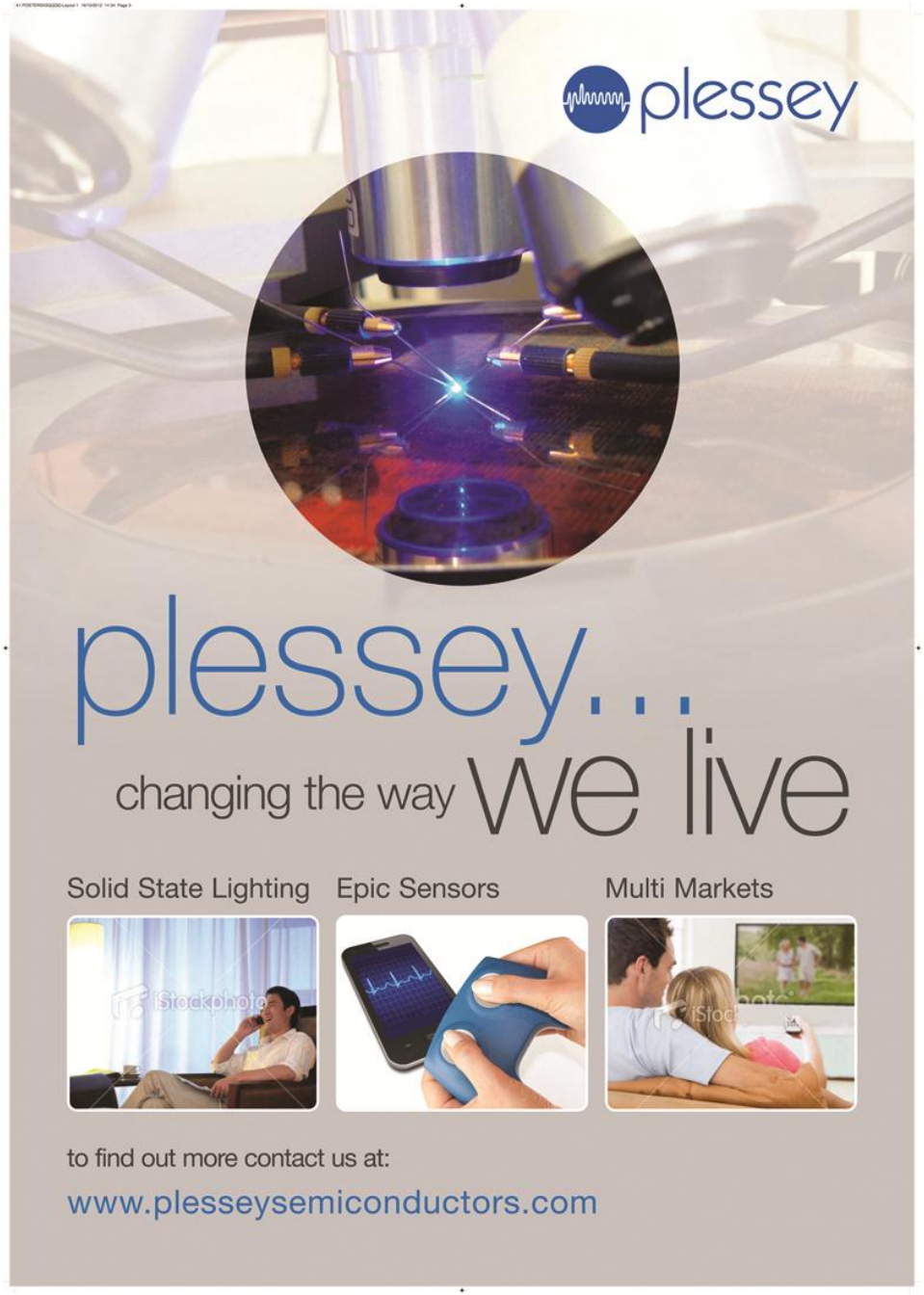


plessey

ABINEE TEC Seminar

Sao Paulo

4th April 2013

Plessey Developments for the Smart Economy

Dr Keith Strickland

CTO

Who is Plesseyé

Plessey is an innovative semiconductor design and manufacturing company

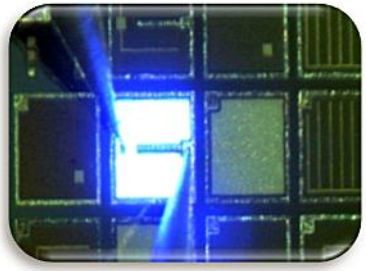
- Globally recognised brand: since 1957
  - 55 Years as a highly respected international British product company
- Innovation & Technology Centres in Cambridge, Swindon & Plymouth
- Sales offices in Shenzhen China, San Diego USA, Seoul Korea, Swindon, UK
- Plus a global network of representatives and distributors
- Significant manufacturing assets, land and buildings at HQ in Plymouth, UK
- 165 employees, 30% of staff at PHD/Degree level
- Rich IP portfolio including 10 patents in just two years
- Sales of $21 million in 2012
- Projected growth to sales of >$150 million in 2014

