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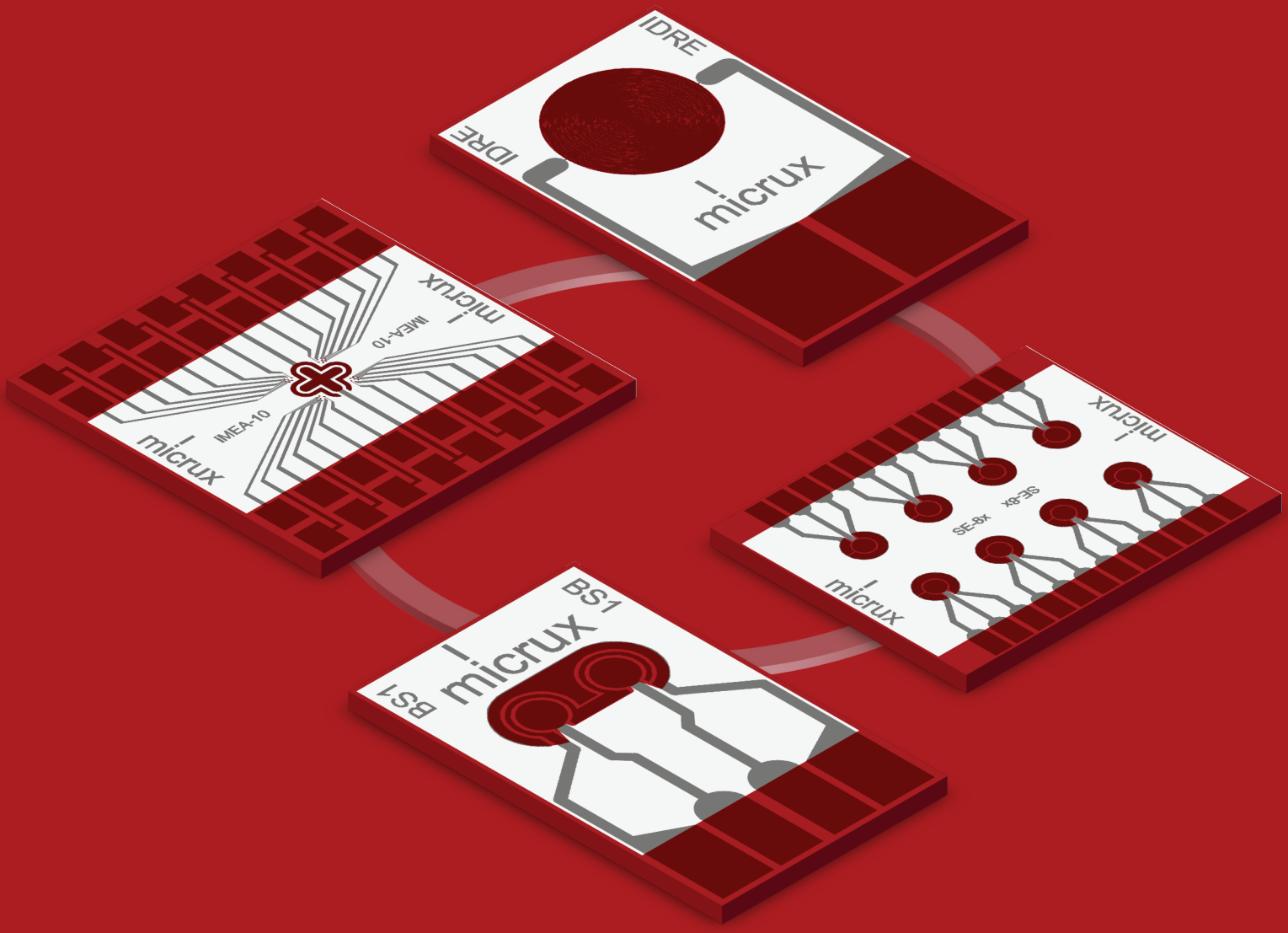


