



## **1 Overview**

This document concern the main features of PTB801DC valve drivers for ABS board with 2 x L9349 devices.

### **1.1 Introduction**

The PTB801DC is a complete demonstrator of an ABS system based on STMicroelectronics devices. The board implements a flexible and open design demonstrating the capability of the STMicroelectronics 16/32 bit microcontrollers and devices for ABS applications. The PTB801DC mounts two L9349 devices and accept external signal coming from PTB801 MB.

### **1.2 Main components**

- L9349 valve drivers
- Connector for valves with supply
- Connector for I/O, enables signals
- Standardized CPU board connector (PTB801 MB) providing access to off board I/O, PWM, SPI and power supply

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## 2 Evaluation board description

The PTB801DC is a valve drivers board for ABS system based on STMicroelectronics devices. The board implements a flexible and open design demonstrating the capability of the STMicroelectronics for ABS applications. The PTB801DC mounts two L9349 devices, the control coming from UN24 mother board.

The board has opened connectivity to external valves.

### 2.1 Features

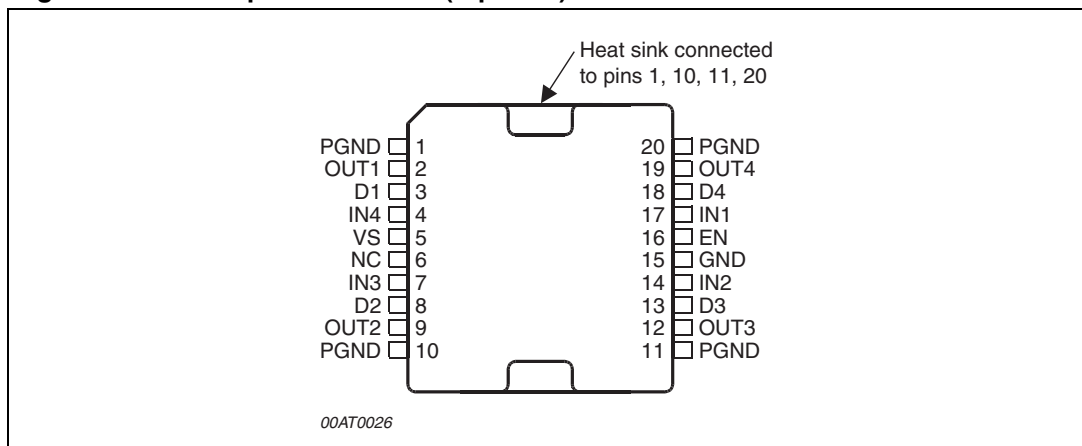
General features of this board are:

- Full evaluation and development system based on the system basis chip L9349
- Full system evaluation: integration, basic and safety functions

#### 2.1.1 L9349 quad intelligent power low-side switch

The L9349 is a monolithic integrated quad low side driver realized in an advanced BCDmultipower mixed technology. The device is intended to drive valves in automotive environment.

