

**MOTOR CONTROL CIRCUIT****AM6651B****General Description**

The AM6651B is a monolithic integrated circuit that provides motor speed control, reverse voltage protection, and stable reference voltage. This IC is specially designed for tape recorder and recorder player.

The AM6651B is available in plastic TO-126B package.

**Features**

- Small 4-lead Plastic Package for Compact Motor
- Few External Components
- Stable Low Reference Voltage (1.0V, Typ)
- Wide Motor Speed Control
- Highly Stable Operation over a Wide Range of Supply Voltage,  $V_{CC}=3.5V$  to 14.4V
- Reverse Voltage Protection Circuit Built-in

**Applications**

- Tape Recorder
- Recorder Player

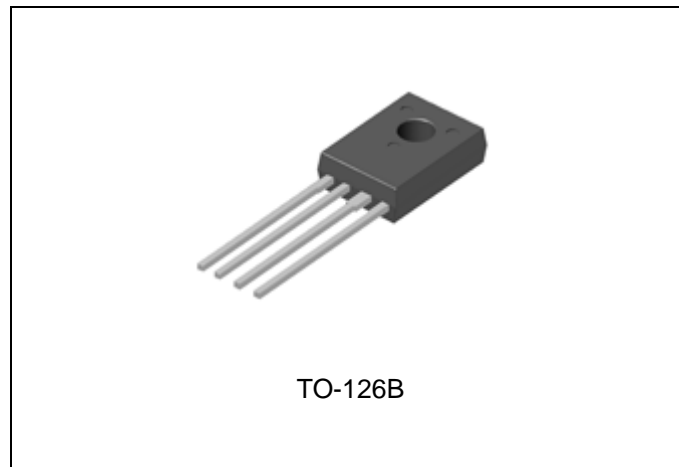


Figure 1. Package Type of AM6651B



**MOTOR CONTROL CIRCUIT**

**AM6651B**

**Pin Configuration**

U Package  
(TO-126B)

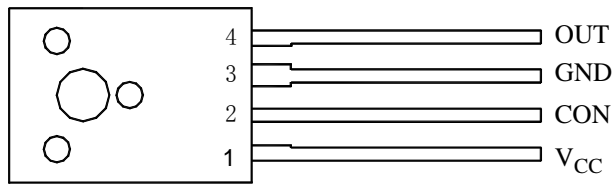


Figure 2. Pin Configuration of AM6651B (Top View)

**Pin Description**

Pin Number	Pin Name	Function
1	V <sub>CC</sub>	Supply voltage
2	CON	Control pin
3	GND	Ground
4	OUT	Output



**MOTOR CONTROL CIRCUIT**

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**Functional Block Diagram**

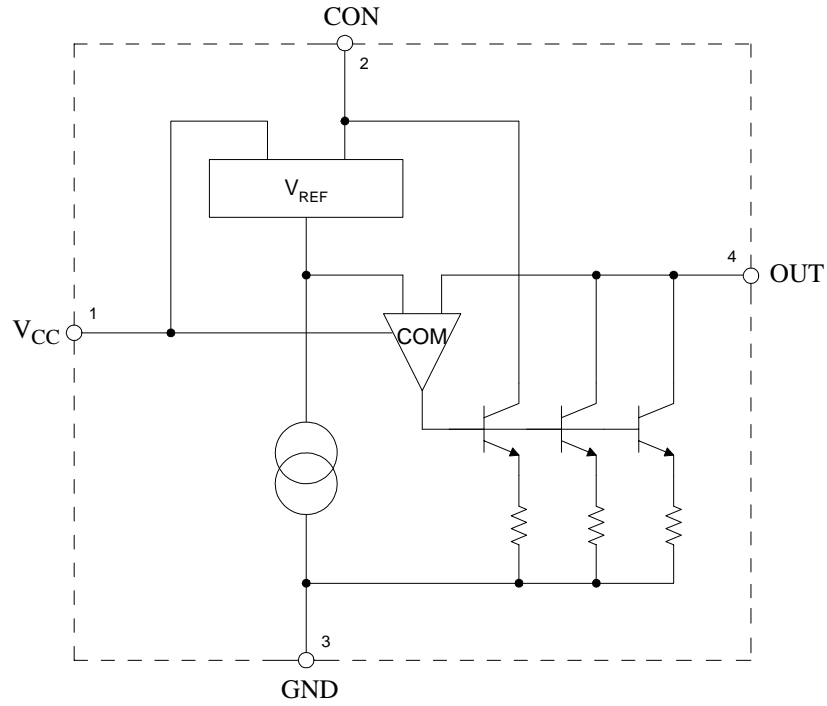
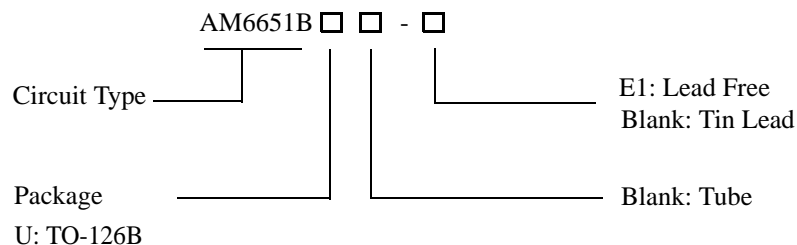


