KETEK'S UNIQUE GRAPHENE WINDOW

IMPROVED SDD COOLING TECHNOLOGY

KETEK

CONSTANT HIGH PERFORMANCE UP TO +80°C HEAT SINK TEMPERATURE

KETEK'S PROPRIETARY CHARGE SENSITIVE AMPLIFIER

VITUS

KETEK VITUS
SILICON DRIFT DETECTORS (SDDs)

KETEK VITUS Silicon Drift Detectors (SDDs) are the state-of-the-art x-ray detectors for the energy range from 0.05 keV to 30 keV. They are used in manifold applications such as EDS, XRF, µXRF and TXRF, in electron microscopes, benchtop systems, XRF handheld spectrometers as well as in recycling and mining material sorting installations. Due to their wide operating temperature range, their excellent energy resolution and high reliability they are particularly suited for industrial applications.

GRAPHENE WINDOW TECHNOLOGY

- Two window types available:

  CH WINDOW
  1 µm Carbon without support grid (replaces the 8 µm Beryllium window)

  CL WINDOW
 165 nm Carbon with Silicon support grid (86 % open area) for low energy applications

- Both window types allow vacuum encapsulation of detectors for excellent cooling performance
- Transmission better than conventional window types over whole energy range

Comparison of energy resolution vs. peaking time for CSA and CUBE based SDDs

······ CUBE PRE16
—— KETEK CSA-H

FWHM [eV] vs. Peaking Time [µs]

KETEK PROPRIETARY CHARGE SENSITIVE AMPLIFIER (CSA)

- Significantly improved energy resolution, especially at short peaking times
- Extremely high throughput at appropriate DPP settings
- Fully compliant with CUBE technology

NEW SDD COOLING TECHNOLOGY

- −60°C SDD chip temperature achievable even at +65°C heat sink temperature
- Drastically increased efficiency of the thermoelectric cooling (e.g. 200 mW at −35°C sensor temperature)
- Ultra stable vacuum integrity for typically more than 10 years of operation
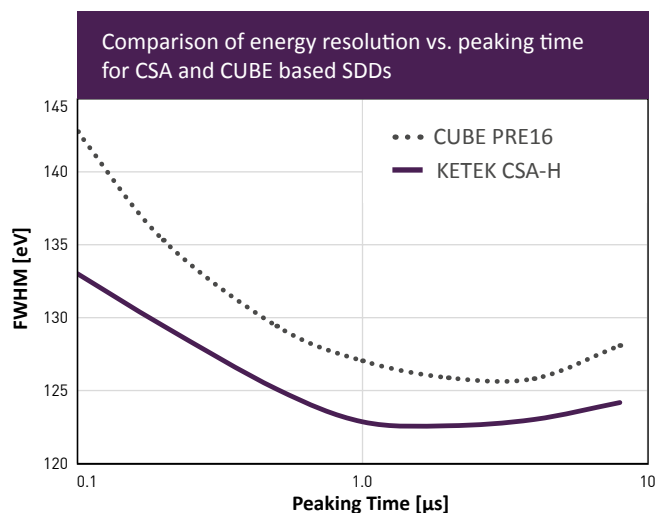
VITUS

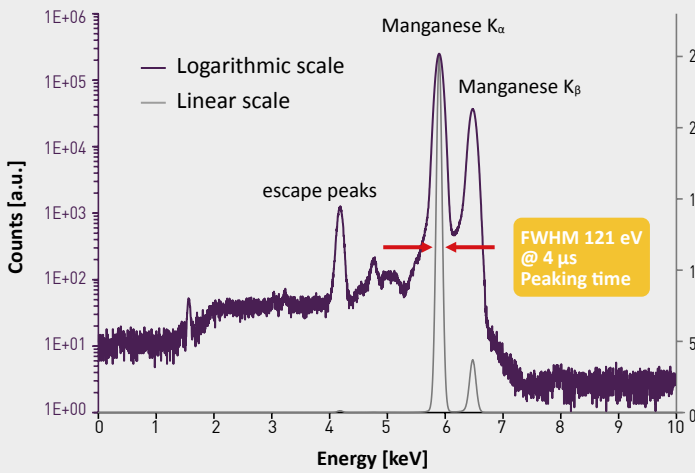|	H7 H7LE	H20 H20LE	H30 H30LE	H50/K50 H50LE	H80	H150
COLLIMATED AREA [mm²]	7	20	28	47	80	143
ACTIVE AREA [mm²]	13	30	41	65	100	170

Energy resolution FWHM down to 121 eV for Manganese K_α at 4 µs peaking time

Counts [a.u.] (Logarithmic scale / Linear scale)

Manganese K_α
Manganese K_β
escape peaks
FWHM 121 eV @ 4 µs Peaking time

Energy [keV]

Low-energy spectrum acquired with VITUS SDD showing Gaussian Lithium and Oxygen K_α peaks

Counts [a.u.]

