OEM Detection Module
Model DM118 / DM118/L

Operator's manual

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1. INTRODUCTION

The compact and low power consuming Detection Modules DM118, DM118/L with CdZnTe (CZT) detectors of volume 500 mm^3 or 1600 mm^3 are designed for gamma-radiation measurements. These modules are intended for an easy integration in customer specific equipment.

The detector module includes CZT detector, charge sensitive preamplifier, spectroscopy shaping amplifier, detector HV bias supply.

The charge sensitive preamplifier with FET input and resistive feedback convert the charge carriers developed in the CZT detector during each absorbed nuclear event to a step function voltage pulse, the amplitude of which is proportional to the total charge accumulated in that event.

The spectroscopy shaping amplifier is intended for magnify the amplitude of the preamplifier output pulse and shapes the pulses to optimize the energy resolution.

The low power detector bias supply provides stabile, low noise high voltage in a range up to 2000 V necessary for proper operation of CZT detector. Selection and assignment of an optimal operation high voltage for the detector is performed by the manufacturer.

Outward appearance of the DM118 / DM118/L are shown in fig. 1.

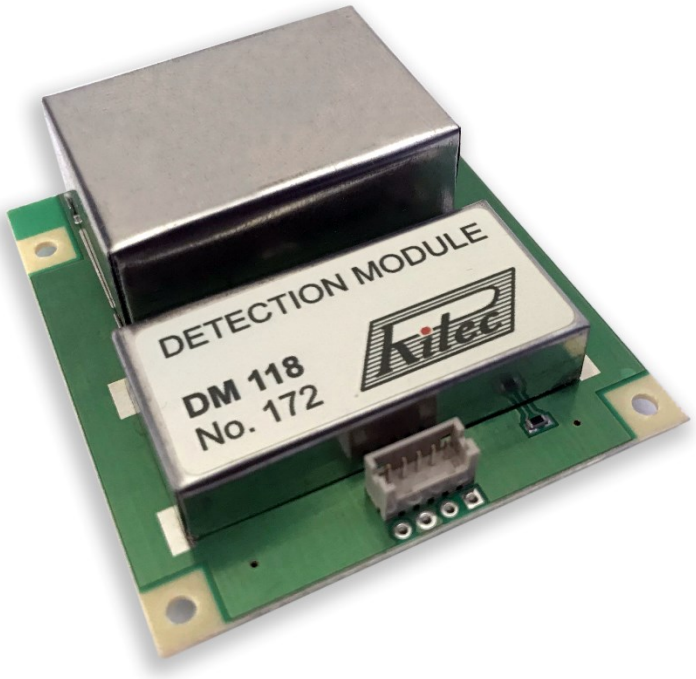

Fig. 1. Detection Module DM118 / DM118/L.

2. SPECIFICATIONS

Detector

- detector type ..... CdZnTe quasi hemispherical detector
- detector volume
  DM118 ..... 500 mm^3
  DM118/L ..... 1600 mm^3

Basic

- energy resolution (FWHM) at 662 keV line (at operation temperature of +22 °C),
  DM118 ..... < 2,5 %
  DM118/L ..... < 3,5 %
- peak-to-Compton ratio at 662 keV line ..... > 4,0
- charge sensitivity ..... ≥ 1 V/MeV
- integral nonlinearity (50 keV ... 1.4 MeV) ..... < 0.5 %
- shift peak position in a recommended range of operation temperatures
  DM118 ..... < 0.02 %/°C
  DM118/L ..... < 0.03 %/°C
- shift peak position for 8 hours of continuous operation ..... < 0.2 %

Output

- signal polarity ..... positive
- impedance ..... 50 Ω
- peaking time ..... ≈ 1,8 µs
- pulse width (FWHM) ..... ≈ 2,2 µs

Power Requirements ..... + 5 V, ≤ 12 mA; - 5 V, ≤ 4 mA

Recommended Operation Temperature Range ..... +10°C to +40°C*

Connector ..... Hirose DF13-5P-1.25DSA**

Mechanical

- dimensions ..... 45 mm x 50 mm x 16 mm
- assembly holes ..... 4 x 2,2 mm
- weight ..... 30 g

*NOTE: On special request a wider range of operating temperatures up to -20°C to +50°C is available.

**NOTE: On special request, a connector with a pitch of 2 mm is available, for example Adam Tech 2PH1-04-VA.

Spectrum of ^{137}Cs obtained with the DM118/L is shown in fig. 2.

