

SAC4700QP3



MMIC Limiter Low Noise Amplifier
0.02~1GHz

Rev 1.1

Features

- Frequency: 0.02~1GHz
- Gain: 28dB
- Noise Figure: 0.5dB Typ., 0.7dB Max.
- RF Input Port Power Endurance: 2W CW
- Recovery Time: 30μs
- Output P_{-1dB}: 20dBm
- Supply Voltage: +5V/85mA
- Package Size: 3mmx3mmx1.3mm

Typical Applications

- Radar
- Low Noise Amplifier

General Description

SAC4700QP3 is a PIN diode limiter low noise amplifier (Limiter-LNA) MMIC, the Limiter-LNA handles up to 33 dBm CW input power without failure. Small-signal gain and noise figure (NF) are 28dB and 0.5dB, respectively over the 0.02to 1 GHz frequency range.

Electrical Performance

T_A=25°C, V_D=+5V, I_D=85mA, Z₀=50Ω

Parameter	Min.	Typ.	Max.	Units
Frequency Range	0.02~1			GHz
Gain	26	28	32	dB
Gain Flatness	—	±0.8	±1.5	dB
Input/Output VSWR	—	1.5	2.2	:1
Noise Figure	—	0.5	0.7	dB
Recovery Time*	—	30	—	nS
Reverse Isolation	—	35	—	dB
Output Power for 1 dB Compression (OP-1dB)	18.5	20	—	dBm
Supply Current (I _D)	—	85	—	mA

* f=700MHz, Pin=33dBm

Absolute Maximum Ratings

Maximum Input Power	+36dBm, CW, 30s	Operating Temperature	-55°C~+85°C
Channel Temperature	+150°C	Storage Temperature	-55°C~+150°C
VD Bias	+8V	RF input port reverse withstand voltage	±2V

SuperApex, LLC

1580 S. Milwaukee Ave. Suite 405, Libertyville, IL 60048, USA
Tel: 1-847-505-8319, 1-847-573-9866
E-mail: sales@superapexco.com
Website: www.superapexco.com

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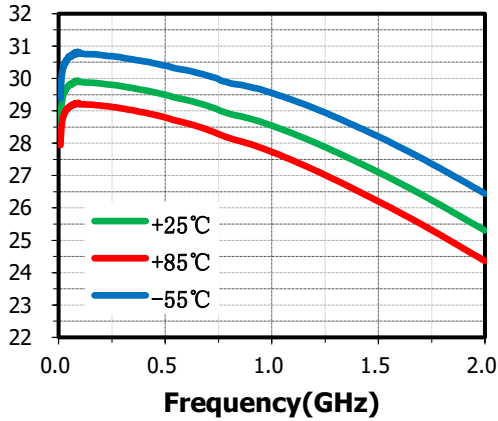
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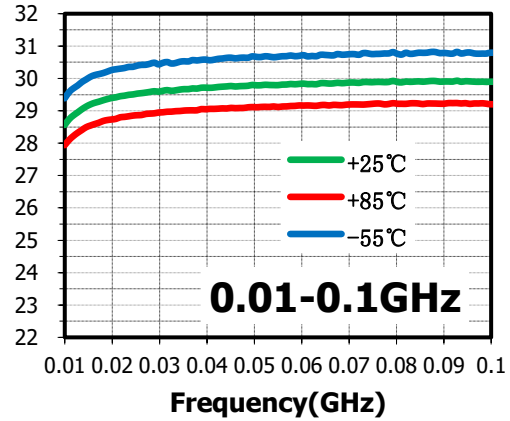
Typical Performance Curve

The following data are obtained from SAC4700QP3 evaluation board, $V_D=+5V$ $I_{DQ}=85mA$.

