



LB1934T

3V Camera 1.5-Channel Driver

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 microcontroller 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.

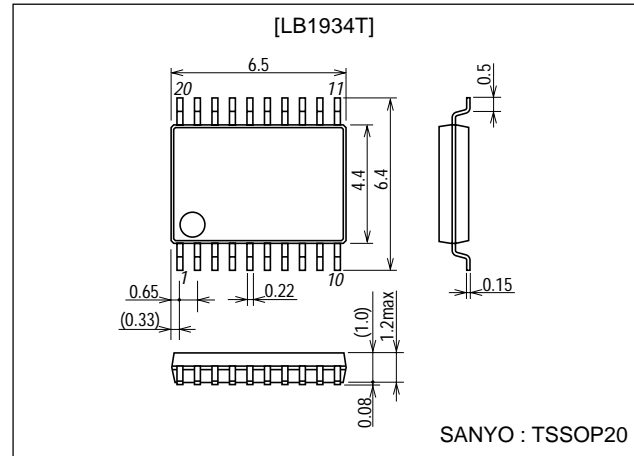
Features

- 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 : residual voltage (upper side transistor + lower side transistor) = 0.5V typ. at $I_o=1A$.
- Zero power dissipation in standby mode.
- Direct microcontroller drive possible (any strength relationships of voltage supported between microcontroller 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 ; thickness=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	V _S	-0.3 to +8.0	V
	V _{CC} max	V _{CC}	-0.3 to +8.0	V
Maximum output current	I _O max1	OUT1, OUT2	2000	mA
	I _O max2	OUT3P, OUT3N	1500	mA
Maximum applied output voltage	V _O max	OUT1, OUT2, OUT3P, OUT3N	-0.3 to V _S +V _{SF}	V
Maximum applied input voltage	V _I max	MD1, MD2, IN1, IN2	-0.3 to +8.0	V
Allowable power dissipation	Pd max	With specified substrate*	850	mW
Operating temperature	T _{opr}		-20 to +70	°C
Storage temperature	T _{stg}		-55 to +150	°C

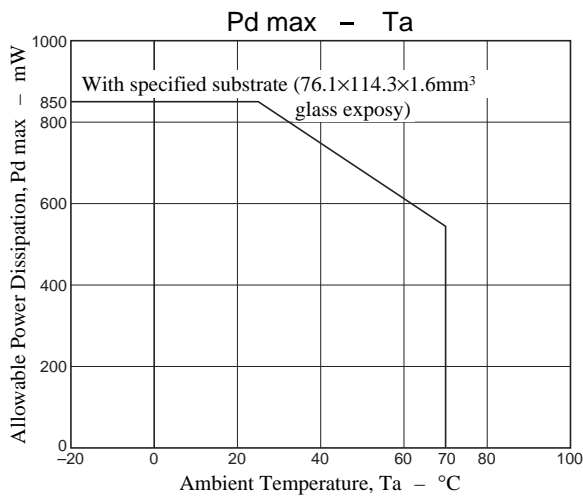
*Specified substrate : 76.1×114.3×1.6mm³ (glass epoxy)

Allowable Operating Ranges at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Power supply voltage	V _S	V _S	1.0 to 7.0	V
	V _{CC}	V _{CC}	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	I _{STB}	I _{CC} +I _S		0.1	3	μA
V _S operating current drain 1	I _{S1}	(Forward/reverse)		70	90	mA
V _S operating current drain 2	I _{S2}	(Brake)		75	95	mA
V _{CC} operating current drain 1	I _{CC1}	(1ch/2ch/half-bridge mode)		4	5	mA
V _{CC} operating current drain 1	I _{CC1}	(IN1/IN2 input ignore mode)		1	2	mA
[Output circuits]						
OUT1/OUT2 output saturation voltage	V _{Osat1}	(PNP+NPN) I _O =1000mA		0.5	0.75	V
OUT3P output saturation voltage	V _{Osat2}	(PNP) I _O =1000mA		0.4	0.55	V
OUT3N output saturation voltage	V _{Osat3}	(NPN) I _O =1000mA		0.3	0.45	V
Spark killer diode reverse current	I _S (leak)				10	μA
Spark killer diode forward voltage	V _{SF}	OUT1, OUT2, OUT3P, OUT3N			1.7	V
[Input circuit]						
Input high-level current	I _{INH}	V _{IN} =5V (MD1, MD2, IN1, IN2)		70	100	μA
Input low-level current	I _{INL}	V _{IN} =0V (MD1, MD2, IN1, IN2)			0	μA



