DSt

Sensor Technologies Ltd

Company Presentation 2024

www.dstsensor.eu

Leader In Detection and Sensing

DSt have established a successful business supplying markets requiring high performance detector and sensor technologies

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Strengths

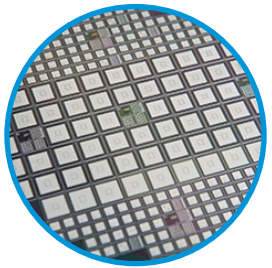
- Interactive design optimisation with customers
- Strong technical support
- In-depth process knowledge
- Detailed understanding of X-ray sensor requirements
- Best performance ultra low noise JFETS and PIN diodes.
- Supplies JFETs/PIN Diodes to >50% end markets
- Familiar with MEMS sensor technologies for a broad set of applications

Expert

DSt Sensor Technologies is an expert developer and supplier of semiconductor sensor devices for the X-Ray detector, X-Ray fluorescence, Radiotherapy dosimeter and Radiation detector markets.

Products include

- **High performance PIN diodes,**
- **Ultra low noise JFETs – 3 pin for high transconductance**
- **Ultra low noise JFETs – 4 pin with integrated charge reset mechanism and feedback capacitor for large area nuclear detectors coupled with charge sensitive amplifiers – available for both positive and negative charge collection)**
- **Neutron detectors**



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Service and Product form factor

Full custom design and manufacturing service

We can supply in:

- Wafer form, as 100% tested die
- Die in waffle trays
- Devices in packages
- Fully assembled and tested modules

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Products and Markets Served

- **Further Areas of Activity**
  - ✓ **Packaged PiN diodes for Neutron radiation monitoring.**
  - ✓ **Customer specific charged particle detectors.**
  - ✓ **Medical dosimetry using PiN diode and Radfet devices.**
  - ✓ **MEMS based thermal conductivity gauge for O2 sensing**
  - ✓ **Gas Sensing ; Micro hotplates, IR emitters**
  - ✓ **Thin silicon PiN diodes for advanced medical dosimetry.**
  - ✓ **MEMS breathing sensor for Sleep Apnea, COPD, Asthma**

X-Ray & Other Detection Markets

Market Size

- End user market - >$500M p.a.
- Component sales – c.100,000 p.a.
- Growth rate - >10% p.a.

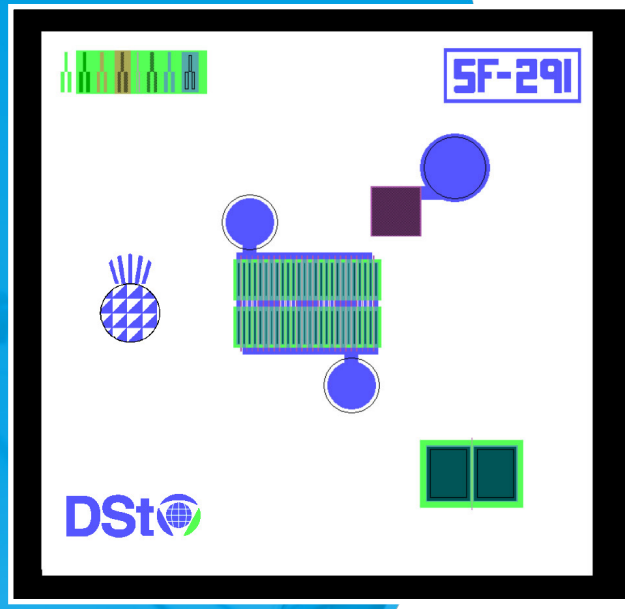
Market Drivers

- RoHS compliance
- Homeland security
- Handheld instrumentation
- In home medical diagnostic devices

Design and Modelling Capability

- In house design and layout using LEDIT software
- Device modelling using Silvaco
- Characterisation using in house SEM and EDAX
- Detailed reverse engineering analysis at Loughborough Surface Analysis for FIB, device cross sections and elemental analysis

