temperature rise across glue line

Thermal conductivity

Dexter-Hysol EA9361 glue
Thermal conductivity @150K is 0.238 W/m-K (generated by Tom Miller, LBL)
(This is at the low end of the range for epoxies, unfortunately,
but EA9361's charm is that it won't strain the Si.)

[Compare to a thermally-conductive filled epoxy, E&C Stycast 2850FT,
with k = 1.41W/mm-K @150K This glue has a much higher shear modulus,
which would severely strain the Si. Is that important? I don't know.]

Moly and silicon
Thermal conductivity ~=150 W/m-K

So the first thing we see is that we can ignore the
resistivity (1/conductivity) of the moly and silicon.
The Si CCD should be isothermal, characteristic dimensions
of glue and Si being in the same ballpark, which they are.

Heat loads

Radiative
The 2K x 2K CCD is 32.7 x 33.7 mm, just a little bigger than the
proposed SNAP CCD. Let's say it sees 300K (~80F) surfaces and has
a view factor of those surfaces of about 1/3 and the CCD is at 140K.
Then
Q = (1/3)*5.67E-8*(300^4-140^4)*32.7*33.7/(1000^2) = 0.16 W

Dissipative
Each corner of the CCD dissipates ~.01 W for a total of .04 W.

Sum of heat loads = .20 W

Thermal path
There are 22+ dots of glue. Each has a path length of 0.5 mm.
(.0005 m) Their diameters are supposed to be 5 mm, but some
glue stuck in the glue mask, so their diameters are actually
4.1 mm. [We can fix this.] So currently the cross sectional
area of each dot is (pi/4)4.1^2 = 13.2 mm^2 = 1.32E-5 m^2 but
it should be 1.96E-5 m^2, a factor of 1.5 better.

The heat carried by each dot is .20/22 = .0091 W

delta T = L*Q/(A*K) = .0005*.0091/(1.32E-5*0.238) = 1.45 K

Variations

Let's say the view factor is perfectly awful (far far worse than SNAP),
and is 100%. Then the heat load per dot is .024 W and delta T goes up
to 3.8 K.

Let's say we correct the dot diameter problem. New delta T with 1/3 view factor = 0.98 K

New delta T with 100% view factor = 2.9 K

Temperature swings

Only the dissipative load swings; the radiative load is constant. Therefore, the CCD temperature will stay constant in proportion to how much of the .04 W is turned off and on. .04 W is 20% of the total, so the swing should be 0.2 K, worst case.