

FG system speed servo controller

BA6302A/BA6302AF/BA6303/BA6303F

The BA6302A and BA6303 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

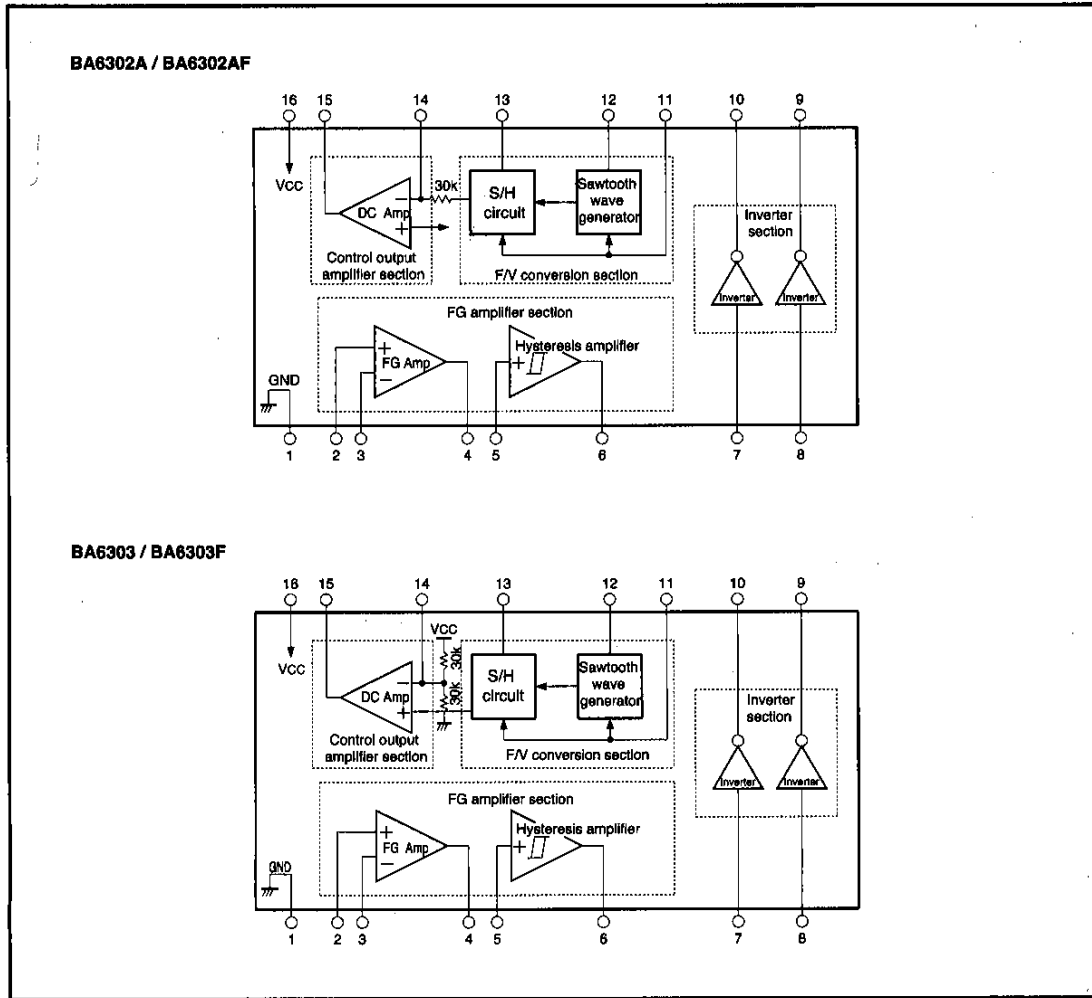
- 1) S/H system F/V converter allows speed setting with a stable external CR.
- 2) High hysteresis FG amplifier with high noise resistance.
- 3) Start-up circuit allows quick and precise motor starting.
- 4) Motor speed can be controlled at different levels by installing an FG program counter.
- 5) Low power consumption. ($V_{CC}=9V$, $I_o=2.3mA$ 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}	-20~60	$^\circ C$
Storage temperature	T_{stg}	-55~125	$^\circ C$
Inverter circuit load current	I_L	10	mA

* Reduce power by 4.5 mW for each degree above 25 $^\circ C$.

●Block diagram



FG Servos

●Electrical characteristics (Unless otherwise noted, Ta=25°C, Vcc=9V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	
Operating 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 _{FB}	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 _{FQD}	2.0	2.6	3.0	V _{P-P}	R _{FG} =100kΩ	
Hysteresis comparator bias current	I _{bb2}	—	600	1200	nA	BA6302A / BA6302AF ; I _{bb1}	
Mid-hysteresis voltage accuracy	ΔV _{hym}	-140	-60	+30	mV	Difference electric potential from pin3	
Potential difference with reference to pin 3	V _{hyw}	40	60	80	mV	—	
Hysteresis amplifier output level	V _{hyo}	6.5	7.3	—	V _{P-P}	R _L =10kΩ	
< FV conversion section >							
Output temperature coefficient	ΔV _{FVT}	—	160	—	ppm / °C	V _{FVO} =4.5V	
Output drift	ΔV _{FVO}	—	0	—	mV	V _{FVO} =4.5V	
Pin-12 base current	I _{bb3}	—	25	100	nA	—	
Pin-13 base current	I _{bb4}	—	15	60	nA	—	
Conversion efficiency	ΔFV	—	30	—	mV / Hz	R _T =120kΩ C _T =0.1 μF F ₀ =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 _{CCO}	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)

