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National Semiconductor

980600403 – LMV7231 Evaluation Board User Guide

This evaluation board contains the LMV7231 Hex Window Comparator and allows for evaluation of the device.

Connectors, Jumpers, Test Points

Power Supply

There are two test points labeled V+, and GND to power the evaluation board. A single supply per the LMV7231 Datasheet Operating Ratings can be used.

Signal Connectors

There are three connectors for signals.
J1 is a 2x7 100mil Header for the monitored voltage signals.
J2 is a 2x14 100mil Header for the input signals.
J3 is a 2x7 100mil Header for the output signals.

Jumpers

The demo board has 3 jumpers.
J4 connects the AOSEL pin of the LMV7231 to either VPU or GND. Default AOSEL connected to GND.
J5 connects the COPOL pin of the LMV7231 to either VPU or GND. Default COPOL connected to GND.
A 3rd jumper can be used at J1 to connect V+ to VPU. Default V+ connected to VPU.

Using the board

Power Supply Setup

Connect a single supply per the Datasheet Operating Ratings to the V+ and GND test points.

Monitored Voltage Signals

The monitored voltage signals (VIN1, VIN2, VIN3, VIN4, VIN5, VIN6) are connected to the board using jumper J1.

Input Signals, AOSEL, and COPOL

Access directly to the LMV7231 window comparator inputs (+IN1, -IN1, +IN2, -IN2, etc.) and AOSEL and COPOL are available at jumper J2.

Output Signals

The comparator output signals (CO1, CO2, CO3, CO4, CO5, CO6, AO) are taken from jumper J3.

3 Resistor Voltage Divider

No 3 resistor voltage divider (R7, R8, R9) is populated on Channel 1 to allow customer the flexibility to select resistors in order set their own voltage detection window. See the 3 RESISTOR VOLTAGE DIVIDER SELECTION section of the LMV7231 datasheet for proper resistor selection. Remaining channels have their 3 resistor voltage dividers populated to detect the windows in the table below and are optimized for a signal rising into and out of the voltage detection window.

Table 1. Voltage Detection Windows

Channel	Window	Min	Max
1	Open	NA	NA
2	3.3V +/-5%	3.135V	3.465V
3	2.5V +/- 5%	2.375V	2.625V
4	1.8V +/- 5%	1.71V	1.89V
5	1.2V +/- 5%	1.14V	1.26V
6	1.0V +/- 5%	0.95V	1.05V

Output Pull-up Resistors and Capacitive Loads

Output pull-up resistors (R19, R20, R21, R22, R23, R24, R25) and capacitive load (C2, C3, C4, C5, C6, C7, C8) can be adjusted to meet customer evaluation requirements. By default pull-up resistors are 10 kΩ and capacitive load is unpopulated.

VPU

VPU is the output pull-up resistor voltage and can be pulled up to any voltage within the Abs Max ratings of the LMV7231. By default VPU is set to V+ with a jumper at J1.

AOSEL

The state of AOSEL pin determines whether the AO pin is active on an over-voltage or under-voltage event. When tied LOW the AO output will be active upon an over-voltage event. By default AOSEL is set LOW with jumper J4 shorting AOSEL to GND.

COPOL

The state of the COPOL pin determines whether the CO1-CO6 pins are active “HIGH” or “LOW”. When tied LOW the CO1-CO6 outputs will go LOW to indicate an out of window comparison. By default COPOL is set LOW with jumper J5 shorting COPOL to GND.

AO and Optional AO LED

The AO output is the ANDED combination of either the overvoltage comparator outputs or the under-voltage comparator outputs and is controlled by the state of the AOSEL. AO pin is active “LOW”. Footprint for an optional AO LED, D1, and current limiting resistor, R26, have been included on the board to allow a user to visually indicate an out of window event. See BOM for recommended components.

