Product Preview

AutoBahn™ Support Device (ABSD)

MC100SX1452

AUTOBAHN™ SUPPORT DEVICE
ABSD

FI SUFFIX
CERAMIC CLCC PACKAGE
CASE TBD

The ABSD is a bi–directional repeater for use in a serial AutoBahn databus environment. It is a completely asynchronous part. No clock will be used.

During data transmission via the serial system bus, the ABSD receives data from the serial system bus and transmits the data to the receiving AutoBahn. Vice versa, the ABSD transmits data from the AutoBahn on the local side to the serial system bus.

The direction of the transmission is automatically determined by the activities at the serial bus I/O's.

The ABSD is able to handle a data collision, but no collision detect is provided.

A disable pin, which will be controlled by the AutoBahn board, supports the live insertion function. Enabling the ABSD requires a deassertion of the disable signal and a cutoff state at the serial system bus.

- Bi–Directional Data Transmission Up to 1600MBit/s
- 8–Pin CLCC Package
- Differential Data I/Os
- Enables Live Insertion
- Self–Detecting Transmission Direction
- Enables Up to 21 Nodes
- Impedance Controlled Termination

The ABSD supports variable data transfer rates of 400Mbit/s, 800Mbit/s and 1600Mbit/s. This enables the usage in combination with all AutoBahn Spanceiver™ components.

The ABSD will be used either as an active impedance controlled access node to a serial bus system, or it will act as a cable driver or line repeater.

Motorola's MOSAIC V™ process allows high speed designs up to 3GHz. The design is implemented with a flow–through pinout architecture.

The ABSD chip works from a single +5V supply.

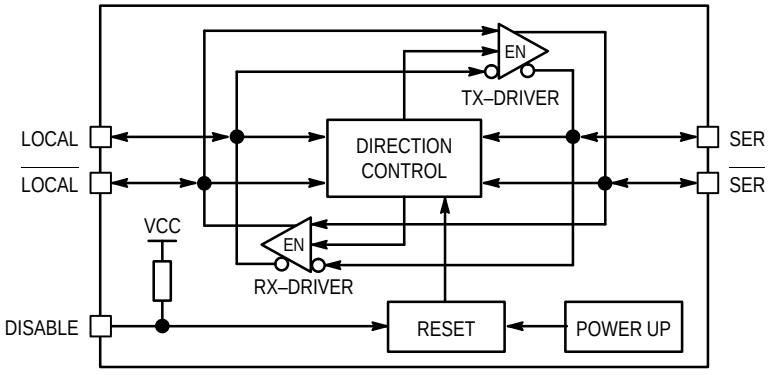

Figure 1. Simplified Block Diagram

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'Spanceiver' has been formed as a contraction of Serial/Parallel Transceiver.
MOSAIC V is a trademark of Motorola, Inc.

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MOTOROLA

Table 1. PIN DESCRIPTIONS

Signal	Pin No	Direction	Level	Description
DISABLE	3	In	PCT	Low level immediately enables the ABSD if the public bus is in cutoff. High level disables the ABSD
SER	6	I/O	CUTOFF–PECL	Serial data I/O at the serial system bus
$\overline{\text{SER}}$	5	I/O	CUTOFF–PECL	Inverted serial data I/O at the serial system bus
LOCAL	1	I/O	CUTOFF–PECL	Serial data I/O connected to the local AutoBahn serial bus
$\overline{\text{LOCAL}}$	2	I/O	CUTOFF–PECL	Inverted serial data I/O connected to the local AutoBahn serial bus
Power and Ground Pins				
GND	4	Supply	–	Ground
VCC	8	Supply	–	Positive supply
VCCO	7	Supply	–	Positive supply output drivers

BLOCK DIAGRAM FUNCTIONAL DESCRIPTION

MODES OF OPERATION

IDLE MODE

When RESET is active, both the RX–DRIVER and the TX–DRIVER are in cutoff. After enabling the part, the DRIVERs remain in cutoff state if there is no activity on the local and the public bus. If there is a data transfer running on the public bus after enabling the part, the ABSD switches to RECEIVE MODE.

RECEIVE MODE

In the idle mode, when DIRECTION CONTROL recognizes data on the public side, the ABSD switches to RECEIVE MODE. This means the RX–DRIVER becomes active and the TX–DRIVER remains in cutoff–state.

Both buffers remain in their states until the public bus goes to a cutoff state. Then the RX–DRIVER is deasserted again and the logic returns to idle mode.

