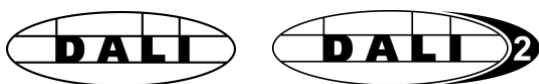
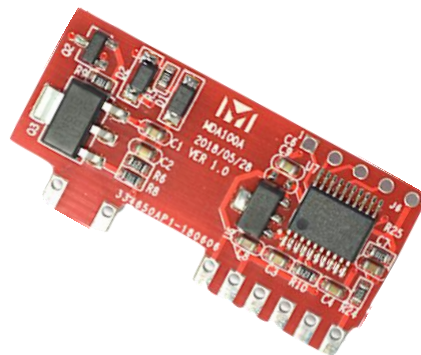


MDA100A

LED 驱动电源内置 DALI 协议转换模块

DALI-2 (Device Type 6) , Push Dim , 宽电压供电 , 单路 PWM 调光输出 , 故障检测输入 , 外形紧凑



概述

MDA100A 是一款符合 DALI (数字可寻址灯光接口) 标准 2.0 版本的 PCB 模块 , 它负责处理 DALI 总线的信号 , 并将 DALI 总线的控制信号转化为 PWM 信号 , PWM 信号可以直接和 LED 驱动电源内部的电源转换部分电路接口。MDA100 模块适合集成在 LED 驱动电源内部 , 加快支持 DALI-2 标准的产品开发和认证。

本模块内置固件实现了 DALI 控制装置-LED 模组最新标准 (IEC 62386-207:2009ed1.0 和 IEC 62386-207:2018ed2.0) , 能够兼容主流厂商的 DALI 控制器和控制系统 , 实现开关、调光、分组和场景等功能。

特性

- 符合 DALI-2 标准 , 兼容性好 , 缩短 LED 驱动电源产品获得 DALI-2 认证的周期。
- 支持 Push Dim (按键调光) 功能 , 可连接自恢复式开关进行调光。
- 自带高压保护 , DALI 总线误接市电不会损坏模块。
- 控制电路宽范围供电 (4.5 ~ 13.2Vdc) 。
- 模块化设计 , 集成度高 , 尺寸紧凑。
- 接受固件功能定制、硬件接口规格和结构尺寸定制。

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规格参数

本产品的主要规格参数如下表所示。

参数	规格
支持协议	IEC 62386-101:2014 ed2.0 IEC 62386-102:2014 ed2.0 IEC 62386-207:2018 ed2.0 (默认) / IEC 62386-207-2009 ed1.0
供电电源 VCC/VSS	电压：4.5 ~ 13.2V，典型值为 5V 功率：<0.2W
DALI 总线	电压：9.5 ~ 22.5Vdc 电流：<2.0 mA 与控制电路隔离电压：3000Vac
Push Dim 输入	额定电压：100 ~ 240Vac，极限最大电压（短时间 30s）：300Vac，额定频率：50/60Hz。 在 Push Dim 模式下，模块检测 DALI 总线两线间是否接入 AC 交流信号来判断是否有外接开关按下，根据按下的时间间隔长短执行不同的功能。 ● 短按：检测到按下 0.1 ~ 1S，开关切换 ● 长按：检测到按下 1.5 ~ 10S，调光（两次长按方向切换） ● 复位长按：检测到按下超过 11s，则设置输出为最大亮度
PWM 输出	频率：默认 1250Hz，可根据需要在 200 ~ 4KHz 间定制调整 占空比：0 ~ 100%，精度：0.1% 输出：集电极开路输出（内部默认上拉电阻 2.2K 接到 VCC，可接受定制）/3.3V 推挽输出（10mA）/其他定制输出 逻辑：正向逻辑（高电平或者 OC 开路表示 PWM 有效，低电平或者 OC 导通表示 PWM 无效。可接受定制为反逻辑）
ON 输出	5V 集电极开路输出（内部默认上拉电阻 2K，可接受定制）/3.3V 推挽输出（10mA）/其他定制输出
ERR 输入	高电平输入指示电源内部发生故障或保护状态，低电平输入表示无故障，默认为低电平。高电平 >4.2V，低电平 < 0.7V。
工作环境	温度：-40~85C，湿度：8% ~ 70%
存储环境	温度：-40~105C，湿度：8% ~ 90%
外形结构	尺寸（长*宽*高）：35.36mm*17.10mm*6.3mm，PCB 板厚 1.2mm
安装方式	金手指，焊接
重量	10±1g

