

SANYO	No. 3473	LB1673M
	3-Phase Brushless, Sensorless Motor Driver	

Applications

- Rotational control of brushless, sensorless motors for use in audio applications such as headphone stereos, micro-cassette recorders, mini-cassette recorders.

Functions and Features

- Brushless, sensorless motor drive (3-phase half-wave drive)
- Bidirectional motor drive
- On-chip speed control function (V servo type)
- On-chip reference voltage
- On-chip one comparator (PNP input, NPN open collector output)

Absolute Maximum Ratings at Ta = 25°C

			unit
Maximum Supply Voltage	V _{CC} max	5	V
Output Transistor Breakdown Voltage	V _{SUS} max	10	V
Output Current	I _M	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

Allowable Operating Conditions at Ta = 25°C,

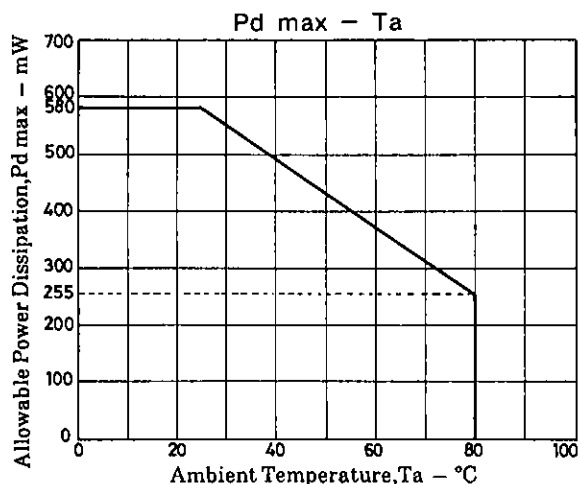
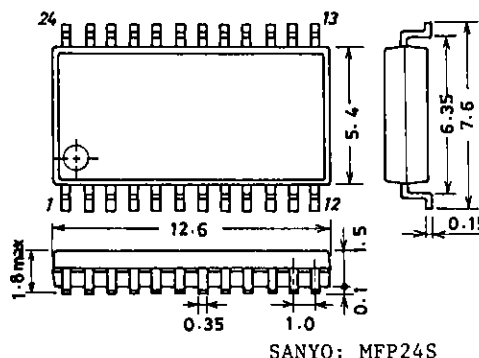
			unit
Supply Voltage	V _{CC}	1.0 to 3.5	V

Electrical Characteristics at Ta = 25°C, V_{CC} = 1.5V unless otherwise specified

			min	typ	max	unit
Supply Current 1	I _{CC(L)}	START pin 'L'		0	10	mA
Supply Current 2	I _{CC(H)}	START pin 'H'		4.8	10	μA
Reference Voltage	V _{ref}		0.49	0.52	0.55	V
Voltage Characteristic of Reference Voltage	$\frac{\Delta V_{ref}}{V_{ref}/\Delta V_{CC}}$	V _{CC} = 1 to 3.5V		0.3	1.0	%/V

Continued on next page.

