11-MD141

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Low-saturation, Low-voltage

Bi-directional Motor Driver

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Low-saturation, Low-voltage
Bi-directional Motor Driver

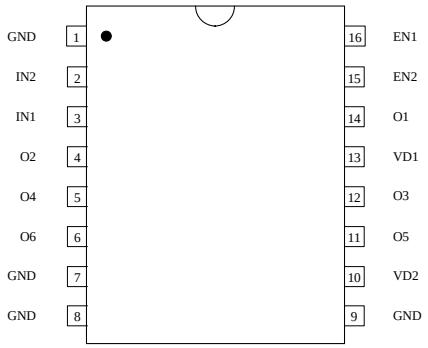
General Specifications

The device is a four-channels low-saturation bi-directional motor driver IC. The design is optimal for stepping-motor applications.

Features and Benefits

- Low voltage operation ($V_{D1\ min}$ = $V_{D2\ min}$ = 1.5V)
- Low saturation voltage
- Optimal for 2 stepping motors
- High output sinking and driving capability
- Thin, small, highly reliable package (SSOP-16)

Pin Assignment



PIN NO.	PIN NAME	DESCRIPTION
1	GND	Ground pin
2	IN2	Input pin that determines driving mode.
3	IN1	Input pin that determines driving mode.
4	O2	Output sinking / driving pin.
5	O4	Output sinking / driving pin.
6	O6	Output sinking / driving pin.
7	GND	Ground pin
8	GND	Ground pin
9	GND	Ground pin
10	VD2	Power supply pin.
11	O5	Output sinking / driving pin.
12	O3	Output sinking / driving pin.
13	VD1	Power supply pin.
14	O1	Output sinking / driving pin.
15	EN2	Input pin that select active motor.
16	EN1	Input pin that select active motor.

Absolute Maximum Ratings *(Unless otherwise noted, T_A= 25℃)*

Characteristic	Symbol	Rating	Unit
Supply Voltage	V_{DD}	6.0	V
Input Voltage	V_{IN}	V_{DD}+0.4	V
I_{ODC} Current	I_{ODC}	400	mA
Power Dissipation	P_D	600	mW
Operating Temperature Range	T_{OPR}	-40 ~ 125	°C
Storage Temperature Range	T_{STG}	-65 ~ 150	°C

Electrical Characteristic

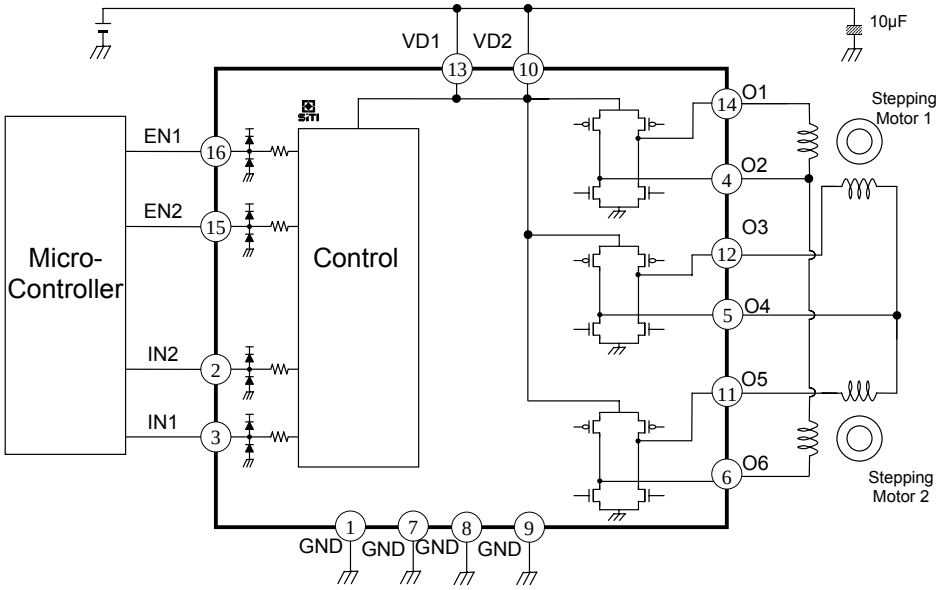
(Unless otherwise noted, T_A= 25℃ & V_{D1} = V_{D2} = 3V)

Characteristic	Sym.	Condition	Limit			Unit
			Min.	Typ.	Max.	
Supply Voltage	V_{D1}, V_{D2}		1.5	3	6	V
Supply Current (I_{D1} + I_{D2})	I_{DD0}	$V_{EN1, EN2, IN1, IN2}$ = 0V		0.1	0.5	μA
EN1 / EN2 / IN1 / IN2 Input Terminal (T_J = 25℃)						
Input Voltage “H”	V_{IH}	-	0.5*V_{DD}	-	V_{DD}+0.4	V
Input Voltage “L”	V_{IL}	-	-0.4	-	0.2*V_{DD}	V
Input Current “H”	I_{IH}	V_{IN} = V_{DD}	-	-	±5	A
Input Current “L”	I_{IL}	V_{IN} = 0 V	-	-	±5	μA
O1 / O2 / O3 / O4 Output Terminal (T_J = 25℃)						
Output Voltage (upper + lower)	V_{OUT}	I_{OUT} = 400 mA	-	0.4	0.8	V
Output Sustaining Voltage	$V_{O(SUS)}$	I_{OUT} = 400 mA	-	-	V_{DD}	V

