

SAC3242Q5



GaAs MMIC PIN Switch
5GHz~7GHz SP2T

Rev 1.0

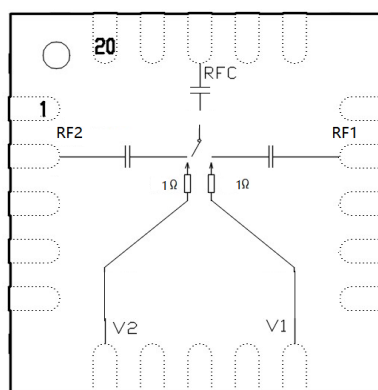
Features

- Frequency: 5~7GHz
- Insertion Loss: 1dB@5.8GHz
- Isolation: 33dB@5.8GHz
- Reflective switch
- P_{-0.5} dB:43dBm
- Package: QFN5x5

Description

SAC3242Q5 is an SP2T PIN diode switch with integrated bias networks offered in lead-free 3 x 3 mm QFN surface mount plastic package, Each RF port contains DC blocking capacitors and a DC bias circuit consisting of high impedance lines and decoupling capacitor.

Functional Diagram



Electrical Performance

T_{BASE}=25°C, Z₀=50Ω, 60mA/+5V/-40V, CW

Parameter	Min.	Typ.	Max.	Units
Frequency	5	—	7	GHz
Insertion Loss	—	1	1.3	dB
VSWR _{RFC}	—	1.2	1.7	: 1
VSWR _{RFX}	—	1.2	1.7	: 1
Isolation	28	33	—	dB
Forward Bias Current*	55	60	80	mA
Switching Speed**	—	10	—	nS
Forward Bias Voltage	—	1.7	—	V

*Bias current for +V control.

**10%~90% RF power establishment time

Absolute Maximum Ratings

Input Power	+46dBm,10%,1mS (-V: -40V)	Operating Temperature (T _{BASE})	-55°C~+85°C
Junction Temperature	150°C	Storage Temperature	-55°C~+150°C
Forward Bias Current	100mA	Reverse Bias Voltage(-V)	-50V

