AN6656, AN6656S

Micromotor Forward/Reverse Electronic Governors

■ Overview

The AN6656 and the AN6656S are the electronic governors capable of controlling the forward/reverse speed, fast forward, rewind, and start stop of the micromotors used for the radio/cassette tape recorders, automatic answering telephone sets, and so on.

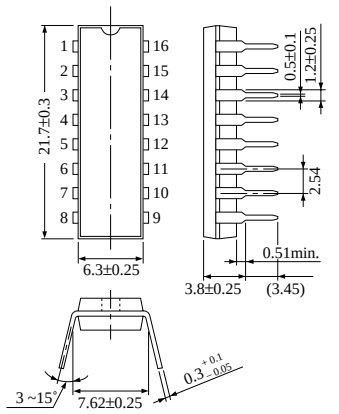
■ Features

- Wide operating supply voltage range : V_{CC}=1.8V to 6V
- Stable reference voltage (120mV) and easy speed control
- Capable of controlling forward/reverse rotation, fast forward/constant speed, and start/stop via 3 input pins
- Capable of controlling a fast forward/rewind speed
- Large starting torque and maximum control torque
- Good secular drift because of external power transistor
- Provided with the motor stop function ; I_{CC}=50µA or less at stop time

■ Applications

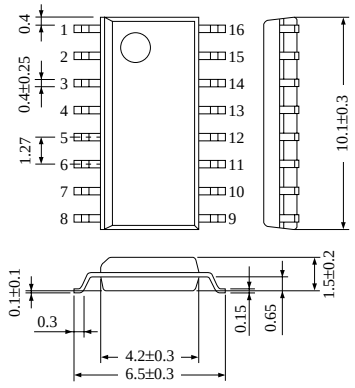
- Speed control of the micromotors for the radio cassettes
- Speed control of the micromotors for the microcassettes of the automatic answering telephone sets
- Control of the tape loading motors for the DATs, etc.

AN6656 Unit : mm



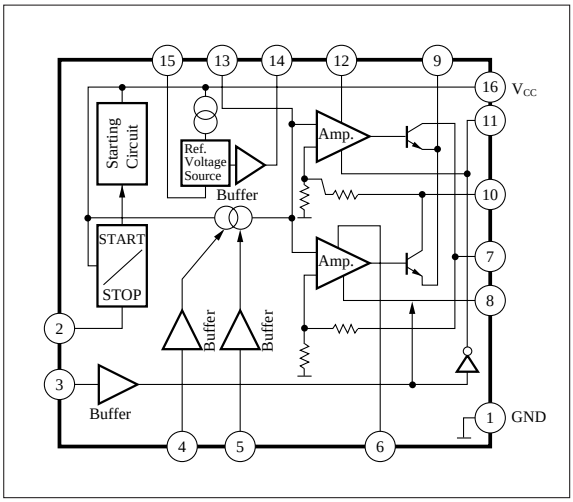
16-Lead DIP Package (DIP016-P-0300E)

AN6656S Unit : mm



16-Lead SOP Package (SOP016-P-0225)

■ Block Diagram



■ Absolute Maximum Ratings (Ta= 25˚C)

Parameter		Symbol	Rating	Unit
Supply Voltage		V_{CC}	6.5	V
Supply Current		I_{CC}	25	mA
Output Current		I_O	1000	mA
Power Dissipation	AN6656	P_D	500	mW
	AN6656S		380	
Operating Ambient Temperature		T_{opr}	–20 ~ + 70	˚C
Storage Temperature	AN6656	T_{stg}	–55 ~ +150	˚C
	AN6656S		–55 ~ +125	

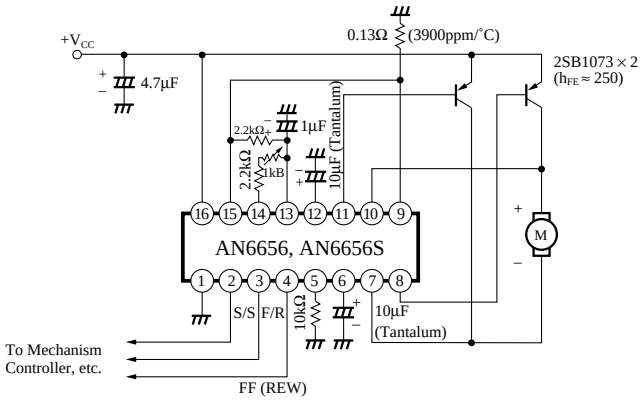
■ Recommended Operating Range (Ta = 25˚C)

Parameter	Symbol	Range
Operating Supply Voltage Range	V_{CC}	1.8V ~ 6V

■ Electrical Characteristics (Ta = 25˚C)

