

RN5T567

PCB Layout Guide

Version 1.2

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Abstract

This document describes the constraints and points when designing the PCB layout with RN5T567.
This guide provides examples to explain of how it can be done.
The PCB layout example is helpful to achieve optimal RN5T567 performance.

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1. Basic Policy and Examples of Board Pattern

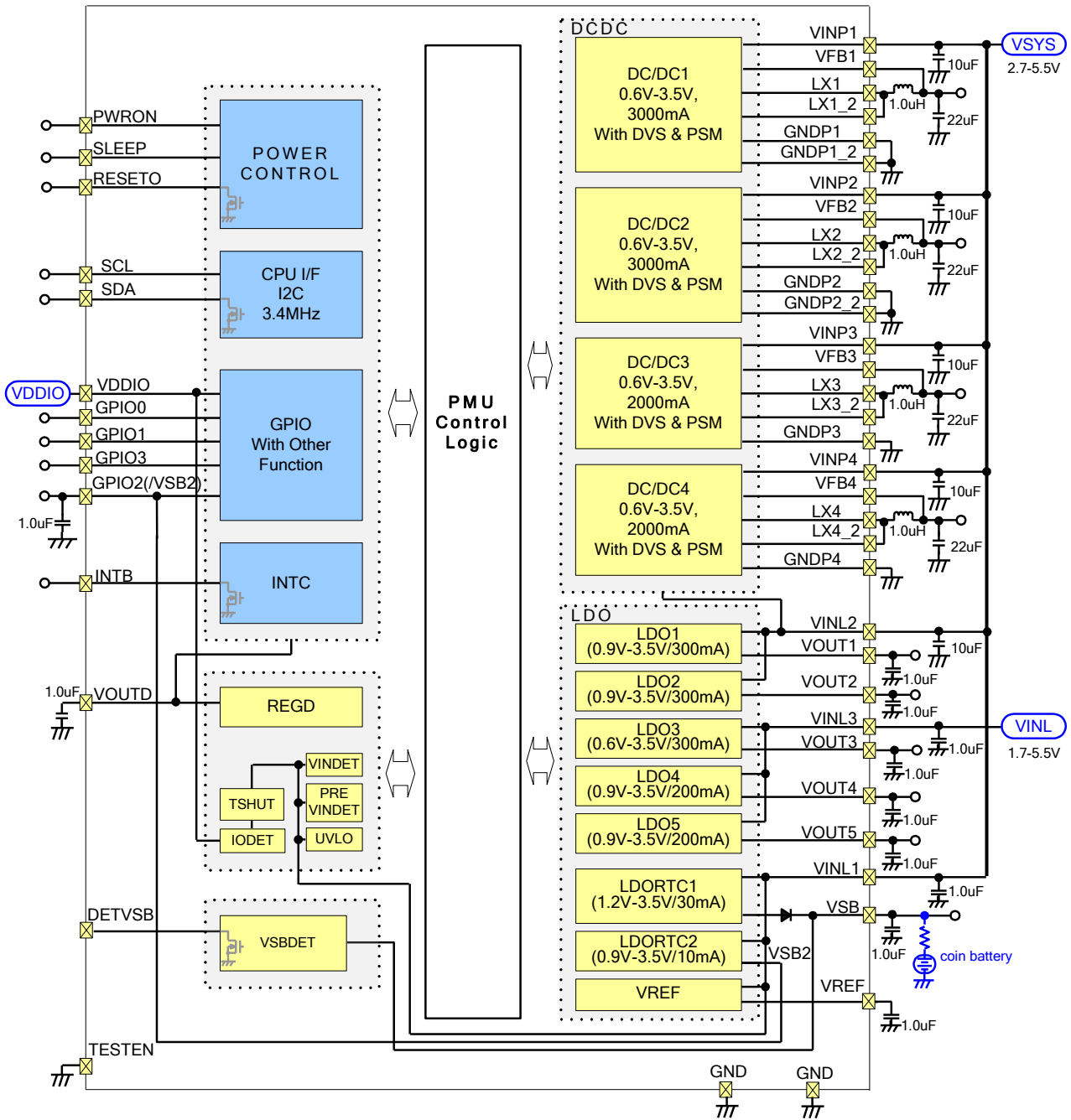


Fig. 1: RN5T567 Block Diagram

1.1 <DCDC Block>

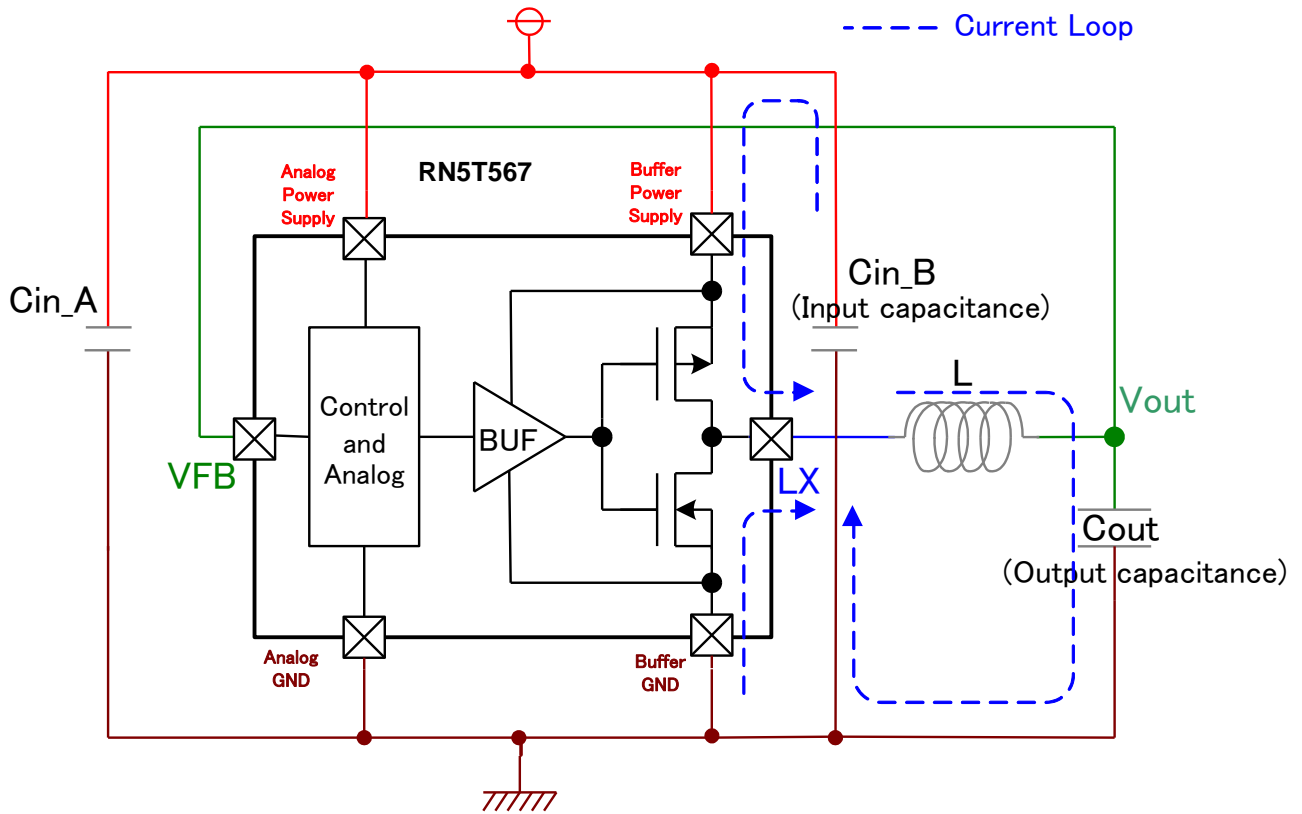


Fig. 1-1: Simplified Schematic for DCDC1, DCDC2, DCDC3 and DCDC4

RN5T567 Pin Names

	DCDC1	DCDC2	DCDC3	DCDC4
Analog Power Supply	VINL2			
Buffer Power Supply	VINP1	VINP2	VINP3	VINP4
VFB	VFB1	VFB2	VFB3	VFB4
LX	LX1	LX2	LX3	LX4

