Hot Swappable Dual I²C Isolators

ADuM1250/ADuM1251

FEATURES

- Bidirectional I²C communication
- Open-drain interfaces
- Suitable for hot swap applications
- 30 mA current sink capability
- 1000 kHz operation
- 3.0 V to 5.5 V supply/logic levels
- 8-lead SOIC lead-free package
- High temperature operation: 105°C
- Safety and regulatory approvals
  - UL recognition
    - 2500 V rms for 1 minute per UL 1577
  - CSA Component Acceptance Notice #5A (pending)
  - VDE Certificate of Conformity (pending)
    - DIN EN 60747-5-2 (VDE 0884 Part 2): 2003-01
    - DIN EN 60950 (VDE 0805): 2001-12; DIN EN 60950: 2000
    - V_{IORM} = 560 V peak

APPLICATIONS

- Isolated I²C, SMBus, or PMBus interfaces
- Multilevel I²C interfaces
- Power supplies
- Networking
- Power-over-Ethernet

FUNCTIONAL BLOCK DIAGRAMS

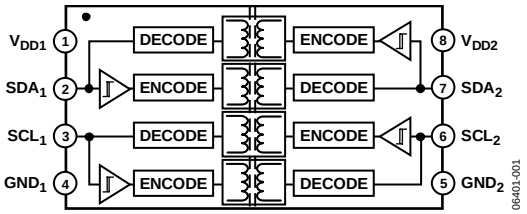

Figure 1. ADuM1250 Functional Block Diagram

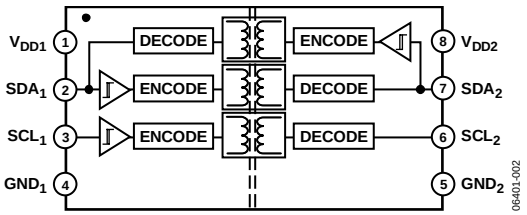

Figure 2. ADuM1251 Functional Block Diagram

GENERAL DESCRIPTION

The ADuM1250/ADuM1251[1] are hot swappable digital isolators with non latching bidirectional communication channels compatible with I²C interfaces. This eliminates the need for splitting I²C signals into separate transmit and receive signals for use with standalone optocouplers.

The ADuM1250 provides two bidirectional channels supporting a complete isolated I²C interface. The ADuM1251 provides one bidirectional channel and one unidirectional channel for those applications where a bidirectional clock is not required.

Both the ADuM1250 and ADuM1251 contain hot swap circuitry to prevent glitching data when an unpowered card is inserted onto an active bus.

These isolators are based on *i*Coupler® chip scale transformer technology from Analog Devices, Inc. *i*Coupler is a magnetic isolation technology with functional, performance, size, and power consumption advantages as compared to optocouplers. With the ADuM1250/ADuM1251, *i*Coupler channels can be integrated with semiconductor circuitry, which enables a complete isolated I²C interface to be provided in a small form factor.

[1] Protected by U.S. Patents 5,952,849 and 6,873,065. Other patents pending.

Rev. 0

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REVISION HISTORY

10/06—Revision 0: Initial Version 0

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

DC Specifications

All voltages are relative to their respective ground. All min/max specifications apply over the entire recommended operating range, unless otherwise noted. All typical specifications are at T_A = 25°C, V_{DD1} = 5 V, and V_{DD2} = 5 V, unless otherwise noted.

Table 1.

Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
ADuM1250						
Input Supply Current, Side 1, 5 V	I_{DD1}		2.8	5.0	mA	V_{DD1} = 5 V
Input Supply Current, Side 2, 5 V	I_{DD2}		2.7	5.0	mA	V_{DD2} = 5 V
Input Supply Current, Side 1, 3.3 V	I_{DD1}		1.9	3.0	mA	V_{DD1} = 3.3 V
Input Supply Current, Side 2, 3.3 V	I_{DD2}		1.7	3.0	mA	V_{DD2} = 3.3 V
ADuM1251						
Input Supply Current, Side 1, 5 V	I_{DD1}		2.8	6.0	mA	V_{DD1} = 5 V
Input Supply Current, Side 2, 5 V	I_{DD2}		2.5	4.7	mA	V_{DD2} = 5 V
Input Supply Current, Side 1, 3.3 V	I_{DD1}		1.8	3.0	mA	V_{DD1} = 3.3 V
Input Supply Current, Side 2, 3.3V	I_{DD2}		1.6	2.8	mA	V_{DD2} = 3.3 V
LEAKAGE CURRENTS	I_{SDA1}, I_{SDA2}, I_{SCL1}, I_{SCL2}		0.01	10	µA	$V_{SDA1} = V_{DD1}$, $V_{SDA2} = V_{DD2}$, $V_{SCL1} = V_{DD1}$, $V_{SCL2} = V_{DD2}$
SIDE 1 LOGIC LEVELS						
Logic Input Threshold[1]	V_{SDA1T}, V_{SCL1T}	500		700	mV	
Logic Low Output Voltages	V_{SDA1OL}, V_{SCL1OL}	600		900	mV	$I_{SDA1} = I_{SCL1}$ = 3.0 mA
		600		850	mV	$I_{SDA1} = I_{SCL1}$ = 0.5 mA
Input/Output Logic Low Level Difference[2]	ΔV_{SDA1}, ΔV_{SCL1}	50			mV	
SIDE 2 LOGIC LEVELS						
Logic Low Input Voltage	V_{SDA2IL}, V_{SCL2IL}			0.3 V_{DD2}	V	
Logic High Input Voltage	V_{SDA2IH}, V_{SCL2IH}	0.7 V_{DD2}			V	
Logic Low Output Voltage	V_{SDA2OL}, V_{SCL2OL}			400	mV	$I_{SDA2} = I_{SCL2}$ = 30 mA

[1] V_{IL} < 0.5 V, V_{IH} > 0.7 V.

[2] $\Delta V_{S1} = V_{S1OL} - V_{S1T}$. This is the minimum difference between the output logic low level and the input logic threshold within a given component. This ensures that there is no possibility of the part latching up the bus to which it is connected.

AC Specifications

All voltages are relative to their respective ground. All min/max specifications apply over the entire recommended operating range, unless otherwise noted. All typical specifications are at T_A = 25°C, V_{DD1} = 5 V, and V_{DD2} = 5 V, unless otherwise noted. Refer to Figure 5.

Table 2.

Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
MAXIMUM FREQUENCY		1000			kHz	
OUTPUT FALL TIME						
5 V Operation						4.5 V ≤ V_{DD1}, V_{DD2} ≤ 5.5 V, C_{L1} = 40 pF, R1 = 1.6 kΩ, C_{L2} = 400 pF, R2 = 180 Ω
Side 1 Output (0.9 V_{DD1} to 0.9 V)	t_{f1}	13	26	120	ns	
Side 2 Output (0.9 V_{DD2} to 0.1 V_{DD2})	t_{f2}	32	52	120	ns	
3 V Operation						3.0 V ≤ V_{DD1}, V_{DD2} ≤ 3.6 V, C_{L1} = 40 pF, R1 = 1.0 kΩ, C_{L2} = 400 pF, R2 = 120 Ω
Side 1 Output (0.9 V_{DD1} to 0.9 V)	t_{f1}	13	32	120	ns	
Side 2 Output (0.9 V_{DD2} to 0.1 V_{DD2})	t_{f2}	32	61	120	ns	
PROPAGATION DELAY						
5 V Operation						4.5 ≤ V_{DD1}, V_{DD2} ≤ 5.5 V, C_{L1} = C_{L2} = 0, R1 = 1.6 kΩ, R2 = 180 Ω
Side 1-to-Side 2, Rising Edge[1]	t_{PLH12}		95	130	ns	
Side 1-to-Side 2, Falling Edge[2]	t_{PHL12}		162	275	ns	
Side 2-to-Side 1, Rising Edge[3]	t_{PLH21}		31	70	ns	
Side 2-to-Side 1, Falling Edge[4]	t_{PHL21}		85	155	ns	
3 V Operation						3.0 V ≤ V_{DD1}, V_{DD2} ≤ 3.6 V, C_{L1} = C_{L2} = 0, R1 = 1.0 kΩ, R2 = 120 Ω
Side 1-to-Side 2, Rising Edge[1]	t_{PLH12}		82	125	ns	
Side 1-to-Side 2, Falling Edge[2]	t_{PHL12}		196	340	ns	
Side 2-to-Side 1, Rising Edge[3]	t_{PLH21}		32	75	ns	
Side 2-to-Side 1, Falling Edge[4]	t_{PHL21}		110	210	ns	
PULSE WIDTH DISTORTION						
5 V Operation						4.5 V ≤ V_{DD1}, V_{DD2} ≤ 5.5 V, C_{L1} = C_{L2} = 0, R1 = 1.6 kΩ, R2 = 180 Ω
Side 1-to-Side 2, $\lvert t_{PLH12} - t_{PHL12} \rvert$	PWD_{12}		67	145	ns	
Side 2-to-Side 1, $\lvert t_{PLH21} - t_{PHL21} \rvert$	PWD_{21}		54	85	ns	
3 V Operation						3.0 V ≤ V_{DD1}, V_{DD2} ≤ 3.6 V, C_{L1} = C_{L2} = 0, R1 = 1.0 kΩ, R2 = 120 Ω
Side 1-to-Side 2, $\lvert t_{PLH12} - t_{PHL12} \rvert$	PWD_{12}		114	215	ns	
Side 2-to-Side 1, $\lvert t_{PLH21} - t_{PHL21} \rvert$	PWD_{21}		77	135	ns	
COMMON-MODE TRANSIENT IMMUNITY[5]	$\lvert CM_H \rvert$, $\lvert CM_L \rvert$	25	35		kV/µs	

[1] t_{PLH12} propagation delay is measured from the Side 1 input logic threshold to an output value of 0.7 V_{DD2}.
[2] t_{PHL12} propagation delay is measured from the Side 1 input logic threshold to an output value of 0.4 V.
[3] t_{PLH21} propagation delay is measured from the Side 2 input logic threshold to an output value of 0.7 V_{DD1}.
[4] t_{PLH21} propagation delay is measured from the Side 2 input logic threshold to an output value of 0.9 V.
[5] CM_H is the maximum common-mode voltage slew rate that can be sustained while maintaining V_O > 0.8 V_{DD2}. CM_L is the maximum common-mode voltage slew rate that can be sustained while maintaining V_O < 0.8 V. The common-mode voltage slew rates apply to both rising and falling common-mode voltage edges. The transient magnitude is the range over which the common mode is slewed.

PACKAGE CHARACTERISTICS

Table 3.

Parameter	Symbol	Min	Typ	Max	Unit	Test Conditions
Resistance (Input-Output)[1]	R_{I-O}		10^{12}		Ω	
Capacitance (Input-Output)[1]	C_{I-O}		1.0		pF	f = 1 MHz
Input Capacitance	C_I		4.0		pF	
IC Junction-to-Case Thermal Resistance, Side 1	θ_{JCI}		46		°C/W	Thermocouple located at center of package underside
IC Junction-to-Case Thermal Resistance, Side 2	θ_{JCO}		41		°C/W	

[1] The device is considered a 2-terminal device; Pin 1 through Pin 4 are shorted together, and Pin 5 through Pin 8 are shorted together.

REGULATORY INFORMATION

The ADuM1250/ADuM1251 has been approved by the following organizations:

Table 4.

UL	CSA (Pending)	VDE (Pending)
Recognized under 1577 Component Recognition Program[1]	Approved under CSA Component Acceptance Notice #5A	Certified according to DIN EN 60747-5-2 (VDE 0884 Part 2):2003-01[2]
Basic insulation, 2500 V rms isolation rating	Basic insulation per CSA 60950-1-03 and IEC 60950-1, 400 V rms (560 V peak) maximum working voltage	Basic insulation,400 V rms (560 V peak) maximum working voltage
File E214100	File 205078	File 2471900-4880-0001

[1] In accordance with UL1577, each device is proof tested by applying an insulation test voltage ≥ 3000 V rms for 1 second (current leakage detection limit = 5 μA).
[2] In accordance with DIN EN 60747-5-2, each device is proof tested by applying an insulation test voltage ≥ 1050 V peak for 1 second (partial discharge detection limit = 5 pC).

