

Type-C Port Controller Evaluation Board

General Description

The RT1719GQW is a Sink-Only USB Type-C controller that complies with the latest USB Type-C and PD standards. This document explains the function and use of the RT1719GQW evaluation board (EVB), and provides information to enable operation, modification of the evaluation board and circuit to suit individual requirements.

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Performance Specification Summary

Summary of the RT1719GQW Evaluation Board performance specification is provided in Table 1. The ambient temperature is 25°C.

Table 1. RT1719GQW Evaluation Board Performance Specification Summary

| Specification | Test Conditions | Min | Typ | Max | Unit |
|---------------------------|-----------------|-----|-----|-----|------|
| VBUS Voltage Range | | 5 | -- | 20 | V |
| Power Consumption | LED indication | -- | -- | 35 | mA |

Power-up Procedure

RT1719GQW is a sink only Type-C port controller. The main function is to request Vbus (Fixed Power) for the system. RT1719GQW requests the matched and maximum power Source PDO according to the settings at Table_SEL, PSEL2, and PSEL1. Table_SEL, PSEL2, and PSEL1 can be configured by adjusting JP964, JP955, and JP961 respectively. The following two tables show the Sink PDO for 128 configurations.

Table 2. Table_Sel Setting = 1

| Table_Sel setting | PSEL2 setting | PSEL1 setting | Min. V | Max. V | PDO1 | | PDO2 | | PDO3 | | PDO4 | | PDO5 | |
|-------------------|---------------|---------------|--------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|
| | | | | | V (V) | I (mA) | V (V) | I (mA) | V (V) | I (mA) | V (V) | I (mA) | V (V) | I (mA) |
| 1 | 111 | 111 | 5 | 9 | 5 | 500 | 9 | 500 | NA | NA | -- | -- | -- | -- |
| 1 | 111 | 110 | 5 | 9 | 5 | 1000 | 9 | 1000 | NA | NA | -- | -- | -- | -- |
| 1 | 111 | 101 | 5 | 9 | 5 | 1500 | 9 | 1500 | NA | NA | -- | -- | -- | -- |
| 1 | 111 | 100 | 5 | 9 | 5 | 2000 | 9 | 2000 | NA | NA | -- | -- | -- | -- |
| 1 | 111 | 011 | 5 | 9 | 5 | 2500 | 9 | 2500 | NA | NA | -- | -- | -- | -- |
| 1 | 111 | 010 | 5 | 9 | 5 | 3000 | 9 | 3000 | NA | NA | -- | -- | -- | -- |
| 1 | 111 | 001 | 5 | 9 | 5 | 3500 | 9 | 3500 | NA | NA | -- | -- | -- | -- |
| 1 | 111 | 000 | 5 | 9 | 5 | 4000 | 9 | 4000 | NA | NA | -- | -- | -- | -- |
| 1 | 110 | 111 | 5 | 9 | 5 | 4500 | 9 | 4500 | NA | NA | -- | - | -- | -- |
| 1 | 110 | 110 | 5 | 9 | 5 | 5000 | 9 | 5000 | NA | NA | -- | --- | -- | -- |
| 1 | 110 | 101 | 5 | 12 | 5 | 500 | 9 | 500 | 12 | 500 | NA | NA | -- | -- |
| 1 | 110 | 100 | 5 | 12 | 5 | 1000 | 9 | 1000 | 12 | 1000 | NA | NA | -- | -- |
| 1 | 110 | 011 | 5 | 12 | 5 | 1500 | 9 | 1500 | 12 | 1500 | NA | NA | -- | -- |
| 1 | 110 | 010 | 5 | 12 | 5 | 2000 | 9 | 2000 | 12 | 2000 | NA | NA | -- | -- |
| 1 | 110 | 001 | 5 | 12 | 5 | 2500 | 9 | 2500 | 12 | 2500 | NA | NA | -- | -- |
| 1 | 110 | 000 | 5 | 12 | 5 | 3000 | 9 | 3000 | 12 | 3000 | NA | NA | -- | -- |
| 1 | 101 | 111 | 5 | 12 | 5 | 3500 | 9 | 3500 | 12 | 3500 | NA | NA | -- | -- |
| 1 | 101 | 110 | 5 | 12 | 5 | 4000 | 9 | 4000 | 12 | 4000 | NA | NA | -- | -- |
| 1 | 101 | 101 | 5 | 12 | 5 | 4500 | 9 | 4500 | 12 | 4500 | NA | NA | -- | -- |
| 1 | 101 | 100 | 5 | 12 | 5 | 5000 | 9 | 5000 | 12 | 5000 | NA | NA | -- | -- |