**Figure 1. L9349 pin connection (top view)**

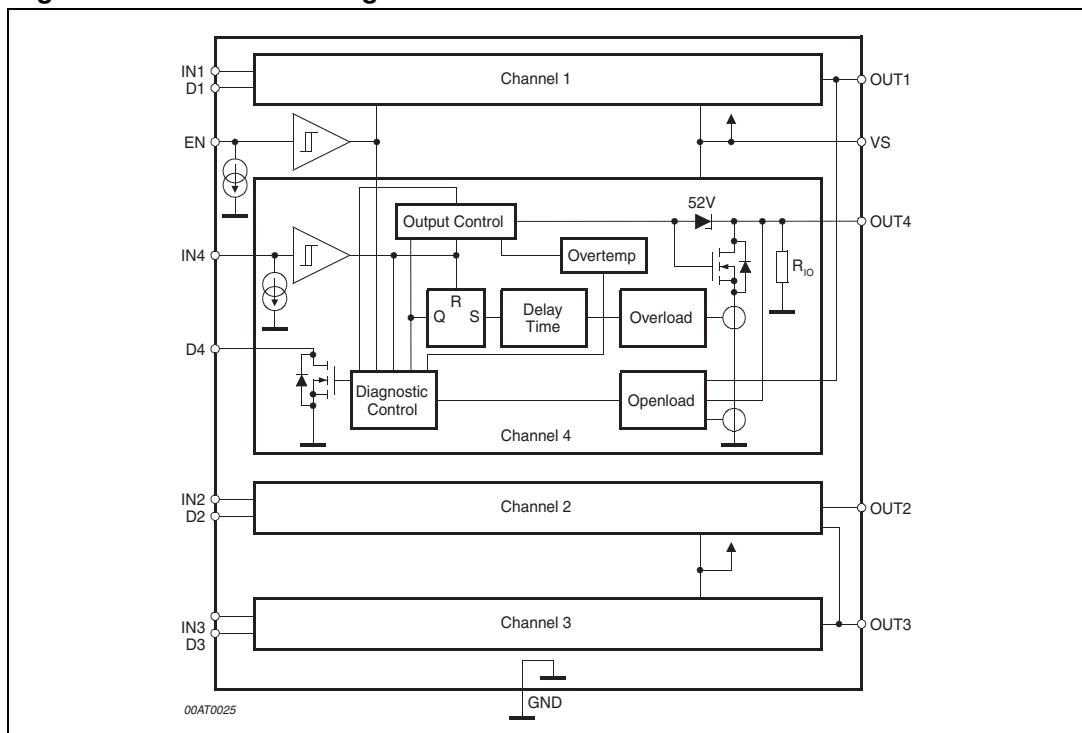


The L9349 is a quad low-side driver with following functions:

- Quad power low side driver with 2 x 5 A and 2 x 3 A output current capability
- Low  $R_{\text{DS(on)}}$  typically 200 m $\Omega$  and 300 m $\Omega$  @  $T_j = 25^\circ\text{C}$
- Internal output clamping structures with  $V_{\text{FB}} = 50\text{V}$  for fast inductive load current recirculation
- Limited output voltage slew rate for low EMI
- Protected  $\mu\text{P}$  compatible enable and input
- Wide operating supply voltage range 4.5 V to 32 V

- Real time diagnostic functions:
  - Output shorted to GND
  - Output shorted to Vss
  - Open load detection in ON and OFF condition
  - Load bypass detection
  - Overtemperature detection
- Device protection functions:
  - Overload disable
  - Selective thermal shutdown
- Signal- and power-ground-loss shutdown

Figure 2. L9349 block diagram

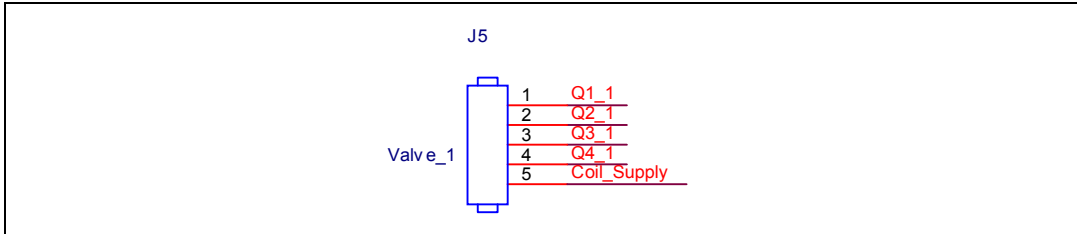


## 2.2 Board connections

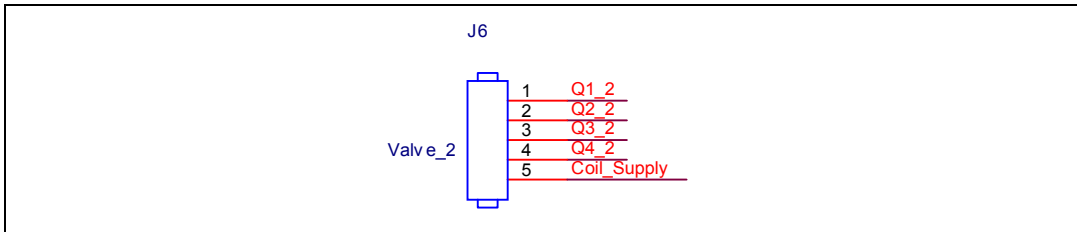
PTB801DC has many connector to communicate with:

