

50 dB Gain High Power GaN Amplifier at 50 Watt Psat Operating from 2 GHz to 6 GHz with SMA Input, SMA Output

SPA-060-50-SMA is a 50W high gain power GaN amplifier operating in the 2 to 6 GHz frequency range. The amplifier offers 46 dBm min of saturated power and a high 50 dB typical small signal gain with the gain flatness of ± 1.25 dB typical. This excellent technical performance is achieved through the use of advanced GaN devices. The amplifier requires typically a +28V DC power supply. The connectorized SMA module is unconditionally stable and includes built-in voltage regulation, bias sequencing, DC On/Off TTL Logic control, current monitoring and over temp shutdown at +90°C for added reliability. The amplifier operates over the temperature range of -40°C and +85°C. The RF Input/Output Connectors are SMA Female. Along with a 15 Pin Micro-D Female Control Socket.



Electrical Specifications

(TA = +25°C, DC Voltage = 28Volts , DC Current = 6A)

Description	Min	Typ	Max	Unit
Frequency Range	2		6	GHz
Small Signal Gain	50			dB
Gain Flatness		± 1.25		dB
Input Power (CW)			+15	dBm
Psat	+46	+47		dBm
Efficiency (PAE)		30		%
Harmonics @50 Watts		-15		dBc
Noise Figure			7	dB
Spurious @50 Watts		-70		dBc
Impedance (Input)		50		Ohms
Impedance (Output)		50		Ohms
Input VSWR		2:1		
Output VSWR		2:1		
TTL Control	"1": Off, "0": On (Blanking), Enable: 0V, Disable: 5V			
Operating DC Voltage		28		Volts
Operating DC Current		6		A
Operating Temperature Range	-40		+85	°C

Features:

- 2 GHz to 6 GHz Frequency Range
- Psat 46 dBm min
- Small Signal Gain: 50 dB min
- Gain Flatness ± 1.25 dB typical
- 50 Ohms Input and Output Matched
- Unconditionally Stable
- Regulated Supply & Bias Sequencing
- Hermetically Sealed Module
- Current Monitoring
- Mismatch Handling 5.0:1 max
- Over Temp Shutdown

Applications:

- Military Radio
- Communication Systems
- High Gain Driver Power Amplifier
- High Gain Output Power Amplifier

Mechanical Specifications

Size	
Length	2.5 in [63.5 mm]
Width	2.75 in [69.85 mm]
Height	0.45 in [11.43 mm]
Weight	0.2647 lbs [120.07 g]
Input Connector	SMA Female
Output Connector	SMA Female
Cooling	HEATSINK REQUIRED use SPA-00-00-KIT

Environmental Specifications

Temperature	
Operating Range	-40 to +85 deg C
Storage Range	-54 to +85 deg C

Fairview Microwave
 301 Leora Ln., Suite 100
 Lewisville, TX 75056
 Tel: 1-800-715-4396 / (972) 649-6678
 Fax: (972) 649-6689
www.fairviewmicrowave.com
sales@fairviewmicrowave.com

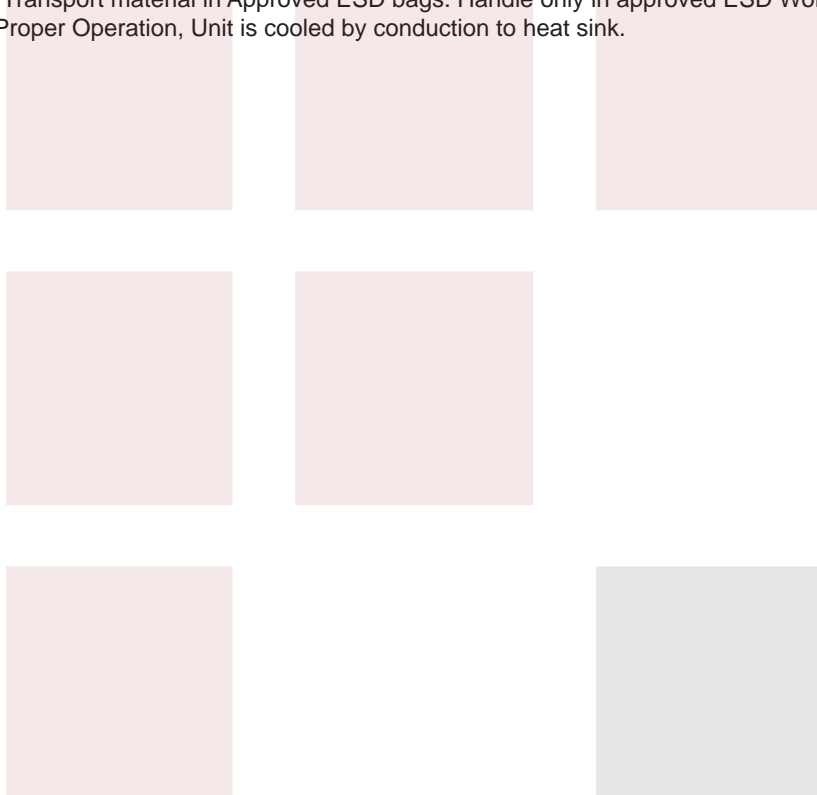
Humidity	IAW MIL-STD-810F, up to 95
Shock	IAW MIL-STD-202G method 214, condition C
Vibration	IAW MIL-STD-810F, Method 514.5, Table
Altitude	up to 30,000 ft
Salt Fog	5%, +35°C 96 hrs IAW MIL-STD- 810G method
Fungus	IAW MIL-STD-810G method 508.6

Compliance Certifications (see [product page](#) for current document)

Plotted and Other Data

Notes:

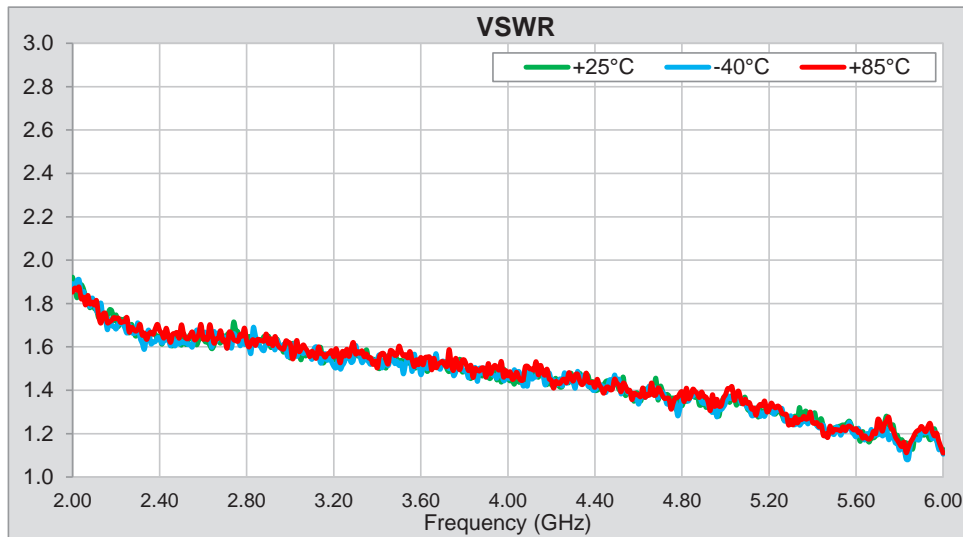
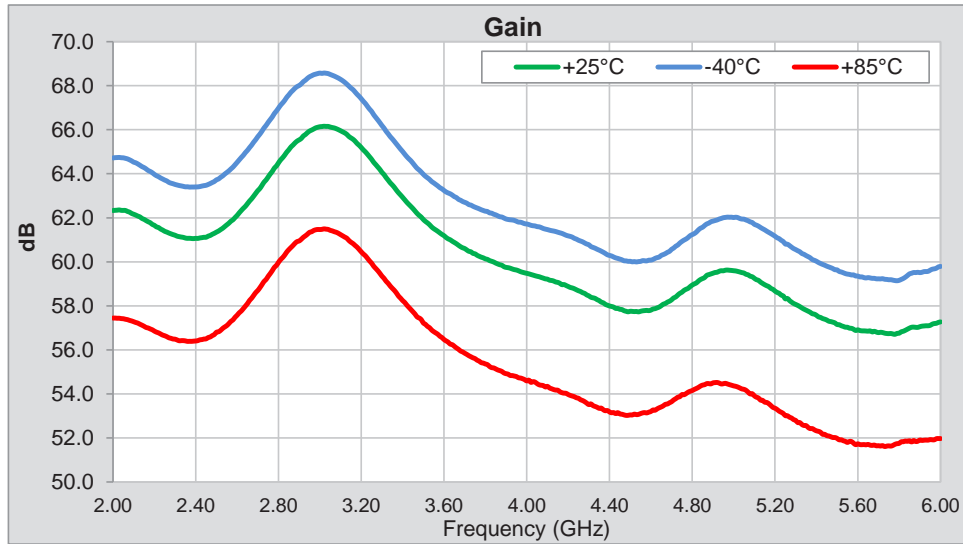
- Values at 25 °C, sea level
- ESD Sensitive Material, Transport material in Approved ESD bags. Handle only in approved ESD Workstation.
- Heat Sink Required for Proper Operation, Unit is cooled by conduction to heat sink.



Amplifier Power-up Precautions

- 1.) Confirm that proper ESD precautions and controls are always in place before handling any Amplifier module.
- 2.) Confirm adequate thermal management is in place to effectively dissipate heat away from the Amplifier package. The Amplifier operational baseplate temperature must be within the operational temperature range stated in the Amplifier datasheet. Depending on the design and thermal requirements, using a heatsink with cooling fan is always recommended for safe reliable operation. A heat sink without a cooling fan may also be used. Damage caused from overheating will void the warranty.
- 3.) Confirm adequate system grounding is established. The DC power supply and Amplifier must have a common ground in order to operate properly.
- 4.) Power Amplifiers may require additional DC Current when initially powered-up. Depending on the design, the input current draw could range from an additional 10% to 100% above the maximum rated DC current of the Amplifier. This varies based on product part number.
- 5.) Confirm the DC power supply, if limited, is set to allow for additional start-up current that's rated for the Power Amplifier.
- 6.) Confirm the system is designed and calibrated for 50 ohms. Any impedance mismatch may cause performance issues.
- 7.) Perform a CALIBRATION (if required) with the loads before connecting the Amplifier to the Network Analyzer to ensure proper performance.
- 8.) Use a fixed attenuator between the signal source and input port of the Amplifier to optimize the input VSWR match.
- 9.) Confirm the input power level at the input port of the amplifier does not exceed the maximum rated limit for input power (as stated in the Amplifier datasheet).
 P_{in} for Small Signal Gain = P1dB-SSG-10 dB
 P_{in} for P1dB = P1dB-SSG+1 dB
- 10.) Confirm the Network Analyzer is always connected to the Amplifier first before DC power is applied to the Amplifier.
- 11.) As long as the input and output ports of the amplifier are connected to a 50Ohm load and RF signal power is applied, the Amplifier can be powered up with DC voltage.
- 12.) Confirm the Amplifier output load is matched for a 50 Ohm impedance and will not exceed the maximum rated VSWR or Return Loss limit for the Amplifier. Exceeding the maximum rated VSWR or Return Loss limit will result in reflected signal power that could damage the Amplifier and void the warranty.
- 13.) **Power Amplifier connected to an Antenna for signal transmission** - It's strongly recommended to use a high power fixed attenuator pad or an Isolator between the output port of the Amplifier and input port to the antenna. Any reflected signal power due to impedance mismatch will likely damage the Amplifier and void the warranty.
- 14.) The attenuator or isolator used at the output port of the Amplifier must be rated to handle the output power level and operational frequency band of the amplifier.

