Fairview Microwave
an INFINITE brand

SPA-025-40-12-SMA DATA SHEET

40 dB Gain High Power Amplifier at 13 Watt P1dB Operating from 800 MHz to 2.5 GHz with 50 dBm IP3, SMA

The SPA-025-40-12-SMA is a wideband GaAs amplifier module that is ideal for wideband communications, pulsed applications including radar, and medical and laboratory applications. It produces 3 Watts of linear, 10 MHz LTE. The high gain power coaxial amplifier operating in the 0.8 to 2.5 GHz frequency range. The amplifier offers 40 dB typical small signal gain with the gain flatness of ±2 dB typical. The amplifier has several protection circuits including load VSWR protection, low and high bias protection, reverse bias protection and thermal protection. The connectorized SMA module is unconditionally stable and includes built-in voltage regulation, bias sequencing, and requires typically a +12V DC power supply. The amplifier operates over the temperature range of -40°C and +85°C and provides an RF Sample Port Output.

Features:

- 0.8 GHz to 2.5 GHz Frequency Range
- P1dB 41 dBm typ
- Small Signal Gain: 40 dB typ
- Gain Flatness: ±2 typ
- 50 Ohms Input and Output Matched
- Unconditionally Stable
- Regulated Supply & Bias Sequencing
- Overvoltage Protection
- Thermal Protection
- RF Sample Port

Applications:

- L-band Military Radar
- Commercial Air Traffic Control
- Weather & Earth Observation Satellites
- Radar & Communication Systems
- High Gain Driver Power Amplifier
- High Gain Output Power Amplifier

Electrical Specifications

(TA = +25°C, DC Voltage = 12Volts)

Description	Min	Typ	Max	Unit
Frequency Range	0.8		2.5	GHz
Small Signal Gain	38	40		dB
Gain Flatness		±2		dB
P1dB	+39	+41		dBm
RF Sample Port	+29	+30	+31	dB
Output 3rd Order Intercept Point		+50		dBm
Impedance (Input)		50		Ohms
Impedance (Output)		50		Ohms
Input Return Loss	-12	-14		dB
Rise/Fall Time		<1		usec
Operating DC Voltage	11	12	13	Volts
Standby DC Current		400		mA
Quiescent Current		5.5		A
Operating Temperature Range	-40		+85	°C

Protections

Environmental / Protections			
Parameter	Min	Max	Unit
Operating Temp. (Housing Temp.)	-40	+85	°C
Storage Temp Range	-60	+100	°C
Humidity Range	0-100		%
Altitude	0-30,000		ft.
Shock / Vibration	MIL-STD-810 and equivalents		--
Max RF Input	+3		dBm
Load VSWR @ P1dB	Open / Short Output Protection		--
PA Baseplate Shutoff Temperature	+ 90		°C

Mechanical Specifications

Size

Length	6 in [152.4 mm]
Width	3.5 in [88.9 mm]
Height	0.69 in [17.53 mm]
Weight	1.088 lbs [493.51 g]
Input Connector	SMA Female
Output Connector	SMA Female

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Cooling	HEATSINK REQUIRED use FMAMC5013 OR FMAMC5013F

Environmental Specifications

Temperature	
Operating Range	-40 to +85 deg C
Storage Range	-60 to +100 deg C
Humidity	100
Shock	MIL-STD-810
Vibration	MIL-STD-810

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.) Preform 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.

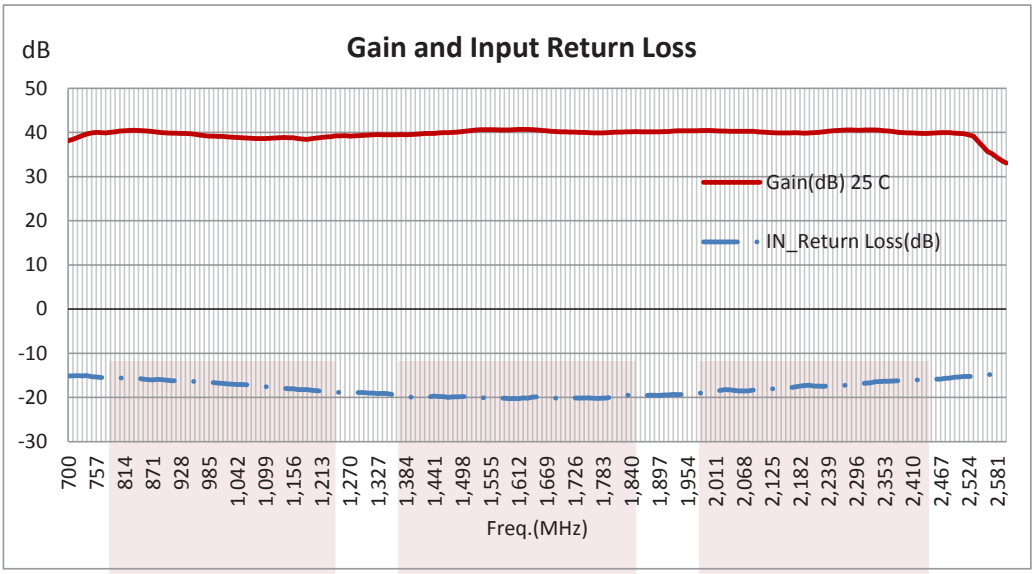
11.) As long as the input and output ports of the amplifier are connected to a 50Ohm load and RF signal power is applied, the Amplifier can be powered up with DC voltage.

