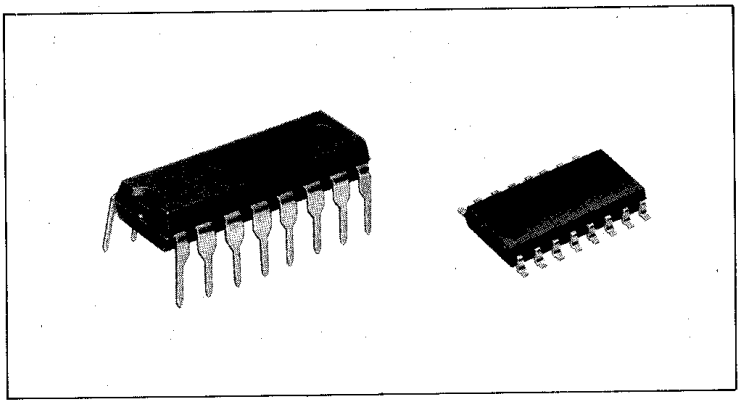
Velocity Servo

BA6302A/BA6303



Dimensions (mm)

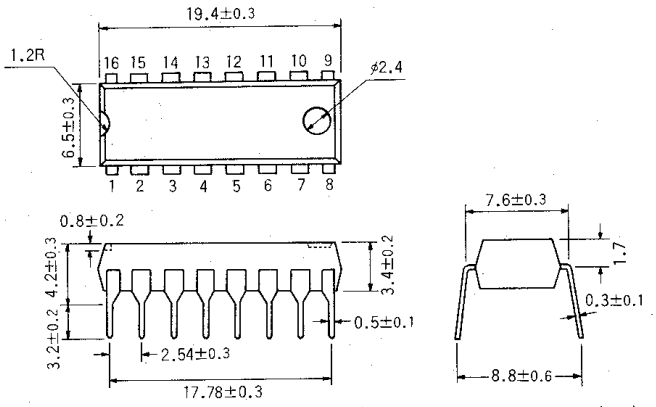


Fig. 1 Note: A mini-flat packaged type is also available upon request.

The BA6302A/BA6303 is a monolithic integrated circuit consisting of a sample and hold type F/V converter section, FG amplifier with hysteresis section, an error amplifier section, and an inverter section. Speed setting for motor control is achieved using externally connected RC constants, to allow a high level of freedom in setting the speed. To achieve stable start-up characteristics, a built-in high-speed start-up circuit is used.
By connecting a program counter to the FG amplifier output and F/V converter input, several types of motors can be speed controlled using a program.

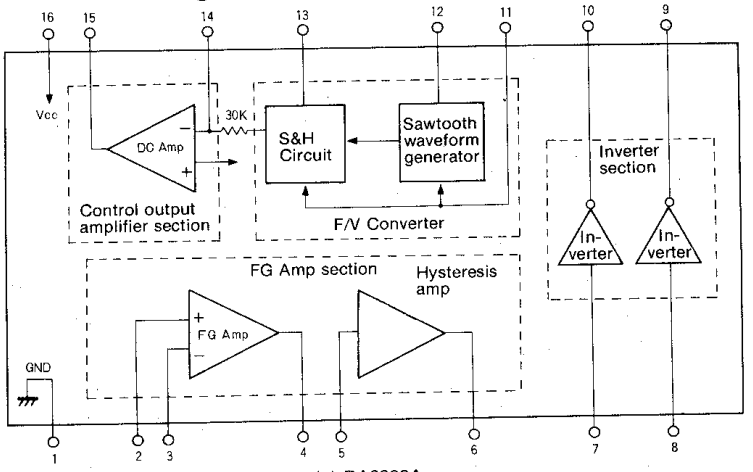
Features

1. Highly stable speed control is used with externally connected RC speed-setting components. A sample and hold F/V converter is used.
2. An FG amplifier with hysteresis is used to enable high noise immunity.
3. A built-in start-up circuit is used to achieve both high speed and high stability at start-up.
4. By using an FG program counter, multi-step speed control is possible.
5. Low power consumption (V_{CC} = 9V, I_{CC} = 2.3mA, typical)
6. Operates stably on 5V, 9V, or 12V supply.
7. Two inverters are used for flexibility.

