

YHM4205

Single Channel Bi-direction Voltage-Level Translator

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
- Low Transmission Gate Ron: 20Ω
- Pullup Resistor Enabled for High Voltage Side
- 1.3uA Supply Current
- 2.07mm x 2.30mm 6-pin SC70

Applications

- UART, GPIO, and other signal interfaces

General Description

The YHM4205 is a single channel, bidirectional UART or GPIO voltage-level translator, 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 one 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 0.9V/1.2V/1.8V/2.5V/3V/3.3V system 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 Device also integrate one shot block to reduce the rise time for high speed application.

The YHM4205 comes in a 6 PIN, 2.07mm x 2.30mm SC70-6 package.

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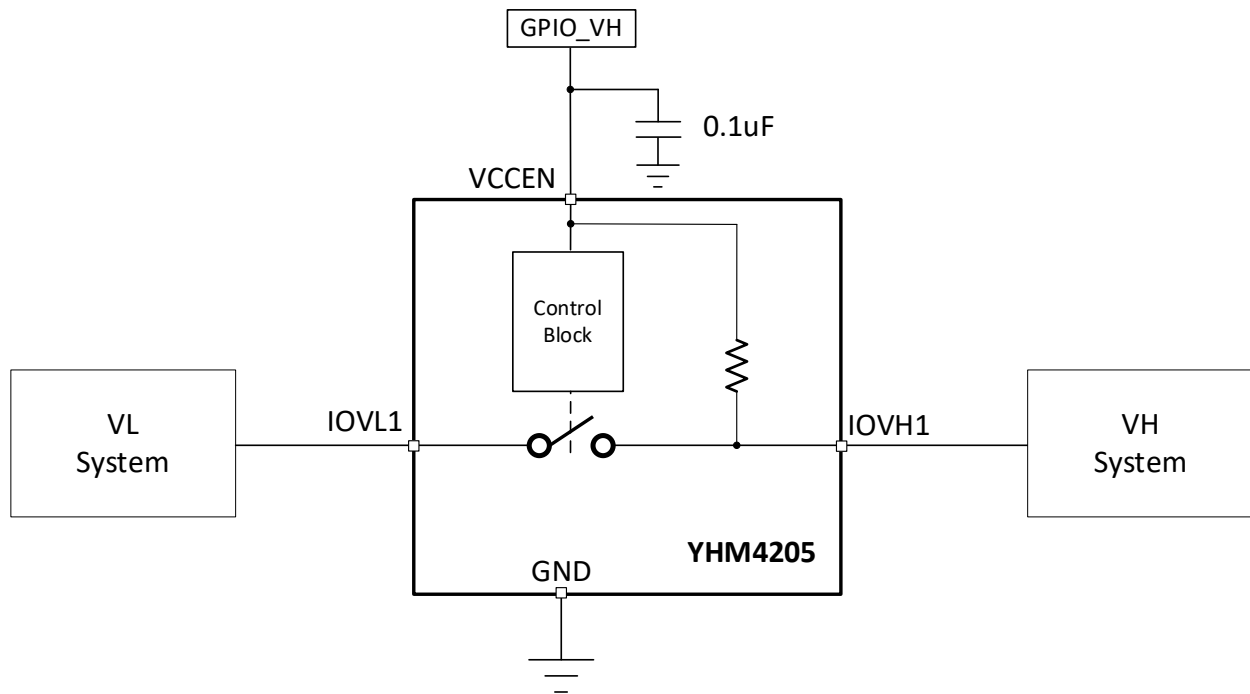


Fig 1. YHM4205 Internal Block Diagram

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YHM4205 Pin Configurations

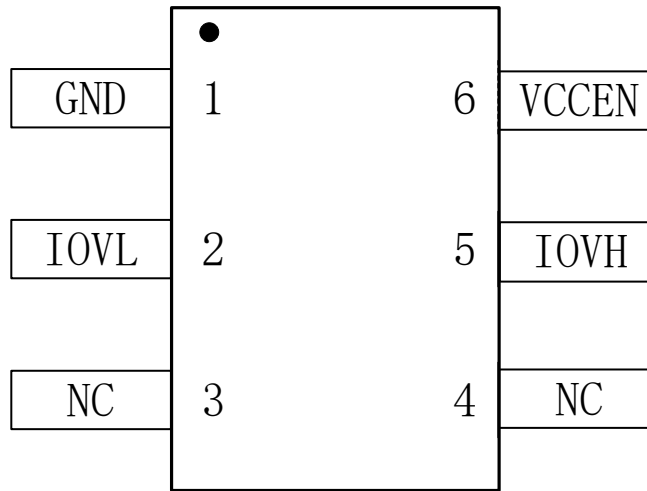


Fig 2. YHM4205 SC70-6 Pin Assignment(Top Through View)

YHM4205 SC70 Pin Descriptions

SC70	Name	Description
1	GND	Ground.
2	IOVL	Low Voltage Input/Output. Reference to VL.
3	NC	Not Connected.
4	NC	Not Connected.
5	IOVH	High Voltage Input/Output. Reference to VH.
6	VCCEN	Power Supply and Enable. Connect to VH GPIO. Bypass a 0.1uF capacitor.

