



# **3.125 Gbps 1:4 LVDS Buffer/Repeater with Transmit Pre-emphasis and Receive Equalization**

## **DS25BR204 Evaluation Kit**

### ***USER MANUAL***

**Part Number: DS25BR204EVK NOPB**

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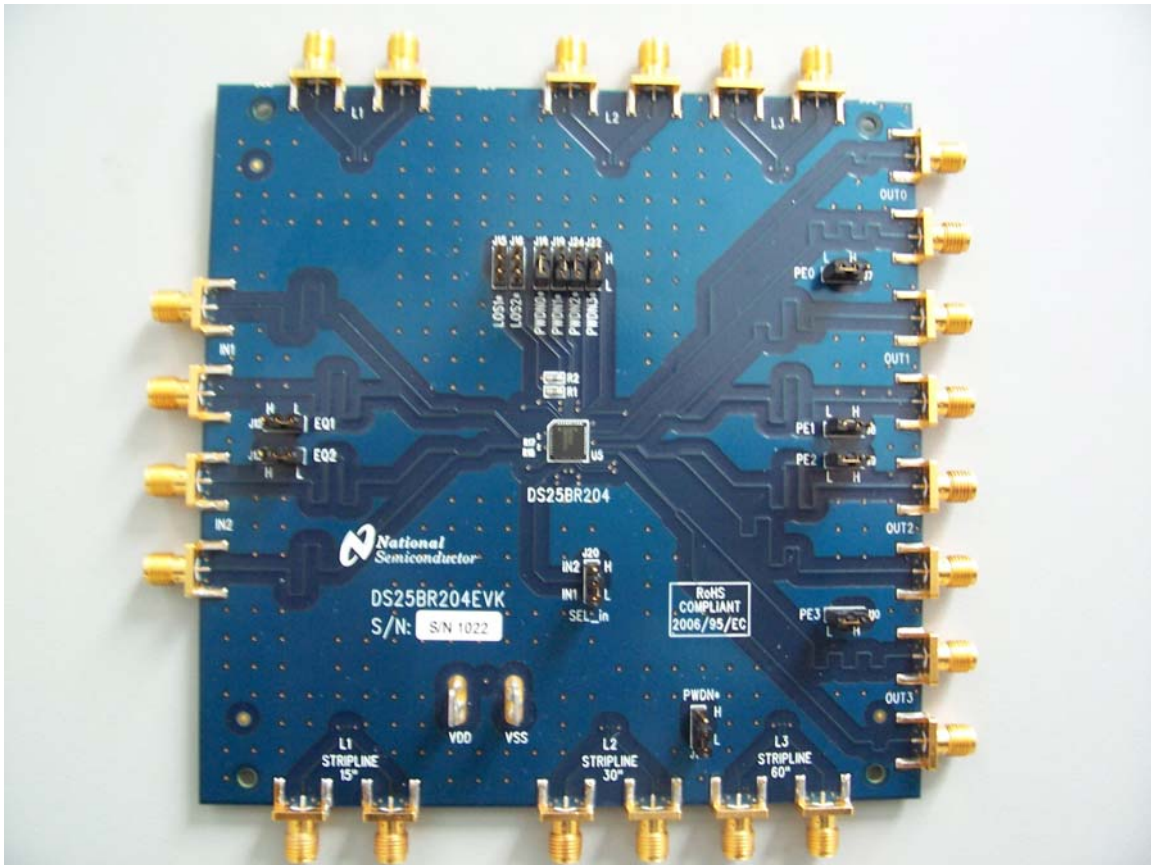
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## Overview

The DS25BR204EVK is an evaluation kit designed for demonstrating performance of the DS25BR204, a 3.125 Gbps 1:4 LVDS Buffer/Repeater with transmit pre-emphasis and receive equalization. The evaluation kit is comprised of the DS25BR204 with its associated input and output SMA connectors and jumpers to manually configure the switch. In addition, the EVK features three FR4 striplines (15 (~38), 30 (~76) and 60 (~152) inches (cm) in length) for exercising device's signal conditioning features (pre-emphasis and equalization).

The purpose of this document is to familiarize the user with the DS25BR204EVK, to suggest test setup procedures and instrumentation to test the device optimally, and to guide the user through some typical measurements that demonstrate the performance of the DS25BR204 in typical applications.



**Figure 1.** Photo of the DS25BR204EVK

## Description

Figure 2 shows the top layer drawing of the PCB with the silkscreen annotations. The 5.25 by 5.25 inch, eight-layer PCB is designed to evaluate the functions of the DS25BR204.

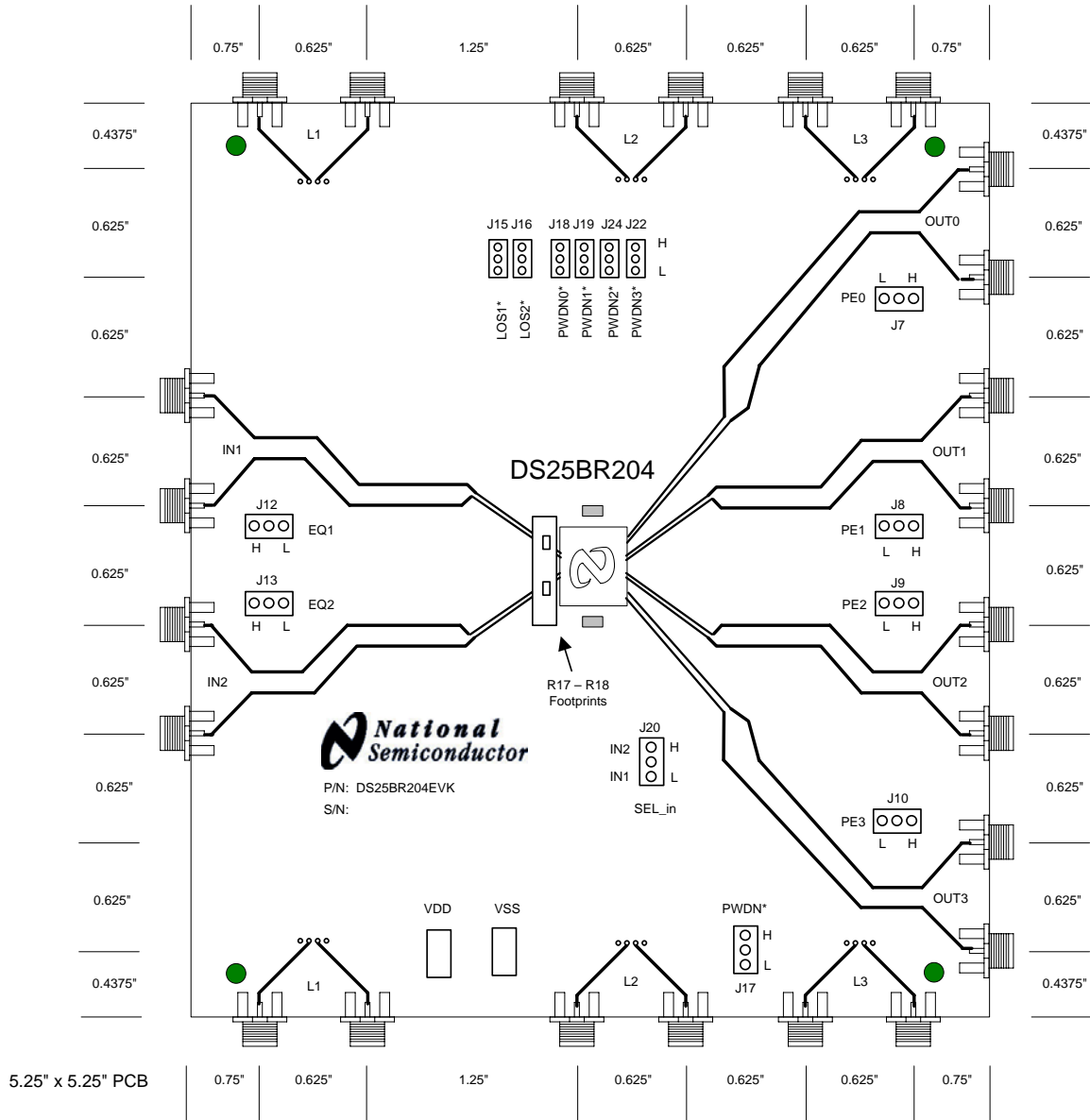
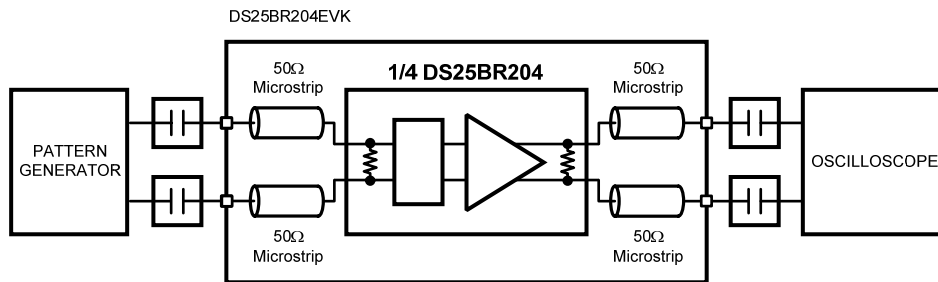


Figure 2. Top Layer DS25BR204EVK

## Evaluation

This section provides recommended test setup procedure for the device evaluation. Figure 3 depicts a typical setup and instrumentation you may use for the device evaluation.

