

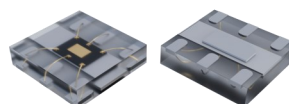
1. 产品特点

- 1.6V至3.6V供电，宽供电范围
- 低工作电流：3 μ A(典型值)
- 测量范围：0.01Lux至83K Lux
- 采用精密光学滤光，可与人眼匹配
- 可阻隔99%(典型值)以上的红外线(IR)
- 12种二进制权满量程范围设置：范围间匹配程度<0.2%(典型值)
- 23位有效动态范围，支持自动设置增益范围
- 工作温度范围：-40-105 $^{\circ}$ C
- 灵活的中断系统
- 小封装尺寸：2.0mm x 2.0mm x 0.65mm

2.应用

- 显示屏背光控制
- 手机、平板电脑和笔记本
- 照明控制系统
- 销售终端设备
- 摄像机

3.封装

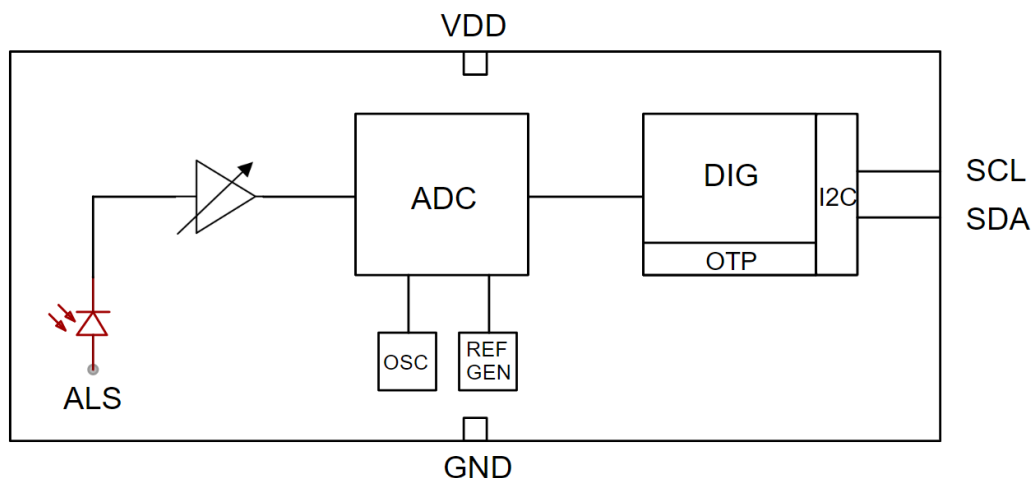


DFN 2*2*0.65mm ROHS

4.产品描述

TVALTA123X芯片是一款仿人眼测量光强的环境光芯片。TVALTA123X具备精密的频谱响应和较强的IR抑制能力。测量范围可达0.01Lux至83K Lux，内置满量程自动切换功能，无需手动选择量产范围。TVALTA123X具备23位有效动态范围，可进行连续测量，也可单次触发。数字输出通过I²C串口进行通信。TVALTA123X兼具低功耗和低电源电压特性，可延长电池寿命。

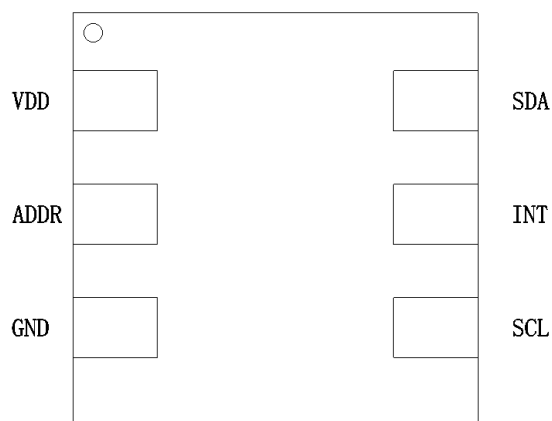
5.电路框图



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6. 管脚图



7. 管脚定义

编号	名称	功能	功能
1	VDD	供电电压	电压pin, 供电电压1.6V至3.6V
2	ADDR	数字输入	地址pin, 该pin对I2C地址进行配置
3	GND	Ground	地
4	SCL	数字输入	I2C时钟, 外接10K电阻到一个1.6V至5.5V的电源上
5	INT	数字输出	中断输出指示, 外接10K电阻到一个1.6V至5.5V的电源上
6	SDA	数字输入/输出	I2C数据pin, 外接10K电阻到一个1.6V至5.5V的电源上

