MX115S

1-CH DC Motor Driver

Features

- One channel H-bridge drivers with build in PMOS and NMOS power transistors
- Four functions for each channel - Forward/Reserve/ Stop/Brake functions
- Low stand-by current (typ.0.1uA)
- Wide supply voltage (VM=1.8V ~ 7V) suitable for Battery operated applications
- 3.3V and 5V micro-controller interface
- Low output resistance (upper and lower total : typ. 0.7Ω@1A)
- Built-in a thermal shutdown(TSD) function with hysteresis
- Temperature independent internal voltage reference

Description

The MX115S is a monolithic one channel dc motor drive IC designed for low voltage operated systems. It has dual H-bridge drivers, using PMOS and NMOS power transistors with a low output resistance. Power packages with heat sinks ensure high continuous output current. The high current and low output resistance make this device suitable for dc motor applications such as toy cars. It has also a built-in thermal shutdown protection circuit with hysteresis.

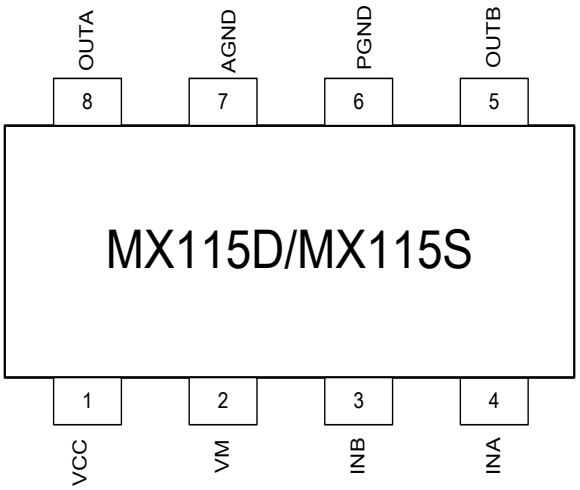
Typical Application

- General purpose dc motor driver
- Electronic toys - robots
- Digital still camera(DSC) and film camera
- Home appliances and office equipment
- Precision instruments

Ordering information

Device	Package	Operating Temp.
MX115S	8 - SOP	-20℃ ~ 75℃

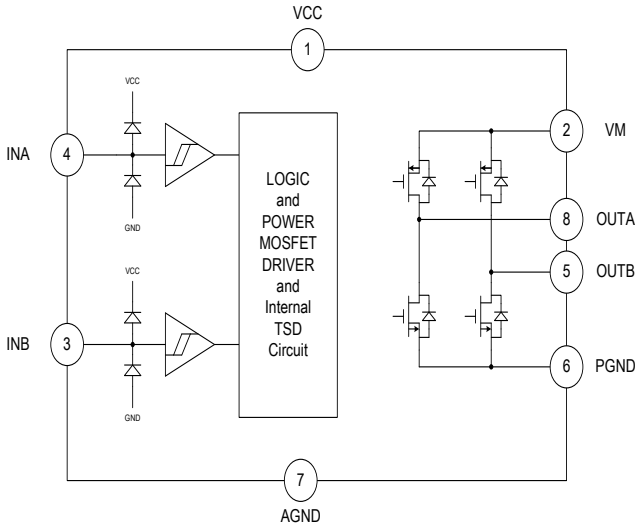
Pin Assignments



Pin Definitions

Pin Number	Pin Name	I/O	Pin Function Description
1	VCC	-	Logic and control circuit supply voltage
2	VM	-	Supply voltage output
3	INB	I	Reverse logic input
4	INA	I	Forward logic input
5	OUTB	O	Output
6	PGND	-	Output power control ground
7	AGND	-	Logic and control circuit ground
8	OUTA	O	Output

Internal Block Diagram



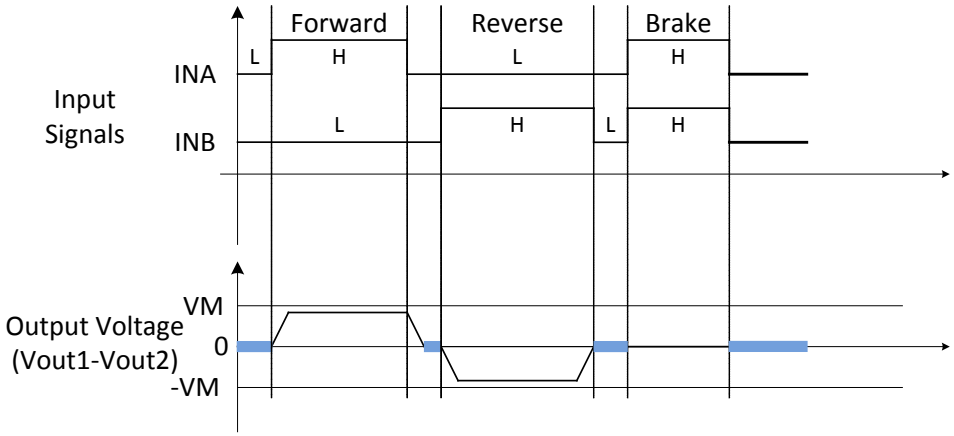
Note: MX115D pin number

Function Descriptions

Logical Truth Table

INA	INB	OUTA	OUTB	Function
L	L	Z	Z	Stand-by(Stop)
H	L	H	L	Forward
L	H	L	H	Reverse
H	H	L	L	Brake

