- *Leading European Supplier of Schottky Diodes & THz-MICs*
- *High Performance Multiplier, Mixer & Detector Modules*
- *SoA Subsystems (HP-Sources, Receivers & Transceivers)*
- *Quasi-Optical THz Detectors*
- *Space Heritage for Components & Modules*

ACST

Technology Solutions for Terahertz Electronics

Systems

Modules

Diodes

2019 Product Catalog

Standard And Custom Solutions

» YOUR **PARTNER** FOR INNOVATIVE **TERAHERTZ SOLUTIONS** «

ACST GmbH (ACST) was founded in April 2006 with the objective of providing the European community with a continuous source of Schottky diodes for mm and sub-mm applications. By founding ACST the first European supplier in this fast-evolving field became available thereby supporting and strengthening the research community.

Being a spin-off company of the Technische Universität Darmstadt (TUD) in Germany, ACST succeeded to over twenty years of technology standards, R&D activity and accumulated experience at TUD in the field of THz technology. This has been used by ACST to build a solid background in fabrication technology of THz Schottky components but also in RF modules and THz systems.

Over the past decade ACST has undertaken over twenty R&D projects supported by ESA, EC (FP7 & H2020), the German Government (BMBF, BMWI) and also leading industrial partners. Accumulated experience and know-how has successfully been implemented into ACST development strategy and supported ACST to become a leading European source for Schottky-based THz technology targeting at ultimate performance at MM/SubMM-Waves.

With a strong technology background ACST has been involved in various space projects and currently provides products and technology support for space missions in Europe and Asia.

The ACST business model relies on two core competencies: **Component Fabrication Technology** and **RF-Engineering**. Both these activities are supporting each-other at ACST, which significantly facilitates development of custom-orientated products and services.

Component fabrication technology:
Relying on its outstanding intellectual property and the above well founded technological background ACST has developed a particular, so-called 'Film-Diode Process' (FD Process), which is used for fabrication of III-V semiconductor devices and MMICs on a transferred insulating membrane. The FD Process is particularly developed for the highest frequency applications and represents a breakthrough in THz technology when the performance and reproducibility is considered.
Currently ACST confidently keeps European leadership by development of new diode types, involving various III-V semiconductors, MMICs and customer-orientated diode structures.

RF-Engineering:
ACST is defining new performance standards at Module/System level by development of modules and systems based on dedicated components for particular requirements and design solutions.
A particular interest represents ACST high-power multiplier technology. Due to dedicated Schottky components, ACST frequency multipliers and mixers are able to convert unmatched power levels whilst presenting state of the art efficiency.

In-house availability of the entire development chain from microelectronic device fabrication to up/down converter modules and customised systems provides a short development loop. This reduces development time and costs of dedicated solutions for new emerging applications.

ACST dedicated and cost-efficient solutions push THz technology from niche applications into industrial mainstream.

Your Team of ACST



Rev. V1.1

MM/SUB-MM WAVE MODULES

Multipliers

ACST offers a set of frequency multipliers based on dedicated GaAs Schottky diode technology. The current offer covers frequencies up to 370 GHz. These doublers and triplers are based on our high power Schottky diode technology able to provide the highest power handling capabilities in the market while maintaining State-of-the-art conversion efficiency and bandwidth.

New modules are continuously under development based on customer demands and necessities. Let us know about your project requirements.

High Power Doublers

ACST offers a set of frequency doublers for high power and wide band applications based on our high power Schottky varactor-diodes technology. Frequency doublers are an efficient option to increase the frequency of a source beyond W-band while maintaining the power level required for a wide range of applications.

ACST´s high power doublers are able to handle the power provided by most of the E-band and W-band amplifiers available in the market. Frequency doublers is our most efficiently option to provide high power sources width up to 40% efficiency and 180 mW at ~170 GHz, and 30% efficiency and 40 mW at ~340 GHz without power combining techniques. Power combining technique can increase the offered power in a factor two to four.

Applications

- MM-Wave FMCW-Radar
- Active Imaging
- LO Source for MM/SubMM Wave Heterodyne Receivers
- High-Bit Rate Data Trans-Mission Systems

Features

- High Power & Efficiency
- Large Bandwidth
- Flat Response

ACST High Power Multiplier Technology

Catalog Models

Band	Model Number	Output Frequency Range (GHz)	Max. Output Power (dBm)	Input / Output Ports	Typ. Conversion Efficiency (%)
D	210A	135 - 160	+23	WR12 / WR6	30
G	210B	155 - 185	+23	WR10 / WR5	30
Y	211A	270 - 320	+16	WR6 / WR3.4	25
Y	211B	310 - 370	+15	WR5 / WR2.8	25

Further models will follow shortly. For more information, please visit our website at www.acst.de and subscribe to our newsletter to learn about new product releases.

More information can be found in the data sheet. Please contact us.

Custom Models

We also offer Custom Solutions. Please contact us to discuss. You can reach us by phone, e-mail or visit our website at **www.acst.de**.

Full-Band Doublers

ACST´s full band doublers implement our high power Schottky diodes technology to address the power handling limitations and lead full-band sources to the next level. ACST´s full band doublers can handle any full E-band and W-band amplifier available in the market.

