LP3E HMC467LP3E HMC539LP3E HMC624LP4E HMC629LP4E HMC792LP4E	HMC425LP3E HMC467LP3E HMC468LP3E HMC624LP4E HMC629LP4E HMC792LP4E
Mixer	HMC207S8E HMC208MS8E HMC400MS8E HMC483MS8GE	HMC215LP4E HMC285E HMC316MS8E HMC334LP4E HMC552LP4E HMC557 HMC557LC4 HMC622LP4E HMC688LP4E HMC689LP4E	HMC214MS8E HMC215LP4E HMC333E HMC340ALP5E HMC557 HMC557LC4 HMC615LP4E HMC622LP4E HMC666LP4E	HMC220MS8E HMC218MS8E HMC219MS8E HMC488MS8GE HMC525LC5 HMC557 HMC557LC4
Demodulator	HMC597LP4E	HMC597LP4E HMC631LP3E	HMC597LP4E	
Modulator	HMC495LP3E HMC497LP4E HMC696LP4E HMC795LP5E	HMC495LP3E HMC497LP4E HMC696LP4E HMC795LP5E	HMC495LP3E HMC497LP4E HMC697LP4E	HMC496LP3E
Phase Shifter: Digital		HMC647 HMC647LP6E	HMC648 HMC648LP6E HMC649 HMC649LP6E	HMC649 HMC649LP6E HMC638LP5E
PLL	HMC702LP6CE	HMC702LP6CE	HMC702LP6CE	HMC702LP6CE
Power Detector	HMC600LP4E HMC601LP4E HMC602LP4E HMC612LP4E HMC909LP4E HMC1010LP4E	HMC600LP4E HMC601LP4E HMC602LP4E HMC612LP4E HMC909LP4E HMC1010LP4E	HMC600LP4E HMC601LP4E HMC602LP4E HMC909LP4E HMC1010LP4E	HMC600LP4E HMC601LP4E HMC602LP4E HMC909LP4E
Switch: SPST & SPNT	HMC253QS24E HMC536LP2E HMC544E HMC550E HMC595 HMC784MS8GE HMC849LP4CE HMC922LP4E	HMC241LP3E HMC536MS8GE HMC546LP2E HMC550E HMC595 HMC646LP2E HMC784MS8GE HMC849LP4CE HMC922LP4E	HMC241LP3E HMC349MS8GE HMC536MS8GE HMC544E HMC550E HMC784MS8GE HMC849LP4CE HMC922LP4E	HMC224MS8E HMC321LP4E HMC347LP3E HMC536LP2E HMC536MS8GE HMC550E HMC849LP4CE
Switch: Bypass, Diversity, Matrix & Transfer	HMC276LP4E HMC427LP3E HMC596LP4E	HMC276LP4E HMC427LP3E HMC596LP4E	HMC427LP3E	HMC427LP3E
VCO	HMC384LP4E	HMC384LP4E HMC385LP4E	HMC388LP4E HMC389LP4E HMC390LP4E	HMC430LP4E HMC431LP4E
VGA	HMC625LP5E HMC626LP5E HMC627LP5E HMC628LP4E HMC743LP6CE	HMC625LP5E HMC680LP4E HMC681LP5E HMC742LP5E HMC743LP6CE	HMC625LP5E HMC680LP4E HMC681LP5E HMC742LP5E HMC743LP6CE	HMC625LP5E HMC680LP4E HMC681LP5E

BROADBAND

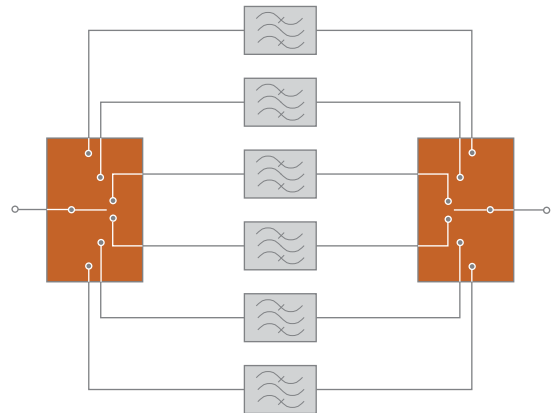
CABLE MODEM, CATV, DBS & VoIP SOLUTIONS, 5 - 2150 MHz

Cable Modem Termination System (CMTS)



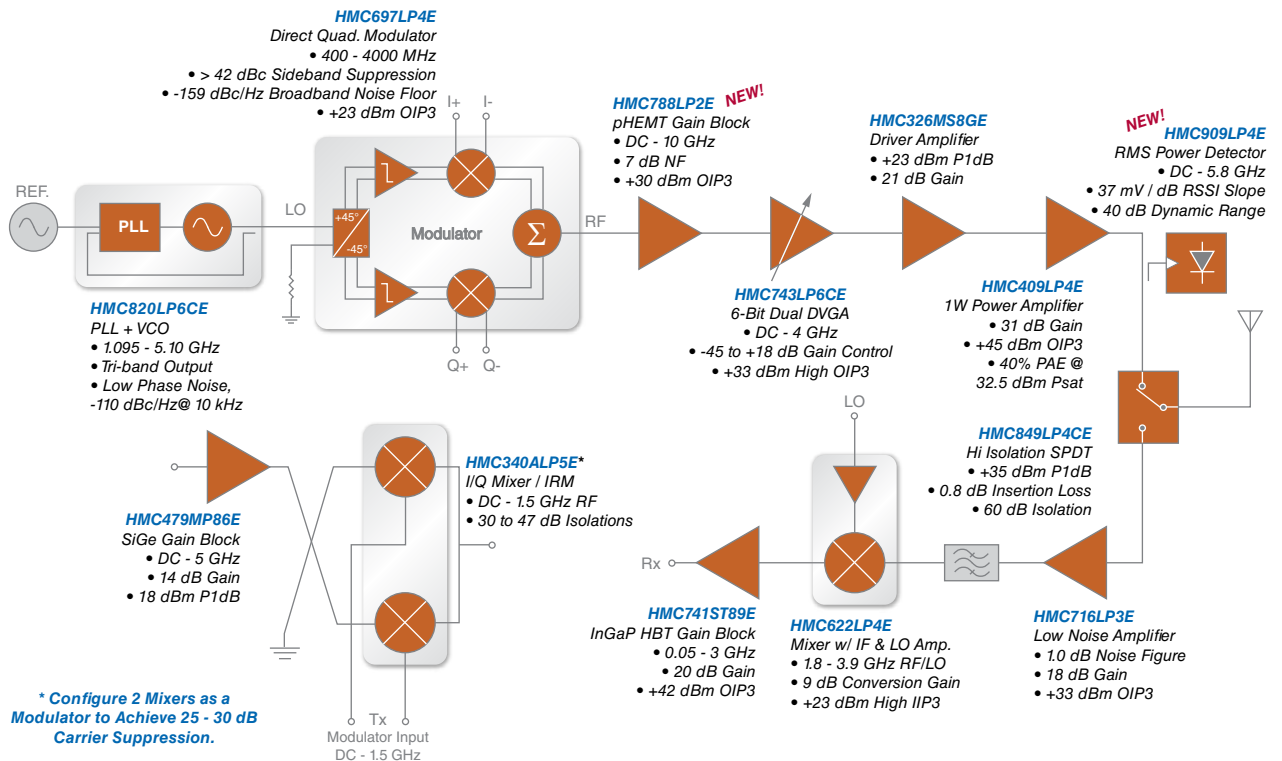
A Selection of SPNT Switches for CATV Filter & Signal Routing

Part Number	Frequency (GHz)	Function	1 GHz Loss / Isolation (dB)
HMC348LP3E	DC - 2.5	SPDT, 75 Ω	0.6 / 58
HMC349LP4CE	DC - 4	SPDT	0.9 / 65
HMC347LP3E	DC - 14	SPDT	1.4 / 65
HMC245QS16GE	DC - 3.5	SP3T	0.5 / 44
HMC345LP3E	DC - 8	SP4T	2.0 / >50
HMC252QS24E	DC - 3	SP6T	2.0 / >45
HMC321LP4E	DC - 8	SP8T	2.0 / >45



Typical Broadband applications are illustrated. See the full product listing for alternatives to the select HMC products shown in each functional block.

WiMAX & FIXED WIRELESS, 2 - 6 GHz



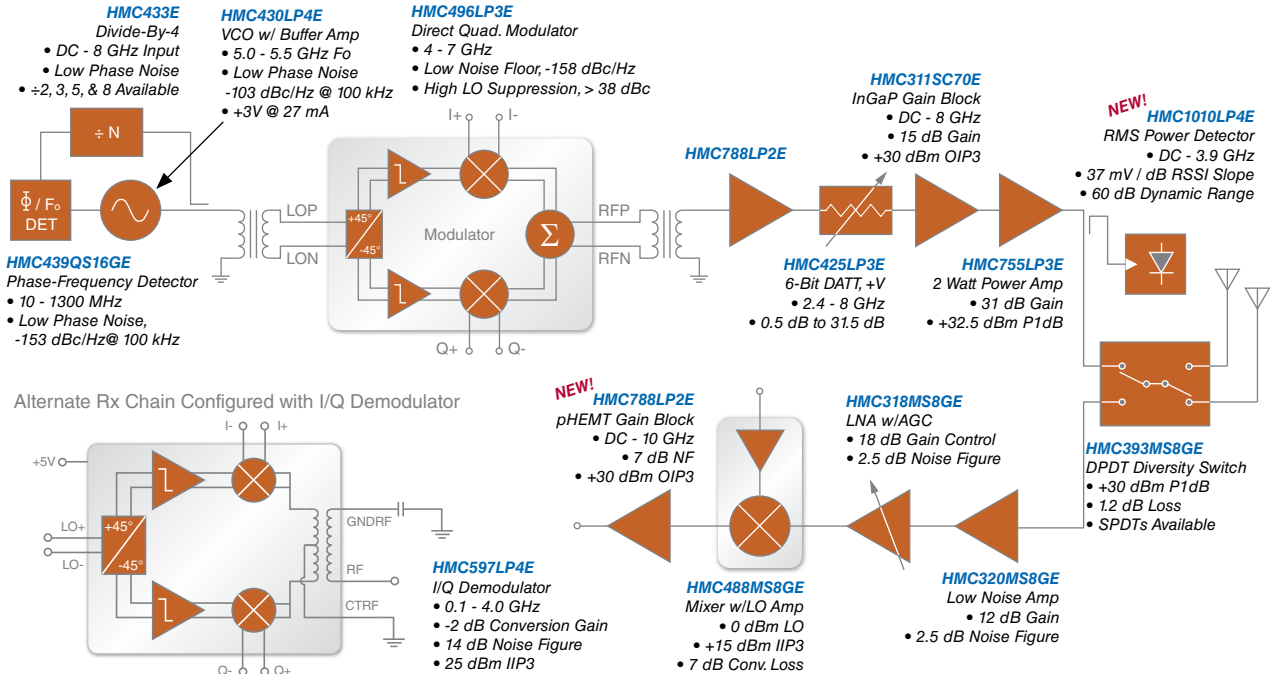
* Configure 2 Mixers as a Modulator to Achieve 25 - 30 dB Carrier Suppression.

Typical WiMAX / FWA Transceiver is illustrated. See the full product listing for alternatives to the select HMC products shown in each functional block.

MARKET & APPLICATION GUIDE

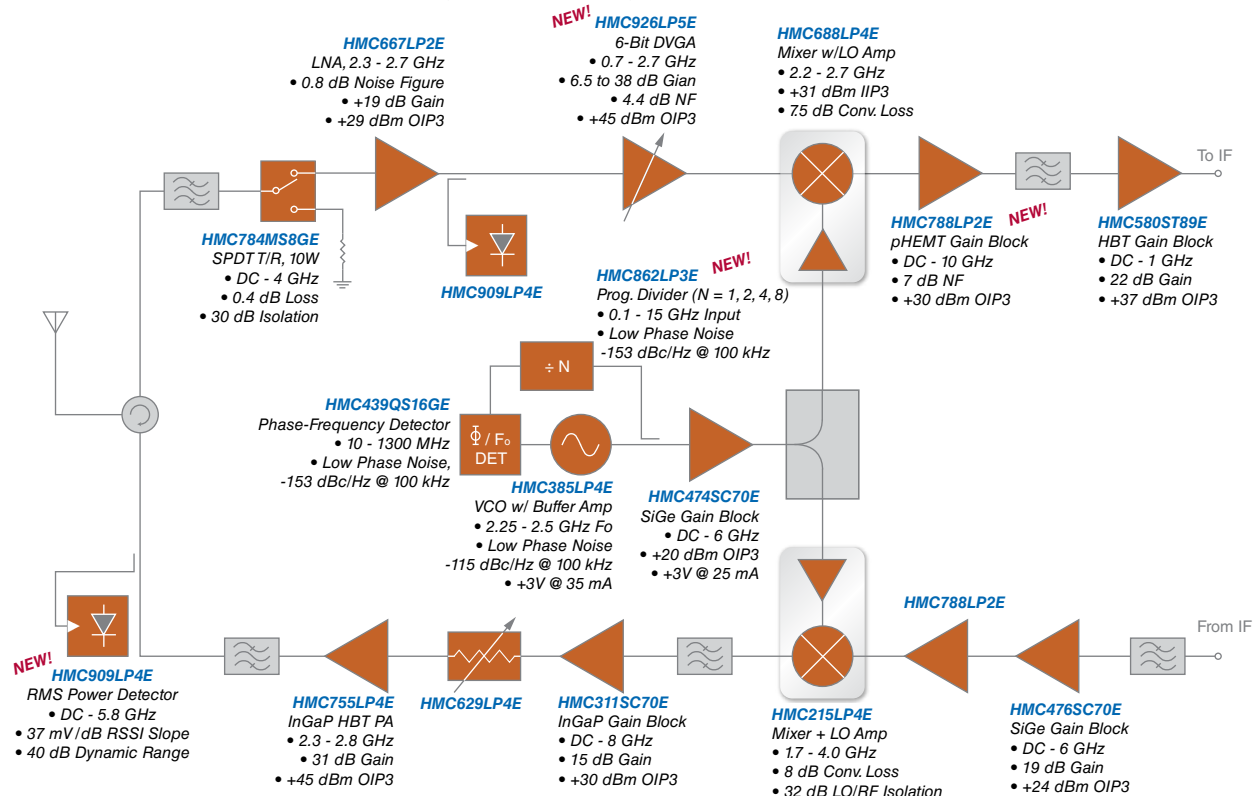
Broadband, DC - 11 GHz

WIRELESSLAN, UWB, UNII & ISM SOLUTIONS, 2.4, 4.9, 5.4, 5.8 & 3 - 11 GHz



Typical 4.9 - 5.9 GHz Wi-Fi Access Point application is illustrated. See the full product listing for alternatives to the select HMC products shown in each functional block.

