# AN6651

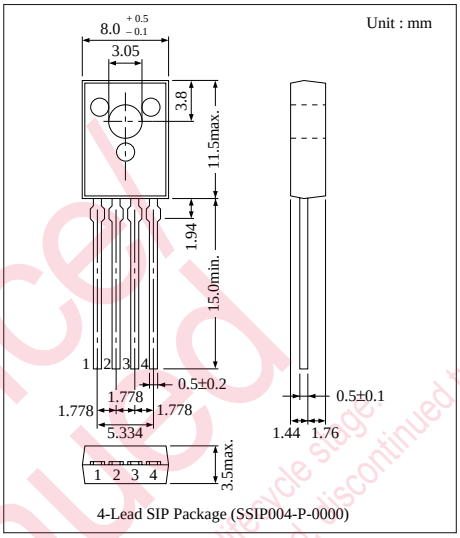
## Motor Control Circuit

### ■ Overview

The AN6651 is an IC designed for the rotating speed control of a compact DC motor which is used for a tape recorder, record player, etc.

### ■ Features

- Small four-lead plastic package for compact motor. Fewer external parts
- Stable low reference voltage (1.0V typ.), wide motor speed setting
- Highly stable operation over a wide range of supply voltage and torque supply voltage, $V_{CC}$ = 3.5V ~ 14.4V
- Reverse voltage protection circuit is built-in

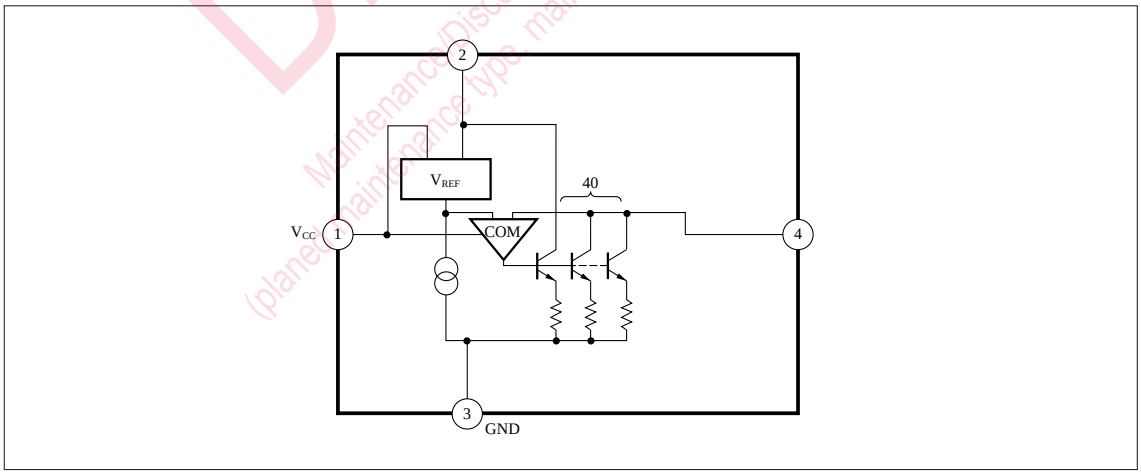


4-Lead SIP Package (SSIP004-P-0000)

### ■ Pin Descriptions

| Pin No. | Pin Name |
|---|---|
| 1 | $V_{CC}$ |
| 2 | Control Pin |
| 3 | GND |
| 4 | Motor Pin |

### ■ Block Diagram



## ■ Absolute Maximum Ratings (Ta= 25˚C)

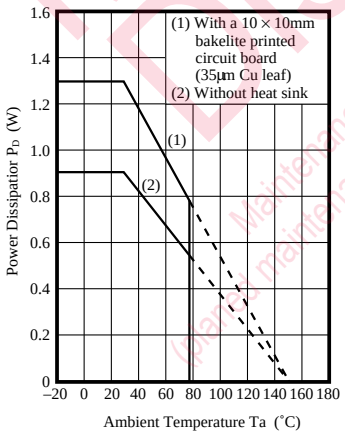
| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Supply Voltage | $V_{CC}$ | 14.4 | V |
| Supply Current | $I_{CC}$ *2 | 2000 | mA |
| Power Dissipation | $P_D$ *1 | 1300 | mW |
| Operating Ambient Temperature | $T_{opr}$ | –20 ~ + 75 | ˚C |
| Storage Temperature | $T_{stg}$ | – 40 ~ +150 | ˚C |

*1 Ta = 25˚C, With a 10 × 10mm bakelite printed circuit board (35µm Cu leaf)
*2 t ≤ 5s

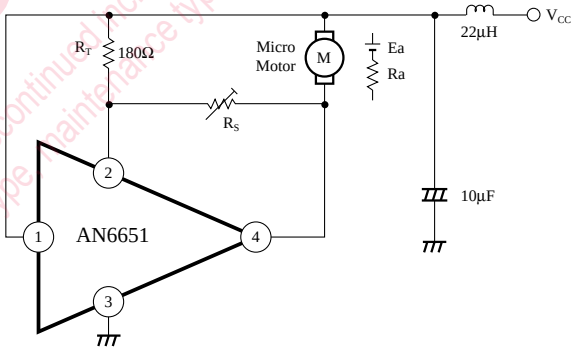
## ■ Electrical Characteristics (Ta = 25˚C)

| Parameter | Symbol | Condition | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|
| Reference Voltage | $V_{REF}$ | $V_{CC}$ = 6V, Ra = 1kΩ | 0.85 | 1.0 | 1.15 | V |
| Bias Current | $I_{Bias}$ | $V_{CC}$ = 6V | — | 0.8 | 1.8 | mA |
| Current Proportional Constant | K | $V_{CC}$ = 6V, $DI_4$ = 40mA | 35 | 40 | 45 | |
| Saturation Voltage | $V_{sat}$ | $V_{CC}$ = 4.2V, Ra = 5.0Ω | — | 1.15 | 2 | V |
| Voltage Characteristics (1) | $\frac{\Delta V_{REF}}{V_{REF}}/V_{CC}$ | $V_{CC}$ = 3.5V ~ 14V, Ra = 1kΩ | — | – 0.1 | — | %/V |
| Voltage Characteristics (2) | $\frac{\Delta K}{K}/V_{CC}$ | $V_{CC}$ = 3.5V ~ 14V, $DI_4$ = 40mA | — | 0.2 | — | %/V |
| Current Characteristics (1) | $\frac{\Delta V_{REF}}{V_{REF}}/I_4$ | $I_4$ = 50mA ~ 200mA | — | – 0.02 | — | %/mA |
| Current Characteristics (2) | $\frac{\Delta K}{K}/I_4$ | $I_4$ = 50mA ~ 200mA | — | – 0.01 | — | %/mA |
| Temperature Characteristics (1) | $\frac{\Delta V_{REF}}{V_{REF}}/Ta$ | Ta = –20˚C ~ 75˚C, $V_{CC}$ = 6V, Ra = 1kΩ | — | 0.01 | — | %/˚C |
| Temperature Characteristics (2) | $\frac{\Delta K}{K}/Ta$ | Ta = –20˚C ~ 75˚C, $DI_4$ = 40mA | — | 0.01 | — | %/˚C |

## ■ Characteristics Curve




## ■ Application Circuit




Motor Constants
- Ka : Electromotive force constant = 1.1mV/rpm
- Ra : Internal resistor = 5Ω
- $K_T$ : Torque constant = 100g · cm/A

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