Automotive Electronics

Product Information
Satellite Sensor Interface IC - CG974

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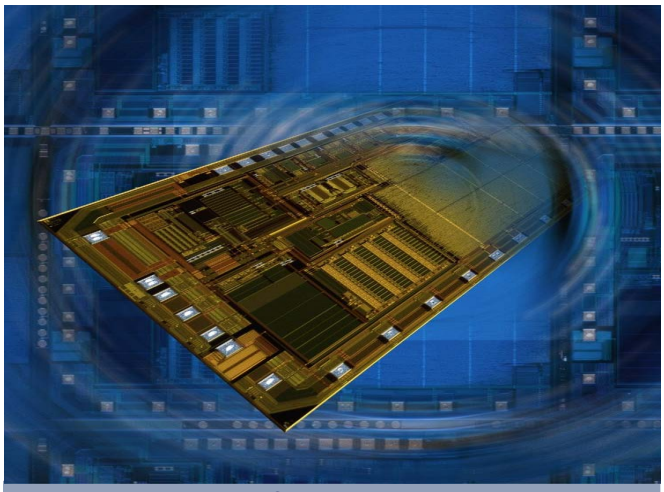


Satellite Sensor Interface IC

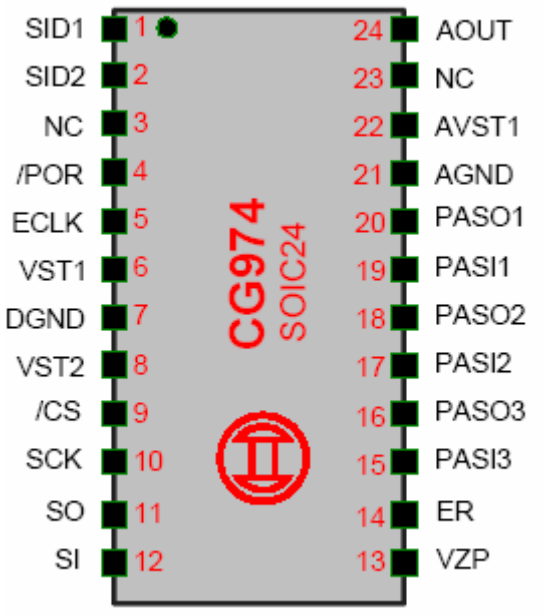
Features

- 3 channel satellite sensor interface
- Sensor supply
- PAS3- and PAS4 protocol compatible data receiver
- 2 SID inputs (SID1,SID2) for sensor indication purposes
- All functions controlled via 8MHz, 16 bit bi-directional SPI
- Analogue output for sensor supply monitoring
- 5V/3.3V systems compatibility
- Cascadable
- SOIC24 package

Customer benefits:

- Excellent system know-how
- Smart concepts for system safety
- Secured supply
- Long- term availability of manufacturing processes and products
- QS9000 and ISO/TS16949 certified

PIN Configuration

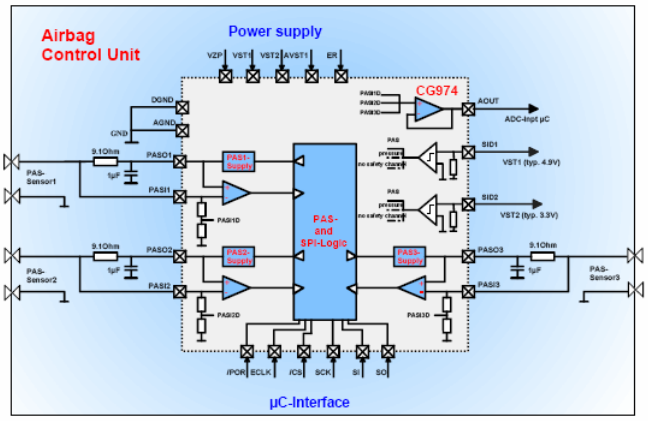


Following the successful implementation of the CG570 dual stand alone satellite sensor interface IC, BOSCH Automotive Electronics will move along with the introduction of a highly integrated version of a satellite sensor interface IC with 3 integrated channels for peripheral acceleration sensors (PAS). The CG974 is being designed by utilizing leading-edge automotive ASIC processes with 0.8 um feature size. The superior performance with respect to precision and reliability and the well-proven safety concept of its predecessors will be combined with a variety of new features as required by the quickly evolving next generations of electronic safety systems:

