

PRODUCT OVERVIEW

RF Power

Teledyne e2v manufactures pioneering new developments in microwave devices: specifically microwave radar components, microwave products and RF technology.

Within the solid-state microwave and electronics operation, this respect continues as customers choose Teledyne e2v's products and engineering skills to meet ever more demanding technological challenges.

EXAMPLE PRODUCTS IN DEVELOPMENT:

- Junction Circulators
- Phase Shift Circulators
- Resonance Isolators
- Ground-based tracking & surveillance radar
- Airborne tracking & ISR
- Guided Weapon seekers
- Naval & maritime tracking & surveillance radar
- Airborne & maritime weather radar transmitter protection

Teledyne e2v
Microwave Technology Centre
T: +44 (0)1245 493493
E: rfpower@teledyne-e2v.com

Firth Road Business Centre
Firth Road
Lincoln
LN6 7AA

HIGH POWER CIRCULATORS & ISOLATORS

Capable of significant high power, phase shift circulators provide the heavyweight end of ferrite device operation. Bandwidth limitations are primarily due to the Tee and Coupler, though extended performances can be achieved. Out-of-band requirements should be stated with enquiries.



X-BAND 60KW
Phase Shift Circulators



4-PORT MATCHED SETS
Phase Shift Isolator



INTEGRATED SOLUTION
Benefits: size|compatibility|cost



4-PORT MATCHED SETS
X-band 12kW Circulator

PRODUCT OVERVIEW

RF Power

Teledyne e2v supply a range of 2-terminal devices spanning the frequency spectrum from 10 GHz to 100 GHz, developed over many years in the business.

Our products have found applications in the Defence, Communications, Space, Automotive and Instrumentation markets. In recent years, research and development have focused on new generation microwave devices that exploit leading-edge physics.

This includes quantum well and heterojunction structures fabricated to atomic layer precision.

KEY FEATURES:

- Narrow band of fixed frequency Gunn diode sources
- Low phase noise
- Low frequency drift with temperature
- Improved switch on at low temperature
- Gunn bias or varactor tuning
- Optional isolator or regulator
- Rugged construction for use in airborne, ground fixed and ground mobile environments

Teledyne e2v
Microwave Technology Centre
T: +44 (0)1245 493493
E: rfpower@teledyne-e2v.com

Firth Road Business Centre
Firth Road
Lincoln
LN6 7AA

GUNN OSCILLATORS

Teledyne e2v fabricate their GaAs, graded gap Gunn (G3) die within a dedicated facility at the University of Nottingham. Optimised design of the epitaxial wafer and use of an integral heat-sink construction yields superior performance and reliability. Tailored designs for diodes to customers specific requirements can be undertaken when required.



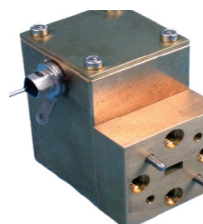
FREQUENCY | POWER | TUNING
35GHz 10mW 1GHz

30GHz Gunn bias tuned, fundamental cavity oscillator; 6.3V operating voltage; 10mW output power



FREQUENCY | POWER | TUNING
30GHz 100mW 1GHz

30GHz Gunn bias tuned, fundamental cavity oscillator; 6.3V operating voltage; 100mW output power



FREQUENCY | POWER | TUNING
62.5GHz 80mW 200MHz

60GHz Gunn bias tuned, second harmonic cavity oscillator with waveguide adaptor; 5V operating voltage; 80mW output power



FREQUENCY | POWER | TUNING
76.5GHz 50mW 1GHz

76.5GHz Gunn bias tuned, second harmonic cavity oscillator with waveguide adaptor; 5V operating voltage; 50mW output power



FREQUENCY | POWER | TUNING
94GHz 50mW 400MHz

94GHz Gunn bias tuned, second harmonic cavity oscillator with waveguide adaptor; 4.5V operating voltage; 50mW output power



PRODUCT OVERVIEW

RF Power

Teledyne e2v supply a range of 2-terminal devices spanning the frequency spectrum from 10 GHz to 100 GHz, developed over many years in the business.