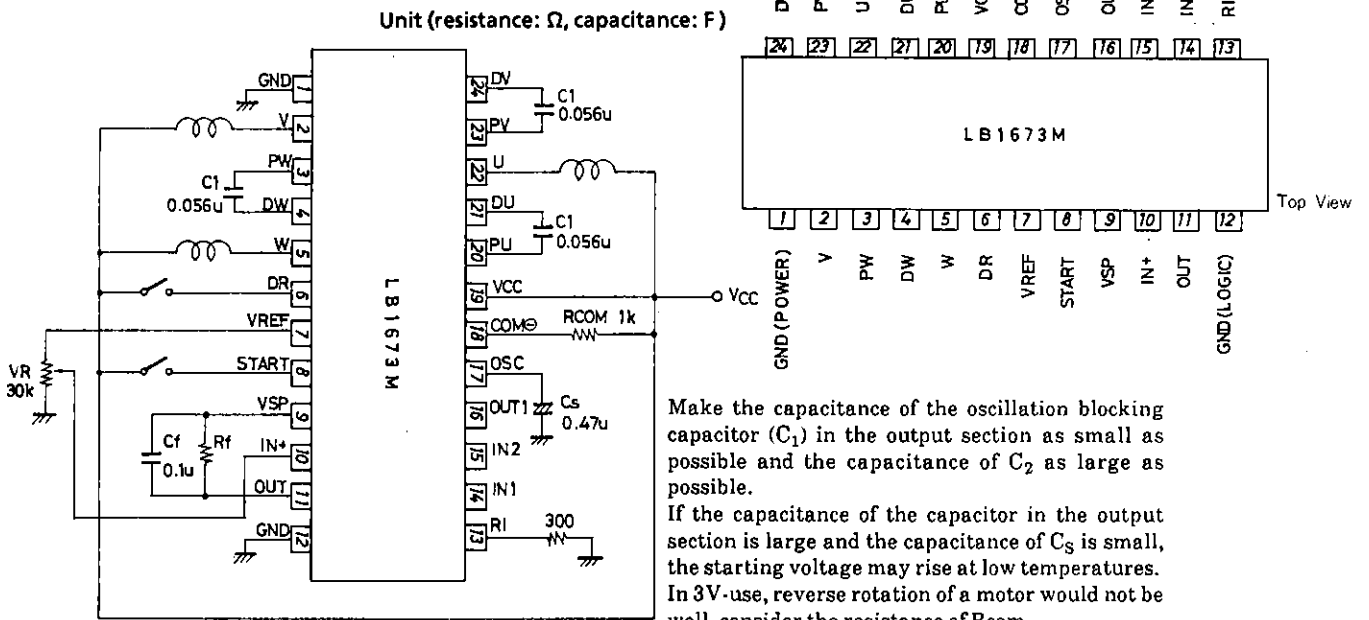
Package Dimensions 3112
(unit: mm)



LB1673M

Sample Peripheral Circuit

Pin Assignment



Pin Description

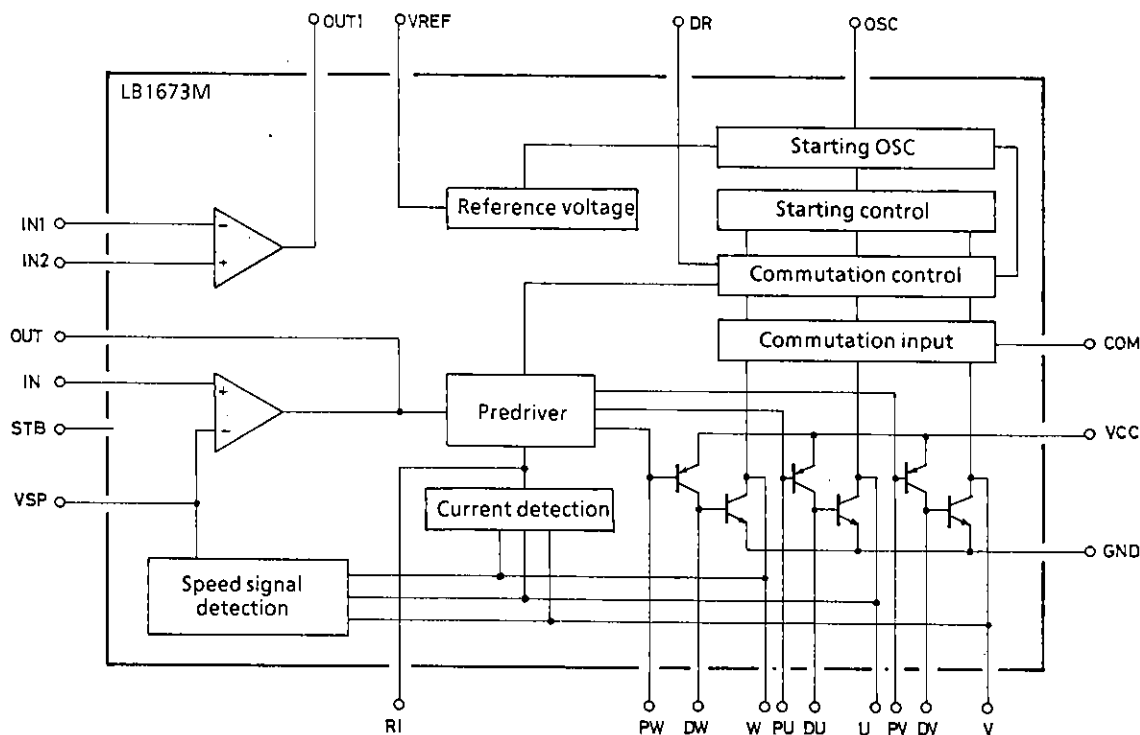
Pin No.	Pin Name	Description
1	GND	GND pin for the whole circuit
2	V	V phase output pin
3	PW	W phase output drive transistor base
4	DW	W phase output transistor base
5	W	W phase output pin
6	DR	Pin for selecting the direction of rotation (H : forward)
7	Vref	Reference voltage (0.5V)
8	START	High active
9	Vsp	Speed signal (induced voltage) detection
10	IN \ominus	Speed signal error amp reference input
11	OUT	Speed signal error amp output. The motor current is fed back.
12	GND	GND pin for logic circuit.
13	R _I	Pin for detecting the motor current
14	IN1	\ominus input of internal comparator (PNP base input)
15	IN2	\oplus input of internal comparator (PNP base input)
16	OUT1	Output of internal comparator (NPN open collector)
17	OSC	Pin for setting the starting pulse width
18	COM \ominus	Pin for providing a supplementary function for the current control circuit at the time of start or selection of direction of rotation
19	V _{CC}	Power supply pin
20	PU	U phase output drive transistor base
21	DU	U phase output transistor base
22	U	U phase output pin
23	PV	V phase output drive transistor base
24	DV	V phase output transistor base