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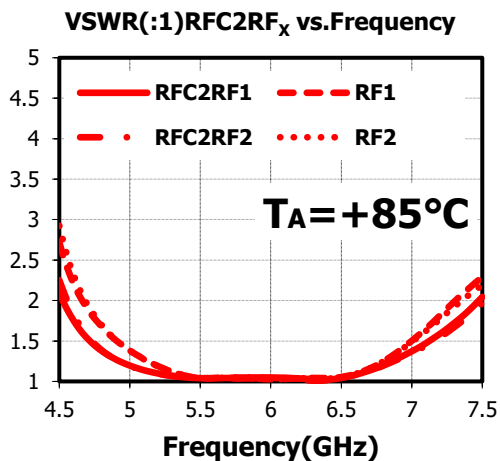
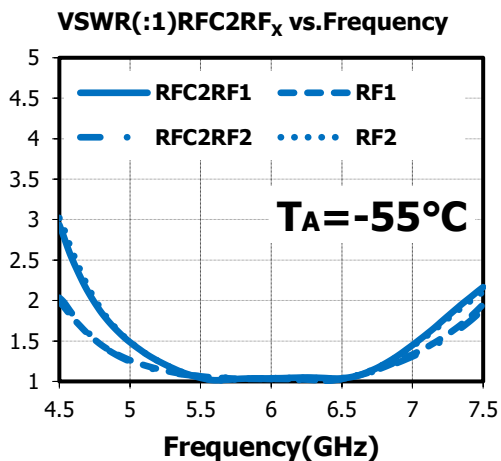
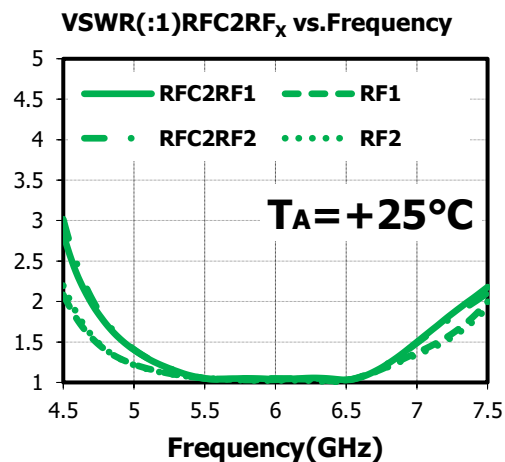
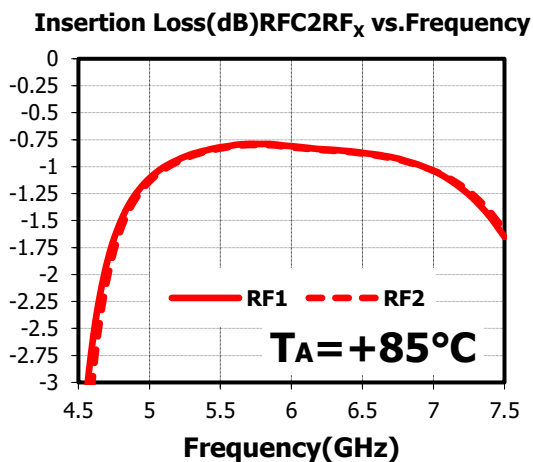
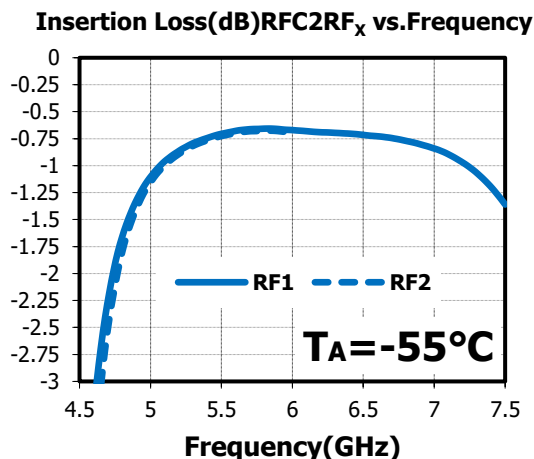
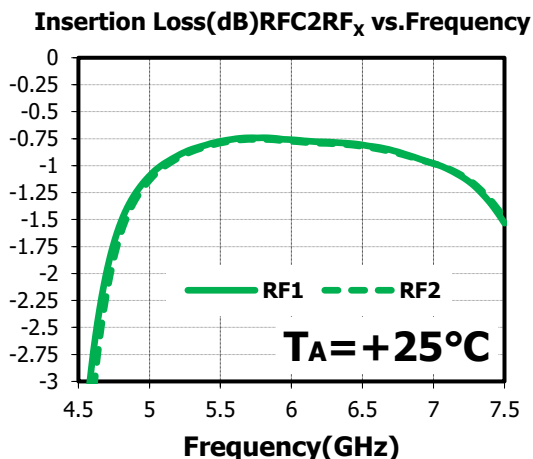


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Typical Performance Curve

The following curves are taken from SAC3242Q5 evaluation board, 60mA/+5V/-40V, CW, T_{BASE}=+25°C



