

NXP Communicator

P3A9606JK

Dual bidirectional I3C/I2C-bus and SPI voltage-level translator

Communicator Finalization Date: Jul 2021

Communicator Created: May 2021

Global Full Market Launch Date: Jul 2021



P3A9606 Product Summary

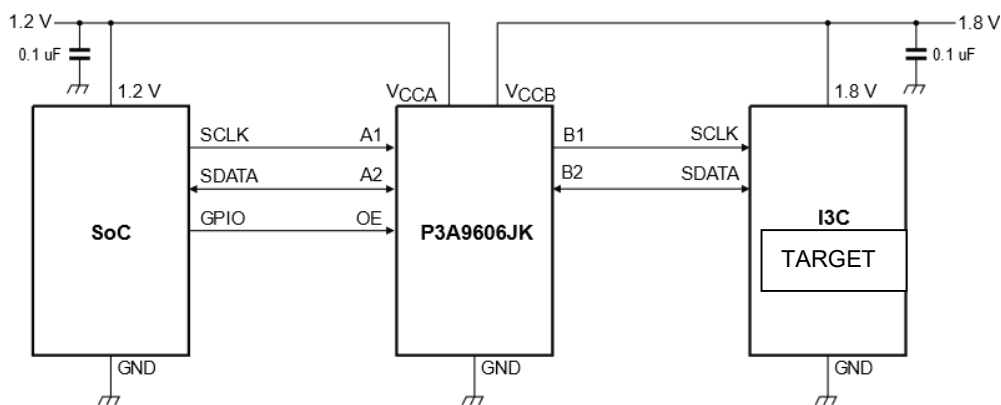
The P3A9606JK is a 2-bit, dual supply translating transceiver with auto direction sensing, that enables bidirectional voltage level translation for traditional open drain I²C-bus/SMBus applications, combination open drain and push pull 12.5 MHz I³C-bus applications or push pull SPI applications (with two devices).

Both V_{CC(A)} and V_{CC(B)} can be supplied at any voltage between 0.72 V and 1.98 V making the device suitable for translating between any of the low voltage nodes (0.8 V, 1.2 V and 1.8 V).

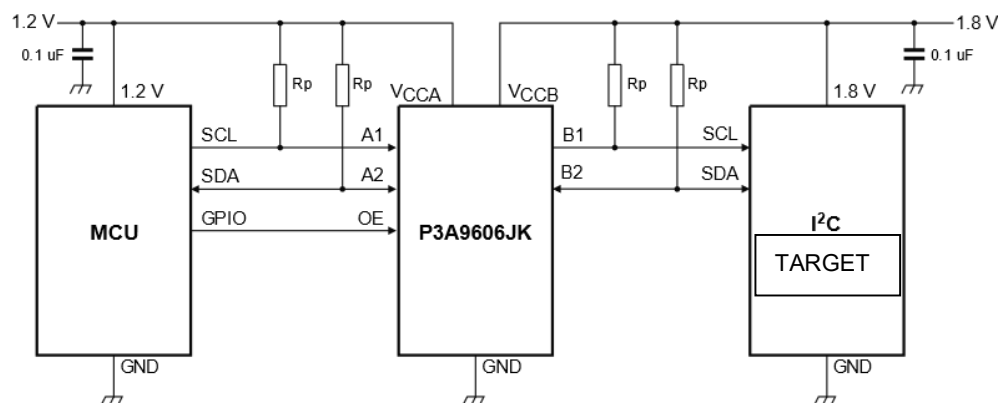
It features two 1-bit input-output ports (A_n and B_n) controlled by one output enable input (OE).