Thin-film Electrochemical Sensors *(On-Demand)*

Thin-film Sensors

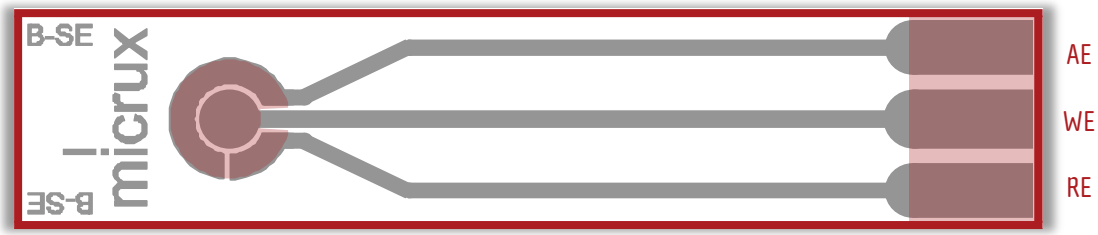
Thin-film technologies enable the manufacture of a wide variety of electrochemical sensors with multiple analytical applications. MicruX is able to manufacture *off–the–shelf* metal-based thin-film (micro)electrodes as well as other *pre-designed sensors* *on-demand*.

On-demand sensors are just manufactured under previous request. Delivery time for these sensors is about 7-8 weeks depending on the workload.

» Basic Single- & Multi-Electrode Systems

Different single- and multi-electrode chips, integrating one or more working electrodes (WE) as well as reference (RE) and auxiliary (AE) electrodes, are easily manufactured by using thin-film technologies.

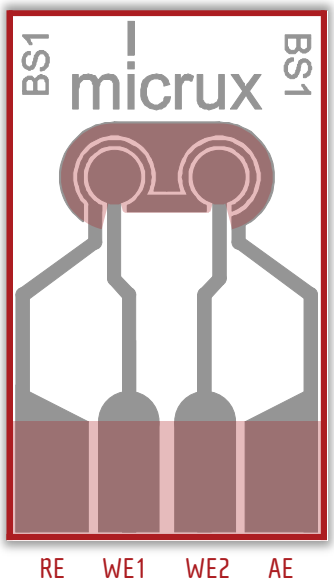
» Single-Sensor



» External dimensions:	17 x 3.5 x 0.75 mm
» Substrate:	Glass
» Protective layer:	SU-8 resin
» Electrochemical cell:	2 mm Ø
» Electrode material:	Platinum or Gold

Reference	Material	WE area	Thickness
» *ED-B-SE-Pt*	Ti/Pt	0.8 mm^2	50/150 nm
» *ED-B-SE-Au*	Ti/Au	0.8 mm^2	50/150 nm

» Dual-Sensor



» External dimensions:	10 x 6x 0.75 mm
» Substrate:	Glass
» Protective layer:	SU-8 resin
» Electrode material:	Platinum or Gold

Reference	Material	WE1 area	WE2 area	Thickness
» *ED-BS1-Pt*	Ti/Pt	0.8 mm^2	0.8 mm^2	50/150 nm
» *ED-BS1-Au*	Ti/Au	0.8 mm^2	0.8 mm^2	50/150 nm

Dual-sensors are compatible with standard electrochemical platforms (Drop- & AIO-cell)

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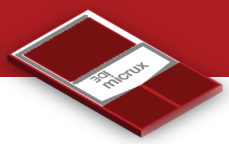
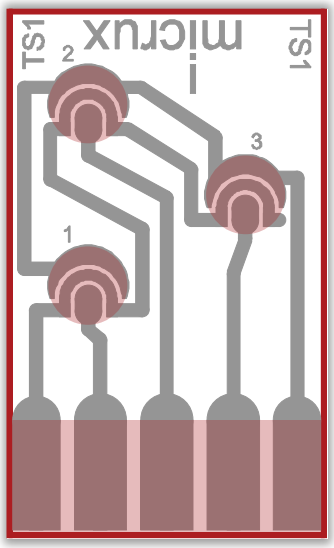


» Basic Single- & Multi-Electrode Systems

» Tri-Sensor

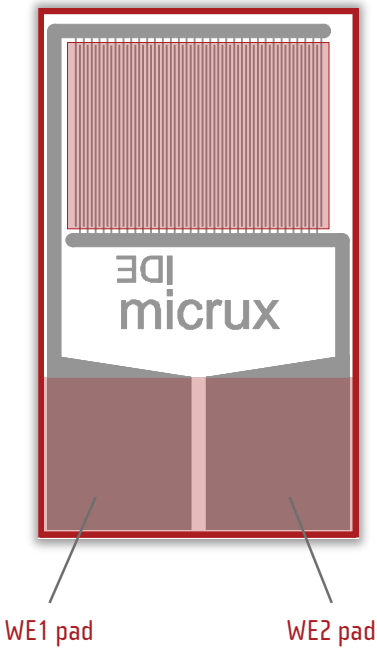


» External dimensions:	10 x 6x 0.75 mm
» Substrate:	Glass
» Protective layer:	SU-8 resin
» Electrochemical cells	1.5 mm Ø
» Electrode material:	Platinum or Gold

Reference	Material	WE1 area	WE2 area	WE3 area	Thickness
» *ED-TS1-Pt*	Ti/Pt	0.3 mm^2	0.3 mm^2	0.3 mm^2	50/150 nm
» *ED-TS1-Au*	Ti/Au	0.3 mm^2	0.3 mm^2	0.3 mm^2	50/150 nm

» Basic Interdigitated Lineal Electrodes

The basic interdigitated lineal-band electrodes (IDE) consist of two individually addressable microelectrode array strips with an interdigitated approach.



» External dimensions:	10 x 6 x 0.75 mm
» Substrate:	Glass
» Protective layer:	SU-8 resin
» Electrochemical cell:	5 x 3.5 mm

Reference	Material	µElectrode width	µElectrode gap	Number of feet	Thickness
» *ED-cIDE4-Pt*	Ti/Pt	10 µm	10 µm	120 pairs	50/150 nm
» *ED-cIDE5-Pt*	Ti/Pt	10 µm	5 µm	160 pairs	50/150 nm
» *ED-cIDE6-Pt*	Ti/Pt	5 µm	5 µm	240 pairs	50/150 nm
» *ED-cIDE4-Au*	Ti/Au	10 µm	10 µm	120 pairs	50/150 nm
» *ED-cIDE5-Au*	Ti/Au	10 µm	5 µm	160 pairs	50/150 nm
» *ED-cIDE6-Au*	Ti/Au	5 µm	5 µm	240 pairs	50/150 nm

IDE sensors are compatible with standard electrochemical platforms (Drop- & AIO-cell)

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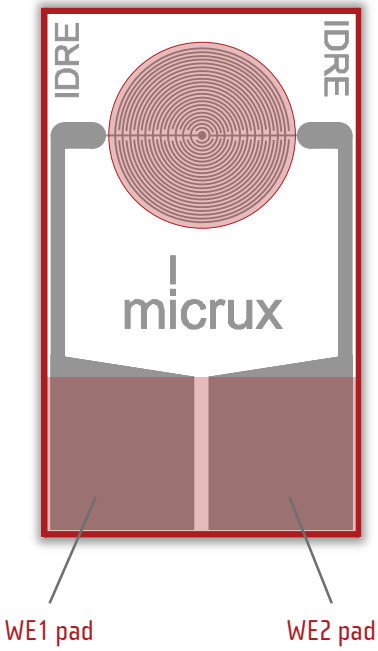
» Basic Interdigitated Ring Electrodes

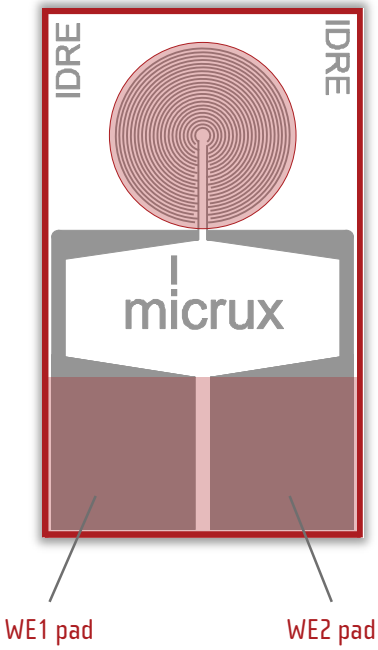
Two different ring approaches are available for the interdigitated ring electrodes, adapting their performance to several applications.

» External dimensions:	10 x 6 x 0.75 mm
» Substrate:	Glass
» Protective layer:	SU-8 resin
» Electrochemical cell:	3.5 mm Ø



» IDRE approach (1)

Reference	Material	µElectrode width	µElectrode gap	Number of feet	Thickness
» *ED-IDRE1-Pt*	Ti/Pt	10 µm	10 µm	45 pairs	50/150 nm
» *ED-IDRE2-Pt*	Ti/Pt	10 µm	5 µm	60 pairs	50/150 nm
» *ED-IDRE3-Pt*	Ti/Pt	5 µm	5 µm	90 pairs	50/150 nm
» *ED-IDRE1-Au*	Ti/Au	10 µm	10 µm	45 pairs	50/150 nm
» *ED-IDRE2-Au*	Ti/Au	10 µm	5 µm	60 pairs	50/150 nm
» *ED-IDRE3-Au*	Ti/Au	5 µm	5 µm	90 pairs	50/150 nm



