

## PID ASIC Change

PID sensors issued February 2016 and later have been updated with a new Application-Specific Integrated Circuit (ASIC) that offers improvements in performance. This ASIC is a silicon chip custom designed and manufactured for the Ion Science PID sensor exclusively supplied by Alphasense.

### What are the improvements?

The PID lamp is illuminated by a high frequency electromagnetic field. Unlike other PIDs which use free-oscillating circuits, our PID uses a custom ASIC to illuminate the lamp with three advantages:

1. The circuit oscillates more reliably than competitive circuits, an advantage especially at extreme temperatures.
2. Whereas competitors use a fixed frequency circuit, this ASIC hunts and latches onto the lamp's resonant frequency, refreshing regularly. This results in lower power, no sensitivity hopping and better lamp efficiency. This optimised frequency means that the PID temperature dependence is best of class with tighter reproducibility and a small improvement of sensitivity temperature dependence (see figure 1).
3. Ion Science has also improved the signal-to-noise (S/N) ratio. This means greater sensitivity, giving the PID-AH and PID-A1 an even better Limit of Detection (LoD).

### How does this affect you?

1. The new ASIC (Type 2) does not change linearity, signal range, response time or other performance specifications. See our updated Technical Data Sheet.
2. Sensitivity temperature dependence is improved (figure 1), but you should not need to modify your correction algorithm since the temperature dependence has been a modest correction - please check your algorithm against the graph below.

The new ASIC PID does have a slightly greater start up current: 130 to 140 mA for the first 10 ms, compared to about 120 mA for the older PIDs. This rapidly decays to around 23 mA (at 3.0 V) in 50 to 150 ms over a temperature range of -30 to 70 °C (see figure 2). Your circuit design therefore should be capable of supplying this initial surge current for the duration to strike the lamp reliably.

For further information, please contact [sensors@alphasense.com](mailto:sensors@alphasense.com)

Effect of temperature on sensor response

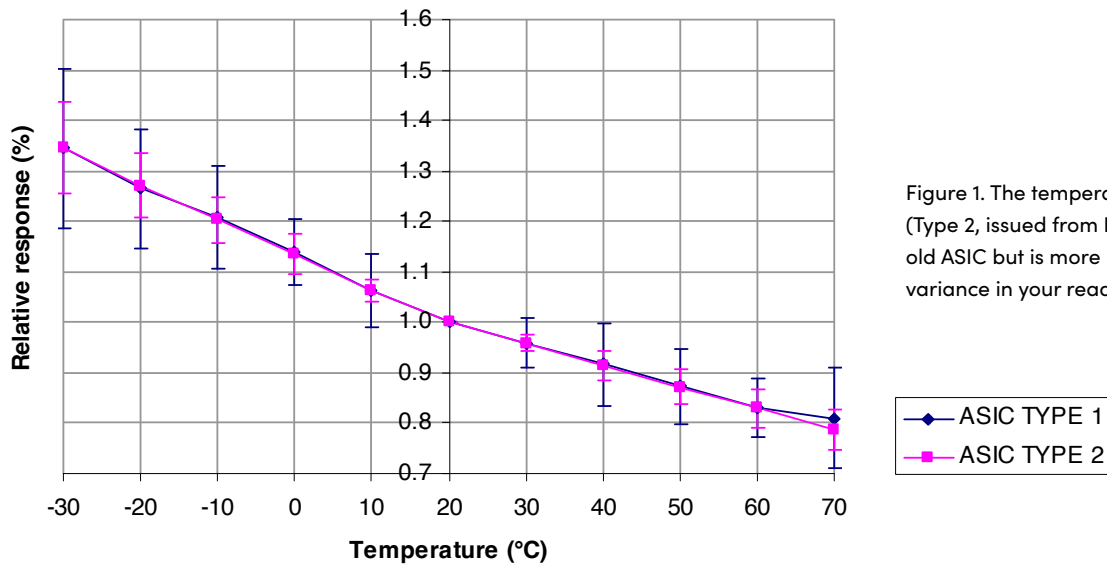


Figure 1. The temperature profile of the new ASIC (Type 2, issued from February 2016) is similar to the old ASIC but is more reproducible thus reducing variance in your reading.

Type 2 ASIC current draw at 3.0 V

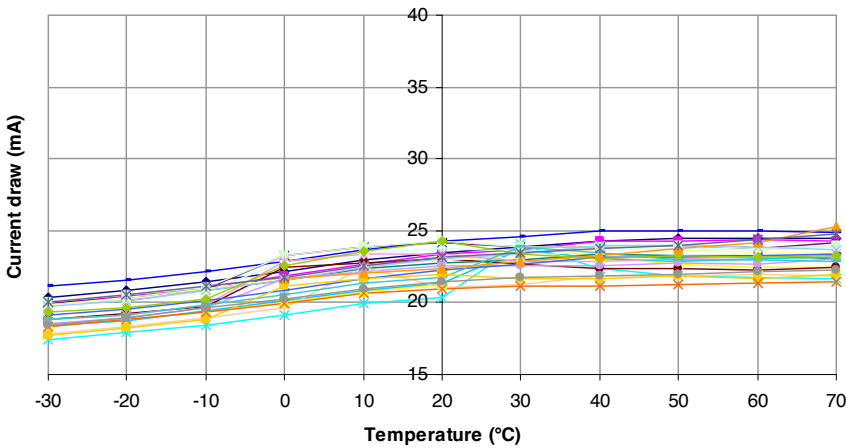


Figure 2. PIDs with the new ASIC show reproducible power consumption over a wide operating temperature enabling a greater degree of stability in your set-up.