YHM4201/4203

Tiny Size, Bi-direction Voltage-Level Translator with 2:1 Switch

Features

- Single 1.6V to 5.5V Supply Voltage
- Enable and High Voltage Supply from VCCEN
- Low Voltage Decided by Internal LDO, down to 0.9V
- Supports 10MHz Open-Drain Operation without external pull up resistor
- I2C Requirements for Standard, Fast, and High Speeds
- Low Transmission Gate Ron: 20Ω
- Pullup Resistor Enabled for High Voltage Side
- Single Pole Dual Throw Switch
- 1.3uA Supply Current

  Tiny 0.9mm x 1.1mm 6-pin DFN

  or 2.07mm x 2.30mm 6-pin SC70

Applications

- I2C, SMBus, PMBus, MDIO, UART, low-speed

SDIO, GPIO, and other two-signal interfaces

General Description

The YHM4201/4203 is a bidirectional voltage-level translator with single pole dual throw switch, designed specifically for low power consumption making it suitable for portable and battery powered equipment. Externally applied voltages, VH and VL, set the logic levels on either side of the device. A logic signal present on the VL side of the device appears as the same logic signal on the VH side of the device, and vice-versa.

The device is operational from 0.9V to 3.3V VL and 1.6V to 5.5V VH, with only two VCCEN pin which is tied to VH for enable and internal LDO input. The VL is decided by internal LDO output, which can be used for 0.9/1.2V/1.8V/2.5V/3V/3.3V IO by different device version A/B/C/D/E. When VCCEN is low, the translator switch is off, and a high-impedance state exists between ports.

The single pole dual throw switch is controlled by VCCEN1 and VCCEN2. When VCCEN1 is high, channel 1 is turn on with level shift. When VCCEN2 is high, channel 2 is turn on with level shift.

The Device also integrate one shot block to reduce the rise time for high speed application.

The YHM4201/4203 comes in a 6 PIN, 0.4mm Pitch, 0.9mmx1.1mm DFN-6 package or a 6 PIN, 2.07mm x 2.30mm SC70-6 package.

