SAC3243Q4

GaAs MMIC PIN Switch
8.5GHz~12GHz SP2T

Rev 1.0

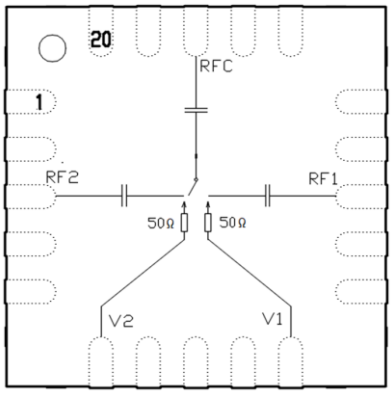
Features

- Frequency: 8.5~12GHz
- Insertion Loss: 0.5dB@10GHz
- Isolation: 30dB@10GHz
- Reflective switch
- $P_{-0.5}$ dB: 36dBm
- Package: QFN4x4

Description

SAC3243Q4 is an SP2T PIN diode switch with integrated bias networks offered in lead-free 4 x 4 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℃, Z_0=50Ω, 20mA/+5V/-15V, CW

Parameter	Min.	Typ.	Max.	Units
Frequency	8.5	—	12	GHz
Insertion Loss	—	0.5	0.8	dB
$VSWR_{RFC}$	—	1.3	1.8	: 1
$VSWR_{RFX}$	—	1.3	1.8	: 1
Isolation	24	30	—	dB
Forward Bias Current*	—	20	35	mA
Switching Speed**	—	25	—	nS
Forward Bias Voltage	—	1	—	V

*Bias current for +V control.

**10%~90% RF power establishment time

Absolute Maximum Ratings

Input Power	+39dBm (-V: -15V)	**Operating Temperature (T_{BASE})**	-55℃~+85℃
Junction Temperature	150℃	**Storage Temperature**	-55℃~+150℃
Forward Bias Current	45mA	**Reverse Bias Voltage(-V)**	-30V

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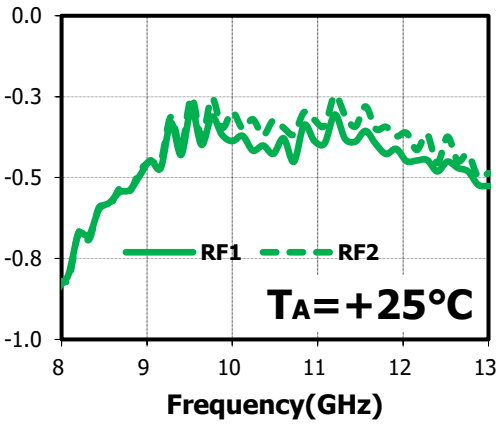
Typical Performance Curve

The following curves are taken from SAC3243Q4 evaluation board， 20mA/+5V/-15V, CW, T_{BASE}=+25℃

Insertion Loss(dB)RFC2RF$_X$ vs.Frequency



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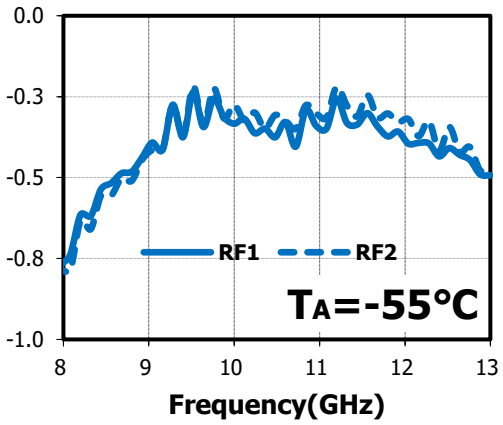

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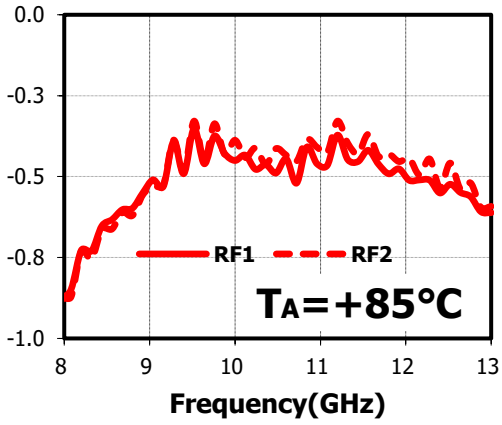
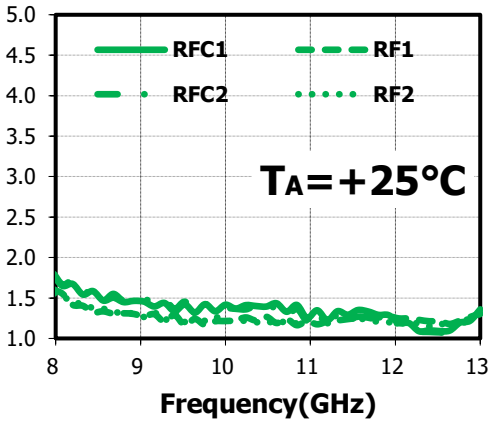
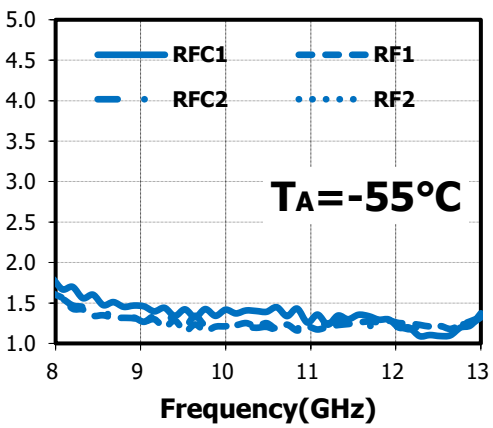


VSWR(:1)RFC2RF$_X$ vs.Frequency



VSWR(:1)RFC2RF$_X$ vs.Frequency



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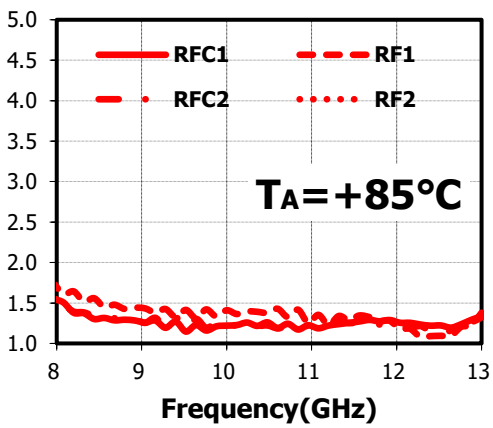

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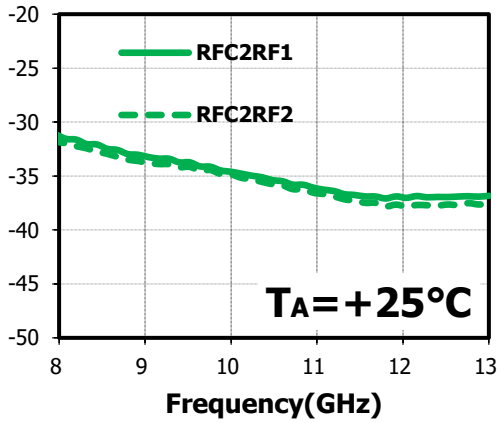
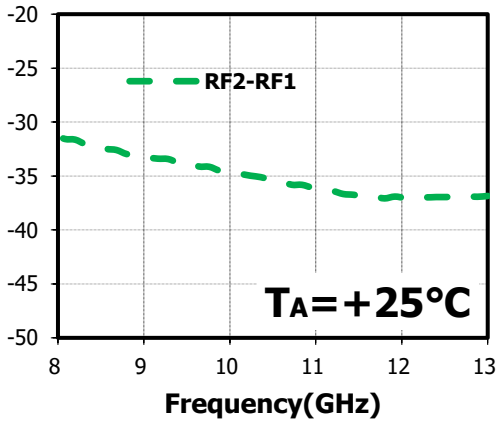
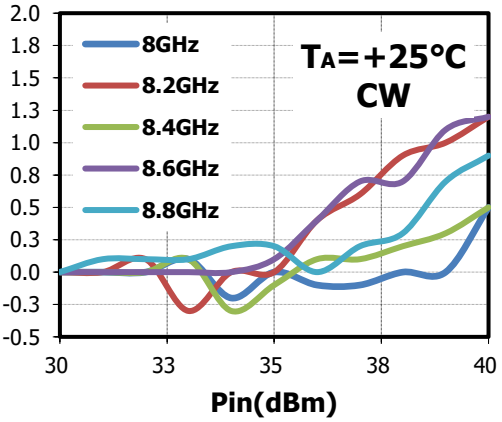
Isolation(dB) RFC2RFx vs.Frequency



Isolation(dB) RF2-RF1 vs.Frequency



Power Comp.(dB) vs. Input Power



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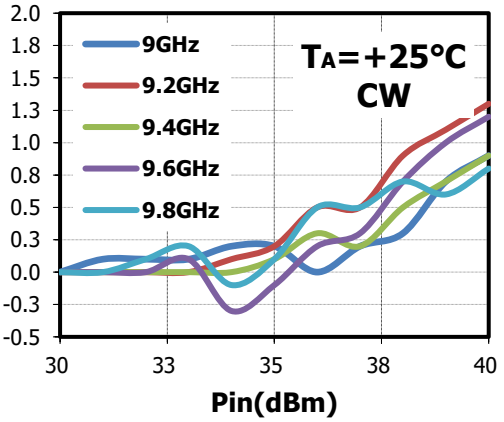

