

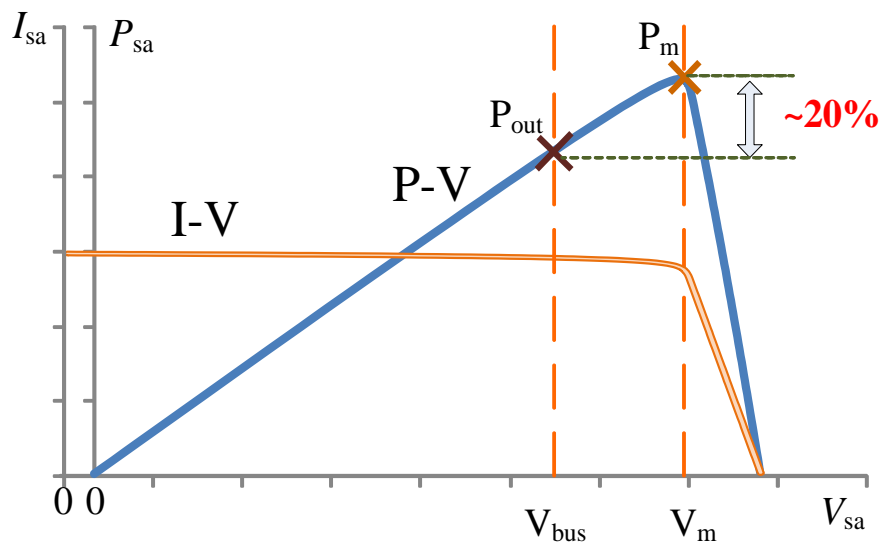
Low Cost Array Power Regulator for LEO Space Applications

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Array Power Regulator Design

Comparison of S3R and MPPT:



Topology:

