L_{RFC_a}

C_{shunt_a}

蓝牙®

V_{o_+}

$$sCv_{o\_1}(s) - Cv_{o\_2}(0) + \frac{v_{o\_1}(s)+(V_{sd}-V_f)}{R_2} + \frac{v_{o\_1}(s)-V_{dd}}{R_1} = 0$$

$$v_{o\_2}(s) = \frac{v_{o\_1}(T_{bdc})}{s + \left(\frac{R_1 + R_2 + R_3}{R_1(R_2 + R_3)C}\right)} + \frac{V_{ad}\left(\frac{R_2 + R_3}{R_1 + R_2 + R_3}\right)\left(\frac{R_1 + R_2 + R_3}{R_1(R_2 + R_3)C}\right)}{s + \left(\frac{R_1 + R_2 + R_3}{R_1(R_2 + R_3)C}\right)}$$

$\tau_2 = \frac{R_1(R_2+R_3)C}{R_1+R_2+R_3}$, $k_3 = \frac{R_2+R_3}{R_1+R_2+R_3}$,

$$v_{o_e2}(s) = \frac{v_{o\_1}(T_{bdc})}{s + \frac{1}{\tau_2}} + \frac{V_{dd}\,\frac{k_3}{\tau_2}}{s + \frac{1}{\tau_2}}$$

$$v_{o\_2}(t) = v_{o\_1}(T_{bdc})e^{\frac{-(t-T_{bdc})}{\tau_2}} + k_3 V_{dd}\left(1 - e^{\frac{-(t-T_{bdc})}{\tau_2}}\right)$$

$$v_{o\_1}(s) = \frac{v_{o\_2}(0)}{s + \left(\frac{R_1 + R_2}{R_1 R_2 C}\right)} - \frac{\left(V_{sd} - V_f\right)\left(\frac{R_1}{R_1 + R_2}\right)\left(\frac{R_1 + R_2}{R_1 R_2 C}\right)}{s + \left(\frac{R_1 + R_2}{R_1 R_2 C}\right)} + \frac{V_{dd}\left(\frac{R_2}{R_1 + R_2}\right)\left(\frac{R_1 + R_2}{R_1 R_2 C}\right)}{s + \left(\frac{R_1 + R_2}{R_1 R_2 C}\right)}$$

$$\tau_1 = \frac{R_1 R_2 C}{R_1 + R_2}, \quad k_1 = \frac{R_1}{R_1 + R_2}$$

$k_2 = \frac{R_2}{R_1+R_2}$:

$$v_{o\_1}(s) = \frac{v_{o\_2}(0)}{s + \frac{1}{\tau_1}} - \frac{(V_{sd} - V_f)\frac{k_1}{\tau_1}}{s + \frac{1}{\tau_1}} + \frac{V_{dd}\frac{k_2}{\tau_1}}{s + \frac{1}{\tau_1}}$$

$$v_{o\_1}(t) = v_{o\_2}(0)e^{\frac{-t}{\tau_1}} + \left(k_2 V_{dd} - k_1\left(V_{sd} - V_f\right)\right)\left(1 - e^{\frac{-t}{\tau_1}}\right)$$

$V_{SS_1} = k_2 V_{dd} - k_1(V_{sd} - V_f)$:

$$v_{o\_1}(t) = v_{o\_2}(0)e^{\frac{-t}{\tau_1}} + V_{SS_1}\left(1 - e^{\frac{-t}{\tau_1}}\right)$$

$$sC\,v_{o\_2}(s) - C\,v_{o\_1}(T_{bdc}) + \frac{v_{o\_2}(s)}{R_2 + R_3} + \frac{v_{o\_2}(s) - V_{dd}}{R_1} = 0$$

$V_{SS_2} = k_3 V_{dd}$

$$v_{o\_2}(t) = v_{o\_1}(T_{bdc})e^{\frac{-(t-T_{bdc})}{\tau_2}} + V_{SS_2}\left(1 - e^{\frac{-(t-T_{bdc})}{\tau_2}}\right)$$

$$v_{o\_1}(T_{bdc}) = v_{o\_2}(0)e^{\frac{-T_{bdc}}{\tau_1}} + V_{SS_1}\left(1 - e^{\frac{-T_{bdc}}{\tau_1}}\right) = v_{o\_2}(T)e^{\frac{-T_{bdc}}{\tau_1}} + V_{SS_1}\left(1 - e^{\frac{-T_{bdc}}{\tau_1}}\right)$$

$$v_{o\_2}(0) = v_{o\_2}(T) = v_{o\_1}(T_{bdc})e^{\frac{-(T-T_{bdc})}{\tau_2}} + V_{SS_2}\left(1 - e^{\frac{-(T-T_{bdc})}{\tau_2}}\right)$$

$$v_{o\_1}(T_{bdc}) = \left(v_{o\_1}(T_{bdc}) e^{\frac{-(T-T_{bdc})}{\tau_2}} + V_{SS_2} \left(1 - e^{\frac{-(T-T_{bdc})}{\tau_2}} \right) \right) e^{\frac{-T_{bdc}}{\tau_1}} + V_{SS_1} \left(1 - e^{\frac{-T_{bdc}}{\tau_1}} \right)$$

$$v_{o\_1}(T_{bdc}) = \frac{V_{SS_2}\left(1 - e^{\frac{-(T-T_{bdc})}{\tau_2}}\right)e^{\frac{-T_{bdc}}{\tau_1}} + V_{SS_1}\left(1 - e^{\frac{-T_{bdc}}{\tau_1}}\right)}{1 - e^{\frac{-(T-T_{bdc})}{\tau_2}}e^{\frac{-T_{bdc}}{\tau_1}}}$$

$$V_{o\_} = \frac{1}{T}\left(\int_0^{T_{bdc}} v_{o\_1}(t)dt + \int_{T_{bdc}}^{T} v_{o\_2}(t)dt\right)$$

$$V_{o\_} = \frac{1}{T}\left(\int_0^{T_{bdc}} \left(v_{o\_2}(0)e^{\frac{-t}{\tau_1}} + V_{SS_1}\left(1 - e^{\frac{-t}{\tau_1}}\right)\right) dt \right.$$

$$\left. + \int_{T_{bdc}}^{T} v_{o\_1}(T_{bdc})e^{\frac{-(t-T_{bdc})}{\tau_2}} + V_{SS_2}\left(1 - e^{\frac{-(t-T_{bdc})}{\tau_2}}\right) dt \right)$$

$$V_{o\_} = \frac{1}{T}\left(\left(-\tau_1 v_{o\_2}(0)\left(e^{\frac{-T_{bdc}}{\tau_1}} - 1\right) + V_{SS_1}\left(T_{bdc} + \tau_1\left(e^{\frac{-T_{bdc}}{\tau_1}} - 1\right)\right)\right)\right.$$
$$+\left(-\tau_2 v_{o\_1}(T_{bdc})\left(e^{\frac{-(T-T_{bdc})}{\tau_2}} - 1\right)\right.$$
$$\left.\left.\left.+ V_{SS_2}\left(T - T_{bdc} + \tau_2\left(e^{\frac{-(T-T_{bdc})}{\tau_2}} - 1\right)\right)\right)\right)\right)$$