外形结构

实物图

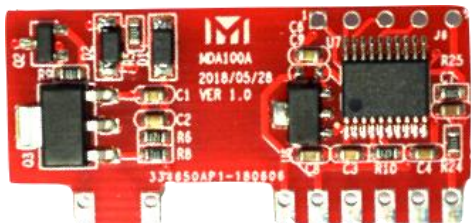


图 1 实物顶面

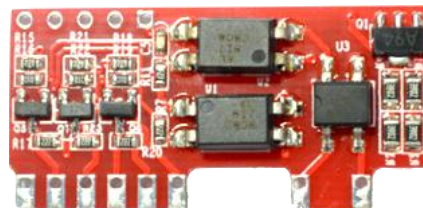


图 2 实物底面

尺寸图

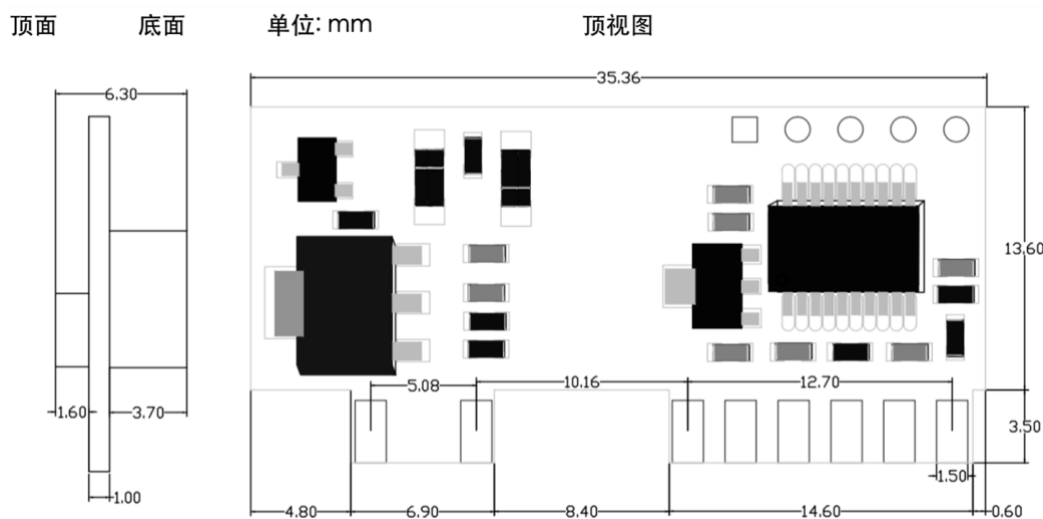


图 3 外形尺寸图

PCB 焊盘

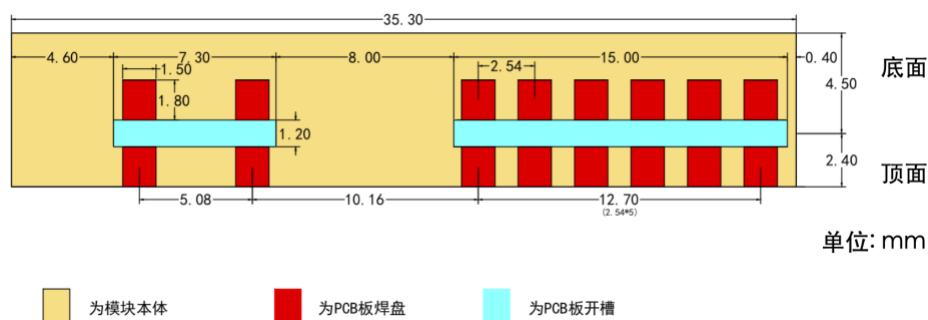
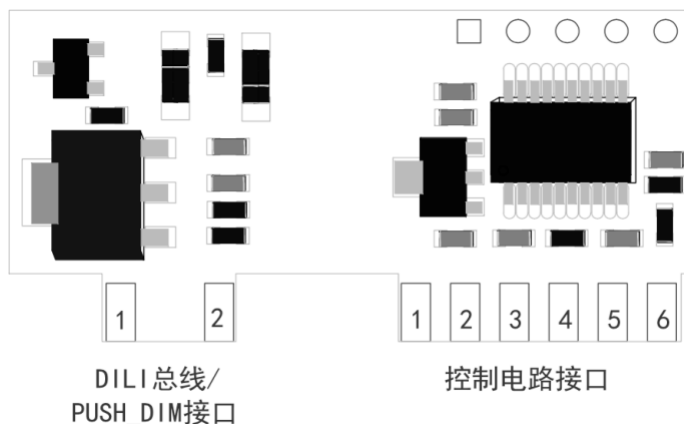


