BA3819F

Comparator array, five point, with power on circuit

The BA3819F is a mechanical controller for 3 V cassette tape recorders.

It consists of five comparators and a comparator reference level circuit together with a power-on circuit.

The power-on circuit allows the comparator circuit to be switched off when there is no input.

By using the BA3819F and a few external components, a soft touch mechanical control can be built for use with 2-line remote control units.

It can also be used as an LED level meter driver.

Features

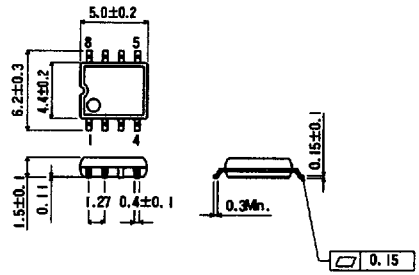
- available in a SOP8 package
- low voltage operation, 2.0 ~ 5.0V
- large output current, $I_{Omax} = 5$ mA
- has a standby mode in which operating current is 0 mA

Applications

- cassette player mechanical control
- headphone stereos
- portable CD players
- 2-wire remote control system
- LED dot display level meter

Dimensions (Units : mm)

BA3819F (SOP8)



Block diagram

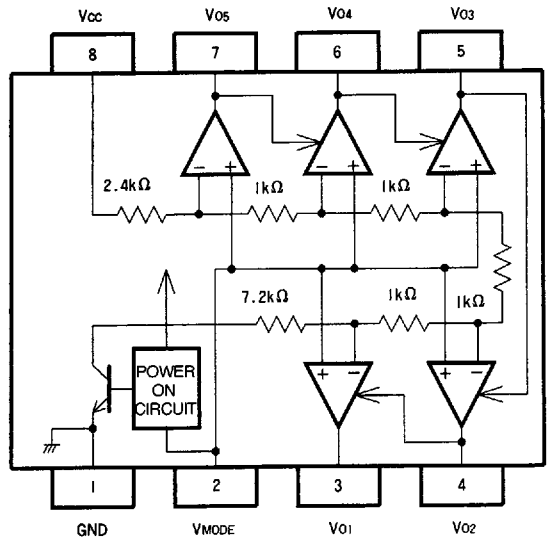
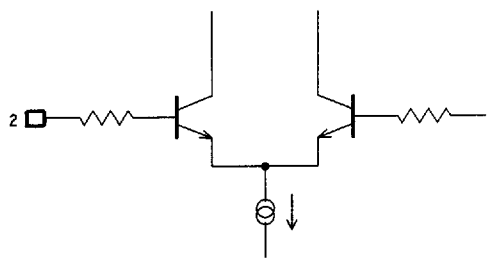
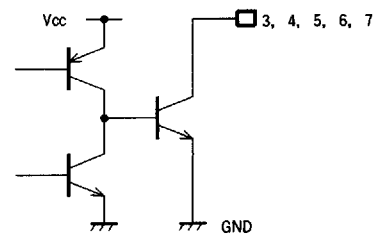


Table 1 Pin description

Pin no	Pin name	Function
1	GND	Substrate GND
2	V_{MODE}	Comparator input
3	V_{01}	Comparator 1 output
4	V_{02}	Comparator 2 output
5	V_{03}	Comparator 3 output
6	V_{04}	Comparator 4 output
7	V_{05}	Comparator 5 output
8	V_{CC}	Power supply

Input and output equivalent circuits





Absolute maximum ratings (T_a = 25°C)

Parameter	Symbol	Limits	Unit	Conditions
Power supply voltage	V_{CC}	6.0	V	
Output current	I_{OUT}	5	mA	
Power dissipation	P_d	450	mW	Reduce power by 4.5 mW/°C for each degree above 25°C.
Operating temperature	T_{opr}	−25 ~ +75	°C	
Storage temperature	T_{stg}	−55 ~ +125	°C	

Recommended operating conditions (T_a = 25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V_{CC}	2.0 ~ 5.0	V

Electrical characteristics (unless otherwise noted, T_a = 25°C, V_{CC} = 3 V)

