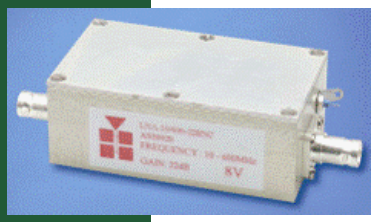
RF Amplifier Modules



DrawCom offers a wide range of RF amplifier modules including Low Noise/High Dynamic Range Amplifiers, Medium and High Power Linear (linearised also) Class A Power Amplifiers and Class AB Power Amplifiers. The amplifiers are designed to operate across various frequency bands from 60MHz up to 18GHz and available in range of gain options with appropriate connector types. Possible applications are:

- Signal strength testing.
- Site evaluation.
- Power testing.
- Signal enhancing (repeaters).
- Receiver distribution systems.
- Two-way radio-communication.
- Transmission of jamming signals, etc.

A unique feature of most DrawCom amplifiers is that they are relatively broadband and specified to cover most of the typical telecommunications bandwidths such as 66-108MHz, 134-174MHz, 380-500MHz, 800-1000MHz, 1700-2000MHz, 2-6GHz, 6-18GHz, 2-18GHz, etc. without the necessity to retune inside these bandwidths.

Low Noise Amplifiers are available with typical gain of 15dB per stage and Noise Figures in the region of 1dB. Due to the OIP3 always being better than 30dBm, all of the LNAs have very good High Dynamic Range. Single ended and balanced amplifiers are available.

Our Medium Power Amplifiers work in Class A mode and provide P1dB of 1W and 2W in balanced configuration. The GaAs FETs selected for these provide exceptionally good OIP3. Combined in front with the LNA stages they produce extremely high dynamic range amplifiers, and also are used as drivers for the High Power Amplifiers.

High Power Linear Amplifiers based on LDMOS technology are available with output powers (P1dB) up to 20W in Class A for a single case module and using a 24-28V DC power supply. These 20W amplifiers are also offered with analogue predistortion type linearisation achieving 5-12dB (bandwidth dependent) higher IP3 and 1-1.5dB higher P1dB.

High Power Class A Amplifiers up to 20W are also available with GaAs FETs and 12V power supply. They have 4-5dB higher IP3 compared with the LDMOS types before linearization is applied.

The single case high power Class A amplifiers are also offered in combinations of 2 and 4 in parallel to provide up to 100W (with predistortion) of P1dB and exceptionally high linearity. These are normally configured as 4" high fan cooled rack mount units.

Class AB Power Amplifiers are available up to 150W when efficiency is more of a concern than the linearity. Everyone of the Class A 20W amplifiers with 24-28V power supply can easily be realized as 40-50W Class AB amplifier also.

All of the Class A and most of the Class AB power amplifiers are in balanced configuration to provide resilience to failure. Failure of only one side of a balanced amplifier reduces gain by 6dB.

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RF Amplifier Modules *(cont.)*

Selection Guide: Low Noise Amplifiers

Part No.	Amp Name	P1dB (dBm) (TOI (dBm))	Gain (dB)	Gain Flatness (dB)	Freq. (MHz)	I/P R loss (dB)	O/P R loss (dB)	Noise Figure (dB)	Power Supply Voltage (V)	Current Typ. (mA)
11-007601	50-200MHz LNA, 14dB.	≥20 (32 OIP3)	≥14	0.5 max	50-200	>16	>18	<1.7	10-24	120
11-007602	50-200MHz LNA, 14dB.	≥22 (35 OIP3) (36dBm @85MHz)	≥14	0.5 max	50-200	>16	>18	<1.7	10-24	200
11-006001	VHF LNA, 20dB	≥20, 21 typ. (33 OIP3)	21.3 ± 0.5	0.7 max	70-500	>14	>20	≤2.7	10-24	230
11-007701	200-400MHz LNA, 14dB.	≥20 (34 OIP3)	≥14	1 max	200-400	>16	>18	<1.4	10-24	150
11-005401	UHF LNA	≥20, 21 typ. (33 OIP3)	15.5 ± 0.5	0.5 max	380- 500	>14	>14	≤2 1.8 typ.	10-24	115
11-007401	380-500MHz LNA, 30dB	≥21 (33 OIP3)	30-32	1.7max	380-500	>20	>19	<1.3	10-24	300
11-007301	380-500MHz LNA, 20dB	≥23.5 (36 OIP3)	20-22	1.3max	380-500	≥20	≥20	<1.3	10-24	200
11-007501	500-610MHz LNA, 15dB	≥20 (32 OIP3)	15-16	0.5 max	500-610	>20	>20	<1.3	10-24	200
11-007001	500-610MHz LNA, 30dB	≥20.5 (34 OIP3)	29.5-31.5	0.9 max	500-610	>20	>17.7	<1.3	10-24	300
11-005901	900MHz LNA, 20dB	≥20, 22.5 typ (33 OIP3)	18-20	1 max 0.5 typ.	800-1000	≥20	≥20	≤1.0	10-24	190
11-006701	800-1000MHz LNA, 29dB	≥20 (32 OIP3)	28.5-30	0.5 max 0.2 typ	800-960	>18	>18	<1.5	10-24	170
11-007201	PCN LNA, 16dB	≥20 (30 OIP3)	15.8-17	1max 0.8 typ.	1700-1900	≥18	≥18	<1.2	10-24	180
11-008201	1.7-2.0 GHz LNA, 30dB	≥20 (31.5 OIP3)	≥30	0.5 max	1700-2000	≥18	≥18	1.0	10-15	210
11-005501	UMTS LNA, 15dB	≥20, 21.5 typ (32 OIP3)	15.3-17	1.5 max	1920-2170	>20	>20	≤1.0	10-24	170
11-006201	UMTS LNA, 14dB	≥23 (33.0 OIP3)	14-15.5	0.9 max	1920-2170	>20	>20	<1.5	10-24	220
11-006401	UMTS LNA, 30dB	≥20, 21.5 typ. (32 OIP3)	30.5-3.5	2.3 max	1920-2170	≥20	≥20	≤1.25	10-24	340
11-008101	2.4GHz LNA 40dB	≥ 24 typ. (35 OIP3)	≥40	1.3 max	2400-2500	>14	>18	≤2 1.6 typ.	10-24	370