图 4 PCB 焊盘参考设计

引脚定义

引脚序号

模块引脚序号如下图所示。



输入（ DALI 总线/ Push Dim 输入 ）信号接口

序号	名称	功能描述
1	DA/PUSH_DIM_L	DALI 接口输入/ Push Dim AC 输入 L
2	DA/PUSH_DIM_N	DALI 接口输入/ Push Dim AC 输入 N

控制电路接口

序号	名称	描述
1	VSS	控制供电参考地
2	VCC	控制供电电源
3	ON	当 LED 电源功率电路在 PWM 为 0 时无法关闭输出，可利用该信号进行辅助控制。
4	Reserved	保留未用
5	PWM	PWM 调光输出信号。模块输出到 LED 驱动电源调光电路部分以控制输出功率
6	ERR	内部故障保护信号。由 LED 驱动电源功率电路检测并输入到模块

DALI 命令支持

本产品实现的 DALI 协议符合以下标准：

- IEC 62386-101:2014 ed2.0
- IEC 62386-102:2014 ed2.0
- IEC 62386-207:2018 ed2.0

IEC 62386-102 协议指令

本产品实现的 IEC 62386-102:2014 标准命令如下表所列。

控制、配置和查询命令

命令号	名称	描述
	DIRECT ARC POWER CONTROL	Adjusts the lighting control level to any level xxxx xxxx according to the Fade time.
0	OFF	Turns off lighting.
1	UP	Increases the lighting control level for 200 ms according to the Fade rate.
2	DOWN	Decreases the lighting control level for 200 ms according to the Fade rate.
3	STEP UP	Increments the lighting control level.
4	STEP DOWN	Decrements the lighting control level.
5	RECALL MAX LEVEL	Maximizes the lighting control level.
6	RECALL MIN LEVEL	Minimizes the lighting control level.
7	STEP DOWN AND OFF	Decrements the lighting control level and turns off lighting if the level is at the minimum.
8	ON AND STEP UP	Increments the lighting control level and turns on lighting if lighting is off.
9	ENABLE DAPC SEQUENCE	It shows the repeat start of the DAPC command.
10	GO TO LAST ACTIVE LEVEL	Adjusts the previous lighting control level according to the Fade time.
11-15	RESERVED	[Reserved]
16-31	GO TO SCENE	Adjusts the lighting control level for Scene xxxx according to the Fade time.
32	RESET	Changes the variables in the persistent memory to their reset values.
33	STORE ACTUAL LEVEL IN THE DTR (STORE ACTUAL LEVEL IN DTR0)	Saves the current lighting control level to the DTR(DTR0).
34	SAVE PERSISTENT VARIABLES	Saves a variable in a nonvolatile memory (NVM).
35	SET OPERATING MODE	Data of DTR0 is set as an operating mode.
36	RESET MEMORY BANK	The memory bank specified in DTR0 is changed to the reset value.
37	IDENTIFY DEVICE	Starts an identification state of the device.
38-41	RESERVED	[Reserved]
42	STORE THE DTR AS MAX LEVEL (SET MAX LEVEL)	Specifies the DTR (DTR0) data as the maximum lighting control level.
43	STORE THE DTR AS MIN LEVEL (SET MIN LEVEL)	Specifies the DTR (DTR0) data as the minimum lighting control level.
44	STORE THE DTR AS SYSTEM FAILURE LEVEL (SET SYSTEM FAILURE LEVEL)	Specifies the DTR (DTR0) data as the "FAILURE LEVEL".