INSULATION AND SAFETY-RELATED SPECIFICATIONS

Table 5.

Parameter	Symbol	Value	Unit	Conditions
Rated Dielectric Insulation Voltage		2500	V rms	1 minute duration
Minimum External Air Gap (Clearance)	L(I01)	4.90 min	mm	Measured from input terminals to output terminals, shortest distance through air
Minimum External Tracking (Creepage)	L(I02)	4.01 min	mm	Measured from input terminals to output terminals, shortest distance path along body
Minimum Internal Gap (Internal Clearance)		0.017 min	mm	Insulation distance through insulation
Tracking Resistance (Comparative Tracking Index)	CTI	>175	V	DIN IEC 112/VDE 0303 Part 1
Isolation Group		IIIa		Material Group (DIN VDE 0110, 1/89, Table 1)

DIN EN 60747-5-2 (VDE 0884 PART 2) INSULATION CHARACTERISTICS

This isolator is suitable for basic isolation only within the safety limit data. Maintenance of the safety data is ensured by protective circuits. The * marking on the package denotes DIN EN 60747-5-2 approval for a 560 V peak working voltage.

Table 6.

Description	Symbol	Characteristic	Unit
Installation Classification per DIN VDE 0110			
For Rated Mains Voltage ≤ 150 V rms		I to IV	
For Rated Mains Voltage ≤ 300 V rms		I to III	
For Rated Mains Voltage ≤ 400 V rms		I to II	
Climatic Classification		40/105/21	
Pollution Degree (DIN VDE 0110, Table 1)		2	
Maximum Working Insulation Voltage	V_{IORM}	560	V_{PEAK}
Input-to-Output Test Voltage, Method b1	V_{PR}	1050	V_{PEAK}
$V_{IORM} \times 1.875 = V_{PR}$, 100% Production Test, t_m = 1 sec, Partial Discharge < 5 pC			
Input-to-Output Test Voltage, Method a	V_{PR}		
After Environmental Tests Subgroup 1			
$V_{IORM} \times 1.6 = V_{PR}$, t_m = 60 sec, Partial Discharge < 5 pC		896	V_{PEAK}
After Input and/or Safety Test Subgroup 2/3		672	
$V_{IORM} \times 1.2 = V_{PR}$, t_m = 60 sec, Partial Discharge < 5 pC			
Highest Allowable Overvoltage (Transient Overvoltage, t_{TR} = 10 sec)	V_{TR}	4000	V_{PEAK}
Safety-Limiting Values (Maximum Value Allowed in the Event of a Failure (See also Figure 3)			
Case Temperature	T_S	150	°C
Side 1 Current	I_{S1}	160	mA
Side 2 Current	I_{S2}	170	mA
Insulation Resistance at T_S, V_{IO} = 500 V	R_S	$>10^9$	Ω

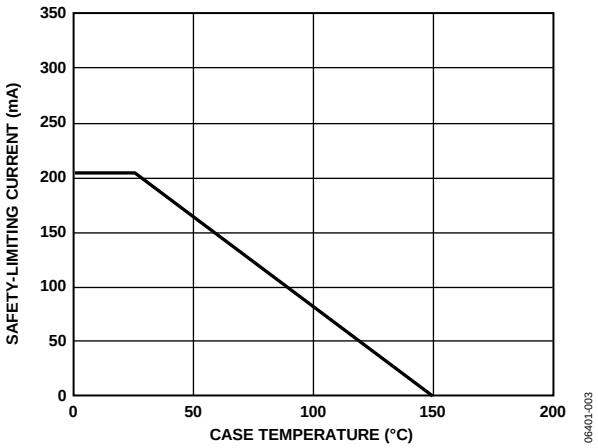


Figure 3. Thermal Derating Curve, Dependence of Safety Limiting Values on Case Temperature, per DIN EN 60747-5-2

RECOMMENDED OPERATING CONDITIONS

Table 7.