» IDRE approach (2)

Reference	Material	µElectrode width	µElectrode gap	Number of feet	Thickness
» *ED-IDRE4-Pt*	Ti/Pt	10 µm	10 µm	45 pairs	50/150 nm
» *ED-IDRE5-Pt*	Ti/Pt	10 µm	5 µm	60 pairs	50/150 nm
» *ED-IDRE6-Pt*	Ti/Pt	5 µm	5 µm	90 pairs	50/150 nm
» *ED-IDRE4-Au*	Ti/Au	10 µm	10 µm	45 pairs	50/150 nm
» *ED-IDRE5-Au*	Ti/Au	10 µm	5 µm	60 pairs	50/150 nm
» *ED-IDRE6-Au*	Ti/Au	5 µm	5 µm	90 pairs	50/150 nm

IDRE sensors are compatible with standard electrochemical platforms (Drop- & AIO-cell)

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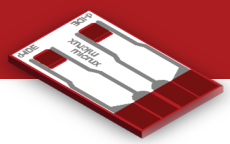
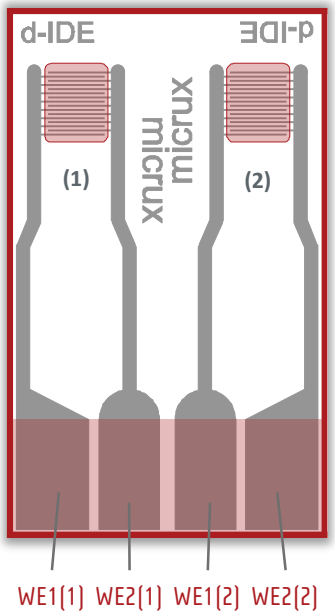


» Dual Interdigitated Lineal Electrodes

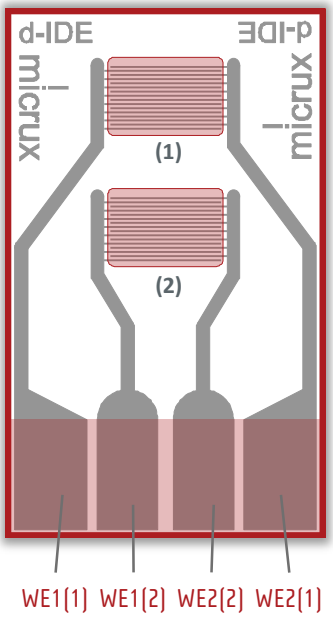
Dual interdigitated lineal-band electrodes can be integrated in a single chip with different configurations.

» External dimensions:	10 x 6 x 0.75 mm
» Substrate:	Glass
» Protective layer:	SU-8 resin
» Electrochemical cells:	1.2 x 1.5 mm (1) // 2.2 x 1.5 mm (2)



» Dual-IDE approach (1)

Reference	Material	µElectrode width	µElectrode gap	Number of feet *per* cell	Thickness
» *ED-dIDE1-Pt*	Ti/Pt	10 µm	10 µm	30 pairs	50/150 nm
» *ED-dIDE2-Pt*	Ti/Pt	10 µm	5 µm	40 pairs	50/150 nm
» *ED-dIDE3-Pt*	Ti/Pt	5 µm	5 µm	60 pairs	50/150 nm
» *ED-dIDE1-Au*	Ti/Au	10 µm	10 µm	30 pairs	50/150 nm
» *ED-dIDE2-Au*	Ti/Au	10 µm	5 µm	40 pairs	50/150 nm
» *ED-dIDE3-Au*	Ti/Au	5 µm	5 µm	60 pairs	50/150 nm



» Dual-IDE approach (2)

Reference	Material	µElectrode width	µElectrode gap	Number of feet *per* cell	Thickness
» *ED-dIDE4-Pt*	Ti/Pt	10 µm	10 µm	30 pairs	50/150 nm
» *ED-dIDE5-Pt*	Ti/Pt	10 µm	5 µm	40 pairs	50/150 nm
» *ED-dIDE6-Pt*	Ti/Pt	5 µm	5 µm	60 pairs	50/150 nm
» *ED-dIDE4-Au*	Ti/Au	10 µm	10 µm	30 pairs	50/150 nm
» *ED-dIDE5-Au*	Ti/Au	10 µm	5 µm	40 pairs	50/150 nm
» *ED-dIDE6-Au*	Ti/Au	5 µm	5 µm	60 pairs	50/150 nm

