

SANYO

No. 4353

LB1672NM**Brushless-Sensorless Motor Driver**

The LB1672NM is ideal IC for stereo headphone, micro cassette and mini cassette players applications.

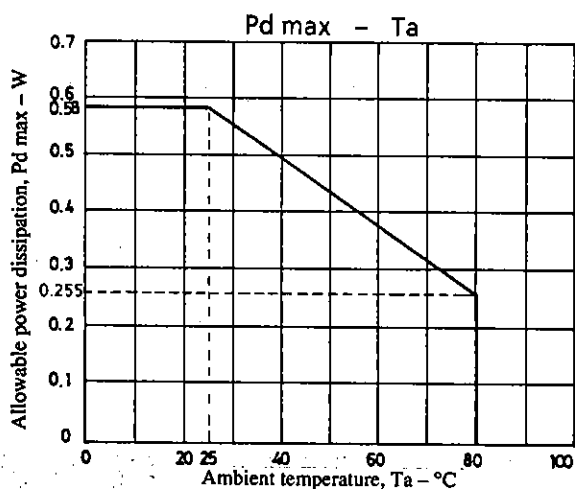
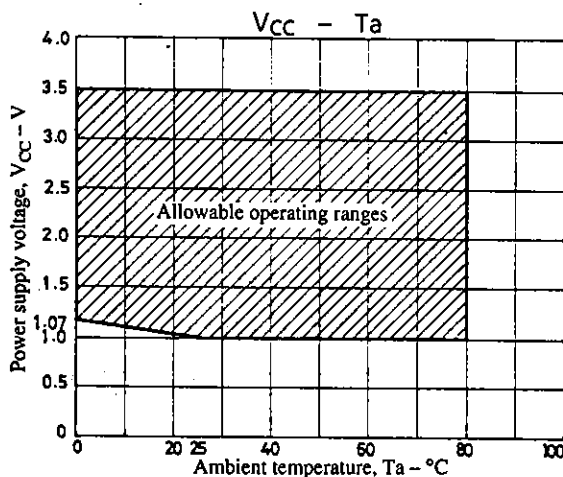
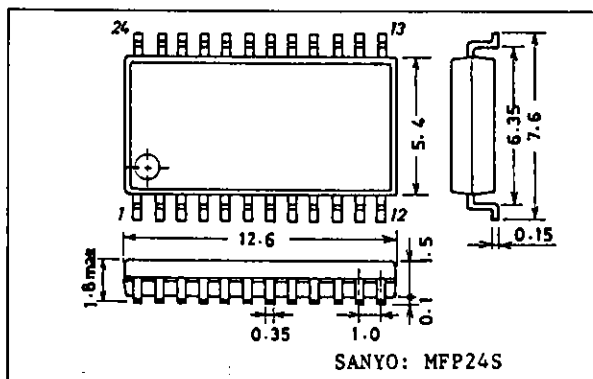
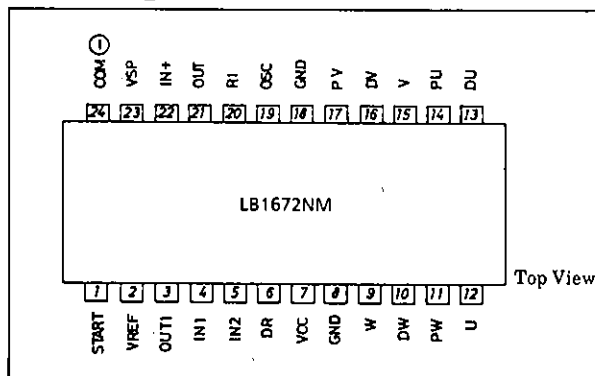
Functions and Features

- Supports forward and reverse rotation
- On-chip speed control function (V-servo system)
- On-chip start/stop pin
- On-chip stabilized reference voltage (0.5 V)
- One on-chip comparator (NPN open collector output)
- Low voltage operation (1.0 V -)

