

Broadbands GaAs FET Amplifiers

0.5 to 18.0 GHz

MLA 2000-000 Series

V3.00

Features

- Broadband Frequency Ranges
- Low Noise Figures
- Wide Dynamic Ranges
- Temperature Compensation
- Miniature Outlines

Description

The MLA 2000-000 series of broadband GaAs FET Amplifiers from M/A-COM is a comprehensive range of devices for octave and multi-octave applications from 0.5 to 18 GHz. The range includes standard low noise and medium power gain blocks available with or without temperature compensation as well as limiting amplifiers for output power compression. All amplifiers are available in either a standard or optional miniature package style.

The designs are based on a balanced hybrid approach giving excellent gain flatness and VSWR over very wide bandwidths. Construction of the amplifiers is by integration of the FET, HEMT or MMIC devices into either a conventional alumina MIC or glass MIC (GMIC) with the complete amplifier assembly then hermetically sealed by laser welding. GMIC is a proprietary pseudo-monolithic MIC fabrication technique established by M/A-COM photolithographically defined with the discrete FET devices mounted in via holes. The compact, rugged construction of these amplifiers makes them suitable for the most severe environmental conditions encountered in military and hi-reliability applications.

Low noise amplifiers have a wide variety of uses in broadband EW and radar receivers and test equipment applications while medium power units can be used as driver amplifiers for high power TWTA's or as output amplifiers for ECM, decoy and target transmitters. Limiting amplifiers are used where an input signal with wide dynamic range is to be compressed to an output signal with very narrow dynamic range for subsequent signal processing and detection. Advances in solid state technology make these amplifiers suitable as direct replacements for TWTAs in many applications giving improved reliability at lower cost.

As well as the basic amplifiers described M/A-COM also manufactures devices with additional components integrated within the same housing. Available options include input limiters for passive high power protection, integral PIN attenuators for gain/sensitivity control, coupled outputs for successive detection and filters. For details for these options and to discuss other custom requirements please contact the factory for applications assistance.

Specifications Subject to Change Without Notice.

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Description

The series of broadband low noise amplifiers offers non-temperature compensated performance over a variety of octave and multi-octave frequency bands. These amplifiers have a wide range of gain and output power options and are optimised for noise figure and dynamic range.

Low Noise Specifications (Guaranteed @ +25° C)

Frequency Range (GHz)	Output Power at 1dB Gain Comp (dBm) Min.	Gain (dB) Min.	Gain Flatness (dB) Max.	Gain Variation with Temp (dB/°C)	Noise Figure (dB) Max.	Input and Output VSWR Max.	DC Current at +15V (mA)	Package Styles	Part Number
0.5 - 2.0	+12	16	±1.00	0.020	4.0	2.0	65	A1,A3	MLA2130-101
		32	±2.00	0.040	4.0	2.0	130	A1,A3	MLA2130-102
		48	±2.50	0.060	4.0	2.0	200	A1,A3	MLA2130-103
	+20	8	±1.00	0.010	5.0	2.0	150	A1,A3	MLA2130-201
		24	±2.00	0.030	4.0	2.0	200	A1,A3	MLA2130-202
		40	±2.50	0.040	4.0	2.0	270	A1,A3	MLA2130-203
	+23	8	±1.00	0.020	5.0	2.0	150	A1,A3	MLA2130-301
		16	±2.00	0.040	4.0	2.0	280	A1,A3	MLA2130-302
		32	±2.50	0.060	4.0	2.0	350	A1,A3	MLA2130-303
		48	±3.00	0.080	4.0	2.0	420	B1,B3	MLA2130-304
2.0 - 8.0	+10	18	±1.50	0.025	3.5	2.0	130	A1,A3	MLA2140-101
		27	±1.50	0.035	3.5	2.0	200	B1,B3	MLA2140-102
		36	±1.75	0.050	3.5	2.0	270	B1,B3	MLA2140-103
	+18	18	±1.50	0.025	5.0	2.0	180	A1,A3	MLA2140-301
		27	±1.50	0.035	5.0	2.0	280	B1,B3	MLA2140-302
		36	±1.75	0.050	5.0	2.0	350	B1,B3	MLA2140-303
6.0 - 12.0	+10	12	±1.00	0.025	3.8	2.0	100	A1,A2	MLA2150-101
		23	±1.25	0.050	3.8	2.0	200	B1,B2	MLA2150-102
		34	±1.75	0.075	3.8	2.0	300	B1,B2	MLA2150-103
		46	±2.00	0.100	3.8	2.0	400	C1,C2	MLA2150-104
		52	±2.00	0.120	3.8	2.0	450	D1,D2	MLA2150-105
	+18	10	±1.25	0.025	7.0	2.0	175	A1,A2	MLA2150-301
		21	±1.50	0.050	6.0	2.0	275	B1,B2	MLA2150-302
		32	±1.75	0.075	6.0	2.0	400	B1,B2	MLA2150-303
		42	±2.00	0.100	6.0	2.0	500	C1,C2	MLA2150-304
		48	±2.00	0.120	6.0	2.0	550	D1,D2	MLA2150-305

