# SAC3233Q4

GaAs MMIC PIN Switch
24GHz~35GHz SP3T

Rev 1.0

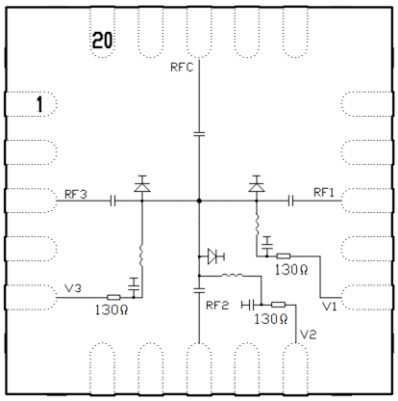
## Features

- Frequency：24~35GHz
- Insertion Loss：1.5dB@33GHz
- Isolation：30dB@33GHz
- Reflective switch
- Package: QFN4x4

## General Description

SAC3233Q4 is a wideband reflective SP3T switch housed in a QFN surface mount 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, +10mA/-5V, CW

| Parameter | Min. | Typ. | Max. | Units |
|---|---|---|---|---|
| Frequency | 24 | — | 35 | GHz |
| Insertion Loss | — | 1.5 | 2.5 | dB |
| RFC Return Loss | — | 13 | — | dB |
| $RF_X$ Return Loss | — | 12 | — | dB |
| Isolation | 26 | 30 | — | dB |
| Forward Bias Current | 8 | 10 | 20 | mA |
| Switching Speed | — | 25 | — | nS |
| Forward Bias Voltage | — | 1 | — | V |

## Absolute Maximum Ratings

| | | | |
|---|---|---|---|
| **Input Power** | +33dBm（-V：-15V） | **Operating Temperature ($T_{BASE}$)** | -55℃~+85℃ |
| **Junction Temperature** | 150℃ | **Storage Temperature** | -55℃~+150℃ |
| **Forward Bias Current** | 25mA | **Reverse Bias Voltage（-V）** | -30V |

RoHS

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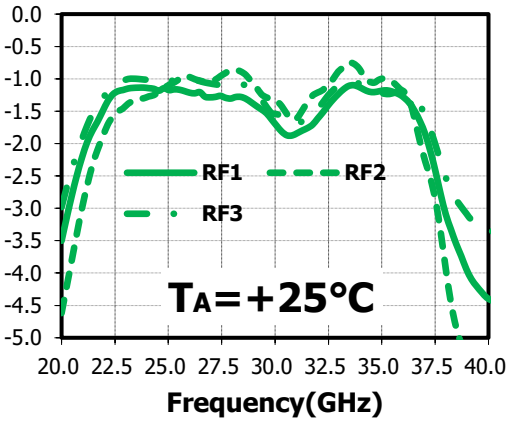
## Typical Performance Curve

**The following curves are taken from SAC3233Q4 evaluation board. De-embedding operation has been Implemented.**
**+10mA/-5V, CW, $T_{BASE}$=+25℃**

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

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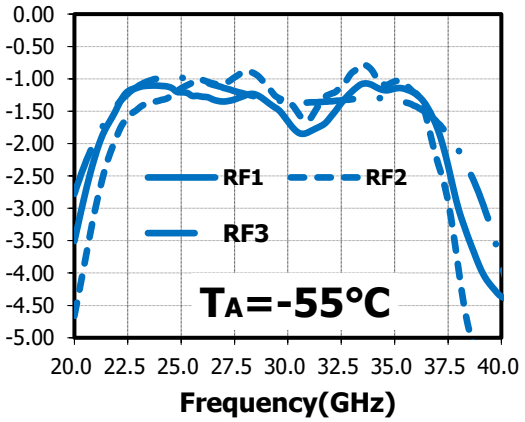


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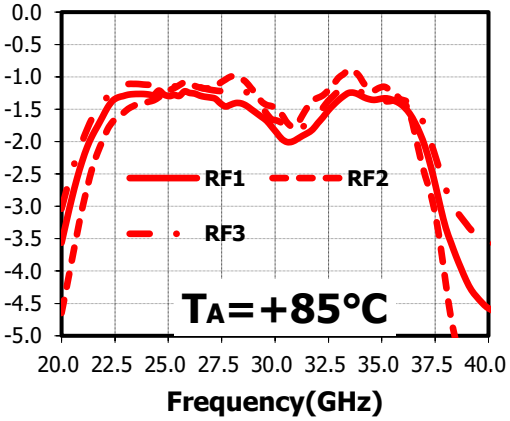
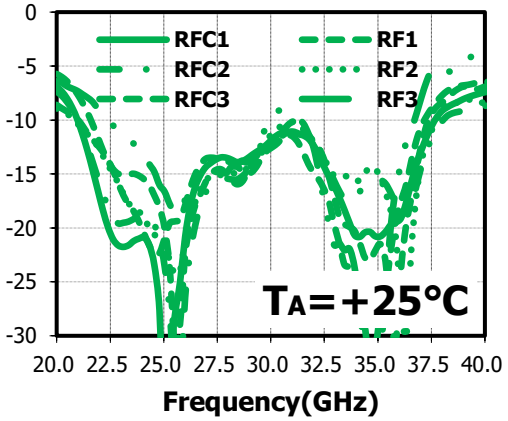
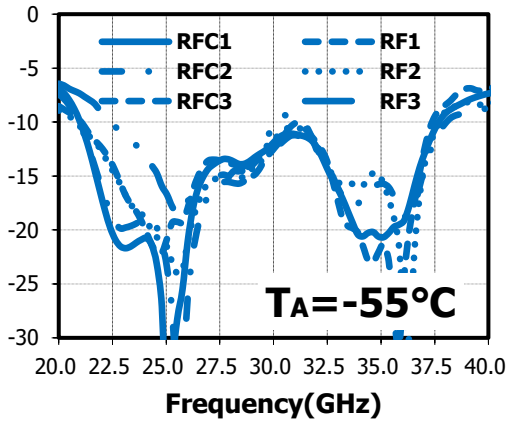


