



LB1934T

3V Camera 1.5-Channel Driver

Preliminary

Overview

The LB1934T is a low-voltage, low-saturation forward/reverse driver IC with built-in 1.5-channel bridge. Its compact, low-profile package makes it ideal for use in compact cameras powered by 3V lithium batteries. Using direct microprocessor drive, it is possible to control standby, forward rotation, reverse rotation, and braking of two motors for film rewind and lens drive by means of only three control signals. The 0.5-channel section of the 1.5-channel bridge can be divided into sink/source output, allowing configurations such as 1-channel bridge + sink output + source output.

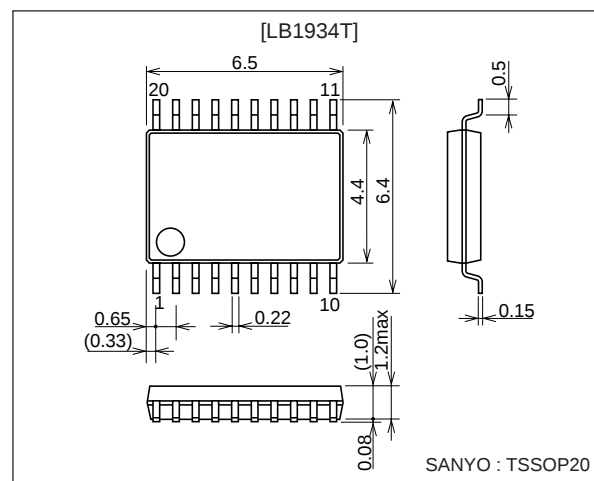
Features

- Low voltage drive possible
When using same power supply for V_{CC} and V_S : $V_{CC} = V_S = 1.4V$ min.
When using separate power supply for V_{CC} and V_S : $V_S = 1.0V$ min., $V_{CC} = 1.4V$ min.
- Low saturation voltage: remaining voltage (upper side transistor + lower side transistor) = 0.5V typ. at $I_O = 1A$
- Zero power dissipation in standby mode
- Direct microprocessor drive possible (any strength relationships of voltage supported between microprocessor control signal and V_{CC} or V_S)
- Logic power supply and motor power supply can be supplied at separate pins.
- Built-in thermal protection circuit
- Number of control signals can be optimized for the set.
“2-motor control” or “1-motor + 2-load control” can be implemented by 3 control signals.
In addition to the above, 4 control signals allow implementation of a “input ignore mode” where two control signals are used in conjunction with other IC input signals.
- Built-in spark killer diode
- Compact, low-profile package (TSSOP-20; $t = 1.1$ mm typ.)

Package Dimensions

unit: mm

3246-TSSOP20



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Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V _S max	VS	−0.3 to 8.0	V
	V _{CC} max	VCC	−0.3 to 8.0	V
Maximum output current	I _{omax1}	OUT1, OUT2	2000	mA
	I _{omax2}	OUT3P, OUT3N	1500	mA
Maximum applied output voltage	V _{omax}	OUT1, OUT2, OUT3P, OUT3N	−0.3 to VS+VSF	V
Maximum applied input voltage	V _{imax}	MD1, MD2, IN1, IN2	−0.3 to 8.0	V
Allowable power dissipation	P _{dmax}	With specified substrate*	850	mW
Operating temperature	T _{opr}		−20 to +70	°C
Storage temperature	T _{stg}		−55 to +150	°C

*Specified substrate: 76.1×114.3×1.6 mm³ (glass expoxy)

Allowable Operating Ranges at Ta = 25°C

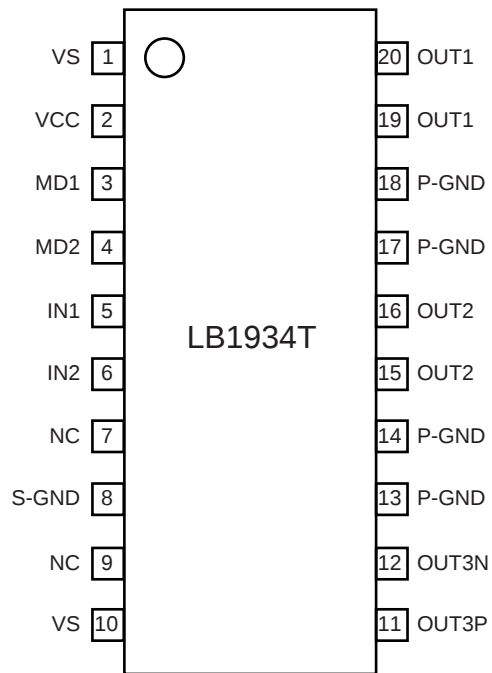
Parameter	Symbol	Conditions	Ratings	Unit
Power supply voltage	V _S	VS	1.0 to 7.0	V
	V _{CC}	VCC	1.4 to 7.0	V
Input High level voltage	V _{INH}	MD1, MD2, IN1, IN2	1.4 to 7.0	V
Input Low level voltage	V _{INL}	MD1, MD2, IN1, IN2	−0.3 to +0.4	V