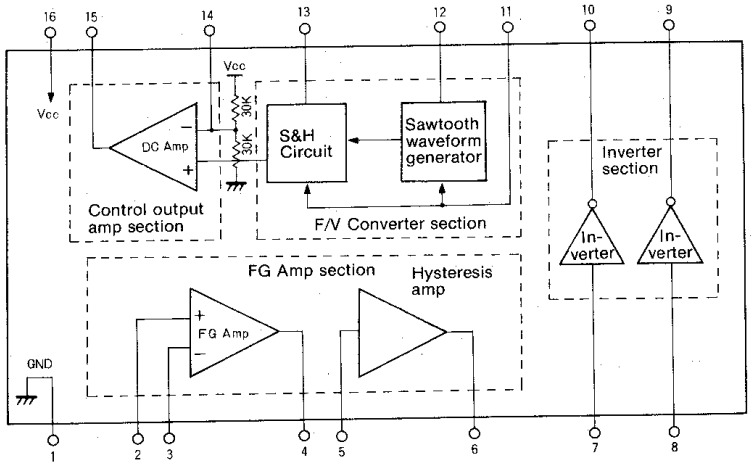
Applications

1. VTR Capstan motor speed control
2. VTR Drum motor speed control
3. VTR Reel motor speed control
4. Other motor speed control applications

Block Diagrams



(a) BA6302A



(b) BA6303

Fig. 2

Absolute Maximum Ratings (T_a = 25° C)

Parameter	Symbol	Limits	Unit
Supply voltage	V_{CC}	15	V
Power dissipation	P_d	450	mW
Operating temperature	T_{opr}	−20~+60	°C
Storage temperature	T_{stg}	−55~+125	°C
Inverter circuit load current	I_L	10	mA

* Derating is done at 4.5mW/° C for operation above T_a = 25°C.

Electrical Characteristics (Unless otherwise noted, T_a = 25°C, V_{CC} = 9.0V)

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Supply voltage	V_{CC}	4.5	—	13.0	V	
Supply current	I_{CC}	1.6	2.3	3.0	mA	
FG Amplifier section						
FG Amp DC bias voltage	V_{FGB}	1.1	1.3	1.5	V	
FG Amp base bias current	I_{bb1}	—	80	320	nA	
FG Amp open-loop voltage gain	A_{VO1}	65	75	—	dB	R_{FG} =1MΩ
FG Amp output level	V_{FGO}	2.0	2.6	3.0	V_{p-p}	R_{FG} = 100kΩ
Hysteresis comparator bias current	I_{bb1}	—	600	1200	nA	
Central hysteresis voltage	V_{hym}	1.1	1.3	1.5	V	
Hysteresis width	V_{hyw}				mV	
Hysteresis amplifier output level	V_{hyo}	6.5	7.3	—	V_{p-p}	R_L = 10kΩ
F/V Conversion section						
F/V Conversion output temperature coefficient	ΔV_{FVT}	—	160	—	ppm/°C	V_{FVO} = 4.5V
F/V Conversion 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	00	nA	
F/V Conversion efficiency	ΔFV	—	30	—	mV/Hz	C_T = 0.1μF R_T = 120kΩ FG = 100Hz
Control output amplifier section						
DC Amp open-loop gain	G_{VO2}	49	55	—	dB	
Central bias voltage	V_B	4.2	4.6	5.0	V	
DC Amp output level	V_{DCO}	6.1	6.3	—	V_{p-p}	R_F = 30kΩ R_L = 10kΩ
Inverter circuit						
Input threshold voltage	V_T	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