- UN24 mother board
- External valves

**Figure 3. Valves controlled by first L9349**



**Figure 4. Valves controlled by second L9349**



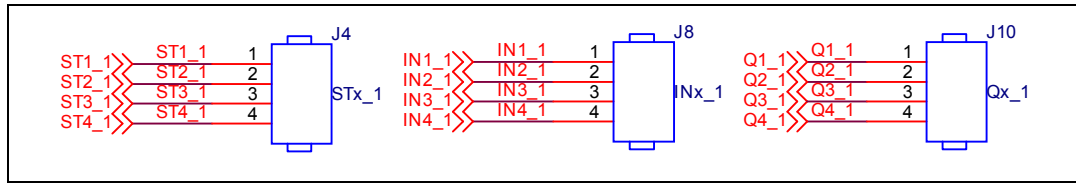
The following table describes the pin out of the valve connectors J5 and J6:

**Table 1. Valve connectors J5 and J6**

Name	Figure	Description
J5 Pin 1	<i>Figure 3.</i>	Output Q1 of first driver
J5 Pin 2		Output Q2 of first driver
J5 Pin 3		Output Q3 of first driver
J5 Pin 4		Output Q4 of first driver
J5 Pin 5		Coil Supply
J6 Pin 1	<i>Figure 4.</i>	Output Q1 of second driver
J6 Pin 2		Output Q2 of second driver
J6 Pin 3		Output Q3 of second driver
J6 Pin 4		Output Q4 of second driver
J6 Pin 5		Coil Supply

On the board, there are three connectors to monitoring the input (INx\_1), output (Qx\_1), and status (STx\_1) of the drivers.

**Figure 5. First L9349 signals monitoring connectors**



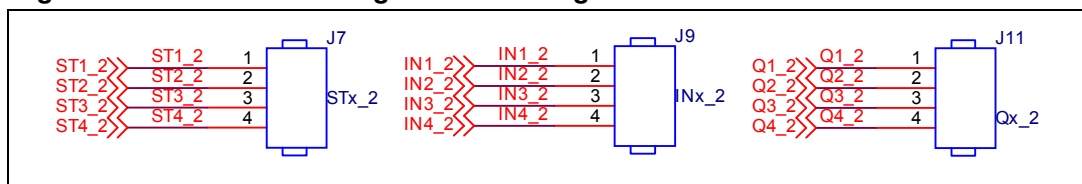
The following table describes the pin out of the first signals monitoring connectors J4, J8 and J10:

**Table 2. Valve connectors J4, J8 and J10**

Name	Figure	Description
J4 Pin 1	<i>Figure 5.</i>	Status Q1 of first driver
J4 Pin 2		Status Q2 of first driver
J4 Pin 3		Status Q3 of first driver
J4 Pin 4		Status Q4 of first driver
J8 Pin 1		Input Q1 of first driver
J8 Pin 2		Input Q2 of first driver
J8 Pin 3		Input Q3 of first driver
J8 Pin 4		Input Q4 of first driver
J10 Pin 1		Output Q1 of first driver
J10 Pin 2		Output Q2 of first driver
J10 Pin 3		Output Q3 of first driver
J10 Pin 4		Output Q4 of first driver

On the board, there are three connectors to monitoring the input (INx\_2), output (Qx\_2), and status (STx\_2) of the drivers.

**Figure 6. Second L9349 signals monitoring connectors**



The following table describes the pin out of the second signals monitoring connectors J7, J9 and J11:

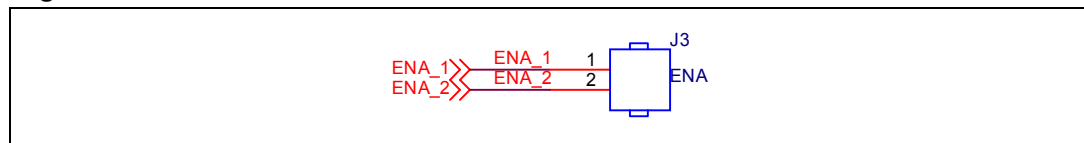


**Table 3. Valve connectors J7, J9 and J11**

Name	Figure	Description
J7 Pin 1	<i>Figure 6.</i>	Status Q1 of second driver
J7 Pin 2		Status Q2 of second driver
J7 Pin 3		Status Q3 of second driver
J7 Pin 4		Status Q4 of second driver
J9 Pin 1		Input Q1 of second driver
J9 Pin 2		Input Q2 of second driver
J9 Pin 3		Input Q3 of second driver
J9 Pin 4		Input Q4 of second driver
J11 Pin 1		Output Q1 of second driver
J11 Pin 2		Output Q2 of second driver
J11 Pin 3		Output Q3 of second driver
J11 Pin 4		Output Q4 of second driver

On the board there are a connector to monitoring the enabled status of the L9349 drivers.