Electrical Characteristics at Ta = 25°C, V_S = V_{CC} = 3V

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[Operating current drain]						
Standby mode current drain	ISTB	ICC+IS		0.1	3	μA
VS operating current drain 1	IS1	(Forward/reverse)		70	90	mA
VS operating current drain 2	IS2	(Brake)		75	95	mA
VCC operating current drain 1	ICC1	(1ch/2ch/half-bridge mode)		4	5	mA
VCC operating current drain 1	ICC1	(IN1/IN2 input ignore mode)		1	2	mA
[Output circuits]						
OUT1/OUT2 output saturation voltage	Vosat1	(PNP+NPN) Io = 1000 mA		0.5	0.75	V
OUT3P output saturation voltage	Vosat2	(PNP) Io = 1000 mA		0.4	0.55	V
OUT3N output saturation voltage	Vosat3	(NPN) Io = 1000 mA		0.3	0.45	V
Spark killer diode reverse current	Is (leak)				10	μA
Spark killer diode forward voltage	VSF	OUT1, OUT2, OUT3P, OUT3N			1.7	V
[Input circuit]						
High level input current	IINH	VIN = 5V (MD1, MD2, IN1, IN2)		70	100	μA
Low level input current	IINL	VIN = 0V (MD1, MD2, IN1, IN2)			0	μA