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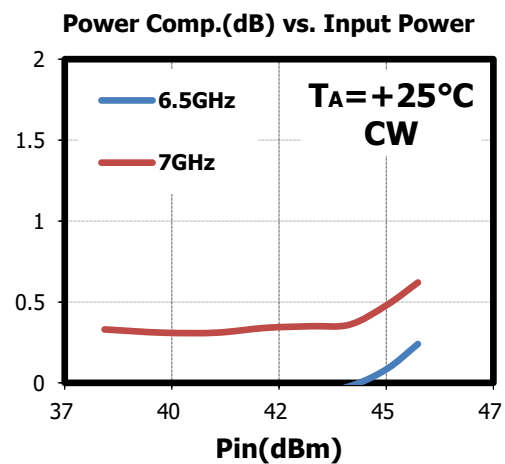
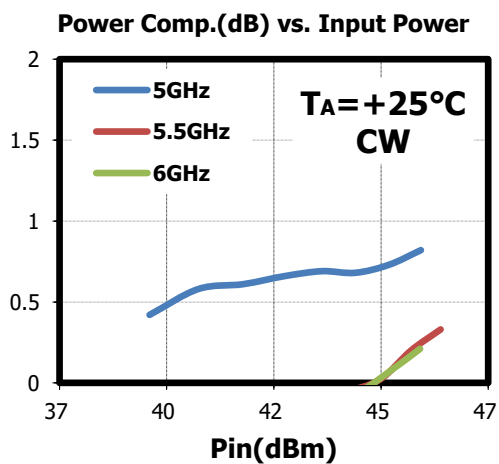
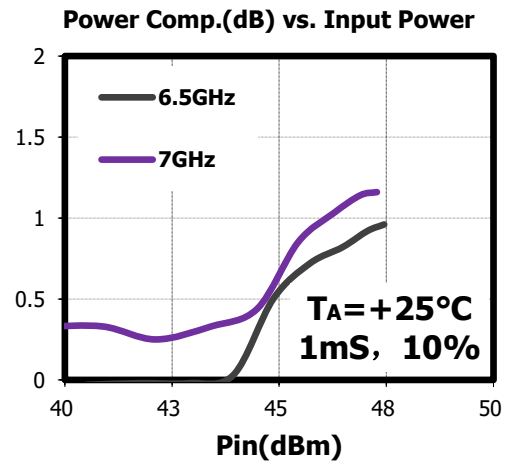
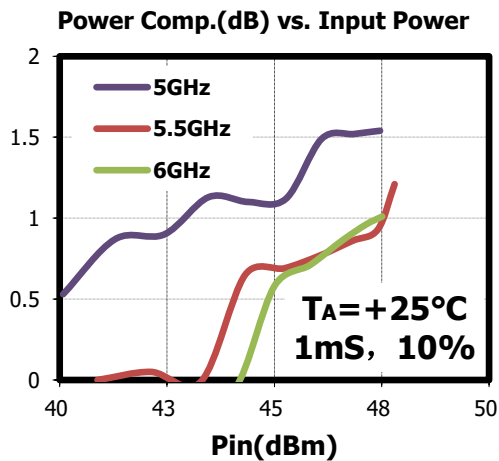
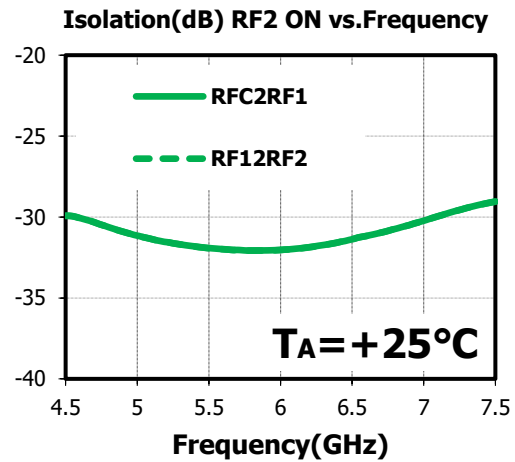
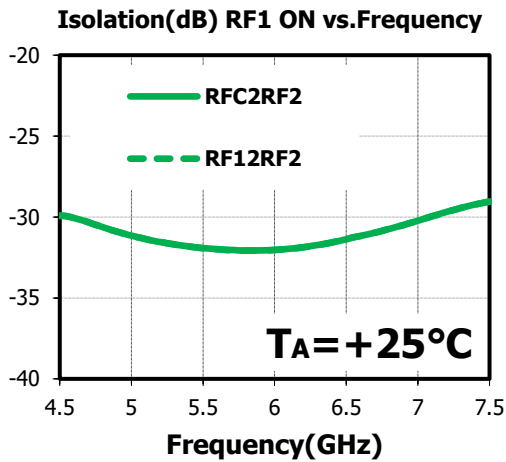
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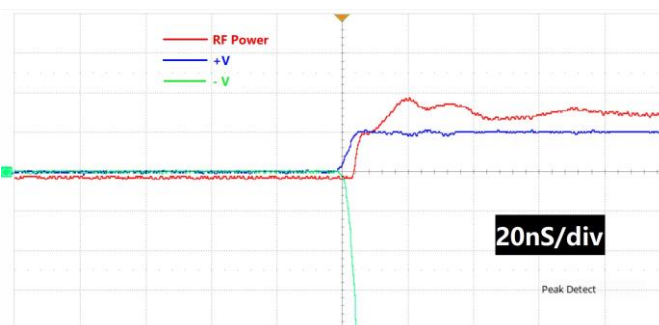