Applications

- MM-Wave FMCW-Radar
- Active Imaging
- LO Source for MM/SubMM Wave Heterodyne Receivers
- High-Bit Rate Data Trans-Mission Systems

Features

- High Power & Efficiency
- Full Bandwidth
- Flat Response

Band	Model Number	Output Frequency Range (GHz)	Max. Output Power (dBm)	Input / Output Ports	Typ. Conversion Efficiency (%)
D	214A	125 - 187.5	+13	WR12 / WR6	10

MM/SUB-MM WAVE MODULES

High Efficiency Triplers

ACST offers a set of frequency triplers for high power and wide band applications based on our high power Schottky varactor-diodes technology. Frequency triplers are a fast option to increase the frequency of a source beyond W-band while maintaining the bandwidth required for a wide range of applications.

ACST´s high power triplers are specially developed to maximize the conversion efficiency to offer a fast way to efficiently increase the frequency of any E-band or W-band source. Frequency tripler with an outstanding conversion efficiency higher than 22% at ~210 GHz and 50 mW output power is the prove of ACST´s commitment to our clients. Power combining technique can increase the offered power in a factor two to four.

Applications

- MM-Wave FMCW-Radar
- Active Imaging
- LO Source for MM/SubMM Wave Heterodyne Receivers
- High-Bit Rate Data Trans-Mission Systems

Features

- High Power & Efficiency
- Large Bandwidth
- Flat Response

Catalog Models

Band	Model Number	Output Frequency Range (GHz)	Max. Output Power (dBm)	Input / Output Ports	Typ. Conversion Efficiency (%)
G	213A	200 - 225	+18	WR12 / WR4.3	20

High Efficiency MM-Wave Power Up Conversion

Further models will follow shortly. For more information, please visit our website at www.acst.de and subscribe to our newsletter to learn about new product releases.

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Custom Models

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Full-Band Triplers

ACST´s full band triplers implement our high power Schottky diodes technology to address the power handling limitations and lead full-band sources to the next level. ACST´s full band triplers can handle any full E-band and W-band amplifier available in the market and provide outstanding efficiency up to 10% in our full W-band tripler with up to 9 mW output power.

Applications

- MM-Wave FMCW-Radar
- Active Imaging
- LO Source for MM/SubMM Wave Heterodyne Receivers
- High-Bit Rate Data Trans-Mission Systems

Features

- High Efficiency
- Full Band
- Flat Response

Catalog Models

Band	Model Number	Output Frequency Range (GHz)	Max. Output Power (dBm)	Input / Output Ports	Typ. Conversion Efficiency (%)
W	212A	78 - 115	+10	K-Type / WR10	7

Further models will follow shortly. For more information, please visit our website at www.acst.de and subscribe to our newsletter to learn about new product releases.

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MM/SUB-MM WAVE MODULES

Mixers

ACST offers sub-harmonically pumped frequency mixers (SHM) based on our Schottky film-diode technology. The current offer goes up to 320 GHz subharmonic frequency mixing based on antiparallel Schottky diodes configuration. Sub-harmonic mixers are the best option to obtain a high frequency receiver with a simplified local oscillator source.

Subharmonic Mixers (SHM)

ACST´s subharmonic mixers are specially developed to reduce the noise figure and local oscillator power requirements. They can be used for up or down convert signals. The IF frequency features a broad band to provide flexibility for any particular application. The lower frequency of the local oscillator (LO) compared to the radio frequency (RF) signal allows to define even more than 100 dB isolation between them and simplify the complexity of the THz LO source. The low local oscillator power requirement makes ACST´s mixers suitable for array receiver systems.

Applications

- MM-Wave FMCW-Radar
- Up and Down Converter
- Heterodyne Reception
- Active Imaging
- Array Receiver Systems
- High-Bit Rate Data Reception Systems

Features

- Low Noise
- Large Bandwidth
- Flat Response

ACST Varistor Diodes

Catalog Models

Band	Model Number	RF Frequency Range (GHz)	LO Frequency Range (GHz)	IF Frequency Range (GHz)*	DSB Noise Figure (dB)*	Input LO Power (mW)	RF / LO / IF Ports
G	310A	270 - 320	135 - 160	0 - 18	5	2.5	WR3.4 / WR6.5 / SMA(F)

**All technical specifications are referred to mixer performance.*

Further models will follow shortly. For more information, please visit our website at www.acst.de and subscribe to our newsletter to learn about new product releases.

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Custom Models

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Quasi-Optical THz Detectors

High sensitivity in ultra-wide frequency band and room-temperature operation make ACST Schottky-barrier diode (SBD) based Quasi-Optical detectors the best alternative to available free-space detectors for the low-THz frequency-region.

Bias-free operation allows for system simplicity and ultra-low noise. In contrast to typical THz detectors, the ACST SBD solution is simpler, geometrically smaller, and much faster. Using the Detectors is simple, lowering training efforts significantly. Different options allow adaptation to specific tasks like high sensitivity for CW or ultra-high bandwidth applications.

ACST optionally offers also a dedicated power supply unit, which considerably simplify the detector installation and exploitation in customer setups. Detector output is connected to a SMA connector, female.

Currently there are three versions of Quasi-Optical Detectors (QOD) available at ACST. These are as follows:

1. 3DL 12C LS2500 A0

2. 3DL 12C LS2500 A1
(or 3DL 12C LS2500 A1M on particular request)

3. 3DL 12C LS2500 A2

The ...A1 and ...A2 versions have an integrated video-amplifier and stabilization stages for the power supply. This crucially simplifies handling procedures concerning ESD-hazard and reduces requirements for powering the amplifier.