Board Layout, Schematic, and BOM

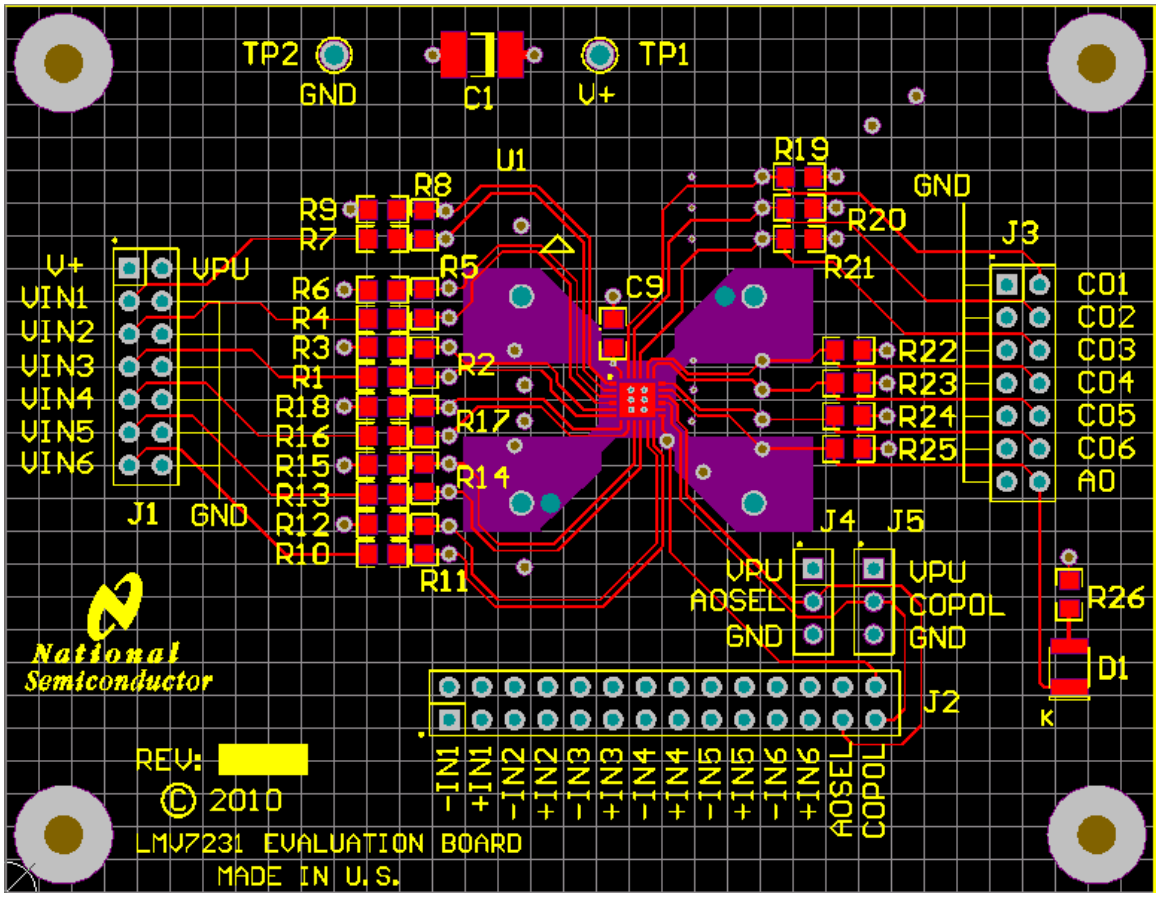


Figure 1. Top of Evaluation Board

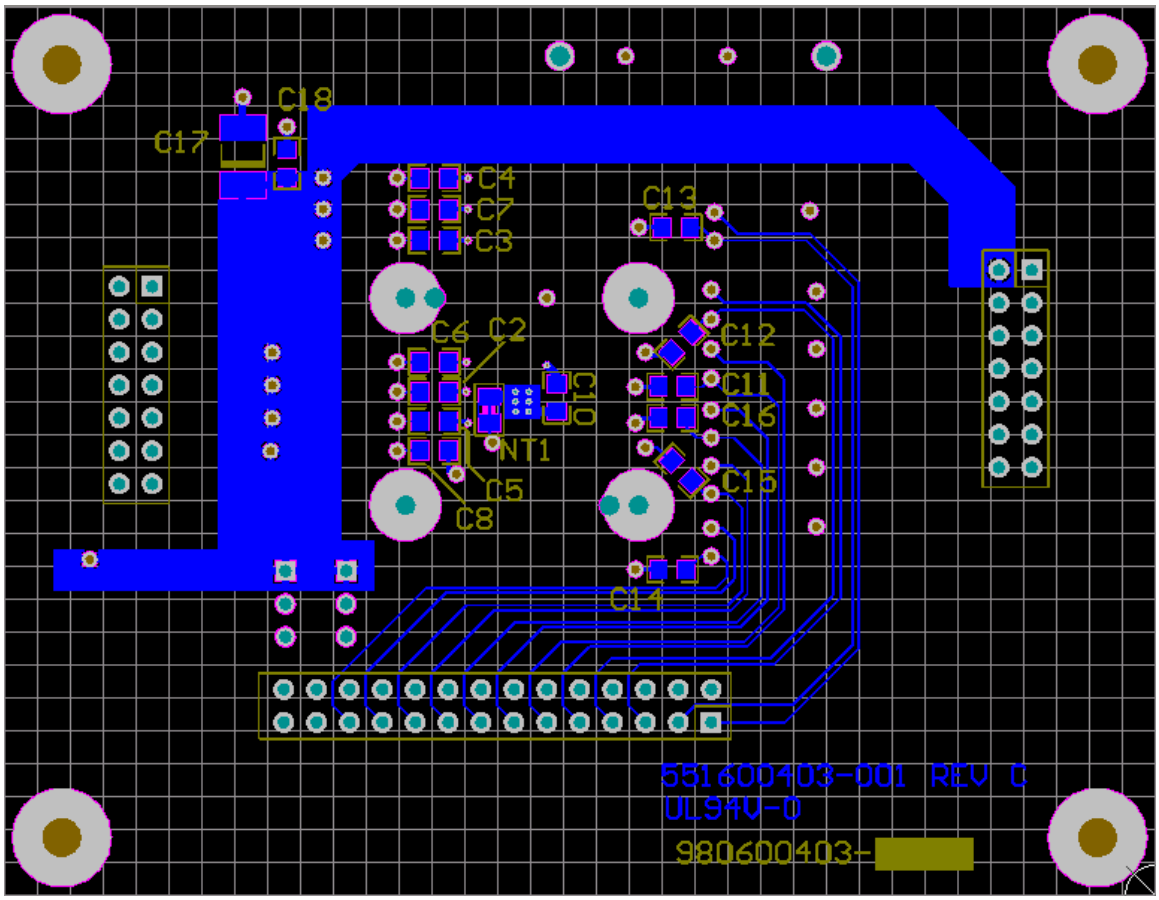


Figure 2. Bottom of Evaluation Board

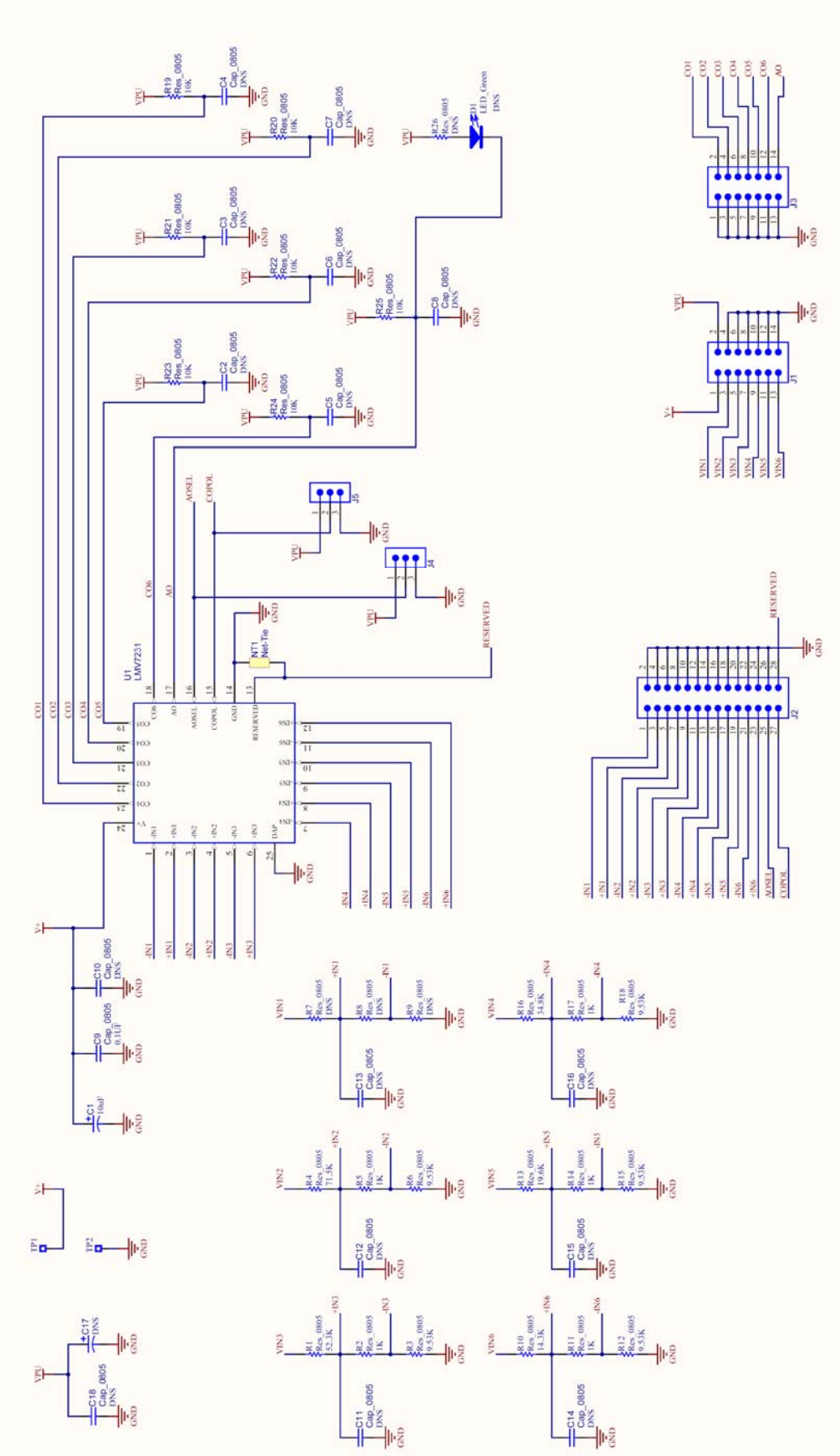


Figure 3. Schematic

Table 2. BOM

Item	Designator	Description	Manufacturer	Manufacturer P/N	Quantity
1	C1	10uF Tantalum EIA-D	Vishay/Sprague	293D106X0025C2TE3	1
2	C2, C3, C4, C5, C6, C7, C8	DNS			0
3	C11, C12, C13, C14, C15, C16	DNS			0
4	C9	0.1uF 0805	Kemet	C0805C104J5RACTU	1
5	C10, C17, C18	DNS			0
6	J1, J3	Header, 100mil, 2x7, Tin	Sullins	PEC36DACN	1
