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# LB1638MC

## Monolithic Digital IC Low-Voltage, Low-Saturation Bidirectional Motor Driver

### Overview

The LB1638MC are low-saturation bidirectional motor driver ICs for use in low-voltage applications. At an  $I_O$  of 500mA, they have a low saturation output of  $V_O(\text{sat}) = 0.75\text{V}$ . They are especially suited for use in compact motor of portable equipment.

### Features

- Low voltage operation (2.5V min.)
- Low saturation voltage (upper transistor + lower transistor residual voltage; at  $I_O = 500\text{mA}$ ,  $V_O(\text{sat}) = 0.75\text{V}$  typ.)
- Low current drain at standby mode ( $I_{CCO} = 0.1\mu\text{A}$  typ. or less)
- Separate logic power supply and motor power supply
- Brake function
- Built-in spark killer diodes

### Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC}$ max		-0.3 to +10.5	V
	$V_S$ max		-0.3 to +10.5	V
Output applied voltage	$V_{OUT}$		-0.3 to $V_{CC} + V_{SF}$	V
Input applied voltage	$V_{IN}$		-0.3 to +10.0	V
Ground pin flow-out current	$I_{GND}$		1.0	A
Allowable power dissipation	$P_d$ max	Mounted on a specified board	820	mW
Operating temperature	$T_{opr}$		-20 to +75	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-40 to +125	$^\circ\text{C}$

\* Specified board: 114.3mm × 76.1mm × 1.6mm, glass epoxy board.

Caution 1) Absolute maximum ratings represent the value which cannot be exceeded for any length of time.

Caution 2) Even when the device is used within the range of absolute maximum ratings, as a result of continuous usage under high temperature, high current, high voltage, or drastic temperature change, the reliability of the IC may be degraded. Please contact us for the further details.

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.

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## Allowable Operating Conditions at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage range	$V_{CC}$		2.5 to 9.0	V
	$V_S$		2.2 to 9.0	V
Input high-level voltage	$V_{IH}$		2.0 to 9.0	V
Input low-level	$V_{IL}$		-0.3 to +0.7	V

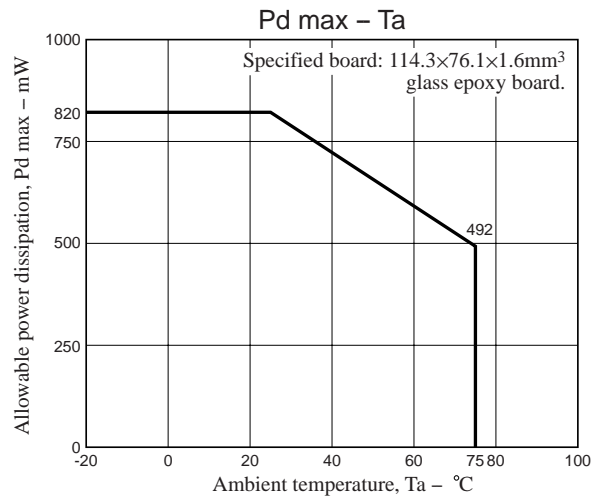
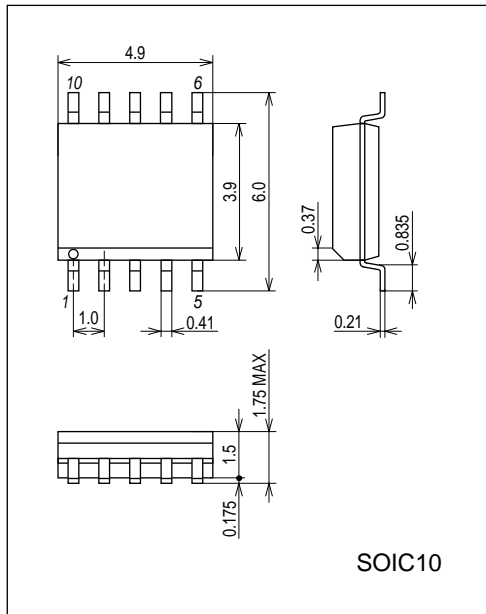
## Electrical Characteristics at $T_a = 25^\circ\text{C}$ , $V_{CC} = 5\text{V}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Current drain	$I_{CC0}$	$V_{IN1,2}$ $I_{CC} + I_S$			10	$\mu\text{A}$
	$I_{CC1}$	$V_{IN1} = 3\text{V}$ , $V_{IN2} = 0\text{V}$ $I_{CC} + I_S$			20	mA
	$I_{CC2}$	$V_{IN1,2} = 3\text{V}$ $I_{CC} + I_S$			40	mA
Output saturation voltage (upper + lower)	$V_{OUT1}$	$I_{OUT} = 200\text{mA}$		0.25	0.5	V
	$V_{OUT2}$	$I_{OUT} = 500\text{mA}$		0.70	1.3	V
Output pin voltage difference		$I_O = 200\text{mA}$			0.1	V
Output sustain voltage	$V_{O(sus)}$	$I_{OUT} = 500\text{mA}$	9			V
Input current	$I_{IN}$	$V_{IN} = 7\text{V}$ , $V_{CC} = 7\text{V}$			0.5	mA
<b>Spark killer diode</b>						
Reverse current	$I_S(\text{leak})$	$V_{CC}$ , $V_S = 7\text{V}$			10	$\mu\text{A}$
Forward voltage	$V_{SF}$	$I_{OUT} = 200\text{mA}$			1.7	V

