

Features

- Wide power supply voltage range: +2V to +30V
- Input offset voltage: $\pm 1\text{mV}$ (typ)
- Low supply current: $V_{\text{SUPPLY}} = 30\text{V}$, $0.7\mu\text{A}$ (max) for each channel
- Common mode input voltage range includes grounding
- Low output saturation voltage
- Fast response time: $1.3\mu\text{s}$
- Open drain output
- The output is compatible with TTL, MOS and CMOS
- Working temperature: $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$
- Micro package: SOIC-8 (SOP8), TSSOP8

Applications

- Vacuum robot
- Single phase UPS
- Server PSU
- Cordless power tool
- Wireless infrastructure
- Building automation
- Factory automation & control
- Motor drives

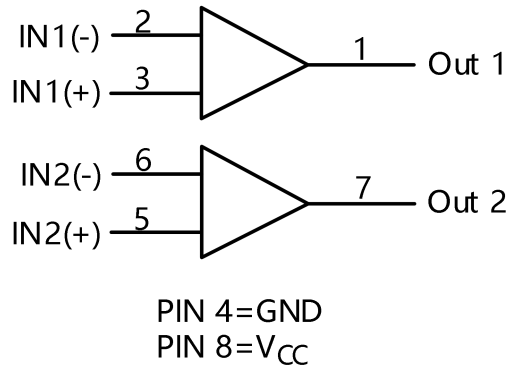
Description

CBM2903 is a dual channel comparator whose output can be connected to other open collector outputs to realize line and logic. It can operate between 2V and 30V, and the power consumption of each channel (typical value) is as low as μA level.

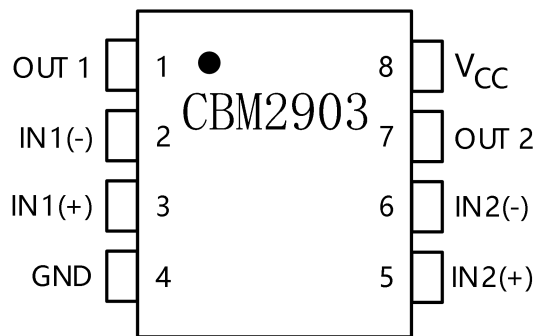
The CBM2903 consists of two independent voltage comparators designed to operate from a single power supply over a wide voltage range. Quiescent current has nothing to do with power supply voltage. For the application of low input offset voltage, high power supply voltage, low power supply current and space saving are the main technical indicators of portable consumer goods circuit design, this device is the most cost-effective solution.

CBM2903 supports green sop-8 and tssop-8 packaging. Its operating temperature range is - 40° C to +125°C.

Logic Diagram



Pin Assignment



SOP-8

PIN_N	SYMBOL/SOP-8 (CBM2903)	I/O	NAME AND FUNCTION
1	OUT 1	O	Output 1
2	IN1 (-)	I	inverting input A
3	IN1 (+)	I	None inverting input A
4	GND	--	Negative power supply
5	IN2 (+)	I	None inverting input B
6	IN2 (-)	I	inverting input B
7	OUT 2	O	Output 2
8	V _{CC}	--	Positive power supply

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Maximum Ratings

Symbol	Parameter	Value	Unit
V_{CC}	Power Supply Voltage		
	Single Supply	36	V
	Split Supplies	± 18	V
V_{IDR}	Input Differential Voltage Range	36	V
V_{ICR}	Input Common Mode Voltage Range (1)	-0.3 to V_{CC}	V
I_{SC}	Output Short Circuit to Ground	Continuous	
I_{IN}	Input Current, per pin (2)	50	mA
T_J	Junction Temperature		
	Plastic Packages	150	$^{\circ}C$
T_{STG}	Storage Temperature	-65 to +150	$^{\circ}C$
T_L	Lead Temperature, 1mm from Case for 10 Seconds	260	$^{\circ}C$
P_D	Power Dissipation @$T_A=25^{\circ}C$		
	Plastic Package	570	mW
	Derate above $25^{\circ}C$	5.7	mW/ $^{\circ}C$

* Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied.

Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability. Functional operation should be restricted to the Recommended Operating Conditions. Notes:

1.Split Power Supplies.

2. $V_{IN} < -0.3V$. This input current will only exist when voltage at any of the input leads is driven negative.

Recommended Operating Conditions (Ta=-40~125°C)

Symbol	Parameter	Min	Max	Unit
V _{CC}	DC Supply Voltage	2	30	V
T _A	Operating Temperature, All Package Types	-40	+125	°C

This device contains protection circuitry to guard against damage due to high static voltages or electric fields. However, precautions must be taken to avoid applications of any voltage higher than maximum rated voltages to this high-impedance circuit. For proper operation, V_{IN} and V_{OUT} should be constrained to the range $GND \leq (V_{IN} \text{ or } V_{OUT}) \leq V_{CC}$.

Unused inputs must always be tied to an appropriate logic voltage level (e.g., either GND or V_{CC}). Unused outputs must be left open.

