

1. Grounding types

1.1 DGND (Digital GND)

1.2 AGND (Analog GND)

- For components that require a dedicated analog power supply like controllers for a dc-dc converter
- If you're dealing with something like a digital to analog converter, analog to digital converter, and then they have these different pins on them, DGND and AGND are referring to two different references in the system that are used for measuring the input signal and then outputting the proper signal level on the digital interface, or vice versa if you're dealing with a DAC.

1.3 SGND (Signal GND) (Secondary side of the package)

1.4 PGND (Power GND) (Primary side of the package)

- For the non-isolated components like dc-dc, SGND and PGND are going to be connected somewhere at a single point, and if they are used, they have to be separated in order of galvanic isolation.

1.5 GND

- Other components that don't have all this separation are just going to use a very simple ground, GND, which means the same ground everywhere.

2. Grounding loops

➤ What causes ground loops?!

A potential offset is created between for example two grounds, but a potential offset on its own doesn't really count until interfacing the components with each other, then a big loop has been created which takes the first ground connection on the second ground connection, and now this voltage offset between these two grounds can then cause some current to flow along this loop.

This is a ground loop.

➤ how to prevent ground loops?!

what can be done is rather than connecting to two different ground points that already have a potential between them, we basically can just connect to one ground point, so that they share the same exact reference conductor

But this is not the only solution because a ground loop can also be created between one ground connection and a metal side inside of a shielded enclosure.

So, to avoid it we need to know the reasons behind the ground loop:

1. Reception of a stray magnetic field develops a voltage offset and then that can cause some current to flow along the loop
 2. If the earth only connects at one point, you then have a path into the chassis, the chassis does have a path to the other mounting hole, but this other mounting hole doesn't have a path back over to this earth connection.
- The solution is that you can use these mounting holes as chassis connections and you can also use them as safety grounds, for example, if you have a connector on the other side of the through hole component that is not connected to the earth with some shielding on the connector housing.
 - All of that can be used to then access the safety ground. But again, because you're not putting a direct connection, you're actually not creating a ground loop

The following image describes the above explanation



Figure 2.1