ADMONT Essential Capabilities & Services X-FAB Dresden GmbH&Co.KG

Information for potential ADMONT pilot line user

V2.0 Status 07/2015

Advanced Distributed Pilot Line for More-than-Moore Technologies

This project has received funding from the ECSEL Joint Undertaking under grant agreement No 661796.
This Joint Undertaking receives support from the European Union's Horizon 2020 research and innovation programme and Germany, Finland, Sweden, Italy, Austria, Hungary."

Who is ADMONT?

Advanced Distributed Pilot Line for More-than-Moore Technologies

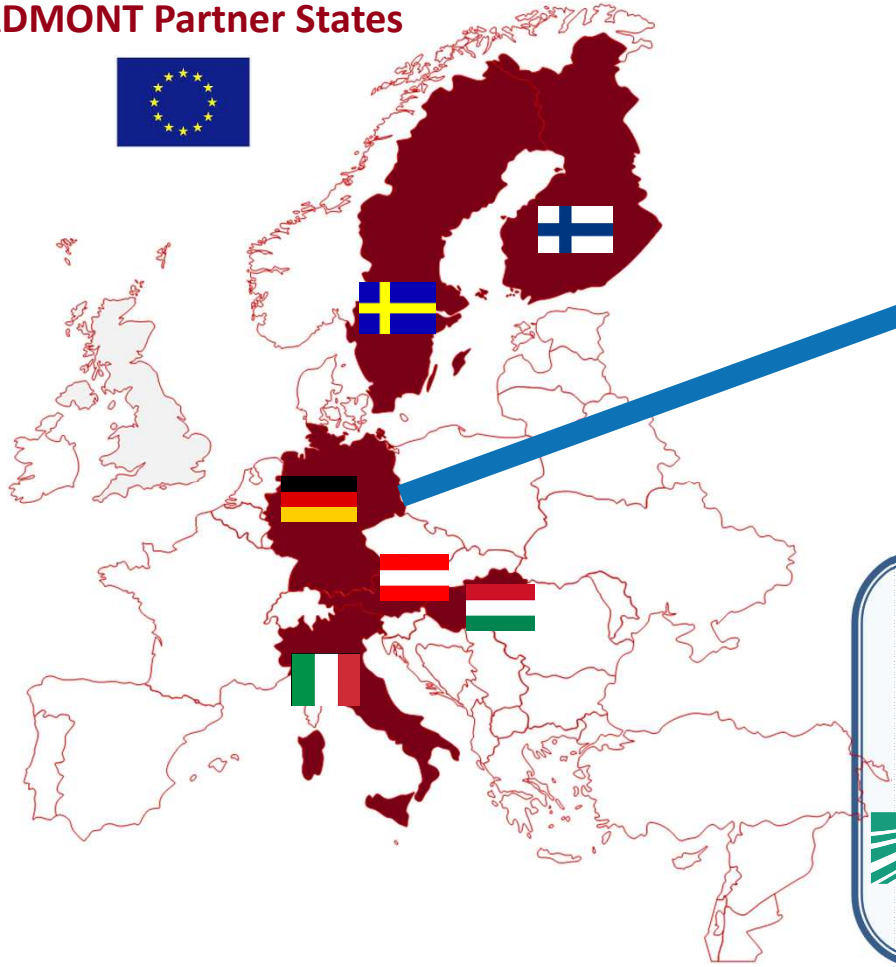
ADMONT is a **multi-KET pilot line** driven by a **combination** of **technology platforms** in Dresden carried by industry and research institutes serving pilot line clients in Europe

