National Semiconductor
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DS91M125
125 MHz 1:4 M-LVDS Repeater with LVDS Input Evaluation Kit

USER MANUAL

Part Number: DS91M125EVK NOPB

For the latest documents concerning these products and evaluation kit, visit lvds.national.com. Schematics and gerber files are also available at lvds.national.com
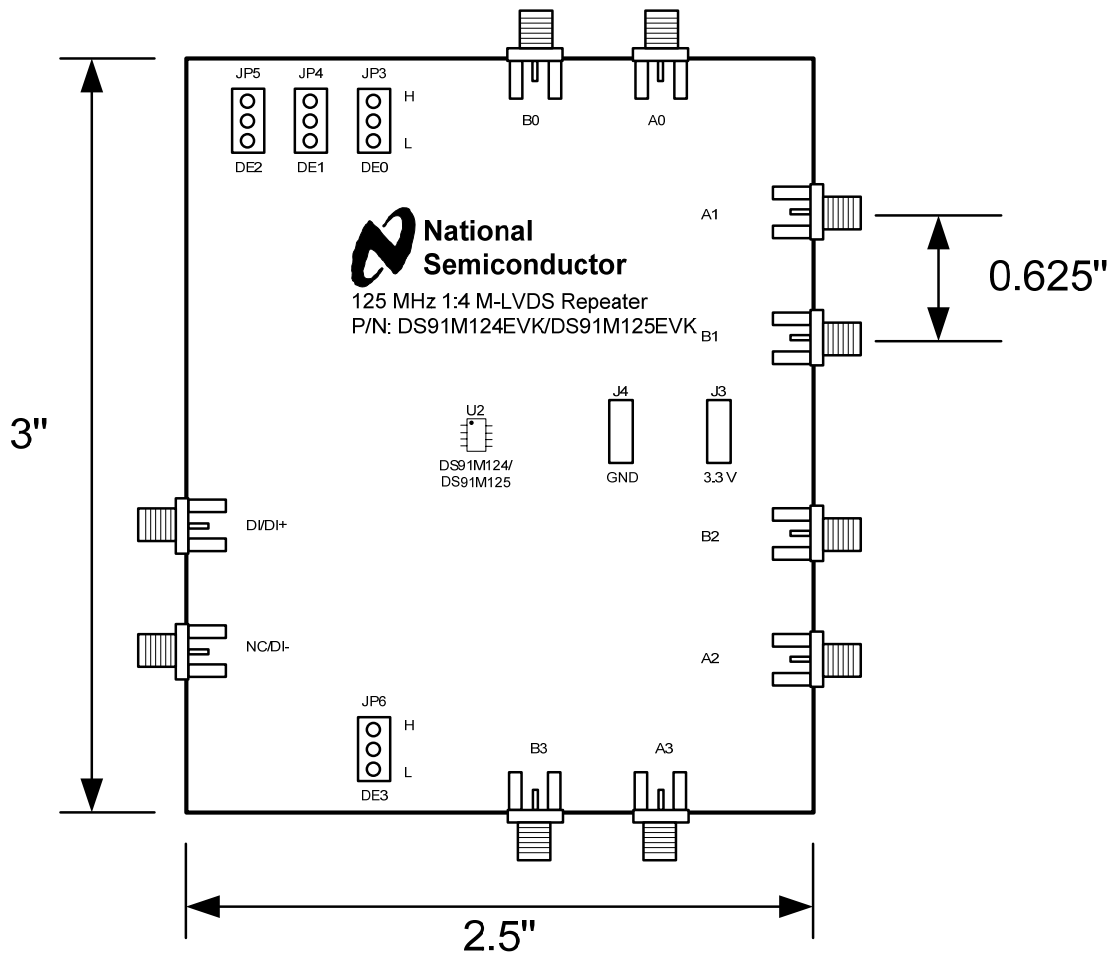
Overview

The purpose of this document is to familiarize you with the DS91M125 evaluation board, suggest the test setup procedures and instrumentation, and to guide you through some typical measurements that will demonstrate the performance of the device. The board enables the user to examine performance and all functions of the DS91M125 as a standalone device.