1. Configure the test setup as shown in Figure 3.
2. Select a desired input using J20.
3. Power up the device and desired output(s) using the J18, J19, J20, J22 and J24.
4. Apply + supply (3.3V typical) to the VDD and – supply (ground) to the VSS connectors.
5. Set desired pre-emphasis and/or equalization levels according to Tables 1 and 2.
6. Connect a signal source (signal generator, data source, or an LVDS driver) to the desired INn inputs on the board and adjust the signal parameters (VOH, VOL, VCM) so that they comply with the device input recommendations.
7. Connect an oscilloscope to the selected OUTn outputs and view the output signals with an oscilloscope with the analog bandwidth of at least 5 GHz.



**Figure 3.** DS25BR204 Test Setup Example

## Truth Tables

OUTPUT OUT <sub>n</sub> , n = {0, 1, 2, 3}	
CONTROL Pin PEn (J7, J8, J9, J10) State	Pre-emphasis Level
L	OFF
H	ON

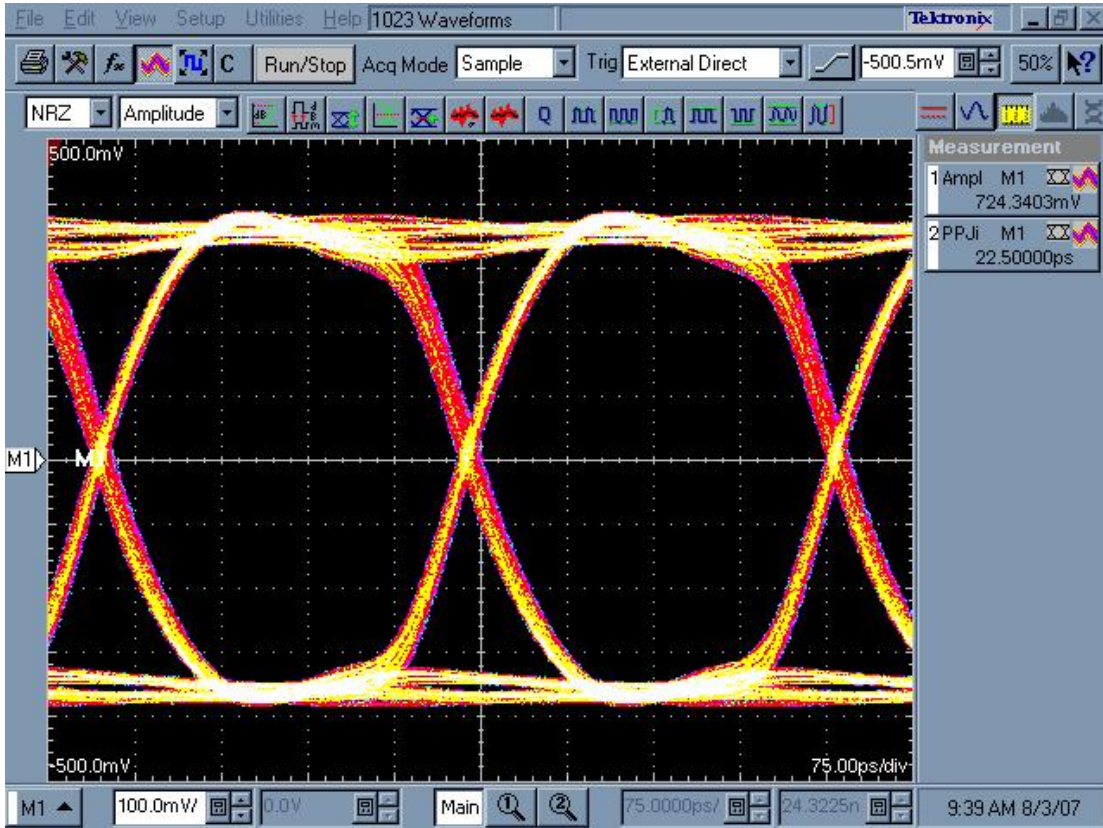
**Table 1.** Transmit Pre-emphasis Truth Table

INPUT IN <sub>n</sub> , n = {1, 2}	
CONTROL Pin EQn (J12, J13) State	Pre-emphasis Level
L	OFF
H	ON

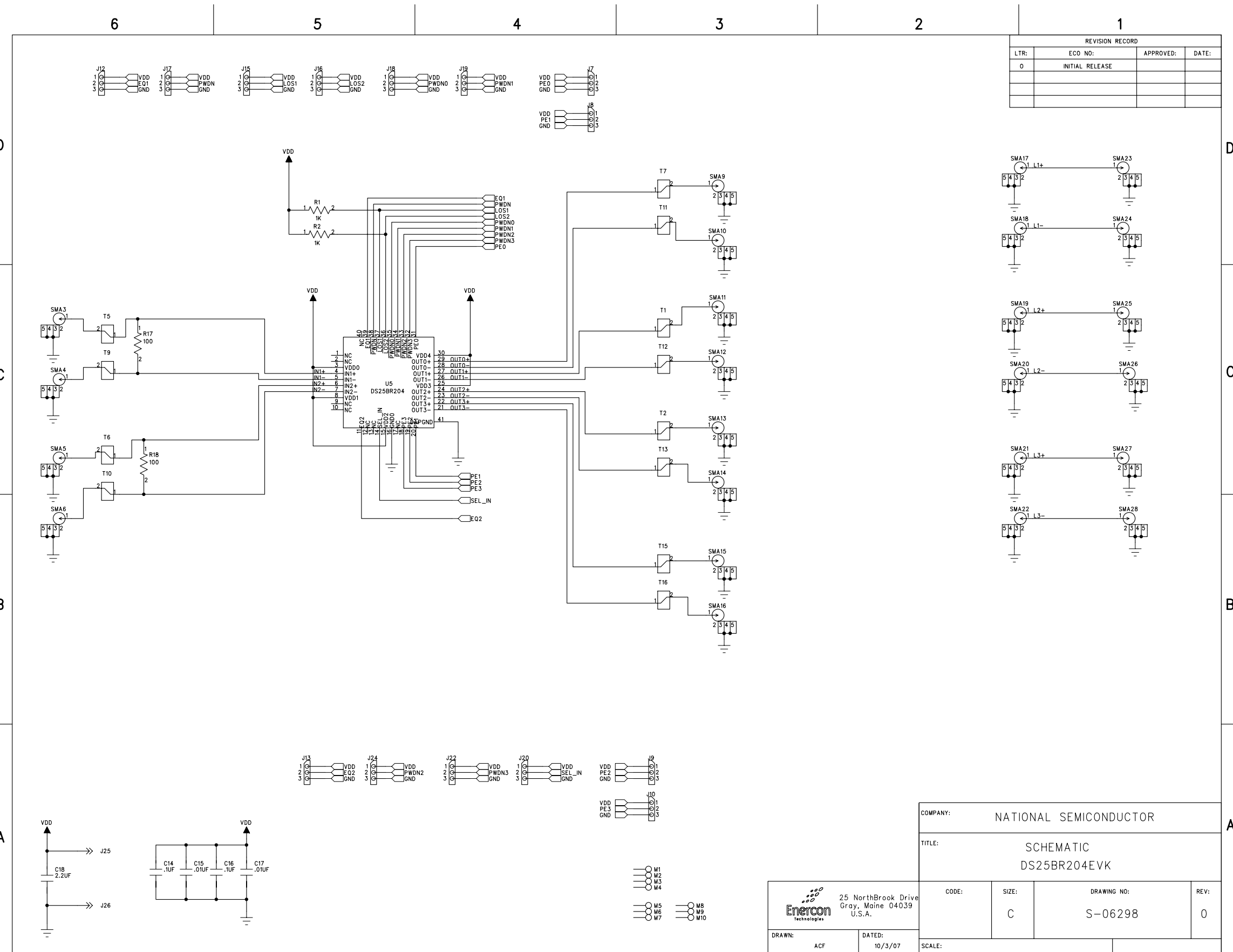
**Table 2.** Receive Equalization Truth Table

## Typical Performance

This section of the User Manual shows a typical eye diagram you can expect to see when evaluating the DS25BR204EVK.




