Ordering number:EN1530C

Monolithic Digital IC

LB1650

Dual Bidirectional Motor Driver

Overview

The LB1650 is a dual bidirectional motor driver that is designed to accept standard TTL input logic levels and drive motors. It provides the functions of bidirectional motor drive, brake that are determined by two inputs and the inhibit function that brings the output to a high impedance state.

Applications

- Multi DC motor driver.
- Bidirectional motor driver.
- Bipolar stepping motor driver.

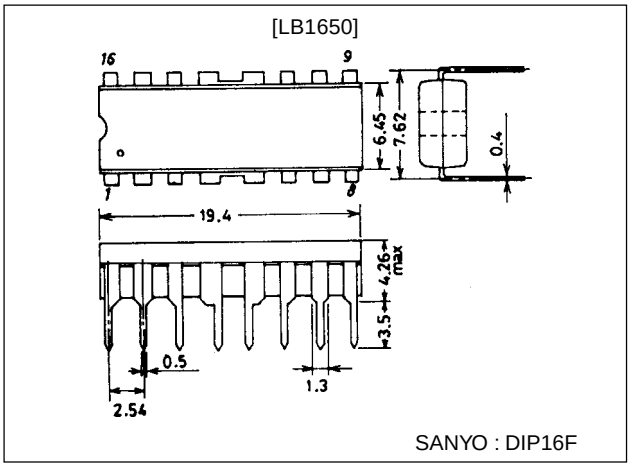
Features

- High output current (1A/ch).
- Wide operating voltage range (4.5 to 36V).
- Inhibit facility.
- Input connectable to TTL, CMOS IC.
- High noise margin.

Package Dimensions

unit:mm

3054A-DIP16F



Specifications

Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} 1		36	V
Logic supply voltage	V_{CC} 2		36	V
Input voltage	V_{IN}		7	V
Inhibit voltage	V_{inh}		7	V
Peak output current	I_{OUT}	1ms non-repetitive	2	A
Allowable power dissipation	Pd max	IC only	1.9	W
Operating temperature	Topr		–20 to +80	˚C
Storage temperature	Tstg		–40 to +150	˚C

Allowable Operating Conditions at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V_{CC} 1		4.5 to 36	V
Logic supply voltage	V_{CC} 2		4.5 to 36	V

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Electrical Characteristics at Ta = 25˚C, V_{CC1}=24V, V_{CC2}=5V

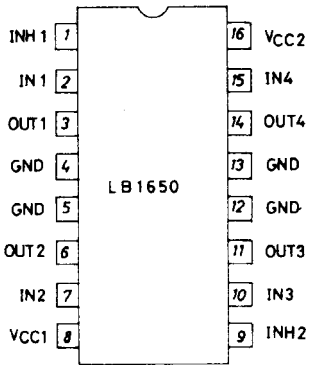
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Supply current (per CH)	I_{CC} 1	V_{IN}=L, I_O=0, V_{inh}=H			1.5	mA
		V_{IN}=H, I_O=0, V_{inh}=H			6	mA
		V_{inh}=L			1	mA
Logic supply current	I_{CC} 2	V_{IN}=L, I_O=0, V_{inh}=H		44	60	mA
		V_{IN}=H, I_O=0, V_{inh}=H			22	mA
		V_{inh}=L			24	mA
Low-level input voltage	V_{IL}		–0.3		1.5	V
High-level input voltage	V_{IH}	V_{CC2}≤7V	2.3		V_{CC2}	V
		V_{CC2}≤7V	2.3		7	V
Low-level input current	I_{IL}	V_{IN}=L			±10	µA
High-level input current	I_{IH}	V_{IN}=H–0.3V		30	100	µA
Low-levle inhibit voltage	V_{inhL}		–0.3		1.5	V
High-level inhibit voltage	V_{inhH}	V_{CC2}≤7V	2.3		V_{CC2}	V
		V_{CC2}≤7V	2.3		7	V
Low-level inhibit current	I_{inhL}		–100	–30		µA
High-level inhibit current	I_{inhH}				±10	µA
Saturation voltage	$V_{CE(sat)H}$	I_O=–1A		1.4	1.8	V
	$V_{CE(sat)L}$	I_O=1A		1.2	1.8	V

