MUX36S08EVM-PDK

This user guide describes the characteristics, operation, and use of the MUX36S08 evaluation module (EVM) performance demonstration kit (PDK). This kit is an evaluation platform for MUX36S08, an analog multiplexer (mux) that offers 8:1 single-ended channels. This user guide includes setup and operating instructions, complete circuit descriptions, schematic diagrams, printed circuit board (PCB) layout, and a bill of materials (BOM).

NOTE: The MUX36S08EVM may also be used to evaluate the performance of the MUX508 as the two parts are pin compatible. The MUX508 would have to be separately ordered and manually soldered on the MUX36S08EVM.

Throughout this document, the terms MUX36S08EVM, demonstration kit, evaluation board, evaluation module, and EVM are synonymous with the MUX36S08EVM-PDK

The following related documents are available through the Texas Instruments web site at www.ti.com.

Related Documentation

Device	Literature Number
MUX36S08	SBOS705

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1 Overview

The MUX36S08 is a CMOS analog multiplexer that offers 8:1 single-ended channels, and operates with either dual supplies (±5 V to ±18 V) or a single supply (10 V to 36 V), and supports true rail-to-rail input and output. The MUX36S08 has very low on- and off-leakage currents and low quiescent current that make it ideally suited for portable applications.

1.1 MUX36S08EVM-PDK Features

The MUX36S08EVM-PDK includes the following features:

- Hardware required for evaluation of the with industry-standard, TSSOP-package MUX36S08.
- Multiple connectors on input and output pins for ease of evaluation.
- Layout as per the reference layout in the product data sheet (SBOS705).
- In addition to basic switching operations, the EVM can be used to test the crosstalk and off-isolation as per the product data sheet.

2 EVM Setup

This section describes the power supply and jumper configuration options available on the MUX36S08EVM.

2.1 Powering Up the EVM

The MUX36S08EVM-PDK operates with either dual supplies (±5 V to ±18 V) or a single supply (10 V to 36 V). The EVM operates with both symmetric supplies (such as V_{DD} = 12 V, V_{SS} = –12 V), and unsymmetric supplies (such as V_{DD} = 12 V, V_{SS} = –5 V).

The MUX36S08EVM-PDK provides connections for the power-supply pins with either a single or dual power supply, from a minimum V_{DD} – V_{SS} range of 10 V to maximum of 36 V. The V_{DD} supply must be connected at pin 1, and V_{SS} at pin 2 of J17 from a tabletop power-supply unit (PSU), as shown in Figure 1. For single-supply operation, connect V_{SS} to GND through a wire-bridge between pin 2 and pin 3 of J17. Both V_{DD} and V_{SS} can be monitored using TP9 and TP22, respectively.

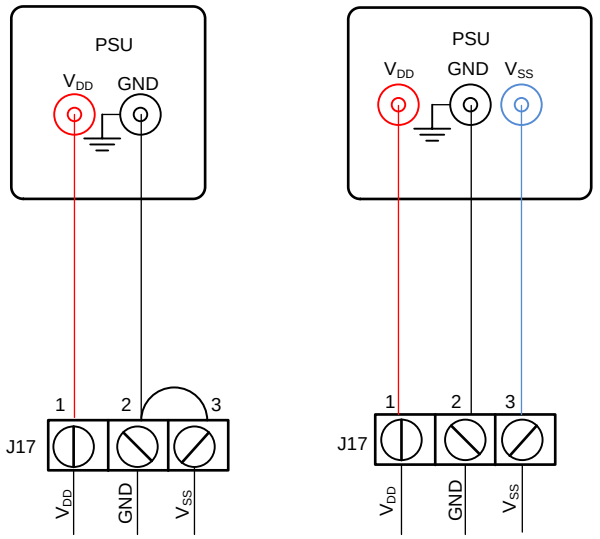

Figure 1. Power Connections for Single-Supply (Left) and Dual-Supply (Right) Operation

Jumpers J1 and J14 are provided to enable monitoring of the currents drawn from each of these supplies by the MUX36S08 using ammeters. In case ammeters are not used, headers J1 and J14 must be shorted using shunts for normal operation as listed in Table 1. The EVM ships with these shunts inserted.