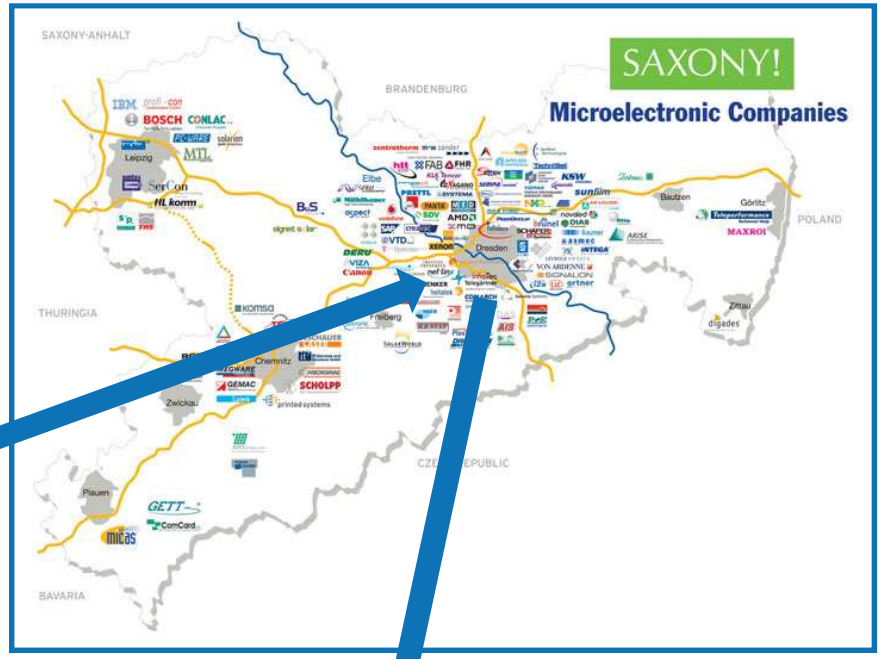
- ADMONT is organised along the **value chain** from wafer material, CMOS wafer, sensor and OLED processing to silicon system integration in one production flow
- ADMONT is an **ECS** (European Electronics Components and Systems) **ecosystem** in **Saxony** for Europe with sustainable impact on economic growth and employment in the European Union
- ADMONT addresses key applications: **smart mobility**, **smart energy**, **smart health** and **smart production** in excellent agreement with the **ECSEL Multiannual Strategic Plan**
- ADMONT addresses essential capabilities: **semiconductor process equipment** and **materials**, **design technology**, **smart system integration**

ADMONT as a distributed More-than-Moore pilot line is unique in Europe and worldwide.

Where is ADMONT?

