EMC Amplifiers

DATA SHEET / 4T-101-EMC

MODELS:
MPA-0G6-6G-100
MPA-0G6-6G-200
MPA-0G6-6G-500
MPA-2G-18G-50
MPA-6G-18G-50
MPA-6G-18G-100
MPA-6G-18G-250
MPA-18G-26G5-100
MPA-18G-40G-20
MPA-18G-40G-40
MPA-26G5-40G-100

Maury Microwave

// May 2024

Not all amplifiers are created equal, so how can you be certain that an amplifier will work for your needs? You deserve to be confident that the amplifiers used in your EMC immunity testing not only meet the requirements of industry standards but offer high reliability and comprehensive support both pre- and post-sale. When it comes to application expertise, reliability, and support, there is no company that does it better than Maury Microwave.

Why Maury Microwave EMC amplifiers?

Maury Microwave has more than 60 years of experience in designing, manufacturing, and supporting turnkey measurements solutions. Our expertise includes base station and handset, radar, Wi-Fi, and FEM testing. EMC testing is a natural fit.

EMC is now venturing into higher frequencies beyond 6 GHz, integrating modulation testing into its standards. The overlap between typical semiconductor and FEM testing techniques with EMC (Figure 1) is getting closer and closer.

The power amplifier, used to generate the high field strength for radiated immunity testing, is starting to become a key element in simplifying the bench, especially as bandwidth and linearity requirements emerge as significant performance factors.

The Maury Microwave EMC line uses the experience of the semiconductor industry to offer outstanding wideband ranges and linearity required for modern EMC testing.

Maury Microwave EMC amplifiers will support the development of 5G products, automotive and ordinary equipments, or military equipment to be compliant with international standards: IEC, CISPR, ISO, IEEE, CENELEC, ETSI, FCC, ANSI, RTCA and the MIL-STDs.

All the units will support full CW, Pulsed, AM, PM, FM or complex modulation such as OFDM. The user friendly remote control features, integrated couplers and power detection make these amplifiers suitable to be placed closed to the radiating object minimizing cable insertion loss.

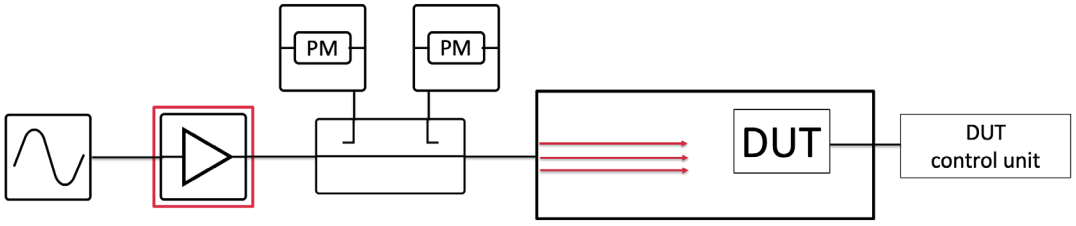
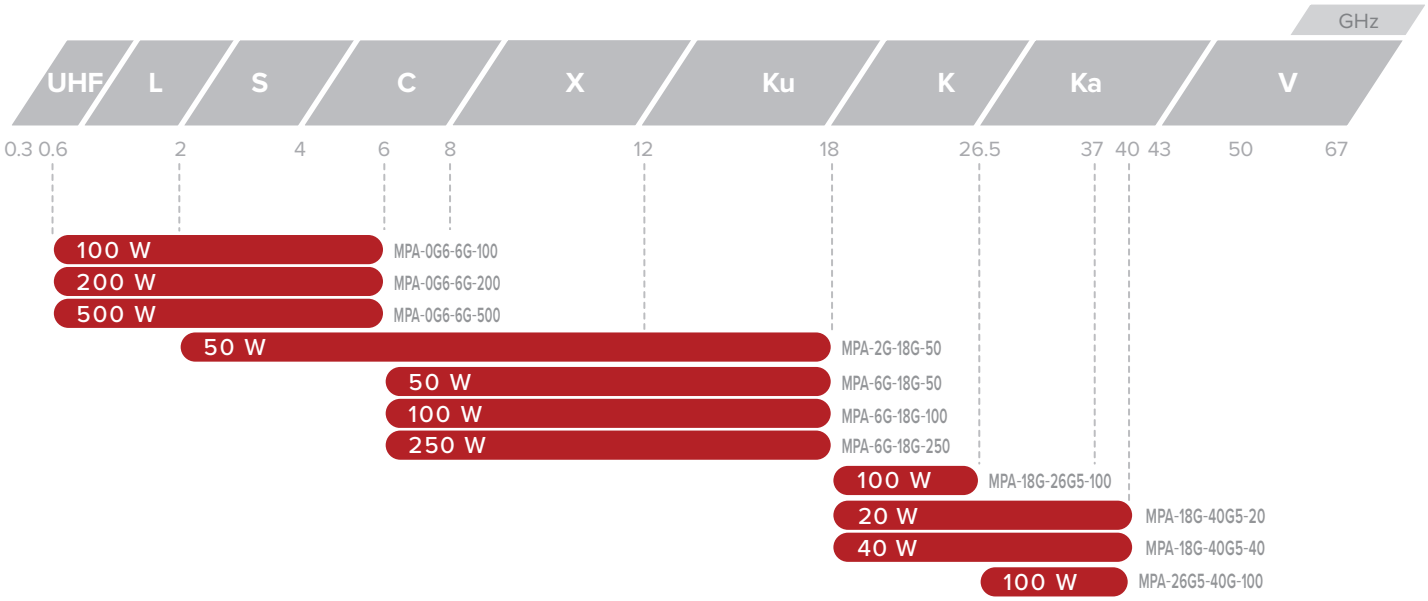


