

# **THCV2712 Design Guide**

## **System Diagram and PCB Design Guideline**

---

**Contents**

**Contents**..... 2

**Application diagram**..... 3

**Example: Distribution Mode 1**..... 3

**Example: Distribution Mode 2**..... 4

**Example: Switch Mode (1:2 Switch Function)** ..... 5

**Example: Switch Mode (2:1 Switch Function)** ..... 6

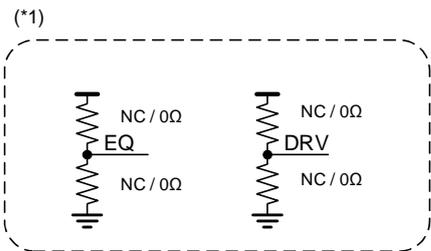
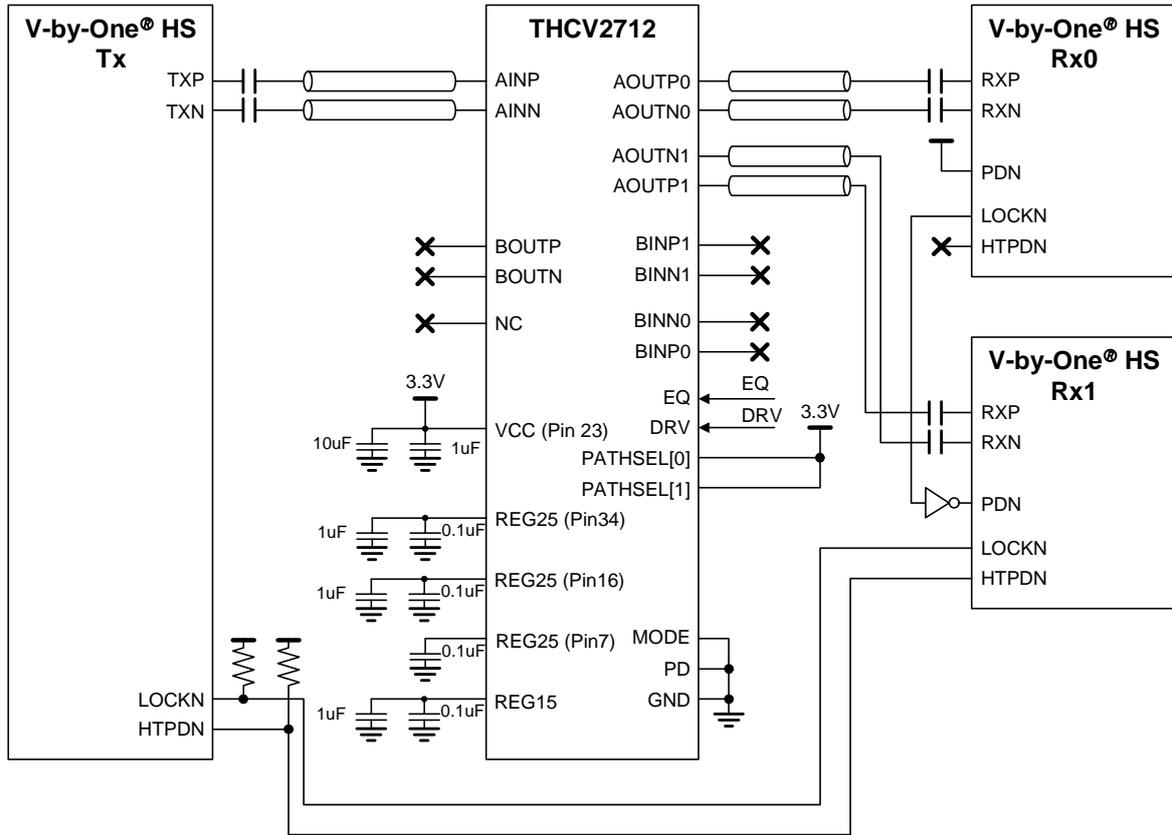
**Example: Switch Mode for THCS251** ..... 7