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RF Amplifier Modules *(cont.)*

Selection Guide: Medium Power Amplifiers

Part No.	Amp Name	P1dB (dBm) (TOI (dBm))	Gain (dB)	Gain Flatness (dB)	Freq. (MHz)	I/P R loss (dB)	O/P R loss (dB)	Noise Figure (dB)	Power Supply Voltage (V)	Current Typ. (mA)
12-023201	60-250 MHz LPA	≥31 (47 OIP3)	≥35	0.8	60-250	≥15	≥14	≤4.0	11.5 - 12.5	600
12-024301	60-500 MHz LPA	≥33 (43.5 OIP3)	≥33	1.2	60-500	≥15	≥15	≤7.0	24 ± 0.5	580
11-007901	TETRA LPA	≥30.8 (44 OIP3)	≥37.5	0.7 max	380-470	≥18	≥18	≤1.35	10-15	780
11-006101	380-500MHz LPA	≥31 (46 OIP3)	15.5 ± 0.5	1 max 0.5 typ	380-500	>20	>20	≤4.8	10-24	510
12-021801	TETRA 1W 15dB	≥31 (42.0 OIP3)	15.5 ± 0.5	0.5 max	380-500	>20	>20	≤5.5	10-15	530
12-021802	TETRA 2W 15dB	≥33.5 (47 OIP3)	15 ± 0.5	0.5 max	380-500	>20	>20	≤5.5	10-15	840
12-015201	TETRA LPA	≥33.4 (49 OIP3)	15.2 - 16.5	1 max	380-500	>20	>20	≤4.5	10-15	920
11-005801	800-960 MHz LPA	≥30 (46 OIP3)	14.5 ± 0.5	1 max	800-960	>20	>18	≤2.7	10-24	510
12-021901	900MHz 1W	≥30.50 (43 OIP3)	≥15	0.8 max	800 - 1000	>18	>18	≤6.0	10 - 15	500
12-021902	900MHz 2W	≥33.8 (47.5 OIP3)	≥15	0.8 max	800 - 1000	>18	>18	≤6.5	10 - 15	820
11-006301	PCN 1W 15dB	≥30.4 (44 OIP3)	14.6 ± 0.5	0.6 max 0.5 typ	1700 - 1900	≥18	≥18	≤4.0	10 - 24	560
11-006801	UMTS LPA	≥31.4 (47 OIP3)	14.3 ± 0.5	0.5 max	1920 - 2170	>20	>18	≤3.5	12 ± 2%	470
11-007101	UMTS LPA	≥31 (45 OIP3)	29 - 31.5	1.5 max 1.2typ	1920 - 2170	>20	>20	≤1.35	12 ± 2%	640
11-008001	2.4GHz 40dB Gain	≥32.7 (44 OIP3)	≥40	0.7 max	2400 - 2500	≥16	≥16	2.6	10 - 15	1160

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RF Amplifier Modules *(cont.)*