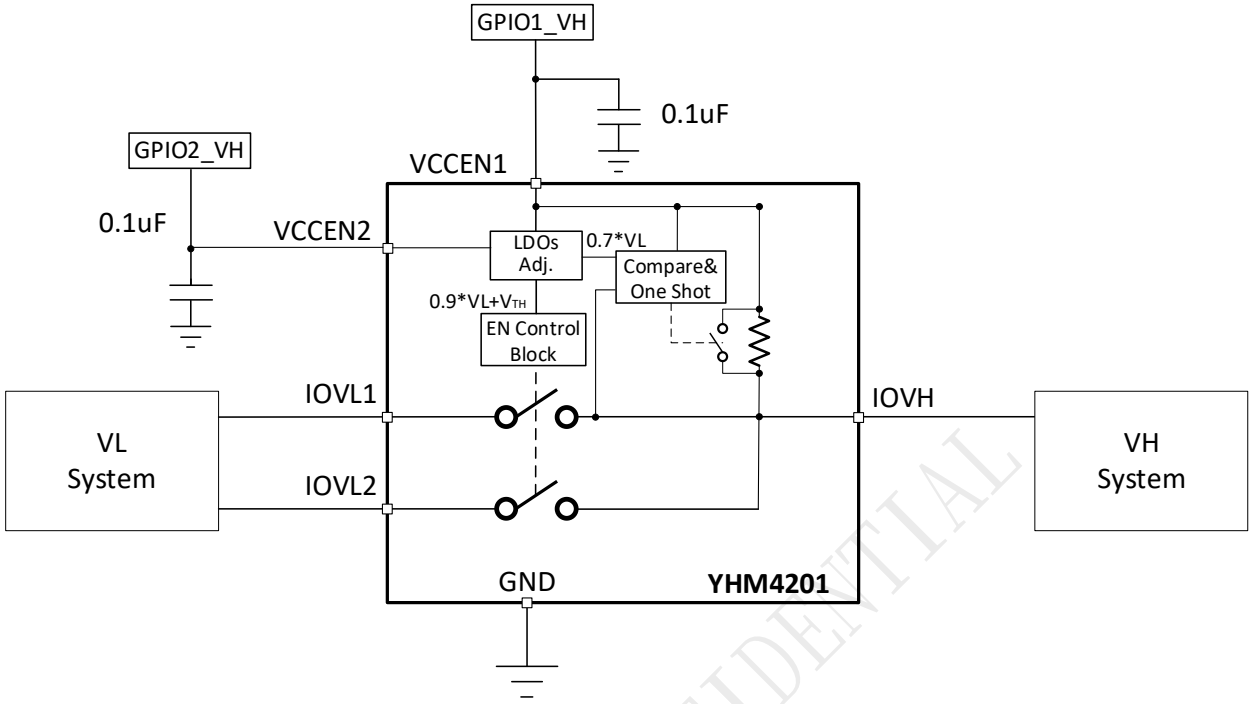


Fig 1. YHM4201 Internal Block Diagram

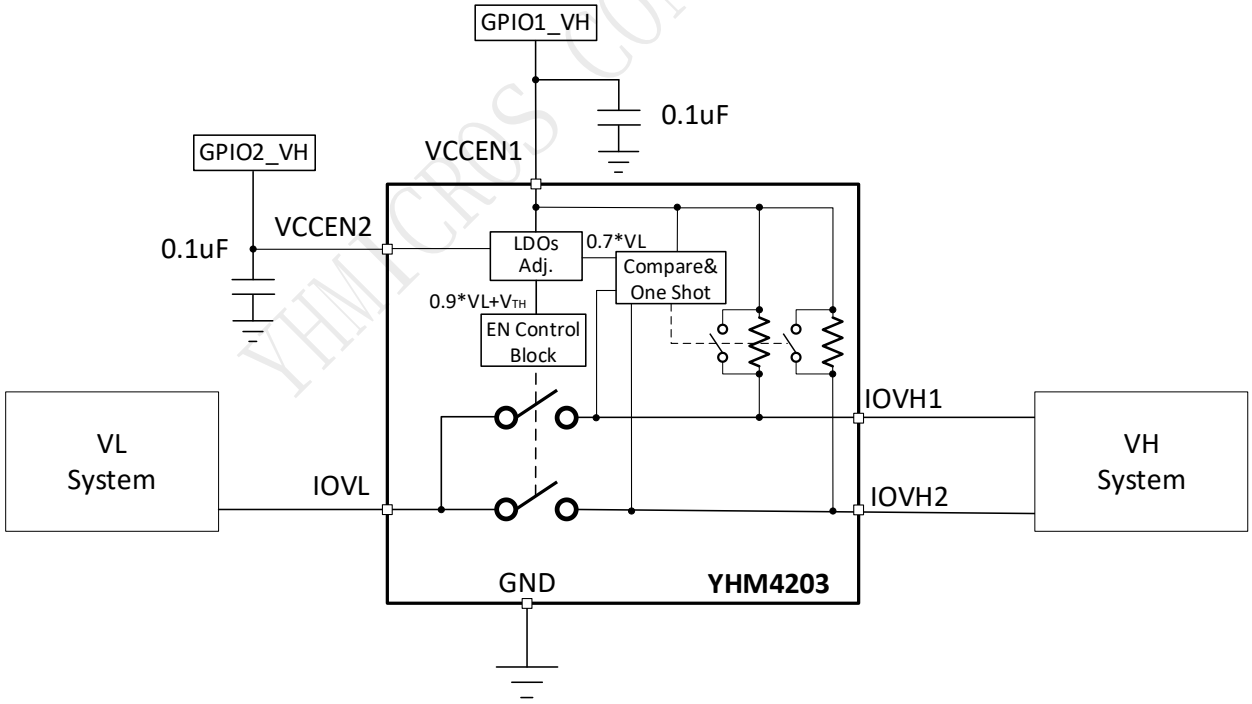


Fig 2. YHM4203 Internal Block Diagram

YHM4201 DFN Pin Configurations

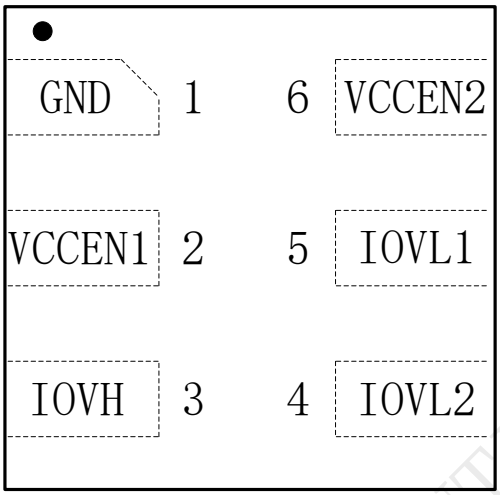


Fig 4. YHM4201 DFN-6 Pin Assignment(Top Through View）

YHM4201 DFN Pin Descriptions

DFN	Name	Description
1	GND	Ground.
2	VCCEN1	Power Supply and Enable 1. Connect to VH GPIO. Bypass a 0.1uF capacitor. If it is high, IOVL1 to IOVH switch with level shift will be turn on. Do not leave this pin floating.
3	IOVH	Input/Output. Reference to VH.
4	IOVL2	Input/Output 2. Reference to VL.
5	IOVL1	Input/Output 1. Reference to VL.
6	VCCEN2	Power Supply and Enable 2. Connect to VH GPIO. Bypass a 0.1uF capacitor. If it is high, IOVL2 to IOVH switch with level shift will be turn on. Do not leave this pin floating.

