5. NewGen Array Guideline

Seoul Semiconductor recommends a minimum edge to edge spacing between NewGen 0.2mm. Placing multiple NewGen too close to each other may adversely impact the ability of the PCB to dissipate the heat from the NewGens. Also, the light output for each LED may drop due to optical absorption by adjacent LED packages.

5.1 Efficacy dependency on die spacing

The efficacy of NewGen depends on die spacing, the efficacy drop due to optical absorption by adjacent array of NewGen. The data indicates above 1mm between die spacing, the efficacy variation is saturated. The NewGen array operates at 2W condition, the PCB with the 1.5mm thick Al-MCPCB, 1.5mm X 1.5mm size board (2oz copper).

	D=0.2mm	D=0.4mm	D=0.8mm	D=1mm	D=2mm	D=3mm	D=4mm	D=5mm
Simulation Design								
Efficacy	**96%**	**98%**	**99.6%**	**100%**	**100.2%**	**100.3%**	**100.4%**	**100.4%**

	D=0.2mm	D=0.4mm	D=0.8mm	D=1mm	D=2mm	D=3mm	D=4mm	D=5mm
Device Design								
Efficacy	**92.6%**	**95.4%**	**98.4%**	**100%**	**101.2%**	**101.5%**	**101.7%**	**102%**

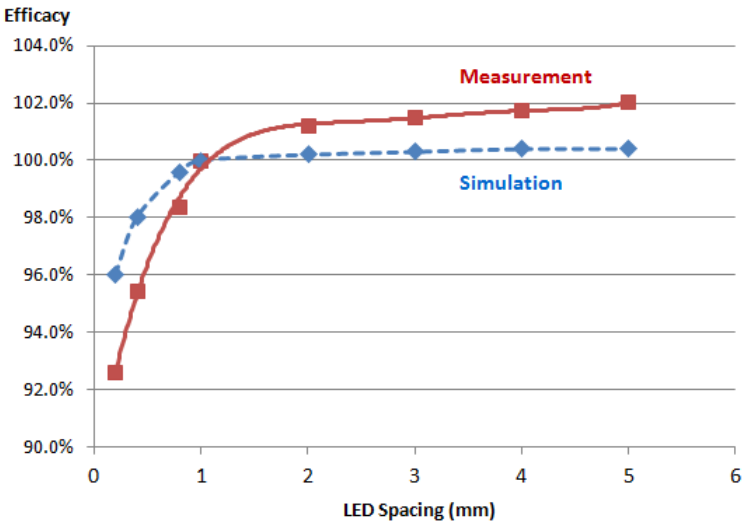
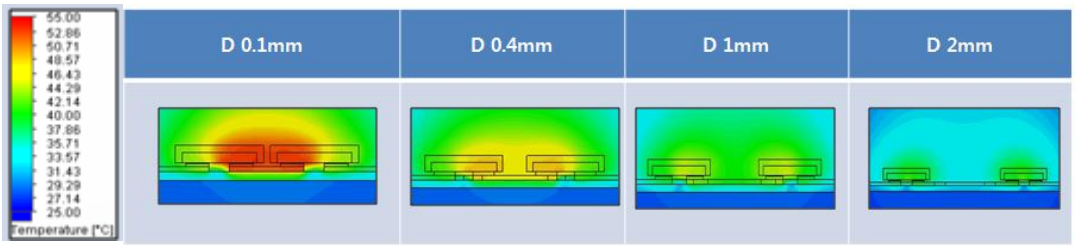


Figure 9. Simulation and Device test results.

Simulation based on optical absorption by adjacent NewGen, which is not considered thermal effect. And the device measurement done by 25˚C with pulse condition with 2W operation. Simulation and device measurement show small difference, but the efficacy variation trend is similar. The device result can be affected by small variation of the chip flux or SMD condition, also PAD design which may result in the difference of simulation and real measurement.

5.2 Junction temperature dependency on die spacing

Placing multiple NewGen too close to each other may adversely impact the ability of the PCB to dissipate the heat from the NewGens. LED board configurations with numbers of closely packed NewGens may require thermal modeling to determine the junction temperature. Figure 10 shows thermal simulation depends on die spacing.



Cu	Distance	Max junction
1oz	0.1	96
	0.4	86
	0.8	77
	1	75.8
	2	67.9
	3	65.2
	4	64.4
2oz	0.1	85.9
	0.4	76.8
	0.8	69.9
	1	68.8
	2	61.5
	3	58.7
	4	57.5

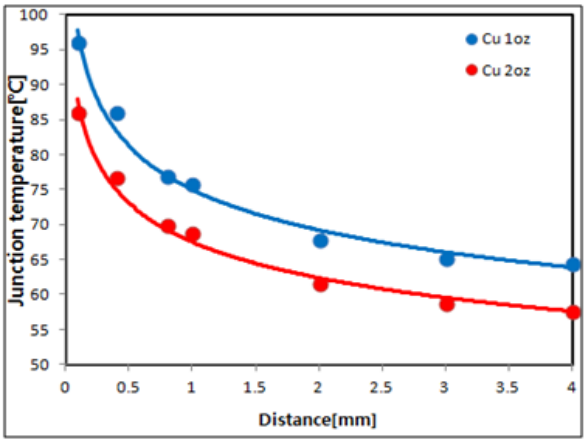


Figure 10. Thermal simulation depends on NewGen array distance.