Truth Table

V_{IN} (per CH)	V_{inh}	V_O
H	H	H
L	H	L
H	L	Open*
L	L	Open*

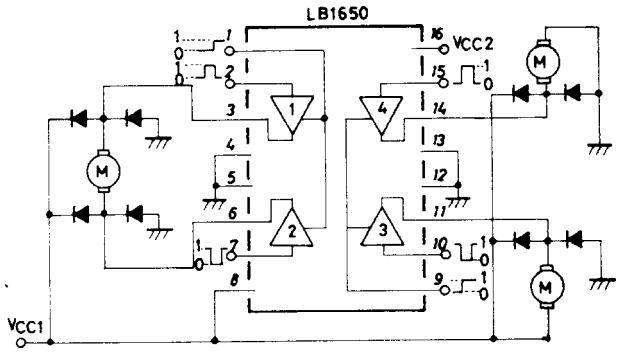
* : High impedance

Pin Assignment



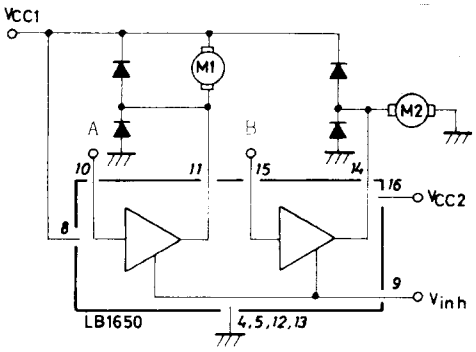
Top view

Equivalent Circuit Block Diagram and Peripheral Circuit



Sample Application Circuits

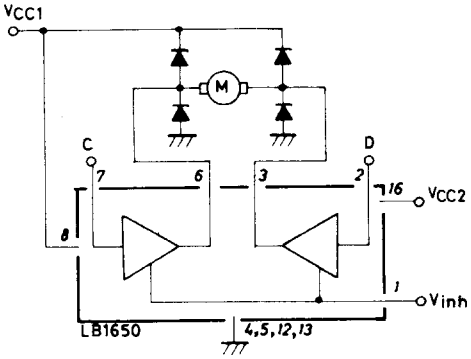
(1) DC motor control



V_{inh}	A	M1	B	M2
H	H	Brake	H	Forward
H	L	Forward	L	Brake
L	X	Open*	X	Open*

X : don't care

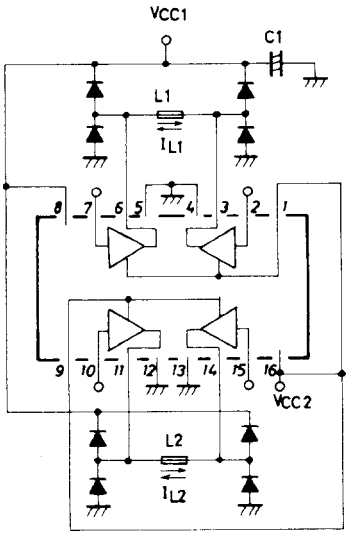
(2) DC motor control (Forward, reverse)