8. 绝对最大额定参数

编号	名称	功能	规格		单位
			Min	Max	
1	VDD	VDD to GND	-0.5	6	V
		SDA, SCL, INT, and ADDR to GND	-0.5	6	V
2	I_{pinin}	Current into any pin	/	10	mA
3	ESD	HBM		±2000	V
4		CDM		±500	V
5	Topr	动作温度	-40	105	°C
6	Tstg	储存温度	-65	150	

9. 电气参数

At TA = 25°C, VDD = 3.3 V, 800-ms conversion time (CT = 1)(1), automatic full-scale range (RN[3:0] = 1100b(1)), white LED, and normal-angle incidence of light, unless otherwise specified.

Test Items	Test Conditions	MIN	TYP	MAX	Unit
O/S		-	-	-	-
VDD Operating range		1.6	-	3.6	-
VI ² C Operating range of I2C pull-up resistor		1.6	-	5.5	-
IQ Quiescent current	Dark_Shutdown(M[1:0]=00b) VDD=3.6V	-	1.2	0.47	uA
	Dark_Active(M[1:0]≠00b), VDD=3.6V	-	3.2	2.5	
	Full_Scale_Shutdown(RN[3:0] =1110b; M[1:0]=00b),VDD=3.6V	-	1.4	-	
	FullScale_Active(RN[3:0]=1110b; M [1:0]≠00b),VDD=3.6V	-	3.7	-	
POR Power-on-reset threshold	TA = 25°C	-	0.8	-	V
Peak irradiance spectral responsivity	-		550		nm
Resolution (LSB)	Lowest full-scale range, RN[3:0] = 0000b		0.01		lux
Full-scale illuminance	-		83865.6		lux
Measurement output result	0.64 lux per ADC code, 2620.80 lux full-scale (RN[3:0] = 0110), 2000 lux input	2812	3125	3437	ADC codes
		1800	2000	2200	lux
Relative accuracy between gain ranges	-		0.8%		-
Light source variation	Bare device, no cover glass		4%		-
Linearity	Input illuminance > 40 lux		5%		-
	Input illuminance <40 lux		8%		-
Dark condition, ADC output	0.01 lux per ADC code		0		ADC codes
Half-power angle	50% of full-power reading		60		degrees
PSRR	VDD at 3.6 V and 1.6 V		0.1		%/V
OTP Program&Read	Ensure that 0x44h[1]=1b and 0x10-0x17 are all burned into the chip within 1s	-	PASS	-	-
INT Verify	Verify Register configuration, 设置寄存器Add=0x10h[15:14]即RN[3:2]=11b; Add=0x10h[4]即L[4]=1b	-	PASS	-	-
Latched Window-Style Comparison Mode	Verify this Mode by register configuration, 设置寄存器Add=0x02h[15:14]即LE[3:2]≠11b	-	PASS		-
Transparent Hysteresis-Style Comparison Mode	Verify this Mode by register configuration, 设置寄存器Add=0x02h[15:14]即LE[3:2]≠11b	-	PASS		-
End-of-Conversion Mode	Verify this Mode by register configuration, 设置寄存器Add=0x02h[15:14]即LE[3:2]=11b	-	PASS		-
End-of-Conversion and Transparent Hysteresis-Style Comparison Mode	Verify this Mode by register configuration, 设置寄存器Add=0x02h[15:14]即LE[3:2]=11b	-	PASS		-

10. 光学性能

At TA = 25°C, VDD = 3.3 V, 800-ms conversion time (CT = 1), white LED, and normal-angle incidence of light, unless otherwise specified.