Dual-IDE sensors are compatible with standard electrochemical platforms (Drop- & AIO-cell)

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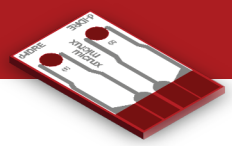
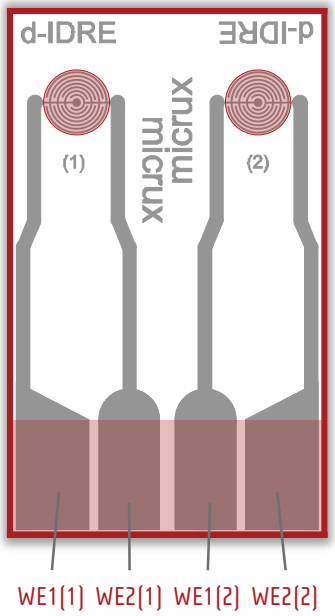
Thin-film Sensors



» Dual Interdigitated Ring Electrodes

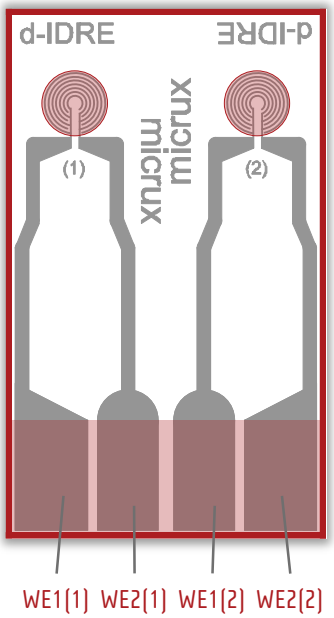
Dual interdigitated ring electrodes can be also integrated in a single chip with different configurations.

» External dimensions:	10 x 6 x 0.75 mm
» Substrate:	Glass
» Protective layer:	SU-8 resin
» Electrochemical cells:	1.25 mm Ø



» Dual-IDRE approach (1)

Reference	Material	µElectrode width	µElectrode gap	Number of feet *per* cell	Thickness
» *ED-dIDRE1-Pt*	Ti/Pt	10 µm	10 µm	15 pairs	50/150 nm
» *ED-dIDRE2-Pt*	Ti/Pt	10 µm	5 µm	20 pairs	50/150 nm
» *ED-dIDRE3-Pt*	Ti/Pt	5 µm	5 µm	30 pairs	50/150 nm
» *ED-dIDRE1-Au*	Ti/Au	10 µm	10 µm	15 pairs	50/150 nm
» *ED-dIDRE2-Au*	Ti/Au	10 µm	5 µm	20 pairs	50/150 nm
» *ED-dIDRE3-Au*	Ti/Au	5 µm	5 µm	30 pairs	50/150 nm



» Dual-IDE approach (2)

Reference	Material	µElectrode width	µElectrode gap	Number of feet *per* cell	Thickness
» *ED-dIDRE4-Pt*	Ti/Pt	10 µm	10 µm	15 pairs	50/150 nm
» *ED-dIDRE5-Pt*	Ti/Pt	10 µm	5 µm	20 pairs	50/150 nm
» *ED-dIDRE6-Pt*	Ti/Pt	5 µm	5 µm	30 pairs	50/150 nm
» *ED-dIDRE4-Au*	Ti/Au	10 µm	10 µm	15 pairs	50/150 nm
» *ED-dIDRE5-Au*	Ti/Au	10 µm	5 µm	20 pairs	50/150 nm
» *ED-dIDRE6-Au*	Ti/Au	5 µm	5 µm	30 pairs	50/150 nm

Dual-IDRE sensors are compatible with standard electrochemical platforms (Drop- & AIO-cell)