All these detectors use essentially similar diodes, similar antennas, similar lens, and differ only by the integrated amplifier and the metallic housing. Therefore, the THz frequency response is expected similar for all these detectors. The difference is only absolute responsivity and NEP values, which depend on the used amplifier and its mismatch with the diode. Each version is shortly described in the following sections.

ACST offers a 12 month warranty for all types of Quasi-Optical Detectors. This warranty covers any defect of the detector, but only in the case of proper handling and exploitation by the customer.

Furthermore, ACST offers detector repair service. If the detector is damaged by improper handling or exploitation, then this damage is not covered by ACST warranty and reparation costs should be charged to the customer. Usually these do not exceed 3.5k€.

ACST Quasi-Optical Detectors are packed in antistatic bag and aluminium boxes, which protect detector modules from ESD and mechanical shocks during transportation and at customer facility. User guide with description of typical detector performance and operation conditions is included in the box.

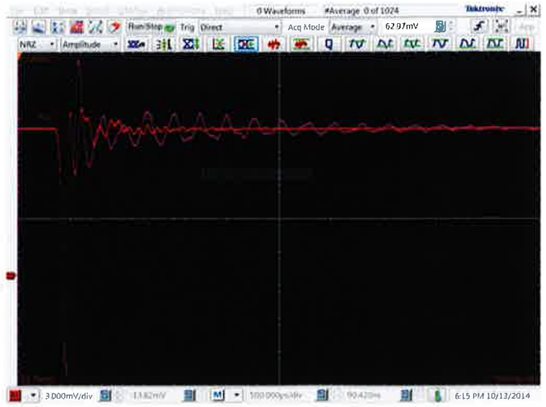
Type 3DL 12C LS2500 A0

This version has no integrated amplifier. The diode is directly connected to the output via 50Ω transmission line. This is the fastest version with the response time of less than 20ps. This is also the most flexible version because the customer can attach to the output any amplifier or reading electronic he needs for particular application.

During last few years this detector has continuously been optimized for monitoring of short pulses from Synchrotron Accelerators. This 3rd generation is a result of successful collaboration between ACST and several Synchrotron teams in Germany and Switzerland.

The new generation (3DL...) has essentially similar performance as the previous generation but is implemented in a new housing and has considerably reduced effect of parasitic oscillation after the true pulse. This parasitic oscillation is called "ringing"-effect. Reducing the "ringing"-effect is of particular interest for monitoring of short pulses.

For comparison see the Figure with comparative responses from the old generation of detector 2DL 12C LS2500 A0 (magenta curve) and new generation of same detector, now called 3DL 12C LS2500 A0 (red curve). These measurements have been performed at PTB synchrotron accelerator in Berlin and the pulse form was the same in both cases. Obviously, the 3rd generation shows considerably faster response time and significantly-reduced "ringing"-effect.



However, it has to be noted, that the A0-version has no protection against ESD. Therefore, this detector is very ESD sensitive and can easily be damaged by improper handling or measurement setup.

If the customer decides on own risk to purchase the A0 detector version, then ACST recommends to keep it always with a plugged-in bias-tee and a 50Ω cap. This significantly reduces the risk of ESD-damage of the detector. ACST offers such a bias-tee and a 50Ω cap optionally.

One more issue to be noted is that the A0 detector has no integrated amplifier and the output signal can be very small. The customer may need an own LNA to be connected to the detector output for signal amplification.

Moreover, high-frequency reading electronic is required for monitoring of very short impulses. For instance, the picture in the Figure is done with a 40 GHz real-time oscilloscope. Such an oscilloscope costs in order of few hundreds of k€.

To the conclusion, if a good and fast reading electronics is not available and the customer does not have any particular application for the A0 version, then is probably better for him to consider other detector versions like A1/ A1M, or A2.

» Type 3DL 12C LS2500 A0 «

Applications

- » Monitoring of Ultra-Short THz Pulses
- » Measurements in Synchrotron Accelerators
- » THz-Imaging Systems
- » Fast THz Screening
- » THz Spectroscopy
- » THz Pulse Radar / Time Domain Reflectometry

Features

- » Ultra-Wideband: 50 GHz – 2.5 THz in Single Device
- » Much Faster than Golay-Cell Detector
- » Much Higher Sensitivity than Pyroelectric Detector
- » Operates at Room Temperature
- » Compact, Low Power-Consumption, Simple Operation

Technical Specifications	
Lens Diameter (mm)	12
Lens Type	Collimated
Antenna Type	Log-spiral
Antenna Bandwidth (GHz)	50-2500
Integrated Amplifier	No
Videoamplifier Bandwidth (Hz)	Limited by connections with diode
Power Supply (V)	-
Recommended max. Output Voltage (mV)	± 3
Current Consumption (mA)	-
Responsivity (V/W)	22±0,12@70GHz/0,11±0,12@1000GHz
Noise-equivalent Power (pW/Hz$^{1/2}$)	3 min
Responsivity Measured at (°C)	25