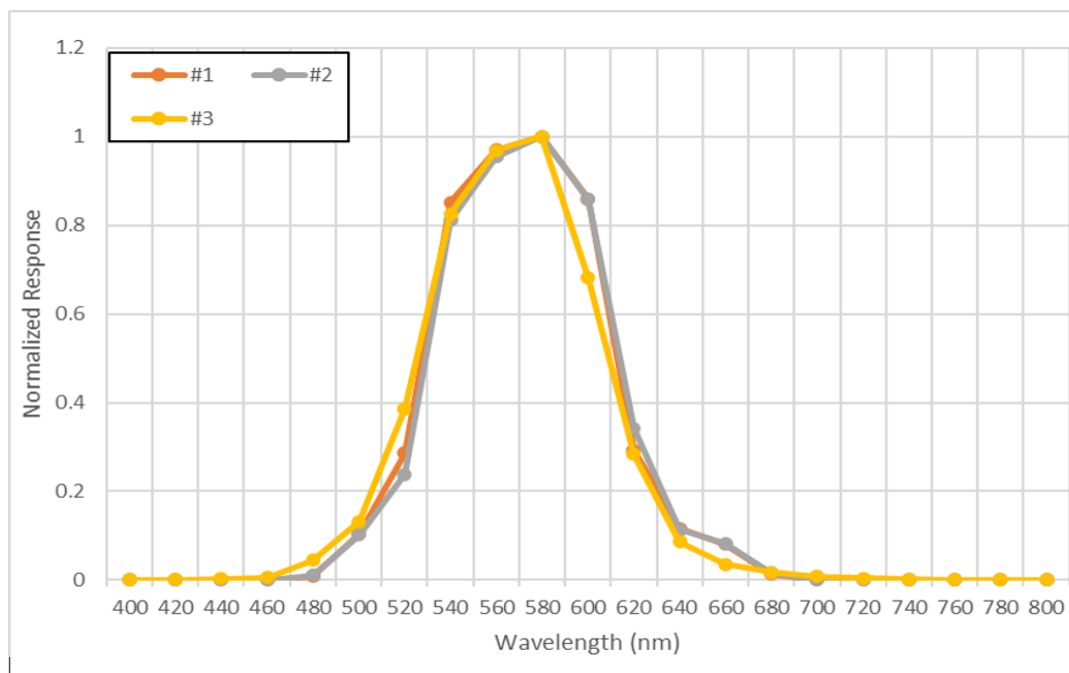


Figure 1 Spectral Response vs Wavelength

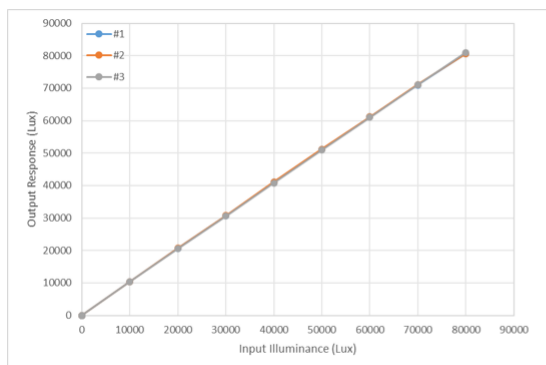


Figure 2 Output Response vs Input Illuminance (0~83K lux)^[1]

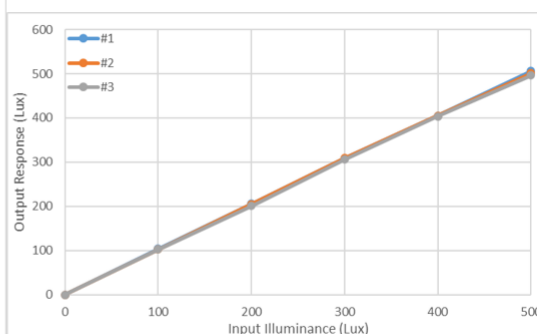


Figure 3 Output Response vs Input Illuminance (0~500lux)

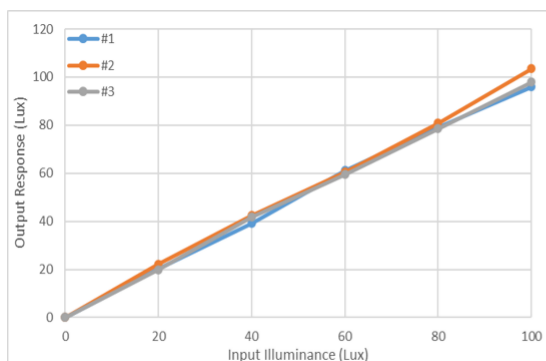


Figure 4 Output Response vs Input Illuminance (0~100lux)

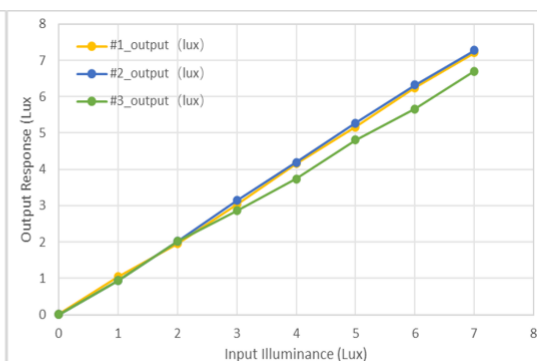


Figure 5 Output Response vs Input Illuminance (0~7lux)

10. 光学性能

At TA = 25°C, VDD = 3.3 V, 800-ms conversion time (CT = 1), white LED, and normal-angle incidence of light, unless otherwise specified.