Plessey ï the Company

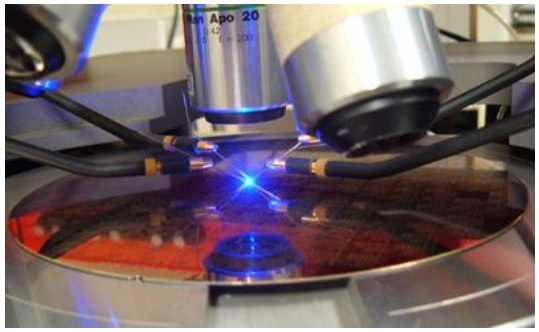
Plessey is owned by management and financial backers

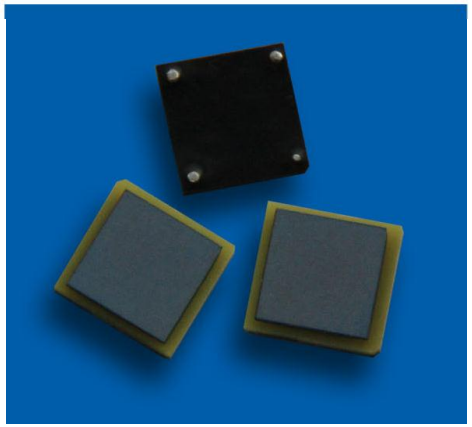
Strategy is focused on products utilising Plessey in-house technologies

- EPIC is a unique, award winning, sensor product with multiple high volume applications
- Plessey MAGIC LEDs aims to be a leading player in HB LED market
- Strong track record of launching innovative products in the market
- Roadmap defined for future products, including high performance integrated sensor and HB LED smart lighting systems



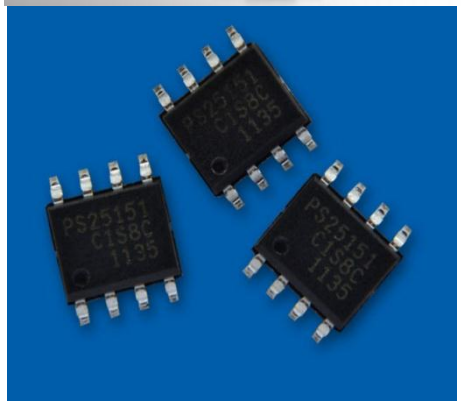
Product Lines





EPIC
Sensors

MAGIC
High Brightness
LEDs



Multi-Market
Products

Markets and Customers

Smart Cities

- SSL for street lighting
- Replacement lamps
- Traffic monitoring
- Crowd monitoring

Consumer

- STB
- Home security
- Gaming
- TV
- Laptops
- Smart phones
- Tablets

Health & Fitness

- Home gym equipment
- Sports watch
- Smart weigh scales
- Health monitoring
- UV Lighting

Medical

- Digital XRAY
- Tomography
- ECG
- Smart beds and incubator cots

Automotive

- Driver alertness
- Lighting
- Digital radio tuners
- Hall effect sensors

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Epic... changing the future

AUTOMOTIVE

SPORTS FITNESS

HEALTHCARE

Multi Award Winning EPIC Sensor

Disruptive EPIC sensor with multiple proven applications

- The EPIC sensor is a high sensitivity electric potential sensor that can be used in either contact or non-contact mode:
  - **Contact Mode:** for measuring bio-electric signals like ECG, EMG, EOG and EEG
  - **Non-Contact Mode:** for measuring disruptions in the electric field caused by human body movement enabling proximity & movement sensing and gesture recognition

Strong demand for products with major opportunities in:

- Communications … smart-phones and tablets for ECG, proximity sensing and security
- Consumer … remote sensing controllers for video games consoles
- Automotive … alertness, occupancy and slow speed collision avoidance
- Medical … ECG, tomography and “smart bed” applications

EPIC Healthcare Reference Designs

- Healthcare reference design - **imPulse**
- Simple equivalent single lead ECG measurement
- Bluetooth to Android smart phone app

- Automotive ï Driver well-being
- Array of sensors built into seat back
- Monitoring Driver drowsiness

Further Applications

- Surface body electrophysiology, ECG, EMG, EOG, EEG
- Long term monitoring, rehabilitation
- Telehealth and assistive technologies
- Remote vital signs, non-contact body measurements
- ECG/Pulse arm cuff
- Defibrillators
- Occupancy monitoring
- Security
- Sports / fitness monitoring

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MAGIC

High Brightness LEDs

Illuminating the Futureé

Solid State Lighting Opportunity

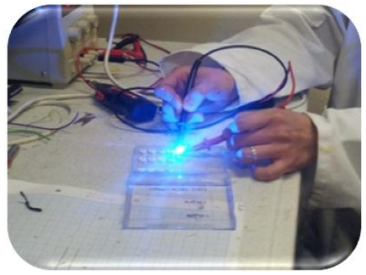
- Total lighting market is $100Bn+.
- Total LED market is $10Bn+.
- Plessey GaN-on-Si enables up to 80% cost reduction from conventional GaN-on-sapphire.