Our products have found applications in the Defence, Communications, Space, Automotive and Instrumentation markets.

In recent years, research and development have focused on new generation microwave devices that exploit leading-edge physics. This includes quantum well and heterojunction structures fabricated to atomic layer precision.

KEY FEATURES:

- Narrow band of fixed frequency Gunn diode sources
- Low phase noise
- Low frequency drift with temperature
- Improved switch on at low temperature
- Gunn bias or varactor tuning
- Optional isolator or regulator
- Rugged construction for use in airborne, ground fixed and ground mobile environments

Teledyne e2v
Microwave Technology Centre
T: +44 (0)1245 493493
E: rfpower@teledyne-e2v.com

Firth Road Business Centre
Firth Road
Lincoln
LN6 7AA

GUNN OSCILLATORS

Teledyne e2v fabricate their GaAs, graded gap Gunn (G3) die within a dedicated facility at the University of Nottingham. Optimised design of the epitaxial wafer and use of an integral heat-sink construction yields superior performance and reliability. Tailored designs for diodes to customers specific requirements can be undertaken when required.



FREQUENCY | POWER | TUNING

125GHz 20mW 500MHz

94GHz Gunn bias tuned, second harmonic cavity oscillator with waveguide adaptor; 4.5V operating voltage; 50mW output power



FREQUENCY 35GHz

35GHz varactor-tuned Gunn oscillator used in Teledyne e2v's helicopter radar RF head



FREQUENCY 62.5 & 125GHz

62.5GHz & 125GHz sources for security screening



FREQUENCY 77GHz

77GHz oscillator used in Teledyne e2v's radar head for airport security



PRODUCT OVERVIEW

RF Power

Teledyne e2v is the world's leading producer of magnetrons, thyratrons, compact modulators, microwave receiver protection and microwave receivers for use in professional radar systems.

With over 60 years' experience in RF power for airborne and ground based radar, we are able to both support existing radar systems and address the performance requirements across extreme environmental conditions for new airborne and ground based radar.

SUPPORT SERVICES

Teledyne e2v has been manufacturing high power receiver protector devices for radar systems for more than 30 years, for applications with operating frequencies within the range 2 to 40GHz.

While many new radar systems now operate with phased array designs there continues to be requirements for traditional waveguide devices both as spares and replacements in existing systems and in upgrades for new generations of equipment.

Teledyne e2v
Microwave Technology Centre
T: +44 (0)1245 493493
E: rfpower@teledyne-e2v.com

Firth Road Business Centre
Firth Road
Lincoln
LN6 7AA

SUPPORT SERVICES TO MAINTAIN AND UPGRADE RADAR SYSTEMS

Next generation equipment can benefit from higher levels of integration, with functions such as circulators, isolators, low noise amplifiers, mixers, filters etc. supplied assembled with the receiver protector or as an integrated sub-system.

This approach often provides improved performance and savings in both size weight and in many instances cost.

Teledyne e2v microwave also design and manufacture hybrid assemblies and sub-systems including limiters, low noise and power amplifiers and direct RF to digital VPX format boards.





PRODUCT OVERVIEW

RF Power

Teledyne e2v, with The University of Nottingham form an industry and academic collaboration in the field of advanced microwave technology.

The partnership has made ground-breaking achievements in research and development and device manufacture, including cutting-edge Teledyne e2v Gunn and Schottky diodes.

These have been launched out of the Teledyne e2v Semiconductor Technology Centre, a state-of-the-art semiconductor cleanroom in the University's School of Physics and Astronomy (SPA).

