UM11646

BTS6303U Evaluation Board Quick Start Guide

Rev. 1.2 — 15 April 2024 User manual

1 Introduction

This document describes the use, design, and test results of the BTS6303U.

1.1 BTS6303U product description

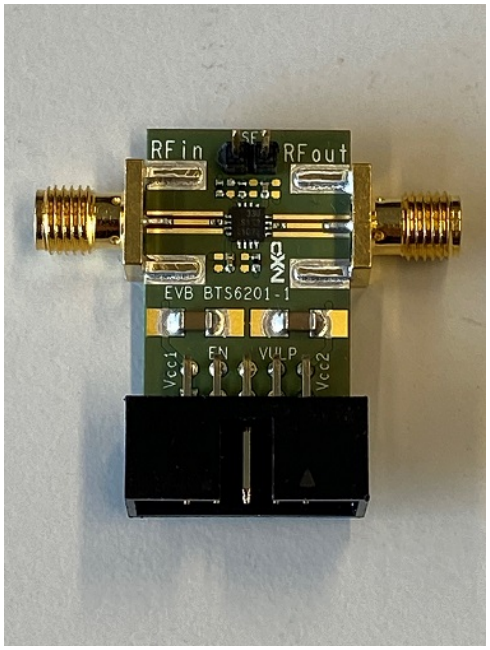
The BTS6303U is a wideband, high linearity, pre-driver amplifier for 5G massive MIMO infrastructure applications, with fast on-off switching to support TDD systems. The amplifier is designed to operate from 2.3 GHz to 4.2 GHz.

It is housed in a 3 mm x 3 mm x 0.85 mm 16-terminal HVQFN package. The amplifier is ESD protected on all terminals.

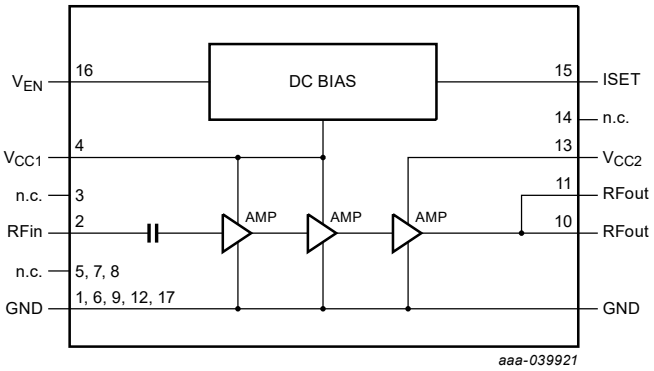
BTS6303U key features and benefits

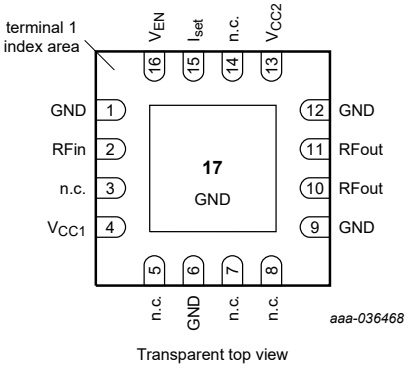
- High saturated output power $P_{o(sat)}$ = 27.3 dBm
- High power-gain G_p = 36 dB
- High linearity performance ACLR = -40 dBc
- Programmable bias current (via external resistor)
- Fast switching to support TDD systems
- 5 V single supply, quiescent current 70 mA
- Small 16-terminal leadless package 3 mm x 3 mm x 0.85 mm
- ESD protection on all terminals
- Moisture sensitivity level 1