V_{o_+}

V_{o+}

V_{o_+}

$$V_o = V_{o_+} - V_{o_-}$$

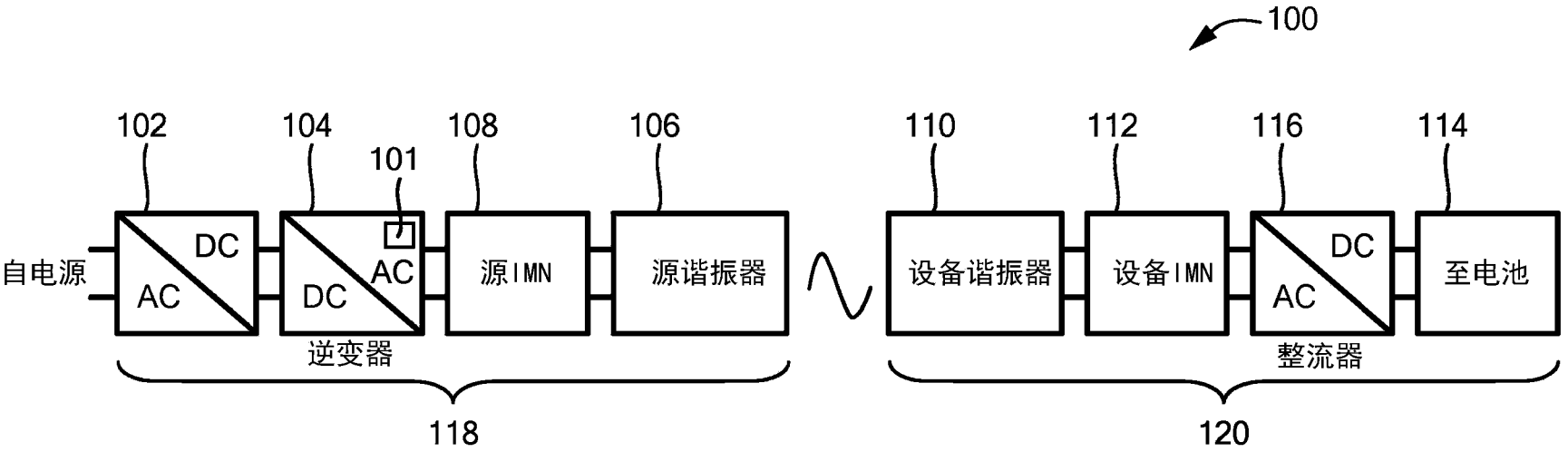
$$V_o = V_{dd}\left(\frac{R_5}{R_4+R_5}\right)$$
$$-\frac{1}{T}\left(\left(-\tau_1 v_{o\_2}(0)\left(e^{\frac{-T_{bdc}}{\tau_1}}-1\right)+V_{SS_1}\left(T_{bdc}+\tau_1\left(e^{\frac{-T_{bdc}}{\tau_1}}-1\right)\right)\right)\right.$$
$$+\left(-\tau_2 v_{o\_1}(T_{bdc})\left(e^{\frac{-(T-T_{bdc})}{\tau_2}}-1\right)\right.$$
$$\left.\left.\left.+V_{SS_2}\left(T-T_{bdc}+\tau_2\left(e^{\frac{-(T-T_{bdc})}{\tau_2}}-1\right)\right)\right)\right)\right)$$

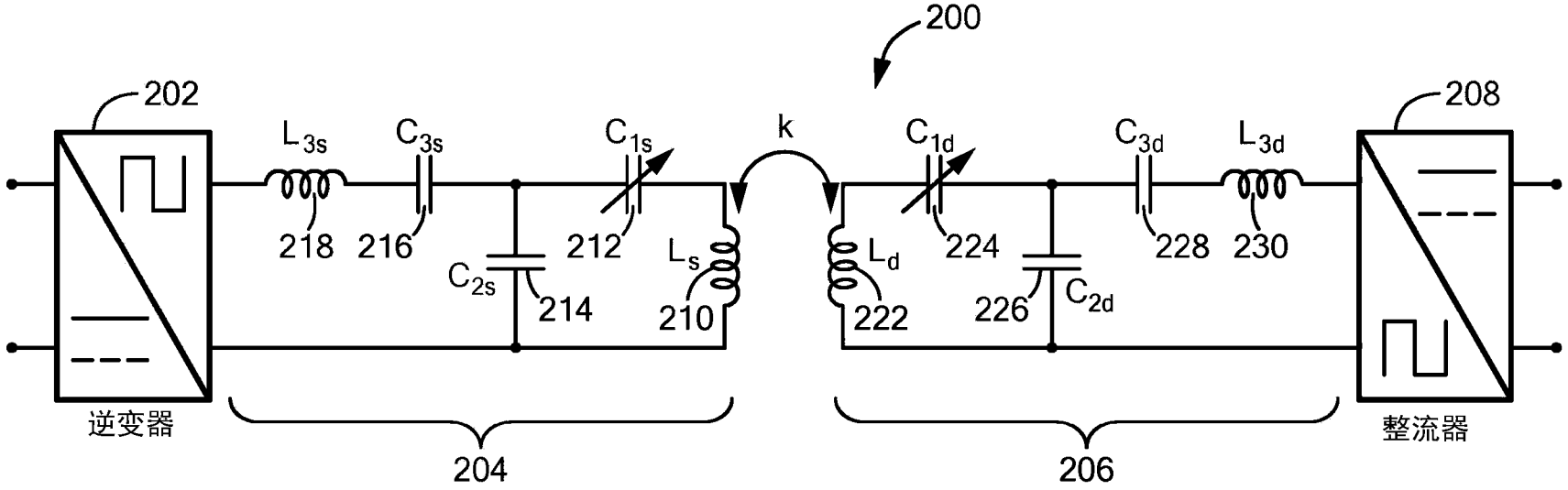
$V_{dd}\left(\frac{R_5}{R_4+R_5}\right) = V_{SS_2}$,

