

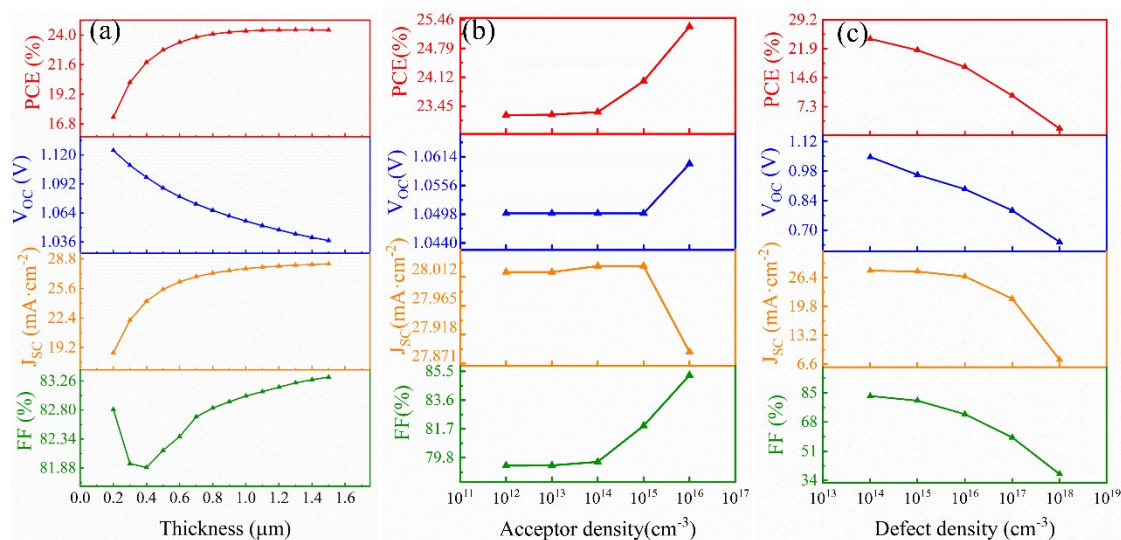


Fig. S1. Effects of (a) thickness, (b) defect density and (c) acceptor density of MASnI_3 layer on device performance (DEV1).

Table S1 Optimized parameters of double absorber layer device.

Parameters	MASnI_3	CIGS
Thickness (μm)	0.8	0.6
Acceptor density (cm^{-3})	10^{13}	10^{18}
Defect density (cm^{-2})	10^{14}	10^{12}

