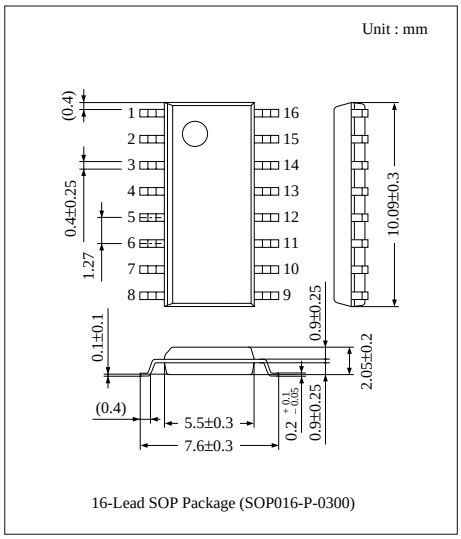
AN6607NS

DC Motor Forward/Reverse Dual Speed Electronic Governor

■ Overview

The AN6607NS is an electronic governor which incorporates the forward/reverse rotation and double speed controls of the DC motors used for radio/cassette tape recorder, and the functions such as fast forward, rewind, brake, and pause.



16-Lead SOP Package (SOP016-P-0300)

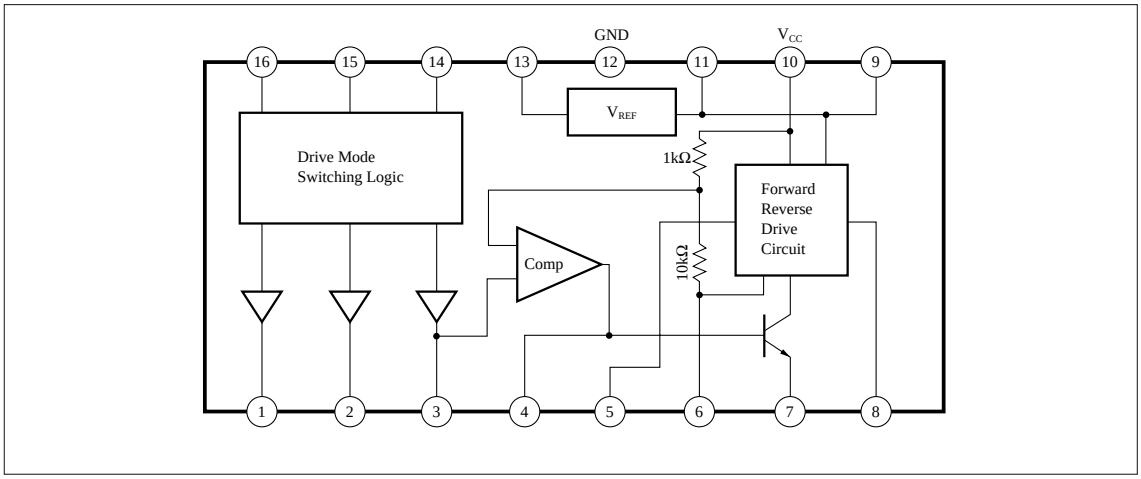
■ Features

- Operating supply voltage range ; Vcc = 8V to 16V
- Stable reference voltage (1.27V) and easy speed adjustment
- Large starting torque and maximum control torque
- Good secular drift because of external power transistor
- High-density mounting allowed by the SO package
- Forward/reverse constant speed and double speed controls, and fast forward, brake, and pause functions available by 3-bit input

■ Applications

Cassette decks, radio/cassette tape recorders, car cassette tape players, DC motor control such as DAT, tape loading motor control.

■ Block Diagram



■ Absolute Maximum Ratings (Ta= 25˚C)

Parameter	Symbol	Rating	Unit
Supply Voltage	V_{CC}	18	V
Supply Current	I_{CC}	20	mA
Power Dissipation	P_D	450	mW
Operating Ambient Temperature	T_{opr}	–20 ~ + 70	˚C
Storage Temperature	T_{stg}	–55 ~ +125	˚C