Package Dimensions

unit : mm

3112-MFP24S

**Pin Assignment****SANYO Electric Co., Ltd. Semiconductor Business Headquarters**

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20593TS A8-8604 No.4353-1/4

Specifications

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

			unit
Maximum supply voltage	V_{CC} max	5	V
Output transistor pressure	V_{OTR} max	10	V
Maximum output current	I_M max	1	A
Allowable power dissipation	P_d max	0.58	W
Operating temperature	T_{opr}	Temperatures other than 25°C are shown in a separate diagram	0 to $+80$ $^\circ\text{C}$
Storage temperature	T_{stg}	-40 to $+125$	$^\circ\text{C}$

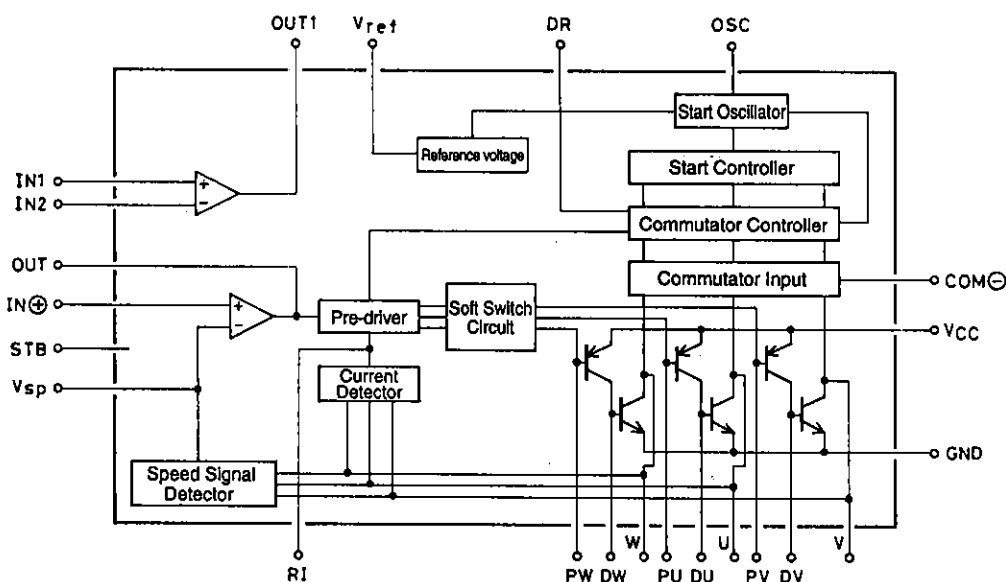
Allowable Operation Conditions at $T_a = 25^\circ\text{C}$

			unit
Power supply voltage operating range	V_{CC} op	1.0 to 3.5	V

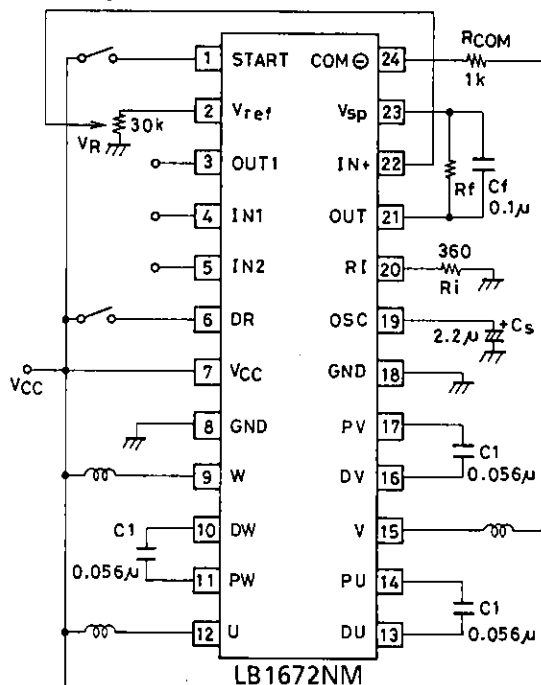
Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 1.5\text{V}$, and the specified Test Circuit