| Table_Sel setting | PSEL2 setting | PSEL1 setting | Min. V | Max. V | PDO1 | | PDO2 | | PDO3 | | PDO4 | | PDO5 | |
|-------------------|---------------|---------------|--------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|
| | | | | | V (V) | I (mA) | V (V) | I (mA) | V (V) | I (mA) | V (V) | I (mA) | V (V) | I (mA) |
| 1 | 101 | 011 | 12 | 12 | 5 | 1000 | 12 | 1000 | NA | NA | -- | -- | -- | -- |
| 1 | 101 | 010 | 12 | 12 | 5 | 1500 | 12 | 1500 | NA | NA | -- | -- | -- | -- |
| 1 | 101 | 001 | 12 | 12 | 5 | 2000 | 12 | 2000 | NA | NA | -- | -- | -- | -- |
| 1 | 101 | 000 | 12 | 12 | 5 | 2500 | 12 | 2500 | NA | NA | -- | -- | -- | -- |
| 1 | 100 | 111 | 12 | 12 | 5 | 3000 | 12 | 3000 | NA | NA | -- | -- | -- | -- |
| 1 | 100 | 110 | 12 | 12 | 5 | 3500 | 12 | 3500 | NA | NA | -- | -- | -- | -- |
| 1 | 100 | 101 | 12 | 12 | 5 | 4000 | 12 | 4000 | NA | NA | -- | -- | -- | -- |
| 1 | 100 | 100 | 12 | 12 | 5 | 4500 | 12 | 4500 | NA | NA | -- | -- | -- | -- |
| 1 | 100 | 011 | 12 | 12 | 5 | 5000 | 12 | 5000 | NA | NA | -- | -- | -- | -- |
| 1 | 100 | 010 | 5 | 15 | 5 | 500 | 9 | 500 | 12 | 500 | 15 | 500 | NA | NA |
| 1 | 100 | 001 | 5 | 15 | 5 | 1000 | 9 | 1000 | 12 | 1000 | 15 | 1000 | NA | NA |
| 1 | 100 | 000 | 5 | 15 | 5 | 1500 | 9 | 1500 | 12 | 1500 | 15 | 1500 | NA | NA |
| 1 | 011 | 111 | 5 | 15 | 5 | 2000 | 9 | 2000 | 12 | 2000 | 15 | 2000 | NA | NA |
| 1 | 011 | 110 | 5 | 15 | 5 | 2500 | 9 | 2500 | 12 | 2500 | 15 | 2500 | NA | NA |
| 1 | 011 | 101 | 5 | 15 | 5 | 3000 | 9 | 3000 | 12 | 3000 | 15 | 3000 | NA | NA |
| 1 | 011 | 100 | 5 | 15 | 5 | 3500 | 9 | 3500 | 12 | 3500 | 15 | 3500 | NA | NA |
| 1 | 011 | 011 | 5 | 15 | 5 | 4000 | 9 | 4000 | 12 | 4000 | 15 | 4000 | NA | NA |
| 1 | 011 | 010 | 5 | 15 | 5 | 4500 | 9 | 4500 | 12 | 4500 | 15 | 4500 | NA | NA |
| 1 | 011 | 001 | 5 | 15 | 5 | 5000 | 9 | 5000 | 12 | 5000 | 15 | 5000 | NA | NA |
| 1 | 011 | 000 | 15 | 15 | 5 | 1000 | 15 | 1000 | NA | NA | -- | -- | -- | -- |
| 1 | 010 | 111 | 15 | 15 | 5 | 1500 | 15 | 1500 | NA | NA | -- | -- | -- | -- |
| 1 | 010 | 110 | 15 | 15 | 5 | 2000 | 15 | 2000 | NA | NA | -- | -- | -- | -- |
| 1 | 010 | 101 | 15 | 15 | 5 | 2500 | 15 | 2500 | NA | NA | -- | -- | -- | -- |
| 1 | 010 | 100 | 15 | 15 | 5 | 3000 | 15 | 3000 | NA | NA | -- | -- | -- | -- |
| 1 | 010 | 011 | 15 | 15 | 5 | 3500 | 15 | 3500 | NA | NA | -- | -- | -- | -- |
| 1 | 010 | 010 | 15 | 15 | 5 | 4000 | 15 | 4000 | NA | NA | -- | -- | -- | -- |
| 1 | 010 | 001 | 15 | 15 | 5 | 4500 | 15 | 4500 | NA | NA | -- | -- | -- | -- |
| 1 | 010 | 000 | 15 | 15 | 5 | 5000 | 15 | 5000 | NA | NA | -- | -- | -- | -- |
| 1 | 001 | 111 | 5 | 20 | 5 | 1000 | 9 | 1000 | 12 | 1000 | 15 | 1000 | 20 | 1000 |
| 1 | 001 | 110 | 5 | 20 | 5 | 2000 | 9 | 2000 | 12 | 2000 | 15 | 2000 | 20 | 2000 |
| 1 | 001 | 101 | 5 | 20 | 5 | 2500 | 9 | 2500 | 12 | 2500 | 15 | 2500 | 20 | 2500 |
| 1 | 001 | 100 | 5 | 20 | 5 | 3000 | 9 | 3000 | 12 | 3000 | 15 | 3000 | 20 | 3000 |
| 1 | 001 | 011 | 5 | 20 | 5 | 3500 | 9 | 3500 | 12 | 3500 | 15 | 3500 | 20 | 3500 |
| 1 | 001 | 010 | 5 | 20 | 5 | 4000 | 9 | 4000 | 12 | 4000 | 15 | 4000 | 20 | 4000 |
| 1 | 001 | 001 | 5 | 20 | 5 | 4500 | 9 | 4500 | 12 | 4500 | 15 | 4500 | 20 | 4500 |
| 1 | 001 | 000 | 5 | 20 | 5 | 5000 | 9 | 5000 | 12 | 5000 | 15 | 5000 | 20 | 5000 |
| 1 | 000 | 111 | 20 | 20 | 5 | 1000 | 20 | 1000 | NA | NA | -- | -- | -- | -- |
| 1 | 000 | 110 | 20 | 20 | 5 | 2000 | 20 | 2000 | NA | NA | -- | -- | -- | -- |

| Table_Sel setting | PSEL2 setting | PSEL1 setting | Min. V | Max. V | PDO1 | | PDO2 | | PDO3 | | PDO4 | | PDO5 | |
|-------------------|---------------|---------------|--------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|
| | | | | | V (V) | I (mA) | V (V) | I (mA) | V (V) | I (mA) | V (V) | I (mA) | V (V) | I (mA) |
| 1 | 000 | 101 | 20 | 20 | 5 | 2500 | 20 | 2500 | NA | NA | -- | -- | -- | -- |
| 1 | 000 | 100 | 20 | 20 | 5 | 3000 | 20 | 3000 | NA | NA | -- | -- | -- | -- |
| 1 | 000 | 011 | 20 | 20 | 5 | 3500 | 20 | 3500 | NA | NA | -- | -- | -- | -- |
| 1 | 000 | 010 | 20 | 20 | 5 | 4000 | 20 | 4000 | NA | NA | -- | -- | -- | -- |
| 1 | 000 | 001 | 20 | 20 | 5 | 4500 | 20 | 4500 | NA | NA | -- | -- | -- | -- |
| 1 | 000 | 000 | 20 | 20 | 5 | 5000 | 20 | 5000 | NA | NA | -- | -- | -- | -- |