Function Table

VCCEN1	VCCEN2	IOVH to IOVL1	IOVH to IOVL2
High	Low	On	Off
Low	High	Off	On

YHM4201 SC70 Pin Configurations

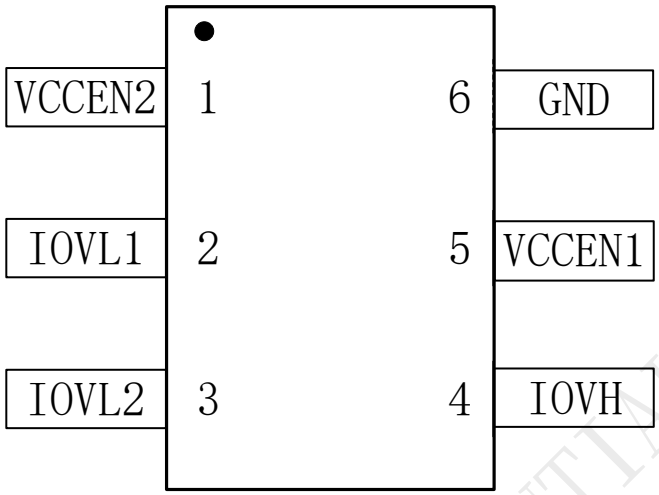


Fig 3. YHM4201 SC70-6 Pin Assignment(Top Through View）

YHM4201 SC70 Pin Descriptions

SC70	Name	Description
1	VCCEN2	Power Supply and Enable 2. Connect to VH GPIO. Bypass a 0.1uF capacitor. If it is high, IOVL2 to IOVH switch with level shift will be turn on. Do not leave this pin floating.
2	IOVL1	Input/Output 1. Reference to VL.
3	IOVL2	Input/Output 2. Reference to VL.
4	IOVH	Input/Output. Reference to VH.
5	VCCEN1	Power Supply and Enable 1. Connect to VH GPIO. Bypass a 0.1uF capacitor. If it is high, IOVL1 to IOVH switch with level shift will be turn on. Do not leave this pin floating.
6	GND	Ground.

