



LB1674V

Brushless, Sensorless Motor Driver

Overview

The LB1674V is a small motor driver ideal for mini-cassettes, headphone stereos and micro-cassettes.

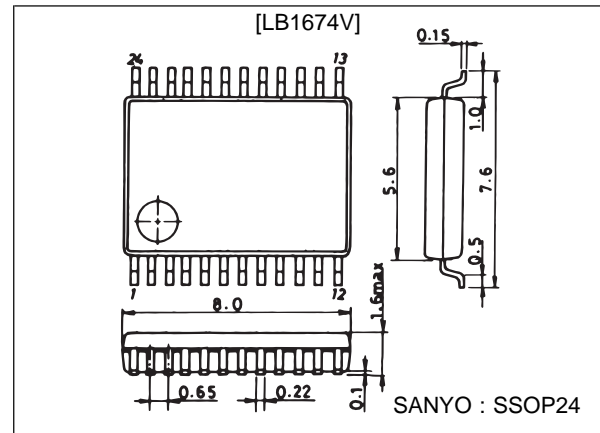
Functions and Features

- 3-phase unipolar, brushless, sensorless motor driver
- Reverse function
- Built-in speed control function (V servo)
- Built-in reference voltage (0.5 V)
- Soft switching driver

Package Dimensions

unit : mm

3175A-SSOP24



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 withstand voltage	V_{sus}		10	V
Maximum output current	$I_m \text{ max}$		0.6	A
Allowable power dissipation	$P_d \text{ max}$	$T_j = 125^\circ\text{C}$	0.4	W
Operating temperature	T_{opr}		0 to + 80	$^\circ\text{C}$
Storage temperature	T_{stg}		-40 to + 125	$^\circ\text{C}$

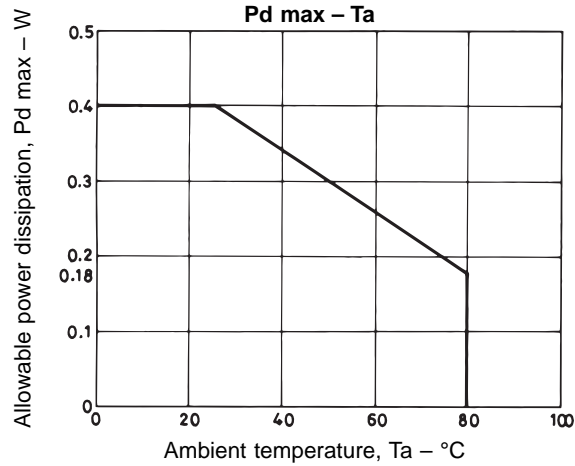
Allowable Operating Range at $T_a = 25^\circ\text{C}$

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

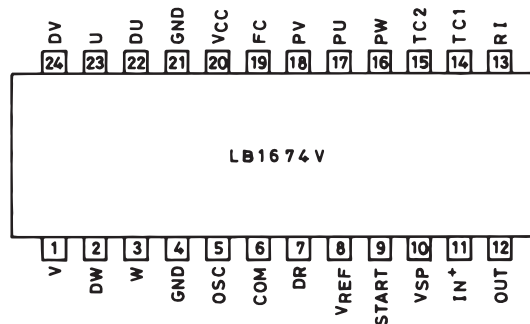
LB1674V

Electrical Characteristics at Ta = 25°C, VCC = 1.5 V, unless otherwise noted

Parameter	Symbol	Conditions	min	typ	max	Unit
Supply current	I _{CC}	START pin: high		6.5	10	mA
		START pin: low		0	10	μA
Reference voltage	V _{ref}		0.47	0.50	0.53	V
Reference-voltage characteristic	$\frac{\Delta V_{ref}}{V_{ref}} / \Delta V_{CC}$	V _{CC} = 1.0 to 3.5 V		1	1.5	%/V
Reference-voltage load characteristics	$\frac{\Delta V_{ref}}{\Delta I_{ref}}$	I _{ref} = 0 to -50 μA	-0.2	-0.06		mV/μA
Reference-voltage temperature characteristics	$\frac{\Delta V_{ref}}{V_{ref}} / \Delta T_a$	T _a = 0 to 80°C		0.01		%/°C
Speed signal detection accuracy	V _{sp}	V _{IN} = 750 mV	140	155	170	mV
Speed signal interphase error			-5		+5	%
Speed-signal voltage characteristics	$\frac{\Delta V_{sp}}{V_{sp}} / \Delta V_{CC}$	V _{CC} = 1.0 to 3.5 V		2	3	%/V
Speed-signal temperature characteristics	$\frac{\Delta V_{sp}}{V_{sp}} / \Delta T_a$	V _{IN} = 0.75 V, T _a = 0 to 80°C		0.05		%/°C
Current detection accuracy	V _{RI}	V _{IN1} = 0.3 V, V _{IN2} = 1.0 V, R _I = 330 Ω	70	85	100	mV
Current detection ratio	K _I	V _{IN1} = 0.3 V, V _{IN2} = 1 to 1.3 V	0.17	0.22	0.27	
Starting pulse period	T _S	C _S = 0.1 μF		32		ms
COM _⊖ lead-in current	I _{COM_⊖}		25	35	45	μA
Output saturation voltage	V _{sat}	V _{CC} = 1.0 V, I _m = 0.3 A		0.15	0.25	V
Logic input high-level voltage	V _H		0.9			V
Logic input low-level voltage	V _L				0.3	V
TC pin lead-in current	I _{TC}		35	50	65	μA