Table 3. Table_Sel Setting = 0

| Table_Sel setting | PSEL2 setting | PSEL1 setting | Min. V | Max. V | PDO1 | | PDO2 | | PDO3 | | PDO4 | | PDO5 | |
|-------------------|---------------|---------------|--------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|
| | | | | | V (V) | I (mA) | V (V) | I (mA) | V (V) | I (mA) | V (V) | I (mA) | V (V) | I (mA) |
| 0 | 111 | 111 | 5 | 5 | 5 | 500 | NA | NA | -- | -- | -- | -- | -- | -- |
| 0 | 111 | 110 | 5 | 5 | 5 | 1500 | NA | NA | -- | -- | -- | -- | -- | -- |
| 0 | 111 | 101 | 5 | 5 | 5 | 2000 | NA | NA | -- | -- | -- | -- | -- | -- |
| 0 | 111 | 100 | 5 | 5 | 5 | 3000 | NA | NA | -- | -- | -- | -- | -- | -- |
| 0 | 111 | 011 | 5 | 9 | 5 | 1500 | 9 | 830 | NA | NA | -- | -- | -- | -- |
| 0 | 111 | 010 | 5 | 9 | 5 | 2000 | 9 | 1110 | NA | NA | -- | -- | -- | -- |
| 0 | 111 | 001 | 5 | 9 | 5 | 3000 | 9 | 1660 | NA | NA | -- | -- | -- | -- |
| 0 | 111 | 000 | 5 | 9 | 5 | 4000 | 9 | 2220 | NA | NA | -- | -- | -- | -- |
| 0 | 110 | 111 | 5 | 9 | 5 | 5000 | 9 | 2770 | NA | NA | -- | -- | -- | -- |
| 0 | 110 | 110 | 5 | 12 | 5 | 1500 | 9 | 830 | 12 | 620 | NA | NA | -- | -- |
| 0 | 110 | 101 | 5 | 12 | 5 | 2000 | 9 | 1110 | 12 | 830 | NA | NA | -- | -- |
| 0 | 110 | 100 | 5 | 12 | 5 | 3000 | 9 | 1660 | 12 | 1250 | NA | NA | -- | -- |
| 0 | 110 | 011 | 5 | 12 | 5 | 4000 | 9 | 2220 | 12 | 1660 | NA | NA | -- | -- |
| 0 | 110 | 010 | 5 | 12 | 5 | 5000 | 9 | 2770 | 12 | 2080 | NA | NA | -- | -- |
| 0 | 110 | 001 | 5 | 15 | 5 | 1500 | 9 | 830 | 12 | 620 | 15 | 500 | NA | NA |
| 0 | 110 | 000 | 5 | 15 | 5 | 2000 | 9 | 1110 | 12 | 830 | 15 | 660 | NA | NA |
| 0 | 101 | 111 | 5 | 15 | 5 | 3000 | 9 | 1660 | 12 | 1250 | 15 | 1000 | NA | NA |
| 0 | 101 | 110 | 5 | 15 | 5 | 4000 | 9 | 2220 | 12 | 1660 | 15 | 1330 | NA | NA |
| 0 | 101 | 101 | 5 | 15 | 5 | 5000 | 9 | 2770 | 12 | 2080 | 15 | 1660 | NA | NA |
| 0 | 101 | 100 | 5 | 20 | 5 | 1500 | 9 | 830 | 12 | 620 | 15 | 500 | 20 | 370 |
| 0 | 101 | 011 | 5 | 20 | 5 | 2000 | 9 | 1110 | 12 | 830 | 15 | 660 | 20 | 500 |
| 0 | 101 | 010 | 5 | 20 | 5 | 3000 | 9 | 1660 | 12 | 1250 | 15 | 1000 | 20 | 750 |
| 0 | 101 | 001 | 5 | 20 | 5 | 4000 | 9 | 2220 | 12 | 1660 | 15 | 1330 | 20 | 1000 |
| 0 | 101 | 000 | 5 | 20 | 5 | 5000 | 9 | 2770 | 12 | 2080 | 15 | 1660 | 20 | 1250 |
| 0 | 100 | 111 | 9 | 12 | 5 | 1800 | 9 | 1000 | 12 | 750 | NA | NA | -- | -- |
| 0 | 100 | 110 | 9 | 12 | 5 | 2400 | 9 | 1330 | 12 | 1000 | NA | NA | -- | -- |
| 0 | 100 | 101 | 9 | 12 | 5 | 3600 | 9 | 2000 | 12 | 1500 | NA | NA | -- | -- |