The DS91M125 is a high-speed 1:4 M-LVDS repeater with an LVDS input designed for multipoint applications with multiple drivers or receivers. The device conforms to TIA/EIA-899 standard. It utilizes M-LVDS technology for low power, high-speed and superior noise immunity.

Description

Figure 1 below represents the top layer drawing of the board with the silkscreen annotations. It is a 2.5 x 3 inch 4 layer printed circuit board (PCB) that features a single DS91M125 (U2) device.


Figure 1 - DS91M125EVK Top View Drawing

![National Semiconductor logo] *National Semiconductor* — *The Sight & Sound of Information*

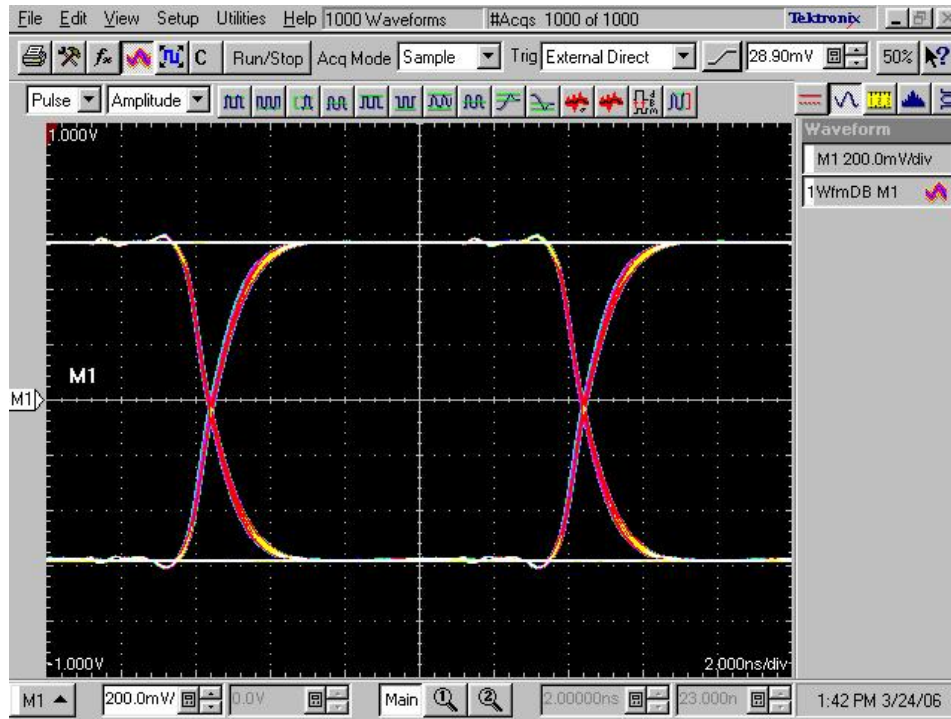# DS91M125 Evaluation in a Point-to-Point Link

The following is a recommended procedure for using and evaluating the DS91M125EVK. Figure 2 depicts a typical setup and instrumentation used.

1. Select a single DS91M125 evaluation board.

2. Apply the power to the board (3.3 V typical) between J3 and J4 power tabs, observe the value of I_{CC}, and compare it with the expected value (refer to the datasheet) to ensure that the devices are functional.

3. Enable one of the U2 driver outputs. This is accomplished by setting the DE0-3 pin to VDD (JP3-6).

4. Connect a signal source to the driver input (DI+, DI-). The signal needs to be an LVDS/M-LVDS/CML/LVPECL compliant signal. Refer to the DS91M125 datasheet for the receiver input compatibility.

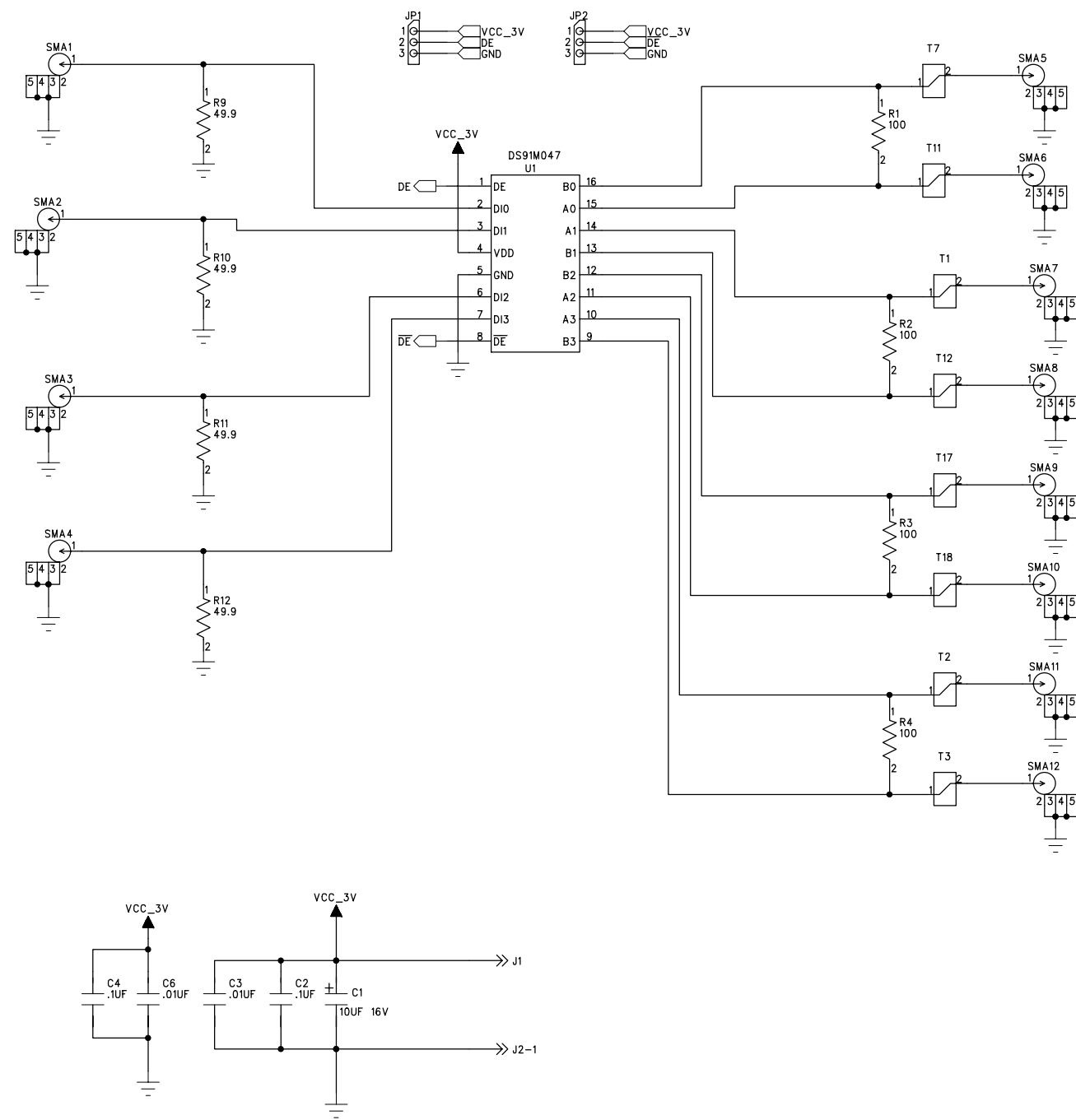5. Connect one of the U2 outputs (A0-3/B0-3) to an oscilloscope and observe the waveforms.
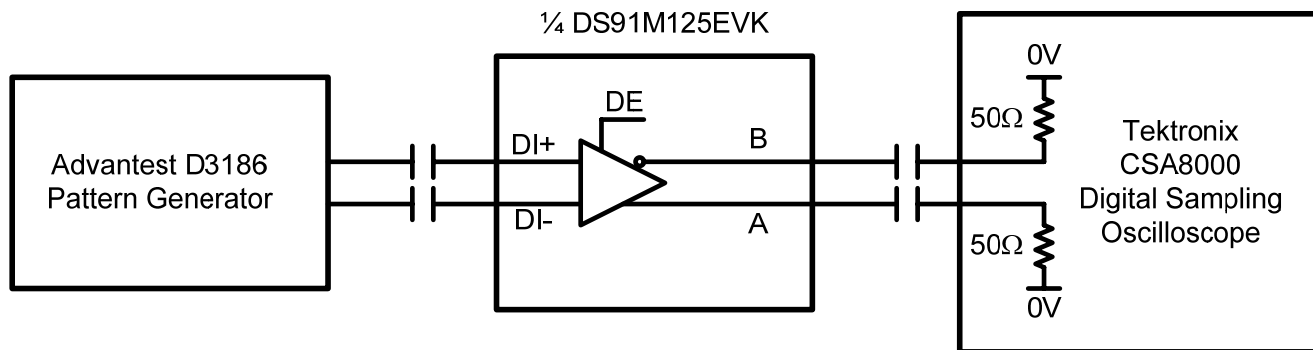
Figure 2 – DS91M125 Test Setup