Figure 1 - Typical block diagram of an immunity EMC test setup

Amplifier Frequency Map

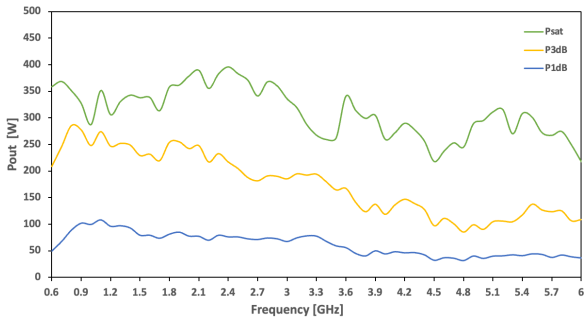


Available Models

Model Series	Frequency (GHz)	Typical Psat (W)	Min. Psat (W)	Min. Small Signal Gain (dB)	Gain Adj. (dB) Max.	Typ. 2nd Harmonic Power @ Psat (dBc)	Page Reference
MPA-0G6-6G-100	0.6-6	100	100	50	20	-15	3
MPA-0G6-6G-200	0.6-6	200	200	50	20	-15	7
MPA-0G6-6G-500	0.6-6	500	500	50	20	-15	8
MPA-2G-18G-50	2-18	50	50	49	20	-15	6
MPA-6G-18G-50	6-18	50	50	50	20	-15	7
MPA-6G-18G-100	6-18	100	100	52	20	-15	20
MPA-6G-18G-250	6-18	250	250	53	20	-15	21
MPA-18G-26G5-100	18-26.5	100	100	51	15	-15	26
MPA-18G-40G-20	18-40	20	20	43	15	-15	28
MPA-18G-40G-40	18-40	40	40	46	15	-15	29
MPA-26G5-40G-100	26.5-40	100	100	50	15	NA	31

MPA-0G6-6G-100

0.6-6 GHz, 100W



Default Options:

- Remote Control TCPIP and RS485
- Protective circuits: Temperature, input power, module

Optional:

> MPA-COUP	Integrated coupler for forward and reflected power detection
> MPA-INPUT-REAR	RF Input port on the rear
> MPA-OUTPUT-REAR	RF Output port on the rear
> MPA-SAMPLING	RF Forward sampling port

Specifications

Frequency Range: .....0.6-6 GHz
Psat: .....Typical 100 W, Minimum 100 W
Input Power:.....Maximum 0 dBm
Small Signal Gain: .....Minimum 50 dB
Gain Flatness:.....Typical ±4 dB
Gain Adjustment:.....20 dB
VSWR (Input):.....Maximum 2:1
2nd Harmonic Power @ Psat: ....Typical -15 dBc
Spur @ Psat:.....Typical -65 dBc
IM3* @ 13 dB back off: .....Typical -39 dBc
IM3* @ 3 dB back off:.....Typical -25 dBc
Unconditionally Stable
VSWR Load @Psat: .....3:1†
ECCN:.....3A001.b4.a4
Warranty:.....24 months

** 10 MHz Tone spacing*
†Infinite protection with Option MPA-COUP

Mechanical Specifications

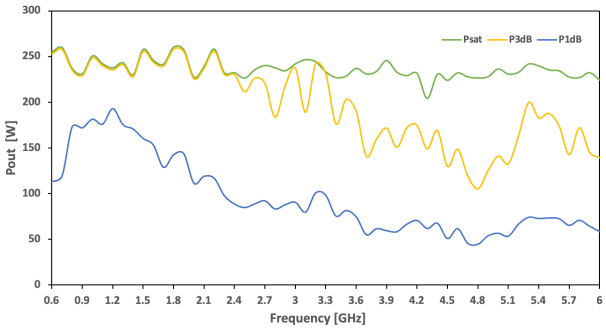
Enclosure Type:.....C
Weight: .....84 lbs
RF Input/Output: .....Type N Female

Environmental Specifications

Operating Temp.:.....0°C to 50°C
Storage Temp.:.....-25°C to 65°C

MPA-0G6-6G-200

0.6-6 GHz, 200W



Default Options:

- Remote Control TCPIP and RS485
- Protective circuits: Temperature, input power, module

Optional:

> MPA-COUP	Integrated coupler for forward and reflected power detection
> MPA-INPUT-REAR	RF Input port on the rear
> MPA-OUTPUT-REAR	RF Output port on the rear
> MPA-SAMPLING	RF Forward sampling port

Specifications

Frequency Range: .....0.6-6 GHz
Psat: .....Minimum 200 W
Input Power:.....Maximum 0 dBm
Small Signal Gain: .....Minimum 50 dB
Gain Flatness:.....Typical ±4 dB
Gain Adjustment:.....20 dB
VSWR (Input):.....Maximum 2:1
2nd Harmonic Power @ Psat: ....Typical -15 dBc
Spur @ Psat:.....Typical -65 dBc
Unconditionally Stable
VSWR Load @Psat: .....3:1†
ECCN:.....3A001.b4.a4
Warranty:.....24 months

** 10 MHz Tone spacing*
†Infinite protection with Option MPA-COUP

Mechanical Specifications

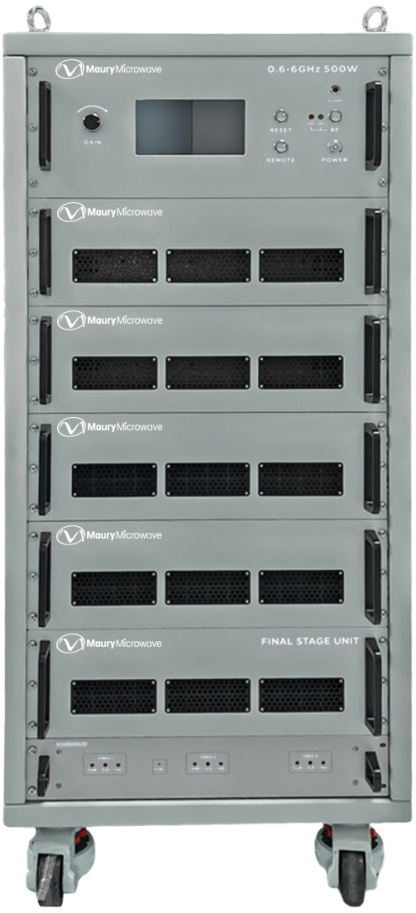
Enclosure Type:.....C
Weight: .....84 lbs
RF Input/Output: .....Type N Female