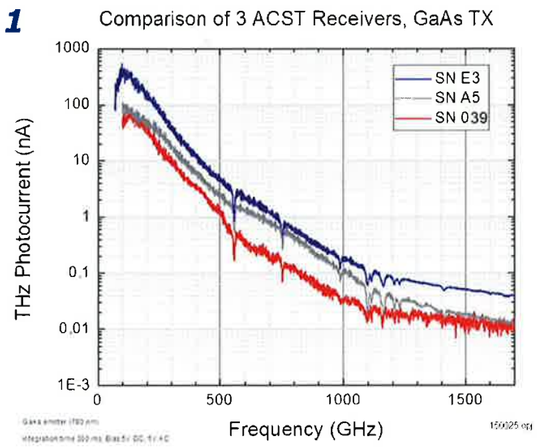
Type 3DL 12C LS2500 A1

This version has a relatively slow (1MHz bandwidth) pre-amplifier. This version has the smallest NEP and is the most sensitive detector version. Figure 1 summarises comparative measurements of three ...A1 Detectors in a Photoconductive setup at Toptica Photonics AG (Germany). These three detectors are selected with maximum difference from each other. That means, the performance of detectors delivered to the customer may vary within these frames. Since measurements have been done in laboratory environment, water lines are clearly seen on the spectrum at several point frequencies starting with about 550GHz and up to about 1400GHz. This indicates that the measurements are performed correct and the detector signal indeed corresponds to the indicated frequency and are not just an artefact due to misinterpretation of the measurement results. After about 1.5THz the signal is probably lost because at higher frequencies the THz signal from the used photoconductive setup becomes very small and below the noise floor of the detector. In fact, the noise floor of this detector is about 10-15dB below 0.01nA, and water lines should be seen up to about 2THz. However, quasioptical measurements at such high frequencies are very tricky. Therefore, a good measurement setup and skilled operators are required to accurately perform such measurements. Measurement in another setup has demonstrated responsivity up to 1.7THz and that was limited by available THz power at higher frequencies.

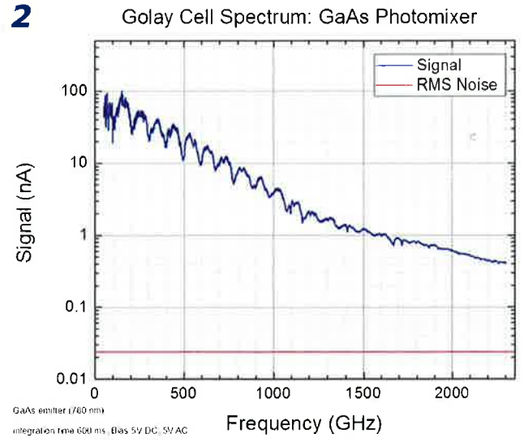
Figure 2 shows measurement results of the GaAs photoconductive setup used in Figure 1, but using a Golay Cell detector. The Golay Cell detector is assumed to have a frequency-independent response up to several THz but is very slow and not suitable for many applications. In fact, the ACST QOD were developed to replace the Golay Cell for applications, where fast response is required. Nevertheless, the results from Figure 2 can be compared to the results from Figure 1 to roughly estimate responsivity of 3DL 12C LS2500 A1 detector. If we compare the signal level at 100GHz and at 1THz in Figure 2, we estimate the drop of the TX signal level by factor of about 15. Same comparison from Figure 1 suggest the drop of the output signal by factor of 30-35. This suggests, that the responsivity and S/N of ACST QOD drops from 100GHz to 1THz by less than 20dB! This is excellent performance for Schottky-based detectors!

Figure 3 shows measurement results of ACST QOD by FTIR technique. These results suggest that this type of detectors have a frequency response at least up to 2500GHz.

1



2



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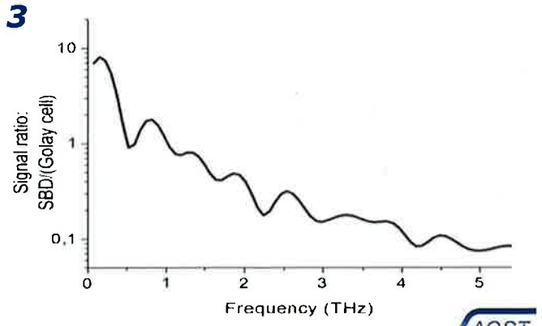


» Type 3DL 12C LS2500 A1 «

Applications

» THz-Imaging Systems

» Fast THz Screening

» THz Spectroscopy

Features

» Ultra-Wideband: 50 GHz – 2.5 THz in Single Device

» Much Faster than Golay-Cell Detector

» Much Higher Sensitivity than Pyroelectric Detector

» Operates at Room Temperature

» Compact, Low Power-Consumption, Simple Operation

Technical Specifications	
Lens Diameter (mm)	12
Lens Type	Collimated
Antenna Type	Log-spiral
Antenna Bandwidth (GHz)	50-2500
Videoamplifier Bandwidth	10 Hz to 1 MHz (DC-Coupled)
Power Supply (V)	+/- 12
Recommended max. Output Voltage (V)	± 3
Current Consumption (mA)	40 max
Responsivity (V/W)	22000±1200@70GHz/1100±120@1000GHz
Noise-equivalent Power (pW/Hz$^{1/2}$)	6 min
Responsivity Measured at (°C)	25

Type 3DL 12C LS2500 A1M

Some customers need A1 version but with extended bandwidth. So, ACST can modify the preamplifier and increase the bandwidth from 1MHz up to 40-50MHz. This is what is called 3DL 12C LS2500 A1M version and the price and delivery is same as for A1 version. However, it should be noted, that this detector has a little less responsivity and somehow larger noise because of amplifier modifications and larger bandwidth.