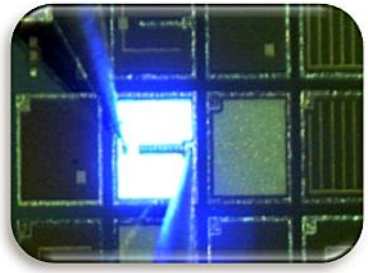
- Plesseyôs is lower cost than other GaN-on-Si processes due to its thin-layer technology and automated IC processing capabilities.

Source: Strategies Unlimited

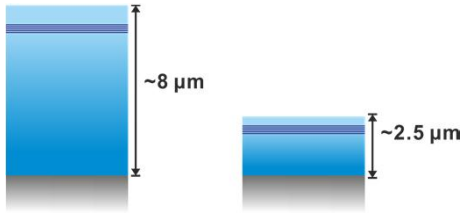
MAGIC High Brightness LEDs

- **Plessey is bringing to market a range of high-brightness light emitting diodes (HB LEDs) for solid state lighting applications**
  - Solid state lighting forms a significant part of the global effort to reduce energy consumption and green house gas emissions
  - HB-LEDs are being designed into lamp replacement products as well as new architectural lighting, street lighting, commercial lighting and medical applications





- **Plessey's innovative products combine its strong R&D and operational expertise with the disruptive GaN-on-silicon technology from University of Cambridge**
  - Plessey acquired University of Cambridge spinout **CamGaN** in December 2011
- **Plessey's proprietary GaN-on-silicon technology**
  - Enables the growth of high performance gallium nitride (GaN) LED structures on large-diameter (6-inch and 8-inch), standard silicon substrates
  - Plessey's GaN layer is 70% thinner and hence takes less time to grow and costs less
  - Standard substrates enable the use of automated semiconductor processing equipment
  - This technology delivers industry-standard performance at a dramatically reduced cost of manufacture with estimated savings of up to 80%



SSL Revolution

TODAY

- Mains Powered (AC)
- Glass Envelope
- Designed to be replaced
- Low efficiency illumination
- Finite lifetime

FUTURE

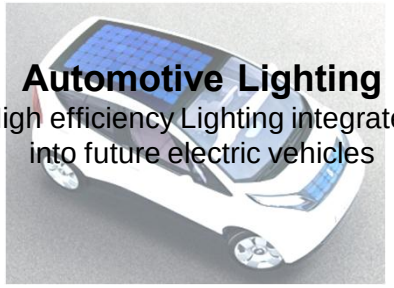
- Low Voltage (DC)
- High efficacy illumination
- Surface Mounted Chip
- 2D light emitting surfaces
- Integrated with microelectronics
  - →SMART Lighting
- Very long lifetime

Domestic Lighting – eg. LifeBulb

Allowing LEDs to be used in convention fittings

Eco Lighting

Lighting integrated into residential micro generation systems



Automotive Lighting

High efficiency Lighting integrated into future electric vehicles

Plessey Applications / Roadmap

Improving Efficiency

Smart Lighting

Integrating functionality:

- Daylight sensing / control
- Colour control
- Mood lighting
- Occupancy sensing

Convergence

Factors influencing SSL Control:

- Application needs
- Inherent controllability of LEDs

Sensors:

- Environment: Daylight, Occupancy
- Location: GPS
- Performance: Optical, Thermal

Intelligence:

- Monitoring: Hours, Temperatureé é
- Feedback: Thermal, Optical, Fault
- Advanced: Optimisation for energy saving, task, load sheddingé

Networking:

- Control of multi sites, remote monitoring & control
- Feedback: Thermal, Optical, Fault
- Connecting to the smart grid

Make Internet-enabled, energy-efficient lighting networks a reality

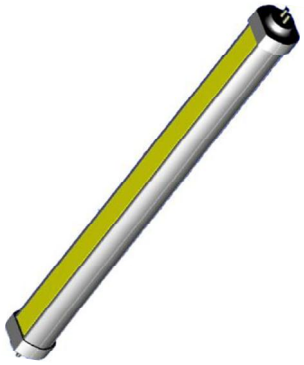
This complete hardware/software solution enables IP connectivity, where every light bulb has its own IP address, so you can create advanced lighting systems that are easily controlled by IP-enabled devices like smartphones, tablets, and PCs.

