



**THE DATASHEET OF  
AFEM-9040-SG1**



# Wireless Semiconductor Products



Selection Guide

# Accelerating Progress in Wireless Communications

Mobile communications are changing the way industries and individuals manage their lives, homes, offices and businesses. Avago Technologies is at the forefront of the wireless revolution, offering a broad range of mobile connectivity and wireless solutions, and is the partner of choice for leading wireless manufacturers and service providers around the globe. Avago products add value to every stage in the wireless production cycle.

## RF Component Solutions

Avago Technologies RF component innovations have been instrumental in driving the wireless revolution. Avago CoolPAM® power amplifiers, Film Bulk Acoustic Resonator (FBAR) filters, and Enhancement-mode pHEMT low noise amplifiers have set new benchmarks for performance, size and battery life. Avago products combine innovative technology, three decades of microwave and RF design experience, and expertise in system, protocol and regulatory understanding to create solutions that can help customers meet the most demanding technical specifications and the most difficult regulatory tests around the world.

## Manufacturing Technologies

- Film Bulk Acoustic Resonator
- Gallium Arsenide Heterojunction Bipolar Transistor
- Pseudomorphic High Electron Mobility Transistor
- Enhancement Mode Pseudomorphic High Electron Mobility Transistor
- Silicon

## Product Offerings

- Filters, Duplexers, and Multiplexers
- Power Amplifier Modules for many standards, including GSM, CDMA, W-CDMA, TD-SCDMA, and LTE
- Low Noise Amplifiers
- Front End Modules including Power Amplifier - Duplexers and Filter-LNAs
- RFICs
- Schottky and PIN Diodes
- Field Effect and Bipolar Transistors
- Millimeter Wave MMICs

## Film Bulk Acoustic Resonator (FBAR) Filters, Duplexers, Multiplexers and Front-end Modules

Today's smartphones face many challenges, including support for difficult LTE frequency bands and the need for coexistence between multiple radio systems. The exceptional performance of Avago FBAR filtering technology helps designers meet these challenges by providing low loss filtering with steep rejection characteristics. Microcap wafer-to-wafer bonding technology enables flexible, miniature packaging, including true chip-scale WaferCap filters.

## Features

- Steep roll-off
- Low insertion loss
- High Isolation
- Superior Out-of-Band Rejection
- Excellent power handling
- Low temperature coefficient

## Benefits

- Supports more efficient use of spectrum
- Extends battery life
- Supports coexistence of simultaneously operating radio systems
- Meets stringent 2nd Harmonic LTE requirements
- Improves phones sensitivity, enhancing data rate and network performance
- Can support multiple standards



Avago Technologies tiny RFICs have helped lead to smaller wireless products with increased battery life.

## FBAR Duplexer

UMTS Band 1	UMTS Band 2 / CDMA PCS	UMTS/LTE Band 3	LTE/UMTS Band 4/ CDMA AWS-1	LTE Band 7	LTE B25/BC14	UMTS Band 8	LTE Band 13
	ACMD-6102	ACMD-6003	ACMD-4104	ACMD-6107	ACMD-6125	ACMD-7606	ACMD-6013
ACMD-7617	ACMD-7411	ACMD-6103		ACMD-6207 ACMD-6307	ACMD-6225		

## FBAR Multiplexer

Part No.	Standard	Package Size
ACFM-7103	CDMA PCS, Cellular & GPS Quintplexer	4.0x7.0x1.2 mm
ACFM-7526	Band 25 & Band 26 Quadplexer	3.0x3.0x1.05 mm
ACFM-2013	Band 1 & Band 3 CA Quadplexer	3.6x2.0x0.8 mm
ACFM-7024	Band 2 & Band 4 CA Quadplexer	3.6x2.0x0.8 mm
ACFM-7037	Band 3 & Band 7 CA Quadplexer	3.6x2.0x0.8 mm
ACFM-7045	Band 2/25 & Band 66 CA Quadplexer	2.5x2.0x0.8mm
ACFM-2021	Band 2/25-Band 1/4 Diversity Rx Diplexer	1.8x1.4x0.8 mm
ACFM-2024	Band 25-Band 26-Band 41 Rx Triplexer	3.0x2.0x1.1 mm
ACFM-2113	Band 1 & Band 3 CA Quadplexer	2.5x2.0x0.8mm
ACFM-2149	Band 39-Band 41 CA Diplexer	1.8x1.4x0.8 mm

## FBAR Filters

Part No.	Standard	Passband	Package Size
ACPF-7141	LTE B41	2496-2690 MHz	2.0x1.6x0.90 mm
ACPF-7341	LTE B41 Rx	2496-2690 MHz	1.8x1.4x0.93 mm
ACPF-7124	ISM/WLAN/BT	2401-2482 MHz	1.1 x 1.4 x 0.8 mm
ACPF-7324	ISM/WLAN/BT	2401-2482 MHz	0.66 x 0.92 x 0.25 mm
ACPF-7424	ISM/WLAN/BT	2401-2482 MHz	1.1x1.4x0.8 mm
ACPF-7624	ISM/WLAN/BT	2401-2482 MHz	0.71x0.92x0.25
ACPF-8240	LTE B40	2300-2400 MHz	1.1x1.4x0.8 mm
ACFF-1024	WiFi (Small Cell Application)	2401-2482 MHz	1.1 x 1.4 x 0.8 mm

## FBAR Extractors

Part Number	Standard	Package Size
ACFM-W0G7	GPS/GLONASS+WLAN+Cellular Triplexer	2.9x2.0x0.8mm
ACFM-W1G7	GPS/GLONASS/Beidou+WLAN+Cellular Triplexer	2.5x2.5x0.8mm
ACFM-W025	HB Cellular+WLAN+5GHz ISM Triplexer	2.0x2.0x0.8mm
ACFM-W412	LB Cellular+MB/HB Cellular+WLAN Triplexer	2.0x2.0x0.8mm

# Power Amplifier Modules and PA-Duplexer Front End Modules

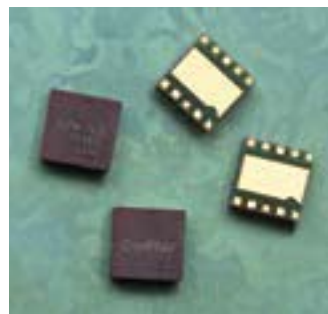
Battery life is one of the most important issues facing designers of next-generation mobile handsets. Not only is it inconvenient to frequently recharge the battery, but lower power consumption in the power amplifier frees more energy for other features like large displays. Avago has developed a technology called CoolPAM® that helps to optimize battery life by only turning on as much of the power amplifier as is needed, thus greatly enhancing efficiency. Avago has over 15 years of design and manufacturing expertise in power products, and offers power amplifier modules for many different applications. Additionally, Avago has combined its industry-leading FBAR and CoolPAM® technologies to offer a range of integrated modules. By combined multiple “best in class” technologies and optimizing partitioning and device interfaces, these devices can provide superior electrical performance, allowing designers get their products to market faster, with less risk and higher yields.

## Features

- High Efficiency
- Integrated high directivity coupling
- Support for multiple standards, including CDMA, W-CDMA, GSM/EDGE, LTE, and TD-SCDMA
- Support for most major bands in a common footprint

## Benefits

- Extends battery life
- Excellent power control
- Supports complex 3G and 4G architectures
- Can support multiple standards



Avago Technologies CoolPAM® and FEM technologies offer superior performance.

## Power Amplifiers

Classification	Part Number	Bands	Control	Signal	Package Size	C: CDMA U: UMTS L: LTE T: TD-SCDMA
Single band PA	ACPM-9001	B1(B34/39)	GPIO	APT	2 x 2.5mm	C/U/L/T
	ACPM-9002	B2	GPIO	APT	2 x 2.5mm	U/L
	ACPM-9004	B4	GPIO	APT	2 x 2.5mm	U/L
	ACPM-9005	B5	GPIO	APT	2 x 2.5mm	C/U/L
	ACPM-9008	B8	GPIO	APT	2 x 2.5mm	U/L
	ACPM-9007	B7	GPIO	APT	2 x 2.5mm	L
	ACPM-9011	B11	GPIO	APT	2 x 2.5mm	L
	ACPM-9013	B13	GPIO	APT	2 x 2.5mm	L
	ACPM-9017	B17	GPIO	APT	2 x 2.5mm	L
	ACPM-9020	B20	GPIO	APT	2 x 2.5mm	L
	ACPM-9040	B40	GPIO	APT	2 x 2.5mm	L
	ACPM-9041	B41	GPIO	APT	2 x 2.5mm	L
	ACPM-9301	B34/39	MIPI	APT	2 x 2.5mm	T
	ACPM-9307	B7	MIPI	APT	2 x 2.5mm	L
	ACPM-9311	B11	MIPI	APT	2 x 2.5mm	L
	ACPM-9313	B13	MIPI	APT	2 x 2.5mm	L
	ACPM-9317	B17	MIPI	APT	2 x 2.5mm	L
	ACPM-9320	B20	MIPI	APT	2 x 2.5mm	L
	ACPM-9328	B28	MIPI	APT	2 x 2.5mm	L
	ACPM-9340	B40	MIPI	APT	2 x 2.5mm	L
	ACPM-9341	B41	MIPI	APT	2 x 2.5mm	L
	ACPM-9407	B7	MIPI	ET	2 x 2.5mm	L
	ACPM-9411	B11	MIPI	ET	2 x 2.5mm	L
	ACPM-9413	B13	MIPI	ET/APT	2 x 2.5mm	L
	ACPM-9420	B20	MIPI	ET	2 x 2.5mm	L
	ACPM-9428	B28	MIPI	ET	2 x 2.5mm	L
	ACPM-9430	B30	MIPI	ET	2 x 2.5mm	L
	ACPM-9641	B41	MIPI	APT	2 x 2.5mm	L
Multi band PA	ACPM-9374140	B7/B40/B41	MIPI	APT	3 x 4mm	L
	ACPM-967341	B7/B30/B40/B41	MIPI	APT	3 x 3.5mm	L
Multi Mode Multi band PA	ACPM-7777	B1/B2/B3/B4(B34,39)/B5/B8/B17(B20,B28)	MIPI	APT	5 x 7mm	C/U/L/T
	ACPM-7788	B1/B2/B3/B4/B34(39)/B5/B8/B13/B17/ B20/B28	MIPI	APT	5 x 7mm	C/U/L/T
	ACPM-7620	B1/B2/B3/B4/B5/B8/B20	MIPI	ET/APT	5 x 7mm	C/U/L/T
	ACPM-7617	B1/B2/B3/B4/B5/B8/B17	MIPI	ET	5 x 7mm	C/U/L/T
	ACPM-8117	B1/B2/B3/B4/B5/B8/B17	MIPI	ET	5 x 7mm	C/U/L/T
ACPM-7800	B1/B2/B3/B4/B34(B39)/B5/B8/B20/ B17(B28A)/B28B	MIPI	ET/APT	5 x 7mm	C/U/L/T	
PAD	AFEM-7007	B7	MIPI	ET	4 x 2.5mm	L
PAMiD	AFEM-9010	B7,B40,B41	MIPI	ET/APT	4.5 x 6.15mm	L
	AFEM-9020	B1/B2/B3/B4/B34/B39	MIPI	ET	5.5 x 7.7mm	C/U/L/T
	AFEM-9025	B1/B2/B3/B4/B34/B39	MIPI	ET	5.5 x 7.7mm	C/U/L/T
	AFEM-9030	B7/B40/B41	MIPI	ET	4.5 x 6.15mm	L
	AFEM-9040	B1/B2/B3/B4/B34/B39	MIPI	ET	5.5 x 7.7mm	C/U/L/T

# System Block Diagrams and Suggested Products

## Wireless Infrastructure

- Basestation Radio Card 7
- Basestation Low Noise Amplifier (LNA) 10
- Basestation Tower Mounted Amplifier (TMA) 10
- Basestation Multi-carrier Power Amplifier (MCPA) 11
- Microwave Link (Point-Point/Point-Multipoint) 12
- Small Cell Front End 16
- DBS Satellite TV System 19
- Mobile DAB/SDARS/DMB Digital Receivers 20
- GPS/GLONASS Receivers 21
- 2-6 GHz Systems (including 802.11a/b/g and 802.16a) 22

## VSAT

- C-band 25
- Ku-band 27
- Ka-band 28

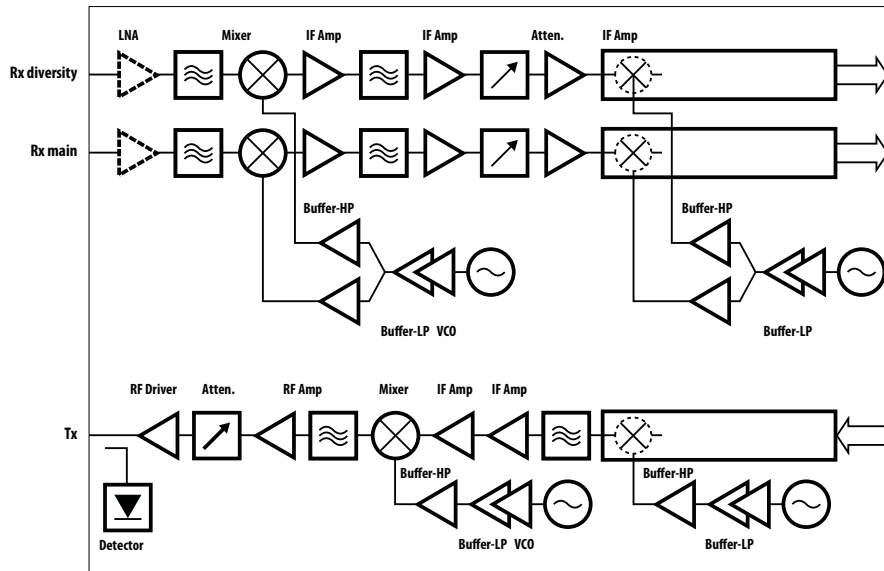
## RFID

- RFID 900 MHz Reader 29

## Product Selection Guides

- RFICs (GaAs and Silicon) 30
- Transistors (FET and Bipolar) 35
- Diodes (PIN and Schottky) 36
- Millimeter Wave MMICs 42
- Microwave Radio Link Application Circuit 47

# Wireless Infrastructure Basestation Radiocard



## Radiocard Suggested Components

Application	Part Number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB <sup>1</sup> @ 2GHz	P1dB/dBm <sup>1</sup> @ 2GHz	OIP3/dBm @ 2GHz	NF/dB <sup>2</sup> @ 2GHz	Device Type and Package (mm)
LNA	MGA-13116	5/55	0.4 - 1.5	38	23.3	41.4	0.51	QFN 4x4x0.85
	MGA-13216	5/53	1.5 - 2.5	35.8	23.6	40.5	0.61	QFN 4x4x0.85
	MGA-13316 <sup>6</sup>	5/53	2.2 - 4.0	34.3	23.5	41.8	0.76	QFN 4x4x0.85
	MGA-14516	5/45	1.4 - 2.7	31.7	-	23.5	0.66	QFN 4x4x0.85
	MGA-16116 <sup>11</sup>	4.8/61	0.45-1.45	18.4	21.2	21.2 (IIP3)	0.27	QFN 4x4x0.85
	MGA-16216 <sup>12</sup>	4.8/52.5	1.44-2.35	18.4	19.5	19.5 (IIP3)	0.32	QFN 4x4x0.85
	MGA-16316 <sup>13</sup>	4.8/53.3	1.95-4.0	18.2	18.7	15.5 (IIP3)	0.45	QFN 4x4x0.85
	MGA-53543	5/54	0.4 - 6	15.4	18.6	39.1	1.5	E-pHEMT MMIC, SOT343
	MGA-53589	5/52	0.05 - 3.0	15.8	18.2	37	1.7	SOT-89
	MGA-631P8 <sup>5</sup>	4/60	0.4 - 1.5	17.5	18.0	33.1	0.53	E-pHEMT MMIC, LPCC 2x2
	MGA-632P8 <sup>5</sup>	4/60	1.4 - 3	17.6	19.2	34.8	0.62	E-pHEMT MMIC, LPCC 2x2
	MGA-633P8	5/54	0.45 - 2	18	-	37	0.37	QFN 2x2x0.75
	MGA-634P8	5/48	1.5 - 2.3	17.4	22	36	0.37	QFN 2x2x0.75
	MGA-635P8	5/56	2.3 - 4.0	18	21.9	35.9	0.56	QFN 2x2x0.75
	MGA-636P8	4.8/105	0.45 - 1.5	18.5	23	41.5	0.5	QFN 2x2x0.75
	MGA-637P8	4.8/70	1.5 - 2.5	17.5	22	41.5	0.6	QFN 2x2x0.75
	MGA-638P8	4.8/90	2.5 - 4	17.5	22	39.5	0.8	QFN 2x2x0.75
	ATF-58143	3/30	0.45 - 6	16.5	19	30.5	0.5	E-pHEMT FET, SOT343
	ATF-54143	3/60	0.45 - 6	16.6	20	36.2	0.5	E-pHEMT FET, SOT343
	ALM-12124	5/227.7	1.880 - 2.025	39	23.5	36.5	0.85	MCOB 8.0x8.0x1.2
ALM-12224	5/228.7	2.30 - 2.40	36.8	22.7	38.5	0.99	MCOB 8.0x8.0x1.2	

**Notes:**

- Gain and P1dB performance for discrete FETs when matched for best IP3.
- NFmin figures for discrete FETs.
- High reverse isolation: 50dB typical.

- Current adjustable: 20-60mA.
- Both MGA-631P8 and MGA-632P8 come with integrated active bias circuit. MGA-631P8 data tested at 900MHz.
- MGA-30116, ALM-31122 and ALM-32120 data tested at 900MHz.
- MGA-30316, ALM-31322 and ALM-32320 data tested at 3.5GHz.