Applications

» THz-Imaging Systems

» Fast THz Screening

» THz Spectroscopy

Features

» Ultra-Wideband: 50 GHz – 2.5 THz in Single Device

» Much Faster than Golay-Cell Detector

» Much Higher Sensitivity than Pyroelectric Detector

» Operates at Room Temperature

» Compact, Low Power-Consumption, Simple Operation

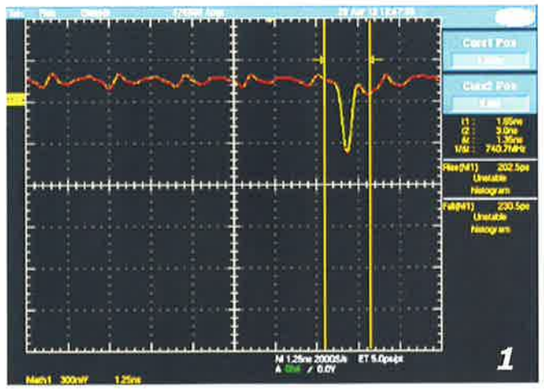
Technical Specifications	
Lens Diameter (mm)	12
Lens Type	Collimated
Antenna Type	Log-spiral
Antenna Bandwidth (GHz)	50-2500
Videoamplifier Bandwidth	10 Hz to 50 MHz (DC-Coupled)
Power Supply (V)	+/- 12
Recommended max. Output Voltage (V)	± 0.3
Current Consumption (mA)	30 max
Responsivity (V/W)	3500±200@70GHz/100±30@1000GHz
Noise-equivalent Power (pW/Hz$^{1/2}$)	15 min
Responsivity Measured at (°C)	25

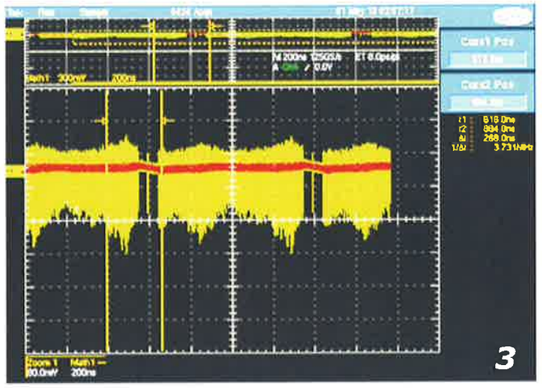
Type
3DL 12C LS2500 A2

The 3DL 12C LS2500 A2 version has an integrated 4GHz amplifier. In fact, the amplifier bandwidth extends up to about 5GHz but with some-how less gain.

This detector version, similarly to the 3DL 12C LS2500 A0 version, has continuously been optimised in collaboration with several European Synchrotron Accelerator researchers during last several years.

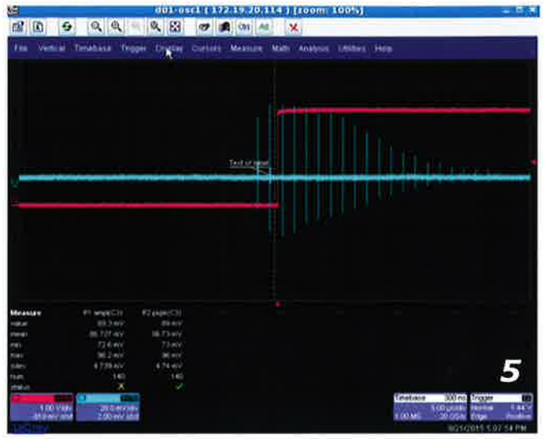
The repetition rate of synchrotron pulses is usually few nanoseconds. The 3DL 12C LS2500 A2 detector is optimised for monitoring of such pulses. Figure 1,2 and 3 shows measurement results with 2DL 12C LS2500 A2 detector at Synchrotron BESSY in Berlin. Although the "ringing" effect of this detector was rather strong, the synchrotron research team could quite well resolve separate pulses from a macro bunch.





The 3DL 12C LS2500 A2 version has less "ringing" effect and separate pulses can even better be resolved. Figure 4 and 5 shows measurement results at synchrotron SOLEIL in France. Unfortunately, the time resolution on these pictures is not very well resolved, but the working staff there is very satisfied with performance of this detector.

3DL 12C LS2500 A2 detector is incorporated in a similar housing and version as the ...A1.



Applications

- » THz-Imaging Systems
- » Fast THz Screening
- » Monitoring of Short THz Pulses
- » Measurements in Synchrotron Accelerators

Features

- » Ultra-Wideband: 50 GHz – 2.5 THz in Single Device
- » Much Faster than Golay-Cell Detector
- » Much Higher Sensitivity than Pyroelectric Detector
- » Operates at Room Temperature
- » Compact, Low Power-Consumption, Simple Operation

