# 2.17运算放大器(OPA)(3.04)

测试人员：郑焕龙 陈梦鸽 测试时间：2020-08-20

1. 测试仪器：直流稳压电源（IT6932A）；数字示波器（TDS2022C）；高低温交变湿热试验箱（501565）；万用表（FLUKE 17B DIGITAL MULTIMETER）；
2. 测试工具：CS2110 下载器，CS2110 MPA DEMO VER1.2
3. 上位机下载软件及烧写程序：CS2110 3.0.0



1. 测试方法：烧录【CS2110\_S01B\_OPA】目录下程序,看OPA1和OPA2电压跟随是否正常。附加电压系数和温漂；
2. 要求：2.17 运算放大器寄存器读写及对应功能正常，OPA1和OPA2能够电压跟随；
   1. 运算放大器精度<8LSB
3. 测试数据：

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | OPA1 | A1E输出 | | |  | OPA2 | A2E输出 | | |
|  |  | 1# | 2# | 3# |  |  | 1# | 2# | 3# |
| A1P输入 | 1V | 0.999 | 1.002 | 1.001 | A2P输入 | 1V | 1.0014 | 1.0016 | 1 |
| 1.5V | 1.499 | 1.5024 | 1.5015 | 1.5V | 1.5018 | 1.5018 | 1.5 |
| 2V | 1.999 | 2.0023 | 2.0012 | 2V | 2.0015 | 2.0018 | 1.999 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | OPA1输入1V | A1E输出 | | | OPA2输入1V | A2E输出 | | |
| 电压系数 | VDD供电 | 1# | 2# | 3# | VDD供电 | 1# | 2# | 3# |
|  | 5V | 1.002 | 1.0028 | 1.0019 | 5V | 1.002 | 1.0021 | 1.007 |
|  | 4V | 1.0006 | 1.0032 | 1.0024 | 4V | 1.0026 | 1.0027 | 1.0012 |
|  | 3V | 1.0006 | 1.0034 | 1.0025 | 3V | 1.0027 | 1.0029 | 1.0012 |
|  | 2V | 1.1706 | 1.1735 | 1.1625 | 2V | 1.0063 | 1.0653 | 1.0639 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 输入 | 1V | A1E输出 | | | A2E输出 | | |
| 温漂系数 | 温度 | 1# | 2# | 3# | 1# | 2# | 3# |
|  | -40 | 0.997 | 0.994 | 0.996 | 0.997 | 0.996 | 0.998 |
|  | -20 | 0.997 | 0.995 | 0.996 | 0.997 | 0.996 | 0.998 |
|  | 0 | 0.997 | 0.995 | 0.996 | 0.997 | 0.996 | 0.998 |
|  | 20 | 0.997 | 0.996 | 0.996 | 0.997 | 0.996 | 0.998 |
|  | 40 | 0.997 | 0.996 | 0.996 | 0.998 | 0.996 | 0.999 |
|  | 60 | 0.997 | 0.996 | 0.996 | 0.998 | 0.996 | 0.998 |
|  | 80 | 0.997 | 0.996 | 0.996 | 0.998 | 0.997 | 0.998 |

1. 测试结果：根据测试结果表明，OPA1和OPA2电压跟随正常；运算放大器精度<8LSB。
2. CS2110 MPA DEMO VER1.2原理图：



