

High Power GaAs Amplifier at 4 Watt P1dB Operating from 8.5 GHz to 11 GHz with 45 dBm IP3, SMA Input, SMA Output and 30 dB Gain

SPA-110-30-04-SMA is a 4 W X-band coaxial power amplifier designed for high linearity applications in the 8.5 to 11 GHz frequency range. The amplifier offers 30 dB small signal gain with the excellent gain flatness of ± 0.75 dB and the outstanding IP3 performance of 45 dBm typical. High power devices utilized in the amplifier provide excellent linearity, high gain and wide dynamic range. High efficiency is achieved through using hybrid MIC design and advanced GaAs PHEMT devices. The amplifier requires a +12V DC power supply. The connectorized SMA module is unconditionally stable and includes built-in voltage regulation, bias sequencing, and reverse bias protection for added reliability. The amplifier operates over the temperature range of -30°C and $+60^{\circ}\text{C}$.

Electrical Specifications

(TA = $+25^{\circ}\text{C}$, DC Voltage = +12Volts, DC Current = 4.5A)

Description	Min	Typ	Max	Unit
Frequency Range	8.5		11	GHz
Small Signal Gain	30			dB
Gain Flatness		± 0.75	± 1.25	dB
P1dB	+35	+36		dBm
Output 3rd Order Intercept Point	+44	+45		dBm
Noise Figure		5		dB
Impedance (Input)		50		Ohms
Impedance (Output)		50		Ohms
Input VSWR		1.8:1	2:1	
Output VSWR		1.8:1	2:1	
Operating DC Voltage		+12		Volts
Operating DC Current*		4.5	5	A
Operating Temperature Range	-30		+60	$^{\circ}\text{C}$

*This design requires an initial Start-Up Current that is between 50% to 100% higher than the maximum operating DC current.

Absolute Maximum Rating

Parameter	Rating	Units
Source Voltage	+15	Volts
RF input Power	+17	dBm
Operating Temperature (base-plate)	-30 to +60	$^{\circ}\text{C}$
Storage Temperature	-55 to +85	$^{\circ}\text{C}$



ESD Sensitive Material, Transport material in Approved ESD bags. Handle only in approved ESD Workstation.

Mechanical Specifications

Size	
Length	3.87 in [98.3 mm]
Width	3.64 in [92.46 mm]
Height	0.67 in [17.02 mm]



Features:

- 8.5 GHz to 11 GHz Frequency Range
- High P1dB Output Power: 36 dBm Typical
- Small Signal Gain: 30 dB min
- Gain Flatness: ± 0.75 dB
- High Output IP3: 45 dBm Typical
- Noise Figure: 5 dB
- 50 Ohm Input and Output Matched
- -30 to $+60^{\circ}\text{C}$ Operating Temperature
- Unconditionally Stable
- Regulated Supply & Bias Sequencing
- Hermetically Sealed Module
- Overvoltage External Protection for Easy Repair

Applications:

- Telecom Infrastructure
- Test Instrumentation
- Fixed Microwave Backhaul
- Military & Space
- Radar Systems
- Communication Systems
- Microwave Radio Systems
- Satellite Communication
- Commercial Avionics
- Driver Amplifier
- High Power Output Amplifier

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Weight	0.7 lbs [317.51 g]
Input Connector	SMA Female
Output Connector	SMA Female

Environmental Specifications

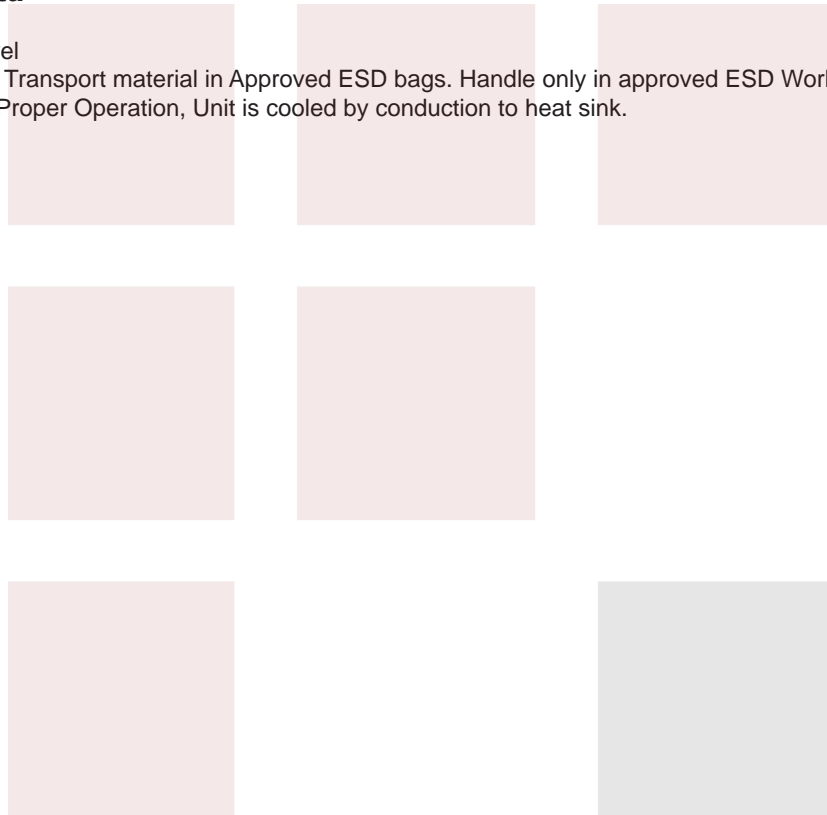
Temperature
Operating Range -30 to +60 deg C

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

Plotted and Other Data

Notes:

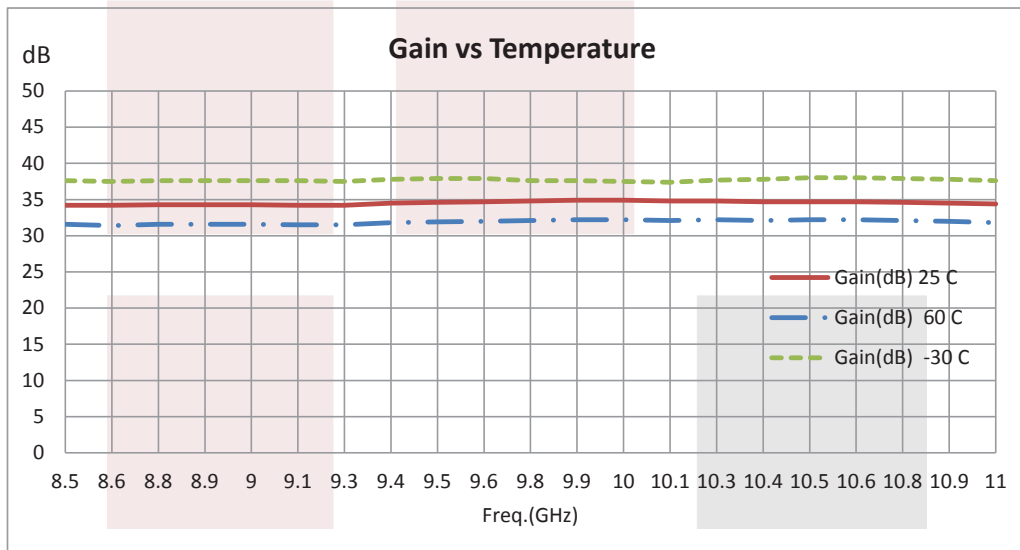
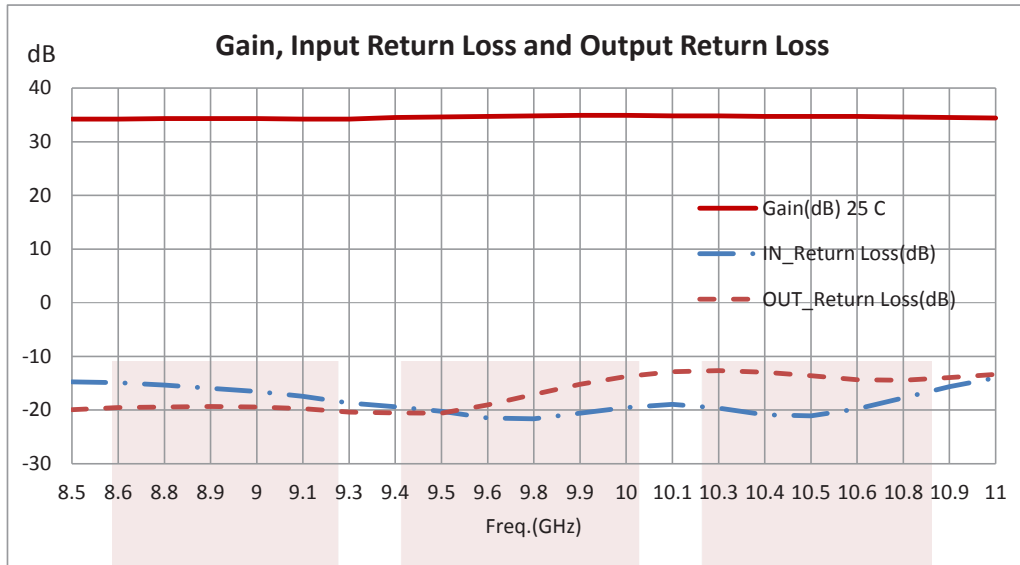
- Values at 25 °C, sea level
- ESD Sensitive Material, Transport material in Approved ESD bags. Handle only in approved ESD Workstation.
- Heat Sink Required for Proper Operation, Unit is cooled by conduction to heat sink.