Table 1. J1 and J14 Header Descriptions

Signal	Location	Description
V_{DD}	J1 pin 1 to pin 2	Positive power supply for the MUX36S08
V_{SS}	J14 pin 1 to pin 2	Negative power supply for the MUX36S08

2.2 Digital Signal Connections

The digital signals of the MUX36S08 are brought out to headers. Each of these signals can be connected to V_{DD} or V_{SS} by using shunts, as listed on Table 2.

Table 2. Digital Signal Locations

Signal	Location	Description
EN	J3 pin 2	Active-high digital input. When this pin is low, all switches are turned off. When this pin is high, the A[2:0] inputs determine which switch is turned on.
A0	J4 pin 2	Address line A0
A1	J5 pin 2	Address line A1
A2	J6 pin 2	Address line A2

Alternatively, these signals may be driven directly from a processor by removing the shunts, and wiring the processor general-purpose I/Os to pin 2 of the J3, J4, J5, and J6 jumpers.

2.3 Analog Signal Connections

The analog signals of the MUX36S08 are accessible at multiple locations on the MUX36S08EVM-PDK. Table 3 lists the all locations. These signals may be used as input or output signals because the device acts as a switch between the input and output terminals.

Table 3. Analog Signal Locations

Signal	Header	SMA	Testpoint	Description
S1	J13 pin 1	J2	TP12	Source terminal 1
S2	J13 pin 2	J7	TP14	Source terminal 2
S3	J13 pin 3	J9	TP19	Source terminal 3
S4	J13 pin 4	J10	TP20	Source terminal 4
S5	J13 pin 7	J11	TP21	Source terminal 5
S6	J13 pin 8	J12	TP24	Source terminal 6
S7	J13 pin 9	J15	TP25	Source terminal 7
S8	J13 pin 10	J16	TP26	Source terminal 8
D	N/A	J8	TP18	Drain terminal

3 Evaluation Using the MUX36S08EVM-PDK

All parameters listed in the specifications table in the MUX36S08 datasheet can be tested on the MUX36S08EVM-PDK.

3.1 Channel Selection Logic

Table 4 provides the truth table for the selection logic for the MUX36S08. This behavior of the device can be evaluated by driving the digital selection signal listed in Section 2.2 to the appropriate levels.

Table 4. Channel Selection Truth Table

EN	A2	A1	A0	On channel
0	X(1)	X(1)	X(1)	All channels are off
1	0	0	0	Channel 1
1	0	0	1	Channel 2
1	0	1	0	Channel 3
1	0	1	1	Channel 4
1	1	0	0	Channel 5
1	1	0	1	Channel 6
1	1	1	0	Channel 7
1	1	1	1	Channel 8

(1) X denotes *don't care.*

3.2 Key Specifications

The MUX36S08 data sheet (SBOS705) contains detailed information of the test setups for each of the mux parameters. The MUX36S08EVM-PDK can be used to validate these parameters, as per the test procedures described in the data sheet.

4 Bill of Materials, PCB Layout, and Schematics

This section contains the MUX36S08EVM-PDK bill of materials (BOM), PCB layout, and the EVM schematics.

4.1 Bill of Materials

Table 5 lists the MUX36S08EVM BOM.

