



## LB1635M

### Low-Saturation Bidirectional Motor Drive for Low-Voltage Applications

## Overview

The LB1635M is a low-saturation bidirectional motor driver IC for use in low-voltage applications. At an  $I_O$  of 200 mA, they have a low saturation output of  $V_O(\text{sat}) = 0.5$  V typ. They are especially suited for use in compact motor of portable equipment.

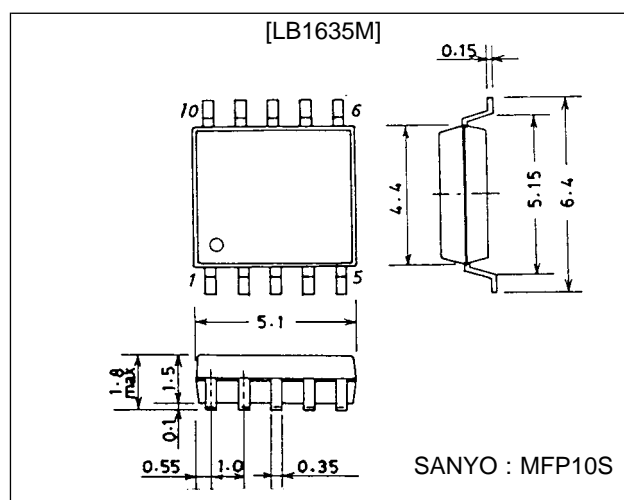
## Features

- Low voltage operation (2.5 V min.)
- Low saturation voltage  
(upper transistor + lower transistor residual voltage;  
at  $I_O = 200$  mA,  $V_O(\text{sat}) = 0.5$  V typ.)
- Low current drain at standby mode ( $I_{\text{CCO}} = 0.1$   $\mu\text{A}$  typ. or less)
- Separate logic power supply and motor power supply
- Brake function built in
- Spark killer diodes built in
- Compact package (MFP-10S) suited for surface mounting.

## Package Dimensions

unit : mm

### 3086A-MFP10S



## Specifications

### Absolute Maximum Ratings at $T_a = 25$ °C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{\text{CC max}}$		-0.3 to +8.0	V
	$V_{\text{S max}}$		-0.3 to +8.0	V
Output applied voltage	$V_{\text{OUT}}$		-0.3 to $V_{\text{S}} + V_{\text{F}}$	V
Input applied voltage	$V_{\text{IN}}$		-0.3 to +8.0	V
Ground pin flow-out current	$I_{\text{GND}}$		500	mA
Allowable power dissipation	$P_{\text{d max1}}$	Independent IC	300	mW
	$P_{\text{d max2}}$	* With board	440	mW
Operating temperature	$T_{\text{opr}}$		-20 to +75	°C
Storage temperature	$T_{\text{stg}}$		-40 to +125	°C

\* Specified board ( $30 \times 30 \times 1.5$  mm<sup>3</sup> glass epoxy)

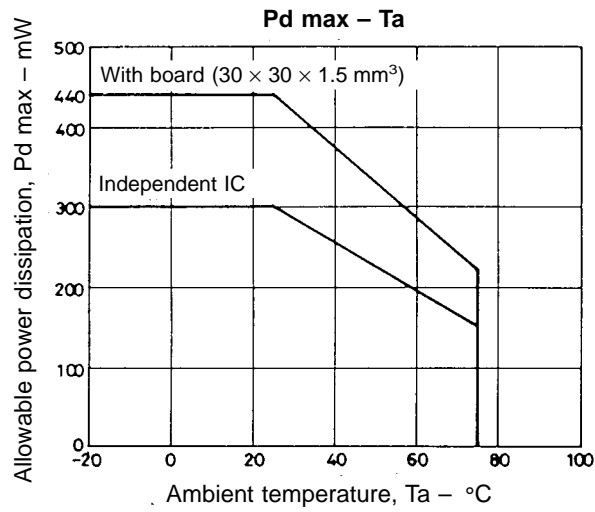
### Allowable Operating Ranges at $T_a = 25$ °C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	$V_{\text{CC}}$		2.5 to 7.0	V
	$V_{\text{S}}$		2.2 to 7.0	V
Input high-level voltage	$V_{\text{IH}}$		2.0 to 7.0	V
Input low-level voltage	$V_{\text{IL}}$		-0.3 to +0.7	V

