文件状态

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| --- | --- | --- | --- |
| 发放部门： |  | 文件受控状态： |  |
| 文件发布状态： |  | 文件生效日期： |  |
| 备注： |  | | |

编制

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| **部门** | **职位** | **签章** | **签章日期** |
|  |  | 肖琨 | 2022.03.15 |
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评审

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| **部门** | **职位** | **签章** | **签章日期** |
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批准

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| **部门** | **职位** | **签章** | **签章日期** |
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修订历史

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| --- | --- | --- | --- |
| **版本号** | **修订人** | **更改描述** | **更改日期** |
| V1.00 | 肖琨 | 初版 | 2022.03.15 |
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# 测试信息汇总表

|  |  |
| --- | --- |
| 文件编号 | 08-06-05 |
| 单板名称 |  |
| 单板硬件版本号 |  |
| 单板固件版本号 |  |
| 测试产品名称 |  |
| 测试产品型号 |  |
| 项目编号 |  |
| 固件工程师 |  |
| 硬件工程师 |  |
| 测试工程师 |  |
| 开始测试日期 |  |
| 结束测试日期 |  |
| 总测试时长/小时 |  |
| 缺陷个数 |  |
| 测试结论 | 通过/不通过 |

# 测试设备汇总表

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **设备名称** | **设备型号** | **设备编号** | **精度级别** | **校准日期** | **校准过期日期** |
|  |  |  |  |  |  |
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# 整版性能测试

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **功耗（关机）** |  |  | 通过/不通过 |  |
| **功耗（待机）** |  |  |  |  |
| **功耗（正常工作）** |  |  |  |  |
| **反复上下电** |  |  |  |  |
| **反复激活** |  |  |  |  |
| **防反接功能** |  |  |  |  |
| **最小供电值** |  |  |  |  |
| **最大供电值** |  |  |  |  |

# 电源完整性测试

## 3.3V电平测试

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **电压值** |  |  | 通过/不通过 |  |
| **最大负载电流** |  |  |  |  |
| **纹波频率** |  |  |  |  |
| **纹波幅值** |  |  |  |  |
| **噪声** |  |  |  |  |
| **上电时序** |  |  |  |  |
| **下电时序** |  |  |  |  |
| **充电波动** |  |  |  |  |
| **地电平波动** |  |  |  |  |
| **缓慢上电** |  |  |  |  |

纹波测试图

噪声测试图

上电时序图

下单时序图

# 信号完整性测试

## 晶体晶振

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **电平** |  |  |  |  |
| **频率** |  |  | 通过/不通过 |  |

晶体/晶振信号测试图

## 复位信号

a) 上电复位

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **复位信号电平** |  |  | 通过/不通过 |  |
| **上升时间** |  |  |  |  |
| **复位信号抖动** |  |  |  |  |

复位信号测试图

b) 手动复位

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **复位信号电平** |  |  | 通过/不通过 |  |
| **上升时间** |  |  |  |  |
| **复位信号抖动** |  |  |  |  |

复位信号测试图

## IIC信号

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **SCL信号电平** |  |  | 通过/不通过 |  |
| **SDA信号电平** |  |  |  |  |
| **SCL信号速率** |  |  |  |  |
| **建立时间** |  |  |  |  |
| **保持时间** |  |  |  |  |

IIC信号测试图1

IIC信号测试图2

## SPI信号

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **CLK信号电平** |  |  | 通过/不通过 |  |
| **CS信号电平** |  |  |  |  |
| **MOSI信号电平** |  |  |  |  |
| **MISO信号电平** |  |  |  |  |
| **CLK信号速率** |  |  |  |  |
| **MOSI建立时间** |  |  |  |  |
| **MOSI保持时间** |  |  |  |  |
| **MISO建立时间** |  |  |  |  |
| **MISO保持时间** |  |  |  |  |
| **MOSI过冲** |  |  |  |  |
| **MISO过冲** |  |  |  |  |

SPI信号测试图1

SPI信号测试图2

## UART信号

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **RX信号电平** |  |  | 通过/不通过 |  |
| **TX信号电平** |  |  |  |  |
| **RX信号速率** |  |  |  |  |
| **TX信号速率** |  |  |  |  |

UART信号测试图

## 串口电路

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **RX信号电平** |  |  | 通过/不通过 |  |
| **TX信号电平** |  |  |  |  |
| **RX信号速率** |  |  |  |  |
| **TX信号速率** |  |  |  |  |