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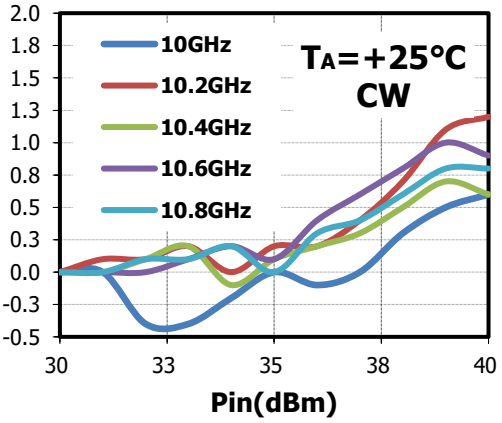

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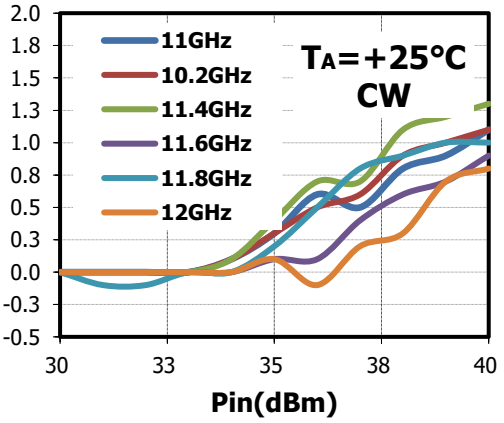
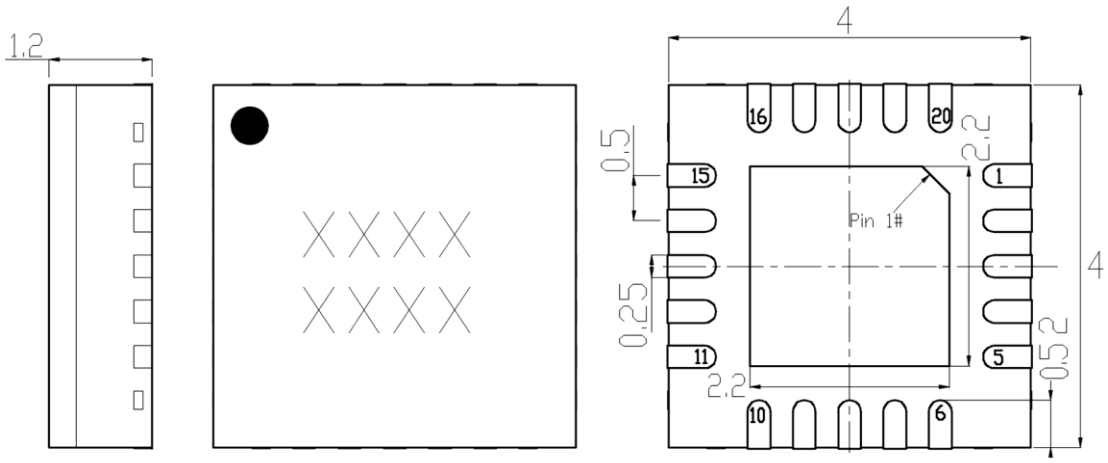


Outline Drawing (mm)



Truth Table

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

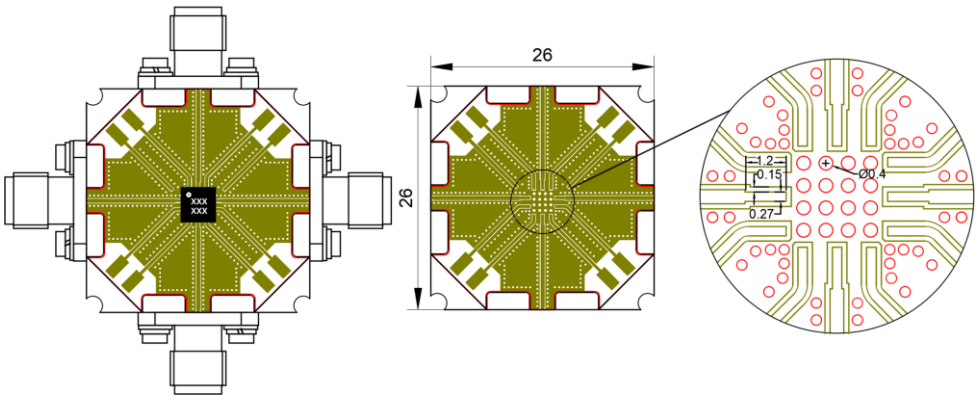
1．-V is the reverse bias voltage, Reverse bias voltage should be determined based on input power, for example, -15V is minimum requirements for 36dBm power handling ability;

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.

Pin Function

Pin No.	Description	Pin No.	Description
1	Connect to GND	11	Connect to GND
2	Connect to GND	12	Connect to GND
3	RF2	13	RF1
4	Connect to GND	14	Connect to GND
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

SAC3243Q4 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 Ω 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 ℃/60% 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+/-5 ℃ environment for 6 hours before soldering.

Revision History

Revision	Date	Comment
1.0	Oct 19, 2024	First Release

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