TRANSMIT MODE

In the idle mode, when DIRECTION CONTROL recognizes data on the local, side the ABSD switches to TRANSMIT MODE. This means the TX–DRIVER becomes active and the RX–DRIVER remains in cutoff–state.

Both buffers remain in their states until the local bus goes to a cutoff state. Then the TX–DRIVER is deasserted again and the logic returns to idle mode.

COLLISION DETECT

In the idle mode, when DIRECTION CONTROL recognizes data on the local side and on the public side at the same time, the ABSD goes to RECEIVE MODE. The signals on the SER/SER bus (back plane) are not disturbed. On the local bus a data–collision occurs and the local AutoBahn Spanceiver shows an error.

POWER UP LOGIC

When the voltage drops below 4.6V an internal RESET– signal is generated.

RESET–LOGIC

The DISABLE signal indicates to the ABSD the disconnection of the local AutoBahn Spanceiver or board from the back plane, e.g., during a self test or plug/unplug of the board.

The DISABLE or the internal generated power up reset sets the internal logic to a known state. The RX–DRIVER and the TX–DRIVER are set to cutoff state. The DISABLE pin is terminated internally with a pull up resistor.

TX–DRIVER

The TX–DRIVER is a cutoff driver. The DIRECTION CONTROL circuit monitors the local bus. When a stable differential signal is detected the TX–DRIVER is enabled.

RX–DRIVER

The RX–DRIVER is a cutoff driver. The DIRECTION CONTROL circuit monitors the public bus. When a stable differential signal is detected the RX–DRIVER is enabled.

SERIAL BUS IO CHARACTERISTICS

To achieve best multipoint performance the serial IO's have lowest output impedance during transmit mode and high input impedance in receive mode.

If the serial IO's are in a cutoff mode the DC input impedance is above 10KΩ. During transmit mode (differential) the IO's show a output impedance of 6Ω – 8Ω.

TYPICAL SERIAL BUS APPLICATION

The ABSD is a bi–directional repeater for the serial AutoBahn databus. It is a completely asynchronous part. No clock will be used.

During data transmission via the serial system bus, the ABSD receives data from the serial system bus and transmits these data to the receiving AutoBahn. Vice versa, the ABSD transmits data from the AutoBahn on the local side to the serial system bus.
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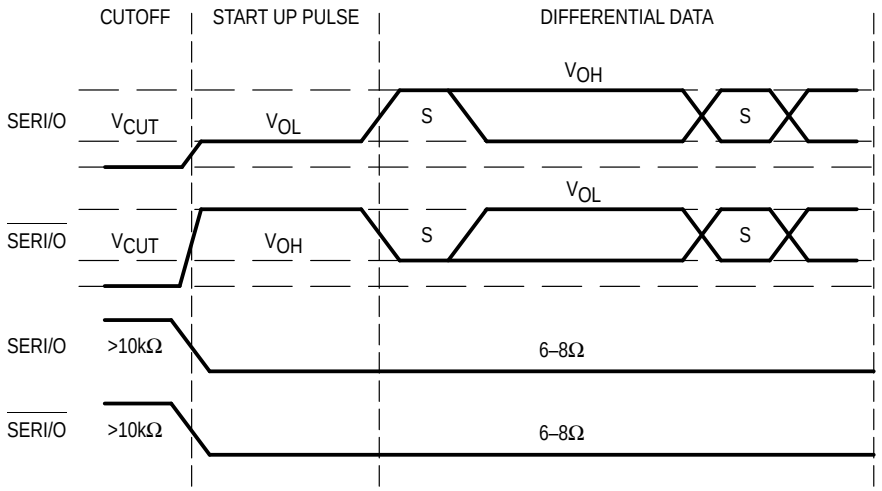

Figure 2. Output Driver Characteristics – Serial I/O
(LOCAL and SER)

