# 2.22 恒流驱动（IRED）（3.08）

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1. 测试仪器：直流稳压电源（IT6932A）；电流探头（501658）；数字示波器（TDS2022C）；高低温交变湿热试验箱（501565）
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IRED（VDD/LDO2）测试程序，修改寄存器配置，用电流探头测试不同档位IRED驱动电流、电压系数、温漂；
2. 要求：2.22 IRED寄存器读写及对应功能正常，IRED驱动电流在0-200mA之间；
   1. IRED驱动电流稳定，无波动。
3. 测试数据：

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| **寄存器配置电流大小（mA）** | **实测数据** | | | | | |
|
| **寄存器配置值** | 1# | | 2# | | 3# | |
|  | IRED\_ENHANCE=0 | IRED\_ENHANCE=1 | IRED\_ENHANCE=0 | IRED\_ENHANCE=1 | IRED\_ENHANCE=0 | IRED\_ENHANCE=1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 8 | 8 | 6.4 | 8 | 8 | 8 |
| 2 | 16 | 32 | 19.2 | 32 | 28.8 | 30 |
| 3 | 32.8 | 40 | 49.6 | 40 | 36 | 40 |
| 4 | 60 | 62 | 56 | 62 | 56 | 62 |
| 5 | 65.6 | 72 | 66 | 72 | 64 | 72 |
| 6 | 85.6 | 94 | 84 | 94 | 83 | 92 |
| 7 | 92 | 102 | 92 | 102 | 89.6 | 100 |
| 8 | 114 | 124 | 112 | 126 | 110 | 120 |
| 9 | 122 | 134 | 118 | 134 | 116 | 130 |
| 10 | 140 | 154 | 138 | 156 | 136 | 150 |
| 11 | 146 | 162 | 144 | 162 | 142 | 158 |
| 12 | 166 | 182 | 164 | 184 | 160 | 178 |
| 13 | 172 | 188 | 170 | 192 | 166 | 186 |
| 14 | 190 | 206 | 188 | 210 | 184 | 206 |
| 15 | 198 | 214 | 196 | 216 | 190 | 212 |

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| **步进** | | | | | |
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| 1# | | 2# | | 3# | |
| IRED\_ENHANCE=0 | IRED\_ENHANCE=1 | IRED\_ENHANCE=0 | IRED\_ENHANCE=1 | IRED\_ENHANCE=0 | IRED\_ENHANCE=1 |
|  |  |  |  |  |  |
| 8 | 8 | 6.4 | 8 | 8 | 8 |
| 8 | 24 | 12.8 | 24 | 20.8 | 22 |
| 16.8 | 8 | 30.4 | 8 | 7.2 | 10 |
| 27.2 | 22 | 6.4 | 22 | 20 | 22 |
| 5.6 | 10 | 10 | 10 | 8 | 10 |
| 20 | 22 | 18 | 22 | 19 | 20 |
| 6.4 | 8 | 8 | 8 | 6.6 | 8 |
| 22 | 22 | 20 | 24 | 20.4 | 20 |
| 8 | 10 | 6 | 8 | 6 | 10 |
| 18 | 20 | 20 | 22 | 20 | 20 |
| 6 | 8 | 6 | 6 | 6 | 8 |
| 20 | 20 | 20 | 22 | 18 | 20 |
| 6 | 6 | 6 | 8 | 6 | 8 |
| 18 | 18 | 18 | 18 | 18 | 20 |
| 8 | 8 | 8 | 6 | 6 | 6 |

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| IRED电压系数，IRED外接到0.8V，IRED\_ENHANCE=1，寄存器配置值1 |  |  |  |
| 电源电压 | 1# | 2# | 3# |
| 5.0 |  |  | 8.0 |
| 4.5 |  |  | 8.0 |
| 4.0 |  |  | 8.0 |
| 3.5 |  |  | 8.0 |
| 3.0 |  |  | 8.0 |
| 2.9 |  |  | 8.0 |
| 2.8 |  |  | 8.0 |
| 2.7 |  |  | 8.0 |
| 2.6 |  |  | 8.0 |
| 2.5 |  |  | 8.0 |