**PCB Layout Considerations** ..... 8

**Notices and Requests**..... 9

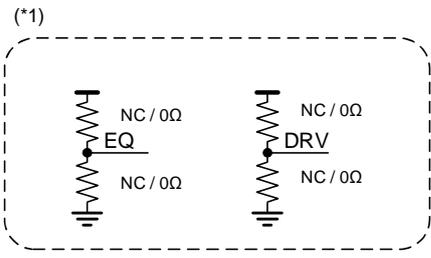
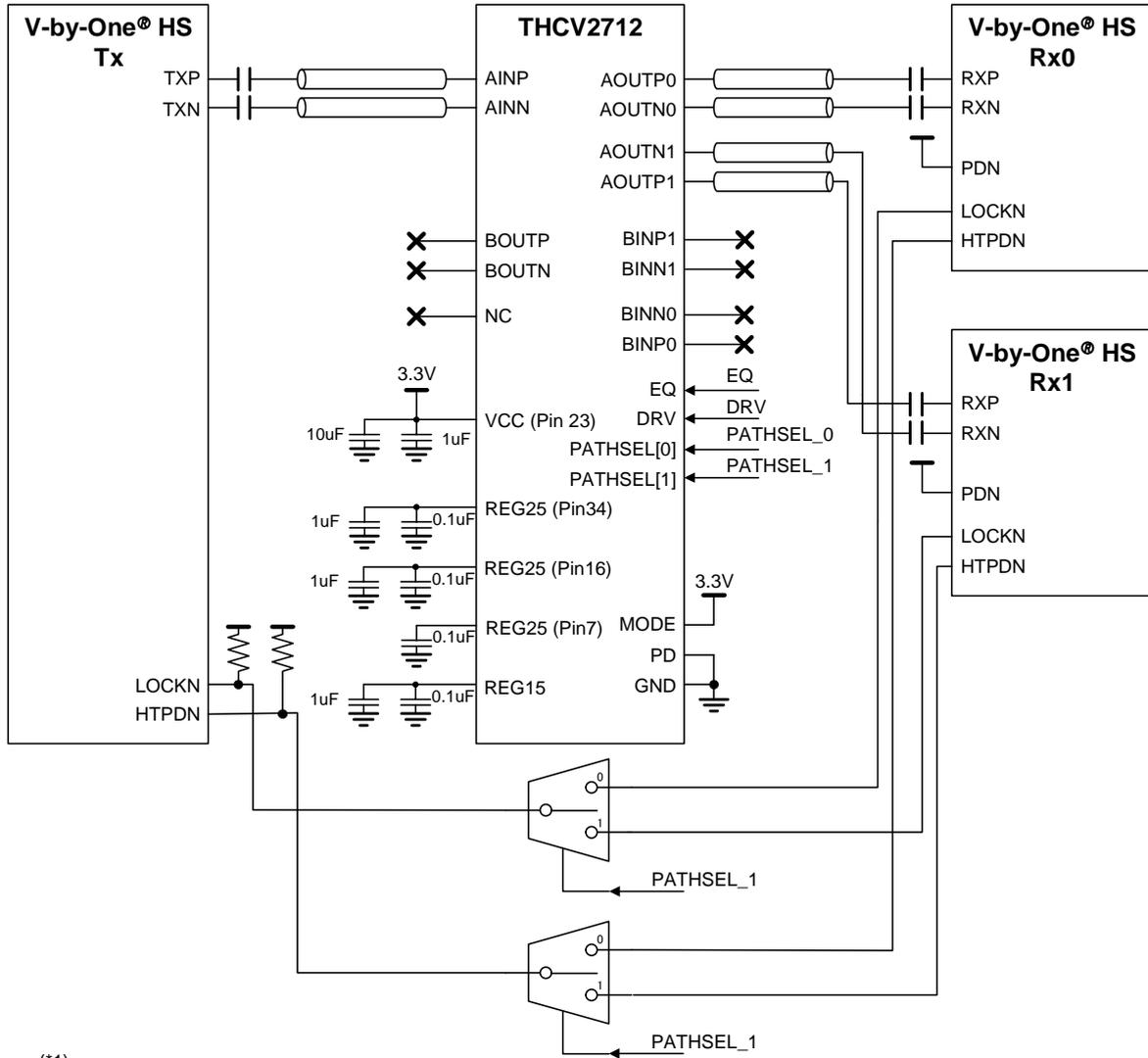


