

AN6914UBS

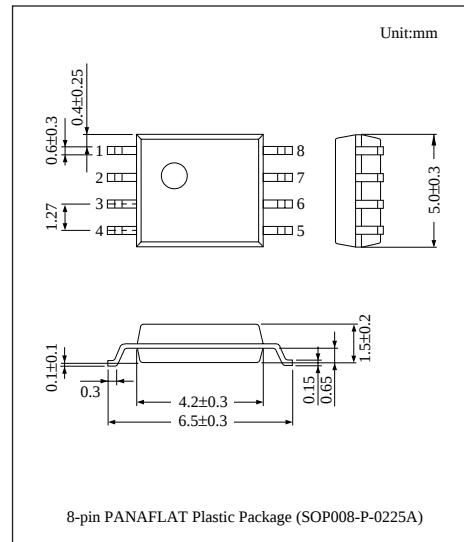
Industrial Surface Mounting Package Comparator

■ Overview

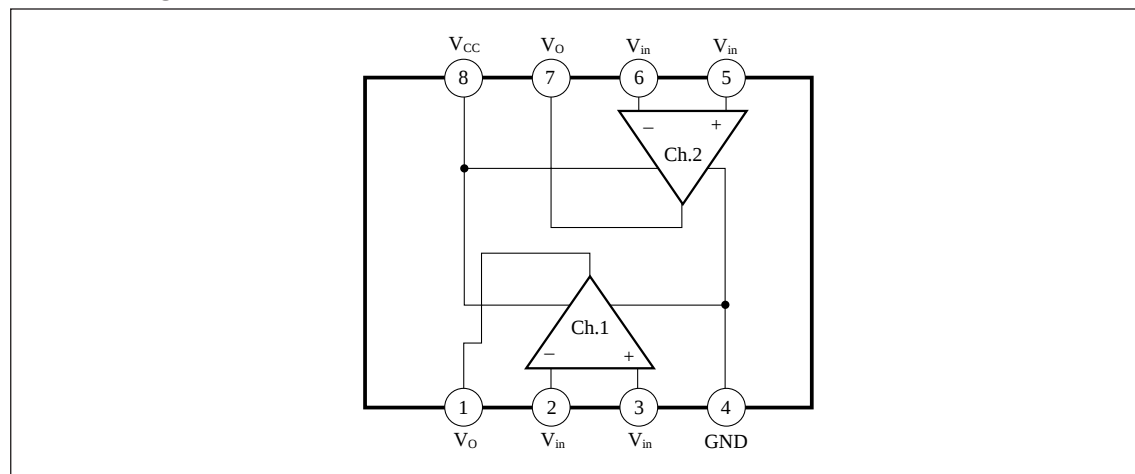
The AN6914UBS is available for automotive and industrial equipments which require high reliability through an enhanced screening process.

■ Features

- Temperature cycle test conducted for all the products
- All the products inspected at $T_a=25^{\circ}\text{C}$ and $=100^{\circ}\text{C}$ to assure the characteristics
- Operating temperature range: -40°C to $+100^{\circ}\text{C}$
- Either of the following types of packing is selectable:
 Embossed taping.....AN6914UBS-(E1)
 Magazine.....AN6914UBS
- Quantity of packed ICs
 AN6914UBS-(E1) 2000 pcs./reel
 AN6914UBS 90 pcs./magazine



■ Block Diagram



■ Absolute Maximum Ratings (Ta=25°)

Parameter	Symbol	Rating	Unit
Supply voltage	V _{CC}	36	V
Common-mode input voltage	V _{ICM}	− 0.3 to +36 *1	V
Differential input voltage	V _{ID}	36 *2	V
Output applied voltage	V ₁ , V ₇	24	V
Power dissipation	P _D	360	mW
Operating ambient temperature	T _{opr}	−40 to +100	°C
Storage temperature	T _{stg}	−55 to +125	°C

*1 The common-mode input voltage is applied to the non-inverting input pin and inverting input pin simultaneously.

*2 Differential input corresponds to the potential difference between the non-inverting input pin and inverting input pin.