KEY FEATURES:

- Superlattice electron devices (SLED's) for millimetre-wave components
- Manufacture and use of semiconductor PIN diodes for receiver protection – a knowledge transfer partnership
- Millimetre-wave acousto-electric phenomena in semiconductor nanodevices leading to the integration of TeraHertz (THz) acoustics with THz electromagnetic technologies

Teledyne e2v
Microwave Technology Centre
T: +44 (0)1245 493493
E: rfpower@teledyne-e2v.com

Firth Road Business Centre
Firth Road
Lincoln
LN6 7AA

MICROWAVE SEMICONDUCTOR CAPABILITY

Teledyne e2v delivers the widest possible technology span, from the atomic level precision of epitaxial wafer design and specification, through the micron scale of semiconductor processing and the miniature scale of millimetre wave circuits and fabrication, to the real-world scale of working microwave components and sub-systems that simply need to be plugged into an end-user's system.

Teledyne e2v Gunn and Schottky diodes operate as high frequency sources and receivers, well above the 100 GigaHertz (GHz) level, and are an example of an industry challenge overcome by the joint effort. They remain a unique capability – there are no devices similar being made anywhere else in the world.



DIODE FREQUENCY 35 - 125GHz

GaAs graded gap Gunn (G3) diodes. Hot electron injection provides increased efficiency (output power), higher operating frequencies & improved temperature stability, phase noise & cold switch-on.



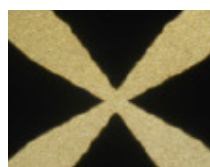
SCHOTTKY FREQUENCY 35 - 110GHz

GaAs air-bridged beam lead diodes for mixing and detection. Low capacitance (junction and parasitic), series resistance, reverse leakage and 1/f noise.



P-I-N FREQUENCY 3 - 25GHz

GaAs mesa epitaxial P-I-Ns for Phase shifting, limiting, switching and variable attenuation. High cut-off frequency, low on-state resistance and low off-state capacitance.



MICRO STRUCTURE FREQ. 35 - 125GHz

Pre-formed electroplated gold micro-structures for Interconnect and bonding. Low capacitance and inductance interconnect structures for diode and circuit assembly.

PRODUCT OVERVIEW

RF Power

Teledyne e2v, with The University of Nottingham form an industry and academic collaboration in the field of advanced microwave technology.

The partnership has made groundbreaking achievements in research and development and device manufacture, including cutting-edge Teledyne e2v Gunn and Schottky diodes.

These have been launched out of the Teledyne e2v Semiconductor Technology Centre, a state-of-the-art semiconductor cleanroom in the University's School of Physics and Astronomy (SPA).

KEY FEATURES:

- Superlattice electron devices (SLED's) for millimetre-wave components
- Manufacture and use of semiconductor PIN diodes for receiver protection – a knowledge transfer partnership
- Millimetre-wave acousto-electric phenomena in semiconductor nanodevices leading to the integration of TeraHertz (THz) acoustics with THz electromagnetic technologies

Teledyne e2v
Microwave Technology Centre
T: +44 (0)1245 493493
E: rfpower@teledyne-e2v.com

Firth Road Business Centre
Firth Road
Lincoln
LN6 7AA

MICROWAVE SEMICONDUCTOR CAPABILITY RESEARCH INTERESTS

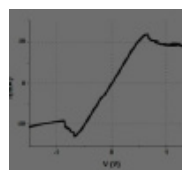
Research interests include; Quantum sensors and metrologys for cold atom chips at the University of Birmingham. Wide bandgap semiconductors for Cubic Gallium Nitride WITH EPSRC Impact Acceleration Account Proof of Concept funding for fundamental research in c-GaN growth, doping and characterisation and Acoustic down-conversion for TeraHertz acoustics.



SUB-MILLIMETRE WAVE SOURCES AND OSCILLATORS

Graded gap Gunn diode (G3) Resonant tunnelling diode (RTD). Superlattice electronic device (SLED) temperature stability, phase noise & cold switch-on.