WiBro "WIRELESS BROADBAND", 1.82 - 1.87, 2.3 - 2.5 & 3.48 - 3.52 GHz



Typical WiBro application is illustrated. See the full product listing for alternatives to the select HMC products shown in each functional block.

A selection of components, see the full product listing starting on page 10.

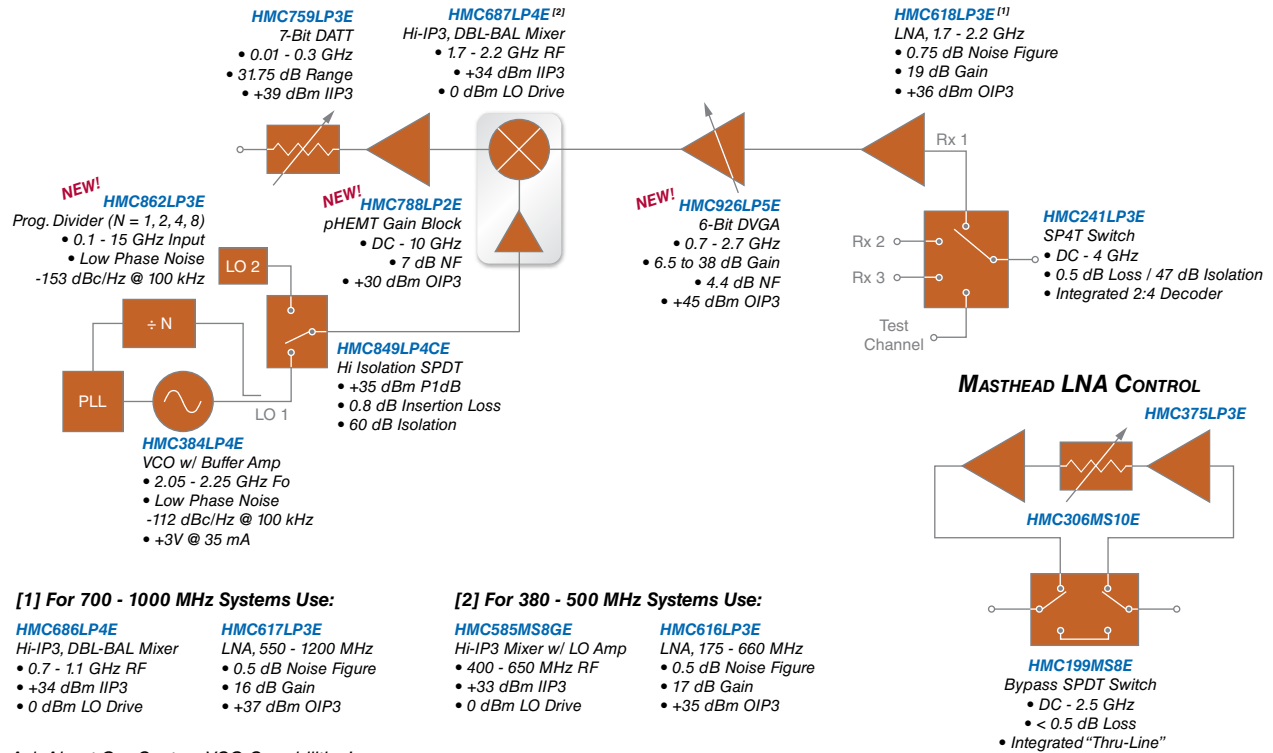
**CELLULAR INFRASTRUCTURE,
380 - 2200 MHz – GSM, GPRS, CDMA, TD-SCDMA, WCDMA, UMTS & 4G /LTE**

Function	400 MHz	700 / 800 / 900 MHz	1800 / 1900 MHz	2100 / 2200 MHz
Active Bias Controller	HMC920LP5E	HMC920LP5E	HMC920LP5E	HMC920LP5E
Low Noise Amplifier	HMC374E HMC616LP3E HMC636ST89E	HMC617LP3E HMC636ST89E HMC718LP4E	HMC618LP3E HMC636ST89E HMC719LP4E	HMC618LP3E HMC636ST89E HMC667LP2E
Driver Amplifier & Gain Block	HMC311SC70E HMC454ST89E HMC475ST89E HMC476SC70E HMC478ST89E HMC580ST89E	HMC308E HMC311SC70E HMC454ST89E HMC475ST89E HMC476SC70E HMC589ST89E	HMC308E HMC311SC70E HMC454ST89E HMC475ST89E HMC476SC70E HMC589ST89E	HMC308E HMC311SC70E HMC454ST89E HMC475ST89E HMC476SC70E HMC589ST89E
Linear & Power Amplifier	HMC452ST89E HMC453ST89E HMC454ST89E HMC636ST89E	HMC452ST89E HMC453ST89E HMC454ST89E HMC636ST89E HMC921LP4E	HMC452ST89E HMC453ST89E HMC454ST89E HMC457QS16GE HMC636ST89E HMC921LP4E	HMC452ST89E HMC453ST89E HMC454ST89E HMC636ST89E HMC921LP4E
Attenuator: Analog	HMC473MS8E HMC973LP3E	HMC473MS8E HMC973LP3E	HMC973LP3E	HMC973LP3E
Attenuator: Digital	HMC540LP3E HMC541LP3E HMC472LP4E HMC542LP4E HMC624LP4E HMC629LP4E HMC759LP3E HMC792LP4E	HMC540LP3E HMC541LP3E HMC467LP3E HMC542LP4E HMC624LP4E HMC629LP4E HMC759LP3E HMC792LP4E	HMC539LP3E HMC541LP3E HMC468LP3E HMC542LP4E HMC624LP4E HMC629LP4E HMC759LP3E HMC792LP4E	HMC539LP3E HMC541LP3E HMC542LP4E HMC624LP4E HMC629LP3E HMC792LP4E
Frequency Divider & Detector	HMC394LP4E HMC434E HMC439QS16GE HMC705LP5E	HMC394LP4E HMC434E HMC439QS16GE HMC705LP5E	HMC394LP4E HMC434E HMC439QS16GE HMC705LP5E	HMC394LP4E HMC434E HMC439QS16GE HMC705LP5E
Mixer	HMC387MS8E HMC585MS8GE	HMC334LP4E HMC399MS8E HMC423MS8E HMC483MS8GE HMC551LP4E HMC581LP6E HMC621LP4E HMC665LP4E HMC683LP6E HMC684LP4E HMC686LP4E	HMC215LP4E HMC334LP4E HMC381LP6E HMC400MS8E HMC485MS8GE HMC552LP4E HMC622LP4E HMC623LP4E HMC682LP6E HMC685LP4E HMC687LP4E	HMC215LP4E HMC334LP4E HMC400MS8E HMC421QS16GE HMC422MS8E HMC615LP4 HMC622LP4E HMC688LP4E HMC689LP4E
Demodulator	HMC597LP4E	HMC597LP4E	HMC597LP4E	HMC597LP4E
Modulator: Direct Quadrature & Vector	HMC495LP3E HMC497LP4E HMC696LP4E HMC697LP4E HMC795LP5E	HMC495LP3E HMC497LP4E HMC630LP3E HMC696LP4E HMC697LP4E HMC795LP5E	HMC495LP3E HMC497LP4E HMC631LP3E HMC696LP4E HMC697LP4E HMC795LP5E	HMC495LP3E HMC497LP4E HMC631LP3E HMC696LP4E HMC697LP4E HMC795LP5E
PLL: Synthesizer ICs	HMC701LP6CE	HMC701LP6CE	HMC701LP6CE	HMC701LP6CE
Power Detector	HMC600LP4E HMC601LP4E HMC602LP4E HMC611LP4E HMC612LP4E HMC909LP4E HMC1010LP4E	HMC600LP4E HMC601LP4E HMC602LP4E HMC611LP4E HMC612LP4E HMC909LP4E HMC1010LP4E	HMC600LP4E HMC601LP4E HMC602LP4E HMC611LP4E HMC612LP4E HMC909LP4E HMC1010LP4E	HMC600LP4E HMC601LP4E HMC602LP4E HMC611LP4E HMC612LP4E HMC909LP4E HMC1010LP4E
Switch: SPST & SPNT	HMC546MS8GE HMC550E HMC646LP2E HMC784MS8GE HMC849LP4CE	HMC550E HMC574MS8E HMC646LP2E HMC784MS8GE HMC849LP4CE	HMC545E HMC546MS8GE HMC646LP2E HMC784MS8GE HMC849LP4CE	HMC546LP2E HMC550E HMC646LP2E HMC784MS8GE HMC849LP4CE
Switch: Bypass, Diversity, Matrix & Transfer	HMC199MS8E HMC596LP4E	HMC199MS8E HMC596LP4E	HMC199MS8E HMC596LP4E	HMC199MS8E HMC596LP4E
VGA	HMC625LP5E HMC626LP5E HMC627LP5E HMC628LP4E HMC680LP4E HMC681LP5E HMC972LP5E	HMC625LP5E HMC626LP5E HMC627LP5E HMC628LP4E HMC680LP4E HMC681LP5E HMC926LP5E HMC972LP5E	HMC625LP5E HMC626LP5E HMC627LP5E HMC628LP4E HMC680LP4E HMC681LP5E HMC926LP5E HMC972LP5E	HMC625LP5E HMC626LP5E HMC627LP5E HMC628LP4E HMC680LP4E HMC681LP5E HMC926LP5E HMC972LP5E

MARKET & APPLICATION GUIDE

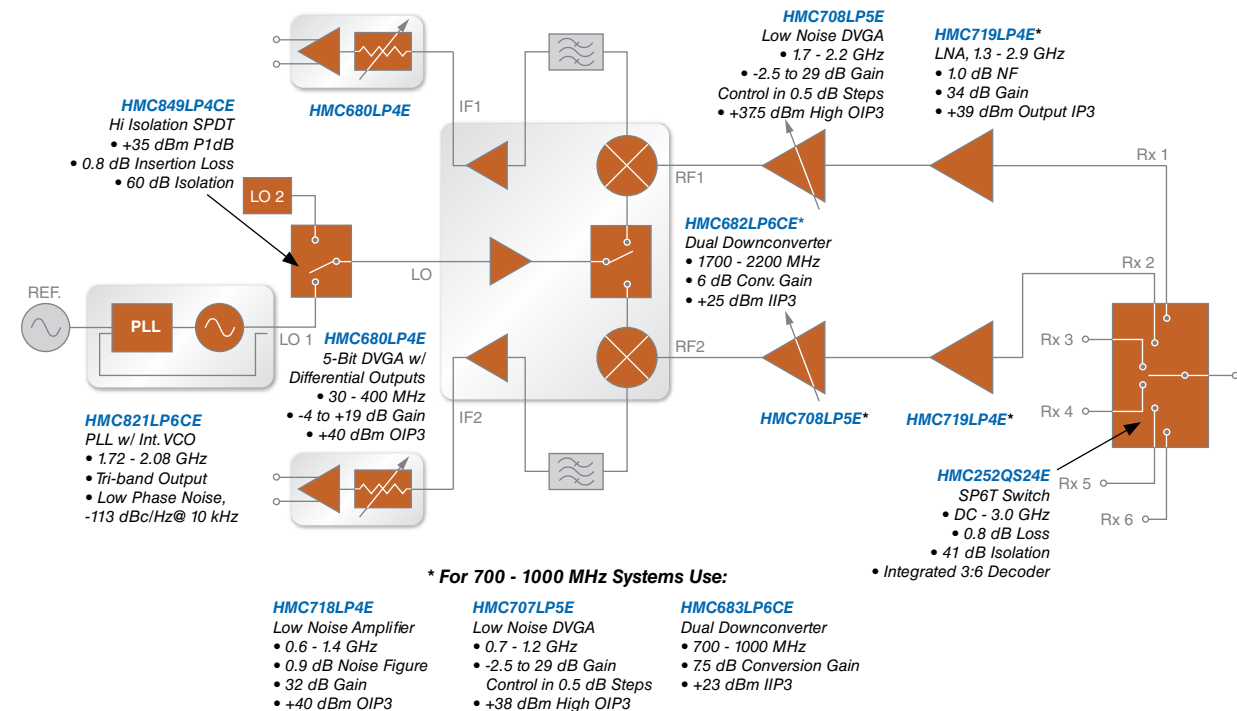
Cellular Infrastructure, 380 - 2200 MHz

BTS RECEIVER SOLUTIONS FEATURING HIGH IP3 MIXER



Ask About Our Custom VCO Capabilities!