| Table_Sel setting | PSEL2 setting | PSEL1 setting | Min. V | Max. V | PDO1 | | PDO2 | | PDO3 | | PDO4 | | PDO5 | |
|-------------------|---------------|---------------|--------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|
| | | | | | V (V) | I (mA) | V (V) | I (mA) | V (V) | I (mA) | V (V) | I (mA) | V (V) | I (mA) |
| 0 | 100 | 100 | 9 | 12 | 5 | 4800 | 9 | 2660 | 12 | 2000 | NA | NA | -- | -- |
| 0 | 100 | 011 | 9 | 12 | 5 | 5000 | 9 | 3000 | 12 | 2250 | NA | NA | -- | -- |
| 0 | 100 | 010 | 9 | 12 | 5 | 5000 | 9 | 4000 | 12 | 3000 | NA | NA | -- | -- |
| 0 | 100 | 001 | 9 | 12 | 5 | 5000 | 9 | 5000 | 12 | 3750 | NA | NA | -- | -- |
| 0 | 100 | 000 | 9 | 15 | 5 | 1800 | 9 | 1000 | 12 | 750 | 15 | 600 | NA | NA |
| 0 | 011 | 111 | 9 | 15 | 5 | 3000 | 9 | 1660 | 12 | 1250 | 15 | 1000 | NA | NA |
| 0 | 011 | 110 | 9 | 15 | 5 | 4000 | 9 | 2220 | 12 | 1660 | 15 | 1330 | NA | NA |
| 0 | 011 | 101 | 9 | 15 | 5 | 5000 | 9 | 3000 | 12 | 2250 | 15 | 1800 | NA | NA |
| 0 | 011 | 100 | 9 | 15 | 5 | 5000 | 9 | 4000 | 12 | 3000 | 15 | 2400 | NA | NA |
| 0 | 011 | 011 | 9 | 15 | 5 | 5000 | 9 | 5000 | 12 | 3750 | 15 | 3000 | NA | NA |
| 0 | 011 | 010 | 9 | 20 | 5 | 1800 | 9 | 1000 | 12 | 750 | 15 | 600 | 20 | 450 |
| 0 | 011 | 001 | 9 | 20 | 5 | 3000 | 9 | 1660 | 12 | 1250 | 15 | 1000 | 20 | 750 |
| 0 | 011 | 000 | 9 | 20 | 5 | 4000 | 9 | 2220 | 12 | 1660 | 15 | 1330 | 20 | 1000 |
| 0 | 010 | 111 | 9 | 20 | 5 | 5000 | 9 | 3000 | 12 | 2250 | 15 | 1800 | 20 | 1350 |
| 0 | 010 | 110 | 9 | 20 | 5 | 5000 | 9 | 4000 | 12 | 3000 | 15 | 2400 | 20 | 1800 |
| 0 | 010 | 101 | 9 | 20 | 5 | 5000 | 9 | 5000 | 12 | 3750 | 15 | 3000 | 20 | 2250 |
| 0 | 010 | 100 | 12 | 15 | 5 | 2000 | 12 | 830 | 15 | 660 | NA | NA | -- | -- |
| 0 | 010 | 011 | 12 | 15 | 5 | 3000 | 12 | 1250 | 15 | 1000 | NA | NA | -- | -- |
| 0 | 010 | 010 | 12 | 15 | 5 | 4800 | 12 | 2000 | 15 | 1600 | NA | NA | -- | -- |
| 0 | 010 | 001 | 12 | 15 | 5 | 5000 | 12 | 2500 | 15 | 2000 | NA | NA | -- | -- |
| 0 | 010 | 000 | 12 | 15 | 5 | 5000 | 12 | 3000 | 15 | 2400 | NA | NA | -- | -- |
| 0 | 001 | 111 | 12 | 15 | 5 | 5000 | 12 | 3750 | 15 | 3000 | NA | NA | -- | -- |
| 0 | 001 | 110 | 12 | 15 | 5 | 5000 | 12 | 5000 | 15 | 4000 | NA | NA | -- | -- |
| 0 | 001 | 101 | 12 | 20 | 5 | 2000 | 12 | 830 | 15 | 660 | 20 | 500 | NA | NA |
| 0 | 001 | 100 | 12 | 20 | 5 | 3000 | 12 | 1250 | 15 | 1000 | 20 | 750 | NA | NA |
| 0 | 001 | 011 | 12 | 20 | 5 | 4800 | 12 | 2000 | 15 | 1600 | 20 | 1200 | NA | NA |
| 0 | 001 | 010 | 12 | 20 | 5 | 5000 | 12 | 3000 | 15 | 2400 | 20 | 1800 | NA | NA |
| 0 | 001 | 001 | 12 | 20 | 5 | 5000 | 12 | 3750 | 15 | 3000 | 20 | 2250 | NA | NA |
| 0 | 001 | 000 | 12 | 20 | 5 | 5000 | 12 | 5000 | 15 | 4000 | 20 | 3000 | NA | NA |
| 0 | 000 | 111 | 15 | 20 | 5 | 2000 | 15 | 660 | 20 | 500 | NA | NA | -- | -- |
| 0 | 000 | 110 | 15 | 20 | 5 | 3000 | 15 | 1000 | 20 | 750 | NA | NA | -- | -- |
| 0 | 000 | 101 | 15 | 20 | 5 | 4000 | 15 | 1330 | 20 | 1000 | NA | NA | -- | -- |
| 0 | 000 | 100 | 15 | 20 | 5 | 5000 | 15 | 1660 | 20 | 1250 | NA | NA | -- | -- |
| 0 | 000 | 011 | 15 | 20 | 5 | 5000 | 15 | 2000 | 20 | 1500 | NA | NA | -- | -- |
| 0 | 000 | 010 | 15 | 20 | 5 | 5000 | 15 | 3000 | 20 | 2250 | NA | NA | -- | -- |
| 0 | 000 | 001 | 15 | 20 | 5 | 5000 | 15 | 4000 | 20 | 3000 | NA | NA | -- | -- |
| 0 | 000 | 000 | 15 | 20 | 5 | 5000 | 15 | 5000 | 20 | 3750 | NA | NA | -- | -- |

RT1719GQW supports DR_Swap but does not support Alternate Mode. The following table shows how RT1719GQW responds the DR_Swap and expresses the USB ability in Sink Capability. It is configured at JP969.

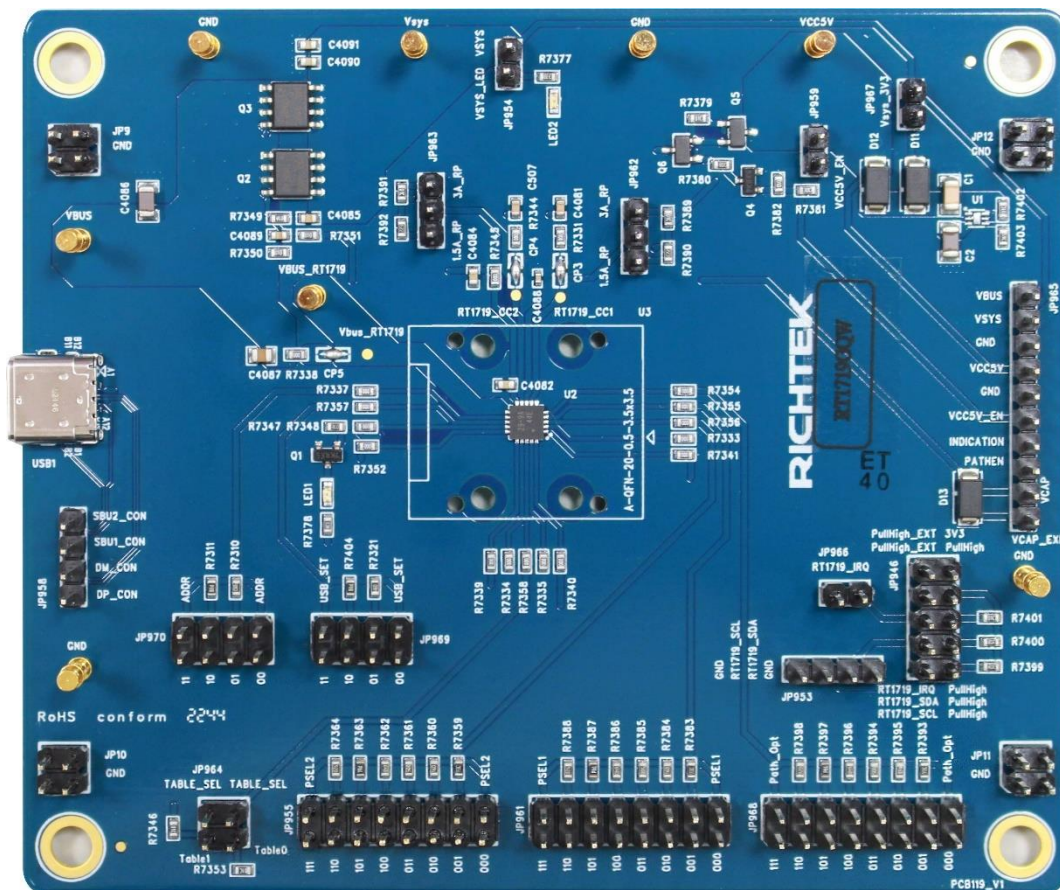
| USB Setting | Resistance between USB_SET and GND (unit: kΩ) | 0x3E[1:0] | Behavior |
|---|---|-----------|---|
| USB ability, Data role swap | Open | 11b | <ol style="list-style-type: none"> Response "Accept" to "DR_Swap," and 0x35[7] will be 1b if "DR_Swap" is received. USB Communications Capable in "Sink_Capabilities" is 1b. MCU can send "DR_Swap" by 0x03[7] = 1b. |
| USB ability, No Data role swap (UFP only) | 309 | 01b | <ol style="list-style-type: none"> Response "Reject" to "DR_Swap," and 0x35[6] will be 1b if "DR_Swap" is received. USB Communications Capable in "Sink_Capabilities" is 1b. |
| No USB ability | 0 | 00b | <ol style="list-style-type: none"> Response "Reject" to "DR_Swap," and 0x35[6] will be 1b if "DR_Swap" is received. USB Communications Capable in "Sink_Capabilities" is 0b. |