Specifications Subject to Change Without Notice.

Low Noise Specifications (Guaranteed @ +25° C)

Frequency Range (GHz)	Output Power at 1dB Gain Comp (dBm) Min.	Gain (dB) Min.	Gain Flatness (dB) Max.	Gain Variation with Temp (dB/°C)	Noise Figure (dB) Max.	Input and Output VSWR Max.	DC Current at +15V (mA)	Package Styles	Part Number
12.0 - 18.0	+10	11	±1.00	0.025	4.2	2.0	100	A1,A2	MLA2160-101
		22	±1.25	0.050	4.2	2.0	200	B1,B2	MLA2160-102
		33	±1.75	0.075	4.2	2.0	300	B1,B2	MLA2160-103
		44	±2.00	0.100	4.2	2.0	400	C1,C2	MLA2160-104
		50	±2.00	0.120	4.2	2.0	450	D1,D2	MLA2160-105
	+18	9	±1.00	0.025	8.0	2.0	175	A1,A2	MLA2160-301
		20	±1.25	0.050	7.0	2.0	275	B1,B2	MLA2160-302
		30	±1.75	0.075	7.0	2.0	400	B1,B2	MLA2160-303
		40	±2.00	0.100	7.0	2.0	500	C1,C2	MLA2160-304
		46	±2.00	0.120	7.0	2.0	550	D1,D2	MLA2160-305
6.0 - 18.0	+10	11	±1.00	0.025	4.2	2.0	100	A1,A2	MLA2170-101
		22	±1.50	0.050	4.2	2.0	200	B1,B2	MLA2170-102
		33	±1.75	0.075	4.2	2.0	300	B1,B2	MLA2170-103
		44	±2.00	0.100	4.2	2.0	400	C1,C2	MLA2170-104
		50	±2.00	0.120	4.2	2.0	450	D1,D2	MLA2170-105
	+18	9	±1.50	0.025	8.0	2.0	175	A1,A2	MLA2170-301
		20	±1.50	0.050	7.0	2.0	275	B1,B2	MLA2170-302
		30	±1.75	0.075	7.0	2.0	400	B1,B2	MLA2170-303
		40	±2.00	0.100	7.0	2.0	500	C1,C2	MLA2170-304
		46	±2.00	0.120	7.0	2.0	550	D1,D2	MLA2170-305
2.0 - 18.0	+2	10	±1.00	0.018	4.8	2.2	50	A1	MLA2180-101
		20	±1.50	0.036	4.8	2.2	100	A1	MLA2180-102
	+12	20	±2.00	0.072	5.5	2.2	500	B1	MLA2180-202
		30	±2.50	0.090	5.5	2.2	550	B1	MLA2180-203
	+17	15	±1.50	0.036	8.5	2.2	360	A1	MLA2180-302
		20	±2.00	0.054	8.5	2.2	450	A1	MLA2180-303
		30	±2.50	0.072	8.5	2.2	500	B1	MLA2180-304