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| IRED电压系数，IRED外接到0.8V，IRED\_ENHANCE=1，寄存器配置值2 |  |  |  | IRED电压系数，IRED外接到0.8V，IRED\_ENHANCE=1，寄存器配置值3 |  |  |  |
| 电源电压 | 1# | 2# | 3# | 电源电压 | 1# | 2# | 3# |
| 5.0 | 32.0 | 32.0 | 31.2 | 5.0 | 40.0 | 40.0 | 40.0 |
| 4.5 | 32.0 | 32.0 | 31.2 | 4.5 | 40.0 | 40.0 | 40.0 |
| 4.0 | 32.0 | 32.0 | 31.2 | 4.0 | 40.0 | 40.0 | 40.0 |
| 3.5 | 32.0 | 32.0 | 31.2 | 3.5 | 40.0 | 40.0 | 40.0 |
| 3.0 | 32.0 | 32.0 | 31.2 | 3.0 | 40.0 | 40.0 | 40.0 |
| 2.9 | 32.0 | 32.0 | 31.2 | 2.9 | 40.0 | 40.0 | 40.0 |
| 2.8 | 32.0 | 32.0 | 31.2 | 2.8 | 40.0 | 40.0 | 40.0 |
| 2.7 | 32.0 | 32.0 | 31.2 | 2.7 | 40.0 | 40.0 | 40.0 |
| 2.6 | 32.0 | 32.0 | 31.2 | 2.6 | 40.0 | 40.0 | 40.0 |
| 2.5 | 32.0 | 32.0 | 31.2 | 2.5 | 40.0 | 40.0 | 40.0 |
| 2.4 | 26.4 | 27.2 | 26.4 | 2.4 | 34.0 | 34.0 | 33.0 |
| 2.3 | 20.0 | 21.6 | 20.8 | 2.3 | 26.0 | 26.0 | 26.0 |

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| IRED电压系数，IRED外接到0.8V，IRED\_ENHANCE=1，寄存器配置值4 |  |  |  | IRED电压系数，IRED外接到0.8V，IRED\_ENHANCE=1，寄存器配置值5 |  |  |  |
| 电源电压 | 1# | 2# | 3# | 电源电压 | 1# | 2# | 3# |
| 5.0 | 64.0 | 62.0 | 62.0 | 5.0 | 72.0 | 72.0 | 70.0 |
| 4.5 | 64.0 | 62.0 | 62.0 | 4.5 | 72.0 | 72.0 | 70.0 |
| 4.0 | 64.0 | 62.0 | 62.0 | 4.0 | 72.0 | 72.0 | 70.0 |
| 3.5 | 64.0 | 62.0 | 62.0 | 3.5 | 72.0 | 72.0 | 70.0 |
| 3.0 | 64.0 | 62.0 | 62.0 | 3.0 | 72.0 | 72.0 | 70.0 |
| 2.9 | 64.0 | 62.0 | 62.0 | 2.9 | 72.0 | 72.0 | 70.0 |
| 2.8 | 64.0 | 62.0 | 62.0 | 2.8 | 72.0 | 72.0 | 70.0 |
| 2.7 | 64.0 | 62.0 | 62.0 | 2.7 | 72.0 | 72.0 | 70.0 |
| 2.6 | 64.0 | 62.0 | 62.0 | 2.6 | 72.0 | 72.0 | 70.0 |
| 2.5 | 64.0 | 62.0 | 62.0 | 2.5 | 72.0 | 72.0 | 70.0 |
| 2.4 | 54.0 | 52.0 | 52.0 | 2.4 | 60.0 | 62.0 | 58.0 |
| 2.3 | 44.0 | 44.0 | 42.0 | 2.3 | 48.0 | 50.0 | 48.0 |

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| IRED电压系数，IRED外接到0.8V，IRED\_ENHANCE=1，寄存器配置值8 |  |  |  | IRED电压系数，IRED外接到0.8V，IRED\_ENHANCE=1，寄存器配置值9 |  |  |  |
| 电源电压 | 1# | 2# | 3# | 电源电压 | 1# | 2# | 3# |
| 5.0 | 116.0 | 118.0 | 116.0 | 5.0 | 130.0 | 130.0 | 126.0 |
| 4.5 | 116.0 | 118.0 | 116.0 | 4.5 | 130.0 | 130.0 | 126.0 |
| 4.0 | 116.0 | 118.0 | 116.0 | 4.0 | 130.0 | 130.0 | 126.0 |
| 3.5 | 116.0 | 118.0 | 116.0 | 3.5 | 130.0 | 130.0 | 126.0 |
| 3.0 | 116.0 | 118.0 | 116.0 | 3.0 | 130.0 | 130.0 | 126.0 |
| 2.9 | 116.0 | 118.0 | 116.0 | 2.9 | 130.0 | 130.0 | 126.0 |
| 2.8 | 116.0 | 118.0 | 116.0 | 2.8 | 130.0 | 130.0 | 126.0 |
| 2.7 | 116.0 | 118.0 | 116.0 | 2.7 | 130.0 | 130.0 | 126.0 |
| 2.6 | 116.0 | 118.0 | 116.0 | 2.6 | 130.0 | 130.0 | 126.0 |
| 2.5 | 116.0 | 118.0 | 116.0 | 2.5 | 130.0 | 130.0 | 126.0 |
| 2.4 | 100.0 | 104.0 | 104.0 | 2.4 | 110.0 | 112.0 | 108.0 |
| 2.3 | 82.0 | 86.0 | 84.0 | 2.3 | 88.0 | 90.0 | 86.0 |

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| IRED电压系数，IRED外接到0.8V，IRED\_ENHANCE=1，寄存器配置值F |  |  |  |
| 电源电压 | 1# | 2# | 3# |
| 5.0 | 222.0 | 184.0 | 216.0 |
| 4.5 | 222.0 | 184.0 | 216.0 |
| 4.0 | 222.0 | 184.0 | 216.0 |
| 3.5 | 222.0 | 184.0 | 216.0 |
| 3.0 | 222.0 | 184.0 | 216.0 |
| 2.9 | 222.0 | 184.0 | 216.0 |
| 2.8 | 222.0 | 184.0 | 216.0 |
| 2.7 | 222.0 | 184.0 | 216.0 |
| 2.6 | 222.0 | 184.0 | 216.0 |
| 2.5 | 220.0 | 184.0 | 216.0 |
| 2.4 | 188.0 | 154.0 | 186.0 |
| 2.3 | 154.0 | 120.0 | 152.0 |

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| IRED电压电流特性,IRED外加电压,不同VDD供电(寄存器配置4F) |  | | | | | | | | |
| VDD供电 | 3V | | | 2.5V | | | 2.4V | | |
| IRED外加电压(VDS) | 1# | 2# | 3# | 1# | 2# | 3# | 1# | 2# | 3# |
| 0.1 | 46 | 40 | 38 | 44 |  | 36 | 30 |  | 36 |
| 0.2 | 88 | 84 | 72 | 76 |  | 78 | 60 |  | 68 |
| 0.3 | 118 | 116 | 102 | 110 |  | 110 | 98 |  | 94 |
| 0.4 | 148 | 148 | 130 | 138 |  | 140 | 122 |  | 120 |
| 0.5 | 172 | 174 | 154 | 164 |  | 164 | 144 |  | 140 |
| 0.6 | 194 | 196 | 174 | 186 |  | 188 | 160 |  | 158 |
| 0.7 | 208 | 210 | 192 | 204 |  | 202 | 174 |  | 172 |
| 0.8 | 226 | 220 | 208 | 216 |  | 214 | 184 |  | 180 |
| 0.9 | 230 | 226 | 218 | 224 |  | 220 | 190 |  | 190 |
| 1 | 234 | 232 | 224 | 230 |  | 226 | 194 |  | 192 |
| 1.1 | 238 | 236 | 228 | 234 |  | 228 | 196 |  | 196 |
| 1.2 | 240 | 238 | 232 | 238 |  | 232 | 200 |  | 198 |
| 1.3 | 242 | 240 | 234 | 240 |  | 234 | 202 |  | 200 |
| 1.4 | 246 | 242 | 236 | 242 |  | 236 | 202 |  | 202 |
| 1.5 | 248 | 246 | 240 | 244 |  | 238 | 204 |  | 204 |

IRED外加1V电压,3V供电(寄存器配置4F),测试IRED驱动电流的温漂特性

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|  | 1# | 2# | 3# |
| -40 | 66/144 | 172/192 | 76/156 |
| -30 | 62/150 | 186/198 | 72/164 |
| -20 | 56162 | 198/202 | 68/178 |
| -10 | 72/192 | 178/208 | 92/198 |
| 0 | 186 | 212 | 206 |
| 10 | 220 | 212 | 220 |
| 20 | 222 | 210 | 226 |
| 30 | 222 | 208 | 232 |
| 40 | 228 | 210 | 236 |
| 50 | 224 | 192 | 230 |
| 60 | 226 | 194 | 240 |
| 70 | 218 | 184 | 240 |
| 80 | 214 | 176 | 230 |

1. 测试结果：根据测试结果表明，IRED驱动电流最大可达到200mA以上，在低温时波动较大。
2. CS2110 MPA DEMO VER1.2原理图：



