



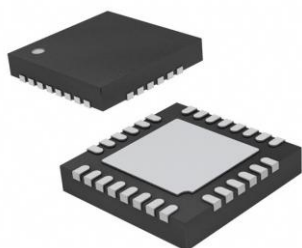
Serial Controlled, 16-Channel SPCO Switch

FEATURES

- ◆ 16 individually serial controlled SPCO switches
- ◆ SPI-compatible serial interface
- ◆ multiple devices can be daisy chained
- ◆ compact 28-Pin package: QFN-28

Applications

- Electronic music
- Instrumentation
- Signal Routing
- Audio commutation
- Data Acquisition and Process Control



QFN-28 5x5 mm 0,5 mm

General Description

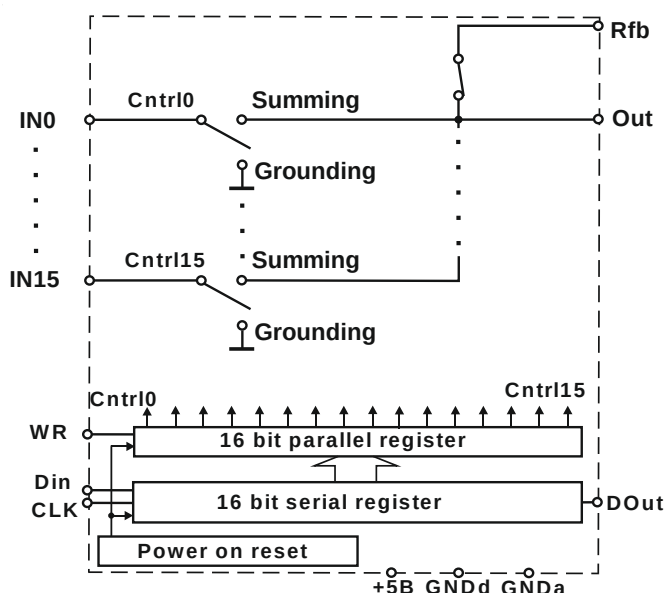
The AS16M1 analog switch with serial digital interface offers 16 individually controlled single-pole-change-over (SPCO) switches. All switches conduct equally in either direction and on-resistance (170 Ω) is constant over the analog signal range.

These CMOS switches can operate continuously with power supply +5V and switch input currents in any combination to output node (summing) or ground them.

Upon power-up, all summing switches are off, grounding switches are on and the internal serial and parallel shift registers are reset to zero.

The AS16M1 is controlled by a serial interface. The interface is compatible with the SPI interface standard.

Block Diagram

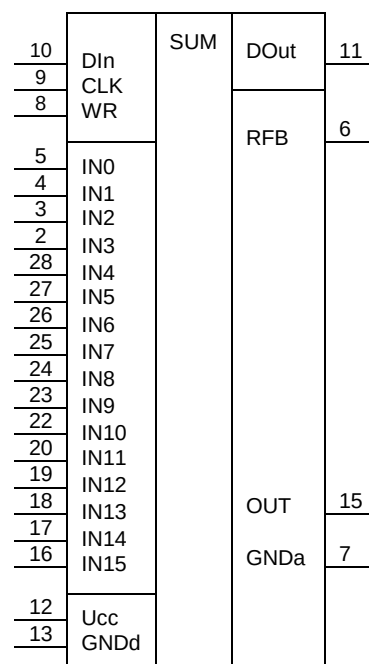


Pin Information

Pin on package	Function	Pin on package	Function
1, 14, 21	NC	15	OUT
2	IN3	16	IN15
3	IN2	17	IN14
4	IN1	18	IN13
5	IN0	19	IN12
6	RFB	20	IN11
7	GNDa	22	IN10
8	WR	23	IN9
9	CLK	24	IN8
10	DIn	25	IN7
11	DOut	26	IN6
12	Ucc	27	IN5
13	GNDd	28	IN4

Absolute Maximum Ratings

Ucc to GND	-0,3V to +6V
Power Dissipation	50mW
Current through summing/grounding switch	-1mA to +2 mA
Current through Rfb	-1mA to +2mA
URfb	-0,3V to +0,3V
Operating Temperature Range AS16M1	- 40°C to 85°C
Maximum Junction Temperature	150°C
Storage Temperature Range	- 65°C to 150°C





