



# FSP-PA-512

## VARIABLE GAIN AMPLIFIER 5 - 12 GHz

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Variable Gain Amplifier - Module

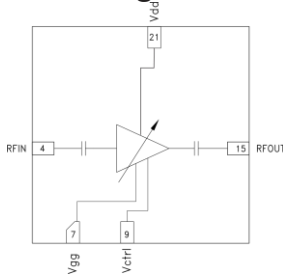
### Typical Applications

The FSP-PA-512 is ideal for:

- Point-to-Point Radio
- Point-to-Multi-Point Radio
- EW & ECM Subsystems
- X-Band Radar
- Test Equipment & Sensors



### Functional Diagram



### Features

- Wide Gain Control range: 22 db
- Single Control Voltage: -1 to -4.5V
- Output ip3 @ max Gain: +34 dbm
- Output p1db: +22 dbm
- low noise figure 2db @ max gain
- no external matching

### General Description

The FSP-PA-512 is a Gaas pHEMT mmiC analog variable gain amplifier and / or driver amplifier which operates between 5 and 12 GHz. ideal for microwave radio applications, the amplifier provides up to 18.5 db of gain, output p1db of up to +23 dBm, and up to +34 dBm of output ip3 at maximum gain, while requiring only 170 ma from a +5V supply. Gain control voltage pin (Vctrl) is provided to allow variable gain control up to 22 db. Gain flatness is excellent making the FSP-PA-512 ideal for EW, ECM and radar applications.

### Electrical Specifications, $T_A = +25^\circ\text{C}$ , $V_{dd} = 5\text{V}$ , $V_{ctrl} = -4.5\text{V}$ , $I_{dd} = 120\text{ mA}^*$

parameter	min.	Typ.	max.	min.	Typ.	max.	Units
frequency range	5 - 8.5		8.5 - 12				GHz
Gain	16	18.5		13	16		db
Gain flatness		$\pm 0.5$			$\pm 1$		db
Gain Variation Over Temperature		0.006			0.006		db/ °C
Gain Control range	15	22		15	20		db
noise figure		2.5			2		db
input return loss		17			9		db
Output return loss		23			7		db
Output power for 1 db Compression (p1db)	19	22		20	23		dbm
Saturated Output power (psat)		23			24		dbm
Output Third Order intercept (ip3)		34			34		dbm
Total Supply Current (idd)		120			120		ma

\*Set Vctrl = -4.5V and then adjust Vgg between -2V to 0V to achieve idd = 120 ma typical. (Already Tuned)

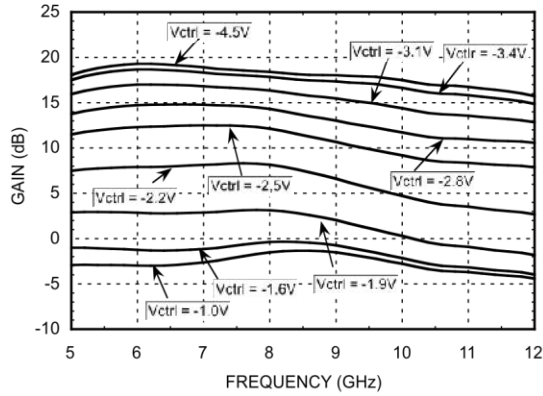
For price, delivery, and to place orders, please contact **Fidar System Pooyan** Corporation:

[www.cintix.ir](http://www.cintix.ir) Phone: +98-21-88516856 Fax: +98-21-88735031