ADMONT Partner States





FAB
MIXED-SIGNAL FOUNDRY EXPERTS

Fraunhofer FEP

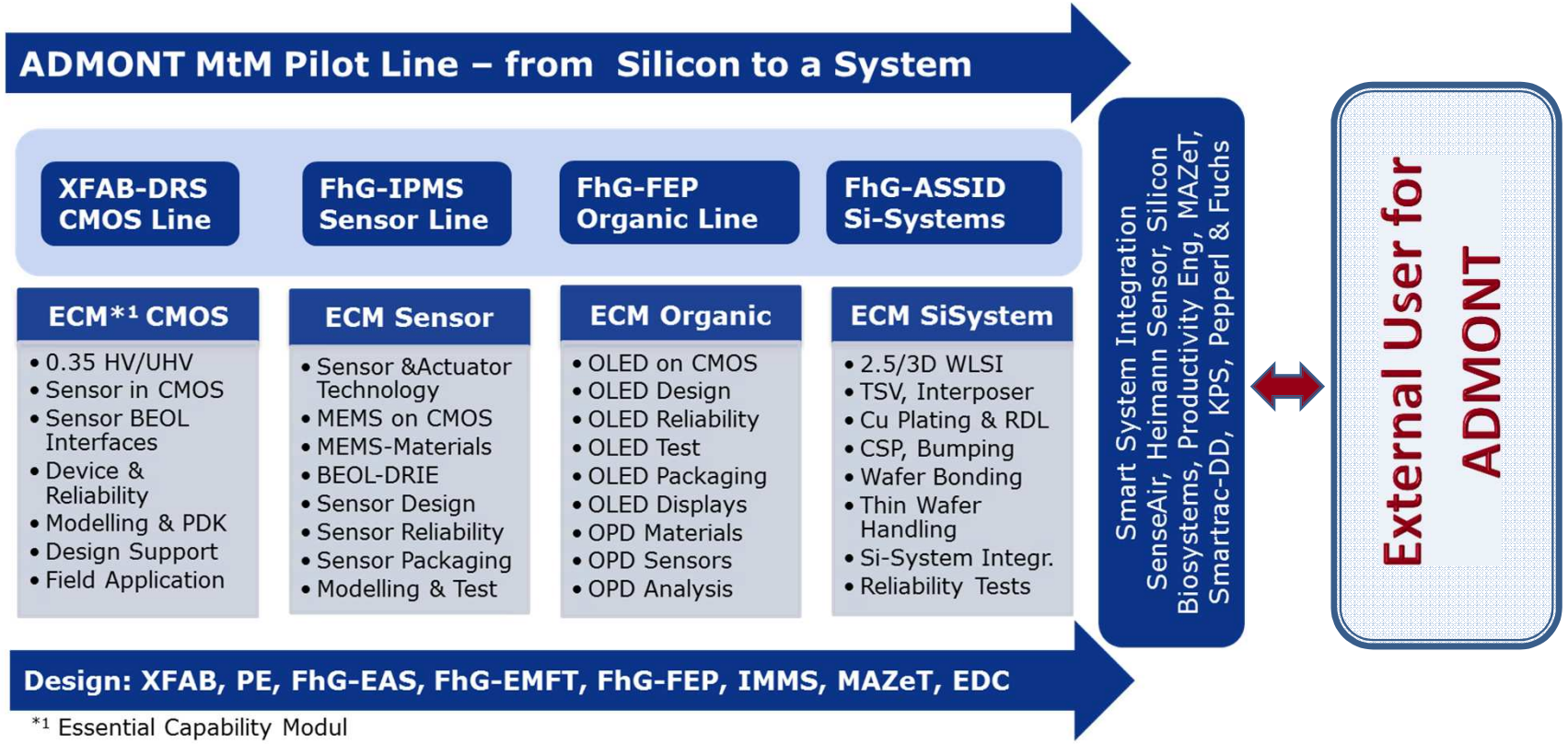
ADMONT Pilot Line

Fraunhofer IPMS

Fraunhofer IZM

ADMONT Concept & Capabilities

- ADMONT pilot line concept, structure and excellences



- Detailed Information are available under (Link: XFAB, IPMS, FEP, ASSID)

FAB
THE MORE
THAN MOORE
FOUNDRY.

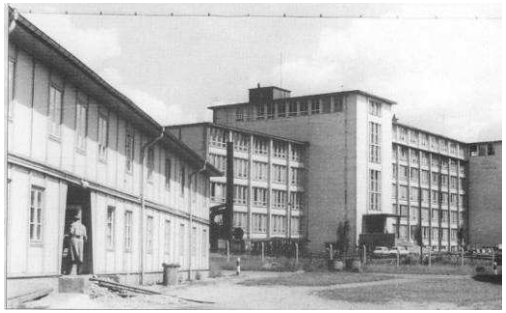
INTRODUCTION X-FAB DRESDEN ADMONT CMOS-HV PILOT LINE

Presenter
Rev.2 KHS 07/2015

History, Location, Business Modell, Service Offering

History Dresden

1961	Founded* AMD
1999	Privatized, IDM-Model, 5 inch production line
2001	6 inch
2007	X-FAB, Foundry-Model
2009	8 inch
2011	50 years Microelectronic Dresden
2013	8 inch capacity extension



*1961- Professor Werner Hartmann founded ‚Arbeitstelle für Molekularelektronik Dresden'

Locations - Dresden

Processes

- 0.35µm ultra-high-voltage CMOS process (XU035)
- 0.35µm HV and analog/mixed-signal CMOS (XH035)
- 0.35µ integrated Thermopile in CMOS XT-035
- 0.6µm HV and analog/mixed-signal CMOS
- special purpose customer specific 0.6 and 0.35µm analog/mixed-signal/HV CMOS processes