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Pin Assignment



Pin Function

Pin number	Pin name	Function
1, 10	V _S	Motor drive power supply pin (+)
2	V _{CC}	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

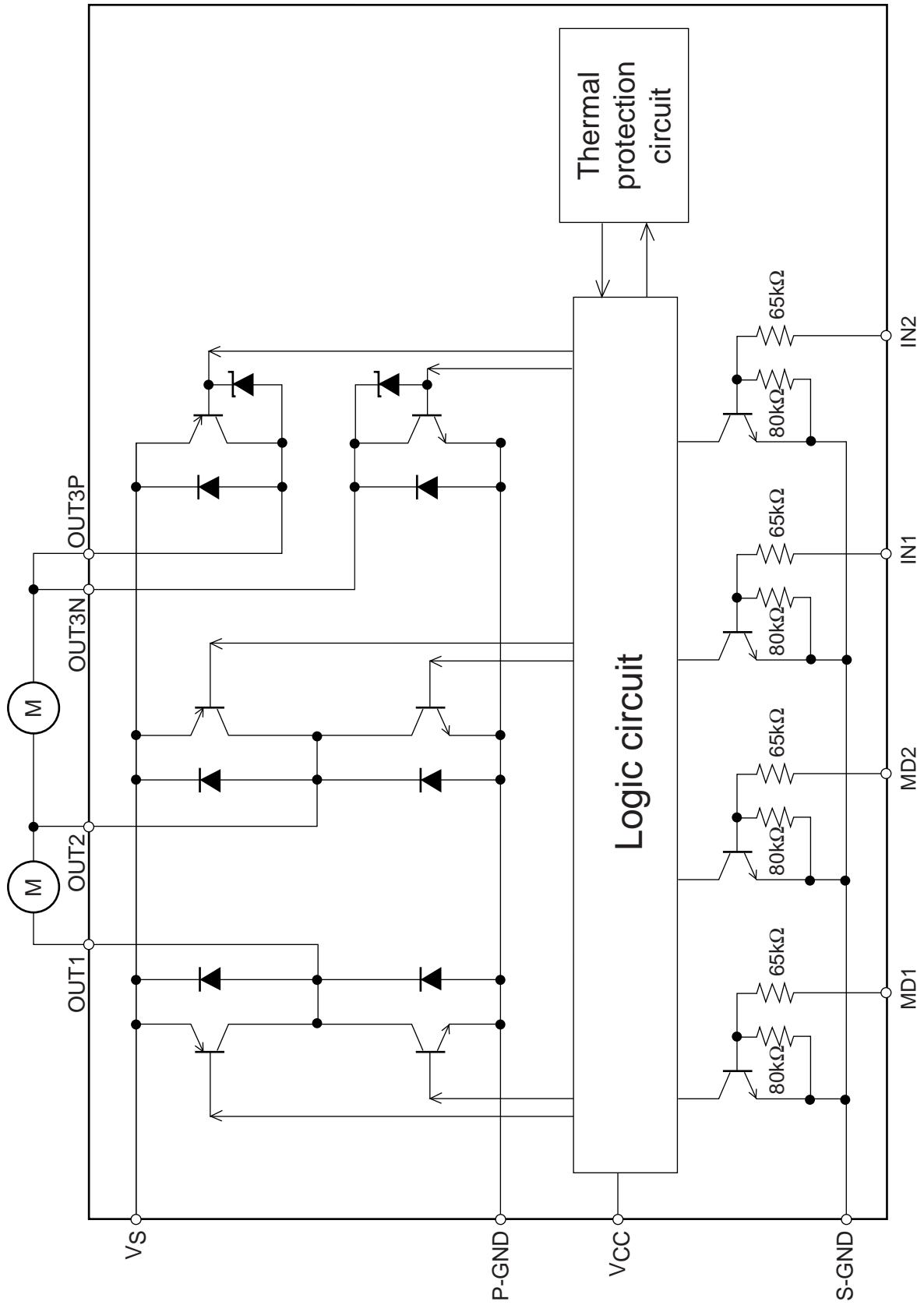
Truth Table

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".