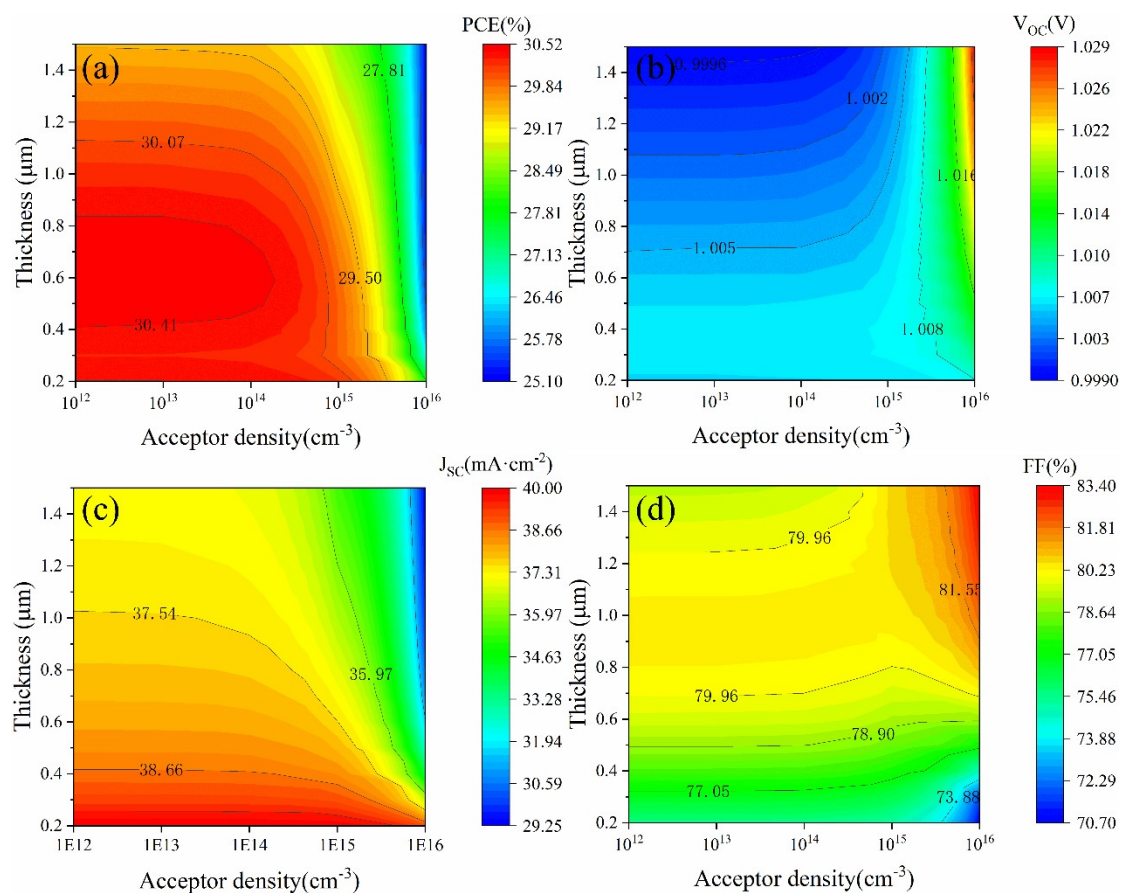


Fig. S2. Synergistic effects of thickness and acceptor density of MASnI₃ layer on device performance.

