AN6651

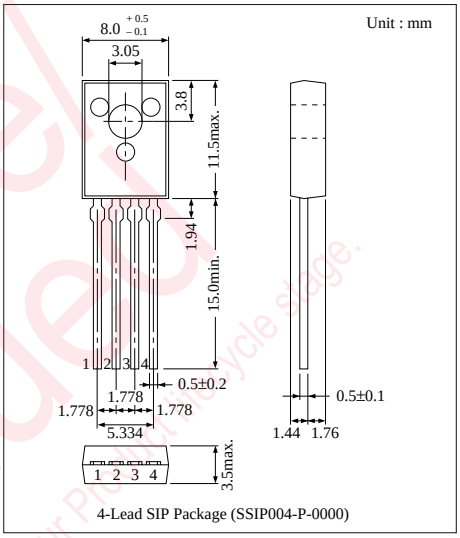
Motor Control Circuit

■ 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

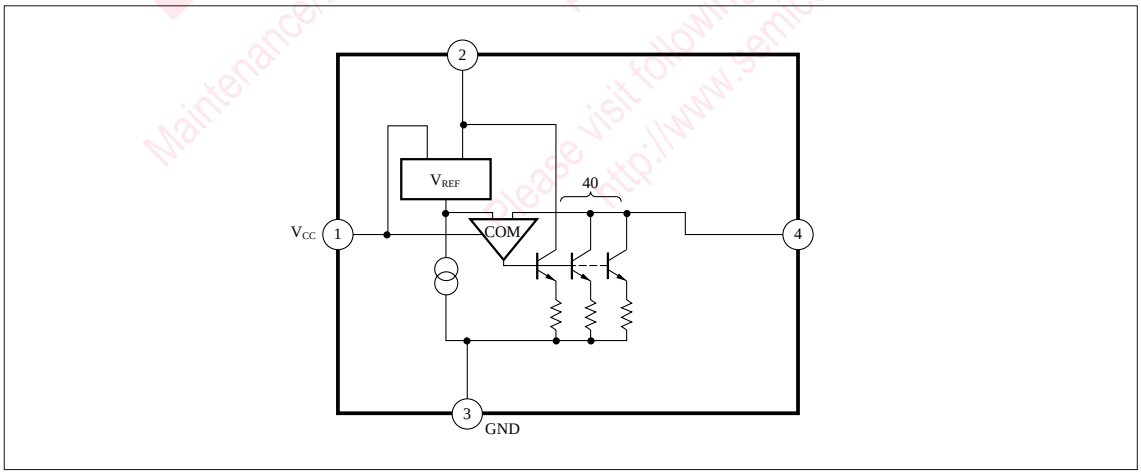


4-Lead SIP Package (SSIP004-P-0000)

■ Pin Descriptions

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

■ Block Diagram



Maintenance/Discontinued
Maintenance/Discontinued includes following four Product Life Cycle stage.
planed maintenance type
maintenance type
planed discontinued type
discontinued type
Please visit following URL about latest information.
http://www.semicon.panasonic.co.jp/en/

■ Absolute Maximum Ratings (Ta= 25˚C)

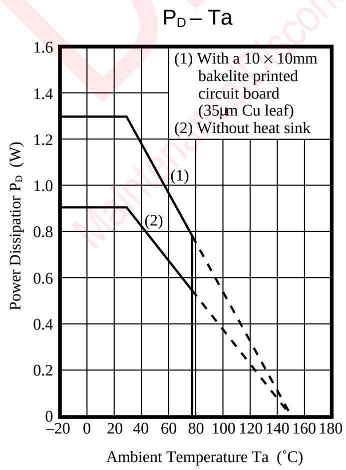
Parameter	Symbol	Rating	Unit
Supply Voltage	V_{CC}	14.4	V
Supply Current	I_{CC} *2	2000	mA
Power Dissipation	P_D *1	1300	mW
Operating Ambient Temperature	T_{opr}	–20 ~ + 75	˚C
Storage Temperature	T_{stg}	– 40 ~ +150	˚C

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

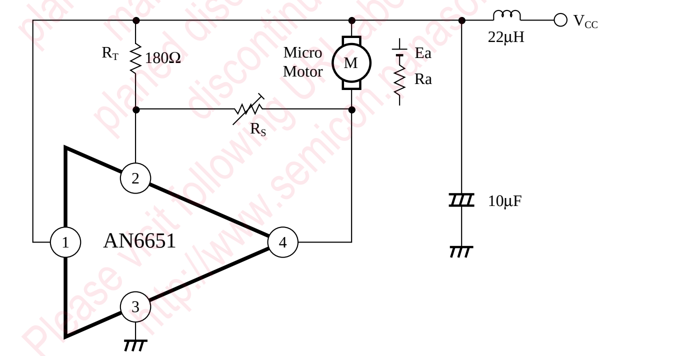
■ Electrical Characteristics (Ta = 25˚C)

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

Maintenance/Discontinued
Maintenance/Discontinued includes following four Product lifecycle stage. planed maintenance type, maintenance type, planed discontinued typed, discontinued type. Please visit following URL about latest information. http://www.semicon.panasonic.co.jp/en/

Request for your special attention and precautions in using the technical information and semiconductors described in this book

(1) If any of the products or technical information described in this book is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially, those with regard to security export control, must be observed.

(2) The technical information described in this book is intended only to show the main characteristics and application circuit examples of the products, and no license is granted under any intellectual property right or other right owned by our company or any other company. Therefore, no responsibility is assumed by our company as to the infringement upon any such right owned by any other company which may arise as a result of the use of technical information described in this book.

(3) The products described in this book are intended to be used for standard applications or general electronic equipment (such as office equipment, communications equipment, measuring instruments and household appliances).
Consult our sales staff in advance for information on the following applications:
- Special applications (such as for airplanes, aerospace, automobiles, traffic control equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
- Any applications other than the standard applications intended.

(4) The products and product specifications described in this book are subject to change without notice for modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.

(5) When designing your equipment, comply with the range of absolute maximum rating and the guaranteed operating conditions (operating power supply voltage and operating environment etc.). Especially, please be careful not to exceed the range of absolute maximum rating on the transient state, such as power-on, power-off and mode-switching. Otherwise, we will not be liable for any defect which may arise later in your equipment.
 Even when the products are used within the guaranteed values, take into the consideration of incidence of break down and failure mode, possible to occur to semiconductor products. Measures on the systems such as redundant design, arresting the spread of fire or preventing glitch are recommended in order to prevent physical injury, fire, social damages, for example, by using the products.

(6) Comply with the instructions for use in order to prevent breakdown and characteristics change due to external factors (ESD, EOS, thermal stress and mechanical stress) at the time of handling, mounting or at customer's process. When using products for which damp-proof packing is required, satisfy the conditions, such as shelf life and the elapsed time since first opening the packages.

(7) This book may be not reprinted or reproduced whether wholly or partially, without the prior written permission of Matsushita Electric Industrial Co., Ltd.

Maintenance/Discontinued
Maintenance/Discontinued includes following Products
planed maintenance type
maintenance type
planed discontinued type
discontinued type
Please visit following URL about latest information.
http://www.semicon.panasonic.co.jp/en/