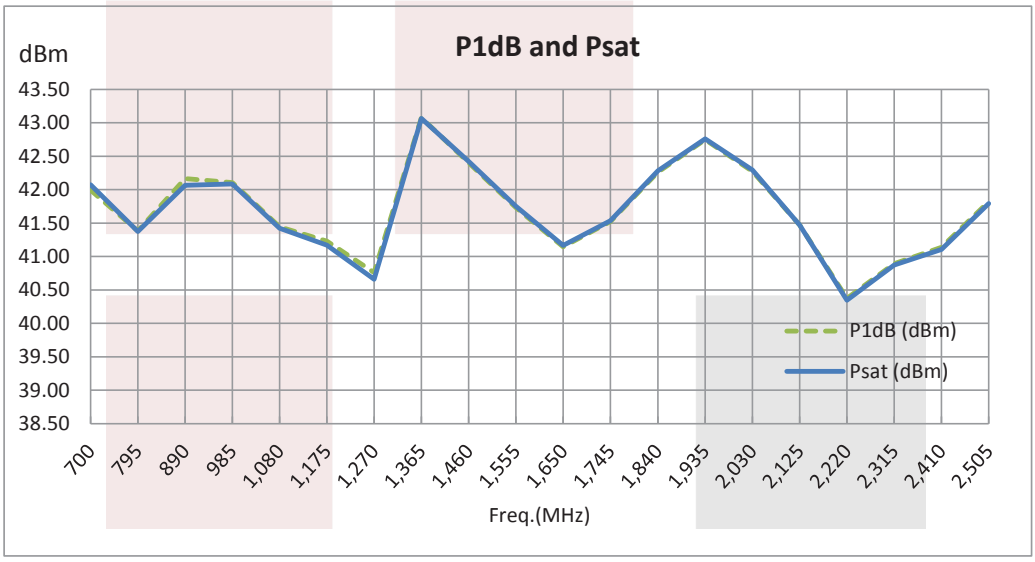
12.) Confirm the Amplifier output load is matched for a 50 Ohm impedance and will not exceed the maximum rated VSWR or Return Loss limit for the Amplifier. Exceeding the maximum rated VSWR or Return Loss limit will result in reflected signal power that could damage the Amplifier and void the warranty.

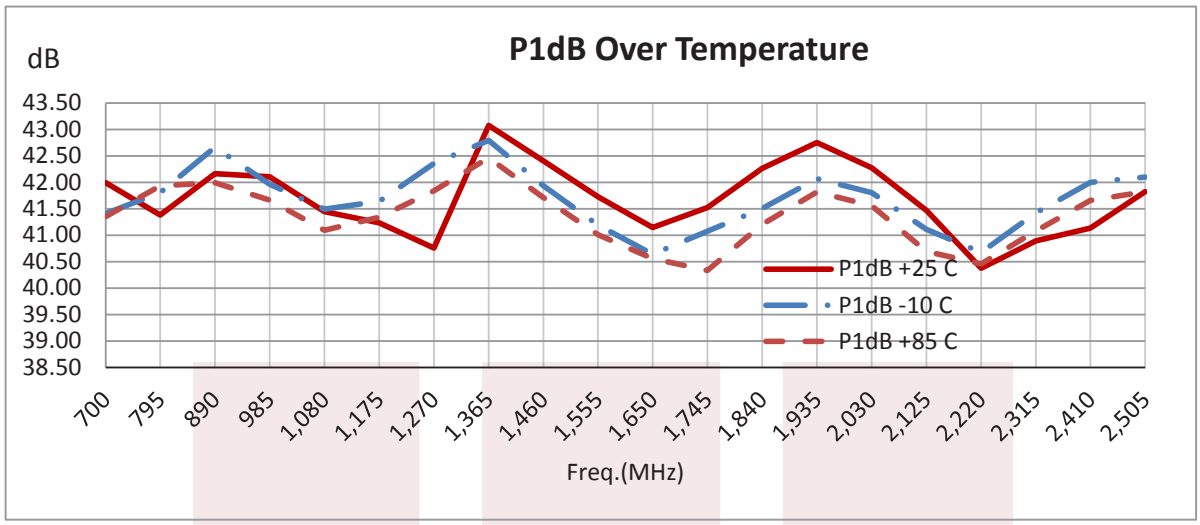
13.) **Power Amplifier connected to an Antenna for signal transmission** - It's strongly recommended to use a high power fixed attenuator pad or an Isolator between the output port of the Amplifier and input port to the antenna. Any reflected signal power due to impedance mismatch will likely damage the Amplifier and void the warranty.