SF291 JFET Layout



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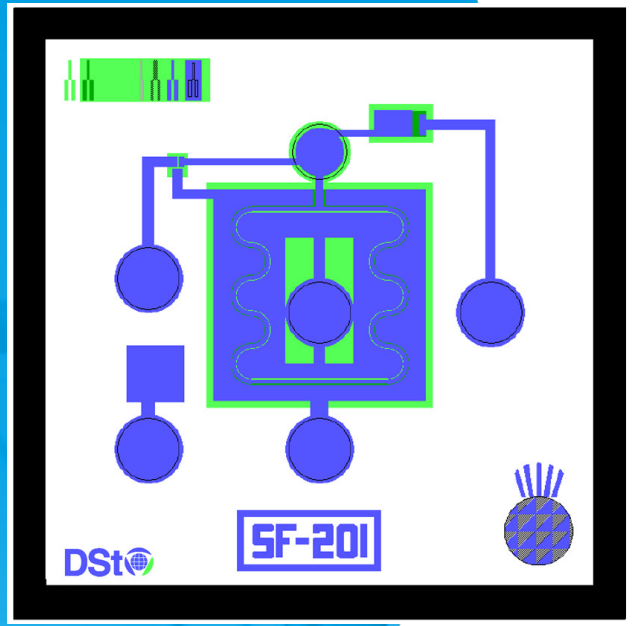
SF201 JFET Layout



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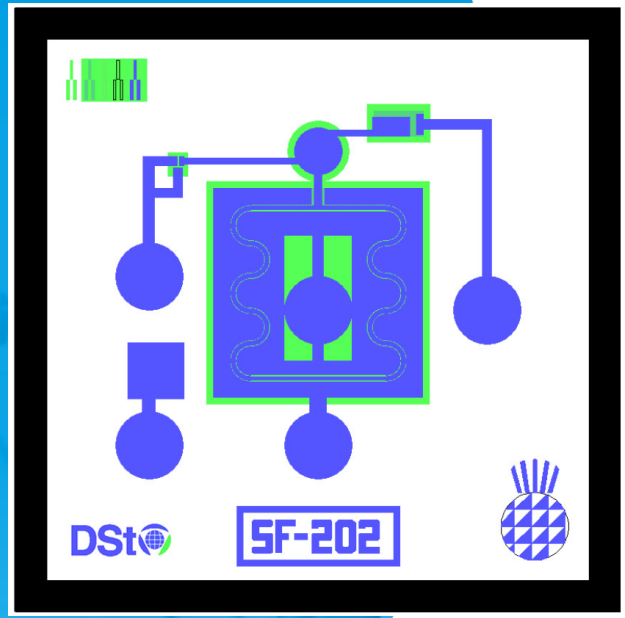
SF202 JFET Layout



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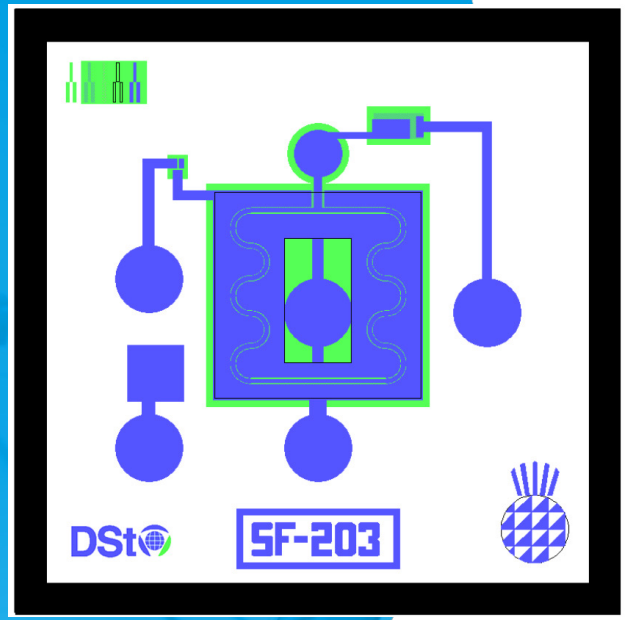
SF203 JFET Layout



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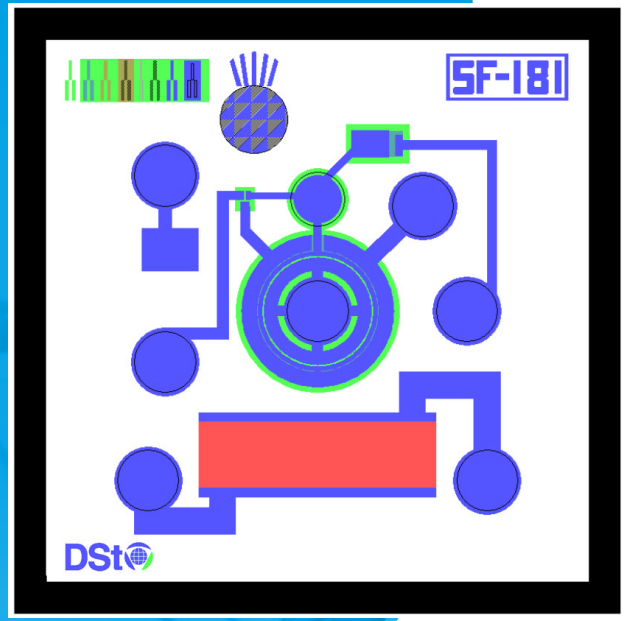
SF181 JFET Layout