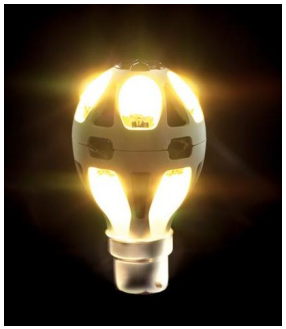
NXP GreenChip iCFL and GreenChip iSSL smart lighting solutions.

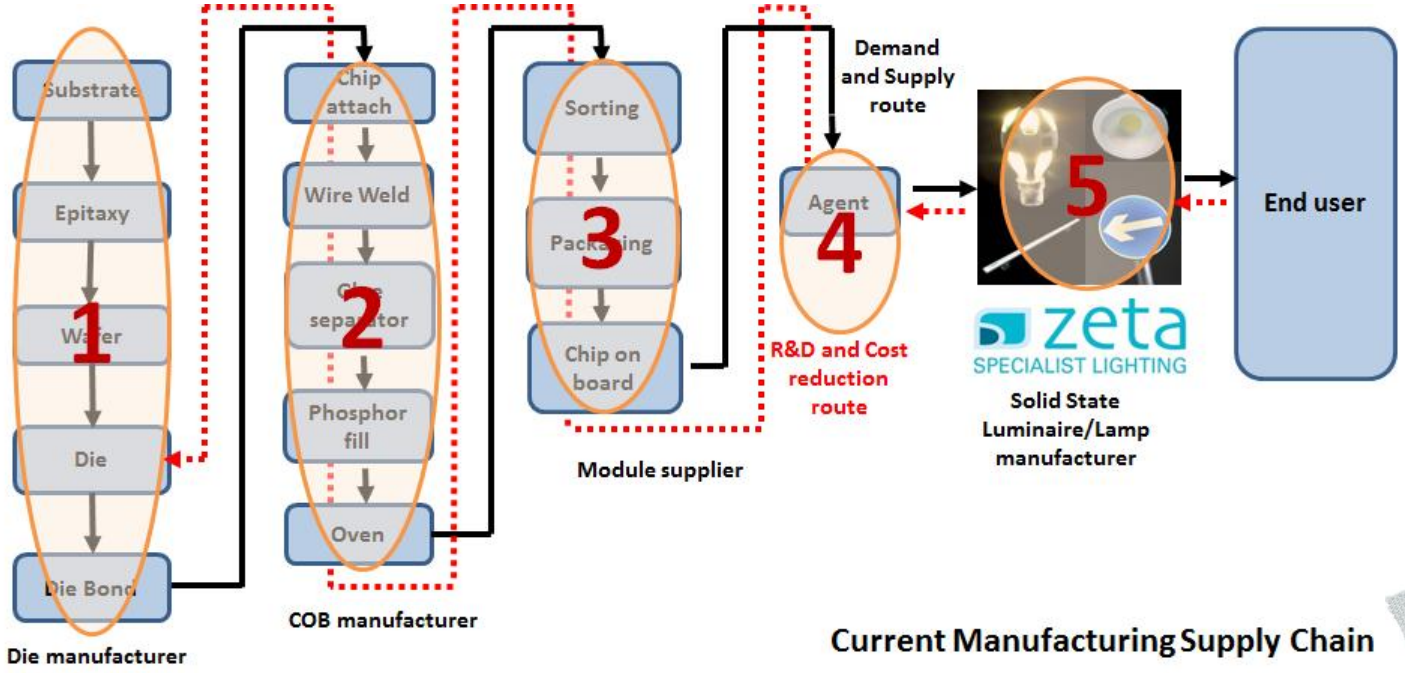
Source: Philips Color Kinetics & NXP

UK Funded - AMSCI

- **Advanced Manufacturing Supply Chain Initiative, with Zeta Lighting**
  - The set up of a sustainable supply chain for new product development and introduction and advanced manufacturing in Solid State Lighting
  - Move to production of the Zeta lifeBulb with Plessey LEDs
  - Permits die level innovations between LED manufacturers and Luminaire designers
  - Development of innovative Smart lighting solutions







Current Manufacturing Supply Chain

Summary

- Strong heritage and international brand recognition
- State-of-the-art manufacturing facilities
- New, high-impact, disruptive products ready to commercialise in large potential markets
  - EPIC Sensor - innovative technology with multiple large market applications, including advanced SMART healthcare
  - HB LEDs - a fraction of the cost of existing technologies, supporting the SSL revolution and SMART lighting
- Rich IP portfolio and development ñengine roomòfor new technology
- Strong academic relationships for the exploitation and industrialization of research