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# MINIPIX

Version 1.0 - Datasheet

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Model No.: MNXSTD-Xxx170518



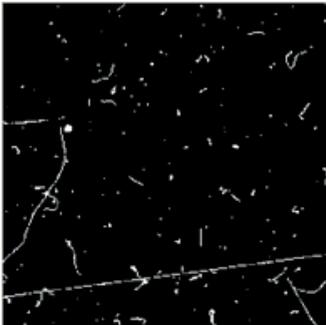


Illustration of single particle sensitivity of Timepix device. The tracks of different particles of normal radiation background were recorded in 10 minutes. No noise (clean zero) is seen in dark regions.

The **MINIPIX** is miniaturized and low power solution of radiation camera with single particle counting (or particle tracking) detector Timepix. The standard **MINIPIX** system incorporates single Timepix detector (256 x 256 pixels with pitch of 55 µm) with sensor according to customer preference (standardly 300 µm thick silicon). It uses USB 2.0 interface capable to read up to 45 frames per second (with exposure time of 1 ms). The Timepix detector is energy sensitive which brings a new dimension to radiographic images.

The **MINIPIX** device is controlled via USB interface. The major operating systems are supported (MS Windows, Mac OS and LINUX). The complex software PIXET PRO used for detector operation is provided for free.

Several **MINIPIX** devices connected to single or several computers can be operated together forming the radiation monitoring network. The whole group is accessed using advanced application allowing setting of alarm levels for different radiation types, performing data logging and calculating various statistics, protocols and charts. Such network can serve as long time monitor of environment<sup>1</sup>. Several other devices developed in IEAP CTU in Prague and produced by ADVACAM s.r.o. company can be also integrated into such monitoring network.

Example of the radiation monitoring network based on the first version of **MINIPIX** is operated in ISS (International Space Station). This network was installed by common effort of NASA, University of Houston and IEAP CTU in Prague. Devices and software was developed by IEAP CTU in Prague.

## Main Features:

- Readout chip type ..... Timepix
- Pixel size ..... 55 x 55 µm
- Sensor resolution..... 256 x 256 pixels
- Dynamic range in one frame ..... 11 082<sup>2</sup>
- Dark Current..... none
- Interface..... USB 2.0(Hi-Speed)
- Maximum frame rate ..... 45 fps
- Dimensions ..... 87.9 x 19 x 10 mm
- Weight ..... 25.2 g

<sup>1</sup> **MINIPIX** is not certified dosimetric device. It serves as the first level indicator and monitor of radiation fields allowing identification of a radiation type. Radiation protection of people cannot be based on measurements of **MINIPIX**.

<sup>2</sup> Dynamic range of final picture is theoretically unlimited; the only limiting factor is exposure time.



## Device Parameters

### Operating Conditions

Symbol	Parameter	Min	Typ	Max	Units	Comment
TA	Temperature Range	0	50	70	°C	
Φ	Humidity			60	%	Not condensing

## Electrical Specification

TA = 25°C, USB voltage V<sub>CC</sub> = 4.8V

Symbol	Parameter	Min	Typ	Max	Units	Comment
V <sub>CC</sub>	Supply Voltage	4.0	5.0	6.0	V	Comply with USB 2.0
I <sub>CC</sub>	Supply Current					
I <sub>CC1</sub>	Chip disabled		147.0		mA	
I <sub>CC2</sub>	Chip active			500	mA	Comply with USB 2.0
P <sub>2</sub>	Power Dissipation			2.5	W	
V <sub>INL</sub>	Aux. Conn. Input Voltage Low	-0.3		1.16	V	
V <sub>INH</sub>	Aux. Conn. Input Voltage High	1.83		5.5	V	
<b>Bias Voltage Source for Sensor Diode</b>						
V <sub>BIAS</sub>	Bias Voltage	3		200	V	
I <sub>BIAS</sub>	Bias Current (V <sub>BIAS</sub> = 5V)			10	mA	
	Bias Current (V <sub>BIAS</sub> = 30V)			5	mA	
	Bias Current (V <sub>BIAS</sub> = 100V)			1	mA	

## Performance Characteristics

Symbol	Parameter	Min	Typ	Max	Units	Comment
f	Frame Rate			45	fps	with USB 2.0 Host
TREAD	Frame Readout Time <sup>3</sup>		22		ms	

<sup>3</sup> During Readout time (or Dead time), no charge is collected from the sensor.