YHM4203 DFN Pin Configurations

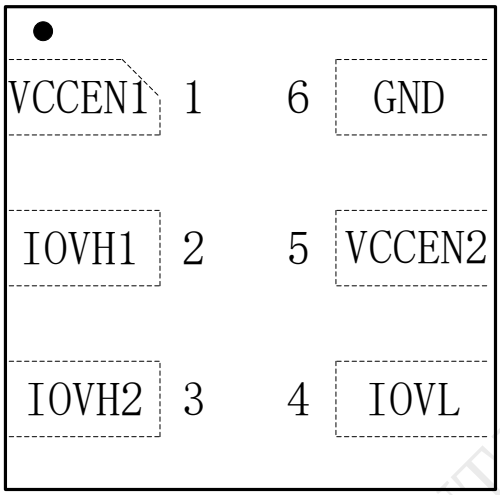


Fig 3. YHM4203 DFN-6 Pin Assignment(Top Through View）

YHM4203 DFN Pin Descriptions

DFN	Name	Description
1	VCCEN1	Power Supply and Enable 1. Connect to VH GPIO. Bypass a 0.1uF capacitor. If it is high, IOVH1 to IOVL switch with level shift will be turn on. Do not leave this pin floating.
2	IOVH1	Input/Output 1. Reference to VH.
3	IOVH2	Input/Output 2. Reference to VH.
4	IOVL	Input/Output. Reference to VL.
5	VCCEN2	Power Supply and Enable 2. Connect to VH GPIO. Bypass a 0.1uF capacitor. If it is high, IOVH2 to IOVL switch with level shift will be turn on. Do not leave this pin floating.
6	GND	Ground.

Function Table

VCCEN1	VCCEN2	IOVH1 to IOVL	IOVH2 to IOVL
High	Low	On	Off
Low	High	Off	On

YHM4203 SC70 Pin Configurations

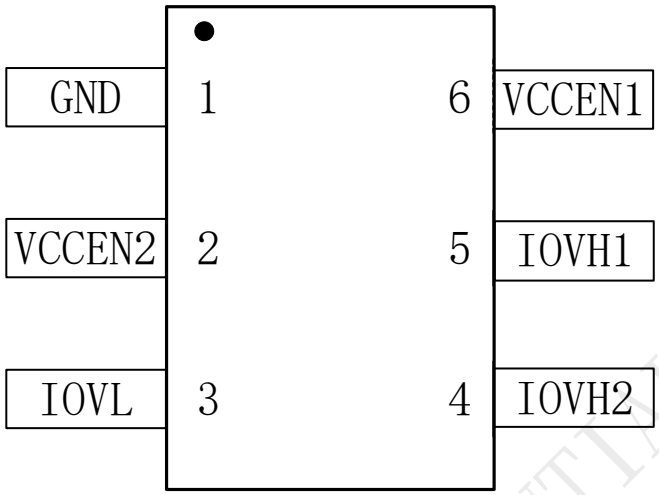


Fig 3. YHM4203 SC70-6 Pin Assignment(Top Through View）

YHM4203 SC70 Pin Descriptions

SC70	Name	Description
1	GND	Ground.
2	VCCEN2	Power Supply and Enable 2. Connect to VH GPIO. Bypass a 0.1uF capacitor. If it is high, IOVH2 to IOVL switch with level shift will be turn on. Do not leave this pin floating.
3	IOVL	Input/Output. Reference to VL.
4	IOVH2	Input/Output 2. Reference to VH.
5	IOVH1	Input/Output 1. Reference to VH.
6	VCCEN1	Power Supply and Enable 1. Connect to VH GPIO. Bypass a 0.1uF capacitor. If it is high, IOVH1 to IOVL switch with level shift will be turn on. Do not leave this pin floating.

1 Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

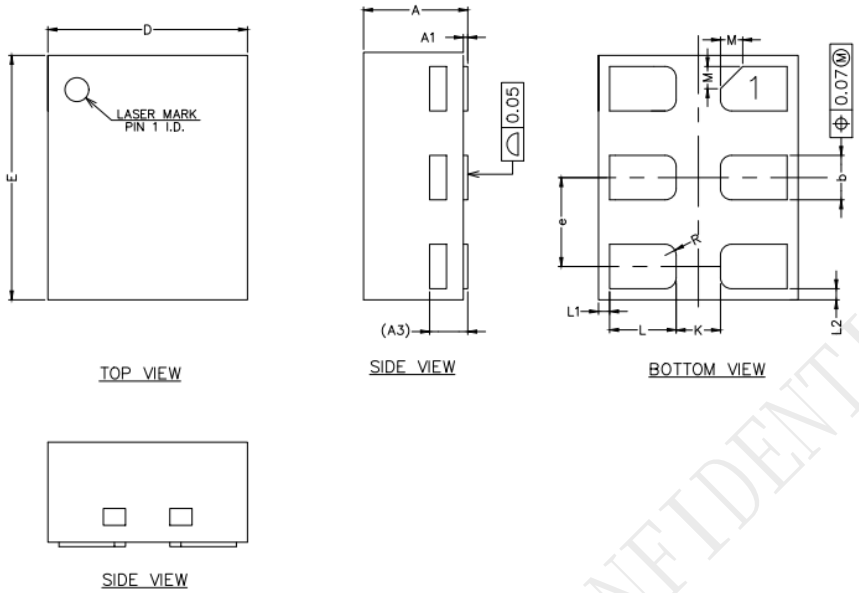
Disclaimer: YHMICROS reserves the right to make any change in circuit design, specification or other related things if needed without notice at any time.