Example: Distribution Mode 2



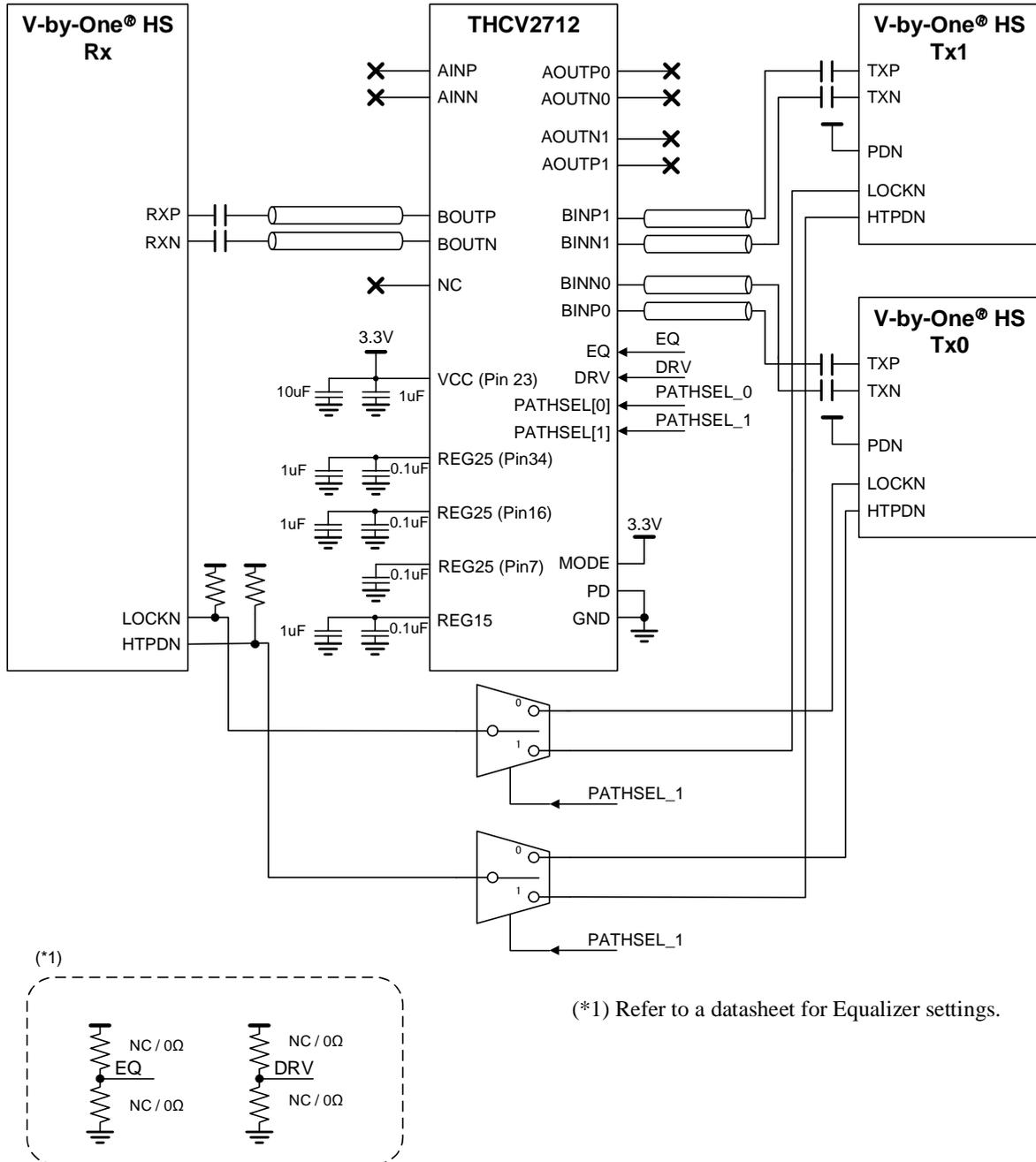
(\*1) Refer to a datasheet for Equalizer settings.