Selection Guide: Power Amplifiers Class A

Part No.	Amp Name	P1dB (dBm) (TOI (dBm))	Gain (dB)	Gain Flat-ness (dB)	Freq. (MHz)	I/P R loss (dB)	O/P R loss (dB)	Power Supply Voltage (V)	Current Typ. (mA)	Comment
12-025601	66-108 MHz 5W PA	≥37.0 (49 OIP3)	>34	1max	66-108	≥18	≥14	24	1020	
12-025602	108-174 MHz 5W PA	≥37.0 (48 OIP3)	>34	1.2max	108-174	≥16	≥15	24	1020	
12-025603	174-250 MHz 5W PA	≥37.0 (47.5 OIP3)	>34	1.5max	174-250	≥16	≥15	24	1070	
12-021601	380-470 MHz (TETRA) 5W PA	≥37.5 (50 OIP3)	30± 0.5	0.5max	380-470	≥18	≥18	12	1900	
12-016302	380-470MHz (TETRA) PA 10W	≥40.5 (53 OIP3)	≥22.8	1.5max	380-470	≥18	≥18	24	2500	
12-016301	380-470MHz PA 20W	≥43.5 (54 OIP3)	≥23	1.5max	380-470	≥18	≥18	24	3700	
12-022101	380-470MHz PA 10W	≥40.3 (54 OIP3)	≥34.0	1.5max	380-470	≥18	≥18	12	4300	GaAs FET,
12-022102	380-470MHz PA 20W	≥42.8 (59 OIP3)	≥36.0	2max	380-470	≥18	≥18	12	5500	GaAs FET,
12-018601	800-960MHz 5W PA	≥37 (52.5 OIP3)	≥30	0.5max	800-960	≥20	≥20	12	2000	
12-018001	800-960MHz 10W PA	≥40.4 (54 OIP3)	≥30	1.2max	800-960	≥18	≥18	12	3550	GaAs FET
12-018002	800-960MHz 20W PA	≥42.5 (56 OIP3)	≥30	1.2max	800-960	≥18	≥18	12	5000	GaAs FET
12-020501	800-960MHz 20W PA	≥43.5 (54.0 OIP3)	≥31.5	0.6max	800-960	≥18	≥18	24	4600	
12-017301	1700-2000MHz (PCN) 10W PA	≥40.6 (55.5 OIP3)	≥39.6	1.0max	1700-2000	≥18	≥18	12	4500	GaAs FET
12-018801	1800-2000MHz (PCN) 20W PA	≥43.5 (53.5 OIP3)	≥41	1.2max	1800-2000	≥15	≥15	24	4500	
12-018201	2100-2200MHz (UMTS) 20W PA	≥43.1 (59.0 OIP3)	≥22	0.4max	2100-2200	≥18	≥18	12	6200	W-CDMA 3.5dBm 64 DPCH Carrier
12-019001	2100-2200MHz (UMTS) 20W PA	≥43.3 (53.0 OIP3)	≥16	0.5max	2100-2200	≥18	≥18	24	3600	W-CDMA 32dBm 64 DPCH Carrier
12-019002	2100-2200MHz (UMTS) 10W PA	≥40.5 (52.0 OIP3)	≥16	0.4max	2100-2200	≥18	≥18	24	2200	W-CDMA 29dBm 64 DPCH Carrier

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RF Amplifier Modules *(cont.)*

Selection Guide: Power Amplifiers Class AB									
Part No.	**Amp Name**	**P1dB (dBm)**	**Gain (dB)**	**Gain Flatness (dB)**	**Freq. (MHz)**	**I/P R loss (dB)**	**O/P R loss (dB)**	**Power Supply Voltage (V)**	**Current Typ. (mA)**
12-005203	87.5-108MHz 20W PA	≥44	≥20	-	87.5 - 108	≥14	N/A	24	3800
12-005201	110-140MHz 10W PA	≥43	≥45	-	110 - 140	≥14	N/A	24	3500
12-005301	VHF 60dB 10W PA	≥43	≥60	-	110 - 140	≥14	N/A	24	3600
12-005202	140-170MHz 10W	≥43	≥45	-	140 - 170	≥14	N/A	24	3500
12-005302	150MHz 40dB 10W PA	≥43	≥60	-	140 - 170	≥14	N/A	24	3600
12-020801	860-960MHz 40W PA	≥46.5	≥28	0.5max	860 - 960	≥18	≥18	24	5800max @P1dB (1650 Iqc)

