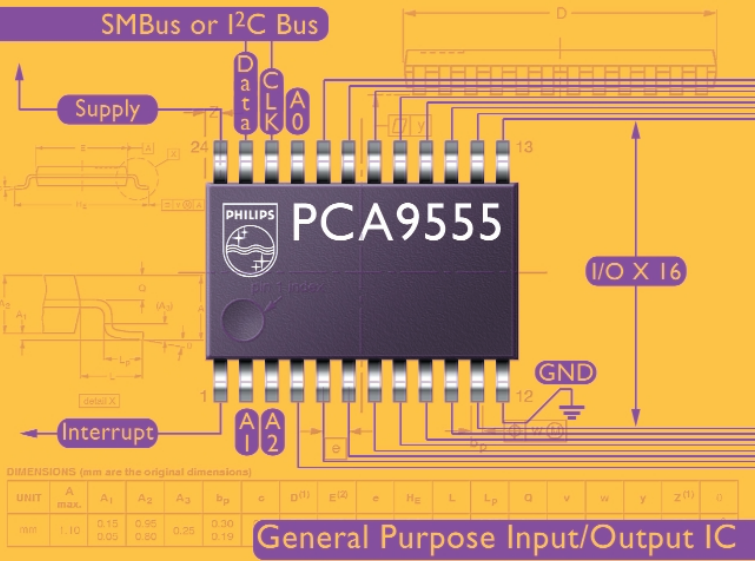


# Philips Configuration System Management ICs

# PCA9554/54A/55

## 8- and 16-bit I<sup>2</sup>C and SMBus I/O Port with Interrupt



General Purpose Input/Output IC

The PCA9554/54A/55 were developed to enhance the Philips family of I<sup>2</sup>C I/O expanders. The improvements include higher drive capability, 5V I/O tolerance, lower supply current, individual I/O configuration, 400 kHz clock frequency, and smaller packaging.

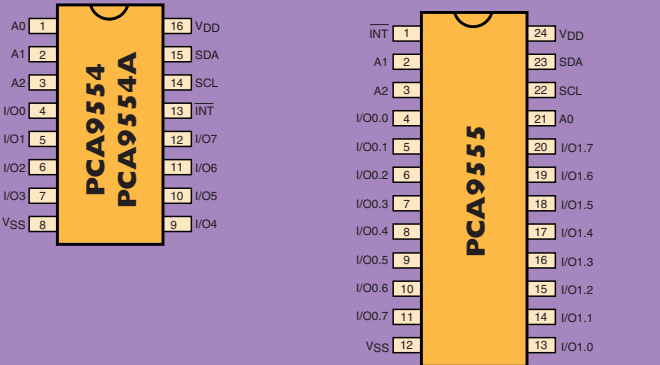
### Part Type Description

The PCA9554 and PCA9554A are 16-pin CMOS devices that provide 8 bits of General Purpose parallel Input/Output (GPIO) expansion for I<sup>2</sup>C/SMBus applications. These I/O expanders provide a simple solution when additional I/O is needed for ACPI power switches, sensors, pushbuttons, LEDs, fans, etc. The parts consist of an 8-bit Configuration register (Input or Output selection); 8-bit Input register, 8-bit Output register and an 8-bit Polarity inversion register (Active high or Active low operation). The PCA9555 is a 24-pin CMOS device, which provides 16 bits of GPIO and consists of two 8-bit Configuration, Input, Output and Polarity inversion registers.

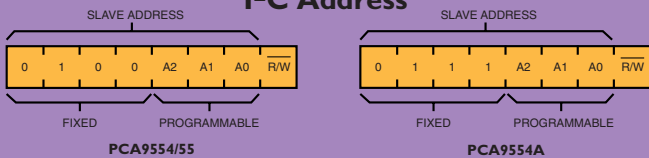
The system master can enable the PCA9554/54A/55 I/Os as either inputs or outputs by writing to the I/O configuration bits. The data for each Input or Output is kept in the corresponding Input or Output register. The polarity of the read register can be inverted with the Polarity Inversion Register. All registers can be read by the system master. Although pin to pin and I<sup>2</sup>C address compatible with the PCF857X series, software changes are required due to the enhancements and are discussed in Application Note AN469. The PCA9554/54A/55 open-drain interrupt output is activated when any input state differs from its corresponding input port register state and is used to indicate to the system master that an input state has changed. If an external hardware reset is needed, the PCA9556/57 should be used.

Three hardware pins (A0, A1, A2) vary the fixed I<sup>2</sup>C address and allow up to eight devices to share the same I<sup>2</sup>C/SMBus. The PCA9554A is identical to the PCA9554 except that the fixed I<sup>2</sup>C address is different allowing up to sixteen of these devices (eight of each) on the same I<sup>2</sup>C/SMBus. The fixed I<sup>2</sup>C address of the PCA9555 is the same as the PCA9554 allowing up to eight of these devices in any combination to share the same I<sup>2</sup>C/SMBus.