Parameter	Symbol	Min	Max	Unit
Operating Temperature	T_A	−40	+105	°C
Supply Voltages[1]	V_{DD1}, V_{DD2}	3.0	5.5	V
Input/Output Signal Voltage	V_{SDA1}, V_{SCL1}, V_{SDA2}, V_{SCL2}		5.5	V
Capacitive Load, Side 1	C_{L1}		40	pF
Capacitive Load, Side 2	C_{L2}		400	pF
Static Output Loading, Side 1	I_{SDA1}, I_{SCL1}	0.5	3	mA
Static Output Loading, Side 2	I_{SDA2}, I_{SCL2}	0.5	30	mA

[1] All voltages are relative to their respective ground. See the Application Notes section for data on immunity to external magnetic fields.

ABSOLUTE MAXIMUM RATINGS

Ambient temperature = 25°C, unless otherwise noted.

Table 8.

Parameter	Symbol	Min	Max	Unit
Storage Temperature	T_{ST}	−55	+150	°C
Ambient Operating Temperature	T_A	−40	+105	°C
Supply Voltages[1]	V_{DD1}, V_{DD2}	−0.5	+7.0	V
Input/Output Voltage[1], Side 1	V_{SDA1}, V_{SCL1}	−0.5	V_{DD1} + 0.5	V
Input/Output Voltage[1], Side 2	V_{SDA2}, V_{SCL2}	−0.5	V_{DD2} + 0.5	V
Average Output Current, per Pin2	I_O			mA
Common-Mode Transients[3]		−100	+100	kV/µs

[1] All voltages are relative to their respective ground.
[2] See Figure 3 for maximum rated current values for various temperatures.
[3] Refers to common-mode transients across the insulation barrier. Common-mode transients exceeding the absolute maximum rating may cause latch-up or permanent damage.

Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ESD CAUTION

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

PIN CONFIGURATION AND FUNCTION DESCRIPTIONS

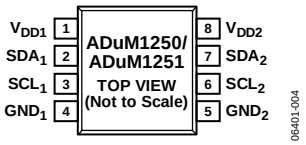


Figure 4. ADuM1250/ADuM1251 Pin Configuration

Table 9. ADuM1250 Pin Function Descriptions

Pin No.	Mnemonic	Description
1	V_{DD1}	Supply Voltage, 3.0 V to 5.5 V.
2	SDA_1	Data Input/Output, Side 1.
3	SCL_1	Clock Input/Output, Side 1.
4	GND_1	Ground 1. Ground reference for isolator Side 1.
5	GND_2	Ground 2. Isolated ground reference for isolator Side 2.
6	SCL_2	Clock Input/Output, Side 2.
7	SDA_2	Data Input/Output, Side 2.
8	V_{DD2}	Supply Voltage, 3.0 V to 5.5 V.

Table 10. ADuM1251 Pin Function Descriptions

Pin No.	Mnemonic	Description
1	V_{DD1}	Supply Voltage, 3.0 V to 5.5 V.
2	SDA_1	Data Input/Output, Side 1.
3	SCL_1	Clock Input, Side 1.
4	GND_1	Ground 1. Ground reference for isolator Side 1.
5	GND_2	Ground 2. Isolated ground reference for isolator Side 2.
6	SCL_2	Clock Output, Side 2.
7	SDA_2	Data Input/Output, Side 2.
8	V_{DD2}	Supply Voltage, 3.0 V to 5.5 V.