Notes

1. Maximum input power without damage +20dBm (CW)
2. Third order intercept point is typically 10dB above P1dB
3. All amplifiers have reverse polarity and over voltage power supply protection
4. Alternative +8V and +12V power supplies are available on selected amplifiers, please contact the factory
5. All amplifiers are unconditionally stable for any input or output VSWR, any phase
6. Case operating temperature -55°C to +95°C.
Storage temperature -55°C to +125°C
7. Amplifiers are supplied in standard package styles (A1, B1, C1, D1) unless miniature option (A2, B2, etc) is specified.

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Description

This series of broadband low noise amplifiers has an integral temperature compensation network giving flat gain response over the full military temperature range. These amplifiers operate over a variety of octave and multi-octave frequency bands with a wide range of gain and output power options, performance is optimised for noise figure and dynamic range.

Low Noise Temperature Compensated Specifications (Guaranteed -55° C to +95° C)

Frequency Range (GHz)	Output Power at 1dB Gain Comp (dBm) Min.	Gain (dB) Min.	Gain Flatness (dB) Max.	Gain Variation with Temp (dB) Max.	Noise Figure (dB) Max.	Input and Output VSWR Max.	DC Current at +15V (mA)	Package Styles	Part Number
2.0- 8.0	+10	17	±2.00	±0.75	4.5	2.0	130	A1, A3	MLA2240-101
		25	±2.00	±1.00	4.5	2.0	200	B1, B3	MLA2240-102
		34	±2.25	±1.25	4.5	2.0	270	B1, B3	MLA2240-103
	+18	17	±2.00	±0.75	6.0	2.0	180	A1, A3	MLA2240-301
		25	±2.00	±1.00	6.0	2.0	280	B1, B3	MLA2240-302
		34	±2.25	±1.25	6.0	2.0	350	B1, B3	MLA2240-303
6.0 - 12.0	+10	10	±1.00	±0.75	6.2	2.0	100	A1, A2	MLA2250-101
		19	±1.25	±1.00	5.2	2.0	200	B1, B2	MLA2250-102
		28	±1.75	±1.50	5.2	2.0	300	B1, B2	MLA2250-103
		38	±2.00	±2.00	5.2	2.0	400	C1, C2	MLA2250-104
		44	±2.00	±2.00	5.2	2.0	500	D1, D2	MLA2250-105
	+18	9	±1.25	±0.75	7.5	2.0	175	A1, A2	MLA2250-301
		18	±1.50	±1.00	6.5	2.0	275	B1, B2	MLA2250-302
		27	±1.75	±1.50	6.5	2.0	400	B1, B2	MLA2250-303
		36	±2.00	±2.00	6.5	2.0	500	C1, C2	MLA2250-304
		42	±2.00	±2.00	6.5	2.0	550	D1, D2	MLA2250-305
12.0 - 18.0	+10	9	±1.00	±0.75	6.5	2.0	100	A1, A2	MLA2260-101
		18	±1.25	±1.00	5.5	2.0	200	B1, B2	MLA2260-102
		27	±1.75	±1.50	5.5	2.0	300	B1, B2	MLA2260-103
		36	±2.00	±2.00	5.5	2.0	400	C1, C2	MLA2260-104
		41	±2.00	±2.00	5.5	2.0	500	D1, D2	MLA2260-105
	+18	8	±1.00	±0.75	9.0	2.0	175	A1, A2	MLA2260-301
		17	±1.25	±1.00	8.0	2.0	275	B1, B2	MLA2260-302
		26	±1.75	±1.50	7.0	2.0	400	B1, B2	MLA2260-303
		34	±2.00	±2.00	7.0	2.0	500	C1, C2	MLA2260-304
		39	±2.00	±2.00	7.0	2.0	550	D1, D2	MLA2260-305
6.0 - 18.0	+10	9	±1.00	±0.75	6.5	2.0	100	A1, A2	MLA2270-101
		18	±1.50	±1.00	5.5	2.0	200	B1, B2	MLA2270-102
		27	±1.75	±1.50	5.5	2.0	300	B1, B2	MLA2270-103
		36	±2.00	±2.00	5.5	2.0	400	C1, C2	MLA2270-104
		41	±2.00	±2.00	5.5	2.0	500	D1, D2	MLA2270-105
	+18	8	±1.50	±0.75	9.0	2.0	175	A1, A2	MLA2270-301
		17	±1.50	±1.00	8.0	2.0	275	B1, B2	MLA2270-302
		26	±1.75	±1.50	7.0	2.0	400	B1, B2	MLA2270-303
		34	±2.00	±2.00	7.0	2.0	500	C1, C2	MLA2270-304
		39	±2.00	±2.00	7.0	2.0	550	D1, D2	MLA2270-305