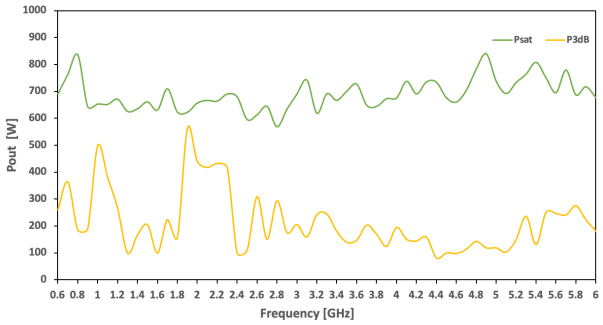
Environmental Specifications

Operating Temp.:.....0°C to 50°C
Storage Temp.:.....-25°C to 65°C

MPA-0G6-6G-500

0.6-6 GHz, 500W





Default Options:

- Remote Control TCPIP and RS485
- Protective circuits: Temperature, input power, module

Optional:

> MPA-COUP	Integrated coupler for forward and reflected power detection
> MPA-INPUT-REAR	RF Input port on the rear
> MPA-OUTPUT-REAR	RF Output port on the rear
> MPA-SAMPLING	RF Forward sampling port
> MPA-LIQCOOL	Liquid Cooling

Specifications

Frequency Range: .....0.6-6 GHz
Psat: .....Minimum 500 W
Input Power:.....Maximum 0 dBm
Small Signal Gain: .....Minimum 50 dB
Gain Flatness:.....Typical ±4 dB
Gain Adjustment:.....20 dB
VSWR (Input):.....Maximum 2:1
2nd Harmonic Power @ Psat: ....Typical -15 dBc
Spur @ Psat:.....Typical -65 dBc
Unconditionally Stable
VSWR Load @Psat: .....3:1†
ECCN: 3A001.b4.a4
Warranty:.....24 months

** 10 MHz Tone spacing*
†Infinite protection with Option MPA-COUP

Mechanical Specifications

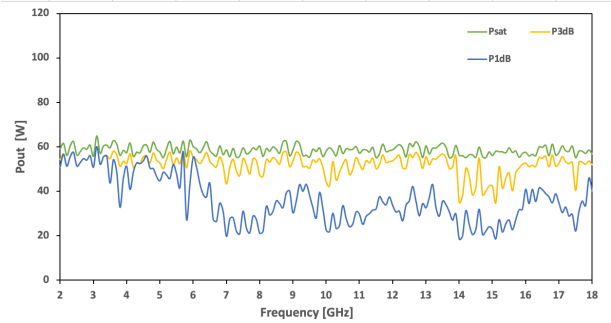
Enclosure Type:.....E
Weight: .....500 lbs
RF Input:.....Type N Female
RF Output: 7/16

Environmental Specifications

Operating Temp.:.....0°C to 50°C
Storage Temp.:.....-25°C to 65°C
Voltage.....3 phase 208 V
Current.....27 A

MPA-2G-18G-50

2-18 GHz, 50W



Default Options:

- Remote Control TCPIP and RS485
- Protective circuits: Temperature, input power, module

Optional:

- MPA-COUP — Integrated coupler for forward and reflected power detection
- MPA-INPUT-REAR — RF Input port on the rear
- MPA-OUTPUT-REAR — RF Output port on the rear
- MPA-SAMPLING — RF Forward sampling port

Specifications

Frequency Range: .....2-18 GHz
Psat: .....Typical 50 W, Minimum 50 W
Input Power:.....Maximum 0 dBm
Small Signal Gain: .....Minimum 49 dB
Gain Flatness:.....Typical ±4 dB
Gain Adjustment:.....20 dB
VSWR (Input):.....Maximum 2.1:1
2nd Harmonic Power @ Psat: ....Typical -15 dBc
Spur @ Psat:.....Typical -65 dBc
IM3* @ 13 dB back off: .....Typical -38 dBc
IM3* @ 3 dB back off:.....Typical -20 dBc
Unconditionally Stable
VSWR Load @Psat: .....3:1†
ECCN:.....3A001.b4
Warranty:.....24 months

** 10 MHz Tone spacing*
†Infinite protection with Option MPA-COUP

Mechanical Specifications

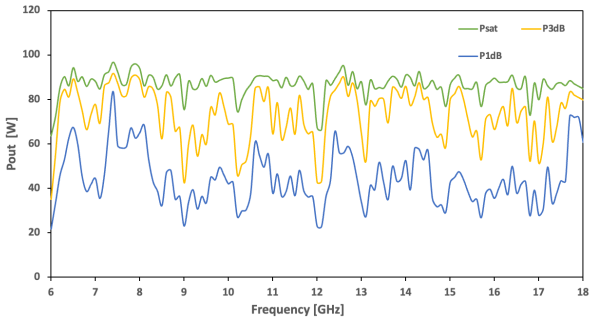
Enclosure Type:.....A
Weight: .....48 lbs
RF Input/Output: .....Type N Female

Environmental Specifications

Operating Temp.:.....0°C to 50°C
Storage Temp.:.....-25°C to 65°C

MPA-6G-18G-50

6-18 GHz, 50W



Default Options:

- Remote Control TCPIP and RS485
- Protective circuits: Temperature, input power, module

Optional:

- MPA-COUP — Integrated coupler for forward and reflected power detection
- MPA-INPUT-REAR — RF Input port on the rear
- MPA-OUTPUT-REAR — RF Output port on the rear
- MPA-SAMPLING — RF Forward sampling port

Specifications

Frequency Range: .....6-18 GHz
Psat: .....Minimum 50 W
Input Power:.....Maximum 3 dBm
Small Signal Gain: .....Minimum 50 dB
Gain Flatness:.....Typical ±3 dB
Gain Adjustment:.....20 dB
VSWR (Input):.....Maximum 2:1
2nd Harmonic Power @ Psat: ....Typical -15 dBc
Spur @ Psat:.....Typical -65 dBc
IM3* @ 13 dB back off: .....Typical -37 dBc
IM3* @ 3 dB back off:.....Typical -20 dBc
Unconditionally Stable
VSWR Load @Psat: .....3:1†
ECCN:.....3A001.b4
Warranty:.....24 months