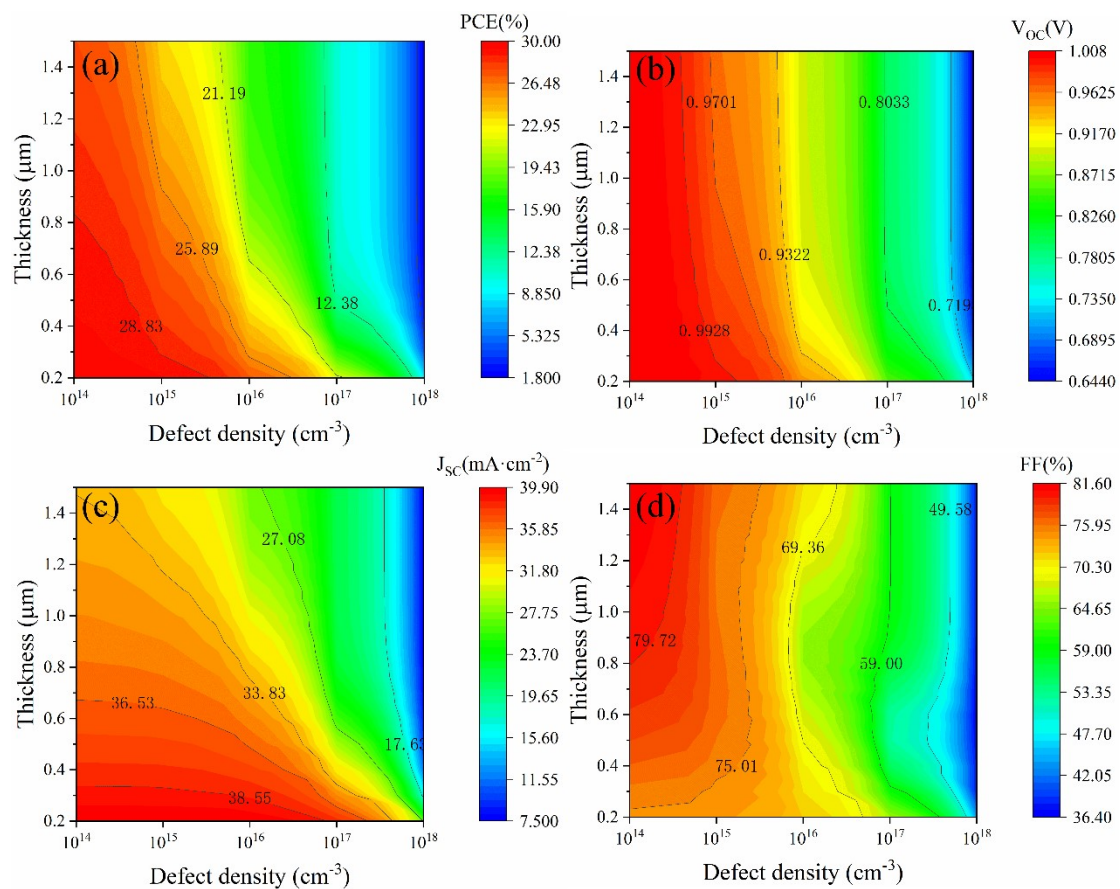


Fig. S3. Synergistic effects of thickness and defect density of MASnI₃ layer on device performance.

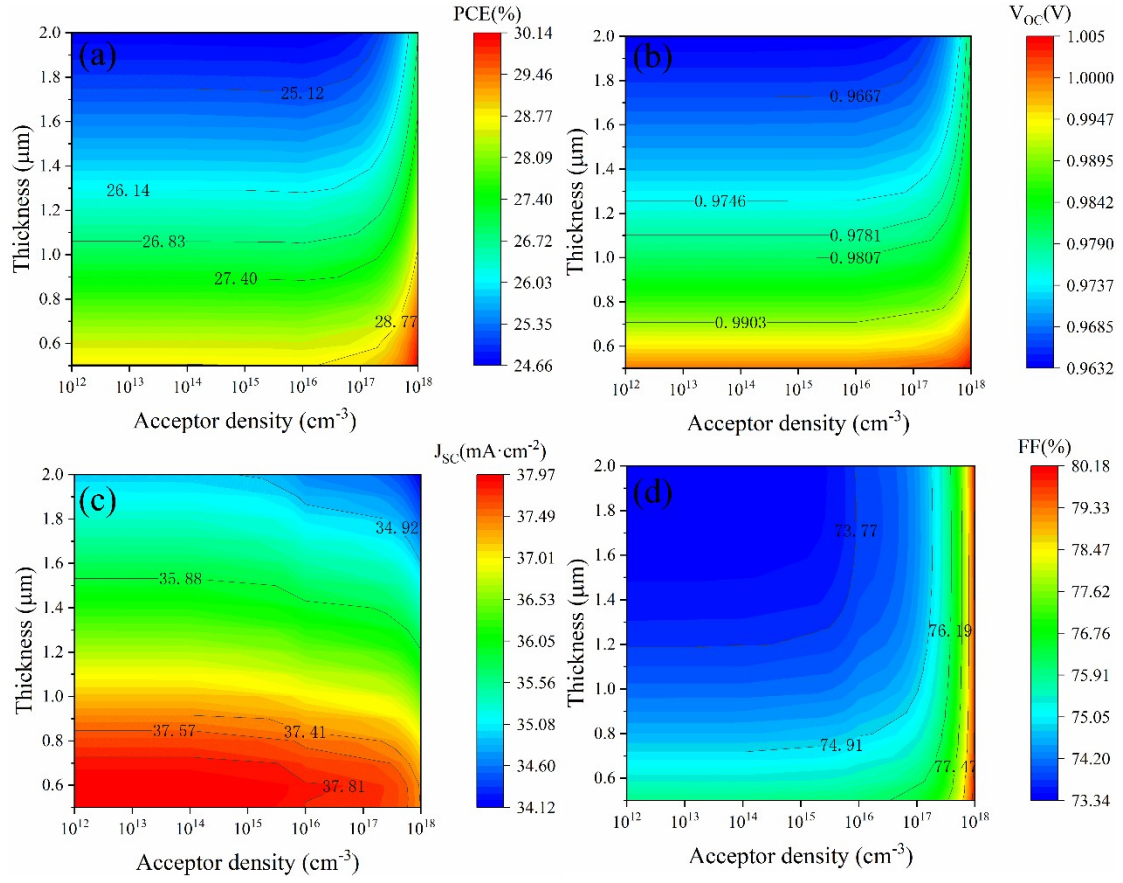


Fig. S4. Synergistic effects of thickness and acceptor density of CIGS layer on device performance.