Notes

- Maximum input power without damage +20dBm (CW)
- Third order intercept point is typically 10dB above P1dB
- All amplifiers have reverse polarity and over voltage power supply protection
- Alternative +8V and +12V power supplies are available on selected amplifiers, please contact the factory
- All amplifiers are unconditionally stable for any input or output VSWR, any phase
- Case operating temperature -55°C to +95°C. Storage temperature -55°C to +125°C
- Amplifiers are supplied in standard package styles (A1, B1, C1, D1) unless miniature option (A2, B2, etc) is specified.

Specifications Subject to Change Without Notice.

Description

This series of broadband medium power amplifiers offers non-temperature compensated performance over a variety of octave and multi-octave frequency bands. These amplifiers have a wide range of gain and output power options and are optimised for output power and flatness.

Medium Power Specifications (Guaranteed @ +25° C)

Frequency Range (GHz)	Output Power at 1dB Gain Comp (dBm) Min.	Gain (dB) Min.	Gain Flatness (dB) Max.	Gain Variation with Temp (dB/°C)	Noise Figure (dB) Max.	Input and Output VSWR Max.	DC Current at +15V (mA)	Package Styles	Part Number
2.0 - 8.0	+21	17	±2.00	0.025	7.5	2.0	300	A1,A3	MLA2140-401
		26	±2.00	0.035	6.0	2.0	400	B1,B3	MLA2140-402
		35	±2.00	0.050	6.0	2.0	480	B1,B3	MLA2140-403
	+26	15	±2.00	0.025	8.0	2.0	350	A1,A3	MLA2140-501
		24	±2.00	0.035	7.0	2.0	450	B1,B3	MLA2140-502
		33	±2.00	0.050	6.0	2.0	550	B1,B3	MLA2140-503
6.0 - 12.0	+21	10	±1.00	0.025	9.0	2.0	200	A1,A2	MLA2150-401
		21	±1.25	0.050	8.0	2.0	300	B1,B2	MLA2150-402
		31	±1.50	0.075	8.0	2.0	450	B1,B2	MLA2150-403
		42	±1.75	0.100	8.0	2.0	600	C1,C2	MLA2150-404
12.0 - 18.0	+21	9	±1.00	0.025	10.0	2.0	200	A1,A2	MLA2160-401
		20	±1.25	0.050	9.0	2.0	300	B1,B2	MLA2160-402
		30	±1.50	0.075	9.0	2.0	450	B1,B2	MLA2160-403
		40	±1.75	0.100	9.0	2.0	600	C1,C2	MLA2160-404
6.0 - 18.0	+21	9	±1.25	0.025	10.0	2.0	200	A1,A2	MLA2170-401
		20	±1.50	0.050	9.0	2.0	300	B1,B2	MLA2170-402
		30	±1.75	0.075	9.0	2.0	450	B1,B2	MLA2170-403
		40	±2.00	0.100	9.0	2.0	600	C1,C2	MLA2170-404

Notes

- Higher output power of up to +30 dBm are available in non-standard outlines, please contact the factory
- Maximum input power without damage +20dBm (CW)
- Third order intercept point is typically 10dB above P1dB
- All amplifiers have reverse polarity and over voltage power supply protection
- Alternative +8V and +12V power supplies are available on selected amplifiers, please contact the factory
- All amplifiers are unconditionally stable for any input or output VSWR, any phase
- Case operating temperature -55°C to +95°C. Storage temperature -55°C to +125°C
- Amplifiers are supplied in standard package styles (A1, B1, C1, D1) unless miniature option (A2, B2, etc) is specified.