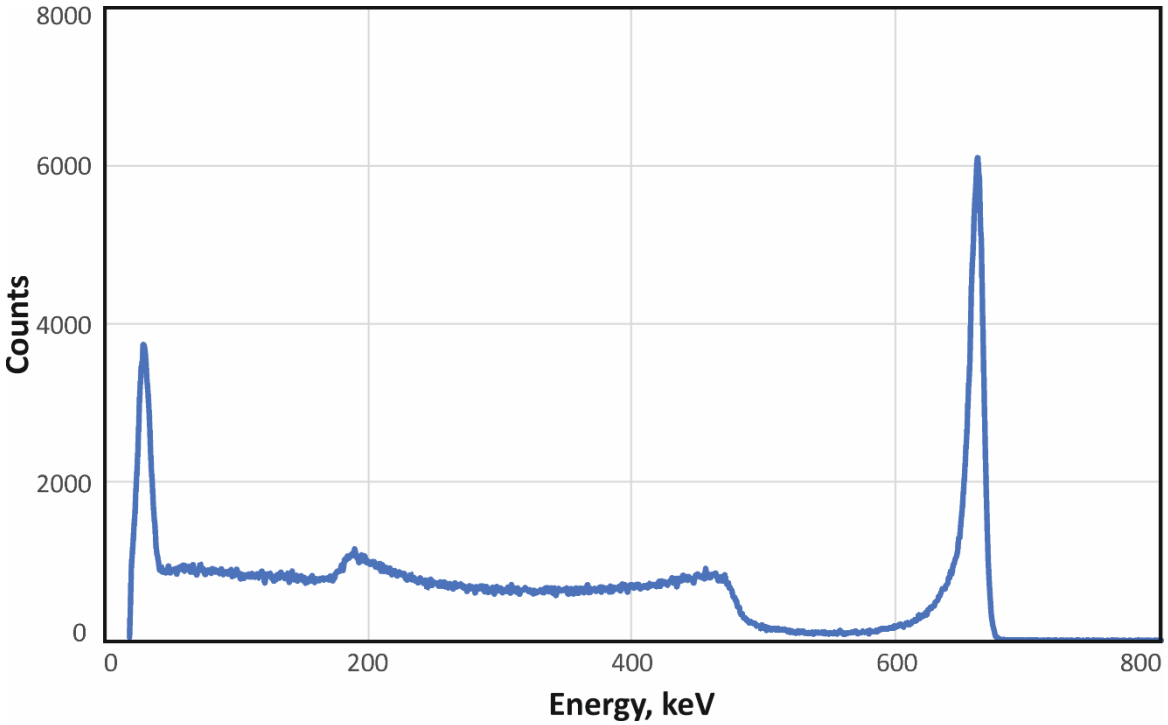

Fig. 2. Spectrum of ^{137}Cs obtained with the DM118/L.

2. DESIGN FEATURES

Appearance of the DM118 / DM118/L was shown in fig. 1.

Connector Hirose DF13-5P-1.25DSA, mate with DF13-5S-1.25C. The connector pin assignment is shown in table 1.

Table 1

PIN	DF13-5P-1.25DSA
1	+5 V
2	Output
3	GND
4	Not used
5	-5 V

A typical output waveform is shown in Fig. 3.

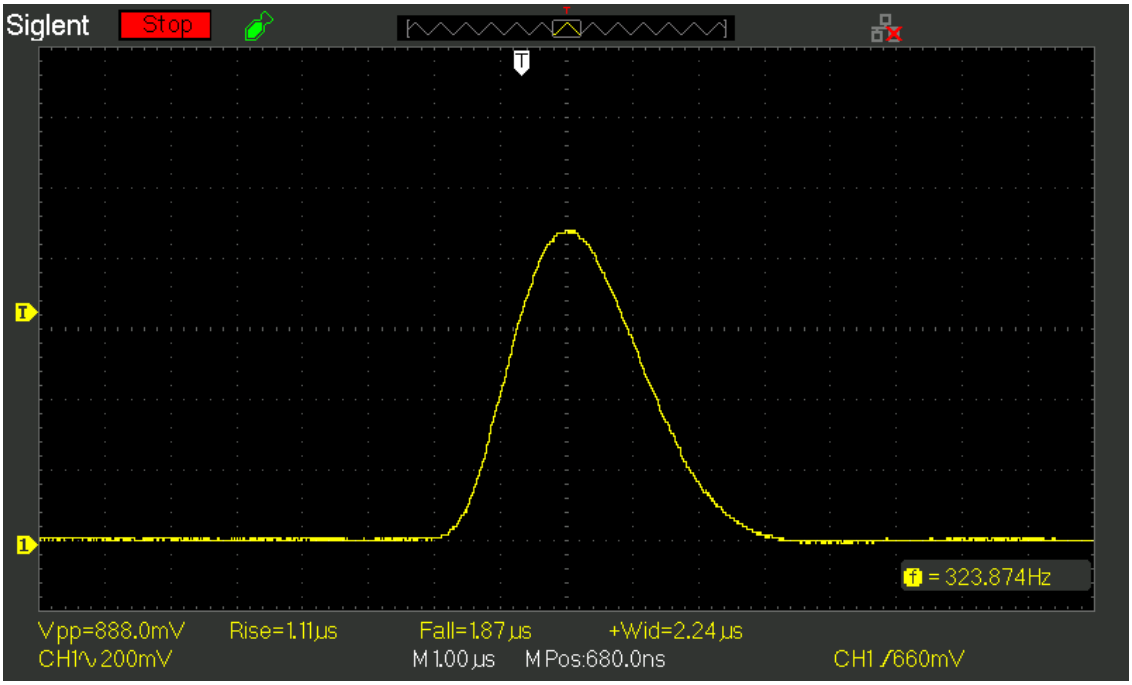

Fig. 3. A typical output waveform.

