Ordering number : ENA3948B

LB1837M

ON Semiconductor®

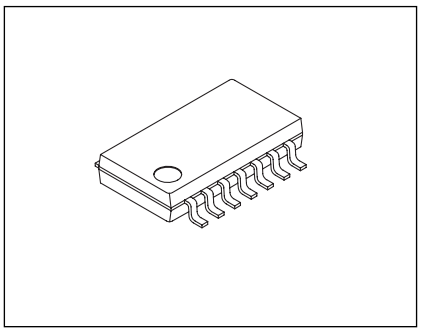
http://onsemi.com

Monolithic Linear IC

Low-voltage/Low-saturation Bidirectional Constant-Voltage Regulated Motor Driver

Overview

The LB1837M is a low-voltage, low-saturation, two-channel motor driver with a bidirectional braking function that provides constant-voltage regulated output for bidirectional operation. The design of the LB1837M is ideal for video equipment, cameras, and other portable equipment.



MFP14S(225mil)

Function

- Wide operating voltage range (3.0 to 9.0 V).
- Low saturation voltage
  VO (sat) = 0.40 V at IO = 200 mA.
- Consumes almost no current in standby mode (0.1 μA or less).
- Permits setting of bidirectional constant-voltage regulated value.
- Built-in reference voltage coupled to input.
- Brake function built in.
- Compact MFP14S package.

Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	VCC max		10.5	V
Output current	Im max		250	mA
Applied input voltage	VIN		–0.3 to +10	V
Allowable power dissipation	Pd max	With board (30 x 30 x 1.5 mm^3)	800	mW
Operating temperature	Topr		–20 to +80	°C
Storage temperature	Tstg		–40 to +12	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Allowable Operating Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	VCC		3.0 to 9.0	V
Input [H] voltage	VIH		3.0 to 9.0	V
Input [L] voltage	VIL		–0.3 to +0.7	V
Control voltage	VC		0.2 to 6.0	V

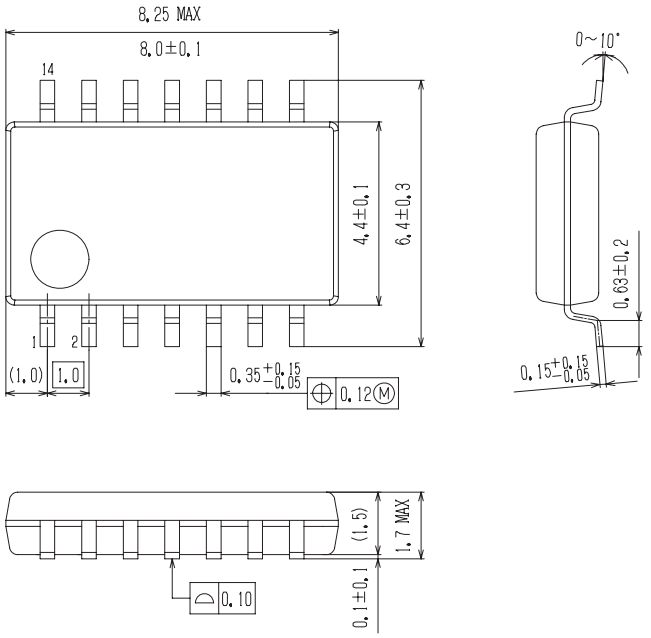
Electrical Characteristics at Ta = 25°C, V_{CC} = 6V

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Supply current	ICC0	During standby		0.1	10	μA
	ICC1	(For one channel) During bidirectional operation during control, load open		2	3	mA
	ICC2	(For one channel) During bidirectional operation during saturation, load open		3	5	mA
	ICC3	During braking (for one channel)		6.5	9	mA
Output saturation voltage	Vsat1	IO = 100 mA (upper side + lower side)		0.3	0.4	V
	Vsat2	IO = 200 mA (upper side + lower side)		0.4	0.55	V
	Vsat3	IO = 200 mA (lower side)	0.07	0.10	0.15	V
Reference voltage	Vref	Ivref = 1 mA	1.85	2.0	2.15	V
Output voltage voltage characteristics	$\frac{\Delta VO}{\Delta VCC}$	VO = 5 V, VCC = 5.5 to 9 V, IO = 100 mA			20	mV
Output voltage current characteristics	$\frac{\Delta VO}{\Delta ICC}$	VO = 5 V, VCC = 6 V, IO = 10 to 100 mA			50	mV
Input current	IIN	VIN = 5 V		90	150	μA
Output voltage	VO	Between OUT and GND	2.5 x VC		2.7 x VC	V