### Pin Configurations



### I<sup>2</sup>C Address



### Order Information

Package	Container	PCA9554	PCA9554A	PCA9555
SO	Tube	PCA9554D	PCA9554AD	PCA9555D
	T & R	PCA9554D-T	PCA9554AD-T	PCA9555D-T
SSOP	Tube	PCA9554DB	PCA9554ADB	PCA9555DB
	T & R	PCA9554DB-T	PCA9554ADB-T	PCA9555DB-T
TSSOP	Tube	PCA9554PW	PCA9554APW	PCA9555PW
	T & R	PCA9554PW-T	PCA9554APW-T	PCA9555PW-T

### PCA9554/54A/55 Features

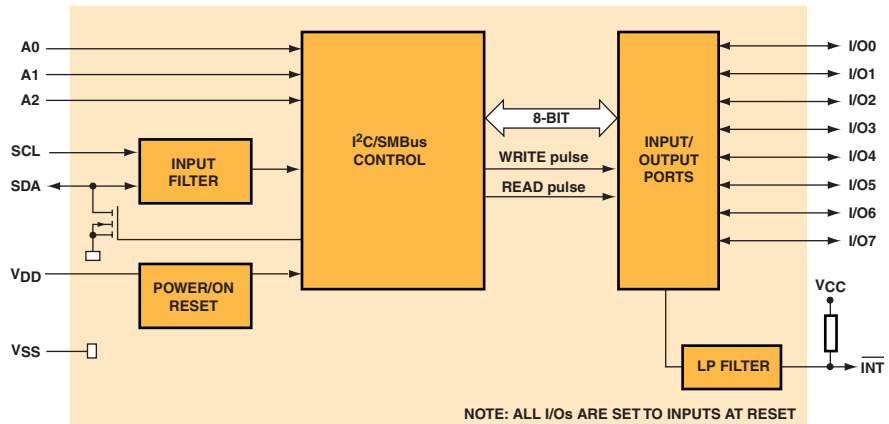
- I<sup>2</sup>C and SMBus compatible
- 8 or 16 programmable I/Os compatible with most processors
  - Input or output
  - Push-Pull or open-drain outputs
  - True vs. quasi bi-directional style I/O
- Outputs can directly drive LEDs
  - 25 mA max sink and 10 mA max source per bit
  - Capacity of 100 mA max per 8-bit register
- Open-drain interrupt output activated when input changes state
- Low I<sub>DDH</sub> standby current of 1.5 µA max
- 5 V tolerant I/Os
- Offered in SO Wide (D), SSOP (DB) and TSSOP (PW)
- Manufactured in high-volume CMOS process

### PCA9554/54A/55 Operating Characteristics

- 2.3 V to 5.5 V operating voltage
- -40 to 85 °C operating temperature range
- 0 to 400 kHz clock frequency

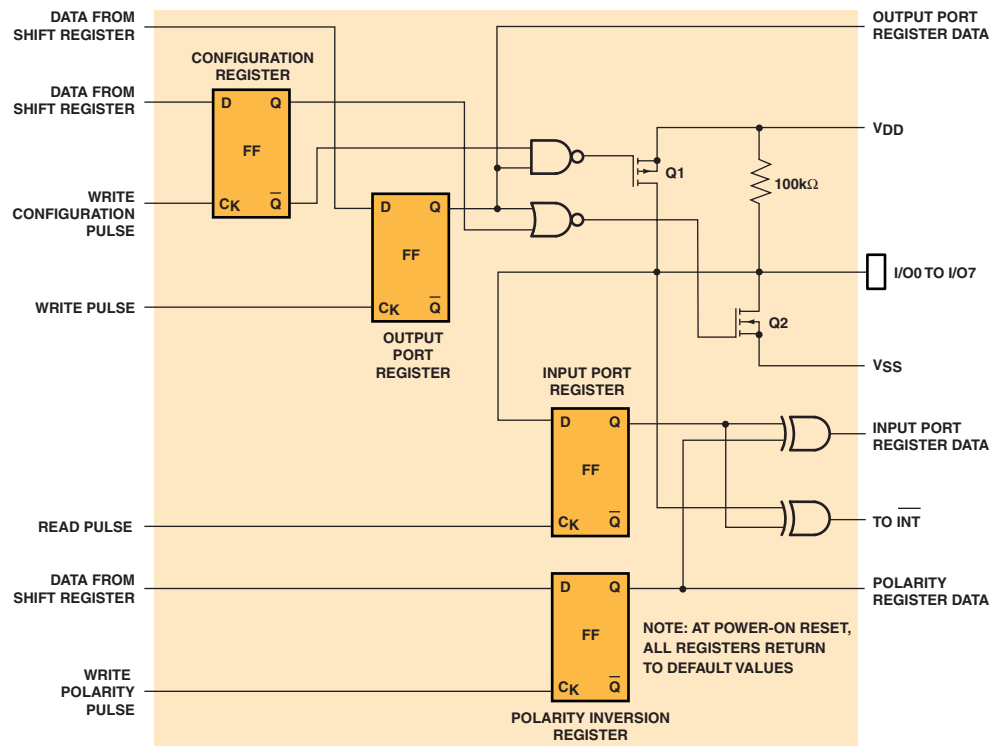
## Block Diagram

The PCA9554/54A and PCA9555 functional diagram and I/O schematic are identical except that the PCA9555 has two 8-bit blocks of I/O.



## Simplified Schematic of I/O0 to I/O7

The PCA9554/54A/55 feature outputs that sink 25 mA and source 10 mA while quasi bi-directional outputs sink 25 mA but limit the source current to only 100  $\mu$ A.



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