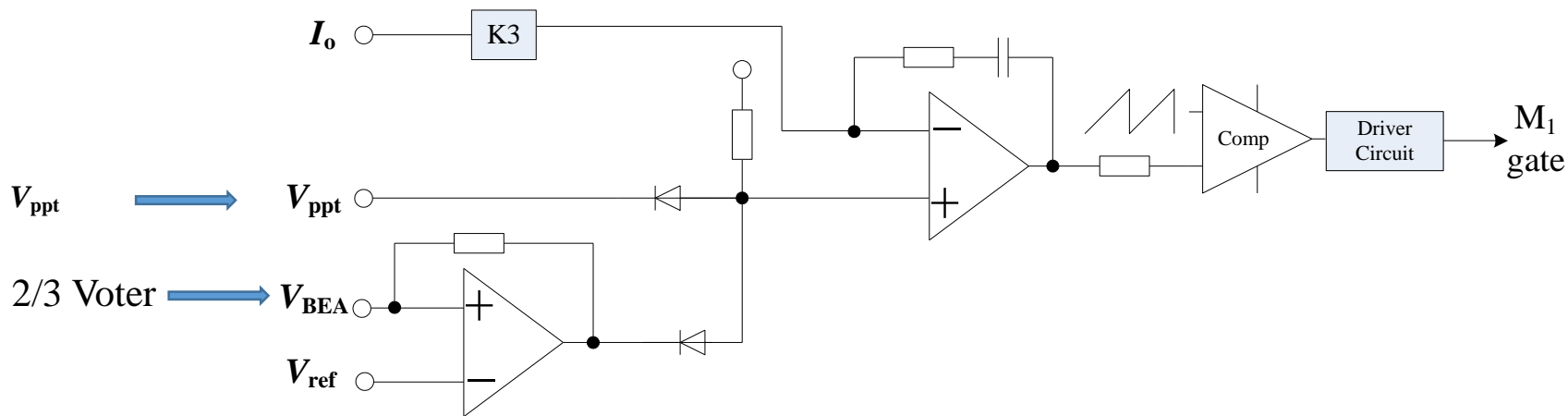
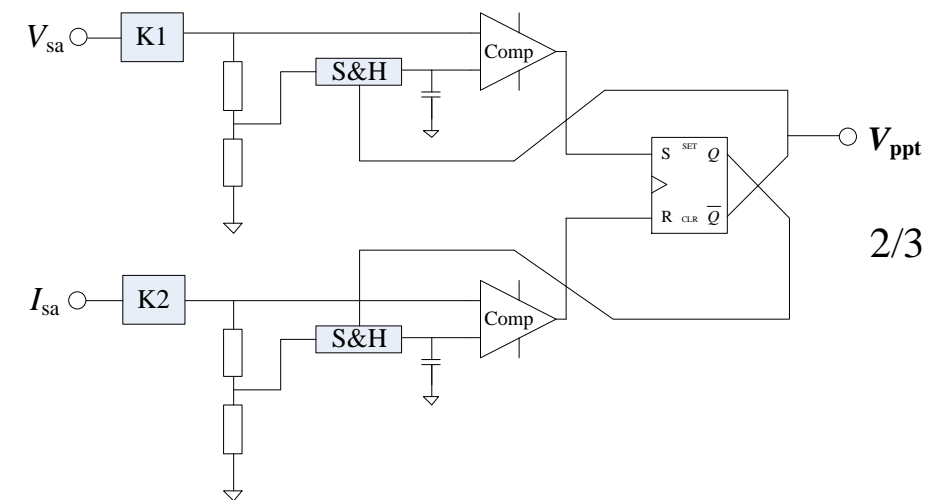
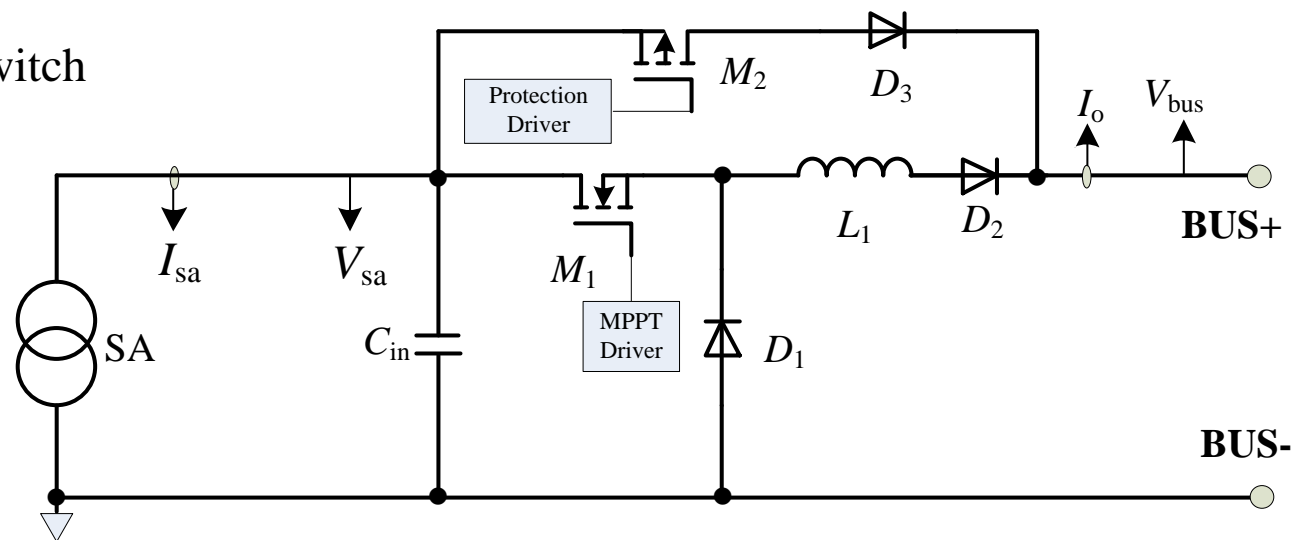
Buck+Bypass switch

Control:

