



SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

LB1830M

Monolithic Digital IC

Low-Voltage, Low-Saturation

Bidirectional Motor Driver

Overview

The LB1830M is a low-saturation bidirectional motor driver IC with brake function for use in low-voltage applications. As both of forward and reverse outputs are regulated, it is especially suited for use in portable equipment.

Features

- Wide operating voltage range: 3.0 to 9.0 V
- Low saturation voltage: 0.2V at $I_O = 40\text{mA}$ (typ)
- Low current drain at standby mode (0.1 μA or less)
- Brake function
- Regulated voltage value (forward/reverse) setting available by one variable resistor
- Regulated output/saturation output switching available
- Built-in spark killer diodes
- Small package: MFP10S

Specifications

Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
maximum supply voltage	$V_{CC\text{ max}}$		10.5	V
Output current	$I_M\text{ max}$		500	mA
Input supply voltage	V_{IN}		-0.3 to +10	V
Allowable power dissipation	$P_d\text{ max}$	Independent IC	0.4	W
		Mounted on a specified board *	0.55	W
Operating temperature	T_{opr}		-20 to +80	$^\circ\text{C}$
Storage temperature	T_{stg}		-40 to +125	$^\circ\text{C}$

* Specified board: 30mm \times 30mm \times 1.5mm, glass epoxy board.

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Allowable Operating Ranges at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V _{CC}		3.0 to 9.0	V
Input high level voltage	V _{IH}		2.0 to 9.0	V
Input low level voltage	V _{IL}		-0.3 to +0.3	V
Control voltage	V _C		1.0 to 6.0	V

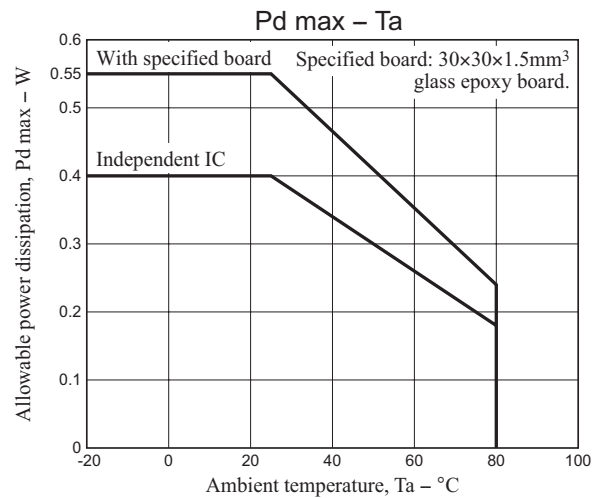
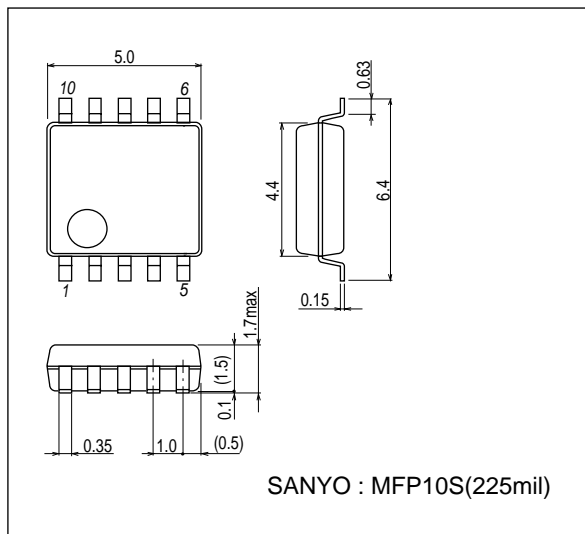
Electrical Characteristics at Ta = 25°C, V_{CC} = 6V