- MGA-13316 data tested at 2.5GHz
- ALM-12124 data tested at 2018MHz
- ALM-12224 data tested at 2400MHz
- MGA-16116 data tested at 900 MHz
- MGA-16216 data tested at 1950 MHz
- MGA-16316 data tested at 2.6 GHz

# Wireless Infrastructure

## Basestation Radiocard

### Radiocard Suggested Components

Application	Part Number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB <sup>1</sup> @ 2GHz	P1dB/dBm <sup>1</sup> @ 2GHz	OIP3/dBm @ 2GHz	NF/dB <sup>2</sup> @ 2GHz	Device Type and Package (mm)	
RF Amplifier	MGA-30116 <sup>6</sup>	5/202.8	0.75 - 1	17	-	44.1	2	QFN 3x3	
	MGA-30216	5/206	1.7 - 2.7	14.2	-	45.3	2.8	QFN 3x3	
	MGA-30316 <sup>7</sup>	5/198	3.3 - 3.9	12.8	-	44.4	2.7	QFN 3x3	
	MGA-30489	5/97	0.25 - 3.0	13.3	23.3	39	3	SOT-89	
	MGA-30689	5/104	0.04 - 2.6	14.6	22.5	40	3.3	SOT-89	
	MGA-30789	5/100	2 - 6	11.7	-	41.8	3.3	SOT-89	
	MGA-30889	5/65	0.04 - 2.6	15.5	-	38	1.9	SOT-89	
	MGA-30989	5/51	2 - 6	12	-	36.8	2	SOT-89	
	MGA-31189	5/111	0.05 - 2	21	24	42	3	SOT-89	
	MGA-31289	5/124	1.5 - 3	18.7	24	41.8	3	SOT-89	
	MGA-31389	5/73	0.05 - 2	21.3	22.2	38.6	2	SOT-89	
	MGA-31489	5/69	1.5 - 3	19.5	21.9	37.3	1.9	SOT-89	
	MGA-31589	5/146	0.45 - 1.5	20.4	27.2	45.3	1.9	SOT-89	
	MGA-31689	5/168	1.5 - 3	18.1	27.6	44.9	1.9	SOT-89	
	MGA-31716	5/58	2	20.2	21.2	41	1.9	QFN 3x3	
	MGA-31816	5/59	1.5 - 4.0	19.5	20.5	40.5	1.6	QFN 3x3	
	MGA-53543	5/54	0.4 - 6	15.4	18.6	39.1	1.5	E-pHEMT MMIC, SOT343	
	MGA-53589	5/52	0.05 - 3.0	15.8	18.2	37	1.7	SOT-89	
	MGA-545P8	3.3/127	0.05 - 7	18.6	21.7	34	2.7	E-pHEMT MMIC, LPCC	
	MGA-61563 <sup>4</sup>	3/41	0.5 - 6	15.5	15.1	31.7	1	E-pHEMT MMIC, SOT363	
	ATF-52189	4.5/200	0.05 - 6	16	27	42	1.21	E-pHEMT FET, SOT89	
	ATF-521P8	4.5/200	0.05 - 6	17	26.5	42	0.96	E-pHEMT FET, LPCC	
	ATF-53189	4/135	0.05 - 6	15.5	23	40	0.62	E-pHEMT FET, SOT89	
	ATF-531P8	4/135	0.05 - 6	20	24.5	38	0.6	E-pHEMT FET, LPCC	
	ADA-4789	4.1/80	DC - 2.5	16.3	16.9	29	4.5	Si MMIC, SOT89	
	Variable Gain Amplifier	ALM-80110 <sup>8</sup>	5/110	0.4 - 1.6	(-27) to 13.6	23.3	40.3	4.8	MCOB 5.0x5.0x1.1
		ALM-80210	5/110	1.6 - 2.6	(-25.5) to 9.8	23.6	40.8	5.3	MCOB 5.0x5.0x1.1
ALM-81224		5/383	1.45 - 2.75	23.8	27.4	44	2	MCOB 6.0x6.0x1.0	
RF Driver	MGA-30489	5/97	0.25 - 3.0	13.3	23.3	39	3	SOT-89	
	MGA-30689	5/104	0.04 - 2.6	14.6	22.5	40	3.3	SOT-89	
	MGA-30789	5/100	2 - 6	11.7	-	41.8	3.3	SOT-89	
	MGA-30889	5/65	0.04 - 2.6	15.5	-	38	1.9	SOT-89	
	MGA-30989	5/51	2 - 6	12	-	36.8	2	SOT-89	
	MGA-31189	5/111	0.05 - 2	21	24	42	3	SOT-89	
	MGA-31289	5/124	1.5 - 3	18.7	24	41.8	3	SOT-89	
	MGA-31389	5/73	0.05 - 2	21.3	22.2	38.6	2	SOT-89	
	MGA-31489	5/69	1.5 - 3	19.5	21.9	37.3	1.9	SOT-89	
	MGA-31589	5/146	0.45 - 1.5	20.4	27.2	45.3	1.9	SOT-89	
	MGA-31689	5/168	1.5 - 3	18.1	27.6	44.9	1.9	SOT-89	
	MGA-31716	5/58	2	20.2	21.2	41	1.9	QFN 3x3	
	MGA-31816	5/59	1.5 - 4.0	19.5	20.5	40.5	1.6	QFN 3x3	
	MGA-53589	5/52	0.05 - 3.0	15.8	18.2	37	1.7	SOT-89	
	ATF-50189	4.5/280	0.05 - 6	15.5	29	45	1.1	E-pHEMT FET, SOT89	
	ATF-501P8	4.5/280	0.05 - 6	14.7	28	45	-	E-pHEMT FET, LPCC	
	ATF-511P8	4.5/200	0.05 - 6	14.8	30	41.7	1.4	E-pHEMT FET, LPCC	
	ALM-31122 <sup>6</sup>	5/394	0.7 - 1	15.6	-	47.6	2	MCOB 5.0x6.0x1.1	
	ALM-31222	5/415	1.7 - 2.7	14.9	-	47.9	2.7	MCOB 5.0x6.0x1.1	
	ALM-31322 <sup>7</sup>	5/413	3.3 - 3.9	13.2	-	47.7	2.8	MCOB 5.0x6.0x1.1	
	ALM-32120 <sup>6</sup>	5/800	0.7 -1.0	14	-	52	2.5	MCOB 7.0x10.0x1.1	
	ALM-32220	5/800	1.7 - 2.7	14.8	-	50	3.5	MCOB 7.0x10.0x1.1	
	ALM-32320 <sup>7</sup>	5/800	3.3 - 3.9	12.5	-	50	2.5	MCOB 7.0x10.0x1.1	

#### Notes:

- Gain and P1dB performance for discrete FETs when matched for best IP3.
- NFmin figures for discrete FETs.

- High reverse isolation: 50dB typical.
- Current adjustable: 20-60mA.
- Both MGA-631P8 and MGA-632P8 come with integrated active bias circuit. MGA-631P8 data tested at 900MHz.
- MGA-30116, ALM-31122 and ALM-32120 data tested at 900MHz.

- MGA-30316, ALM-31322 and ALM-32320 data tested at 3.5GHz.
- ALM-80110 data tested at 900MHz

# Wireless Infrastructure

## Basestation Radiocard

### Radiocard Suggested Components

Application	Part Number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB <sup>1</sup> @2GHz	P1dB/dBm <sup>1</sup> @2GHz	OIP3/dBm @2GHz	NF/dB <sup>2</sup> @2GHz	Device Type and Package (mm)
Buffer-High Power	MGA-565P8 <sup>3</sup>	5/67	0.1 - 3.5	21.8	20 (P <sub>sat</sub> )	-	-	E-pHEMT MMIC, LPCC
	ABA-54563	5/79	DC - 3.4	23	16.1	27.3	4.4	Si MMIC, SOT363
Buffer-Low Power	ABA-51563	5/18	DC - 3.5	21.5	1.8	11.4	3.7	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.5	9.8	19.9	3.3	Si MMIC, SOT363
	ABA-53563	5/46	DC - 3.5	21.5	12.7	22.9	3.5	Si MMIC, SOT363
	AVT-50663	5/36	DC - 6	15.3	12.5	25	4	SOT-363 (SC70)
	AVT-51663	5/37	DC - 6	19.6	12.9	25.1	3.2	SOT-363 (SC70)
	AVT-52663	5/45	DC - 6	15.3	12.7	27	4	SOT-363 (SC70)
	AVT-53663	5/48	DC - 6	19.6	15.1	26.5	3.2	SOT-363 (SC70)
	AVT-54689	5/48	0.05 - 6	17.1	17.4	29.6	4.1	SOT-89
AVT-55689	5/75	0.05 - 6	17.2	19.5	32.5	4.3	SOT-89	

Application	Part Number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB <sup>1</sup> @500MHz	P1dB/dBm <sup>1</sup> @500MHz	OIP3/dBm @500MHz	NF/dB <sup>2</sup> @500MHz	Device Type and Package (mm)
IF Amplifier	MGA-30489	5/97	0.25 - 3.0	18.8	22.7	37	3.3	SOT-89
	MGA-30689	5/104	0.04 - 2.6	14.4	22.2	44	3.0	SOT-89
	MGA-30789	5/100	2 - 6	11.7	-	41.8	3.3	SOT-89
	MGA-30889	5/65	0.04 - 2.6	15.5	-	38	1.9	SOT-89
	MGA-30989	5/51	2 - 6	12	-	36.8	2	SOT-89
	MGA-31189	5/111	0.05 - 2	21	24	42	3	SOT-89
	MGA-31289	5/124	1.5 - 3	18.7	24	41.8	3	SOT-89
	MGA-31389	5/73	0.05 - 2	21.3	22.2	38.6	2	SOT-89
	MGA-31489	5/69	1.5 - 3	19.5	21.9	37.3	1.9	SOT-89
	MGA-31589	5/146	0.45 - 1.5	20.4	27.2	45.3	1.9	SOT-89
	MGA-31689	5/168	1.5 - 3	18.1	27.6	44.9	1.9	SOT-89
	MGA-62563 <sup>4</sup>	3/55	0.1 - 3	22	18	35	0.8	E-pHEMT MMIC, SOT363
	MGA-545P8	3.3/135	0.1 - 7	22	19	36	2	E-pHEMT MMIC, LPCC
	ADA-4789	4.1/80	DC - 2.5	17	18.8	35	4.2	Si MMIC, SOT89
	ADA-4743	(3.8)/60	DC - 2.5	16.5	17.1	34	4.2	Si MMIC, SOT343
	ADA-4643	(3.5)/35	DC - 2.5	17.3	14	29	4	Si MMIC, SOT343
	ADA-4543	(3.4)/15	DC - 2.5	15.5	2.4	15	3.7	Si MMIC, SOT343
	ABA-54563	5/81	DC - 3	23	18	32	3	Si MMIC, SOT363
	ABA-53563	5/46	DC - 3.5	21.5	15	27.5	2.9	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.8	12.5	28	2.7	Si MMIC, SOT363
Detector - Schottky Diodes	HSMS-282x	Ct max = 1pF @0V						SOT323/363/23/143
	HSMS-286x	Ct max = 0.3pF @0V						SOT323/363/23/143
Attenuator - PIN Diodes	HSMP-381x	Very low distortion, Ct typ. = 0.2pF @0V, see AN1048 & AN5262 pi-attenuator design						SOT323/23/25
	HSMP-386x	Lower current, low cost, Ct typ. = 0.2pF @0V, see AN1048 pi-attenuator design						SOT323/363/23/25
Attenuator - Module	ALM-38140	Low distortion, high dynamic range attenuator module						MCOB 3.8x3.8x1.0

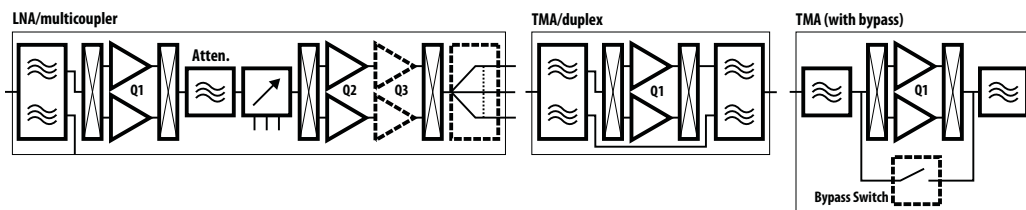
#### Notes:

- Gain and P1dB performance for discrete FETs when matched for best IP3.
- NFmin figures for discrete FETs.
- High reverse isolation: 50dB typical.
- Current adjustable: 20-60mA.
- Both MGA-631P8 and MGA-632P8 come with integrated active bias circuit. MGA-631P8 data tested at 900MHz.
- MGA-30116, ALM-31122 and ALM-32120 data tested at 900MHz.
- MGA-30316, ALM-31322 and ALM-32320 data tested at 3.5GHz.

# Wireless Infrastructure

## Basestation Low Noise Amplifier (LNA)

## Basestation Tower Mounted Amplifiers (TMA)



### LNA & TMA Suggested Components

Application	Part Number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB <sup>1</sup> @ 2GHz	PldB/dBm <sup>1</sup> @ 2GHz	OIP3/dBm @ 2GHz	NF/dB <sup>2</sup> @ 2GHz	Device Type and Package (mm)
Q1	MGA-13116	5/55	0.4 - 1.5	38	23.3	41.4	0.51	QFN 4x4x0.85
	MGA-13216	5/53	1.5 - 2.5	35.8	23.6	40.5	0.61	QFN 4x4x0.85
	MGA-13316	5/53	2.2 - 4.0	34.3	23.5	41.8	0.76	QFN 4x4x0.85
	MGA-14516	5/45	1.4 - 2.7	31.7	-	23.5	0.66	QFN 4x4x0.85
	MGA-16116 <sup>7</sup>	4.8/61	0.45-1.45	18.4	21.2	21.2 (IIP3)	0.27	QFN 4x4x0.85
	MGA-16216 <sup>8</sup>	4.8/52.5	1.44-2.35	18.4	19.5	19.5 (IIP3)	0.32	QFN 4x4x0.85
	MGA-16316 <sup>9</sup>	4.8/53.3	1.95-4.0	18.2	18.7	15.5 (IIP3)	0.45	QFN 4x4x0.85
	MGA-631P8 <sup>3</sup>	4/60	0.4 - 1.5	17.5	18.0	33.1	0.53	E-pHEMT MMIC, LPCC 2x2
	MGA-632P8 <sup>3</sup>	4/60	1.4 - 3	17.6	19.2	34.8	0.62	E-pHEMT MMIC, LPCC 2x2
	MGA-633P8	5/54	0.45 - 2	18	-	37	0.37	E-pHEMT MMIC, LPCC 2x2
	MGA-634P8	5/48	1.5 - 2.3	17.4	22	36	0.37	E-pHEMT MMIC, LPCC 2x2
	MGA-635P8	5/56	2.3 - 4.0	18	21.9	35.9	0.56	E-pHEMT MMIC, LPCC 2x2
	ALM-11036	5/92	0.776 - 0.87	15.6	4	37.6	0.78	SMT 7x10
	ALM-11136	5/92	0.87 - 0.915	15.4	4.5	38.2	0.76	SMT 7x10
	ALM-11236	5/99	1.71 - 1.85	15.9	3.5	32.3	0.67	SMT 7x10
	ALM-11336	5/100	1.85 - 1.98	15.3	3.8	35.5	0.72	SMT 7x10
	ATF-58143	3/30	0.45 - 6	16.5	19	30.5	0.5	E-pHEMT FET, SOT343
	ATF-54143	3/60	0.45 - 6	16.6	20	36.2	0.5	E-pHEMT FET, SOT343
	ATF-55143	2.7/10	0.45 - 6	17.7	14	24.2	0.6	E-pHEMT FET, SOT343
	ATF-53189	4/135	0.05 - 6	15.5	23	40	0.62	E-pHEMT FET, SOT89
ATF-531P8	4/135	0.05 - 6	20	24.5	38	0.6	E-pHEMT FET, LPCC	
Q2/Q3	MGA-30116 <sup>4</sup>	5/202.8	0.75 - 1	17	-	44.1	2	QFN 3x3
	MGA-30216	5/206	1.7 - 2.7	14.2	-	45.3	2.8	QFN 3x3
	MGA-30316 <sup>5</sup>	5/198	3.3 - 3.9	12.8	-	44.4	2.7	QFN 3x3
	MGA-31716	5/58	2	20.2	21.2	41	1.9	QFN 3x3
	MGA-31816	5/59	1.5-4.0	19.5	20.5	40.5	1.6	QFN 3x3
	MGA-53543	5/54	0.4 - 6	15.4	18.6	39.1	1.5	E-pHEMT MMIC, SOT343
	MGA-53589	5/52	0.05 - 3.0	15.8	18.2	37	1.7	SOT-89
	MGA-636P8	4.8/105	0.45 - 1.5	18.5	23	41.5	0.5	E-pHEMT MMIC, LPCC
	MGA-637P8	4.8/70	1.5 - 2.5	17.5	22	41.5	0.6	E-pHEMT MMIC, LPCC
	MGA-638P8	4.8/90	2.5 - 4	17.5	22	39.5	0.8	E-pHEMT MMIC, LPCC
	ATF-50189	4.5/280	0.05 - 6	15.5	29	45	1.1	E-pHEMT FET, SOT89
	ATF-501P8	4.5/280	0.05 - 6	14.7	28	45	-	E-pHEMT FET, LPCC
	ATF-511P8	4.5/200	0.05 - 6	14.8	30	41.7	1.4	E-pHEMT FET, LPCC
	ATF-52189	4.5/200	0.05 - 6	16	27	42	1.21	E-pHEMT FET, SOT89
	ATF-521P8	4.5/200	0.05 - 6	17	26.5	42	0.96	E-pHEMT FET, LPCC
	ATF-53189	4/135	0.05 - 6	15.5	23	40	0.62	E-pHEMT FET, SOT89
	ATF-531P8	4/135	0.05 - 6	20	24.5	38	0.6	E-pHEMT FET, LPCC
Bypass Switch - PIN Diodes	HSMP-389x	General purpose switch, Ct typ. = 0.4pF @0V						SOT-323/363/23/143
	HSMP-489x	Low inductance, shunt, Ct typ. = 0.4pF @0V						SOT323/23
	HSMP-386x	Higher linearity switch, Ct typ = 0.2pF @0V						SOT323/363/23/25
Attenuator - PIN Diodes	HSMP-381x	Very low distortion, Ct typ. = 0.2pF @0V, see AN1048 & AN5262 pi-attenuator design						SOT323/23/25
	HSMP-386x	Lower current, low cost, Ct typ. = 0.2pF @0V, see AN1048 pi-attenuator design						SOT323/363/23/25
Attenuator-Module	ALM-38140	Low distortion, high dynamic range attenuator module						MCOB 3.8x3.8x1.0

#### Notes:

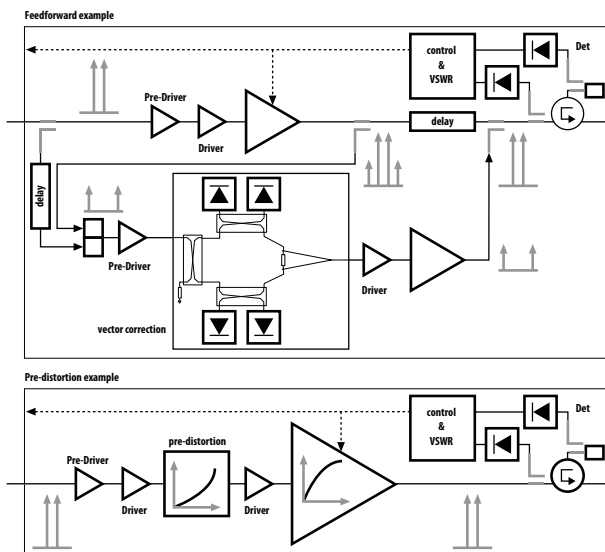
- Gain and PldB performance for discrete FETs when matched for best IP3.
- NFmin figures for discrete FETs.
- Both MGA-631P8 and MGA-632P8 come with integrated active bias circuit. MGA-631P8 data tested at 900MHz.

- MGA-30116 data tested at 900MHz.
- MGA-30316 data tested at 3.5GHz.
- MGA-16116 data tested at 900 MHz

- MGA-16216 data tested at 1950 MHz.
- MGA-16316 data tested at 2.6 GHz.

# Wireless Infrastructure

## Basestation Multi-Carrier Power Amplifier (MCPA)



### MCPA Suggested Components

Application	Part Number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB <sup>1</sup> @ 2GHz	P1dB/dBm <sup>1</sup> @ 2GHz	OIP3/dBm @ 2GHz	NF/dB <sup>2</sup> @ 2GHz	Device Type and Package (mm)
Pre-Driver	MGA-30116 <sup>3</sup>	5/202.8	0.75 - 1	17	-	44.1	2	QFN 3x3
	MGA-30216	5/206	1.7 - 2.7	14.2	-	45.3	2.8	QFN 3x3
	MGA-30316 <sup>4</sup>	5/198	3.3 - 3.9	12.8	-	44.4	2.7	QFN 3x3
	MGA-30489	5/97	0.25 - 3.0	13.3	23.3	39	3	SOT-89
	MGA-30689	5/104	0.04 - 2.6	14.6	22.5	40	3.3	SOT-89
	MGA-30789	5/100	2 - 6	11.7	-	41.8	3.3	SOT-89
	MGA-30889	5/65	0.04 - 2.6	15.5	-	38	1.9	SOT-89
	MGA-30989	5/51	2 - 6	12	-	36.8	2	SOT-89
	MGA-31189	5/111	0.05 - 2	21	24	42	3	SOT-89
	MGA-31289	5/124	1.5 - 3	18.7	24	41.8	3	SOT-89
	MGA-31389	5/73	0.05 - 2	21.3	22.2	38.6	2	SOT-89
	MGA-31489	5/69	1.5 - 3	19.5	21.9	37.3	1.9	SOT-89
	MGA-31589	5/146	0.45 - 1.5	20.4	27.2	45.3	1.9	SOT-89
	MGA-31689	5/168	1.5 - 3	18.1	27.6	44.9	1.9	SOT-89
	MGA-31716	5/58	2	20.2	21.2	41	1.9	QFN 3x3
	MGA-31816	5/59	1.5 - 4.0	19.5	20.5	40.5	1.6	QFN 3x3
	MGA-53543	5/54	0.4 - 6	15.4	18.6	39.1	1.5	E-pHEMT MMIC, SOT343
	MGA-53589	5/52	0.05 - 3.0	15.8	18.2	37	1.7	SOT-89
	MGA-545P8	3.3/127	0.05 - 7	18.6	21.7	34	2.7	E-pHEMT MMIC, LPCC
	Driver	ATF-52189	4.5/200	0.05 - 6	16	27	42	1.21
ATF-521P8		4.5/200	0.05 - 6	17	26.5	42	0.96	E-pHEMT FET, LPCC
ATF-53189		4/135	0.05 - 6	15.5	23	40	0.62	E-pHEMT FET, SOT89
ATF-531P8		4/135	0.05 - 6	20	24.5	38	0.6	E-pHEMT FET, LPCC
ADA-4789		4.1/80	DC - 2.5	16.3	16.9	29	4.5	Si MMIC, SOT89
ATF-50189		4.5/280	0.05 - 6	15.5	29	45	1.1	E-pHEMT FET, SOT89
ATF-501P8		4.5/280	0.05 - 6	14.7	28	45	-	E-pHEMT FET, LPCC
ATF-511P8		4.5/200	0.05 - 6	14.8	30	41.7	1.4	E-pHEMT FET, LPCC
ALM-31122 <sup>3</sup>		5/394	0.7 - 1	15.6	-	47.6	2	MCOB 5.0x6.0x1.1
ALM-31222		5/415	1.7 - 2.7	14.9	-	47.9	2.7	MCOB 5.0x6.0x1.1
ALM-31322 <sup>4</sup>	5/413	3.3 - 3.9	13.2	-	47.7	2.8	MCOB 5.0x6.0x1.1	
ALM-32120 <sup>3</sup>	5/800	0.7 - 1.0	14	-	52	2.5	MCOB 7.0x10.0x1.1	
ALM-32220	5/800	1.7 - 2.7	14.8	-	50	3.5	MCOB 7.0x10.0x1.1	
ALM-32320 <sup>4</sup>	5/800	3.3 - 3.9	12.5	-	50	2.5	MCOB 7.0x10.0x1.1	
ALM-81224	5/383	1.45 - 2.75	23.8	27.4	44	2	MCOB 6.0x6.0x1.0	
Detector - Schottky Diodes	HSMS-282x	Ct max = 1pF @0V						SOT323/363/23/143
	HSMS-286x	Ct max = 0.3pF @0V						SOT323/363/23/143
Vector Correction - PIN Diodes	HSMP-481x	Low inductance, shunt, very low distortion, Ct typ. = 0.2pF @0V						SOT323/23
	HSMP-381x	Very low distortion, Ct typ. = 0.2pF @0V						SOT323/23/25