## USB connector

USB type A, Standard USB 2.0 Hi-Speed.

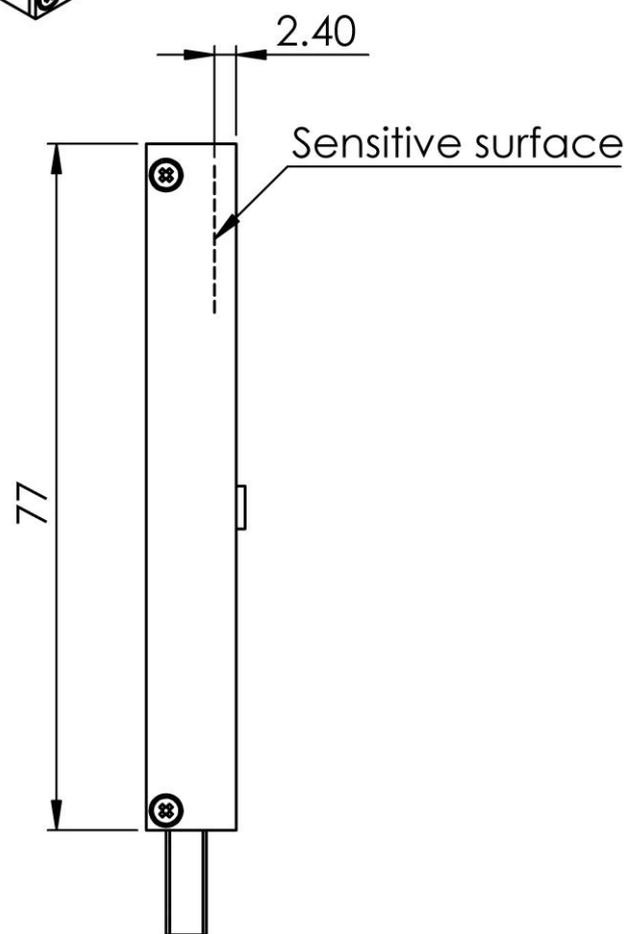
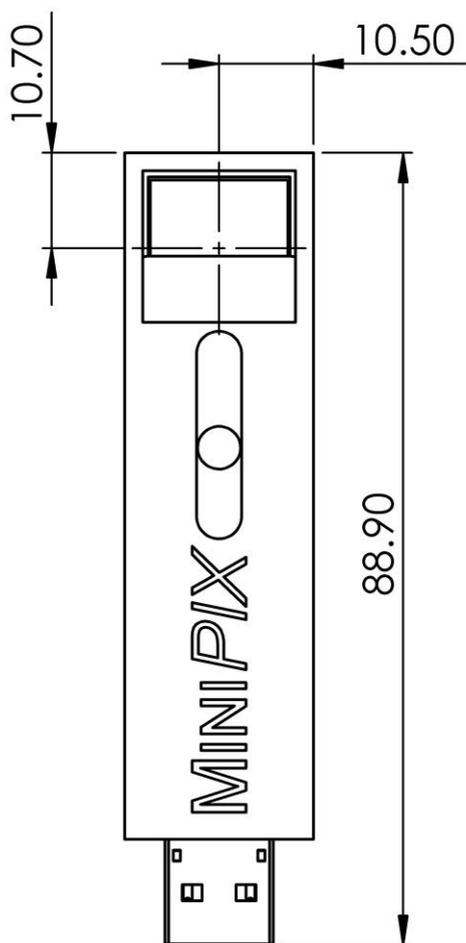
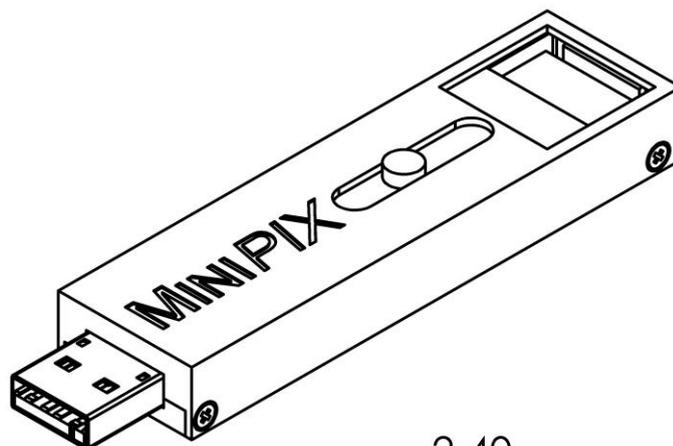
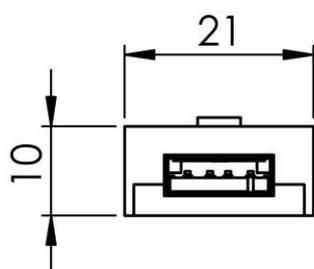
## Product/Model number codes