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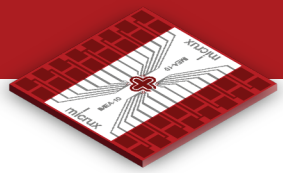
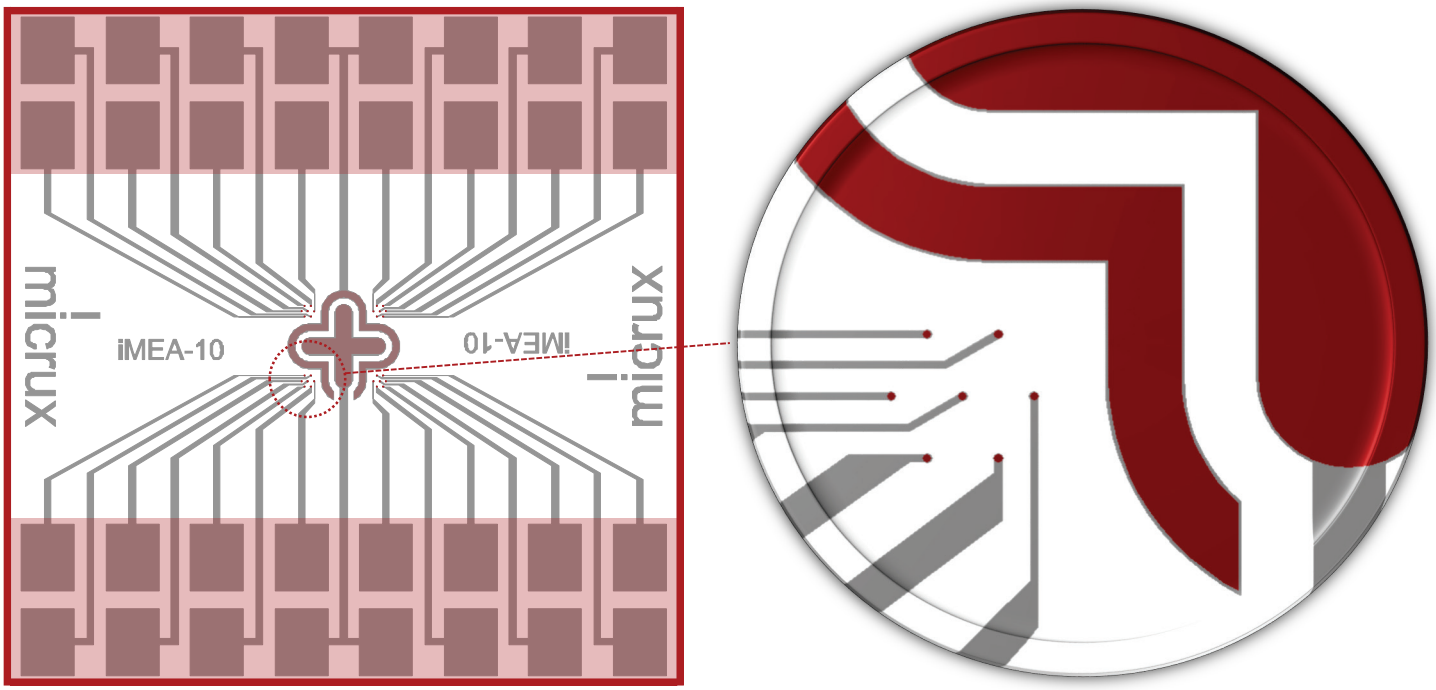


» Individually Addressable MicroElectrode Arrays

Thin-film technologies enable the manufacture of different individually addressable multi-electrode array (iMEA) systems.

» iMEA chip

iMEA chip consists of four sets of seven 10-µm microelectrodes (28 individually addressable microelectrodes) with integrated reference and auxiliary electrodes in the center of the chip.



» External dimensions:	10 x 10 x 0.75 mm	» Substrate:	Glass
» Protective layer:	SU-8 resin	» Electrode material:	Platinum or Gold

Reference	Material	Microelectrodes			Thickness
		Diameter	Pitch	Number	
» *ED-iMEA-10-Pt*	Ti/Pt	10 µm	100 µm	4x7	50/150 nm
» *ED-iMEA-10-Au*	Ti/Au	10 µm	100 µm	4x7	50/150 nm

Custom-made accessories can be developed for using these specific microelectrode chips.