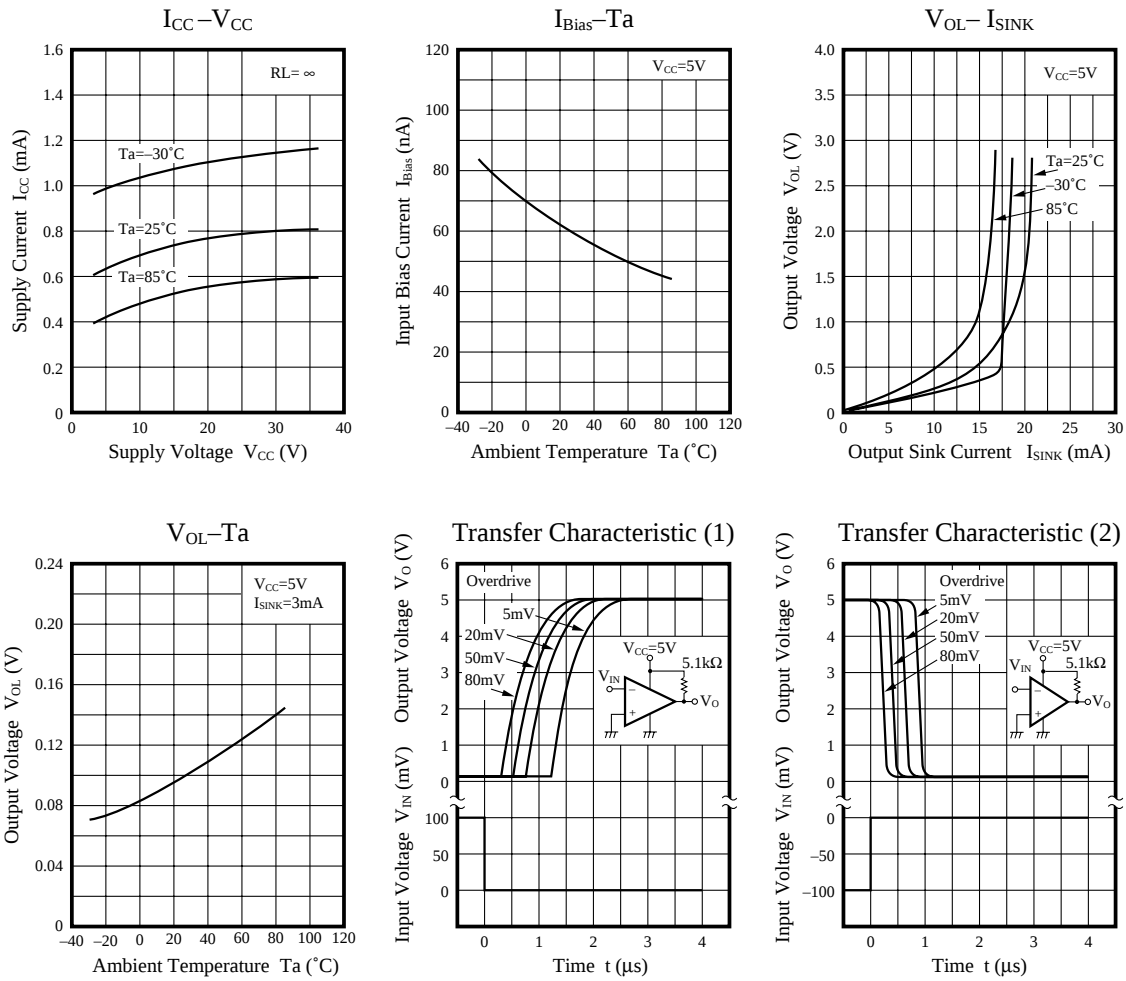
■ Electrical Characteristics (V_{CC}=5V)

Parameter	Symbol	Condition	min *4	typ *3	max *4	Unit
Input offset voltage	V _{I (offset)}		—	1	5	mV
Input offset current	I _{IO}		—	—	50	nA
Input bias current	I _{Bias}		—	—	250	nA
Voltage gain	G _V	R _L =15kΩ	—	200	—	V/mV
Common-mode input voltage width	V _{CM}		0	—	V _{CC} −1.5	V
Supply current	I _{CC}	R _L =∞	—	0.6	1.5	mA
Response time	t _r	R _L =5.1kΩ	—	1.3	—	μs
Output sink current	I _{SINK}	V _{REF} =0V, V _{IN} =1V, V _O ≤1.5V	10	—	—	mA
Output voltage low level	V _{OL}	V _{REF} =0V, V _{IN} =1V, I _{SINK} =3mA	—	0.2	0.4	V
Output pin leak current	I _{O (Leak)}	V _{REF} =1V, V _{IN} =0V, V _O =5V	—	0.1	—	nA