命令号	名称	描述
45	STORE THE DTR AS POWER ON LEVEL (SET POWER ON LEVEL)	Specifies the DTR (DTR0) data as the "POWER ON LEVEL".
46	STORE THE DTR AS FADE TIME (SET FADE TIME)	Specifies the DTR (DTR0) data as the "Fade time".
47	STORE THE DTR AS FADE RATE (SET FADE RATE)	Specifies the DTR (DTR0) data as the "Fade rate".
48	SET EXTENDED FADE TIME	Specifies the DTR (DTR0) data as the "Extended Fade Time".
49-63	RESERVED	[Reserved]
64-79	STORE THE DTR AS SCENE (SET SCENE)	Specifies the DTR (DTR0) data as Scene <code>XXXX</code> .
80-95	REMOVE FROM SCENE	Deletes the Scene <code>XXXX</code> setting. (Specifies 1111 1111 for the Scene register.)
96-111	ADD TO GROUP	Adds the slave to Group <code>XXXX</code> .
112-127	REMOVE FROM GROUP	Deletes the slave from Group <code>XXXX</code> .
128	STORE DTR AS SHORT ADDRESS (SET SHORT ADDRESS)	Specifies the DTR (DTR0) data as a Short Address.
129	ENABLE WRITE MEMORY	Admits the writing of the memory bank.
130-143	RESERVED	[Reserved]
144	QUERY STATUS	Returns <code>STATUS INFORMATION</code>
145	QUERY CONTROL GEAR (QUERY CONTROL GEAR PRESENT)	Is there a slave that can communicate?
146	QUERY LAMP FAILURE	Is there a lamp problem?
147	QUERY LAMP POWER ON	Is a lamp on?
148	QUERY LIMIT ERROR	Is the specified lighting control level out of the range from the minimum to the maximum values?
149	QUERY RESET STATE	Is the slave in 'RESET STATE'?
150	QUERY MISSING SHORT ADDRESS	Does the slave not have a Short Address?
151	QUERY VERSION NUMBER	What is the corresponding IEC standard number?
152	QUERY CONTENT DTR (QUERY CONTENT DTR0)	What is the DTR (DTR0) content?
153	QUERY DEVICE TYPE	What is the device type? (fluorescent lamp:0000 0000)
154	QUERY PHYSICAL MINIMUM LEVEL	What is the minimum lighting control level specified by the hardware?
155	QUERY POWER FAILURE	Has the slave operated without the execution of reset-command or the adjustment of the lighting control level?
156	QUERY CONTENT DTR1	What is the DTR1 content?
157	QUERY CONTENT DTR2	What is the DTR2 content?
158	QUERY OPERATING MODE	What is the OperatingMode?
159	QUERY LIGHT SOURCE TYPE	What is the type of light source?
160	QUERY ACTUAL LEVEL	What is the "ACTUAL LEVEL" (the current lighting control level)?
161	QUERY MAX LEVEL	What is the maximum lighting control level?
162	QUERY MIN LEVEL	What is the minimum lighting control level?
163	QUERY POWER ON LEVEL	What is the "POWER ON LEVEL" (the lighting control level when the power is turned on)?
164	QUERY SYSTEM FAILURE LEVEL	What is the "SYSTEM FAILURE LEVEL" (the lighting control level when a failure occurs)?
165	QUERY FADE TIME / FADE RATE	What are the Fade time / Fade rate?

