

MW-PA-0760-100W

High-Efficiency Power Amplifier Module (0.7 GHz – 6.0 GHz, 100W)

Product Overview

The MW-PA-0760-100W is a high-efficiency, GaN-based ultra-wideband solid-state power amplifier (SSPA) module designed for the 700 MHz to 6.0 GHz frequency range. Leveraging advanced Gallium Nitride (GaN) technology, it delivers a typical saturated output power of 50 dBm (100W) with a maximum gain of 55 dB. The module is optimized for both Pulse and CW signals and integrates an RS485 serial interface for real-time telemetry, ensuring superior thermal management and structural reliability in compact industrial applications.

Key Features

- GaN Technology:** High power density and superior efficiency for broad-spectrum performance.
- Ultra-Wideband:** 0.7 GHz to 6.0 GHz continuous coverage.
- High Gain:** 55 dB maximum gain with excellent operational stability.
- Power Output:** 100W (P_{sat}) typical output performance.
- Integrated Telemetry:** RS485 serial port interface for real-time monitoring of voltage, current, internal temperature, and forward/reflected power.
- Comprehensive Protection:** Automatic shutdown safety logic for over-voltage (>32V), over-current (>25A), and over-temperature (>95°C) conditions.
- Ruggedized Housing:** Compact 6061 Aluminum enclosure featuring a native conductive oxidation finish.

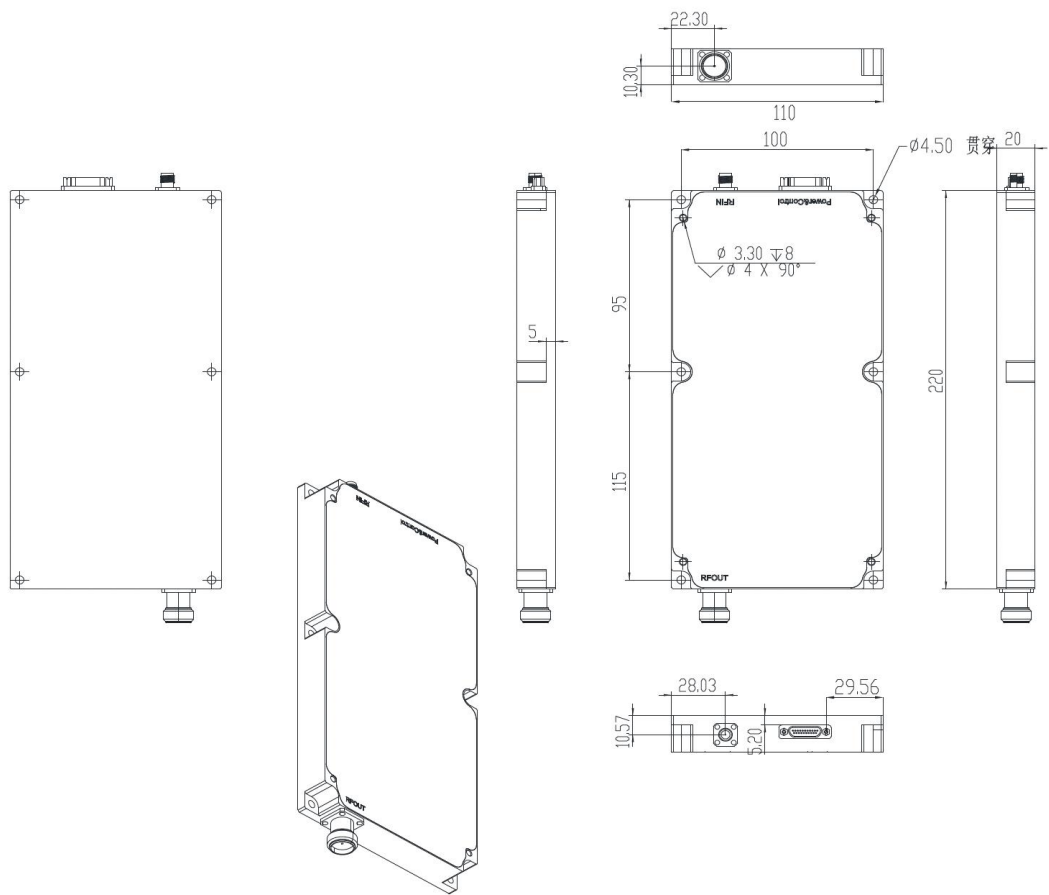
Technical Specifications (T = 25° C, Vdd = +28V, 50 Ω System)

Parameter	Min	Typ	Max	Unit
Frequency Range	0.7		6.0	GHz
Output Power (P_{sat})	49	50		dBm
Power Gain			55	dB
Gain Flatness		±1.5		dB
Efficiency		30		%
Input Power		0	+5	dBm
Supply Voltage (V_{DD})	28		30	V
Quiescent Current (I_{DQ})		3.0		A
2nd Harmonic			-10	dBc
3rd Harmonic			-15	dBc
Spurious Suppression			-60	dBc
Input VSWR		1.5:1		-

Mechanical & Environmental Specifications

Parameter	Specification
Dimensions	220 × 110 × 20 mm (Excluding connectors; Outline Tolerance: ±0.5 mm)
Weight	≤ 3.0 kg
RF Input Connector	SMA-Female (50 Ω)
RF Output Connector	N-Female (50 Ω)
Interface Connector	J30J-21ZKN
Housing Material	6061 Aluminum
Surface Finish	Native Conductive Oxidation
Operating Temperature	-45°C to +75°C (Baseplate Temperature)
Storage Temperature	-55°C to +85°C

Outline Dimensions



- All dimensions are in mm .
- Outline Tolerances: ±0.5.
- Mounting Holes Tolerances: ±0.2.