			min	typ	max	unit
Supply current	I_{CC1}	START pin "H"		6	10	mA
	I_{CC2}	START pin "L"		0	10	μA
Reference voltage	V_{ref}		0.48	0.5	0.53	V
Reference voltage Voltage characteristics	$\frac{\Delta V_{ref}}{\Delta V_{CC}}$	$V_{CC} = 1$ to 3.5V		1	1.5	$\%/V$
Reference voltage Load characteristics	$\frac{\Delta V_{ref}}{\Delta I_{ref}}$	$I_{ref} = 0$ to $-60\ \mu\text{A}$	-0.1	-0.04		$\text{mV}/\mu\text{A}$
Reference voltage Temperature characteristics	$\frac{\Delta V_{ref}}{V_{ref}} / \Delta T_a$	$T_a = 0$ to 80°C		0.01		$\%/^\circ\text{C}$
Speed signal Detection accuracy	V_{sp}	$V_{IN} = 500\text{mV}$	125	135	145	mV
Speed signal Interphase error			-5		5	$^\circ$
Speed signal Voltage characteristics	$\frac{\Delta V_{sp}}{V_{sp}} / \Delta V_{CC}$	$V_{CC} = 1$ to 3.5V		2	3	$\%/V$
Speed signal Temperature characteristics	$\frac{\Delta V_{sp}}{V_{sp}} / \Delta T_a$	$V_{IN} = 0.5\text{V}$, $T_a = 0$ to $+80^\circ\text{C}$		0.05		$\%/^\circ\text{C}$
Current detection accuracy	V_{RI}	$V_{IN1} = 0.3\text{V}$, $V_{IN2} = 1\text{V}$	100	120	137	mV
Current detection ratio	K_I	$V_{IN1} = 0.3\text{V}$, $V_{IN2} = 1$ to 1.3V	0.17	0.2	0.23	
Start pulse period	T_S	$C_S = 2.2\ \mu\text{F}$		55		ms
COM $\ominus$ lead-in current	$I_{COM\ominus}$		22	32	42	μA
Output saturation voltage	V_{sat}	$V_{CC} = 1\text{V}$, $I_M = 0.2\text{A}$		0.15	0.25	V
Logic input "H"-level voltage	V_H		0.9			V
Logic input "L"-level voltage	V_L				0.3	V
Comparator offset voltage	V_{OFF}		-10	0	10	mV
Comparator output current		$V_{CC} = 1\text{V}$, $\text{OUT1} = V_{CC}$	100			μA

Equivalent Circuit Block Diagram



Application Circuits Example



- When the resistance value of R_I increases and the capacitance between V_{CC} and GND is large ($1500\mu F$), oscillation elevates to the motor waveform.
- When the resistance value of R_I is excessively low, start voltage increases.
- The damping capacitor (C_1) for the output circuit should be as small as possible with C_S as large as possible.
- When the capacitor for the output circuit is large and C_S is small, start voltage increases with low temperatures.

Unit (resistance: Ω , capacitance: F)

Pin Descriptions

Pin Number	Pin Name	Functions
1	START	This pin is "H" active.
2	Vref	This pin is for reference voltage (0.5 V).
3	OUT1	This pin is for the on-chip comparator output (NPN open comparator).
4	IN1	This pin is for the on-chip comparator negative input (PNP base input).
5	IN2	This pin is for the on-chip comparator positive input (PNP base input).
6	DR	This pin is for switching rotation direction ("H" initiates forward rotation)
7	VCC	This pin is for the power supply.
8	GND	This pin is for all circuit grounds.
9	W	This pin is for W-phase output.
10	DW	This pin is for the W-phase output transistor base.
11	PW	This pin is for the W-phase output predrive transistor base.
12	U	This pin is for the U-phase output.
13	DU	This pin is for the U-phase output transistor base.
14	PU	This pin is for the U-phase output predrive transistor base.
15	V	This pin is for the V-phase output.
16	DV	This pin is for the V-phase output transistor base.
17	PV	This pin is for the V-phase output predrive transistor base.
18	GND	This pin is the common for pin ⑧ which is the pin for all circuit grounds.
19	OSC	This pin is for start pulse period setting.
20	R_I	This pin is for use in detecting motor current.
21	OUT	This pin is for speed signal error amplifier output. Motor current is returned.
22	IN $\oplus$	This pin is for speed signal error amplifier standard input.
23	Vsp	This pin is for detecting the speed signal (voltage induction).
24	COM $\oplus$	This pin performs a supporting role for the current control circuit during startup or when the rotational direction is changed.

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