TEST CONDITIONS

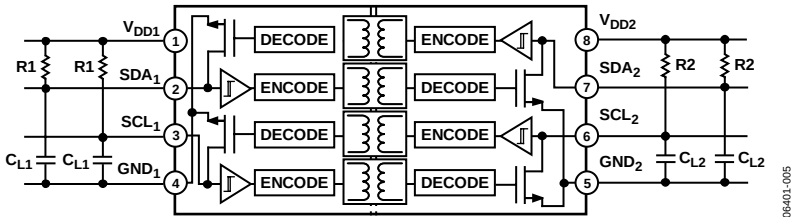


Figure 5. Timing Test Diagram

APPLICATION NOTES

FUNCTIONAL DESCRIPTION

The ADuM1250/ADuM1251 interfaces on each side to a bidirectional I²C signal. Internally, the I²C interface is split into two unidirectional channels communicating in opposing directions via a dedicated *i*Coupler isolation channel for each. One channel (the bottom channel of each channel pair shown in Figure 6) senses the voltage state of the Side 1 I²C pin and transmits its state to its respective Side 2 I²C pin.

Both the Side 1 and the Side 2 I²C pins are designed to interface to an I²C bus operating in the 3.0 V to 5.5 V range. A logic low on either causes the opposite pin to be pulled low enough to comply with the logic low threshold requirements of other I²C devices on the bus. Avoidance of I²C bus contention is ensured by an input low threshold at SDA_1 or SCL_1 guaranteed to be at least 50 mV less than the output low signal at the same pin. This prevents an output logic low at Side 1 being transmitted back to Side 2 and pulling down the I²C bus.

Since the Side 2 logic levels/thresholds are standard I²C values, multiple ADuM1250/ADuM1251 devices connected to a bus by their Side 2 pins can communicate with each other and with other devices having I²C compatibility[1].

However, since the Side 1 pin has a modified output level/input threshold, this side of the ADuM1250/ADuM1251 can only communicate with devices conforming to the I²C standard. In other words, Side 2 of the ADuM1250/ADuM1251 is I²C-compliant while Side 1 is only I²C-compatible.

The output logic low levels are independent of the V_{DD1} and V_{DD2} voltages. The input logic low threshold at Side 1 is also independent of V_{DD1}. However, the input logic low threshold at Side 2 is designed to be at 0.3 V_{DD2}, consistent with I²C requirements. The Side 1 and Side 2 pins have open-collector outputs whose high levels are set via pull-up resistors to their respective supply voltages.

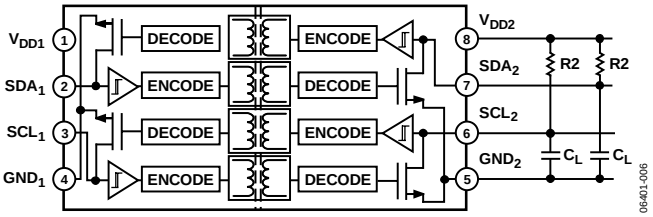


Figure 6. ADuM1250 Block Diagram

[1] Here a distinction is made between I²C compatibility and I²C compliance. I²C compatibility refers to situations in which a component's logic levels do not necessarily meet the requirements of the I²C specification but still allow the component to communication with an I²C-compliant device. I²C compliance refers to situations in which a component's logic levels meet the requirements of the I²C specification.

STARTUP

Both the V_{DD1} and V_{DD2} supplies have an under voltage lockout feature to prevent the signal channels from operating unless certain criteria are met. This avoids the possibility of input logic low signals from pulling down the I²C bus inadvertently during power-up/power-down.

The two criteria that must be met in order for the signal channels to be enabled are as follows:

- Both supplies must be at least 2.5 V.
- At least 40 µs must elapse after both supplies exceeded the internal startup threshold of 2.0 V.

Until both of these criteria are met for both supplies, the ADuM1250/ADuM1251 outputs are pulled high, ensuring a startup that avoids any disturbances on the bus. Figure 7 and Figure 8 illustrate the supply conditions for fast and slow input supply slew rates.

