



ON Semiconductor®

<http://onsemi.com>

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.

LB1638MC

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

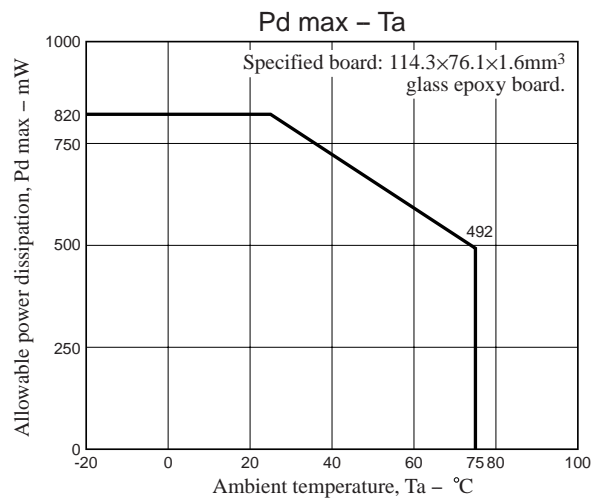
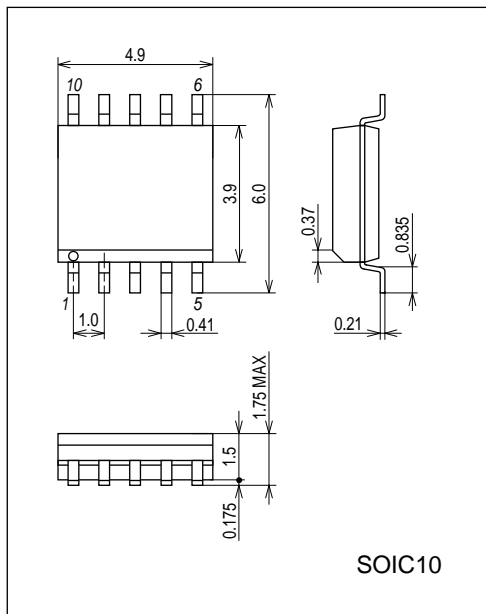
Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 5\text{V}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Current drain	I_{CC0}	$V_{IN1,2}$ $I_{CC} + I_S$			10	μA
	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	$V_O(\text{sus})$	$I_{OUT} = 500\text{mA}$	9			V
Input current	I_{IN}	$V_{IN} = 7\text{V}$, $V_{CC} = 7\text{V}$			0.5	mA
Spark killer diode						
Reverse current	$I_S(\text{leak})$	V_{CC} , $V_S = 7\text{V}$			10	μA
Forward voltage	V_{SF}	$I_{OUT} = 200\text{mA}$			1.7	V

Package Dimensions

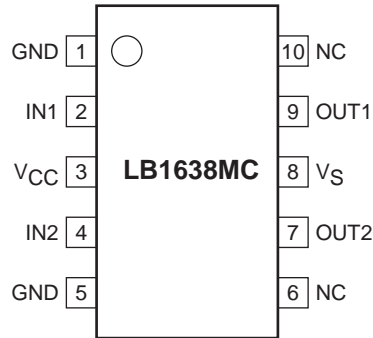
unit : mm (typ)

3426A



LB1638MC

Pin Assignment

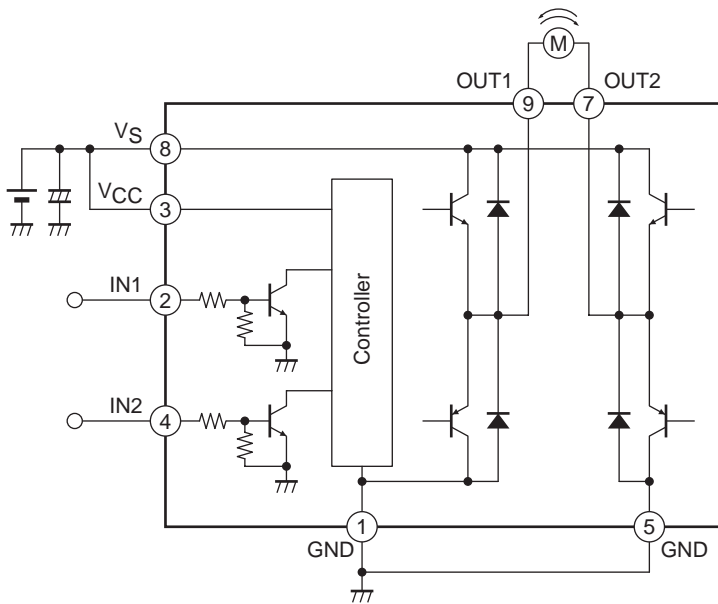


Note: both ground pins must be grounded.