Selection Guide: Power Amplifiers Linearised Class A									
Part No.	**Amp Name**	**P1dB (dBm) (TOI (dBm))**	**Gain (dB)**	**Gain Flatness (dB)**	**Freq. (MHz)**	**I/P R loss (dB)**	**O/P R loss (dB)**	**Power Supply Voltage (V)**	**Current Typ. (mA)**
12-021701	380-410MHz PA 20W	≥44.0 (63 OIP3 @33dBm/ tone)	≥38.5	0.8max	380 - 410	≥15	≥15	24	4500
12-021702	410-440MHz PA 20W	≥44.0 (63OIP3 @33dBm/ tone)	≥38.5	0.8max	410 - 440	≥15	≥15	24	4500
12-021703	440-470MHz PA 20W	≥44 (63 OIP3 @33dBm/ tone)	≥38.5	0.8max	440 - 470	≥15	≥15	24	4500
12-021704	470-500MHz PA 20W	≥44 (63OIP3 @33dBm/ tone)	≥38.5	0.8max	470 - 500	≥15	≥15	24	4500
12-023301	851-866 PA 20W	≥44 (63 OIP3 @31.5dBm/ tone)	≥36	0.8max	851 - 866	≥15	≥15	24	4350

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RF Amplifier Modules - Broadband

Part No.	Frequency range (GHz)	Min. Gain (dB)	Max. Gain ripple	Max. Noise figure	Min. P1dBm	Max. DC current
LMF202	0.5 - 2	15	+/-1.2dB	+4.5dB	14	90mA
LMF212	2 - 4	15	+/-1.2dB	+4.5dB	14	90mA
LMF222	4 - 8	15	+/-1.2dB	+4.5dB	14	90mA
LMF232	8 - 12	15	+/-1.2dB	+4.5dB	14	90mA
LMF242	12 - 18	15	+/-1.2dB	+4.5dB	14	90mA
LMF262	2 - 18	15	+/-1.2dB	+4.5dB	14	90mA
LMF272	6 - 18	15	+/-1.2dB	+4.5dB	14	90mA
LMF303	0.5 - 2	23	+/-1.5dB	+4.5dB	13	140mA
LMF313	2 - 4	23	+/-1.5dB	+4.5dB	13	140mA
LMF323	4 - 8	23	+/-1.5dB	+4.5dB	13	140mA
LMF333	8 - 12	23	+/-1.5dB	+4.5dB	13	140mA
LMF343	12 - 18	23	+/-1.5dB	+4.5dB	13	140mA
LMF363	2 - 18	23	+/-1.5dB	+4.5dB	13	140mA
LMF373	6 - 18	23	+/-1.5dB	+4.5dB	13	140mA
LMF304	0.5 - 2	32	+/-1.5dB	+4.5dB	13	170mA
LMF314	2 - 4	32	+/-1.5dB	+4.5dB	13	170mA
LMF324	4 - 8	32	+/-1.5dB	+4.5dB	13	170mA
LMF334	8 - 12	32	+/-1.5dB	+4.5dB	13	170mA
LMF344	12 - 18	32	+/-1.5dB	+4.5dB	13	170mA
LMF364	2 - 18	32	+/-1.5dB	+4.5dB	13	170mA
LMF374	6 - 18	32	+/-1.5dB	+4.5dB	13	170mA
LMF405	0.5 - 2	42	+/-1.5dB	+4.5dB	14	220mA
LMF415	2 - 4	42	+/-1.5dB	+4.5dB	14	220mA
LMF425	4 - 8	42	+/-1.5dB	+4.5dB	14	220mA
LMF435	8 - 12	42	+/-1.5dB	+4.5dB	14	220mA
LMF445	12 - 18	42	+/-1.5dB	+4.5dB	14	220mA
LMF465	2 - 18	42	+/-1.5dB	+4.5dB	14	220mA
LMF475	6 - 18	42	+/-1.5dB	+4.5dB	14	220mA
LMF406	0.5 - 2	51	+/-1.8dB	+4.5dB	14	260mA
LMF416	2 - 4	51	+/-1.8dB	+4.5dB	14	260mA
LMF426	4 - 8	51	+/-1.8dB	+4.5dB	14	260mA
LMF436	8 - 12	51	+/-1.8dB	+4.5dB	14	260mA
LMF446	12 - 18	51	+/-1.8dB	+4.5dB	14	260mA
LMF466	2 - 18	51	+/-1.8dB	+4.5dB	14	260mA
LMF474	6 - 18	51	+/-1.8dB	+4.5dB	14	260mA

COMMON SPECIFICATIONS

Input VSWR <2:1
Output VSWR <2:1

Absolute maximum input power +19dBm

LME Series Gain level varies by 0.015dB/°C per gain stage
Operating temperature range -40°C to +85°C - Temperature compensated devices
Functional temperature range -40°C to +85°C - Performance not guaranteed over temperature

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