AM041050SF-5H

GaN 0.4–1.0 GHz, 100 W Solid-State Power Amplifier Module

+48 V · 48 dBm linear (P1dB) · 50.5 dBm Psat · 47 dB gain · Airborne rugged

Features

- 0.4–1.0 GHz instantaneous bandwidth
- Linear output power (P1dB): 47 dBm minimum, 48 dBm typical
- 50.5 dBm (112 W) typical saturated output power
- 55 dBm typical output IP3
- 47 dB typical small-signal gain
- Single +48 V supply; 7.3 A (350 W) typical at full output
- TTL RF on/off control, < 5 µs switching
- −40 °C to +85 °C case; 0.3 dB typical P1dB drop at +85 °C
- 40,000 ft altitude; MIL-STD-810 shock and vibration
- 9.0 × 6.0 × 2.0 in; < 4 lb including heat sink
- SMA female input; N-type female output available

Description

The AMCOM AM041050SF-5H is a GaN solid-state power amplifier module that delivers 48 dBm typical (47 dBm minimum) of linear output power and 50.5 dBm saturated output power across 0.4–1.0 GHz from a single +48 V supply. 47 dB of small-signal gain lets it be driven directly from a low-level source, and input and output are matched to 50 Ω.

A TTL input turns the RF output on and off, and an analog output reports module temperature for monitoring or protection. The unit measures 9.0 × 6.0 × 2.0 in, weighs less than 4 lb including its heat sink, and is built in a silver-nickel plated aluminum housing for airborne platforms.

Applications

Radar, communication systems, instrumentation and measurements, and military and aerospace systems, including airborne platforms.



Electrical Specifications

Typical values at Vdd = +48 V and +25 °C case unless noted. Minimum and maximum values apply across 0.4–1.0 GHz.

Parameter	Minimum	Typical	Maximum
RF Performance			
Frequency range	0.4 GHz		1.0 GHz
Small-signal gain	43 dB	47 dB	
Gain ripple		±2 dB	±4.0 dB
Input return loss		10 dB	
Output return loss		10 dB	
Linearity and Output Power (0.4–1.0 GHz)			
Linear output power, 1 dB compression (P1dB)	47 dBm	48 dBm	
Output power at 3 dB compression (P3dB)		49.5 dBm	
Saturated output power (Psat)	48.5 dBm	50.5 dBm	
Output third-order intercept (OIP3)		55 dBm	
Two-tone IMD3 at 40 dBm per tone		−30 dBc	
Input power at P1dB		+2 dBm	
DC, Control and Monitoring			
Supply voltage (Vdd)		+48 V	
Quiescent current (Idq)		TBD	
DC current at full output (Psat)		7.3 A	
DC power at full output (Psat)		350 W	
TTL RF on/off	< 1 V OFF, > 2.5 V ON		
Switching time			5 µs

Linear Output Power and Temperature

The module delivers 47 dBm minimum and 48 dBm typical at 1 dB compression across 0.4–1.0 GHz. That covers the 47–48+ dBm linear-region requirement. Saturated output is 50.5 dBm typical, and output reaches about 49.5 dBm at 3 dB compression. 50 dBm is therefore a saturated level for this module, not a linear one.

All temperatures in this datasheet are case (baseplate) temperatures. P1dB typically drops by about 0.3 dB from +25 °C to +85 °C case, and Psat by about 0.3 dB.

Mechanical and Environmental

Parameter	Minimum	Typical	Maximum
Mechanical and Interfaces			
Dimensions (L × W × H)	9.0 × 6.0 × 2.0 in, including heat sink		
Weight, including heat sink	< 4 lb		
Housing	Aluminum, silver-nickel plated		
RF input connector	SMA female, 50 Ω		
RF output connector	SMA female standard; N-type female available		
DC and control terminals	+48 V, GND, TTL, TEMP		
Mounting	Six 130 mil through holes		
Environmental (Airborne)			
Operating temperature (case)	−40 °C		+85 °C
P1dB change, +25 °C to +85 °C case		−0.3 dB	
Altitude (operating)	Up to 40,000 ft		
Shock and vibration	MIL-STD-810, airborne		
Environmental standard	MIL-STD-810 (altitude, high/low temperature, shock, vibration)		

Absolute Maximum Ratings

Parameter	Minimum	Typical	Maximum
Maximum RF input			+12 dBm
Drain supply voltage (Vdd)			+48 V
TTL voltage			+6 V
Continuous dissipation at 25 °C			300 W
Operating temperature (case)	−40 °C		+85 °C
Storage temperature	−55 °C		+135 °C