MXSTD-XP1170518 – Silicon planar sensor, thickness 100  $\mu\text{m}$

MXSTD-XP3170518 – Silicon planar sensor, thickness 300  $\mu\text{m}$

MXSTD-XP5170518 – Silicon planar sensor, thickness 500  $\mu\text{m}$

## Mechanical Dimensions

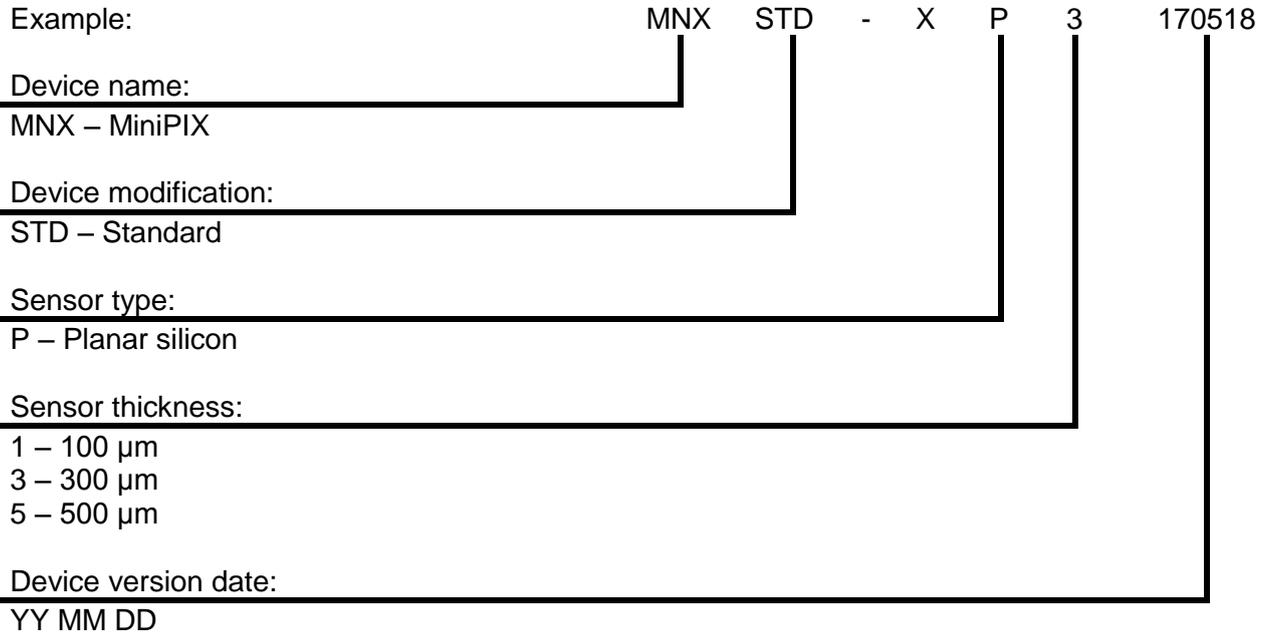


All dimensions are in mm.





## Model number codes



## Release history

Date	Changes
17/11/02	Model number codes added, datasheet version



# Warning

Do not touch sensor surface!

Instructions for safe use.

To avoid malfunction or damage to your **MINIPIX** please observe the following:

- Do not expose to water, moisture.
- Do not disassemble. Wire-bonding connection may be irreversibly damaged.
- Do not insert any object into the sensor window.

## Copyright



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