Table 5. Bill of Materials

Manufacturer Part Number	Qty	Reference Designators	Manufacturer	Description
PA019	1	PCB1	Any	Printed Circuit Board
C3216X5R1E476M160AC	2	C1, C4	TDK	CAP, CERM, 47 µF, 25 V, +/- 20%, X5R, 1206
GMK316AB7106KL	2	C2, C5	Taiyo Yuden	CAP, CERM, 10 µF, 35 V, +/- 10%, X7R, 1206
C3216X7R1H105K	2	C3, C6	TDK	CAP, CERM, 1 µF, 50 V, +/- 10%, X7R, 1206
GRM188R72A104KA35D	2	C7, C10	MuRata	CAP, CERM, 0.1 µF, 100 V, +/- 10%, X7R, 0603
C1608C0G2A101J	2	C8, C9	TDK	CAP, CERM, 100 pF, 100 V, +/- 5%, C0G/NP0, 0603
N/A	3	FID1, FID2, FID3	N/A	Fiducial mark. There is nothing to buy or mount.
SJ-5303 (CLEAR)	4	H9, H10, H11, H12	3M	Bumpon, Hemisphere, 0.44 X 0.20, Clear
TSM-102-01-L-SV	2	J1, J14	Samtec	Header, 100mil, 2x1, Gold with Tin Tail, SMT
5-1814832-1	9	J2, J7, J8, J9, J10, J11, J12, J15, J16	TE Connectivity	SMA Straight PCB Socket Die Cast, 50 Ohm, TH
TSM-103-01-L-SV	4	J3, J4, J5, J6	Samtec	Header, 100mil, 3x1, Gold, SMT
OSTTE100161	1	J13	On-Shore Technology	Terminal Block, 3.5mm, 10x1, Tin, Blue, TH
39357-0003	1	J17	Molex	Terminal Block, 3.5 mm, 3x1, Tin, TH
THT-14-423-10	1	LBL1	Brady	Thermal Transfer Printable Labels, 0.650" W x 0.200" H - 10,000 per roll
CRCW08050000Z0EA	8	R1, R2, R3, R4, R5, R6, R7, R8	Vishay-Dale	RES, 0, 5%, 0.125 W, 0805
969102-0000-DA	6	SH-J1, SH-J3, SH-J4, SH-J5, SH-J6, SH-J14	3M	Shunt, 100mil, Gold plated, Black
5005	3	TP1, TP9, TP11	Keystone	Test Point, Compact, Red, TH
5006	7	TP2, TP3, TP4, TP5, TP6, TP7, TP8	Keystone	Test Point, Compact, Black, TH
5008	3	TP10, TP22, TP23	Keystone	Test Point, Compact, Orange, TH
5122	8	TP12, TP14, TP19, TP20, TP21, TP24, TP25, TP26	Keystone	Test Point, Compact, Blue, TH
5009	4	TP13, TP15, TP16, TP17	Keystone	Test Point, Compact, Yellow, TH
5007	1	TP18	Keystone	Test Point, Compact, White, TH
MUX36S08IPWR	1	U1	Texas Instruments	Fault-Protected, 8-Channel, Single-Ended Multiplexer, PW0016A

4.2 PCB Layout

Figure 2 and Figure 3 illustrate the EVM PCB layout.