Lithium
Oxygen
FWHM 39 eV
Carbon
Nitrogen

Energy [eV]
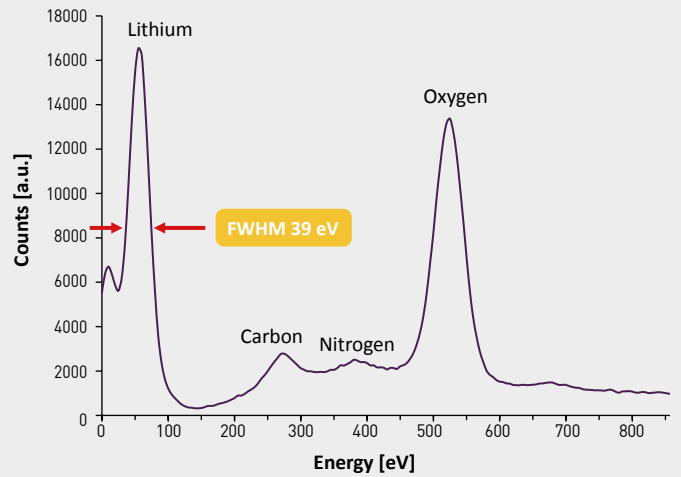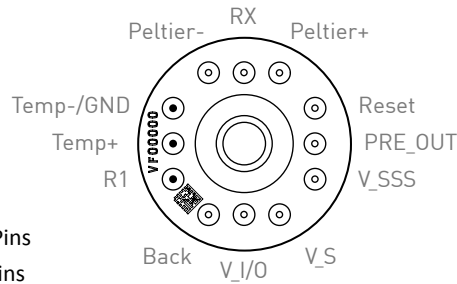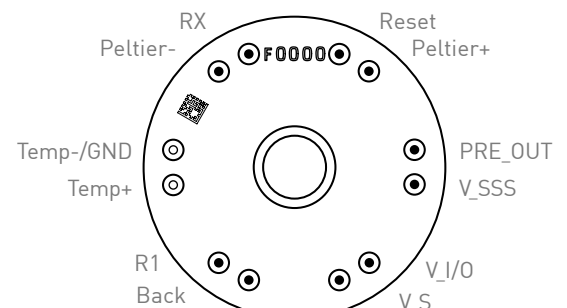

H7-H30
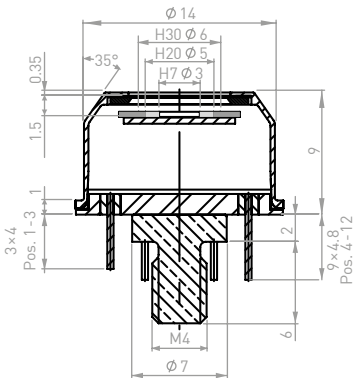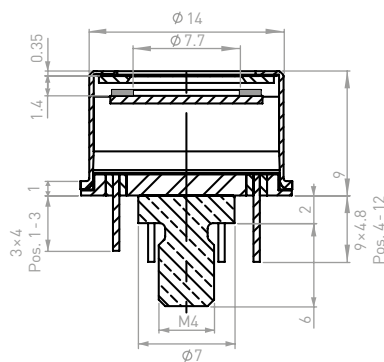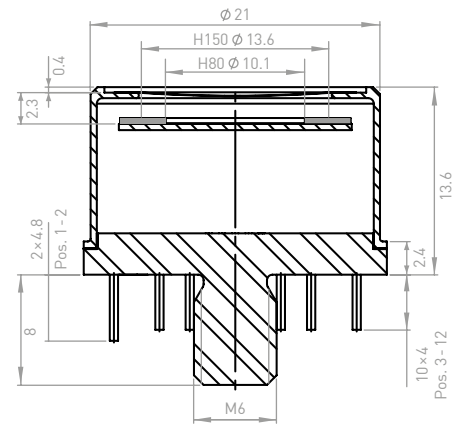
H50 K50