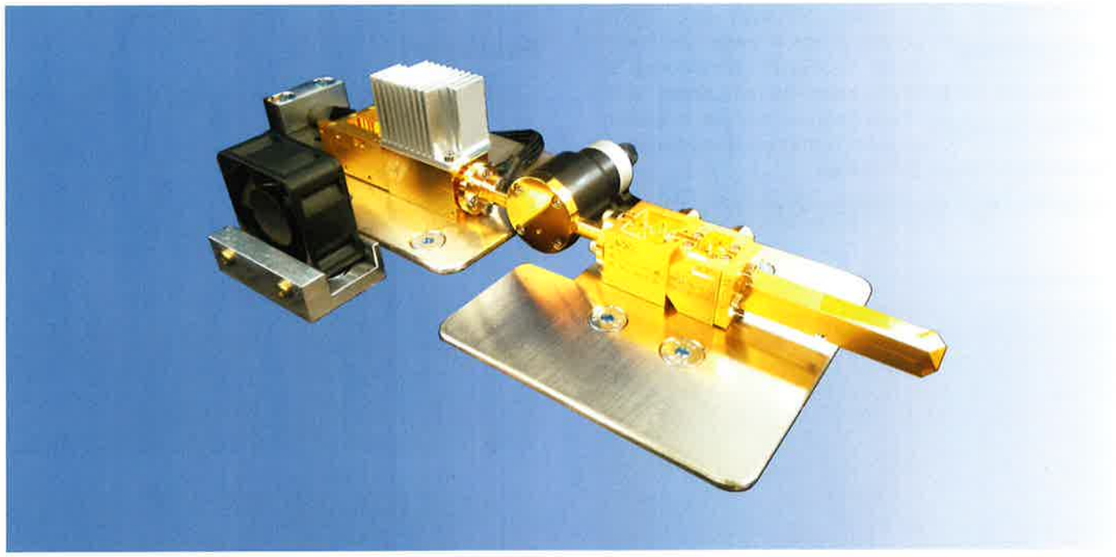
Technical Specifications	
Lens Diameter (mm)	12
Lens Type	Collimated
Antenna Type	Log-spiral
Antenna Bandwidth (GHz)	50-2500
Videoamplifier Bandwidth (MHz)	767285
Power Supply (V)	+/- 12
Recommended max. Output Voltage (V)	± 0.25
Current Consumption (mA)	90 max
Responsivity (V/W)	230 @ 70 GHz / 17 @ 1 THz
Noise-equivalent Power (pW/Hz$^{1/2}$)	38.8 min
Responsivity Measured at (°C)	25

» THz CUSTOM PRODUCTS «

AMC / Transmitters

ACST Sources represent an Active Multiplier Chain based on high performance Microwave/MM-Wave components, followed by an ACST high-power MM-Wave multiplier. The source is designed and manufactured as a bench top unit to extend the low frequency synthesizer or sweeper without losing all of the functionalities and features. The source is fixed tuned and does not require any adjustment for proper operation.

All required voltage biases and current sources are provided by a dedicated power supply unit, which only needs a standard AC power. A TTL modulation port and/or an user-controlled attenuator can be integrated on customer request.



Applications

» MM-Wave FMCW-Radar

» Active Imaging

» LO Source for MM/SubMM Wave Receiver Arrays

» High-Bit Rate Data Trans-Mission Systems

Features

» High Power & Efficiency

» Large Bandwidth

» Flat Response

» TTL-Modulation Port (optional)

» User Controlled Attenuation (optional)

» ACST High Power MM-Wave Sources «

Catalog Models

Band	Model Number	Output Frequency Range (GHz)	Input Frequency Range (GHz)	Max. Output Power (dBm)	Input / Output Ports
D	1210A	138 - 158	11.50 - 13.17	+22.5	K-Type / WR6.5
G	1210B	158 - 178	13.10 - 14.90	+22.5	K-Type / WR5.1
Y	1211A	275 - 315	11.45 - 13.12	+16	K-Type / WR3.4
Y	1211B	310 - 358	12.90 - 14.90	+15	K-Type / WR2.8

Further models will follow shortly. For more information, please visit our website at www.acst.de and subscribe to our newsletter to learn about new product releases.

More information can be found in the data sheet. Please contact us.

Custom Models

We also offer Custom Solutions. Please contact us to discuss. You can reach us by phone, e-mail or visit our website at **www.acst.de**.

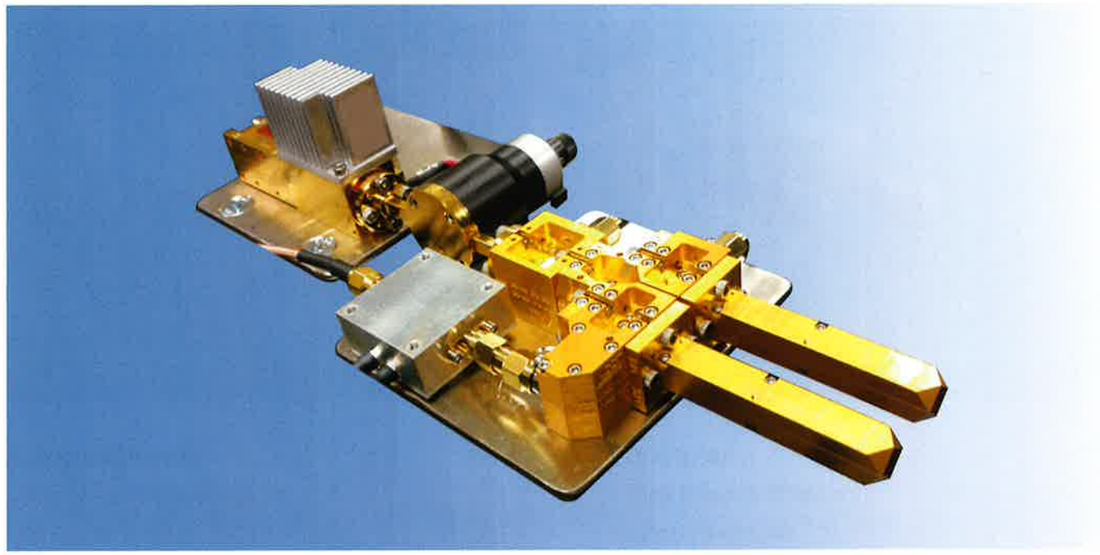
THz CUSTOM PRODUCTS

Transceivers

300 GHz Transceiver

ACST 300 GHz transceiver for FMCW radar is designed and manufactured as a bench top unit. It takes an input signal at 11.45 GHz to 13.12 GHz to reach 275 to 315 GHz for the Tx and LO power at 137.5 - 157.5 GHz for the Rx. A dedicated directional coupler is used to separate the transmitter and receiver LO paths. The typical transmitting power is +14 dBm and 8.5 dB DSB noise figure receiver performance. The transceiver assembly is fixed tuned and does not require any adjustment for proper operation. A dedicated power supply is included.