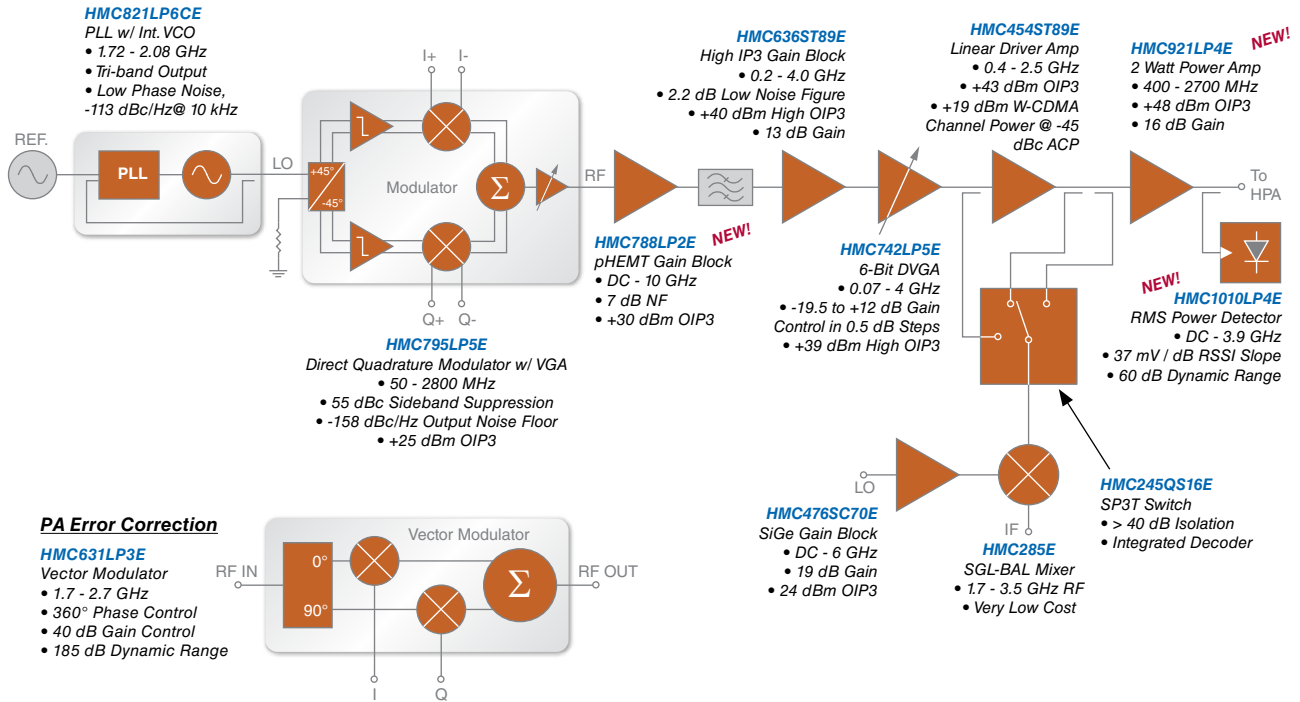
BTS RECEIVER SOLUTIONS FEATURING DUAL RFIC DOWNCONVERTER



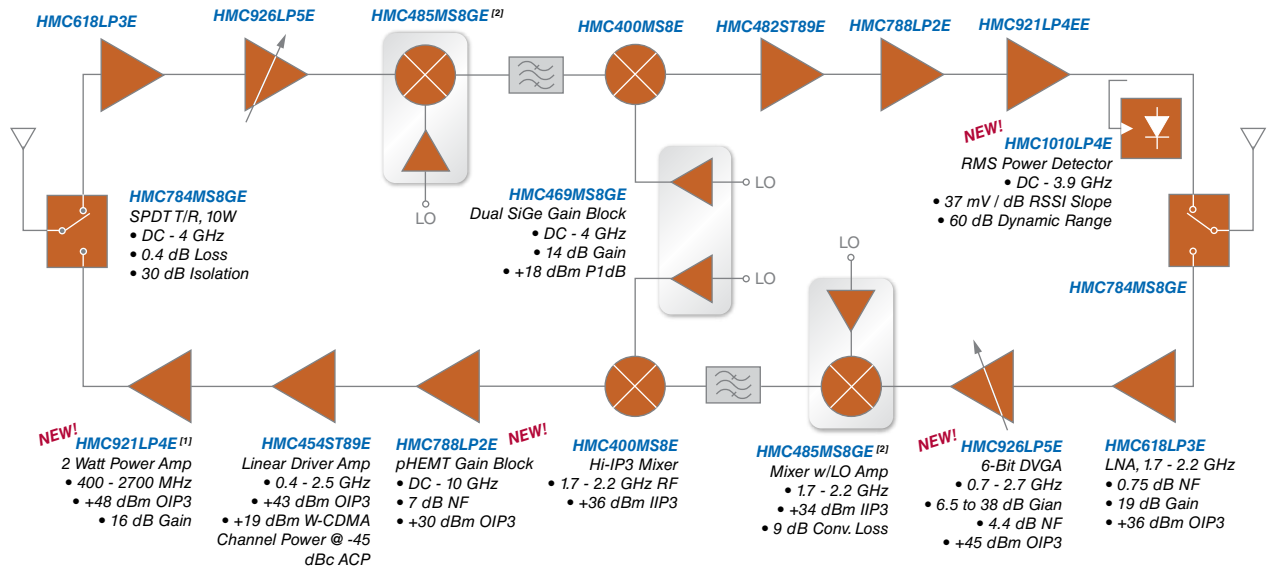
Typical Cellular/PCS/3G applications are illustrated.

See the full product listing for alternatives to the select HMC products shown in each functional block.

BTS TRANSMITTER SOLUTIONS



CDMA / GSM / TD-SCDMA REPEATER SOLUTIONS



[1] High Gain Option:

- HMC457QS16GE**
1 Watt Power Amp
• 1.7 - 2.2 GHz
• +46 dBm OIP3
• 26 dB Gain

[2] For 700 - 1000 MHz Systems Use:

- HMC483MS8GE**
Mixer w/LO Amp
• 0.7 - 1.4 GHz
• +35 dBm IIP3

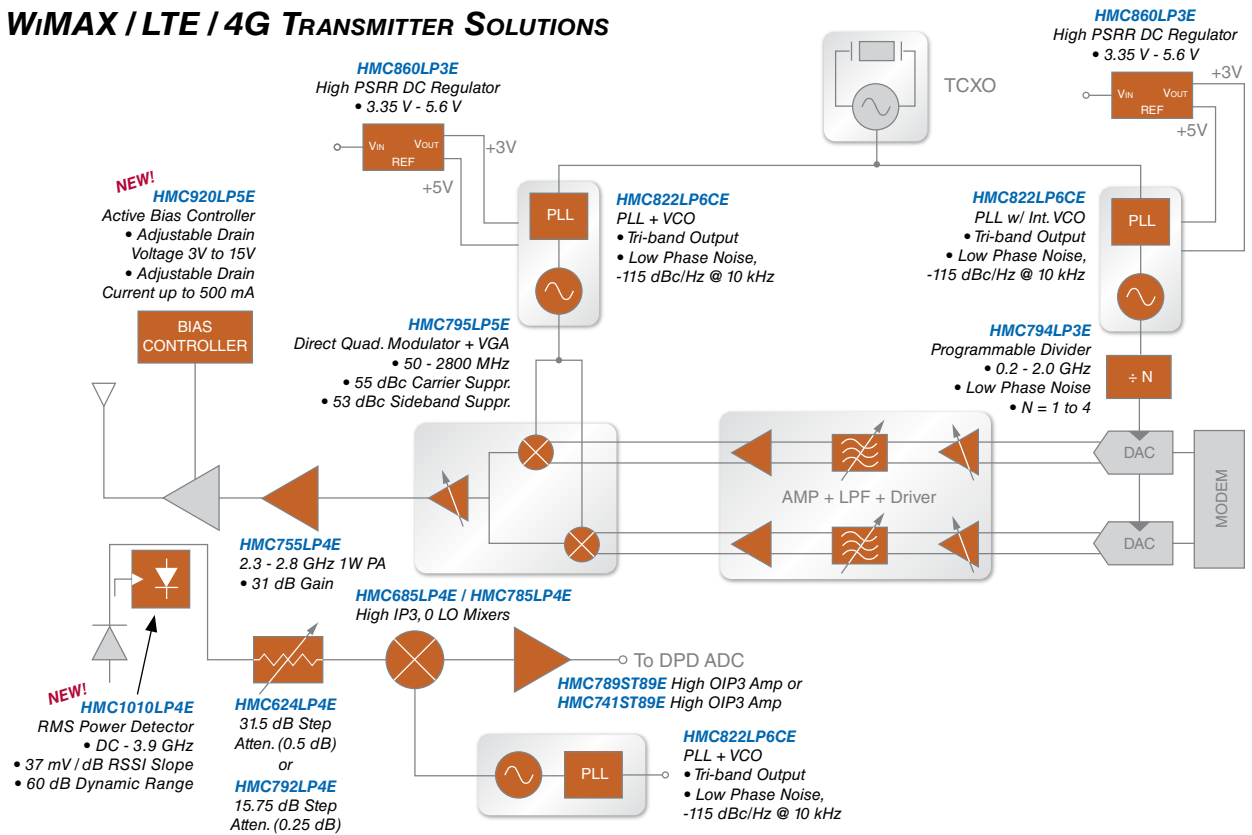
Typical Cellular/PCS/3G applications are illustrated.

See the full product listing for alternatives to the select HMC products shown in each functional block.

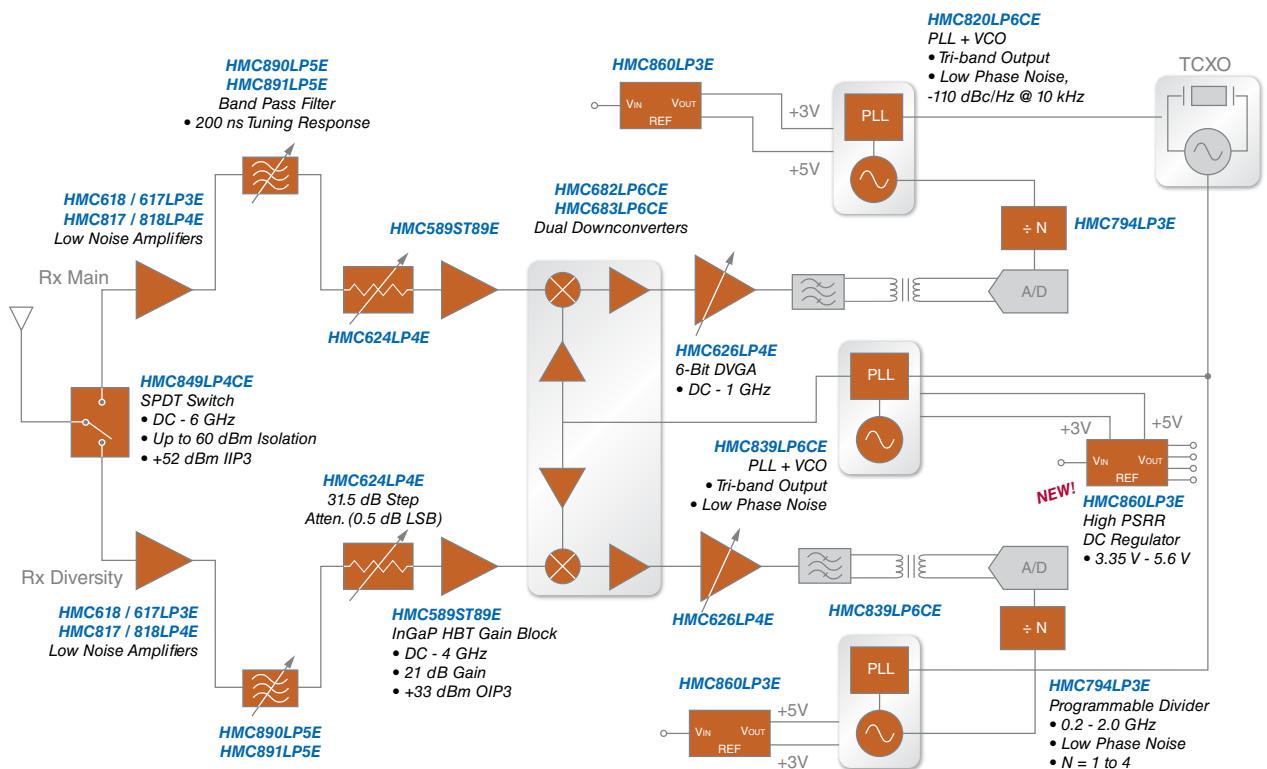
MARKET & APPLICATION GUIDE

Cellular Infrastructure, 380 - 2200 MHz

WiMAX / LTE / 4G TRANSMITTER SOLUTIONS



WiMAX / LTE / 4G RECEIVER SOLUTIONS FEATURING HETERODYNE DOWNCONVERSION



Typical WiMAX/LTE/4G applications are illustrated. See the full product listing for alternatives to the select HMC products shown in each functional block.

A selection of components, see the full product listing starting on page 10.