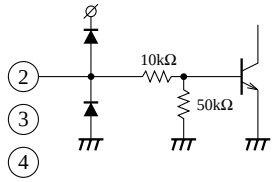
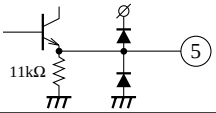
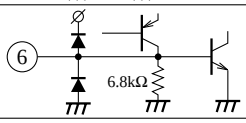
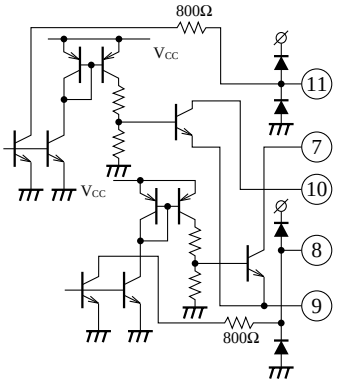
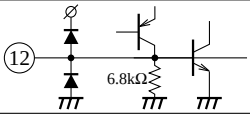
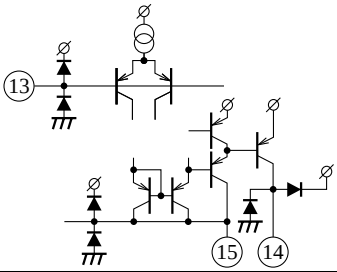
Parameter	Symbol	Condition	min.	typ.	max.	Unit
Bias Current	I_{bias}	V_{CC} = 5V	—	5	15	mA
Prestart Current	I_{stop}	V_{CC} = 5V	—	—	50	µA
Reference Voltage	V_{ref}	V_{CC} = 3V	85	120	150	mV
Start Voltage	$V_{CC\ (S)}$	Supply voltage at which a 50mA current flows to Ra	—	—	1.2	V
Start Current	I_{st}	V_{CC} = 1.8V, Ra = 4.9Ω	180	—	—	mA
Rated Load r.p.m.	N_L	V_{CC} = 3V, I_L = 100mA, N = 2400rpm	–10	0	10	%
Forward/Reverse r.p.m. Difference	ΔN_{Logi}	V_{CC} = 3V, I_L = 100mA, N = 2400rpm	–8	0	8	%
r.p.m. Characteristics on Voltage Change	ΔN_V	V_{CC} = 3V ~ 6V, I_L = 100mA	—	—	60	rpm/V
r.p.m. Characteristics on Load Change	ΔN_L	V_{CC} = 1.8V, I_L = 50mA ~ 100mA	—	—	150	rpm
Switching Mode Input H	V_H		0.9	—	V_{CC}+0.5	V
Switching Mode Input L	V_L		0	—	0.3	V
Ref. Voltage Temperature Characteristics	ΔV_r/Ta	V_{CC} = 3V, Ta = 0˚C ~ 60˚C	—	0.01	—	%/˚C

■ Application Circuit



Note) The motor stops when the Pin2 is at "L" (0 to 0.3V), and starts at "H" (0.9 to V_{CC} + 0.5V).
The motor runs in the reverse direction (a current flows from the motor ⊖ pin to ⊕ pin) when the Pin3 is at "L" (0 to 0.3V).
The motor runs in the forward direction (a current flows from the motor ⊕ pin to ⊖ pin) when the Pin3 is at "H" (0.9 to V_{CC} + 0.5V).
The motor runs at a normal speed when the Pin4 is at "L" (0 to 0.3V), and runs at a high speed (fast forward, rewind) when at "H" (0.9 to V_{CC} + 0.5V).
At high speed rotation, the motor speed can be controlled with resistor between the Pin5 and GND.

■ Pin Descriptions

Pin No.	Pin Name	Description	I/O	Voltage	Equivalent Circuit
1	GND	GND pin	I	—	
2	Start/Stop	Start/stop control pin	I	—	
3	Forward/Reverse	Forward/reverse control pin	I		
4	FF (REW) Switching	FF (REW) speed control pin	I		
5	FF (REW) Speed Control	FF (REW) speed setting pin	O	0.05V	
6	Phase Compensation	Oscillation preventive phase compensation pin	I	0.7V	
7	Drive 1	Motor drive pin 1	O	—	
8	Output Control 1	External transistor control pin 1	O		
9	Load Characteristics Setting	Load characteristics setting pin	O		
10	Drive 2	Motor drive pin 2	O		
11	Output Control 2	External transistor control pin 2	O		
12	Phase Compensation	Oscillation preventive phase compensation pin	I	0.7V	
13	Speed Setting	Speed setting input pin	I	—	
14	Reference Voltage ⊕	Reference voltage ⊕ output pin	O	0.15V	
15	Reference Voltage ⊖	Reference voltage ⊖ output pin	O	0	
16	V_{CC}	V_{CC} pin	I	—	

■ Characteristics Curve