Overall capacity > 8,000 eight inch equivalent wafer starts per month

Wafer size 8"

Clean Room ISO Class 3

Employees ~400 (+36), 25 R&D

Campus Dresden

X-FAB Dresden: Grenzstraße 28, 01109 Dresden

Business Model

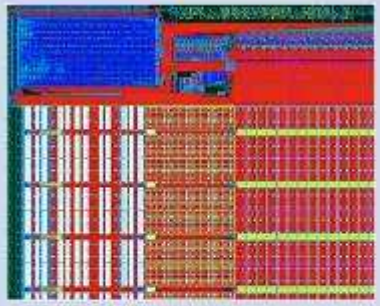
- X-FAB is a pure-play foundry provider
- Provides IC manufacturing solutions to fabless firms, IDMs & OEMs
- Focus on More than Moore technologies
- Foundry solutions:
  - Open platform technologies
  - Sensors, MEMS
  - Outsourcing / Custom process implementation

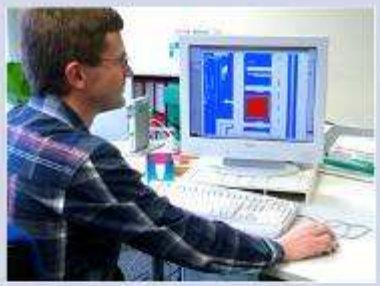
Service Offering

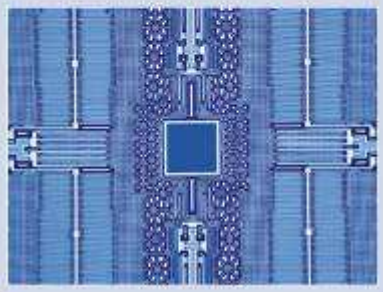
- Comprehensive design support
  - Hotline service & 24/7 online access to full technical documentation
  - PDKs for all major EDA vendors
  - Optimized analog and digital libraries; statistical models; simulation
- Flexible & low cost prototyping options
  - MPW & MLM service
- Manufacturing excellence
  - High reliability (zero ppm support)
  - Process longevity to support long lifetime products
  - Full online reporting for efficient supply chain management
  - Second source capabilities for major technologies

Best-in-Class Design Support

- Most comprehensive design support in foundry industry
- PDKs support 3 Sigma consumer applications; up to 6 Sigma for automotive applications in temperature range from -40°C up to 175°C
  - Support of all major EDA platforms (Cadence, Mentor, Synopsys, Tanner)
  - Digital libraries developed for dedicated mixed-signal needs (low power, low noise, junction isolated)
  - Model accuracy and design flow which support first time right for analog and mixed-signal designs
  - Design kit trainings, design reviews and ESD consultancy on request
- Wide range of embedded non-volatile memory IP: eFlash, EEPROM, OTP
- 24 hour Hotline service available



