SENSYLINK Microelectronics

(CA9538)

Low-Voltage 8-bit I²C/SMBus I/O Expander with Interrupt Output and Reset

CA9538 is an 8-bit remote I/O expander with Interrupt output, Reset and Configuration Registers. It provides remote GPIO expansion for most MCU families via the I²C or SMBus interface. It is ideally used in Server and Telecom equipment.

1. Description

The chip is an 8-bit I/O expander. It provides remote GPIO expansion for most MCU families via the I²C or SMBus interface. The CA9538 has 8-bit Input Port register, Output Port register, Configuration register (setup as input or output), and Polarity Inversion register (active high or active low). After power on, the 8 I/O pins are configured as inputs. However, the master can enable the I/O pins as either inputs or outputs individually by setup the configuration register bits. The data for each input or output is stored in the corresponding input or output port resister. The polarity of the Input Port register can be inverted with the Polarity Inversion register. All registers can be read by the master.

The master can reset the chip using the power-on reset feature or setting $\overline{\text{RESET}}$ pin as low, which resets all registers in their default state and initializes the I²C/SMBus state machine.

The chip open-drain interrupt ($\overline{\text{INT}}$) 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.

Two hardware pins (A0 and A1) vary the fixed I²C-bus address.

Available Package: TSSOP-16 package.

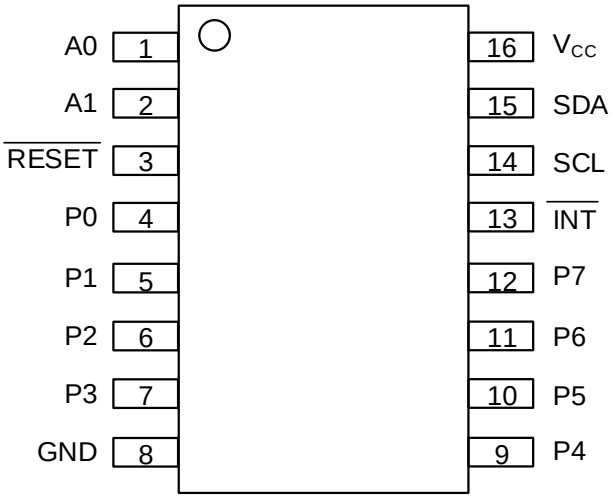
2. Features

- Operation Voltage: 1.65V to 5.5V
- Standby Current: 1.5uA (@Vcc=5.5V)
- 5.5 V Tolerance I/O Port
- Remote 8-bit GPIO Expander
- Compatible with SMBus and I²C interface
- I²C Speed up to 1.0MHz (Fast Mode Plus)
- Up to 4 slave addresses
- Interrupt output with active low
- Input, Output and Configuration Register
- Polarity Inversion Register
- Built-in Power-on Reset
- Reset input with active low
- No Glitch during Power-up
- Noise Filter on SCL/SDA inputs
- 8 I/O pins
  - As Input without internal pull-up resistor (default)
  - As Output with internal push-pull
- Latch feature when driving LEDs directly with high current capability
- Temperature Range: -40°C to 85°C