Typical Performance Data



50 dB Gain High Power GaN Amplifier at 50 Watt Psat Operating from 2 GHz to 6 GHz with SMA Input, SMA Output from Fairview Microwave is in-stock and available to ship same-day. All of our RF/microwave products are available off-the-shelf from our ISO 9001:2008 certified facilities in Lewisville, Texas. Fairview Microwave is RF on-demand.

For additional information on this product, please click the following link: [50 dB Gain High Power GaN Amplifier at 50 Watt Psat Operating from 2 GHz to 6 GHz with SMA Input, SMA Output SPA-060-50-SMA](#)

URL: <https://www.fairviewmicrowave.com/50db-high-power-high-gain-amplifier-50watt-spa-060-50-sma-p.aspx>

The information contained in this document is accurate to the best of our knowledge and representative of the part described herein. It may be necessary to make modifications to the part and/or the documentation of the part, in order to implement improvements. Fairview Microwave reserves the right to make such changes as required. Unless otherwise stated, all specifications are nominal. Fairview Microwave does not make any representation or warranty regarding the suitability of the part described herein for any particular purpose, and Fairview Microwave does not assume any liability arising out of the use of any part or documentation.

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	10/6/2020	T.GALLA

PIN	DESCRIPTION
1	+28V
2	+28V
3	GND
4	GND
5	N/C
6	N/C
7	OVER-CURRENT BIT
8	BLANKING TTL
9	+28V
10	+28V
11	GND
12	GND
13	N/C
14	N/C
15	OVER-TEMP BIT

NOTE:

- HEAT SINK REQUIRED FOR PROPER OPERATION, UNIT IS COOLED BY CONDUCTING TO HEAT SINK.

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<p>Fairview Microwave an INFINIT[®] brand</p> <p>TITLE</p> <p>50 dB Gain High Power GaN Amplifier at 50 Watt Psat Operating from 2 GHz to 6 GHz with SMA Input, SMA Output</p>	<p>UNLESS OTHERWISE SPECIFIED LEADING DIMENSIONS ARE INCHES DIMENSIONS IN [] ARE MILLIMETERS</p> <p>TOLERANCES: CABLE LENGTH (L) TOLERANCES:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">.X = ±.2 [5.08]</td> <td style="width: 33%;">FRACTIONS</td> <td style="width: 34%;">L ≤ 12 [305] = +1 [25] / -0</td> </tr> <tr> <td>.XX = ±.02 [.51]</td> <td>± 1/32</td> <td>12 [305] < L ≤ 60 [1524] = +2 [51] / -0</td> </tr> <tr> <td>.XXX = ±.005 [.13]</td> <td>ANGLES ± 1°</td> <td>60 [1524] < L ≤ 120 [3048] = +4 [102] / -0</td> </tr> <tr> <td></td> <td></td> <td>120 [3048] < L ≤ 300 [7620] = +6 [152] / -0</td> </tr> <tr> <td></td> <td></td> <td>300 [7620] < L = +5%L / -0</td> </tr> </table> <p>ALL DIMENSIONS SHOWN ARE FOR REFERENCE ONLY.</p>	.X = ±.2 [5.08]	FRACTIONS	L ≤ 12 [305] = +1 [25] / -0	.XX = ±.02 [.51]	± 1/32	12 [305] < L ≤ 60 [1524] = +2 [51] / -0	.XXX = ±.005 [.13]	ANGLES ± 1°	60 [1524] < L ≤ 120 [3048] = +4 [102] / -0			120 [3048] < L ≤ 300 [7620] = +6 [152] / -0			300 [7620] < L = +5%L / -0	<p>THIRD-ANGLE PROJECTION</p> <p>THE INFORMATION AND DESIGN IN THIS DOCUMENT IS THE PROPERTY OF FAIRVIEW MICROWAVE CORPORATION. ALL RIGHTS RESERVED.</p> <p>SHEET 1 OF 1</p> <p>SCALE N/A</p>
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<p>SIZE A CAGE CODE 3FKR5 DRAWN BY K.Dang ITEM NO. SPA-060-50-SMA REV A</p>																	

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