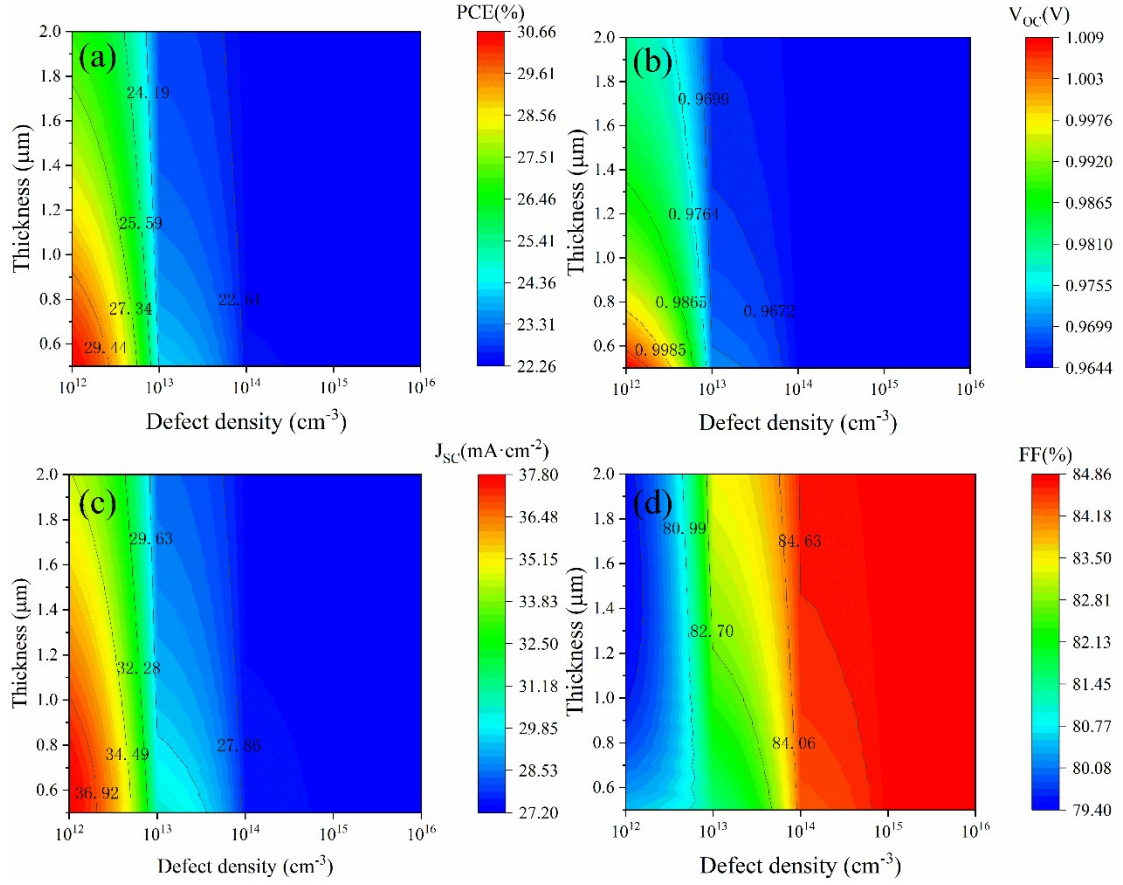


Fig. S5. Synergistic effects of thickness and defect density of CIGS layer on device performance.

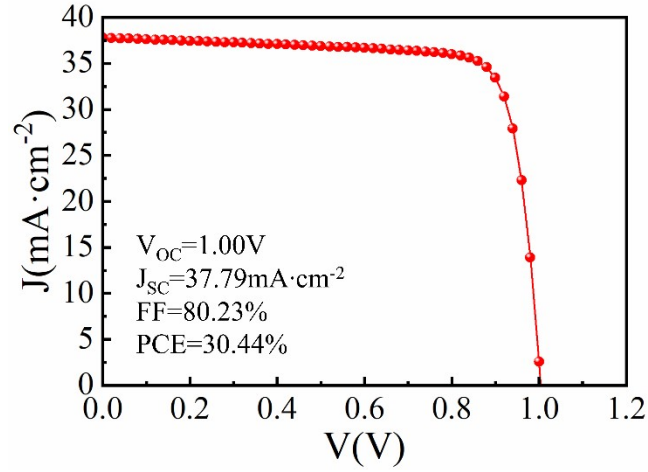


Fig. S6. Optimized JV characteristics of double absorber device (DEV2).