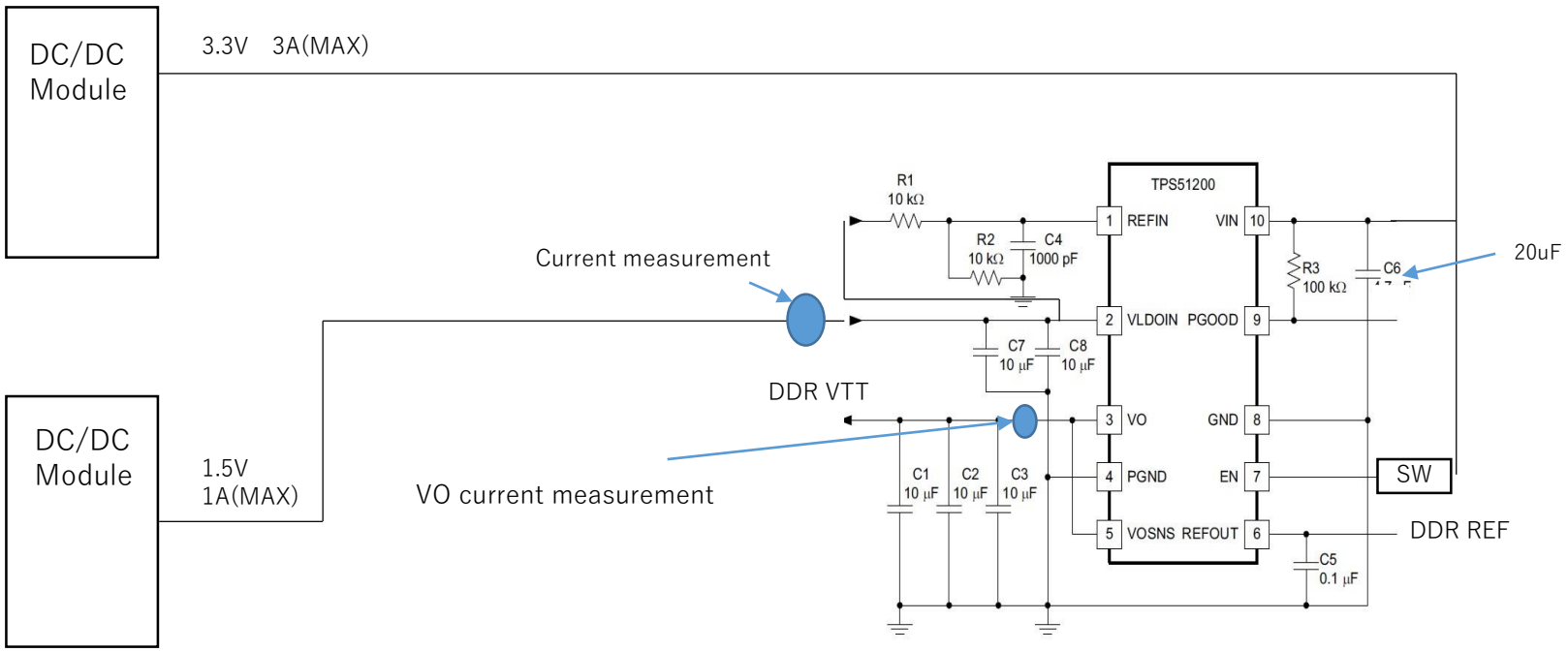
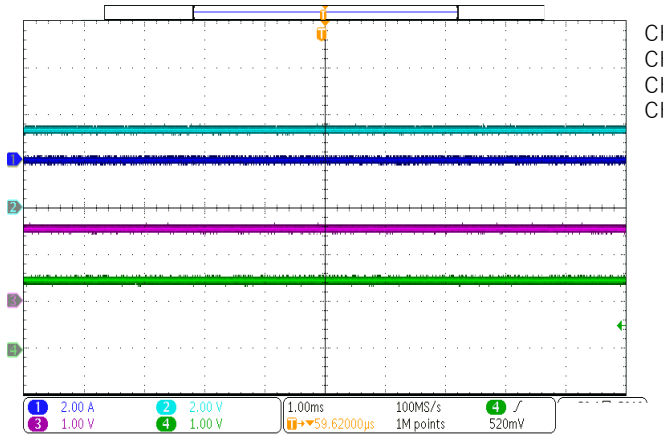

DC/DC Module
3.3V 3A(MAX)
DC/DC Module
1.5V 1A(MAX)
Current measurement
VO current measurement
DDR VTT
20uF
DDR REF
SW
TPS51200
R1 10 kΩ
R2 10 kΩ
C4 1000 pF
R3 100 kΩ
C6
C7 10 µF
C8 10 µF
C1 10 µF
C2 10 µF
C3 10 µF
C5 0.1 µF
1 REFIN
2 VLDOIN
3 VO
4 PGND
5 VOSNS
6 REFOUT
7 EN
8 GND
9 PGOOD
10 VIN

Waveform 1



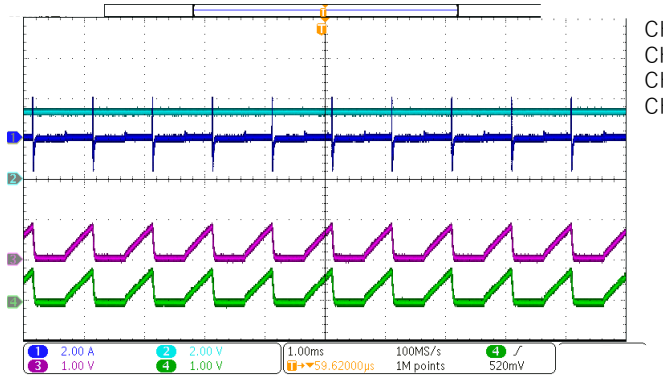
CH1 : VLDOIN Current
CH2 : Vin 3.3V
CH3 : DC/DC 1.5V
CH4 : TPS51200 VLDOINpin

We are currently conducting verification with the first circuit.
3.3 V and 1.5 V created by DC / DC are supplied to the TPS 51200.

It is carried out by the sequence of 3.3 V → 1.5 V → EN (SW off → on) with DC / DC.

Waveform 1 ：When EN = off
3.3 V and 1.5 V rise.

Waveform 2

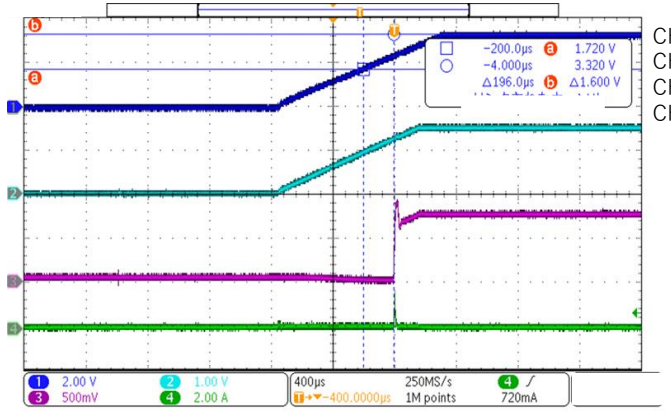


CH1 : VLDOIN Current
CH2 : Vin 3.3V
CH3 : DC/DC 1.5V
CH4 : TPS51200 VLDOINpin

Waveform 2： Change from waveform 1 to EN → ON
The input current of VLDOIN of the TPS51200 is around 2A, and the supply is stopped by DC / DC overcurrent control.
Inrush current of VO of TPS51200 is large.

Waveform 3： VO load and Co = 10uF.
Turn on the power to the TPS51200 and set it to EN = ON
The input current of VLDOIN is 2 A, but the power supply starts up.

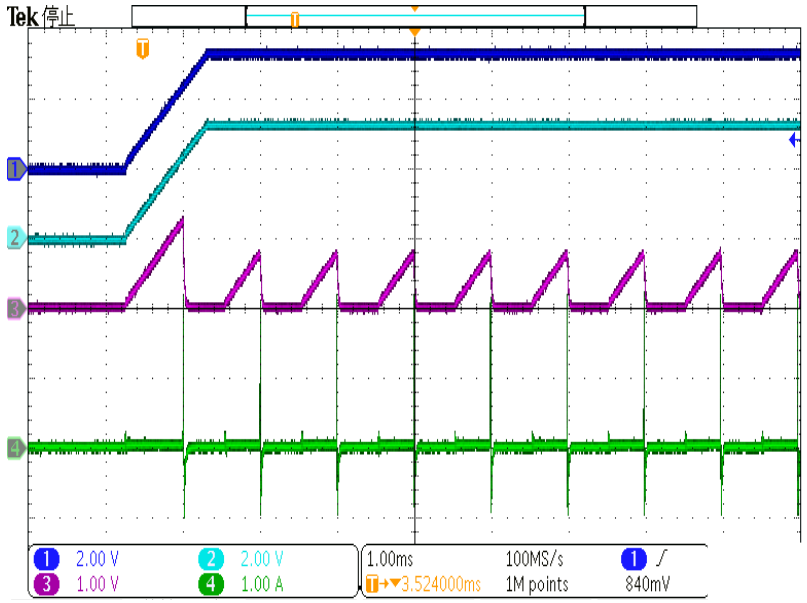
Waveform 3



CH1 : EN (Swout)
CH2 : VLDOIN
CH3 : VO
CH4 : VLDOIN Current

A question
Q1 In this circuit, the inrush of VLDOIN is 2 A or more, but will the inrush of 2A or more occur?
There is a soft start, but what is the reason for 2A flow? (Is there not leakage current, through current etc inside?)
Q2 How much is the inrush current of the TPS51200?
The first stage DC / DC is 1A product. Is it missing with this DC / DC?
Q3 I'd like to limit the inrush to less than 1 A, but is there a countermeasure method?