Specifications Subject to Change Without Notice.

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Description

This series of broadband medium power amplifiers has an integral temperature compensation network giving flat gain response over the full military temperature range. These amplifiers operate over a variety of octave and multi-octave frequency bands with a wide range of gain and output power options, performance is optimised for output power and flatness.

Medium Power, Temperature Compensated Specifications (Guaranteed -55° C to +95° C)

Frequency Range (GHz)	Output Power at 1dB Gain Comp (dBm) Min.	Gain (dB) Min.	Gain Flatness (dB) Max.	Gain Variation with Temp (dB) Max.	Noise Figure (dB) Max.	Input and Output VSWR Max.	DC Current at +15V (mA)	Package Styles	Part Number
2.0 - 8.0	+21	16	±2.00	±0.75	8.0	2.0	300	A1,A3	MLA2240-401
		24	±2.00	±1.00	7.0	2.0	400	B1,B3	MLA2240-402
		33	±2.00	±1.25	7.0	2.0	480	B1,B3	MLA2240-403
	+26	14	±2.00	±0.75	9.0	2.0	350	A1,A3	MLA2240-501
		22	±2.00	±1.00	8.0	2.0	450	B1,B3	MLA2240-502
		31	±2.00	±1.25	7.0	2.0	550	B1,B3	MLA2240-503
6.0 - 12.0	+21	9	±1.00	±0.75	10.0	2.0	200	A1,A2	MLA2250-401
		20	±1.25	±1.00	9.0	2.0	300	B1,B2	MLA2250-402
		29	±1.50	±1.50	9.0	2.0	450	C1,C2	MLA2250-403
		40	±1.75	±2.00	9.0	2.0	600	D1,D2	MLA2250-404
12.0 - 18.0	+21	8	±1.00	±0.75	12.0	2.0	200	A1,A2	MLA2260-401
		18	±1.25	±1.00	10.0	2.0	300	B1,B2	MLA2260-402
		27	±1.50	±1.25	10.0	2.0	450	C1,C2	MLA2260-403
		36	±1.75	±2.00	10.0	2.0	600	D1,D2	MLA2260-404
6.0 - 18.0	+21	8	±1.25	±0.75	12.0	2.0	200	A1,A2	MLA2270-401
		18	±1.50	±1.00	10.0	2.0	300	B1,B2	MLA2270-402
		27	±1.75	±1.50	10.0	2.0	450	C1,C2	MLA2270-403
		36	±2.00	±2.00	10.0	2.0	600	D1,D2	MLA2270-404

Notes

- Higher output power of up to +30/dBm are available in non-standard outlines, please contact the factory
- Maximum input power without damage +20dBm (CW)
- Third order intercept point is typically 10dB above P1dB
- All amplifiers have reverse polarity and over voltage power supply protection
- Alternative +8V and +12V power supplies are available on selected amplifiers, please contact the factory
- All amplifiers are unconditionally stable for any input or output VSWR, any phase
- Case operating temperature -55°C to +95°C.
Storage temperature -55°C to +125°C
- Amplifiers are supplied in standard package styles (A1, B1, C1, D1) unless miniature option (A2, B2, etc) is specified.

Specifications Subject to Change Without Notice.

Description

The series of broadband low noise amplifiers offers temperature compensated performance over a wide variety of octave and multi-octave frequency bands. These amplifiers have a wide range of input and output power options and are optimised for output power flatness and harmonic distortion.