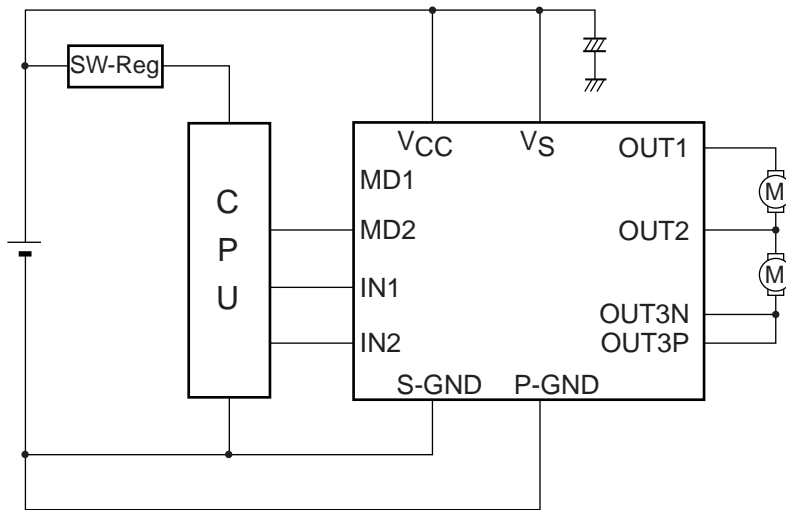
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Block Diagram

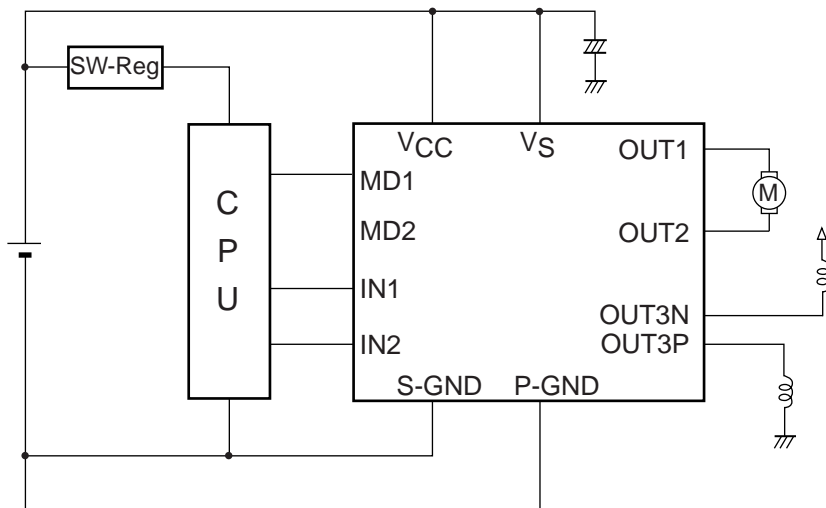


Sample Application Circuits

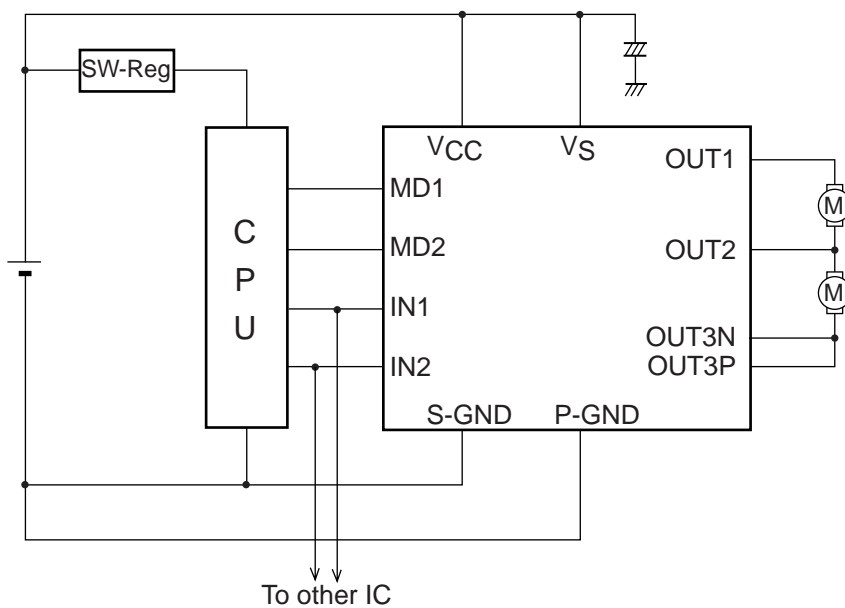
1) 2-motor control (3 control signals)



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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