Figure 3. Functional Block Diagram of AM6651B

**MOTOR CONTROL CIRCUIT****AM6651B****Ordering Information**

Package	Temperature Range	Part Number		Marking ID		Packing Type
		Tin Lead	Lead Free	Tin Lead	Lead Free	
TO-126B	0 to 70 °C	AM6651BU	AM6651BU-E1	AM6651BU	AM6651BU-E1	Tube

BCD Semiconductor's Pb-free products, as designated with "E1" suffix in the part number, are RoHS compliant.

**Absolute Maximum Ratings (Note 1)**

Parameter	Symbol	Value	Unit
Supply Voltage	$V_{CC}$	16	V
Supply Current	$I_{CC}$	500 (Note 2)	mA
Power Dissipation	$P_D$	1300	mW
Storage Temperature Range	$T_{STG}$	-40 to 150	°C

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

Note 2: The transient startup/shutdown current is allowed to exceed 1.0A.

**Recommended Operating Conditions**

Parameter	Symbol	Min	Max	Unit
Supply Voltage	$V_{CC}$	3.5	14.4	V
Operating Temperature	$T_A$	0	70	°C

**MOTOR CONTROL CIRCUIT****AM6651B****Electrical Characteristics**(V<sub>CC</sub>=6V, T<sub>A</sub>=25°C, unless otherwise specified.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reference Voltage	V <sub>REF</sub>	V <sub>CC</sub> =6V, R <sub>A</sub> =1kΩ (Figure 6)	0.90	1.0	1.10	V
Bias Current	I <sub>BIAS</sub>	V <sub>CC</sub> =6V (Figure 5)		0.9	1.8	mA
Current Coefficient	K	V <sub>CC</sub> =6V, ΔI <sub>4</sub> =40mA (Figure 4) (Note 3)	35		45	
Saturation Voltage	V <sub>SAT</sub>	V <sub>CC</sub> =4.2V, R <sub>A</sub> =5Ω		1.06	2	V
Voltage Characteristic of Reference Voltage	(ΔV <sub>REF</sub> /V <sub>REF</sub> )/ΔV <sub>CC</sub>	V <sub>CC</sub> =3.5 to 14V, R <sub>A</sub> =1kΩ		-0.02		%/V
Voltage Characteristic of Current Coefficient	(ΔK/K)/ΔV <sub>CC</sub>	V <sub>CC</sub> =3.5 to 14V, ΔI <sub>4</sub> =40mA		0.39		%/V
Current Characteristic of Reference Voltage	(ΔV <sub>REF</sub> /V <sub>REF</sub> )/ΔI <sub>4</sub>	I <sub>4</sub> =50 to 200mA		-0.06		%/mA
Current Characteristic of Current Coefficient	(ΔK/K)/ΔI <sub>4</sub>	I <sub>4</sub> =50 to 200mA		-0.01		%/mA
Temperature Characteristic of Reference Voltage	(ΔV <sub>REF</sub> /V <sub>REF</sub> )/ΔT <sub>A</sub>	V <sub>CC</sub> =6V, R <sub>A</sub> =1kΩ T <sub>A</sub> =0 to 70 °C		0.01		%/ °C
Temperature Characteristic of Current Coefficient	(ΔK/K)/ΔT <sub>A</sub>	V <sub>CC</sub> =6V, ΔI <sub>4</sub> =40mA T <sub>A</sub> =0 to 70 °C		0.01		%/ °C

Note 3: I<sub>4</sub> is the motor driver current, please see Figures 4 and 5.



**MOTOR CONTROL CIRCUIT**

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**Test Circuits**

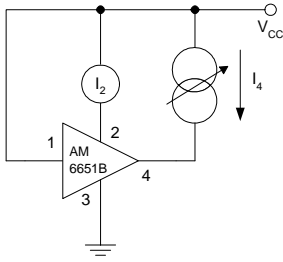


Figure 4. Test Circuit 1 ( $K = \Delta I_4 / \Delta I_2$ )

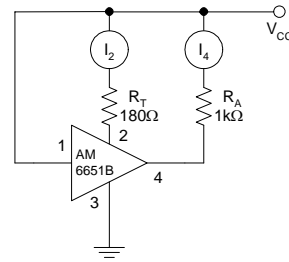


Figure 5. Test Circuit 2 ( $I_{BIAS} = I_2 - I_4 / K$ )