Figure 3 shows an eye diagram acquired at the output of the DS91M125 driver loaded with a 100-ohm resistor. The generator connected to the driver input simulated a 100 Mbps PRBS-7 NRZ.

Figure 3 – DS91M125 Output

REVISION RECORD

LTR:	ECO NO:	APPROVED:	DATE:
O	INITIAL RELEASE		

D

C

B

A

JP1
1
2 VCC_3V
3 DE
   GND

JP2
1
2 VCC_3V
3 DE
   GND

SMA1
5 4 3 2

R9
49.9
2

SMA2
5 4 3 2

R10
49.9
2

SMA3
5 4 3 2

R11
49.9
2

SMA4
5 4 3 2

R12
49.9
2

VCC_3V

DS91M047
U1

1	DE	B0	16
2	DI0	A0	15
3	DI1	A1	14
4	VDD	B1	13
5	GND	B2	12
6	DI2	A2	11
7	DI3	A3	10
8	DE̅	B3	9

DE

DE̅

T7
1 2
R1
100
2

SMA5
1
2 3 4 5

T11
1 2

SMA6
2 3 4 5

T1
1 2
R2
100
2

SMA7
2 3 4 5

T12
1 2

SMA8
2 3 4 5

T17
1 2
R3
100
2

SMA9
2 3 4 5

T18
1 2

SMA10
2 3 4 5

T2
1 2
R4
100
2

SMA11
2 3 4 5

T3
1 2

SMA12
2 3 4 5

VCC_3V

VCC_3V

C4
.1UF

C6
.01UF

C3
.01UF

C2
.1UF

C1
10UF 16V

J1

J2-1

M1
M2
M3
M4

M8 M5
M9 M6

M10 M7

Enercon
Technologies

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

COMPANY: NATIONAL SEMICONDUCTOR

TITLE:
SCHEMATIC
DS91M047EVK/DS91M124EVK/DS91M125EVK

CODE:	SIZE:	DRAWING NO:	REV:
	C	S-06539	0

DRAWN: ACF
DATED: 3/11/08
SCALE:

