

FG system speed servo controller

BA6302A / BA6302AF / BA6303 / BA6303F

The BA6302A/AF and BA6303/F are FG-system servo control ICs suitable for controlling the speed of VCR motors. They contain a hysteresis FG amplifier section, an S / H system F / V conversion section, an error amplifier section, and an inverter section.

Motor speed can be set with a high degree of freedom by an external CR. The start-up circuit allows quick and precise motor starting.

Motor speed can be controlled precisely at different levels by installing an FG program counter between the FG amplifier output and the F / V conversion input.

●Applications

Speed control of various motors including capstan motors, drum head motors, and reel motors

●Features

- 1) S / H system F / V converter allows speed setting with a stable external CR.
- 2) High hysteresis FG amplifier with high noise resistance.
- 3) Start-up circuit allows quick and precise motor starting.
- 4) Motor speed can be controlled at different levels by installing an FG program counter.
- 5) Low current dissipation. ($V_{CC}=9V$, $I_o=2.3mA$ Typ.)
- 6) Stable operation with either 5, 9, or 12V supply voltage.
- 7) Two versatile inverters are built in.

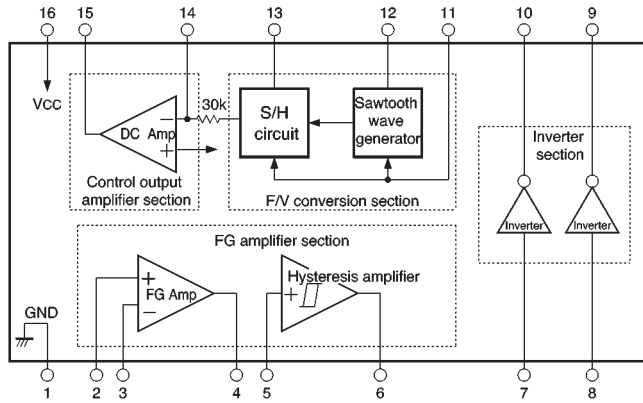
●Absolute maximum ratings ($T_a = 25^\circ C$)

| Parameter | Symbol | Limits | Unit |
|-------------------------------|-----------|-----------------|------------|
| Power supply voltage | V_{CC} | 15 | V |
| Power dissipation | P_d | 450* | mW |
| Operating temperature | T_{opr} | $-20 \sim +60$ | $^\circ C$ |
| Storage temperature | T_{stg} | $-55 \sim +125$ | $^\circ C$ |
| Inverter circuit load current | I_L | 10 | mA |

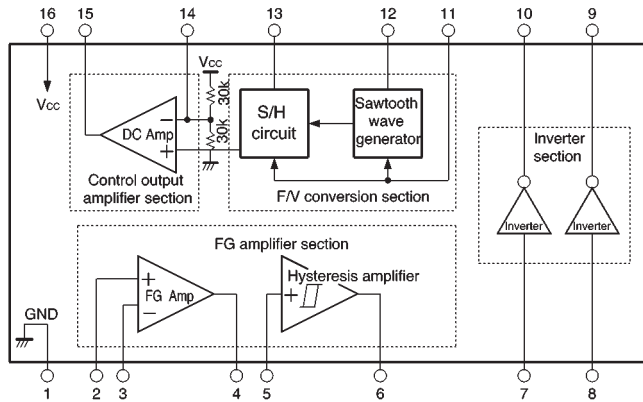
* Reduced by 4.5 mW for each increase in T_a of $1^\circ C$ over $25^\circ C$.