The sink path control can be also configured for applications. The following table shows the Path_EN behavior and the HV/LV Bound of VBUS. It is configured at JP970.

| Path Option Setting | Resistance between Path_Opt and GND (unit: kΩ) | 0x3F[2:0] | Behavior | HV Bound | LV Bound |
|---------------------|--|-----------|---|--|--|
| Option 7 | Open | 111b | The same with Path option = 000 | The same with Path option 0 | The same with Path option 0 |
| Option 6 | 887 | 110b | PATHEN is low no matter if Sink PDO is matched with Source DPO. | 20V | 5V |
| Option 5 | 649 | 101b | PATHEN is low no matter if Sink PDO is matched with Source DPO. | 15V | 5V |
| Option 4 | 453 | 100b | PATHEN is low no matter if Sink PDO is matched with Source DPO. | 12V | 5V |
| Option 3 | 324 | 011b | PATHEN is low no matter if Sink PDO is matched with Source DPO. | 9V | 5V |
| Option 2 | 143 | 010b | PATHEN is low no matter if Sink PDO is matched with Source DPO. | 5V | 5V |
| Option 1 | 56.2 | 001b | PATHEN is low no matter if Sink PDO is matched with Source DPO. | Depending on Max. V of the Sink capability | <ol style="list-style-type: none"> Match: Depending on the requested PDO. Mismatch: 5V |
| Option 0 | 0 | 000b | Match: PATHEN is low. Mismatch: PATHEN is high. | Depending on Max. V of the Sink capability | <ol style="list-style-type: none"> Match: Depending on the requested PDO. Mismatch: 5V |

Detailed Description of Hardware

Headers Description and Placement



Carefully inspect all the components used in the EVB according to the following Bill of Materials table, and then make sure all the components are undamaged and correctly installed. If there is any missing or damaged component, which may occur during transportation, please contact our distributors or e-mail us at evb_service@richtek.com.

Test Points

The EVB is provided with the test points and pin names listed in the table below.

| Test Point/ Pin Name | Function |
|-------------------------|--|
| VBUS | 5V to 20V. |
| CC1 | CC1 is used to establish and manage the Source-to-Sink connection. |
| CC2 | CC2 is used to establish and manage the Source-to-Sink connection. |
| GND | Ground. |
| Vsys | After sink path on, the system can get power from this net. |

| Test Point/ Pin Name | Function |
|-------------------------|--|
| INDICATION | This pin will be high if there is a mismatch for Sink PDO and Source PDO. |
| PATHEN | This pin will be low to turn on the external PMOS. |
| SDA/SCL | These two pins are I ² C communication between RT1719GQW and MCU. |
| IRQB | This pin will be low to inform I ² C master. |
| Table_SEL | Connect this pin to VCAP or GND through a 10kΩ resistor. |
| PSEL2 | Connect this pin to with the dedicate resistors. |
| PSEL1 | Connect this pin to with the dedicate resistors. |
| ADDR | Connect this pin to with the dedicate resistors. |
| USB_SET | Connect this pin to with the dedicate resistors. |