Truth Table

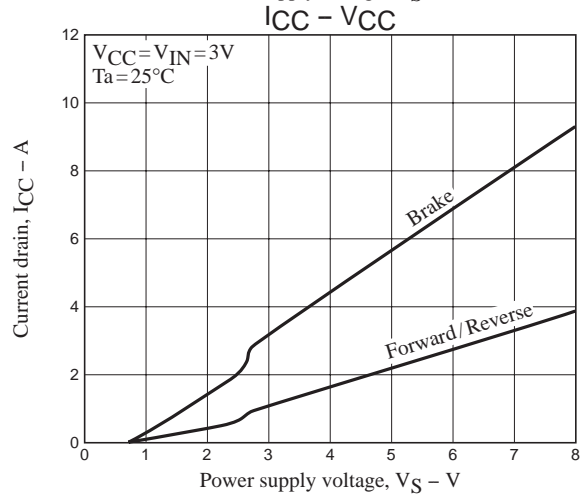
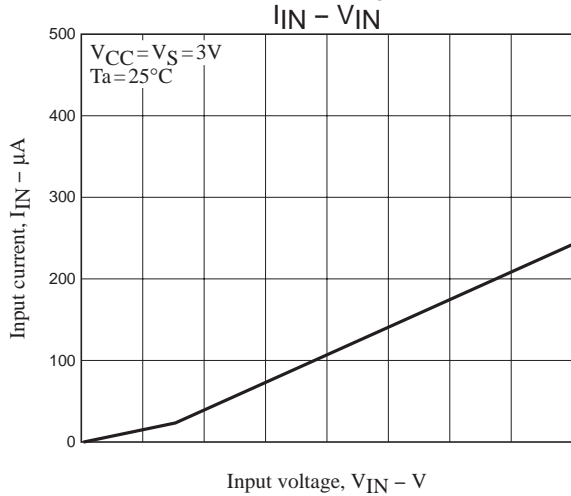
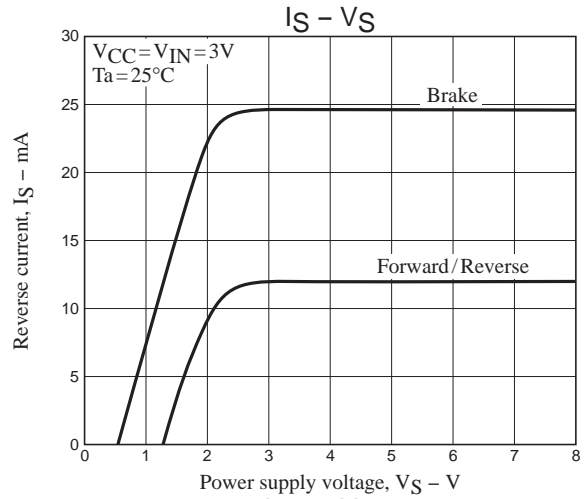
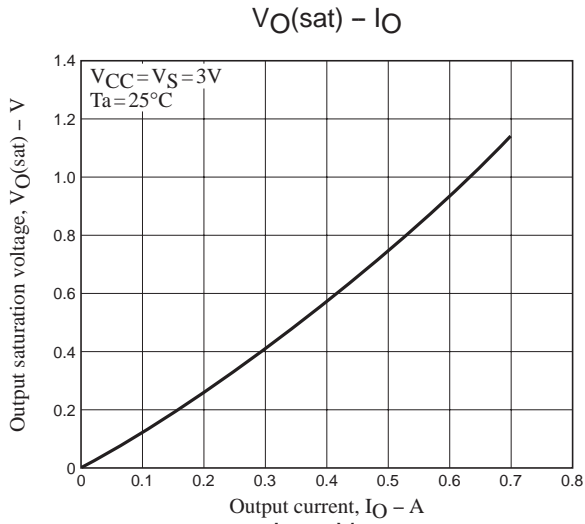
IN1	IN2	OUT1	OUT2	MMode
H	L	H	L	Forward
L	H	L	H	Reverse
H	H	L	L	Brake
L	L	OFF	OFF	Standby

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.

LB1638MC



ON Semiconductor and the ON logo are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of SCILLC's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.