



# Silicon Drift Detector Datasheet

Every detector module produced by KETEK GmbH is tested electrically and spectroscopically. Testing parameters and results achieved in the final qualification are reported below. A leakage test (MIL-STD-883, Method 1014.10) was performed and passed.

For proper operation of the silicon drift detector please follow the operation parameters listed in the data sheet.

Serial Number:	02395
Chip Type:	SDD-10-145 -PNS
Active area:	SDD10 (10 sqmm)

**Spectroscopic results**  
(measurements performed with <sup>55</sup>Fe x-ray source at 5.895 keV)

FWHM @ -20°C:	eV	@	μs
FWHM @ -10°C:	158 eV	@	0.50 μs
FWHM @ 0°C:	190 eV	@	0.25 μs
FWHM @ 20°C:	401 eV	@	0.25 μs
Peak to background ratio with standard collimator:	532		

**Testing conditions**

Count rate [cps]:	1500
Heat sink temperature [°C]:	26

**Cooling performance**

	-10°C	-20°C
Peltier current [A]:	0.514	
Temperature difference [K]:	35.8	25.8
Abs. chip temperature [°C]:	-10.0	

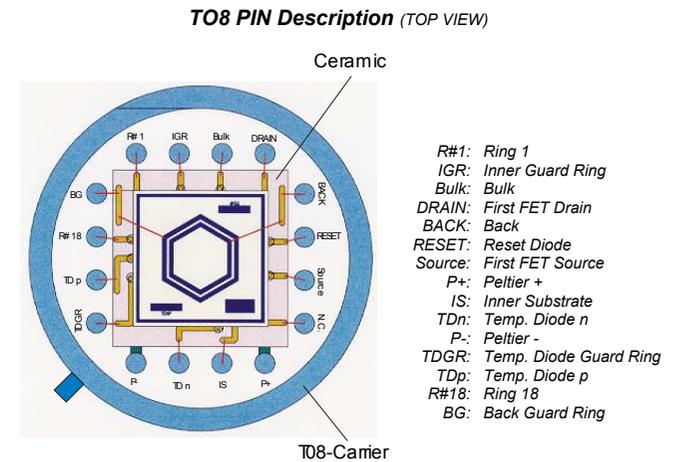
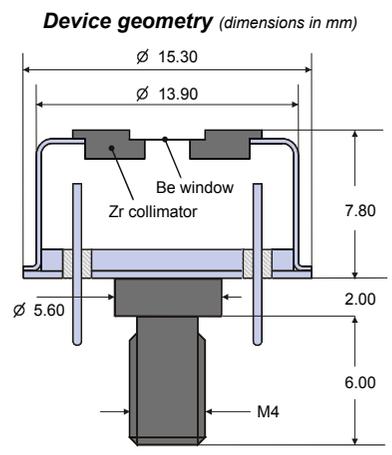
Temp. diode Voltage for 1μA [V]: @ -10°C

Temperature diode sensitivity: appr. 3mV/K

**TO8 housing**

Collimator:	Dual collimator
Collimator diameter:	3.4 mm
Entrance window:	MOXTEK DuraBeryllium 8 um
Resistance between collimator and base:	1..... Ohm

The max. current allowed for the operation of the Peltier thermocooler strongly depends on the thermal characteristics of the system detector- heat sink.  
The values specified are suitable for optimal coupling to an external heat sink with low thermal resistance.



**Operating conditions**

Ring 1 [V]:	-10.3
Ring 18 [V]:	-126.7
BACK [V]:	-77.0
MOS biasing Current [μA]:	26.1
First FET current [μA]:	250.0
Inner Guard Ring [V]:	-12.0
Reset Diode [V]:	-15.0
BACK Guard Ring [V]:	n.c.
Inner Substrate [V]:	0.0
Bulk [V]:	0.0
First FET Drain [V]:	12.0
TDGR [V]:	-6.0

**WARNING:**

- Sealing**  
The TO8-housing is closed hermetically. A leakage test MIL-STD-883 was performed. However every mechanical stress on the detector module can damage the module entrance window or the PIN s introducing a leakage in the housing.
- Thermal coupling**  
Ensure a good thermal coupling between TO8 M4 adapter on bottom of the housing and heat sink. A poor thermal coupling may cause overheating of the detector system already at low peltier currents, damaging the detector irreparably.
- Radiation hardness**  
Radiation hardness of the silicon drift detector has been investigated using synchrotron radiation.  
With a total dose of 10<sup>19</sup> absorbed photons on the SDD active area, typical variation of the energy resolution in terms of FWHM are less than 2% and peak/background ratio variation are less than 10%.  
Radiation hardness is energy dependent. The analyses made represents the worst case, assuming incoming x-rays in an energy range between 10 and 15 keV, where the damage on the integrated electronics is maximized. Outside this energy range is the detector radiation harder.

Our technical staff is at your disposal for any kind of questions  
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