Example: Switch Mode (1:2 Switch Function)

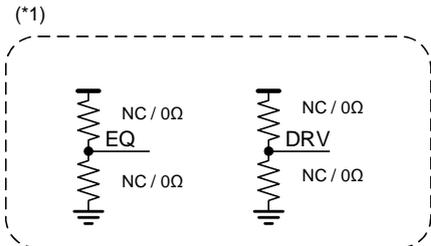
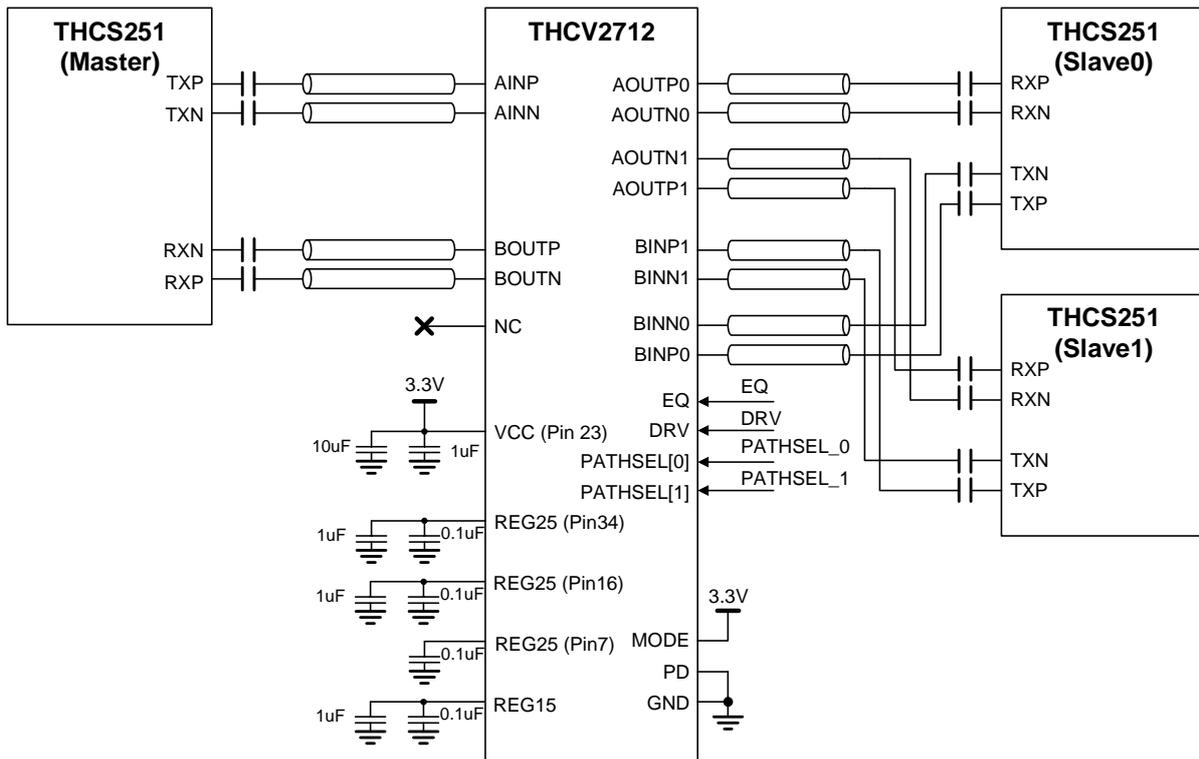


(\*1) Refer to a datasheet for Equalizer settings.

Example: Switch Mode (2:1 Switch Function)



Example: Switch Mode for THCS251



(\*1) Refer to a datasheet for Equalizer settings.

## PCB Layout Considerations

- Use at least four-layer PCB with signals, ground, power, and signals assigned for each layer. (Refer to figure below.)
- PCB traces for high-speed signals must be single-ended microstrip lines or coupled microstrip lines for  $100\Omega$  differential characteristic impedance.
- Minimize the distance between traces of a differential pair (S1) to maximize common mode rejection and coupling effect which works to reduce EMI (Electro-Magnetic Interference).
- Route differential signal traces symmetrically.
- For high speed signals, avoid right-angle bends in a trace. Route them at least with two  $45^\circ$  corners or round bend. Also avoid transmission line with vias in signal routings for signal integrity. If it is impossible, trace the differential line vias with symmetrically during and manage via impedance for required characteristic impedance.
- Mismatch among impedances of PCB traces, connectors and cables also caused reflection, limiting the bandwidth of the high-speed channels.
- Using common-mode choke filter on differential traces would reduce system EMI. Pay attention on parasitic capacitance for the component and differential mode attenuation for high speed signal. For example, in case of 3Gbps data-rate, low impedance of common mode at 1.5GHz would reduce the EMI, however low impedance of differential mode at 1.5GHz would make signal integrity worse.