DC ELECTRICAL CHARACTERISTICS

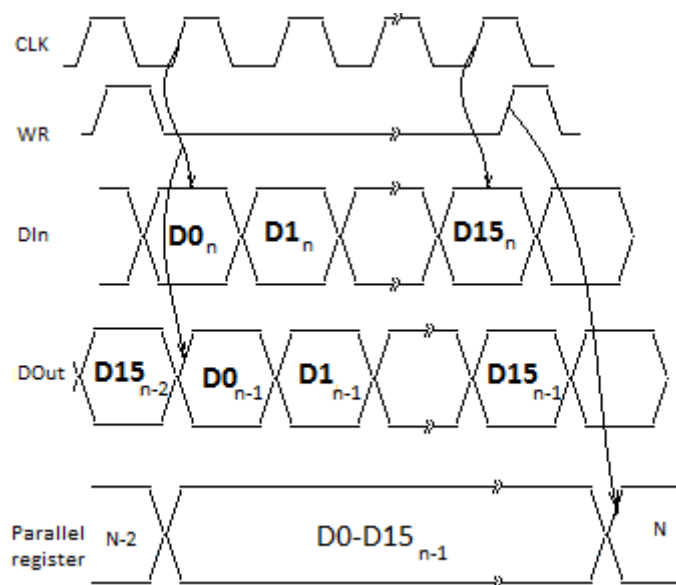
$U_{cc} = +5V$. Typical values are at $T_A = +25^\circ C$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
SWITCH						
Input Analog Signal Range	I _{ANALOG}	$U_{cc}=5V, U_{IN}=5V$	-1		+2	mA
Resistance of summing switch	R _{SUM}	$U_{cc}=5V, I_{SUM}=1\text{ mA}$		100	150	Ohm
Current through summing switch	I _{SUM}	$U_{cc}=5V, U_{IN}=5V$	-1 ²⁾		+2 ²⁾	mA
Resistance of grounding switch	R _{GROUND}	$U_{cc}=5V, I_{GROUND}=1\text{ mA}$		200	250	Ohm
Current through grounding switch	I _{GROUND}	$U_{cc}=5V, U_{IN}=5V$	-1 ²⁾		+2 ²⁾	mA
Current through R _{fb}	I _{RFB}	$U_{cc}=5V, U_{IN}=5V$	-1 ²⁾		+2 ²⁾	mA
DIGITAL I/O						
Din, CLK, WR Input Logic Threshold High	U _{IH}		2/3 U _{cc}			V
Din, CLK, WR Input LogicThreshold Low	U _{IL}				1/3U _{cc}	V
OUT Output Voltage Logic High	U _{DOUT}	I _{DOUT} = 0,8mA	3,5		U _{cc}	V
OUT Output Voltage Logic Low	U _{DOUT}	I _{DOUT} = -1,6mA			0,4	V
U _L RESET Voltage	U _{LL}	(Note 1)	TBD			V
U _h RESET Voltage	U _{LH}				TBD	V
SWITCH DYNAMIC CHARACTERISTICS						
Turn-On Time	t _{ON}	From rising edge of WR			400	ns
Turn-Off Time	t _{OFF}	From rising edge of WR			400	ns
Maximum frequency	F _{clk}				20	MHz
POWER SUPPLIES						
Power-Supply Voltage Range	U _{cc}		4,5		5,2	V
U _{cc} Supply Current	I _{cc}	U _{IL} / U _{IH} (Din, CLK, WR) = 0V/5V			1	mkA

Note 1: When U_L falls below this voltage internal shift and parallel registers are cleared (all zero), summing switches closed and grounding switches are open.

Note 2: Sum of all currents trough Input must not exceed limitation for Current through R_{fb} limitation.