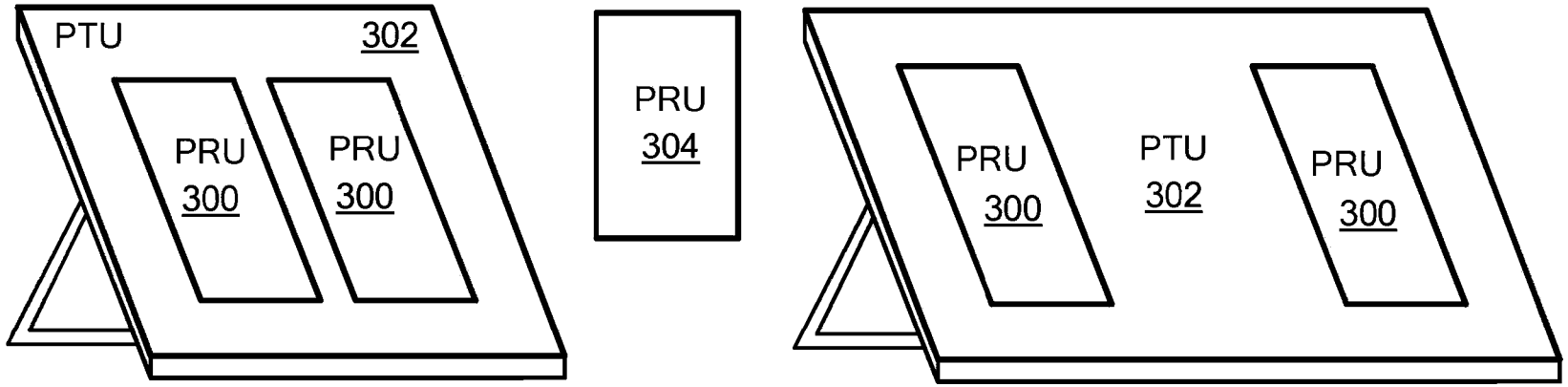
$$V_o = V_{SS_2} - \frac{1}{T}\left(\left(-\tau_1 v_{o\_2}(0)\left(e^{\frac{-T_{bdc}}{\tau_1}} - 1\right) + V_{SS_1}\left(T_{bdc} + \tau_1\left(e^{\frac{-T_{bdc}}{\tau_1}} - 1\right)\right)\right) +\right.$$

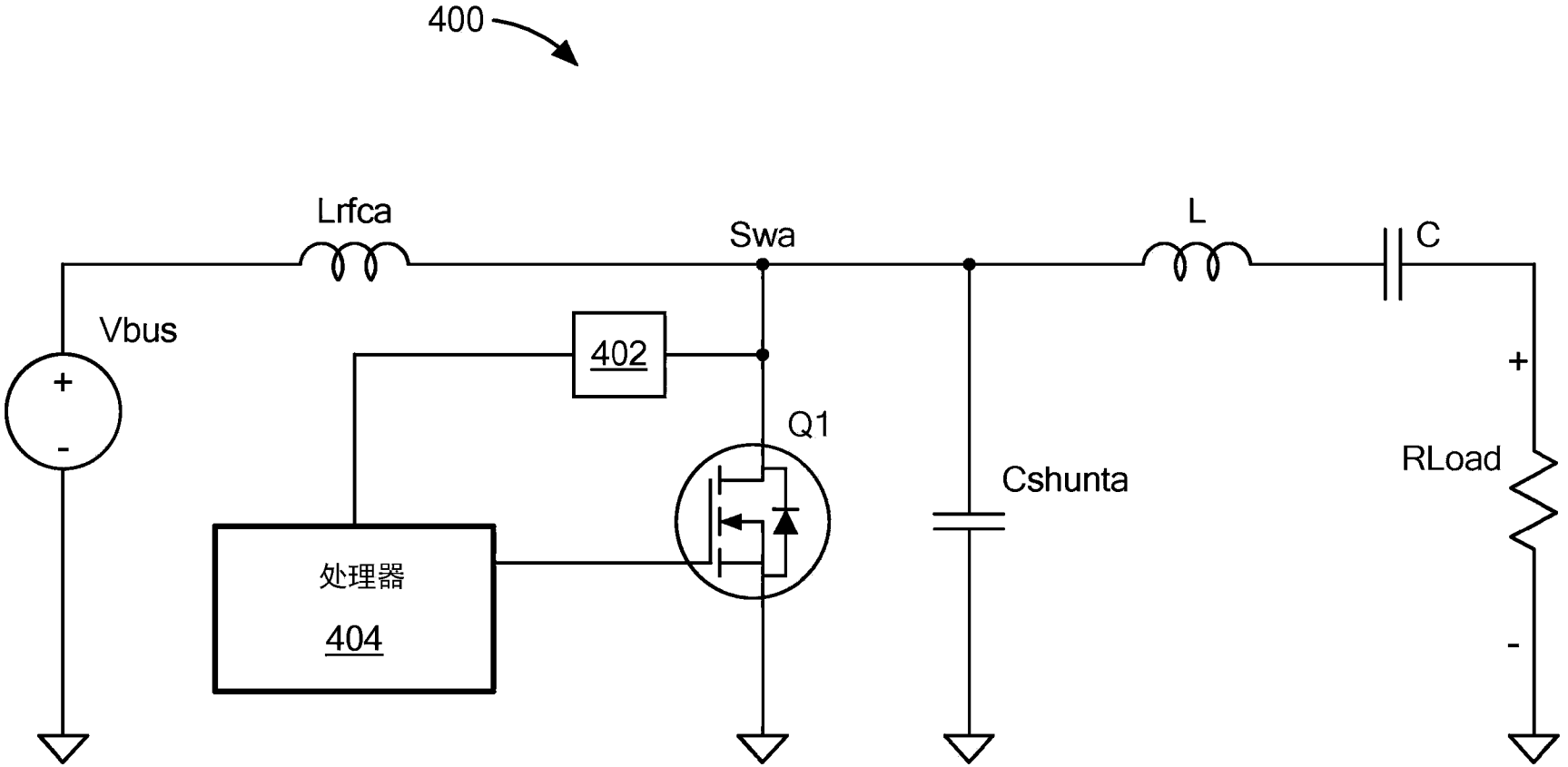
$$\left(-\tau_2 v_{o\_1}(T_{bdc})\left(e^{\frac{-(T-T_{bdc})}{\tau_2}}-1\right)+V_{SS_2}\left(T-T_{bdc}+\tau_2\left(e^{\frac{-(T-T_{bdc})}{\tau_2}}-1\right)\right)\right)$$