Electrical Characteristics

$V_{CC} = 5V, T_A = 25^\circ C$ (unless otherwise noted)

Symbol	Parameter	Test Conditions	Guaranteed Limit			Unit
			Min	Typ	Max	
V_{IO}	Input Offset Voltage	$V_0 = 1.4V$ $V_{CC} = 5.0-30V; R_S \leq 100\Omega$ $V_{ICR} = 0V - (V_{CC} - 1.5)V$	-5	--	5	mV
I_{IB}	Input Bias Current	$V_0 = 1.4V, V_{CC} = 5.0-30V$ $V_{ICR} = 0V - (V_{CC} - 1.5)V$	--	--	400	nA
I_{IO}	Input Offset Current	$V_0 = 1.4V, V_{CC} = 5.0-30V$	--	--	± 50	nA
V_{ICR}	Input Common Mode Voltage Range		GN D	--	$(V_{CC} - 1.5)$	V
I_{SC}	Supply Current	$R_L = \infty, V_{CC} = 5.0;$ $R_L = \infty, V_{CC} = 30V$	-	--	1.0	mA
			-	--	2.5	
A_{VD}	Voltage Gain	$V_{CC} = 15V, R_L = 10K\Omega$	70	--	--	dB
R_T	t1	$V_{IN} = \text{TTL Logic Swing}, V_{ref} = 1.4V,$ $V_{CC} = 5.0V, R_L = 5.1\Omega, V_{RL} = 5.0V$	--	300	--	ns
	t2	$V_{CC} = 5.0V, R_L = 5.1K\Omega, V_{RL} = 5.0V$	--	1.3	--	μs
I_{SINK}	Output Sink Current	$V_i(-) = 1.0V, V_i(+) = 0V,$ $V_O \leq 1.5V, V_{CC} = 5.0V$	6.0	--	--	mA
V_{OL}	Low-Level output voltage	$I_{OL} = 4mA, V_{ID} = -1V$	--	110	400	mV
V_{SAT}	Saturation Voltage	$V_i(-) = 1.0V, V_i(+) = 0V,$ $I_{SINK} \leq 4.0mA, V_{CC} = 5.0V$	--	--	700	mV
I_{OH}	High-Level Output Leakage Current	$V_{OH} = 5V, V_{ID} = 1V$	--	0.1	50	nA
I_{OL}	Output Current(sinking)	$V_O = 1.5V; V_{ID} = -1V; V_S = 5V$	--	6	--	mA
		All $V_{IN} \geq \text{GND}$ or V^- Supply (if used)	--	--	V_{CC}	V
V_{IDR}	Differential Input Voltage Range	$V_i(-) = 1.0V, V_i(+) = 0V,$ $V_O \leq 1.5V, V_{CC} = 5.0V$	6.0	--	--	mA

Typical Performance Characteristics

($V_{CC}=1.5V$, $T_A=+25^{\circ}C$, (each comparator))

