

## > XG CSA098 / 099 / 100

### Charge Sensitive Amplifier for Radiation Detectors

CSA098/099/100 are charge sensitive amplifiers designed to read different types of solid-state photodetectors with selectable polarity. They are available in two different package options, QFN12 (Q) and PSOIC16 (S) and cover three different detector capacitance ranges.

#### Main Features

**Polarity:** electrons or holes collection, selectable

**Supply voltage:**  $\pm 2.5$  V and -6 V

**Detector capacitance:** see Table 1

**Feedback capacitance:** 50 fF

**Gain:** 0.9 mV/keV for Silicon detectors

**ENC:** 25e- @ 1 $\mu$ s

**Reset:** continuous or pulsed

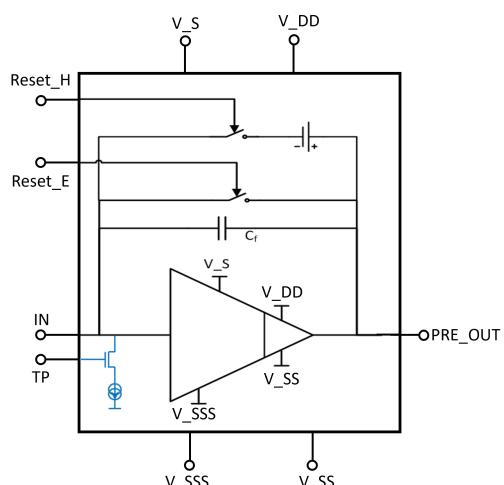


Figure 1. Circuit schematic of the CSA preamplifier

#### Applications

- X and Gamma rays spectroscopy
- Particle physics experiments
- PIN diodes
- CdTe or CZT detectors
- High purity germanium detectors
- Strip detectors

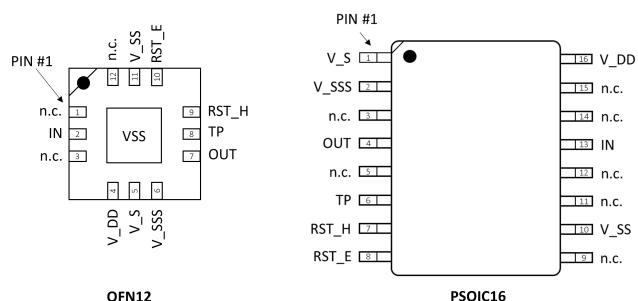
PART NUMBER	PACKAGE	BODY SIZE (mm)	PART IMAGE
CSA098Q CSA099Q CSA100Q	QFN12	3 x 3 x 0.8	
CSA098S CSA099S CSA100S	PSOIC16	10.4 x 10.16 x 2.5	

Table 1. CSA package options

## CSA Pin layout

NAME	DESCRIPTION
IN	Input of the CSA
V_DD, V_S, V_SS, V_SSS	Power supply
OUT	Output of the CSA
TP	Test pad. TP can be used before connecting the detector to check the correct functionality of the CSA
RST_H, RST_E	Input signal to reset the preamplifier. If not used don't connect.

Figure 2. PIN layout



## CSA Electrical characteristics

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
V_out_reset	CSA output after reset	Electrons reset Holes reset		0.87 4.00		V
I_leak	CSA leakage without detector			0.4		fA
ENC (@1μs)	Equivalent noise charge	CSA98Q/S CSA99Q/S CSA100Q/S		25 / 28 26 / 29 29 / 33		e
T_rise	CSA risetime of the output to a charge pulse at the input	CSA98 CSA99 CSA100		30		ns
C_in	Input capacitance	CSA98 CSA99 CSA100		1260 2120 3950		fF
Cf	Feedback capacitance			50		fF
CLoad	Capacitance load drive				30	pF
P	Power consumption	CSA98 CSA99 CSA100		20 27 27		mW

Table 2. Electrical characteristics at  $T_a = 25C$ ,  $V_{DD} = 5 V$ ,  $VSS = 0 V$ ,  $V_S = +2.5 V$ ,  $V_{SSS} = -4V$ .  $Cdet = C_{in}$  (no detector)

## Typical Performance

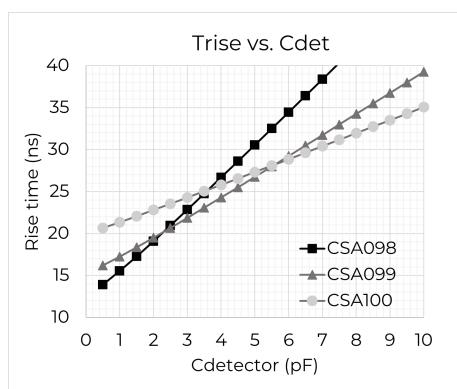


Figure 3. CSA rise time vs Capacitance at the input

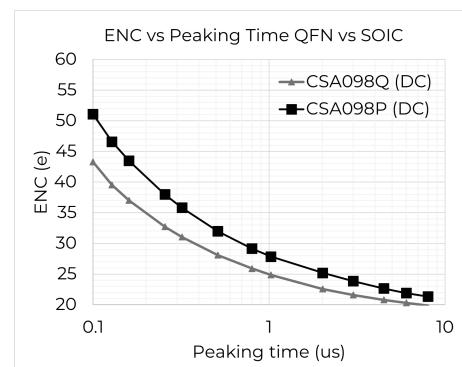


Figure 4. ENC without detector with QFN package in DC coupling and pulsed reset

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