FIBER OPTICS, OC-48 to 100G

Fiber Optic Custom Solutions Inquiries: FO@hittite.com

Function	OC-1	OC-3	OC-12	OC-48	OC-192	OC-768	
Active Bias Controller	HMC920LP5E	HMC920LP5E	HMC920LP5E	HMC920LP5E	HMC920LP5E	HMC920LP5E	
Broadband Gain Blocks	HMC311SC70E HMC396 HMC405 HMC474MP86E HMC474SC70E HMC475ST89E HMC476SC70E HMC478SC70E	HMC311SC70E HMC396 HMC405 HMC474MP86E HMC474SC70E HMC475ST89E HMC476SC70E HMC478SC70E	HMC311SC70E HMC396 HMC405 HMC474MP86E HMC474SC70E HMC475ST89E HMC476SC70E HMC478SC70E	HMC311SC70E HMC396 HMC405 HMC474MP86E HMC474SC70E HMC475ST89E HMC476SC70E HMC478SC70E	HMC311SC70E HMC396 HMC405 HMC474MP86E HMC474SC70E HMC475ST89E HMC476SC70E HMC478SC70E	HMC405	
Limiting Amplifiers	HMC750LP4E HMC865LC3C HMC866LC3C HMC914LP4E	HMC750LP4E HMC865LC3C HMC866LC3C HMC914LP4E	HMC750LP4E HMC865LC3C HMC866LC3C HMC914LP4E	HMC750LP4E HMC865LC3C HMC866LC3C HMC914LP4E	HMC750LP4E HMC865LC3C HMC866LC3C HMC914LP4E	HMC750LP4E HMC865LC3C HMC866LC3C HMC914LP4E	HMC865LC3C HMC866LC3C
Linear & Power Amplifiers	HMC441LC3B HMC441LP3E HMC441LH5 HMC441LM1 HMC498LC4 HMC442LM1 HMC442LC3B HMC499LC4	HMC441LC3B HMC441LP3E HMC441LH5 HMC441LM1 HMC498LC4 HMC442LM1 HMC442LC3B HMC499LC4	HMC441LC3B HMC441LP3E HMC441LH5 HMC441LM1 HMC498LC4 HMC442LM1 HMC442LC3B HMC499LC4	HMC441LC3B HMC441LP3E HMC441LH5 HMC441LM1 HMC498LC4 HMC442LM1 HMC442LC3B HMC499LC4	HMC441LC3B HMC441LP3E HMC441LH5 HMC441LM1 HMC498LC4 HMC442LM1 HMC442LC3B HMC499LC4	HMC441LC3B HMC441LP3E HMC441LH5 HMC441LM1 HMC498LC4 HMC442LM1 HMC442LC3B HMC499LC4	HMC441LC3B HMC441LP3E HMC441LH5 HMC441LM1 HMC498LC4 HMC442LM1 HMC442LC3B HMC499LC4
Low Noise Amplifiers	HMC517LC4 HMC564LC4	HMC517LC4 HMC564LC4	HMC517LC4 HMC564LC4	HMC517LC4 HMC564LC4	HMC517LC4 HMC564LC4	HMC517LC4 HMC564LC4	
Microwave & Optical Amplifiers	HMC870LC5 HMC871LC5	HMC870LC5 HMC871LC5	HMC870LC5 HMC871LC5	HMC870LC5 HMC871LC5	HMC870LC5 HMC871LC5		
Transimpedance Amplifier	HMC799LP3E HMC690	HMC799LP3E HMC690	HMC690	HMC690	HMC690		
Wideband (Distributed) & Driver Amplifiers	HMC-AUH312 HMC-AUH232 HMC-AUH249 HMC633LC4 HMC634LC4 HMC635LC4	HMC-AUH312 HMC-AUH232 HMC-AUH249	HMC-AUH312 HMC-AUH232 HMC-AUH249	HMC-AUH312 HMC-AUH232 HMC-AUH249	HMC-AUH312 HMC-AUH232 HMC-AUH249	HMC-AUH312	
Connectorized Amplifier Modules	HMC-C004 HMC-C036 HMC-C037	HMC-C004 HMC-C036 HMC-C037	HMC-C004 HMC-C036 HMC-C037	HMC-C004 HMC-C036 HMC-C037	HMC-C004 HMC-C036 HMC-C037		
Broadband Time Delays	HMC856LC5 HMC910LC4B	HMC856LC5 HMC910LC4B	HMC856LC5 HMC910LC4B	HMC856LC5 HMC910LC4B	HMC856LC5 HMC910LC4B	HMC856LC5 HMC910LC4B	
Attenuators: Analog	HMC346 HMC346G8 HMC346LP3E HMC346MS8GE	HMC346 HMC346G8 HMC346LP3E HMC346MS8GE	HMC346 HMC346G8 HMC346LP3E HMC346MS8GE	HMC346 HMC346G8 HMC346LP3E HMC346MS8GE	HMC346 HMC346LP3	HMC-VVD104 HMC-VVD106	
Attenuators: Digital	HMC424 HMC424LH5 HMC424LP3E HMC542LP4E HMC624LP4E HMC629LP4E	HMC424 HMC424LH5 HMC424LP3E HMC542LP4E HMC624LP4E HMC629LP4E	HMC424 HMC424LH5 HMC424LP3E HMC542LP4E HMC624LP4E HMC629LP4E	HMC424 HMC424LH5 HMC424LP3E HMC542LP4E HMC624LP4E HMC629LP4E	HMC424 HMC424LH5 HMC424LP3E		
Attenuators: Passive	HMC650 - HMC655 HMC656LP2E HMC657LP2E HMC658LP2E	HMC650 - HMC655 HMC656LP2E HMC657LP2E HMC658LP2E	HMC650 - HMC655 HMC656LP2E HMC657LP2E HMC658LP2E	HMC650 - HMC655 HMC656LP2E HMC657LP2E HMC658LP2E	HMC650 - HMC655 HMC656LP2E HMC657LP2E HMC658LP2E	HMC650 - HMC655 HMC656 HMC657 HMC658	
Connectorized Attenuator Modules	HMC-C018 HMC-C053	HMC-C018 HMC-C053	HMC-C018 HMC-C053	HMC-C018 HMC-C053	HMC-C025 HMC-C053		
Frequency Dividers & Detectors	HMC394LP4E HMC439QS16GE HMC440QS16GE HMC492LP3E HMC493LP3E HMC494LP4E	HMC394LP4E HMC439QS16GE HMC440QS16GE HMC492LP3E HMC493LP3E HMC494LP4E	HMC394LP4E HMC439QS16GE HMC440QS16GE HMC492LP3E HMC493LP3E HMC494LP4E	HMC394LP4E HMC439QS16GE HMC440QS16GE HMC492LP3E HMC493LP3E HMC494LP4E	HMC440QS16GE HMC492LP3E		

MARKET & APPLICATION GUIDE

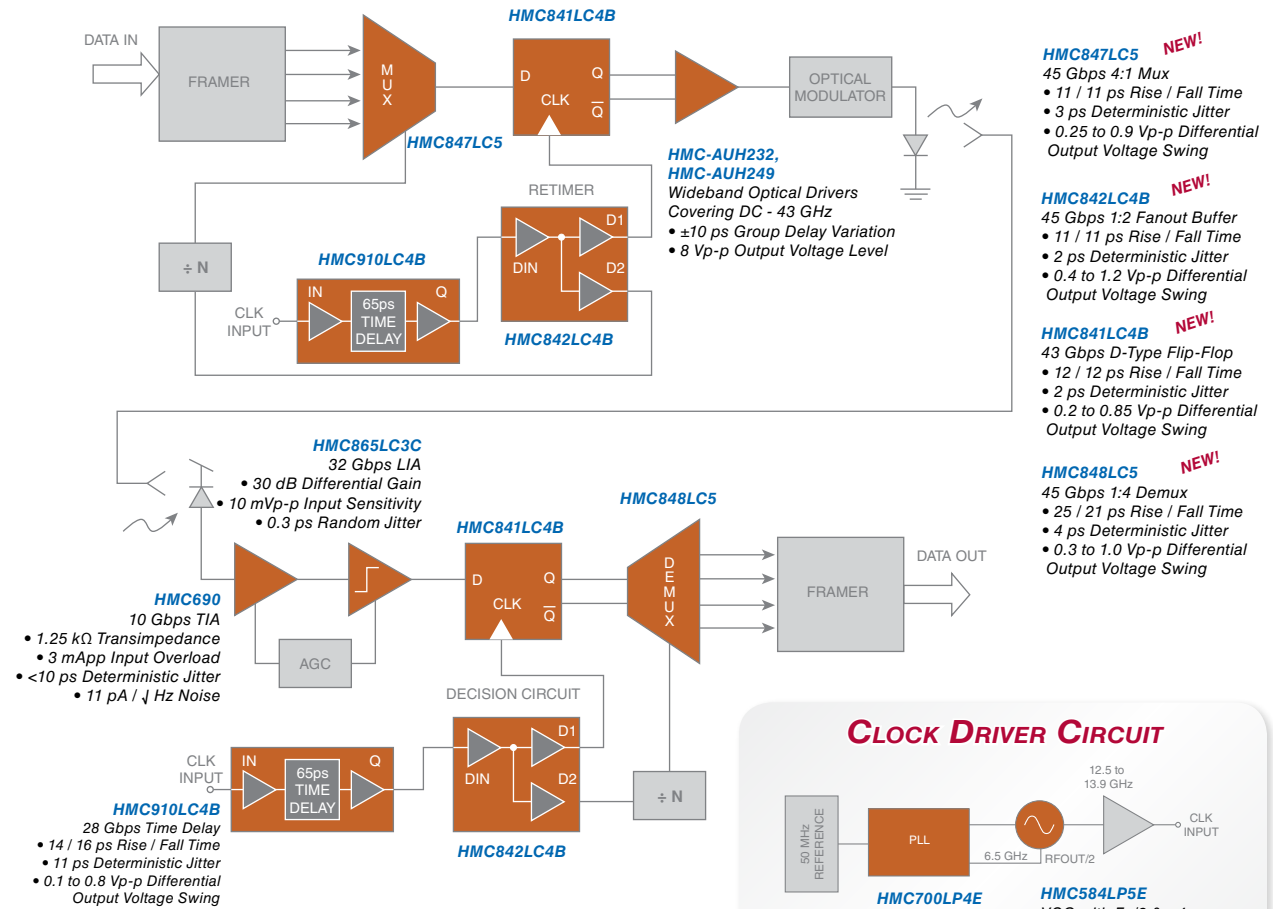
Fiber Optics, OC-48 to 100G

FIBER OPTICS, OC-48 to 100G

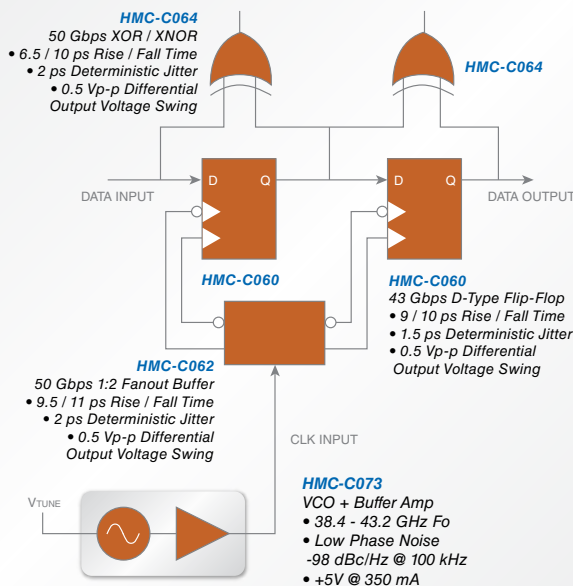
Fiber Optic Custom Solutions Inquiries: FO@hittite.com

Function	OC-1	OC-3	OC-12	OC-48	OC-192	OC-768
Connectorized Freq. Divider Modules	HMC-C040	HMC-C006 HMC-C007 HMC-C039 HMC-C040	HMC-C005 HMC-C006 HMC-C007 HMC-C039 HMC-C040	HMC-C005 HMC-C006		
Frequency Multipliers: Active	HMC573LC3B HMC814LC3B HMC576LC3B HMC448LC3B	HMC573LC3B HMC814LC3B HMC576LC3B HMC448LC3B	HMC573LC3B HMC814LC3B HMC576LC3B HMC448LC3B	HMC573LC3B HMC814LC3B HMC576LC3B HMC448LC3B	HMC448LC3B HMC576 HMC576LC3B HMC561LP3E HMC598 HMC-XDB112 HMC-XDH158	HMC579 HMC598
Connectorized Freq. Multiplier Modules					HMC-C032 HMC-C033 HMC-C034	
High Speed Digital Logic:						
1:2 Fanout Buffer	HMC720LC3C	HMC720LP3E	HMC724LC3C	HMC744LC3C	HMC850LC3C	HMC842LC4B
1:4 Fanout Buffer	HMC940LC4B	HMC940LC4B	HMC940LC4B	HMC940LC4B	HMC940LC4B	
2:1 Selector	HMC678LC3C	HMC728LC3C	HMC728LC3C	HMC748LC3C	HMC748LC3C	
XOR / XNOR	HMC721LP3E	HMC721LC3C	HMC725LC3C	HMC745LC3C	HMC851LC3C	HMC844LC4B
AND / NAND / OR / NOR	HMC672LC3C	HMC722LC3C	HMC722LP3E	HMC726LC3C	HMC746LC3C	HMC843LC4B
D-Type Flip-Flop	HMC723LC3C	HMC723LP3E	HMC727LC3C	HMC747LC3C	HMC853LC3C	HMC841LC4B
T Flip-Flop w/ Reset	HMC679LC3C	HMC679LC3C	HMC729LC3C	HMC729LC3C	HMC749LC3C	HMC749LC3C
NRZ-to-RZ Converter	HMC706LC3C	HMC706LC3C	HMC706LC3C	HMC706LC3C	HMC706LC3C	
Clock Divider	HMC791LC4B	HMC791LC4B	HMC791LC4B	HMC791LC4B	HMC791LC4B	HMC791LC4B
Connectorized High Speed Digital Logic Modules						HMC-C060 HMC-C061 HMC-C062 HMC-C064 HMC-C065
Connectorized Mixer Modules	HMC-C035	HMC-C035	HMC-C035	HMC-C035		
Phase Shifters: Analog				HMC247 HMC538LP4E	HMC247 HMC538LP4E	
Phase Shifters: Digital				HMC647 HMC647LP6E HMC648 HMC648LP6E	HMC642LC5 HMC643LC5 HMC644 HMC644LC5	
Connectorized Phase Shifter Modules					HMC-C010	
Switches: SPDT	HMC232LP4E HMC347 HMC347LP3E HMC547LP3E HMC646LP2E	HMC232LP4E HMC347 HMC347LP3E HMC547LP3E HMC646LP2E	HMC232LP4E HMC347 HMC347LP3E HMC547LP3E HMC646LP2E	HMC232 HMC232LP4E HMC347 HMC347LP3E HMC547LP3E	HMC232 HMC232LP4E HMC347 HMC347LP3E HMC547LP3E	HMC-SDD112
Switches: Multi-Throw	HMC253LC4 HMC344LC3 HMC344LP3E HMC344LH5 HMC641 HMC641LC4 HMC641LP4E	HMC253LC4 HMC344LC3 HMC344LP3E HMC344LH5 HMC641 HMC641LC4 HMC641LP4E	HMC253LC4 HMC344LC3 HMC344LP3E HMC344LH5 HMC641 HMC641LC4 HMC641LP4E	HMC253LC4 HMC344LC3 HMC344LP3E HMC344LH5 HMC641 HMC641LC4 HMC641LP4E	HMC641 HMC641LC4 HMC641LP4E	
Switches: Transfer	HMC427LP3E	HMC427LP3E	HMC427LP3E	HMC427LP3E		
Connectorized Switch Modules	HMC-C011 HMC-C019 HMC-C058	HMC-C011 HMC-C019 HMC-C058	HMC-C011 HMC-C019 HMC-C058	HMC-C011 HMC-C019 HMC-C058	HMC-C011 HMC-C019 HMC-C058	
Variable Gain Amplifiers	HMC694LP4E	HMC694LP4E	HMC694LP4E	HMC694LP4E	HMC694LP4E	
Connectorized VCO Modules						HMC-C073

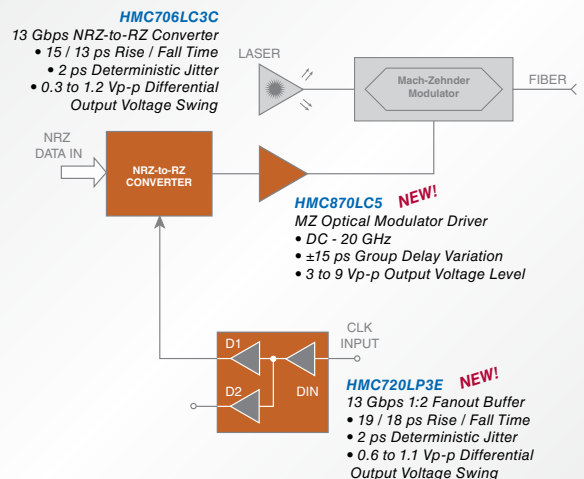
TYPICAL SERIAL FIBER OPTIC DATA TRANSMISSION SYSTEM



43 Gbps HOGGE PHASE DETECTOR FOR CLOCK & DATA RECOVERY



13 Gbps, NRZ-TO-RZ CONVERSION



Typical Fiber Optic applications are illustrated.

