# PGA970EVM defects

The PGA970EVM evaluation board has two defects in the PGA970 chip. The first one is a waveform generator defect, the second one is a measured signal amplifier defect.

<u>Waveform generator defect.</u>

**The DAC (digital-to-analog converter) sample rate of the waveform generator of the PGA970 chip is 532 kHz, instead of 1 MHz.**

According to the specification, the DAC sample rate, should be 1 MHz (Figure 1). This parameter is set by design and cannot be changed by the chip settings or during its operation under the influence of other factors.



| PGA970 |
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## 6.9 Electrical Characteristics – LVDT Primary Supply Waveform Generator

| PARAMETER | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
| --- | --- | --- | --- | --- | --- |
| DAC resolution | | | 14 | | Bits |
| DAC range | | | 1.25 | | V |
| DAC sample rate | | | 1 | | MHz |
| Waveform generator FIFO depth | | | | 256 | 14-bit samples |

Figure 1 – PGA970 FULL Datasheet Rev A, page 7

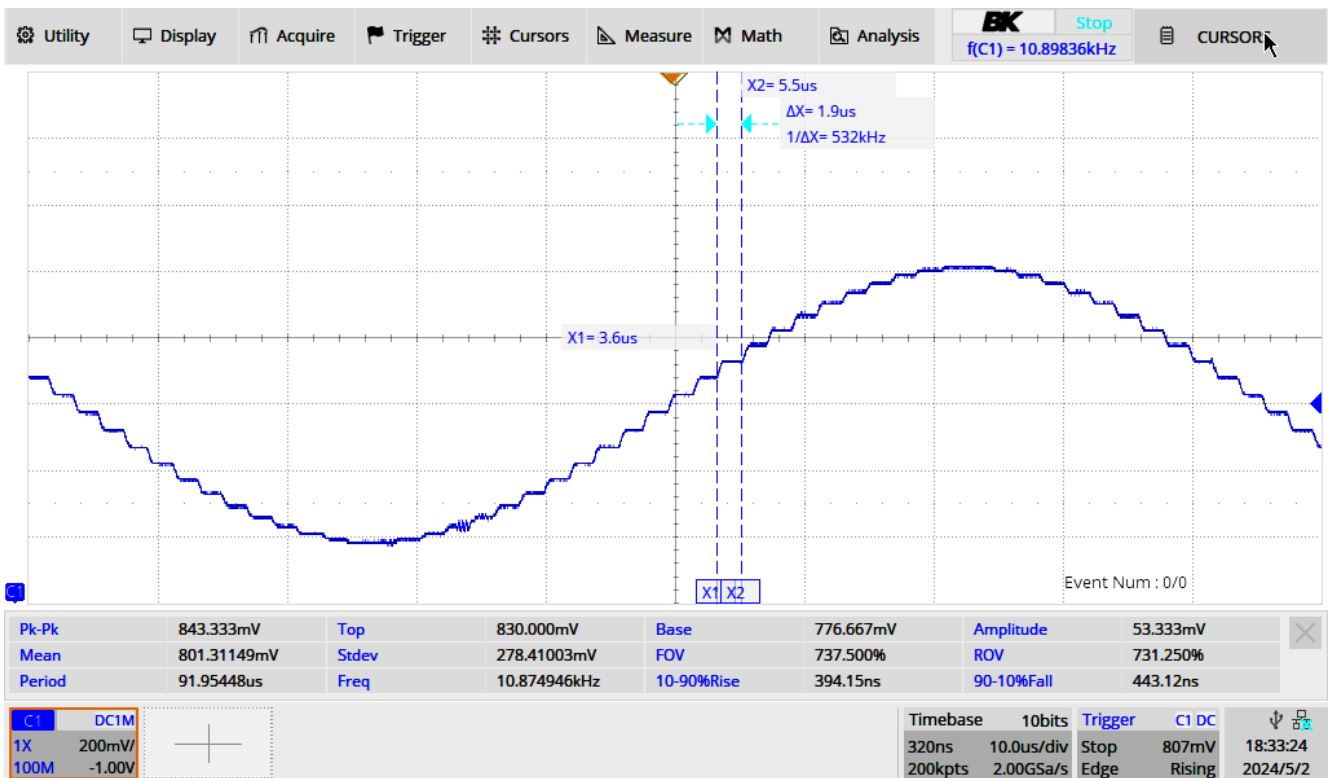The real DAC sample rate of waveform generator is 532 kHz (Figure 2).



Figure 2 – Oscillogram of the generated signal with the waveform frequency set to 20 kHz

Deviation of this parameter leads to incorrect operation of the waveform generator. In particular, to the generation of a waveform with a frequency that does not correspond to the parameters set by the PGA970 settings: 10.87 kHz instead of 20 kHz, 5.22 kHz instead of 20 kHz, etc. And to incorrect measurement of the signal amplitude by the PGA970 at high frequencies due to the discrepancy between the actual frequency and the set one.

<u>S1 S2 amplifiers defect.</u>

**The gain step "2" of the amplifiers S1 and S2 of the PGA970 chip is not valid.**

According to the specification, amplifiers S1 and S2 have 4 gain steps: "1", "1.33", "1.67" and "2" (Figure 3).

| 6.12 Electrical Characteristics – S1 and S2 Gain | | | | | |
|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITIONS** | **MIN** | **TYP** | **MAX** | **UNIT** |
| Gain steps (2 bits) | Gain control bits = 00b at dc | | 1 | | V/V |
| | Gain control bits = 01b | | 1.33 | | |
| | Gain control bits = 10b | | 1.67 | | |
| | Gain control bits =11b | | 2.00 | | |

Figure 3 – PGA970 FULL Datasheet Rev A, page 8

When setting the "ADC1 Gain" and "ADC2 Gain" to "2" in the settings of the PGA970 chip, the signal is not amplified. The amplitude value of the signal is the same as with gain step "1".