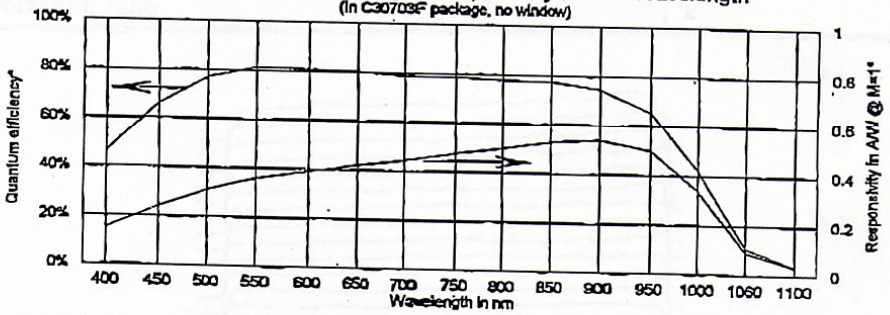
EG&G OPTOELECTRONICS Canada

C30703E/F Series
10 x 10 mm Silicon Avalanche Photodiodes

**DEVELOPMENTAL TYPE - PRELIMINARY PRODUCT ANNOUNCEMENT**

| Features: | Applications: |
|---|---|
| ■ Rugged solid-state detector<br>■ Proven reliability, planar processing<br>■ Time constant <5ns (or 2.2 $R_L C_d$, whichever is greater)<br>■ Low dark current and noise<br>■ Operating voltage < 500V<br>■ 400 to 1100 nm response<br>■ Immunity to electromagnetic fields<br>■ Small application specific packages | ■ Photomultiplier replacement<br>■ High speed photometry & spectrometry of weak sources<br>■ Particle physics, both direct detection and use with scintillators<br>■ Extending the sensitivity of instruments using silicon PIN detectors |

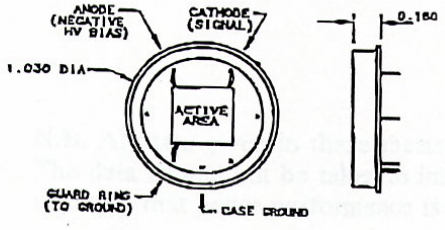
APD Quantum Efficiency & Responsivity versus Wavelength
(In C30703F package, no window)



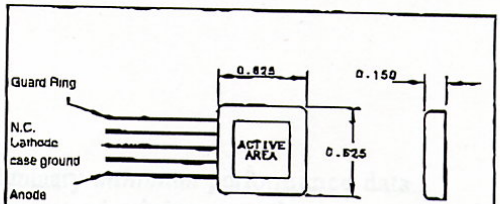

* Note that neither Q.E. nor the Responsivity at a Gain of 1 can be directly measured for reachthrough APD's

EG&G Optoelectronics Canada, (formerly RCA), has been the world leader in silicon avalanche photodiodes for over twenty years, a leadership based upon constant evolution and improvement of our planar processed "reachthrough" APD structure. Our standard product line has now been extended to include 10 x 10 mm APDs. These detectors offer lower operating voltages, lower dark currents, better blue and green response, and much shorter tails (faster fall times) than alternative products.

Package drawings show actual size.



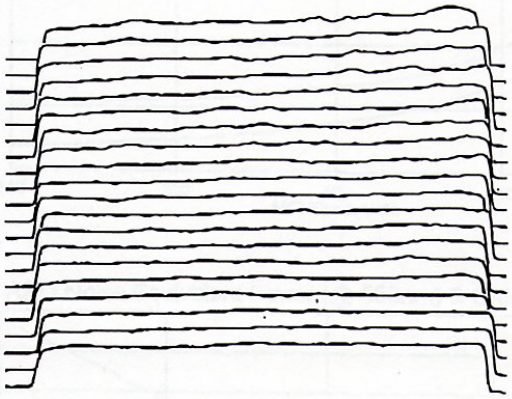

C30703E for photometry/spectrometry




C30703F for particle physics

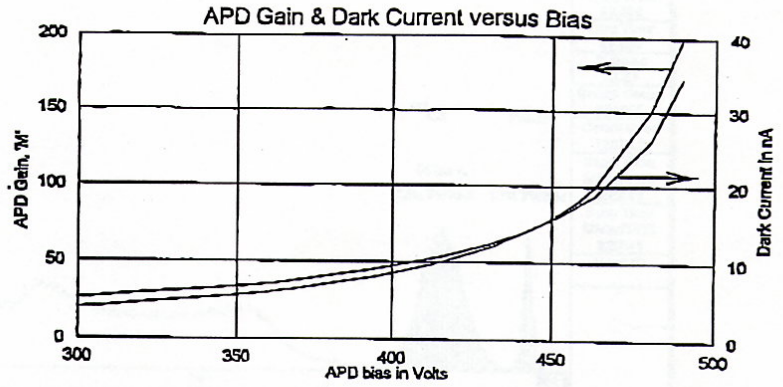
Typical electro-optical performance limits are as follows:

