

# AN6650, AN6650S

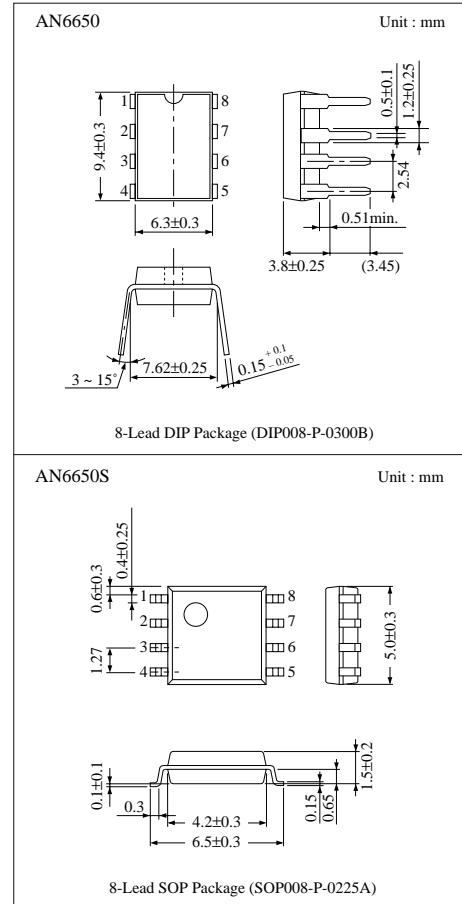
## Motor Control Circuits

### ■ Overview

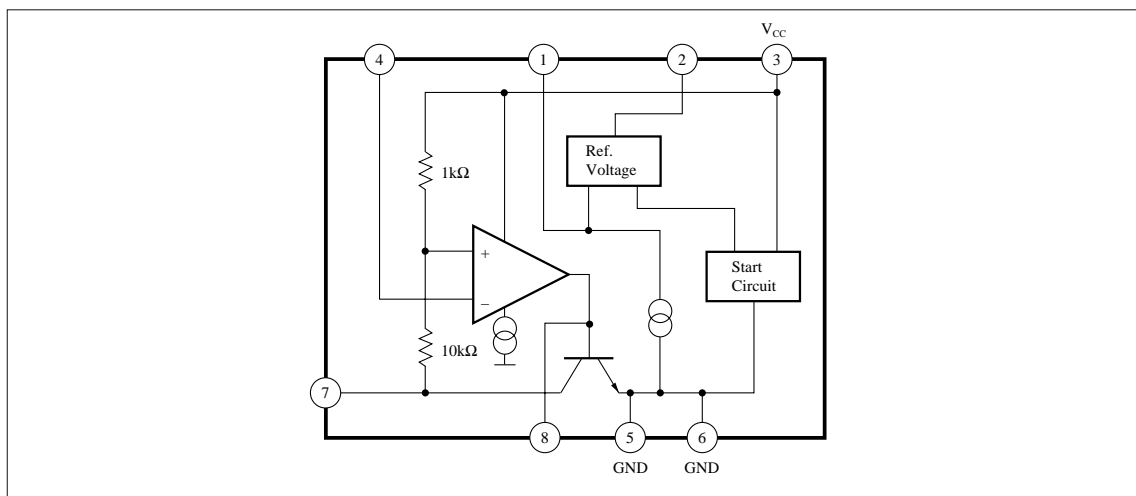
The AN6650 and the AN6650S are the electronic governors suitable for a low-voltage and compact DC motor which is used for a tape recorder, etc.

### ■ Features

- Wide range of operating voltage :  $V_{CC(opr)} = 1.8V \sim 7V$   
 AN6650 :  $V_{CC(opr)} = 1.8V \sim 7V$   
 AN6650S :  $V_{CC(opr)} = 1.8V \sim 3.6V$
- 2 package types
- Fewer external parts
- Speed control in steps with linear fine control



### ■ Block Diagram



### Pin Descriptions

Pin No.	Pin Name	Pin No.	Pin Name
1	V <sub>REF</sub> ⊖	5	GND
2	V <sub>REF</sub> ⊕	6	GND
3	V <sub>CC</sub>	7	Motor Pin
4	Comparator Input	8	Phase Compensation

