

# Analog IP - Megafunction

## 2 x Differential Capacitive Voltage Converter

### XH035



### General Description

This universal Megafunction block converts single ended and differential capacitances into digital values. It integrates all necessary sample&hold and mux functions, references, ADC, registers and SPI and is functional as a separate IC with reference voltage pins connected to VDD and VSS. Parameters and measured data are stored in registers and can be read and written via SPI. It has been evaluated for complete functionality and accuracy in silicon.

### Ratings, Parameters and Conditions

Parameter / Condition	Symbol	Min	Typ.	Max	Unit	Comment
Sensor capacitance	$C_{\text{sensor}}$	1		10	pF	Delta C = 4pF = $\pm 2$ pF
Resolution	N		12		Bit	LSB 1fF
Conversion time	$T_{\text{conv}}$			4	ms	
Supply Voltage	Vdd	3.0	3.3	3.6	V	
Current Consumption	Idd			850	$\mu$ A	
Operating temperature	$T_{\text{junction}}$	-20		80		Calibration required
Stimuli clock frequency	$F_{\text{stim}}$		1		MHz	within the IP cell

### Register structure

Name	Address	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
CTOV Active	01h	n.u.															EN		
StartX	02h	n.u.					Measure Data from last Measurement of X Sensor												
StartY	03h	n.u.					Measure Data from last Measurement of Y Sensor												
CalibStartX	04h	n.u.					Old calibration register Data back, replacing data												
CalibStartY	05h	n.u.					Old calibration register Data back, replacing data												
CalibConstX	10h	n.u.					Calibration data back and replacing data												
CalibConstY	11h	n.u.					Calibration data back and replacing data												
CPNX	12h	DE	X	CP-DataX						n.u.		CN-DataX							
CPNY	13h	DE	Y	CP-DataY						n.u.		CN-DataY							
Clk1MTrim	14h	EN	PA	DC	LK											CLK1MTRIM-Data			
ReadX	80h	n.u.					Send back measurement register												
ReadY	81h	n.u.					Send back measurement register												

#### CTOV Active

Enables the cell with EN='1' and disables with EN='0'.

#### StartX/ StartY

Start measurement for X/Y Sensor, send back last Data and writes new measurement data.

#### CalibStartX/ CalibStartY

Start calibration of X/Y Sensor, send back last Data (CalibConstX, CalibConstY) and writes new calibration data.

#### CalibConstX/ CalibConstY

Send back last Data and writes new data from SPI interface. (12 Bit)

#### CPNX/ CPNY

Send back last Data and writes new data from SPI interface. Bit15 set DiffEnX/ DiffEnY. The highest bit of CP-DataX/CN-DataX / DataY/CN-DataY is the enable signal to activate the CPX/CNX / CPY/CNY capacity.

#### Clk1MTrim

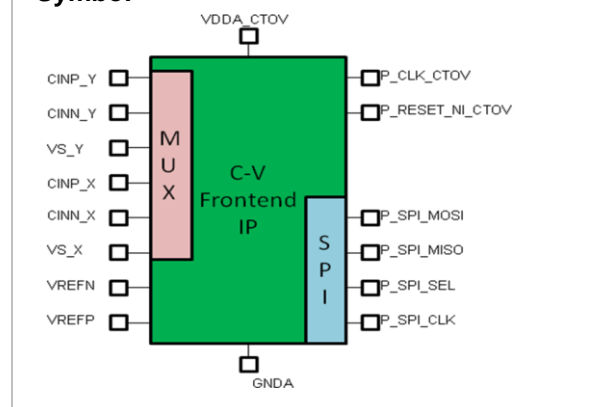
Send back last registered Data and replace register with new data from SPI interface. (4Bit) Bit15 enables the external Clock "PADCLK1M".

For more information please contact  
PE GmbH at:  
info@pe-gmbh.com

#### ReadX/ ReadY

Send back measured registered X/Y Data. (12 Bit)

#### Symbol



or visit our web site at:  
www.pe-gmbh.com