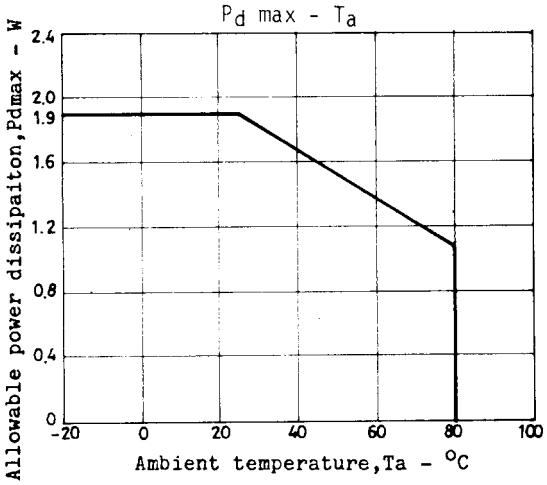


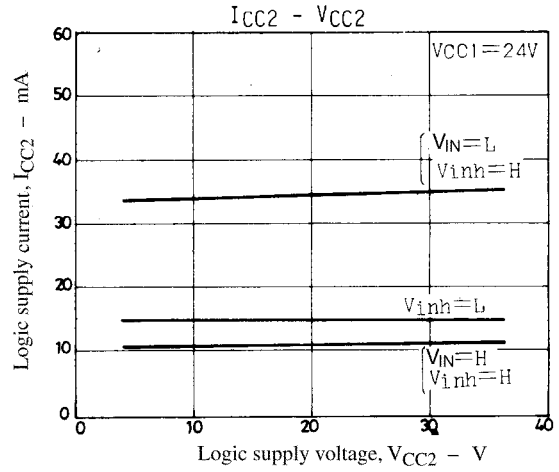
Input		Function
V_{inh}	C=H D=L C=L D=H C=D	Forward (right) Reverse (left) Brake
V_{inh}=L	C=X D=X	Open*

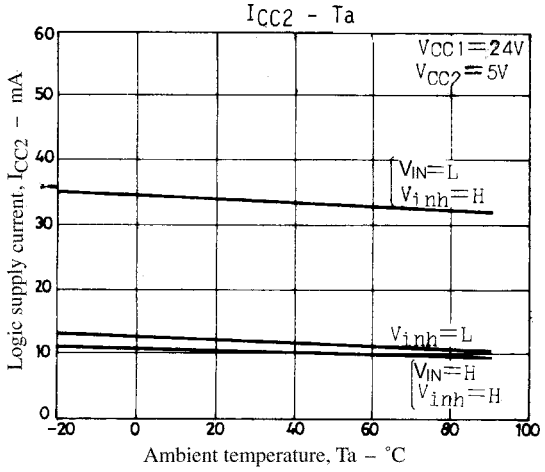
* : High impedance

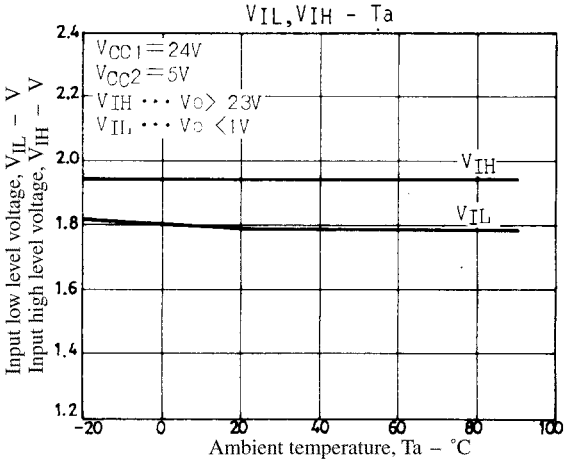
(3) Stepping motor control (Bipolar drive)