Truth Table

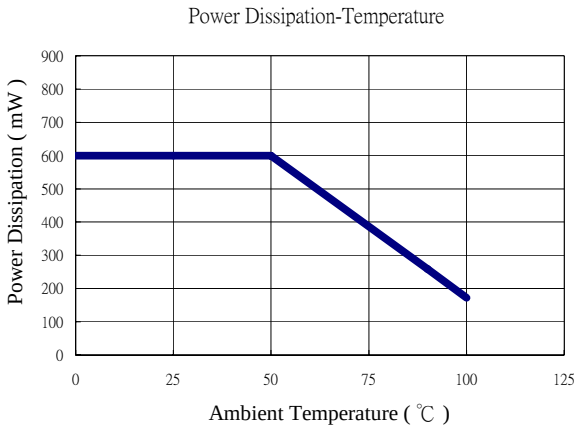
EN1	EN2	IN1	IN2	O1	O2	O3	O4	O5	O6	Notes
L	L	-	-	OFF	OFF	OFF	OFF	OFF	OFF	Standby
H	H	-	-	OFF	OFF	OFF	OFF	OFF	OFF	
H	L	L	L	H	L	H	L	L	L	Motor 1 2-phase excitation
		L	H	H	L	L	H	H	L	
		H	H	L	H	L	H	H	H	
		H	L	L	H	H	L	L	H	
L	H	L	L	H	H	H	H	L	L	Motor 2 2-phase excitation
		L	H	L	L	H	H	L	H	
		H	H	L	L	L	L	H	H	
		H	L	H	H	L	L	H	L	

Block Diagram & Application Circuit



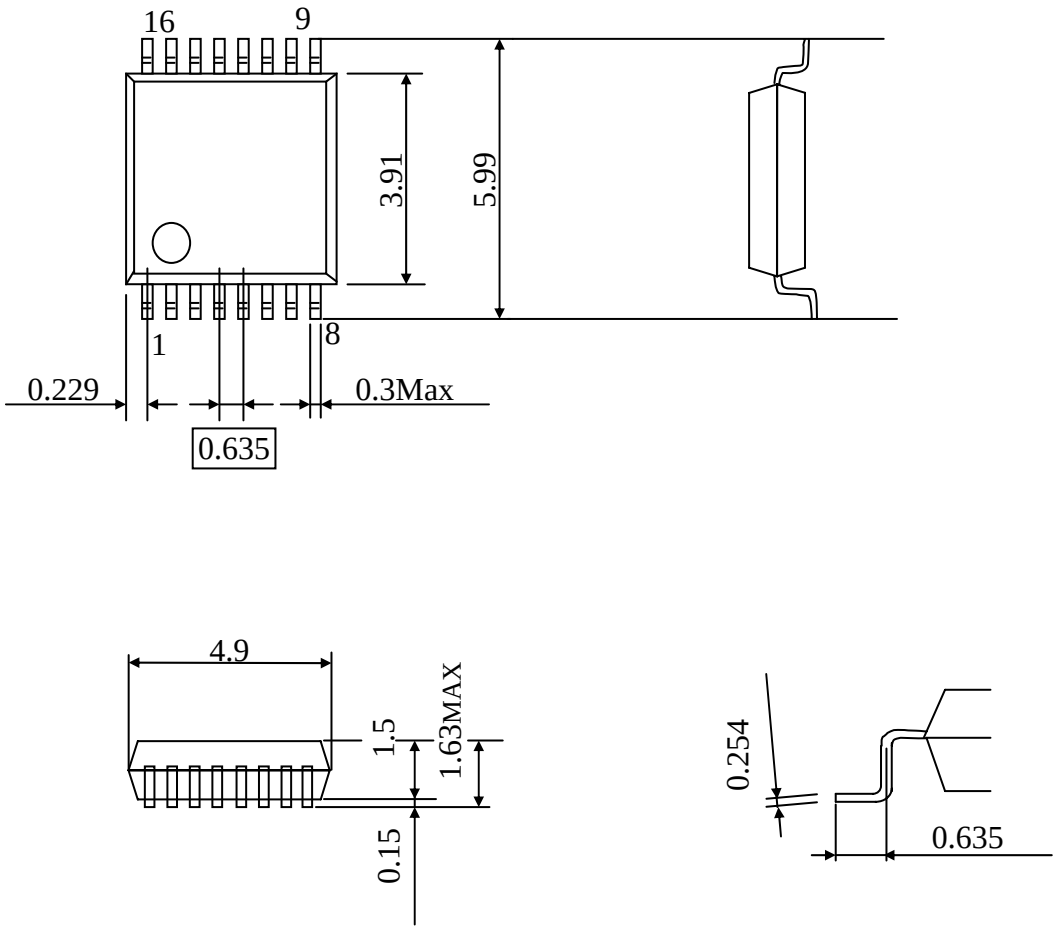
Application Notes

- The GND pin 1, pin 7, pin8 and pin9 must both connect to system ground. The VD1 pin 13 and VD2 pin 10 must both connect to system power.
- In 2-stepping motors application, the driver IC drivers only one stepping-motor operating at the same time.
- The power dissipated by the IC varies widely with the supply voltage, the output current, and loading. It is important to ensure the application does not exceed the allowable power dissipation of the IC package. The recommended motor driver power dissipation versus temperature is depicted as follows:



Package Specifications(SSOP-16)

Unit: mm



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