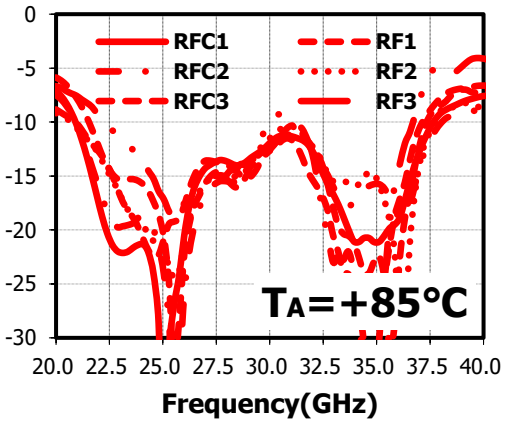

**Return Loss(dB)RFC2RF$_X$ vs.Frequency**



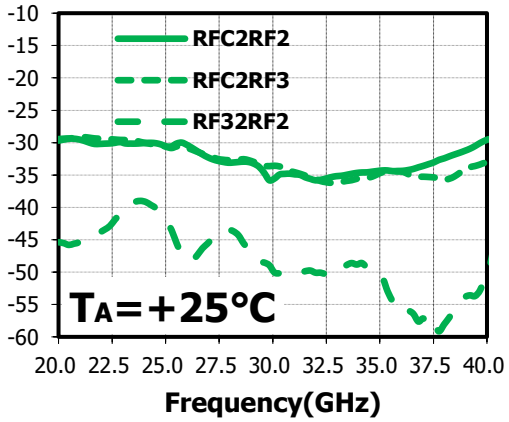
**Return Loss(dB)RFC2RF$_X$ vs.Frequency**