**Figure 7. Enabled status connectors**



The following table describes the pin out of the enable L9349 drivers:

**Table 4. Valve connectors J3**

Name	Figure	Description
J3 Pin 1	<i>Figure 7.</i>	Enable first L9349 valve driver
J3 Pin 2		Enable second L9349 valve driver

## 3 Before you start

This section describes operations needed before powering up the board.

Before powering up the mother board, could connect:

- Daughter board 2 x L9349
- Wheel Speed Sensor board
- $\mu$ C mini module (ST10/SPC family)

### 3.1 How to exercise diagnostic functionality

The PTB801DC has many diagnostic features. Please see the L9349 datasheet for detail.

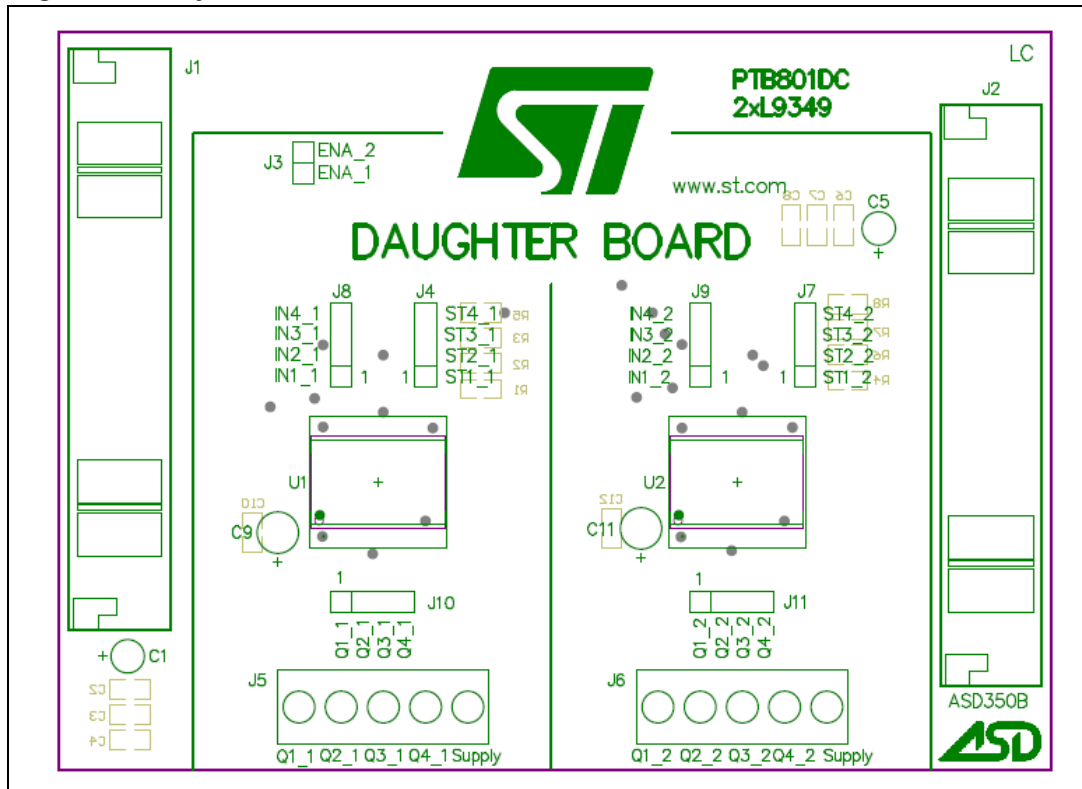
## 4 Hardware

This chapter describes all the hardware modules of the board.

### 4.1 PTB801DC overview

The PTB801DC is a specific platform for ABS valve drivers system with parallel interface.

**Figure 8. Layout 2 x L9349**



## 5 Revision history

**Table 5. Document revision history**

Date	Revision	Changes
28-May-2009	1	Initial release.
17-Sep-2013	2	Updated Disclaimer.

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