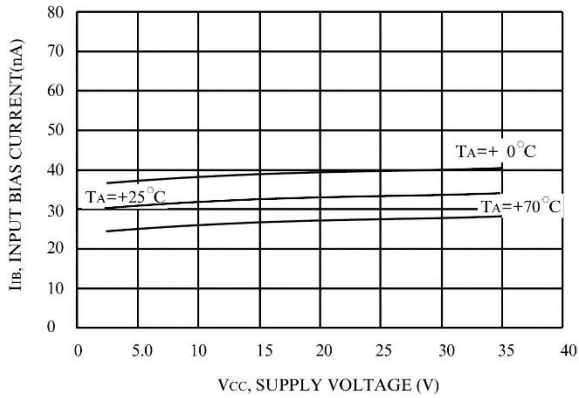


Figure 1. Normalized Input Offset Voltage

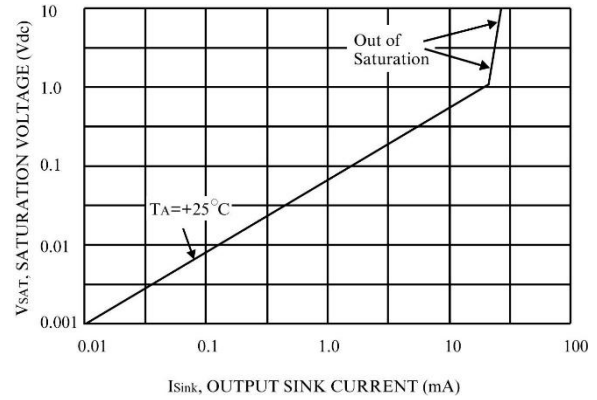


Figure 2. Input Bias Current

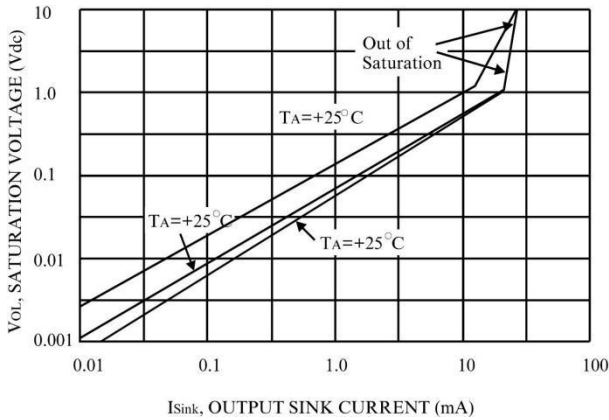


Figure 3. Output Sink Current versus Output Saturation Voltage

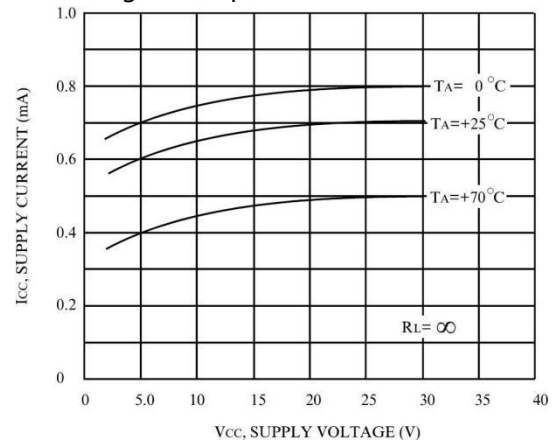
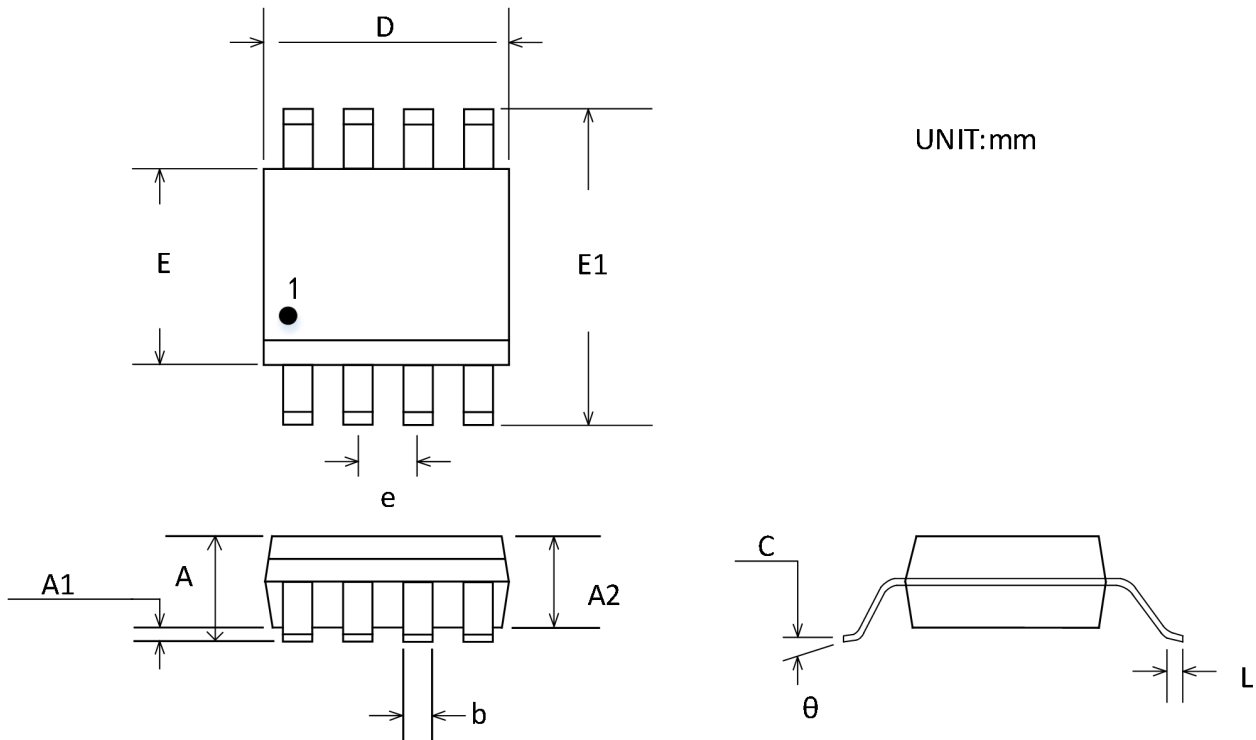


Figure 4. Power Supply Current versus Power Supply Voltage

Package Outline Dimensions

SOIC-8(SOP-8)



Symbol	Dimensions In Millimeters		Dimensions Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 BSC		0.050 BSC	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Package/Ordering Information

ORDERING	TEMPRANGE	PACKAGE	PAKEAGE	TRANSPOT
CBM2903AS8	-40°C~125°C	SOP-8	CBM2903A	Reel, 2500
CBM2903AS8-RL	-40°C~125°C	SOP-8	CBM2903A	Reel, 3000
CBM2903AS8-REEL	-40°C~125°C	SOP-8	CBM2903A	Reel, 4000
CBM2903ATS8	-40°C~125°C	TSSOP-8	CBM2903AT	Reel, 2500
CBM2903ATS8-RL	-40°C~125°C	TSSOP-8	CBM2903AT	Reel, 3000
CBM2903ATS8-REEL	-40°C~125°C	TSSOP-8	CBM2903AT	Reel, 4000