### PCB Cross-sectional View for Microstrip Lines

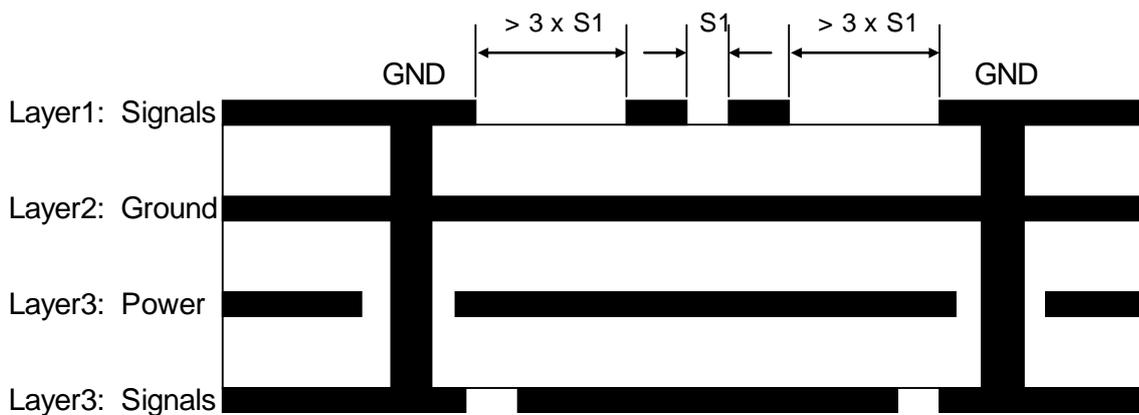


Figure 1 PCB cross-sectional view

---

## **Notices and Requests**

1. The product specifications described in this material are subject to change without prior notice.
2. The circuit diagrams described in this material are examples of the application which may not always apply to the customer's design. THine Electronics, Inc. ("THine") is not responsible for possible errors and omissions in this material. Please note even if errors or omissions should be found in this material, THine may not be able to correct them immediately.
3. This material contains THine's copyright, know-how or other proprietary. Copying or disclosing to third parties the contents of this material without THine's prior permission is prohibited.
4. Note that even if infringement of any third party's industrial ownership should occur by using this product, THine will be exempted from the responsibility unless it directly relates to the production process or functions of the product.
5. Product Application
  - 5.1 Application of this product is intended for and limited to the following applications: audio-video device, office automation device, communication device, consumer electronics, smartphone, feature phone, and amusement machine device. This product must not be used for applications that require extremely high-reliability/safety such as aerospace device, traffic device, transportation device, nuclear power control device, combustion chamber device, medical device related to critical care, or any kind of safety device.
  - 5.2 This product is not intended to be used as an automotive part, unless the product is specified as a product conforming to the demands and specifications of IATF16949 ("the Specified Product") in this data sheet. THine accepts no liability whatsoever for any product other than the Specified Product for it not conforming to the aforementioned demands and specifications.
  - 5.3 THine accepts liability for demands and specifications of the Specified Product only to the extent that the user and THine have been previously and explicitly agreed to each other.
6. Despite our utmost efforts to improve the quality and reliability of the product, faults will occur with a certain small probability, which is inevitable to a semi-conductor product. Therefore, you are encouraged to have sufficiently redundant or error preventive design applied to the use of the product so as not to have our product cause any social or public damage.
7. Please note that this product is not designed to be radiation-proof.
8. Testing and other quality control techniques are used to this product to the extent THine deems necessary to support warranty for performance of this product. Except where mandated by applicable law or deemed necessary by THine based on the user's request, testing of all functions and performance of the product is not necessarily performed.
9. Customers are asked, if required, to judge by themselves if this product falls under the category of strategic goods under the Foreign Exchange and Foreign Trade Act.
10. The product or peripheral parts may be damaged by a surge in voltage over the absolute maximum ratings or malfunction, if pins of the product are shorted by such as foreign substance. The damages may cause a smoking and ignition. Therefore, you are encouraged to implement safety measures by adding protection devices, such as fuses.

***THine Electronics, Inc.***

<https://www.thine.co.jp>