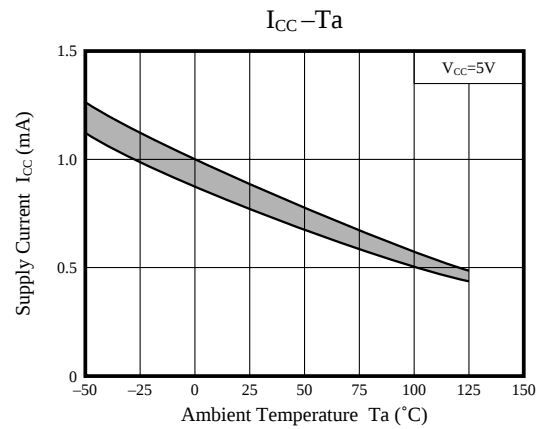
*3 Typical value:Ta=25°C

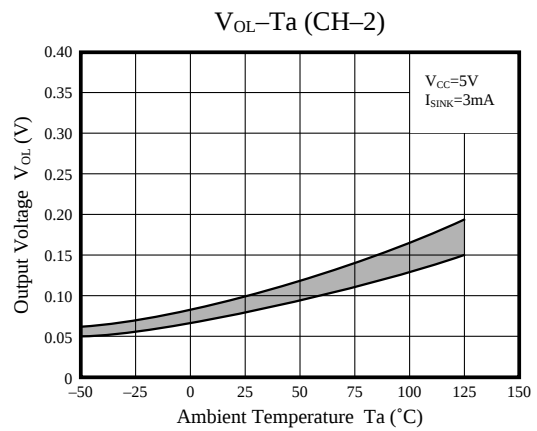
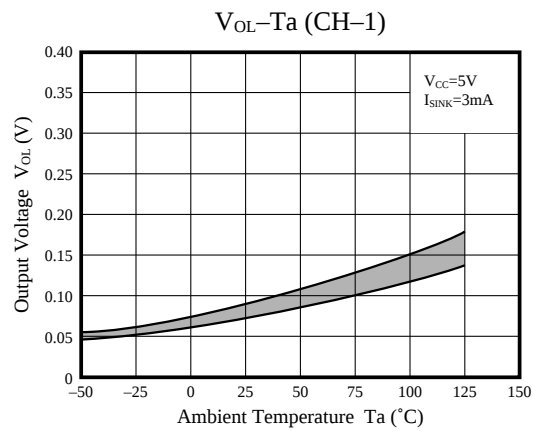
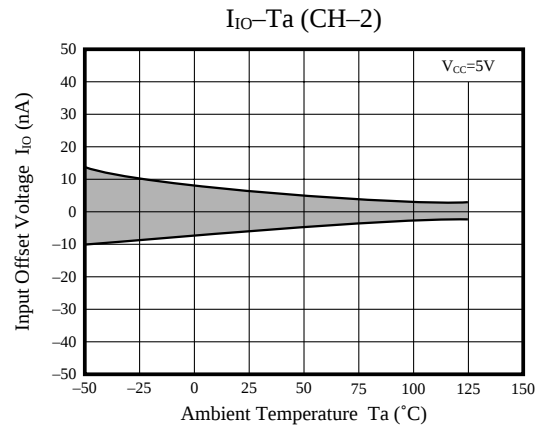
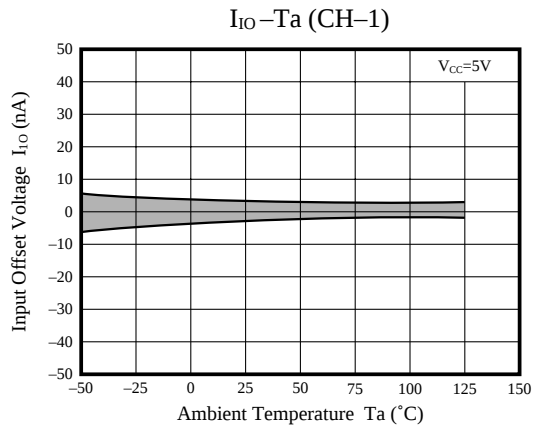
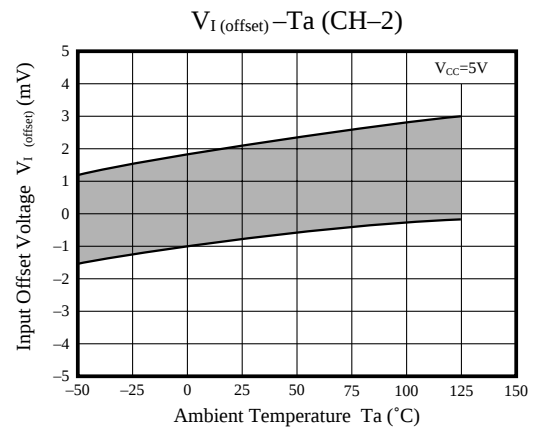
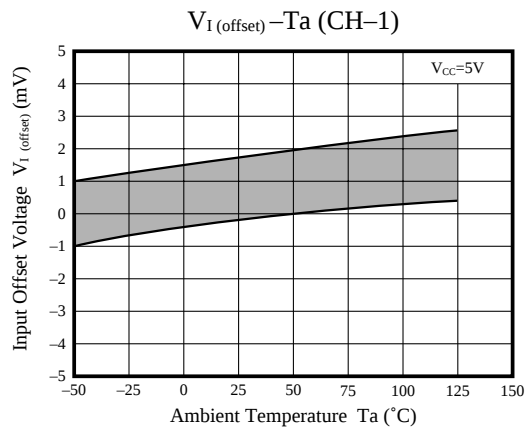
*4 Maximum and minimum values:All the ICs are inspected at two conditional temperatures of Ta=25°C and Ta=100°C to assure the characteristics.