Table 1-1: RN5T567 Pin Names

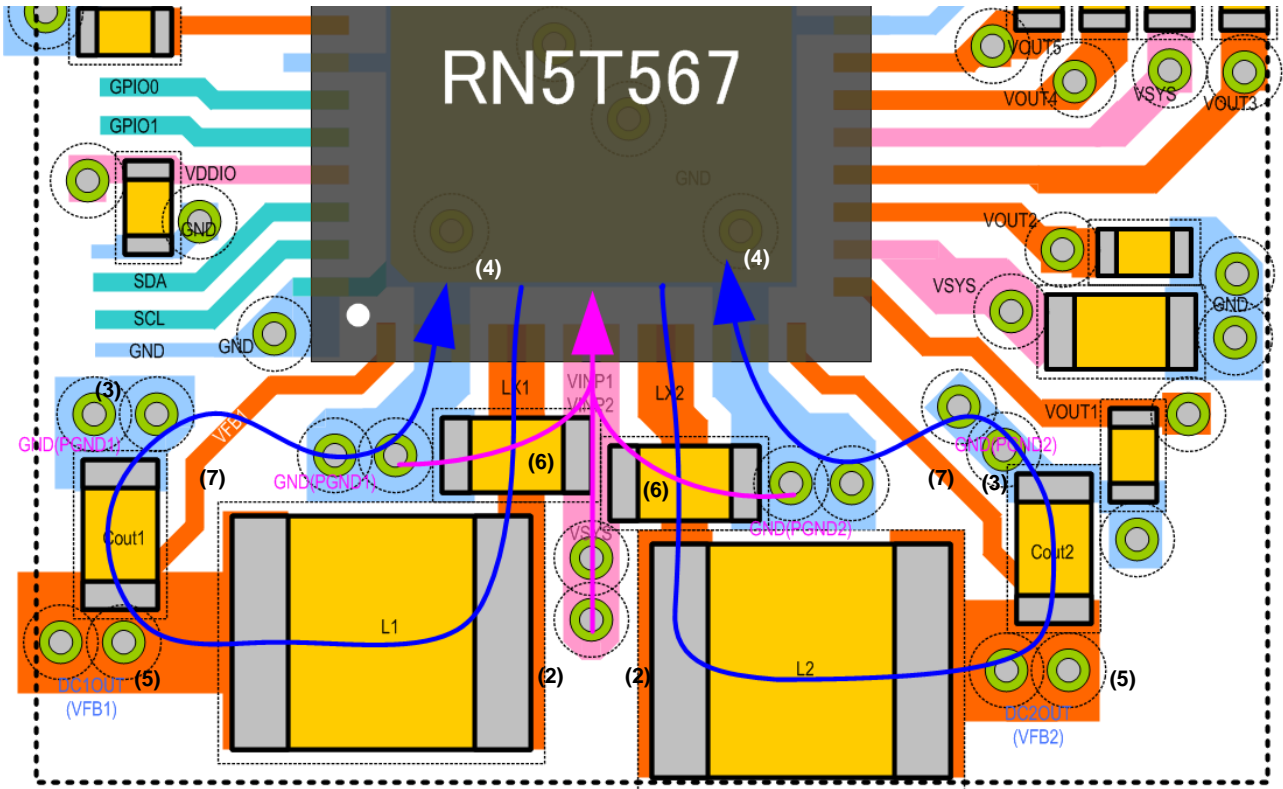


Fig. 1-2: Example of DCDC Block Board Pattern (Top Layer)

- (1) Place the parts to minimize the switching current loop (Figure 1-1: Blue line, Figure 1-2: Blue line and purple line).
- (2) Route the LX line as short and wide as possible between RN5T567 and an inductor, and prohibit adding other redundant lines on it.
- (3) Connect the ground line of “Cout” directly to the internal ground plane with multiple vias, in order to reduce impedance as small as possible. (Target: 50mΩ or less)
- (4) Connects TABPAD* of RN5T567 to ground plane with low impedance.
*) TABPAD is thermal pad in the bottom of QFN package.
- (5) Pull out the output of DCDC from near not “L” but “Cout”.
- (6) Place “Cin” as close as possible to RN5T567. (Higher priority level is “Cin” < L < “Cout” in the close distance order with RN5T567.)
- (7) Prohibit routing the VFB line which goes back to the RN5T567 with parallel to noise source line as LX, and if possible it's preferable to route the VFB line in the different layer from noise source. In addition, it should not pass under the Inductors.