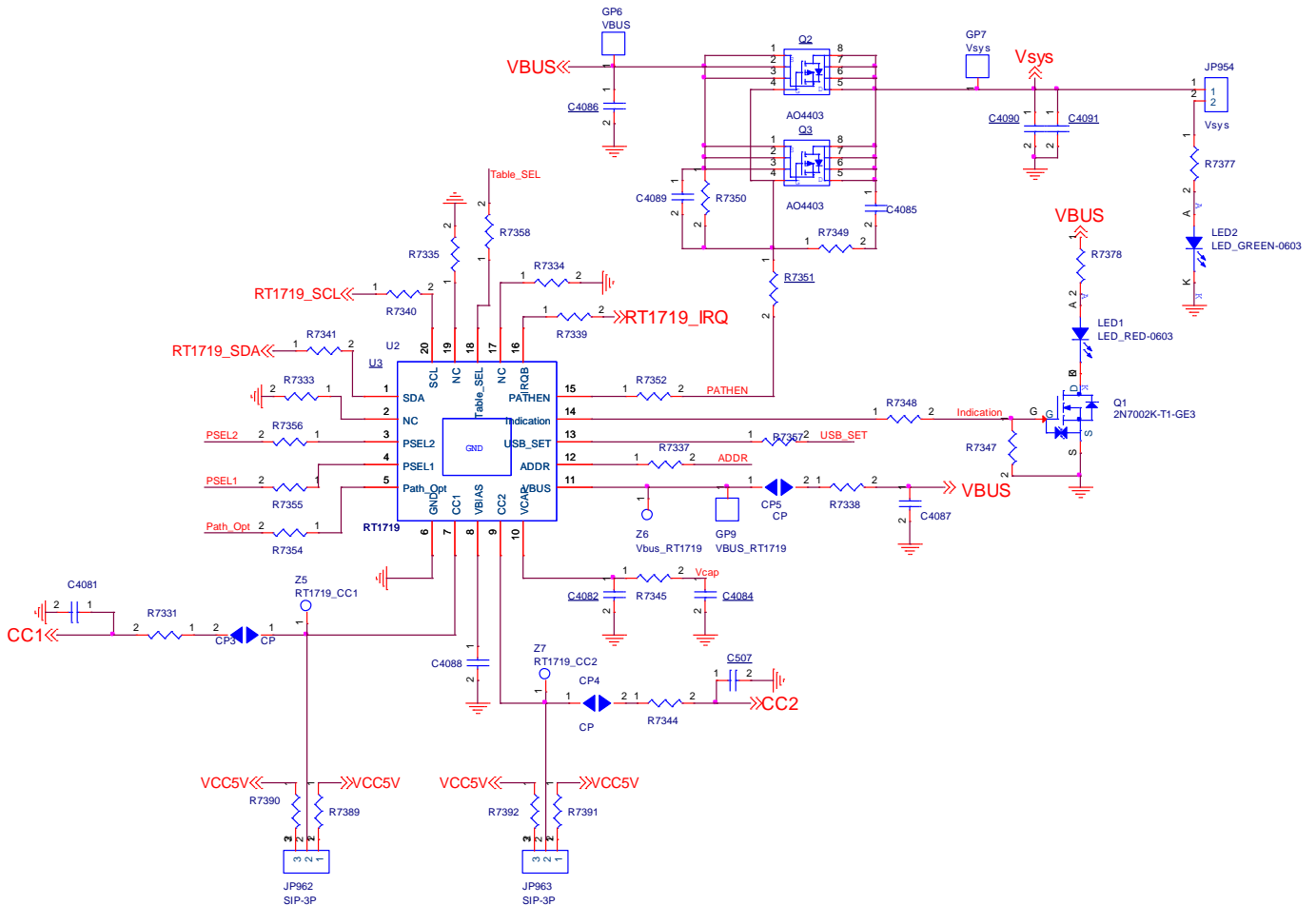
Bill of Materials

| Reference | Count | Part Number | Value | Description | Package | Manufacturer |
|---|-------|---------------------|----------------|------------------------------|--------------|---------------|
| C1 | 1 | 1206B105K5 | 1μF | 50V/X7R | 1206 | WALSIN |
| C2 | 1 | 1206B225K500CT | 2.2μF | 50V/X7R | 1206 | WALSIN |
| C507, C4081 | 2 | 0603B471K500CT | 470pF | 50V/X7R | 0603 | WALSIN |
| C4082, C4084, C4090, C4091 | 4 | 0603X105K250CT | 1μF | 25V/X5R | 0603 | WALSIN |
| C4085, C4089 | 2 | C1608X7R1H104KT000N | 0.1μF | 50V/X7R | 0603 | TDK |
| C4086 | 1 | UMK316AB7475KL-T | 4.7μF | 50V/X7R | 1206 | TAIYO YUDEN |
| C4087 | 1 | GRM21BR71H105KA12L | 1μF | 50V/X7R | 0805 | MURATA |
| C4088 | 1 | 0402B104K500CT | 0.1μF | 50V/X7R | 0402 | WALSIN |
| D11, D12, D13 | 3 | SX34 | SX34 | SX34 | SMA/DO-214AC | PANJIT |
| LED1 | 1 | LNL-191SUR | RED | LED_RED-0603 | 0603 | LighTop |
| LED2 | 1 | LNL-190SUG | GREEN | LED_GREEN-0603 | 0603 | LighTop |
| Q1, Q4 | 2 | 2N7002K-T1-GE3 | 2N7002K-T1-GE3 | 2N7002K-T1-GE3 | SOT-23 | VISHAY |
| Q2, Q3 | 2 | AO4403 | AO4403 | AO4403 | SOIC-8 | Alpha & Omega |
| Q5, Q6 | 2 | AO3403 | AO3403 | AO3403 | SOT-23-3L | Alpha & Omega |
| R7310, R7321 | 2 | WR06X3093FTL | 309k | Resistor, Chip, 1/10W, 1% | 0603 | WALSIN |
| R7311, R7404 | 2 | RTT036653FTP | 665k | Resistor, Chip, 1/10W, 1% | 0603 | RALEC |
| R7331, R7333, R7334, R7335, R7337, R7338, R7339, R7340, R7341, R7344, R7345, R7348, R7352, R7354, R7355, R7356, R7357, R7358 | 18 | WR06X000 PTL | 0 | Resistor, Chip, 1/10W, 1% | 0603 | WALSIN |

| Reference | Count | Part Number | Value | Description | Package | Manufacturer |
|---|-------|----------------|------------|-------------------------------------|---------------------|------------------------|
| R7346, R7353, R7379, R7389, R7391, R7401, R7402 | 7 | WR06X1002FTL | 10k | Resistor, Chip, 1/10W, 1% | 0603 | WALSIN |
| R7347 | 1 | WR06X1004FTL | 1M | Resistor, Chip, 1/10W, 1% | 0603 | WALSIN |
| R7349 | 1 | WR06X1000FTL | 100 | Resistor, Chip, 1/10W, 1% | 0603 | WALSIN |
| R7350, R7351, R7382 | 3 | WR06X1003FTL | 100k | Resistor, Chip, 1/10W, 1% | 0603 | WALSIN |
| R7359, R7383, R7393 | 3 | RTT035622FTP | 56.2k | Resistor, Chip, 1/10W, 1% | 0603 | RALEC |
| R7360, R7384, R7395 | 3 | WR06X1433FTL | 143k | Resistor, Chip, 1/10W, 1% | 0603 | WALSIN |
| R7361, R7385, R7394 | 3 | WR06X3243FTL | 324k | Resistor, Chip, 1/10W, 1% | 0603 | WALSIN |
| R7362, R7386, R7396 | 3 | WR06X4533FTL | 453k | Resistor, Chip, 1/10W, 1% | 0603 | WALSIN |
| R7363, R7387, R7397 | 3 | RTT036493FTP | 649k | Resistor, Chip, 1/10W, 1% | 0603 | RALEC |
| R7364, R7388, R7398 | 3 | RTT038873FTP | 887k | Resistor, Chip, 1/10W, 1% | 0603 | RALEC |
| R7377, R7378 | 2 | WR06X2151FTL | 2.15k | Resistor, Chip, 1/10W, 1% | 0603 | WALSIN |
| R7380, R7399, R7400 | 3 | WR06X2001FTL | 2k | Resistor, Chip, 1/10W, 1% | 0603 | WALSIN |
| R7381 | 1 | WR06X2002FTL | 20k | Resistor, Chip, 1/10W, 1% | 0603 | WALSIN |
| R7390, R7392 | 2 | WR06X2202FTL | 22k | Resistor, Chip, 1/10W, 1% | 0603 | WALSIN |
| R7403 | 1 | WR06X4022FTL | 40.2k | Resistor, Chip, 1/10W, 1% | 0603 | WALSIN |
| U2 | 1 | RT1719GQW | RT1719GQW | Sink Only Type-C Port Controller | WQFN-20L 3.5x3.5 | RICHTEK |
| USB1 | 1 | C-NBR2L-AK5320 | USB TYPE-C | USB TYPE-C | 9.24x9.1mm | ADVANCED- CONNECTEK |