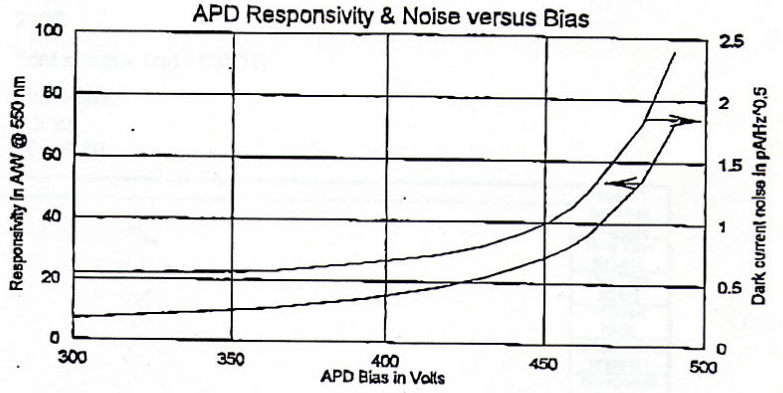
| | | |
|---|---|---|
| Minimum achievable gain | 50 | M |
| Operating bias at M = 50 | 400 to 450 Volts | $V_{op.}$ |
| Bias voltage temperature dependance | 2.4 V/°C. | dV/dT |
| Capacitance | 100 pF | $C_d$ |
| Dark current at M = 50 (surface + multiplied bulk) | 10 nA. | $i_d$ ( = $i_s$ + ($i_b$ x M) ) |
| Dark noise at M = 50 | 0.7 pA/√Hz | $i_n$ |
| Responsivity at M = 50 @ 550 nm | 16 A/W | $R_I$ |
| Ionization ratio | 0.02 | 'k' |

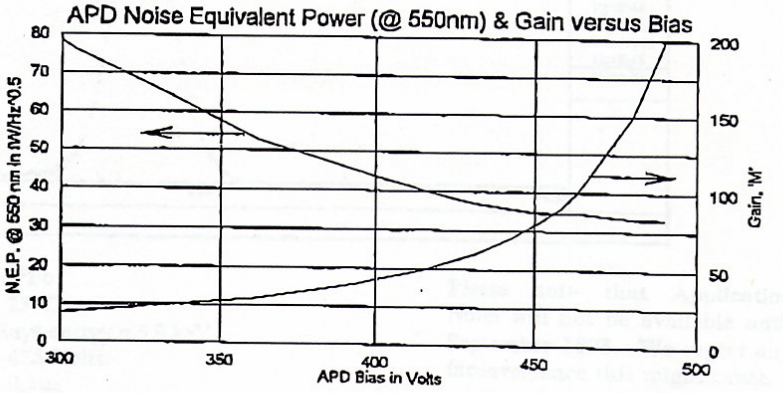


**C30703E gain uniformity scan at M = 50**

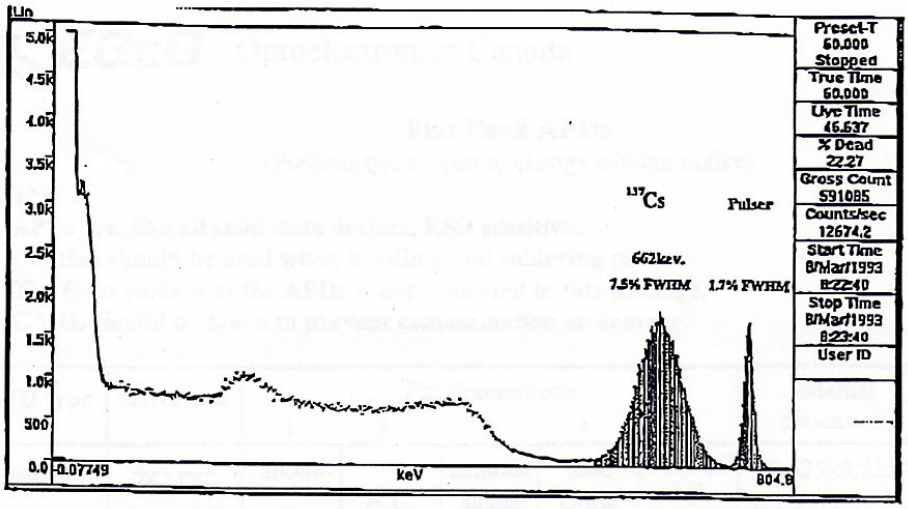
N.B. All data given in these sheets is preliminary *minimum* performance data. The data should not be taken to imply a guaranteed minimum performance, nor to imply that better performance is unavailable.



