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|---|----------|----------------|
| SANYO | No. 4954 | LB1674M |
| Brushless, Sensorless Motor Driver | | |

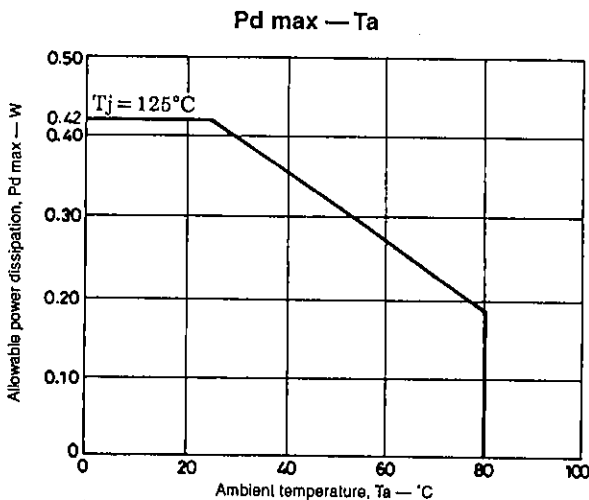
Overview

The LB1674M is a motor driver IC which is ideal for minicassette player, headphone stereo, and microcassette player applications.

Functions and Features

- Brushless, sensorless motor drive (3-phase unipole drive)
- Forward/Reverse direction
- Speed control function built-in (V-servo)
- Reference voltage built-in (0.5V)
- Soft switching drive

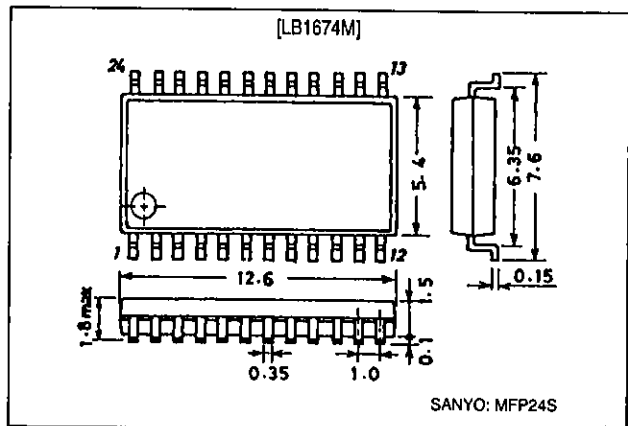
Performance Characteristics



Package Dimensions

Unit: mm

3112-MFP24S



Specifications

Absolute Maximum Ratings at Ta = 25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|------------------------------------|----------------------|------------------------|-------------|------|
| Maximum supply voltage | V _{CC} max | | 5 | V |
| Output transistor blocking voltage | V _O (sus) | | 10 | V |
| Maximum output current | I _m max | | 0.6 | A |
| Allowable power dissipation | P _d max | T _j = 125°C | 0.42 | W |
| Operating temperature | T _{opr} | | 0 to 80 | °C |
| Storage temperature | T _{stg} | | -40 to +125 | °C |