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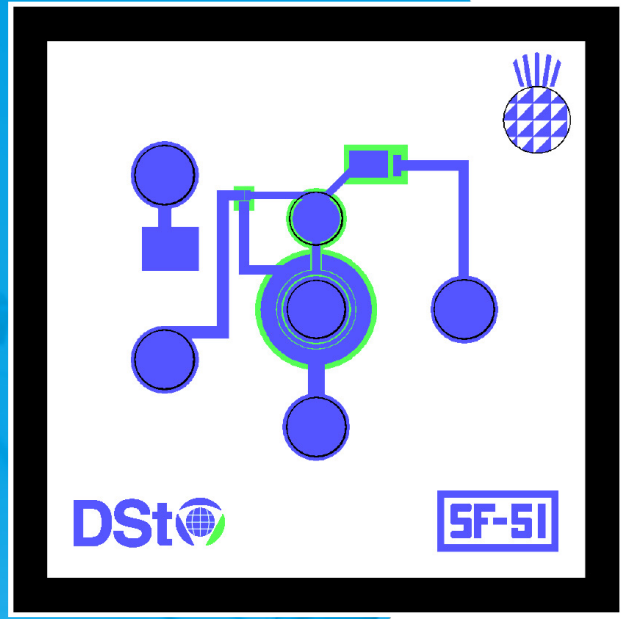
SF51-75 JFET Layout



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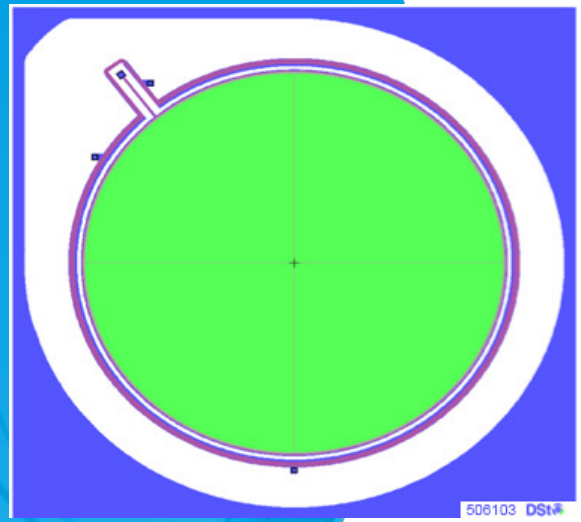
506103 PiN diode layout



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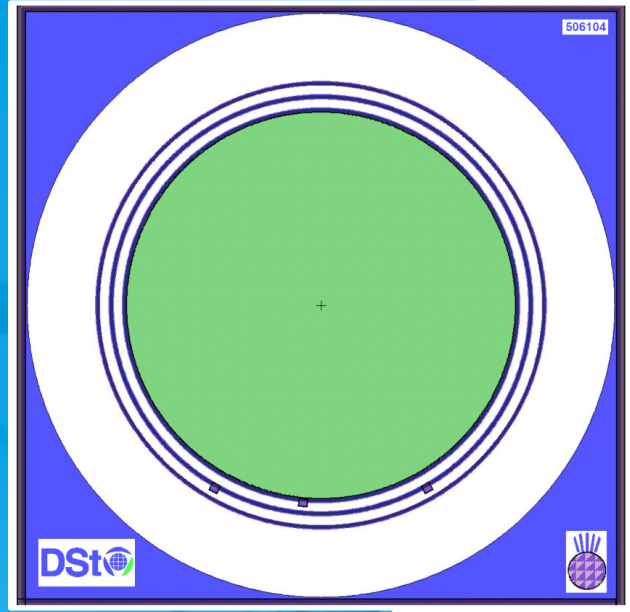
506104 PiN diode layout