## Package Dimensions

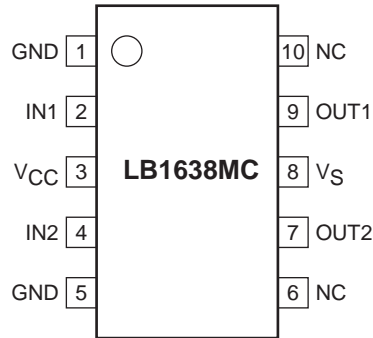
unit : mm (typ)

3426A



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## Pin Assignment

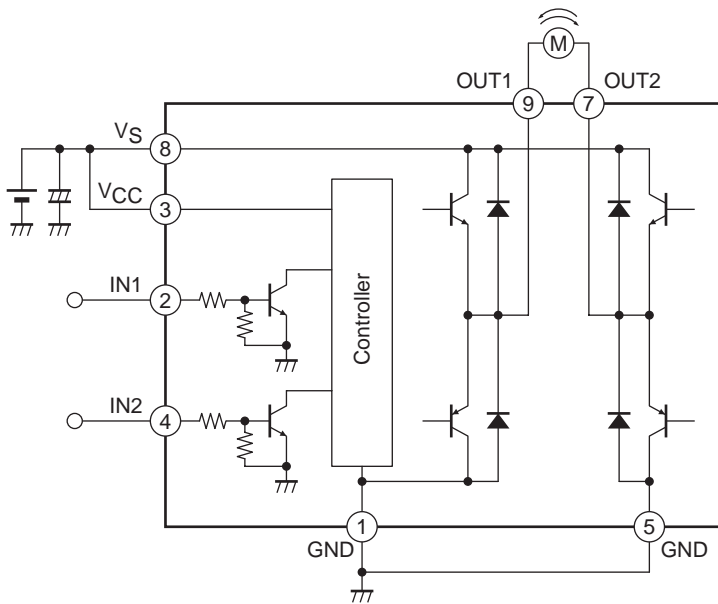


Note: both ground pins must be grounded.