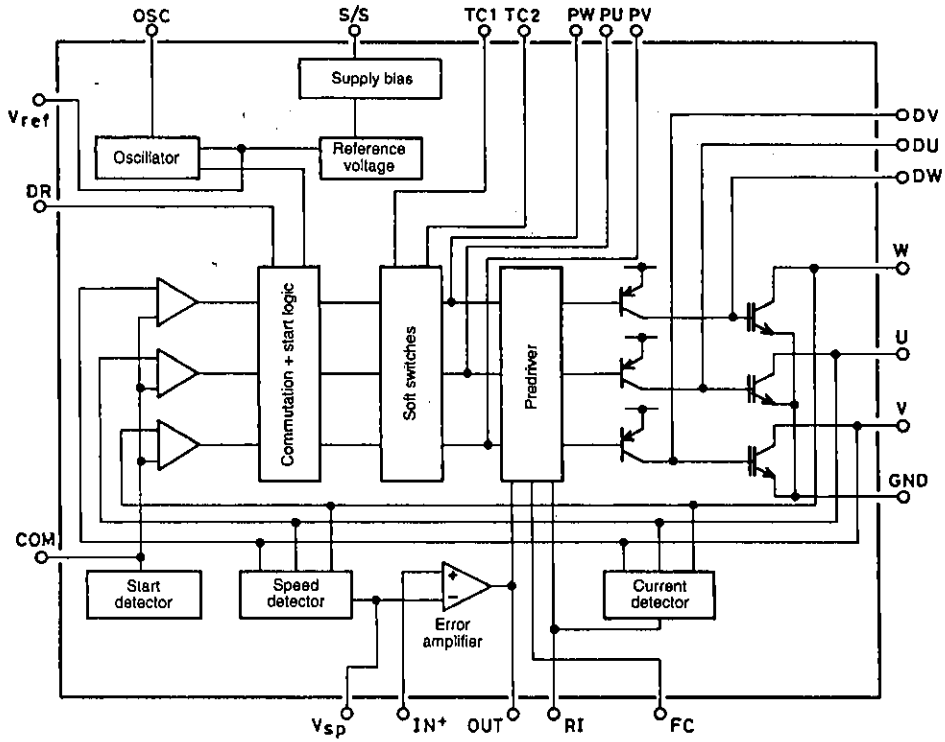
Allowable Operating Ranges at Ta = 25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|----------------|-----------------|------------|------------|------|
| Supply voltage | V _{CC} | | 1.0 to 3.5 | V |

Electrical Characteristics at Ta = 25°C, V_{CC} = 1.5V, specified test circuit

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---------|-------|------|-------|
| | | | min | typ | max | |
| Supply current | I _{CC} | START = HIGH | - | 6.5 | 10 | mA |
| | | START = LOW | - | 0 | 10 | μA |
| Reference voltage | V _{ref} | | 0.47 | 0.50 | 0.53 | V |
| Voltage characteristic of reference voltage | $\frac{\Delta V_{ref}}{V_{ref}} \times \frac{1}{\Delta V_{CC}}$ | V _{CC} = 1.0 to 3.5V | - | 1 | 1.5 | %/V |
| Load characteristic of reference voltage | $\frac{\Delta V_{ref}}{\Delta I_{ref}}$ | I _{ref} = 0 to -50μA | -0.2 | -0.06 | - | mV/μA |
| Temperature characteristic of reference voltage | $\frac{\Delta V_{ref}}{V_{ref}} \times \frac{1}{\Delta T_a}$ | T _a = 0 to 80°C | - | 0.01 | - | %/°C |
| Speed signal detector accuracy | V _{sp} | V _{IN} = 750mV | 140 | 155 | 170 | mV |
| Speed signal interphase error | | | -5 | - | +5 | % |
| Voltage characteristic of speed signal | $\frac{\Delta V_{sp}}{V_{sp}} \times \frac{1}{\Delta V_{CC}}$ | V _{CC} = 1.0 to 3.5V | - | 2 | 3 | %/V |
| Temperature characteristic of speed signal | $\frac{\Delta V_{sp}}{V_{sp}} \times \frac{1}{\Delta T_a}$ | V _{IN} = 0.75V, T _a = 0 to 80°C | - | 0.05 | - | %/°C |
| Current detector sensitivity | V _{RI} | V _{IN1} = 0.3V, V _{IN2} = 1.0V, R _I = 330Ω | 70 | 85 | 100 | mV |
| Current detection ratio | K _I | V _{IN1} = 0.3V, V _{IN2} = 1 to 1.3V | 0.17 | 0.22 | 0.27 | |
| Start pulse cycle time | T _s | C _s = 0.1μF | - | 32 | - | ms |
| COM _⊖ pull-in current | I _{COM_⊖} | | 25 | 35 | 45 | μA |
| Output saturation voltage | V _{sat} | V _{CC} = 1.0V, I _m = 0.3A | - | 0.15 | 0.25 | V |
| HIGH-level logic input voltage | V _H | | 0.9 | - | - | V |
| LOW-level logic input voltage | V _L | | - | - | 0.3 | V |
| TC pin pull-in current | I _{TC} | | 35 | 50 | 65 | μA |

