



Brushless, Sensorless Motor Driver

Overview

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

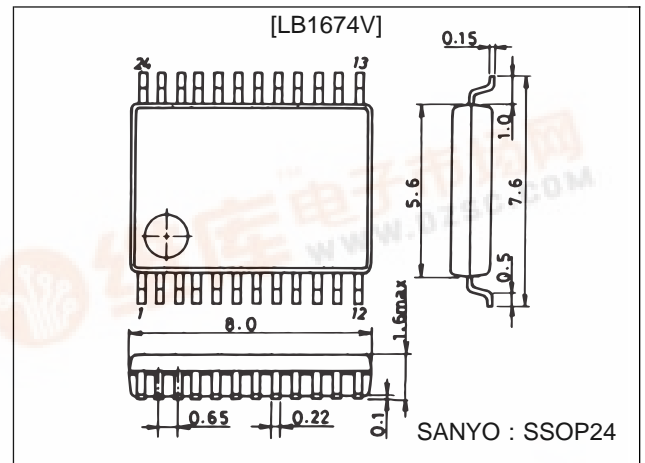
Package Dimensions

unit : mm

3175A-SSOP24

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



Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V _{CC} max		5	V
Output transistor withstand voltage	V _{sus}		10	V
Maximum output current	I _m max		0.6	A
Allowable power dissipation	P _d max	T _j = 125°C	0.4	W
Operating temperature	T _{opr}		0 to + 80	°C
Storage temperature	T _{stg}		-40 to + 125	°C

Allowable Operating Range at Ta = 25°C

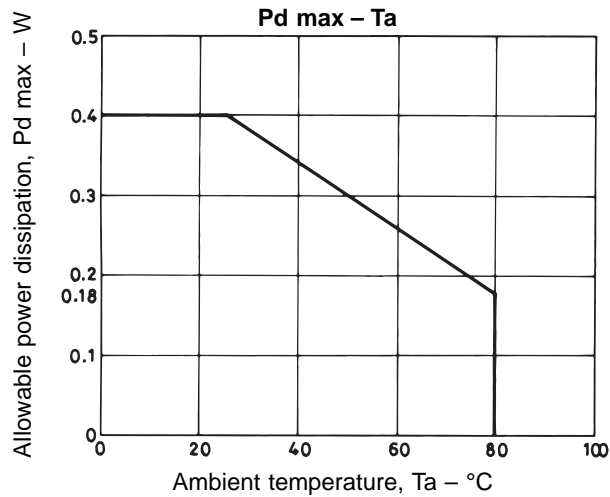
Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V _{CC}		1.0 to 3.5	V



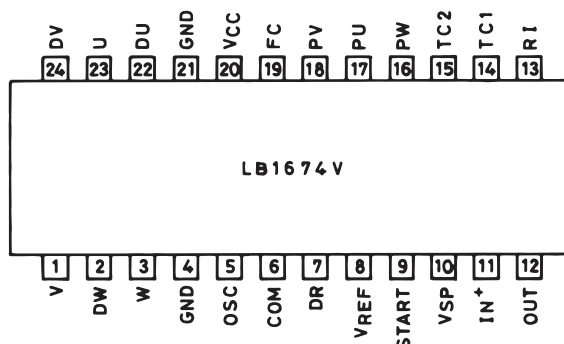
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Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 1.5\text{ V}$, unless otherwise noted

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	$\frac{\Delta V_{ref}}{V_{ref}} / \Delta V_{CC}$	$V_{CC} = 1.0\text{ to }3.5\text{ V}$		1	1.5	%/V
Reference-voltage load characteristics	$\frac{\Delta V_{ref}}{\Delta I_{ref}}$	$I_{ref} = 0\text{ to }-50\ \mu\text{A}$	-0.2	-0.06		mV/ μA
Reference-voltage temperature characteristics	$\frac{\Delta V_{ref}}{V_{ref}} / \Delta T_a$	$T_a = 0\text{ to }80^\circ\text{C}$		0.01		%/ $^\circ\text{C}$
Speed signal detection accuracy	V_{sp}	$V_{IN} = 750\text{ mV}$	140	155	170	mV
Speed signal interphase error			-5		+5	%
Speed-signal voltage characteristics	$\frac{\Delta V_{sp}}{V_{sp}} / \Delta V_{CC}$	$V_{CC} = 1.0\text{ to }3.5\text{ V}$		2	3	%/V
Speed-signal temperature characteristics	$\frac{\Delta V_{sp}}{V_{sp}} / \Delta T_a$	$V_{IN} = 0.75\text{ V}$, $T_a = 0\text{ to }80^\circ\text{C}$		0.05		%/ $^\circ\text{C}$
Current detection accuracy	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	
Starting pulse period	T_S	$C_S = 0.1\ \mu\text{F}$		32		ms
COM \ominus lead-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
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