**Figure 4.** DS25BR204 3.125 Gbps NRZ PRBS-7 Output Eye Diagram



REVISION RECORD			
LTR:	ECO NO:	APPROVED:	DATE:
0	INITIAL RELEASE		

COMPANY: NATIONAL SEMICONDUCTOR			
TITLE: SCHEMATIC DS25BR204EVK			
CODE:	SIZE: C	DRAWING NO: S-06298	REV: 0
DRAWN: ACF	DATED: 10/3/07	SCALE:	


 25 NorthBrook Drive  
 Gray, Maine 04039  
 U.S.A.



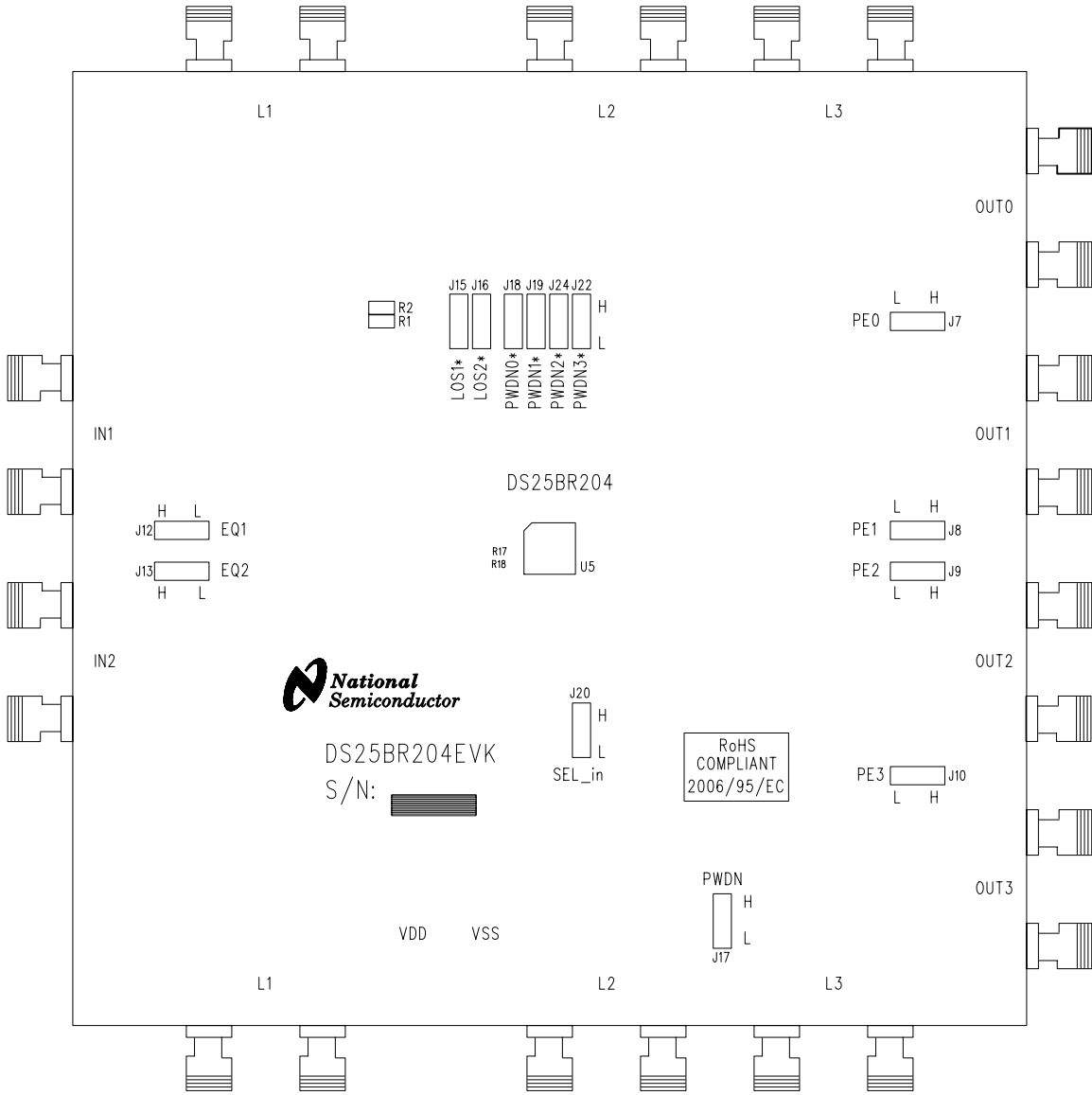
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	Main Product:		Z3199-01	1	BJ	10/18/2007	Released
PCBA, DS25BR204 EVK, ROHS			Responsible Eng/Mgr:	Creator:		Creation Date:	
				Arlene Fox		10/5/2007	