2. Recommended External Parts List

Block	Pin Name	RN5T567 External Parts								
		Parts	Model value	Vender	Num	Parts Size [mm]				
						X Size	Y Size	Z Size	[mm ²]	
PMU	-	-	RN5T567 QFN	RICOH	1	6.00 (7.00)	6.00 (7.00)	0.85	36 (49)	
OTHER	PWRON	-	-	-	0				0	
	GPIO3	-	-	-	0				0	
	INTB	-	-	-	0				0	
	RESETO	-	-	-	0				0	
	DETVSB	-	-	-	0				0	
	SLEEP	-	-	-	0				0	
	GPIO0	-	-	-	0				0	
	GPIO1	-	-	-	0				0	
	VDDIO	0.1uF	GRM155R11C104KA88B	murata	1	1.00	0.50	0.50	0.5	
	SDA	-	-	-	0				0	
	SCL	-	-	-	0				0	
	TESTEN	-	-	-	0				0	
	LDO	VINL1	1.0uF	GRM155B31A105KE15	murata	1	1.00	0.50	0.50	0.5
VSB		1.0uF	GRM155B31A105KE15	murata	1	1.00	0.50	0.50	0.5	
		100ohm	RK73H1ETTP101F	KOA	1	1.00	0.50	0.50	0	
		-	Sub Battery	-	0	5.00	5.00	1.00	0	
VSB2/GPIO2		1.0uF	GRM155B31A105KE15	murata	1	1.00	0.50	0.50	0.5	
VREF		1.0uF	GRM155B31A105KE15	murata	1	1.00	0.50	0.50	0.5	
VOU2D		1.0uF	GRM155B31A105KE15	murata	1	1.00	0.50	0.50	0.5	
VOU5		1.0uF	GRM155B31A105KE15	murata	1	1.00	0.50	0.50	0.5	
VOU4		1.0uF	GRM155B31A105KE15	murata	1	1.00	0.50	0.50	0.5	
VINL3		1.0uF	GRM155B31A105KE15	murata	1	1.00	0.50	0.50	0.5	
VOU3		1.0uF	GRM155B31A105KE15	murata	1	1.00	0.50	0.50	0.5	
VOU2		1.0uF	GRM155B31A105KE15	murata	1	1.00	0.50	0.50	0.5	
VINL2		10uF	LMK107BBJ106MALT	TAIYO	1	1.60	0.80	0.80	1.28	
VOU1	1.0uF	GRM155B31A105KE15	murata	1	1.00	0.50	0.50	0.5		
DCDC	VINP1	10uF	LMK107BBJ106MALT	TAIYO	1	1.60	0.80	0.80	1.28	
	LX1	1uH	DFE322512C-1R0M	TOKO	1	3.20	2.50	1.20	8	
	VFB1	22uF	JMK107BJ226MA-TD	TAIYO	1	1.60	0.80	0.80	1.28	
	VINP2	10uF	LMK107BBJ106MALT	TAIYO	1	1.60	0.80	0.80	1.28	
	LX2	1uH	DFE322512C-1R0M	TOKO	1	3.20	2.50	1.20	8	
	VFB2	22uF	JMK107BJ226MA-TD	TAIYO	1	1.60	0.80	0.80	1.28	
	VINP3	10uF	LMK107BBJ106MALT	TAIYO	1	1.60	0.80	0.80	1.28	
	LX3	1uH	DFE252012C-1R0N	TOKO	1	2.50	2.00	1.20	5	
	VFB3	22uF	JMK107BJ226MA-TD	TAIYO	1	1.60	0.80	0.80	1.28	
	VINP4	10uF	LMK107BBJ106MALT	TAIYO	1	1.60	0.80	0.80	1.28	
	LX4	1uH	DFE252012C-1R0N	TOKO	1	2.50	2.00	1.20	5	
	VFB4	22uF	JMK107BJ226MA-TD	TAIYO	1	1.60	0.80	0.80	1.28	
					Total Num	27	Total Parts size			79.52 (92.52)