**Notes:**

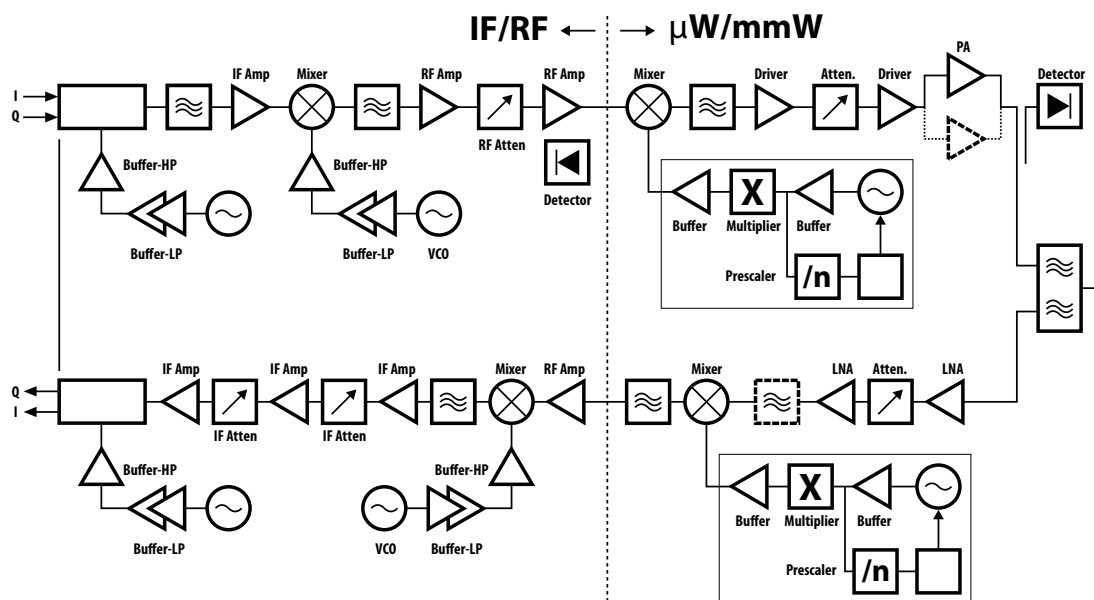
1. Gain and P1dB performance for discrete FETs when matched for best IP3.
2. NFmin figures for discrete FETs.

3. MGA-30116, ALM-31122 and ALM-32120 data tested at 900MHz.

4. MGA-30316, ALM-31322 and ALM-32320 data tested at 3.5GHz.

# Wireless Infrastructure

## Microwave Link (Point-to-Point/Point-to-Multipoint)



### Microwave Link MMICs Suggested Components

Application	Part Number	Bias V/mA	Freq. Range GHz	Typical Performance				Package (mm)
				Gain (dB)	P1dB (dBm)	OIP3 (dBm)	NF (dB)	
Power Amplifiers	AMGP-6432	6/700	28 - 31	20	33	40 @ 30 GHz	-	SM 5x5
	AMGP-6434	6/1400	28 - 31	20	35.5	42 @ 30 GHz	-	SM 5x5
	AMMP-6408	5/650	6 - 18	18	28	38	4.5	SM 5x5
	AMMC-6408	5/650	6 - 18	19	29	38	4.3	chip
	AMMC-6425	5/900 - 0.6	18 - 28	18.5	28.5	38	-	chip
	AMMC-6431	5/0.65	25-33	19	28.5	38	-	chip
	AMMC-6442	5/0.7	37-40	23	30	18	-	chip
Driver/Buffer Amps1	AMMP-5618	5/107	6 - 20	13	19	30	4.4	SM 5x5
	AMMC-5618	5/107	6 - 20	14.5	19.5	26	4.4	chip
	AMMP-5620	5/95	6 - 20	17.5	15	22.5	5.1	SM 5x5
	AMMC-5620	5/95	6 - 20	19	15	23.5	4.2	chip
	AMMC-5040	4.5/300 - 0.45	20 - 45	25	19.5	30	-	chip
	AMMP-6333	5/230	18-33	22	23	30	-	SM 5x5
	AMMC-6333	5/230	18-33	22	23	30	-	chip
Low Noise Amplifiers	AMMP-6220	3/55	6 - 20	22	10	20	2.5	SM 5x5
	AMMC-6220	3/55	6 - 20	23	9	19	2	chip
	AMMP-6222	4/120	7 - 21	24	15.5	29	2.3	SM 5x5
	AMMC-6222	4/120	7 - 21	25	16	29	2.1	chip
	AMMP-6232	4/138	18 - 32	23	18	29	3	SM 5x5
	AMMC-6232	4/138	18 - 32	24	19	29	2.8	chip
	AMMP-6233	3/65	18 - 32	23	8	19	2.6	SM 5x5
Travelling Wave Amplifiers	AMMC-6241	3/60	26 - 43	20	10	20	2.7	chip
	AMMP-5024	7/200	(30k) - 40	15	22	30	4.4	SM 5x5
	AMMC-5024	7/200 - 3	(30k) - 40	16	22.5	30	4.6	chip
	AMMC-5025	5/100	(30k) - 80	8	15	20	-	chip
	AMMC-5026	7/150 - 1	2 - 35	10.5	24	31	3.6	chip

# Wireless Infrastructure

## Microwave Link (Point-to-Point/Point-to-Multipoint)

### Microwave Link MMICs Suggested Components

Application	Part Number	Freq. Range (GHz)	Typical Performance					Package (mm)
			In/Output RL (dB)	Control Range (dB)	Min. IL (dB)	Control Voltage (V)	IIP3 (dBm)	
Variable Attenuator	AMMC-6650	DC - 40	15/15	22	3.1 @ 40GHz	0 to +1.5V	+7 @ 22GHz	Chip
	AMMP-6650	DC - 30	12/12	22	2.1 @ 30GHz	0 to +1.5V	+7 @ 22GHz	SM 5x5

Application	Part Number	Input Freq. (GHz)	Typical Performance					Package (mm)
			Output Freq. (GHz)	IP1dB (dBm)	Pout (dBm)	Fo (dBc)	3Fo (dBc)	
Multiplier	AMMP-6125	5 - 12	10 - 24	0	22	20	20	SM 5x5
	AMMP-6120	4 - 12	8 - 24	2	15	25	25	SM 5x5
	AMMC-6120	4 - 12	8 - 24	2	15	25	25	Chip
	AMMC-6140	10 - 20	20 - 40	5.0	-1	30	25	Chip

Application	Part Number	RF Freq./IF (GHz)	Typical Performance					Package (mm)
			Im Rej (dB)	RF/IF RL. (dB)	Conversion Gain (dB)	LO/RF (Isolation dB)	IIP3 (dBm)	
Mixer/Converter	AMMP-6522	7 - 20/DC - 3.5	15	12/12	-13	-	-2 @ 16 GHz	SM 5x5
	AMMP-6530	5 - 30/DC - 5	15	5/10	-5 @ 20 GHz	25	24 @ 23 GHz	SM 5x5
	AMMP-6545	18 - 40/DC - 3.5	-	-	-11 @ 36GHz	30	12	SM 5x5
	AMMC-6530	5 - 30/DC - 5	15	5/10	-5 @ 20 GHz	25	24 @ 23 GHz	Chip
	AMMC-6545	18 - 45/DC - 3.5	-	-	-9 @ 30GHz	33	18	Chip

### Microwave/Millimeter Wave Diode Suggested Components

Application	Part Number	Description	Package
Detector - Schottky diodes	HSCH-5310	Si single, Ct=0.1pF, med. barrier/low barrier	Beamlead
	HSCH-5314	Si single Ct=0.15pF, med. barrier/low barrier	Beamlead
Mixers - Schottky diodes	HSCH-5310	Si single, Ct=0.1pF, med. barrier/low barrier	Beamlead
	HSCH-5314	Si single Ct=0.15pF, med. barrier/low barrier	Beamlead
Multiplier - Schottky diodes	HSCH-5310	Si single, Ct=0.1pF, med. barrier/low barrier	Beamlead
	HSCH-5314	Si single Ct=0.15pF, med. barrier/low barrier	Beamlead
Attenuator - PIN diodes	HPND-4005	Si single, Ct=17fF, t=100ns	Beamlead
Switch - PIN diodes	HPND-4005	Si single, Ct=17fF, t=100ns	Beamlead

# Wireless Infrastructure

## Microwave Link (Point-to-Point/Point-to-Multipoint)

### Microwave Link - IF Component Suggestions

Application	Part Number	Typ. Bias V/mA	Frequency Range/GHz	Gain (dB) @ 2GHz	P1dB (dBm) @ 2GHz	OIP3 (dBm) @ 2GHz	NF (dB) @ 2GHz	Device Type and Package (mm)
RF Amplifier	MGA-30489	5/97	0.25 - 3.0	13.3	23.3	39	3	SOT-89
	MGA-30689	5/104	0.04 - 2.6	14.6	22.5	40	3.3	SOT-89
	MGA-30789	5/100	2 - 6	11.7	-	41.8	3.3	SOT-89
	MGA-30889	5/65	0.04 - 2.6	15.5	-	38	1.9	SOT-89
	MGA-30989	5/51	2 - 6	12	-	36.8	2	SOT-89
	MGA-31189	5/111	0.05 - 2	21	24	42	3	SOT-89
	MGA-31289	5/124	1.5 - 3	18.7	24	41.8	3	SOT-89
	MGA-31389	5/73	0.05 - 2	21.3	22.2	38.6	2	SOT-89
	MGA-31489	5/69	1.5 - 3	19.5	21.9	37.3	1.9	SOT-89
	MGA-31589	5/146	0.45 - 1.5	20.4	27.2	45.3	1.9	SOT-89
	MGA-31689	5/168	1.5 - 3	18.1	27.6	44.9	1.9	SOT-89
	MGA-53543	5/54	0.4 - 6	15.4	18.6	39.1	1.5	E-pHEMT MMIC, SOT343
	MGA-53589	5/52	0.05 - 3.0	15.8	18.2	37	1.7	SOT-89
	MGA-545P8	3.3/127	0.05 - 7	18.6	21.7	34	2.7	E-pHEMT MMIC, LPCC
	MGA-61563 <sup>1</sup>	3/41.6	0.1 - 6	15.5	15.1	31.7	1	E-pHEMT MMIC, SOT363
	ABA-53563	5/35	DC - 3.5	21.5	12.7	22.9	3.5	Si MMIC, SOT363
	ABA-54563	5/81	DC - 3	22.5	16	26	4.2	Si MMIC, SOT363
ADA-4789	4.1/80	DC - 2.5	16.3	16.9	29	4.5	Si MMIC, SOT89	
Buffer-High Power	MGA-565P8 <sup>2</sup>	5/67	0.1 - 3.5	21.8	20 (Psat)	-	-	E-pHEMT MMIC, LPCC
	ABA-54563	5/81	DC - 3	22.5	16	27.3	4.4	Si MMIC, SOT363
Buffer-Low Power	ABA-51563	5/18	DC - 3.5	21.5	1.8	11.4	3.7	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.5	9.8	19.9	3.3	Si MMIC, SOT363
	ABA-53563	5/35	DC - 3.5	21.5	12.7	22.9	3.5	Si MMIC, SOT363
	AVT-50663	5/36	DC - 6	15.3	12.5	25	4	SOT-363 (SC70)
	AVT-51663	5/37	DC - 6	19.6	12.9	25.1	3.2	SOT-363 (SC70)
	AVT-52663	5/45	DC - 6	15.3	12.7	27	4	SOT-363 (SC70)
	AVT-53663	5/48	DC - 6	19.6	15.1	26.5	3.2	SOT-363 (SC70)
	AVT-54689	5/48	0.05 - 6	17.1	17.4	29.6	4.1	SOT-89
AVT-55689	5/75	0.05 - 6	17.2	19.5	32.5	4.3	SOT-89	

**Notes:**

1. Current Adjustable: 20-60mA.
2. High Reverse Isolation: 50dB typical.

# Wireless Infrastructure

## Microwave Link (Point-to-Point/Point-to-Multipoint)

### Microwave Link - IF Component Suggestions

Application	Part Number	Features	Device Type and Package
Detector - Schottky Diodes	HSMS-282x	Ct max = 1pF @0V	SOT323/363/23/143
	HSMS-286x	Ct max = 0.3pF @0V	SOT323/363/23/143
RF Attenuator - PIN Diodes	HSMP-381x	Very low distortion, Ct typ. = 0.2pF @0V, see AN1048 & AN5262 pi-attenuator design	SOT323/23/25
	HSMP-386x	Lower current, low cost, Ct typ. = 0.2pF @0V, see AN1048 pi-attenuator design	SOT323/363/23/25
Attenuator - Module	ALM-38140	Low distortion, high dynamic range attenuator module	MCOB 3.8x3.8x1.0mm

Application	Part Number	Typ. Bias V/mA	Frequency Range/GHz	Gain (dB) @ 500MHz	P1dB (dBm) @ 500MHz	OIP3 (dBm) @ 500MHz	NF (dB) @ 500MHz	Device Type and Package
IF Amplifier	MGA-62563 <sup>1</sup>	3/55	0.1 - 3	22	18	35	0.8	E-pHEMT MMIC, SOT363
	MGA-545P8	3.3/135	0.1 - 7	22	19	36	2	E-pHEMT MMIC, LPCC
	MGA-30489	5/97	0.25 - 3.0	18.8	22.7	37	3.3	SOT-89
	MGA-30689	5/104	0.04 - 2.6	14.4	22.2	44	3.0	SOT-89
	MGA-30889	5/65	0.04 - 2.6	15.5	-	38	1.9	SOT-89
	MGA-31189	5/111	0.05 - 2	21	24	42	3	SOT-89
	MGA-31389	5/73	0.05 - 2	21.3	22.2	38.6	2	SOT-89
	MGA-31716	5/58	2	20.2	21.2	41	1.9	QFN 3x3
	ADA-4789	4.1/80	DC - 2.5	17	18.8	35	4.2	Si MMIC, SOT89
	ADA-4743	(3.8)/60	DC - 2.5	16.5	17.1	34	4.2	Si MMIC, SOT343
	ADA-4643	(3.5)/35	DC - 2.5	17.3	14	29	4	Si MMIC, SOT343
	ADA-4543	(3.4)/15	DC - 2.5	15.5	2.4	15	3.7	Si MMIC, SOT343
	ABA-54563	5/81	DC - 3	23	18	32	3	Si MMIC, SOT363
	ABA-53563	5/46	DC - 3.5	21.5	15	27.5	2.9	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.8	12.5	28	2.7	Si MMIC, SOT363
	AVT-50663	5/36	DC - 6	15.3	12.5	25	4	SOT-363 (SC70)
	AVT-51663	5/37	DC - 6	19.6	12.9	25.1	3.2	SOT-363 (SC70)
	AVT-52663	5/45	DC - 6	15.3	12.7	27	4	SOT-363 (SC70)
	AVT-53663	5/48	DC - 6	19.6	15.1	26.5	3.2	SOT-363 (SC70)
	AVT-54689	5/48	0.05 - 6	17.1	17.4	29.6	4.1	SOT-89
AVT-55689	5/75	0.05 - 6	17.2	19.5	32.5	4.3	SOT-89	

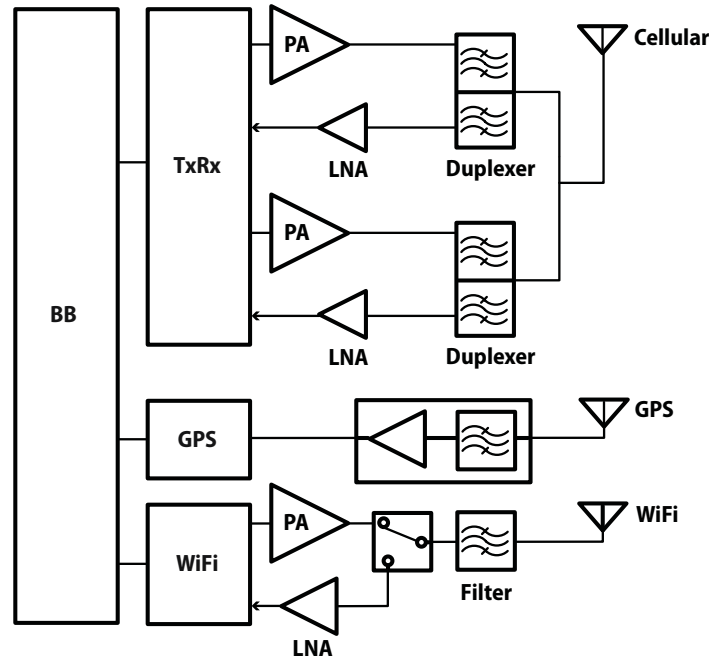
Application	Part Number	Features	Package
Attenuator - PIN Diodes	HSMP-381x	Very low distortion, Ct typ. = 0.2pF @0V, see AN1048 & AN5262 pi-attenuator design	SOT323/23/25
	HSMP-386x	Lower current, low cost, Ct typ. = 0.2pF @0V, see AN1048 pi-attenuator design	SOT323/363/23/25
Attenuator - Module	ALM-38140	Low distortion, high dynamic range attenuator module	MCOB 3.8x3.8x1.0mm

**Note:**

1. Current Adjustable: 20-60mA.

# Wireless Infrastructure

## Small Cell Front End



### Small Cell Front End Suggested Components

Application	Part Number	Freq. Range MHz	Typical Performance					Voltage (V)	Current (mA)	Operating Range
			Gain dB	P1dB dBm	I/O RL	OIP3 dBm	NF dB			
Low Noise Amplifiers	MGA-621P8	900	18.0	21.0	>15.0	36.0	0.58	4.00	60	700-1500
	MGA-622P8	1900	18.5	20.4	>18/12	34.0	0.57	4.00	60	1500-2700
	MGA-62563	500	22.0	18.0	>10.0	35.0	0.8	3.00	60	50-3000
		1000	20.0	17.6	>10.0	33.5	0.9	3.00	60	50-3000
	MGA-683P8	2000	15.5	17.7	>10.0	33.0	1.2	3.00	60	50-3000
		900	17.6	21.9	>10.0	34.7	0.6	5.00	45	400-1500
MGA-684P8	1900	17.1	21.3	>10.0	31.0	0.78	5.00	34	1500-4000	