Analog MPPT,
Incremental
Conductance
Method

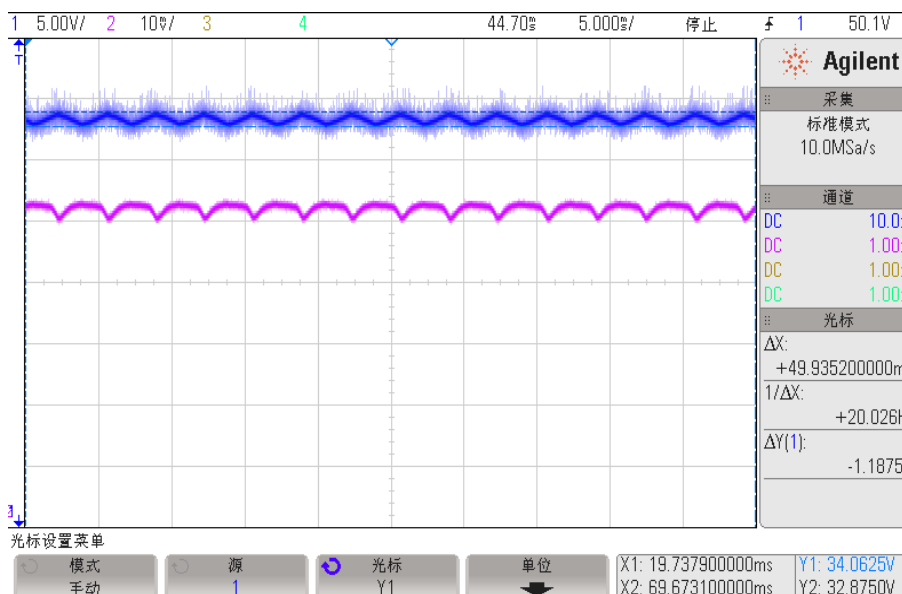
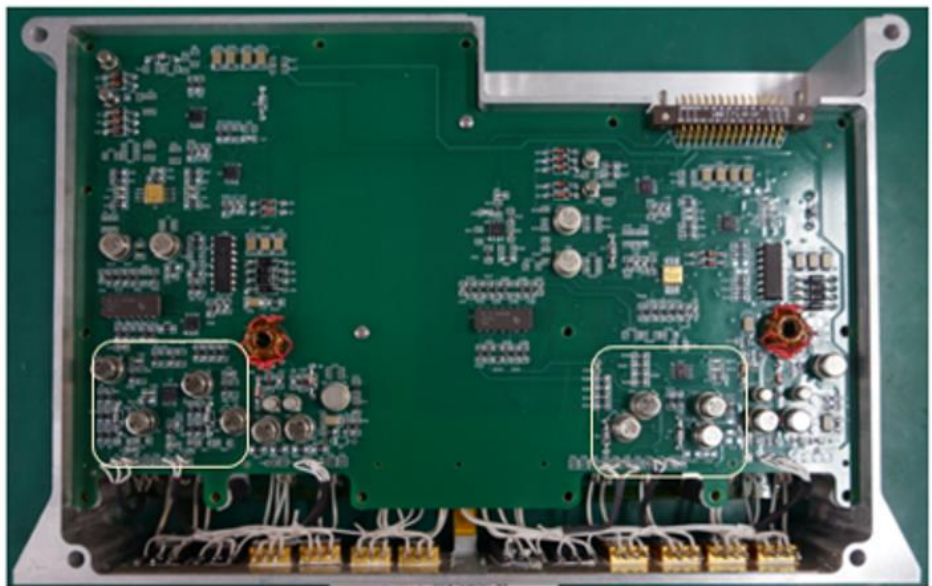
Component:

GJB standard



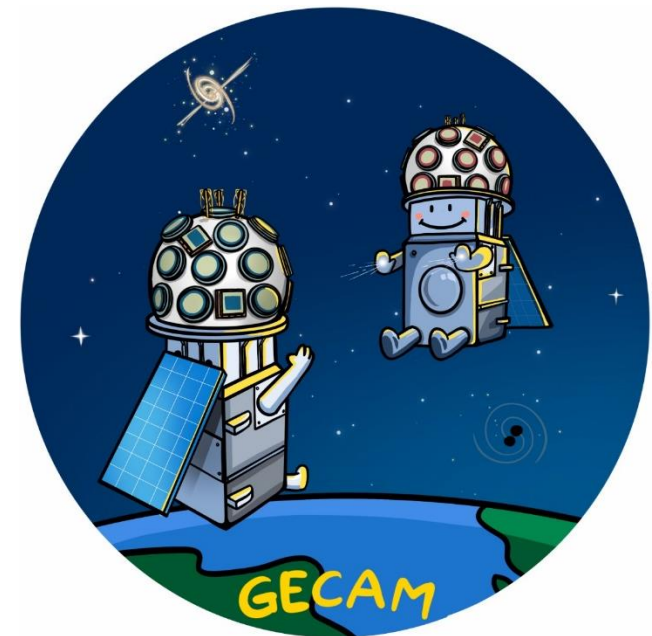
Advantage: Analog control, Simple, Cheap, Reliable.

Hardware Implementation and Test Result



SA: $V_C=39.18\text{V}$, $V_M=33.42\text{V}$,
 $I_S=6.62\text{A}$, $I_M=6.55\text{A}$
 $V_{\text{BUS}}: 28.84\text{V}$
Tracking accuracy: 97.87%;
Efficiency: 94.07%.

SA: $V_C=39.18\text{V}$, $V_M=33.42\text{V}$,
 $I_S=6.62\text{A}$, $I_M=6.55\text{A}$
 $V_{\text{BUS}}: 25.20\text{V}$
Tracking accuracy: 98.01%;
Efficiency: 93.00%.



2020.12.10 Launched

- 1) For the LEO space application, a low cost APR is proposed.
- 2) The MPPT function of the APR is achieved only using a few analog components.
- 3) The APR has a nominal conversion efficiency of 93% and a nominal tracking accuracy of 98%.