Q'n Apps #E20

Q: What about connecting Power and Ground?

Power and Ground on the DUT board

When connecting your DUT power pins to the tester power supplies, several basic concepts should always be applied (or at least considered). Here are some important considerations:

Power and Sense
The DUT power supplies inside of the test system provide programmable Vdd at the DUT board, as well as the sense lines for each supply. The sense lines are joined in surface etch on the DUT board at the supply block and should be severed at this point to allow connection right at the device power pin(s). This is crucial for effective Iddq measurements. Be sure to connect the Power supply minus to Ground on the DUT board. If you do not comply, your ground may "float" relative to the ground inside the tester, and thereby yield inaccurate parametric measurements and supply performance.
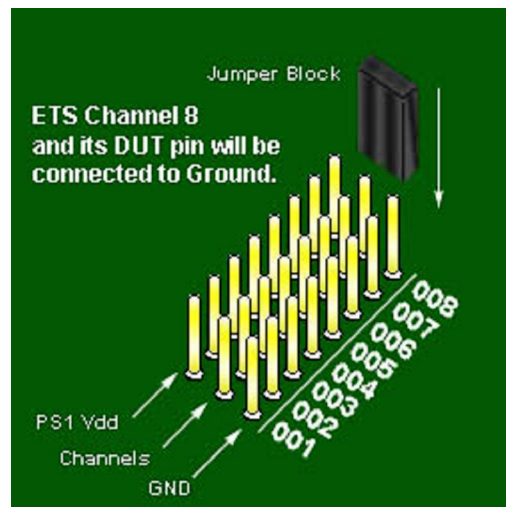
Bypass Capacitors
You will need .01 and/or .1 uf bypass capacitors right at the power pins of the DUT chip socket for a local reservoir of power. Keep the leads as short as possible, and No Electrolytics! The farther your DUT is from the Power Supply, the more important are these capacitors.

Continuity
You may wish to create a SET file that includes the power and ground pins, solely for the purpose of checking continuity. These pins are typically connected directly to power and ground and do not get assigned to tester channels and so are excluded from continuity tests. Note: This applies only when power and ground pins are also connected to tester channels; custom DUT boards that do not connect power and ground pins to tester channels are N/A for this issue. Also, you may need to remove Power and Ground jumpers to give the tester channel control over the DUT pin, just for the continuity test. For this reason, many forego continuity tests on Power and Ground pins.

Power and Ground Alternatives
In the quest for ways to make DUT boards more universal, some users have designed their own custom DUT boards that allow for redefinable power assignments. This is accomplished by a DUT board that connects each DUT socket pin to a tester channel but also connects them to rows of stickpin connectors. Each row of signal stickpins is sandwiched between a row of Ground stickpins and a row of Power Supply stickpins. Standard jumper blocks (such as those used to ID drives and motherboard signals in PCs) are used to connect selected DUT pins to Vdd or Ground.

"Universal" Power and Ground Jumpering

The primary disadvantage to this scheme is that when more than one supply voltage is needed by the DUT, connection to different supplies may be necessary. With a little thought, you can apply this concept in other ways to arrive at the same convenience.

Related info
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Q'nApp #E9: Iddq Testing
Q'nApp #E18: Prober Interface
Q'nApp #E22: Bypass Capacitors