



CUSTOM DETECTORS

Photo-diodes

for Synchrotron Applications

Single or multiple junction on ceramic board Electron Beam Detector Si Photodiodes.



FEATURES

- Single or multiple junction on ceramic board
- Thin junction entrance window: <50 nm
- Low dark current, typically below 1 nA/cm²
- Active area: 50 to 550 mm², different shapes or custom design request are possible
- Diameter hole in center: standard 4 mm, sleeve: 16x3 mm
- No optical window

ADVANTAGES

- Fast read-out (from ns to ps (FWHM))
- Used in photovoltaic or biased mode

APPLICATIONS

- Direct detection of low energy (>1 keV) electron beams with high sensitivity
- Backscattered electron for scanning electron microscope (SEM)
- Photo diodes for synchrotron applications
- Electron Micro Probe analysis for non-destructive chemical analysis



CHARACTERISTICS

Parameter	AOPF-4CT-24*24	ANPD300	ANPF-16CT	Unit
Incident electron energy range	1-250	1-250	1-450	keV
Active area	23.9 x 23.9	300	300	mm ²
Opening	3 x 16	Øin: 4	Øin: 4	mm
Chip dimensions	26 x 26	24 (flat to flat)	24.4 (flat to flat)	mm
Board size	Ø 38 CB	Ø 30 CB	Ø 30 CB	mm
Number of segments	4	1	4 - 16	
Pad capacitance	<28	<65	<2	pF
Operating voltage	80-120	80-140	250-400	V
Operating temperature	-20/+40	-20/+40	-20/+40	°C
Storage temperature	+100	+100	+100	°C
Resolution (Electronic noise)	<7	<11	<15	keV
Junction window thickness	<50	<50	<50	nm
Chip thickness	500	500	1000	um

Table 1

SILICON CHARGED PARTICLE DETECTORS

Depletion Depth (Range in um)	Maximum Electron Energy (MeV)
100	0.11
300	0.23
500	0.32
700	0.40
1000	0.52