Additional options can be implemented on customer request i.e. TTL modulation port, customized IF-band, horn antennas, different multiplication factor of the AMC, etc.



ACST Broadband Transceivers

Applications

- True Ranging Radar Systems
- 300 GHz CW Power Source
- 300 GHz Heterodyne Receiver

Features

- 275 to 315 GHz Operation
- Broad FM Bandwidth
- High Power
- Low Noise

Tech. Specifications	Minimum	Typical	Maximum
Input port		K-type (F) connector	
Input Power (mW)		+7	+10
Input Freq. Signal (GHz)	11.45		13.125
Output Tx Port		WR3.4	
Output Tx Power (mW)	+10	+14	+16
Output Tx Freq. (GHz)	275		315
Input Rx Port		WR3.4	
Input Rx Power (mW)			-10
Input Rx Freq. (GHz)	275		315
Rx Noise Figure (dB)	8	9	11
Rx IF Output Port		SMA (F) connector	
IF LNA Gain (dB)	45	46	
LNA Noise Figure (dB)	1.8	1.9	2.0
IF Output Freq. (MHz)	0.01		500

Further models will follow shortly. For more information, please visit our website at www.acst.de and subscribe to our newsletter to learn about new product releases.

More information can be found in the data sheet. Please contact us.

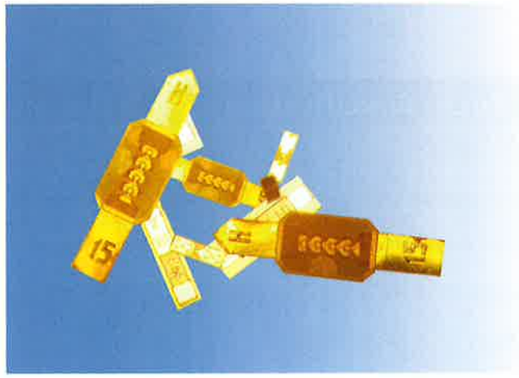
Custom Models

We also offer Custom Solutions. Please contact us to discuss. You can reach us by phone, e-mail or visit our website at **www.acst.de**.

Schottky Barrier Diodes (SBD)

Schottky barrier diodes are the most established components for mixing and frequency multiplication in the range 100 GHz - 2.5 THz. Whisker contacted devices offer a mature technology and have been successfully used up to 2.5 THz, but the whisker contact is sensitive to mechanical vibrations. Planar devices for integration provide the possibility of integration and consequently robust circuits for THz applications.

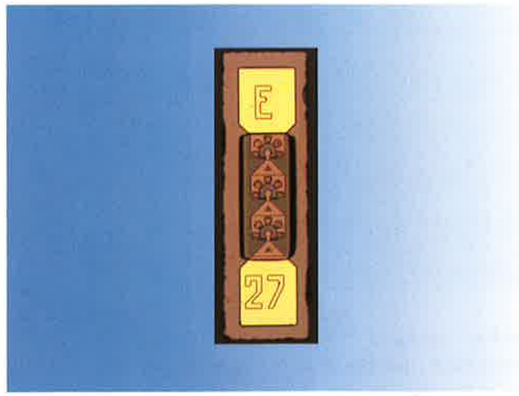
The whole fabrication process of planar devices and especially of integrated structures covers a variety of different technologies. Some of these technologies are rather new or very specific. The fabrication process of planar Schottky diodes is known to only few experts in this area.



Varactor Diodes

ACST Varactor Diodes exhibit nearly ideal I-V behaviour, i.e. very little reverse current and abrupt breakdown at a voltage close to the theoretical limit for particular doping concentration. This allows for accurate module design and optimal power-handling capability.

Due to particular material system and fabrication technology, these diodes survive temperatures up to 250°C for short time, which may be required i.e. for soldering into surrounding circuitry.



Applications

» High-Power Frequency Multipliers
» High-Power Up-Convertors/Mixers
» High-Frequency/High-Power Current Rectifiers

Features

» Extremely Low Reverse Current
» High Breakdown Voltage (close to theoretical limit)
» Low Shunt (pad-to-pad) Capacitance
» Suitable for Flip-Chip Mounting Approach
» The Structure is Optimized for Highly-Reliable Operation at MM-Waves

Available Varactor Diode Configurations

Structure Type	Nominal Parameters				Short Structure Description
	Junction Capacitance C_{j0} (fF/anode)	Total Capacitance C_{tot} (fF)	Series Resistance R_s/ Differential Resistance R_{diff} (Ω)	Breakdown Voltage U_{bd} (V)	
5VA30-13	30	12.5	15	41.4	Three varactors in series on 30 µm thick GaAs-substrate.
5VA40-13	40	14.5	14	41.4	
5VA50-10	50	18	12	32.5	
5VA70-13	70	23.5	12	41.4	
5VA80-10	80	28.1	10	32.5	

Diode parameters are usually determined for each batch individually and may vary within up to 20% from nominal values.
For large ordering quantities customer specifications can be considered.