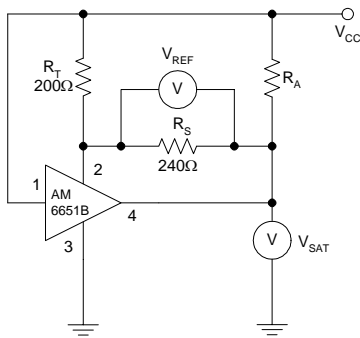


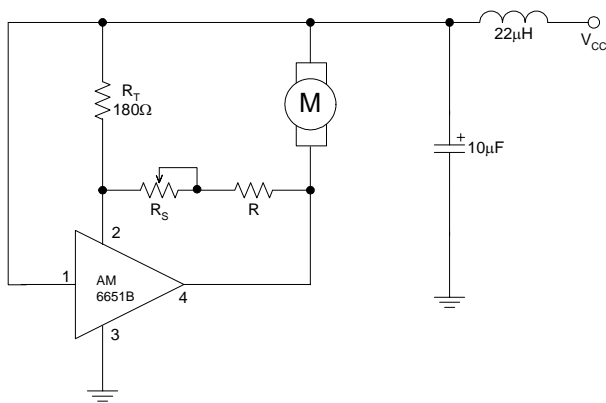
Figure 6. Test Circuit 3



**MOTOR CONTROL CIRCUIT**

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**Typical Application**



Motor (6V DC Motor) constants  
 $K_A$ : Electromotive force constant  
= 1.1mV/rpm  
 $R_A$ : Internal resistor = 5Ω  
 $K_T$ : Torque constant = 100g.cm/A

Figure 7. Typical Application of AM6651B



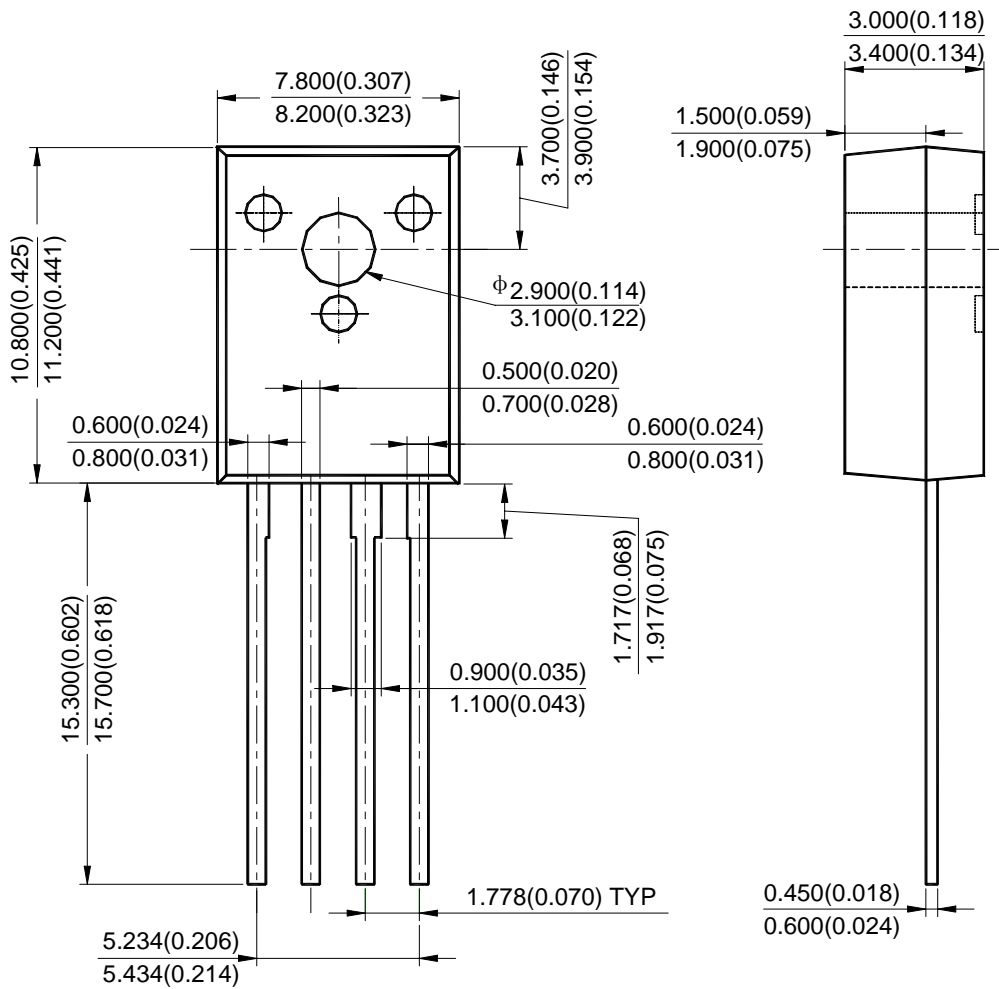
**MOTOR CONTROL CIRCUIT**

**AM6651B**

**Mechanical Dimensions**

**TO-126B**

**Unit: mm(inch)**







BCD Semiconductor Manufacturing Limited

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