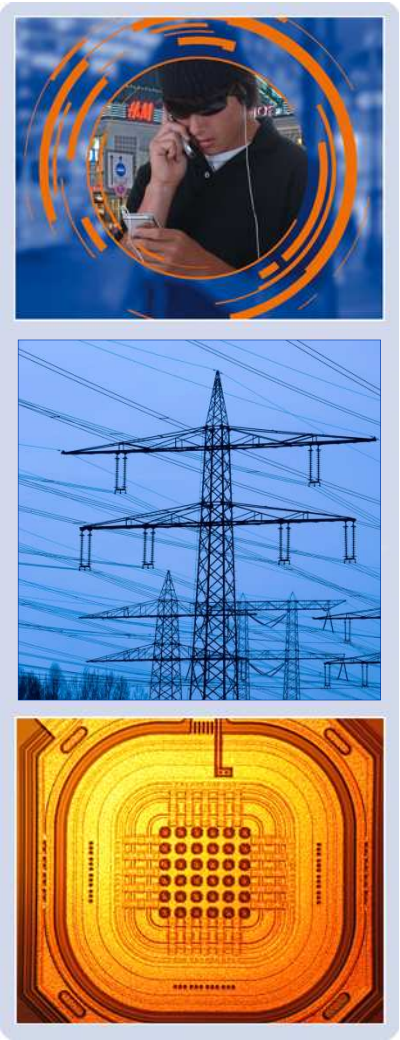




Essential Capabilities

Analog / High-Voltage

- Best-in-class analog characterization & design support
- Covering voltages up to 40V, 60V, 100V, 200V & 700V for CMOS and SOI solutions
- Combination of high-voltage and NVM options with lowest mask count in industry for advanced analog/mixed-signal process nodes
  - NVM options include eFlash, EEPROM, OTP
- Supported applications include:
  - Power management ICs
  - DC/DC converter
  - AC/DC
  - AC LED
  - Precision analog
  - White Light LED driver
  - BLDC controller



Automotive

- Foundry offering meeting automotive requirements:
  - Reliability (0 ppm approach)
  - Robustness
  - High temperature / High voltage
  - Long product lifetime support
  - Production Part Approval Process (PPAP)

- Quality systems:
  - ISO TS 16949 certification for all sites
  - Technologies qualified according to AEC-Q100
  - Audited and approved by major OEMs

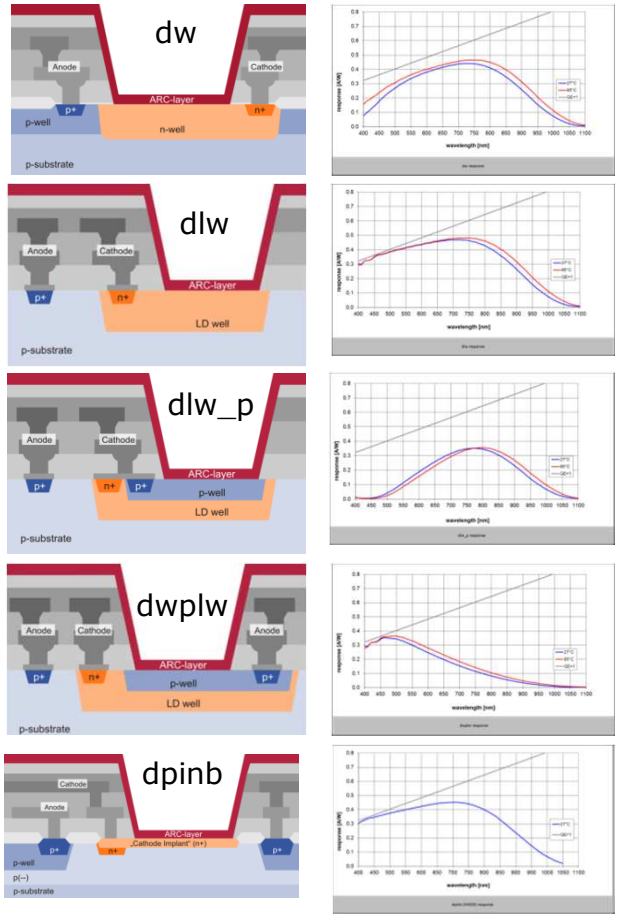
- Process & design kit development and quality systems all are geared towards meeting or exceeding the stringent automotive standards

- At X-FAB - We think automotive.

