



Low-Saturation Bidirectional Motor Drive for Low-Voltage Applications

Overview

The LB1638, 1638M are low-saturation bidirectional motor driver ICs for use in low-voltage applications. At an I_O of 500 mA, they have a low saturation output of $V_O(\text{sat}) = 0.75$ V. They are especially suited for use in compact motor of portable equipment.

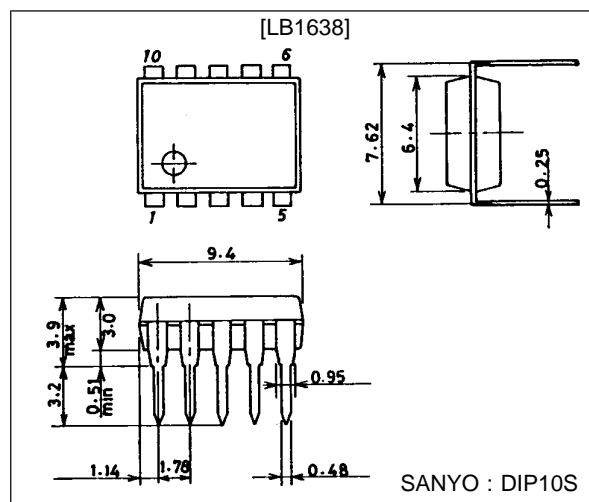
Features

- Low voltage operation (2.5 V min.)
- Low saturation voltage (upper transistor + lower transistor residual voltage; at $I_O = 500$ mA, $V_O(\text{sat}) = 0.75$ V typ.)
- Low current drain at standby mode ($I_{CC0} = 0.1$ μ A typ. or less)
- Separate logic power supply and motor power supply
- Brake function
- Built-in spark killer diodes
- Compact package (MFP-10S) suited for surface mounting.

Package Dimensions

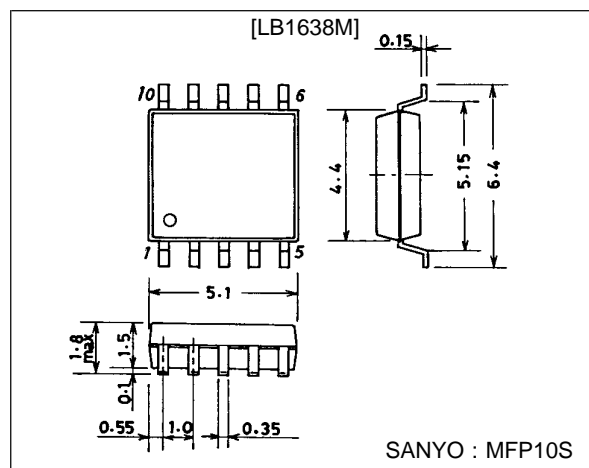
unit : mm

3098B-DIP10S



unit : mm

3086A-MFP10S



LB1638, 1638M

Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC\text{ max}}$		-0.3 to +10.5	V
	$V_S\text{ max}$		-0.3 to +10.5	V
Output applied voltage	V_{OUT}		-0.3 to $V_S + V_F$	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	$P_d\text{ max}$	LB1638	1.0	W
		LB1638M: Independent IC	440	mW
		LB1638M: *With board	550	mW
Operating temperature	T_{opr}		-20 to +75	$^\circ\text{C}$
Storage temperature	T_{stg}		-40 to +125	$^\circ\text{C}$

* Specified board ($30 \times 30 \times 1.5\text{ mm}^3$ glass epoxy)

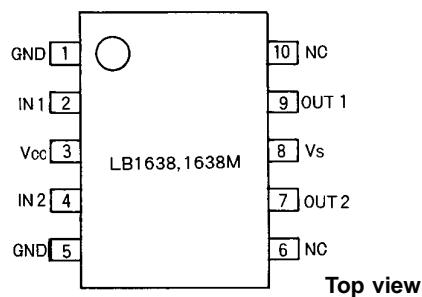
Allowable Operating Ranges at $T_a = 25\text{ }^\circ\text{C}$

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 voltage	V_{IL}		-0.3 to +0.7	V

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

Parameter	Symbol	Conditions	min	typ	max	Unit
Current drain	I_{CC0}	$V_{IN}\ 1, 2$ $I_{CC} + I_S$			10	μA
	I_{CC1}	$V_{IN}\ 1 = 3\text{ V}, V_{IN}\ 2 = 0\text{ V}$ $I_{CC} + I_S$			20	mA
	I_{CC2}	$V_{IN}\ 1, 2 = 3\text{ V}$ $I_{CC} + I_S$			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

Pin Assignment

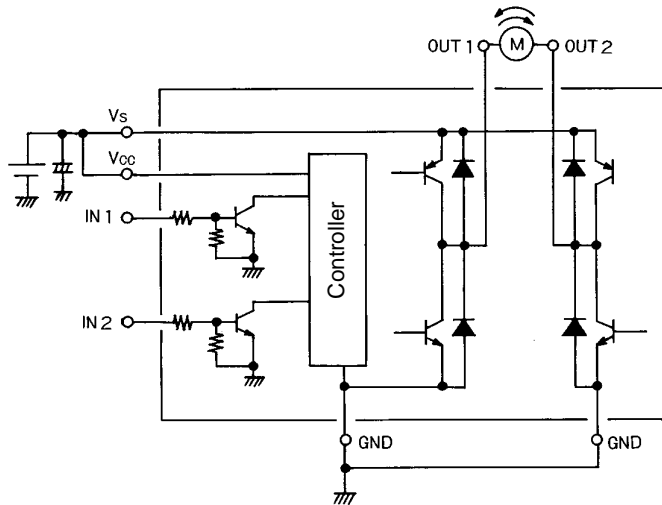


Note: both ground pins must be grounded.