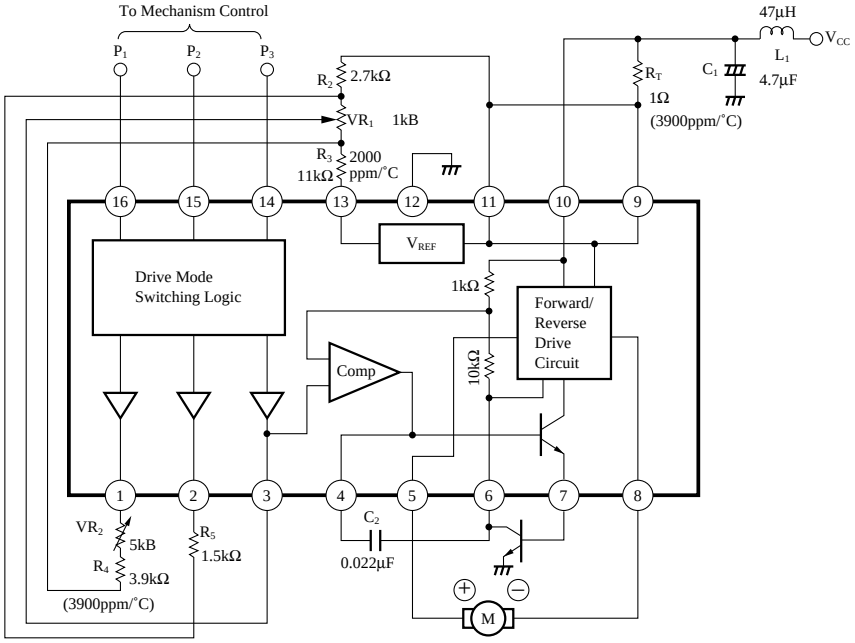
■ Recommended Operating Range (Ta = 25˚C)

Parameter	Symbol	Range
Operating Supply Voltage Range	V_{CC}	8V ~ 16V

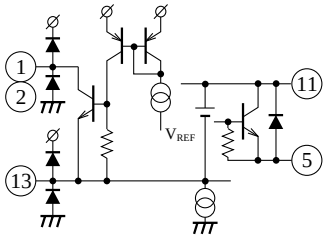
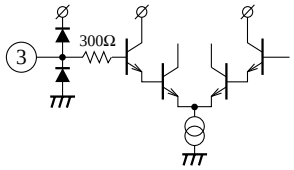
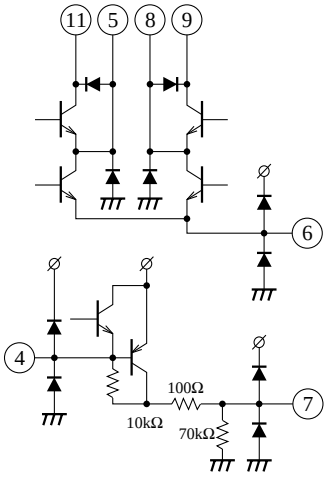
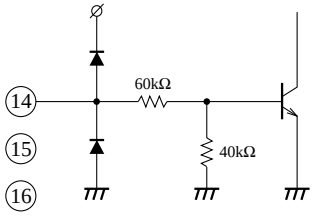
■ Electrical Characteristics (Ta = 25˚C)

Parameter	Symbol	Condition	min.	typ.	max.	Unit
Bias Current at No Load	I_{bias}	V_{CC} = 12V	—	7	15	mA
Reference Voltage	V_{ref}	V_{CC} = 12V	1.15	1.27	1.4	mA
Rated Load Start Voltage	$V_{CC\,(S)}$	Supply voltage at which rotation starts	6.5	—	—	V
Rated r.p.m.	N_L	V_{CC} = 12V, N = 1600rpm	– 8.75	—	8.75	%
r.p.m. Characteristics on Load Change	ΔN_L	V_{CC} = 8V, I_L = 55mA ~ 120mA	–20	—	20	rpm
r.p.m.Characteristics on Voltage Change	ΔN_V	V_{CC} = 8V ~ 16V, N = 1600rpm	–22	0	22	rpm
FF/REW r.p.m. Difference	ΔN_{Logi}	V_{CC} = 12V, N = 5300rpm	–3	0	3	%
Output Saturation Voltage 1	$V_{SAT\,(1)}$	V_{CC} = 8V, I_O = 1A	—	—	2	V
Output Saturation Voltage 2	$V_{SAT\,(2)}$	V_{CC} = 8V, I_O = 1A	—	—	1.5	V
r.p.m. Characteristics on Temperature Change	ΔN_A	V_{CC} = 12V, Ta = –10 ~ + 60˚C	—	100	—	ppm/˚C