D

VCC_3V

DS91M125
U2

DE0	1	DE0	B0	16
DE1	2	DE1	A0	15
DE2	3	DE2	A1	14
	4	VDD	B1	13
	5	GND	B2	12
	6	DI+	A2	11
	7	DI-	A3	10
DE3	8	DE3	B3	9

T15   SMA15
T16   SMA16
T19   SMA17
T20   SMA18
T21   SMA19
T22   SMA20
T23   SMA21
T24   SMA22

R5 100
R6 100
R7 100
R8 100

SMA13
R14 49.9
R13 100
SMA14
R15 49.9

C

B

VCC_3V   VCC_3V

C5 .1UF   C7 .01UF   C10 .01UF   C9 .1UF   C8 10UF 16V

J3-1
J4-1

JP3		VCC_3V
1		DE0
2		GND
3		

JP4		VCC_3V
1		DE1
2		GND
3		

JP5		VCC_3V
1		DE2
2		GND
3		

JP6		VCC_3V
1		DE3
2		GND
3		

A

COMPANY:	NATIONAL SEMICONDUCTOR
TITLE:	SCHEMATIC DS91M047EVK/DS91M124EVK/DS91M125EVK

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

CODE:	SIZE: C	DRAWING NO: S-6539	REV: 0

| DRAWN: ACF | DATED: 3/11/08 | SCALE: | SHEET: 2 OF 2 |

ENERCON - BILL OF MATERIALS

Item	Part Type	Part Number/Value	Mfg	NoSub	Description	Qty	SMT	Ref Des	Notes	Rev
1	PCB	P-06540R0	ENERCON			1				0
2										
3	SUBASY	Z3211-04	ENERCON		LABEL, MADE IN U.S.A.	1			Apply to bottom of PCBA	1
4										
5	IC	DS91M125TMA	NAT		125MHz 1:4 M-LVDS Repeater, SOIC16	1	X	U2		0
6										
7	RES	ERJ-2RKF1000	PANA		100 Ohm 1/16W ±1% 0402 100ppm, Pb-Free	1	X	R13		0
8										
9	CAP	06035C103KAT	AVX		.01µF, 50V, ±10%, 0603, Ceramic, X7R, Pb-Free	2	X	C7,10		0
10	CAP	0603YC104KAT	AVX		.1µF, 16V, ±10%, 0603, Ceramic, X7R, Pb-Free	2	X	C5,9		0
11	CAP	TAJA106K016	AVX		10µF, 16V, ±10%, A-Case, Tantalum, Pb-Free	1	X	C8		0
12										
13	CONN	1287	KEYSTONE		Faston, Male, .250", Pb-Free	2		J3,4		0
14	CONN	142-0701-851	EMERSON		SMA, Jack Receptacle, 50 OHM, Pb-Free	10		SMA13-22		0
15	CONN	15-29-1024	MOLEX		Jumper Shunt, 2p, Gold, Pb-Free	4			Use on JP3,4,5,6 Pins 2&3	0
16	CONN	TSW-103-07-G-S	SAMTEC		Header, 3p, Male, .100"sp, Gold, Pb-Free	4		JP3,4,5,6		0
17										
18	STENCL	T-06544R0	ENERCON		STENCIL FABRICATION, BOTTOM, DS91M047EVK/DS91M1...	1				0
19										
20	REF	C-06541R0	ENERCON		FAB DWG, DS91M047EVK/DS91M124EVK/DS91M125EVK					0
21	REF	C-06542R0	ENERCON		PALLET DWG, DS91M047EVK/DS91M124EVK/DS91M125EVK					0
22	REF	S-06539R0	ENERCON		SCHEMATIC, DS91M047EVK/DS91M124EVK/DS91M125EVK					0
23										