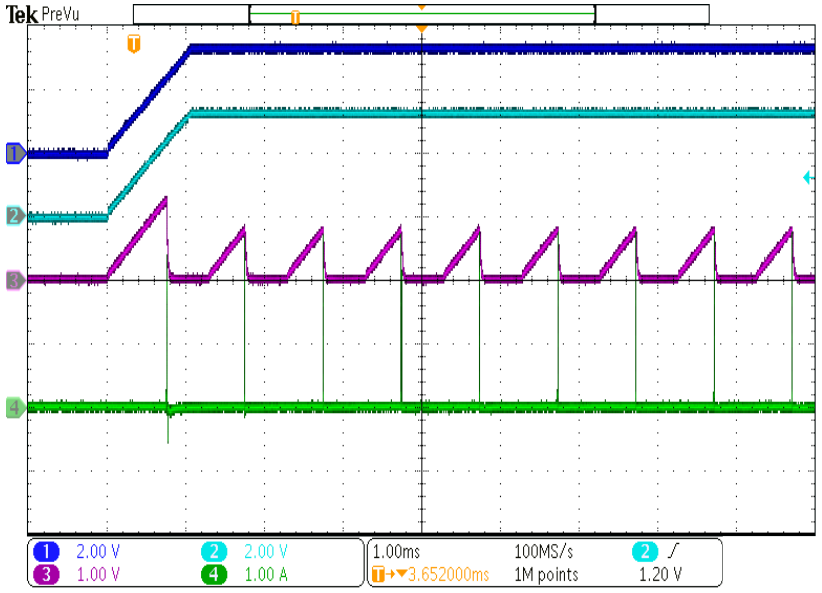
Waveform 4



CH1：Vin　3.3V
CH2：TPS51200、EN（IC11 7pin）
CH3：DC/DC　1.5V
CH4：VLDOIN　Current

Current measurement of VO: 2A

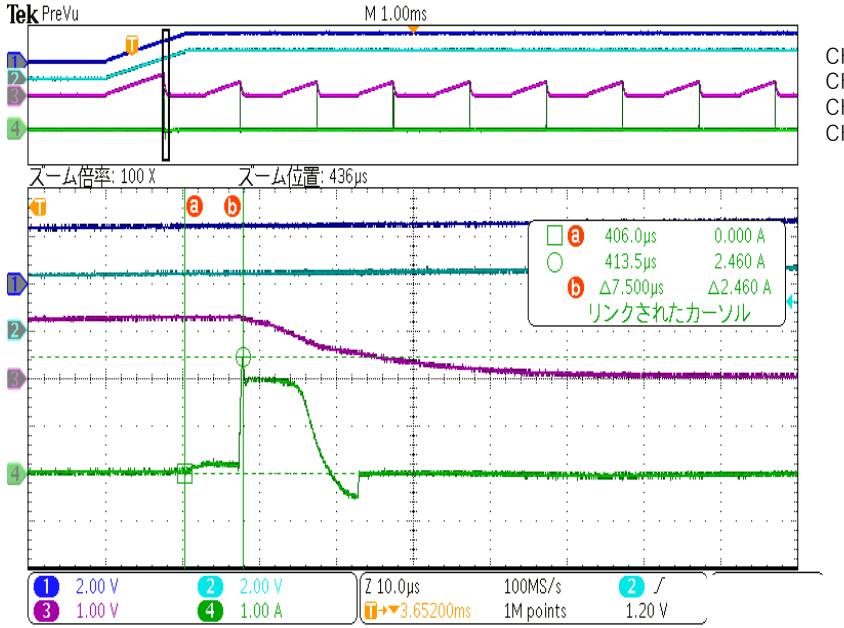
Waveform 5



CH1：Vin　3.3V
CH2：TPS51200、EN（IC11 7pin）
CH3：DC/DC　1.5V
CH4：VO　Current

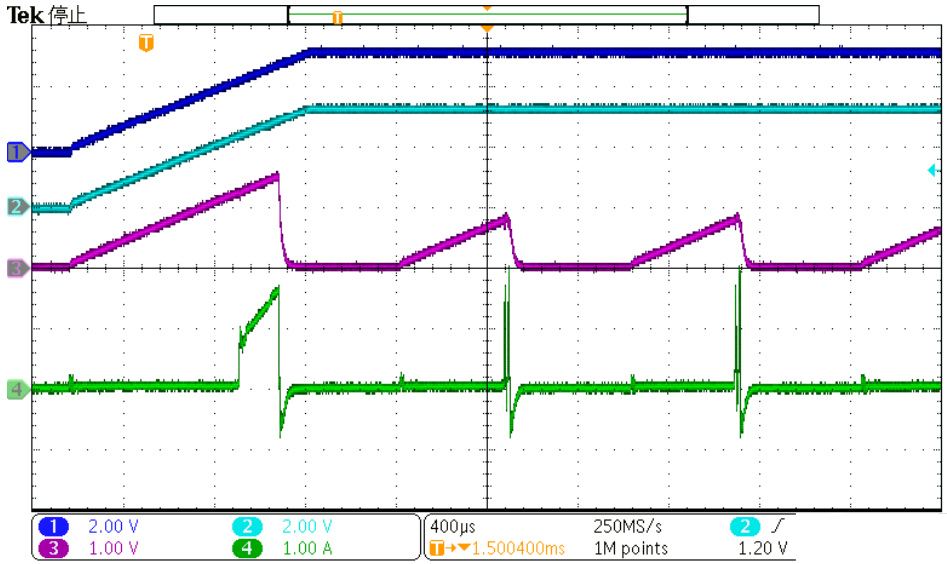
Expansion

Waveform 6



CH1：Vin　3.3V
CH2：TPS51200、EN（IC11 7pin）
CH3：DC/DC　1.5V
CH4：VO　Current

Waveform 7

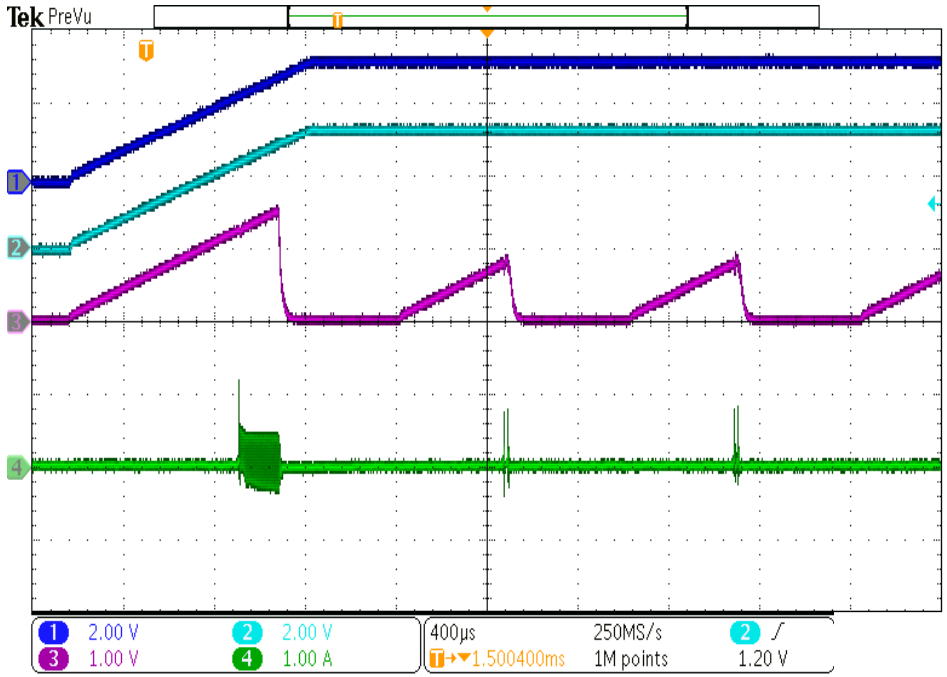


CH1：Vin　3.3V
CH2：TPS51200、EN（IC11 7pin）
CH3：DC/DC　1.5V
CH4：VLDOIN　Current

Changing the capacitor with the circuit of 1 page.
In the case of the ceramic capacitor, the inrush current is large because the ESR is low. When changing to an electrolytic capacitor (chemical capacitor) and increasing the ESR to reduce the inrush current, it was confirmed whether the input current decreased.

ceramic capacitor C1,C2,C3＝30uF→
22uF electrolytic capacitor (chemical capacitor)
Change

Waveform 8



CH1：Vin　3.3V
CH2：TPS51200、EN（IC11 7pin）
CH3：DC/DC　1.5V
CH4：VO　Current

A question
Look at waveform 7. VLDOIN input current = 2A
Inrush current is the same as in case of ceramic capacitor .
However, looking at waveform 8, the VO output current is 0.5 A and the current decreases.

It will be reduced by 1.5 A, but where did the current reduced by 1.5 A go?
Why is the input rushing 2A?