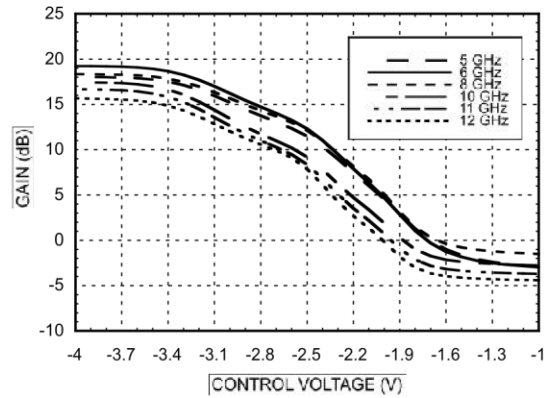


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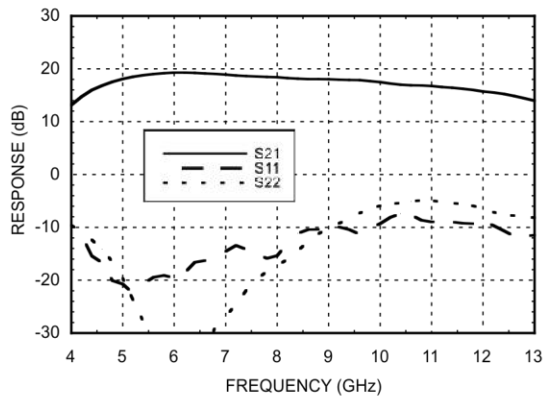
Gain vs. Control Voltage Range



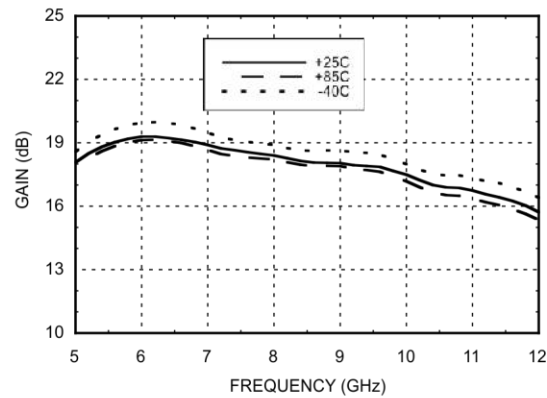
Gain vs. Control Voltage



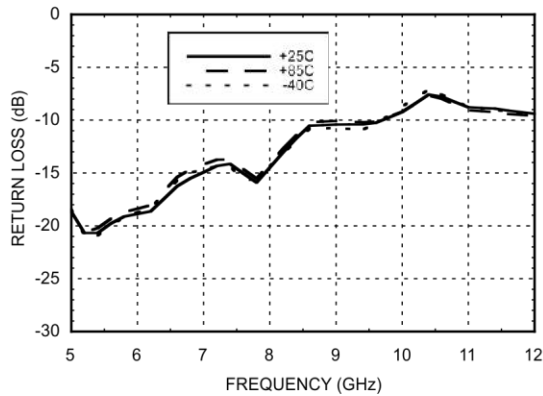
Broadband Gain & Return Loss



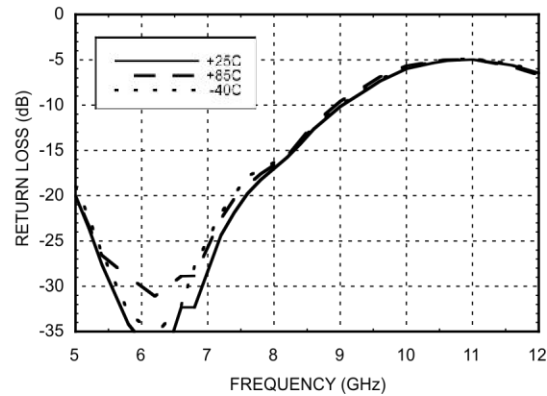
Gain vs. Temperature



Input Return Loss vs. Temperature



Return Loss vs. Temperature





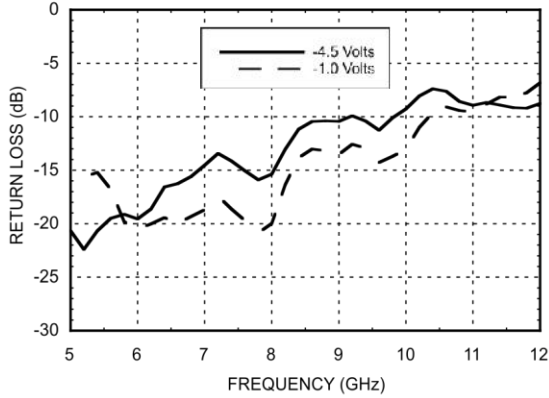
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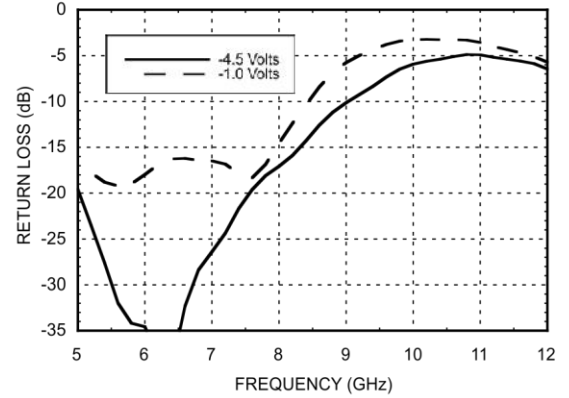
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Variable Gain Amplifier - Module