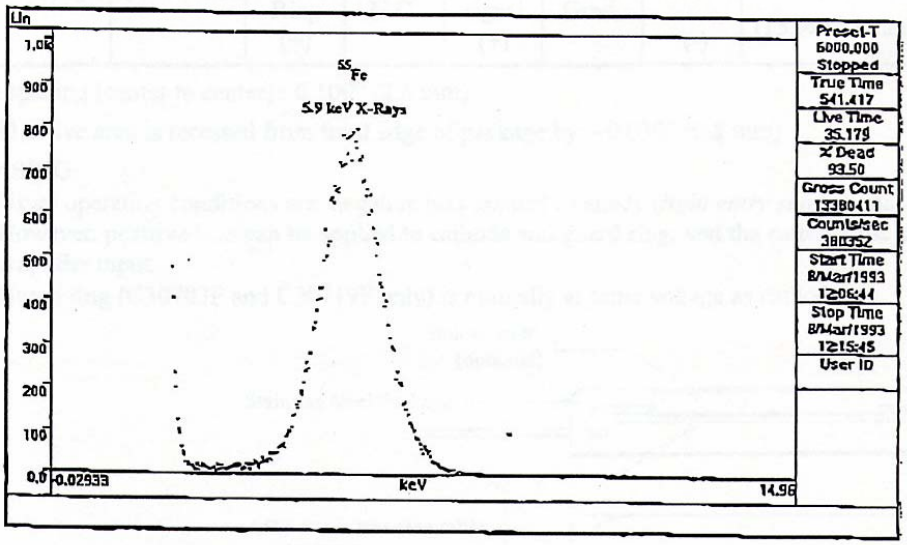




**Typical bias dependance of APD parameters.**




Radioactive Source: $^{137}$Cs
Temperature: 23°C
Crystal: 1cm x 1cm x 1cm - CsI(Tl)
HV= 425 Volts.
Shaping Time : 0.5 µs
Amplifier Gain : 10 x 9.50




Radioactive source: $^{55}$Fe
Tempetature: 23°C
Direct detection X-Rays energy = 5.9 keV.
HV: 425 Volts.
Shaping Time: 0.5µs
Amplifier Gain: 30 x 10

Please note that Application Notes will not be available until September 1993. We regret any inconvenience this might cause.

For further information please contact your local EG&G Optoelectronics Canada representative or EG&G Optoelectronics Canada, 22001 Dumberry Road, Vaudreuil, Quebec J7V 8P7 Canada
Tel: (514) 424-3300 Fax: (514) 424-3411

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EG&G Optoelectronics Canada

# Flat Pack APDs

(Preliminary, subject to change without notice)

**WARNING :**

- **APDs are, like all solid state devices, ESD sensitive. Caution should be used when handling and soldering pins.**
- **The front surface of the APDs is not protected in this package. CARE should be taken to prevent contamination or damage.**

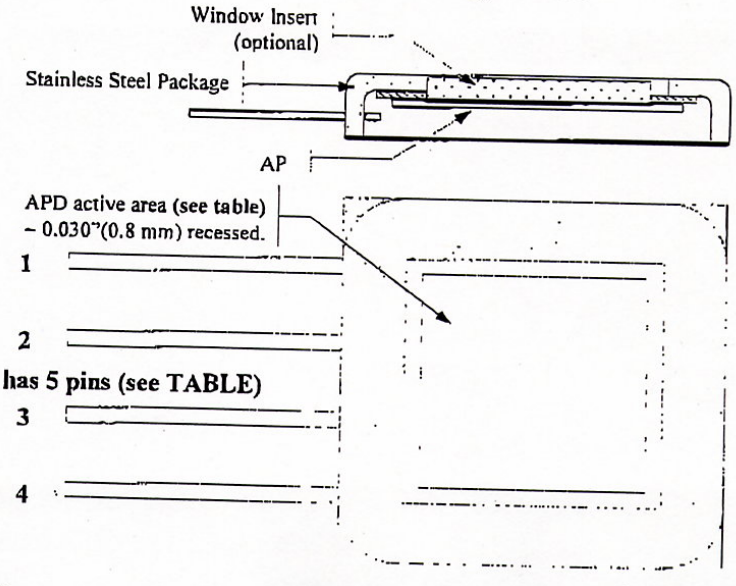
| APD type | active area | Pin Connections 1 | 2 | 3 | 4 | 5 | External dimension | Package thickness |
|---|---|---|---|---|---|---|---|---|
| **C30626F** | 5x5 mm | anode (-) | N.C. | cathode signal (+) | case Grnd. | | ~0.525x0.525" (13.3x13.3mm) | 0.140" (3.5mm) |
| **C30719F** | 5x5 mm | anode (-) | Guard Ring | cathode signal (+) | case Grnd. | | ~0.525x0.525" (13.3x13.3mm) | 0.140" (3.5mm) |
| **C30703F** | 10x10 mm | Guard Ring (+) | N.C. | cathode signal (+) | case Grnd. | Anode (-) | ~0.625x0.625" (15.9x15.9mm) | 0.140" (3.5mm) |

] Pin spacing (center to center) : 0.100" (2.5 mm)

] APD active area is recessed from front edge of package by ~0.030" (0.8 mm)

] BIASING:

- Usual operating conditions are: negative bias applied to anode (*light entry side*). signal taken at cathode. However, positive bias can be applied to cathode and guard ring, and the cathode AC coupled to the pre-amplifier input.
- Guard ring (C30703F and C30719F only) is normally at same voltage as cathode.




**NOTE: C30703F has 5 pins (see TABLE)**