

LSST CCD Array Requirements

Priority

High	
Moderate	
Low	

	Allowable Range	Target	Units
Physical:			
Format(1-side)	>= 2048	>= 2048	pixels
Pixel size	8-12	10	microns
Flatness Deviation	<=10	<=5	microns
Outgassing	<10	<5	10 ⁻¹¹
Packaging			
X-axis Metrology	<100	<=25	microns
Y-axis Metrology	<100	<=25	microns
Z-axis Metrology	<10	<=5	microns
Rotational Metrology	<0.035	<=0.025	degrees
Parallelism	<20	<10	microns
non-radioactive material		yes	
Agrigate fill factor (over full array)	>90%	>95%	percent
Buttability	4	4	side
Butting gap (3 sides)	<500	<=250	microns
Butting gap (1 side)	<1500	<=500	microns
Temperture			
Storage	-60 - +50		C
Operating	-60 - -30	-50	C
Cycling Range	-55 - +30		C
Total Cycles	>150	>200	

Electrical:

Max. Pixel rate per ouput		0.5	Mhz
Frame Read Time	<3	<2	seconds
CTE (per shift @500 electrons on each output)			
Parallel	>0.999990 (<2%)	>0.999995 (<1%)	
Serial	>0.999980 (<4%)	>0.999990 (<2%)	
Read Noise	<10	<=6	electrons
Full well	>=70000	>=90000	electrons
Output-output Crosstalk	<0.05	<0.01	percent
Output-output Crosstalk stability	<0.02	<0.01	percent
Non-linearity			
Absolute	<7	<5	%
Stability	<1	<0.5	%
Dark Signal (95th percentile @ -50C)	<4	<2	e-/pixels/sec
Cosmetics			
Bright Pixels	1:4000	1:10000	pixels
Dark Pixels	1:4000	1:10000	pixels
Traps	<20	<10	pixels
Blooming Control (above full well)	>10E5	>10E6	electrons/sec
Charge Memory (residual image)			
after 1 readout	<0.05	<0.02	percent
after 10 readout	<0.005	<0.002	percent
after 100 readout	<0.005	<0.001	percent
Conversion Gain	4-20	5	u-volt/electron
Pixel FWHM (charge spreading)	<10	<7.5	microns

Optical

A-R Coating		broad-band	
DQE			
400nm	>55	>60	%
600nm	>80	>85	%
800nm	>80	>85	%
900nm	>60	>85	%
1000nm	>25	>45	%
Pixel-to-pixel variations	<5	<2	% rms
Variation across device	<15	<10	%
Device DQE Stability			
1 hour	<2	<1	% p-p
1 month	<4	<2	% p-p
1 year	<10	<5	% p-p
Fringing (within centered 100nm bandpass)			
800nm	<10	<5	% p-p
900nm	<15	<5	% p-p
1000nm	<20	<5	% p-p