Symbol	Parameters		Min.	Max.	Unit
VCCEN	VCCEN to GND		-0.3	6	V
V_{IOVH}	IOVH1/2 to GND		-0.3	6	V
V_{IOVL}	IOVL1/2 to GND		-0.3	6	V
I_{VCCEN}	Continuous Input Current			100	mA
I_{IO}	Continuous channel current			±100	mA
t_{PD}	Total Power Dissipation at T_A=25°C				mW
T_{STG}	Storage Junction Temperature		-65	+150	°C
T_J	Operating Junction Temperature			+150	°C
T_L	Lead Temperature (Soldering, 10 Seconds)			+260	°C
θ_{JA}	Thermal Resistance, Junction-to-Ambient (100mm^2 pad of 1 oz. copper)				°C/W
All Pins	Electrostatic Discharge Capability	Human Body Model, EIA/JESD22-A114	2		KV
		Charged Device Model, JESD22-C101	1		

Note 1. Refer to JEDEC JESD51-7, use a 4-layerboard

Package Dimensions

DFN-6 0.9x1.1x0.55



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

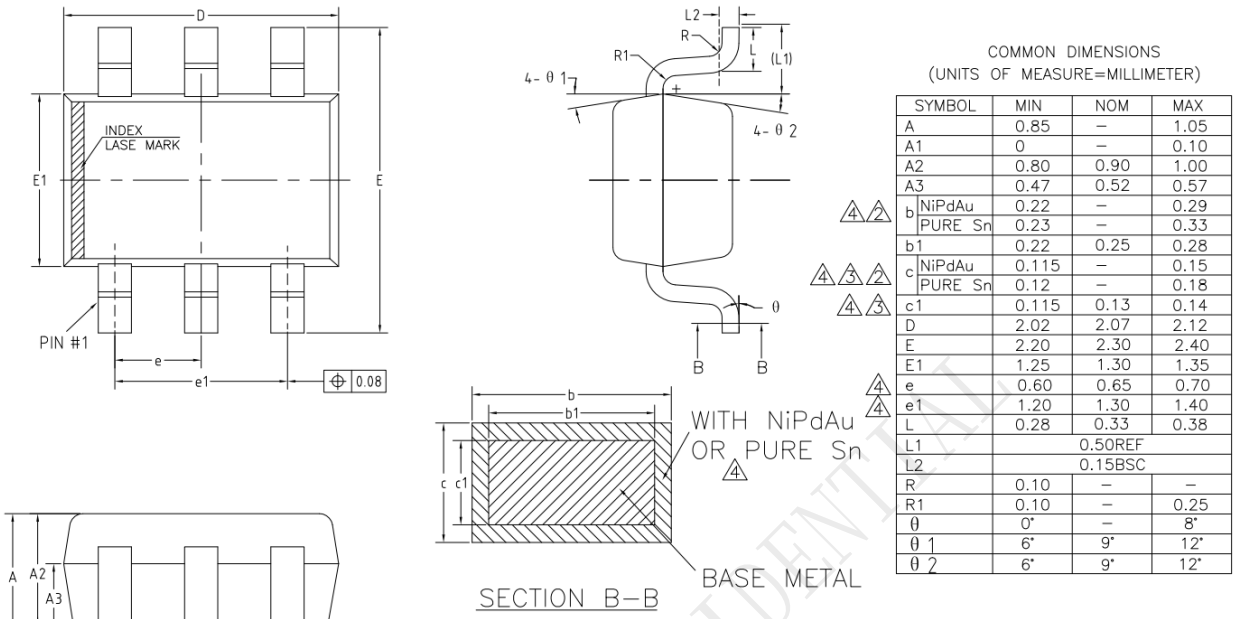
SYMBOL	MIN	NOM	MAX
A	0.50	0.55	0.60
A1	0.00	0.02	0.05
A3		0.152REF	
b	0.15	0.20	0.25
D	0.85	0.90	0.95
E	1.05	1.10	1.15
e	0.35	0.40	0.45
K	0.15	0.20	0.25
L	0.25	0.30	0.35
L1	0.00	0.05	0.10
L2	0.00	0.05	0.10
M		0.10REF	
R		0.05REF	