Pin Definition (J30J-21ZKN Interface)

Pin Number	Mark	Description / Configuration
PIN 01 - 08	+30V	DC Supply Input (+)
PIN 09 - 16	GND	Ground / Reference Earth
PIN 17	PAEN	PA Enable Control (High = 3.3V ON)
PIN 18	RS422T+	Serial Port RS422 Transmit Data (+)
PIN 19	RS422T-	Serial Port RS422 Transmit Data (-)
PIN 20	RS485+ / A (RS422R+)	RS485 Differential Data (+) / RS422 Receive Data (+)
PIN 21	RS485- / B (RS422R-)	RS485 Differential Data (-) / RS422 Receive Data (-)

Note on Protocol Selection:

- For RS485 (2-Wire Half-Duplex): Connect only PIN 20 and PIN 21.
- For RS422 (4-Wire Full-Duplex): Connect PIN 18, PIN 19, PIN 20, and PIN 21.

Serial Port Function (RS485/RS422 Telemetry)

S/N	Function	Description / Protection Logic
1	Voltage Monitor	Real-time tracking of internal operating voltage via serial commands.
2	Current Monitor	Real-time tracking of internal current consumption via serial commands.
3	Temp Monitor	Real-time monitoring of internal core module temperature.
4	Forward Power Monitor	Real-time telemetry for Forward (FWD) power output.
5	Backward Power Monitor	Real-time telemetry for Backward/Reflected (REV) power.
6	Over V/I Protection	Automated safety cut-off of Vdd if Voltage >32V or Current >25A.
7	Thermal Protection	Automated safety cut-off of Vdd if internal temperature exceeds >95°C.
8	Serial Communication	Dual-protocol (RS485/RS422) communication supporting host PC software control.

DC Bias Power Sequencing

I. Power-On Sequence

1. **Physical Setup:** Ensure all RF and interface connectors are securely installed. Connecting a matched 50 Ω output load is strictly mandatory prior to operation to prevent unloading damage.
2. **RF Initialization:** Confirm that the external RF Input Signal Source power is turned completely OFF.
3. **DC Voltage Supply:** Apply the primary DC bias voltage (DC+ = +28V to +30V) to the dedicated supply lines (Pins 1 through 9).
4. **Module Enable:** Apply a 3.3V High signal to the PAEN control line via Pin 17 to activate the internal amplifier stages.
5. **RF Signal Injection:** Turn on the RF Input Power. The maximum drive signal must not exceed +5 dBm.

II. Power-Off Sequence

1. **RF OFF:** Turn off the RF Input Signal Source power first.
2. **Shutdown:** Deassert the PAEN control voltage on Pin 17, then completely shut down the primary Vdd DC power supply lines.

Critical Operational Attention

- a) Prior to activation, carefully verify the power supply electrical properties, voltage polarity, RF port designations, and pinout arrangements.
- b) The module output must never be operated without a proper RF load. The operating voltage must be strictly maintained between +28V and +30V, and must never exceed a maximum absolute limit of +32V.
- c) The maximum RF input signal drive level must not exceed +5 dBm.
- d) Hot-plugging or hot-unplugging any DC supply lines, control interfaces, or RF connections while power or signal is active is strictly prohibited.
- e) For optimal continuous performance, it is highly recommended to operate the module within a deployed field ambient temperature range of -40°C to +55°C. Ensure optimal, planar thermal interface contact between the module baseplate and a heavy-duty external heat sink; do not allow the physical baseplate temperature to exceed its maximum rated limit of 75°C.
- f) Standard electrostatic discharge (ESD) precautionary safety measures must be strictly followed during handling and testing; avoid environments with intense static build-up.
- g) The SSPA module must be stored inside a clean dust-free, moisture-proof, and anti-static protective enclosure system.

Transportation and Storage Specifications

- **Transportation:** Packaged equipment shipments must be handled with care by dedicated transport personnel, completely shielded from direct moisture exposure (rain/snow) and prolonged extreme solar exposure. Heavy drops or structural shocks are strictly prohibited.
- **Storage Environment Requirements:**
 - Long-term Warehouse Shelf Life (Unopened Packaging): 5°C to 30°C (Controlled Room Temperature recommended for optimal packaging and moisture integrity).
 - Relative Humidity Factor: Stable, non-condensing environment not exceeding 80%.
 - Mechanical/EMC Context: Kept isolated from severe physical vibrations, strong electricity, or high-density stray magnetic fields.
 - Ventilation: Kept within clean, dust-controlled spaces with excellent ambient air circulation.
 - Chemical Safety: Prevent exposure to harmful corrosive gases, chemical vapors, or industrial atmospheric agents that degrade packaged microelectronic instruments.

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Maxwellon Electronic Instruments Co., LTD.

No. 18, Shandong Road, Shinan District, Qingdao, China

Tel: +86-532-80977508 | Web: www.maxwellon.com | Email: sales@maxwellon.com