ENERCON - *BILL OF MATERIALS*

Main Product: **PCBA, DS91M125EVK, ROHS**	

TITLE:	**NATIONAL SEMICONDUCTOR** **PCBA, DS91M125EVK, ROHS** **DS91M125**

PL Number:	*Rev:*	*Rev By:*	*Rev Date:*	*PL Status:*
Z3252-01	**1**	**BJ**	**04/30/08**	**Released**
Responsible Eng/Mgr:		*Creator:* **Arlene Fox**		*Creation Date:* **03/14/08**

Notes:
DO NOT STUFF:
U1
M1-10
JP1,2
R1-12,14,15
T1-2,7,15,17,19,21,23,3,11,12,16,18,20,22,24
J1,2
C1,2,3,4,6
SMA1-12

B0   A0

JP1
H   *National*
         Semiconductor
L
EN

DI0   A1

         125 MHz Quad M-LVDS Driver
         P/N: DS91M047EVK

                        C6
                        C4
DI1   B1
J1 C3   U1
    C2 C1   R9   R1
3.3V   R10   R2
    C1   R11   R3
                 R12   R4
         GND   DS91M047

DI2   B2

JP2
H
L   RoHS
EN*   COMPLIANT
                 2006/95/EC

DI3   A2

         B3   A3
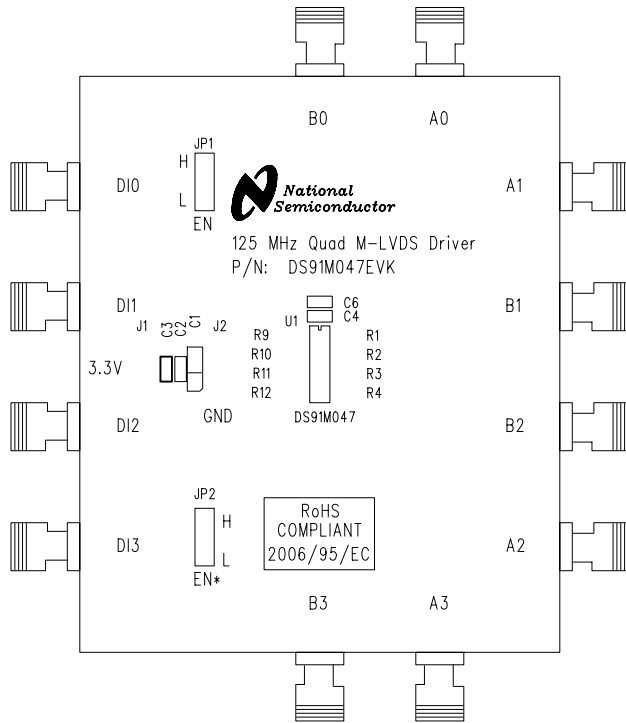
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SILKSCREEN TOP
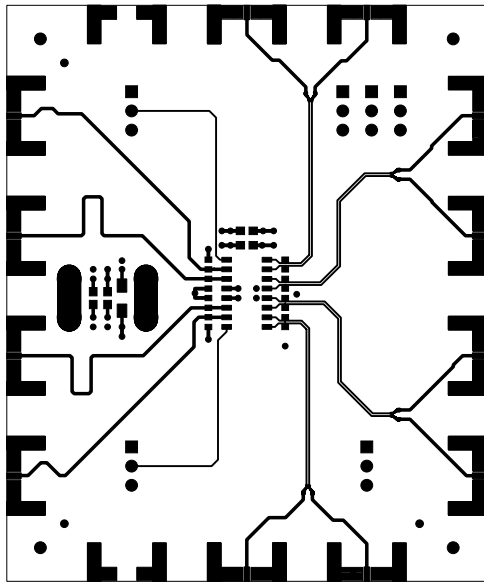
TOP

LAYER 2

LAYER 3

BOTTOM

B0   A0

JP5 JP4 JP3
H
L
DE2 DE1 DE0

National
Semiconductor

A1

125 MHz 1:4 M-LVDS Repeater
P/N: DS91M124EVK

C7
C5   U2   R5   J4   B1
                    R6   J3
R14   R7
R13   R8   3.3V
R15
        DS91M124/   GND C9 C10   B2
        DS91M125   C8

