Ordering number : ENA2039B

SANYO Semiconductors
DATA SHEET

An ON Semiconductor Company

LV8549MC — Bi-CMOS integrated circuit 12V Low Saturation Voltage Drive Stepping Motor Driver

Overview

The LV8549MC is a 2-channel low saturation voltage forward/reverse motor driver IC. It is optimal for Full step motor drive in 12V system products.

Functions

- DMOS output transistor adoption (Upper and lower total RON=1Ω typ)
- The compact package (SOIC10) is adopted.
- V_{CC} max=20v, I_O max=1A
- For one power supply (The control system power supply is unnecessary.)
- Current consumption 0 when standing by

Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum power supply voltage	V_{CC} max		-0.3 to +20	V
Output impression voltage	VOUT		-0.3 to +20	V
Input impression voltage	V_{IN}		-0.3 to +6	V
GND pin outflow current	IGND	For ch	1.0	A
Allowable Power dissipation	Pd max	*	1.0	W
Operating temperature	Topr		-30 to +85	°C
Storage temperature	Tstg		-40 to +150	°C

*: When mounted on the specified printed circuit board (57.0mm ×57.0mm × 1.6mm), glass epoxy, both sides

Caution 1) Absolute maximum ratings represent the value which cannot be exceeded for any length of time.

Caution 2) Even when the device is used within the range of absolute maximum ratings, as a result of continuous usage under high temperature, high current, high voltage, or drastic temperature change, the reliability of the IC may be degraded. Please contact us for the further details.

Recommendation Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Power supply voltage	V_{CC}		4.0 to 16	V
Input “H” level voltage	$V_{IN}H$		+1.8 to +5.5	V
Input “L” level voltage	$V_{IN}L$		-0.3 to +0.7	V

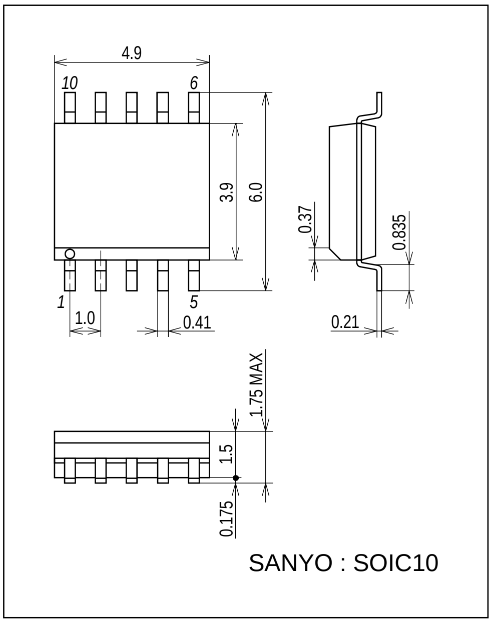
Electrical Characteristics at Ta = 25°C, V_{CC} = 12V

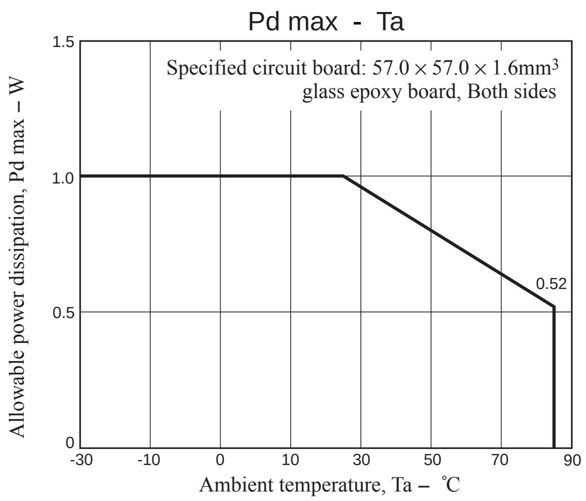
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Power supply voltage	$I_{CC}0$	Standby mode ENA=L			1	μA
	$I_{CC}1$	ENA=H		1.7	2.3	mA
Input current	I_{IN}	V_{IN}=5V	30	50	65	μA
Thermal shutdown operating temperature	Ttsd	Design certification	150	180	210	°C
Width of temperature hysteria	ΔTtsd	Design certification		40		°C
Low voltage protection function operation voltage	$VthV_{CC}$		3.3	3.5	3.65	V
Release voltage	Vthret		3.55	3.8	3.95	V
Output ON resistance (Upper and lower total)	R_{ON}	I_{OUT}=1.0A	0.7	1	1.25	Ω
Output leak current	$I_{O}leak$	V_{O}=16V			10	μA
Diode forward voltage	VD	ID=1.0A		1.0	1.2	V