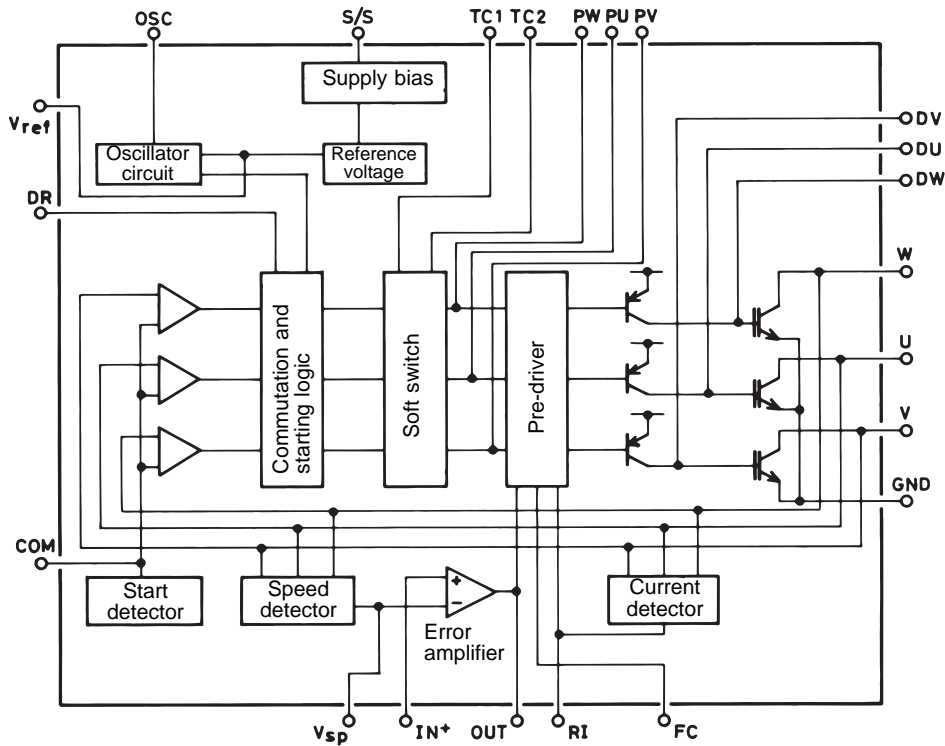
Pin Assignment



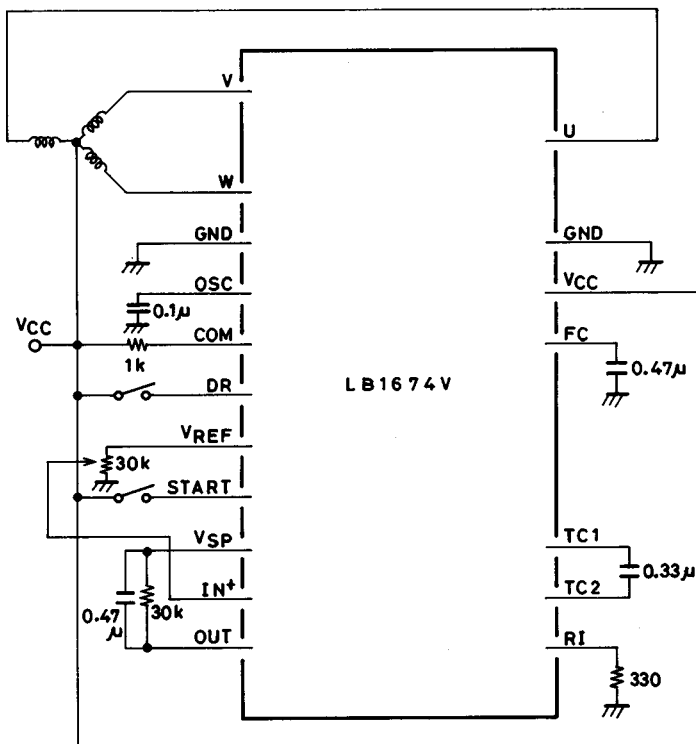
Top view

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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)

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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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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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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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