Limiting Specifications (Guaranteed -55° C to +95° C)

Frequency Range (GHz)	Saturated Output Power (dBm)		Saturated Power Flatness (dB) Max.	Input Power for Saturation (dBm)		Noise Figure (dB) Max.	Input and Output VSWR Max.	DC Current at +15V (mA)	Package Styles	Part Number
	Min.	Max.		Min.	Max.					
2.0 - 8.0	+14	+17	±1.0	-10	5.0	2.0	250	B1,B3		MLA2340-101
				-20	5.0	2.0	300	B1,B3		MLA2340-102
				-30	5.0	2.0	350	C1,C3		MLA2340-103
	+17	+20	±1.0	-10	5.0	2.0	300	B1,B3		MLA2340-201
				-20	5.0	2.0	350	B1,B3		MLA2340-202
				-30	5.0	2.0	400	C1,C3		MLA2340-203
	+20	+23	±1.0	-10	5.0	2.0	350	B1,B3		MLA2340-301
				-20	5.0	2.0	400	B1,B3		MLA2340-302
				-30	5.0	2.0	450	C1,C3		MLA2340-303
6.0 - 12.0	+14	+17	±1.0	-10	6.0	2.0	300	C1,C2		MLA2350-101
				-20	6.0	2.0	350	C1,C2		MLA2350-102
				-30	6.0	2.0	400	D1,D2		MLA2350-103
	+17	+20	±1.0	-10	6.0	2.0	350	C1,C2		MLA2350-201
				-20	6.0	2.0	400	D1,D2		MLA2350-202
				-30	6.0	2.0	450	D1,D2		MLA2350-203
	+20	+23	±1.0	-10	6.0	2.0	500	C1,C2		MLA2350-301
				-20	6.0	2.0	550	D1,D2		MLA2350-302
				-30	6.0	2.0	600	D1,D2		MLA2350-303

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Specifications (Guaranteed -55° C to +95° C) cont'd

Frequency Range (GHz)	Saturated Output Power (dBm)		Saturated Power Flatness (dB) Max.	Input Power for Saturation (dBm)		Noise Figure (dB) Max.	Input and Output VSWR Max.	DC Current at +15V (mA)	Package Styles	Part Number
	Min.	Max.		Min.	Max.					
12.0 - 18.0	+14	+17	±1.0	-10	8.0	2.0	350	C1,C2		MLA2360-101
				-20	8.0	2.0	400	C1,C2		MLA2360-102
				-30	8.0	2.0	450	D1,D2		MLA2360-103
	+17	+20	±1.0	-10	8.0	2.0	400	C1,C2		MLA2360-201
				-20	8.0	2.0	450	D1,D2		MLA2360-202
				-30	8.0	2.0	500	D1,D2		MLA2360-203
	+20	+23	±1.0	-10	8.0	2.0	550	C1,C2		MLA2360-301
				-20	8.0	2.0	600	D1,D2		MLA2360-302
				-30	8.0	2.0	650	D1,D2		MLA2360-303
6.0 - 18.0	+14	+17	±1.0	-10	8.0	2.0	350	C1,C2		MLA2370-101
				-20	8.0	2.0	400	C1,C2		MLA2370-102
				-30	8.0	2.0	450	D1,D2		MLA2370-103
	+17	+20	±1.0	-10	8.0	2.0	400	C1,C2		MLA2370-201
				-20	8.0	2.0	450	D1,D2		MLA2370-202
				-30	8.0	2.0	500	D1,D2		MLA2370-203
	+20	+23	±1.0	-10	8.0	2.0	550	C1,C2		MLA2370-301
				-20	8.0	2.0	600	D1,D2		MLA2370-302
				-30	8.0	2.0	650	D1,D2		MLA2370-303

Notes

1. Amplifiers saturating from lower input powers are available in non-standard outlines, please contact the factory
2. Power output for 1dB gain compression is typically 4dB below saturated output power.
3. Maximum input power without damage +20dBm (CW)
4. Harmonic outputs are typically -12dBc
5. All amplifiers have reverse polarity and over voltage power supply protection
6. Alternative +8V and +12V power supplies are available on selected amplifiers, please contact the factory
7. All amplifiers are unconditionally stable for any input or output VSWR, any phase
8. Case operating temperature -55°C to +95°C.
Storage temperature -55°C to +125°C
9. Amplifiers are supplied in standard package styles (A1, B1, C1, D1) unless miniature option (A2, B2, etc) is specified.