Table 2. Electron Range and PIPS® Depletion Depth

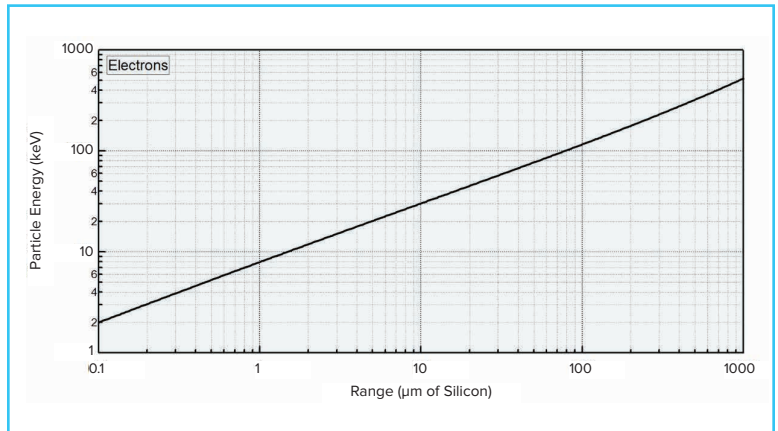


Figure 1: Energy range for electrons in silicon

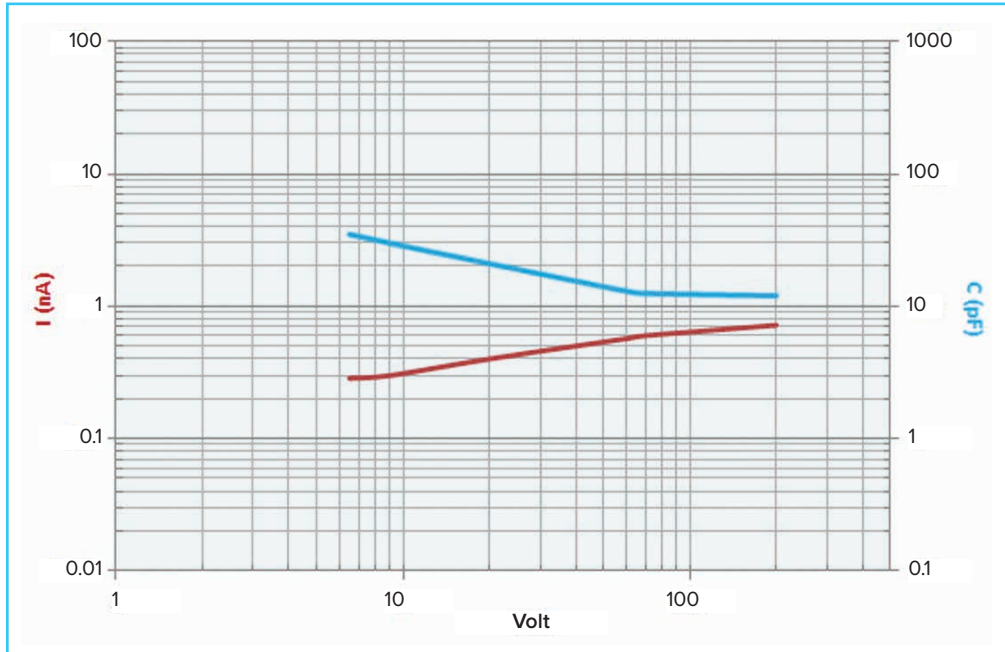


Figure 2: IV/CV measurement of a typical electron beam detector

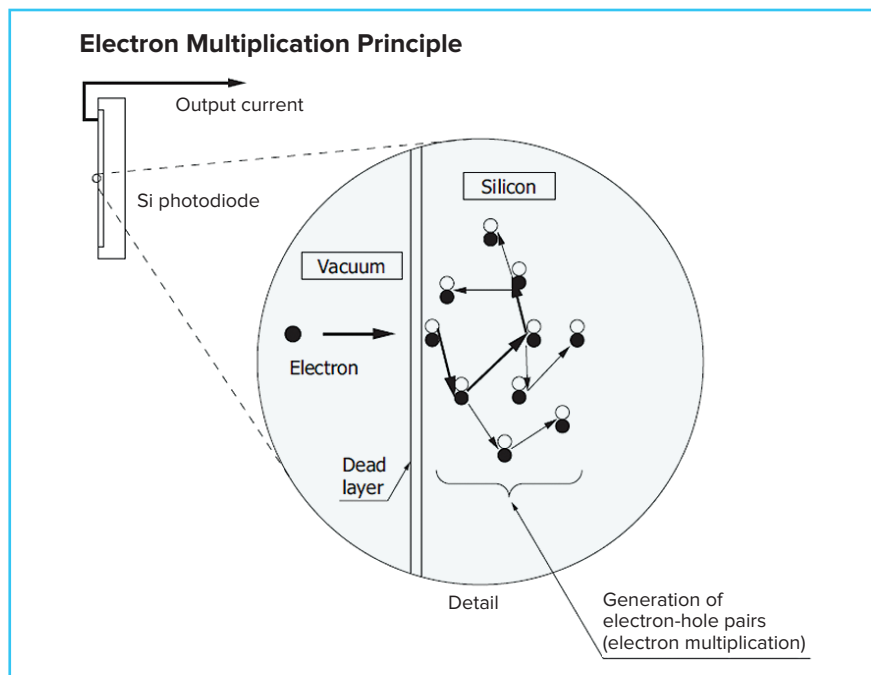
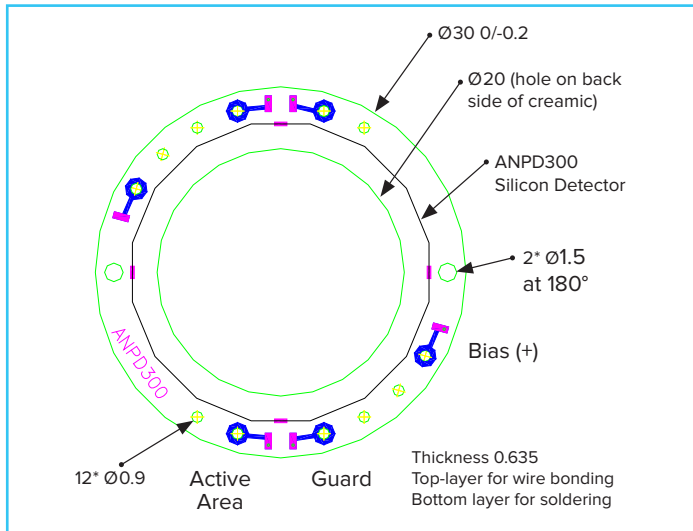