串口信号测试图

## LVDS信号

## RGB并口信号

## USB信号

# 电性能测试

## 基准电路测试

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **基准电平** |  |  | 通过/不通过 |  |
| **噪声电平** |  |  |  |  |

基准电路测试图

## 滤波电路测试

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **截至频率** |  |  | 通过/不通过 |  |

滤波电路测试图

## 看门狗电路测试

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **复位时间** |  |  | 通过/不通过 |  |

## ADC电路测试

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **最高电平** |  |  | 通过/不通过 |  |
| **中间电平** |  |  |  |  |
| **最低电平** |  |  |  |  |

## DAC电路测试

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **最高电平幅值** |  |  | 通过/不通过 |  |
| **最高电平波动** |  |  |  |  |
| **中间电平幅值** |  |  |  |  |
| **中间电平波动** |  |  |  |  |
| **最低电平幅值** |  |  |  |  |
| **最低电平波动** |  |  |  |  |

## 电池电量电路测试

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **最高电平幅值** |  |  | 通过/不通过 |  |
| **最高电平波动** |  |  |  |  |
| **中间电平幅值** |  |  |  |  |
| **中间电平波动** |  |  |  |  |
| **最低电平幅值** |  |  |  |  |
| **最低电平波动** |  |  |  |  |

## 放大电路测试

信号发生器输出电平：

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **<频率1>放大倍数** |  |  | 通过/不通过 |  |
| **<频率2>放大倍数** |  |  |  |  |
| **<频率3>放大倍数** |  |  |  |  |

放大电路测试图形

## 按键电路测试

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **按键按下电平** |  |  | 通过/不通过 |  |
| **按键松开电平** |  |  |  |  |

## 蜂鸣器电路测试

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **开始发声最大抖动电平** |  |  | 通过/不通过 |  |
| **停止发声最大抖动电平** |  |  |  |  |

开始发声时刻波形图

停止发声时刻波形图

## LED电路测试

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **点亮电平** |  |  | 通过/不通过 |  |
| **熄灭电平** |  |  |  |  |

## 按键长按开机电路

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **按键按下电平** |  |  | 通过/不通过 |  |
| **按键松开电平** |  |  |  |  |
| **开机时间** |  |  |  |  |

电源输出口开始输出时的波形

## 按键长按关机电路

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **按键按下电平** |  |  | 通过/不通过 |  |
| **按键松开电平** |  |  |  |  |
| **关机时间** |  |  |  |  |

电源输出口停止输出时的波形

## 恒流源电路测试

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **最高电流值** |  |  | 通过/不通过 |  |
| **最高电流波动** |  |  |  |  |
| **最高电流带载能力（欧姆）** |  |  |  |  |
| **中间电流值** |  |  |  |  |
| **中间电流波动** |  |  |  |  |
| **中间电流带载能力（欧姆）** |  |  |  |  |
| **最低电流值** |  |  |  |  |
| **最低电流波动** |  |  |  |  |

## 风扇卡转电路测试

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **正常转动电平1** |  |  | 通过/不通过 |  |
| **卡转电平1** |  |  |  |  |
| **正常转动电平2** |  |  | 通过/不通过 |  |
| **卡转电平2** |  |  |  |  |
| **正常转动电平3** |  |  | 通过/不通过 |  |
| **卡转电平3** |  |  |  |  |
| **正常转动电平4** |  |  | 通过/不通过 |  |
| **卡转电平4** |  |  |  |  |
| **正常转动电平5** |  |  | 通过/不通过 |  |
| **卡转电平5** |  |  |  |  |

## 电池充电电路测试

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **充电时间** |  |  | 通过/不通过 |  |
| **最大充电电流** |  |  |  |  |

充电过程电池电压变化图

## 电池过热检测电路

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **电池常温电阻值** |  |  | 通过/不通过 |  |
| **报警电阻值** |  |  |  |  |

## 充电过程指示电路测试

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **插入充电电源电平** |  |  | 通过/不通过 |  |
| **拔出充电电源电平** |  |  |  |  |

## 充电完成指示电路

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **充电过程电平** |  |  | 通过/不通过 |  |
| **充电完成时电平** |  |  |  |  |

# 无线性能测试

## 蓝牙天线测试

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **测试项** | **合格范围** | **测试值** | **测试结果** | **备注** |
| **频偏** |  |  | 通过/不通过 |  |
| **发射功率** |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |