



No. 4353

LB1672NM

Brushless-Sensorless Motor Driver

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

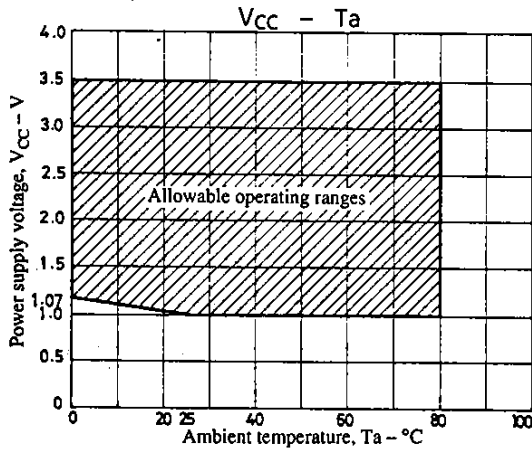
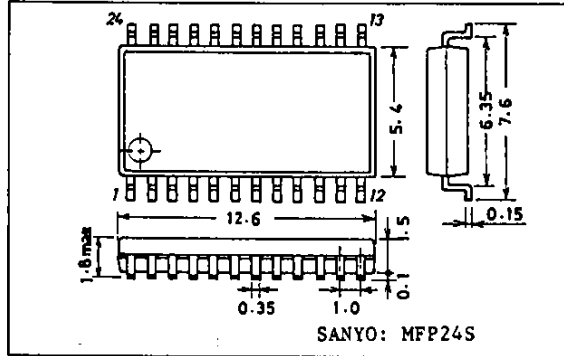
Functions and Features

- 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 -)

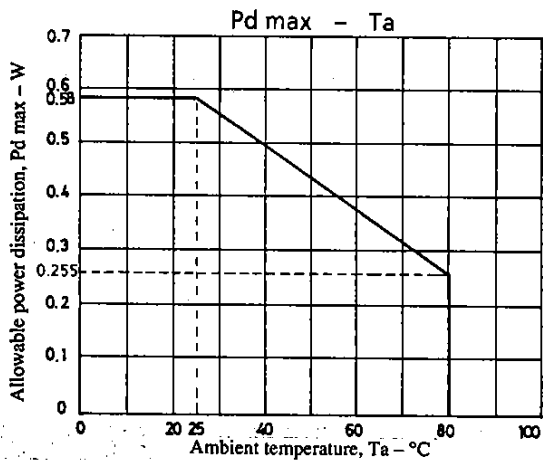
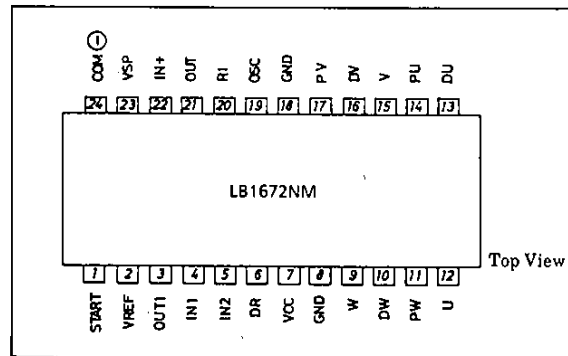
Package Dimensions

unit : mm

3112-MFP24S



Pin Assignment



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Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Value	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}	0 to +80	°C
Storage temperature	T _{stg}	-40 to +125	°C