Package Dimensions

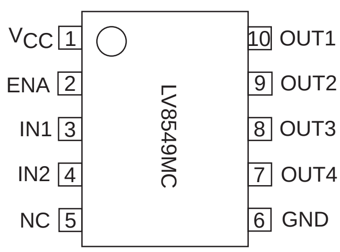
unit : mm (typ)

3426A

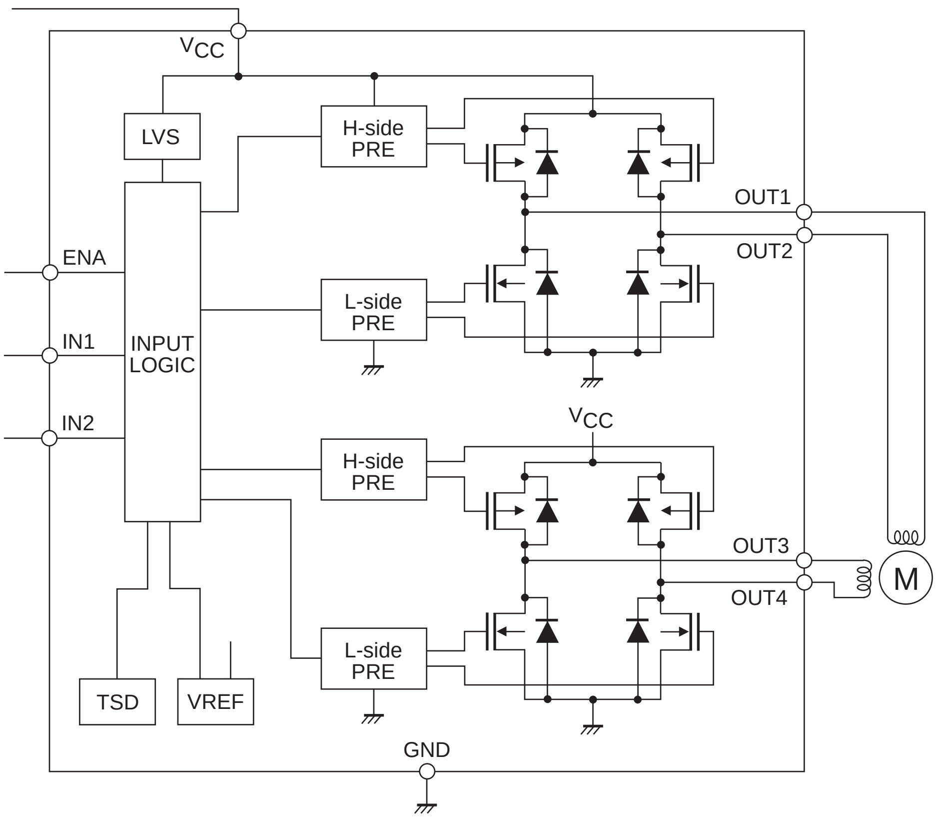




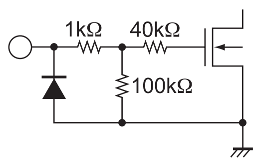
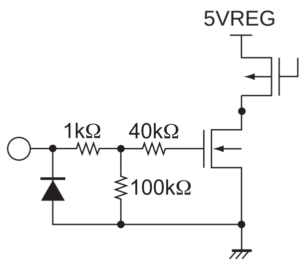
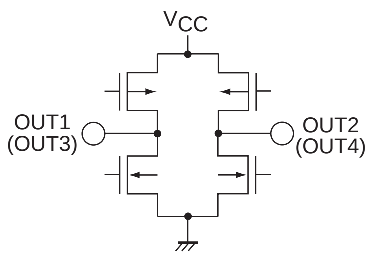
Pin Assignment