Application	Part Number	Freq. Range GHz	Test Freq. (GHz)	Vdd (V)	Idq (mA)	Gain (dB)	P1dB (dB)	Pout @ 2.5% EVM	Band	Package (mm)
LTE/UMTS/CDMA Power Amplifiers	MGA-43228	2.3 - 2.5	2.4	5	1023	38.5	36	29.1	40, WLAN 2.4G	QFN 5x5
	MGA-43328	2.5 - 2.7	2.6	5	1017	37.4	36	29.3	7, 38, 41	QFN 5x5
	MGA-43428	851-894 MHz	0.88	5	800	>30	36	27dBm@50dBc ACLR	5, 26	MCOB 5x5
	MGA-43528	1.93-1.995	1.96	5	1000	>30	35	27dBm@50dBc ACLR	2, 25, 36	MCOB 5x5
	MGA-43628	2.0 - 2.2	2.14	5	1000	>30	35	27dBm@50dBc ACLR	1, 4	MCOB 5x5
	MGA-43728	2.62-2.69	2.65	5	755	38.3	36	27.3dBm @48dBc ACLR	7	MCOB 5x5
	MGA-43828	0.925-0.960	0.94	5	730	32.8	36	27.5dBm @50dBc ACLR	8	MCOB 5x5
	MGA-43003	1.805-1.88	1.842	5	360	41.7	36	27dBm @48dBc ACLR	3,9,39	MCOB 5x5
	MGA-43013	728-756 MHz	0.746	5	380	34	36	27 dBm @48dBc ACLR	12, 13, 17	MCOB 5x5
	MGA-43040	2.3-2.4	2.35	5	380	42	35	27 dBm @48dBc ACLR	30, 40	MCOB 5x5
Carrier Grade WiFi	MGA-43024	2401-2473 MHz	2.442	5	450	40.8	34	27.8	2.4GHz	MCOB 5x5

# Wireless Infrastructure

## Small Cell Front End

### FBAR Duplexer and Filter

Application	Part Number	Band	Pass Band (MHz)	Insertion Loss (dB)
Small Cell and Carrier Grade WiFi	ACMD-6225	B2/B25	B25 TX (1850 - 1915 MHz), RX (1930 - 1995 MHz)	B25 TX IL (1.2dB typ), RX IL (1.3dB typ)
	ACMD-6103	B3	B3 TX (1710 - 1785 MHz), RX (1805 - 1880 MHz)	B3 TX IL (3.5dB Max), RX IL (4.0dB Max)
	ACMD-4104	B4	B4 TX (1710 - 1755 MHz), RX (2110 - 2155 MHz)	B4 TX IL (1.8dB Max), RX IL (1.9dB Max)
	ACMD-6407*	B7	B7 TX (2500 - 2570 MHz), RX (2620 - 2690 MHz)	B7 TX IL (2.0dB typ), RX IL (2.5dB typ)
	ACMD-6013	B13, NS-07 compliant	B13 TX (777.5 - 787 MHz) B13 RX (746 - 756 MHz)	B13 TX IL (3.5dB Max) B13 RX IL (2.7dB Max)
	ACPF-8240	B40	B40 (2300 - 2400 MHz)	B40 IL (3.3dB Max)
	ACPF-7241	B41	B41 (2496 - 2690 MHz)	B41 IL (2.3 dB Typ) WiFi 802.11 b/g/n Ch 1-13 rejection 30dB typ

Note: \*Advance Information

### WiFi/BT/GPS

Application	Part Number	Band Supported	Pass Band (MHz)	Insertion Loss (dB)
Small Cell and Carrier Grade WiFi	ACPF-7724*	WiFi Coexistence CSP Filter	2401 - 2482 MHz	2.4GHz WiFi IL (1.2dB typ)
	ACFM-W025	High Band Cellular + 2.4 GHz + 5 GHz WiFi Triplexer	Cellular high band (2300 - 2690 MHz) 2.4GHz WiFi 5 GHz ISM	Cellular highband IL (1.8dB typ) 2.4GHz WiFi IL (1.6dB typ) 5GHz ISM IL (1.6dB typ)
	ACFM-W412	Low Band Cellular + Mid & High Band Cellular + WiFi Triplexer	Cellular low bands (699 - 960 MHz) Cellular mid/high band (1710 - 2690 MHz) 2.4GHz WiFi	Cellular lowband IL (0.5dB) Cellular mid/highbands (1.6dB typ) 2.4 GHz WiFi IL (1.6GdB typ)
	ACFM-W0G7	WiFi+ GPS + Cellular Band	Cellular bands (699 - 2690 MHz) GPS/GLONASS (1574 - 1608 MHz) 2.4GHz WiFi	Cellular Band IL (2.1dB typ) GPS/GLONASS IL (2.0dB typ) 2.4 GHz WiFi IL (2.9dB typ)
	ACFM-WIG7	WiFi + GPS/GLONASS/Baidu + Cellular Bands	Cellular bands (1710 - 2690 MHz) GPS/GLONASS (1574 - 1608 MHz) 2.4GHz WiFi (2402.5 - 2481.5 MHz)	Cellular bands 1710 - 2170 & 2300 - 2370 MHz IL (1.9dB typ), 2500 - 2570 MHz IL (3.1dB typ), 2570 - 2690 MHz IL (1.5dB typ) Baidu/GPS/GLONASS IL (3dB typ) 2.4 GHz WiFi IL (2.3dB)

Note: \*Advance Information

# Wireless Infrastructure

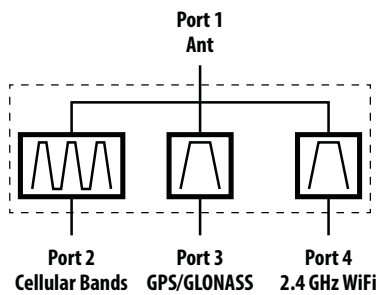
## Small Cell Front End

### FBAR Multiplexer

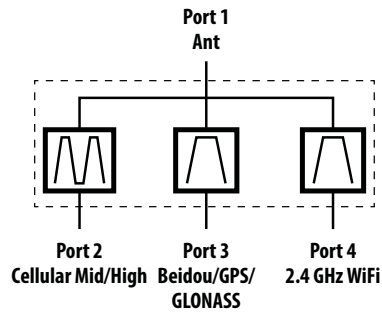
Application	Part Number	Band Supported	Pass Band (MHz)	Insertion Loss (dB)
Small Cell and Carrier Grade WiFi	ACFM-2063*	CA Hexaplexer B25/B2-B30-B66	B25 TX (1850 - 1950 MHz), RX (1930 - 1995 MHz) B30 TX (2305 - 2315 MHz), RX (2350 - 2360 MHz) B66 TX (1710 - 1780 MHz), RX (2110 - 2200 MHz)	B25 TX (2.3dB typ), RX IL (3.0dB typ) B30 TX IL (1.8dB typ), RX IL (2.2dB typ) B66 TX IL (2.3dB typ), RX IL (2.5dB typ)
	ACFM-1037*	CA Hexaplexer B1-B3-B7	B1 TX (1920 - 1980 MHz), Rx (2110 - 2170 MHz) B3 TX (1710 - 1785 MHz), Rx (1805 - 1880 MHz) B7 TX (2500 - 2570 MHz), RX (2620 - 2690 MHz)	B1 TX IL (1.7dB typ), RX IL (1.8dB typ) B3 TX IL (1.7dB typ), RX IL (2.0dB typ) B7 TX IL (1.7dB typ), RX IL (1.5dB typ)
	ACFM-2113	CA Quadplexer B1-B3-B4, supports B4 co-banding	B1 TX (1920 - 1980 MHz), RX (2110 - 2170 MHz) B3 TX (1710 - 1785 MHz), RX (1805 - 1880 MHz) B4 TX (1710 - 1755 MHz), RX (2110 - 2155 MHz)	B1 TX IL (2.4dB Max), RX IL (2.5dB Max) B3 TX IL (3.5dB Max), RX IL (4.0dB Max) B4 TX IL (2.4dB Max), RX IL (2.5dB Max)
	ACFM-2021	Diversity Rx Diplexer B25-B1/B4	B1/B4 RX (2110 - 2170 MHz) B25 RX (1930 - 1995 MHz)	B1/B4 RX IL (2.4dB Max) B25 RX IL (3.8 dB Max)
	ACFM-2024	Triplxer B25-B26-B41 Rx	B25 RX (1930.3 - 1994.8 MHz) B26 RX (859 - 894 MHz) B41 RX (2496 - 2690 MHz)	B25 RX IL (3.5dB Max) B26 RX IL (3.2dB Max) B41 RX IL (4.2dB Max)
	ACFM-7024	CA Quadplexer B2-B4	B2 TX (1850 - 1910MHz), RX (1930 - 1990 MHz) B4 Tx (1710 - 1755), RX (2110 - 2155 MHz)	B2 TX IL (3.5dB Max), RX IL (4.2dB Max) B4 TX IL (2.3dB Max), RX IL (2.5dB Max)
	ACFM-7037	CA Quadplexer B3-B7	B3 TX (1710 - 1785 MHz), RX (1805 - 1880 MHz) B7 TX (2500-2570 MHz), RX (2620 - 2690 MHz)	B3 TX IL (3.50dB Max), RX IL (4.0dB) B7 TX IL (3.2dB Max), RX IL (3.0dB Max)
	ACFM-7045	CA Quadplexer B25-B66	B25 TX (1850 - 1915 MHz), RX (1930 - 1995 MHz) B66 TX (1710 - 1780 MHz), RX (2110 - 2200 MHz)	B3 TX IL (3.5dB Max), RX IL (4.0dB Max) B7 TX IL (3.2dB Max), RX IL (3.0dB Max)
	ACFM-2149	Diplexer B39+B41	B39 (1880-1920 MHz) + B41 (2496 - 2690 MHz)	B39 IL (1.7dB typ), B41 IL (2.0dB typ)

Note: \*Advance Information

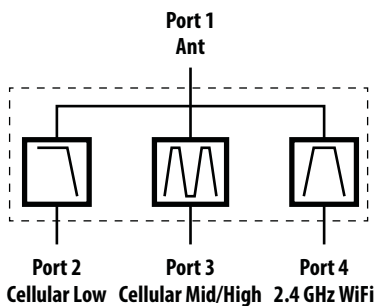
### ACFM-W0G7 Cell/WiFi/GPS+GLONASS Triplexer



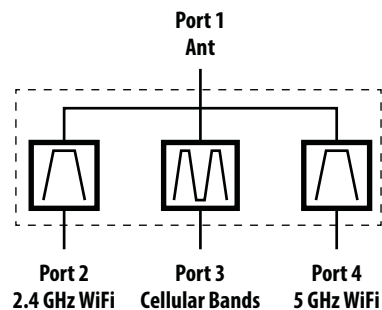
### ACFM-W1G7 Cell/WiFi/Beidou+GPS+GLONASS Triplexer



### ACFM-W412 LB/MB-HB/WiFi Triplexer

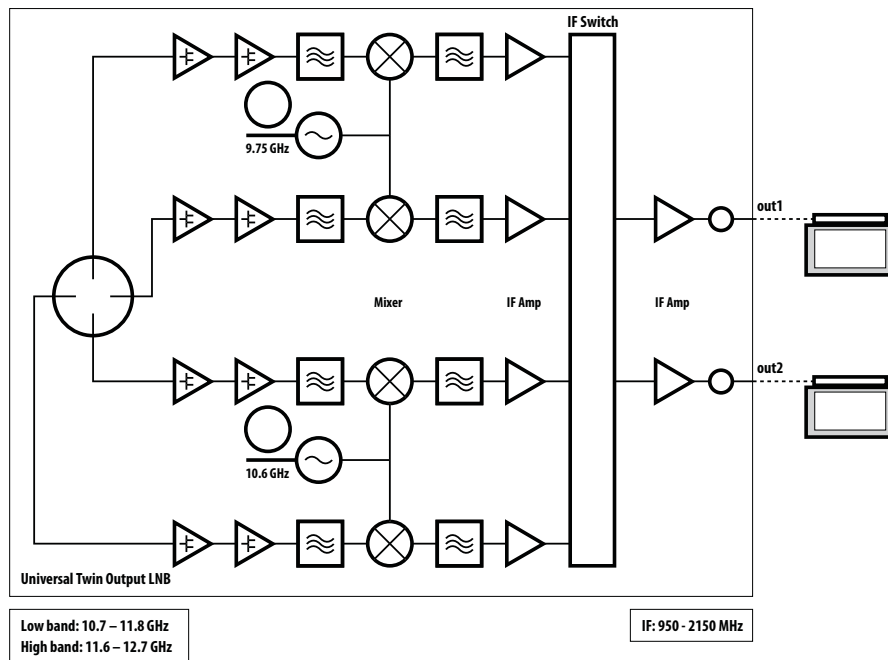


### ACFM-W025 HB Cell/WiFi/5GHz Triplexer



# Wireless Infrastructure

## DBS Satellite TV System

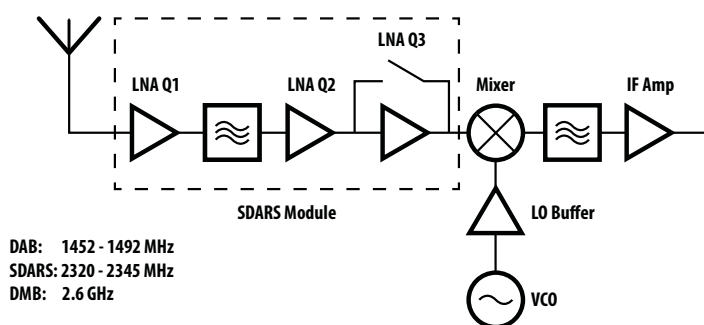


### DBS Satellite TV System Suggested Components

Application	Part number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB @ 2GHz	P1dB/dBm @ 2GHz	OIP3/dBm @ 2GHz	NF/dB @ 2GHz	Device Type and Package
IF Amplifier	ABA-51563	5/18	DC - 3.5	21.5	1.8	11.4	3.7	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.5	9.8	19.9	3.3	Si MMIC, SOT363
	ABA-53563	5/46	DC - 3.5	21.5	12.7	22.9	3.5	Si MMIC, SOT363
	ABA-54563	5/79	DC - 3.4	23	16.1	27.8	4.4	Si MMIC, SOT363
	AVT-50663	5/36	DC - 6	15.3	12.5	25	4	SOT-363 (SC70)
	AVT-51663	5/37	DC - 6	19.6	12.9	25.1	3.2	SOT-363 (SC70)
	AVT-52663	5/45	DC - 6	15.3	12.7	27	4	SOT-363 (SC70)
	AVT-53663	5/48	DC - 6	19.6	15.1	26.5	3.2	SOT-363 (SC70)
	AVT-54689	5/48	0.05 - 6	17.1	17.4	29.6	4.1	SOT-89
	AVT-55689	5/75	0.05 - 6	17.2	19.5	32.5	4.3	SOT-89
	MGA-61563	3/41	0.1 - 6	15.5	15.1	31.7	1.0	E-pHEMT MMIC, SOT363
IF Switch	HSMP-386x	Higher linearity switch, Ct typ = 0.2pF @0V						SOT323/363/23/25
	HSMP-389x	General purpose switch, Ct typ. = 0.4pF @0V						SOT323/363/23/143
	HMPS-389x	General purpose switch, Ct typ. = 0.4pF @0V						Minipak
Mixer - Schottky Diodes	HSMS-8202	Ct max = 0.26pF @0V RD max = 14W @ IF=5Ma						SOT23

# Wireless Infrastructure

## Mobile DAB/SDARS/DMB-S Digital Receivers



### Mobile DAB/SDARS/DMB-S Digital Receivers Suggested Components

Application	Part number	Typ. Bias V/mA	Gain/dB <sup>1</sup>			OIP3/dBm			NF/dB <sup>2</sup>			Device Type and Package (mm)
			DAB	SDARS	DMB-S	DAB	SDARS	DMB-S	DAB	SDARS	DMB-S	
LNA Q1/Q2	ATF-55143	2.7/10	20.0	17.0	16.0	23.0	24.0	24.0	0.3	0.45	0.5	E-pHEMT FET, SOT343
	ATF-551M4	2.7/10	20.0	16.5	16.0	23.0	24.2	24.2	0.3	0.45	0.5	E-pHEMT FET, MiniPak
LNA Q3	MGA-645T6	3/7	-	15.0	14.2	-	7	7.8	-	1.1	1.15	E-pHEMT, UTSLP 2x1.3x0.4
	MGA-64606	3/7	19.7	19.6	11.8	0.75	1.0	3.0 (IIP3)	1.0	1.0	1.1	E-pHEMT, UTSLP 2x1.3x0.5
	MGA-71543 <sup>3</sup>	3/10 <sup>4</sup>	16.5	15.2	14.6	19.5	18.2	17.6	0.7	0.8	0.85	GaAs MMIC, SOT343
	MGA-72543 <sup>3</sup>	3/20 <sup>4</sup>	14.3	13.2	12.8	24.8	23.7	23.3	1.4	1.45	1.45	GaAs MMIC, SOT343
	MGA-725M4 <sup>3</sup>	3/20 <sup>4</sup>	16.6	15.3	14.6	26.5	25.2	24.5	1.2	1.3	1.3	GaAs MMIC, MiniPak
SDARS Module	ALM-2203 <sup>5</sup>	5/110	37.5			9.0 (IIP3)			0.83			E-pHEMT/FBAR, MCOB 5x5

#### Notes:

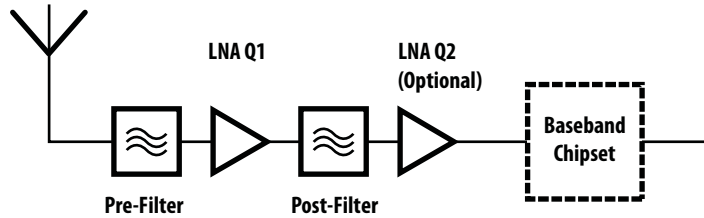
- Gain for discrete FETs when matched for best IP3.
- NFmin figures for LNA parts.
- LNA bypass switch included.
- Current adjustable to set linearity performance
- Output stage does not contain bypass.

### DMB-T/ISDB-T Receivers Suggested Components

Application	Part number	Typ. Bias V/mA	Gain/dB @ 500MHz	OIP3/dBm @ 500MHz	NF/dB @ 500MHz	Device Type and Package (mm)
LNA Q1/Q2	MGA-685T6	3.0/10	18.9	18.7	0.93	E-pHEMT, UTSLP 2x1.3x0.4
	MGA-68563	3.0/10	19.7	20.0	1.0	E-pHEMT MMIC, SOT363
LNA Q3	MGA-785T6	3.0/10	15.7	16.8	1.5	E-pHEMT, UTSLP 2x1.3x0.4
	MGA-725M4	3.0/9	14	16.5	1.7	GaAs MMIC, MiniPak

# Wireless Infrastructure

## GPS/GLONASS Receivers



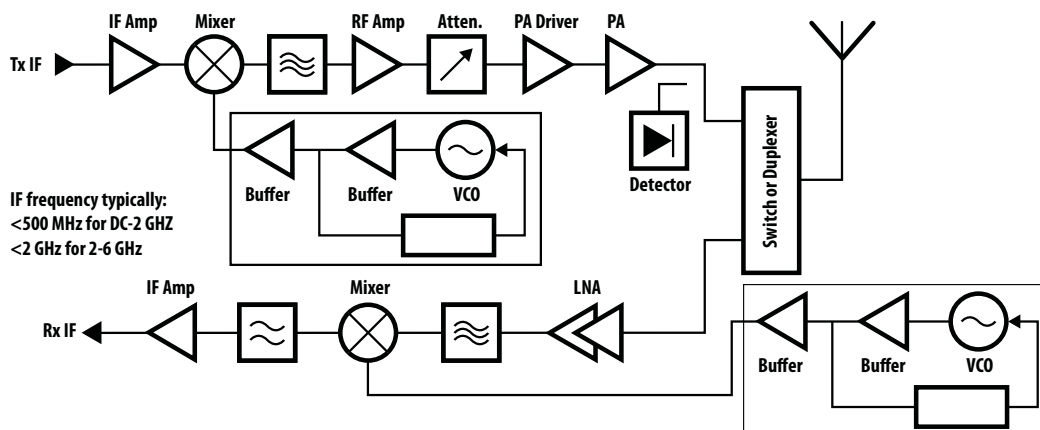
### Mobile GPS Receivers Suggested Components

Application	Part Number	Typ. Bias V/mA	NF/dB	Gain/dB	IIP3/dBm	Device Type and Package (mm)
LNA Q1/Q2	ALM-GA001	2.7/3.3	0.97	17.9	-2.0	uDFN 1.5x1.3x0.5
	ALM-GA002	2.85/8	0.8	14.3	4.7	E-pHEMTF, MCOB 2x2x1.1
	MGA-61563	3.0/9	1.18	16	-3	E-pHEMT MMIC, SOT-363
	MGA-665P8	3.0/21	1.22	20.8	-0.5	E-pHEMT MMIC, LPCC 2x2
	ATF-55143*	2.0/10	0.6	17.4	-0.6	E-pHEMT FET, SOT343

Note: \*Refer to Application Note 1376.