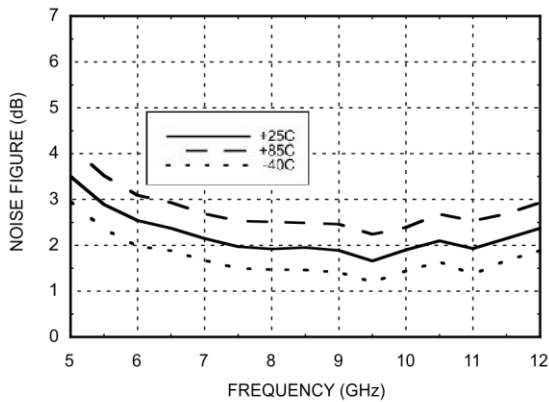
**Input Return Loss @ Control Voltage Extreme**



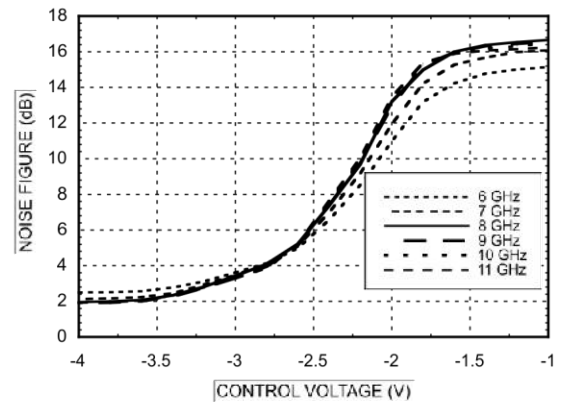
**Output Return Loss @ Control Voltage Extreme**