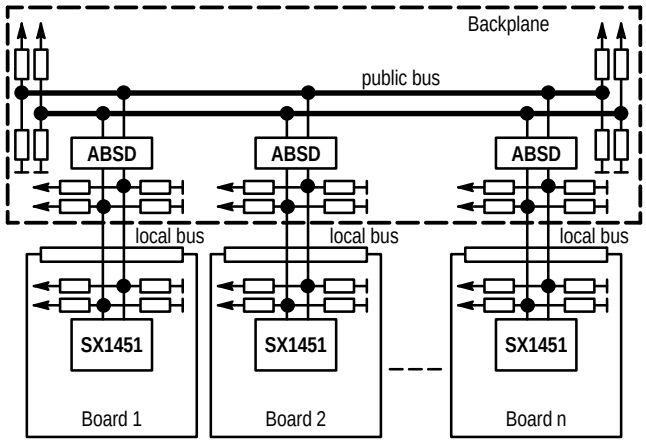

Figure 3. Serial Bus Application

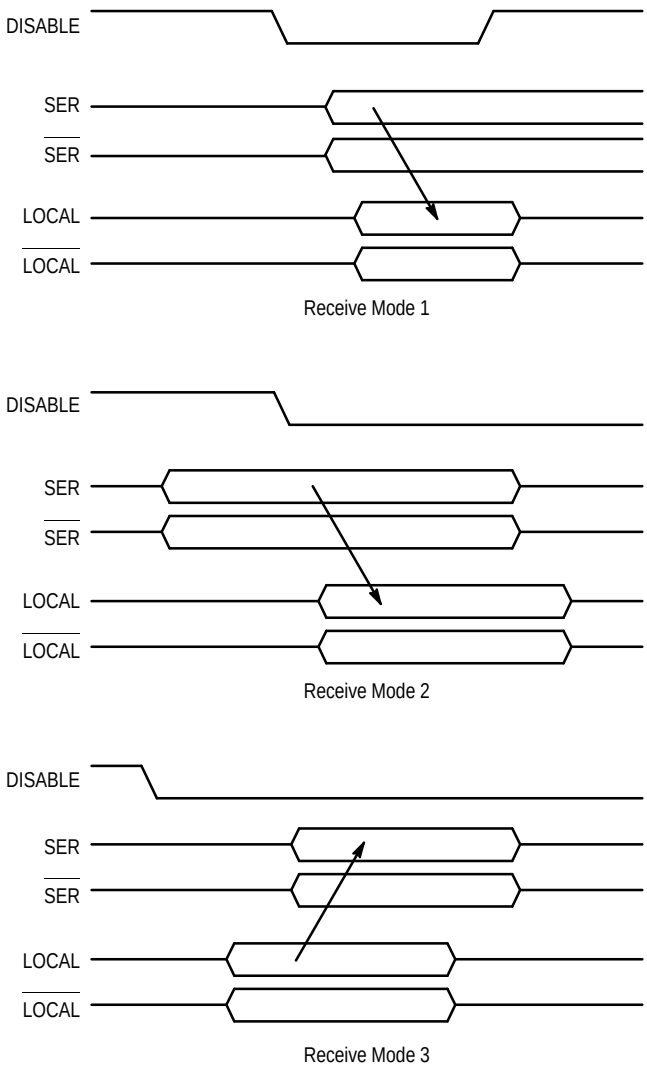

Figure 4. Functional Timings

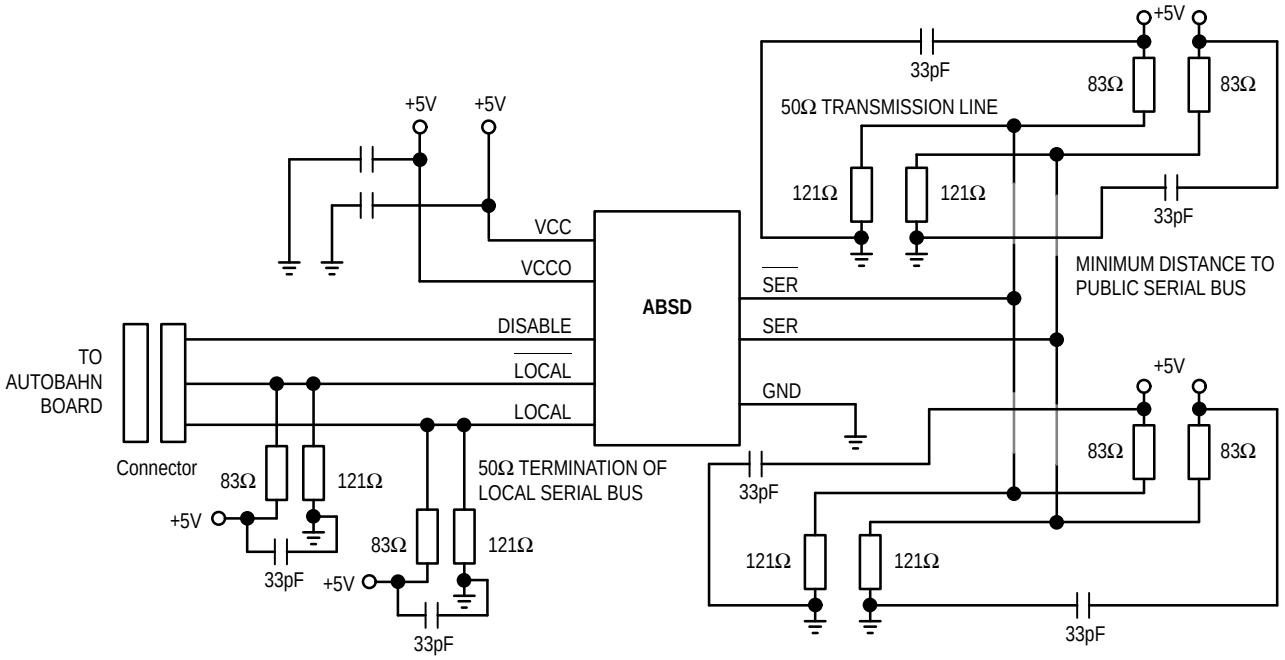

Figure 5. ABSD Interface Design

MAXIMUM RATINGS*

Symbol	Parameter	Value	Unit
V_{CC}, V_{CCO}	DC Supply Voltage (Referenced to GND)	–0.5 to +7.0	V
T_A	Operating Temperature Range (Ambient)	0 to +70	°C
T_{STG}	Storage Temperature Range	–55 to +125	°C

* Maximum Ratings are those values beyond which damage to the device may occur. Functional operation should be restricted to the Recommended Operating Conditions.

DC CHARACTERISTICS

Symbol	Characteristic	Min	Typ	Max	Unit	Condition
V_{CC}, V_{CCO}	Supply Voltage	4.75		5.25	V	
V_{IH}	PECL Input High Level			4.12	V	Note 1.
V_{Icut}	PECL Input Cutoff Level	3.00		3.07	V	Note 1.
V_{IL}	PECL Input Low Level	3.19			V	Note 1.
$V_{P–PD}$	Input Swing Differential	150		1200	mV	Note 1.
$V_{P–PC}$	Input Swing Start–Up Pulse	300		1200	mV	Note 1.
V_{OH}	PECL Output High Level	3.975		4.120	V	Note 1.
V_{Ocut}	PECL Output Cutoff Level	3.00		3.07	V	Note 1.