LB1934T

Pin Assignment

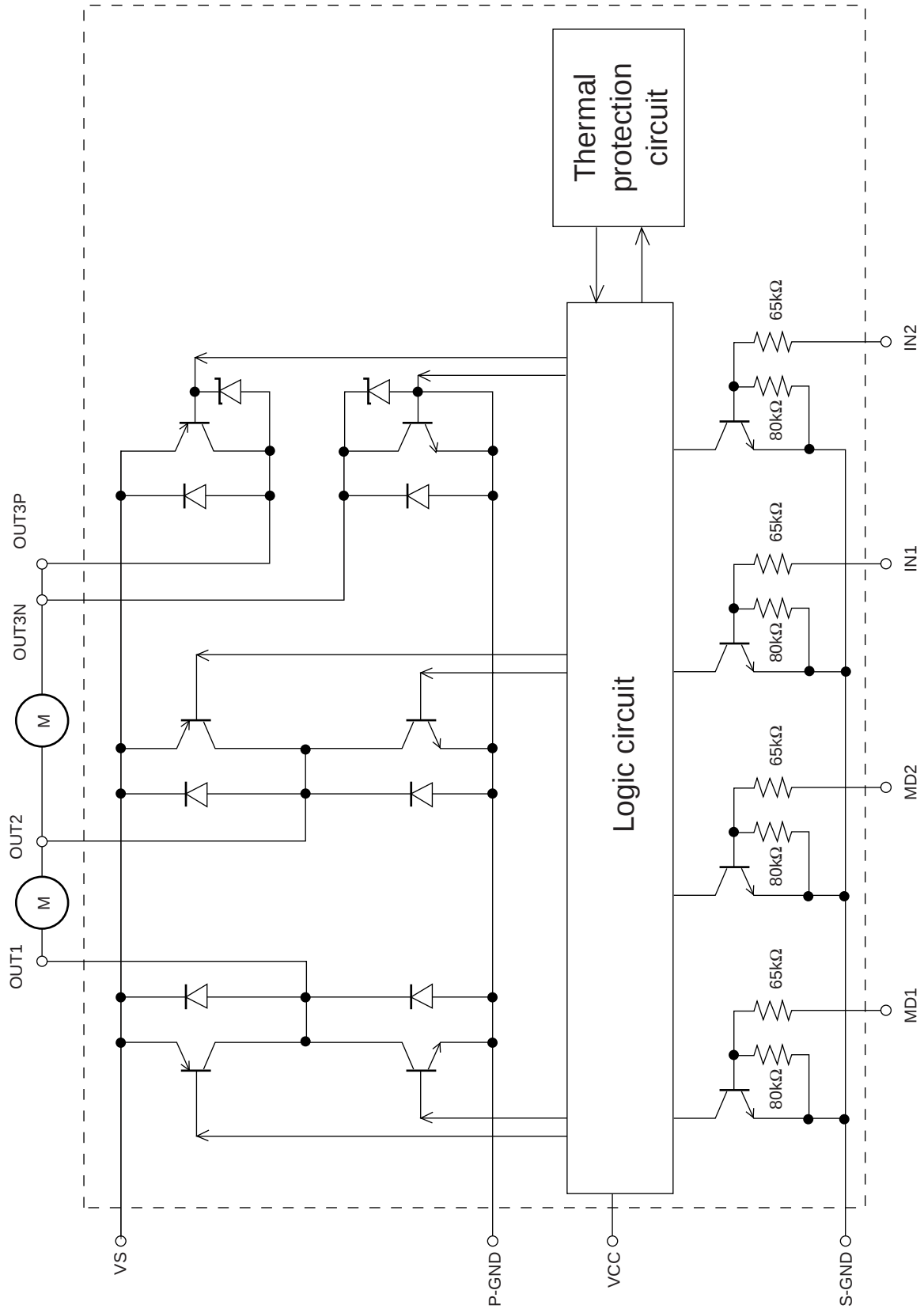


Top view

Pin Description

Pin number	Pin name	Description
1, 10	VS	Motor drive power supply pin (+)
2	VCC	Control system power supply pin (+)
13, 14, 17, 18	P-GND	Motor drive ground pin (–)
8	S-GND	Control system ground pin (–)
19, 20	OUT1	Motor drive output pin (sink/source)
15, 16	OUT2	Motor drive output pin (sink/source)
11	OUT3P	Motor drive output pin (source)
12	OUT3N	Motor drive output pin (sink)
3	MD1	Control input pin (High active)
4	MD2	Control input pin (High active)
5	IN1	Control input pin (High active)
6	IN2	Control input pin (High active)
7, 9	NC	Not used

Block Diagram



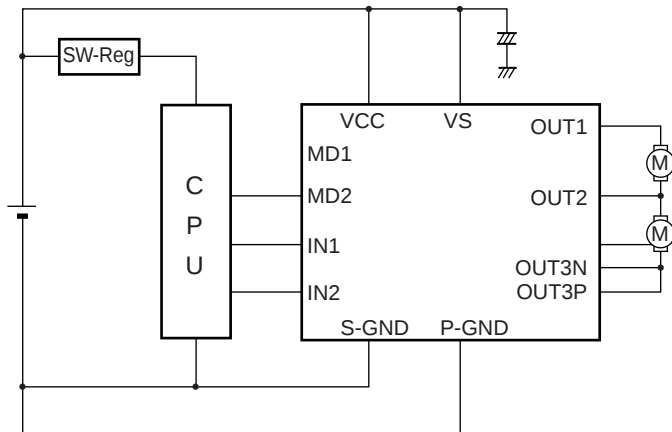
Truth Table

Input				Output				Mode	
MD1	MD2	IN1	IN2	OUT1	OUT2	OUT3P	OUT3N		
L	L	L	L					1 ch	Standby
		H	L	H	L				Forward rotation
		L	H	L	H				Reverse rotation
		H	H	H	H				Brake
L	H	L	L					2 ch	Standby
		H	L		L	H			Forward rotation
		L	H		H		L		Reverse rotation
		H	H		H	H			Brake
H	L	L	L					Half-bridge	Standby
		H	L			H			Source
		L	H				L		Sink
		H	H			H			Source
H	H	*	*					Disregard IN1/IN2 input	

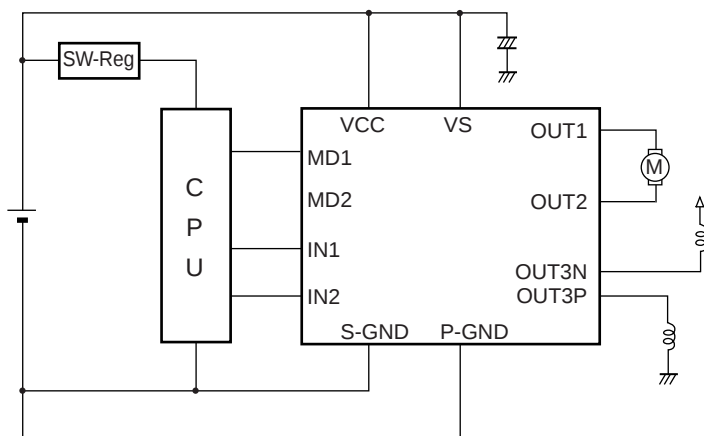
Note: "*" in the input column means "don't care". Blank in the output column means "off".

Sample Application Circuits

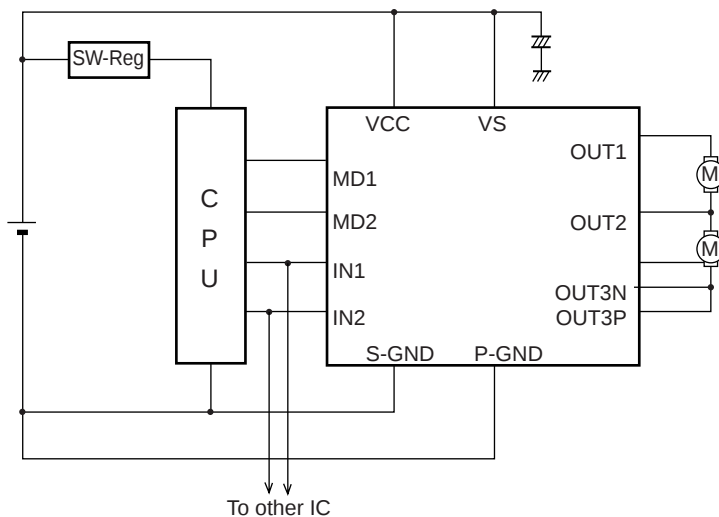
1) 2-motor control (3 control signals)



2) 1-motor + 2-load control (3 control signals)



3) 2-motor control (4 control signals)



Note: 1-motor + 2-load control can also be implemented with 4 control signals.

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