See the full product listing for alternatives to the select HMC products shown in each functional block.

MARKET & APPLICATION GUIDE

A selection of components, see the full product listing starting on page 10.

MICROWAVE & MILLIMETERWAVE RADIO, 7 to 23 GHz

Function	7 / 8 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz
Low Noise Amplifier	HMC392LC4 HMC392LH5 HMC564 HMC564LC4 HMC565 HMC565LC5	HMC516LC5 HMC564 HMC564LC4 HMC565 HMC565LC5	HMC516LC5 HMC565 HMC565LC5	HMC504LC4B HMC516LC5 HMC565 HMC565LC5	HMC517LC4 HMC519LC4 HMC565 HMC565LC5	HMC341LC3B HMC504LC4B HMC517LC4 HMC519 HMC519LC4
Driver Amplifier	HMC441LP3E HMC451LC3 HMC516LC5	HMC441LP3E HMC451LC3 HMC451LP3E HMC516LC5	HMC441LC3B HMC451LC3 HMC451LP3E HMC490LP5E	HMC441LC3B HMC451LC3 HMC451LP3E HMC490LP5E	HMC383LC4 HMC442LC3B HMC451LP3E HMC498LC4 HMC635LC4	HMC383LC4 HMC442LC3B HMC498LC4 HMC635 HMC635LC4
Power Amplifier	HMC486LP5E HMC590 HMC590LP5E HMC591 HMC591LP5E HMC637 HMC637LP5E	HMC487LP5E HMC592 HMC608LC4	HMC489LP5E HMC592	HMC489LP5E HMC-APH462	HMC498LC4 HMC-APH196 HMC-APH462 HMC-APH478 HMC-APH596	HMC498LC4 HMC-APH196 HMC-APH462 HMC-APH518 HMC-APH596
Wideband (Distributed) Amplifiers	HMC463LH250 HMC606 HMC606LC5 HMC619 HMC619LP5E HMC633 HMC633LC4 HMC634 HMC634LC4 HMC634 HMC634LC4 HMC-C050 HMC-ALH102 HMC634LC4 HMC659 HMC-C050 HMC-ALH102 HMC-ALH435 HMC-ALH444 HMC-ALH482 HMC-ALH435 HMC-ALH444 HMC-ALH482 HMC-AUH232 HMC-ALH482 HMC-AUH232 HMC-AUH249 HMC-AUH312	HMC463LH250 HMC606 HMC606LC5 HMC633 HMC633LC4 HMC634 HMC634LC4 HMC-C050 HMC-ALH102 HMC-ALH435 HMC-ALH444 HMC-ALH482 HMC-AUH232 HMC-ALH482 HMC-AUH249 HMC-AUH312	HMC463LH250 HMC606 HMC606LC5 HMC633 HMC633LC4 HMC634 HMC634LC4 HMC-C050 HMC-ALH102 HMC-ALH435 HMC-ALH482 HMC-AUH232 HMC-ALH482 HMC-AUH249 HMC-AUH312	HMC463LH250 HMC606 HMC606LC5 HMC633 HMC633LC4 HMC634 HMC634LC4 HMC-C050 HMC-ALH102 HMC-ALH435 HMC-ALH482 HMC-ALH476 HMC-ALH482 HMC-AUH232 HMC-AUH249 HMC-AUH312	HMC463LH250 HMC606 HMC606LC5 HMC634 HMC634LC4 HMC659 HMC-ALH102 HMC-C050 HMC-ALH216 HMC-ALH435 HMC-ALH445 HMC-ALH476 HMC-ALH482 HMC-AUH232 HMC-AUH249 HMC-AUH256 HMC-AUH312	HMC635 HMC-ALH216 HMC-ALH311 HMC-ALH445 HMC-ALH476 HMC-AUH232 HMC-AUH249 HMC-AUH256 HMC-AUH312
Attenuator: Analog	HMC346LP3E HMC812LC4 HMC-C053	HMC346LP3E HMC812LC4 HMC-C053	HMC346LP3E HMC812LC4 HMC-C053	HMC346LC3B HMC812LC4 HMC-C053	HMC346LC3B HMC-C053 HMC-VVD102	HMC812LC4 HMC-VVD102
Divide-by-2	HMC361S8GE	HMC364S8GE	HMC492LP3E	HMC492LP3E	HMC492LP3E	
Divide-by-4	HMC362S8GE	HMC365S8GE	HMC493LP3E	HMC493LP3E	HMC447LC3	HMC447LC3
Divide-by-8	HMC363S8GE	HMC363S8GE	HMC494LP4E	HMC494LP4E		
Multiplier: Active X2	HMC368LP4E HMC575LP4E HMC561LP3E	HMC368LP4E HMC573LC3B HMC561LP3E HMC-XDB112	HMC368LP4E HMC573LC3B HMC561LP3E HMC-XDB112	HMC368LP4E HMC573LC3B HMC561LP3E HMC-XDB112	HMC448LC3B HMC576 HMC576LC3B	HMC448LC3B HMC576 HMC576LC3B
Multiplier: Active X4		HMC443LP4E	HMC370LP4E	HMC370LP4E HMC-XDH158		
Multiplier: Passive X2	HMC189AMS8E	HMC189AMS8E	HMC204MS8GE	HMC204MS8GE	HMC204MS8GE	HMC205
I/Q Downconverter / Rx I/Q Upconverter/Tx	HMC567LC5	HMC568LC5	HMC869LC5	HMC570 HMC570LC5 HMC709LC5	HMC571 HMC571LC5 HMC710LC5	HMC572 HMC572LC5 HMC815LC5
I/Q Mixer / IRM	HMC520LC4 HMC525LC4 HMC620 HMC620LC4	HMC521LC4 HMC527LC4	HMC521LC4 HMC527LC4	HMC522LC4 HMC528LC4	HMC523 HMC523LC4	HMC523 HMC523LC4 HMC524 HMC-MDB172
Mixer: Fundamental	HMC129LC4 HMC144LC4 HMC219MS8E HMC220MS8E HMC553 HMC553LC3B HMC553LC3B HMC558 HMC558LC3B HMC663LC3	HMC144LC4 HMC411MS8GE HMC412MS8GE HMC553 HMC553LC3B HMC558 HMC558LC3B HMC-C051 HMC663LC3	HMC144LC4 HMC411MS8GE HMC412MS8GE HMC553 HMC553LC3B HMC558 HMC558LC3B HMC-C051	HMC144LC4 HMC260LC3B HMC412MS8GE HMC554 HMC554LC3B HMC558 HMC558LC3B HMC-C051	HMC144LC4 HMC260LC3B HMC292LC3B HMC554 HMC554LC3B HMC-C051	HMC260LC3B HMC292LC3B

A selection of components, see the full product listing starting on page 10.

MICROWAVE & MILLIMETERWAVE RADIO, 7 to 23 GHz

Function	7 / 8 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz
Mixer: Sub-Harmonic				HMC258LM3	HMC258LC3B HMC258LM3 HMC337	HMC264LC3B HMC338LC3B
PLLs: Synthesizer ICs	HMC698LP5E HMC699LP5E HMC700LP4E HMC701LP6CE					
Switch	HMC547LP3E HMC641	HMC607 HMC641	HMC547LP3E HMC641	HMC607 HMC641	HMC547LP3E HMC641	
Signal Generator	HMC-T2000					
VCO & PLO: **Requires X2 or X4	HMC466LP4E HMC505LP4E HMC506LP4E HMC532LP4E HMC586LC4B HMC587LC4B	HMC513LP4E HMC515LP5E HMC534LP4E HMC582LP5E HMC588LC4B HMC735LP5E	HMC513LP4E HMC529LP4E HMC584LP5E	HMC529LP4E HMC531LP5E HMC535LP5E HMC632LP5E HMC736LP4E HMC737LP4E	HMC429LP4E**	HMC431LP4E** HMC738LP4E HMC739LP4E
VGA: Analog	HMC694 HMC694LP4E	HMC694 HMC694LP4E	HMC694 HMC694LP4E	HMC694 HMC694LP4E	HMC694 HMC694LP4E	

MICROWAVE & MILLIMETERWAVE RADIO, 26 to 86 GHz

Function	26 / 28 GHz	32 / 38 GHz	32 - 43 GHz	44 - 66 GHz	71 - 86 GHz
Low Noise Amplifier	HMC341LC3B HMC517LC4 HMC519LC4 HMC635 HMC693	HMC263 HMC566 HMC635 HMC693	HMC-ALH376	HMC-ALH382	HMC-ALH459 HMC-ALH509
Driver Amplifier	HMC383LC4 HMC499LC4 HMC635LC4	HMC300LM1 HMC383LC4 HMC635LC4	HMC-APH403 HMC-APH473 HMC-APH510	HMC-ABH209 HMC-ABH241 HMC-ABH403	HMC-AUH317 HMC-AUH318 HMC-AUH320
Power Amplifier	HMC499LC4 HMC693 HMC-APH196 HMC-APH460 HMC-APH462 HMC-APH596 HMC-APH608	HMC693 HMC-ABH264 HMC-APH403 HMC-APH473 HMC-APH510 HMC-APH596	HMC693 HMC-ABH264 HMC-APH403 HMC-APH473 HMC-APH510 HMC-AUH256	HMC-ABH209 HMC-ABH241 HMC-ABH403	HMC-ALH508 HMC-AUH317 HMC-AUH318 HMC-AUH320
Wideband (Distributed) Amplifiers	HMC-ALH140 HMC-ALH216 HMC-ALH244 HMC-ALH311 HMC-ALH313 HMC-ALH364 HMC-ALH369 HMC-ALH445 HMC-ALH476 HMC-AUH232 HMC-AUH249 HMC-AUH256 HMC-AUH312	HMC635 HMC-ALH140 HMC-ALH244 HMC-ALH310 HMC-ALH313 HMC-ALH364 HMC-ALH369 HMC-ALH376 HMC-ALH445 HMC-ALH476 HMC-AUH249 HMC-AUH256	HMC-ALH140 HMC-ALH244 HMC-ALH310 HMC-ALH313 HMC-ALH364 HMC-ALH369 HMC-ALH376 HMC-ALH445 HMC-AUH232 HMC-AUH249 HMC-AUH256 HMC-AUH312	HMC-ALH376 HMC-AUH312	
Attenuator: Analog	HMC712LP3CE HMC812LC4 HMC-VVD102	HMC-VVD106	HMC-VVD106	HMC-VVD106	HMC-VVD104
Divide-by-4	HMC447LC3				
Multiplier: Active x2	HMC448LC3B HMC577LC4B HMC578LC3B HMC598	HMC449LC3B HMC578LC3B HMC579 HMC598	HMC598	HMC598 HMC-XDH158	
Multiplier: Active x4				HMC-XDH158	

MARKET & APPLICATION GUIDE

A selection of components, see the full product listing starting on page 10.

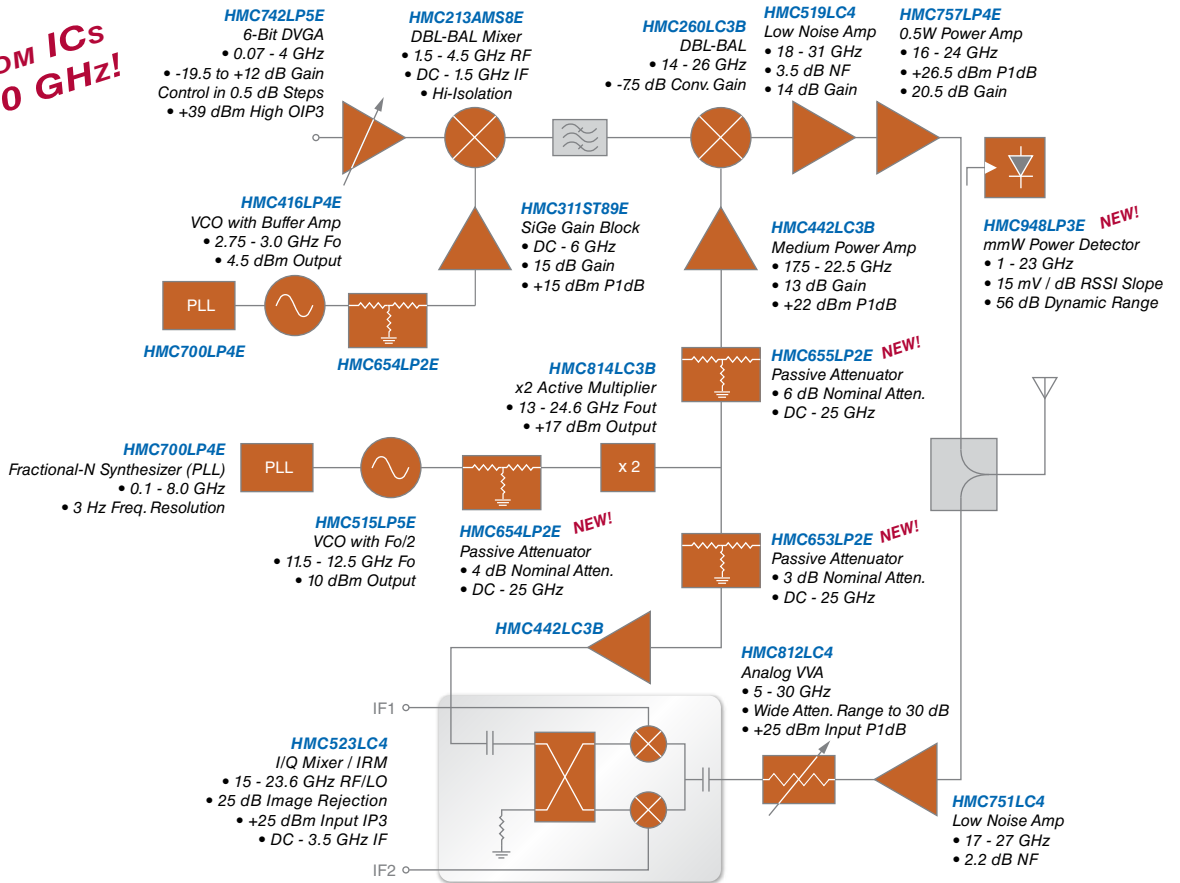
MICROWAVE & MILLIMETERWAVE RADIO, 26 to 86 GHz

