AN6651

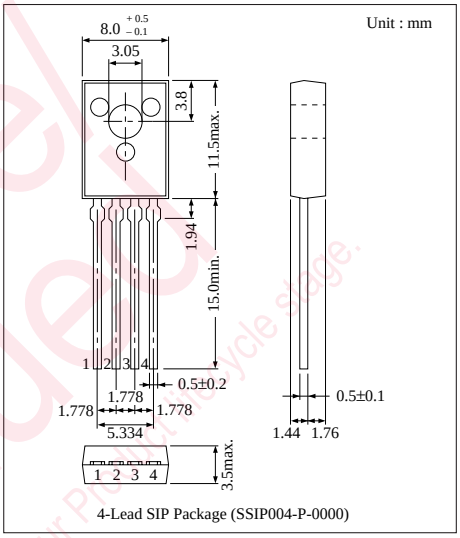
Motor Control Circuit

■ 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

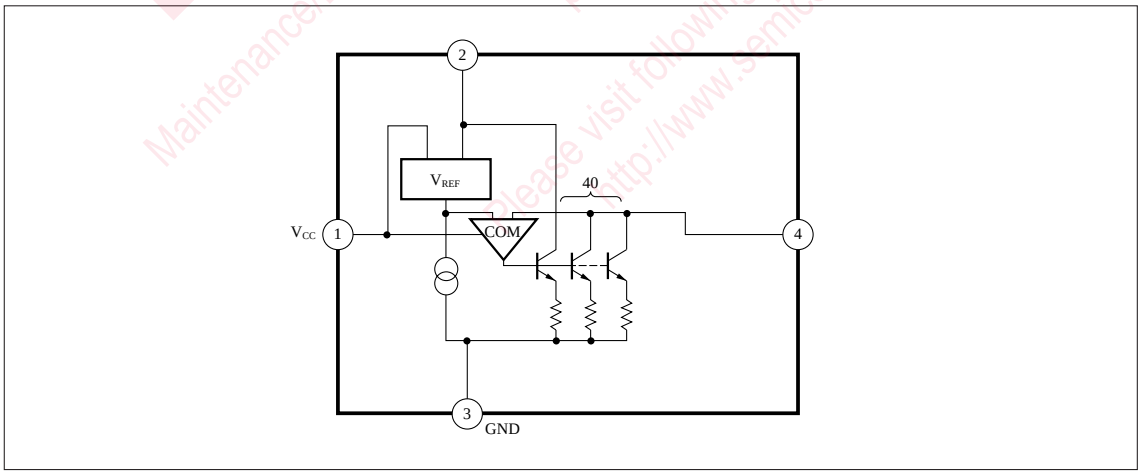


4-Lead SIP Package (SSIP004-P-0000)

■ 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)

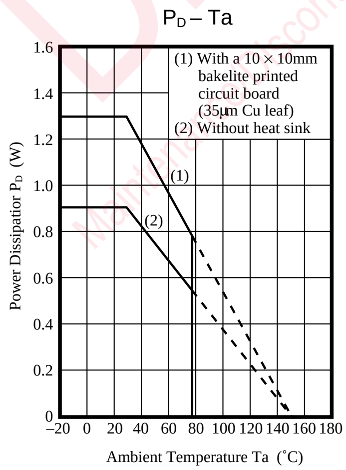
Parameter	Symbol	Rating	Unit
Supply Voltage	V_{CC}	14.4	V
Supply Current	I_{CC} *2	2000	mA
Power Dissipation	P_D *1	1300	mW
Operating Ambient Temperature	T_{opr}	–20 ~ + 75	˚C
Storage Temperature	T_{stg}	– 40 ~ +150	˚C

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

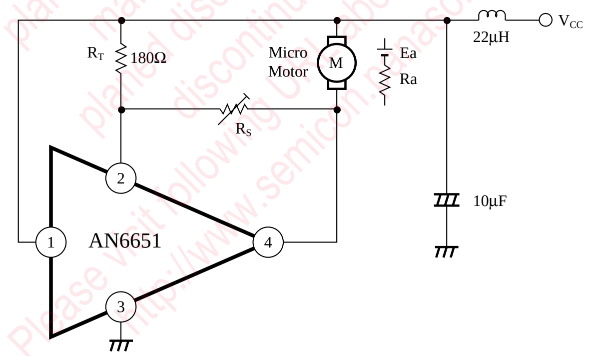
■ Electrical Characteristics (Ta = 25˚C)

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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