1.1 BTS6303U product description...*continued*



Note: *The EVB is shared with the BTS6201U, marking may be different.*





Transparent top view

2 BTS6303U EVB properties

2.1 Schematic

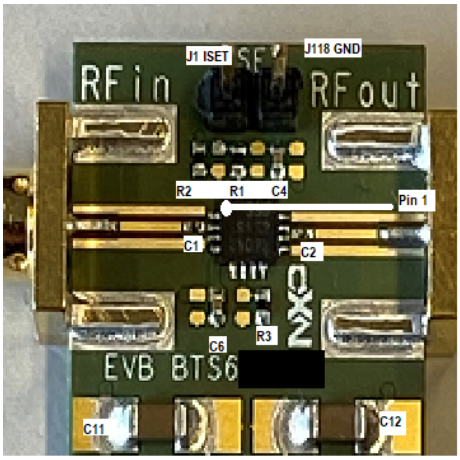


Figure 1. Component numbers

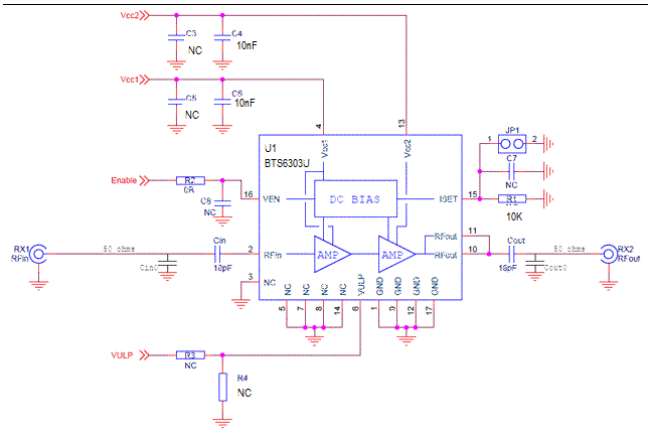


Figure 2. EVB schematic

2.2 DC and control connections

Figure 3 shows the DC and enable connection, at the main header (J117). The connector can be straight or 90 degrees. The text is also on the EVB. Figure 4 shows connectors J118 GND, and J1 ISET. J1 (ISET) on the EVB can be applied to adjust the quiescent current in the final stage of the amplifier. R1 should be removed in case J1 is applied to adjust the bias current.

Note: *NXP recommends that, using the setup as is shown in Figure 4 is R1 (10 kΩ).*

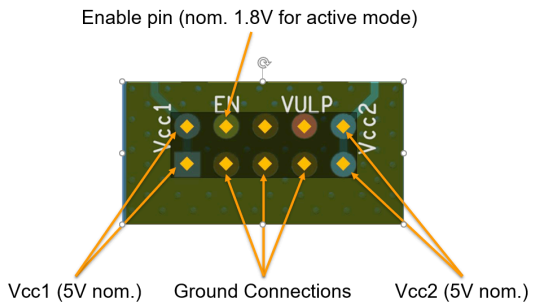


Figure 3. Main header J117

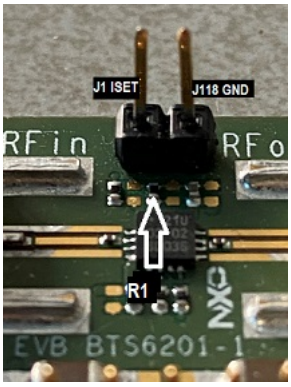


Figure 4. J118/J1

2.3 Operations

Figure 5 shows the connections in a single ended to single ended operation.

If also differential to single ended operation is needed, NXP refers to UM11645 of the BTS6302U.