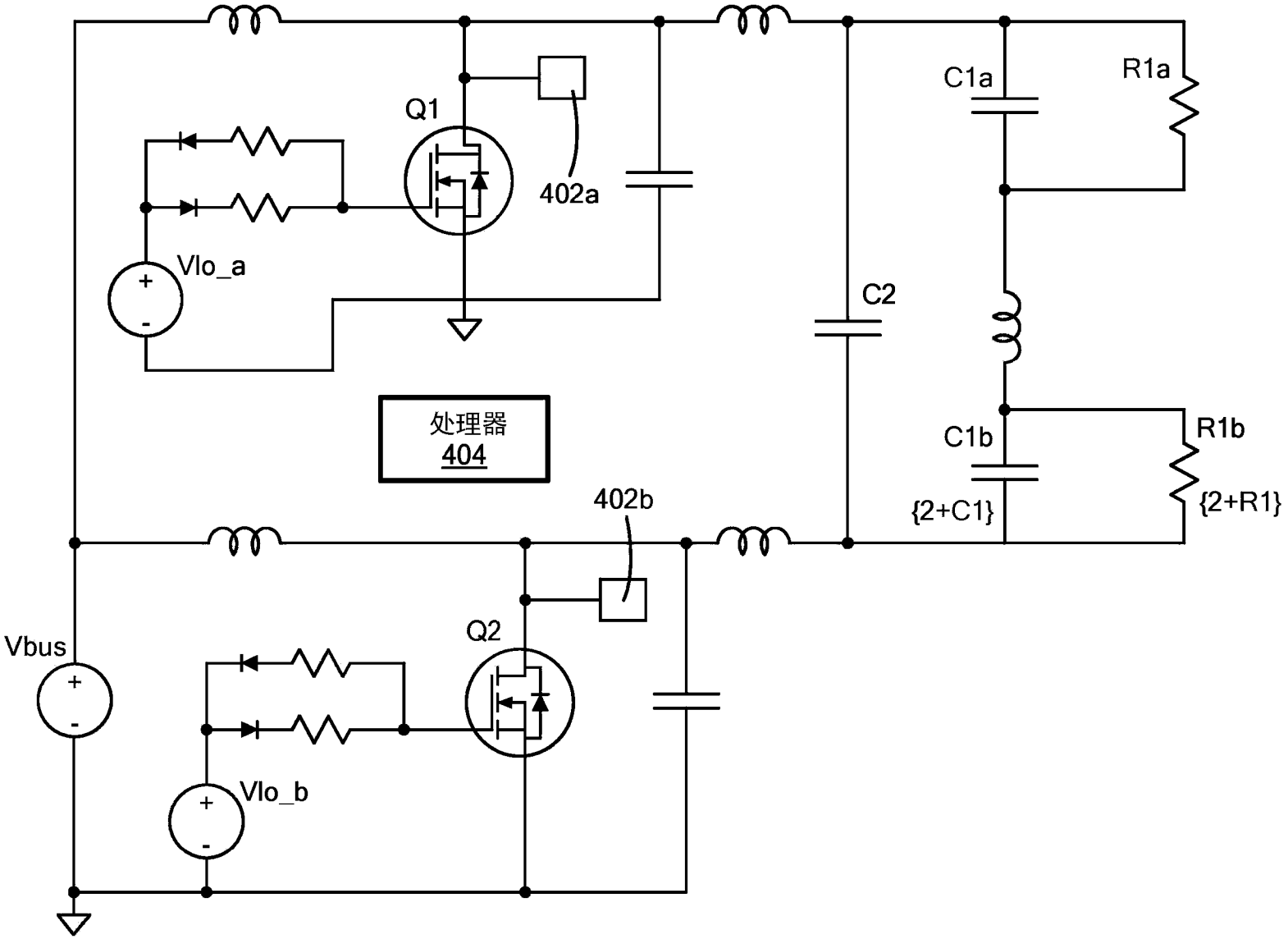
V_{o+}

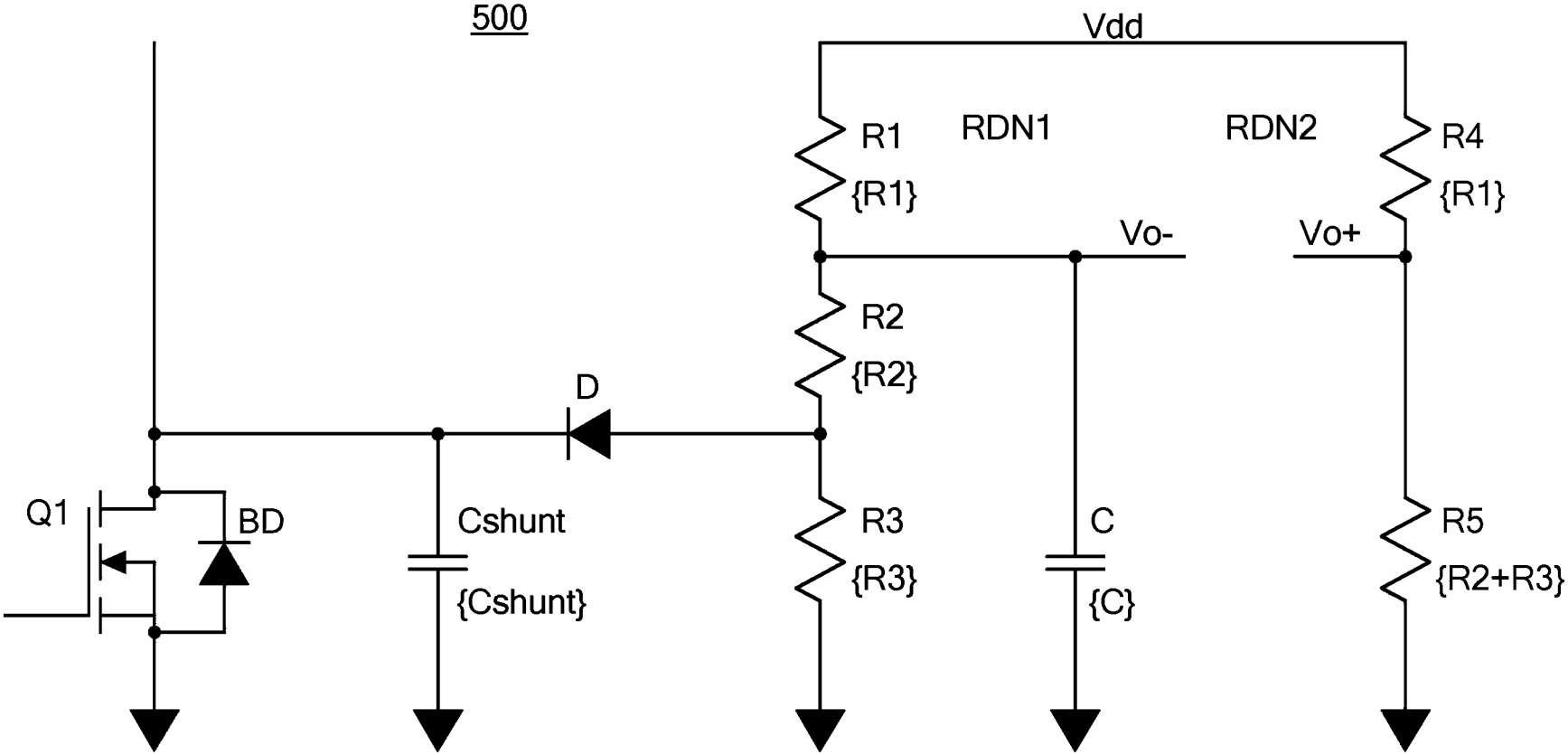

100
102
104
101
108
106
110
112
116
114
自电源
DC
AC
DC
AC
源IMN
源谐振器
设备谐振器
设备IMN
DC
AC
至电池
逆变器
整流器