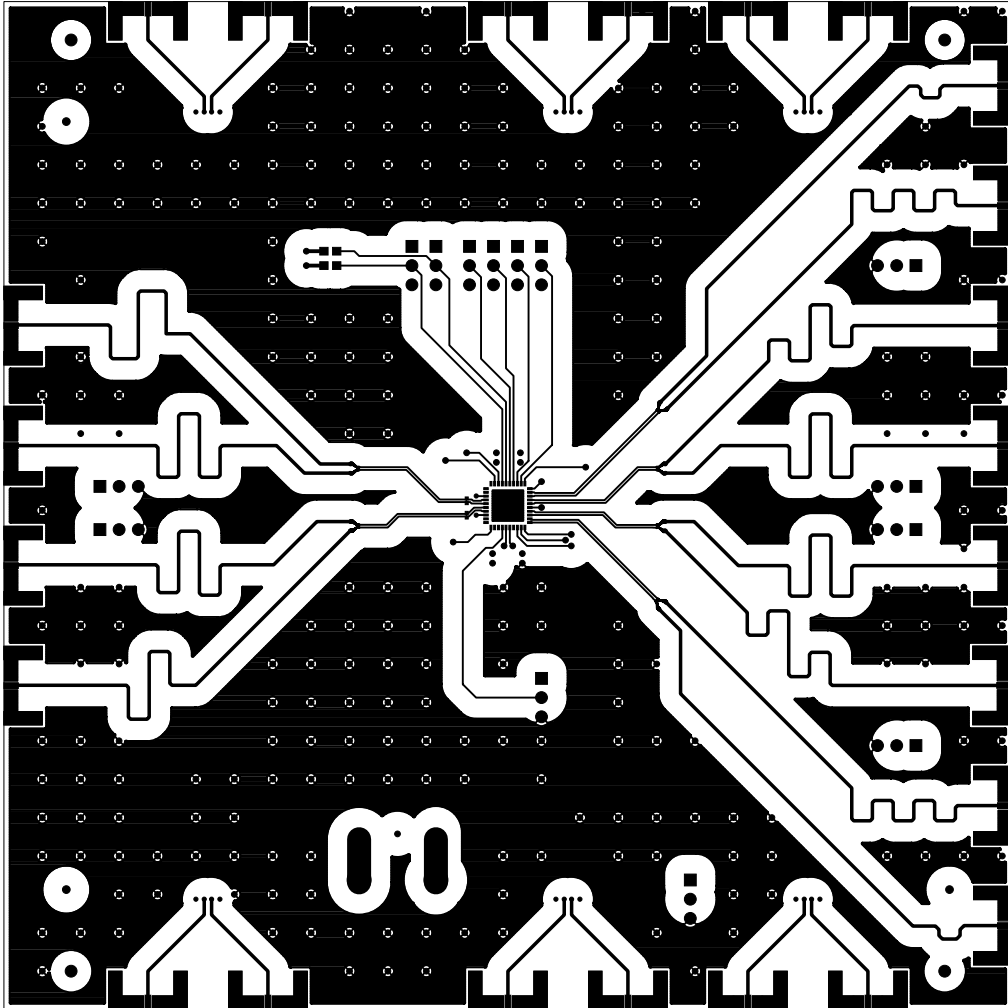
Item	Part Type	Part Number/Value	Mfg	NoSub	Description	Qty	SMT	Ref Des	Notes	Rev
1	PCB	P-06299R0	ENERCON		DS25BR204: 5.25x5.25x.060in, 8 layer	1			Bd: (133.35x 133.35mm) Panel: ( 10.60x5.25in) (269.24x 133.35mm) 2 bds/panel	0
2										
3	IC	DS25BR204TSQ/NOPB	NAT		LVDS Repeater, LLP40, Pb-Free	1	X	U5	Customer Supplied	0
4										
5	RES	ERJ-3GEYJ102	PANA		1K 1/10W ±5% 0603 200ppm, Pb-Free	2	X	R1-2		0
	<ALT>	CRCW06031K00JNEA	VISHAY		1K 1/10W ±5% 0603 200ppm, Pb-Free					
	<ALT>	RK73B1JTTD102J	KOA		1K 1/10W ±5% 0603 200ppm, Pb-Free					
6										
7	CAP	0402YC103KAT	AVX		.01µF, 16V, ±10%, 0402, Ceramic, X7R, Pb-Free	2	X	C15,17		0
	<ALT>	C0402C103K4RAC	KEMET		.01µF, 16V, ±10%, 0402, Ceramic, X7R, Pb-Free					
	<ALT>	ECJ-0EB1C103K	PANA		.01µF, 16V, ±10%, 0402, Ceramic, X7R, Pb-Free					
8	CAP	C0402C104K8RAC	KEMET		.1µF, 10V, ±10%, 0402, Ceramic, X7R, Pb- Free	2	X	C14,16		0
9	CAP	C1206C225K4RAC	KEMET		2.2µF, 16V, ±10%, 1206, Ceramic, X7R, Pb-Free	1	X	C18		0
	<ALT>	ECJ-3YB1C225K	PANA		2.2µF, 16V, ±10%, 1206, Ceramic, X7R, Pb-Free					
10										
11	CONN	1287-ST	KEYSTONE		Faston, Male, .250x.032, Pb-Free	2		J25-26		0
12	CONN	142-0701-851	EMERSON		SMA, Jack Receptacle, 50 OHM, Pb-Free	24		SMA3-6,9-28		0
13	CONN	SNT-100-BK-G	SAMTEC		Shunt, .100"sp, Gold, Pb-Free	14			Use with J7- 10,12-13,15- 20,22,24 Pins 2&3	0
	<ALT>	SNT-100-BK-H	SAMTEC		Shunt, .100"sp, Gold, Pb-Free					

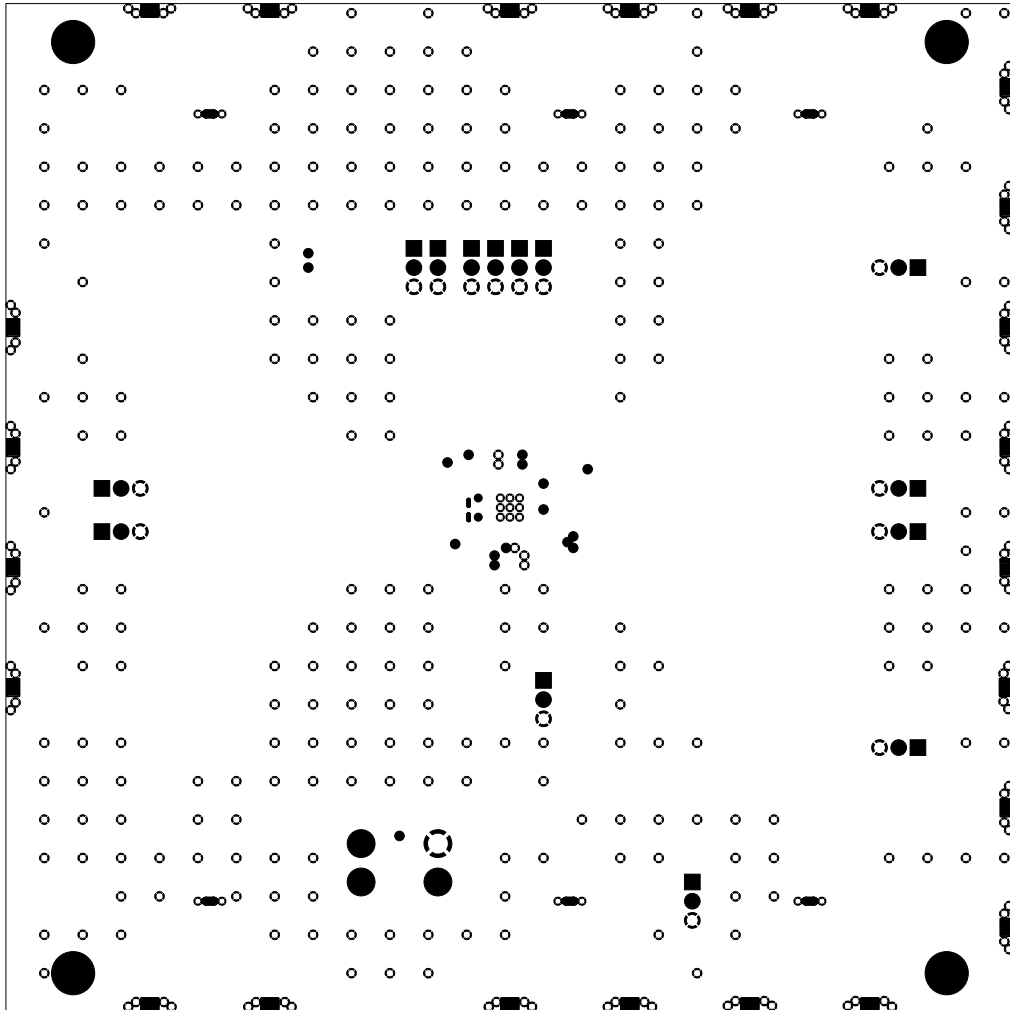
<b>ENERCON - BILL OF MATERIALS</b>	TITLE: NATIONAL SEMICONDUCTOR PCBA, DS25BR204EVK, ROHS DS25BR204EVK	PL Number: Z3199-01	Rev: 1	Rev By: BJ	Rev Date: 10/18/2007	PL Status: Released
		Responsible Eng/Mgr:		Creator: Arlene Fox	Creation Date: 10/5/2007	
Main Product: PCBA, DS25BR204 EVK, ROHS						

Item	Part Type	Part Number/Value	Mfg	NoSub	Description	Qty	SMT	Ref Des	Notes	Rev
14	CONN	TSW-103-07-G-S	SAMTEC		Header, 3p, Male, .100"sp, Gold, Pb-Free	14		J7-10,12-13,15-20,22,24		0
15										
16	STENCL	T-06302R0	ENERCON		STENCIL FABRICATION TOP, DS25BR204EVK	1				0
17	STENCL	T-06303R0	ENERCON		STENCIL FABRICATION BOTTOM, DS25BR204EVK	1				0
18										
19	REF	C-06300R0	ENERCON		FABRICATION DWG, DS25BR204EVK					0
20	REF	C-06301R0	ENERCON		PALLET DWG, DS25BR204EVK					0
21	REF	S-06298R0	ENERCON		SCHEMATIC, DS25BR204EVK					0
22										
23										
24										