● Block diagram

BA6302A / BA6302AF



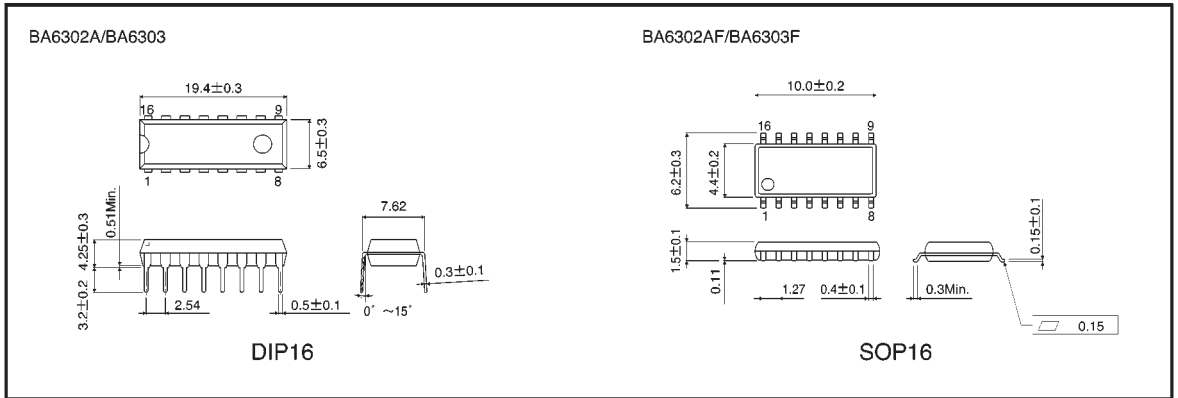
BA6303 / BA6303F



●Electrical characteristics (unless otherwise noted, Ta = 25°C, V_{CC}=9V)

| Parameter | | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|------------------------------------|--------------|-------------------|------|------|------|------------------|-------------------------------------------------------------------|
| Operating power supply voltage | | V _{CC} | 4.5 | — | 13.0 | V | |
| Quiescent current | BA6302A / AF | I _Q | 1.7 | 2.6 | 3.4 | mA | |
| | BA6303 / F | | 1.4 | 2.3 | 3.1 | | |
| 〈FG amplifier section〉 | | | | | | | |
| DC bias potential | | V _{FGB} | 1.1 | 1.3 | 1.5 | V | |
| Base bias current | | I _{bb1} | — | 80 | 320 | nA | |
| Open loop voltage gain | | A _{VO1} | 65 | 75 | — | dB | R _{FG} =1MΩ |
| Output level | | V _{FGO} | 2.0 | 2.6 | 3.0 | V _{P-P} | R _{FG} =100kΩ |
| Hysteresis comparator bias current | | I _{bb2} | — | 600 | 1200 | nA | |
| Mid-hysteresis voltage accuracy | | ΔV _{hym} | −140 | −60 | +30 | mV | Electric potential difference from pin3 |
| Hysteresis voltage width | | V _{hyw} | 40 | 60 | 80 | mV | |
| Hysteresis amplifier output level | | V _{hyo} | 6.5 | 7.3 | — | V _{P-P} | R _L =10kΩ |
| 〈F/V conversion section〉 | | | | | | | |
| Output temperature coefficient | | ΔV _{FVT} | — | 160 | — | ppm / °C | V _{FVO} =4.5V |
| Output drift | | ΔV _{FVO} | — | 0 | — | mV | V _{FVO} =4.5V |
| Pin12 base current | | I _{bb3} | — | 25 | 100 | nA | |
| Pin13 base current | | I _{bb4} | — | 15 | 60 | nA | |
| Conversion efficiency | | ΔFV | — | 30 | — | mV / Hz | R _T =120kΩ C _T =0.1μF F _G =100Hz |
| 〈Control output amplifier section〉 | | | | | | | |
| DC amplifier open loop gain | | G _{VO2} | 49 | 55 | — | dB | |
| Mid-bias voltage | | V _B | 4.2 | 4.6 | 5.0 | V | |
| DC amplifier output level | BA6302A / AF | V _{DCCO} | 6.1 | 6.3 | — | — | R _{DC} =∞, R _L =20kΩ |
| | BA6303 / F | | — | — | | | |
| 〈Inverter circuit〉 | | | | | | | |
| Input threshold voltage | | V _{TH} | 1.5 | — | 3.5 | V | |
| Input impedance | | R _{IN} | 20 | 30 | — | kΩ | |
| Output saturation voltage | | V _{SAT} | — | 0.2 | 0.3 | V | R _L =10kΩ, V _{IN} =V _{CC} |
| Output leakage voltage | | I _L | — | 0 | 1 | μA | V _{CE} =13.0V, V _{IN} =0V |

● External dimensions (Units: mm)



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