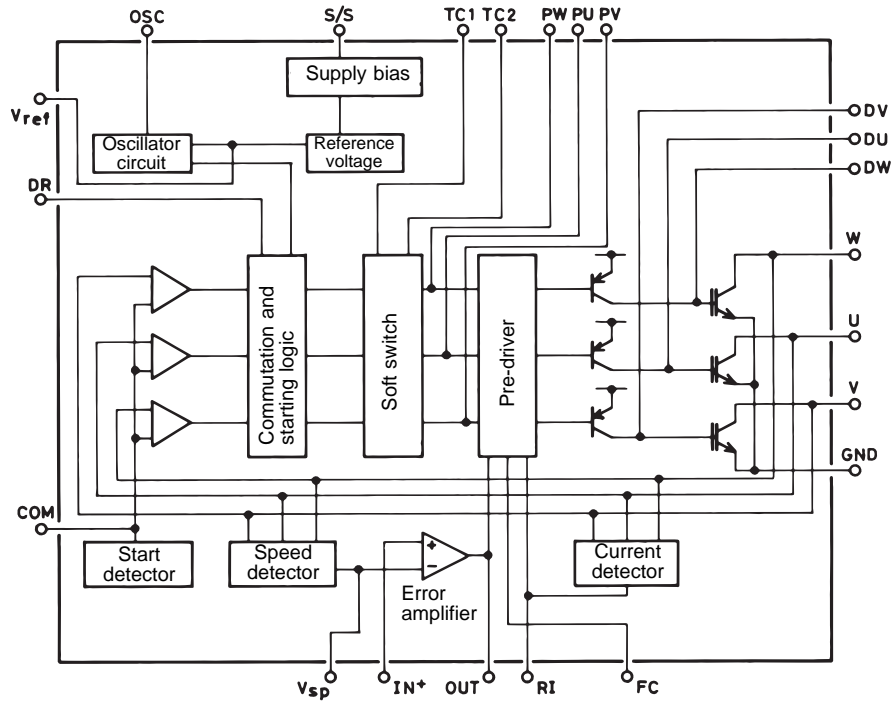


Pin Assignment

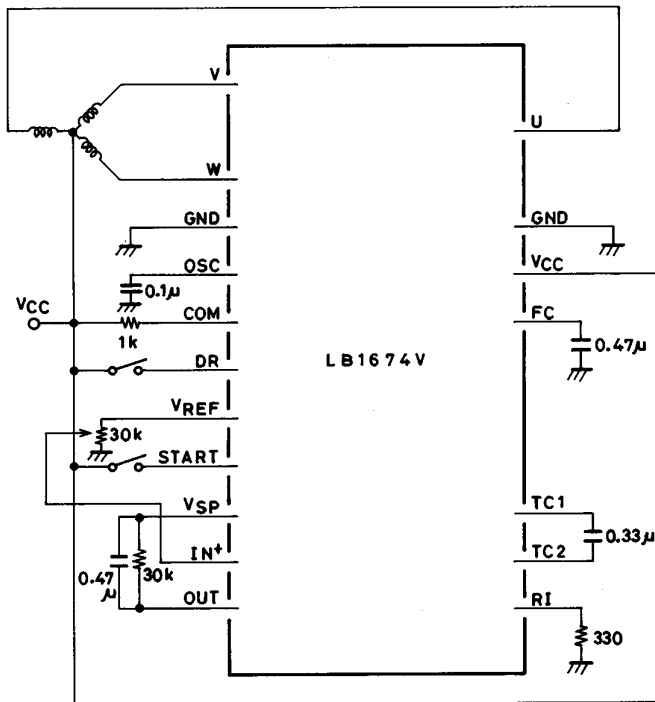


Top view

Equivalent Circuit Block Diagram



Sample Application Circuits at $V_{CC} = 1.5\text{ V}$



Note:
PU, PV and PW are internal
operation measurement pins.

Unit (resistance: Ω , capacitance: F)

LB1674V

Pin Description

Unit (resistance: Ω)

Pin Number	Pin Name	Equivalent Circuit	Description
1 3 23	V W U		<ul style="list-style-type: none"> Motor coil connection pins
2 22 24	DW DU DV		<ul style="list-style-type: none"> Power transistor base pins
4	GND		<ul style="list-style-type: none"> Power and signal ground
5	OSC		<ul style="list-style-type: none"> Starting pulse period set pin
6	COM \ominus		<ul style="list-style-type: none"> Start-up waveform detection circuit offset set pin
7	DR		<ul style="list-style-type: none"> Drive direction switch pin (normally low)
8	Vref		<ul style="list-style-type: none"> Reference voltage pin (0.5 V)
9	START		<ul style="list-style-type: none"> Start/stop control pin. Active-high
10	Vsp		<ul style="list-style-type: none"> Speed signal (motor induction voltage) detector

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LB1674V

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Unit (resistance: Ω)

Pin Number	Pin Name	Equivalent circuit	Description
11	IN ⁺		<ul style="list-style-type: none"> Speed signal error amplifier reference input pin
12	OUT		<ul style="list-style-type: none"> Speed signal error amplifier output for motor current feedback
13	RI		<ul style="list-style-type: none"> Motor current detection pin
14	TC1		<ul style="list-style-type: none"> Motor current rising/falling time constant set pins
15	TC2		<ul style="list-style-type: none"> Motor current rising/falling time constant set pins
16 17 18	PW PU PV		<ul style="list-style-type: none"> Current waveform generator. Internal operation measurement pins. Must be left open.

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LB1674V

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Unit (resistance: Ω)

Pin Number	Pin Name	Equivalent circuit	Description
19	FC		<ul style="list-style-type: none"> Abnormal oscillation stop pin
20	V _{CC}		<ul style="list-style-type: none"> Power supply
21	GND		<ul style="list-style-type: none"> Power and signal ground

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