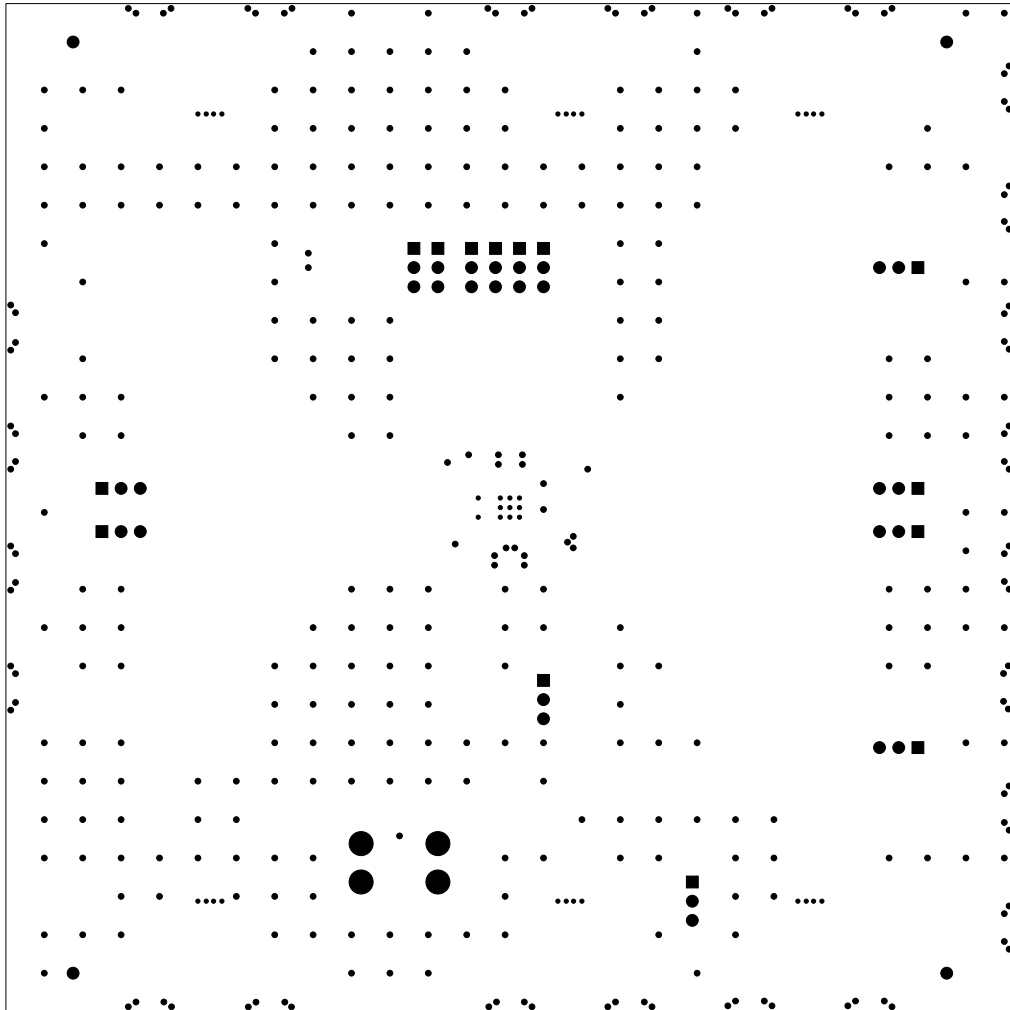
Notes:  
DO NOT STUFF  
R17,18



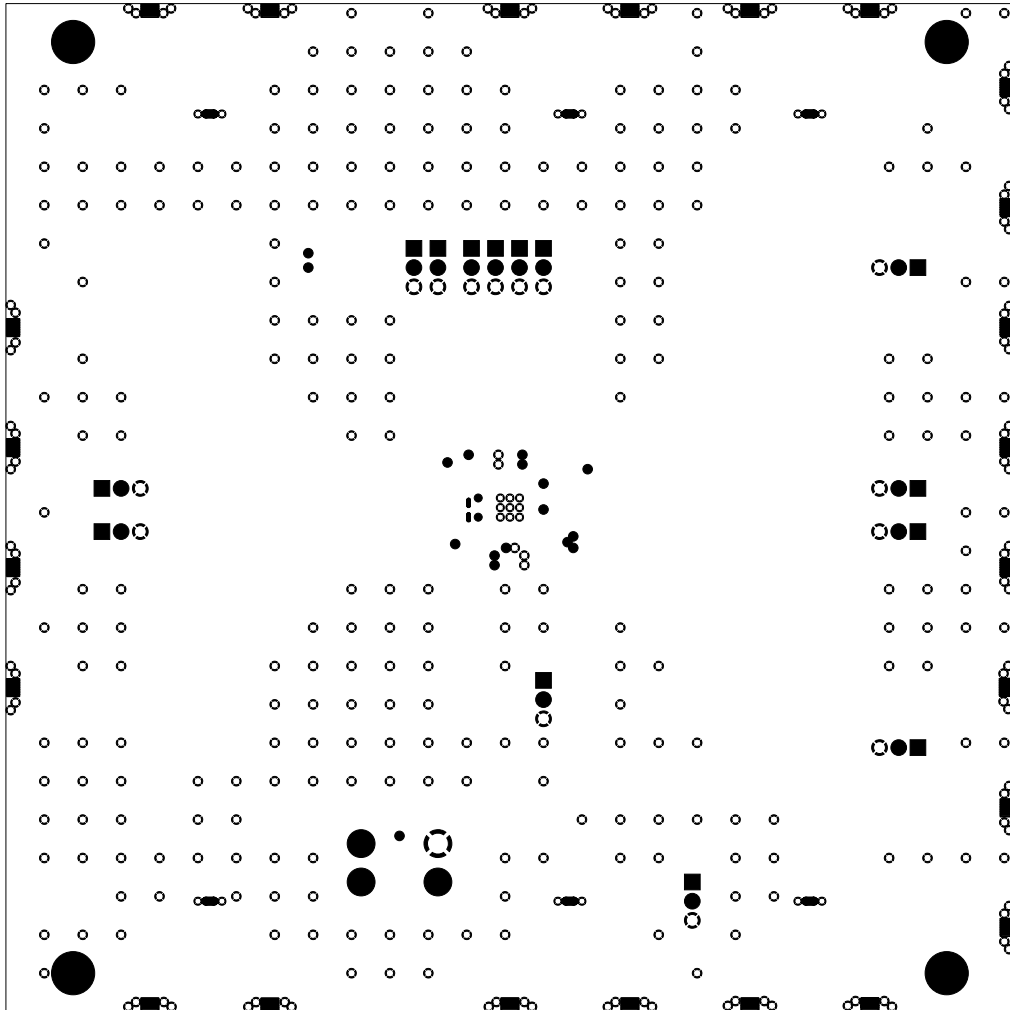




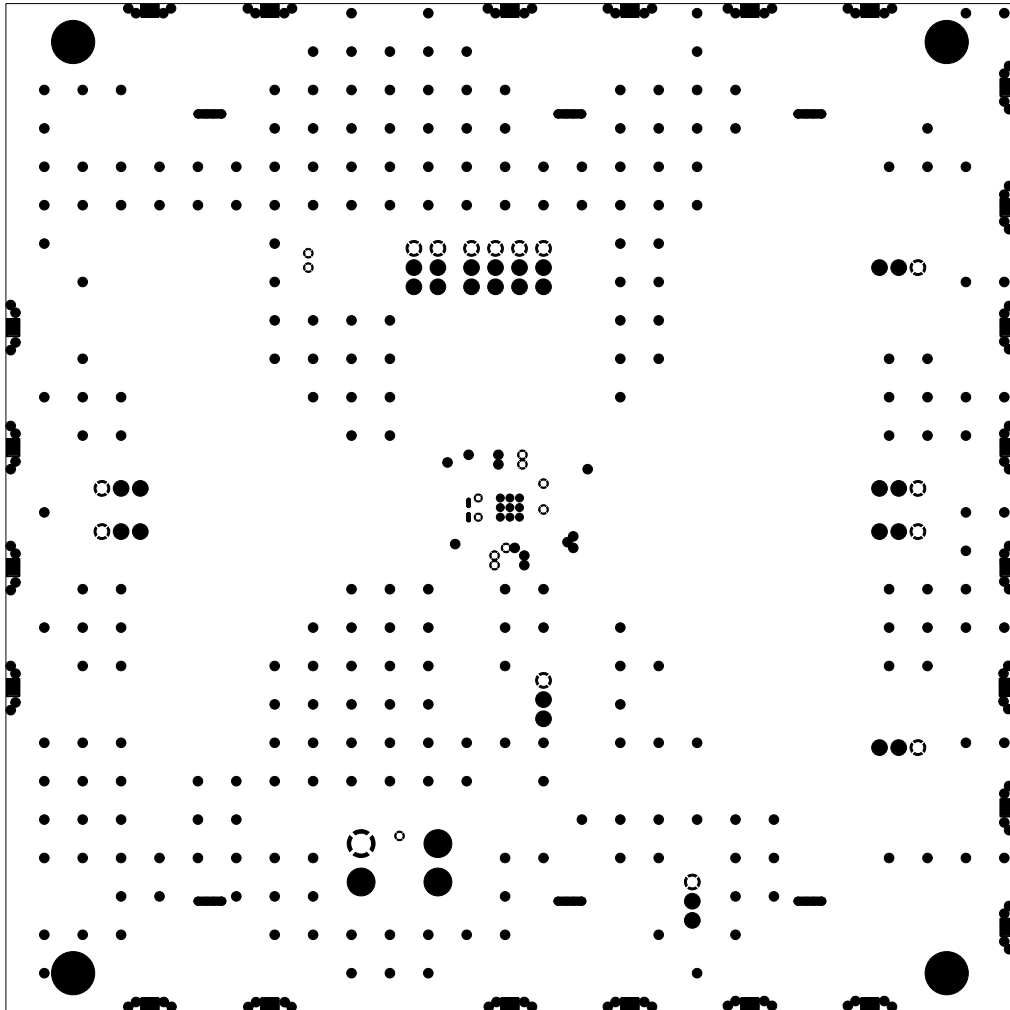