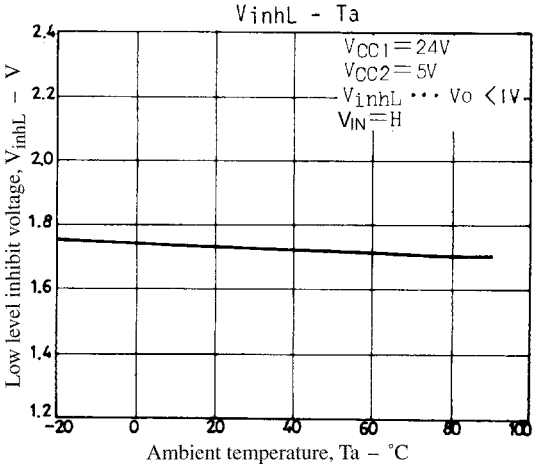


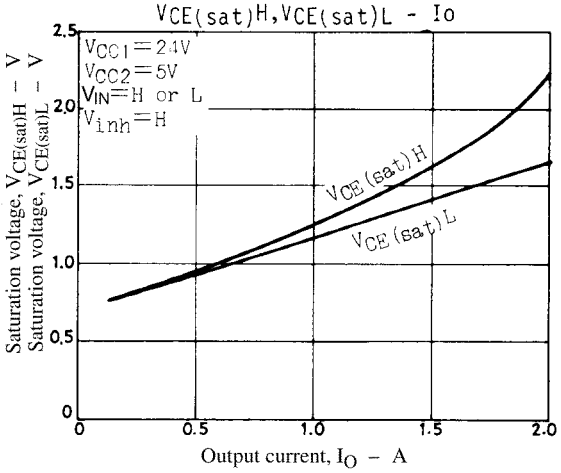


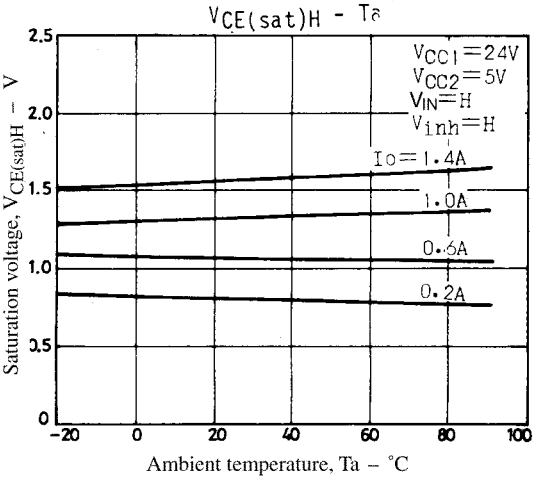

ICC2 - VCC2
VCC1=24V
VIN=L
Vinh=H
Vinh=L
VIN=H
Vinh=H
Logic supply current, ICC2 – mA
Logic supply voltage, VCC2 – V

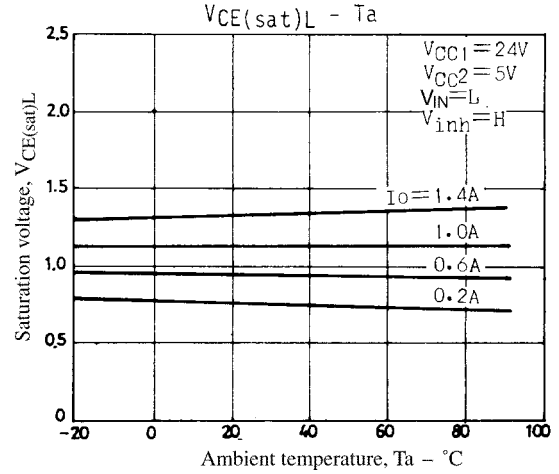

ICC2 - Ta
VCC1=24V
VCC2=5V
VIN=L
Vinh=H
Vinh=L
VIN=H
Vinh=H
Logic supply current, ICC2 – mA
Ambient temperature, Ta – °C


VIL,VIH - Ta
VCC1=24V
VCC2=5V
VIH ··· Vo> 2.3V
VIL ··· Vo <1V
VIH
VIL
Input low level voltage, VIL – V
Input high level voltage, VIH – V
Ambient temperature, Ta – °C


VinhL - Ta
VCC1=24V
VCC2=5V
VinhL ··· Vo <1V
VIN=H
Low level inhibit voltage, VinhL – V
Ambient temperature, Ta – °C


VCE(sat)H,VCE(sat)L - Io
VCC1=24V
VCC2=5V
VIN=H or L
Vinh=H
VCE(sat)H
VCE(sat)L
Saturation voltage, VCE(sat)H – V
Saturation voltage, VCE(sat)L – V
Output current, IO – A


VCE(sat)H - Ta
VCC1=24V
VCC2=5V
VIN=H
Vinh=H
Io=1.4A
1.0A
0.6A
0.2A
Saturation voltage, VCE(sat)H – V
Ambient temperature, Ta – °C


VCE(sat)L - Ta
VCC1=24V
VCC2=5V
VIN=L
Vinh=H
Io=1.4A
1.0A
0.6A
0.2A
Saturation voltage, VCE(sat)L
Ambient temperature, Ta – °C