Function	26 / 28 GHz	32 / 38 GHz	32 - 43 GHz	44 - 66 GHz	71 - 86 GHz
Multiplier: Passive x2 / x3	HMC331	HMC331			
I/Q Receiver	HMC572 HMC572LC5				
I/Q Mixer / IRM	HMC524 HMC524LC3B HMC-MDB172	HMC404 HMC555 HMC556	HMC-MDB171 HMC-MDB172	HMC-MDB171 HMC-MDB207	
Mixer: Fundamental	HMC292LC3B HMC329LC3B HMC557 HMC557LC4 HMC560 HMC560LM3	HMC294 HMC329LM3 HMC560 HMC560LM3		HMC-MDB169	
Mixer: Sub-Harmonic	HMC264LC3B HMC265LM3 HMC338LC3B HMC798LC4	HMC338 HMC339 HMC798LC4		HMC-MDB218	
Power Detectors	HMC662LP3E HMC948LP3E				
Switch				HMC-SDD112	HMC-SDD112
VCO & PLO: **Requires X2 or X4	HMC515LP5E** HMC531LP5E** HMC639LP4E HMC739LP4E	HMC505LP4E HMC506LP4E			
Switch				HMC-SDD112	HMC-SDD112
VCO & PLO: **Requires X2 or X4	HMC515LP5E** HMC531LP5E**	HMC505LP4E HMC506LP4E			

Microwave & mmWave Communications, Test & Measurement & Sensors, 2 - 86 GHz

DOUBLE UPCONVERSION & DIRECT DOWNCONVERSION

CUSTOM ICs TO 110 GHz!



HITTITE'S HIGH FREQUENCY LO SOURCE ALTERNATIVES

PLL & VCO CHIPSET

HMC702LP6CE
Fractional-N Synthesizer (PLL)
• 10 KHz to 14 GHz
• Low Phase Noise: -103 dBc
• -227 FOM Integer Mode

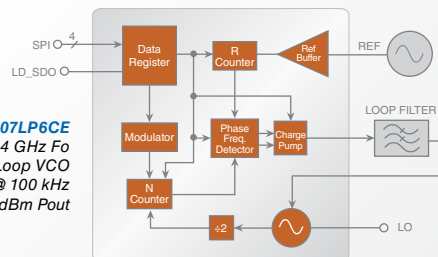


HMC584LP5E
VCO with Fo/2 & Fo/4 Output
• 12.5 - 13.9 GHz Fo
• Low Phase Noise
• -110 dBc/Hz @ 100 kHz
• +10 dBm Pout

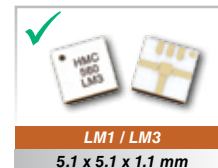
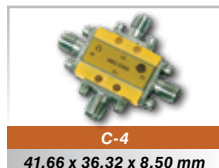
PLL WITH INTEGRATED VCO IC

NEW!

HMC807LP6CE
• 12.4 - 13.4 GHz Fo
• -110 dBc/Hz Open Loop VCO
Phase Noise @ 100 kHz
• +8 dBm Pout



PRODUCTS AVAILABLE IN DIE, SMT OR CONNECTORIZED PACKAGE FORM TO 86 GHz!

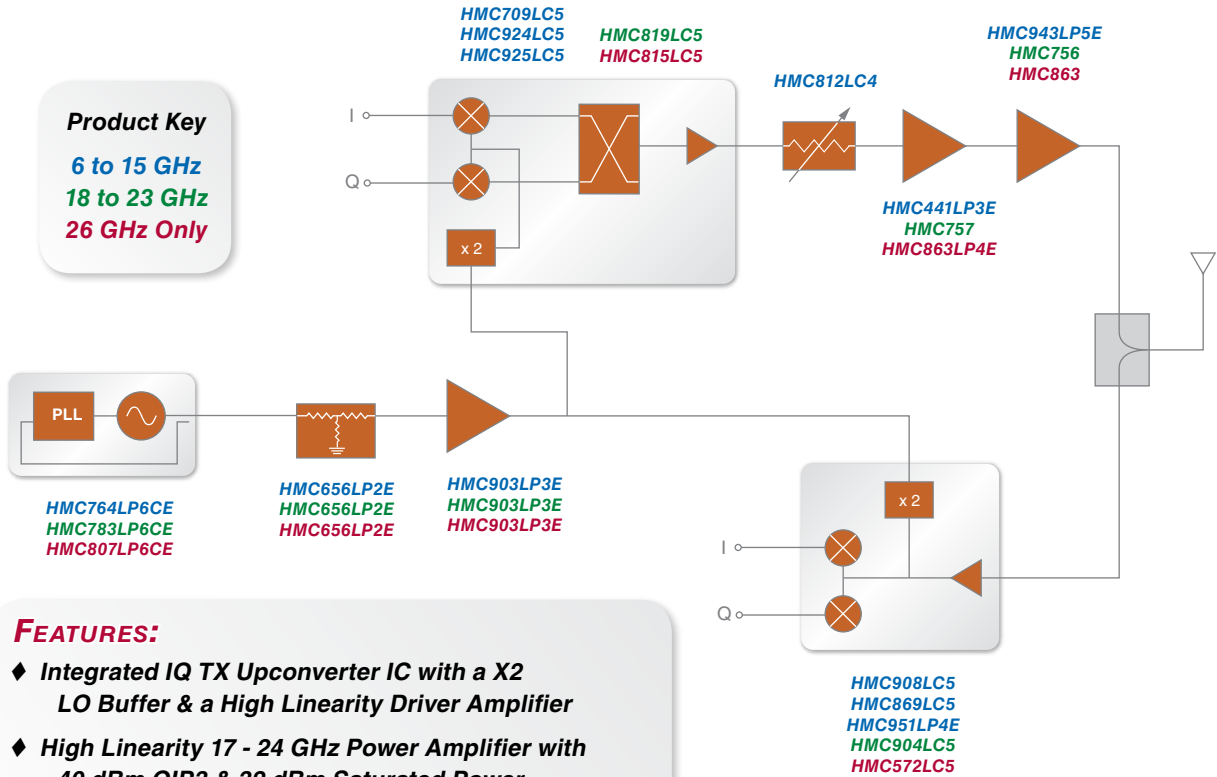


Typical Microwave / Millimeterwave application is illustrated.
See the full product listing for alternatives to the select HMC products shown in each functional block.

MARKET & APPLICATION GUIDE

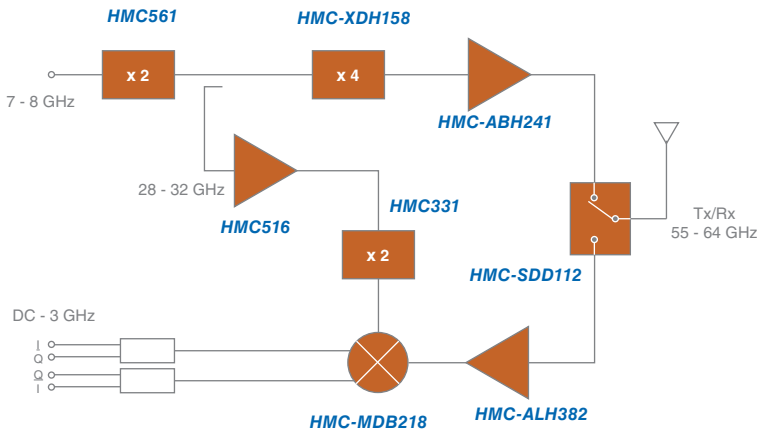
Microwave & mmWave Communications, Test & Measurement & Sensors, 2 - 86 GHz

CHIPSETS FOR 6 TO 42 GHz MICROWAVE RADIO BACKHAUL



MICROWAVE & MILLIMETERWAVE

SUB-HARMONIC OPTION FOR 60 GHz CHIPSET

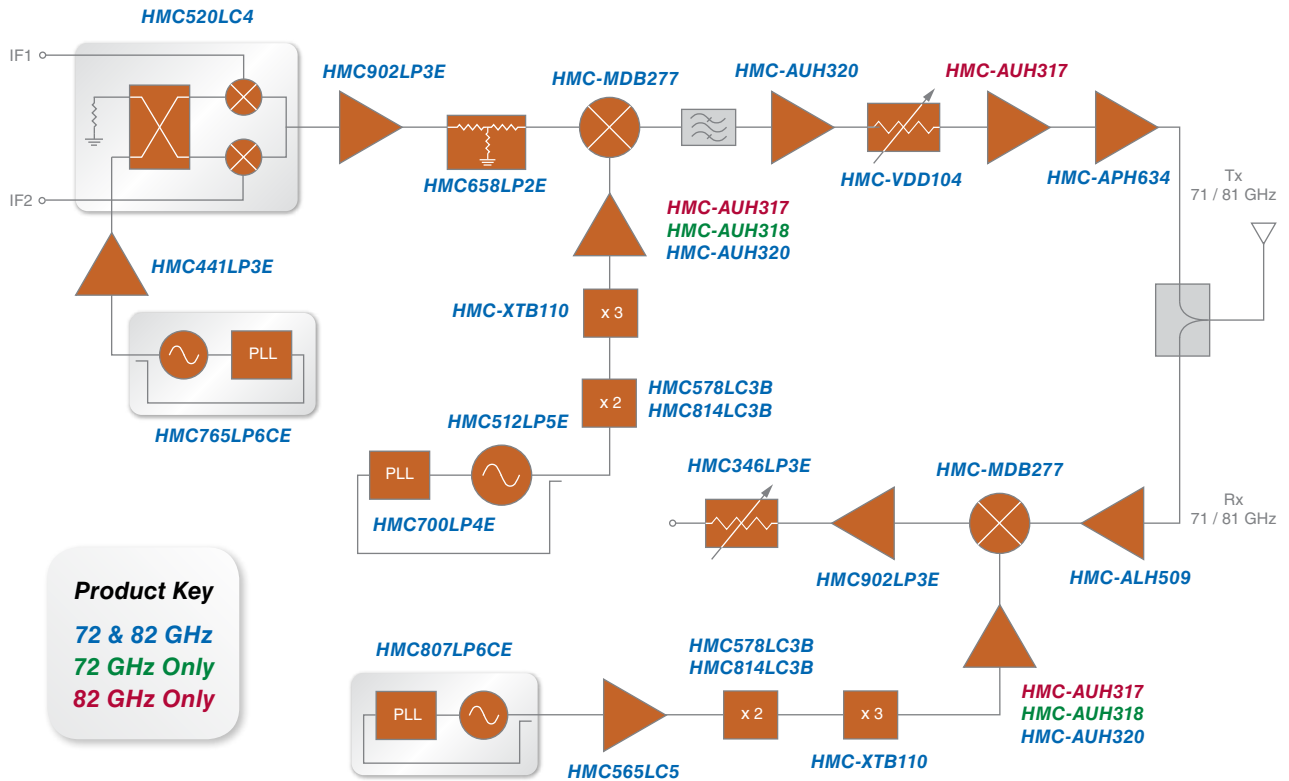


APPLICATIONS:

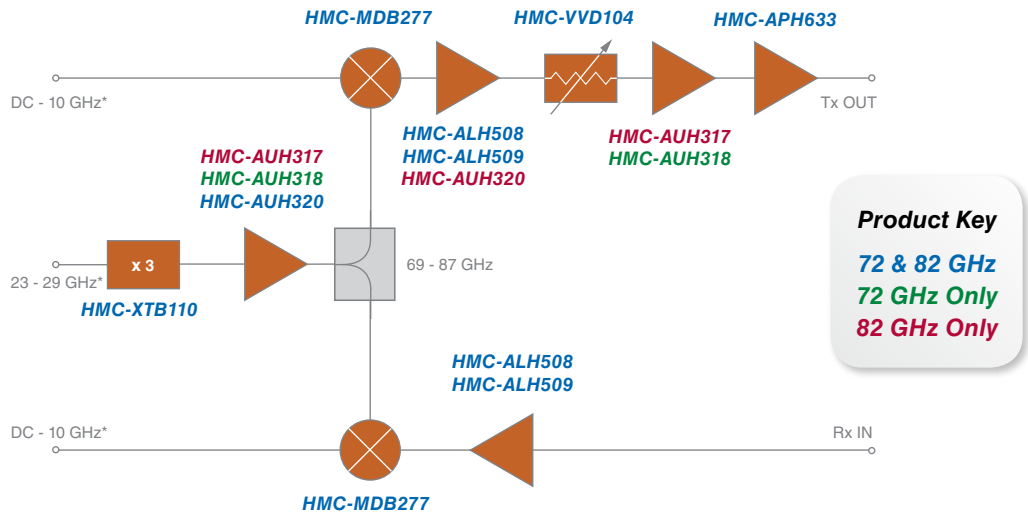
- ◆ Short Haul High Capacity Links
- ◆ Picocell Mobile Phone Links
- ◆ Network Backbone & Branch Links
- ◆ HDTV Wireless Broadcasting

Typical Microwave / Millimeterwave application is illustrated. See the full product listing for alternatives to the select HMC products shown in each functional block.

70 / 80 GHz E-BAND RADIO CHIPSET



72 & 82 GHz Tx/Rx CHIPSET FOR HIGH CAPACITY COMMUNICATION LINKS



Typical Microwave / Millimeterwave application is illustrated. See the full product listing for alternatives to the select HMC products shown in each functional block.