Parameter	Symbol	Min	Typical	Max	Unit	Conditions
Circuit current 1	I_{CC1}		0	10	μA	V_{MODE} = 0 V
Circuit current 2	I_{CC2}	1.4	3.1	4.8	mA	V_{MODE} = 3 V
Comparator level 1	V_{C1}	1.52	1.58	1.64	V	R_L = 560 Ω
Comparator level 2	V_{C2}	1.74	1.80	1.86	V	R_L = 560 Ω
Comparator level 3	V_{C3}	1.97	2.03	2.09	V	R_L = 560 Ω
Comparator level 4	V_{C4}	2.20	2.26	2.32	V	R_L = 560 Ω
Comparator level 5	V_{C5}	2.42	2.48	2.54	V	R_L = 560 Ω
Output saturation voltage	V_{OL}		0.12	0.5	V	R_L = 560 Ω

Figure 1 Test circuit

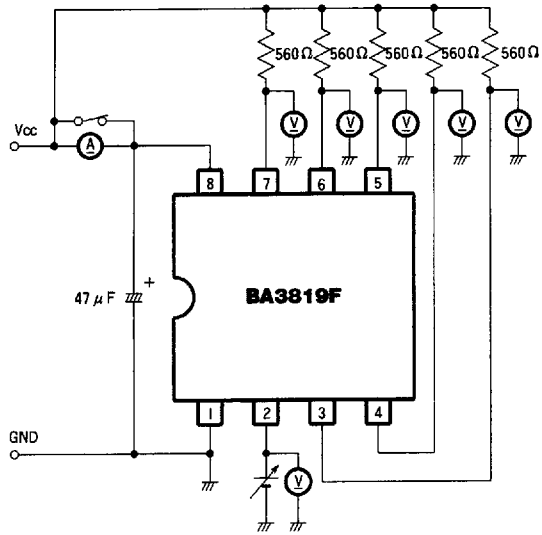
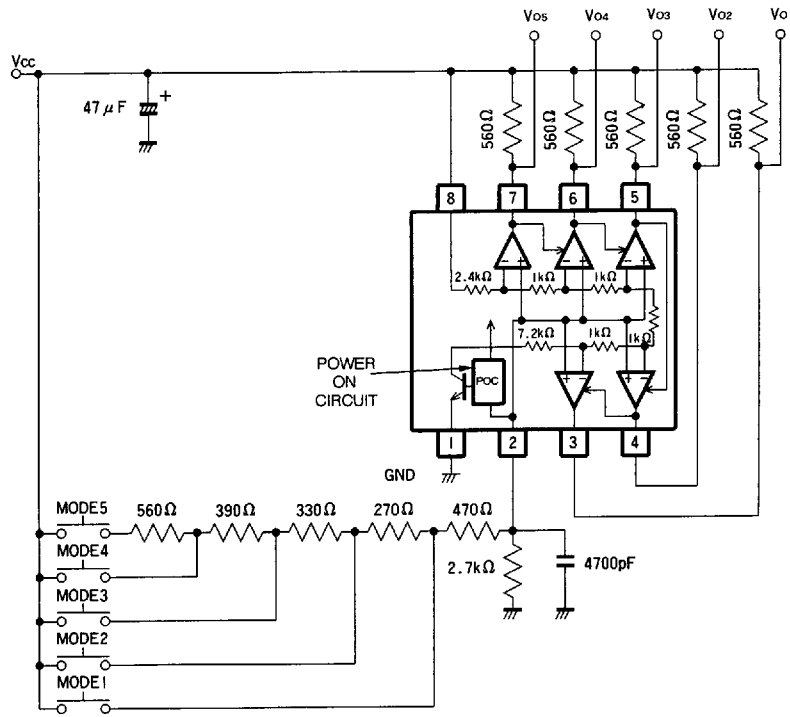


Figure 2 Application example



Circuit operation

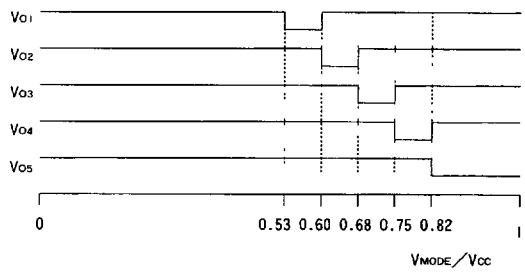
The input voltage from the V_{MODE} pin and the standard voltage from the comparator standard level circuit are inputs into the two pins of each comparator respectively. The output is an open collector. It is pulled up using the external resistor.