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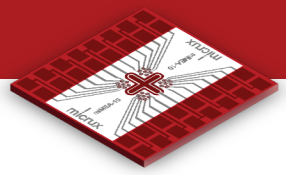
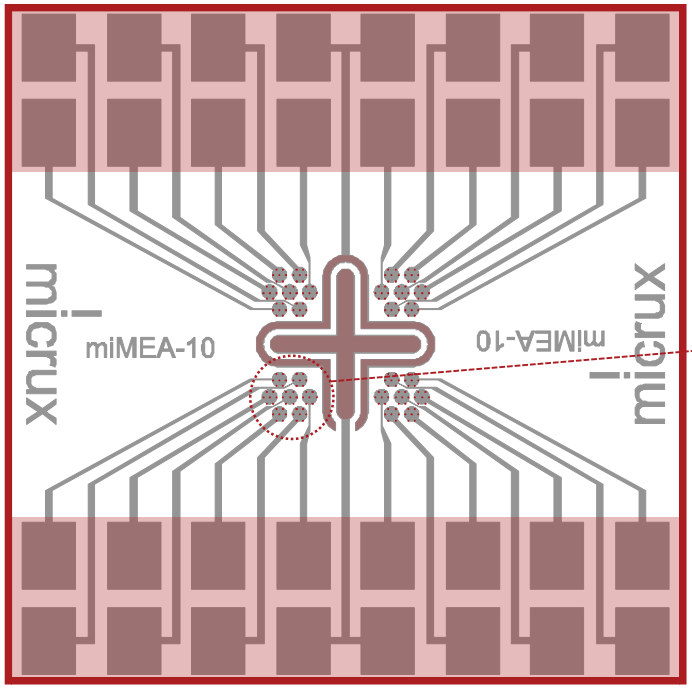


» Individually Addressable MicroElectrode Arrays

Thin-film technologies enable the manufacture of different individually addressable multi-electrode array (iMEA) systems.

» multi-iMEA chip

Multi-iMEA chip consists of four areas with seven sets of seven 10-µm microhole arrays (28 individually addressable microelectrode arrays) with integrated reference and auxiliary electrodes in the center of the chip.



» External dimensions:	10 x 10 x 0.75 mm	» Substrate:	Glass
» Protective layer:	SU-8 resin	» Electrode material:	Platinum or Gold

Reference	Material	Microelectrodes			Thickness
		Diameter	Pitch	Number	
» *ED-miMEA-10-Pt*	Ti/Pt	10 µm	100 µm	4x(7x7)	50/150 nm
» *ED-miMEA-10-Au*	Ti/Au	10 µm	100 µm	4x(7x7)	50/150 nm

Custom-made accessories can be developed for using these specific microelectrode chips.

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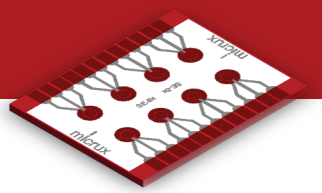
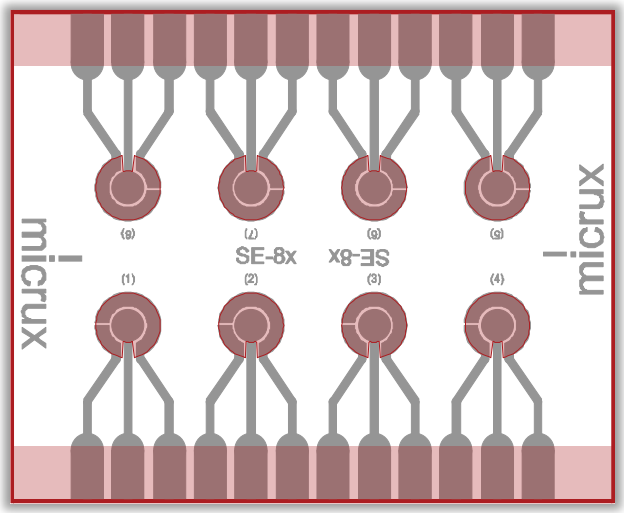


» Multi-Electrodes Chips

Thin-film technologies enable the integration of multiple electrochemical cells in a single chip for multiplexing detection.