** 10 MHz Tone spacing*
†Infinite protection with Option MPA-COUP

Mechanical Specifications

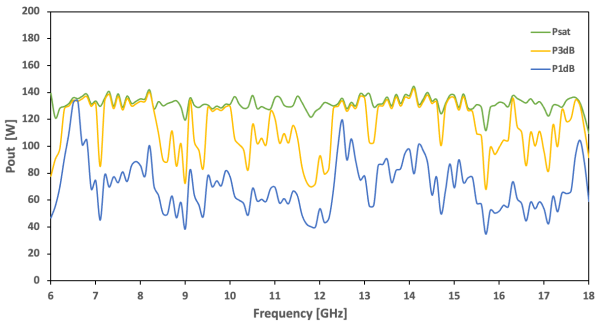
Enclosure Type:.....A
Weight: .....42.3 lbs
RF Input/Output: .....Type N Female

Environmental Specifications

Operating Temp.:.....0°C to 50°C
Storage Temp.:.....-25°C to 65°C

MPA-6G-18G-100

6-18 GHz, 100W



Default Options:

- Remote Control TCPIP and RS485
- Protective circuits: Temperature, input power, module

Optional:

MPA-COUP	Integrated coupler for forward and reflected power detection
MPA-INPUT-REAR	RF Input port on the rear
MPA-OUTPUT-REAR	RF Output port on the rear
MPA-SAMPLING	RF Forward sampling port

Specifications

Frequency Range: .....6-18 GHz
Psat: .....Typical 100 W, Minimum 100 W
Input Power:.....Maximum 0 dBm
Small Signal Gain: .....Minimum 52 dB
Gain Flatness:.....Typical ±4 dB
Gain Adjustment:.....20 dB
VSWR (Input):.....Maximum 2:1
2nd Harmonic Power @ Psat: ....Typical -15 dBc
Spur @ Psat:.....Typical -65 dBc
IM3* @ 3 dB back off:.....Typical -20 dBc
Unconditionally Stable
VSWR Load @Psat: .....3:1†
ECCN:.....3A001
Warranty:.....24 months

** 10 MHz Tone spacing*
†Infinite protection with Option MPA-COUP

Mechanical Specifications

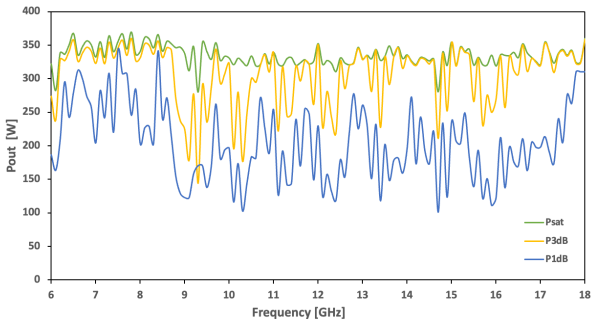
Enclosure Type:.....C
Weight: .....60 lbs
RF Input/Output: .....Type N Female

Environmental Specifications

Operating Temp.:.....0°C to 50°C
Storage Temp.:.....-25°C to 65°C

MPA-6G-18G-250

6-18 GHz, 250W



Default Options:

- Remote Control TCPIP and RS485
- Protective circuits: Temperature, input power, module

Optional:

- MPA-COUP — Integrated coupler for forward and reflected power detection
- MPA-INPUT-REAR — RF Input port on the rear
- MPA-OUTPUT-REAR — RF Output port on the rear
- MPA-SAMPLING — RF Forward sampling port

Specifications

Frequency Range: .....6-18 GHz
Psat: .....Typical 250 W, Minimum 250 W
Input Power:.....Maximum 0 dBm
Small Signal Gain: .....Minimum 56 dB
Gain Flatness:.....Typical ±5 dB
Gain Adjustment:.....20 dB
VSWR (Input):.....Maximum 2:1
2nd Harmonic Power @ Psat: ....Typical -15 dBc
Spur @ Psat:.....Typical -65 dBc
IM3* @ 3 dB back off:.....Typical 18 dBc
Unconditionally Stable
VSWR Load @Psat: .....3:1†
ECCN:.....3A001
Warranty:.....24 months

** 10 MHz Tone spacing*
†Infinite protection with Option MPA-COUP

Mechanical Specifications

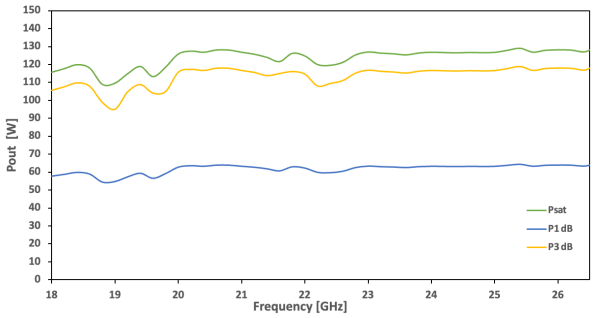
Enclosure Type:.....D
Weight: .....143 lbs
RF Input/Output: .....Type N Female to WRD650

Environmental Specifications

Operating Temp.:.....0°C to 50°C
Storage Temp.:.....-25°C to 65°C

MPA-18G-26G5-100

18-26.5 GHz, 100W



Default Options:

- Remote Control TCPIP and RS485
- Protective circuits: Temperature, input power, module

Optional:

MPA-COUP	Integrated coupler for forward and reflected power detection
MPA-INPUT-REAR	RF Input port on the rear
MPA-OUTPUT-REAR	RF Output port on the rear
MPA-SAMPLING	RF Forward sampling port

Specifications

Frequency Range: .....18-26.5 GHz
Psat: .....Typical 100 W, Minimum 100 W
Input Power:.....Maximum 0 dBm
Small Signal Gain: .....Minimum 51 dB
Gain Flatness:.....Typical ±5 dB
Gain Adjustment:.....15 dB
VSWR (Input):.....Maximum 2:1
Spur @ Psat:.....Typical -65 dBc
Unconditionally Stable
VSWR Load @Psat: .....3:1†
ECCN:.....3A001
Warranty:.....24 months

†Infinite protection with Option MPA-COUP

Mechanical Specifications

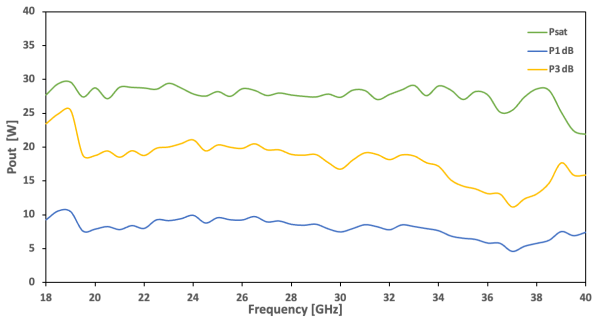
Enclosure Type:.....C
Weight: .....60 lbs
RF Input:.....2.92mm Female
RF Output: WR42

Environmental Specifications

Operating Temp.:.....0°C to 50°C
Storage Temp.:.....-25°C to 65°C

MPA-18G-40G-20

18-40 GHz, 20W



Default Options:

- Remote Control TCPIP and RS485
- Protective circuits: Temperature, input power, module

Optional:

- MPA-COUP — Integrated coupler for forward and reflected power detection
- MPA-INPUT-REAR — RF Input port on the rear
- MPA-OUTPUT-REAR — RF Output port on the rear
- MPA-SAMPLING — RF Forward sampling port

Specifications

Frequency Range: .....18-40 GHz
Psat: .....Minimum 20 W
Input Power:.....Maximum 0 dBm
Small Signal Gain: .....Minimum 43 dB
Gain Flatness:.....Typical ±5 dB
Gain Adjustment:.....15 dB
VSWR (Input):.....Maximum 2:1
Spur @ Psat:.....Typical -65 dBc
Unconditionally Stable
VSWR Load @Psat: .....3:1†
ECCN: 3A001.b4
Warranty:.....24 months

†Infinite protection with Option MPA-COUP

Mechanical Specifications

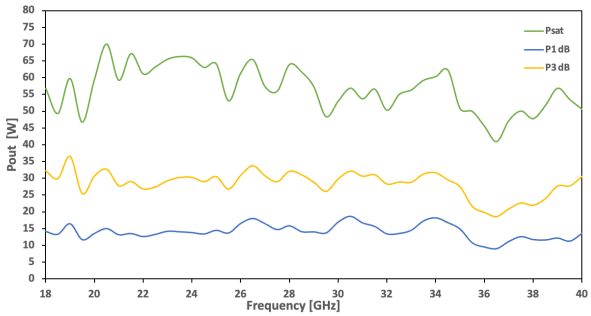
Enclosure Type:.....A
Weight: .....44 lbs
RF Input/Output: .....2.92mm Female/ WRD180C24

Environmental Specifications

Operating Temp.:.....0°C to 50°C
Storage Temp.:.....-25°C to 65°C

MPA-18G-40G-40

18-40 GHz, 40W



Default Options:

- Remote Control TCPIP and RS485
- Protective circuits: Temperature, input power, module

Optional:

- MPA-COUP — Integrated coupler for forward and reflected power detection
- MPA-INPUT-REAR — RF Input port on the rear
- MPA-OUTPUT-REAR — RF Output port on the rear
- MPA-SAMPLING — RF Forward sampling port

Specifications

Frequency Range: .....18-40 GHz
Psat: .....Minimum 40 W
Input Power:.....Maximum 0 dBm
Small Signal Gain: .....Minimum 46 dB
Gain Flatness:.....Typical ±5 dB
Gain Adjustment:.....15 dB
VSWR (Input):.....Maximum 2:1
Spur @ Psat:.....Typical -65 dBc
Unconditionally Stable
VSWR Load @Psat: .....3:1†
ECCN: 3A001.b4
Warranty:.....24 months

†Infinite protection with Option MPA-COUP

Mechanical Specifications

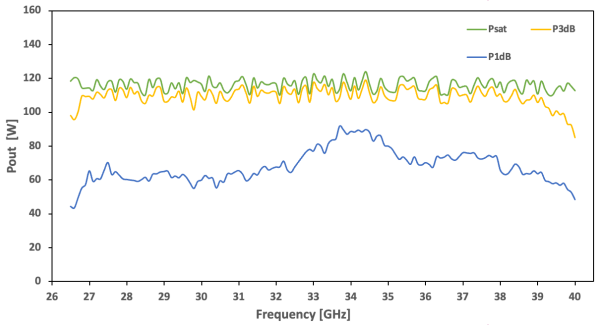
Enclosure Type:.....C
Weight: .....50 lbs
RF Input/Output: .....2.92mm Female/ WRD180C24

Environmental Specifications

Operating Temp.:.....0°C to 50°C
Storage Temp.:.....-25°C to 65°C

MPA-26G5-40G-100

26.5-40 GHz, 100W



Default Options:

- Remote Control TCPIP and RS485
- Protective circuits: Temperature, input power, module

Optional:

- MPA-COUP — Integrated coupler for forward and reflected power detection
- MPA-INPUT-REAR — RF Input port on the rear
- MPA-OUTPUT-REAR — RF Output port on the rear
- MPA-SAMPLING — RF Forward sampling port

Specifications

Frequency Range: .....26.5-40 GHz
Psat: .....Typical 100 W, Minimum 100 W
Input Power:.....Maximum 5 dBm
Small Signal Gain: .....Minimum 50 dB
Gain Flatness:.....Typical ±5 dB
Gain Adjustment:.....15 dB
VSWR (Input):.....Maximum 2:1
Spur @ Psat:.....Typical -65 dBc
Unconditionally Stable
VSWR Load @Psat: .....3:1†
ECCN:.....3A001.b4
Warranty:.....24 months

†*Infinite protection with Option MPA-COUP*

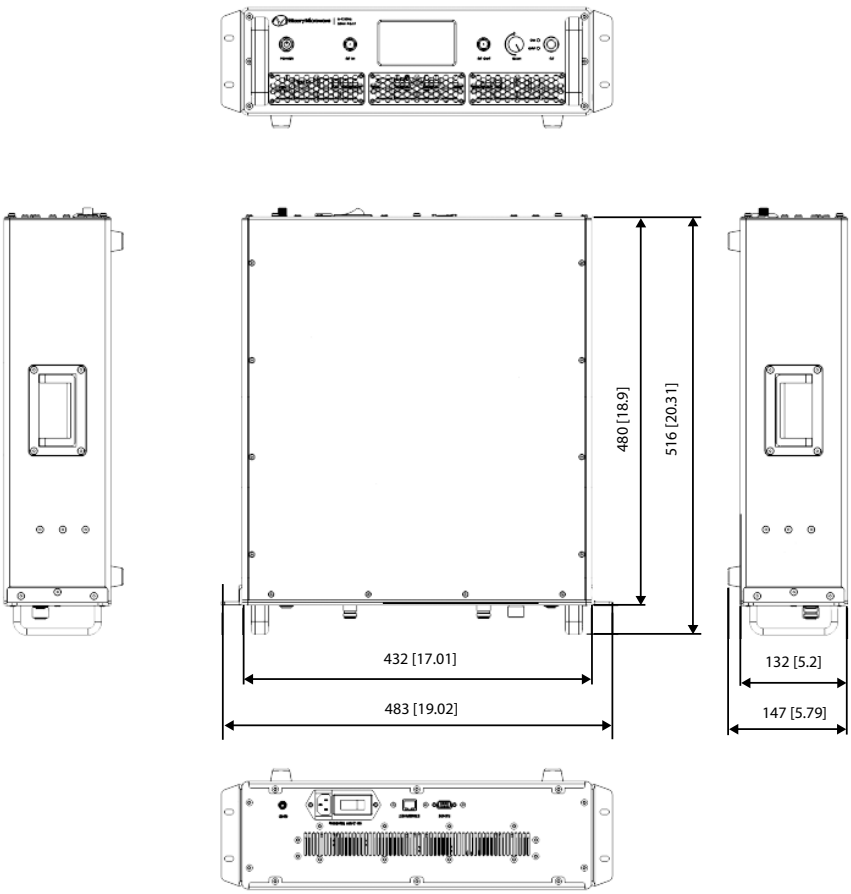
Mechanical Specifications

Enclosure Type:.....Contact Maury
Weight: .....111 lbs
RF Input:.....2.92mm Female
RF Output: .....WR28 flange

Environmental Specifications

Operating Temp.:.....0°C to 50°C
Storage Temp.:.....-25°C to 65°C

A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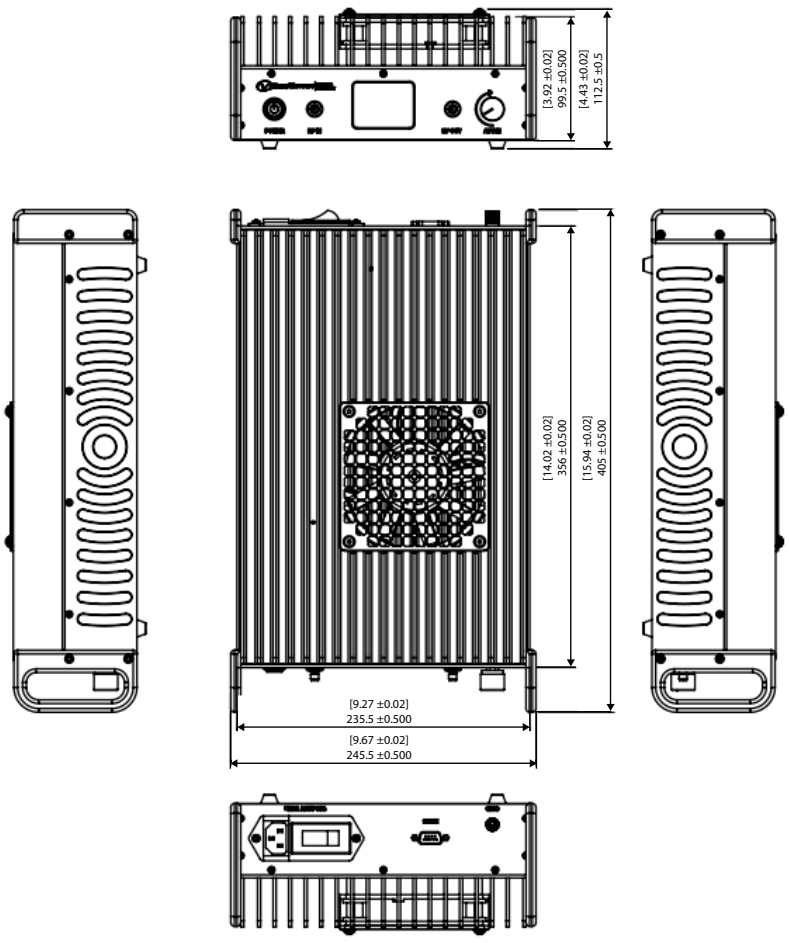
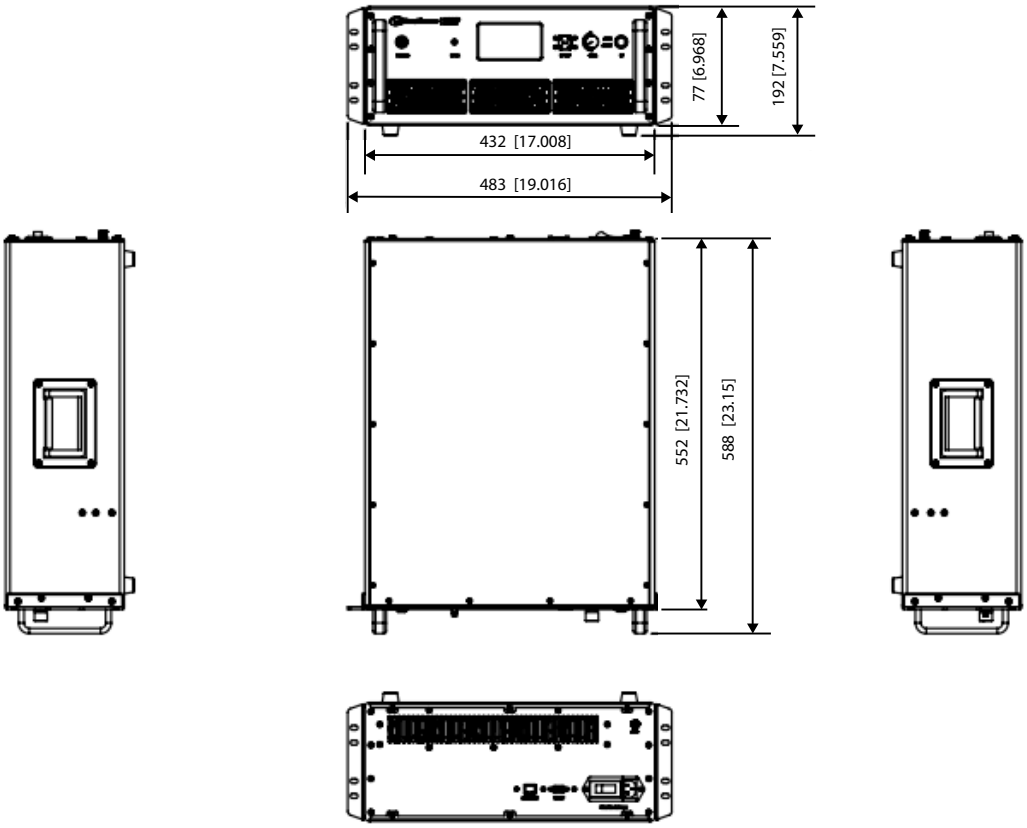
516 [20.31]
432 [17.01]
483 [19.02]
132 [5.2]
147 [5.79]

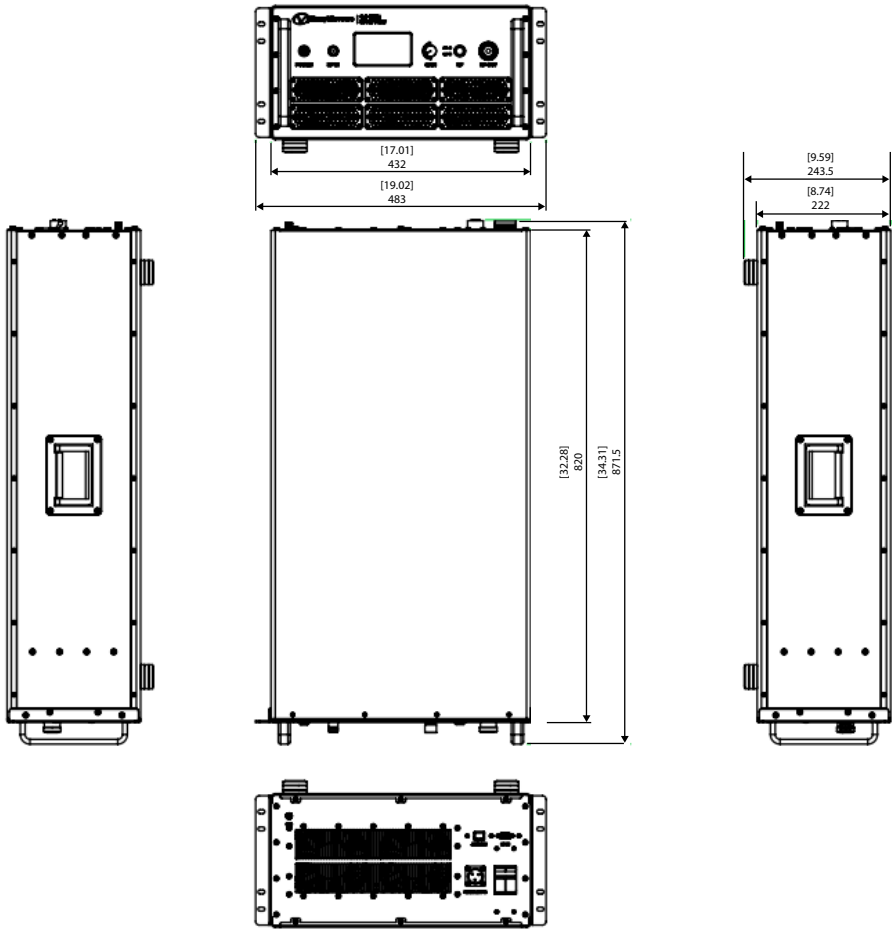
B


[3.92 ±0.02]
99.5 ±0.500
[4.43 ±0.02]
112.5 ±0.5
[14.02 ±0.02]
356 ±0.500
[15.94 ±0.02]
405 ±0.500
[9.27 ±0.02]
235.5 ±0.500
[9.67 ±0.02]
245.5 ±0.500

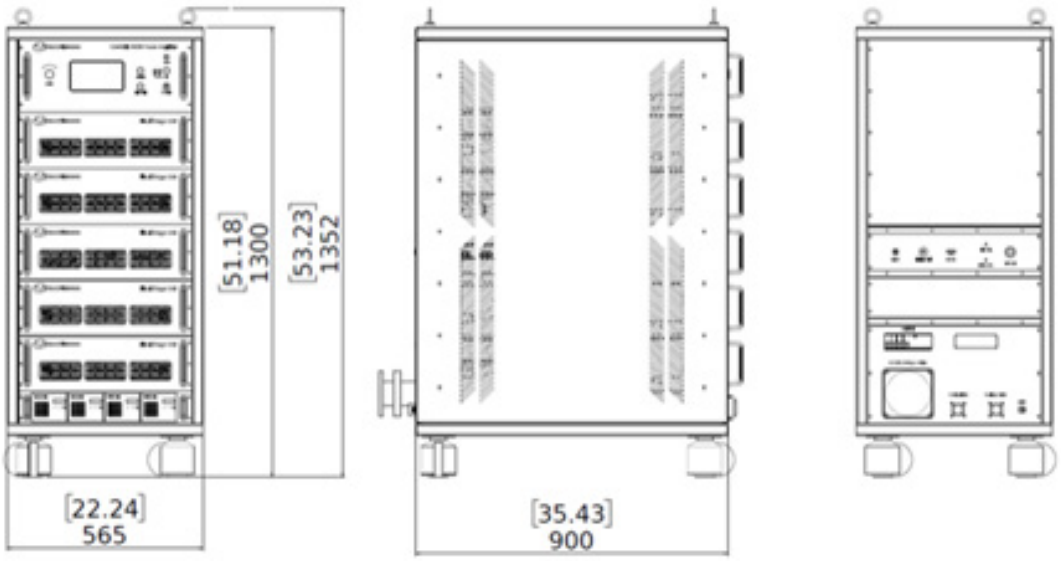
C


77 [6.968]
192 [7.559]
432 [17.008]
483 [19.016]
552 [21.732]
588 [23.15]

D


[17.01]
432
[19.02]
483
[32.28]
820
[34.31]
871.5
[9.59]
243.5
[8.74]
222

E



(Unit:inch/mm)

Maximizing Up-Time

All MPA-series amplifiers go through an extensive burn-in and ageing process to ensure high reliability and maximize up-time. We do recognize that, however unlikely, problems tend to arise at the most inconvenient moments, often when measurement systems are in the highest demand.