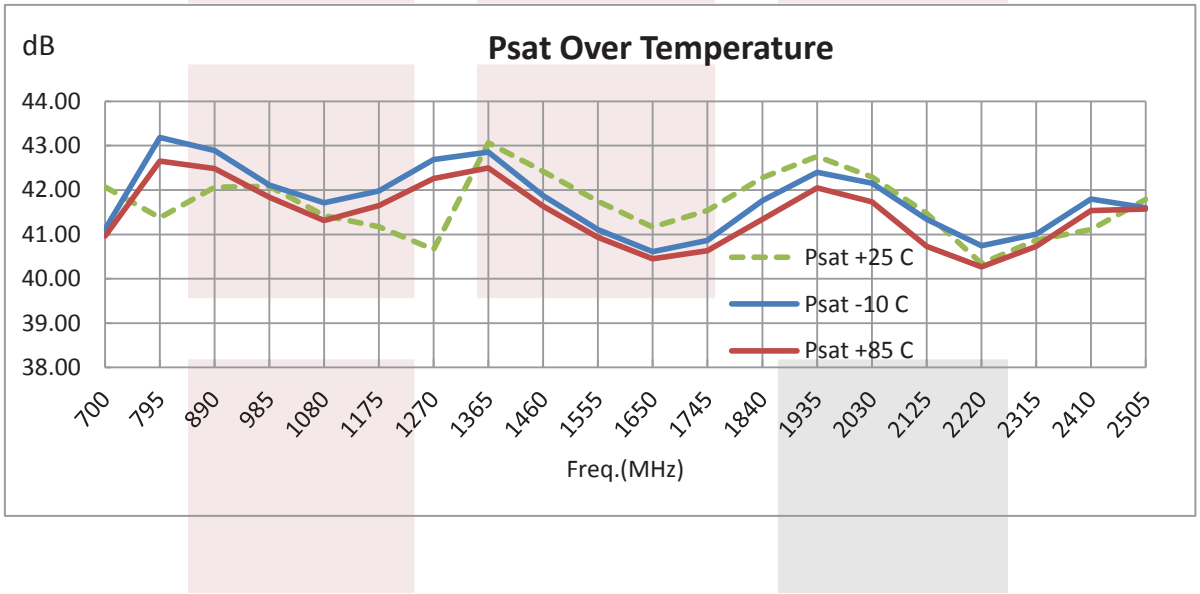
14.) The attenuator or isolator used at the output port of the Amplifier must be rated to handle the output power level and operational frequency band of the amplifier.