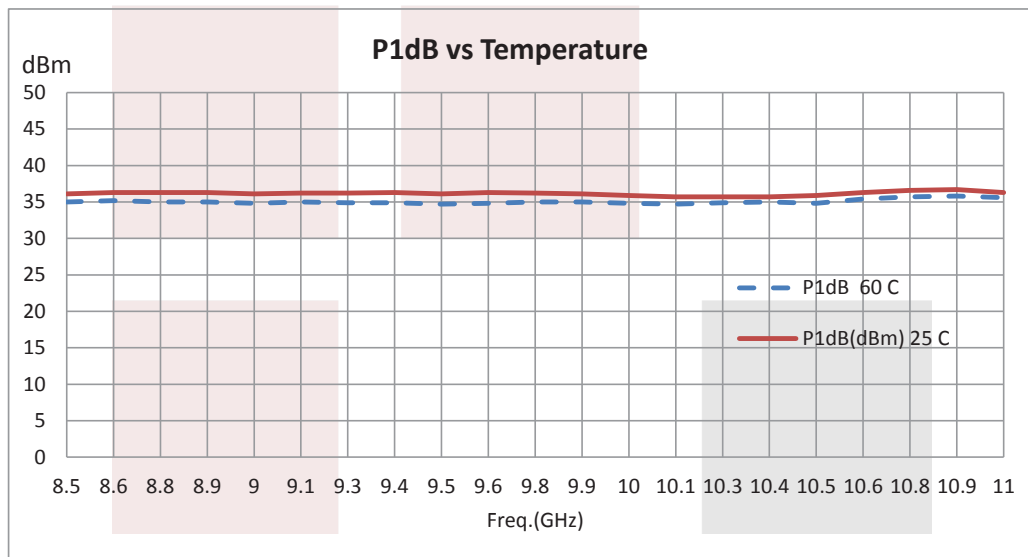
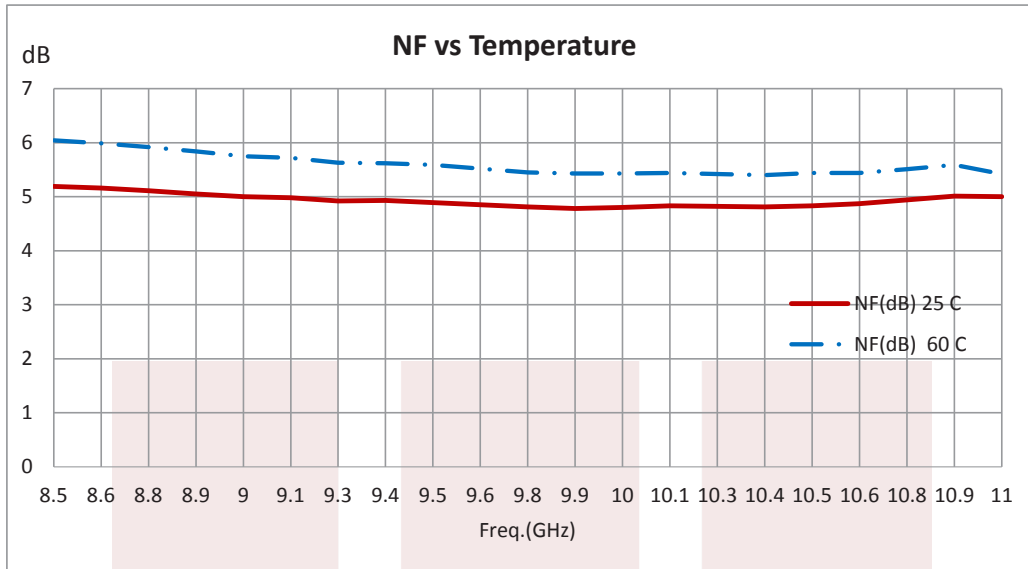


