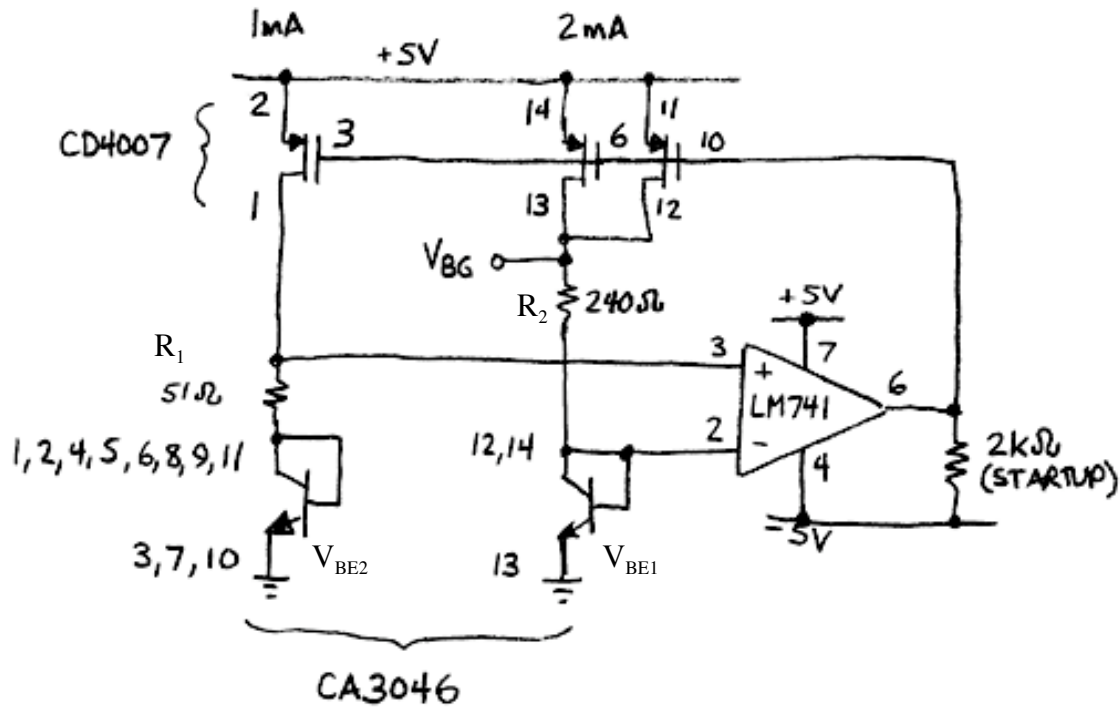


BANDGAP VOLTAGE REFERENCE

Here's the bandgap circuit covered in Friday's lecture:



The CA3046 is a 5 NPN transistor array. Its data sheet is available on the course website.

You will probably need to adjust the 240Ω resistor value to achieve the bandgap voltage of $V_{BG} = 1.205V$. Once that's done, check the various voltages throughout the circuit (is the ΔV_{BE} across the 51Ω what you expected based on the analysis in lecture?). Note the room temperature values of V_{BE1} , V_{BE2} , ΔV_{BE} , and V_{BG} .

If you have access to a heat gun (or hair dryer, or some other means of heating up the CA3046 array), go ahead and blast some hot air on the CA3046 chip. Measure the new values of V_{BE1} , V_{BE2} , ΔV_{BE} , and V_{BG} . Do the changes correspond to what you expected based on the analysis in lecture? Note that the behavior may not be as good as expected: the lecture analysis depends on the ratio between resistors R_1 and R_2 tracking over temperature. This will happen when both resistors are on the silicon die, but with discrete resistors in the lab the tracking will not be as good.