 dummy pattern

Table 2-1: Recommended external parts list

3. Example of Parts Layout

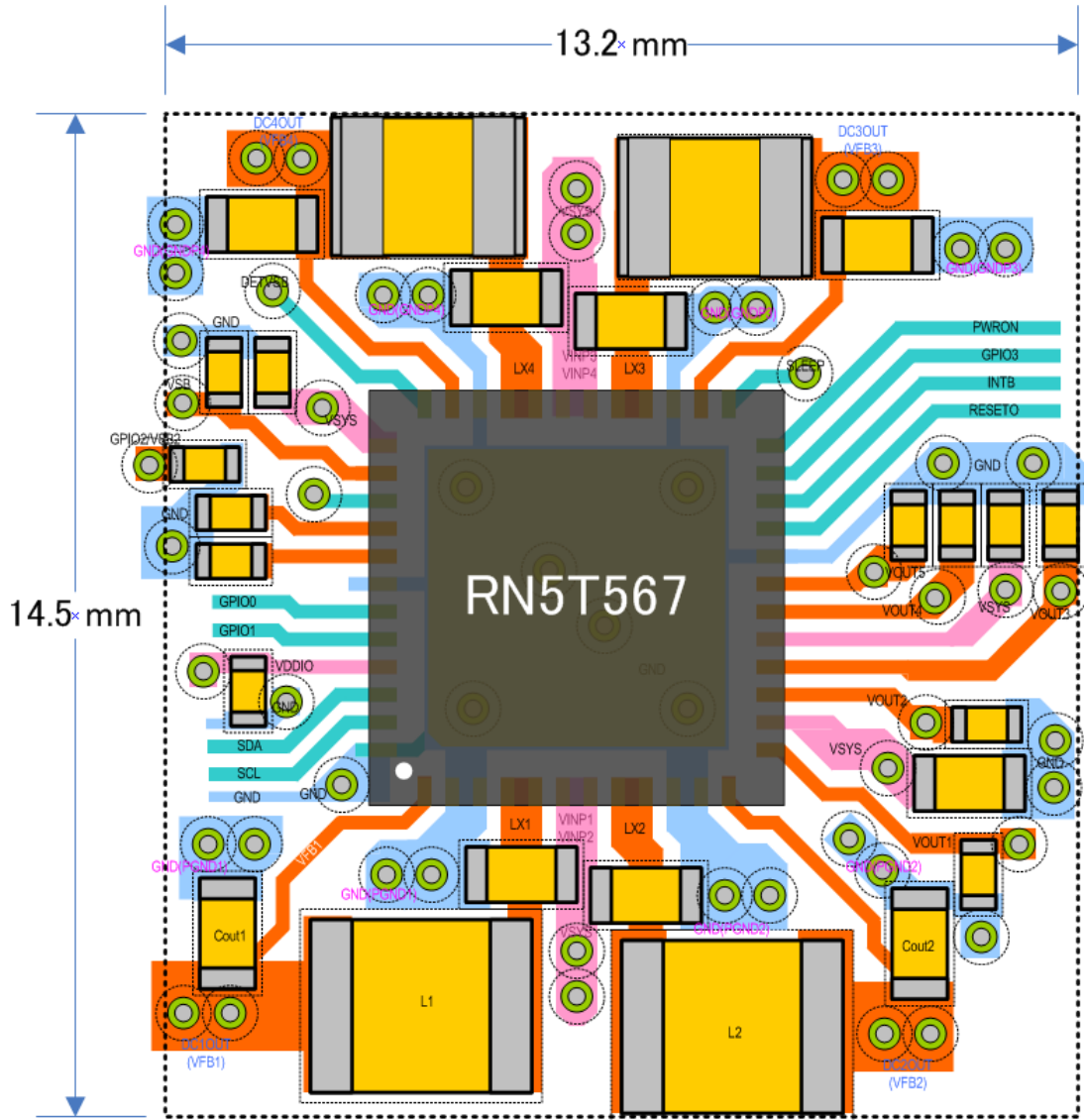