## Truth Table

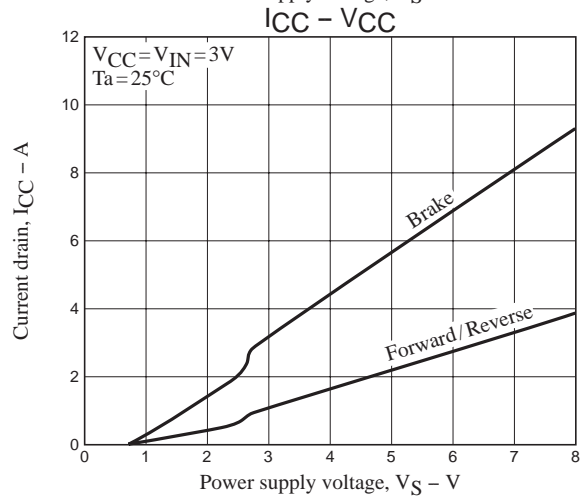
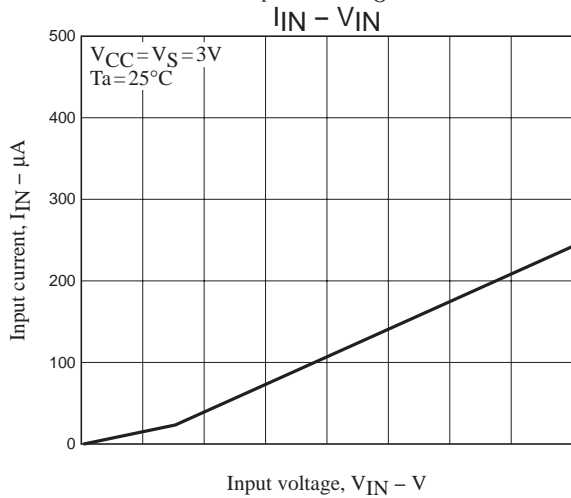
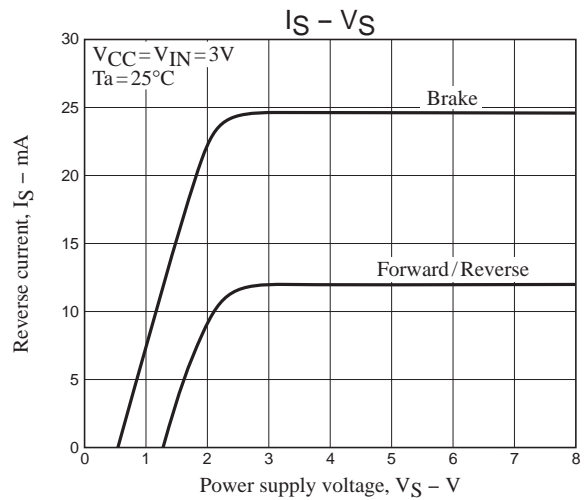
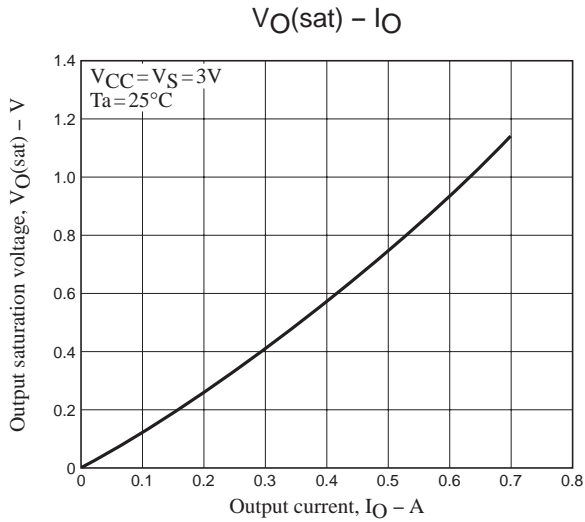
IN1	IN2	OUT1	OUT2	MMode
H	L	H	L	Forward
L	H	L	H	Reverse
H	H	L	L	Brake
L	L	OFF	OFF	Standby

## Block Diagram and Sample Application Circuit



Note: When using the same power supply for VS and VCC, short the VCC and VS pins to each other or insert a capacitor in the VCC line.



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