H80-H150

PIN ASSIGNMENTS
BOTTOM VIEW
H7-H150

⊙ Short Pins
◎ Long Pins

H7 / H20 / H30 / H50 / K50

H80 / H150

IMPROVED COOLING
FOR ALL TYPES UP TO H50/H50LE
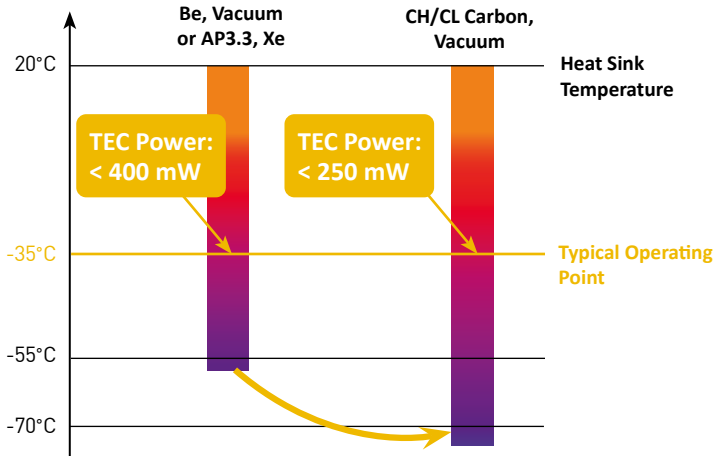
SDD Chip Temperature [°C]	Peltier Power [W]	Current [mA]	Voltage [V]
−22.2	0.12	100	1.2
−36.0	0.24	150	1.6
−46.8	0.42	200	2.1
−62.1	0.90	300	3.0
−71.4	1.52	400	3.8
−76.5	2.30	500	4.6
−77.8	3.36	600	5.6

WINDOW TRANSMISSION
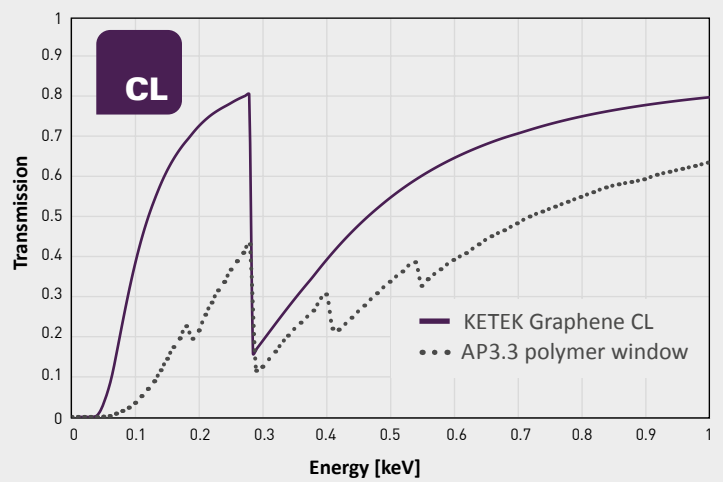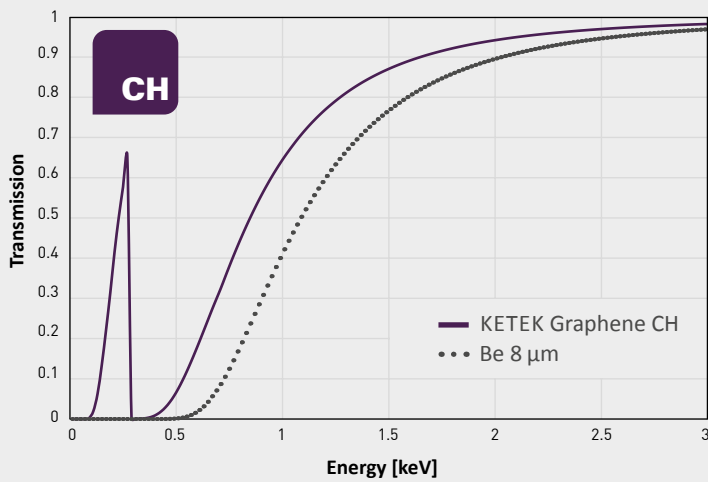
SPECIFICATIONS