NOTES:
ALL DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSION.

YHM4201/4203

Tiny Size, Bi-direction Voltage-Level Translator with 2:1 Switch

SC70-6 2.07 x 2.30 x 0.95



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL		MIN	NOM	MAX
A		0.85	–	1.05
A1		0	–	0.10
A2		0.80	0.90	1.00
A3		0.47	0.52	0.57
4 2 b	NiPdAu	0.22	–	0.29
	PURE Sn	0.23	–	0.33
b1		0.22	0.25	0.28
4 3 2 c	NiPdAu	0.115	–	0.15
	PURE Sn	0.12	–	0.18
4 3 c1		0.115	0.13	0.14
D		2.02	2.07	2.12
E		2.20	2.30	2.40
E1		1.25	1.30	1.35
4 e		0.60	0.65	0.70
4 e1		1.20	1.30	1.40
L		0.28	0.33	0.38
L1		0.50REF		
L2		0.15BSC		
R		0.10	–	–
R1		0.10	–	0.25
θ		0°	–	8°
θ 1		6°	9°	12°
θ 2		6°	9°	12°

NOTES:
ALL DIMENSIONS REFER TO JEDEC STANDARD MO-203 AB
DO NOT INCLUDE MOLD FLASH , PROTRUSIONS OR GATE BURRS.
MOLD FLASH , PROTRUSIONS OR GATE BURRS WILL NOT EXCEED 0.15mm PER SIDE.

Ordering Information

Part Number	Temp Range	Pin Package	Top Mark	MOQ
YHM4201AD6T	-40°C to 85°C	6 DFN	1A	3000
YHM4201BD6T	-40°C to 85°C	6 DFN	1B	3000
YHM4201CD6T	-40°C to 85°C	6 DFN	1C	3000
YHM4201DD6T	-40°C to 85°C	6 DFN	1D	3000
YHM4201ED6T	-40°C to 85°C	6 DFN	1E	3000
YHM4201AS6T	-40°C to 85°C	6 SC70	XXX1A	3000
YHM4201BS6T	-40°C to 85°C	6 SC70	XXX1B	3000
YHM4201CS6T	-40°C to 85°C	6 SC70	XXX1C	3000
YHM4201DS6T	-40°C to 85°C	6 SC70	XXX1D	3000
YHM4201ES6T	-40°C to 85°C	6 SC70	XXX1E	3000
YHM4203AD6T	-40°C to 85°C	6 DFN	3A	3000
YHM4203BD6T	-40°C to 85°C	6 DFN	3B	3000
YHM4203CD6T	-40°C to 85°C	6 DFN	3C	3000
YHM4203DD6T	-40°C to 85°C	6 DFN	3D	3000
YHM4203ED6T	-40°C to 85°C	6 DFN	3E	3000
YHM4203AS6T	-40°C to 85°C	6 SC70	XXX3A	3000
YHM4203BS6T	-40°C to 85°C	6 SC70	XXX3B	3000
YHM4203CS6T	-40°C to 85°C	6 SC70	XXX3C	3000
YHM4203DS6T	-40°C to 85°C	6 SC70	XXX3D	3000
YHM4203ES6T	-40°C to 85°C	6 SC70	XXX3E	3000

T = Tape and reel.
XXX = The last three number of LOTID.

Email Requests to: *SALES@YHMICROS.COM*
YHMicros Website: *WWW.YHMICROS.COM*