LAYER 2 GND PLANE



LAYER 3 SIGNAL

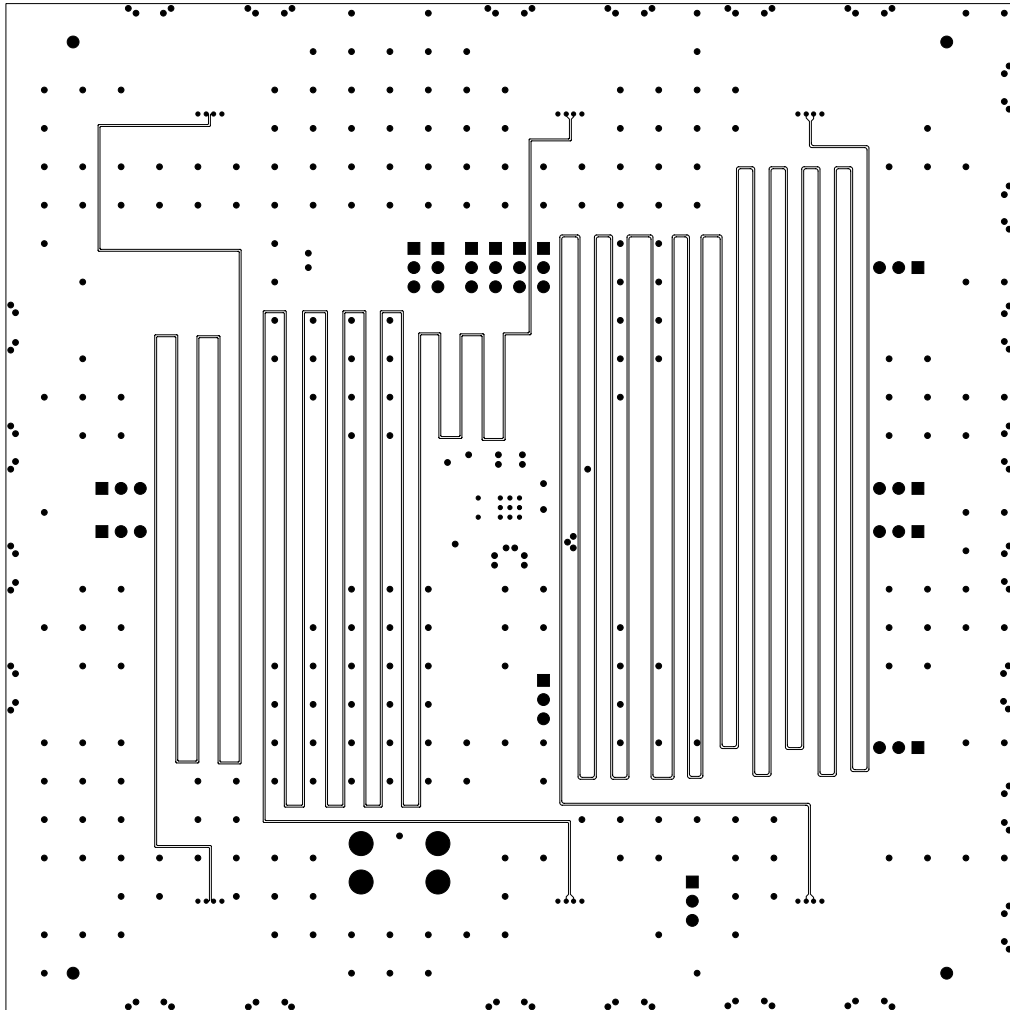


LAYER 4 GND PLANE

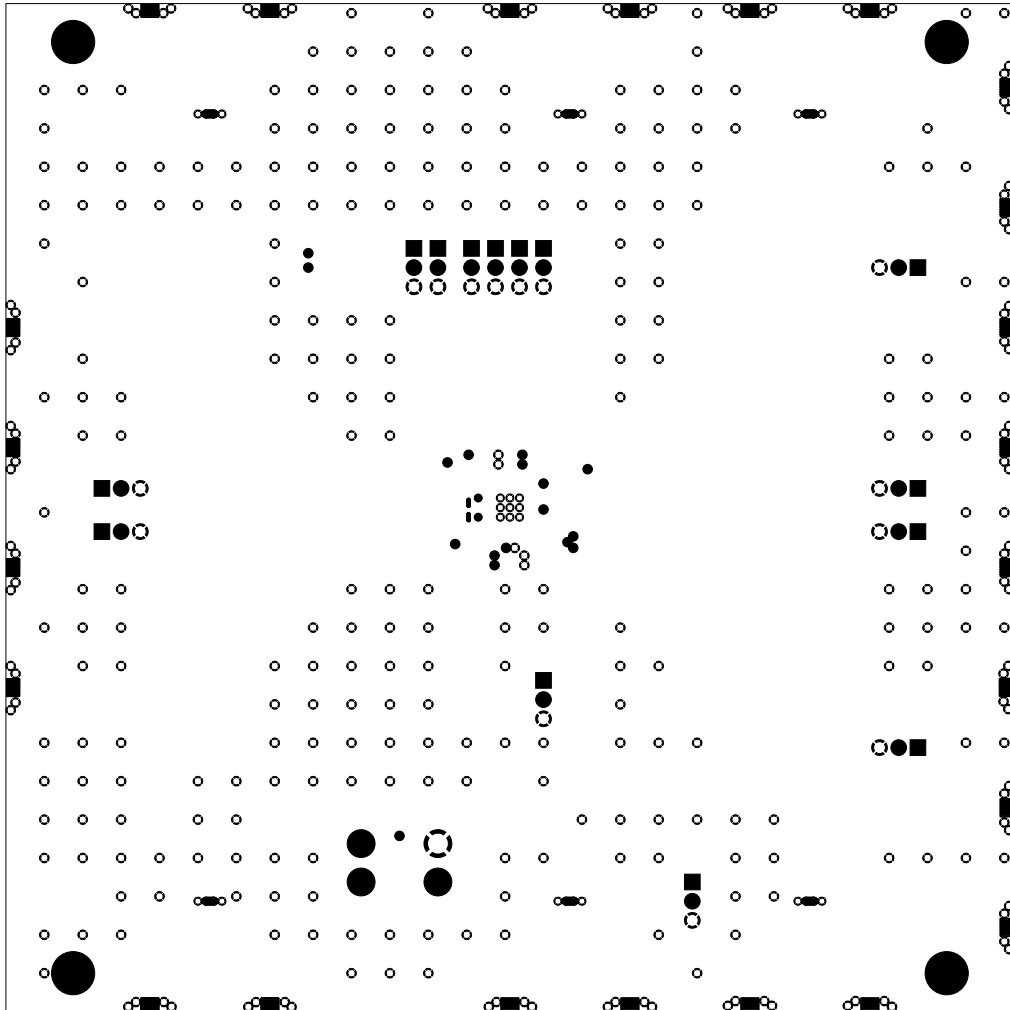


LAYER 5 VCC PLANE