118
120

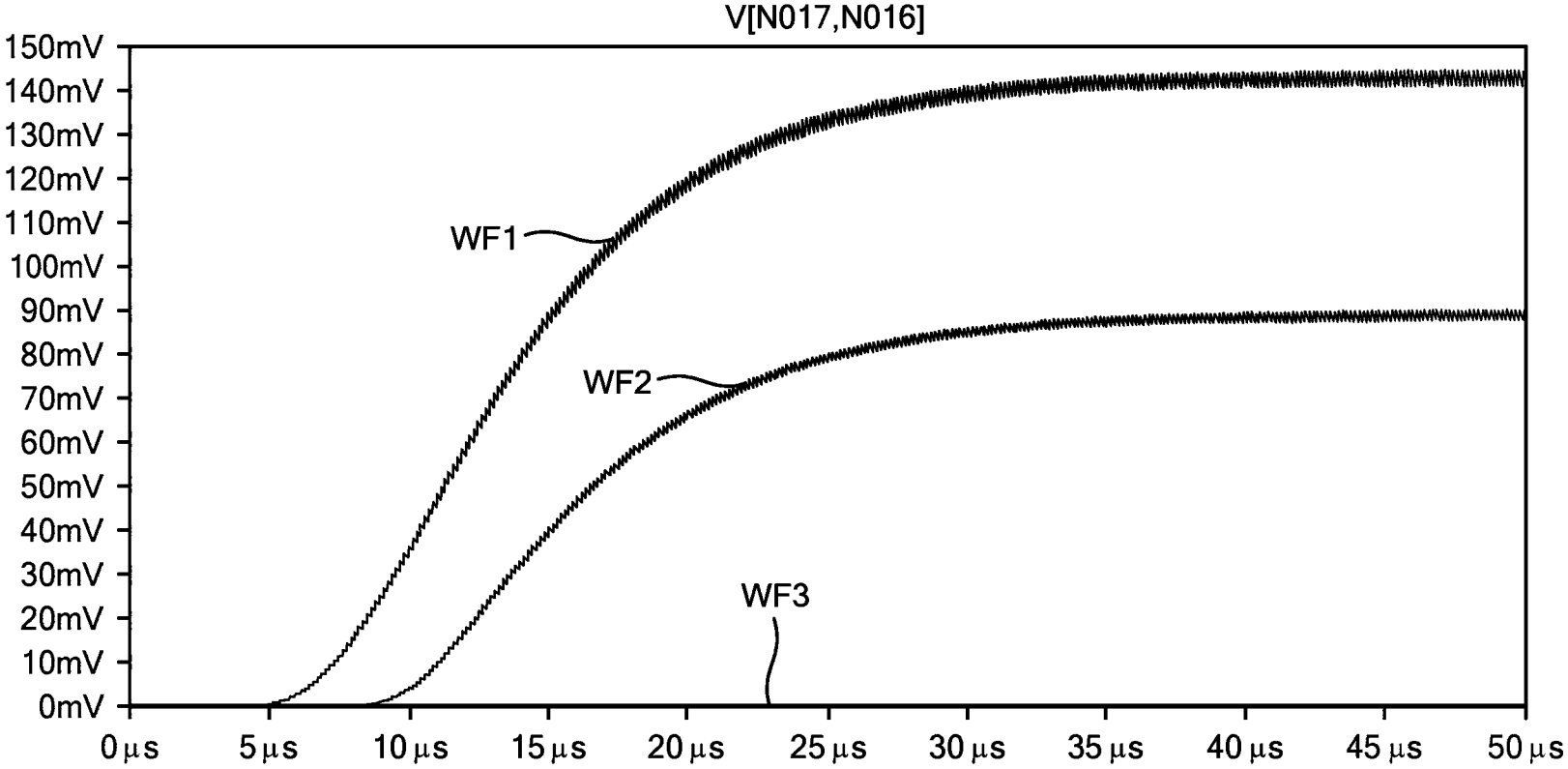

200
202
208
L_{3s}
C_{3s}
C_{1s}
k
C_{1d}
C_{3d}
L_{3d}
218
216
212
L_s
L_d
224
228
230
C_{2s}
214
210
222
226
C_{2d}
逆变器
整流器
204
206