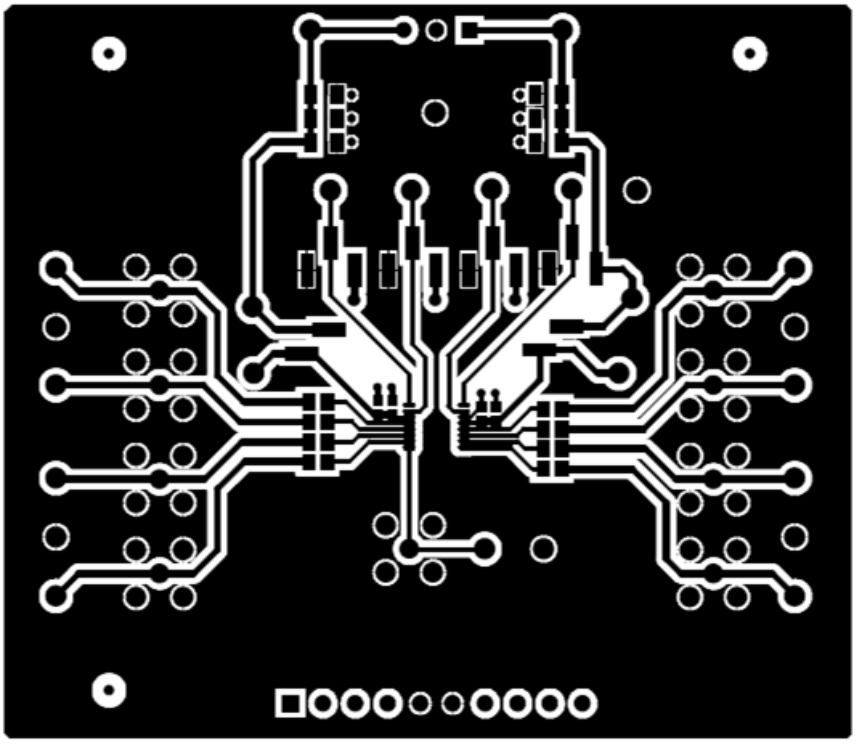

Figure 2. PCB Layer 1: Top Layer

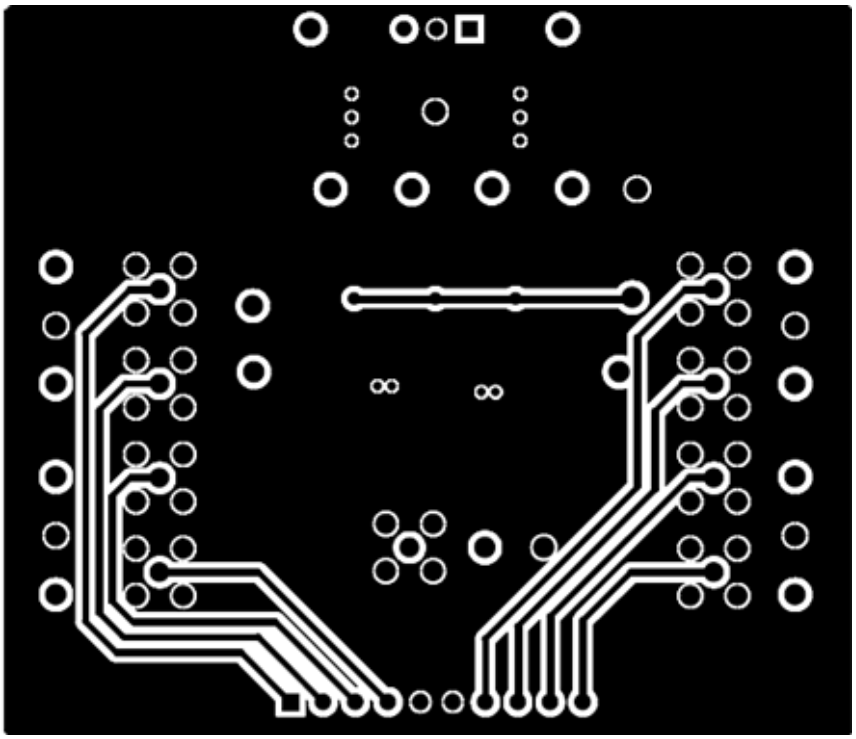

Figure 3. PCB Layer 2: GND Plane

4.3 Schematic

Figure 4 and Figure 5 show the EVM schematics.