For further diode types, please visit our website or contact us via email or phone.

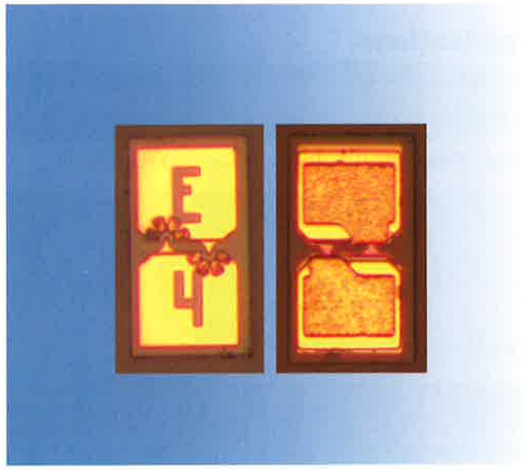
Please ask on availability before ordering.

» SBD «

Varistor Diodes

ACST Varistor Diodes are optimised for operation under forward bias conditions. They feature low series resistance and exponential behaviour of forward I-V characteristics, which extends over up to 8 orders of magnitude of the forward current. This allows for high linearity and high dynamic range MM/SubMM-Wave mixers, which are important for many applications like are radiometry and measurement instrumentation.

Due to particular material system and fabrication technology, these diodes survive temperatures up to 250°C for short time, which may be required i.e. for soldering into surrounding circuitry.



Applications

» Sub-Harmonically-Pumped Frequency Mixers

» Wideband Frequency Multipliers

Features

» Strongly Reduced Shunt (pad-to-pad) Capacitance

» Low Junction Capacitance

» Low RF Series Resistance

» Suitable for Flip-Chip Mounting Approach

» Structure Geometry Optimised for Sub/MM-Waves Applications

Available Varistor Diode Configurations

Structure Type	Nominal Parameters				Short Structure Description
	Junction Capacitance C_{j0} (fF/anode)	Total Capacitance C_{tot} (fF)	Series Resistance R_s/ Differential Resistance R_{diff}	Breakdown Voltage U_{bd} (V)	
2MAF1.0	1.0	5.5	18	-	Two varistors in anti-parallel configuration on 5 µm thick transferred membrane-substrate for ultimate MM/Sub-MM wave performance.
2MAF1.5	1.5	6.5	15	-	
2MAF2.3	2.3	8.0	14	-	
-	-	-	-	-	
3MAS1.5	1.5	8.0	18	-	Two varistors in anti-parallel configuration on 10 µm thick GaAs-substrate
3MAS2.3	2.3	9.6	16	-	

Diode parameters are usually determined for each batch individually and may vary within up to 20% from nominal values.
For large ordering quantities customer specifications can be considered.

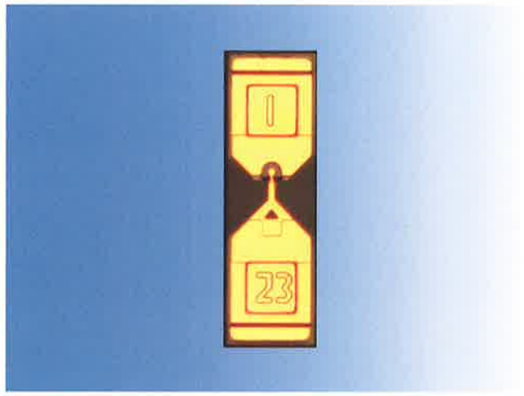
For further diode types, please visit our website or contact us via email or phone.

Please ask on availability before ordering.

» ACST Schottky Diode Process «

Low-Barrier Diodes

ACST Low-barrier diodes are optimized for operation under Low- or Zero-Bias conditions. These diodes feature extremely non-linearity of I-V-behaviour around zero-voltage, which is essential for low-noise electronics. Moreover, Low-Barrier diodes are also employed for frequency mixers with low Local Oscillator requirements. This allows for considerable reduction of weight and costs and, therefore, is of particular interest for space applications but also commercial products.



Applications

» Zero-Bias Square-Low (envelope) Detectors

» Fundamental Frequency Mixers with Low-LO-Requirements

» Sub-Harmonically-Pumped Frequency Mixers with Low-LO Requirements

» High-Frequency Low-Power Rectifiers

Features

» Low Noise due to 0V-Bias

» Low 0V Differential Resistance (easy matching with 50 Ohm reading electronics)

» Strongly Reduced Shunt (pad-to-pad) Capacitance

» Suitable for Flip-Chip Mounting Approach

» Structure geometry optimised for MM/SubMM-Waves applications

Available Low-Barrier Diode Configurations

Structure Type	Nominal Parameters				Short Structure Description
	Junction Capacitance C_{j0} (fF/anode)	Total Capacitance C_{tot} (fF)	Series Resistance R_s/ Differential Resistance R_{diff} (O)	Breakdown Voltage U_{bd} (V)	
3DSF5	5	8	/ 2500	2.0	Low-barrier varistor on 5 µm thick transferred membrane-substrate for zero-bias operation.
3DSF10	10	13	/ 1000	1.6	
3DSF20	20	23	/ 500	1.3	
3DSF30	30	33	/ 300	1.0	
-	-	-	-	-	
4DSF20	20	25	/ 500	1.3	

Diode parameters are usually determined for each batch individually and may vary within up to 20% from nominal values.
For large ordering quantities customer specifications can be considered.

For further diode types, please visit our website or contact us via email or phone.

Please ask on availability before ordering.

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