Opto Sensors in CMOS

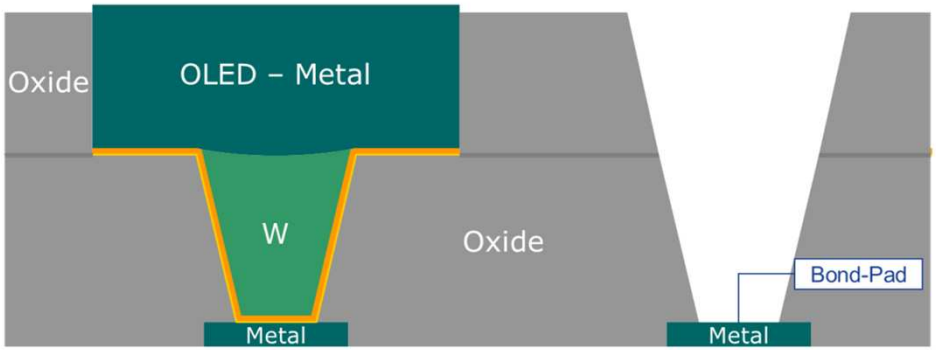
- Providing technologies with integrated CMOS image sensors in XH035
- Wide range of characterized photo diodes on multiple process platforms
  - High sensitivity
  - Adjustable spectral range
- Lowest 1/f noise level and excellent matching behavior for high-performance signal conditioning applications
- Supported applications include:
  - Ambient light sensor
  - CMOS image sensors for industrial & medical applications
  - Microphone amplifier

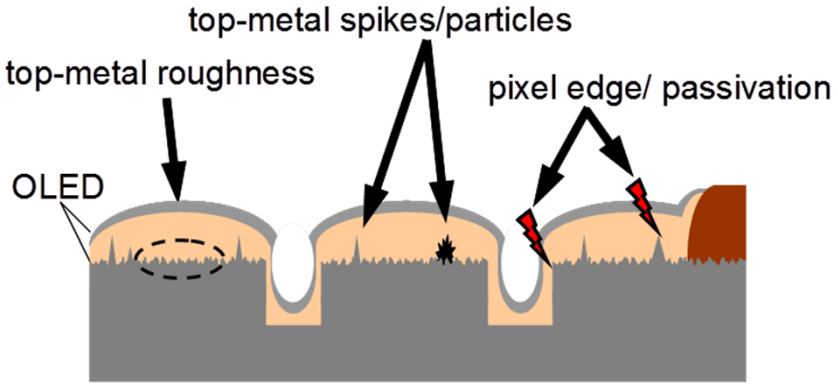
0.35µm (XH035)



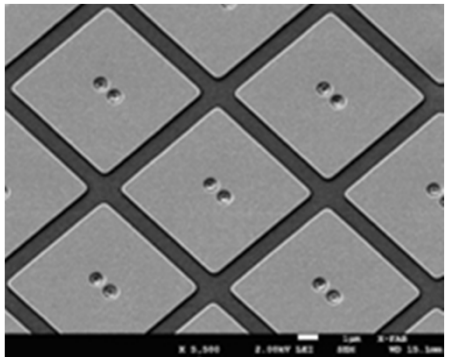
Sensor Interfaces fluidic Lab on Chip

OLED (or planar metal)-CMOS Interface and Target Specification





Parameter	Target	Unit
Total step on top metal surface (edge height incl. oxide edge)	<65	nm
Surface roughness (RMS) within pixel area	<6	nm
Surface roughness (Z-range) within pixel area, incl. Via dimple	<50	nm
Max. protrusion height ("spikes") within pixel area	<50	nm
Maximum depth of defects within pixel area	0..-50	nm