As a courtesy to our customers, Maury retains a pool of common amplifiers which can be used during the repair process. The frequencies and powers of the amplifiers offered as part of the courtesy pool may vary from time to time and are subject to availability.

Beyond our courtesy pool, we offer service level agreements (SLA) that include dedicated backup amplifiers to ensure availability during the warranty period and are shipped within two business days of notice. With an SLA, we can maximize up-time and ensure systems are available for use.

Please inquire with your Maury Sales contact for details.

Semi-Custom and Custom Amplifiers

Semi-Custom and Custom Amplifiers

Not finding what you need in our standard offering? Maury offers semi-custom and custom amplifiers to meet your application requirements.

Semi-Custom Amplifiers

Looking for something not-quite “off-the- shelf”? Do you need a little more power? A slightly different frequency band? A bit more gain? Maury’s semi-custom amplifiers may be just what you need. We will modify our standard amplifiers to meet your application needs while maintaining all the benefits of our standard offering. Contact Maury Sales and we’ll work on delivering a solution that upgrades your test bench to “State-of- the-Art”.

Custom Amplifiers

Looking for something even more specialized? Maury can go beyond modifying our standard “off-the-shelf” amplifiers and customize a solution for your unique application, including:

- Electrical: frequency range, output power, gain, harmonic power, spurious signals levels, intermodulation levels, noise floor...
- Protection and indications: LCD display, over-current protection, over-heat protection...
- Mechanical and environmental: connectors and positioning, cooling, temperature range, dimensions....

Please complete a Custom Amplifier Questionnaire; we will compare your requirements with our capabilities and determine whether we can assist with your custom requirements.

Note: all custom amplifiers requests are evaluated on a case-by-case basis; completing a questionnaire does not ensure Maury will be able to offer an amplifier to meet your requirements; all custom amplifiers will include comprehensive Terms and Conditions (T&C) and will be accompanied by a set of Acceptance Test criteria (ATP).

Specifications Definitions

Parameter	Extended Parameter (if required)	Description and/or Usefulness of Parameter	Notes	Units
Psat	Saturated Output Power	Defines the maximum output power that can be sustained without any damage or long term reliability issues.	Psat is achieved once an increment of 1dB input power results in an increased output power less than 0.2dB	dBm
Input Power		Defines the maximum input power that can be injected into the amplifier without any damage or long term reliability issues.		dBm
Small Signal Gain		Defines the difference between the output power and input power under small signal conditions. Specification allows a user to budget the required input power in order to reach the desired output power.	Power Gain measured under 50ohm conditions with a -30dBm input signal	dB
Gain Flatness	Gain Flatness as a Function of Frequency	Defines the maximum deviation of Gain over the frequency range of the amplifier. May be an important consideration for wideband power measurements.	Small Signal Gain variation vs frequency at -30dBm input power	dB
Gain Adjustment		Defines the range of gain achievable by varying the position of the gain knob. May be an important consideration for measurements which require less gain than maximum, or require a level of gain variability during the measurement.	The lowest achievable Gain is equal to the average Small Signal Gain minus Gain adjustment.	dB
VSWR (input)	Input Voltage Standing Wave Ratio	Defines maximum Input VSWR; a low VSWR ensures sufficient signal transmission between signal generator and amplifier.	VSWR measured with a VNA under small signal conditions (-30dBm input power)	
Harmonic Power		Defines relative power at harmonic frequencies compared with the power at the fundamental frequency. May be important for applications where injecting harmonic powers created by the amplifier may alter DUT performance or invalidate measurement results.	Power at the harmonic frequencies are measured while the power at the fundamental frequency is set to typical Psat. $P_{2H} = P_{2f0} - P_{f0}$ $P_{3H} = P_{3f0} - P_{f0}$	dBc

Spur	Spurious Signals	Defines relative power at non-harmonic frequencies compared with the power at the fundamental frequency. May be important when measuring the stability of a DUT and oscillations.	Power at non-harmonic frequencies are measured while the power at the fundamental frequency is set to typical Psat.	dBc
IM3 @13dB back-off and IM3 @3dB back-off	Third-Order Intermodulation Product	Defines the relative power at intermodulation frequencies for a multi-tone source signal. May be an important consideration for the accurate measurement of DUT linearity performance.	Power at the high and low-third order intermodulation product frequencies are measured while the power at the carrier frequencies with 10 MHz offset are set to 13dB and 3dB back-off from typical Psat. $IM3_L = P_{2f1-f2} - P_{f1}$ $IM3_H = P_{2f2-f1} - P_{f2}$	dBc
Unconditionally Stable	Unconditionally Stable with K>1	An unconditionally stable amplifier will not oscillate regardless of the impedance presented to it.	K-factor is calculated using S-parameters with a -30dBm input signal	
VSWR Load @Psat	Load Voltage Standing Wave Ratio Tolerance at Output Port	Defines maximum Output VSWR which can be presented to the amplifier on RF output port without reflecting a large power which could potentially damage the amplifier. This parameter is specified at typical Psat.	Placing an isolator/circulator on the output port is a best-practice and increases the protection of the amplifier significantly	

Parameters

Parameters may be rated as typical, minimum or maximum based on the following definitions:

- Typical (typ): the actual value will be greater than or equal to the typical specification over 80% of the frequency range.
- Minimum (min): the actual value will be greater than or equal to the minimum specification over 100% of the frequency range.
- Maximum (max): the actual value will be less than or equal to the maximum specification for 100% of the frequency range.

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