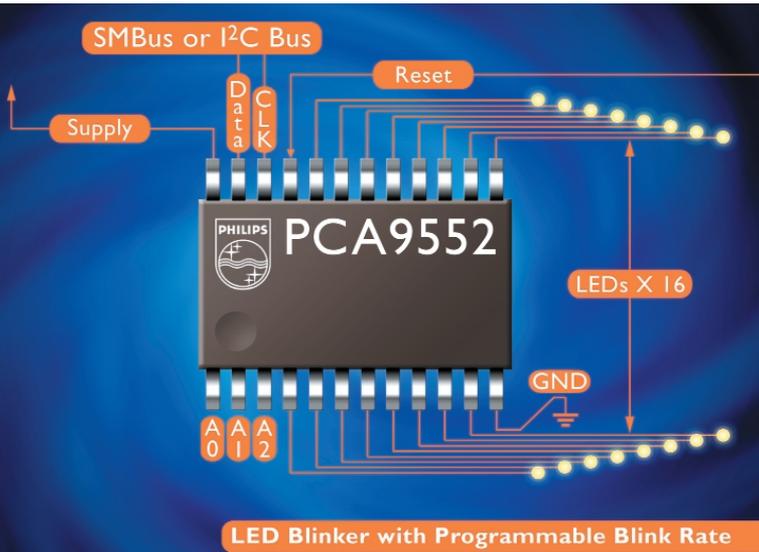




Philips Configuration System Management ICs

PCA9550/51/52

2, 8 and 16-bit I²C and SMBus LED Blinkers with Reset



LED Blinker with Programmable Blink Rate

The PCA9550/51/52 are I²C & SMBus I/O expanders optimized for blinking LEDs. Two user programmable blink rates (from 0.025 sec to 6.4 sec) and duty cycles (from 0% to 99.6%) allow blinking of LEDs without overloading the bus or tying up the I²C Master timer.

Description

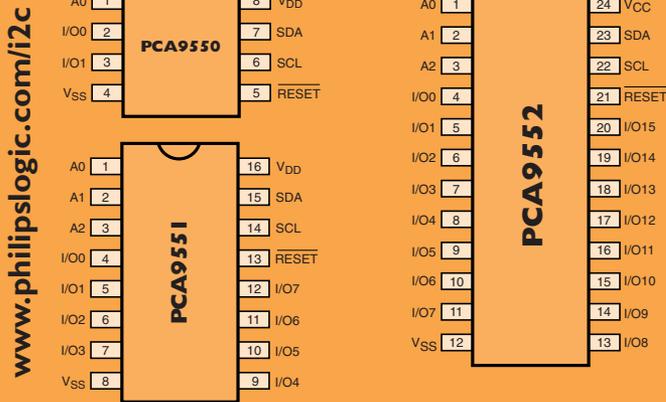
The PCA9550, PCA9551 and PCA9552 blink LEDs in I²C and SMBus applications where it is necessary to limit bus traffic or free up the I²C Master (MCU, MPU, DSP, chipset, etc.) timer. Each LED may be on, off, or flashing at one of two programmable rates. Each flash rate duty cycle is programmable from 0/256 = 0% (output always low or LED always ON) to 255/256 = 99.6% (output almost always Hi-impedance or LED almost always off) and the blink rate can vary between a period of 0.025 sec and 6.4 sec (from 40 Hz to 0.156 Hz). LEDs can also be dimmed by choosing a high blink rate and by varying the duty cycle.

Any bits not used for controlling LEDs can be used for General Purpose Parallel Input/Output (GPIO) expansion. I/O expansion provides a simple solution when additional I/O is needed for ACPI power switches, sensors, pushbuttons, alarm monitoring, LEDs, fans, etc. Philips Semiconductors' full line of GPIO devices is detailed in Application Note AN469.

The three hardware pins (A0, A1, A2) on the PCA9551/52 allow up to eight devices to share the same I²C/SMBus. The single hardware pin (A0) on the PCA9550 allows up to two devices on the same bus.

An external active low hardware reset pin (RESET) is provided on all devices to reset the registers to the default state, should the bus lock up, without having to cycle power to the equipment.

Pin Configurations



I²C Slave Address



PCA9550

PCA9551/52

Order Information

Package	Container	PCA9550	PCA9551	PCA9552
SO	Tube	PCA9550D	PCA9551D	PCA9552D
	T & R	PCA9550D-T	PCA9551D-T	PCA9552D-T
TSSOP	Tube	PCA9550DP	PCA9551PW	PCA9552PW
	T & R	PCA9550DP-T	PCA9551PW-T	PCA9552PW-T

