Introduction

This user manual briefly describes the function and use of the STEVAL-TDR011V1 demonstration board.

The board is a two-stage 50 W RF power amplifier which includes an output LPF (low-pass filter) for harmonics rejection. It also features power detection and a temperature sensor.

The main purpose of the board is to demonstrate the functioning and performance of the PD85006L-E and the STAP85050 devices from the LdmoST plastic family of RF power transistors.

The application is specifically designed for 2-way analog and digital mobile radios.

Figure 1. STEVAL-TDR011V1 demonstration board
1 Schematic diagram

The schematic diagram in Figure 2 shows the following stages:

a) low pass band filter
b) power detector
c) thermal temperature sensor
d) voltage regulator

Figure 2. STEVAL-TDR011V1 demonstration board schematic
2 Testing procedure

2.1 Equipment required
1. DC power supply
2. RF power amplifier
3. RF signal generator
4. Power meters
5. Multimeter

2.2 Connector pin-out

Figure 3. Pin-out scheme

2.3 Testing
To ensure the correct functioning of the STEVAL-TDR011V1, perform the following procedure:

a) Connect a power supply with a high current capability (about 10 A) and set 13.6 V on the drain.

b) The board features a voltage regulator (VR) to supply 5 V to a temperature sensor (TS). Switch on the INHIBIT pin to activate the VR, and read the temperature with the TS according to the following transfer function:

\[
T = -1481.96 + \frac{2.1962 \times 10^6 \times (1.8639 - V_0)}{3.88 \times 10^{-6}}
\]
The INHIBIT is not internally pulled up, and cannot be left floating. Disable the device when connected to GND, or to a positive voltage less than 0.18 V.

c) Select the bias gate mode by configuring the wires as shown in Figure 6 and Figure 7.

2.4 Thermal information

The temperature is taken on the surface of the PCB. If the PCB with its metal flange is cooled using an additional heat-sink (Figure 5), the main path of the heat (Pa) is easily dissipated, maintaining the PCB temperature below 70 °C (Figure 4).

Figure 4. Temperature trend

![Temperature Trend](image)

Figure 5. PCB with an additional heat-sink

![PCB with Heat-Sink](image)

In Figure 6, the two wires are connected together in order to apply the same Vgg bias to both stages of the amplifier.
Figure 6. Bias mode selection - same Vgg bias to both amplifier stages

In Figure 7, the two wires must be open in order to apply two independent Vgg biases on each stage of the amplifier.

Figure 7. Bias mode selection - independent Vgg bias on each amplifier stage


3 Revision history

Table 1. Document revision history

<table>
<thead>
<tr>
<th>Date</th>
<th>Revision</th>
<th>Changes</th>
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</table>
| 18-Jan-2010| 1        | Initial release.


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