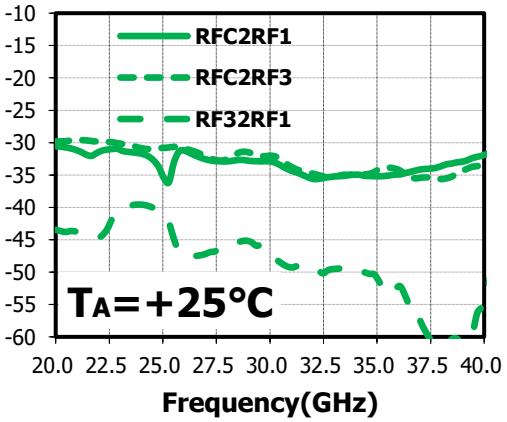

**Return Loss(dB)RFC2RF$_X$ vs.Frequency**



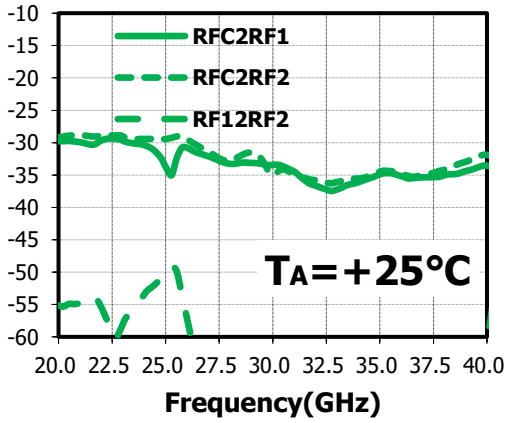

**Isolation(dB) RF1 ON vs.Frequency**



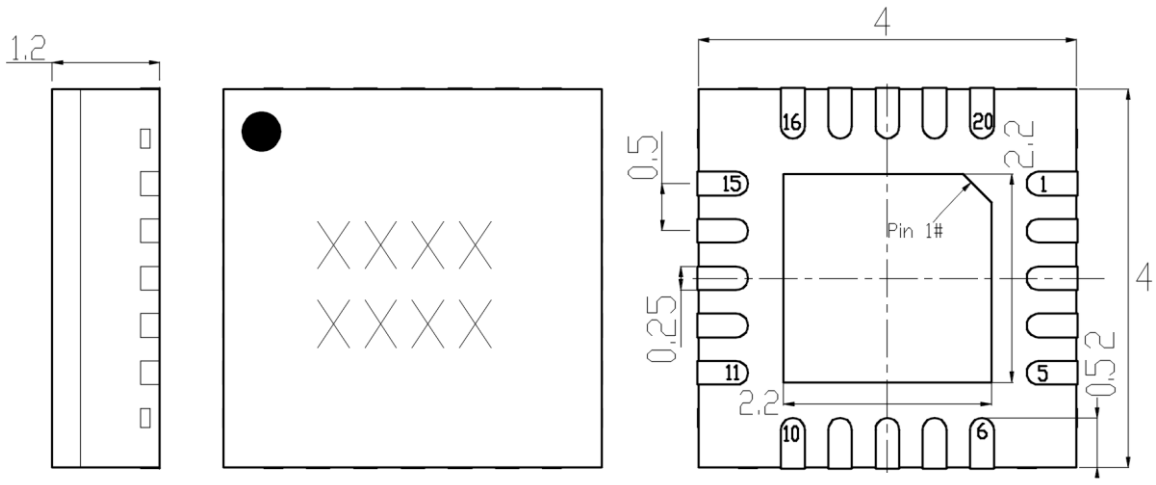

**Isolation(dB) RF2 ON vs.Frequency**




**Isolation(dB) RF3 ON vs.Frequency**



## Outline Drawing (mm)




## Truth Table

| Inputs | | | Outputs | | |
|---|---|---|---|---|---|
| V1 | V2 | V3 | RFC-RF1 | RFC-RF2 | RFC-RF3 |
| -V | +V | +V | ON | OFF | OFF |
| +V | -V | +V | OFF | ON | OFF |
| +V | +V | -V | OFF | OFF | ON |

1. -V is reverse bias voltage, A -5V voltage can be used to reverse bias the PIN diode of the chip, for high power applications, a higher negative voltage can be used,

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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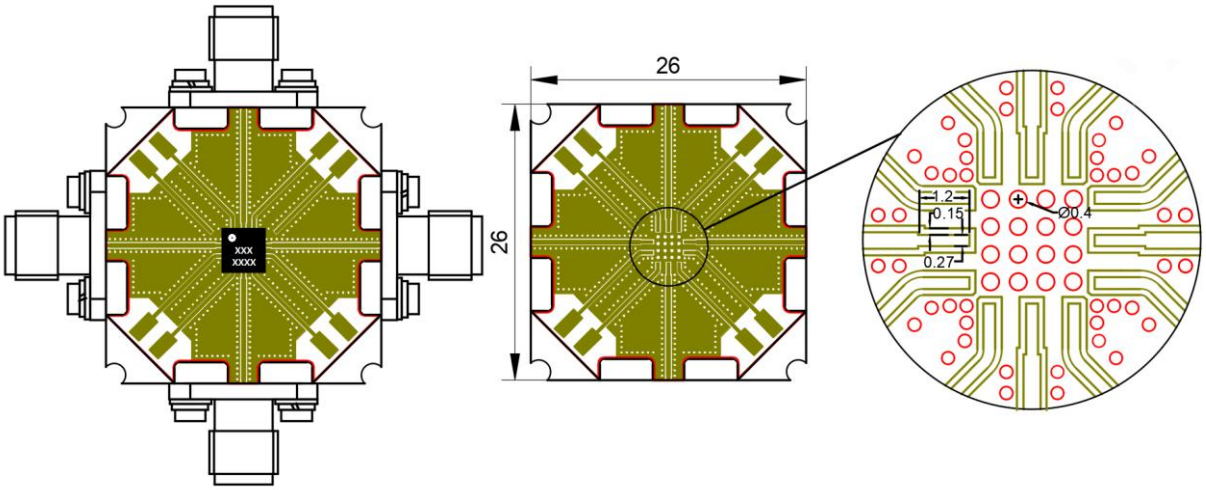
## Pin Function

| Pin No. | Description | Pin No. | Description |
|---|---|---|---|
| 1 | Connect to GND | 11 | V1 |
| 2 | Connect to GND | 12 | Connect to GND |
| 3 | RF3 | 13 | RF1 |
| 4 | Connect to GND | 14 | Connect to GND |
| 5 | V3 | 15 | Connect to GND |
| 6 | Connect to GND | 16 | Connect to GND |
| 7 | Connect to GND | 17 | Connect to GND |
| 8 | RF2 | 18 | RFC |
| 9 | Connect to GND | 19 | Connect to GND |
| 10 | V2 | 20 | Connect to GND |

## SAC3233Q4 Evaluation Board




**The Evaluation board is a 2-layer board fabricated using Rogers 4350 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 back of bare chip is RF and DC ground.
2. The RFC and RFx ports are AC coupled， the withstand voltage is 30V.

## Revision History

| Revision | Date | Comment |
|---|---|---|
| 1.0 | 2024-05-31 | First Release |



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