命令号	名称	描述
166	QUERY MANUFACTURER SPECIFIC MODE	What is the Specific Mode?
167	QUERY NEXT DEVICE TYPE	What is the next Device Type?
168	QUERY EXTENDED FADE TIME	What is the Extended Fade Time?
169	QUERY CONTROL GEAR FAILURE	Does a slave have abnormality?
170-175	RESERVED	[Reserved]
176-191	QUERY SCENE LEVEL (SCENES 0-15)	What is the lighting control level for Scene XXXX?
192	QUERY GROUPS 0-7	Does the slave belong to a Group among Groups 0 to 7? (Each bit corresponds to a Group.)
193	QUERY GROUPS 8-15	Does the slave belong to a Group among Groups 8 to 15? (Each bit corresponds to a Group.)
194	QUERY RANDOM ADDRESS (H)	What are the higher 8 bits of the random address?
195	QUERY RANDOM ADDRESS (M)	What are the middle 8 bits of the random address?
196	QUERY RANDOM ADDRESS (L)	What are the lower 8 bits of the random address?
197	READ MEMORY LOCATION	The value of the specified address of the specified memory bank? (DTR0: address, DTR1: Memory Bank number)
198-223	RESERVED	[Reserved]

特殊命令

命令号	名称	描述
256	TERMINATE	Releases the INITIALISE status.
257	DATA TRANSFER REGISTER(DTR)(DTR0)	Stores the data xxxx xxxx to the DTR (DTR0).
258	INITIALISE	Sets the slave to the INITIALISE status for 15 minutes. Commands 259 to 270 are enabled only for a slave in this status.
259	RANDOMISE	Generates a random address.
260	COMPARE	Is the random address smaller or equal to the search address?
261	WITHDRAW	Excludes slaves for which the random address and search address match from the compare process.
262	RESERVED	[Reserved]
263	PING	Slave ignores.
264	SEARCHADDRH	Specifies the higher 8 bits of the search address.
265	SEARCHADDRM	Specifies the middle 8 bits of the search address.
266	SEARCHADDRL	Specifies the lower 8 bits of the search address.
267	PROGRAM SHORT ADDRESS	Sets the slave of Short Address of being selected to the AAA AAA.
268	VERIFY SHORT ADDRESS	Is the Short Address AAA AAA?
269	QUERY SHORT ADDRESS	What is the Short Address of the slave being selected?
270	PHYSICAL SELECTION	Sets the slave to Physical Selection Mode and excludes the slave from the Compare process. (IEC62386-102ed1.0, -207ed1.0 only)
271	RESERVED	[Reserved]

IEC 62386-207 协议指令

本产品默认支持下表中的 IEC 62386-207:2018 ed1.0 和 IEC 62386-207:2018 ed2.0 命令。

扩展控制、配置和查询命令

命令号	名称	描述
224	REFERENCE SYSTEM POWER	Measures the power level.
225	ENABLE CURRENT PROTECTOR	Enables the current protector.
226	DISABLE CURRENT PROTECTOR	Disables the current protector. (IEC62386-207ed1.0 only)
227	SELECT DIMMING CURVE	Specifies the dimming curve according to DTR value. (IEC62386-207ed1.0 only)
228	STORE DTR AS FAST FADE TIME	Specifies Fast Fade time. (IEC62386-207ed1.0 only)
229-236	Reserved	
237	QUERY GEAR TYPE	Gear type? (IEC62386-207ed1.0 only)
238	QUERY DIMMING CURVE	Dimming curve? (IEC62386-207ed1.0 only)
239	QUERY POSSIBLE OPERATING MODE	Possible Operating Mode? (IEC62386-207ed1.0 only)
240	QUERY FEATURES	FEATURES? (IEC62386-207ed1.0 only)
241	QUERY FAILURE STATUS	Failure status? (IEC62386-207ed1.0 only)
242	QUERY SHORT CIRCUIT	Is Short circuit detected? (IEC62386-207ed1.0 only)
243	QUERY OPEN CIRCUIT	Is Open circuit detected? (IEC62386-207ed1.0 only)
244	QUERY LOAD DECREASE	Is Load decrease detected? (IEC62386-207ed1.0 only)
245	QUERY LOAD INCREASE	Is Load increase detected? (IEC62386-207ed1.0 only)
246	QUERY CURRENT PROTECTOR ACTIVE	Is the current protector active? (IEC62386-207ed1.0 only)
247	QUERY THERMAL SHUTDOWN	Is Thermal shut down detected? (IEC62386-207ed1.0 only)
248	QUERY THERMAL OVERLOAD	Is Thermal overload detected? (IEC62386-207ed1.0 only)
249	QUERY REFERENCE RUNNING	During power level measurement? (IEC62386-207ed1.0 only)
250	QUERY REFERENCE MEASUREMENT FAILED	Is power level measurement failed? (IEC62386-207ed1.0 only)
251	QUERY CURRENT PROTECTOR ENABLE	Is the current protector enabled? (IEC62386-207ed1.0 only)
252	QUERY OPERATING MODE	OPERATING MODE? (IEC62386-207ed1.0 only)
253	QUERY FAST FADE TIME	Fast Fade time? (IEC62386-207ed1.0 only)
254	QUERY MIN FAST FADE TIME	Minimum Fast Fade time? (IEC62386-207ed1.0 only)
255	QUERY EXTENDED VERSION NUMBER	What is the Edition number of the Part2XX? IEC62386-102ed1.0 : NO IEC62386-207ed1.0 : 1 IEC62386-102ed2.0 : NO

