

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. ($V_{CC}=9V$, $I_0=2.3mA$ Typ.)
- 6) Stable operation with either 5, 9, or 12V supply voltage.
- 7) Two versatile inverters are built in.

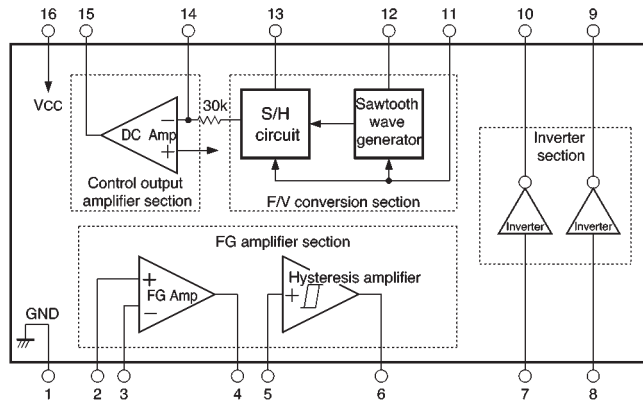
●Absolute maximum ratings ($T_a = 25^\circ C$)

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

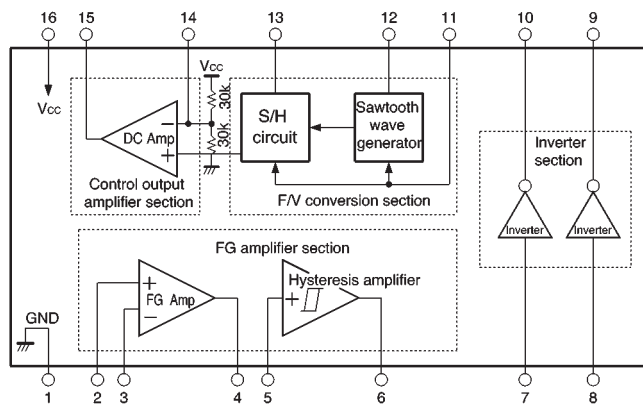
* Reduced by 4.5 mW for each increase in T_a of $1^\circ C$ over $25^\circ C$.

● 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		Δ V _{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		Δ V _{FVT}	—	160	—	ppm / °C	V _{FVO} =4.5V
Output drift		Δ V _{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		Δ FV	—	30	—	mV / Hz	R _T =120kΩ C _T =0.1 μF 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)