Amplifier Power-up Precautions

- 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



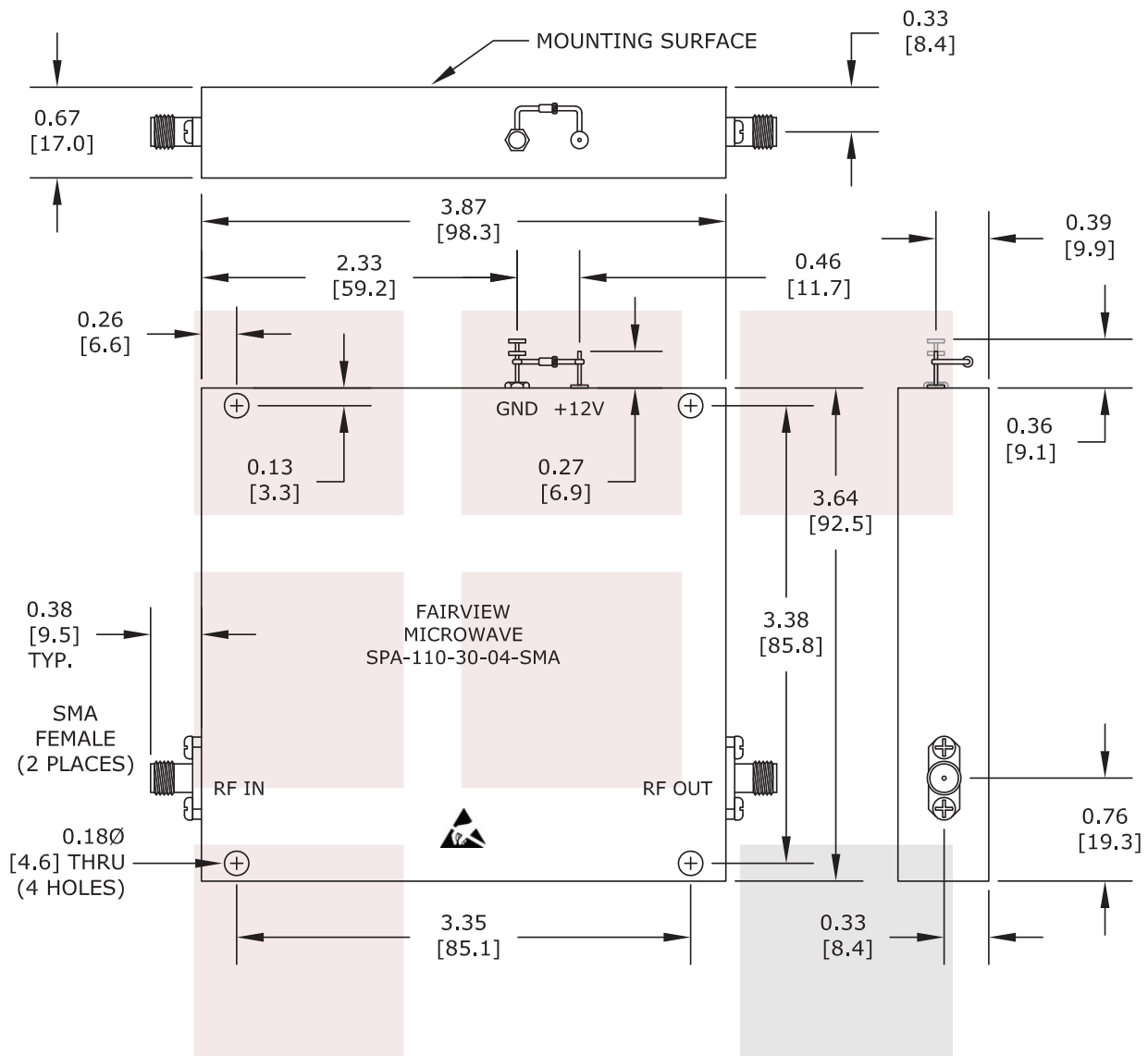


High Power GaAs Amplifier at 4 Watt P1dB Operating from 8.5 GHz to 11 GHz with 45 dBm IP3, SMA Input, SMA Output and 30 dB Gain from Fairview Microwave is in-stock and available to ship same-day. All of our RF/microwave products are available off-the-shelf from our ISO 9001:2008 certified facilities in Lewisville, Texas. Fairview Microwave is RF on-demand.

For additional information on this product, please click the following link: [High Power GaAs Amplifier at 4 Watt P1dB Operating from 8.5 GHz to 11 GHz with 45 dBm IP3, SMA Input, SMA Output and 30 dB Gain SPA-110-30-04-SMA](#)

URL: <https://www.fairviewmicrowave.com/high-power-amplifier-4watt-30db-spa-110-30-04-sma-p.aspx>

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

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TITLE High Power GaAs Amplifier at 4 Watt P1dB Operating from 8.5 GHz to 11 GHz with 45 dBm IP3, SMA Input, SMA Output and 30 dB Gain		DWG NO SPA-110-30-04-SMA		CAGE CODE 3FKR5	
CAD FILE 050914 SHEET		SCALE N/A		SIZE A 2233	