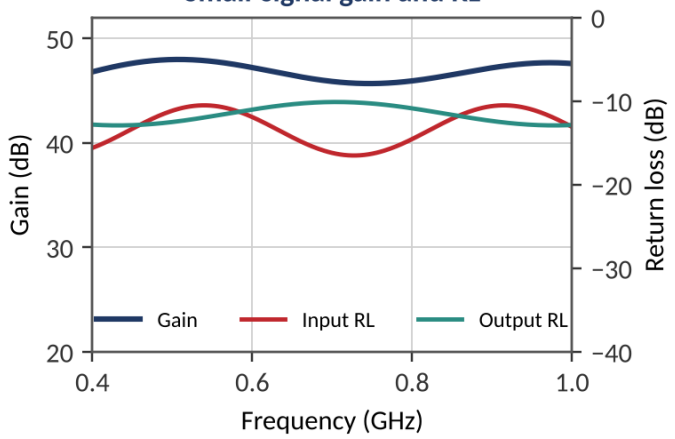
RF On/Off Control and Monitoring

Function	Level	Notes
RF OFF	TTL < 1 V	Output disabled
RF ON	TTL > 2.5 V	Output enabled; switching time < 5 µs
TEMP	0.45 V + 10 mV/°C	Example: 0.95 V at 50 °C

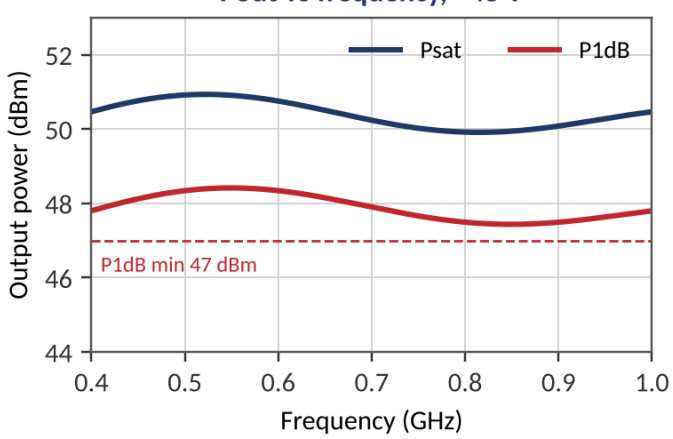
Typical Performance

Typical performance at Vdd = +48 V and +25 °C case unless noted.

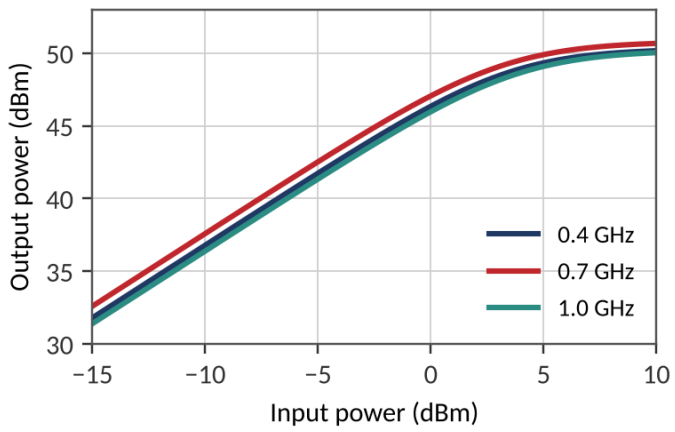
Small-signal gain and RL



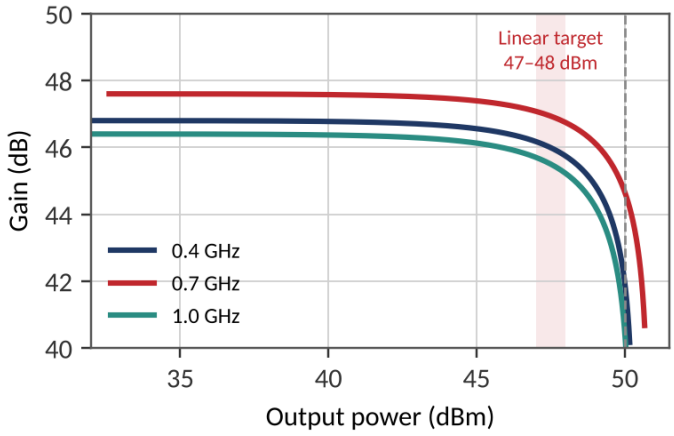
Pout vs frequency, +48 V



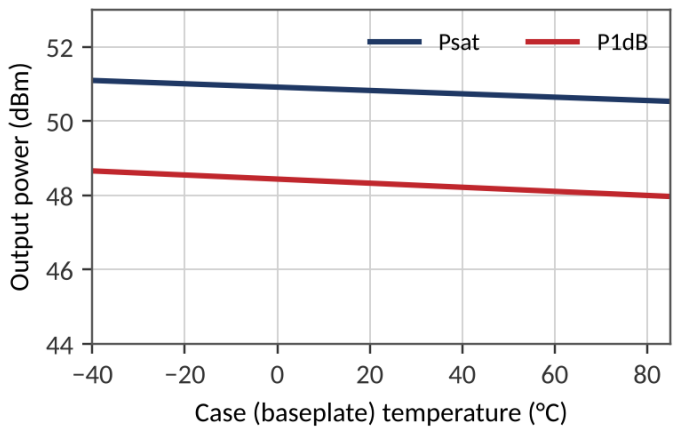
Pout vs Pin



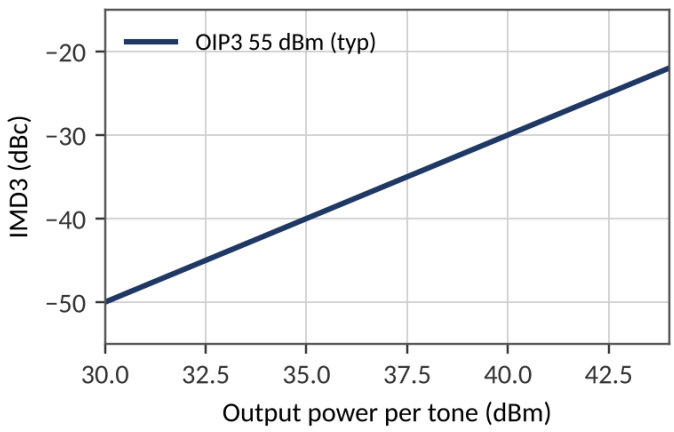
Gain vs Pout



Pout vs case temp., 0.7 GHz

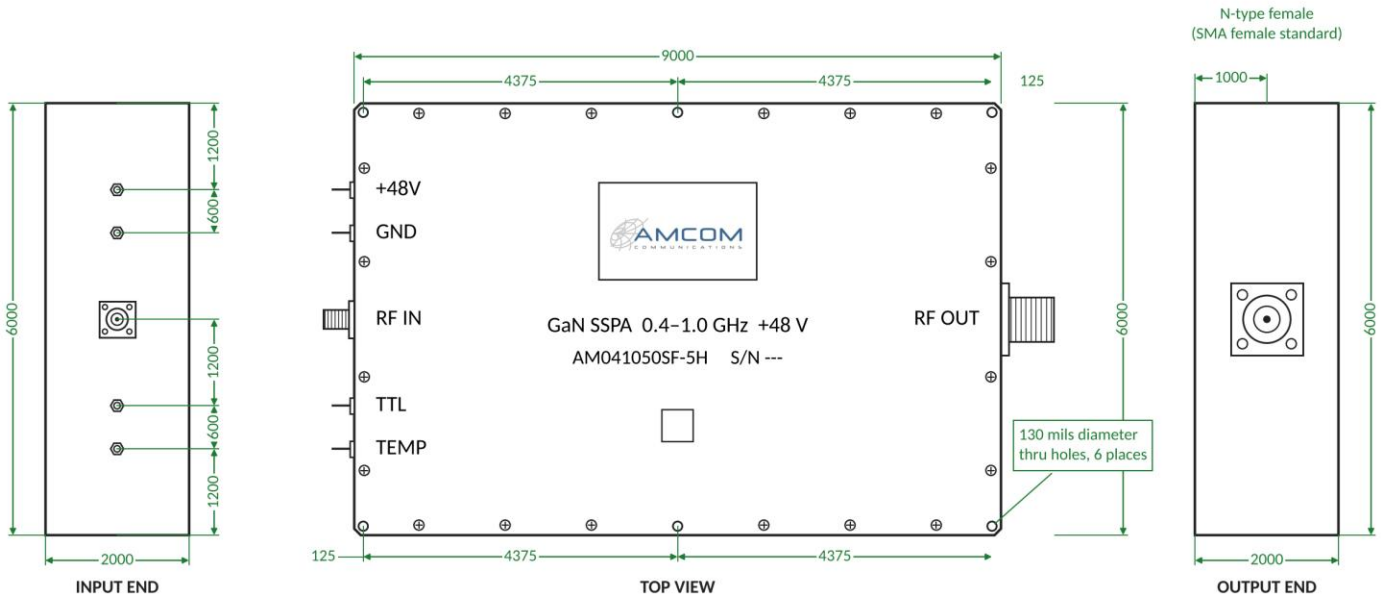


Two-tone IMD3, 0.7 GHz



Mechanical Outline

Dimensions in mils. Overall envelope 9.0 × 6.0 × 2.0 in, including heat sink.



Pin Functions

Terminal	Function
RF IN	RF input, SMA female, 50 Ω. Maximum +12 dBm.
RF OUT	RF output, SMA female standard; N-type female available. 50 Ω.
+48V	Drain supply, +48 V. 7.3 A typical at full output.
GND	DC and control ground.
TTL	RF on/off control: < 1 V OFF, > 2.5 V ON. Maximum +6 V.
TEMP	Analog temperature sensor output: 0.45 V + 10 mV/°C.

Notes

- Rated temperatures are case (baseplate) temperatures. The installation must keep the case at or below +85 °C.
- The heat sink is part of the 9.0 × 6.0 × 2.0 in envelope and is included in the < 4 lb weight.
- Do not exceed the absolute maximum ratings. Operation at or beyond these limits may permanently damage the module.