automotive

e2v

e2v technologies

In today's increasingly stressful environment the need for new technology to reduce the burden for drivers is ever increasing. e2v technologies' high frequency source technology is the heart of radar operated Adaptive Cruise Control (ACC) and succeeds in reducing the pressures of modern day motoring.

ADAPTIVE CRUISE CONTROL SOURCES

ACC senses the position and speed of objects in front of a vehicle and then processes this information to adjust the throttle or brake providing a constant headway for the driver. To get good quality information and therefore a low false alarm rate, high-resolution data is needed from the sensor, which, for radar, means using a millimeter wave technology.

e2v technologies designs and manufactures a broad range of microwave semiconductor diodes as well as Gunn diode based voltage controlled oscillators (VCOs), and is a world leading manufacturer active in this technology. The Company has been making Gunn, Schottky and Varactor diodes for over thirty years and is constantly researching and developing new technology improvements so that these devices are available to meet new challenges ahead. A particularly important innovation was the introduction in the early 1980s of the graded gap Gunn diode.

GRADED GAP
GUNN DIODE

The graded gap structure of e2v technologies' Gunn diode is a unique (patented) feature that enables world-class performance.

Features:

- © 50mW of power at 77GHz (minimum)
- © Good frequency stability against temperature
- © Low circuit phase noise
- © Low noise characteristics (both FM and AM)
- © Operational across a wide range of temperatures, including cold start turn-on

Benefits:

- © Enables lower radar costs and enhanced system performance
- © Works in all weather conditions
- © High reliability (long lifetime)
- © High efficiency
- © Competitively priced

e2v technologies is working with customers to offer a range of integrated oscillator products based on the Gunn diode technology. These innovative products are available as packaged devices ready for assembly into an oscillator. MMIC sized surface mount packaged voltage controlled oscillators are also available for applications at 60GHz and above. These units are the smallest, assembly friendly Gunn diode oscillators available.

We also have a range of standard cavity designs to cover frequencies from 10GHz to 100GHz. These are available as fixed frequency or as voltage controlled oscillators (bias pushed or varactor controlled).

The oscillators are designed and constructed using our own semiconductor products and are carefully assembled and tested to our exacting standards for cost, performance, reliability and repeatability.

The range provides maximum CW powers as follows:

- © 500mW @ 10GHz (1.3A, 10V)
- © 300mW @ 40GHz (1.2A, 5.0V)
- © 70mW @ 100GHz (750mA, 5.0V)

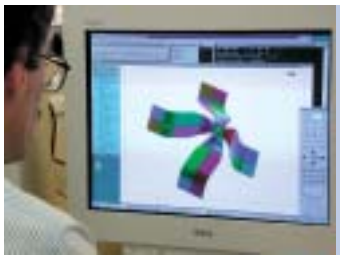
Applications:

- © Automotive ACC sensor heads
- © Doppler motion and direction sensing of objects
- © Frequency Modulated Continuous Wave (FMCW) Radar sensor heads
- © Local oscillators/carrier generators for Microwave Video Distribution Systems (MVDS), point to point links or other communication applications.

http://microwave.e2vtechnologies.com

Technology Roadmap:	Year	Program Description
	1980	Launch of lowest noise millimeter–wave beam lead mixer diode available
	1985	Flip-chip GaAs Mixer for operation at 77GHz and 94GHz
	1987	Introduction of the graded gap Gunn diode technology ('hot' electron injection)
	1989	FMCW 94GHz radar demonstrator shown at MTT-S
	1994	Fundamental mode graded gap Gunn diode oscillator gives 71mW at 77GHz and 11mW at 95GHz
	2001	Demonstration of the first substrate based volume production VCO at 77GHz
	2002	Automation of Gunn diode assembly process for high volume production

Image taken at X125 magnification



DRIVING VISION FORWARD

Introduction of new products is key to e2v technologies' business success. Our engineers have developed their skills and understanding over many years to offer customers advanced solutions. Our teams are equipped to tackle design and development from initial concept through to volume production, with support from a wide range of in house facilities.

Capabilities range from microwave semiconductor design and manufacture to component integration at sub-system level. We have a wealth of experience in constructing devices for applications in markets such as automotive, communications, medical and defence. We have technologies, which can be used across the electromagnetic spectrum, especially at microwave frequencies.

e2v technologies is continuously assessing market trends and developing technology to anticipate next generation requirements. In particular a dedicated engineering team is focused on the development and production of new products for automotive applications.

FUTURE SYSTEM LEVEL TECHNOLOGY

Next generation ACC

Stop-and-Go Adaptive Cruise Control is an extension of conventional ACC and works at speeds ranging from the cruising speed set by the driver, down to stop start conditions in heavy traffic.