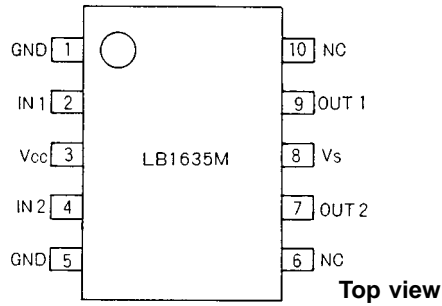
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## Electrical Characteristics at $T_a = 25\text{ }^\circ\text{C}$ , $V_{CC} = V_S = 3\text{ V}$

Parameter	Symbol	Conditions	min	typ	max	Unit
Supply current	$I_{CC0}$	$V_{IN\ 1, 2} = 0\text{ V}$			10	$\mu\text{A}$
	$I_{CC1}$	$V_{IN\ 1} = 3\text{ V}, V_{IN\ 2} = 0\text{ V}$			15	$\text{mA}$
	$I_{CC2}$	$V_{IN\ 1, 2} = 3\text{ V}$			30	$\text{mA}$
Output saturation voltage (upper + lower)	$V_{OUT1}$	$I_{OUT} = 100\text{ mA}$		0.25	0.5	V
	$V_{OUT2}$	$I_{OUT} = 200\text{ mA}$		0.50	1.0	V
Output pin voltage difference		$I_O = 100\text{ mA}$	-20	0	+20	%
Output sustain voltage	$V_O$ (sus)	$I_{OUT} = 200\text{ mA}$	9			V
Input current	$I_{IN}$	$V_{IN} = 7\text{ V}, V_{CC} = 7\text{ V}$			0.5	$\text{mA}$
[Spark killer diode]						
Reverse current	$I_S$ (leak)	$V_{CC}, V_S = 7\text{ V}$			10	$\mu\text{A}$
Forward voltage	$V_{SF}$	$I_{OUT} = 200\text{ mA}$			1.7	V



## Pin Assignment

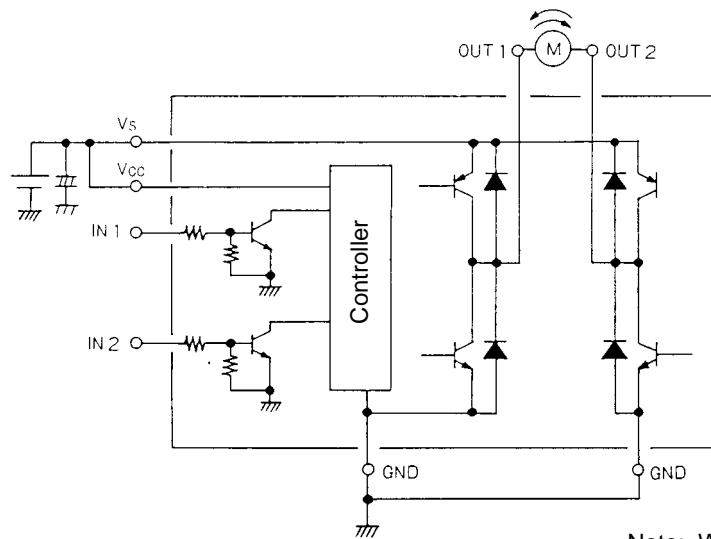


Note: both ground pins must be grounded.

## Truth Table

IN 1	IN 2	OUT 1	OUT 2	Mode
H	L	H	L	Forward
L	H	L	H	Reverse
H	H	L	L	Brake
L	L	OFF	OFF	Standby

## Sample Application Circuit



Note: When using the same power supply for  $V_S$  and  $V_{CC}$ , short the  $V_{CC}$  and  $V_S$  pins to each other or insert a capacitor in the  $V_{CC}$  line.

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