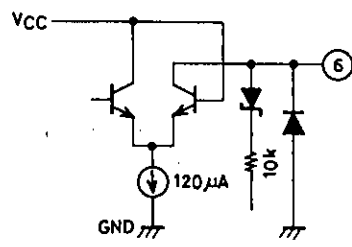
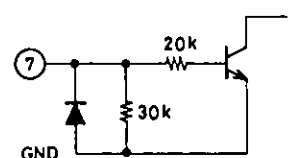
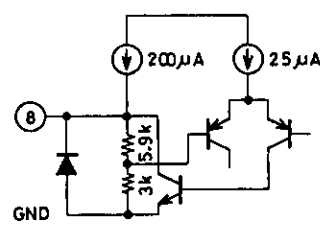
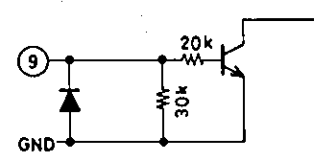
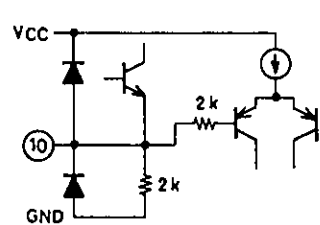
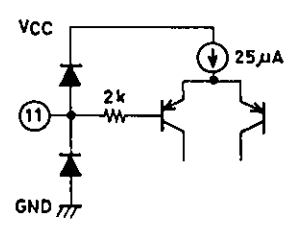
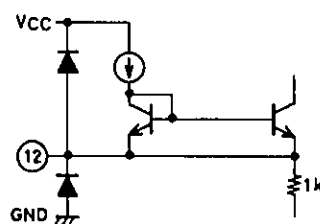
Block Diagram



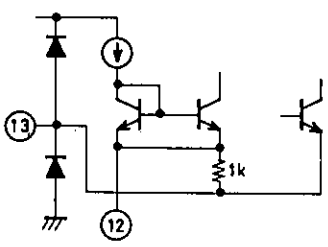
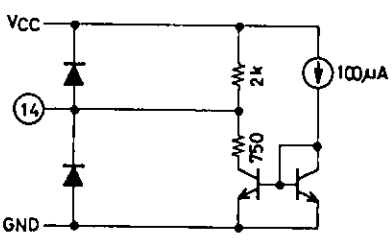
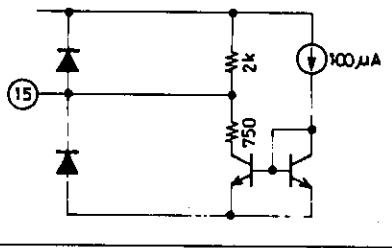
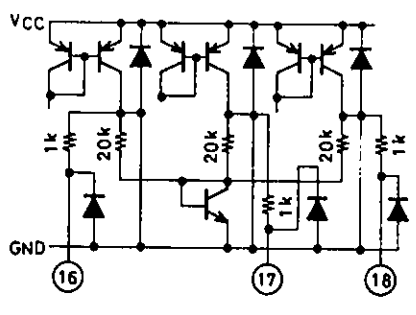
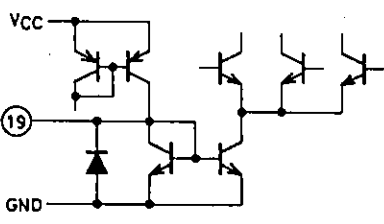
Pin Functions

| Number | Name | Equivalent circuit ¹ | Function |
|---------------|----------------|---------------------------------|---------------------------------------|
| 1 3 23 | V W U | | Motor coil connection pins |
| 2 22 24 | DW DU DV | | Power transistor base connections |
| 4 | GND | | Common power ground and signal ground |
| 5 | OSC | | Start pulse cycle time set pin |