Typical Applications

EVB Schematic Diagram



1. The capacitance values of the input and output capacitors will influence the input and output voltage ripple.
2. MLCC capacitors have degrading capacitance at DC bias voltage, and especially smaller size MLCC capacitors will have much lower capacitance.

Evaluation Board Layout

Figure 1 to Figure 4 are RT1719GQW Evaluation Board layout. This board size is 70mm x 50mm and is constructed on four-layer PCB, outer layers with 2 oz. Cu and inner layers with 1 oz. Cu.

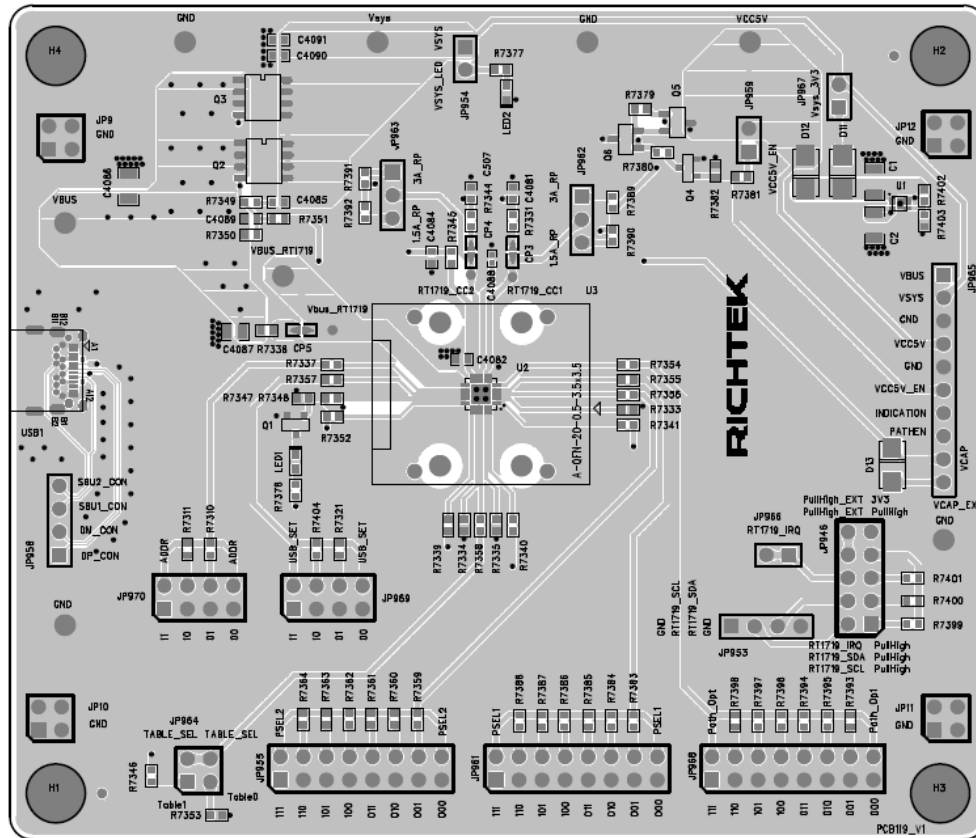


Figure 1. Top View (1st layer)

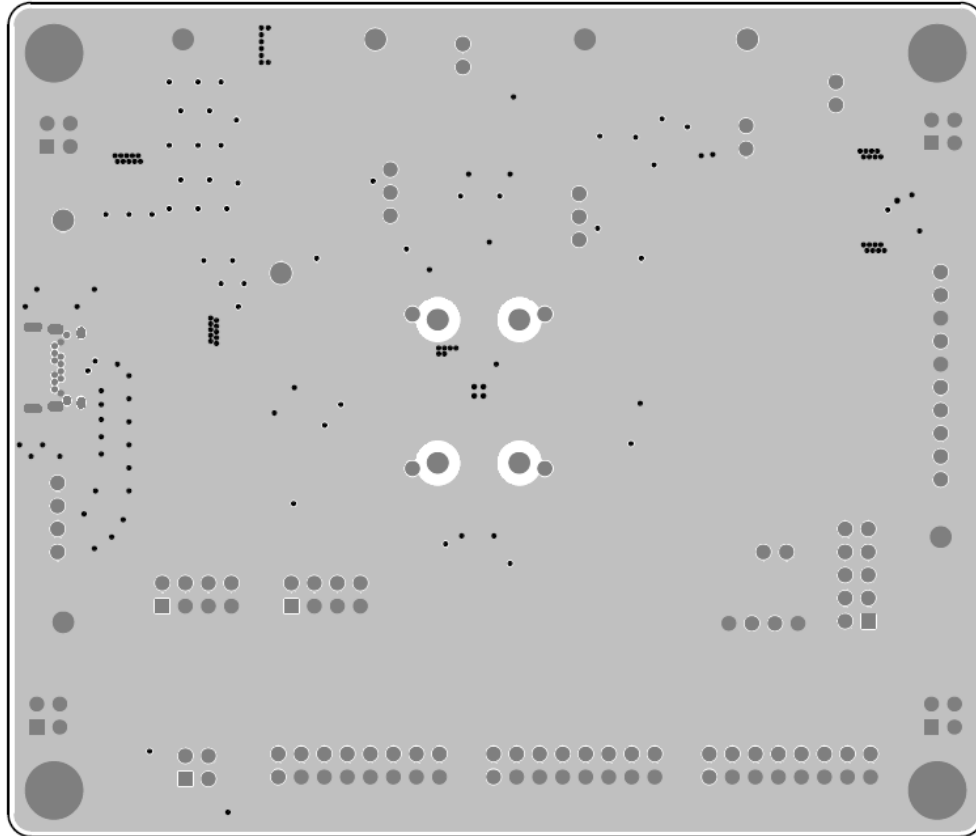


Figure 2. PCB Layout—Inner Side (2nd Layer)