# Wireless Infrastructure

## 2-6 GHz Systems (including 802.11 a/b/g and 802.16)



### 2-6 GHz Systems Suggested Components

Application	Part Number	Typical Performance					Package (mm)
		Test Bias V/mA	Test Freq. GHz	Gain <sup>1</sup> dB	Linear Pout dBm	EVM %	
PA	MGA-22003	-	2.5	35	-	-	Small Size 3x3x1
	MGA-23003	-	3.5	35	-	-	Small Size 3x3x1
	MGA-25203	-	5.4	30	-	-	Small Size 3x3x1
	MGA-412P8	3.3/95	2.452	25.5	19	3.0	E-pHEMT MMIC, LPCC
	MGA-425P8 <sup>2</sup>	3.3/58	5.25	16.0	12	3.0	E-pHEMT MMIC, LPCC
	MGA-43228	5/500	2.4	38.5	29.2	2.5	QFN 5x5x0.85
	MGA-43328	5/470	2.6	37.3	29.3	2.5	QFN 5x5x0.85
	MGA-545P8	3.3/127	5.825	11.5	16	5.6	E-pHEMT MMIC, LPCC
	ALM-31222	5/415	2	14.9	-	-	MCOB 5.0x6.0x1.1
	ALM-31322	5/413	3.5	13.2	-	-	MCOB 5.0x6.0x1.1
	ALM-32220	5/800	2	14.8	-	-	MCOB 7.0x10.0x1.1
ALM-32320	5/800	3.5	12	-	-	MCOB 7.0x10.0x1.1	

Application	Part Number	Typical Performance						Package (mm)
		Test Bias V/mA	Test Freq. GHz	Gain <sup>1</sup> dB	P1dB <sup>1</sup> dBm	OIP3 dBm	NF dB	
PA Driver	MGA-30216	5/206	2	14.2	-	45.3	2.8	QFN 3x3
	MGA-30316	5/198	3.5	12.8	-	44.4	2.7	QFN 3x3
	MGA-53543	5/54	1.9	15.4	18.6	39.1	1.5	E-pHEMT MMIC, SOT343
	ATF-501P8	4.5/280	2	15	29	45.5	1	E-pHEMT FET, LPCC
	ATF-511P8	4.5/200	2	14.8	30	41.7	1.4	E-pHEMT FET, LPCC
	ATF-521P8	4.5/200	2	17	26.5	42	1.5	E-pHEMT FET, LPCC
	ATF-531P8	4/135	2	20	24.5	38	0.6	E-pHEMT FET, LPCC
	ATF-541M4	3/60	2	17.5	21.4	35.8	0.5	E-pHEMT FET, MiniPak
	ATF-54143	3/60	2	16.6	20.4	36.2	0.5	E-pHEMT FET, SOT343
WiFi	AFEM-S105		5.1 - 5.9	EVM <-32.5dB at 15dBm, <-35dB at 12dBm			Small Size 3.2x3.2x0.6	
	AFEM-S106		5.1 - 5.9	EVM <-32.5dB at 15dBm, <-35dB at 12dBm			Small Size 3.2x3.2x0.6	

#### Notes:

- Gain and P1dB performance for discrete FETs when matched for best IP3.
- Current adjustable: 10 - 80mA.

# Wireless Infrastructure

## 2-6 GHz Systems (including 802.11 a/b/g and 802.16)

### 2-6 GHz Systems Suggested Components

Application	Part Number	Typical Performance						Package
		Test Bias V/mA	Test Freq. GHz	Gain1 dB	P1dB' dBm	OIP3 dBm	NF dB	
RF Amplifier	MGA-61563 <sup>3</sup>	3/41	2	15.5	15.1	31.7	1	E-pHEMT MMIC, SOT363
	ABA-51563	5/18	2	21.5	1.8	11.4	3.7	Si MMIC, SOT363
	ABA-52563	5/35	2	21.5	9.8	19.9	3.3	Si MMIC, SOT363
	ABA-53563	5/46	2	21.5	12.7	22.9	3.5	Si MMIC, SOT363
	ABA-54563	5/79	2	23	16.1	27.8	4.4	Si MMIC, SOT363
	MGA-565P8 <sup>4</sup>	5/67	2	21.8	20 (Psat)			E-pHEMT MMIC, LPCC
	MGA-61563 <sup>3</sup>	3/41	2	15.5	15.1	31.7	1	E-pHEMT MMIC, SOT363

#### Notes:

- Gain and P1dB performance for discrete FETs when matched for best IP3.
- Current adjustable: 10 - 80mA.
- Current adjustable 10 - 60mA.
- High reverse isolation: 50dB typical.

Application	Part Number	Test Bias	Test Freq.	Gain <sup>1</sup>	P1dB <sup>1</sup>	OIP3	NF	Package (mm)
Low Noise Amplifiers	MGA-14516	5.0/45	1.95	31.7	23.5	38	0.68	QFN 4x4x0.85
	MGA-61563 <sup>2</sup>	3/41	2	15.5	15.1	31.7	1	E-pHEMT MMIC, SOT363
	MGA-632P8	4/60	1.95	17.6	18.3	35.4	0.6	LPCC 2x2
	MGA-645T6	3/7	2.4	15	9.0	22	1.1	E-pHEMT, UTSLP 2x1.3x0.4
	MGA-655T6	3/10	3.5	14.7	12.0	20.2	1.17	E-pHEMT, UTSLP 2x1.3x0.4
	MGA-665P8	3/20.5	5.25	16	11.4	18.2	1.45	E-pHEMT MMIC, LPCC
	MGA-675T6	3.0/10	5.5	17.8	(-10) IP1dB	(-3) IIP3	1.75	E-pHEMT, UTSLP 2x1.3x0.4
	MGA-64606	3/7	2.4	15.3	-3.0 (IP1dB)	20.3	0.95	UTSLP 2.0x1.3
	MGA-65606	3/7	3.5	15.3	-2.4 (IP1dB)	21	1.05	UTSLP 2.0x1.3
	MGA-71543 <sup>3</sup>	2.4/10	2.01	15.9	7.4	18.9	1.1	pHEMT MMIC, SOT343
	MGA-85563	3/15	2	19	0.9	11.5	1.85	pHEMT MMIC, SOT363
	MGA-87563	3/4.5	2	14	-2	8	1.8	pHEMT MMIC, SOT363
	ATF-36163	1.5	12	10	5		1.2	pHEMT FET, SOT363
	ATF-551M4	2.7/10	2	17.5	14.6	24.1	0.5	E-pHEMT FET, MiniPak
	ATF-55143	2.7/10	2	17.7	14.4	24.2	0.6	E-pHEMT FET, SOT343
	ALM-2812	3.3/15	2.45	16.7	(-5.8) IP1dB	6.1 IIP3	0.8	MCOB 3x3x1.1
		3.3/23.4	5.5	23.2	(-12.8) IP1dB	(-2.1) IIP3	1.4	MCOB 3x3x1.1

#### Notes:

- Gain and P1dB performance for discrete FETs when matched for best IP3.
- Current adjustable 10 - 60mA.
- Source grounded configuration.

# Wireless Infrastructure

## 2-6 GHz Systems (including 802.11 a/b/g and 802.16)

### 2-6 GHz Systems Suggested Components

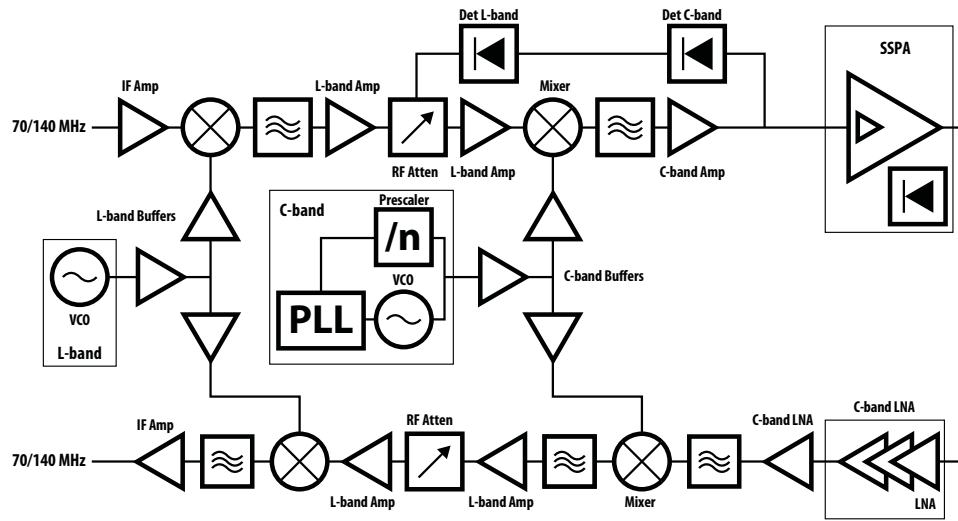
Application	Part Number	Ct max @0V	Package
Detector	HMPS-282x	1pF	Schottky, MiniPak
	HSMS-282x	1pF	Schottky, SOT323/363/23/143
	HSMS-286x	0.3pF	Schottky, SOT323/363/23/143
Switch	HMPP-389x	0.35pF	PIN, MiniPak
	HSMP-389x/489x	0.4pF	SOT323/363/23/143
	HMPP-386x	0.2pF	PIN, MiniPak
	HSMP-386x	0.2pF	SOT323/363/23/25

Application	Part Number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB @ 2GHz	P1dB/dBm @ 2GHz	OIP3/dBm @ 2GHz	NF/dB @ 2GHz	Device Type and Package
IF Amplifier	MGA-62563 <sup>1</sup>	3/55	0.1 - 3	22	18	35	0.8	E-pHEMT MMIC, SOT363
	MGA-545P8	3.3/135	0.1 - 7	22	19	36	2	E-pHEMT MMIC, LPCC
	ADA-4789	4.1/80	DC - 2.5	16.3	16.9	29	4.5	Si MMIC, SOT89
	ADA-4743	(3.8)/60	DC - 2.5	16.5	17.1	34	4.2	Si MMIC, SOT343
	ADA-4643	(3.5)/35	DC - 2.5	17.3	14	29	4	Si MMIC, SOT343
	ADA-4543	(3.4)/15	DC - 2.5	15.5	2.4	15	3.7	Si MMIC, SOT343
	ABA-54563	5/81	DC - 3	23	18	32	3	Si MMIC, SOT363
	ABA-53563	5/46	DC - 3.5	21.5	15	27.5	2.9	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.8	12.5	28	2.7	Si MMIC, SOT363
	AVT-50663	5/36	DC - 6	15.3	12.5	25	4	SOT-363 (SC70)
	AVT-51663	5/37	DC - 6	19.6	12.9	25.1	3.2	SOT-363 (SC70)
	AVT-52663	5/45	DC - 6	15.3	12.7	27	4	SOT-363 (SC70)
	AVT-53663	5/48	DC - 6	19.6	15.1	26.5	3.2	SOT-363 (SC70)

**Note:**

1. Current adjustable 20 - 60mA.

# VSAT C-Band



Tx/GHz: 5.880-6.425, 5.725-6.275, 6.725-7.025, 6.425-6.725  
 Rx/GHz: 3.625-4.200, 3.400-3.950, 4.500-4.800, 3.400-3.700

## VSAT Suggested Components

Application	Part number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB @ 500MHz	P1dB/dBm @ 500MHz	OIP3/dBm @ 500MHz	NF/dB @ 500MHz	Device Type and Package
IF Amplifier	MGA-62563 <sup>1</sup>	3/55	0.1 - 3	22	18	34.8	0.8	E-pHEMT MMIC, SOT363
	MGA-545P8	3.3/135	0.1 - 7	22	19	36	2	E-pHEMT MMIC, LPCC
	ADA-4789	4.1/80	DC - 2.5	17	18.8	35	4.2	Si MMIC, SOT89
	ADA-4743	(3.8)/60	DC - 2.5	16.6	17.1	34	4.2	Si MMIC, SOT343
	ABA-53563	5/46	DC - 3.5	21.5	15	27.5	2.9	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.8	12.5	28	2.7	Si MMIC, SOT363

Application	Part number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB @ 2GHz	P1dB/dBm @ 2GHz	OIP3/dBm @ 2GHz	NF/dB @ 2GHz	Device Type and Package
L-band Amplifier	MGA-53543	5/54	0.4 - 6	15.4	18.6	39.1	1.5	E-pHEMT MMIC, SOT343
L-band Buffer - Low Power	MGA-61563 <sup>1</sup>	3/41.6	0.1 - 6	15.5	15.1	31.7	1	E-pHEMT MMIC, SOT363
	MGA-82563	3/84	0.1 - 6	13.2	17.3	31	2.2	GaAs MMIC, SOT363
	MGA-81563	3/42	0.1 - 6	12.4	14.8	27	2.8	GaAs MMIC, SOT363
	ABA-53563	5/46	DC - 3.5	21.5	12.7	22.9	3.5	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.5	9.8	19.9	3.3	Si MMIC, SOT363
	ABA-51563	5/18	DC - 3.5	21.5	1.8	11.4	3.7	Si MMIC, SOT363
	MGA-85563 <sup>3</sup>	3/15 to 30	0.8 - 6	19	1 to 8	12 to 17	1.9	GaAs MMIC, SOT363
L-band Buffer-High Power	MGA-565P8 <sup>2</sup>	5/67	0.1 - 3.5	21.8	20 (Psat)	-	-	E-pHEMT MMIC, LPCC
	MGA-82563	3/84	0.1 - 6	13.2	17.3	31	2.2	GaAs MMIC, SOT363

**Notes:**

1. Current adjustable 10-60mA.
2. High reverse isolation: 50dB typical.
3. Reverse isolation 40dB typical.

# VSAT C-Band

## VSAT Suggested Components

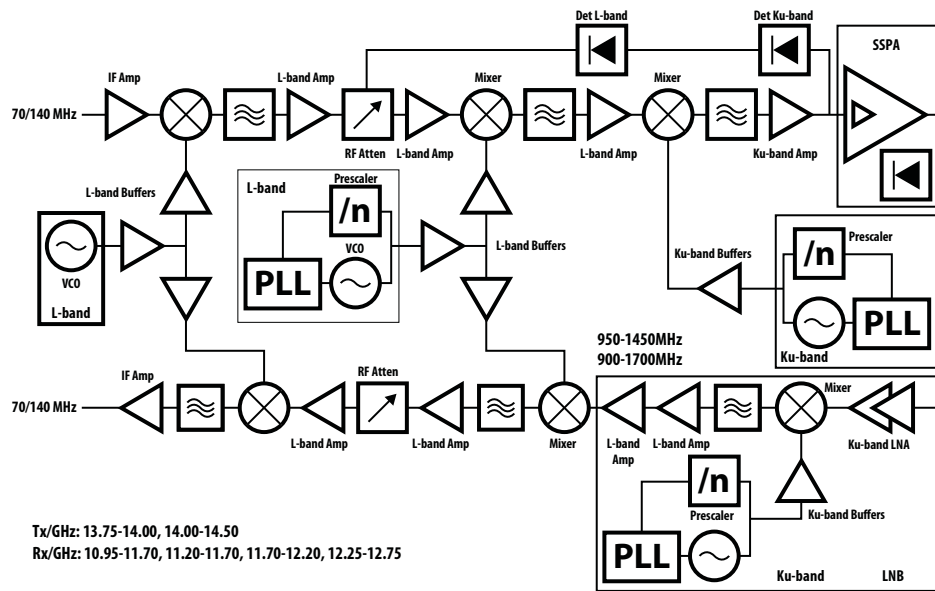
Application	Part Number	Description	Package
L-band/C-band Detector - Schottky Diodes	HSMS-282x	Ct max = 1pF @0V	SOT323/363/23/143
	HSMS-286x	Ct max = 0.3pF @0V	SOT323/363/23/143
RF Attenuator - PIN Diodes	HSMP-381x	Very low distortion, Ct typ. = 0.2pF @0V, see AN1048 pi-attenuator design	SOT323/23/25
	HSMP-386x	Lower current, low cost, Ct typ. = 0.2pF @0V, see AN1048 pi-attenuator design	SOT323/363/23/25
RF Attenuator - Module	ALM-38140	Low distortion, high dynamic range attenuator module	MCOB 3.8x3.8x1.0mm

Application	Part number	Typ. Bias V/ma	Frequency Range/ GHz	Gain/dB <sup>1</sup> @ 5GHz	P1dB/dBm <sup>1</sup> @ 5GHz	OIP3/dBm @ 5GHz	NF/dB <sup>2</sup> @ 5GHz	Device Type and Package
C-band LNA	ATF-36163	1.5/10	1.5 - 18	15	5	-	0.61	PHEMT FET, SOT363
	ATF-551M4	2.7/10	0.5 - 6	12	14.5	24.5	0.75	E-pHEMT FET, MiniPak
	ATF-55143	2.7/10	0.5 - 6	12	13.5	24	0.9	E-pHEMT FET, SOT343
C-band Amplifier C-band Buffer	MGA-545P8	3.3/135	0.1 - 6	12	21	34	3.6	E-pHEMT MMIC, LPCC
	MGA-82563	3/84	0.1 - 6	9.5	17	31	2.6	GaAs MMIC, SOT363
	MGA-81563	3/42	0.1 - 6	10.5	14.5	27	3.2	GaAs MMIC, SOT363
	MGA-85563	3/15 to 30	0.8 - 6	16	1 to 8	12 to 18	1.6	GaAs MMIC, SOT363
	ATF-541M4	3/60	0.5 - 8	11	19.5	37.5	1.02	E-pHEMT FET, MiniPak
	ATF-54143	3/60	0.5 - 6	11	18	36	0.93	E-pHEMT FET, SOT343
	ATF-521P8	4.5/200	0.5 - 6	10	27	39	1.75	E-pHEMT FET, LPCC

### Notes:

1. Gain and P1dB performance for discrete FETs when matched for best IP3.
2. NFmin figures for discrete FETs.

# VSAT Ku-Band



## VSAT Suggested Components

Application	Part number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB <sup>1</sup> @ 12GHz	P1dB/dBm <sup>1</sup> @ 12GHz	OIP3/dBm @ 12GHz	NF/dB <sup>2</sup> @ 12GHz	Device Type and Package (mm)
Ku-band LNA	<a href="#">ATF-36163</a>	1.5/10	1.5 - 18	9.4	5	-	1	PHEMT FET, SOT363
	<a href="#">AMMP-6220</a>	3/60	6 - 20	23	10	23	2.2	SM 5x5
Ku-band Amplifier	<a href="#">AMMP-5618</a>	5/107	6 - 20	13	19	30	4.4	SM 5x5
Ku-band Buffer	<a href="#">AMMP-6408</a>	5/650	6 - 18	18	28	38	4.5	SM 5x5
Ku-band Mixer (IRM)	<a href="#">AMMP-6530</a>	-1/0	5 - 30	-10	8	18	10	SM 5x5

**Notes:**

1. Gain and P1dB performance for discrete FETs when matched for best noise.
2. NFmin figures for discreted FETs.

# VSAT

## Ku-Band

### VSAT Suggested Components

Application	Part Number	Description	Package
Ku-band Detector - Schottky diodes	HSMS-286x	Ct max = 0.3pF @0V	SOT323/363/23/143
	HSCH-5310	Si single, Ct=0.1pF, med. barrier/low barrier	beamlead
	HSCH-5314	Si single Ct=0.15pF, med. barrier/low barrier	beamlead
Ku-band Mixer - Schottky diodes	HSMS-8202	Si series pair, Ct=0.26pF, low-cost	SOT23
	HSCH-5314	Si single Ct=0.15pF, med. barrier/low barrier	beamlead