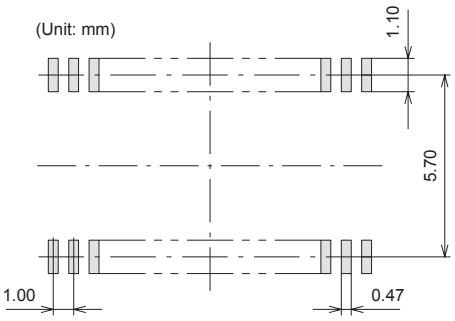
Package Dimensions

unit:mm

SOIC14 W / MFP14S (225 mil)
CASE 751CB
ISSUE A



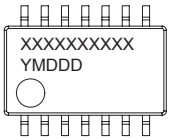
SOLDERING FOOTPRINT*



NOTE: The measurements are not to guarantee but for reference only.

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

GENERIC MARKING DIAGRAM*

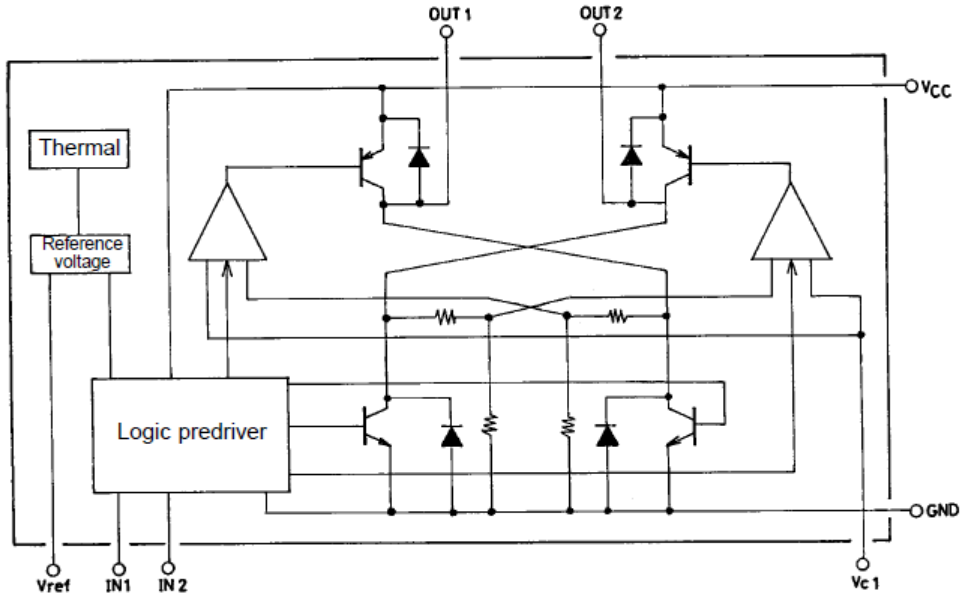


XXXXX = Specific Device Code
Y = Year
M = Month
DDD = Additional Traceability Data

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, "G" or microdot " ▪", may or may not be present.

Equivalent Circuit Block Diagram

(For one channel)