Specifications for H7-H150 and H7LE-H50LE	
First stage amplification	ASIC
Energy resolution	≤ 129 eV @ Mn K_α
Peak to background	> 15,000
Peak to tail	> 2,000
Optimal peaking time at max. cooling	1 µs
Absortion depth Si for H7 to H150	450 µm
Absortion depth Si for K50	550 µm
Peak shift stability up to 100 kcps	< 1 eV
Max. input count rate	2,000 kcps
Window for H7-H50 and K50	CH (1 µm Graphene)
Window for H7LE-H50LE	CL (165 nm Graphene)
Window for H80-H150	Be (25 µm Beryllium)
Cooling performance	@ +20 °C heat sink ΔT > 95 K
On-chip collimator	multilayer

Typical SDD parameters	Voltages	Currents
Ring 1 (R1)	-20 V ± 5 V	10 µA
Ring X (RX)	-130 V ± 20 V	10 µA
Back	-65 V ± 5 V	<1 nA
Peltier element for H7-H50 and K50	5.5 V	600 mA max.
Peltier element for H80-H150	9 V	1000 mA max.
Temperature monitor	NTC thermistor 10 kΩ @ 25°C	
Output signal	ramped reset type	
Output gain	1.6 mV/keV ± 20 %	

ISO 9001
Certified
Quality Management System
www.tuvsud.com/ms-cert

RoHS™ Compliant

CE

EN 55016
EN 61000

ORDER INFORMATION

H7 / H7LE		H20 / H20LE		H30 / H30LE		H50 / K50 / H50LE		H80 / H150	
H7	V000-KTN0-H007-MA2C	**H20**	V000-KTN0-H020-MA2C	**H30**	V000-KTN0-H030-MA2C	**H50**	V000-KTN0-H050-MA6C	**H80**	V000-KAT0-H080-ML4A
						K50	V000-KTN0-K050-MA6C		
H7LE	V000-KTN0-H007-MA2G	**H20LE**	V000-KTN0-H020-MA2G	**H30LE**	V000-KTN0-H030-MA2G	**H50LE**	V000-KTN0-H050-MA6G	**H150**	V000-KAT0-H150-ML4A

SDD ELECTRONICS

Product	Description	
VIAMP-KC/-KL 3.0 **VITUS AMPLIFIER**	The VIAMP-KC/-KL 3.0 module combines a VITUS SDD (all sizes H7 to H150) and an ultra-low-noise preamplifier of the latest generation 3.0 with improved biasing stability. The Aluminum housing functions as efficient heat sink.	■ VIAMP-KC 3.0 for H7 to H50 ■ VIAMP-KL 3.0 for H80 to H150 ■ Ramped reset type output signal ■ Configurable via FFC interface ■ Customized solutions available on request
VICO-DV 3.0 **COMPLETE DPP ELECTRONICS BOARD**	The complement of the VIAMP module is the VICO-DV 3.0, comprising KETEK's new high-performance digital pulse processor DPP3, a temperature controller and all voltage supplies for the SDD. Also an analog version without DPP3 is available.	■ KETEK's new DPP3 with peaking time down to 25 ns ■ Extremely small dimensions 60 × 32 × 11 mm³ ■ Ethernet, USB and SPI interfaces ■ Comprehensive programming library (VICOLib), acquisition software (VICOScope) and update tool (VICOUpdate) available vor Windows and Linux
AXAS 3.0 **ANALYTICAL X-RAY ACQUISITION SYSTEM**	The AXAS 3.0 is KETEK's new all-in-one system for VITUS SDDs in an ultra compact housing equipped with the latest generation 3.0 preamp technology. It is available with all VITUS SDDs from H7 to H50 and different lengths of the vacuum tight finger.	■ Very small & complete XRF system: 81 × 61 × 36 mm³ ■ KETEK's new high-performance digital pulse processor DPP3 with peaking time down to 25 ns ■ Ethernet and USB type C interface ■ Mapping Mode for scanning applications ■ Acquisition software (VICOScope) and update tool (VICOUpdate) available for Windows and Linux

ACCESSORIES

Product	Description	
VMLCOL **EXTERNAL COLLIMATOR**	The clip-on mount for external multilayer collimators suits all VITUS SDDs up to H50. Different collimator apertures are available. The VMLCOL prevents the excitation and fluorescence of the SDD's cap material.	■ No stray lines from SDD cap ■ Improved P/B and P/T ■ Additional protection for the VITUS entrance window
VCGRID **CARBON PROTECTION GRID**	The pure carbon grid can be mounted within an instrument in front of the SDD in order to protect the window from mechanical impact.	■ Open area > 75 % ■ Thickness < 0.58 mm ■ Withstands a static stress up to 50 N ■ Customized grid designs available on request