Pin description

No	Name	Description
1	SID1	Safety ID of sensor pair PAS 1 and PAS 2
2	SID2	Safety ID of sensor PAS 3
3	NC	Not connected
4	/POR	Power on reset (active low)
5	ECLK	System clock (2MHz)
6	VST1	VST1 supply voltage
7	DGND	Digital ground
8	VST2	VST2 supply voltage
9	/CS	Chip select (active low)
10	SCK	Serial clock (SPI)
11	SO	Slave out (SPI)
12	SI	Slave in (SPI)
13	VZP	Protected supply voltage
14	ER	Energy reserve supply voltage
15	PASI3	Comparator input PAS3
16	PASO3	PAS3 supply output
17	PASI2	Comparator input PAS2
18	PASO2	PAS2 supply output
19	PASI1	Comparator input PAS1
20	PASO2	PAS1 supply output
21	AGND	Analogue ground
22	AVST1	AVST1 supply voltage
23	NC	Not connected
24	AOUT	Analogue output

Application example



Note: In this application PAS sensors are connected to PAS-Channel 1+2 (SID1=4.9V), a pressure sensor is connected to PAS-Channel 3 (SID2=3.3V)

SID Inputs

CG974 has two hardware programmable SID inputs for sensor indication purposes. Different sensor types can be distinguished by applying dedicated voltage levels at SIDx.

PAS Protocol

Communication between the PAS and central unit is asynchronous and is started every TPAS. The duration of a PAS communication is T_{Tran}.
The transfer is accomplished using Manchester Code, and there is a flank change in the bit centre respectively. A logical 0 has a rising current flank, a logical 1 has a dropping current flank in the bit centre.
It takes T_{Bit} to transfer a bit.
A PAS3 data frame (please refer to Figure 1: Timing diagram PAS3 communication) consists of 11 bits transferred in the following form:
2 start bits, 8 data bits, 1 parity bit (even parity).

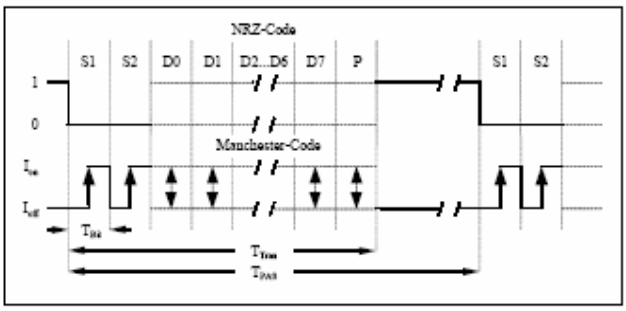


Figure 1: Timing diagram PAS3 communication

A PAS4 data frame (please refer to Figure 2: Timing diagram PAS4 communication) consists of 13 bits transferred in the following form:
2 start bits, 10 data bits, 1 parity bit (even parity).

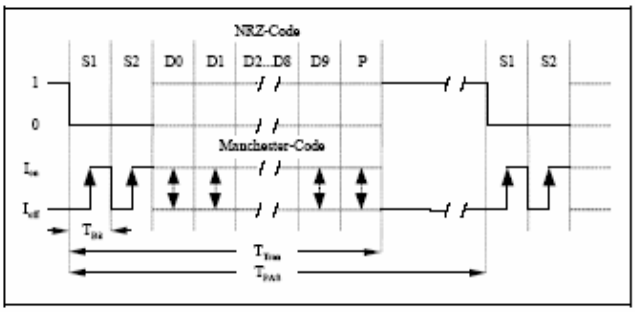


Figure 2: Timing diagram PAS4 communication

Maximum ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltages	V_{ER}	-0.3		36	V
	V_{VZP}	-0.3		36	V
	V_{ST1}	-0.3		7	V
	V_{AVST1}	-0.3		7	V
	V_{ST2}	-0.3		7	V
Digital ground	V_{DGND}	-0.3		0.3	V
PAS output	V_{PASOx}	-0.3		18	V
PAS input	V_{PASIx}	-0.3		18	V
Junction temperature	T_j	-40		150	°C
Operating temperature	T_{amb}	-40		105	°C
ESD classification Human body, C=100pF, R=1.5kOhm	V_{HBM}	-2000		2000	V

Electrical characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltages	V_{VZP}	5.2	14	20	V
	V_{ER}	V_{ZPmin} +5	33	35	V
	V_{VST1}	4.7	4.9	5.1	V
	V_{AVST1}	4.7	4.9	5.1	V
	V_{VST2}	3.1	3.3	5.1	V
Sensor supply	V_{PASOx}	5.1	7.9	11	V
Digital IO (ECLK, /POR, SCK, /CS, SI, SO) Low level High Level	 U_{IL} U_{IH}	 2.0	 	 1.0	 V V
Baud rate PAS communication SPI communication	 V_{PAS} V_{SPI}	 	 125	 8	 kBd MBd
PAS Timing Bit duration Transition time PAS3 Transition time PAS4 PAS Repetition rate	 T_{Bit} T_{Tran} T_{Tran} T_{PAS}	 T_{TRAN} + T_{Bit}	 8 88 104 228	 	 µs µs µs µs

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