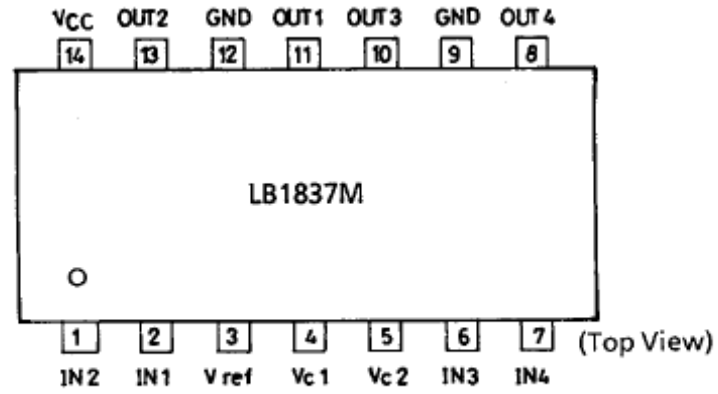


Truth Table

Input		Output		Mode
IN 1/3	IN 2/4	Out 1/3	Out 2/4	
L	L	OFF	OFF	Standby
H	L	H	L	Constant-voltage regulated forward operation
L	H	L	H	Constant-voltage regulated reverse operation
H	H	L	L	Brake

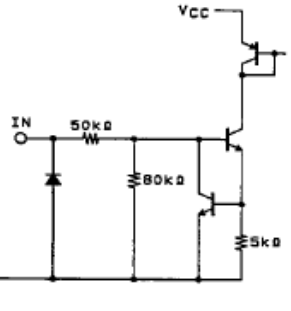
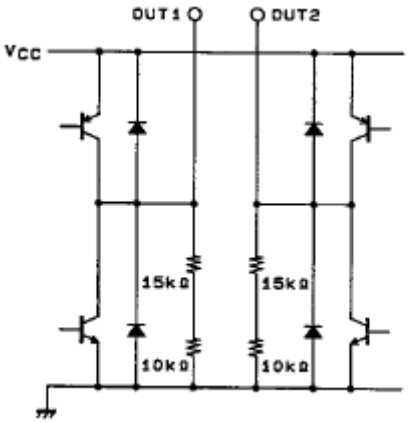
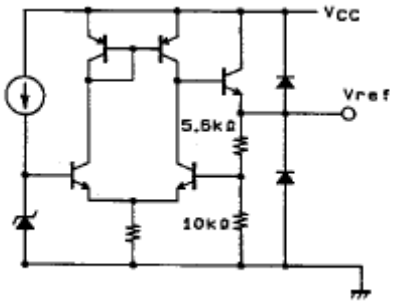
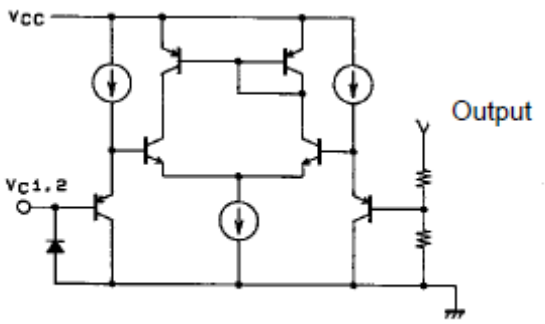
The constant-voltage regulated output V_O (= voltage between H side output and GND) is controlled by 2.5 x V_C.
The output is in the saturated state when the V_C input range is 0.2 to 6 V and $V_O \geq V_{CC}$.

Pin Assignment

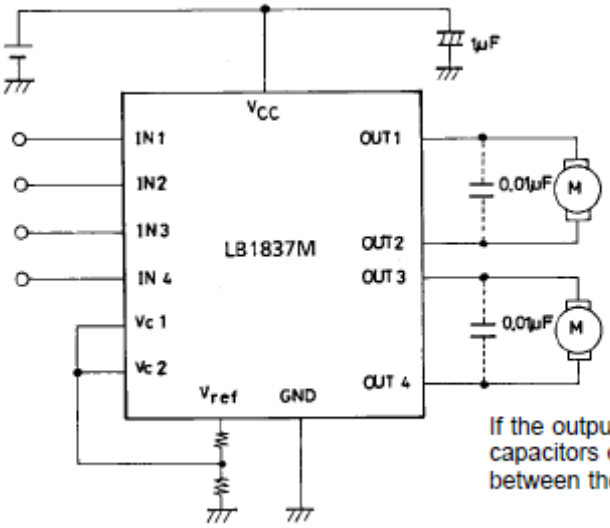


Note: Both GND pins must be grounded.