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| Number | Name | Equivalent circuit ¹ | Function |
|--------|---------------|---|--|
| 6 | COM \ominus |  | Start waveform detector circuit offset set pin |
| 7 | DR |  | Rotation direction switching control pin (forward when LOW) |
| 8 | Vref |  | Reference voltage pin (0.5V) |
| 9 | START |  | Start/Stop pin. Active HIGH |
| 10 | Vsp |  | Speed signal (motor induced voltage) detector |
| 11 | IN* |  | Speed signal error amplifier reference input pin |
| 12 | OUT |  | Speed signal error amplifier output pin. Motor current feedback control. |

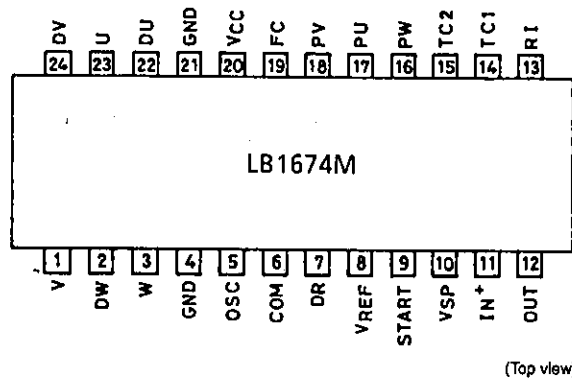
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| Number | Name | Equivalent circuit ¹ | Function |
|----------------|-----------------|---|---|
| 13 | RI |  | Motor current detector pin |
| 14 | TC1 |  | Motor current rising/falling slope set pin (for soft switching operation) |
| 15 | TC2 |  | Motor current rising/falling slope set pin (for soft switching operation) |
| 16 17 18 | PW PU PV |  | Current waveform generator. These pins are for measuring the internal operation. Always left open for normal use. |
| 19 | FC |  | Noise and abnormal oscillation stop pin |
| 20 | V _{CC} | | Supply pin |
| 21 | GND | | Common power ground and signal ground |

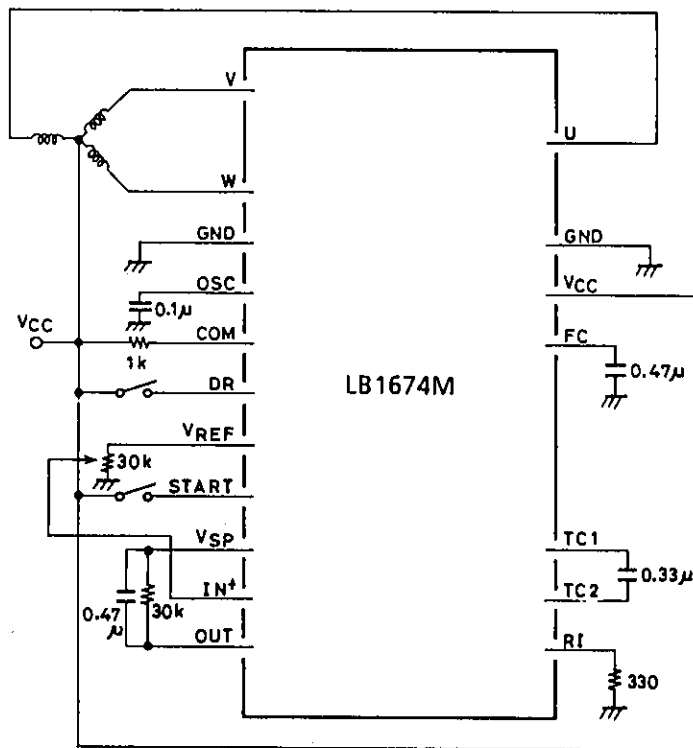
1. Unit (resistance: Ω)

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Pin Assignment



Sample Peripheral Circuit ($V_{CC} = 1.5V$)



Pins PU, PV and PW are for internal measurement.

Unit (resistance: Ω , capacitance: F)

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