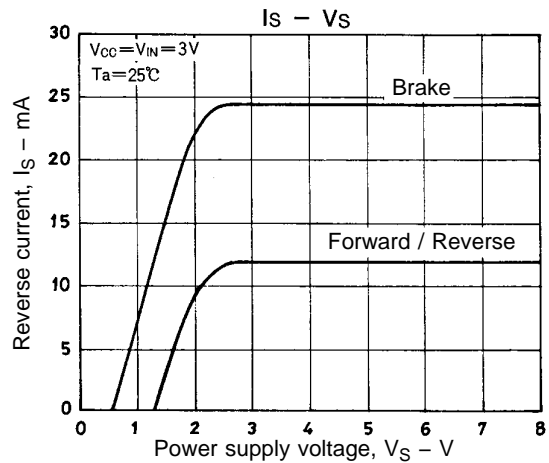
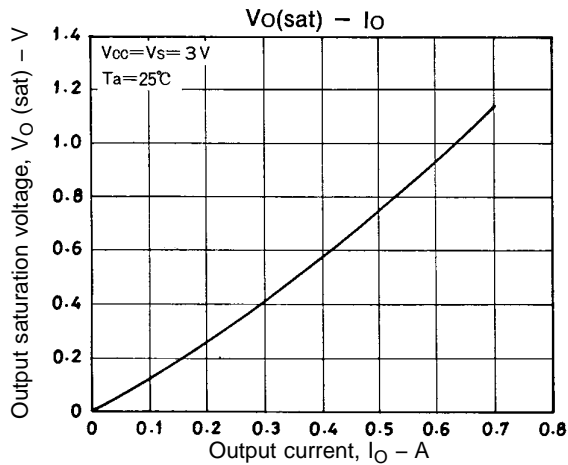
Truth Table

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

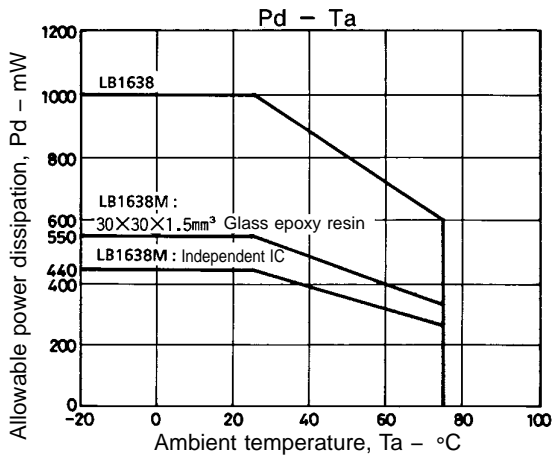
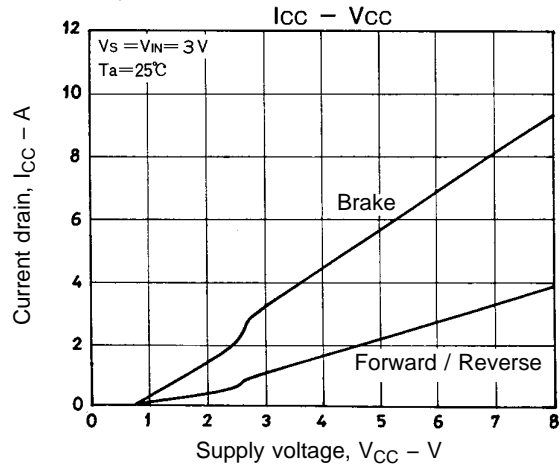
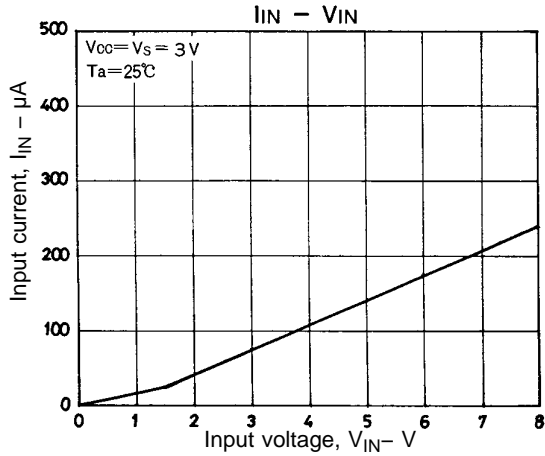
Sample Application Circuit



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.



LB1638, 1638M



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