Pin Functions

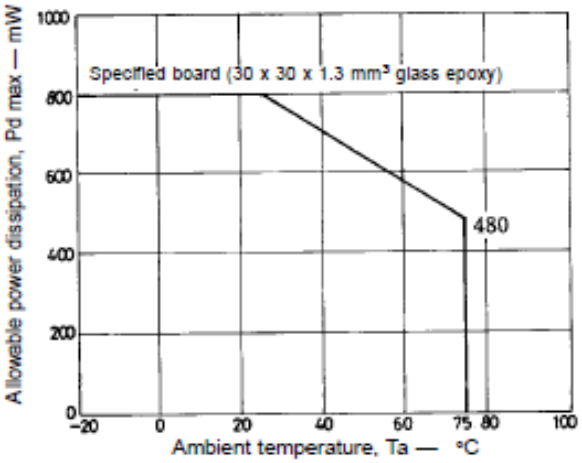
Pin No.	Symbol	Equivalent Circuit Diagram	Pin Function
14	VCC		Power supply pin for output and controller.
9 12	GND		GND pins for output and controller. Both must be grounded.
1 2 6 7	IN2 IN1 IN3 IN4		Input pins that determine the excitation of the outputs. IN1 and IN2 control outputs OUT1 and OUT2; IN3 and IN4 control outputs OUT3 and OUT4. When inputs IN1 through IN4 are all low or open, the device goes into standby mode and current consumption drops to 10 μA or less. L: –0.3 to +0.7 V H: 3.0 to 9.0 V There are no limitations on the magnitude relationships between the VCC and VIN supply voltages.
8 10 11 13	OUT4 OUT3 OUT1 OUT2		Output pins. Have built-in spark killer diodes. Braking provides short braking that turns on the lower transistor.
3	Vref		Reference voltage (= 2.0 V).
4 5	VC1 VC2		Input pins that determine the constantvoltage regulated output level. The constant-voltage regulated output VO (= voltage between H side output and GND) is controlled by VO = 2.5 x VC . There are no limitations on the magnitude relationships between the VCC, VC1 and VC2 supply voltages.

Sample Application Circuit

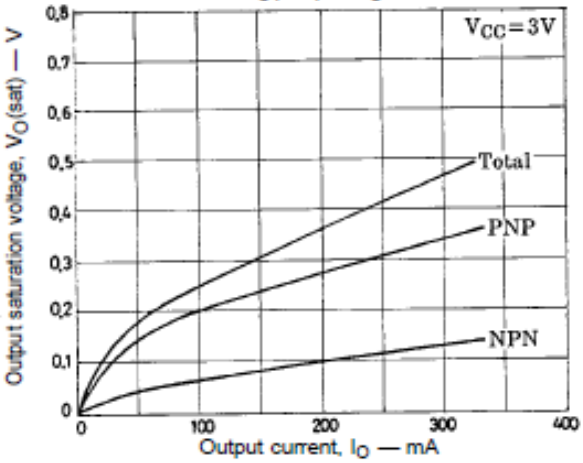


If the outputs oscillate, insert capacitors of 0.001 to 0.1 μF between the outputs.

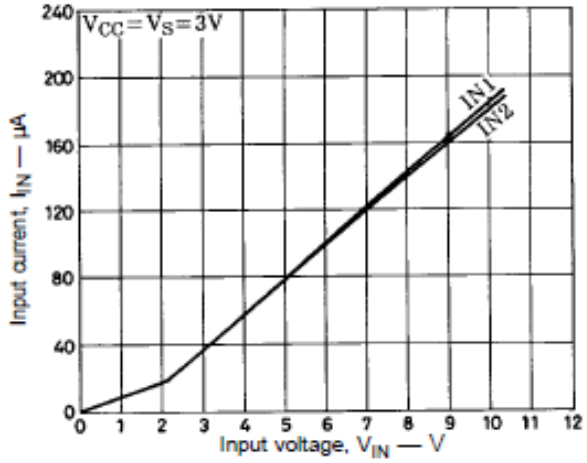
Pd max — Ta



$V_O(sat)$ — I_O



I_{IN} — V_{IN}



V — V_{CC}