11-MD111

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Low-saturation, Low-voltage

1.5 Channel Bi-directional Motor Driver

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MD111

Low-saturation, Low-voltage
1 Channel Bi-directional Toy Motor Driver

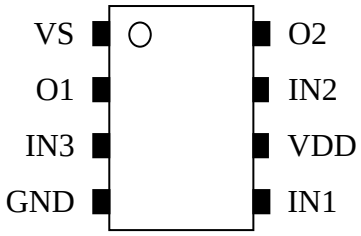
General Specifications

The device is a 1-channel low-saturation bi-directional H-bridge driver IC. The design is optimal for DC motor in toy application with forward, reverse, brake and stand-by function.

Features and Benefits

- Low voltage operation ($V_{DD\ Min}$ = V_{SMin} = 1.5V)
- Low saturation voltage (Upper transistor + low transistor residual voltage; 0.4V typ. at 300mA , V_{DD} = V_S = 3V)
- Low input current
- Brake function
- High output sinking and driving capability
- Thin, highly reliable package (SOP-8, MSOP8)

Pin Assignment



Pin NO.	Pin Name	Description
1	VS	Power supply pin for output driver
2	O1	Output sinking / driving pin
3	IN3	Input pin 3 that determines driving mode
4	GND	Ground pin
5	IN1	Input pin 1 that determines driving mode
6	VDD	Power supply pin for controller.
7	IN2	Input pin 2 that determines driving mode
8	O2	Output sinking / driving pin

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

Characteristic	Symbol	Rating	Unit
Supply Voltage	V_{DD}	6.5	V
	V_S	6.5	V
Input Voltage	V_{IN}	V_{DD}+0.4	V
I_O Peak Current	I_{OPeak}	2	A
I_{ODC} Current	I_{ODC}	0.80	A
Power Dissipation(SOP8)	$P_{D\text{-}SOP}$	680	mW
Power Dissipation(MSOP8)	$P_{D\text{-}MSOP}$	480	mW
Operating Temperature Range	T_{OPR}	-40 ~ 125	°C
Storage Temperature Range	T_{STG}	-65 ~ 150	°C

Electrical Characteristic

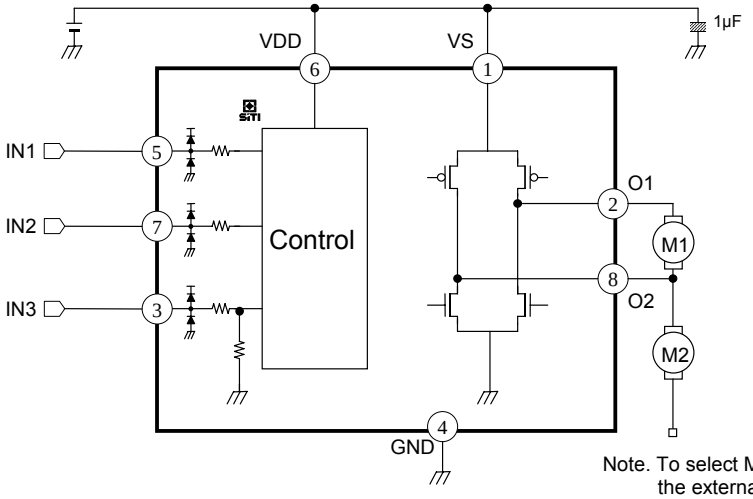
(Unless otherwise noted, T_A= 25℃ & V_{DD} = V_S = 3V)

Characteristic	Sym.	Condition	Limit			Unit
			Min.	Typ.	Max.	
Supply Voltage	V_{DD}		1.5	3	6.5	V
	V_S		1.5	3	6.5	V
Supply Current (I_{DD} + I_S)	I_{DD0}	$V_{IN1, IN2, IN3}$ = 0V		0.5	10	μA
	I_{DD1}	$V_{IN1, IN2, IN3}$ = 3V		1	10	μA
IN1 / IN2 / IN3 Input Terminal (T_J = 25℃)						
Input Voltage “H”	V_{IH}	-	0.8*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	μA
Input Current “L”	I_{IL}	V_{IN} = 0 V	-	-	±5	μA
O1 / O2 Output Terminal (T_J = 25℃)						
Output Voltage (upper + lower)	V_{OUT1}	I_{OUT} = 200 mA	-	0.3	0.45	V
	V_{OUT2}	I_{OUT} = 300 mA	-	0.5	0.7	V
	V_{OUT3}	I_{OUT} = 600 mA	-	0.9	1.0	V
Output Sustaining Voltage	$V_{O(SUS)}$	I_{OUT} = 400 mA	-	-	V_S	V

Truth Table

Input Signal			Output Driver		Mode
IN1	IN2	IN3	O1	O2	
H	L	L	H	L	M1Forward
L	H	L	L	H	M1Reverse
H	H	L	H	H	M1Brake
L	L	L	OFF	OFF	Standby
H	L	H	OFF	H	M2 Operation
L	H	H	OFF	L	M2 Operation
H	H	H	OFF	H	M2 Operation