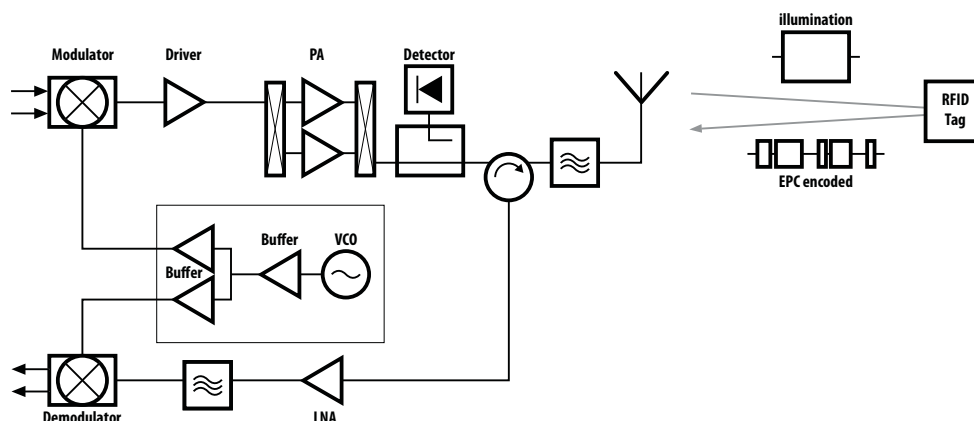
## Ka-Band

### VSAT/Block Converter

Application	Part number	Typ. Bias (V/mA)	Frequency Range/(GHz)	Gain/(dB) @ 30 GHz	P1dB/(dBm) @ 30 GHz	OIP3/(dBm) @ 30 GHz	NF/(dB) @ 30 GHz	Device Type and Package (mm)
Ka-band LNA/ Driver	AMMP-6232	4/135	18 - 32	22	18	28.5	3.1	SM 5x5
	AMMP-6233	3/65	18 - 32	21	8	21	2.8	SM 5x5
	AMMP-6333	5/230	18 - 33	22	24.5	30	-	SM 5x5
Ka-Band Power Amplifier	AMMP-6430	5/650	27 - 34	20	28	34	7.8	SM 5x5
	AMGP-6432	6/700	28 - 31	20	33	40	-	SM 5x5
	AMGP-6434	6/1400	28 - 31	20	35.5	42	-	SM 5x5
Ka-Band Mixer	AMMP-6545	-	RF: 18 - 40/IF: DC - 3.5	-8	-	12 (IIP3)	-	SM 5x5
Ka-Band Multiplier	AMMP-6125	3.5/5V @ 100/110	10 - 24	22	22 (Pout)	-	-	SM 5x5
	AMMP-6120	5/112	8 - 24	13	18 (Pout)	-	-	SM 5x5

## RFID

## RFID 900 MHz Reader



## RFID 900MHz Reader Suggested Components

Application	Part number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB <sup>1</sup> @ 0.9GHz	P1dB/dBm <sup>1</sup> @ 0.9GHz	OIP3/dBm @ 0.9GHz	NF/dB <sup>2</sup> @ 0.9GHz	Device Type and Package (mm)
LNA	MGA-621P8	4/60	0.7-1.5	18.0	21.0	36.0	0.58	E-pHEMT MMIC, LPCC
	MGA-53543	5/54	0.4 - 6	17.4	19.3	39.7	1.3	E-pHEMT MMIC, SOT343
	MGA-72543 <sup>5</sup>	3/20	0.1 - 6	14.8	12	23	1.35	E-pHEMT MMIC, SOT343
	ATF-54143	3/60	0.45 - 6	23.4	18.4	35.5	0.3	E-pHEMT FET, SOT343
	ATF-58143	3/30	0.45 - 6	23.1	18.1	28.6	0.3	E-pHEMT FET, SOT343
Driver Amplifier	MGA-53543	5/54	0.4 - 6	17.4	19.3	39.7	1.3	E-pHEMT MMIC, SOT343
	MGA-545P8	3.3/127	0.05 - 7	22.4	21.5	34	2.6	E-pHEMT MMIC, LPCC
	MGA-61563 <sup>4</sup>	3/41	0.1 - 6	19.3	15.4	30.5	0.9	E-pHEMT MMIC, SOT363
	ATF-52189	4.5/200	0.05 - 6	16.5	27.2	42	1	E-pHEMT FET, SOT89
	ATF-521P8	4.5/200	0.05 - 6	17.2	26.5	42.5	0.7	E-pHEMT FET, LPCC
	ATF-53189	4/135	0.05 - 6	17.2	21.7	42	0.41	E-pHEMT FET, SOT89
	ATF-531P8	4/135	0.05 - 6	25	23	37	0.26	E-pHEMT FET, LPCC
	ADA-4789	4.1/80	DC - 2.5	16.9	18.8	33.2	4.3	Si MMIC, SOT89
ADA-4743	3.8/60	DC - 2.5	16.5	17.1	32.6	4.2	Si MMIC, SOT343	
Power Amplifier	ATF-50189	4.5/280	0.05 - 6	21.5	28.5	44	1	E-pHEMT FET, SOT89
	ATF-501P8	4.5/280	0.05 - 6	16.6	27.3	42	1	E-pHEMT FET, LPCC
	ATF-511P8	4.5/200	0.05 - 6	17.8	29.6	43	1.2	E-pHEMT FET, LPCC
Buffer-High Power	MGA-565P8 <sup>3</sup>	5/67	0.1 - 3.5	28	22 (Psat)	-	-	E-pHEMT MMIC, LPCC
	ABA-54563	5/79	DC - 3.4	23	18	34	4.2	Si MMIC, SOT363
Buffer-Low Power	ABA-51563	5/18	DC - 3.5	21	3.5	15	3.4	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.3	12	26	2.9	Si MMIC, SOT363
	ABA-53563	5/46	DC - 3.5	21.5	14.5	26.5	3.1	Si MMIC, SOT363
Detector	HSMS-282x	Ct max = 1pF @0V						SOT323/363/23/143

## Notes:

1. Gain and P1dB performance for discrete FETs when matched for best IP3.
2. NFmin figures for discrete FETs.
3. High reverse isolation: 50dB typical.
4. Current adjustable: 20-60mA.
5. Includes integral bypass function. Current adjustable between 5 - 60mA.

# RFICs (GaAs and Silicon)

## GaAs RFICs

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idq (mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package
GaAs Fixed Gain Amplifiers	MGA-52543	0.4 - 6	1.9	5	53	1.9	14.2	+17.4	+32	SOT-343 (SC-70)
	MGA-53543	0.4 - 6	1.9	5	54	1.5	15.4	+18.6	+39	SOT-343 (SC-70)
	MGA-53589	0.05 - 6	1.9	5	52	1.66	15.8	+18.5	+37	SOT-89
	MGA-81563	0.1 - 6	2.0	3	42	2.8	12.4	+14.8	+27	SOT-363 (SC-70)
	MGA-82563	0.1 - 6	2.0	3	84	2.2	13.2	+17.3	+31	SOT-363 (SC-70)
	MGA-85563	0.8 - 6	2.0	3	15 to 30	1.9	18.0	+1 to +8	+12 to +17	SOT-363 (SC-70)
	MGA-86563	0.5 - 6	2.0	5	14	1.5	22.7	+4.1	+15	SOT-363 (SC-70)
	MGA-87563	0.5 - 4	2.0	3	4.5	1.6	14.0	-2	+8	SOT-363 (SC-70)

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idsat (mA)	PAE (%)	Gain (dB)	PSAT (dBm)	OIP3 (dBm)	Package (mm)
GaAs Medium Power Amplifiers	MGA-30789	2 - 6	3.5	5	100		11.7	-	41.8	SOT-89
	MGA-30889	0.04 - 2.6	0.9	5	65		15.5	-	38	SOT-89
	MGA-30989	2 - 6	3.5	5	51		12	-	36.8	SOT-89
	MGA-412P8	2.4 - 2.5	2.4	3.3	95	NA	25.5	+25.3	38	LPCC 2X2
	MGA-425P8	2 - 10	5.25	3.3	65	47.0	16.0	+20.3	32.9	LPCC 2x2
	MGA-545P8	0.05 - 7	5.825	3.3	92	46.0	11.5	+22	+34	LPCC 2x2
	MGA-83563	0.5 - 6	2.4	3	152	37.0	22.0	+22	+29	SOT-363 (SC-70)

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idq (mA)	NF (dB)	Gain (dB)	OP1dB (dBm)	OIP3 (dBm)	Package (mm)
GaAs Match-Pair Dual LNA	MGA-16116	0.45-1.45	0.9	4.8	61	0.27	18.4	21.2	21.2 (IIP3)	QFN 4x4x0.85
	MGA-16216	1.44-2.35	1.95	4.8	52.5	0.32	18.4	19.5	19.5 (IIP3)	QFN 4x4x0.85
	MGA-16316	1.95-4.0	2.6	4.8	53.3	0.45	18.2	18.7	15.5 (IIP3)	QFN 4x4x0.85

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idq (mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
GaAs Smart Bias Amplifier	MGA-61563	0.1 - 6	2	3	41	1.2	16.6	+15.8	+28.5	SOT-363 (SC-70)
	MGA-62563	0.1 - 3	0.5	3	60	0.9	22.0	+17.8	+32.9	SOT-363 (SC-70)
	MGA-685T6	0.1 - 1.5	0.5	3	10	0.9	18.9	17.3	+18.7	UTSLP 2.0x1.3x0.4
	MGA-68563	0.1 - 1.5	0.5	3	11	1	19.7	17.5	20.7	SOT-363

## RFICs (GaAs and Silicon)

## GaAs RFICs

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idq (mA)	NF (dB)	Gain (dB)	PAE (%)	OIP3 (dBm)	Package (mm)
GaAs High Linearity Amplifier	ALM-31122	0.7 - 1	0.9	5	394	2	15.6	52.5	47.6	MCOB 5.0x6.0x1.1
	ALM-31222	1.7 - 2.7	2	5	415	2.7	14.9	52.6	47.9	MCOB 5.0x6.0x1.1
	ALM-31322	3.3 - 3.9	3.5	5	413	2.8	13.2	51.5	47.7	MCOB 5.0x6.0x1.1
	ALM-32120	0.7 - 1.0	0.9	5	800	2.5	14	47	52	MCOB 7.0x10.0x1.1
	ALM-32220	1.7 - 2.7	2	5	800	3.5	14.8	47.5	50	MCOB 7.0x10.0x1.1
	ALM-32320	3.3 - 3.9	3.5	5	800	2.5	12	43	49	MCOB 7.0x10.0x1.1
	MGA-30116	0.75 - 1	0.9	5	202.8	2	17	47	44.1	QFN 3x3
	MGA-30216	1.7 - 2.7	2	5	206	2.8	14.2	48.9	45.3	QFN 3x3
	MGA-30316	3.3 - 3.9	3.5	5	198	2.7	12.8	51.3	44.4	QFN 3x3
	MGA-30489	0.25 - 3.0	1.9	5	97	3	13.3	-	39	SOT-89
	MGA-30689	0.04 - 2.6	1.95	5	104	3.3	14.6	-	40	SOT-89
	MGA-31189	0.05 - 2	0.9	5	111	3	21	42.5	42	SOT-89
	MGA-31289	1.5 - 3	1.9	5	124	2	18.7	36.4	41.8	SOT-89
	MGA-31389	0.05 - 2	0.9	5	73	2	21.3	41.2	38.6	SOT-89
	MGA-31489	1.5 - 3	1.9	5	69	1.9	19.5	39.1	37.3	SOT-89
	MGA-31589	0.45 - 1.5	0.9	5	146	1.9	20.4	45	45.3	SOT-89
	MGA-31689	1.5 - 3	1.9	5	168	1.9	18.1	48	44.9	SOT-89
	MGA-31716	DC - 2	0.9	5	58	1.9	20.2	43.9	41	QFN 3x3
MGA-31816	1.5 - 4.0	1.9	5	59	1.6	19.5	38.2	40.5	QFN 3x3	

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idsat (mA)	Isolation (dB)	Gain (dB)	Psat (dBm)	Package (mm)
GaAs LO Buffer Amplifier	MGA-565P8	0.1 - 3	2	5	67	50.0	21.8	+20	LPCC2x2

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vd/Id (V/mA)	Switch Insertion Loss (dB)	NF (dB)	Gain (dB)	P1dB (dBm @ mA)	IIP3 (dBm @mA)	Package (mm)
GaAs Amplifier with Bypass Switch	MGA-645T6	1.7 - 3	2.4	3/7	4.5	1.1	15.0	+9 @ 7	+7 @ 7	UTSLP 2.0x1.3x0.4
	MGA-64606	1.5 - 3	2.4	3/7	4.5	0.95	15.3	-3.0(IPI dB)	+5@7	UTSLP 2.0x1.3
	MGA-655T6	2.5 - 4	3.5	3/10	4.2	1.17	14.7	+12 @ 10	+5.5 @ 10	UTSLP 2.0x1.3x0.4
	MGA-65606	2.5 - 4	3.5	3/7	4.2	1.05	15.3	-2.4(IPI dB)	+5.7@7	UTSLP 2.0x1.3
	MGA-71543	0.1 - 6	2	2.7/10	5.6	0.8	15.4	+7.4 @ 10	+3 @ 10	SOT-343 (SC-70)
	MGA-72543	0.1 - 6	2	2.7/20	2.5	1.4	13.6	+11.2 @ 20	+10.5 @ 20	SOT-343 (SC-70)
	MGA-725M4	0.1 - 6	2	2.7/20	1.6	1.3	15.7	+13.1 @ 20	+9.9 @ 20	MiniPak Package
	MGA-785T6	0.1 - 1.5	0.6	3/10	2.6	1.5	15.7	3.2 @ 10	+1.0 @ 10	UTSLP 2.0x1.3x0.4

# RFICs (GaAs and Silicon)

## GaAs RFICs

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vd (V)	Id (mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
GaAs LNA with Power Down	MGA-665P8	0.5 - 6	5.25	3	21	1.5	16.5	11.1	15.4	LPCC2x2
GaAs LNA Module	MGA-13116	0.4 - 1.5	0.9	5	55	0.51	38	23.3	41.4	QFN 4x4x0.85
	MGA-13216	1.5 - 2.5	1.95	5	53	0.61	35.8	23.6	40.5	QFN 4x4x0.85
	MGA-13316	2.2 - 4.0	2.5	5	53	0.76	34.3	23.5	41.8	QFN 4x4x0.85
	MGA-14516	1.4 - 2.7	1.95	5	45	0.66	31.7	23.5	38	QFN 4x4x0.85
	MGA-621P8	0.7-1.5	0.9	4	60	0.58	18.0	21.0	36.0	LPCC 2x2
	MGA-622P8	1.5-2.7	1.9	4	60	0.57	18.5	20.4	34.0	LPCC 2x2
	ALM-GA001	0.9 - 3.5	1.575	2.7	3.3	0.97	17.9	-9.7 (IP1dB)	-2.0 (IIP3)	uDFN 1.5x1.3x0.5
	MGA-631P8	0.4 - 1.5	0.9	4	60	0.5	17.5	18	32.8	LPCC2x2
	MGA-632P8	1.4 - 3	1.95	4	60	0.6	17.6	18.3	35.4	LPCC2x2
	MGA-633P8	0.45 - 2	0.9	5	54	0.37	18	22	37	QFN 2x2x0.75
	MGA-634P8	1.5 - 2.3	1.9	5	48	0.44	17.4		36	QFN 2x2x0.75
	MGA-635P8	2.3 - 4	2.5	5	56	0.56	18	21.9	35.9	QFN 2x2x0.75
	MGA-636P8	0.45 - 1.5	0.7	4.8	105	0.5	18.5	23	41.5	QFN 2x2x0.75
	MGA-637P8	1.5 - 2.5	1.7	4.8	70	0.6	17.5	22	41.5	QFN 2x2x0.75
	MGA-638P8	2.5 - 4	2.5	4.8	90	0.8	17.5	22	39.5	QFN 2x2x0.75
	MGA-675T6	4.9 - 6.0	5.5	2.7	5	0.9	16.3	NA	14.7	UTSLP
	ALM-11036	0.776 - 0.87	0.849	5	92	0.78	15.6	4	37.6	SMT 7x10
	ALM-11136	0.87 - 0.915	0.915	5	92	0.76	15.4	4.5	38.2	SMT 7x10
	ALM-11236	1.71 - 1.85	1.785	5	99	0.67	15.9	3.5	32.3	SMT 7x10
	ALM-11336	1.85 - 1.98	1.98	5	100	0.72	15.3	3.8	35.5	SMT 7x10
ALM-GA002	0.9 - 2.5	1.575	2.85	8	0.8	14.3	1.9 (IP1dB)	4.7 (IIP3)	MCOB 2x2x1.1	

## RFICs (GaAs and Silicon)

## GaAs RFICs

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vd (V)	Id (mA)	NF (dB)	Gain (dB)	OIP3 (dBm)	P1dB (dBm)	Package (mm)
Variable Gain Amplifier	ALM-80110	0.4 - 1.6	0.9	5	110	4.8	(-27) to 13.6	40.3	23.3	MCOB 5.0x5.0x1.1
	ALM-80210	1.6 - 2.6	1.9	5	110	5.3	(-25.5) to 9.8	40.8	23.6	MCOB 5.0x5.0x1.1
	ALM-81224	1.45 - 2.75	2.14	5	383	2	23.8	44	27.4	MCOB 6.0x6.0x1.0

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idq (mA)	Gain (dB)	P1dB (dB)	Pout @ 2.5% EVM	Atten (dB)	Package (mm)
GaAs Power Amplifier Module	MGA-43228	2.3 - 2.5	2.4	5	1023	38.5	36	29.1	23.8	QFN 5x5
	MGA-43328	2.5 - 2.7	2.6	5	1017	37.4	36	29.3	24.5	QFN 5x5
	MGA-43428	851-894MHz	0.88	5	800	>30	36	27dBm@50dBc ACLR	-	MCOB 5x5
	MGA-43528	1.93 - 1.995	1.96	5	1000	>30	35		-	MCOB 5x5
	MGA-43628	2.0 - 2.2	2.14	5	1000	>30	35		-	MCOB 5x5
	MGA-43728	2.62-2.69	2.65	5	755	38.3	36	27.3dBm@48dBc ACLR	-	MCOB 5x5
	MGA-43828	0.925-0.960	0.94	5	730	32.8	36	27.5dBm@50dBc ACLR	-	MCOB 5x5
	MGA-43003	1.805-1.88	1.842	5	360	41.7	36	27dBm@48dBc ACLR	-	MCOB 5x5
	MGA-43040	2.3-2.4	2.35	5	350	42	35	27 dBm@48dBc ACLR	-	MCOB 5x5
	MGA-43013	728-756 MHz	0.746	5	380	34	36	27 dBm@48dBc ACLR	-	MCOB 5x5
Carrier Grade WiFi	MGA-43024	2401-2473MHz	2.442	5	450	40.8	34	27.8	-	MCOB 5x5

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	BCTRL	Gain (dB)	PAE of 19%	IP1dB (dBm)	Package (mm)	
WiFi Amplifier Module	MGA-22003	2.3 - 2.7	2.5	2.8	35	19	31	Small Size 3x3x1	
	MGA-23003	3.3 - 3.8	3.5	2.8	35	18	31	Small Size 3x3x1	
	MGA-25203	5.1 - 5.9	5.4	2.8	30	13	30	Small Size 3x3x1	
	AFEM-S105	5.1 - 5.9	EVM <-32.5dB at 15dBm, <-35dB at 12dBm						Small Size 3.2x3.2x0.6
	AFEM-S106	5.1 - 5.9	EVM <-32.5dB at 15dBm, <-35dB at 12dBm						Small Size 3.2x3.2x0.6

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idq (mA)	NF (dB)	Gain (dB)	IIP3 (dBm)	IP1dB (dBm)	Package (mm)
WiFi Dual Band LNA Module	ALM-2812	2.4 - 2.5	2.45	3.3	15	0.8	16.7	6.1	5.8	MCOB 3.0x3.0x1.1
		4.9 - 6.0	5.5	3.3	23.4	1.4	23.2	2.2	12.8	MCOB 3.0x3.0x1.1

# RFICs (GaAs and Silicon)

## InGaP HBT

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vd (V)	Id (mA)	Gain (dB)	NF (dB)	P1dB (dBm)	OIP3 (dBm)	Package
Gain Block	AVT-50663	DC - 6	2	5	36	15.3	4	12.5	25	SOT-363 (SC70)
	AVT-51663	DC - 6	2	5	37	19.6	3.2	12.9	25.1	SOT-363 (SC70)
	AVT-52663	DC - 6	2	5	45	15.3	4	12.7	27	SOT-363 (SC70)
	AVT-53663	DC - 6	2	5	48	19.6	3.2	15.1	26.5	SOT-363 (SC70)
	AVT-54689	0.05 - 6	2	5	58	17.1	4.1	17.4	29.6	SOT-89
	AVT-55689	0.05 - 6	2	5	75	17.2	4.3	19.5	32.5	SOT-89

## Silicon RFICs

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Voltage (Vdg)	Current (mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package
Silicon Broadband Amplifiers	ABA-51563	DC - 3.5	2.0	5	18	3.7	21.5	+1.8	11.4	SOT-363 (SC-70)
	ABA-52563	DC - 3.5	2.0	5	35	3.3	21.5	+9.8	19.9	SOT-363 (SC-70)
	ABA-53563	DC - 3.5	2.0	5	46	3.5	21.5	+12.7	22.9	SOT-363 (SC-70)
	ABA-54563	DC - 3	2.0	5	79	4.4	23.0	+16.1	27.8	SOT-363 (SC-70)
Silicon Darlington Amplifiers	ADA-4543	DC - 2.5	0.9	3.4	15	3.7	15.1	+1.9	15.0	SOT-343 (SC-70)
	ADA-4643	DC - 2.5	0.9	3.5	35	4.0	17.0	+13.4	28.3	SOT-343 (SC-70)
	ADA-4743	DC - 2.5	0.9	3.8	60	4.2	16.5	+17.1	32.6	SOT-343 (SC-70)
	ADA-4789	DC - 2.5	0.9	4.1	80	4.3	16.9	+18.8	33.2	SOT-89