3. Application

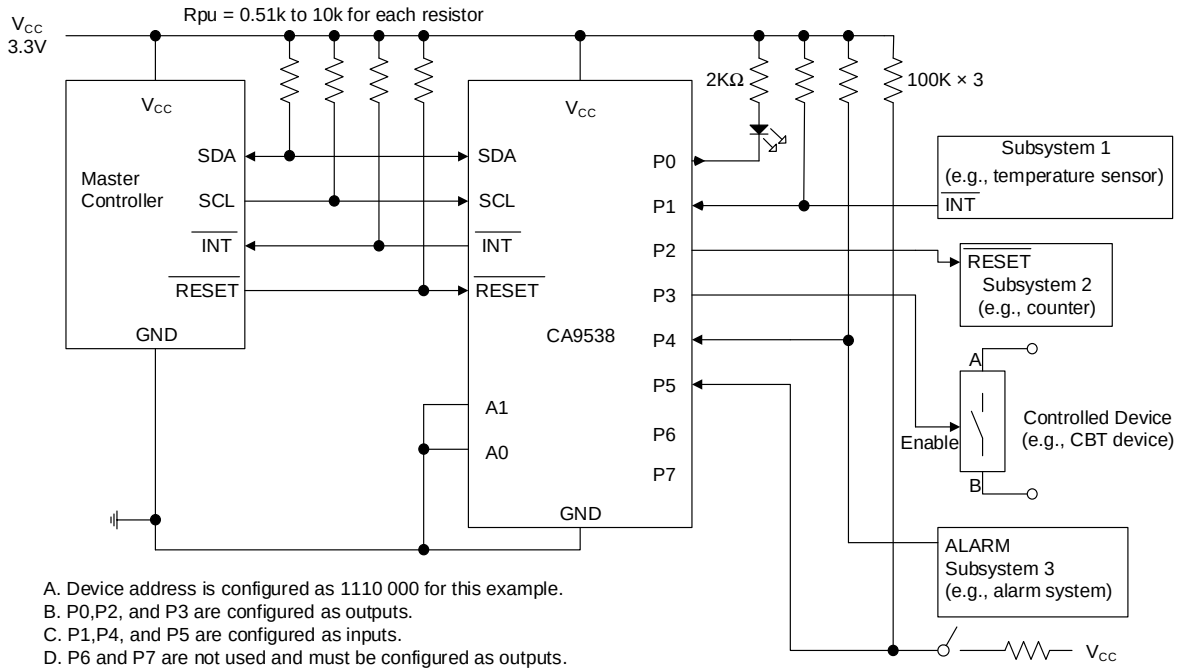
- Server, Notebook PC
- Telecom equipment

4. Pin Configuration (Top View)



TSSOP-16 (Package Code MT)

5. Typical Application



A. Device address is configured as 1110 000 for this example.
B. P0,P2, and P3 are configured as outputs.
C. P1,P4, and P5 are configured as inputs.
D. P6 and P7 are not used and must be configured as outputs.

Figure 1 Typical Application of CA9538

6. Pin Description

Pin Name	Pin No.	Description
A0	1	Slave addresses setup pins, which can generate 4 kinds of slave addresses by connecting these pins to GND or V_{CC} respectively.
A1	2	
$\overline{RESET}$	3	Active-low reset input. Connect to V_{CC} through a pullup resistor if no active connection is used.
P0	4	GPIO bit0, input/output: push-pull structure; default as input after power on.
P1	5	GPIO bit1, input/output: push-pull structure; default as input after power on.
P2	6	GPIO bit2, input/output: push-pull structure; default as input after power on.
P3	7	GPIO bit3, input/output: push-pull structure; default as input after power on.
GND	8	Ground pin.
P4	9	GPIO bit4, input/output: push-pull structure; default as input after power on.
P5	10	GPIO bit5, input/output: push-pull structure; default as input after power on.
P6	11	GPIO bit6, input/output: push-pull structure; default as input after power on.
P7	12	GPIO bit7, input/output: push-pull structure; default as input after power on.
$\overline{INT}$	13	Interrupt output. Connect to V_{CC} through a pullup resistor.
SCL	14	Digital interface clock input pin, need a pull-up resistor to V_{CC}.
SDA	15	Digital interface data input or output pin, need a pull-up resistor to V_{CC}.
V_{CC}	16	Power supply input pin, using 0.1μF low ESR ceramic capacitor to ground.