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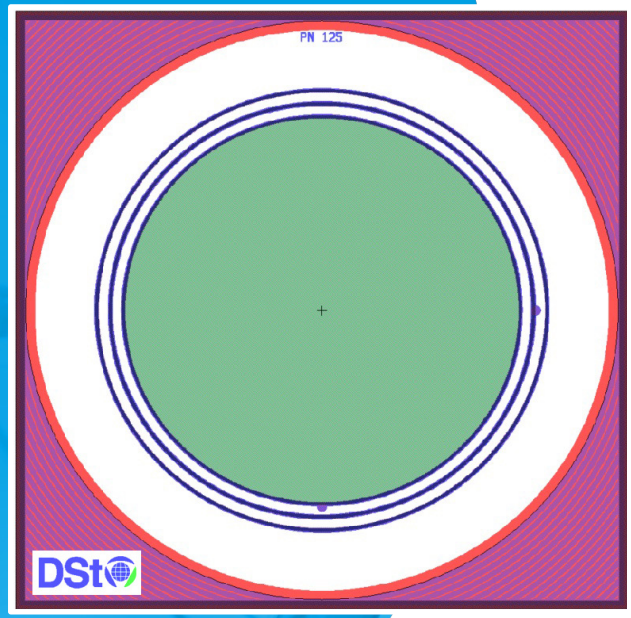
506106 PiN diode layout



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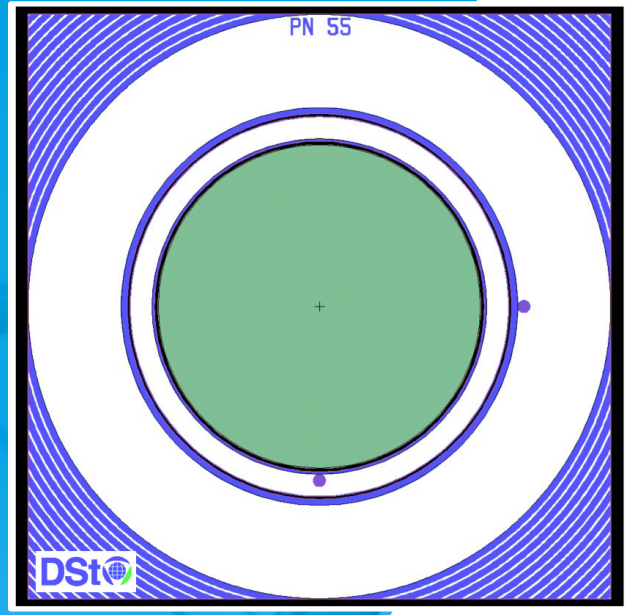
506105 PiN diode layout



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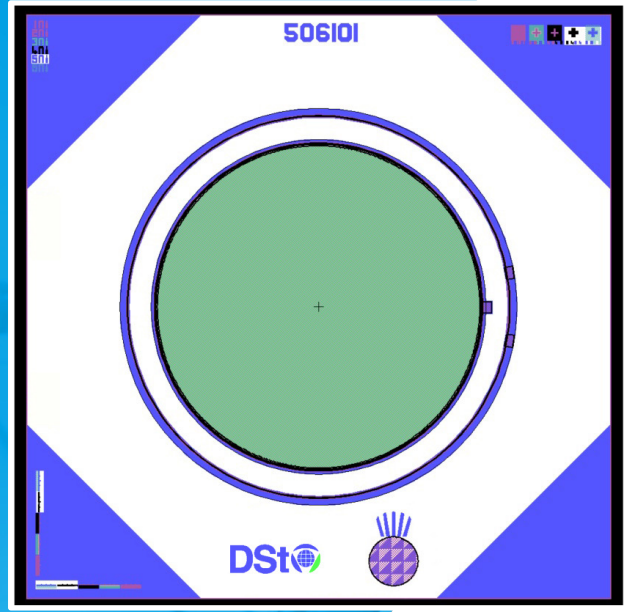
506101 PiN diode layout



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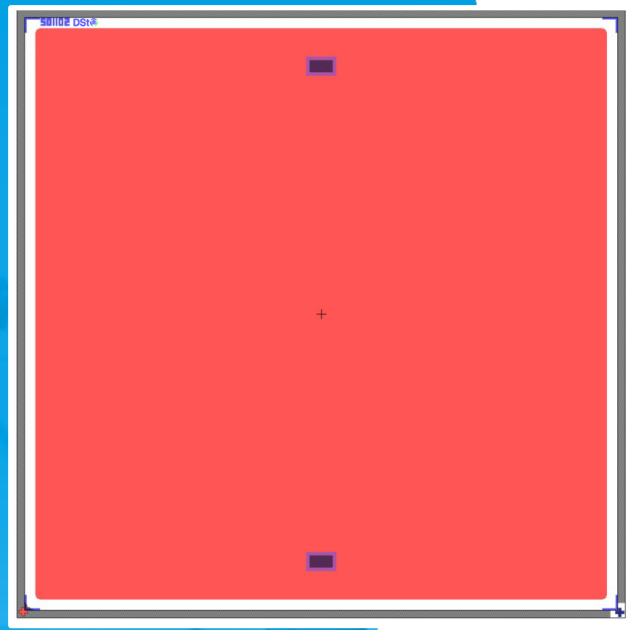
501102 PiN diode layout