Temperatures other than 25°C are shown in a separate diagram

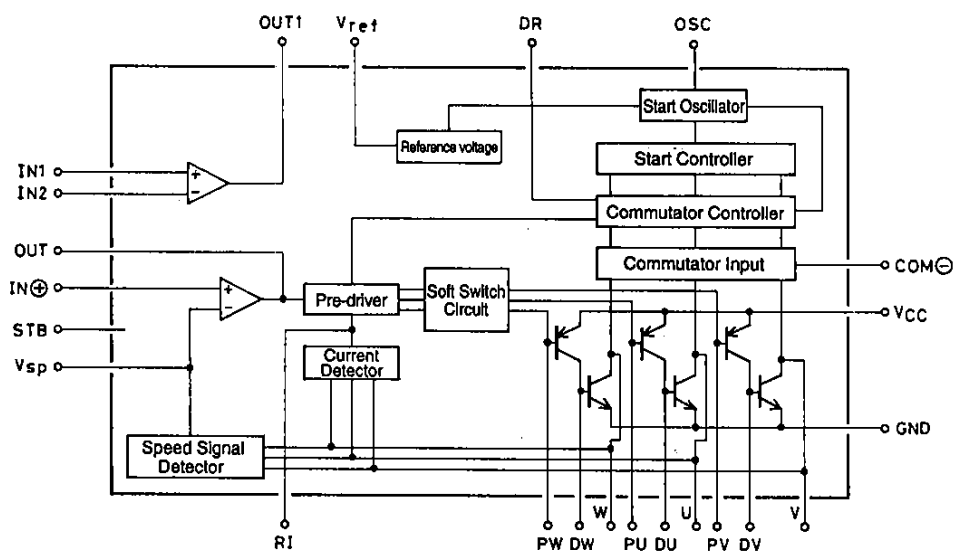
Allowable Operation Conditions at Ta = 25°C

Parameter	Symbol	Value	Unit
Power supply voltage operating range	V _{CC} op	1.0 to 3.5	V

Electrical Characteristics at Ta = 25°C, V_{CC} = 1.5V, and the specified Test Circuit

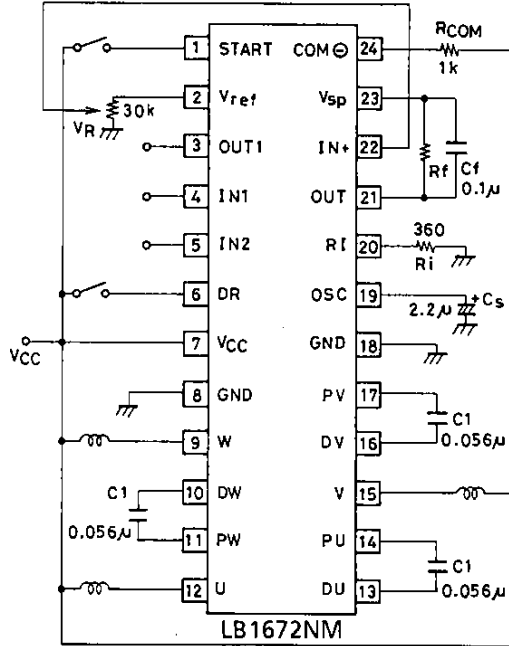
Parameter	Symbol	Test Conditions	min	typ	max	Unit
Supply current	I _{CC1}	START pin "H"		6	10	mA
	I _{CC2}	START pin "L"		0	10	µA
Reference voltage	V _{ref}		0.48	0.5	0.53	V
Reference voltage Voltage characteristics	$\frac{\Delta V_{ref}}{\Delta V_{CC}}$	V _{CC} = 1 to 3.5V		1	1.5	%/V
Reference voltage Load characteristics	$\frac{\Delta V_{ref}}{\Delta I_{ref}}$	I _{ref} = 0 to -60 µA	-0.1	-0.04		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} = 500mV	125	135	145	mV
Speed signal Interphase error			-5		5	%
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} = 0.5V, T _a = 0 to +80°C		0.05		%/°C
Current detection accuracy	V _{RI}	V _{IN1} = 0.3V, V _{IN2} = 1V	100	120	137	mV
Current detection ratio	K _I	V _{IN1} = 0.3V, V _{IN2} = 1 to 1.3V	0.17	0.2	0.23	
Start pulse period	T _S	C _S = 2.2µF		55		ms
COM ⊖ lead-in current	I _{COM ⊖}		22	32	42	µA
Output saturation voltage	V _{sat}	V _{CC} = 1V, I _M = 0.2A		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} = 1V, OUT1 = V _{CC}	100			µA

Equivalent Circuit Block Diagram



LB1672NM

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 Ⓞ 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 Ⓞ	This pin is for speed signal error amplifier standard input.
23	Vsp	This pin is for detecting the speed signal (voltage induction).
24	COM Ⓞ	This pin performs a supporting role for the current control circuit during startup or when the rotational direction is changed.

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