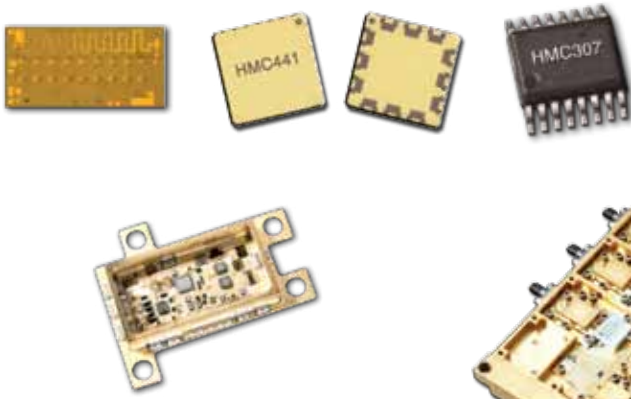
MILITARY & SPACE

High Reliability Solutions for Land, Sea, Air & Space

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- Design, production & screening of highly integrated MIC sub-assemblies for major defense OEMs.
- Military & Space Upscreening to Customer Specifications.

Military Solution Inquiries: MIL@hittite.com



Class B Screening & Qualification

- VI to Method 2010B & 2017H
- Bond Pull & Die Shear Test
- Solderability Test
- High Temp Burn-In Test
- Vibration Stress Test
- Temp Cycle Stress Test
- Constant Acceleration Stress Test
- Fine & Gross Hermeticity Test
- Serialized Test Data
- ESD Characterization

MILITARY & SPACE

SPACE LEVEL COMPONENTS, MODULES & SUBSYSTEMS

Class S Screening & Qualification

- VI to Methods 2010A & 2017K
- Temp Cycle Stress Test
- High Temp Burn-In & Life Test
- Wafer Lot Acceptance Test
 - Bond Pull & Die Shear Test
 - SEM Inspection
 - Metal & Glass Thicknesses
- Serialized Test Data
- Qualification Report

- Class S screening on standard & custom product die and SMT packaging.
- Military & Space Upscreening to Customer Specifications.
- Qualified by major spacecraft OEMs worldwide.
- Over 45,000 S-Level components currently operational on dozens of commercial, scientific & military spacecraft.

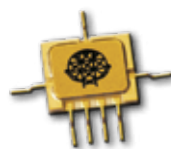
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FET Channel SEM



Serialized Die in GEL-PAK



Hermetic SMT Package



Hermetic Modules



Chip (Die)

**Contact Us Today With Your High Reliability
Mixed-Signal RF, Microwave & Millimeterwave Requirements!**

Evaluation Boards & ICs Reduce Design Cycle Time

7 DESIGNER'S KITS AVAILABLE TO CHOOSE FROM!



- ◆ Gain Blocks DC - 6 GHz, HMC-DK001
- ◆ Linear Driver Amplifiers 0.4 - 2.5 GHz, HMC-DK002
- ◆ High IP3 Mixers 0.45 - 4.0 GHz, HMC-DK003
- ◆ Digital Attenuators DC - 6 GHz, HMC-DK004
- ◆ SPDT Switches DC - 12 GHz, HMC-DK005
- ◆ Passive Attenuator Chips DC - 50 GHz, HMC-DK006
- ◆ Serial/Parallel USB Interface Kit, HMC-DK008

Design engineers can order pre-packaged MMIC Designer's Kits which enable them to quickly assess which Hittite product is the best choice for their application. The end result is a design that goes to layout more quickly and with fewer subsequent changes.

Each Hittite Designer's Kit contains an assembled & tested connectorized evaluation board, 5 to 10 ICs of each part and the latest Hittite CD-ROM catalog.

Designer's Kit	Kit Contents		Eval Boards	
	ICs			
Gain Blocks DC - 6 GHz HMC-DK001	HMC474MP86E HMC476MP86E HMC313E HMC311ST89E HMC478MP86E HMC478ST89E	HMC479MP86E HMC479ST89E HMC481ST89E HMC480ST89E HMC481MP86E HMC482ST89E	104217 – HMC313E 110161 – HMC478ST89E 107490 – HMC481MP86E	
Linear Driver Amps 0.4 - 2.5 GHz HMC-DK002	HMC454ST89E HMC450QS16GE HMC413QS16GE	HMC452ST89E HMC453ST89E HMC457QS16GE	107749 – HMC454ST89E 108349 – HMC450QS16GE 105000 – HMC413QS16GE	108712 – HMC452ST89E 108718 – HMC453ST89E 106043 – HMC457QS16GE
Hi-IP3 Mixers 0.45 - 4.0 GHz HMC-DK003	HMC387MS8E HMC483MS8GE HMC399MS8E HMC316MS8E HMC400MS8E HMC485MS8GE	HMC402MS8E HMC214MS8E HMC478ST89E HMC481ST89E HMC480ST89E	110161 – HMC478ST89E 105188 – HMC485MS8GE	106334 – HMC399MS8E 101830 – HMC400MS8E
Digital Attenuators DC - 6 GHz HMC-DK004	HMC291E HMC468LP3E HMC274QS16E HMC271ALP4E HMC273MS10GE	HMC305ALP4E HMC306MS10E HMC470LP3E HMC472LP4E	103372 – HMC291E 107302 – HMC468LP3E 104976 – HMC274QS16E 108782 – HMC271ALP4E 103393 – HMC273MS10GE	108782 – HMC305AMS10E 103393 – HMC306MS10E 107006 – HMC470LP3E 107010 – HMC472LP4E
SPDT Switches DC - 12 GHz HMC-DK005	HMC221AE HMC284MS8GE HMC349MS8GE HMC232LP4E HMC544E	HMC595E HMC574MS8E HMC784MS8GE HMC536MS8GE	101675 – HMC221AE 107662 – HMC349MS8GE 107723 – HMC232LP4E	104124 – HMC574MS8E 104124 – HMC784MS8GE 105143 – HMC536MS8GE
Passive Attenuators DC - 50 GHz HMC-DK006	HMC650 HMC651 HMC652 HMC653 HMC654	HMC655 HMC656 HMC657 HMC658		
Serial/Parallel USB Interface Kit HMC-DK008	The HMC-DK008 Serial/Parallel Interface Designer's kit enables users to interface with Hittite's family of digital attenuators, interface and variable gain amplifiers.			

PACKAGE INFORMATION

Available Plastic, Ceramic, Hermetic SMT & Connectorized Module Packages

 MP86 "Micro-P" 5.21 x 5.08 x 1.57 mm	 SC70 2.15 x 2.1 x 0.9 mm	 SOT26 2.8 x 2.9 x 1.2 mm	 ST89 4.50 x 4.14 x 1.54 mm	 MS8 / MS8G 4.9 x 3.0 x 1.0 mm
 MS10 / MS10G 4.9 x 3.0 x 1.0 mm	 S8 / S8G 6.0 x 4.9 x 1.6 mm	 S14 6.0 x 8.7 x 1.6 mm	 LP2 "DFN" 2.0 x 2.0 x 1.0 mm	 LP3 "QFN" 3.0 x 3.0 x 1.0 mm
 LP4 / LP4B / LP4C "QFN" 4.0 x 4.0 x 1.0 mm	 LP5 "QFN" 5.0 x 5.0 x 1.0 mm	 LP6 / LP6C "QFN" 6.0 x 6.0 x 1.0 mm	 QS16 / QS16G 6.0 x 4.9 x 1.5 mm	 QS24 6.0 x 8.7 x 1.6 mm
 LC3 / LC3B / LC3C 3.0 x 3.0 x 1.0 / 1.45 mm	 LC4 / LC4B 4.0 x 4.0 x 1.0 / 1.2 mm	 LC5 5.0 x 5.0 x 1.0 mm	 LM1 / LM3 5.1 x 5.1 x 1.1 mm	 C8 7.4 x 5.1 x 2.4 mm
 LH5 Hermetic 5.0 x 5.0 x 1.0 mm	 LH250 Hermetic 6.35 x 6.35 x 1.27 mm	 G8 Hermetic 10.2 x 4.6 x 1.8 mm	 G7 Hermetic 16.1 x 17.3 x 1.7 mm	 G16 Hermetic 10.4 x 10.4 x 1.7 mm
 G32 Hermetic 16 x 16 x 1.96 mm	 C-1 / C-1B 35.31 x 17.78 x 7.38 mm	 C-2 / C-2B 38.1 x 17.78 x 7.38 mm	 C-3 / C-3B 40.89 x 17.78 x 7.38 mm	 C-4 41.66 x 36.32 x 8.50 mm
 C-5 41.66 x 26.8 x 8.79 mm	 C-6 45.34 x 17.27 x 8.50 mm	 C-9 44.45 x 21.59 x 8.76 mm	 C-10 / C-10B 46.63 x 21.59 x 8.50 mm	 C-11 41.66 x 26.8 x 8.64 mm
 C-12 107.6 x 43.0 x 43.0 mm	 C-13 39.43 x 47.12 x 11.42 mm	 C-14 41.91 x 29.85 x 9.65 mm	 C-15 59.69 mm DIA x 9.14 mm	 C-16 48.0 x 48.26 x 14.10 mm
 C-17 68.5 x 66.0 x 14.2 mm	 C-18 38.10 x 47.62 x 26.67 mm	 C-19 27.31 x 25.15 x 5.84 mm	 C-20 53.59 x 19.05 x 6.22 mm	 C-21 38.10 x 33.53 x 5.84 mm

E or = RoHS Compliant.

For more information on our "Green" component program, please contact earthfriendly@hittite.com for details on our RoHS Compliant products or see the RoHS Compliant Components link on our web site.

Hittite Microwave Offers Performance & Price Competitive Components

GAIN BLOCKS

Product	Competitor	Competitor P/N	Hittite P/N Package & Performance	Hittite P/N Performance
Gain Blocks	Mini-Circuits	Gali-1, Gali-19, Gali-2, Gali-21, Gali-29	HMC311ST89E	
Gain Blocks	Mini-Circuits	VAM-3, VAM-6, VAM-7, VNA-21		HMC313E
Gain Blocks	Mini-Circuits	LEE-49, LEE-59		HMC396
Gain Blocks	Mini-Circuits	LEE-39		HMC397
Gain Blocks	Mini-Circuits	LEE-19, LEE-29		HMC405
Gain Blocks	Mini-Circuits	MAR-1SM, MAR-2SM, MAR-6SM, MAR-7SM	HMC474MP86E	
Gain Blocks	Mini-Circuits	ERA-1, ERA-1SM, ERA-2, ERA-21SM, ERA-2SM, ERA-3, ERA-3SM, ERA-8SM, MAR-3SM, RAM-1, RAM-2, RAM-3, RAM-4, RAM-6, RAM-7, RAM-8	HMC476MP86E	
Gain Blocks	Mini-Circuits	MNA-3, MNA-5, VNA-23, VNA-28		HMC476MP86E
Gain Blocks	Mini-Circuits	Gali-S66	HMC476ST89E	
Gain Blocks	Mini-Circuits	ERA-33SM, MAR-4SM, MAR-8ASM, MAR-8SM	HMC478MP86E	
Gain Blocks	Mini-Circuits	MNA-7		HMC478MP86E
Gain Blocks	Mini-Circuits	Gali-3, Gali-33, Gali-39, Gali-4F, Gali-51F, Gali-52, Gali-55, Gali-5F, Gali-6F	HMC478ST89E	
Gain Blocks	Mini-Circuits	ERA-4SM, ERA-4XSM, ERA-5, ERA-6, ERA-6SM, MAV-11SM, MAV-11BSM, MAV-11A	HMC479MP86E	
Gain Blocks	Mini-Circuits	MNA-2, MNA-4, VNA-22		HMC479MP86E
Gain Blocks	Mini-Circuits	Gali-4, Gali-49, Gali-6	HMC479ST89E	
Gain Blocks	Mini-Circuits	Gali-5, Gali-51, Gali-59	HMC480ST89E	
Gain Blocks	Mini-Circuits	ERA-4, ERA-50SM, ERA-51SM, ERA-5SM, ERA-5XSM	HMC481MP86E	
Gain Blocks	Mini-Circuits	MNA-6, VNA-25		HMC481MP86E
Gain Blocks	Mini-Circuits	Gali-74	HMC482ST89E	
Gain Blocks	RFMD	SGA-4163, SGA-4263		HMC311ST89E
Gain Blocks	RFMD	NGA-586, NGA-589, NGA-686, NGA-689		HMC313E
Gain Blocks	RFMD	SGA-0163, SGA-0363, SGA-1163, SGA-1263, SGA-2163, SGB-2233, SGA-2263, SGA-2363, SGA-2463, SGB-4333		HMC474MP86E
Gain Blocks	RFMD	SGA-2186, SGA-2286, SGA-2386, SGA-2486	HMC474MP86E	
Gain Blocks	RFMD	SGA-3263, SGA-3363, SGA-3463, SGA-3563, SGB-2433, SGB-4533		HMC476MP86E
Gain Blocks	RFMD	NGA-386, SGA-3286, SGA-3386, SGA-3486, SGA-3586	HMC476MP86E	
Gain Blocks	RFMD	SGA-4186, SGA-4286, SGA-4386, SGA-4486, SGA-5386, SGA-5486, SGA-5586	HMC478MP86E	
Gain Blocks	RFMD	SGB-6433, SGB-6533		HMC478MP86E
Gain Blocks	RFMD	SGA-4363, SGA-4463, SGA-4563		HMC478ST89E
Gain Blocks	RFMD	SGA-4586, SGA-5389, SGA-5489, SGA-5589	HMC478ST89E	
Gain Blocks	RFMD	SGA-5263		HMC479ST89E
Gain Blocks	RFMD	SGA-5286	HMC479MP86E	
Gain Blocks	RFMD	SGA-5289	HMC479ST89E	
Gain Blocks	RFMD	NGA-489, SGA-6289, SGA-6389, SGA-6489, SGA-6589, SGA-7489	HMC580ST89E	
Gain Blocks	RFMD	SGA-6386, SGA-6286, SGA-6486, SGA-6586	HMC481MP86E	
Gain Blocks	RFMD	NGA-186, NGA-286, NGA-486		HMC480ST89E
Gain Blocks	RFMD	SGA-7489	HMC482ST89E	
Gain Blocks	Triquint	AH1	HMC636ST89E	
Gain Blocks	Triquint	AM-1	HMC639ST89E	
Gain Blocks	Triquint	ECG004B, ECG006F	HMC311ST89E	HMC311LP3E
Gain Blocks	Triquint	AG102, AG103	HMC580ST89E	
Gain Blocks	Triquint	AG302-63, AG303-63, ECG004F		HMC313E
Gain Blocks	Triquint	AG201-63, AG202-63, AG203-63		HMC474MP86E
Gain Blocks	Triquint	AG201-86, AG202-86, AG203-86	HMC474MP86E	
Gain Blocks	Triquint	AG302-86, AG303-86, ECG001C, ECG004C	HMC476MP86E	
Gain Blocks	Triquint	ECG001F, ACG001B		HMC476MP86E
Gain Blocks	Triquint	AG503-86, ECG002C, ECG006C	HMC478MP86E	
Gain Blocks	Triquint	ECG002F		HMC478MP86E
Gain Blocks	Triquint	ECG006B, ECG002B, SCG002B, AG503-89	HMC478ST89E	
Gain Blocks	Triquint	AG402-86, ECG040C, AG602-86, EC1119C	HMC479MP86E	
Gain Blocks	Triquint	AG402-89, ECG040B, AG602-89, EC1119B	HMC479ST89E	
Gain Blocks	Triquint	AG603-89, AG604-89, ECG050B, EC1019B	HMC480ST89E	
Gain Blocks	Triquint	AG403-86, ECG005C, ECG055C, AG603-86, AG604-86, ECG050C, EC1019C, EC1078C	HMC481MP86E	
Gain Blocks	Triquint	AG403-89, ECG005B, ECG055B	HMC481ST89E	
Gain Blocks	Triquint	EC1078B, ECG003, ECG008	HMC482ST89E	

