MASWSS0167 Without Blocking Capacitors (To observe low frequency performance)

Demonstration of lower frequency operation
Please demonstrate low frequency operation on the MASWSS0167.

Datasheet Page 2 Note 4:

4. Insertion Loss can be optimized by varying the DC blocking capacitor value, e.g. 1000 pF for 100 MHz - 500 MHz, 39 pF for 0.5 - 3 GHz.

To operate the switch with positive control, we recommend using large value blocking capacitors (at least 1000pF).

S-Parameters (embedded below, right click to open) are included, de-embedded, to make it easier to integrate into the system. This data was taken without blocking capacitors, to get accurate low frequency data.

Note that the 0 Ohm resistors used probably look a bit inductive at higher frequencies, hence the observed roll off at the high end of the band.
Insertion Loss over Bias and Switch State
Isolation

Isolation over Bias and Switch State

freq, GHz

\(\text{ADS} \quad -10\)

\(\text{freq}, \text{GHz} \quad 0.0 \quad 0.2 \quad 0.4 \quad 0.6 \quad 0.8 \quad 1.0 \quad 1.2 \quad 1.4 \quad 1.6 \quad 1.8 \quad 2.0 \quad 2.2 \quad 2.4 \quad 2.6 \quad 2.8 \quad 3.0 \quad 3.2 \quad 3.4 \quad 3.6 \quad 3.8 \quad 4.0\)
RFC Return Loss over Bias and Switch State

freq, GHz

dB(LF 5V RF2 3P S1) dB(LF 5V RF2 3P S1) dB(LF 3V RF2 3P S1) dB(LF 3V RF2 3P S1) dB(LF 3V RF2 3P S1) dB(LF 2x5V RF2 3P S1) dB(LF 2x5V RF1 3P S1) dB(LF 2x5V RF1 3P S1)
S22 (RF1&2)

RF1 & 2 Return Loss over Bias and Switch State

Isolation Cases

freq, GHz

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At low frequencies, linearity of switch devices is typically reduced. It is important to consider that the datasheet has information extracted at 2.5V. 3 or 5V control could also be used, which will improve linearity in general.

- By linearity, we refer to metrics such as compression, intermodulation distortion, harmonics, etc.

- A 20K resistor, from the RF Common port, pulling up to the most positive control voltage (must be the same as VChigh), also can help to improve linearity when operating at very low voltages.