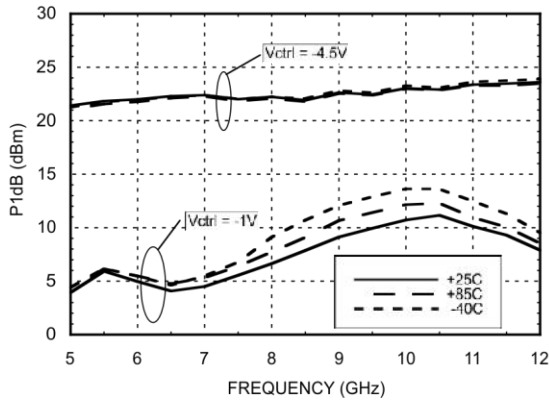
**Noise Figure vs. Temperature**



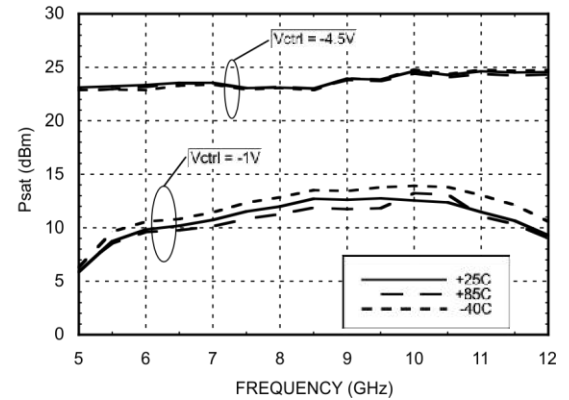
**Noise Figure vs. Control Voltage**



**P1dB vs. Temperature**



**Psat vs. Temperature**

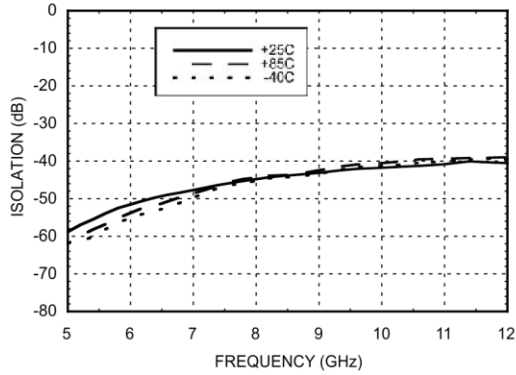




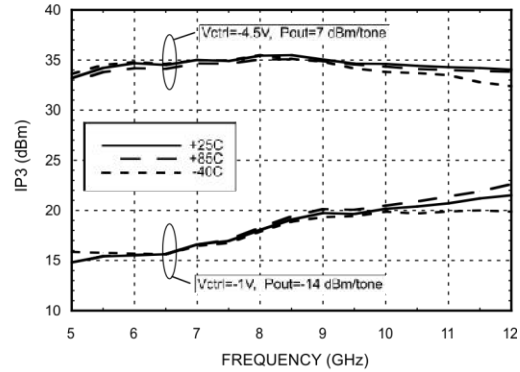
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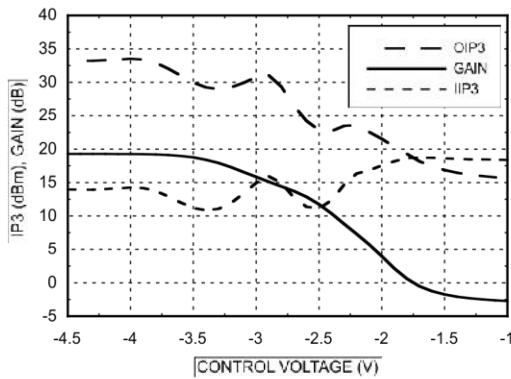
Reverse Isolation vs. Temperature



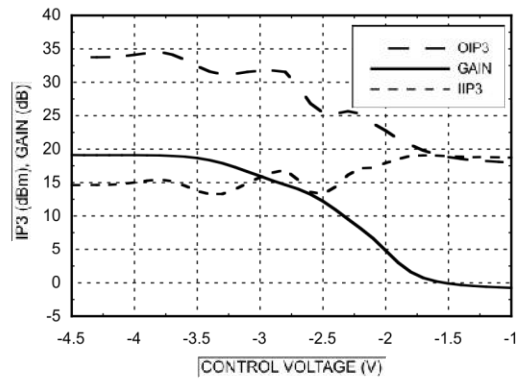
Output IP3 vs. Temperature



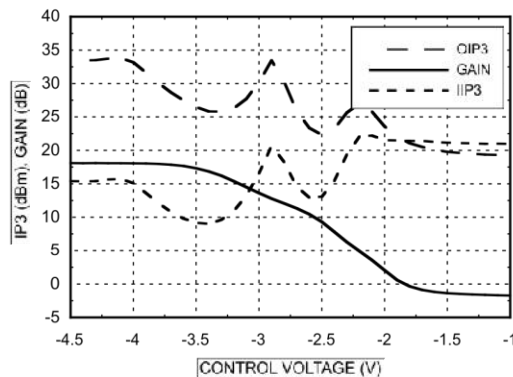
IP3 and Gain @ 6 GHz, Pin = -10 dBm



IP3 and Gain @ 8 GHz, Pin = -10 dBm



IP3 and Gain @ 10 GHz, Pin = -10 dBm





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### Absolute Maximum Ratings

Drain bias Voltage (Vdd1, 2)	+5.5V
Gate bias Voltage (Vgg1, 2)	-3 to 0V
Gain Control Voltage (Vctrl)	-5 to 0V
rf power input	+20 dbm
Channel Temperature	175 °C
Continuous pdiss (T = 85 °C) (derate 11.5 mW/°C above 85 °C) [1]	1.03 W
Thermal resistance (Channel to ground paddle)	86.7 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
eSD Sensitivity (Hbm)	Class 0 passed 150V

### Bias Voltage

Vdd1,2(V)	idd Total (ma)
+5V	120 ma
Vgg1,2 (V)	igg Total (ma)
0V to -2V	<0.1 ma



ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTION

### Outline Drawing

[All Dimensions are in mm]