LB1673M

Continued from preceding page.

			min	typ	max	unit
Load Characteristic of Reference Voltage	$\frac{\Delta V_{ref}}{\Delta I_{ref}}$	$I_{ref} = 0 \text{ to } -60 \mu\text{A}$		-0.03		$\text{mV}/\mu\text{A}$
			Temperature Characteristic of Reference Voltage	$\frac{\Delta V_{ref}}{\Delta T_a}$	$T_a = 0 \text{ to } +80^\circ\text{C}$	0
Speed Signal Detection Accuracy	V_{sp}	$V_{IN} = 500\text{mV}$	135	145	155	mV
Speed Signal Correlation Error			-5		5	%
Voltage Characteristic of Speed Signal	$\frac{\Delta V_{sp}}{V_{sp}} / \Delta V_{CC}$	$V_{CC} = 1 \text{ to } 3.5\text{V}$		0.2	1.0	$\%/V$
Temperature Characteristic of Speed Signal	$\frac{\Delta V_{sp}}{V_{sp}} / \Delta T_a$	$T_a = 0 \text{ to } +60^\circ\text{C}$		0		$\%/^\circ\text{C}$
Current Detection Accuracy	V_{RI}	$V_{IN1} = 0.3\text{V}, V_{IN2} = 1\text{V}$	50	65	80	mV
Current Detection Ratio	K_I	$V_{IN2} = 1 \text{ to } 1.3\text{V}$	0.14	0.17	0.25	
Pin OSC Flow-out Current	I_{OSC}	Measured as pin OSC is 0.4V.	2.6	3.8	5.0	μA
Starting Pulse Width	T_{OSC}	$C_S = 0.47 \mu\text{F}$		60		ms
COM Pull-in Current	$V_{COM} \ominus$	Short V_{CC} with COM	20	30	40	μA
Output Saturation Voltage	V_{sat}	$V_{CC} = 1\text{V}, I_m = 0.2\text{A}$		0.09	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		10	mV
Comparator Output Current	I_{OFF}	$V_{CC} = 1\text{V}, \text{OUT1} = V_{CC}$	100			μA

Equivalent Circuit Block Diagram



- No products described or contained herein are intended for use in surgical implants, life-support systems, aerospace equipment, nuclear power control systems, vehicles, disaster/crime-prevention equipment and the like, the failure of which may directly or indirectly cause injury, death or property loss.
- Anyone purchasing any products described or contained herein for an above-mentioned use shall:
 - ① Accept full responsibility and indemnify and defend SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors and all their officers and employees, jointly and severally, against any and all claims and litigation and all damages, cost and expenses associated with such use:
 - ② Not impose any responsibility for any fault or negligence which may be cited in any such claim or litigation on SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors or any of their officers and employees jointly or severally.
- Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. SANYO believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.