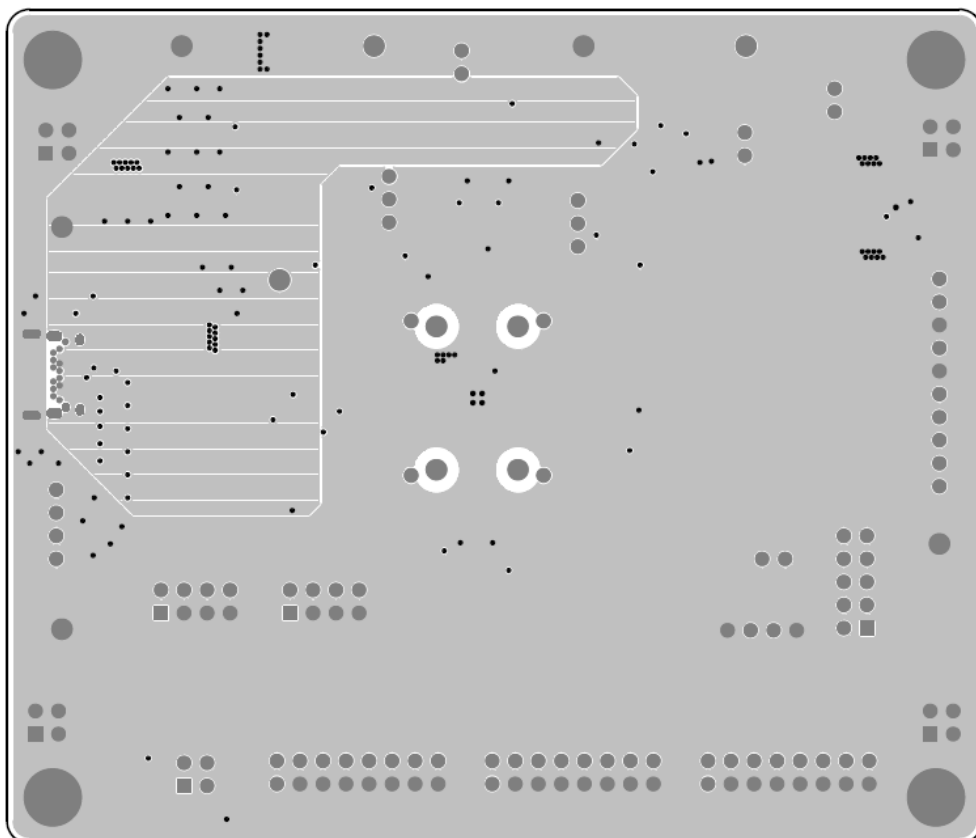


Figure 3. PCB Layout—Inner Side (3rd Layer)

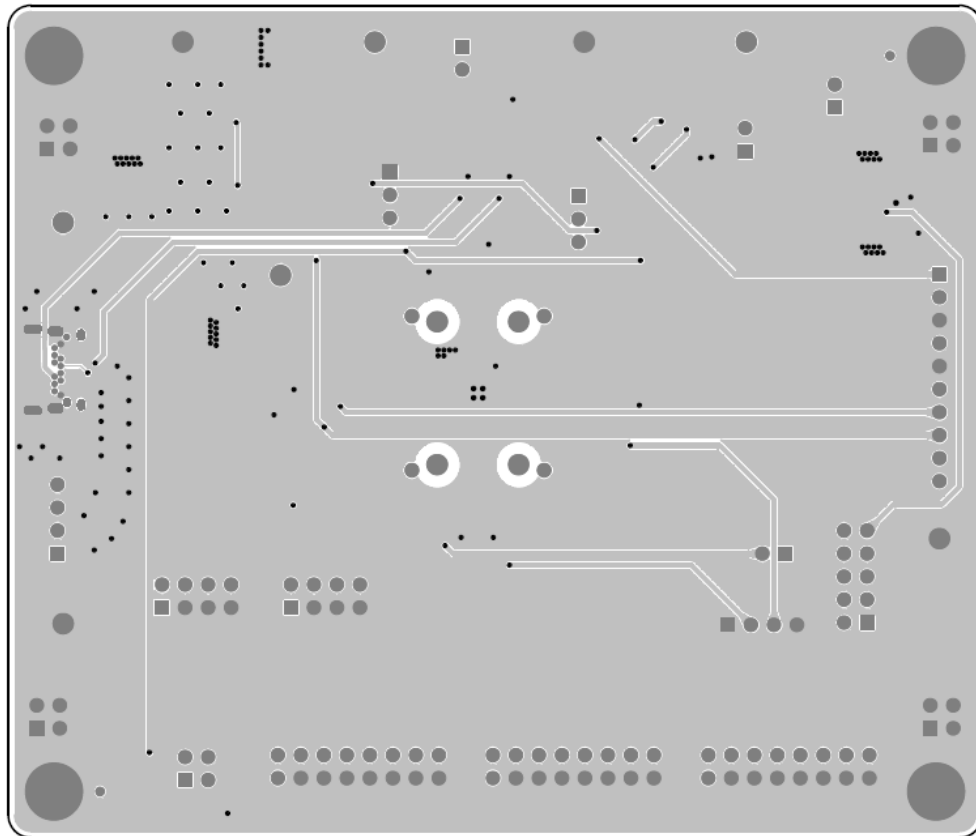


Figure 4. Bottom View (4th Layer)

More Information

For more information, please find the related datasheet or application notes from Richtek website
<http://www.richtek.com>.

Important Notice for Richtek Evaluation Board

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