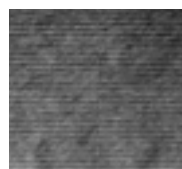
- Narrow-band or fixed-frequency Gunn sources
- Low phase noise
- Low frequency drift with temperature
- Gunn bias or varactor tuning
- Optional isolator or regulator



MULTIPLICATION

Superlattice electronic device (SLED)

- Hermes funded GuSTO project (Gunn Superlattice TeraHertz Oscillator)



DETECTION

Superlattice electronic device (SLED). Asymmetric spacer tunnel diode (ASPAT)

- Broadband, temperature stable, high sensitivity detectors

PRODUCT OVERVIEW

RF Power

Teledyne e2v incorporates pioneering new developments in microwave and RF technology into its product range.

Within the solid-state microwave and electronics operation, customers choose Teledyne e2v's products and engineering skills to meet ever more demanding technical challenges in radar and Electronic Warfare.

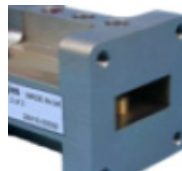
KEY FEATURES:

- Coaxial
- SMT
- Microstrip
- Waveguide
- VPX compatible

Teledyne e2v
Microwave Technology Centre
T: +44 (0)1245 493493
E: rfpower@teledyne-e2v.com

Firth Road Business Centre
Firth Road
Lincoln
LN6 7AA

MICROWAVE COMPONENT PRODUCT RANGE RADAR AND EW



RECEIVER PROTECTORS

Waveguide. High power protection. L to Ka band.

- Passive, Active, Quasi active, Quasi passive, Sensitivity Time
- Control (STC) options
- Gas Cells : peak power > 1MW
- Solid State : peak power >10kW



INTEGRATED ASSEMBLIES

Waveguide. Duplexers. L to Ka band.

- Integrated solutions incorporating isolator, circulator, filter, LNA, mixer functions
- Compact size - superior performance



SOURCES

Microstrip & Waveguide. Synthesized Sources. UHF to 110GHz.

- 4-16GHz fully programmable synthesised microwave source. DDS based. Fully SMT. Agile control of frequency and amplitude



PRODUCT OVERVIEW

RF Power

Teledyne e2v incorporates pioneering new developments in microwave and RF technology into its product range.

Within the solid-state microwave and electronics operation, customers choose Teledyne e2v's products and engineering skills to meet ever more demanding technical challenges in radar and Electronic Warfare.

KEY FEATURES:

- Coaxial
- SMT
- Microstrip
- Waveguide
- VPX compatible

Teledyne e2v
Microwave Technology Centre
T: +44 (0)1245 493493
E: rfpower@teledyne-e2v.com

Firth Road Business Centre
Firth Road
Lincoln
LN6 7AA

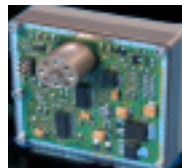
MICROWAVE COMPONENT PRODUCT RANGE RADAR AND EW



RADAR MODULES

Microstrip & Waveguide. Radar Modules. 2.45GHz to 94GHz

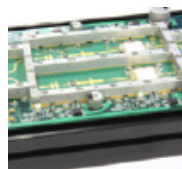
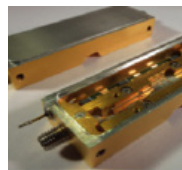
- Low cost FMCW radar using SMT components on laminate
- Versions available for high volume / low cost and high rel missile applications; utilising multiplied mmic PLLs or in house Gunn diodes



AMPLIFIERS

Microstrip. TWT driver. UHF to 40GHz.

- Broadband chip and wire amplifiers and SMT on laminate. Example shown 6-18GHz with equaliser
- Electronic tuning options
- Compact size, rugged construction, laser welded
- Options incorporating equalisers, linearisers, electronic tuning functions



POWER AMPLIFIERS

Microstrip. High Power Amplifier. UHF to 18GHz.

- peak power - 100W
- pulse length - 100uS
- duty - 10% duty
- Chip and wire capability for broadband / high frequency operation