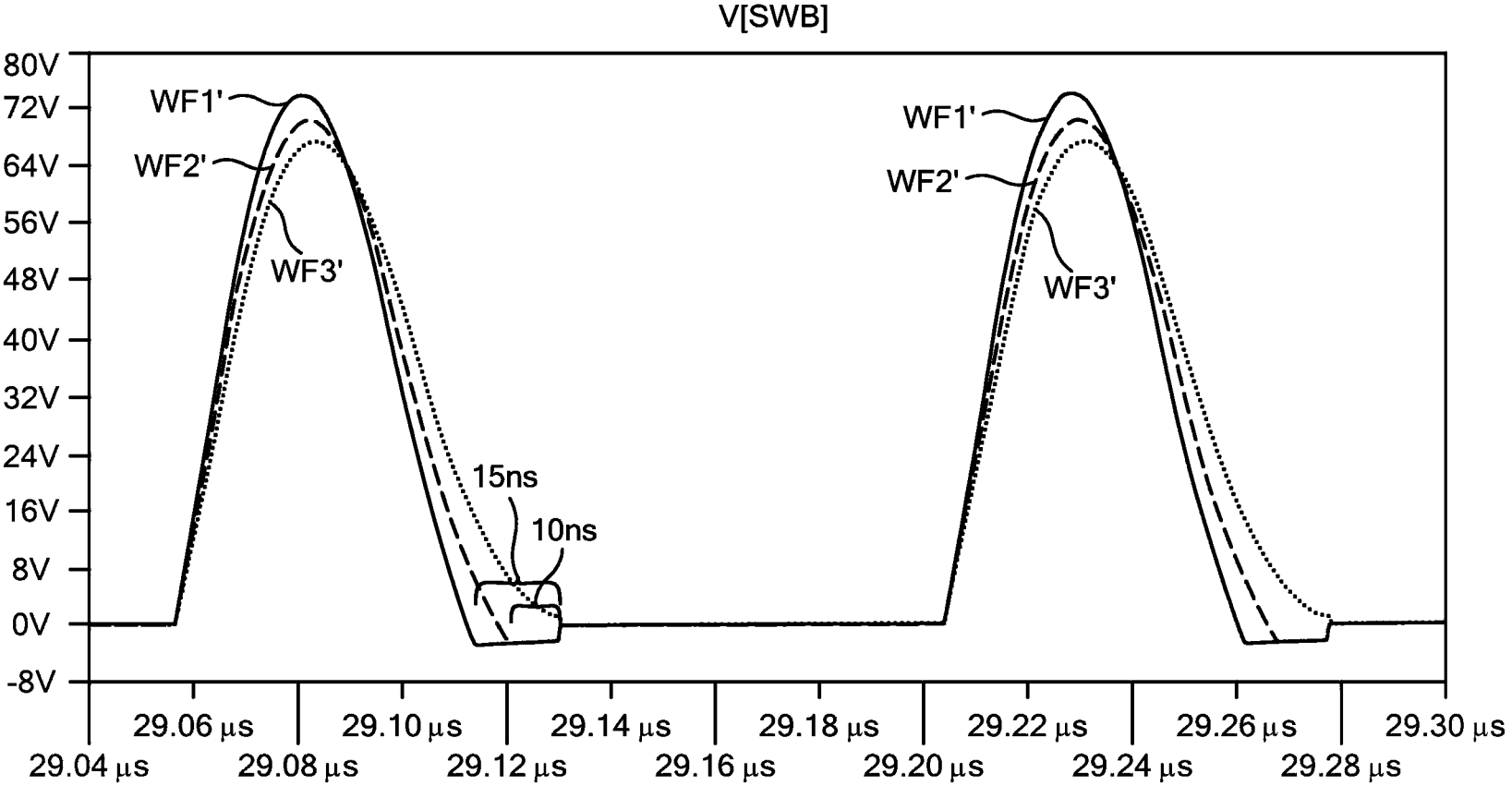

PTU
302
PRU
300
PRU
300
PRU
304
PRU
300
PTU
302
PRU
300

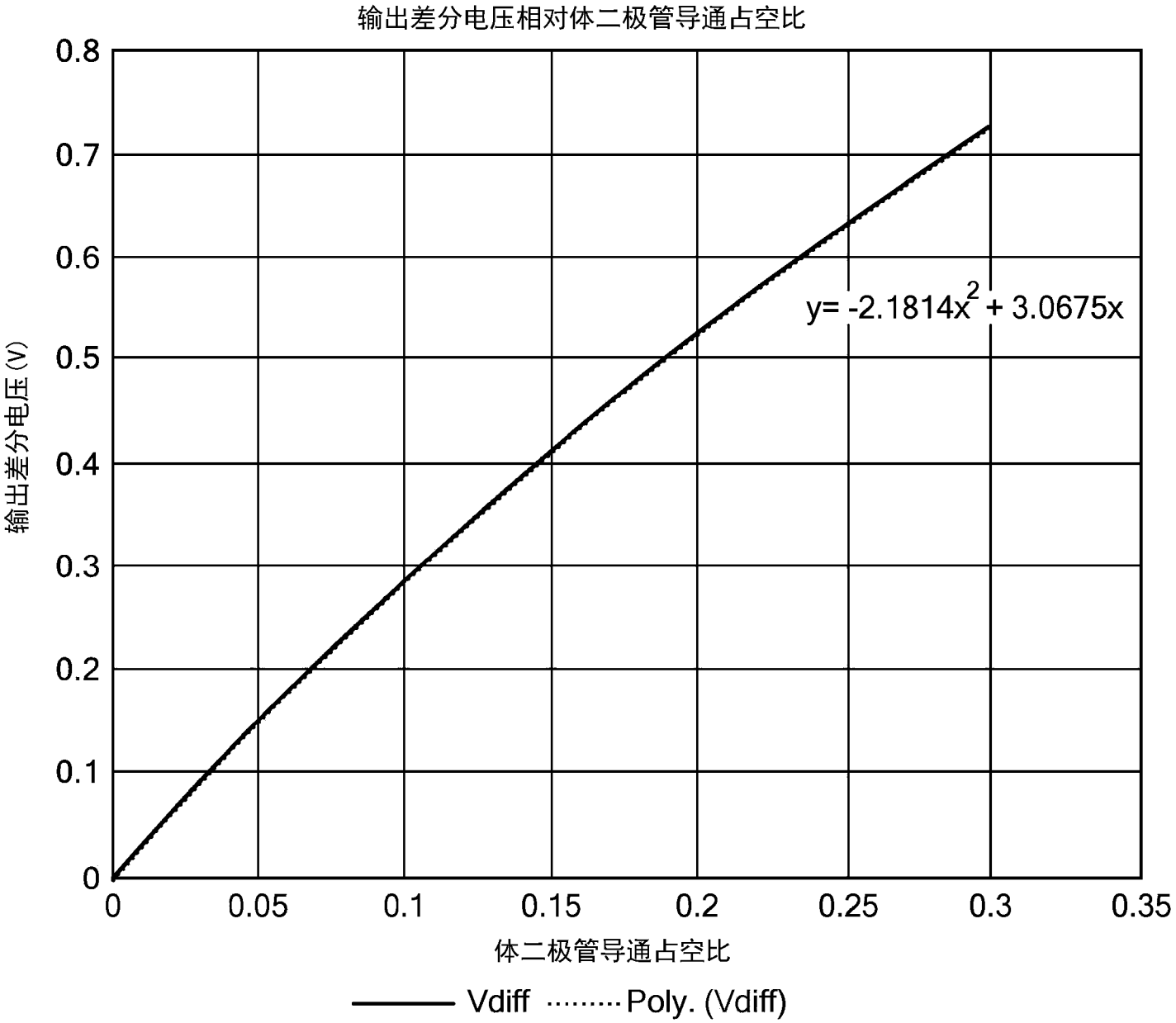

400
Lrfca
Swa
L
C
Vbus
+
-
402
Q1
Cshunta
RLoad
+
-
处理器
404

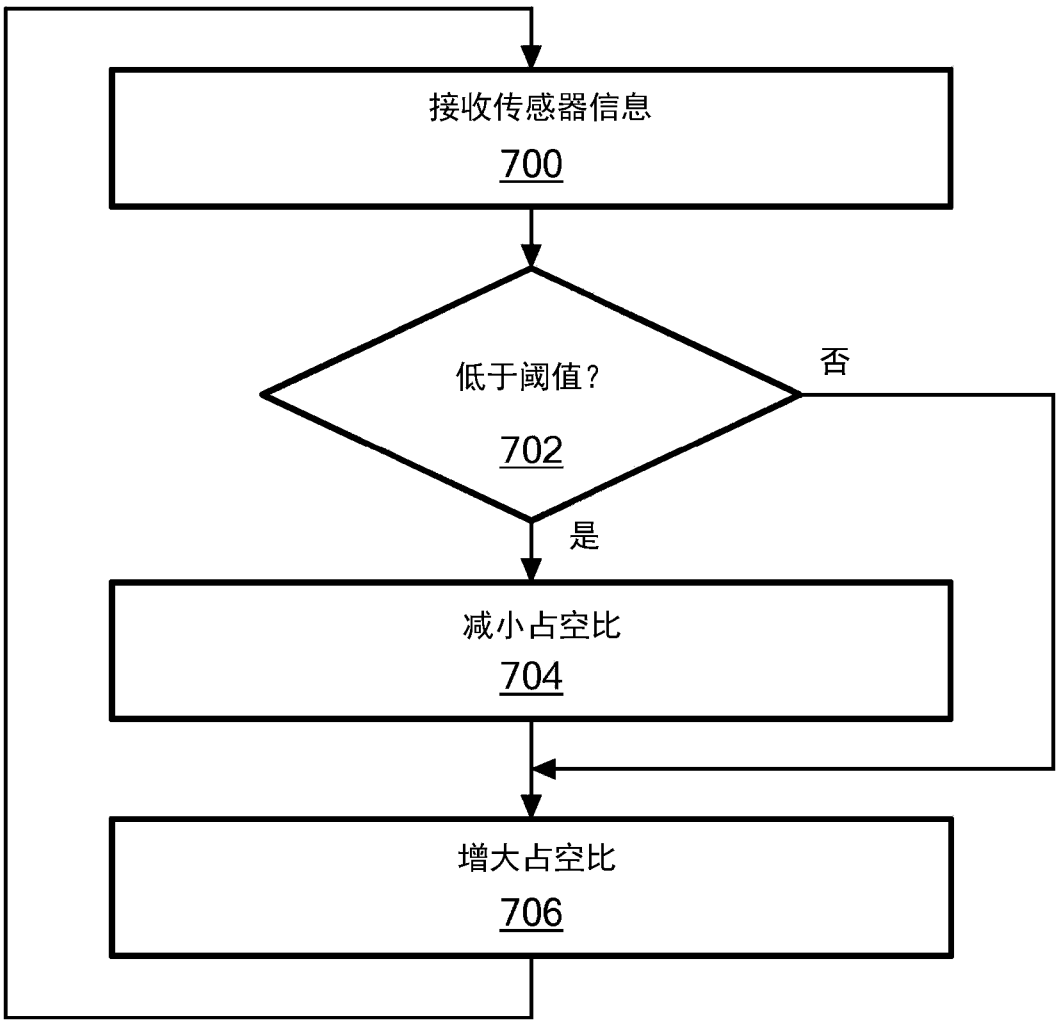

Q1
402a
Vlo_a
C1a
R1a
C2
处理器
404
C1b
R1b
{2+C1}
{2+R1}
402b
Q2
Vbus
Vlo_b

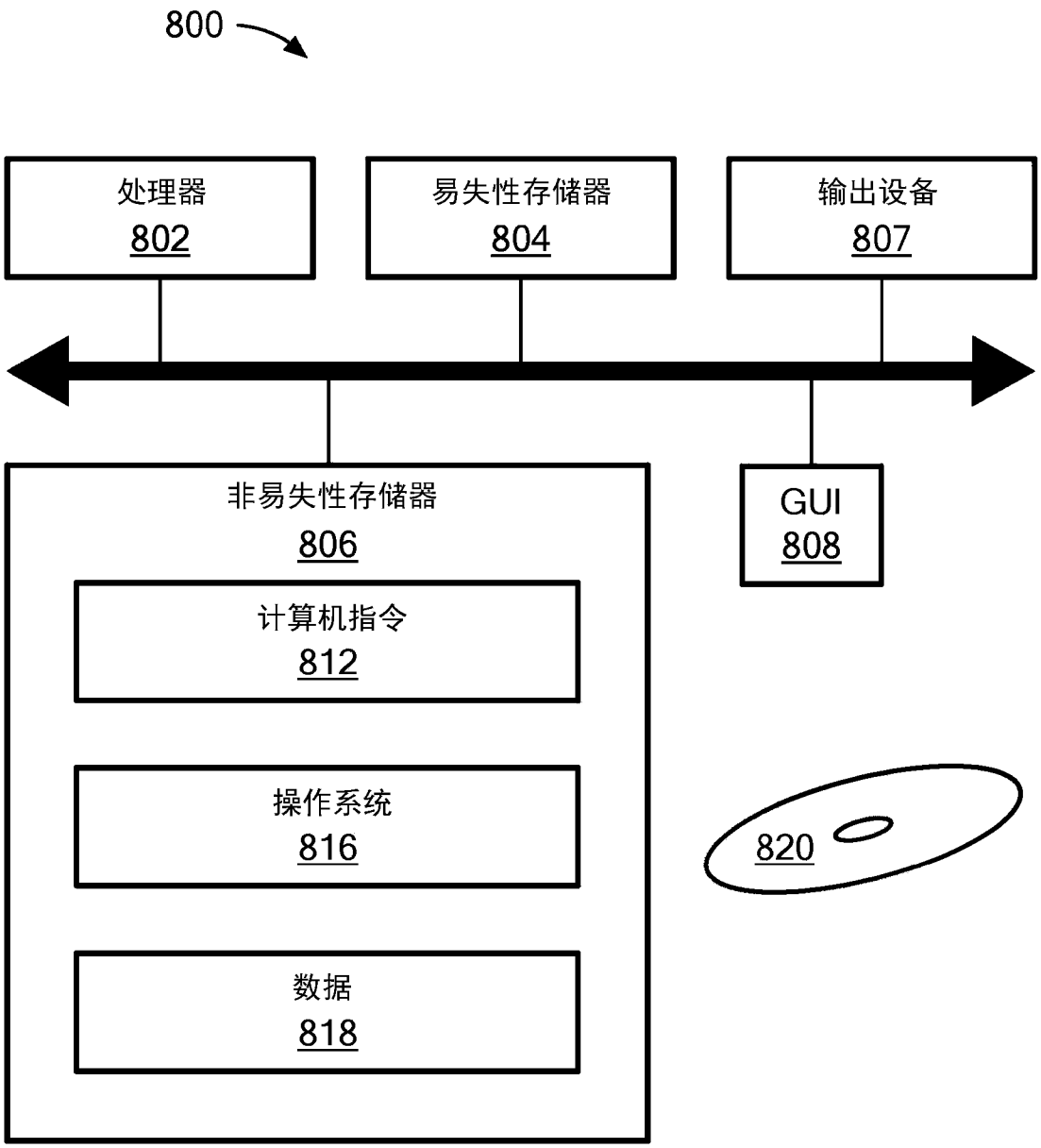

500
Vdd
R1
{R1}
RDN1
RDN2
R4
{R1}
Vo-
Vo+
R2
{R2}
D
Q1
BD
Cshunt
{Cshunt}