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2 Detailed Electrical Characteristics

(VCCEN = 1.8V, T_A = -40°C to +85°C. Typical values are at T_A = +25°C, unless otherwise noted T_A = +25°C, unless otherwise noted.) (Note 1)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
POWER SUPPLY						
Supply Voltage Range	VCCEN		1.6		5.5	V
Quiescent Supply Current	I _{VCCEN}	T _A = +25°C		1.3		μA
		-40°C ≤ T _A ≤ +85°C			4	
IOVL, IOVH Three-State Leakage Current	I _{LEAK}	VCCEN = GND, V _I = 1.2V			1	uA
VCCEN Shutdown Threshold	V _{TH}	VCCEN failing		0.7		V
IOVL to IOVH Resistance	R _{ON}	VCCEN = 1.8V, V _I = 0V, I _O = 15mA		8		Ω
IOVH Pull Up Resistor	R _{IOV}			5		kΩ
High Side Voltage	VH	VH=VCCEN	1.6		5.5	V
Low Side Voltage without pull up resistor	VL'	YHM4205A, for 0.9V VL VCCEN=VH=3.3V		0.81		V
		YHM4205B, for 1.2V VL VCCEN=VH=3.3V		1.08		
		YHM4205C, for 1.8V VL VCCEN=VH=3.3V		1.62		
		YHM4205D, for 2.5V VL VCCEN=VH=3.3V		2.25		
		YHM4205E, for 3V and 3.3V VL VCCEN=VH=3.6V		2.97		
AC SPECIFICATIONS						
(C _{IOVH} ≤ 50pF, C _{IOVL} ≤ 50pF. All timing is 10% to 90% for rise time and 90% to 10% for fall time).						
Turn On Time	t _{ON}	VCCEN from 0 to 1.8V		50		μs
IOVL Rise Time	t _{RH}	Open-drain driving, VL = 1.2V, VH = 1.8V		50		ns
IOVL Fall Time	t _{FH}	Open-drain driving, VL = 1.2V, VH = 1.8V		45		ns
IOVH Rise Time	t _{RH}	Open-drain driving, VL = 1.2V, VH = 1.8V		125		ns
IOVH Fall Time	t _{FH}	Open-drain driving, VL = 1.2V, VH = 1.8V		50		ns
Maximum Data Rate		Open-drain operation		10		MHz
THERMAL PROTECTION						
Thermal Shutdown	T _{SHDN}			150		°C
Thermal Hysteresis	T _{HYST}			20		°C

Note 1: All specifications are 100% production tested at T_A = +25°C, unless otherwise noted. Specifications are over T_A = -40°C to +85°C and are guaranteed by design.

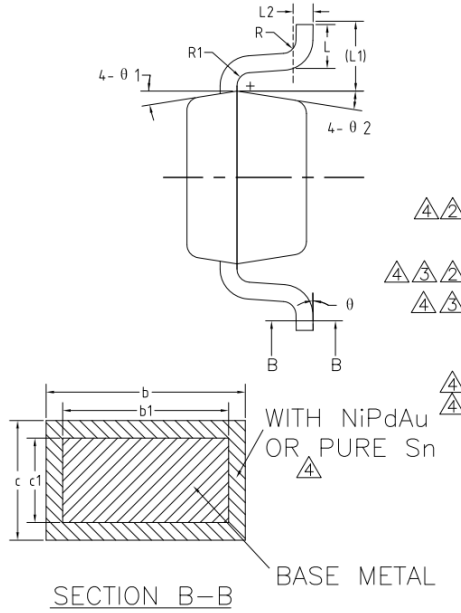
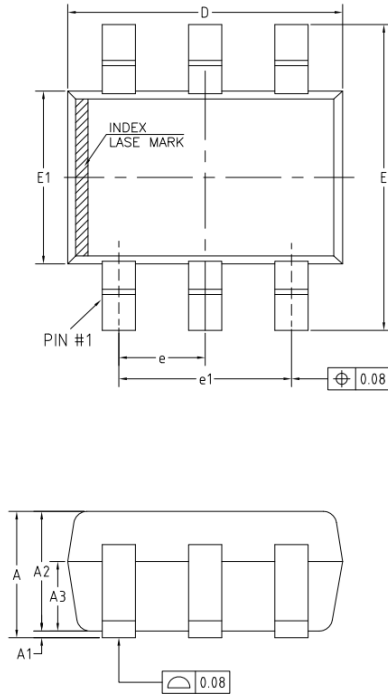
Note 2: Guaranteed by design; not production test.

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Package Dimensions

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	
b	NiPdAu PURE Sn	0.22 0.23	— —	0.29 0.33
b1		0.22 0.25		0.28
c	NiPdAu PURE Sn	0.115 0.12	— —	0.15 0.18
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
e		0.60 0.65		0.70
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.

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Ordering Information

Part Number	Temp Range	Pin Package	Top Mark	MOQ
YHM4205AS6T	-40°C to 85°C	6 SC70	4205A	3000
YHM4205BS6T	-40°C to 85°C	6 SC70	4205B	3000
YHM4205CS6T	-40°C to 85°C	6 SC70	4205C	3000
YHM4205DS6T	-40°C to 85°C	6 SC70	4205D	3000
YHM4205ES6T	-40°C to 85°C	6 SC70	4205E	3000

T = Tape and reel.