V_{OL}	PECL Output Low Level	3.19		3.38	V	Note 1.
I_{OUT}	PECL Output Current Continuous Surge	50 100			mA	
V_{IHTTL}	Input High TTL	2.0			V	
V_{ILTTL}	Input Low TTL			0.8	V	
I_{ILTTL}	Input Current Low Level		–0.6		mA	V_{in} = 0.5V
I_{IHTTL}	Input Current High Level					V_{in} = 2.7V
C_{INECL}	Input Capacitance			2.0	pF	

1. V_{CC} = 5V; Output Load 25Ω to +3V.

DC CHARACTERISTICS

Symbol	Characteristic	Min	Typ	Max	Unit	Condition
f_{max}	Maximum Frequency	0.9	1.0		GHz	Note 2.
DR	Data Rate	1.8	2.0		GBit/s	Note 2.
t_f, t_r	Rise and Fall Time		150		ps	20%–80% at 50pF, 25Ω
PH	Phase Variation	–25		+25	ps	Note 2.
dDL	Differential Delay	–5		+5	ps	Note 2.
pDL	Propagation Delay					Note 3.
t_{en}	Enable Time					
t_{de}	Disable Time					
	AC Load		50		pF	Notes 2., 4.
V_{res}	Power–Up Threshold		4.6		V	

2. V_{CC} = 5V; Output Load 25Ω to +3V.
3. The propagation delay is not relevant for functionality.
4. This is equivalent to 21 nodes.

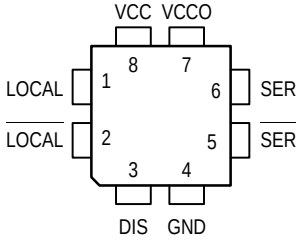

Figure 6. 8–Lead Pinout (Top View)

OUTLINE DIMENSIONS

FI SUFFIX
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