PCA9550/51/52 Features

- I²C and SMBus compatible
- Two User Programmable Blink Rates and Duty Cycles
- Blink rate between 0.025 sec and 6.4 sec (40 Hz to 0.156 Hz)
- Duty cycle between 0% and 99.6%
- Internal oscillator, accurate to +/- 10% and requires no external components
- Open drain outputs can directly drive LEDs
- Maximum of 25 mA sink per bit
- Maximum device limits of 50 mA for the PCA9550, 100 mA for the PCA9551 and 200 mA (100 mA per 8-bit group) for the PCA9552
- Input/Output states readable via I²C/SMBus
- Any bit not used to drive an LED can be used as a normal GPIO
- Active low hardware reset (RESET) or Power On Reset (POR) initializes the registers to their default state, all zeroes, causing all the channels to be deselected
- Low standby current (I_{stb}) of 1.5 µA max
- ESD protection exceeds 2000 V HBM per JESD22-A114,
- 200 V MM per JESD22-A115 and 1000 V CDM per JESD22-C101
- JESDEC Standard JESD78 Latch-up testing exceeds 100 mA
- Offered in SO (D) and TSSOP (DP or PW)
- Manufactured in high-volume CMOS process

PCA9550/51/52 Operating Characteristics

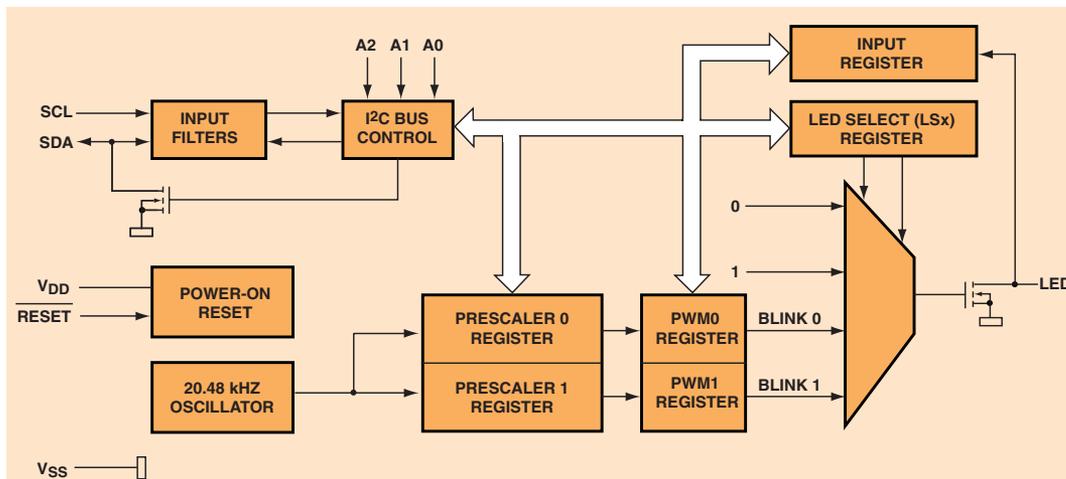
- 2.3 V to 5.5 V operating voltage
- 5.0 V tolerant I/Os
- -40 °C to 85 °C operating temperature range
- 0 kHz to 400 kHz clock frequency

www.philipslogic.com/i2c



The PCA9550/51/52 functional diagram and I/O schematic are identical except for the number of bits and address pins.

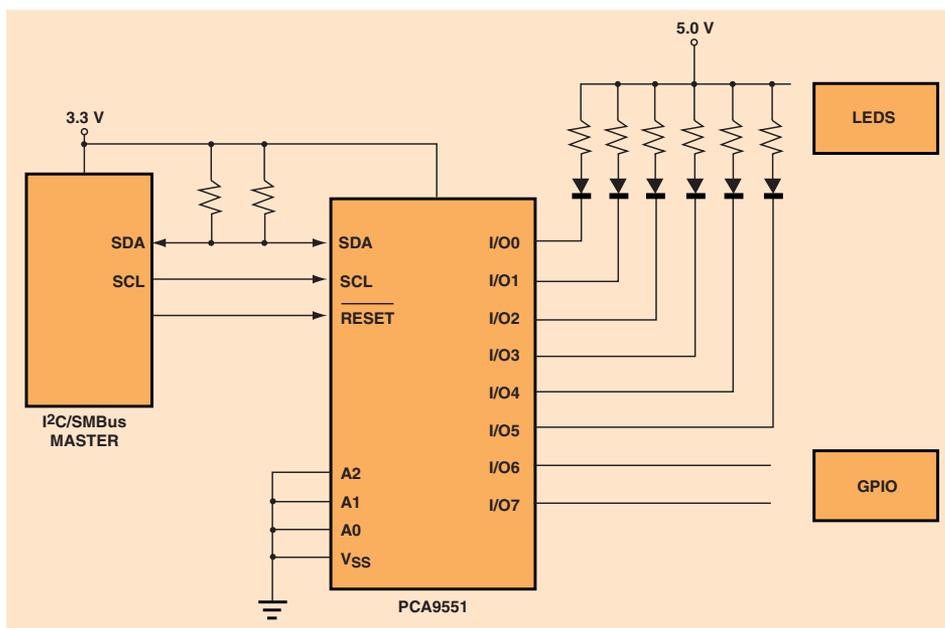
Block Diagram



The LED Blinkers feature open drain outputs that sink 25 mA per bit with a maximum of 50 mA for the PCA9550, 100 mA for the PCA9551 and 200 mA (100 mA per 8-bit group) for the PCA9552.

Any bits not used to control LEDs can be used as normal general purpose I/O bits.

Typical Applications



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