COMPETITOR CROSS-REFERENCE

Hittite Microwave Offers Performance & Price Competitive Components

ATTENUATORS

Product	Competitor	Competitor P/N	Hittite P/N Package & Performance	Hittite P/N Performance
Digital Attenuators	Skyworks	AA100-59LF	HMC230MS8E	
Digital Attenuators	Skyworks	AA101-80	HMC274QS16E	
Digital Attenuators	Skyworks	AA106-86	HMC603MS10E	
Digital Attenuators	Skyworks	SKY12322-86	HMC306MS10E	
Digital Attenuators	Skyworks	SKY12323-303	HMC273MS8GE	
Digital Attenuators	Skyworks	SKY12324-73	HMC291E	
Digital Attenuators	Skyworks	SKY12325-350LF	HMC468LP3E	
Digital Attenuators	M/A-COM	MAATSS0002	HMC274QS16E	
Digital Attenuators	M/A-COM	MAATSS0001, MAATSS0017	HMC603QS16E	
Digital Attenuators	M/A-COM	MAATSS0012	HMC306MS10E	

HIGH SPEED ICs

Product	Competitor	Competitor P/N	Hittite P/N Package & Performance	Hittite P/N Performance
High Speed Logic	Inphi	13600DF	HMC727LC3C	
High Speed Logic	Inphi	13610XR	HMC725LC3C	
High Speed Logic	Inphi	13612OR	HMC726LC3C	
High Speed Logic	Inphi	13616CF	HMC724LC3C	
High Speed Logic	Inphi	20708SE	HMC728LC3C	
High Speed Logic	Inphi	13620TF	HMC729LC3C	
High Speed Logic	Inphi	25720TF		HMC729LC3C
High Speed Logic	Inphi	13707RZ	HMC706LC3C	

POWER DETECTORS

Product	Competitor	Competitor P/N	Hittite P/N Package & Performance	Hittite P/N Performance
Log Detectors	Analog Devices	AD8313		HMC600LP4E HMC601LP4E
Log Detectors	Analog Devices	AD8317		HMC611 HMC611LP4E
Log Detectors	Analog Devices	AD8318		HMC602LP4E HMC611LP4E
RMS Detectors	Analog Devices	AD8362		HMC909LP4E HMC1010LP4E
Log Detectors	Maxim	MAX2014,		HMC612LP4E
Log Detectors	Maxim	MAX2015		HMC600LP4E HMC601LP4E
RMS Detectors	Maxim	MAX2203		HMC909LP4E HMC1010LP4E
Log Detectors	Linear Technology	LT5534, LT5538		HMC600LP4E HMC601LP4E
Log Detectors	Linear Technology	LT5570		HMC612LP4E
RMS Detectors	Linear Technology	LT5581		HMC909LP4E HMC1010LP4E

SWITCHES

Product	Competitor	Competitor P/N	Hittite P/N Package & Performance	Hittite P/N Performance
Switches	Skyworks	AS204-80	HMC241QS16E	
Switches	Skyworks	AS196-307	HMC349LP4CE	
Switches	Skyworks	AS193-73	HMC544E	
Switches	Skyworks	AS169-73	HMC545E	
Switches	Skyworks	AS186-302	HMC435MS8GE	
Switches	M/A-COM	SW-239	HMC239S8E	
Switches	M/A-COM	SW-395		HMC544E
Switches	RFMD	SSW-124	HMC234C8	

Part #	Page#	Part #	Page#	Part #	Page#	Part #	Page#	Part #	Page#
HMC128	20	HMC277MS8E	19	HMC384LP4E	24	HMC463LP5E	13	HMC532LP4E	24
HMC128G8	20	HMC284MS8GE	23	HMC385LP4E	24	HMC464	13	HMC533LP4E	24
HMC129	20	HMC285E	19	HMC386LP4E	24	HMC464LP5E	13	HMC534LP5E	25
HMC129G8	20	HMC286E	10	HMC387MS8E	19	HMC465	13	HMC535LP4E	25
HMC129LC4	20	HMC287MS8E	24	HMC388LP4E	24	HMC465LP5E	13	HMC536LP2E	23
HMC130	20	HMC288MS8E	14	HMC389LP4E	24	HMC466LP4E	24	HMC536MS8GE	23
HMC135	21	HMC290E	14	HMC390LP4E	24	HMC467LP3E	14	HMC538LP4E	21
HMC136	21	HMC291E	14	HMC391LP4E	24	HMC468LP3E	14	HMC539LP3E	14
HMC137	21	HMC292	20	HMC392	10	HMC469MS8GE	11	HMC540LP3E	14
HMC141 / 142	20	HMC292LC3B	20	HMC392LC4	10	HMC470LP3E	14	HMC541LP3E	14
HMC141C8 / 142C8	20	HMC292LM3C	20	HMC392LH5	10	HMC471MS8GE	11	HMC542LP4E	14
HMC141LH5	20	HMC304MS8E	19	HMC393MS8GE	24	HMC472LP4E	14	HMC543	22
HMC143 / 144	20	HMC305LP4E	14	HMC394LP4E	16	HMC473MS8E	14	HMC543LC4B	22
HMC144LC4	20	HMC306MS10E	14	HMC395	11	HMC474MP86E	11	HMC544E	23
HMC144LH5	20	HMC307QS16GE	11	HMC396	11	HMC474SC70E	11	HMC545E	23
HMC156	16	HMC308E	11	HMC397	11	HMC475ST89E	11	HMC546LP2E	23
HMC156C8	16	HMC310MS8GE	10	HMC398QS16GE	24	HMC476MP86E	11	HMC546MS8GE	23
HMC158	16	HMC311LP3E	11	HMC399MS8E	19	HMC476SC70E	11	HMC547LP3E	23
HMC158C8	16	HMC311SC70E	11	HMC400MS8E	19	HMC478MP86E	11	HMC548LP3E	10
HMC168C8	19	HMC311ST89E	11	HMC401QS16GE	24	HMC478SC70E	11	HMC549MS8GE	11
HMC170C8	19	HMC313E	11	HMC402MS8E	19	HMC478ST89E	11	HMC550E	23
HMC171C8	19	HMC316MS8E	19	HMC404	18	HMC479MP86E	11	HMC551LP4E	19
HMC174MS8E	23	HMC318MS8GE	10	HMC405	11	HMC479ST89E	11	HMC552LP4E	19
HMC175MS8E	19	HMC320MS8GE	10	HMC406MS8GE	11	HMC480ST89E	11	HMC553	20
HMC182S14E	23	HMC321LP4E	24	HMC407MS8GE	12	HMC481MP86E	11	HMC553LC3B	20
HMC183QS24E	24	HMC322	24	HMC408LP3E	12	HMC481ST89E	11	HMC554	20
HMC187MS8E	16	HMC322LP4E	24	HMC409LP4E	12	HMC482ST89E	11	HMC554LC3B	20
HMC188MS8E	16	HMC326MS8GE	11	HMC410MS8GE	19	HMC483MS8GE	19	HMC555	18
HMC189MS8E	16	HMC327MS8GE	12	HMC411MS8GE	20	HMC485MS8GE	19	HMC556	18
HMC190MS8E	23	HMC329	20	HMC412MS8GE	20	HMC486	12	HMC557	20
HMC194MS8E	23	HMC329LC3B	20	HMC413QS16GE	11	HMC486LP5E	12	HMC557LC4	20
HMC197E	23	HMC329LM3	20	HMC416LP4E	24	HMC487LP5E	12	HMC558	20
HMC199MS8E	24	HMC331	17	HMC420QS16E	19	HMC488MS8GE	19	HMC558LC3B	20
HMC203	20	HMC333E	19	HMC421QS16E	19	HMC489LP5E	12	HMC559	13
HMC204	16	HMC334LP4E	19	HMC422MS8E	19	HMC490	10	HMC560	20
HMC204C8	16	HMC335G16	14	HMC423MS8E	19	HMC490LP5E	10	HMC560LM3	20
HMC204MS8GE	16	HMC336MS8GE	23	HMC424	14	HMC491LP3E	10	HMC561	16
HMC205	16	HMC337	20	HMC424G16	14	HMC492LP3E	15	HMC561LP3E	16
HMC207S8E	19	HMC338	20	HMC424LH5	14	HMC493LP3E	16	HMC562	13
HMC208MS8E	19	HMC338LC3B	20	HMC424LP3E	14	HMC494LP3E	16	HMC564	10
HMC213MS8E	19	HMC339	20	HMC425	14	HMC495LP3E	21	HMC564LC4	10
HMC214MS8E	19	HMC340LP5E	19	HMC425LP3E	14	HMC496LP3E	21	HMC565	10
HMC215LP4E	19	HMC341	11	HMC426MS8E	15	HMC497LP4E	21	HMC565LC5	10
HMC218MS8E	19	HMC341LC3B	11	HMC427LP3E	24	HMC498	12	HMC566	11
HMC219MS8E	19	HMC342	10	HMC429LP4E	24	HMC498LC4	12	HMC566LP4E	11
HMC220MS8E	19	HMC342LC4	10	HMC430LP4E	24	HMC499	12	HMC567LC5	18
HMC222E	23	HMC344	20	HMC431LP4E	24	HMC499LC4	12	HMC568LC5	18
HMC224MS8E	23	HMC344LC3	23	HMC432E	15	HMC500LP3E	21	HMC570	18
HMC230MS8E	14	HMC344LH5	23	HMC433E	15	HMC504LC4B	10	HMC570LC5	18
HMC231G7	23	HMC344LP3E	23	HMC434E	16	HMC505LP4E	24	HMC571	18
HMC232	23	HMC345LP3E	23	HMC435MS8GE	23	HMC506LP4E	24	HMC571LC5	18
HMC232C8	23	HMC346	14	HMC437MS8GE	15	HMC507LP5E	25	HMC572	18
HMC232G7	23	HMC346C8	14	HMC438MS8GE	16	HMC508LP5E	25	HMC572LC5	18
HMC232G8	23	HMC346G8	14	HMC439QS16GE	16	HMC509LP5E	25	HMC573LC3B	16
HMC232LP4E	23	HMC346LC3B	14	HMC440QS16GE	22	HMC510LP5E	25	HMC574MS8E	23
HMC233G8	23	HMC346LP3E	14	HMC441	12	HMC511LP5E	25	HMC575LP4E	16
HMC234C8	23	HMC346MS8GE	14	HMC441LC3B	12	HMC512LP5E	25	HMC576	16
HMC239S8E	23	HMC347	23	HMC441LH5	12	HMC513LP5E	25	HMC576LC3B	16
HMC240	23	HMC347C8	23	HMC441LM1	12	HMC514LP5E	25	HMC577LC4B	16
HMC241LP3E	23	HMC347G8	23	HMC441LP3E	12	HMC515LP5E	25	HMC578	16
HMC241QS16E	23	HMC347LP3E	23	HMC442	12	HMC516	10	HMC578LC3B	16
HMC244G16	23	HMC348LP3E	23	HMC442LC3B	12	HMC516LC5	10	HMC579	16
HMC245QS16E	23	HMC349LP4CE	23	HMC442LM1	12	HMC517	10	HMC580ST89E	11
HMC247	21	HMC349MS8GE	23	HMC443LP4E	16	HMC517LC4	10	HMC581LP6E	19
HMC252QS24E	24	HMC351S8E	19	HMC444LP4E	16	HMC518	10	HMC582LP5E	25
HMC253LC4	24	HMC358MS8GE	24	HMC445LP4E	16	HMC519	10	HMC583LP5E	25
HMC253QS24E	24	HMC361	15	HMC446E	23	HMC519LC4	10	HMC584LP5E	25
HMC256	18	HMC361S8GE	15	HMC447LC3	16	HMC520	18	HMC585MS8GE	19
HMC258	20	HMC362	15	HMC448	16	HMC520LC4	18	HMC586LC4B	25
HMC258LC3B	20	HMC362S8GE	15	HMC448LC3B	16	HMC521	18	HMC587LC4B	25
HMC258LM3	20	HMC363	16	HMC449	16	HMC521LC4	18	HMC588LC4B	25
HMC260	20	HMC363G8	16	HMC449LC3B	16	HMC522	18	HMC589ST89E	11
HMC260LC3B	20	HMC363S8GE	16	HMC451	12	HMC522LC4	18	HMC590	12
HMC263	11	HMC364	15	HMC451LC3	12	HMC523	18	HMC590LP5E	12
HMC263LP4E	11	HMC364G8	15	HMC451LP3E	12	HMC523LC4	18	HMC591	12
HMC264	20	HMC364S8GE	15	HMC452QS16GE	12	HMC524	18	HMC591LP5E	12
HMC264LC3B	20	HMC365	15	HMC452ST89E	12	HMC524LC3B	18	HMC592	12
HMC264LM3	20	HMC365G8	15	HMC453QS16GE	12	HMC525	18	HMC593LP3E	10
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