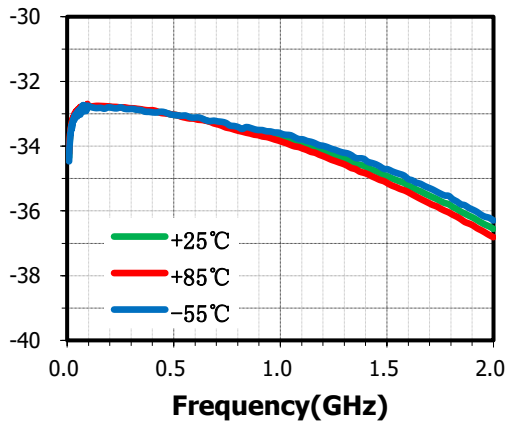
Small Signal Gain(dB) vs.Temperature



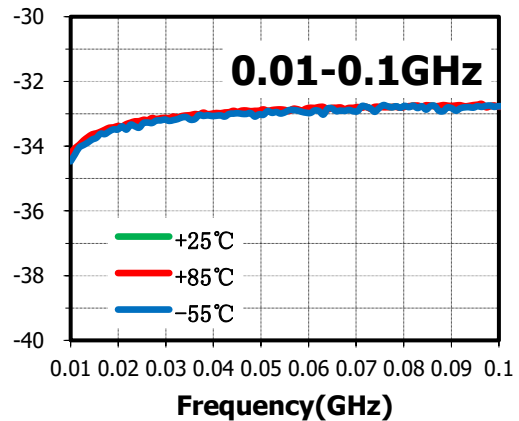
Small Signal Gain(dB) vs.Temperature



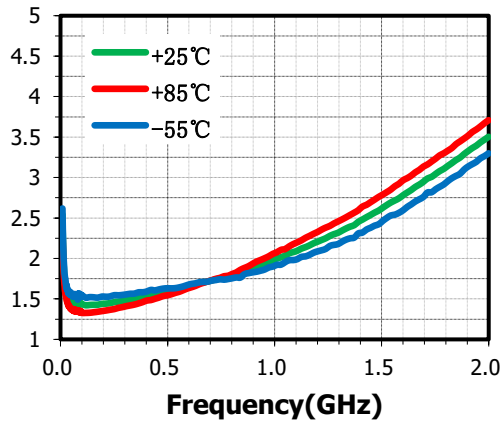
Reverse Isolation(dB) vs.Temperature



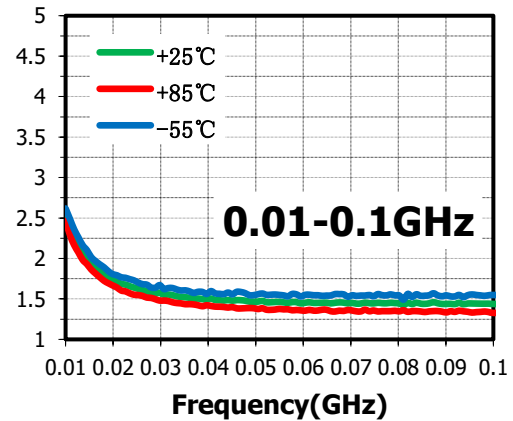
Reverse Isolation(dB) vs.Temperature



Input VSWR(:1) vs.Temperature



Input VSWR(:1) vs.Temperature



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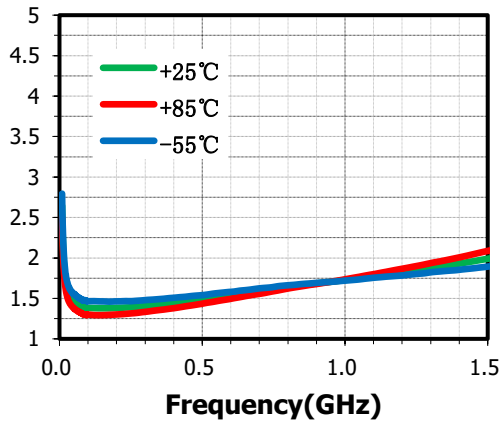
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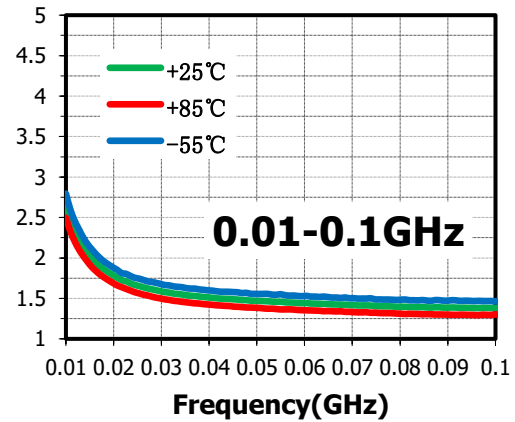
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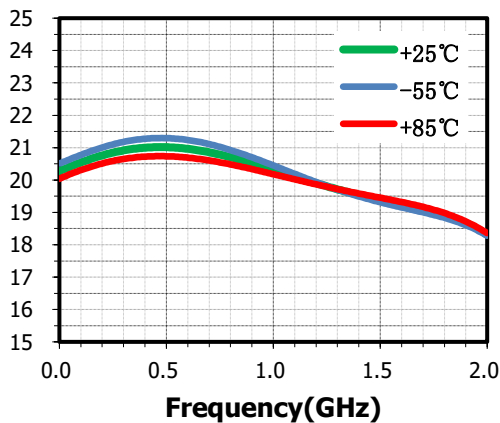
Output VSWR(:1) vs.Temperature