### Absolute Maximum Ratings (Ta= 25°C)

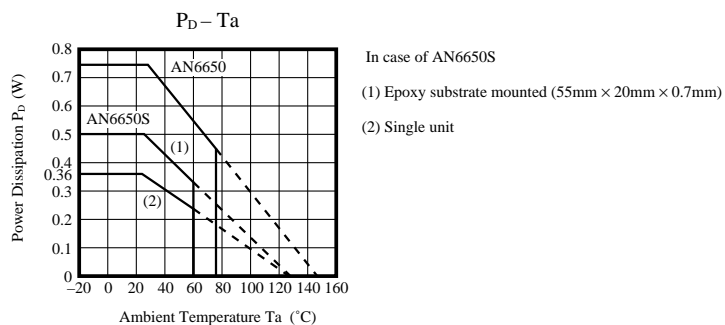
Parameter	Symbol	Rating	Unit
Supply Voltage	AN6650	7.5	V
	AN6650S	4	
Circuit Voltage	AN6650	-0.5	V
	AN6650S	4	
Circuit Voltage	V <sub>n-5,6</sub> (n = 1, 2, 3, 4)	-0.5	1
Supply Current	I <sub>CC</sub> *	1000	mA
Circuit Current	I <sub>7</sub>	—	1000
Power Dissipation	AN6650	750	mW
	AN6650S	360	
Operating Ambient Temperature	AN6650	-20 ~ +75	°C
	AN6650S	-20 ~ +60	
Storage Temperature	AN6650	-40 ~ +150	°C
	AN6650S	-40 ~ +125	

\* AN6650 : t ≤ 5μs, AN6650S : t ≤ 1μs

### Electrical Characteristics (Ta = 25°C)

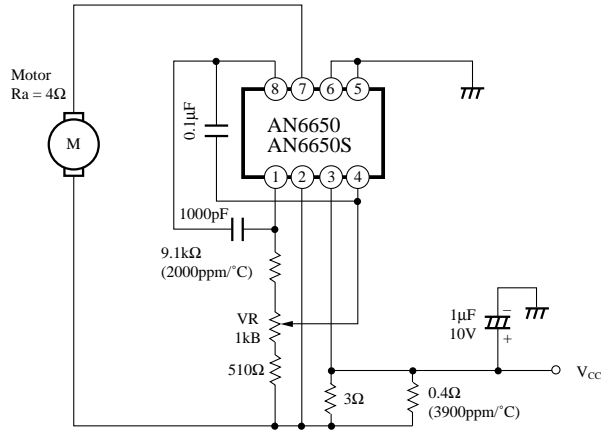
Parameter	Symbol	Condition	min.	typ.	max.	Unit
Supply Current	I <sub>CC</sub>	V <sub>CC</sub> = 3V,	—	2	3	mA
Reference Voltage	V <sub>ref</sub>	V <sub>CC</sub> = 3V, V <sub>2-1</sub> > 10kΩ	1.20	1.28	1.35	V
Starting Voltage	V <sub>CC(S)</sub>	Supply voltage in which 30mA current flows to Ra	—	1.0	1.2	V
Saturation Voltage	V <sub>sat</sub>	V <sub>CC</sub> = 1.8V, Ra = 4.7Ω	—	0.2	0.5	V
Voltage Characteristics 1	AN6650	V <sub>CC</sub> = 1.8V ~ 7.0V ΔV <sub>ref</sub> /ΔV <sub>CC</sub>	-1.25	0.1	1.25	% / V
	AN6650S					
Voltage Characteristics 2	AN6650	V <sub>CC</sub> = 1.8V ~ 7.0V ΔV <sub>a</sub> /ΔV <sub>CC</sub>	-1.2	0.1	1.2	% / V
	AN6650S					
Current Characteristics	ΔV <sub>ref</sub> /ΔI <sub>7</sub>	I <sub>7</sub> = 1mA ~ 20mA	-0.2	0.01	0.2	% / mA
Temperature Current Characteristics	ΔV <sub>ref</sub> /ΔTa	Ta = -20°C ~ +60°C, V <sub>CC</sub> = 3.0V	—	0.01	—	% / °C

Note) Operating Supply Voltage Range : V<sub>CC(oper)</sub> = 1.8V ~ 3.6V



■ Application Circuit

Speed Control Circuit with 3V Core Motor



Motor Constants

- $R_a$ : Internal resistor =  $4\Omega$
- $K_a$ : Electromotive force constant =  $0.4\text{mV/rpm}$
- $K_T$ : Torque constant =  $30\text{g} \cdot \text{cm/A}$