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Current drain	I _{CC0}	IN1 = IN2 = V _m = 0V, V _C = V _{ref} at standby mode		0.1	10	μA
	I _{CC1}	Forward/reverse, control, load OPEN		2	3	mA
	I _{CC2}	Forward/reverse, saturation, load OPEN		3	5	mA
	I _{CC3}	Braking, load OPEN		5	8	mA
Output saturation voltage	V _{sat1}	I _O = 40mA (upper side + lower side)		0.2	0.3	V
	V _{sat2}	I _O = 80mA (upper side + lower side)		0.4	0.6	V
Reference voltage	V _{ref}	I _{Vref} = 1mA	1.85	2.0	2.15	V
Voltage characteristics of output voltage	$\frac{\Delta V_O}{\Delta V_{CC}}$	V _O = 5V, V _{CC} = 5.5 to 9V, I _O = 40mA			80	mA
Current characteristics of output voltage	$\frac{\Delta V_O}{\Delta I_O}$	V _O = 5V, V _{CC} = 6V, I _O = 10 to 80mA			50	mA
Input current	I _{IN}	V _{IN} = 5V		90	150	μA
Output voltage	V _O	V _C = 2V	2.3×V _C		2.5×V _C	V

Package Dimensions

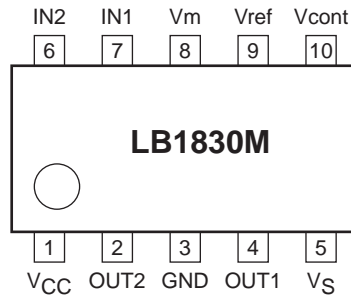
unit : mm (typ)

3086B

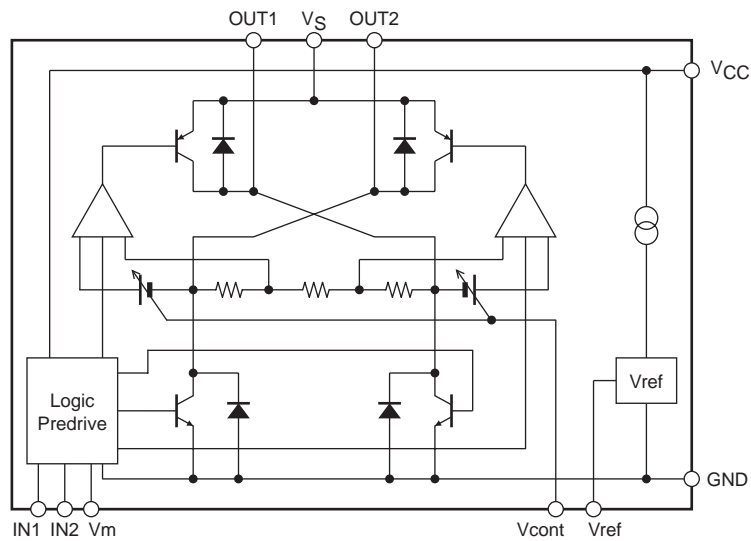


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Pin Assignment



Block Diagram



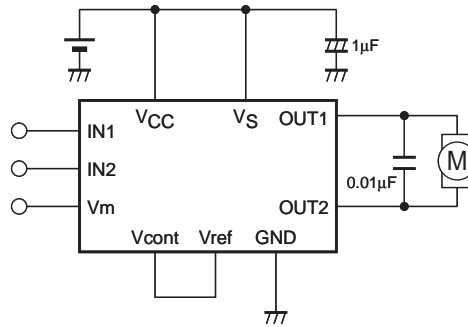
- The constant-voltage drive mode output voltage (the voltage between the output pins) V_O is determined by the following formula. $V_O = (V_{cont} \text{ pin input voltage}) \times 2.4$ (typical)
- There are no restrictions on the relative magnitudes between the following voltages: V_{CC} (control system supply voltage), V_S (motor supply voltage), and $IN1/IN2/V_m$ (the input signal voltages).

Truth Table

Input			Output		Mode
IN1	IN2	V_m	OUT1	OUT2	
L	L	L	OFF	OFF	Standby
H	L	L	H	L	Forward (Regulated)
H	L	H	H	L	Forward (Saturation)
L	H	L	L	H	Reverse (Regulated)
L	H	H	L	H	Reverse (Saturation)
H	H	*	L	L	Brake

* when in saturation mode, $V_C = V_S$ available.

Application Circuit Example



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