7. Function Block

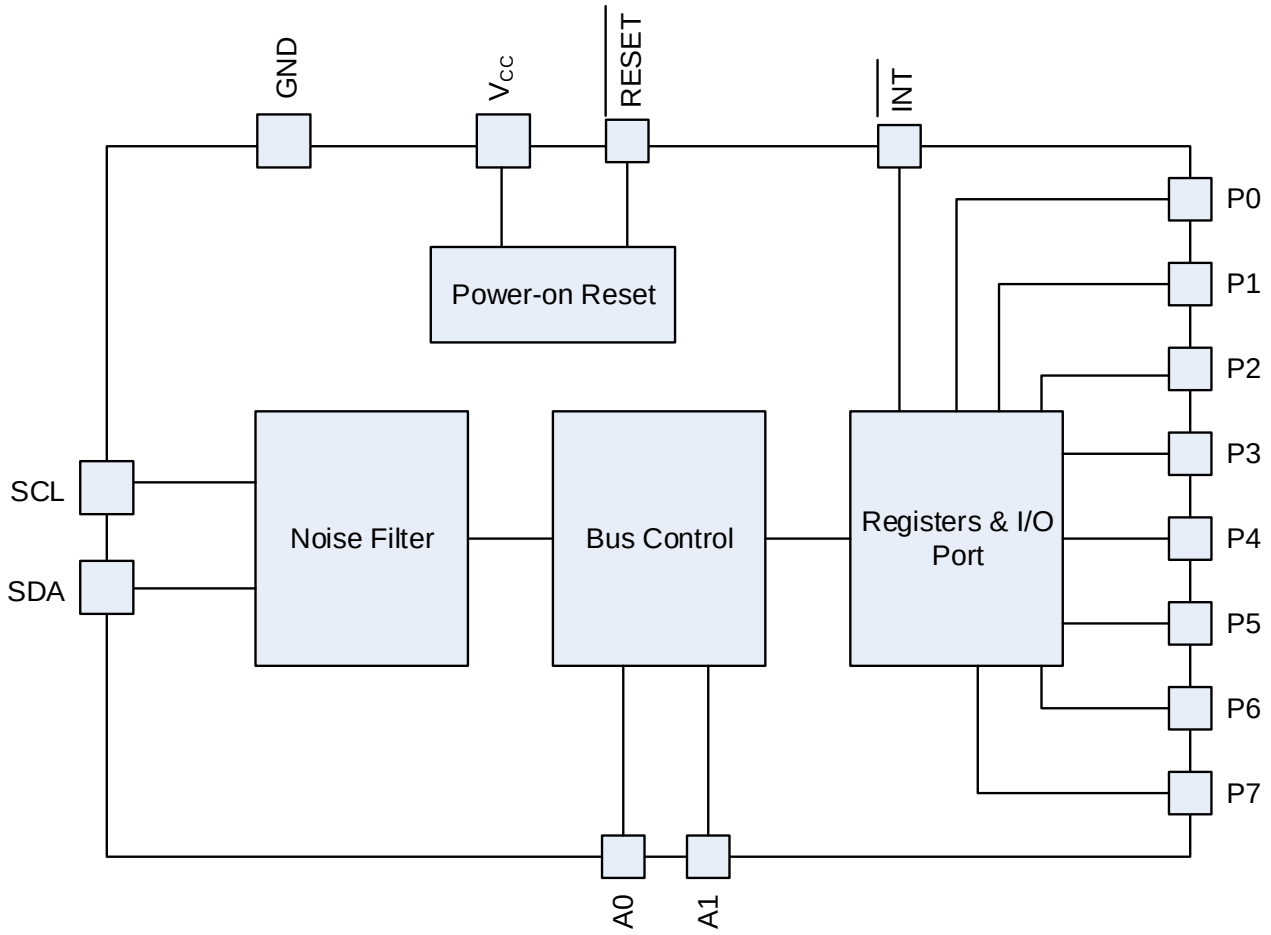
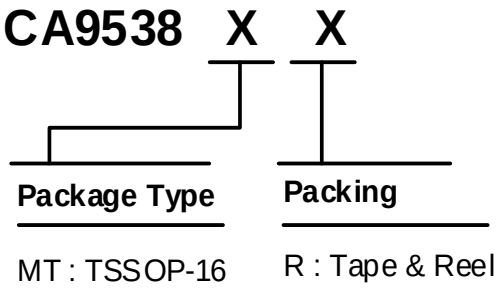


Figure 2 CA9538 Function Block

8. Ordering Information



Order PN	Green[1]	Package	Marking ID[2]	Packing	MPQ	Operation Temperature
CA9538MTR	Halogen free	TSSOP-16	9538 YWWAXX	Tape & Reel	4,000	-40°C to 85°C

Note
1. Based on ROHS Y2012 spec, Halogen free covers lead free. So most package types Sensylink offers only states halogen free, instead of lead free.
2. Marking ID includes 2 rows of characters. In general, the 1st row of characters are part number, and the 2nd row of characters are date code plus production information.

SENSYLINK Microelectronics Inc.

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