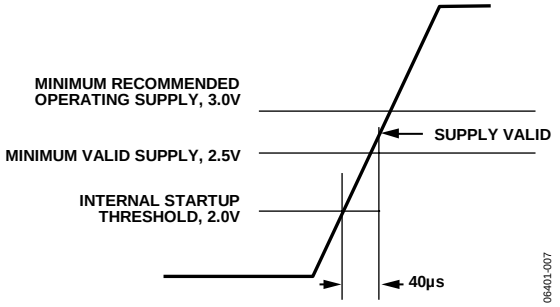


Figure 7. Start-Up Condition, Supply Slew Rate >12.5 V/ms

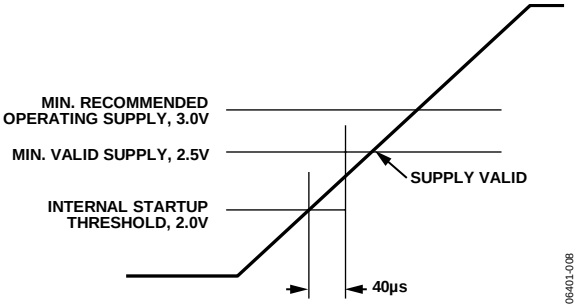


Figure 8. Start-Up Condition, Supply Slew Rate <12.5 V/ms

TYPICAL APPLICATION DIAGRAM

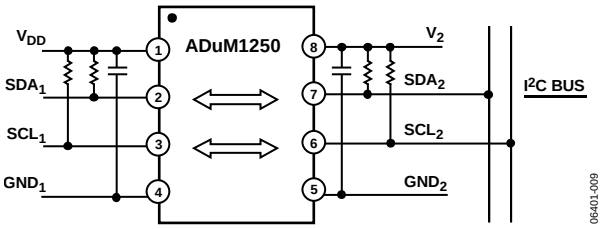


Figure 9. Typical Isolated I²C Interface using ADuM1250

MAGNETIC FIELD IMMUNITY

The ADuM1250 is extremely immune to external magnetic fields. The limitation on the ADuM1250's magnetic field immunity is set by the condition in which induced voltage in the transformer's receiving coil is sufficiently large to either falsely set or reset the decoder. The following analysis defines the conditions under which this may occur. The 3 V operating condition of the ADuM1250 is examined because it represents the most susceptible mode of operation.

The pulses at the transformer output have an amplitude greater than 1.0 V. The decoder has a sensing threshold at about 0.5 V, thus establishing a 0.5 V margin in which induced voltages can be tolerated. The voltage induced across the receiving coil is given by

$$V = (-d\beta / dt)\sum \Pi r_n^2; n = 1, 2, ...N$$

where:

β is the magnetic flux density (gauss).
N is the number of turns in the receiving coil.
r_n is the radius of the nth turn in the receiving coil (cm).

Given the geometry of the receiving coil in the ADuM1250 and an imposed requirement that the induced voltage is at most 50% of the 0.5 V margin at the decoder, a maximum allowable magnetic field is calculated, as shown in Figure 10.

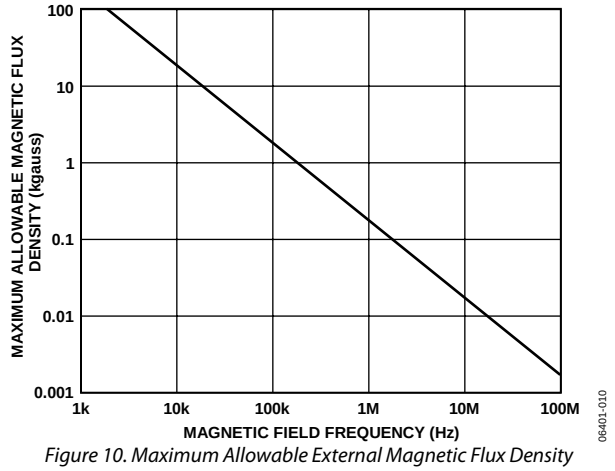


Figure 10. Maximum Allowable External Magnetic Flux Density

For example, at a magnetic field frequency of 1 MHz, the maximum allowable magnetic field of 0.2 kgauss induces a voltage of 0.25 V at the receiving coil. This is about 50% of the sensing threshold and does not cause a faulty output transition. Similarly, if such an event occurs during a transmitted pulse (with the worst-case polarity), it reduces the received pulse from > 1.0 V to 0.75 V. Note that this is still well above the 0.5 V sensing threshold of the decoder.