Specifications Subject to Change Without Notice.

Notes

- 1) Other frequency bands are available, please contact the factory with your requirements.
- 2) Higher output powers for each frequency band are available in non-standard outlines, please contact the factory.
- 3) Maximum input power without damage is +20dBm (CW), higher power handling is available with an optional input limiter, please contact the factory.
- 4) Third order intercept point is typically 10dB above P1dB.
- 5) All amplifiers have an integral voltage regulator giving reverse polarity and over voltage power supply protection.
- 6) Alternative +8V and +12V power supplies are available on selected amplifiers, please contact the factory.
- 7) All amplifiers are unconditionally stable for any input or output VSWR, any phase.
- 8) All amplifiers are supplied in the standard coaxial outline (A1, B1, C1) unless the optional miniature outline (A2, A3, B2, B3, C2) is specified.
- 9) Waveguide inputs are available on selected amplifiers, please contact the factory.
- 10) Case operating temperature -55°C to +95°C
Storage temperature range -55°C to +125°C.

Specifications Subject to Change Without Notice.

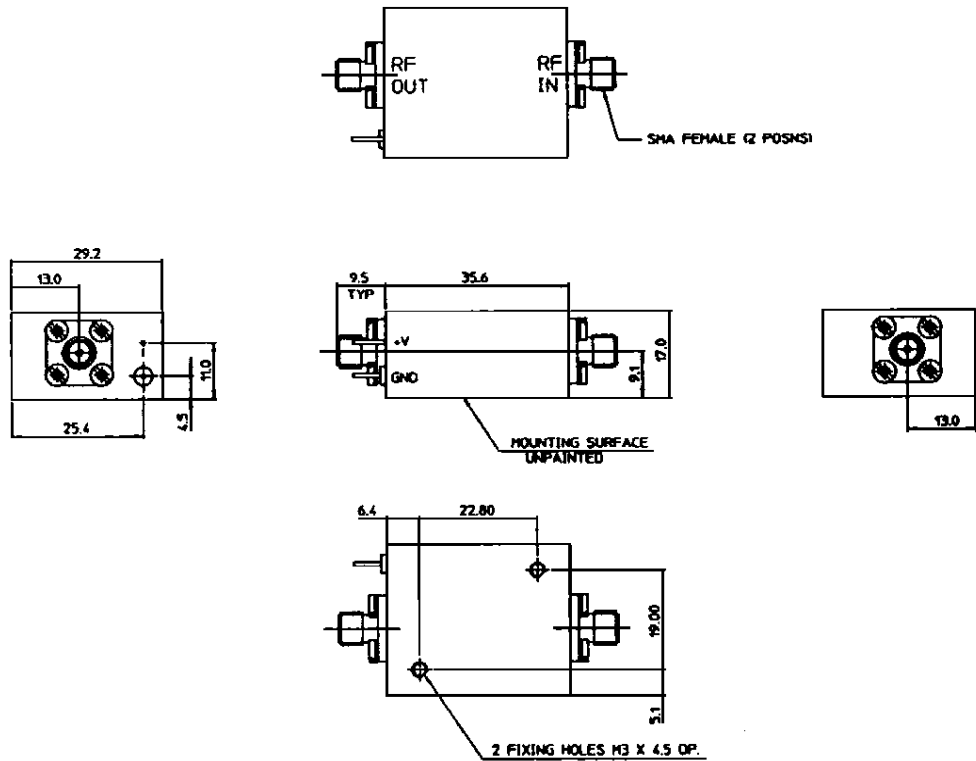
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Package Style A1



Package Style B1