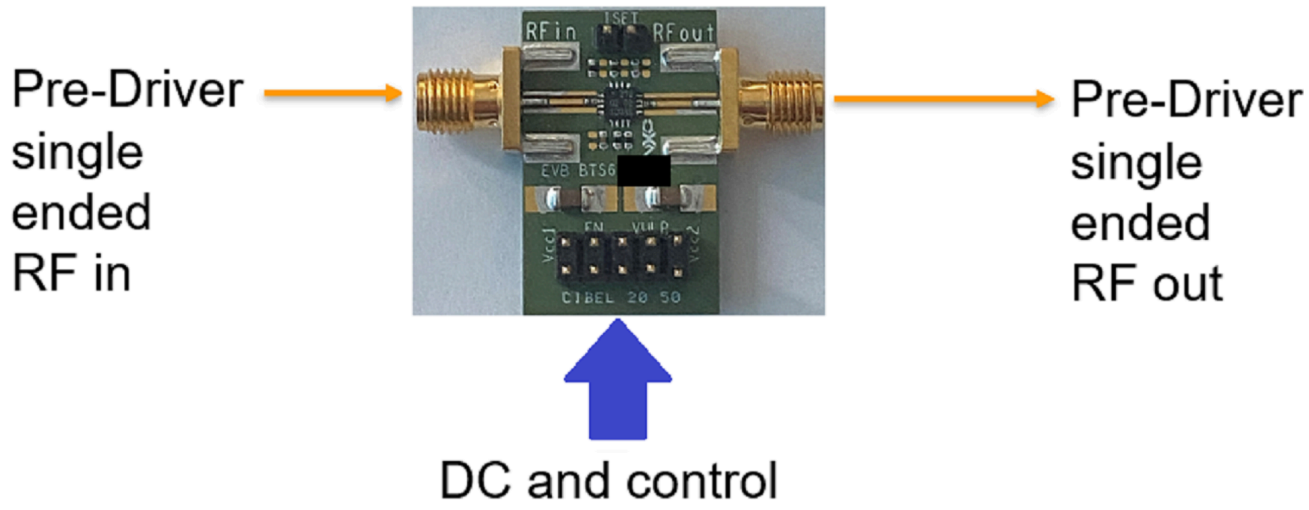


Figure 5. Single ended to single ended operation

3 Measurements results

In the below graphics, the Spar measurements are shown. Measured at nominal conditions V_{CC} = 5 V, T_{case} = 25 °C, R_{set} = 10 KΩ.