The preceding magnetic flux density values correspond to specific current magnitudes at given distances away from the ADuM1250 transformers. Figure 11 expresses these allowable current magnitudes as a function of frequency for selected distances. As shown in Figure 11, the ADuM1250 is extremely immune and can be affected only by extremely large currents operated at high frequency and very close to the component. For the 1 MHz example, one would have to place a 0.5 kA current 5 mm away from the ADuM1250 to affect the component's operation.

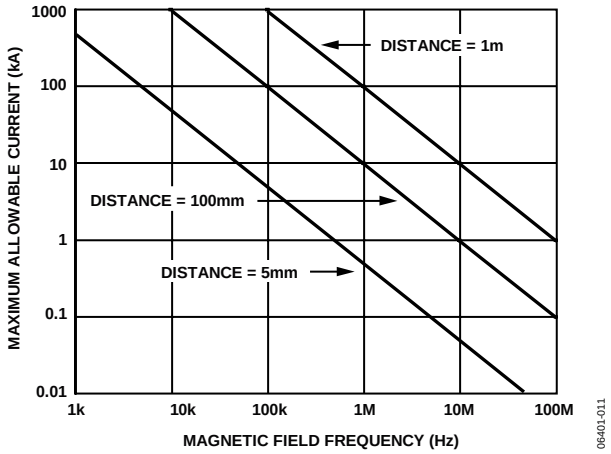
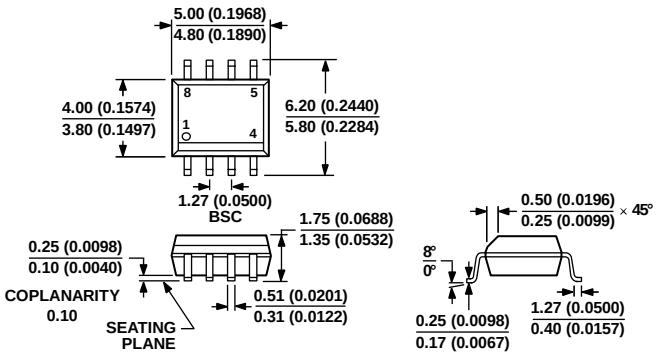


Figure 11. Maximum Allowable Current for Various Current-to-ADuM1250 Spacings

Note that at combinations of strong magnetic fields and high frequencies, any loops formed by printed circuit board traces could induce sufficiently large error voltages to trigger the threshold of succeeding circuitry. Care should be taken in the layout of such traces to avoid this possibility.

OUTLINE DIMENSIONS



COMPLIANT TO JEDEC STANDARDS MS-012-A A

CONTROLLING DIMENSIONS ARE IN MILLIMETERS; INCH DIMENSIONS (IN PARENTHESES) ARE ROUNDED-OFF MILLIMETER EQUIVALENTS FOR REFERENCE ONLY AND ARE NOT APPROPRIATE FOR USE IN DESIGN.

060506-A

Figure 12. 8-Lead Standard Small Outline Package [SOIC_N]
Narrow Body
(R-8)
Dimensions shown in millimeters (inches)

ORDERING GUIDE

Model	Number of Inputs, V_{DD1} Side	Number of Inputs, V_{DD2} Side	Maximum Data Rate (Mbps)	Maximum Propagation Delay (ns)	Temperature Range	Package Description	Package Option
ADuM1250ARZ[1]	2	2	1	150	−40°C to +105°C	8-Lead SOIC_N	R-8
ADuM1250ARZ-RL7[1]	2	2	1	150	−40°C to +105°C	8-Lead SOIC_N	R-8
ADuM1251ARZ[1]	2	1	1	150	−40°C to +105°C	8-Lead SOIC_N	R-8
ADuM1251ARZ-RL7[1]	2	1	1	150	−40°C to +105°C	8-Lead SOIC_N	R-8

[1] Z = Pb-free part.

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