## SDARS Module

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Voltage (Vdg)	Current (mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package
LNA/Filter	ALM-2203	2.32-2.345	2.3325	5	110	0.83	37.5	-	-	MCOB 5x5

# Transistors

## Transistors

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Voltage (V)	NF (dB)	Gain (dB)	P1dB (dBm)	S21E (dB)	OIP3 (dBm)	Package
Silicon Bipolar Transistor	AT-30511	DC - 5	0.9	2.7	1.1	16.0	+7.0	17.9	17.0	SOT-143
	AT-30533	DC - 5	0.9	2.7	1.1	13.0	+7.0	15.2	17.0	SOT-23
	AT-31011	DC - 5	0.9	2.7	0.9	13.0	+9.0	19.1	20.0	SOT-143
	AT-31033	DC - 5	0.9	2.7	0.9	11.0	+9.0	15.8	20.0	SOT-23
	AT-32011	DC - 5	0.9	2.7	1.0	14.0	+13.0	18.9	24.0	SOT-143
	AT-32032	DC - 6	0.9	2.7	1.0	15.0	+13.0	11.5	23.0	SOT-323
	AT-32033	DC - 5	0.9	2.7	1.0	12.5	+13.0	15.1	24.0	SOT-23
	AT-32063	DC - 5	0.9	2.7	1.1	14.5	+12.0	17.0	24.0	SOT-363 (SC-70)

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd / Idq (V)	NF (dB)	Ga (dB)	P1dB (dBm)	OIP3 (dBm)	Gate Width (um)	Package (mm)
Single Voltage Low Noise GaAs E-pHEMTs	ATF-501P8	.05 - 6	2	4.5/280	1.8	14.6	+28	+47	6400	LPCC 2x2
	ATF-50189	.05 - 6	2	4.5/280	1.1	15.5	+29.1	+45.3	6400	SOT-89
	ATF-511P8	.05 - 6	2	4.5/200	1.4	14.8	+30	+42	6400	LPCC 2x2
	ATF-521P8	05 - 6	2	4.5/200	1.5	17.0	+26.5	+42	3200	LPCC 2x2
	ATF-52189	05 - 6	2	4.5/200	1.5	16.0	+27.0	+42	3200	SOT-89
	ATF-531P8	05 - 6	2	4.0/135	0.6	20.0	+24.5	+38	1600	LPCC 2x2
	ATF-53189	05 - 6	2	4.0/135	0.85	15.5	+23.0	+40	1600	SOT-89
	ATF-54143	.45 - 6	2	3.0/60	0.5	16.6	+20.4	+36	800	SOT-343 (SC-70)
	ATF-541M4	.45 - 10	2	3.0/60	0.5	17.5	+21.4	+36	800	MiniPak Package
	ATF-55143	.45 - 6	2	2.7/10	0.6	17.7	+14.4	+24	400	SOT-343 (SC-70)
	ATF-551M4	.45 - 10	2	2.7/10	0.5	17.5	+14.6	+24	400	MiniPak Package
	ATF-58143	.45 - 6	2	3.0/30	0.5	16.5	+19	+30.5	800	SOT-343 (SC-70)
Low Noise GaAs pHEMTs	ATF-33143	.45 - 6	2	4.0/80	0.5	15.0	+22	+33.5	1600	SOT-343 (SC-70)
	ATF-331M4	.45 - 6	2	4.0/80	0.6	15.0	+19	+31	1600	MiniPak Package
	ATF-34143	.45 - 6	2	4.0/60	0.5	17.5	+20	+31.5	800	SOT-343 (SC-70)
	ATF-35143	.45 - 6	2	2.0/15	0.4	18.0	+11	+21	400	SOT-343 (SC-70)
	ATF-38143	.45 - 6	2	2.0/10	0.4	16.0	+12	+22	800	SOT-343 (SC-70)
	ATF-36163	1.5 - 18	12	1.5	1.2	10.0	+5	-	200	SOT-363 (SC-70)

# Diodes — PIN

## MiniPak

	Single	Anti-parallel	Parallel	Shunt Switch
Configuration	<p>(0)</p>	<p>(2)</p>	<p>(5)</p>	<p>(T)</p>
PIN	<a href="#">HMPP-3860</a> <a href="#">HMPP-3890</a>	<a href="#">HMPP-3862</a> <a href="#">HMPP-3892</a>	<a href="#">HMPP-3865</a> <a href="#">HMPP-3895</a>	<a href="#">HMPP-389T</a>

## 3 Lead Diodes SOT-323 (SC-70)

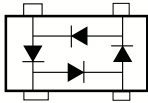
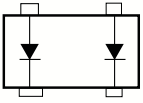
	Single	Dual Anode	Dual Cathode	Series Pair	Common Anode	Common Cathode
Configuration						
PIN	<a href="#">HSMP-381B</a> <a href="#">HSMP-386B</a> <a href="#">HSMP-389B</a>	<a href="#">HSMP-489B</a> <a href="#">HSMP-482B</a>	<a href="#">HSMP-481B</a>	<a href="#">HSMP-381C</a> <a href="#">HSMP-386C</a> <a href="#">HSMP-389C</a>	<a href="#">HSMP-381E</a> <a href="#">HSMP-386E</a> <a href="#">HSMP-389E</a>	<a href="#">HSMP-381F</a> <a href="#">HSMP-386F</a> <a href="#">HSMP-389F</a>

## 3 Lead Diodes SOT-23

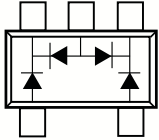
	Single	Dual Anode	Dual Cathode	Series Pair	Common Anode	Common Cathode
Configuration						
PIN	<a href="#">HSMP-3810</a> <a href="#">HSMP-3860</a> <a href="#">HSMP-3890</a> <a href="#">HSMP-3820</a> <a href="#">HSMP-3830</a>	<a href="#">HSMP-4890</a> <a href="#">HSMP-4820</a>	<a href="#">HSMP-4810</a>	<a href="#">HSMP-3812</a> <a href="#">HSMP-3862</a> <a href="#">HSMP-3892</a> <a href="#">HSMP-3822</a> <a href="#">HSMP-3832</a> <a href="#">ASML-5822</a> <a href="#">ASML-5829</a>	<a href="#">HSMP-3813</a> <a href="#">HSMP-3863</a> <a href="#">HSMP-3893</a> <a href="#">HSMP-3823</a> <a href="#">HSMP-3833</a>	<a href="#">HSMP-3814</a> <a href="#">HSMP-3864</a> <a href="#">HSMP-3894</a> <a href="#">HSMP-3824</a> <a href="#">HSMP-3834</a>

# Diodes — PIN

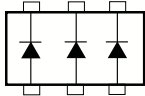
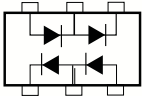
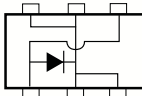
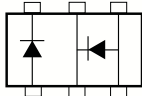
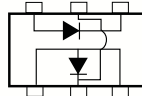
## 4 Lead Diodes SOT-143

	Ring Quad	Unconnected Pair
Configuration		
PIN	HSMP-386D HSMP-389D	HSMP-3895

## 5 Lead Diodes SOT-25

	Pi Quad
Configuration	
PIN	HSMP-3816 HSMP-3866

## 6 Lead Diodes SOT-363 (SC-70)

	Unconnected Trio	Dual Mode Switch	Low Inductance	Series Shunt Pair	High Frequency Series Shunt Pair
Configuration					
PIN	HSMP-386L HSMP-389L	HSMP-389R	HSMP-389T	HSMP-389U	HSMP-389V

# Diodes — PIN

## PIN Diodes

Application	Part Number	$C_i$ (pF) (max/typ)	$R_S$ ( $\Omega$ ) (max)	$V_{BR}$ (V) (min)	$T_{rr}$ (nS) (typ)	Lifetime (nS) (typ)
Low Distortion Attenuator	HSMP-381x	0.35/0.27	3.0	100	300	1500
Low Distortion/Low Inductance Attenuator	HSMP-481x	0.40/0.35	3.0	100	300	1500
Low Resistance Limiter	HSMP-382x	0.8/0.6	0.6	50	7	70
Low Inductance Limiter	HSMP-482x	1.0/0.75	0.6	50	7	70
Low Current Switch/ Attenuator	HSMP-383x	0.3/0.2	1.5	200	80	500
Low Current Switch/ Attenuator	HMPP/HSMP-386x	- / 0.2	1.5 typ	50	80	500
Low Resistance Switch	HMPP/HSMP-389x	0.30/0.20	2.5	50	-	200
Low Resistance/Low Inductance Switch	HSMP-489X	0.38/0.33	2.5	50	-	200

## Beam Lead PIN Diodes

Part Number	$C_i$ (pF)	$R_S$ ( $\Omega$ )	$V_{BR}$ (V)	$T_{rr}$ (nS)	Lifetime (nS)	Configuration	Package
HPND-4005	0.017	4.7	120	n/a	100	Single	Beam Lead

Component	Part Number	Freq. Range (MHz)	IIP3 (dBm)	IP1dB (dBm)	Dynamic Range (dB)	IL (dB)	VSWR (dB)	Package (mm)
50MHz - 4GHz PIN Diode Variable Attenuator Module	ALM-38140	50 - 1000	50	28.8	38	2.8	1.4	3.8x3.8x1.0 MCOB
		1000 - 2000	48.9	35.6	36	3.2	1.4	

Component	Part Number	Freq. Range (MHz)	IIP3 (dBm)	IP1dB (dBm)	ISO (dB)	IL (dB)	RL (dB)	Package
PIN Diode Diversity Switch	HSMP-386D	900	56.8	47.4	25.4	0.35	27.0	SOT-143
	HSMP-389D	900	55.4	46.3	25.7	0.36	28.0	

Component	Part Number	Freq. Range (MHz)	OP1dB (dBm)	IL (dB)	RL (dB)	Package
Schottky Assisted PIN Diode Low Power Limiter	ASML-5822	900	2.85	0.85	10.9	SOT-323
	ASML-5829	900	6.05	0.33	15.6	

# Diodes – Schottky Diode

## MiniPak

	Single	Anti-parallel	Parallel
Configuration	<p>(0)</p>	<p>(2)</p>	<p>(5)</p>
Schottky	HMPS-2820	HMPS-2822	HMPS-2825

## 3 Lead Diodes SOT-323 (SC-70)

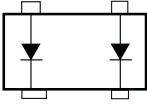
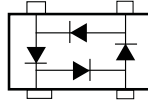
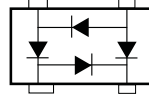
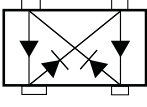
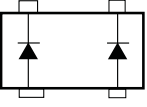
	Single	Series Pair	Common Anode	Common Cathode
Configuration				
Schottky	HSMS-280B	HSMS-280C	HSMS-280E	HSMS-280F
	HSMS-281B	HSMS-281C	HSMS-281E	HSMS-281F
	HSMS-282B	HSMS-282C	HSMS-282E	HSMS-282F
	HSMS-285B	HSMS-285C		
	HSMS-286B	HSMS-286C	HSMS-286E	HSMS-286F

## 3 Lead Diodes SOT-23

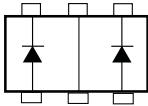
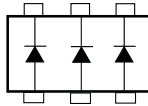
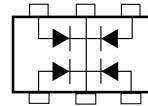
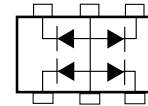
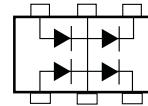
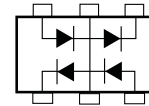
	Single	Series Pair	Common Anode	Common Cathode
Configuration				
Schottky	HSMS-2800	HSMS-2802	HSMS-2803	HSMS-2804
	HSMS-2810	HSMS-2812	HSMS-2813	HSMS-2814
	HSMS-2820	HSMS-2822	HSMS-2823	HSMS-2824
	HSMS-2860	HSMS-2862	HSMS-2863	HSMS-2864
	HSMS-2850	HSMS-2852		
	HSMS-8101	HSMS-8202		

# Diodes — Schottky Diode

## 4 Lead Diodes SOT-143

	Unconnected Pair	Ring Quad	Bridge Quad	Crossover Quad
Configuration				
Schottky	HSMS-2805		HSMS-2808	
	HSMS-2815	HSMS-2817	HSMS-2818	
	HSMS-2825	HSMS-2827	HSMS-2828	HSMS-2829
	HSMS-2865			
		HSMS-8207		HSMS-8209
				
	HSMS-2855			

## 6 Lead Diodes SOT-363 (SC-70)

	High Isolation Unconnected Pair	Unconnected Trio	Common Cathode Quad	Common Anode Quad	Bridge Quad	Ring Quad
Configuration						
Schottky	HSMS-280K	HSMS-280L	HSMS-280M	HSMS-280N	HSMS-280P	HSMS-280R
	HSMS-281K	HSMS-281L				
	HSMS-282K	HSMS-282L	HSMS-282M	HSMS-282N	HSMS-282P	HSMS-282R
		HSMS-285L			HSMS-285P	
	HSMS-286K	HSMS-286L			HSMS-286P	HSMS-286R

# Diodes — Schottky Diode

## Schottky-Barrier Diodes

Application	Part Number	$V_{BR}$ (V) (min)	$V_f$ (mV) (max) $I_F = 1$ mA	$V_f @ I_f$ (V @ mA) (max)	$C_i$ (pF) (typ)	$R_0$ ( $\Omega$ ) (typ)	Volt. Sens. (Y) (mV/mW)			$R_v$ (K $\Omega$ ) (typ)
							900 MHz	2.45 GHz	5.8 GHz	
General Purpose Detector	HMPS/HSMS-282x	15	340	0.7 @ 30	1.0	12.0	-	-	-	-
Lowest flicker noise	HSMS-281x	20	400	1.0 @ 35	1.2	15.0	-	-	-	-
High $V_{BR}$	HSMS-280x	70	400	1.0 @ 35	2.0	35	-	-	-	-
Zero bias detector	HSMS-285x	-	250	0.15 @ 0.1	0.3	-	40	30	22	8
High frequency up to 14 GHz	HSMS-286x	4	350	0.25 @ 0.1	0.3	-	50	35	25	5
Mixer	HSMS-8x0x	4	350	0.25 @ 0.1	0.26	11.0	-	35	25	5

## Beam Lead Schottky Diodes

Part Number	$V_{BR}$ (V)	$V_f$ (mV)	$C_i$ (pF)	$R_0$ ( $\Omega$ )	Configuration	Package
HSCH-5310	4	500	0.1	20.0	Medium Barrier	Beam-Lead
HSCH-5314	4	500	0.15	16.0	Medium Barrier	Beam-Lead

# mmW MMICs

## Millimeter Wave MMICs Selection Guide

	Frequency Bands / GHz															
	<6	6	7	8	10	11	13	15	18	20	23	26	28	32	38	>38
<b>Power Amplifiers</b>																
AMMP-6408																
AMMC-6408																
AMMC-6425																
AMMC-6431																
AMMC-6442																
AMMP-6442																
AMGP-6432																
AMGP-6434																
<b>Driver/Buffer Amps</b>																
AMMP-5618																
AMMC-5618																
AMMP-5620																
AMMC-5620																
AMMC-6333																
AMMP-6333																
AMMC-5040																
AMMC-6345																
<b>Low Noise Amplifiers</b>																
AMMP-6220																
AMMC-6220																
AMMP-6222																
AMMC-6222																
AMMC/AMMP-6232																
AMMP-6233																
AMMC-6241																
<b>Travelling Wave Amplifiers</b>																
AMMP-5024																
AMMC-5024																
AMMC-5026																
AMMC-5025																

# mmW MMICs

## Millimeter Wave MMICs Selection Guide

	Frequency Bands / GHz															
	<6	6	7	8	10	11	13	15	18	20	23	26	28	32	38	>38
<b>Attenuators</b>																
AMMC-6650																
AMMP-6650																
<b>Mixers</b>																
AMMP-6530 IRM																
AMMC-6530 IRM																
AMMP-6522																
AMMC-6522																
AMMP-6545 Sub Harmonic																
AMMC-6545 Sub Harmonic																
<b>Doublers</b>																
AMMP-6120																
AMMC-6120																
AMMP-6125																
AMMC-6140																
<b>Multipliers</b>																
AMMC-5040																
<b>Switches</b>																
AMMC-2008 SPDT																

# mmW MMICs

## Millimeter Wave MMICs Selection Guide

Component	Part Number	Freq. Range (GHz)	Bias condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
GaAs MMIC Low Noise Amplifier	AMMC-5024	30Khz - 40	4V @ 160	3.7	17.5	17.3	22.5	Chip
	AMMC-5026	2 - 35	7V @ 150	3.6	10.0	+24	31	Chip
	AMMC-6220	6 - 20	3V @ 55	1.8	23.0	9	19	Chip
	AMMC-6222	7-21	4V @ 120	2.4	25.0	16	29	Chip
	AMMC-6232	18 - 32	4V @ 135	2.8	27.0	18	29	Chip
	AMMC-6241	26 - 43	3V @ 60	2.7	20.0	10	20	Chip
	AMMP-6220	6 - 20	3V @ 55	1.9	23.0	10	21	SM 5x5
	AMMP-6222	7 - 21	4V @ 120	2.3	24	15.5	29	SM 5x5
	AMMP-6232	18 - 32	4V @ 138	3.0	23	18	29	SM 5x5
	AMMP-6233	18 - 32	3V @ 65	2.6	23	8	19	SM 5x5
GaAs MMIC Broadband Medium Power Amplifiers	AMMC-5025	30Khz -80	5V @ 100	-	8	15	20	Chip
	AMMC-5040	20 - 45	4.5V @ 300	8	24	22	23	Chip
	AMMC-5618	6 - 20	5V @ 107	4.4	14.5	+19.5	26	Chip
	AMMC-5620	6 - 20	5V @ 95	4.2	19	+15	23.5	Chip
	AMMC-6333	18 - 33	5V@230mA	5	20	23	30	Chip
	AMMC-6345	20 - 45	5V @ 480	9.0	20.0	24	32	Chip
	AMMP-5618	6 - 20	5V @ 107	4.4	14.5	+19.5	30	SM 5x5
	AMMP-5620	6 - 20	5V @ 95	5.1	17.5	15	22.5	SM 5x5
	AMMP-6333	18 - 33	5V@230mA	5.5	20	23	30	SMT 5X5

## Millimeter Wave MMICs Selection Guide

Component	Part Number	Freq. Range (GHz)	Biasing Condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
GaAs MMIC Power Amplifiers	AMMC-6408	6 - 18	5V@650mA	4.3	19	29	38	Chip
	AMMP-6408	6 - 18	5V @ 650	4.5	18.0	28	38	SM 5x5
	AMMC-6425	18 - 28	5V @ 900 mA	9	20	28	38	Chip
	AMMP-6430	27-34	5V@650mA	-	20	27	35	SM 5x5
	AMMC-6431	25 - 33	5V @ 650 mA	8.5	19	28.5	37	Chip
	AMMC-6442	37 - 40	5V @ 700 mA	7.5	23	30	36.5	Chip
	AMMP-6442	37 - 40	5V @ 700 mA	8	23	30	36	SM 5x5
	AMGP-6432	28 - 31	6V @ 700 mA	-	20	33	40 @ 30 GHz	SM 5x5
	AMGP-6434	28 - 31	6V @ 1400 mA	-	20	35.5	42 @ 30 GHz	SM 5x5

Component	Part Number	Freq. Range (GHz)	In/Output RL (dB)	Control Range (dB)	Min. IL (dB)	Control Voltage (V)	IIP3 (dBm)	Package (mm)
GaAs MMIC Variable Attenuators	AMMC-6650	DC - 40	15/15	22	3.1 @ 40 GHz	0 to +1.5V	+7 @ 22 GHz	Chip
	AMMP-6650	DC-30	12/12	22	2.1 @ 30 GHz	0 to +1.5V	+7 @ 22 GHz	SM 5x5