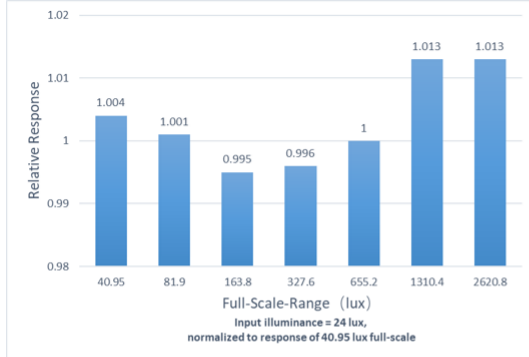


Figure 6 Full-Scale-Range Matching (Lowest 7 Ranges)

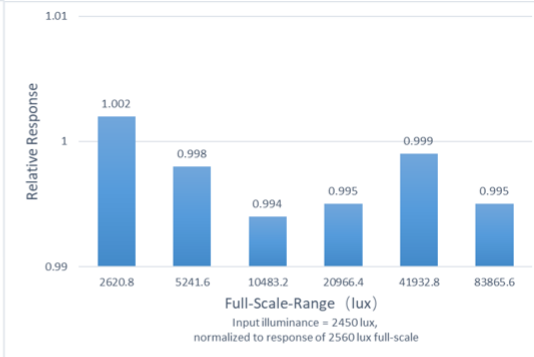


Figure 7 Full-Scale-Range Matching (Highest 6 Ranges)

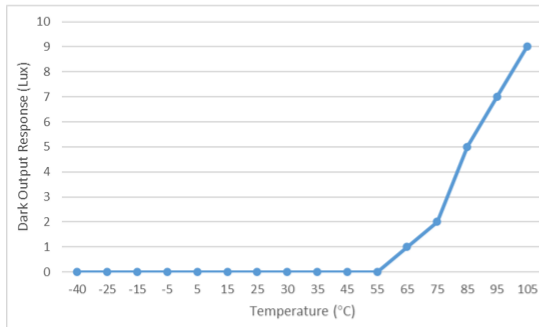


Figure 8 Dark Response vs Temperature

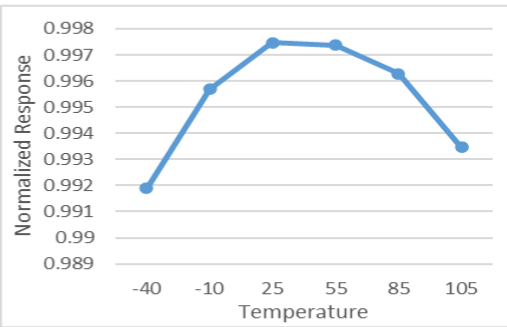


Figure 9 Normalized Response vs Temperature

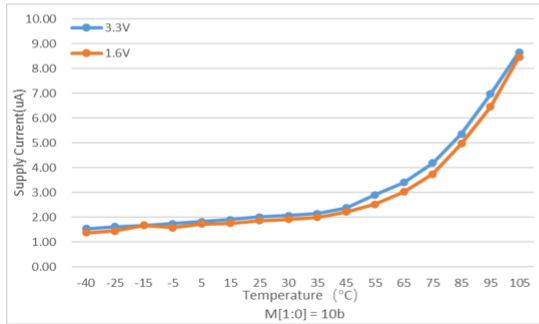


Figure 10 Supply Current vs Temperature

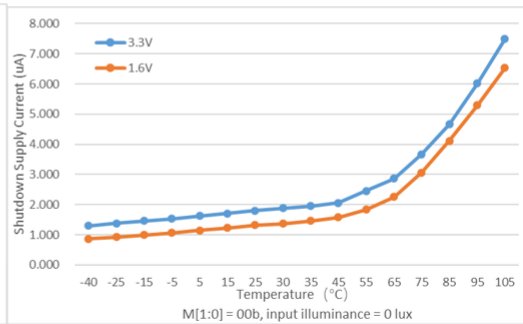


Figure 11 Shutdown Current vs Temperature

11. 芯片尺寸图