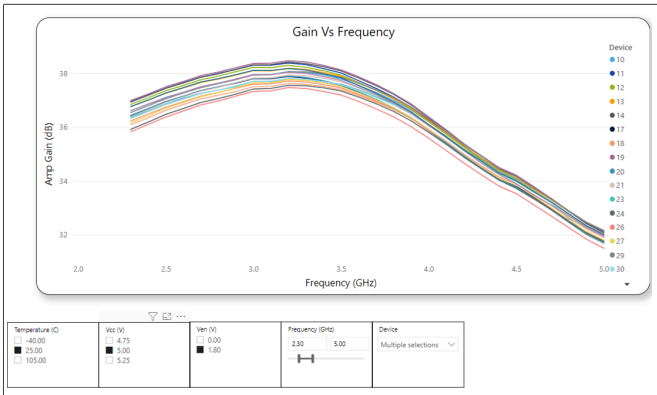


Figure 6. Gain at nominal conditions

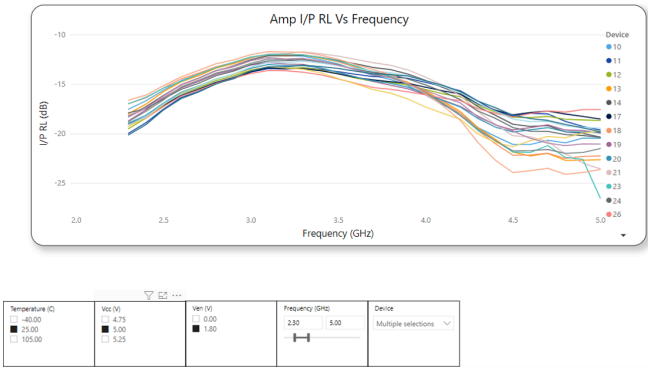


Figure 7. RL_i at nominal conditions

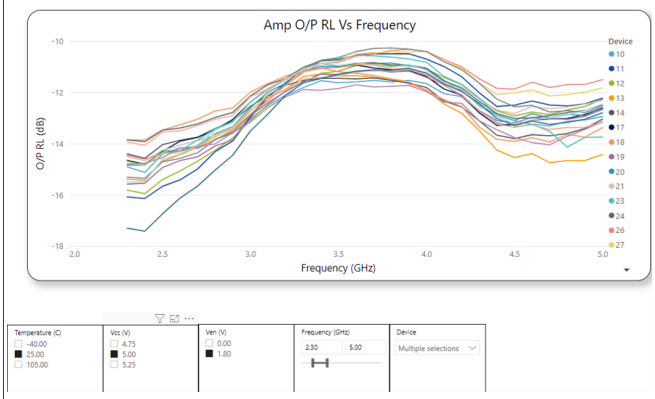


Figure 8. RL_o at nominal conditions

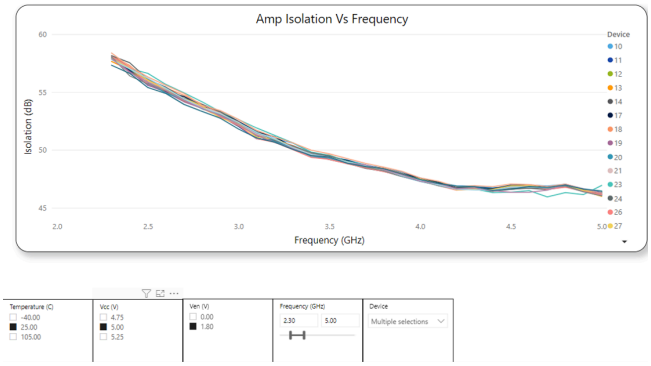


Figure 9. ISL_r (Gain mode) at nominal conditions

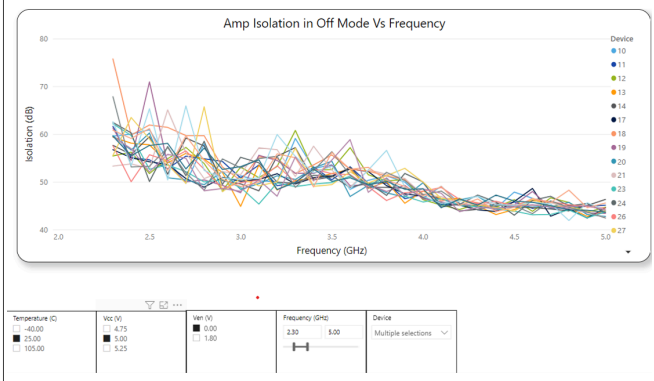


Figure 10. ISL_r (off mode) at nominal conditions

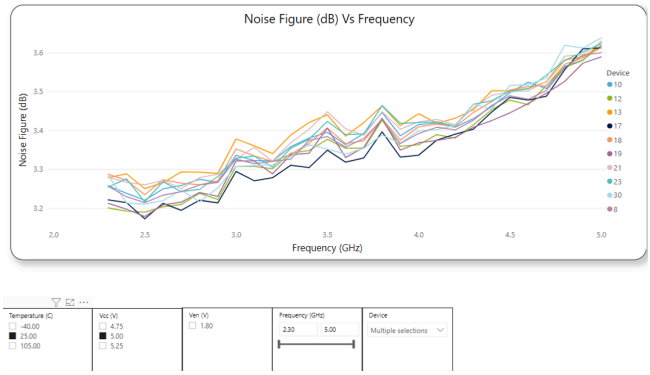


Figure 11. NF at nominal conditions

4 Abbreviations

Table 1. Abbreviations

Acronym	Description
ACLR	adjacent channel leakage ratio
ESD	electrostatic discharge
EVB	evaluation board
MIMO	massive multiple-input multiple-output
RF	radio frequency
TDD	time-division duplexing

5 EMC information

CAUTION

This product has not undergone formal EMC assessment. It is the responsibility of the user to ensure that any finished assembly complies with applicable regulations on EMC interference. EMC testing, and other testing requirements for CE is the responsibility of the user.

6 Revision history

Table 2. Revision history

Document ID	Release date	Description
UM11646 Rev. 1.2	15 April 2024	• Updated Legal information and brought to current standard
UM11646 Rev. 1.1	6 December 2022	• Added EMC information
UM11646 Rev. 1	23 July 2021	• Initial release of user manual

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