When the input voltage is lower than the standard voltage, the output transistor is turned OFF by the internal comparator. Consequently, the comparator output is HIGH.

In contrast, when the input voltage is higher than the standard voltage, the output transistor is ON. Consequently, the comparator output is LOW. In this case, the output transistor of the lower comparator is muted, that is, the lower comparator output is HIGH. Therefore, only one output of the five is LOW.

If the input voltage is below about 0.8 V, the standby function becomes active and the entire circuit is powered off.

Figure 3 Input and output voltage data



Precautions for use

External resistor precision

The external resistors are used to set the input voltage by their ratios. Consequently, particularly in low voltage operation, the differences in the resistor value can have a significant effect on the comparator operation. Therefore, use resistors with a precision better than 1% (0.5% is recommended).

Input voltage setting

Make sure to set the intermediate value of the two values of the comparator level as a guideline for the input voltage. Because the output level may become unstable, do not make the input voltage the same as the standard voltage.

Electrical characteristic curves

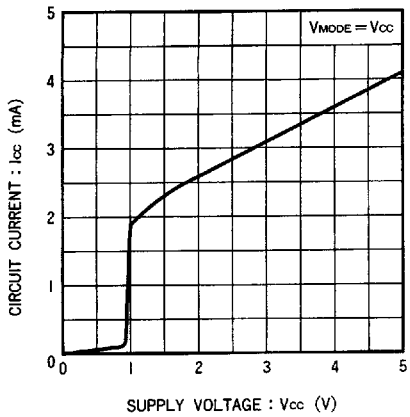


Figure 4

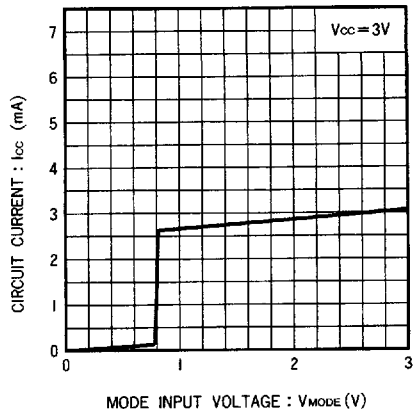


Figure 5

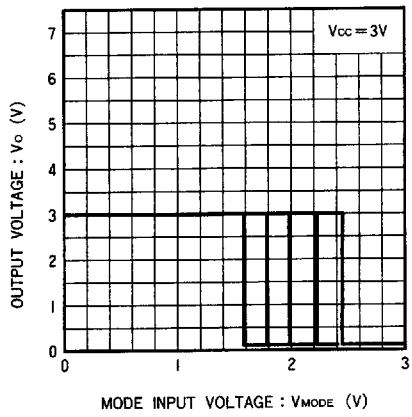


Figure 6

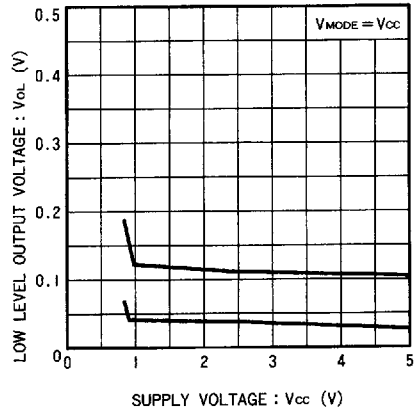


Figure 7

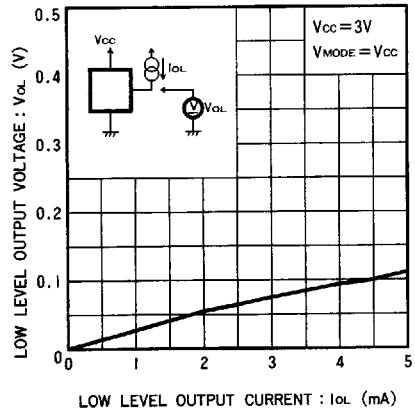


Figure 8