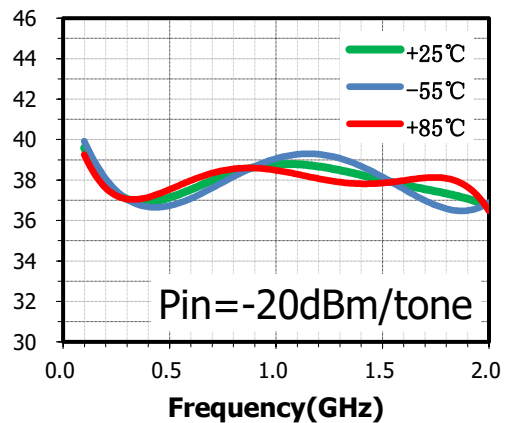
Output VSWR(:1) vs.Temperature



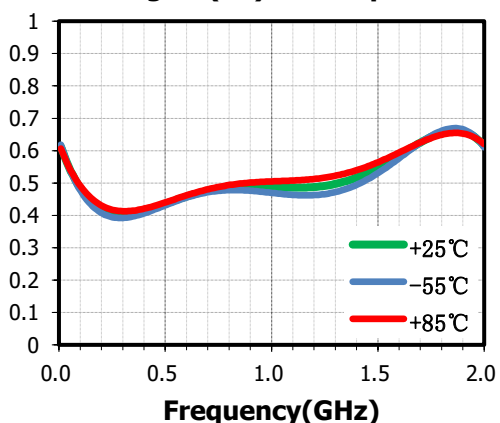
Output P-1dB(dBm) vs.Temperature



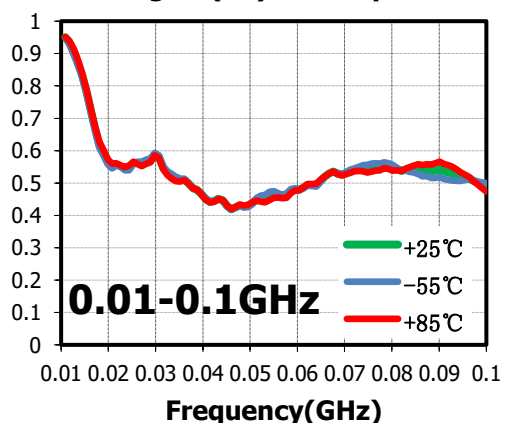
Output IP₃(dBm) vs.Temperature



Noise Figure(dB) vs.Temperature



Noise Figure(dB) vs.Temperature



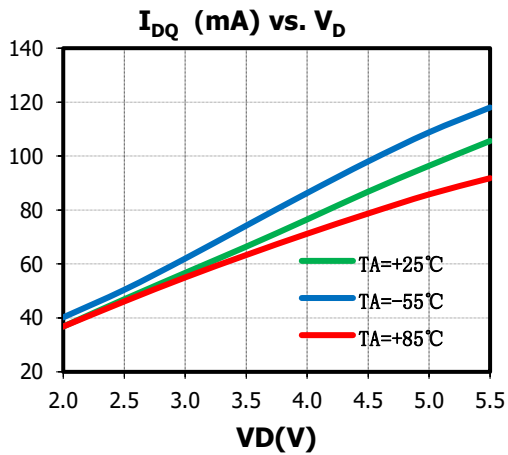
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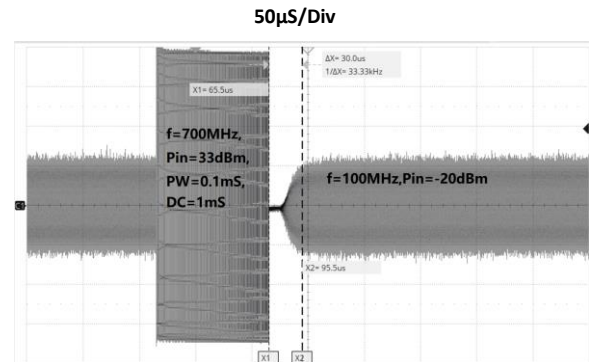
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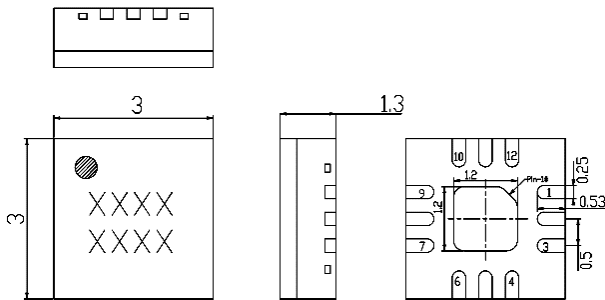


Recover Time(μS)

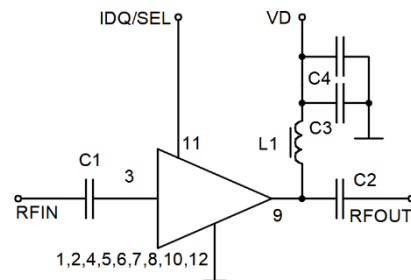


Outline Drawing

(All dimensions in mm)



Assembly Diagram



Pin Function

Pin No.	Description	Pin No.	Description
1	Connect to GND	7	Connect to GND
2	Connect to GND	8	Connect to GND
3	RF Input, DC Coupling	9	RF output, VD Bias
4	Connect to GND	10	Connect to GND
5	Connect to GND	11	Quiescent current selection: Connect to GND--> Lower Current(≈60mA) Floating--> Default (≈85mA)
6	Connect to GND	12	Connect to GND

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Components List

Reference Des.	Value	Part Number	Size
C1、 C2	1000pF	-	0402
C3	1000 pF	-	0402
C4	0.47μF	-	0402
L1	820nH	-	0603

Attention:

- 1.The moisture resistant grade of products is 2A, the storage environment $\leq 30^{\circ}\text{C}/60\% \text{RH}$, the surrounding workshop Life is 4 weeks;
2. Try to use thin RF boards and increase the number of groundings vias at the bottom of the device to reduce grounding inductance;
3. Remove the vacuum packaging and bake in a $125+/-5^{\circ}$ environment for 6 hours before reflow soldering;
4. It is extremely not recommended to heat the package directly from the top.

Revision History

Revision	Date	Comment
1.0	July 16, 2024	First Release
1.1	July 24, 2024	Add recovery time parameter

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