7	J2	Header, 100mil, 2x14, Tin			
8	J4, J5	Header, TH, 100mil, 1x3, Tin	Sullins	PEC36SAAN	1
9	R1	52.3 kohm Resistor, SMT, 0.1% 0805	MULTICOMP	MCTC0525B5232T5E	1
10	R4	71.5 kohm Resistor, SMT, 0.1% 0805	MULTICOMP	MCTC0525B7152T5E	1
11	R7, R8, R9	DNS			0
12	R10	14.3 kohm Resistor, SMT, 0.1% 0805	Susumu	RG2012P-1432-B-T5	1
13	R13	19.6 kohm Resistor, SMT, 0.1% 0805	MULTICOMP	MCTC0525B1962T5E	1
14	R16	34.8 kohm Resistor, SMT, 0.1% 0805	Susumu	RG2012P-3482-B-T5	1
15	R2, R5, R11, R14, R17	1.0 kohm Resistor, SMT, 0.1% 0805	Susumu	RG2012P-102-B-T5	5
16	R3, R6, R12, R15, R18	9.53 kohm Resistor, SMT, 0.1% 0805	Susumu	RG2012P-9531-B-T5	5
17	R19, R20, R21, R22, R23, R24, R25	10 kohm Resistor, SMT, 0805	Vishay/Dale	CRCW080510k0FKEA	7
18	R26	DNS [1.0 kohm Resistor, SMT, 0.1% 0805]	Susumu	RG2012P-102-B-T5	0
19	TP1, TP2	TERMINAL TURRET DBL .084"L	Keystone	1593-2	2
20	D1	DNS [LED Domed Green Clear 1210 SMD]	Lite-On Inc	LTST-C930GKT	0
21	U1	LMV7231 Hex Window Comparator	National Semi	LMV7231SQ	1
22	Shunts	CONN SHUNT CLOSED TOP .100 TIN	Molex	15-38-1026	3

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