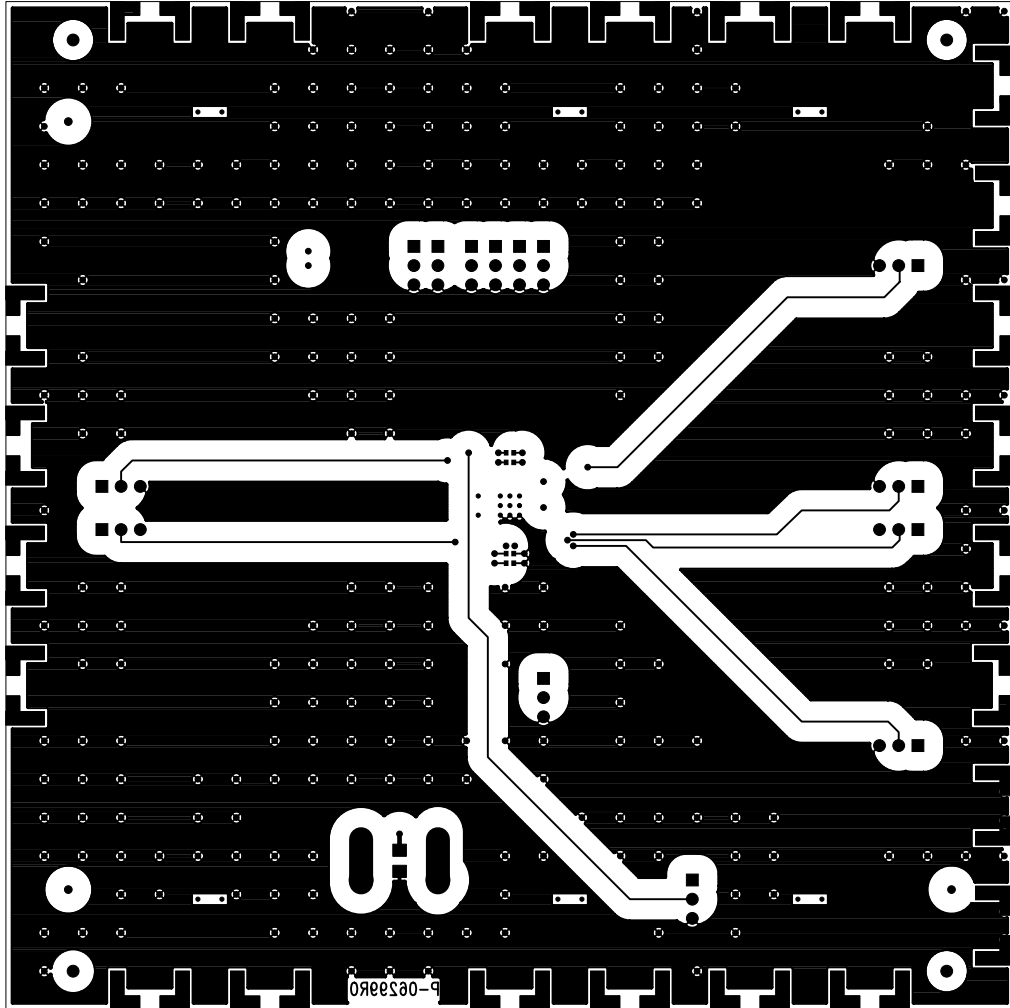




LAYER 6 SIGNAL



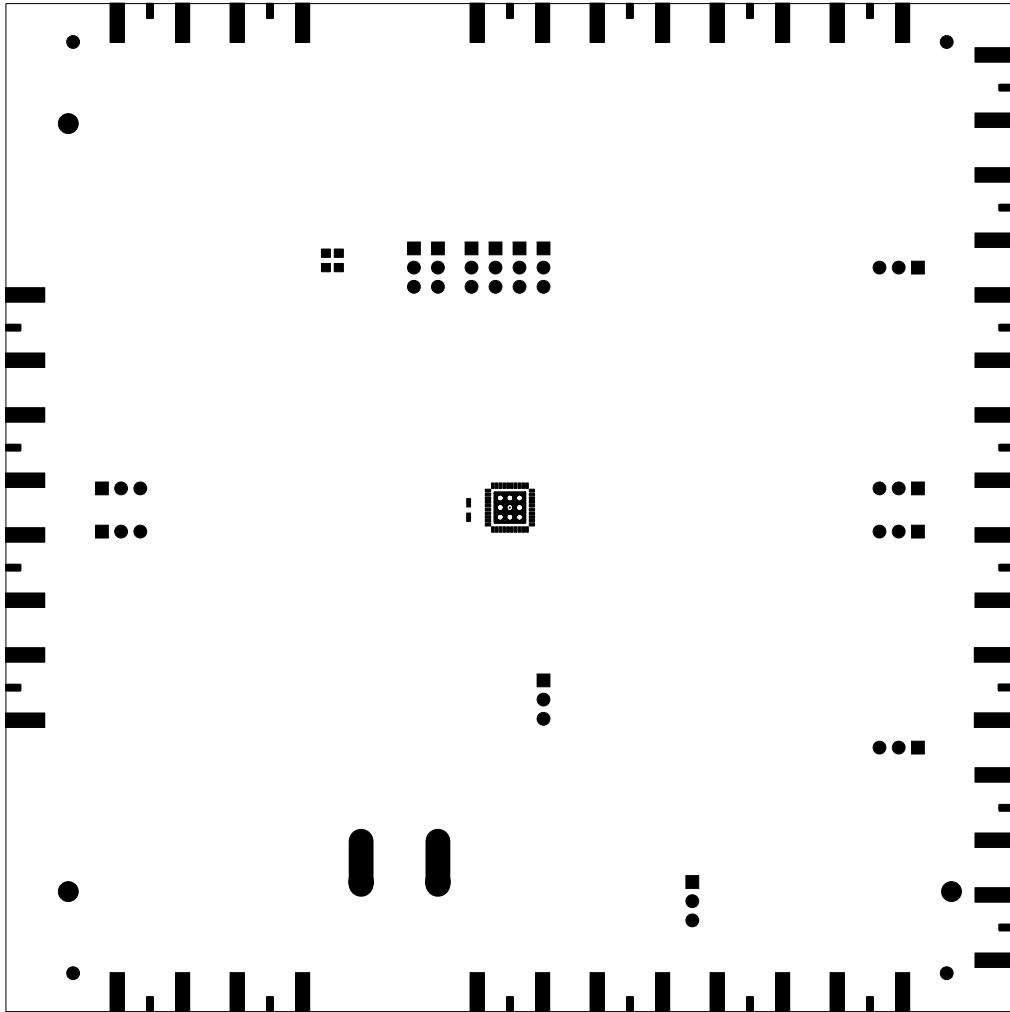
LAYER 7 GND PLANE

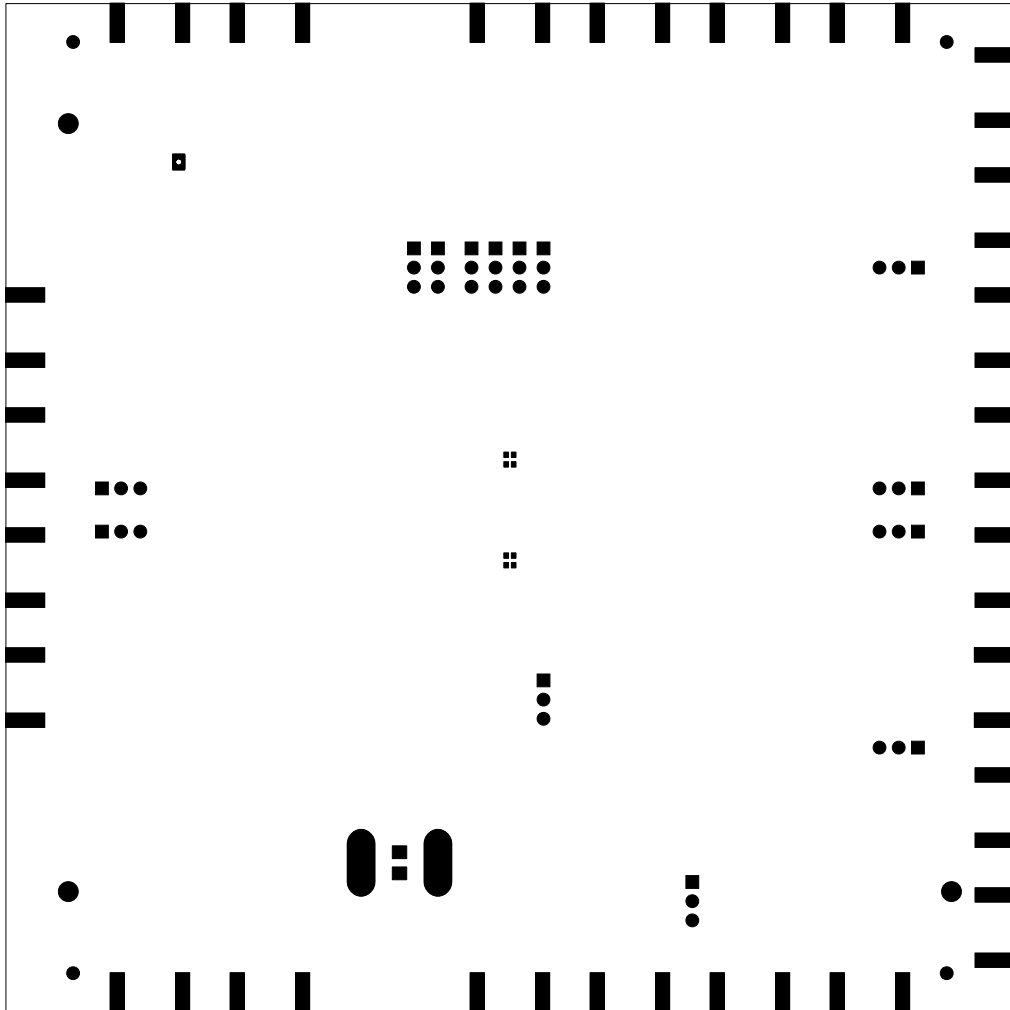


