



# Two-Channel Multipoint Fast-Mode Plus Differential I<sup>2</sup>C-Bus Buffer with Hot-Swap Logic

## PCA9614DP

Last Updated: Jun 18, 2025

The PCA9614 is a Fast-mode Plus (Fm+) SMBus/I<sup>2</sup>C-bus buffer that extends the normal single-ended SMBus/I<sup>2</sup>C-bus through electrically noisy environments using a differential SMBus/I<sup>2</sup>C-bus (dI<sup>2</sup>C) physical layer, which is transparent to the SMBus/I<sup>2</sup>C-bus protocol layer. It consists of two single-ended to differential driver channels for the SCL (serial clock), SDA (serial data).

The use of differential transmission lines between identical dI<sup>2</sup>C bus buffers removes electrical noise and common-mode offsets that are present when signal lines must pass between different voltage domains, are bundled with hostile signals, or run adjacent to electrical noise sources, such as high energy power supplies and electric motors.

The SMBus/I<sup>2</sup>C-bus was conceived as a simple slow speed digital link for short runs, typically on a single PCB or between adjacent PCBs with a common ground connection. Applications that extend the bus length or run long cables require careful design to preserve noise margin and reject interference.

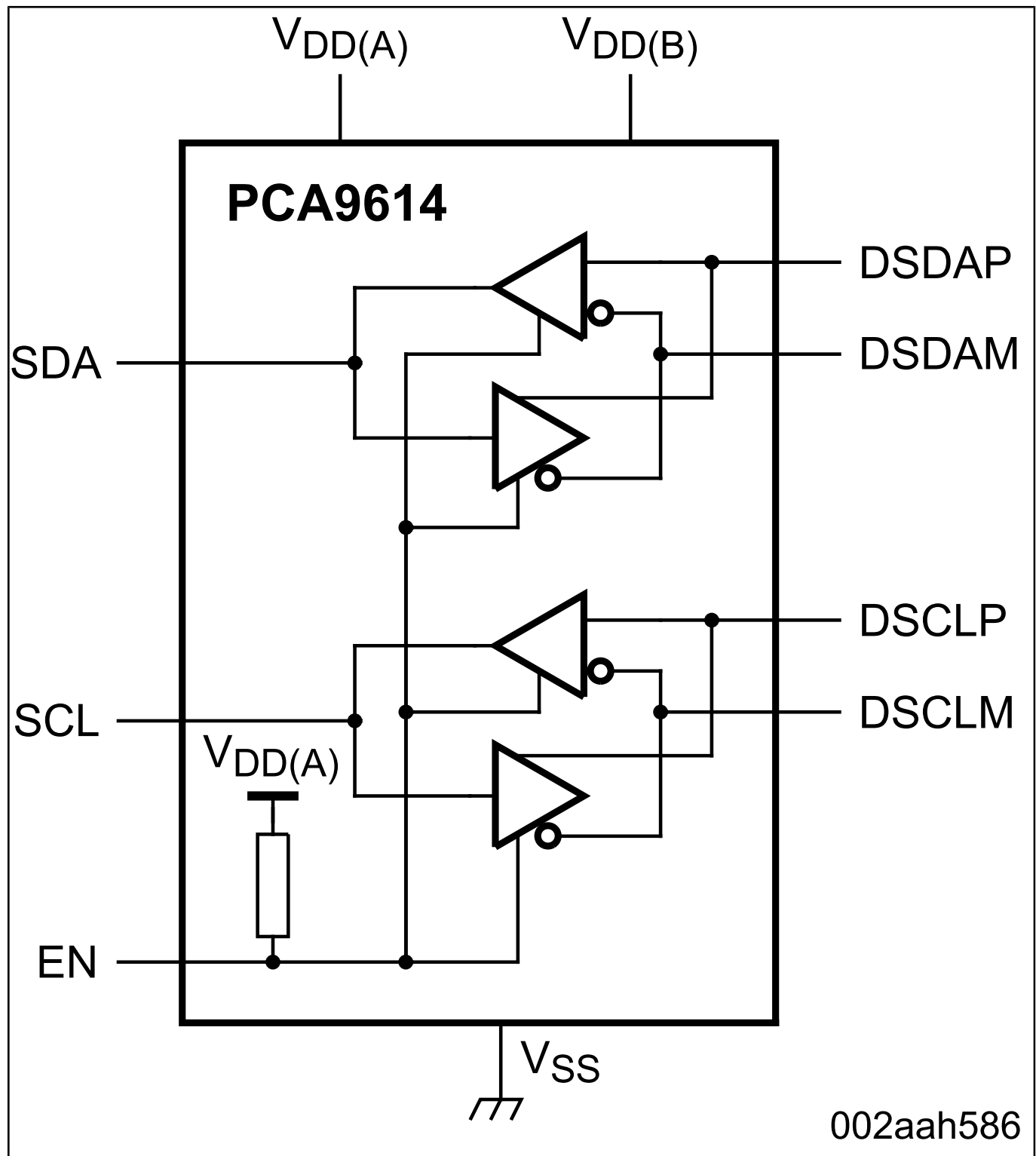
The I<sup>2</sup>C-bus buffers were designed to solve these problems and are ideally suited for rugged high noise environments and/or longer cable applications, allow multiple targets, and operate at bus speeds up to 1 MHz clock rate. Cables can be extended to at least three meters (3 m), or longer cable runs at lower clock speeds. The dI<sup>2</sup>C-bus buffers are compatible with existing SMBus/I<sup>2</sup>C-bus devices and can drive Standard, Fast-mode, and Fast-mode Plus devices on the single-ended side.

Signal direction is automatic and requires no external control. To prevent bus latch-up the I<sup>2</sup>C-bus side employs static level offset. Take care when connecting the PCA9614 to other SMBus/I<sup>2</sup>C-bus buffers that do not operate with other static level offset bus buffers.

These devices are a bridge between the normal 2-wire single-ended wired-OR SMBus/I<sup>2</sup>C-bus and the 4-wire dI<sup>2</sup>C-bus.

The PCA9614 has two supply voltages, VDD(A) and VDD(B). VDD(A), the card side supply, only serves as a reference and ranges from 2.3 V to 5.5 V. VDD(B), the line side supply, serves as the majority supply for circuitry, and ranges from 3.0 V to 5.5 V.

**PCA9614 Block Diagram**



View additional information for [Two-Channel Multipoint Fast-Mode Plus Differential I<sup>2</sup>C-Bus Buffer with Hot-Swap Logic](#).

**Note:** The information on this document is subject to change without notice.

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