The HP 8114A as a current source
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The 8114A outputs a constant-current pulse under the following conditions:

1. The source resistance is set to Hi-Z

2. The product of load current and load resistance cannot exceed 100 V.

Why isn't it possible to get constant current with 50-ohm source resistance?
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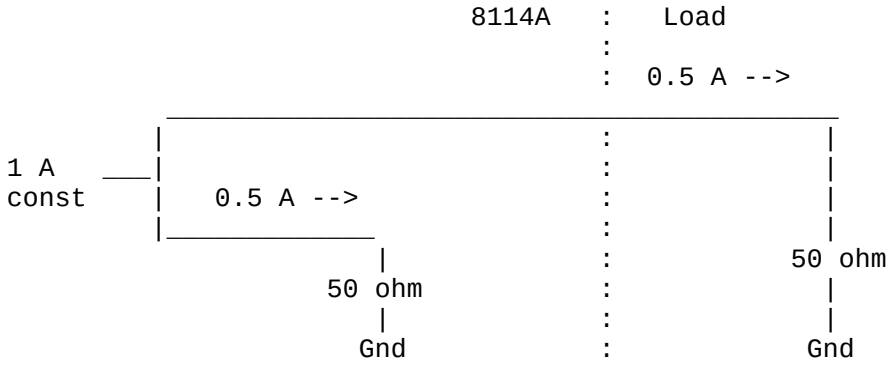
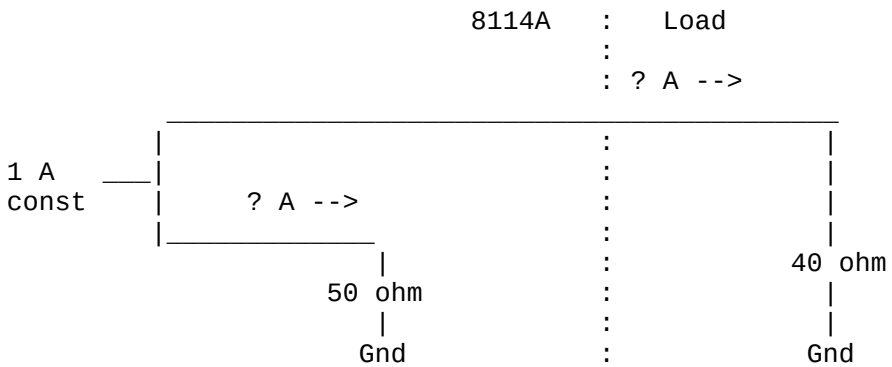
This is so because two different potentials cannot exist across the load
and source resistances at the same time.

To illustrate this, suppose we have a 50-ohm source resistance, a 50-ohm load,
and a current of 0.5 A through the load:




Now suppose the load resistance were to change to 40 ohm. If the current
through the load were to remain 0.5 A, the voltage across it would be 20 V.
And this is not possible when the voltage across the source remains 25 V!:




What happens, of course, is that the total current remains constant but the
branch currents scale themselves like this:

$$40\ I_{load} = 50\ (1-I_{load})$$

so that $I_{load}$ increases to 0.55 A in this case.

## Other considerations with constant-current sourcing

Hi-Z source impedance is a must so:

- constant-current sourcing with offset is not feasible,
- reflections can be more of a problem. If device has a resistance <50 ohm, put a series resistor near the device so that the total load is 50 ohm for best pulse performance.