OLED metal with Via dimple

> RMS<6nm: CMP, IMO-CVD, Etch, Metal-PVD

Process Capabilities Overview

Lithography	▪ ASML PAS 5500 steppers with 0.35um minimum geometry capability ▪ Automated Process Control (APC) for exposure and overlay ▪ DNS and TEL tracks for photoresist , BARC and polyimide application and specialty films
Film Deposition	▪ TEL vertical furnaces, Centrotherm horizontal furnaces (APC installed) ▪ PECVD (AMAT Centura), LPCVD and APCVD for doped, undoped layer deposition p-Si, a-Si, SiO, SiN, TEOS, BPSG, PSG (small layer thicknesses available) ▪ AST Steag RTA capability. ▪ DNS fully automated wetbenches, SST-Cleaning
Implant & Metallization	▪ high energy up to 3,5 MeV, mid- and high current implantation (FDC installed) ▪ AMAT Endura for metal deposition (AlSi, AlSiCu, Ti, TiN) ▪ AMAT Centura for plug fill (Tungsten)
Etching & CMP	▪ AMAT Centura for nitride, poly, oxide, and metal plasma etching processes ▪ Planarization schemes include REB or Flowable Oxides ▪ AMAT Oxide CMP
other Services	▪ Backgrind (6" & 8") service available ▪ PCM testing systems for standard and reliability test capabilities ▪ Enhanced SPC-System with automated out-of-control action handling/tracking (ECAP) ▪ FDC approach for implant, metallization ▪ Complete preventive maintenance approach, partially predictive maintenance approach
Automotive Services	▪ 100% automated visual die inspection available with electronic wafer mapping file delivery. ▪ AMAT bright-& darkfield defect inspection, Review in-line SEM with EDX, Failure analysis in line SEM with EDX, KLARITY Software Package for process monitoring ▪ FWLR (Fast Wafer Level Reliability) monitoring system, specific failure analysis and WLR lab

Performance & Commitment

Quality management

CERTIFICATE

This is to certify that

X-FAB Dresden GmbH & Co. KG
Grenzstraße 28
01109 Dresden

has implemented and maintains a **Quality Management System**.

Scope:
Manufacturing of customer designed microelectronic circuits (COT, Foundry)

An audit, conducted and documented in a report, has verified that this quality management system fulfills the requirements of the following ISO Technical Specification:

ISO/TS 16949 : 2009
(without product design)

Certification decision	2010-11-11
This certificate is valid until	2013-11-10
Certificate Registration No.	385581 TS09
IATF No.	0112919
Main Certificate Registration No.	001795
Frankfurt am Main, Germany	2011-07-18

2-IAO-QMC-01001

DQS GmbH

Michael Drechsel
Managing Director

IATF Contract Office: DQS GmbH, August-Schanz-Straße 21, 60433 Frankfurt am Main

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ISO/TS16949

Environment

CERTIFICATE

DQS GmbH
Deutsche Gesellschaft zur Zertifizierung von Managementsystemen

hereby certifies that the company

X-FAB Semiconductor Foundries AG
Haarbergstraße 67
99097 Erfurt
Germany

X-FAB Dresden GmbH
Grenzstraße 28
01109 Dresden
Germany

with the following company

has implemented and maintains an **Environmental Management System**.

Scope:
Development of technologies for manufacturing of microelectronic circuits and design tools, manufacturing and sales of customer designed microelectronic circuits (COT, Foundry).

Through an audit, documented in a report, it was verified that the management system fulfills the requirements of the following standard:

ISO 14001 : 2004

Certificate registration no.	001795 UM
Date of certification	2010-11-16
Valid until	2013-11-15

TGA-ZM-02-96

Michael Drechsel
Managing Director

Jan Bilge
Managing Director

August-Schanz-Straße 21, 60433 Frankfurt am Main

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ISO 14001

Energy Management

CERTIFICATE

This is to certify that

X-FAB Dresden GmbH & Co. KG
Grenzstraße 28
01109 Dresden

has implemented and maintains an **Energy Management System**.

Scope:
Manufacturing of customer designed microelectronic circuits (COT, Foundry)

Through an audit, documented in a report, it was verified that the management system fulfills the requirements of the following standard:

ISO 50001 : 2011

Certificate registration no.	385581 EMSt
Date of certification	2012-06-14
Valid until	2015-06-13

DAkkS
Deutsche Akkreditierungsstelle
D-ZM-16074-04-01
D-ZM-16074-04-02

DQS GmbH

Michael Drechsel
Managing Director

Accredited Body: DQS GmbH, August-Schanz-Straße 21, 60433 Frankfurt am Main

ISO 50001

ADMONT Grant Agreement No. 661796

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If you need further information, please contact the coordinator:

X-FAB Dresden GmbH & Co. KG

Grenzstrasse 28, 01109 Dresden, GERMANY

Tel: +49 351 40756 214 Fax: +49 351 40756 274

E-Mail: karl-heinz.stegemann@xfab.com

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