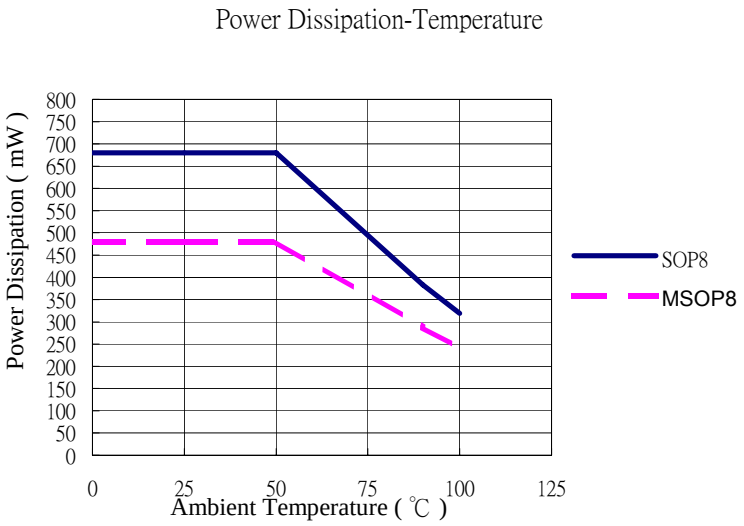
Block Diagram & Application Circuit



Note. To select M2 operating, the external driver is required.

Application Notes

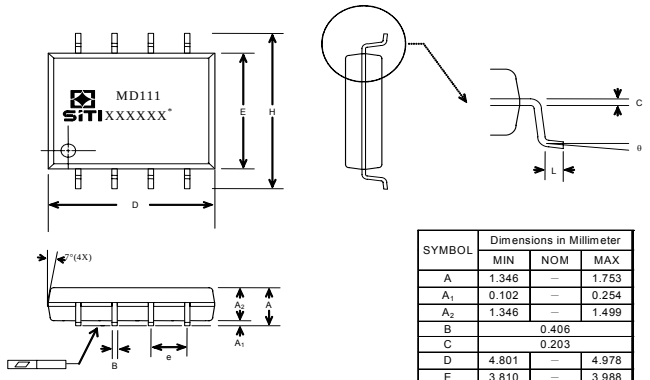
- In multiple power supply application, the voltage of VDD pin must lager than or equal to the voltage of VS pin.
- The power dissipated by the IC varies widely with the supply voltage, the output current, and loading. It is important to ensure the application does not exceed the allowable power dissipation of the IC package. The recommended motor driver power dissipation versus temperature is depicted as follows:



Package Specifications

SOP8 : MD111

(8-pin SOP)

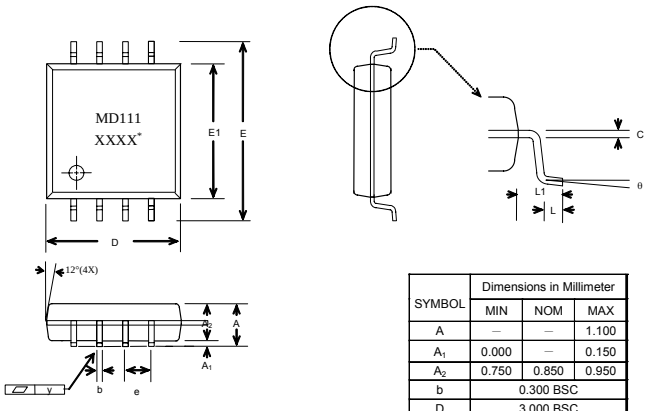


SYMBOL	Dimensions in Millimeter		
	MIN	NOM	MAX
A	1.346	—	1.753
A_1	0.102	—	0.254
A_2	1.346	—	1.499
B		0.406	
C		0.203	
D	4.801	—	4.978
E	3.810	—	3.988
e		1.270	
H	5.791	—	6.198
L	0.406	—	1.270
θ	0°	—	8°

* The package marking "XXXXXX" is a lot number and therefore being subject to change.

MSOP8 : MD111

(8-pin MSOP)



SYMBOL	Dimensions in Millimeter		
	MIN	NOM	MAX
A	—	—	1.100
A_1	0.000	—	0.150
A_2	0.750	0.850	0.950
b		0.300 BSC	
D		3.000 BSC	
E		4.900 BSC	
E1		3.000 BSC	
e		0.650 BSC	
L	0.400	0.600	0.800
L_1		0.950 REF	
θ	0°	—	8°

* The lot number "XXXX" in product code will also be subject to change on the package marking.

The products listed herein are designed for ordinary electronic applications, such as electrical appliances, audio-visual equipment, communications devices and so on. Hence, it is advisable that the devices should not be used in medical instruments, surgical implants, aerospace machinery, nuclear power control systems, disaster/crime-prevention equipment and the like. Misusing those products may directly or indirectly endanger human life, or cause injury and property loss.

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