



NXP Fast-mode Plus 8-bit A/D & D/A converter PCA9691

1-MHz I²C-bus analog-to-digital and digital-to-analog converter

Compatible with Fast-mode Plus, this is the first AD/DA device capable of communication at I²C-bus speeds up to 1 MHz — ten times faster.

Key features

- ▶ Single power supply
- ▶ Operating supply voltage 2.5 V to 5.5 V
- ▶ Low standby current
- ▶ 1-MHz Fast-mode Plus I²C-bus via serial input/output
- ▶ Address by three hardware address pins
- ▶ Sampling rate given by I²C-bus speed
- ▶ Four analog inputs programmable as single ended or differential inputs
- ▶ Auto-incremented channel selection
- ▶ Analog voltage range from V_{SS} to V_{DD}
- ▶ On-chip track and hold circuit
- ▶ 8-bit successive approximation A/D conversion
- ▶ Multiplying DAC with one analog output.

Applications

- ▶ Base stations
- ▶ Audio distribution
- ▶ Personal alarm system
- ▶ High-quality printers for labels
- ▶ Highway equipment
- ▶ Acoustic alerts
- ▶ Industrial control
- ▶ Video surveillance
- ▶ Temperature control
- ▶ Signalization board
- ▶ Power management units

The PCA9691 is a single-chip, single-supply low power 8-bit CMOS data acquisition device with four analog inputs, one analog output and a serial I²C-bus interface. Three address pins A0, A1 and A2 are used for programming the hardware address, allowing the use of up to 64 devices connected to the I²C-bus without additional hardware. Address, control and data to and from the device are transferred serially via the two-line bidirectional I²C-bus.

Two functions are available: an 8-bit analog-to-digital converter with four multiplexed inputs utilizing on-chip track and hold function and a one channel 8-bit digital to analog converter. The maximum conversion rate is given by the maximum speed of the I²C-bus.

The high conversion rate of more than 100k samples per second allows also audio signal distribution. Fast control loops can now be established, without occupying the bus continuously.

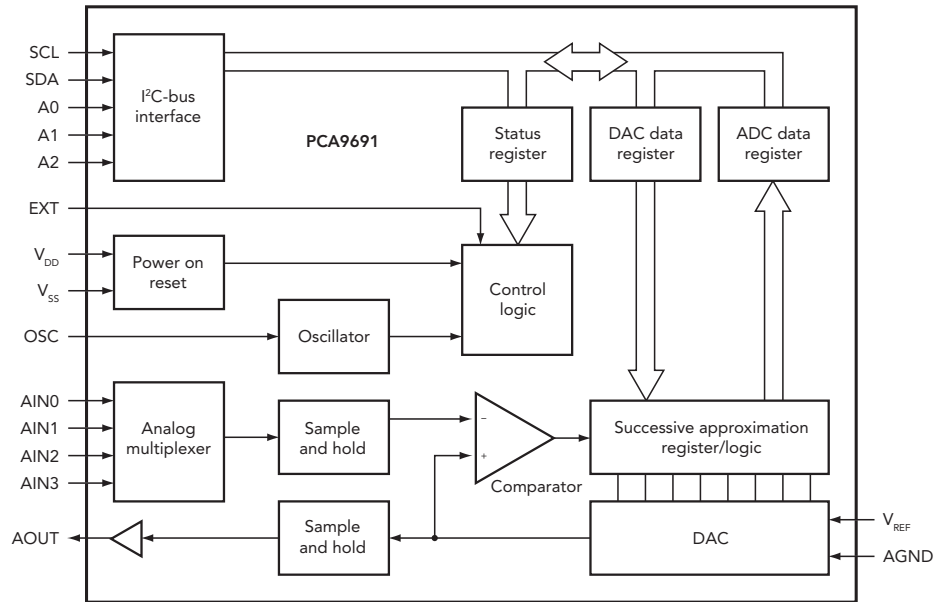
The large variety of input configurations allows simple monitoring of measuring bridges, grounded or floating signals.

The device can operate in Standard and Fast-mode. The operating supply voltage is 2.5 to 6.0 V. For the analog part separate ground pin is available. If bus frequency is below 500 kHz a low power mode can be activated.

The I²C-bus clock frequency is 0 to 1 MHz, and the SDA and SCL outputs are capable of driving 30 mA. The operating temperature range is -40 to +85 °C.

ESD protection exceeds 2000V HBM per JESD22-A114, 200V MM per JESD22-A115, and 1000V CDM per JESD22-C101. Latch-up testing, performed in accordance with JEDEC Standard JESD78, exceeds 100 mA.

For more information visit www.nxp.com/i2clogic



PCA9691 block diagram

Comparison of PCF8591 and PCA9691 A/D, D/A converter

Characteristics	PCA9691	PCF8591
Voltage range		
Maximum I ² C-bus frequency	1000 kHz	100 kHz
Maximum conversion rate	110,000 samples / sec	11,000 samples / sec
Number of device addresses	64	8

Ordering information

Package	Tube, 112	Tape and Reel, 118
DIP 16	PCF8591P	
SO 16	PCA9691T, PCF8591T	PCA9691T, PCF8591T
HVQFN 20		PCA9691BS
TSSOP16	PCA9691TS	PCA9691TS

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