■ Application Circuit



■ Pin Descriptions

Pin No.	Pin Name	Pin Descriptions	I/O	Voltage	Equivalent Circuit
1	Double Speed Setting	Pin to connect the double speed r.p.m. setting resistor	I	V_{CC}−1.5V	
2	FF Setting	Pin to connect the FF r.p.m. setting resistor	I	V_{CC}−1.5V	
3	Speed Adjustment	Pin to control the rotating speed	I	———	
4	Phase Compensation	Pin to connect the oscillation preventive phase compensation capacitor	I	———	
5	Motor Drive ⊕	Pin to connect the motor ⊕ pin	O		
6	Collector Connection	Pin to connect the external NPN transistor's collector	O		
7	Base Connection	Pin to connect the external NPN transistor's base	O		
8	Motor Drive ⊖	Pin to connect the motor ⊖ pin	O		
9	Load Characteristics Setting	Pin to set the load characteristics of the motor torque	O		
10	V_{CC}	V_{CC} Pin	I		
11	To Pin 9	Connect to Pin 9	O		
12	GND	GND pin	I	———	———
13	Reference Voltage ⊖	Reference voltage ⊖ pin	O	V_{CC}−1.5V	———
14	Logic Input	Operating logic input pin P_3	I	———	
15	Logic Input	Operating logic input pin P_2	I	———	
16	Logic Input	Operating logic input pin P_1	I	———	

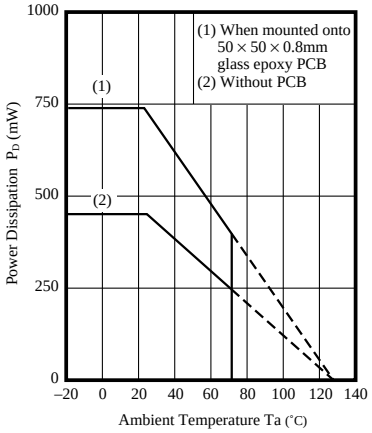
■ Supplementary Explanation

• Operating Logic

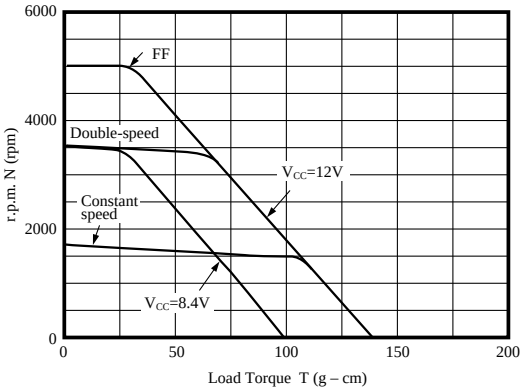
Input			Output				
Pin14	Pin15	Pin16	Pin5	Pin8	Pin1	Pin2	Operating Mode
H	H	H	H	L	OFF	ON	FF
L	H	H	L	H	OFF	ON	REW
H	L	H	H	L	OFF	OFF	Constant speed
H	H	L	H	H	OFF	OFF	Brake
L	L	H	H	L	ON	OFF	Double speed
L	H	L	L	H	ON	OFF	Reverse double speed
H	L	L	L	H	OFF	OFF	Reverse constant speed
L	L	L	—	—	OFF	OFF	Pause

• Characteristics Curve

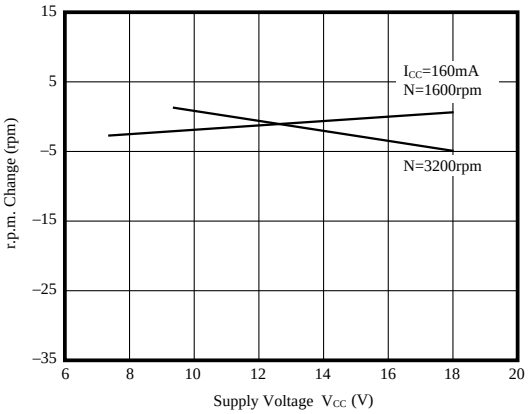
P_D – Ta



r.p.m. – Load Torque Characteristics



r.p.m. – Supply Voltage Characteristics



r.p.m. – Temperature Characteristics