DI/DI+

JP6
H
NC/DI-   L
        DE3   A2

B3   A3
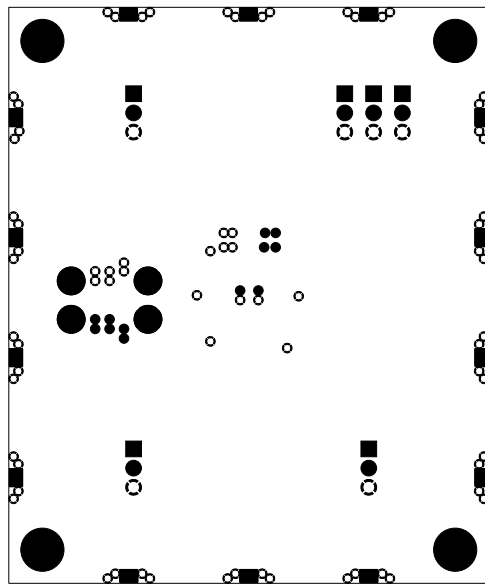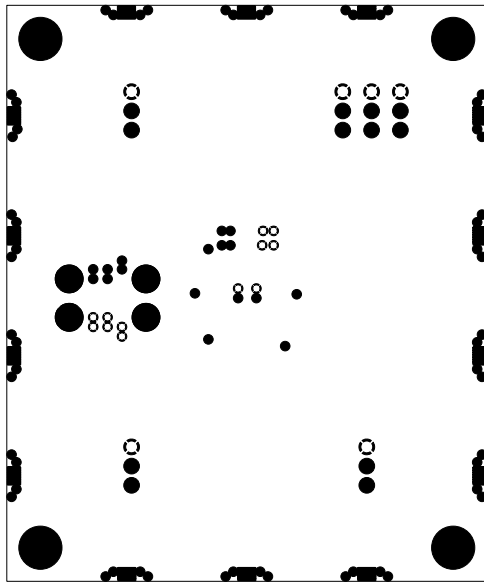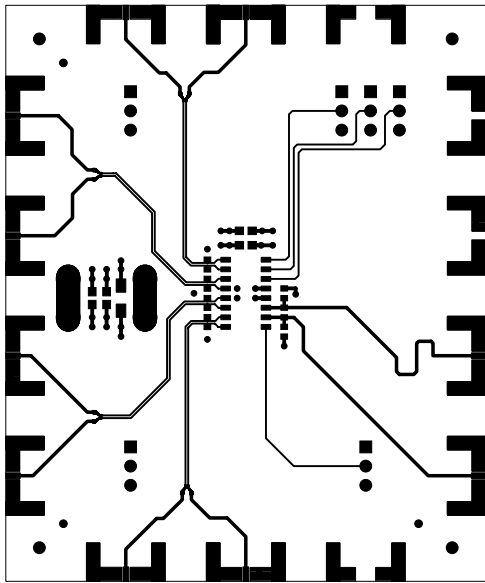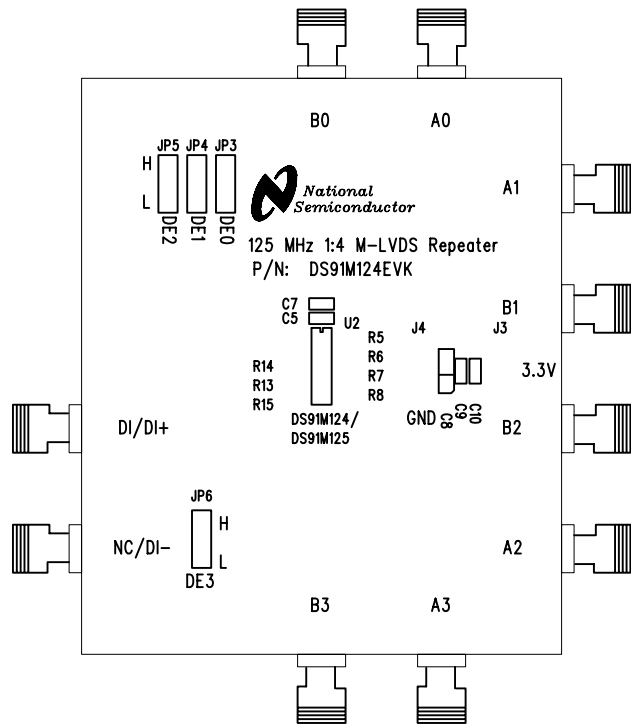
SILKSCREEN BOTTOM
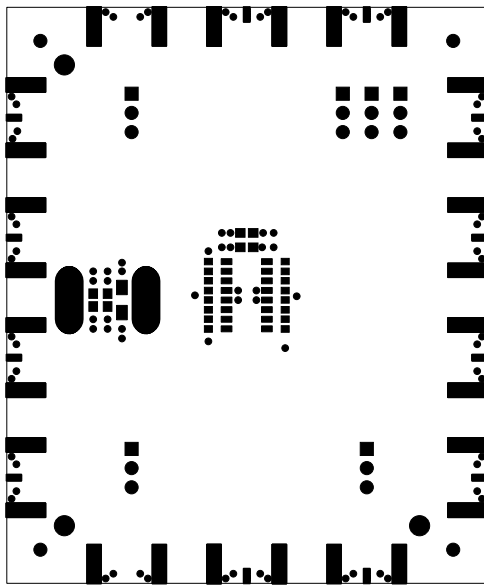
SOLDERMASK TOP