扩展特殊命令

命令号	名称	描述
272	ENABLE DEVICE TYPE X	Adds the device XXXX XXXX (a special device).
273	DATA TRANSFER REGISTER 1 (DTR1)	Stores data XXXX XXXX in DTR1.
274	DATA TRANSFER REGISTER 2 (DTR2)	Stores data XXXX XXXX in DTR2.
275	WRITE MEMORY LOCATION	Writes data to the specified address of the specified memory bank. (there is BW) (DTR (DTR0): address, DTR1: memory bank number)
276	WRITE MEMORY LOCATION – NO REPLY	Writes data to the specified address of the specified memory bank. (there is not BW) (DTR (DTR0): address, DTR1: memory bank number)
273-287	RESERVED	[Reserved]

其他说明

对于 IEC 62386-102ed1.0 及 IEC 62386-207ed1.0 中的部分命令在新版本标准中已经不支持（参见命令列表），本产品默认不支持这些命令。如果支持这些命令，可以联系我们进行固件定制。

典型应用

DALI 总线

LED 驱动电源在使用本产品的 DALI 总线接口时，只需要将电源外侧的 2 条 DALI 总线信号与模块相应引脚连接即可，引线注意保持和 AC 交流信号/电源输出/控制电路间保持必要的电气隔离距离。

PUSH-DIM 功能

如 LED 驱动电源需要在产品中兼容支持 PUSH-DIM 功能，则应在 DA/PUSH-DIM 输入接口处加入必要的保护器件，以符合安规基本要求。

通常情况下，在靠近电源输入端的位置加入压敏电阻和保险丝，保险丝前 L-N 间走线间距不小于 3mm（爬电距离不小于 6mm，推荐开槽），保险丝后走线间距不小于 2mm（爬电距离不小于 3mm）。

订购信息

型号说明

型号代码：

M DA 100 A-XXX

含义如下：

- M: Module (模块)
- DA : DALI 标准
- 100: 产品主型号
- A : 子型号
- XXX : 可选定制代码，标准品无此位

型号列表

型号	订货代码	描述	PWM/ONOFF 输出接口
MDA100A	MDA100A	LED 驱动电源内置 DALI 协议转换模块	OC 输出，内置 2.2K 上拉电阻到 VCC
MDA100A-OC	MDA100A-OC	LED 驱动电源内置 DALI 协议转换模块	OC 输出，内部无上拉电阻
MDA100A-3V3	MDA100A-3V3	LED 驱动电源内置 DALI 协议转换模块	3.3V TTL 推挽输出，最大输出电流 20mA

联系方式

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版本历史

版本	修订日期	描述	修订人	审核人
1.0	2018/7/2	初次发行。		Joey Tian