Block Diagram



Pin function

Pin No.	Pin name	Pin function	Equivalent Circuit
1	V_{CC}	Power-supply voltage pin. V_{CC} voltage is impressed. The permissible operation voltage is from 4.0 to 16.0(V). The capacitor is connected for stabilization for GND pin (6pin).	
2	ENA	Motor drive control input pin. It shifts from the stand-by state to a prescribed output operation corresponding to the state of the input when the ENA pin becomes a standby mode by L, the circuit current can be adjusted to 0, and it makes it to H. It is a digital input, and the range of L level input is 0 to 0.7(V) and the range of H level input are 1.8 to 5.5(V). PWM can be input. Pull-down resistance 100(kΩ) is built into in the terminal.	
3	IN1	Motor drive control input pin. Driving control input pin of OUT1 (10pin) and OUT2 (9pin). PWM can be input. With built-in pull-down resistance.	
4	IN2	Motor drive control input pin. Driving control input pin of OUT3 (8pin) and OUT4 (7pin). PWM can be input. With built-in pull-down resistance.	
5	NC		
6	GND	Ground pin.	
7	OUT4	Driving output pin. The motor coil is connected between terminal OUT3 (8pin).	
8	OUT3	Driving output pin. The motor coil is connected between terminal OUT4 (7pin).	
9	OUT2	Driving output pin. The motor coil is connected between terminal OUT1 (10pin).	
10	OUT1	Driving output pin. The motor coil is connected between terminal OUT2 (9pin).	

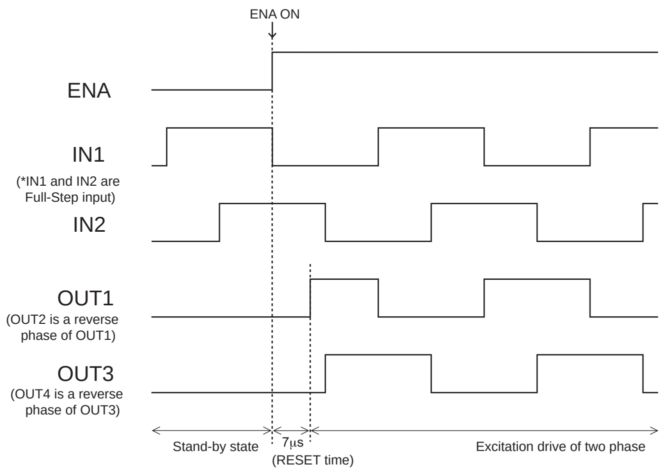
Operation explanation

1. STM output control logic

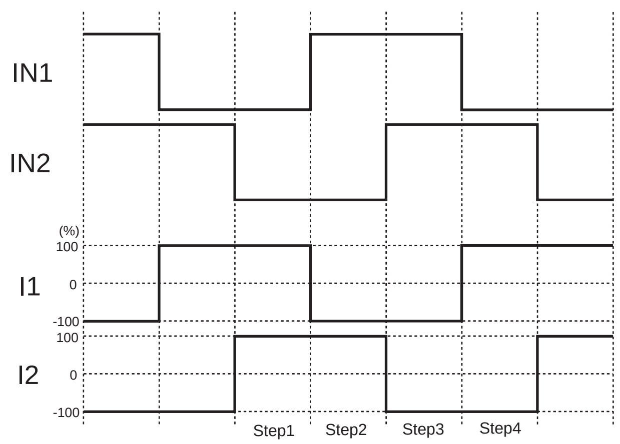
Input			Output				State
ENA	IN1	IN2	OUT1	OUT2	OUT3	OUT4	
L	-	-	OFF	OFF	OFF	OFF	Stand-by
H	L	L	H	L	H	L	Step 1
	H	L	L	H	H	L	Step2
	H	H	L	H	L	H	Step3
	L	H	H	L	L	H	Step4

2. About the switch time from the stand-by state to the state of operation

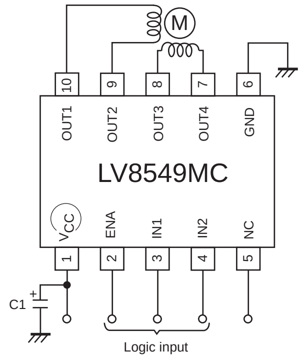
   When ENA pin are "L", this IC has completely stopped operating. After the time of reset (about 7μs of an internal setting) it shifts to a prescribed output status corresponding to the state of the input when the signal enters the ENA pin.



3. Example of current waveform at full-step mode.



Applied circuit example



* Bypass capacitor (C1) connected between V_{CC}-GND of all examples of applied circuit recommends the electric field capacitor of 0.1μA to 10μA.
Confirm there is no problem in operation in the state of the motor load including the temperature property about the value of the capacitor.
Mount the position where the capacitor is mounted on nearest IC.

This catalog provides information as of April, 2012. Specifications and information herein are subject to change without notice.