Time Domain Waveforms



Absolute Maximum Rating (Ta = 25℃)

Parameter	Symbol	Value	Unit
Maximum logic and control supply voltage	VCC(MAX)	6.5	V
Maximum output supply voltage	VM(MAX)	7	V
Maximum output applied voltage	VOUT(MAX)	VM	V
Maximum applied input voltage	VIN(MAX)	VCC	V
Peak output current per channel	IOUT(PEAK)	2.5	A

Recommended Operating Conditions (Ta = 25℃)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Logic and control supply voltage	VCC	2.2		6	V
Maximum output supply voltage	VM	1.8		6.5	V
Continue output current per channel	Iout		±1		A

Note1: you must connect a capacitor (at least 100uF/16V) to VM when driving a motor.
Note2: the maximum voltage of VM is 6.5V which is equal to 4 dry battery.

Electrical Characteristics

(Ta=25℃, VCC=3V, VM=3V, R_{L1} =15Ω, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
VCC stand-by current	ICCST	INA=INB=L	--	0	10	uA
VM stand-by current	IVMST		--	0	10	uA
VCC supply current	ICC	INA=H, INB=L or INA=L, INB=H or INA=H, INB=H	--	0.3	1	mA
VM supply current	IVM	INA=H, INB=L or INA=L, INB=H or INA=H, INB=H with output pins open	--	0.1	5	mA
Input high level voltage	VINH		2.0	--	--	V
Input low level voltage	VINL		--	--	0.8	
Input current	IIN	VIN=3V per each input pin	--	5	20	uA
Pull-down resistance	RIN		--	1.5	--	MΩ
Output resistance	RON	IO=±200mA	--	1.0	1.6	Ω
Spark-killing diode leakage current	IDLEAK	VCC=5V, VM=9V	--	--	100	uA
Spark-killing diode voltage drop	VD	IOUT=400mA	--	--	1.7	V
Protection temperature	TSD		--	150	--	℃
TSD hysteresis	TSDH		--	10	--	℃

Application Information

1. Thermal Shutdown (TSD)

Thermal Shutdown Circuit turns OFF all outputs when the junction temperature typically reaches 150℃.It is intended to protect the device from failures due to excessive junction temperature. The Thermal Shutdown has the hysteresis of 10℃ approximately.

Typical Application Circuits

1. Application reference 1

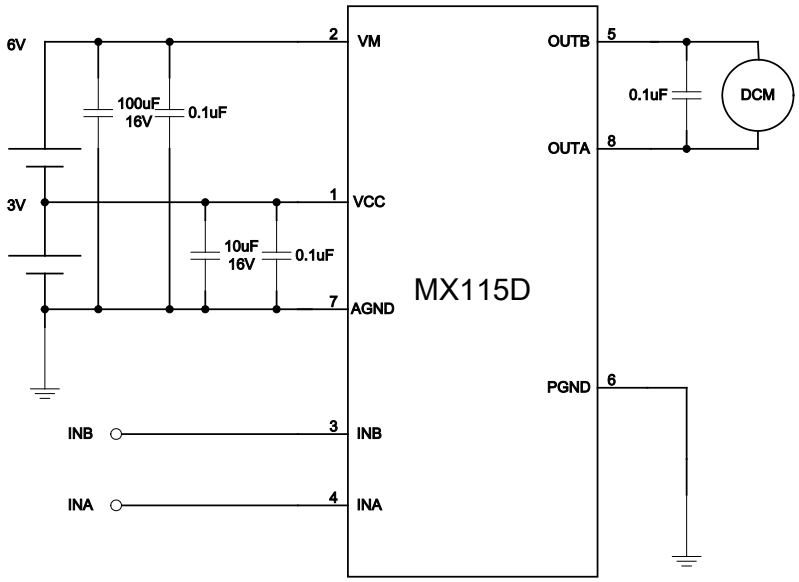


FIG1.DIP8 package of MX115 for typical application

Revision History

Version	Date	Revision Description
1.0	2010/11/29	Initial version