R3
{R3}
C
{C}
R5
{R2+R3}

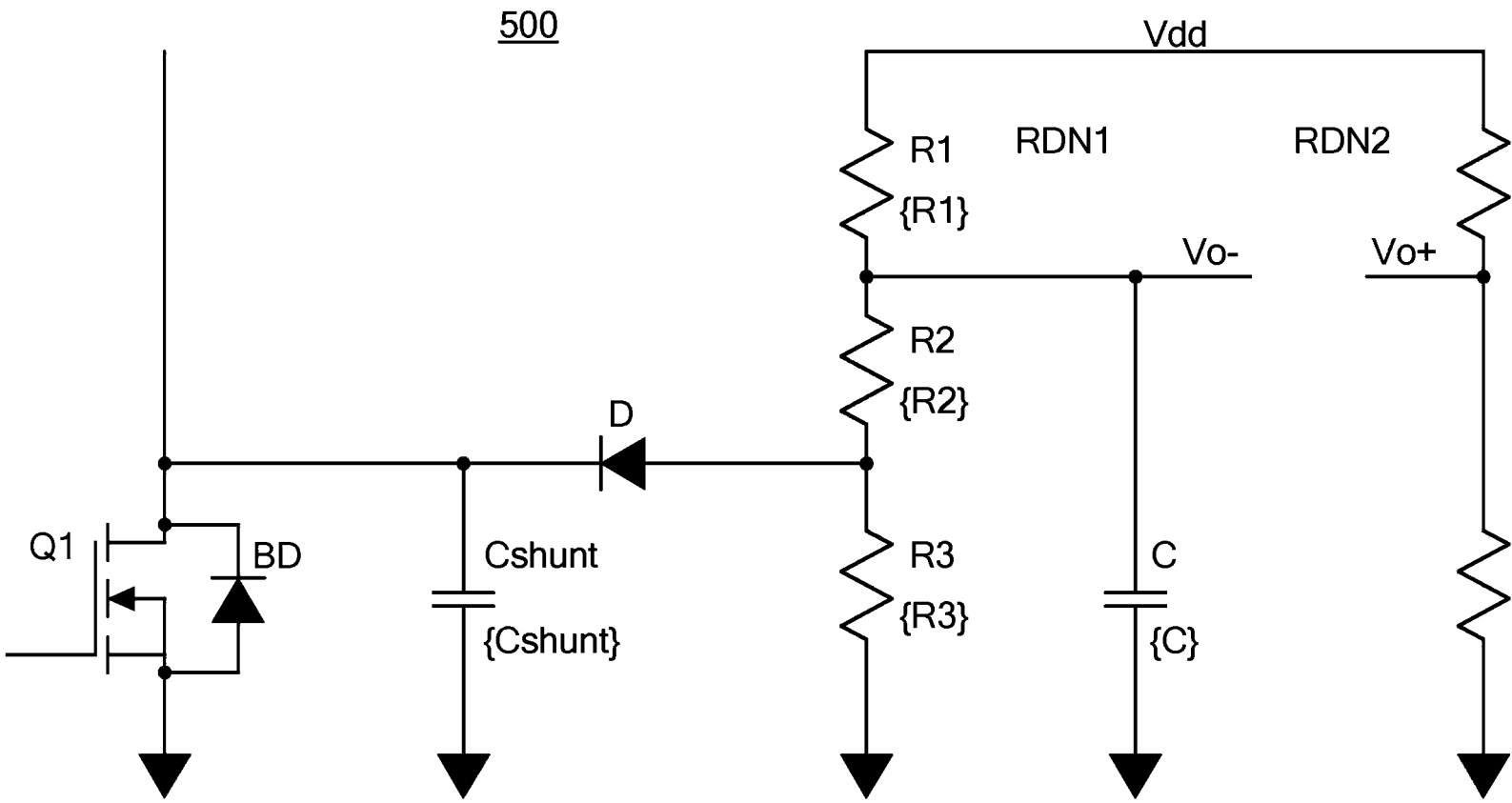

V[N017,N016]
150mV
140mV
130mV
120mV
110mV
100mV
90mV
80mV
70mV
60mV
50mV
40mV
30mV
20mV
10mV
0mV
0µs
5µs
10µs
15µs
20µs
25µs
30µs
35µs
40µs
45µs
50µs
WF1
WF2
WF3


V[SWB]
80V
72V
64V
56V
48V
40V
32V
24V
16V
8V
0V
-8V
WF1'
WF2'
WF3'
15ns
10ns
WF1'
WF2'
WF3'
29.04 µs
29.06 µs
29.08 µs
29.10 µs
29.12 µs
29.14 µs
29.16 µs
29.18 µs
29.20 µs
29.22 µs
29.24 µs
29.26 µs
29.28 µs
29.30 µs


输出差分电压相对体二极管导通占空比
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
输出差分电压 (V)
y= -2.1814x2 + 3.0675x
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
体二极管导通占空比
Vdiff
Poly. (Vdiff)


接收传感器信息
700
低于阈值？
702
否
是
减小占空比
704
增大占空比
706


800
处理器
802
易失性存储器
804
输出设备
807
非易失性存储器
806
GUI
808
计算机指令
812
操作系统
816
数据
818
820


500
Vdd
R1
{R1}
RDN1
RDN2
Vo-
Vo+
R2
{R2}
D
Q1
BD
Cshunt
{Cshunt}
R3
{R3}
C
{C}