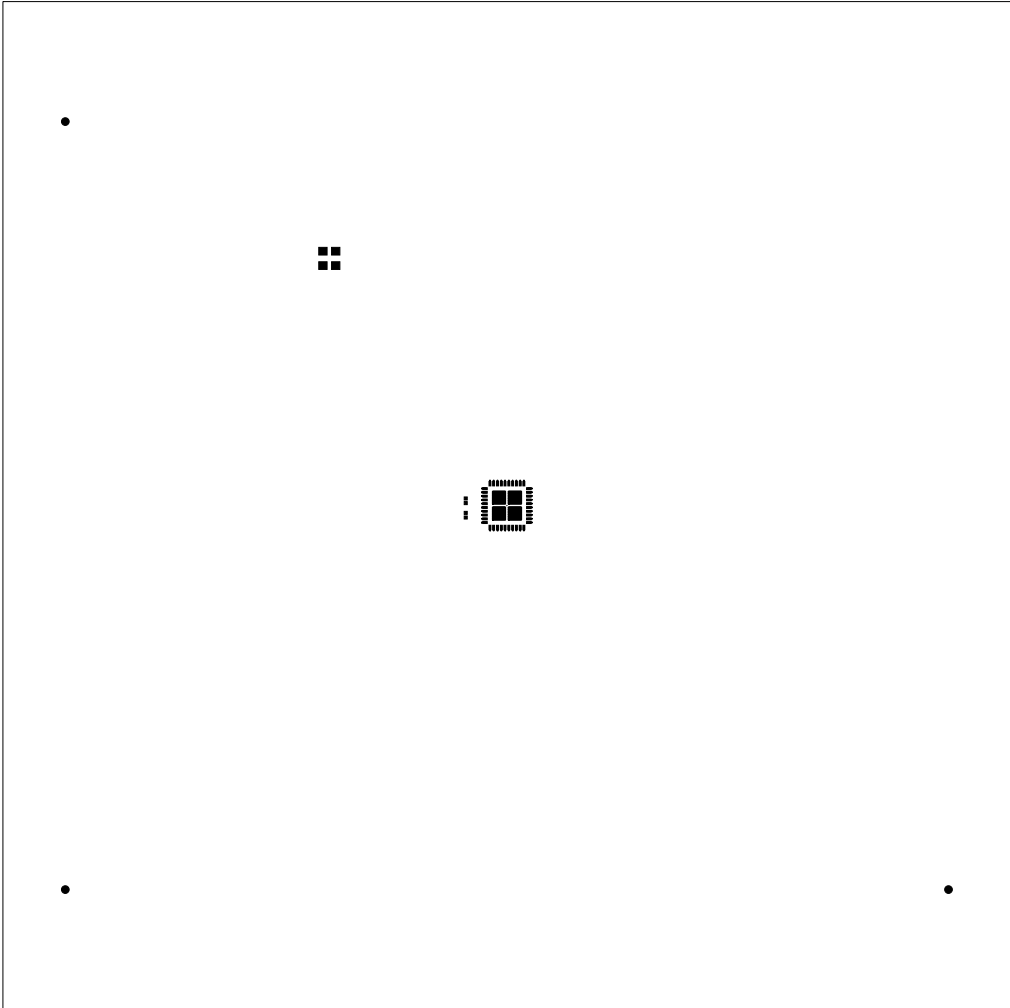
C18

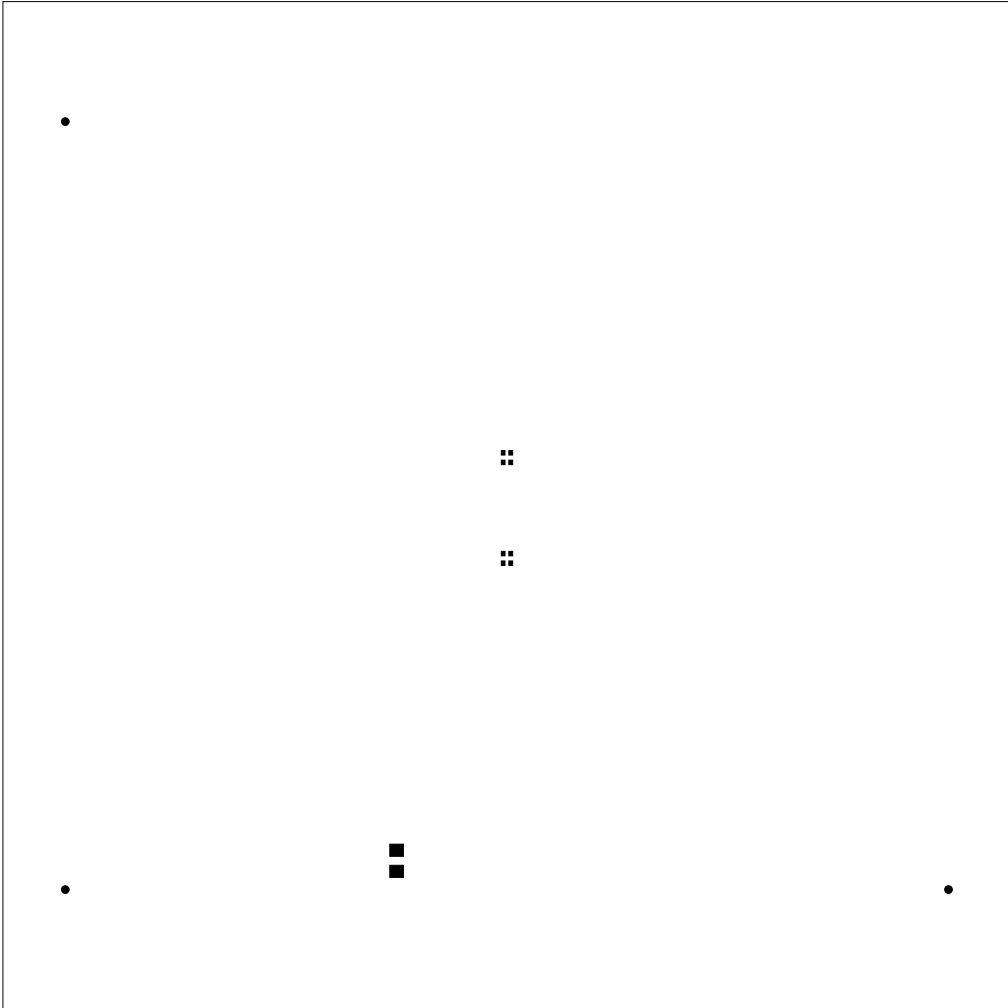
C17  
C18

C19  
C14











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