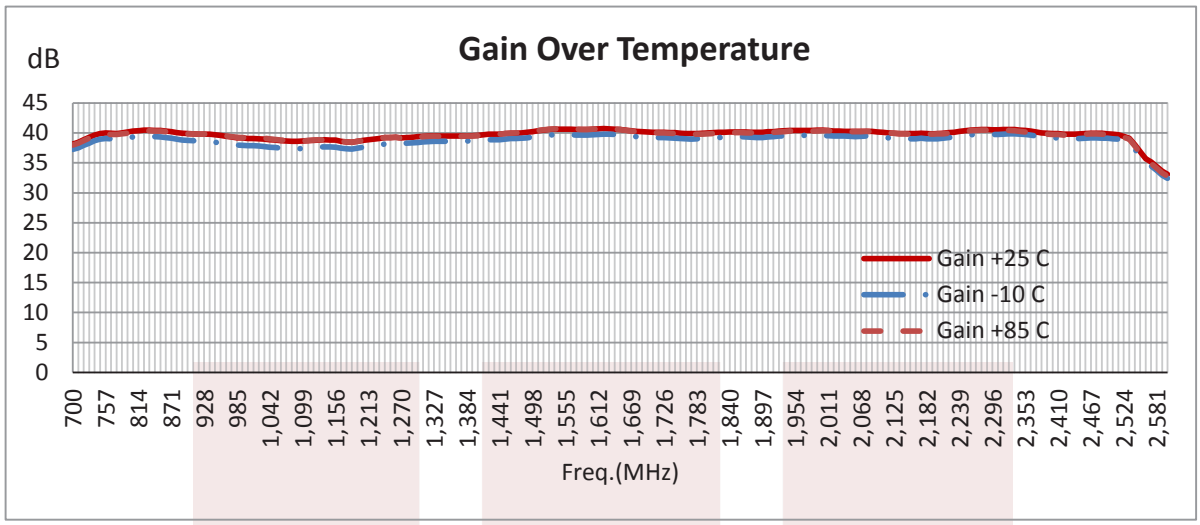
Typical Performance Data

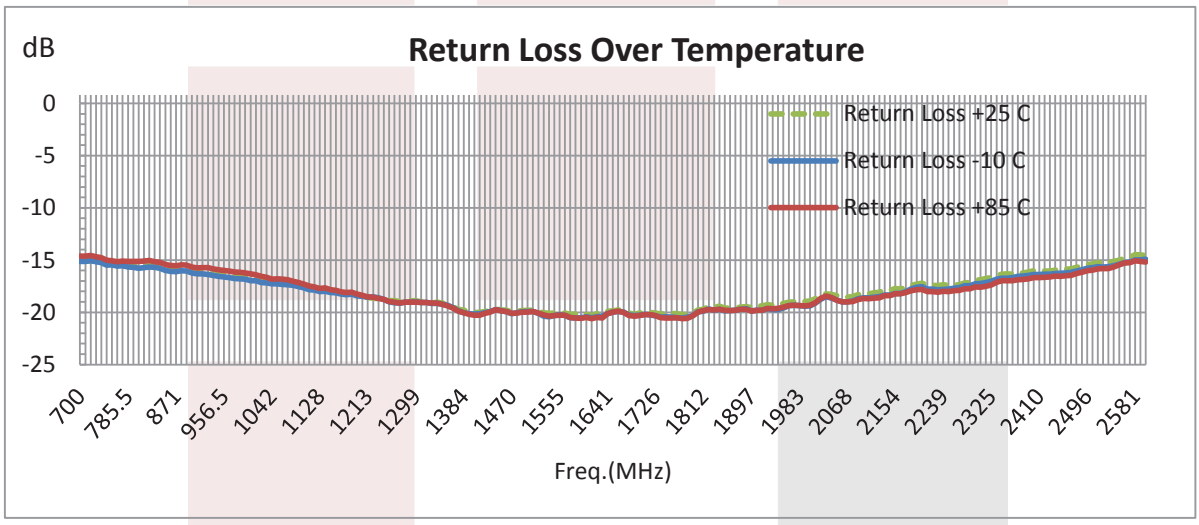








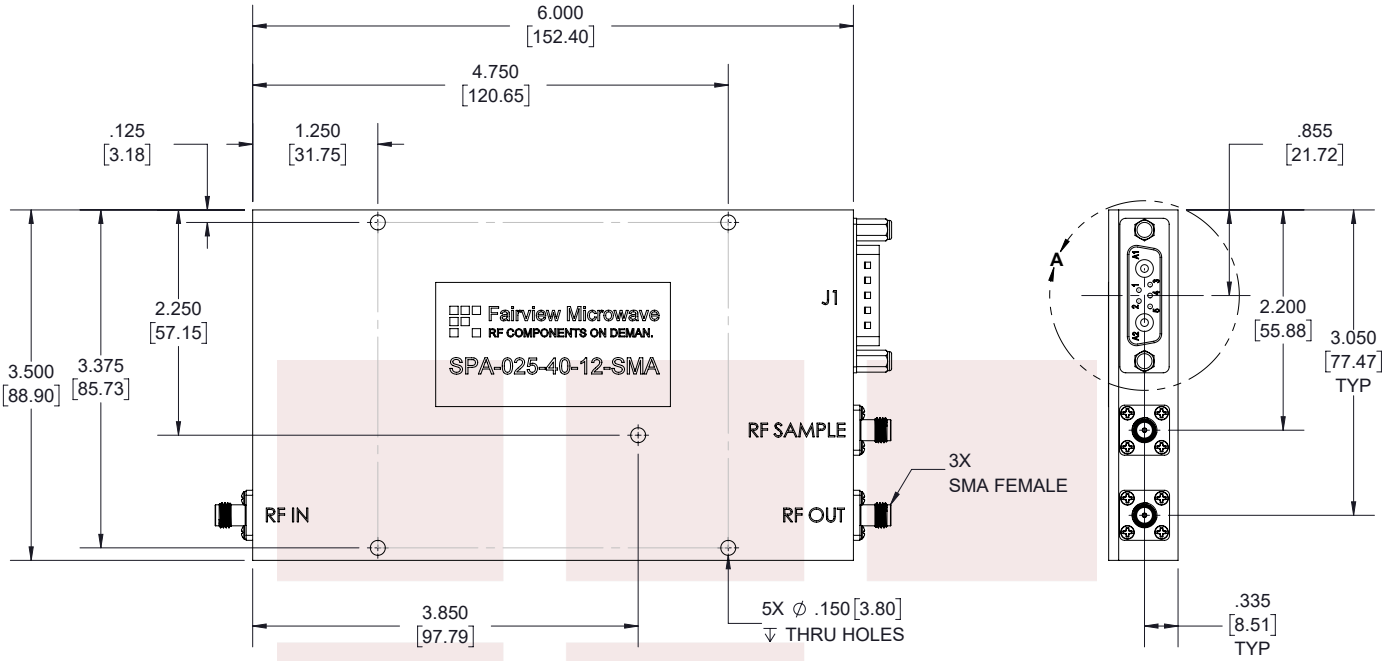


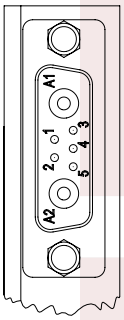


40 dB Gain High Power Amplifier at 13 Watt P1dB Operating from 800 MHz to 2.5 GHz with 50 dBm IP3, SMA from Fairview Microwave is in-stock and available to ship same-day. All of our RF/microwave products are available off-the-shelf from our ISO 9001:2008 certified facilities in Allen, Texas. Fairview Microwave is RF on-demand.

For additional information on this product, please click the following link: 40 dB Gain High Power Amplifier at 13 Watt P1dB Operating from 800 MHz to 2.5 GHz with 50 dBm IP3, SMA SPA-025-40-12-SMA

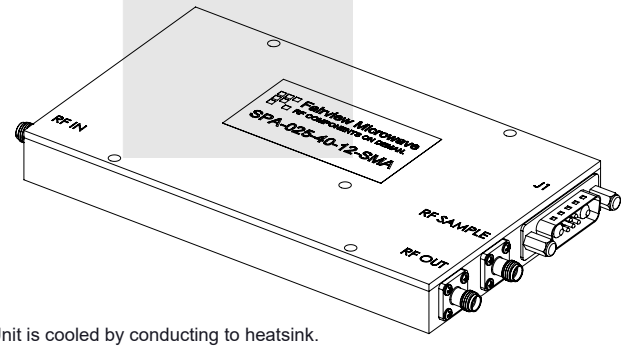
URL: https://www.fairviewmicrowave.com/40db-high-power-high-gain-amplifier-13watt-spa-025-40-12-sma-p.aspx





DETAIL A

7W2 DC Connections		
Pin	**Description**	**Specification**
A1	Ground	VDC Ground
A2	+VDC	+12 VDC ±0.5V **
1	Temperature Sensor	.75V at +25ºC, 1V at +50ºc, 1.25V at +75ºC (±0.05V)
2	Amplifier Enable	Enable: +5V TTL HIGH, Disable: 0V TTL LOW (+5.5V Max.)
3	No Connection	N/A
4	Ground	VDC Ground
5	Forward Power Detection	N/A



STANDARD TOLERANCES
.X ±0.2
.XX ±0.01
.XXX ±0.005

*STANDARD TOLERANCES APPLY ONLY TO DIMENSIONS IN INCHES

Notes: Heatsink required for proper operation. Unit is cooled by conducting to heatsink.
** Specified operation at +12V, However, unit can be run from +10V to +14V.

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NOTES:
1. UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE NOMINAL.
2. ALL SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE AT ANY TIME.
3. DIMENSIONS ARE IN INCHES [mm].

TITLE

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DWG NO	CAGE CODE
SPA-025-40-12-SMA	3FKR5

CAD FILE	SHEET	SCALE	SIZE	
05/09/18	1 OF 1	N/A	A	7361

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