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DSt Low Noise JFET Products

Low Noise JFETs					
Device No.	**Input Cap. Ciss (pF) Vds=0V, Vgs=0V**	**Gm (mS) Vds=3V Vgs=0V**	**Noise, En nV /Root HZ Vds=3V, f=100kHz**	**Die size**	**Additional Information**
SF291	8.0	45	0.65	900 x 900 µm	Three terminal device for amplifiers requiring high transconductance and low noise.
SF201	1.6	10	1.3	900 x 900 µm	Four terminal device with an integrated charge reset mechanism and feedback capacitance. Suitable for large area nuclear detectors coupled to charge sensitive amplifiers. For electron charge collection (negative biased detectors)
SF202	1.6	10	1.3	900 x 900 µm	Four terminal device with an integrated charge reset mechanism and feedback capacitance. Suitable for large area nuclear detectors coupled to charge sensitive amplifiers. For hole charge collection (positive biased detectors).
SF203	1.6	10	1.3	900 x 900 µm	Suitable for positive or negative charge collection. Charge reset mechanism disabled.
SF181	0.8	5	1.8	900 x 900 µm	Four terminal device with an integrated charge reset mechanism and feedback capacitance. Suitable for medium area nuclear detectors coupled to charge sensitive amplifiers. For electron charge collection (negative biased detectors).
SF51	0.4	2.3	2.2	900 x 900 µm	Four terminal device with an integrated charge reset mechanism and feedback capacitance. Suitable for small area nuclear detectors coupled to charge sensitive amplifiers. For electron charge collection (negative biased detectors) .

DSt Silicon Detector Products

Silicon Detectors PiN

Device No.	Active area (sqmm)	Thickness	Capacitance	Leakage current at full Depletion	Mn Energy Resolution at -40C	Additional Information
506103	25	500um	5.5pF	1nA typical	170eV	Large area circular silicon PiN diode suitable for a wide variety of applications including X-Ray and electron detection.
506104	13	500um	3.0pF	600pA typical	156eV	Medium area circular silicon PiN diode suitable for X-ray, and electron detection.
506106	13	500um	3pF	600pA typical	156kev	Medium area circular silicon PiN diode suitable for X-ray, and electron detection.
506101	5.5	500um	1.3pF	350pA typical	149eV	Small area circular silicon PiN diode suitable for a wide variety of applications including X-Ray and electron detection.
506105	5.5	500um	1.3pF	350pA typical	149keV	Small area circular silicon PiN diode suitable for a wide variety of applications including X-Ray and electron detection.
501102	4.1 x 4.1	380um	3.2pF	600pA typical	160keV	Supplied in 18ld LCC package with Kapton window for use as Neutron detector. Suitable for a wide variety of applications including X-Ray and electron detection.

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DSt Silicon Detector Products

PPS506 PiN Diodes – Test Limits							
Parameter	**Test Conditions**	**506101**	**506103**	**506104**	**506105**	**506106**	**501102**
Diode Vf	5mA	0.3V to 1V	0.3V to 1V	0.3V to 1V	0.3V to 1V	0.3V to 1V	
Guard Ring Vf	5mA	0.3V to 1V	0.3V to 1V	0.3V to 1V	0.3V to 1V	0.3V to 1V	
Diode Leakage	Vr = 200V			Max = 1nA		Max = 1nA	
Diode Leakage	Vr = 225V	Max = 700pA	Max = 1.5nA		Max = 700pA		
Guard Ring Leakage	Vr = 200V			Max = 1nA		Max = 1nA	
Guard Ring Leakage	Vr = 225V	Max = 700pA	Max = 1.5nA		Max = 700pA		
Breakdown Voltage		>225V	>225V	>225V	>225V	>225V	
Die Size (mm)		4.9 x 4.9	7.6 x 7.6	6.4 x 6.4	4.9 x 4.9	6.4 x 6.4	4.1.x.4.1


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