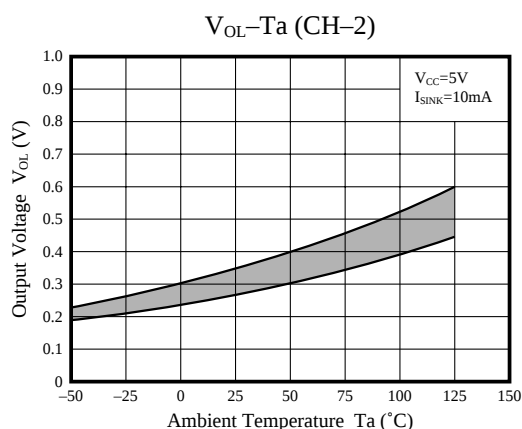
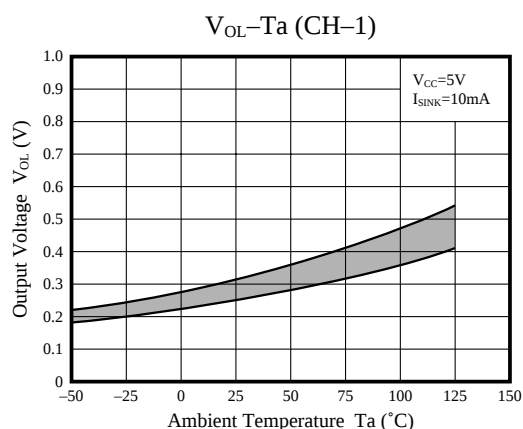
■ Characteristics Curve



■ Characteristics Dispersion Charts







■ Reliability of AN6914UBS

1. Results of Reliability Test

Test item	Test condition	No. of tested pieces	Total test time	No. of failures
High-temperature operation	$T_a=125^{\circ}C$ $V_{CC}=12V$	150	16000	0
Leaving under high temperature	$T_a=125^{\circ}C$	120	3600	0
Thermal shock	$+150^{\circ}C \leftrightarrow -65^{\circ}C$ 500 cycles	160		0
Temperature cycle	$+125 \leftrightarrow -40^{\circ}C$ 10000 cycles	50		0

2. Failure Rate (Refer to JIS-C-5003)

Assuming that the total test time = T (No. of test pieces $\times$ test time) and the No. of failures = r , the failure rate can be calculated by obtaining r/T and multiplying it by the numerical values commensurate with the reliability level and the number of defective ICs.

If the failure rate (FR) is calculated from the results of the above high temperature test of the AN6914UBS, assuming that the reliability level is 60%;

$$T = 150 \times 16000 = 2.4 \times 10^6 (\text{hours})$$

$$r=0 \text{ comes to } 0.92 \text{ at the level of } 60\%.$$

$$FR = 0.92 / 2.4 \times 10^6 = 3.8 \times 10^{-7} = 380 \text{Fit}$$

Assuming that activation energy is 1.0 eV, FR will be 38 Fit at worst ($T_a=100^{\circ}C$) because an acceleration factor differs by about 1 digit between at $125^{\circ}C$ and $100^{\circ}C$.

Screening Regulations

	Flow Chart	Condition
Assembly	Assembly Finish	
Screening	Temperature Cycle Test	$150^{\circ}C=30\text{min.}$, $-50^{\circ}C=30\text{min.}$, Move=5min., Frequency=5times
	High Temperature Characteristics Inspection	$T_a=100^{\circ}C$
	Normal Temperature Characteristics Inspection	$T_a=25^{\circ}C$
Shipping Inspection	Shipping Inspection	