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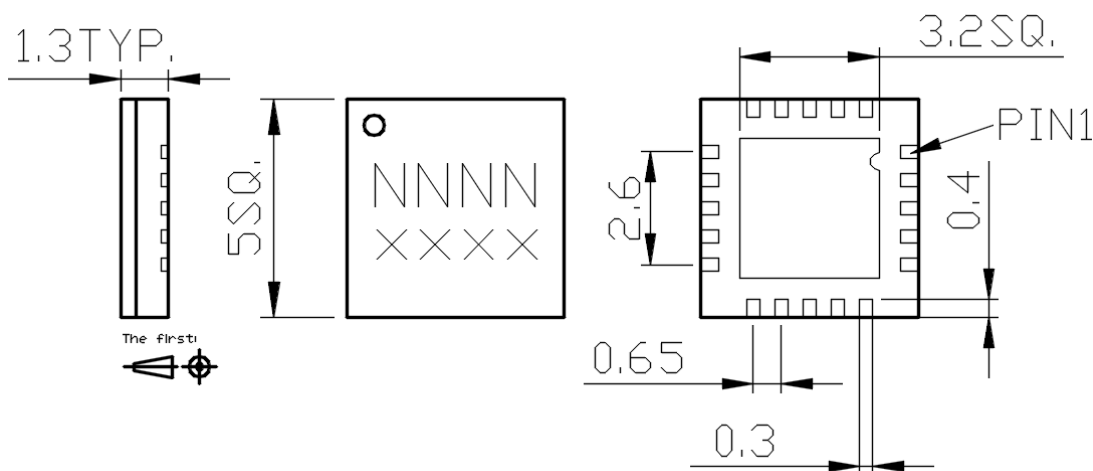
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Switching Speed

$R_{-V}=R_{+V}=50\Omega$, $P_{in}=+24dBm$, $f=6GHz$



Outline Drawing (mm)



Truth Table

Inputs		Outputs	
V1	V2	RFC-RF1	RFC-RF2
-V	+V	ON	OFF
+V	-V	OFF	ON

1. -V is the reverse bias voltage, Reverse bias voltage should be determined based on input power, for example, -40V is minimum requirements for 46dBm power handling ability

2. +V is forward bias voltage, A voltage of 3~5 V can be used to forward bias the PIN diode, forward bias current is set using external bias resistors placed at pads V1 and V2.

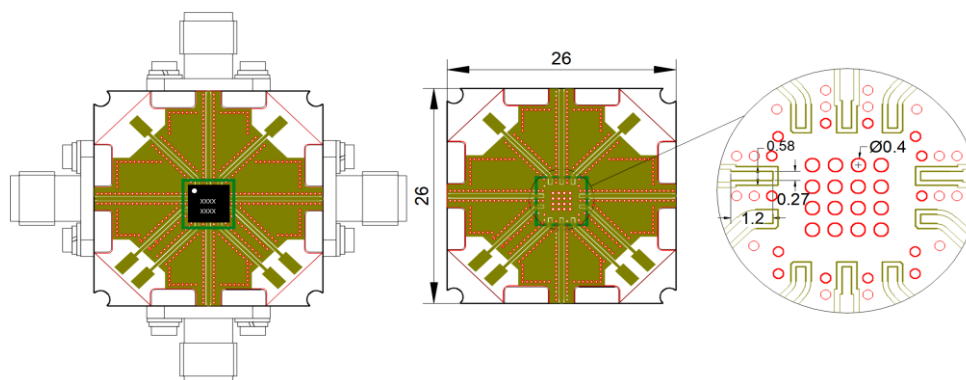
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Pin Function

Pin No.	Description	Pin No.	Description
1	Connect to GND	11	Connect to GND
2	RF2	12	Connect to GND
3	Connect to GND	13	Connect to GND
4	Connect to GND	14	RF1
5	Connect to GND	15	Connect to GND
6	V2	16	Connect to GND
7	Connect to GND	17	Connect to GND
8	Connect to GND	18	RFC
9	Connect to GND	19	Connect to GND
10	V1	20	Connect to GND

SAC3242Q5 Evaluation Board



The Evaluation board is a 2-layer board fabricated using Rogers 4350b $t=0.254$ and using best practices for high frequency RF design. The RF input and RF output traces have a $50\ \Omega$ characteristic impedance.

Attention:

1. The RF input and output ports have integrated DC blocking capacitors with a voltage resistance of 60V;
2. The ESD tolerance level is HBM Class 1B;
3. The moisture resistance level of the packaged product is 2a, the storage environment is less than or equal to $30\ ^\circ\text{C}/60\% \text{RH}$, and the lifespan of the surrounding workshop;
4. When using packaged products, try to use thin RF boards and increase the number of groundings vias at the bottom of the device to reduce grounding inductance;
5. Remove the vacuum packaging and bake in a $125\pm 5\ ^\circ\text{C}$ environment for 6 hours before soldering.

Revision History

Revision	Date	Comment
1.0	July 31, 2024	First Release