

An Integrated Power Amplifier Front-end Module with On-chip Antenna at 180-240 GHz

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Abstract

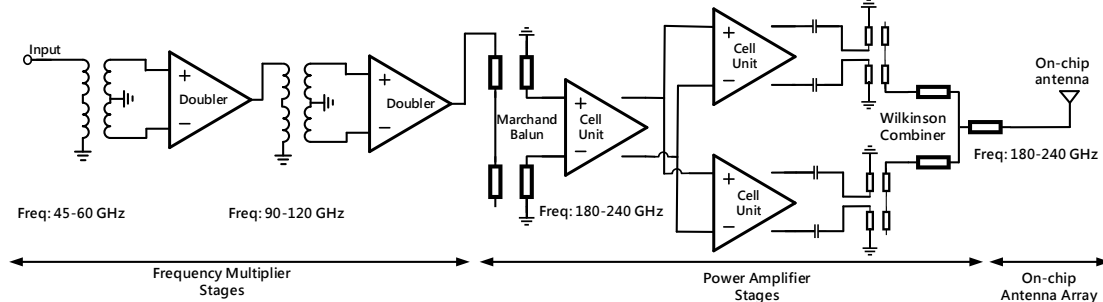
This work presents a practical power amplifier front-end module solution with on-chip antennas at 180-240 GHz. It includes three parts: the frequency multiplier followed by amplifier stages and on-chip antenna array. The input signal varies from 45 GHz to 60 GHz which can be fed through the bond-wire and transmission line on the PCB. All the circuits are implemented by 130-nm SiGe BiCMOS technology.

1 Introduction

Thz communication systems have been in active development in the past years due to the merit of wide bandwidth. It paves the way for a wide range of applications encompassing radar, imaging systems, security and health care. However, it is still a big challenge in designing THz transmitter system because of the limit of transistor cutoff frequency f_t and f_{max} . This work presents the design of a front-end module with on-chip antenna at 180-240 GHz.

2 Design Architecture

This front-end module is composed of frequency multiplier stages and power amplifier stages which are followed by on-chip antenna array. The frequency multiplier consists two frequency doublers and a wide-band transformer. The power amplifier stages include two-stage amplifier and a Marchand balun. The antenna array, implemented on the chip, is driven through the power combiner. All the circuits are integrated on a single chip with compact size.



3 Conclusion

The goal of this work is to achieve high output power and high gain antenna array using an advanced SiGe process in a compact single chip.

Acknowledgements

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References

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