

SANYO	No. 4954	LB1674M
	Brushless, Sensorless Motor Driver	

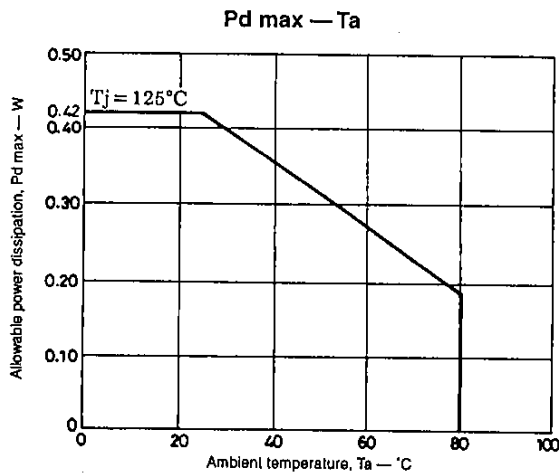
Overview

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

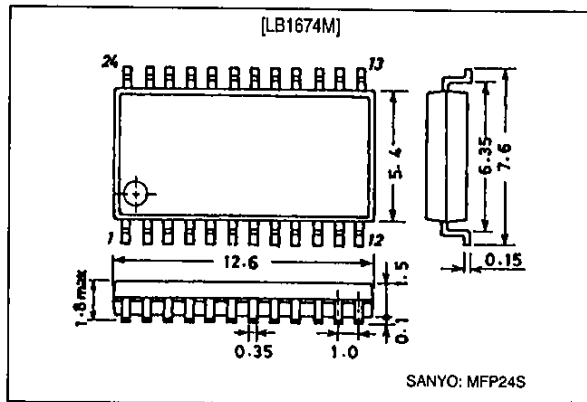
Performance Characteristics



Package Dimensions

Unit: mm

3112-MFP24S



Specifications

Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC\text{ max}}$		5	V
Output transistor blocking voltage	$V_O\text{ (sus)}$		10	V
Maximum output current	$I_m\text{ max}$		0.6	A
Allowable power dissipation	$P_d\text{ max}$	$T_J = 125^\circ\text{C}$	0.42	W
Operating temperature	T_{opr}		0 to 80	$^\circ\text{C}$
Storage temperature	T_{stg}		-40 to +125	$^\circ\text{C}$

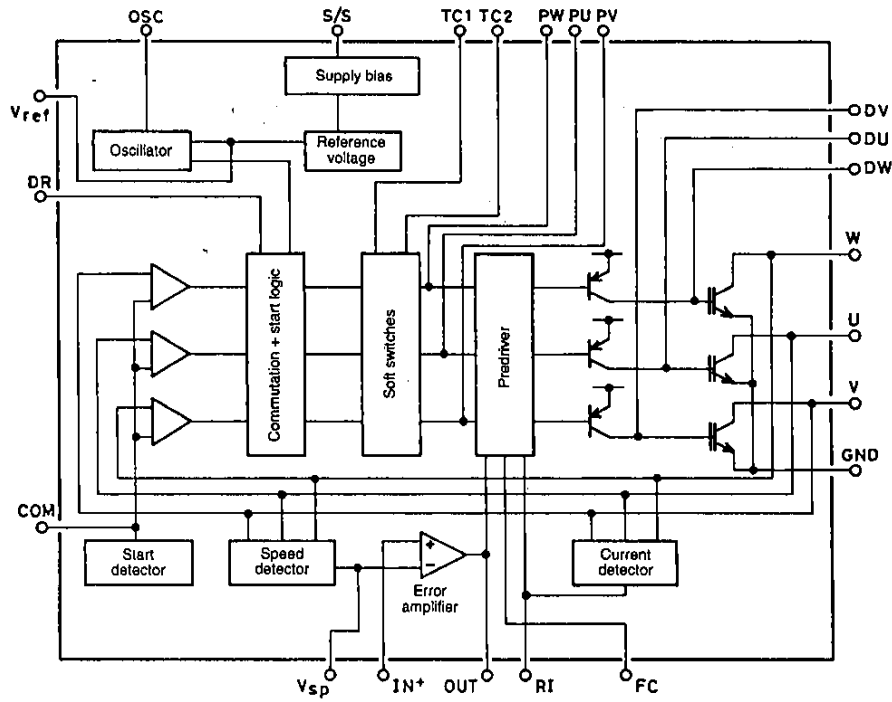
Allowable Operating Ranges at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V_{CC}		1.0 to 3.5	V

Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 1.5\text{V}$, 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	$\frac{\Delta V_{ref}}{V_{ref}} \times \frac{1}{\Delta V_{CC}}$	$V_{CC} = 1.0\text{ to }3.5\text{V}$	-	1	1.5	$\%/V$
Load characteristic of reference voltage	$\frac{\Delta V_{ref}}{\Delta I_{ref}}$	$I_{ref} = 0\text{ to }-50\mu\text{A}$	-0.2	-0.06	-	$\text{mV}/\mu\text{A}$
Temperature characteristic of reference voltage	$\frac{\Delta V_{ref}}{V_{ref}} \times \frac{1}{\Delta T_a}$	$T_a = 0\text{ to }80^\circ\text{C}$	-	0.01	-	$\%/^\circ\text{C}$
Speed signal detector accuracy	V_{sp}	$V_{IN} = 750\text{mV}$	140	155	170	mV
Speed signal interphase error			-5	-	+5	%
Voltage characteristic of speed signal	$\frac{\Delta V_{sp}}{V_{sp}} \times \frac{1}{\Delta V_{CC}}$	$V_{CC} = 1.0\text{ to }3.5\text{V}$	-	2	3	$\%/V$
Temperature characteristic of speed signal	$\frac{\Delta V_{sp}}{V_{sp}} \times \frac{1}{\Delta T_a}$	$V_{IN} = 0.75\text{V}, T_a = 0\text{ to }80^\circ\text{C}$	-	0.05	-	$\%/^\circ\text{C}$
Current detector sensitivity	V_{RI}	$V_{IN1} = 0.3\text{V}, V_{IN2} = 1.0\text{V}, R_I = 330\Omega$	70	85	100	mV
Current detection ratio	K_I	$V_{IN1} = 0.3\text{V}, V_{IN2} = 1\text{ to }1.3\text{V}$	0.17	0.22	0.27	
Start pulse cycle time	T_s	$C_S = 0.1\mu\text{F}$	-	32	-	ms
COM \ominus pull-in current	$I_{COM\ominus}$		25	35	45	μA
Output saturation voltage	V_{sat}	$V_{CC} = 1.0\text{V}, I_m = 0.3\text{A}$	-	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



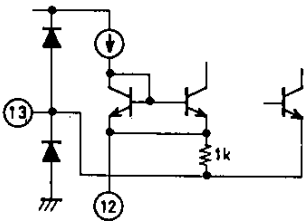
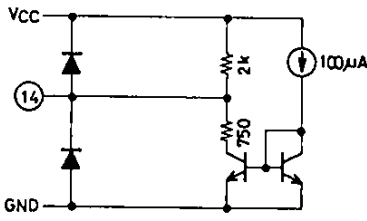
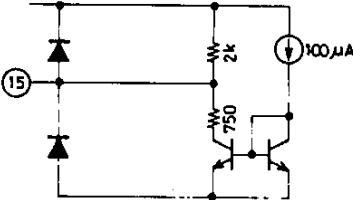
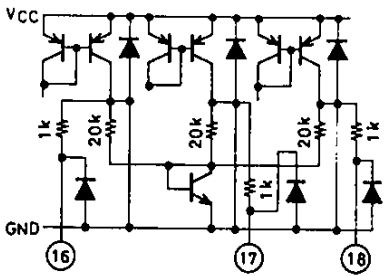
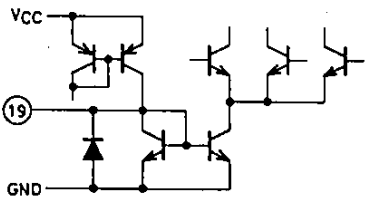
Pin Functions

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.

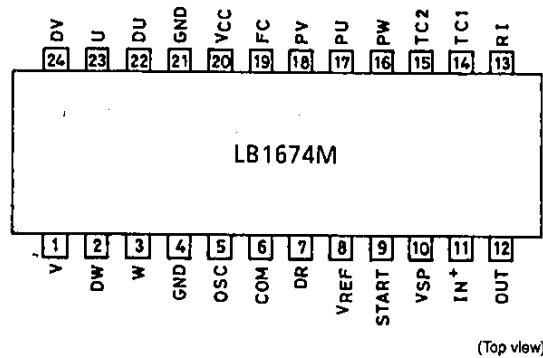
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Number	Name	Equivalent circuit ¹	Function
13	RI		Motor current detector pin
14	TC1		Motor current rising/falling slope set pin (for soft switching operation)
15	TC2		Motor current rising/falling slope set pin (for soft switching operation)
16 17 18	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

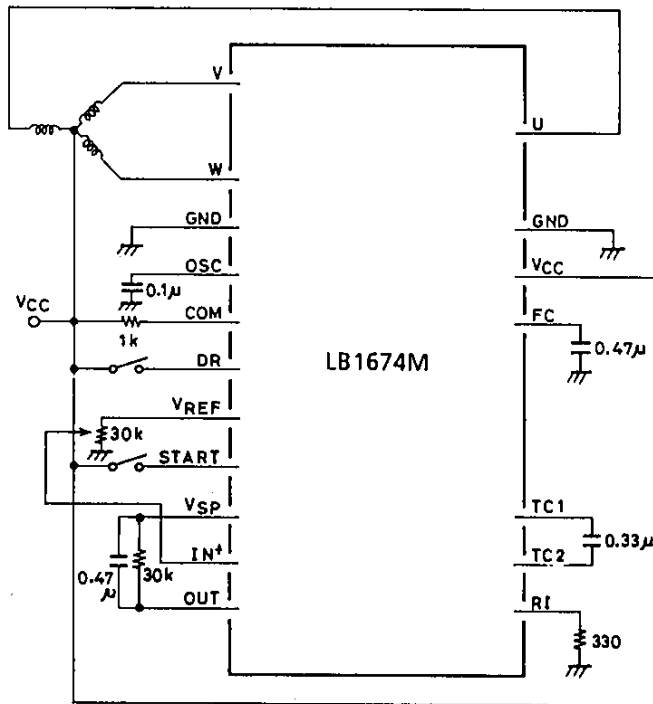
1. Unit (resistance: Ω)

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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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