Block Diagrams

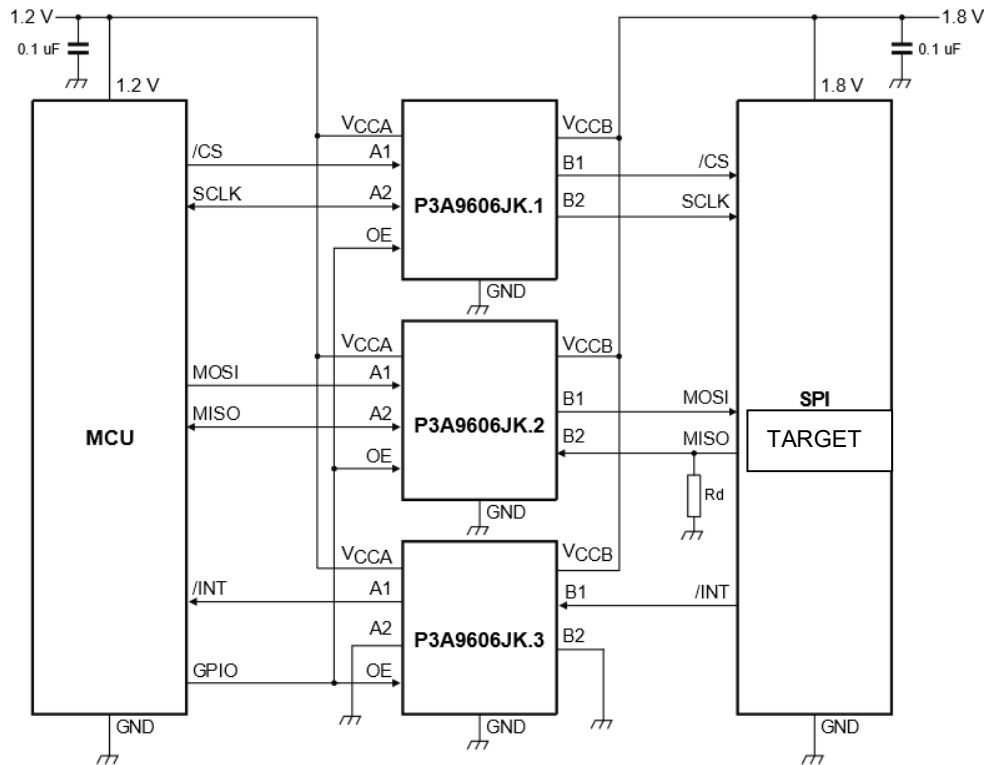
I³C bus level translation



I²C-bus level translation



SPI level translation



P3A9606 Features

- Wide supply voltage range:
 - $V_{CC}(A)$: 0.72 V to 1.98 V and $V_{CC}(B)$: 0.72 V to 1.98 V; $V_{CC}(A) \leq V_{CC}(B)$
- I_{OFF} circuitry provides partial Power-down mode operation
- Inputs accept voltages up to 1.98 V and are overvoltage tolerant to 1.98 V
- Provided voltage level translation for I³C, I²C-bus, SMBus and SPI devices
- Specified from -40 °C to +85 °C and -40 °C to +125 °C
- ESD protection:
 - HBM JESD22-A114E Class 2 exceeds 2000 V
 - CDM JESD22-C101E exceeds 1000 V
- Latch-up performance exceeds 100 mA per JESD 78B Class II
- Available in X2SON8 1.35 x 1.0 x 0.32 mm package with 0.35 mm pitch

Target Applications

Applications

- I3C Bus, I²C-bus and SPI level translation
- Server
- Notebooks/Tablets
- Smartphones

Part Attributes

Table 6. Recommended operating conditions^[1]

Symbol	Parameter	Conditions	Min	Max	Unit
V _{CCA}	supply voltage A	V _{CCA} ≤ V _{CCB}	0.72	1.98	V
V _{CCB}	supply voltage B	V _{CCA} ≤ V _{CCB}	0.72	1.98	V
V _I	input voltage	A port, B port and OE	0	1.98	V
V _O	output voltage	Power-down or 3-state mode; V _{CCA} = 0.72 V to 1.98 V; V _{CCB} = 0.72 V to 1.98 V			
		A port	0	1.98	V
		B port	0	1.98	V
T _{amb}	ambient temperature		-40	+125	°C
T _J	junction temperature ^[2]		-40	+125	°C
Δt/ΔV	input transition rise and fall rate	V _{CCA} = 0.72 V to 1.98 V; V _{CCB} = 0.72 V to 1.98 V	-	<5.3	ns/V


[1] The A and B sides of an unused I/O pair must be held in the same state, both at V_{CCI} or both at GND.

[2] The T_J limits shall be supported by proper thermal PCB design taking the power consumption and the thermal resistance as listed in [Table 7](#) into account.

Table 7 and full specifications located in the data sheet.

Development tools and Ecosystem

The P3A9606 is supported by the evaluation board listed below

Evaluation Board	Description	Image
P3A9606JK-EVB	Easy to use board with mounted P3A9606JK allowing connections to I ² C, I3C or SPI controllers or targets for voltage translation between 0.72 V to 1.98V	

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The extended ECCN for our 5A002 devices is both a.1.a and a.1.b since we have both symmetric and asymmetric algorithms in all of our encrypted products.

Details provided in the stocking excel file. Available at <https://nxp.com/Distynet>

PN	MSL	COO	ECCN	US HTS	CCATS #
P3A9606JKZ 9354 258 46431	1	Thailand	-	854239	NA
P3A9606JK-EVB 935 427 961598	NA	China	EAR99	847330	NA

Available Documentation

Include direct links to high value assets as well as links to NXP.com, disty extranet and channel launch repository.

Distributor extranet: [DistyNet | NXP Semiconductors](#)

NXP.com: www.nxp.com/P3A9606

Datasheet [P3A9606JK](#)

Evaluation board

Tool Part	Description
P3A9606JK-EVB	Dual bidirectional I3C/I2C-bus and SPI voltage-level translator

*Please note that the Channel Launch Repository is for marketing assets like high res block diagram and board photography. This same information is also posted to the “product” launch folder on the distributor extranet for others outside of marketing who may need it.

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