Figure 3: Generation of electron-hole pairs

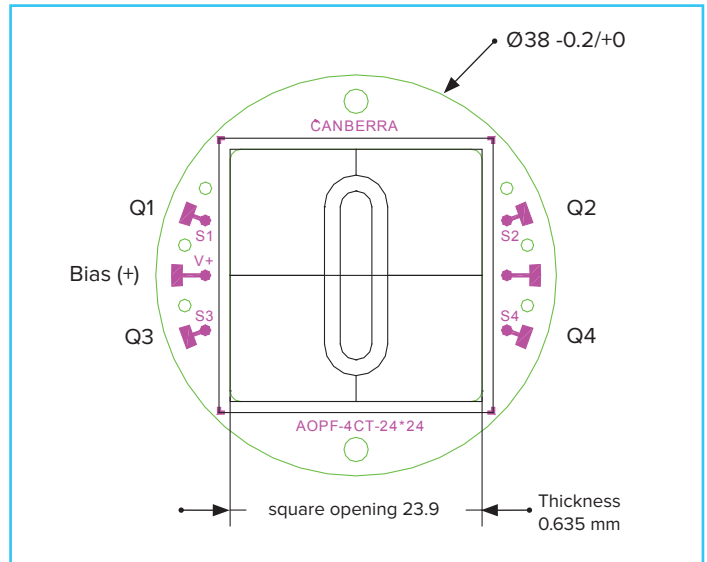
Photo-diodes | FOR SYNCHROTRON APPLICATIONS

DIMENSIONAL OUTLINES (UNIT: MM)



ANPD300 ceramic board, available with contact pins or wires

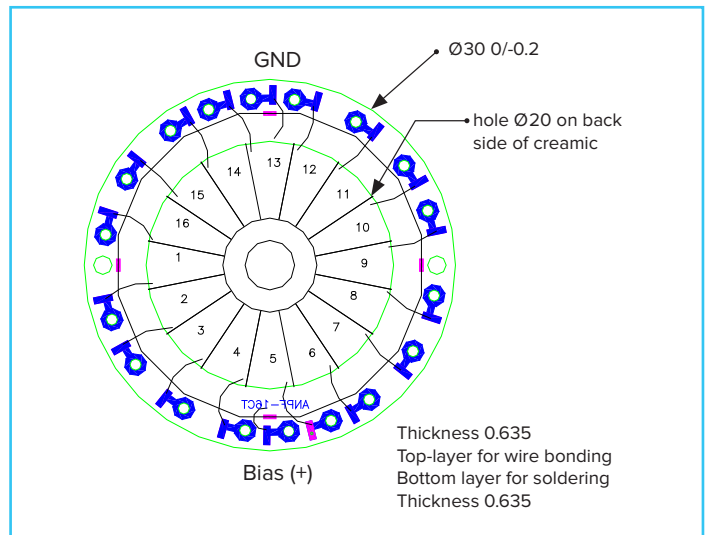
CUSTOM DESIGN MODELS



AOPF-4CT-24x24 ceramic board

Recommended Soldering Conditions

- Before soldering:
 - For PCB's: Bake out the PCB at 90-120 °C during 4 hours to prevent sputtering
 - Ceramics: Pre-heating of the board at 100 °C
- Use appropriate solvents for cleaning: ethyl alcohol, isopropanol
- When using SnPb solder, the maximum Au metallization layer thickness is 1 µm (if thicker, first remove the Au layer)
- For soldering on a Ni layer: use an Ag filled Sn62 solder
- Recommended soldering temperature: between 280 °C to 330°C



Thickness 0.635
Top-layer for wire bonding
Bottom layer for soldering
Thickness 0.635