# mmW MMICs

## Millimeter Wave MMICs Selection Guide

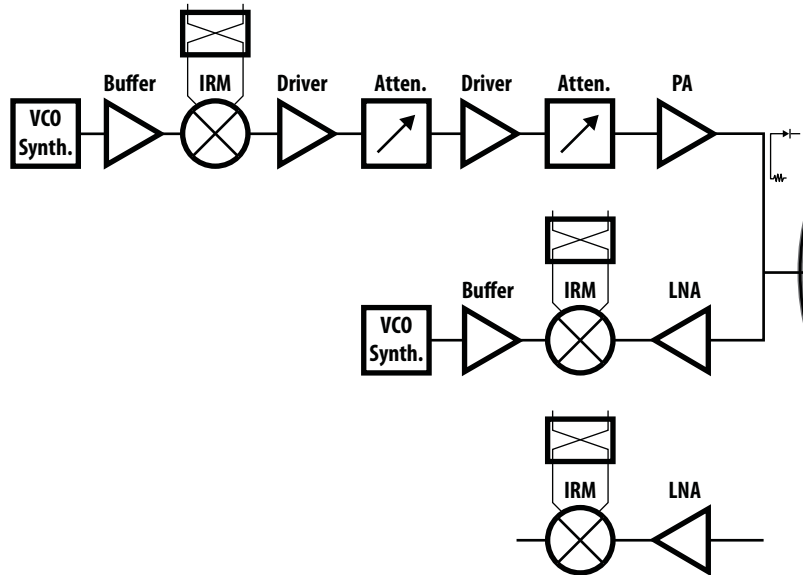
Component	Part Number	Freq. Range (GHz)	Insertion Loss (dBm)	Isolation (dB)	Input P1dB (dBm)	Control Input (Vdc)	Package
GaAs MMIC SPDT Switch	<a href="#">AMMC-2008</a>	DC - 50	2.3	25	14	0 / -5	Chip

Component	Part Number	RF Freq. (GHz)	IF Freq. (GHz)	Conversion Gain (dB)	LO/RF Iso (dB)	IIP3 (dBm)	Image Reject (dB)	Package (mm)
GaAs MMIC Mixers/Converter	<a href="#">AMMC-6530</a>	5 - 30	DC - 5	-10	22	18	15	Chip
	<a href="#">AMMP-6522</a>	7 - 20	DC - 3.5	13		-4	15	SM 5x5
	<a href="#">AMMP-6530</a>	5 - 30	DC - 5	-8	22	18	15	SM 5x5
	<a href="#">AMMP-6545</a>	18 - 45	DC - 3.5	-11	30	11	-	SM 5x5
	<a href="#">AMMP-6522</a>	7 - 20	DC - 3.5	-13	-	-2 @ 16 GHz	15	SM 5x5
	<a href="#">AMMP-6530</a>	5 - 30	DC - 5	-5 @ 20 GHZ	25	24 @ 23 GHZ	15	SM 5x5
	<a href="#">AMMP-6545</a>	18 - 40	DC - 3.5	-11 @ 36GHz	30	12	-	SM 5x5
	<a href="#">AMMC-6530</a>	5 - 30	DC - 5	-5 @20 GHZ	25	24 @ 23 GHZ	15	Chip
	<a href="#">AMMC-6545</a>	18 - 45	DC - 3.5	-9 @ 30GHz	33	18	-	Chip

Component	Part Number	Input Freq. (GHz)	Output Freq. (GHz)	IP1dB (dBm)	Pout (dBm)	Fo (dBc)	3Fo (dBc)	Package (mm)
GaAs MMIC Doublers	<a href="#">AMMC-6120</a>	4 - 12	8 - 24	2.0	15	25	25	Chip
	<a href="#">AMMC-6140</a>	10 - 20	20 - 40	5.0	-1	30	25	Chip
	<a href="#">AMMP-6130</a>	15	30	3.0	21	60	50	SM 5x5
	<a href="#">AMMP-6120</a>	4 - 12	8 - 24	2.0	15	25	25	SM 5x5
	<a href="#">AMMP-6125</a>	5 - 12	10 - 24	0	22	20	20	SM 5x5

# Microwave Radio Link Application Circuit

## Microwave Link Packaged Suggested Solution 7-8 GHz

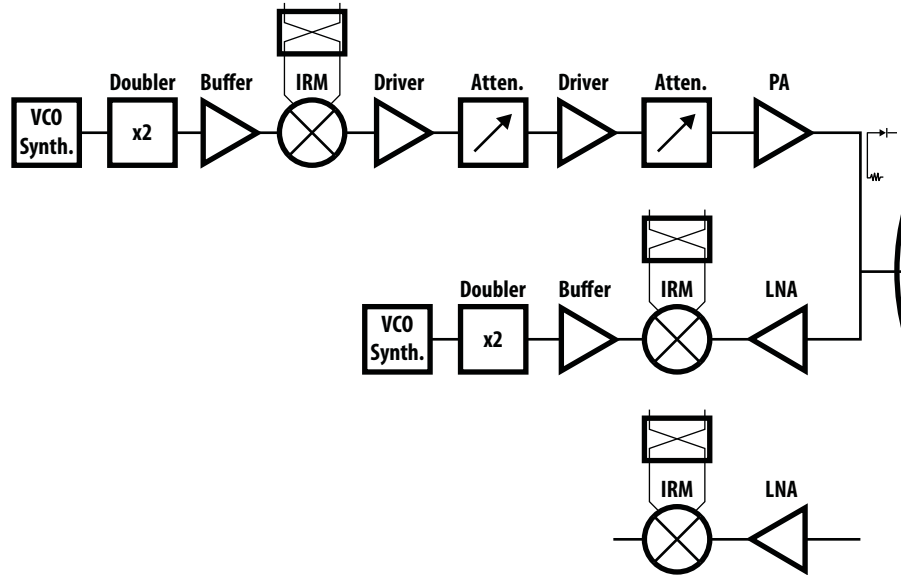


### Microwave Link Packaged Suggested Solution 7-8 GHz

Component	Part Number	Freq. Range (GHz)	Bias condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
	<a href="#">AMMP-5618</a>	6 - 20	5V @ 107	4.4	14.5	+19	-	5x5
	<a href="#">AMMP-5620</a>	6 - 20	5V @ 95	5.1	17.5	+15	-	5x5
	<a href="#">AMMP-6220</a>	6 - 20	3V @ 55	2.5	22	+10.0	-	5x5
	<a href="#">AMMP-6222</a>	7 - 21	4V @120	2.3	24	+15.5	-	5x5
	<a href="#">AMMP-6408</a>	6-18	5V@650	4.5	18	28	38	5x5

# Microwave Radio Link Application Circuit

## Microwave Link Packaged Suggested Solution 10-18 GHz



### Microwave Link Packaged Suggested Solution 10-11 GHz

Component	Part Number	Freq. Range (GHz)	Bias condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
	AMMP-5618	6 - 20	5V @ 107	4.4	14.5	+19	-	5x5
	AMMP-5620	6 - 20	5V @ 95	5.1	17.5	+15	-	5x5
	AMMP-6120	8 - 24	5V @ 112	-	-	-	-	5x5
	AMMP-6125	10 - 24	3.5V/5V @ 260	-	-	-	-	5x5
	AMMP-6220	6 - 20	3V @ 55	2.5	22	+10.0	-	5x5
	AMMP-6222	7 - 21	4V @120	2.3	24	+15.5	-	5x5
	AMMP-6408	6-18	5V@650	4.5	18	28	38	5x5

### Microwave Link Packaged Suggested Solution 13-15 GHz

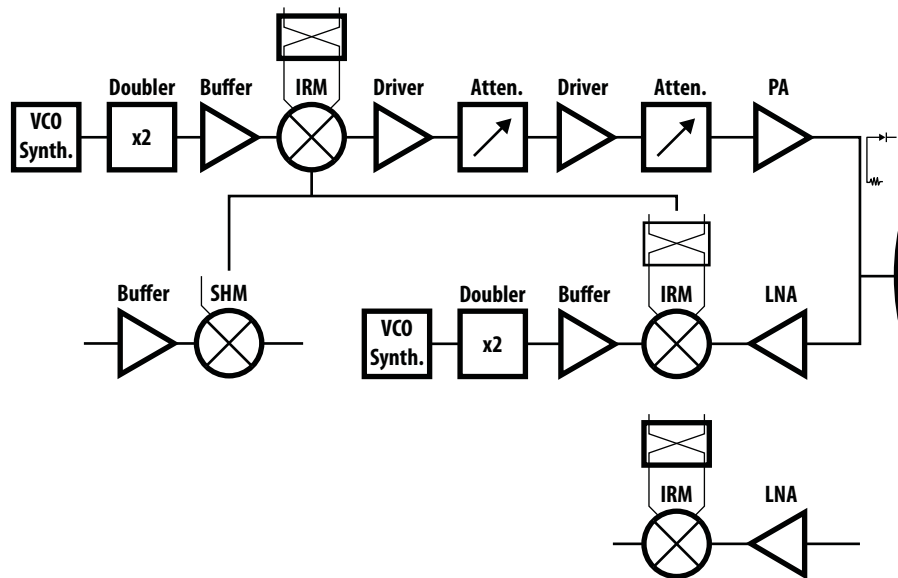
Component	Part Number	Freq. Range (GHz)	Bias condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
	AMMP-5618	6 - 20	5V @ 107	4.4	14.5	+19	-	5x5
	AMMP-5620	6 - 20	5V @ 95	5.1	17.5	+15	-	5x5
	AMMP-6120	8 - 24	5V @ 112	-	-	-	-	5x5
	AMMP-6125	10 - 24	3.5V/5V @ 260	-	-	-	-	5x5
	AMMP-6220	6 - 20	3V @ 55	2.5	22	+10.0	-	5x5
	AMMP-6222	7 - 21	4V @120	2.3	24	+15.5	-	5x5
	AMMP-6408	6-18	5V@650	4.5	18	28	38	5x5

### Microwave Link Packaged Suggested Solution 18 GHz

Component	Part Number	Freq. Range (GHz)	Bias condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
	AMMP-5618	6 - 20	5V @ 107	4.4	14.5	+19	-	5x5
	AMMP-5620	6 - 20	5V @ 95	5.1	17.5	+15	-	5x5
	AMMP-6120	8 - 24	5V @ 112	-	-	-	-	5x5
	AMMP-6125	10 - 24	3.5V/5V @ 260	-	-	-	-	5x5
	AMMP-6220	6 - 20	3V @ 55	2.5	22	+10.0	-	5x5
	AMMP-6222	7 - 21	4V @120	2.3	24	+15.5	-	5x5
	AMMP-6232	18 - 32	4V @135	3.0	23	+18.0	-	5x5
	AMMP-6233	18 - 32	3V @ 65	2.6	23	+8.0	-	5x5
	AMMP-6408	6-18	5V@650	4.5	18	28	38	5x5

# Microwave Radio Link Application Circuit

## Microwave Link Packaged Suggested Solution 23-26 GHz



### Microwave Link Packaged Suggested Solution 23 GHz

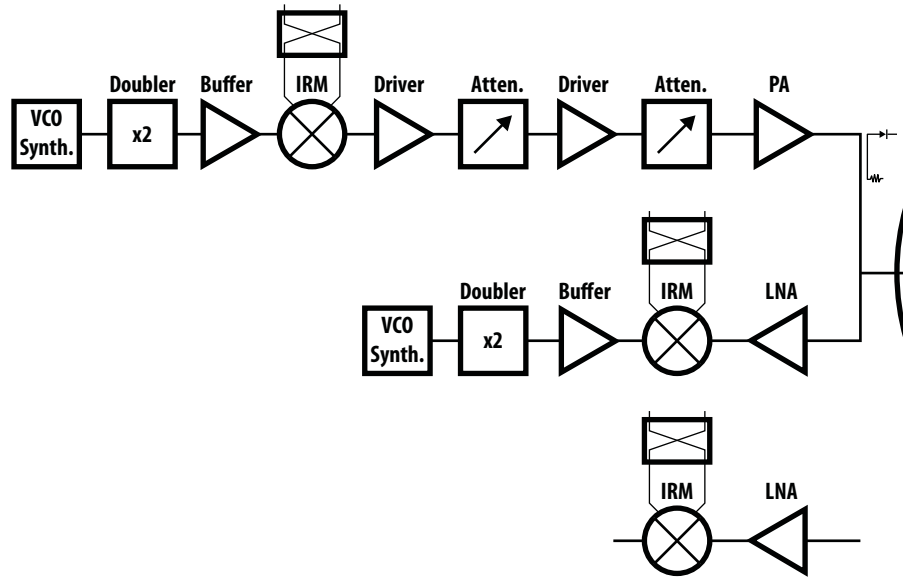
Component	Part Number	Freq. Range (GHz)	Bias condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
	AMMP-5618	6 - 20	5V @ 107	4.4	14.5	+19	-	5x5
	AMMP-5620	6 - 20	5V @ 95	5.1	17.5	+15	-	5x5
	AMMP-6120	8 - 24	5V @ 112	-	-	-	-	5x5
	AMMP-6125	10 - 24	3.5V/5V @ 260	-	-	-	-	5x5
	AMMP-6220	6 - 20	3V @ 55	2.5	22	+10.0	-	5x5
	AMMP-6222	7 - 21	4V @120	2.3	24	+15.5	-	5x5
	AMMP-6232	18 - 32	4V @135	3.0	23	+18.0	-	5x5
	AMMP-6233	18 - 32	3V @ 65	2.6	23	+8.0	-	5x5
	AMMP-6333	18 - 33	5V@230mA	5.5	20	23	30	5x5

### Microwave Link Packaged Suggested Solution 26 GHz

Component	Part Number	Freq. Range (GHz)	Bias condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
	AMMP-5618	6 - 20	5V @ 107	4.4	14.5	+19	-	5x5
	AMMP-5620	6 - 20	5V @ 95	5.1	17.5	+15	-	5x5
	AMMP-6220	6 - 20	3V @ 55	2.5	22	+10.0	-	5x5
	AMMP-6222	7 - 21	4V @120	2.3	24	+15.5	-	5x5
	AMMP-6232	18 - 32	4V @135	3.0	23	+18.0	-	5x5
	AMMP-6233	18 - 32	3V @ 65	2.6	23	+8.0	-	5x5
	AMMP-6333	18 - 33	5V@230mA	5.5	20	23	30	5x5

# Microwave Radio Link Application Circuit

## Microwave Link Packaged Suggested Solution 28-32 GHz



### Microwave Link Packaged Suggested Solution 28 GHz

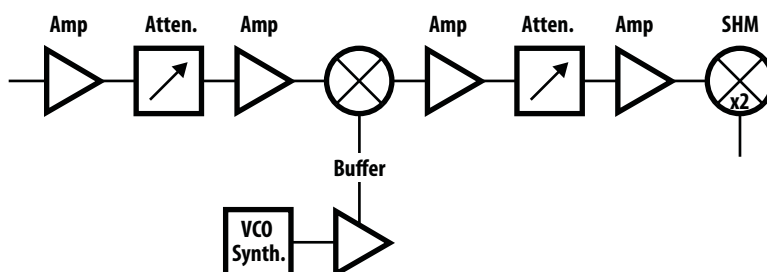
Component	Part Number	Freq. Range (GHz)	Bias condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
	AMMP-5618	6 - 20	5V @ 107	4.4	14.5	+19	-	5x5
	AMMP-5620	6 - 20	5V @ 95	5.1	17.5	+15	-	5x5
	AMMP-6220	6 - 20	3V @ 55	2.5	22	+10.0	-	5x5
	AMMP-6222	7 - 21	4V @120	2.3	24	+15.5	-	5x5
	AMMP-6232	18 - 32	4V @135	3.0	23	+18.0	-	5x5
	AMMP-6425	18 - 28	5V @ 650	-	22	+28.0	-	5X5
	AMMP-6233	18 - 32	3V @ 65	2.6	23	+8.0	-	5x5
	AMMP-6333	18 - 33	5V@230mA	5.5	20	23	30	5X5
	AMMP-6430	27-34	5V@650	-	20	27	35	5X5

### Microwave Link Packaged Suggested Solution 32 GHz

Component	Part Number	Freq. Range (GHz)	Bias condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
	AMMP-5618	6 - 20	5V @ 107	4.4	14.5	+19	-	5x5
	AMMP-5620	6 - 20	5V @ 95	5.1	17.5	+15	-	5x5
	AMMP-6220	6 - 20	3V @ 55	2.5	22	+10.0	-	5x5
	AMMP-6222	7 - 21	4V @120	2.3	24	+15.5	-	5x5
	AMMP-6232	18 - 32	4V @135	3.0	23	+18.0	-	5x5
	AMMP-6233	18 - 32	3V @ 65	2.6	23	+8.0	-	5x5
	AMMP-6333	18 - 33	5V@230mA	5.5	20	23	30	5X5
	AMMP-6430	27-34	5V@650	-	20	27	35	5X5

# Microwave Radio Link Application Circuit

## IF 1st and 2nd Stage Radio Link Suggested Solution



### IF 1st and 2nd Stage Radio Link Suggested Solution

Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vd (V)	Id (mA)	Gain (dB)	NF (dB)	PIdB (dBm)	OIP3 (dBm)	Package (mm)
ABA-53563	DC - 3.5	2	5	46	21.5	3.5	12.7	22.9	SOT-363 (SC70)
ABA-54563	DC - 3	2	5	79	23	4.4	16.1	27.8	SOT-363 (SC70)
ADA-4789	DC - 2.5	0.9	3.8	60	16.5	4.2	17.1	32.6	SOT-89
ATF-54143	0.45 - 6	2	3	60	16.6	0.5	20.4	36	SOT-363 (SC70)
ATF-541M4	0.45 - 10	2	3	60	17.5	0.5	21.4	36	MiniPak Package
AVT-50663	DC-6	2	5	36	15.3	4	12.5	25	SOT-363 (SC70)
AVT-52663	DC-6	2	5	45	15.3	4	12.7	27	SOT-363 (SC70)
AVT-53663	DC-6	2	5	48	19.5	3.2	15.1	26.5	SOT-363 (SC70)
MGA-30489	0.25 - 3.0	1.9	5	97	13.3	3	-	39	SOT-89
MGA-30689	0.04 - 2.6	1.95	5	104	14.6	3.3	-	40	SOT-89
MGA-30889	0.04 - 2.6	0.9	5	65	15.5	-	-	38	SOT-89
MGA-565P8	0.1 - 3	2	5	67	21.8	-	-	-	LPCC2x2
MGA-62563	0.1 - 3	0.5	3	60	22	0.9	17.8	32.9	SOT-363 (SC70)

Part Number	Freq. Range (MHz)	IIP3 (dBm)	IP1dB (dBm)	Dynamic Range (dB)	Insertion Loss (dB)	VSWR (dB)	Package (mm)
ALM-38140	50 - 1000	50	28.8	38	2.8	1.4	3.8x3.8x1.0 MCOB
	1000 - 2000	48.9	35.6	36	3.2	1.4	

Part Number	Freq. Range (GHz)	Test Freq. (GHz)	IIP3 (dBm)	Attenuation (dB)	Insertion Loss (dB)	Return Loss (dB)	Package (mm)
HSMP-3816	0.3 - 4	1	45	38	-3	-22	SOT - 25
HSMP-3866	0.3 - 4	1	30	36	-2.5	-18	SOT - 25

Connecting everything®



**Broadcom Limited is a diversified global semiconductor leader built on 50 years of innovation, collaboration and engineering excellence.**

Broadcom's extensive product portfolio serves multiple applications within four primary end markets: wired infrastructure, wireless communications, enterprise storage and industrial & others. Applications for our products in these end markets include: data center networking, home connectivity, broadband access, telecommunications equipment, smartphones and base stations, data center servers and storage, factory automation, power generation and alternative energy systems, and displays.

Broadcom combines global scale, engineering depth, broad product portfolio diversity and superior execution and operational focus to deliver category-leading connectivity products so its customers can build and grow successful businesses today and in the future.



A Broadcom Limited Company

For product information and a complete list of distributors, visit our website:  
[www.avagotech.com](http://www.avagotech.com)  
[www.avagotech.com/rf](http://www.avagotech.com/rf)

Broadcom, the pulse logo, Connecting everything, the Connecting everything logo, Avago Technologies, the A logo and CoolPAM are the trademarks of Broadcom in the United States, certain other countries and/or the EU. Copyright © 2015-2016 Broadcom. All Rights Reserved. The term "Broadcom" refers to Broadcom Limited and/or its subsidiaries. For more information, please visit [www.broadcom.com](http://www.broadcom.com). AV00-0252EN 04.29.16

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Avago Technologies:](#)

[AFEM-S257-BLKG](#) [AFEM-S257-TR1G](#) [MGA-636P8-TR1G](#) [MGA-637P8-TR1G](#) [MGA-638P8-TR1G](#)

## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

 [View AFEM-9040-SG1 on WIN SOURCE](#)

 [Broadcom Limited Information](#)

## Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management