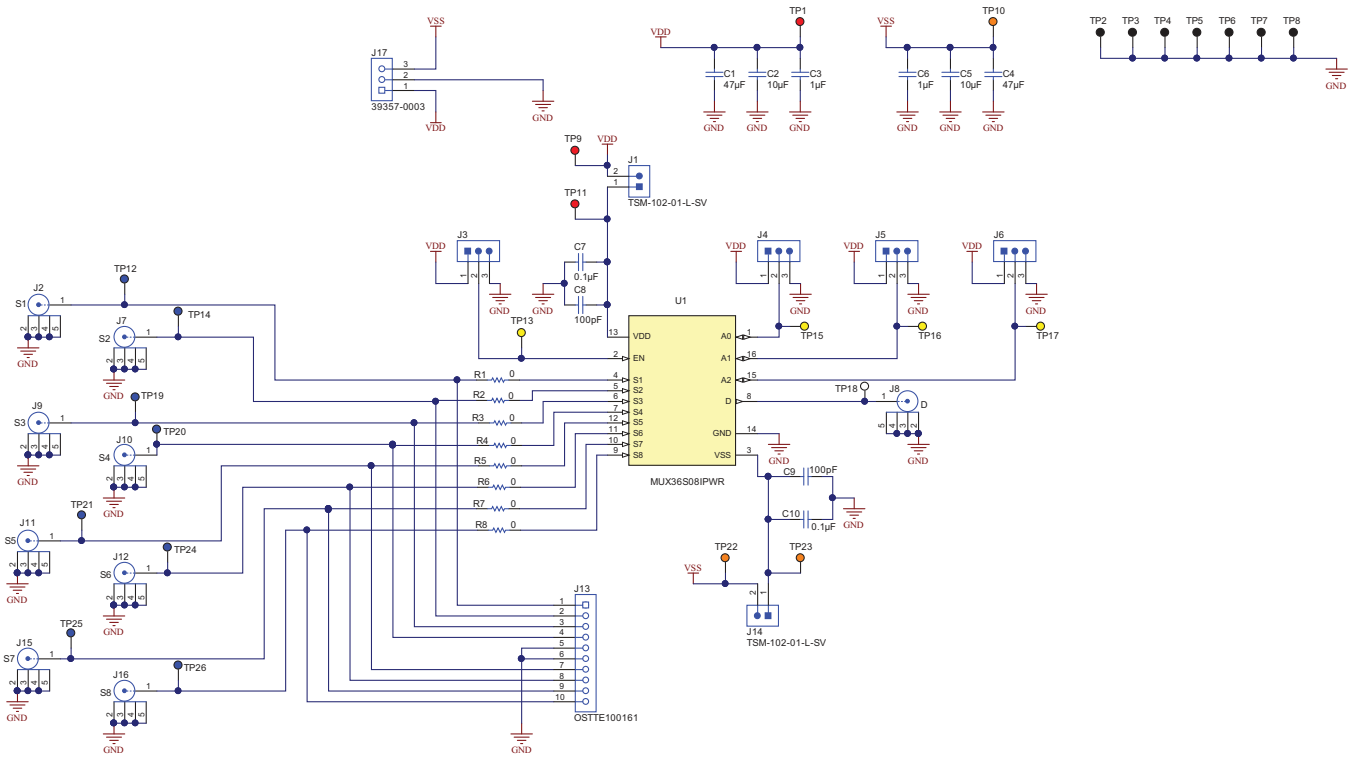

Figure 4. Schematic Diagram: Electrical

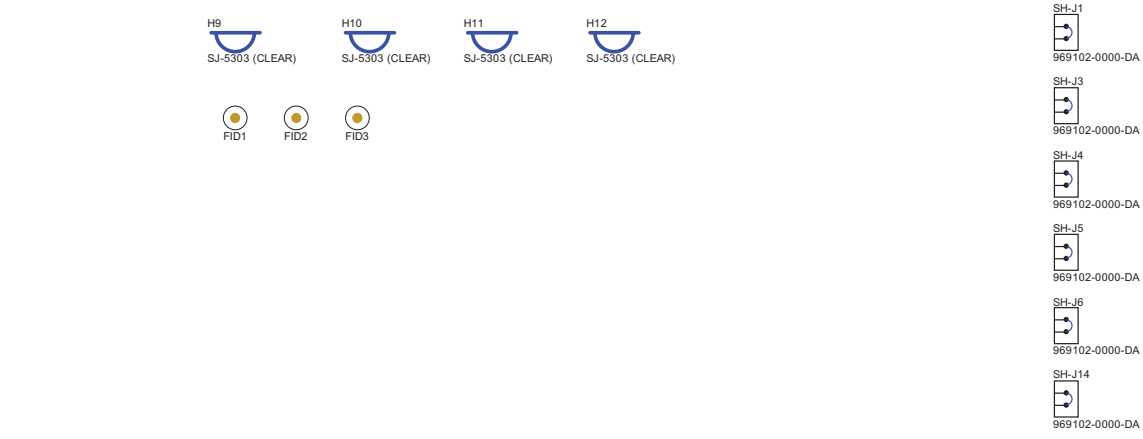

Figure 5. Schematic Diagram: Mechanical

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- *Reorient or relocate the receiving antenna.*
- *Increase the separation between the equipment and receiver.*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- *Consult the dealer or an experienced radio/TV technician for help.*

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3.2.1 *For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210*

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Concernant les EVMs avec appareils radio:

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Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

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Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur

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