SOLDERMASK BOTTOM
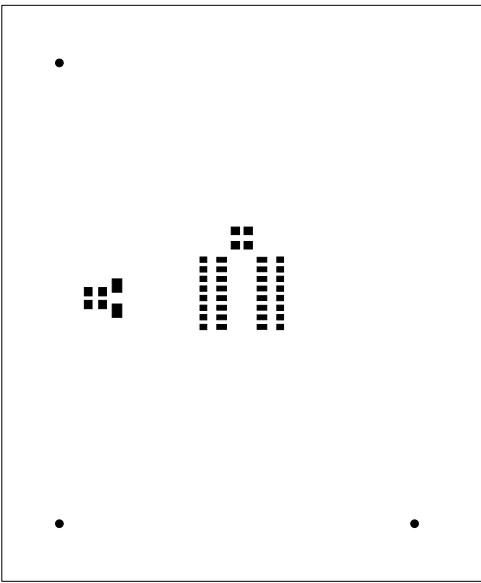
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SOLDERPASTE TOP
SQUEEGEE VIEW
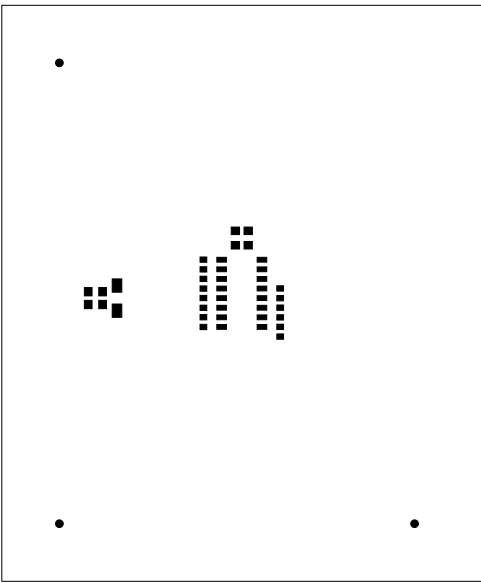
SOLDERPASTE BOTTOM

IMPORTANT NOTICE