Dimensions of the DM118 / DM118/L shown on fig.4.

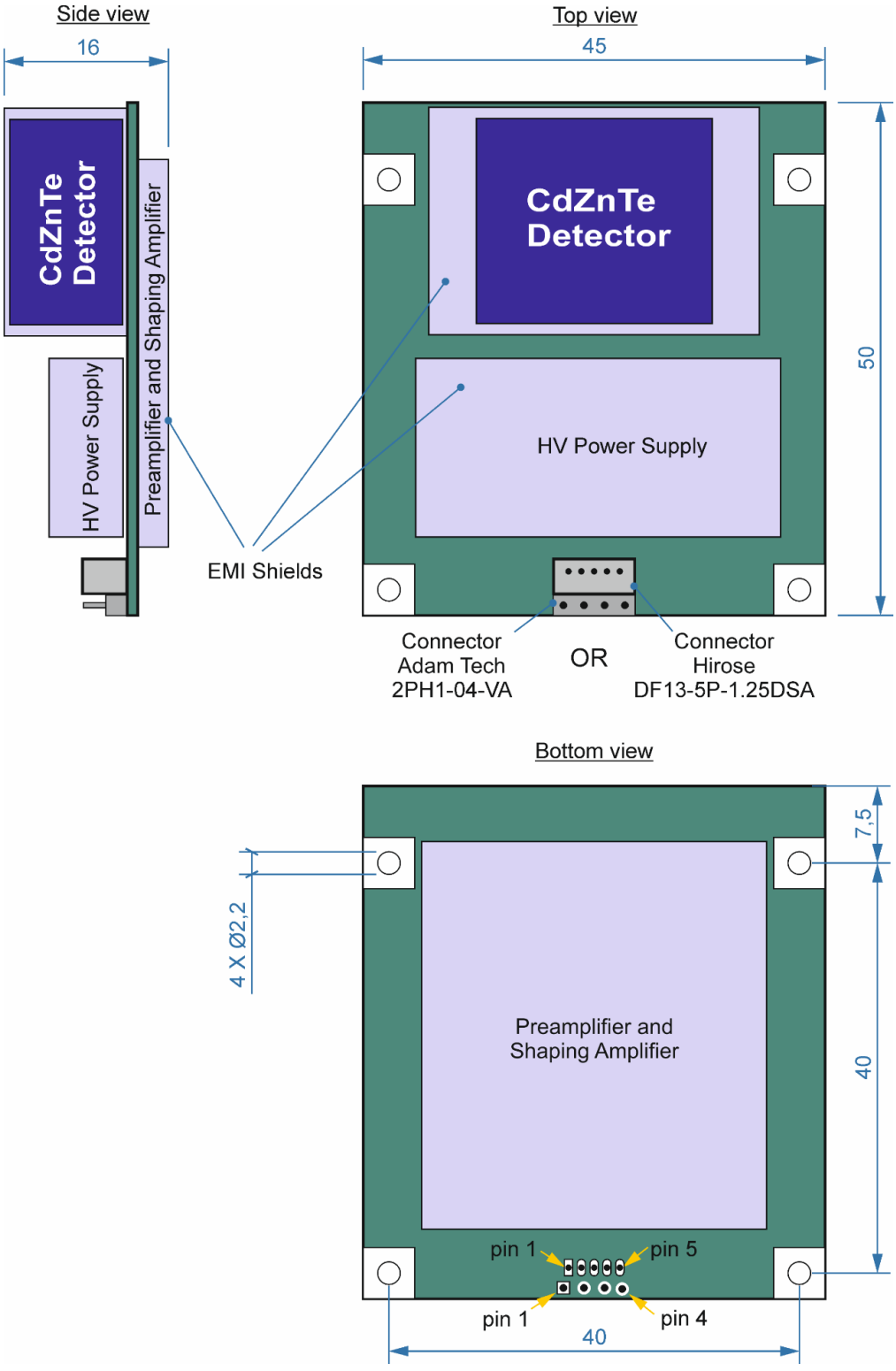

Fig. 4. Dimensions of the DM118 / DM118/L.

3. SAFETY AND PRECAUTIONS

- The Detection Module EMI shields have a thin wall and should not be strongly squeezed.
- Do not remove the EMI shields, this may cause product breakdown.
- Do not disconnect the connector while the high voltage is on and for 2 minutes after system is shut down.