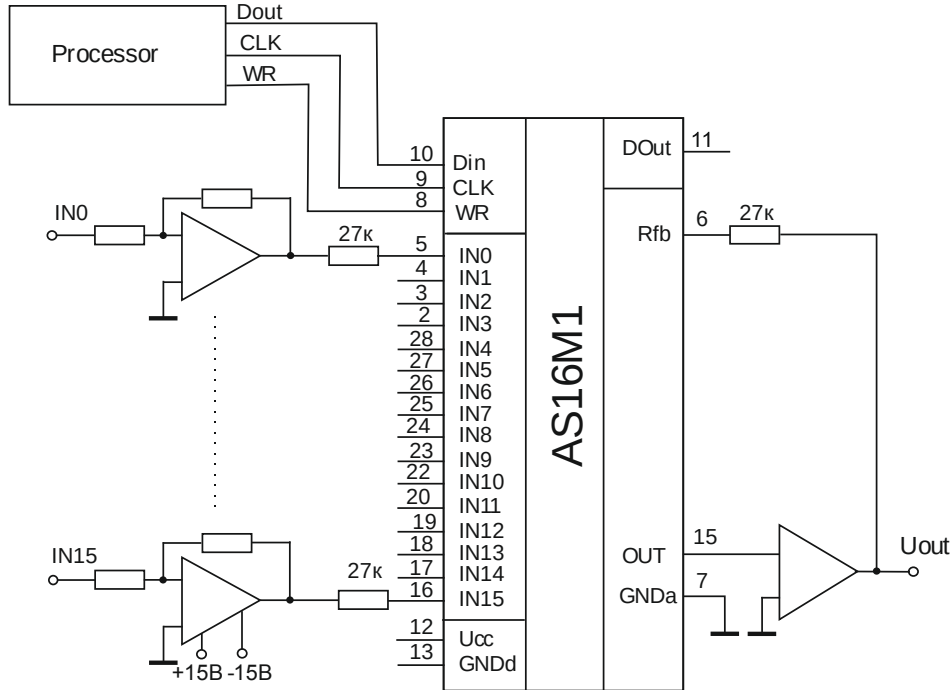
Timing Diagram



Application examples:

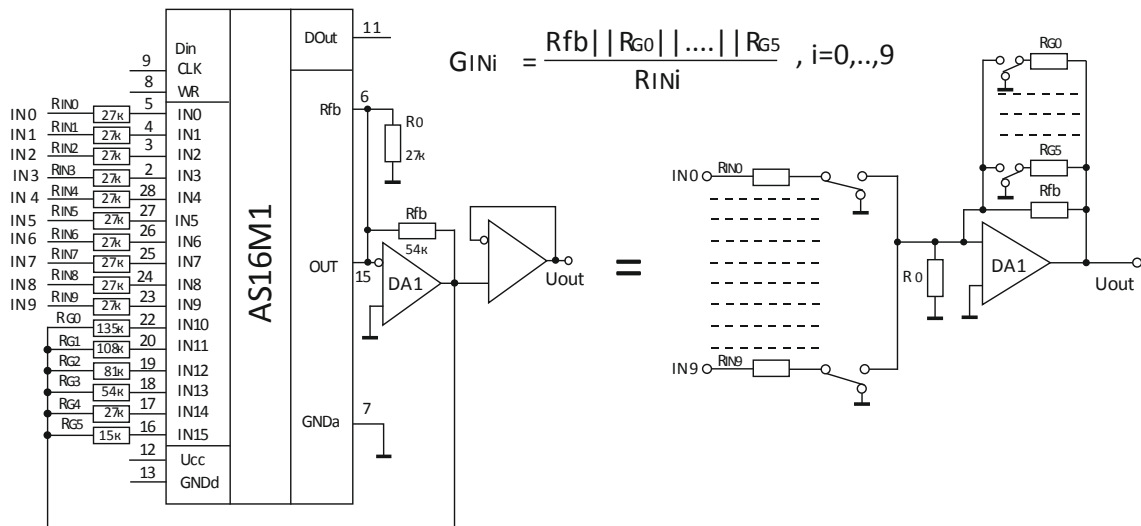
1. Summing and amplification of signals:

$$U_{out} = \sum_{i=0}^{15} (K_i \cdot IN_i); K_i = 0,1; i=0,...,15$$



2. Summing and programmable gain of signals:

$$U_{out} = \sum_{i=0}^9 (K_i \cdot G_{INi} \cdot IN_i); K_i = 0,1; i=0,...,9$$



Example - summing of any combination of signals IN0-IN9 with programmable gain.

Programmable gain is determined by Rx (input resistor) for any input and by feedback resistor which is formed from parallel connection of Rfb and connected in parallel any combination of resistors RG0-RG5 (64 combinations - levels of gain).

Resistor R0 is required to provide a zero signal when all inputs are disconnected.

Note: grounding of RGx will increase load current for operational amplifier.

Package Information

QFN-28 5x5 mm 0,5 mm