Intelligent transportation systems will allow communication between vehicles and the roadside to exchange data on road conditions ahead or advise of alternative routes.

Ultimately, convoys of vehicles working together could follow each other at short intervals with limited driver intervention.

360° Vision

All round vision is fast becoming a reality with the development of lane keeping detection and blind spot monitoring systems allowing a driver to be aware of the surroundings at all times.

Sensing technology is already being used to realize reversing and parking aids in cars today. Development of this technology will allow pedestrian detection systems to warn a driver when an obstacle enters the predicted path of the vehicle using a combination of enhanced autonomous on-vehicle sensors and computer processed vision technology.

Over the next decade, the role of the driver is likely to change dramatically with the development and collaboration of sophisticated technology. It is only a matter of time before all vehicles are wrapped in a shell of sensors, and are communicating with each other and the roadside, to work co-operatively together.

HOW DO WE FIT IN?

e2v technologies is running targeted programs to deliver components or subsystems into these next generation platforms. Examples include 77GHz / 24GHz radar sources, advanced low light vision technology and gas sensing.

OBJECT RECOGNITION –

L3Vision

e2v technologies' L3Vision™ camera enables unique low light sensitivity, opening the possibility of driver night vision systems operating entirely on available natural light or with minimum Near Infra Red (NIR) illumination, reducing cost and eliminating eye hazard. Future developments will extend the dynamic range and reduce the effect of oncoming glare. Removing the optical signal by the use of filtering still gives a good sensitivity in the NIR up to 1064nm.

http://ccds.e2vtechnologies.com

GAS SENSING

We have established businesses in many other product areas, e.g. gas sensors for flammable gases, hydrocarbons and CO_2. Future developments will extend the range of hydrocarbons and include toxic gases like CO, NO_x and SO_x.

Possible applications may include vehicle emissions monitoring, combustion sensing, climate control systems and in-vehicle environment sensing.

http://gassensors.e2vtechnologies.com

PARTNERSHIPS – FUTURE TECHNOLOGY INNOVATION

e2v technologies has strong links with a number of Universities who are active in areas of interest, resulting in industrial collaboration in a number of research projects. Current programs in Gunn diode and circuit technologies have strategic importance for the ongoing and future automotive and radar component business.

The mixture of design and production philosophies is managed with the emphasis on ideas integration; this gives balanced benefits in terms of capable design for cost–effective manufacture. Bringing component technology into system use, we constantly look forward to working with our customers in the challenge for new applications. One such new application is Terahertz imaging.

Do you have an idea for the future?

Then let us be your technology partner!

CUSTOMER FOCUS

e2v technologies pays particular attention to supporting customers by engaging a focused team to work closely with the customers' engineers, ensuring a smooth transition from concept design through to final production.

QUALITY WITHOUT COMPROMISE

e2v technologies' Quality Management System is certified to ISO9001:1994, with conversion to ISO9001:2000 adopted during 2002.

Production Part Approval Process (PPAP) is used by e2v technologies as a confidence measure prior to commencement of production to ensure customer requirements are met consistently during a production run.

e2v technologies is continually improving its products and processes using Six Sigma, a data driven approach to analyzing problems and solving them. Using Six Sigma tools and techniques, we are able to systematically reduce waste and, in turn, improve quality throughout the supply chain.

Quality techniques such as Failure Mode and Effects Analysis (FMEA), Measurement System Analysis (MSA), and process capability studies are carried out as appropriate. Product validation testing including accelerated life testing and ageing trials are carried out on products to ensure reliability targets are achieved in the demanding automotive environment. Products are subjected to rigorous in-process quality checks and appropriate environmental stress screening during manufacture with the target of providing defect free products to the customer. Specific screening tests and qualification details can be found on the product data sheets or on the website.

bright ideas

e2v technologies limited
Waterhouse Lane
Chelmsford
Essex CM1 2QU
United Kingdom
T +44 (0)1245 493 493
F +44 (0)1245 492 492

USA
e2v technologies Inc
4 Westchester Plaza
Elmsford
NY 10523-1482
T +1 914 592 6050
F +1 914 592 5148

France
e2v technologies SAS
16 Burospace
F-91 572 Bievres Cedex
T +33 (0) 1 6019 5500
F +33 (0) 1 6019 5538

Germany
e2v technologies GmbH
Industriestraße 29
82194 Gröbenzell
T +49 (0) 8142 418 504
F +49 (0) 8142 284 547

All email enquiries to:
enquiries @e2vtechnologies.com

www.e2vtechnologies.com

To find out more about our emerging technologies please contact your local sales office or a semiconductor applications engineer on the contact numbers shown.