Fig. 3-1: Example PCB Parts Layout

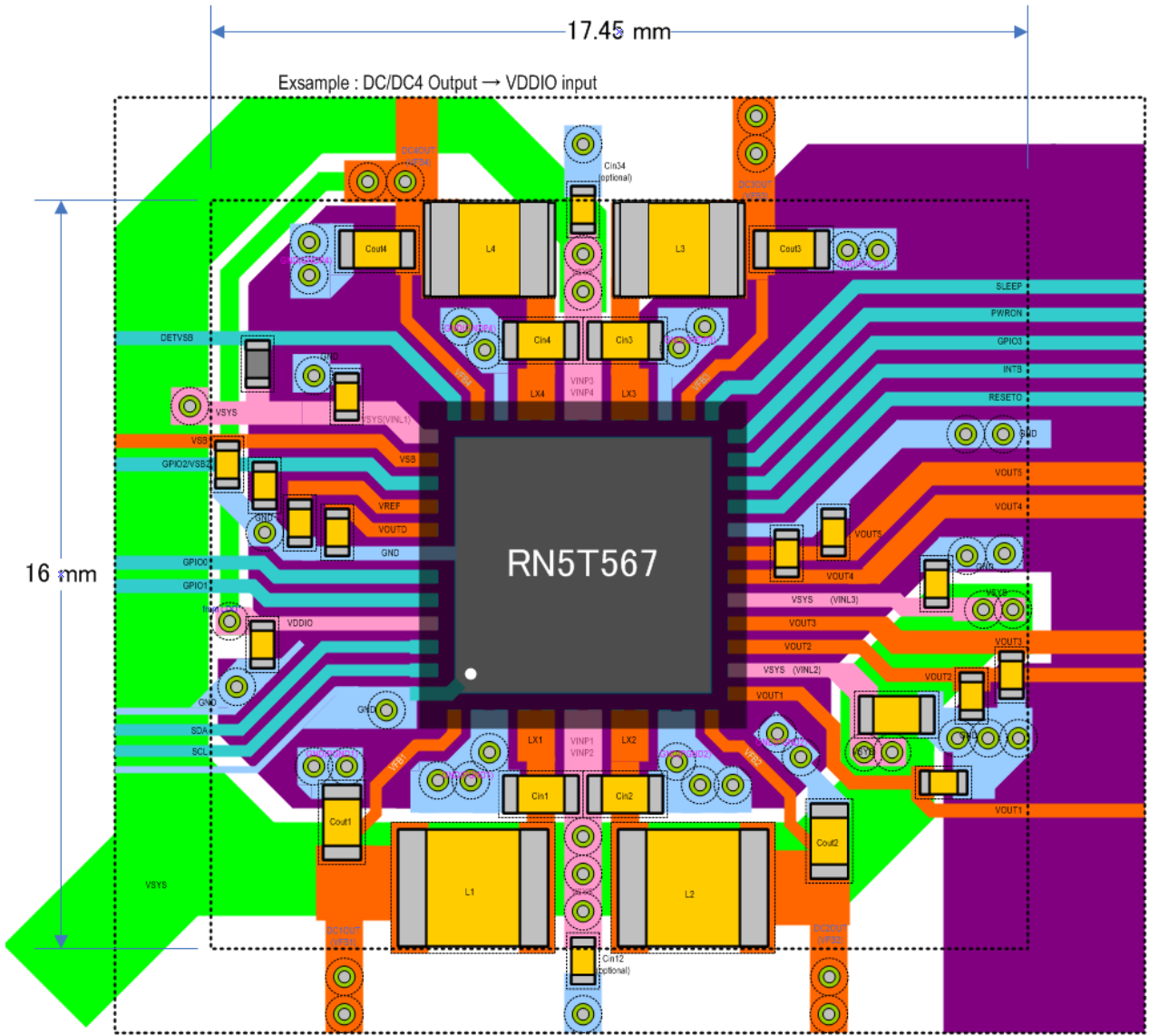


Fig. 3-2: Example PCB Parts Layout [QFN0707-48]
 (At 2-layers image)