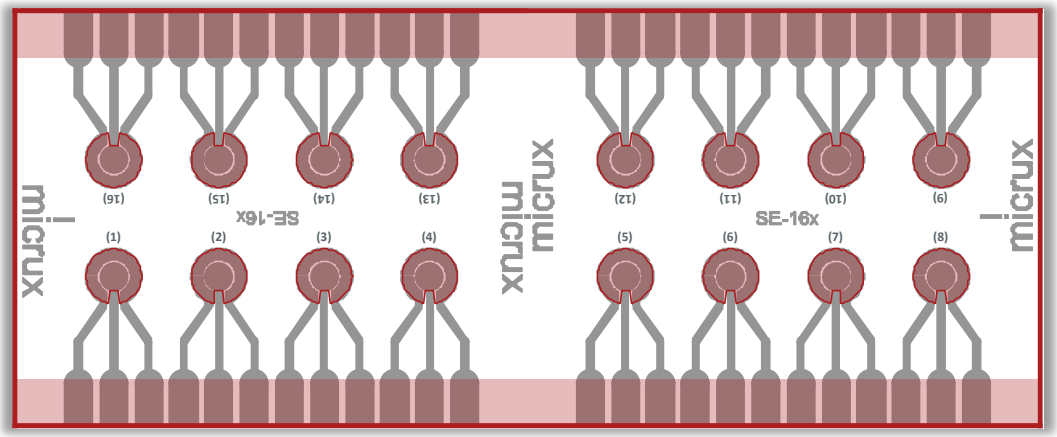
» 8x single-electrode chip



» External dimensions:	18.5 x 15 x 0.75 mm
» Substrate:	Glass
» Protective layer:	SU-8 resin
» Electrochemical cells:	2 mm Ø
» Electrode material:	Platinum or Gold

Reference	Material	WE area	Thickness
» *ED-SE-8x-Pt*	Ti/Pt	0.8 mm²	50/150 nm
» *ED-SE-8x-Au*	Ti/Au	0.8 mm²	50/150 nm

» 16x single-electrode chip



» External dimensions:	37 x 15 x 0.75 mm
» Substrate:	Glass
» Protective layer:	SU-8 resin
» Electrochemical cells:	2 mm Ø
» Electrode material:	Platinum or Gold

Reference	Material	WE area	Thickness
» *ED-SE-16x-Pt*	Ti/Pt	0.8 mm²	50/150 nm
» *ED-SE-16x-Au*	Ti/Au	0.8 mm²	50/150 nm

Custom-made accessories can be developed for using these specific multi-electrode chips.

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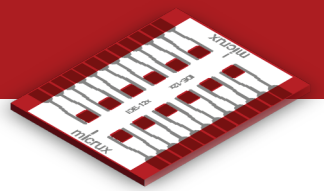
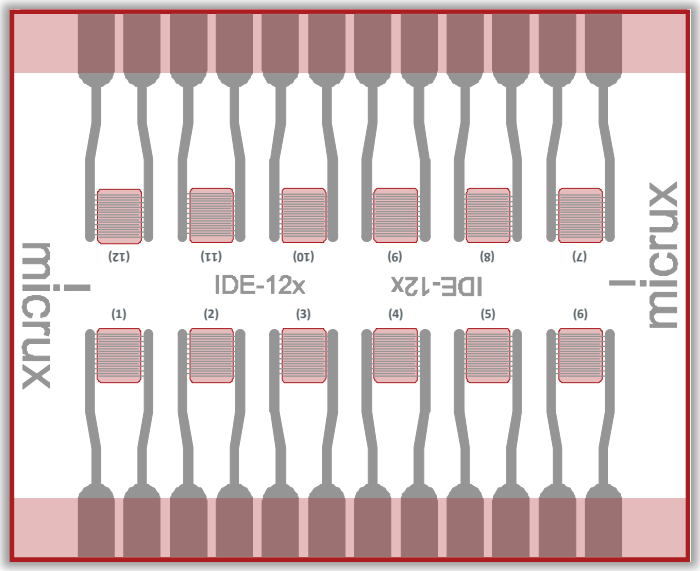


» Multi Interdigitated Electrodes Chips

Thin-film technologies also enable the integration of multiple cells with interdigitated electrodes in a single chip for multiplexing detection.



» External dimensions:	18.5 x 15 x 0.75 mm
» Substrate:	Glass
» Protective layer:	SU-8 resin
» Electrochemical cells:	1.2 x 1.5 mm
» Electrode material:	Platinum or Gold

Reference	Material	µElectrode width	µElectrode gap	Number of feet *per* cell	Thickness
» *ED-IDE10-12x-Pt*	Ti/Pt	10 µm	10 µm	30 pairs	50/150 nm
» *ED-IDE5-12x-Pt*	Ti/Pt	5 µm	5 µm	60 pairs	50/150 nm
» *ED-IDE10-12x-Au*	Ti/Au	10 µm	10 µm	30 pairs	50/150 nm
» *ED-IDE5-12x-Au*	Ti/Au	5 µm	5 µm	60 pairs	50/150 nm

Custom-made accessories can be developed for using these specific multi-electrode chips.

» Other thin-film (micro)electrodes

Thin-film technologies open the gate to the manufacture of other different customized (micro)electrode designs with a low-cost, high precision and resolution. Thus, other chips including multiple single-electrodes or interdigitated electrodes (lineal or ring) can be also accomplished.

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