

HOLITA TECHNOLOGY PHOTON MODULE

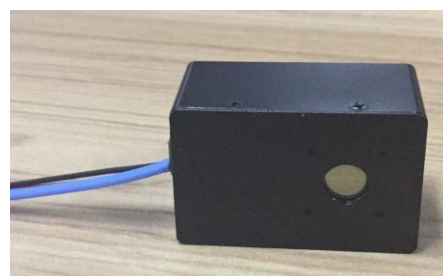
SINGLE PHOTON COUNTING MODULE

SPCM-01单光子探测器(含高压电路)

产品介绍

北京和力达科技推出的超小型极弱光单光子计数模块是由超小型光电倍增管、高压产生模块和高速运放电路等组成。为了达到检测极弱光的目标，和力达科技针对性的推出该单光子探测器模块，该模块具有如下特性：

- 1 采用正压设计以消除阴极电势差；
- 2 为了降低输出偏差，采用Cockcroft-Walton驱动电路；
- 3 采用金属屏蔽外壳，用以降低磁场干扰；
- 4 采用单5V供电；
- 5 PMT高压可控，最大1045V；
- 6 采用独特单光子探测技术用以增加动态范围；
- 7 可检测输入光功率为 10^{-15} --- 10^{-9} W的弱光信号；
- 8 输出信号使用高频屏蔽信号线，采用SMA公口连接；
- 9 输出2V以上TTL正脉冲信号（50欧姆匹配）；
- 10 输出正脉冲宽度大于8ns；
- 11 可定制化设计，用于满足不同的客户需求。



典型应用场所：

- 1 痕量级SO₂分析仪；
- 2 痕量级NO₂分析仪；
- 3 高灵敏颗粒物分析仪；
- 4 生物荧光分析、细菌检测；
- 5 医药荧光分析；
- 6 激光雷达探测；
- 7 FLIM成像分析；
- 8 光致光(PL)分析；
- 9 化学荧光分析；

产品列表 (Productions)

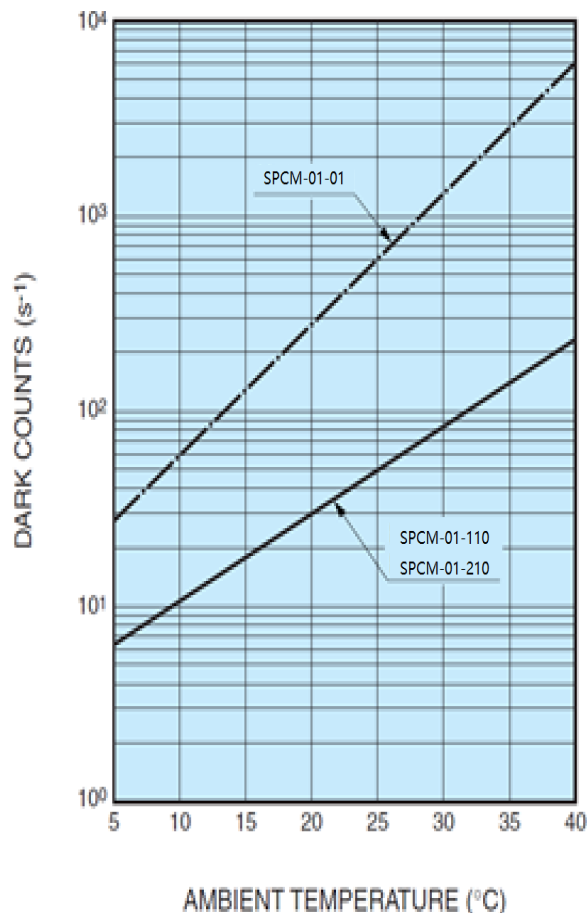
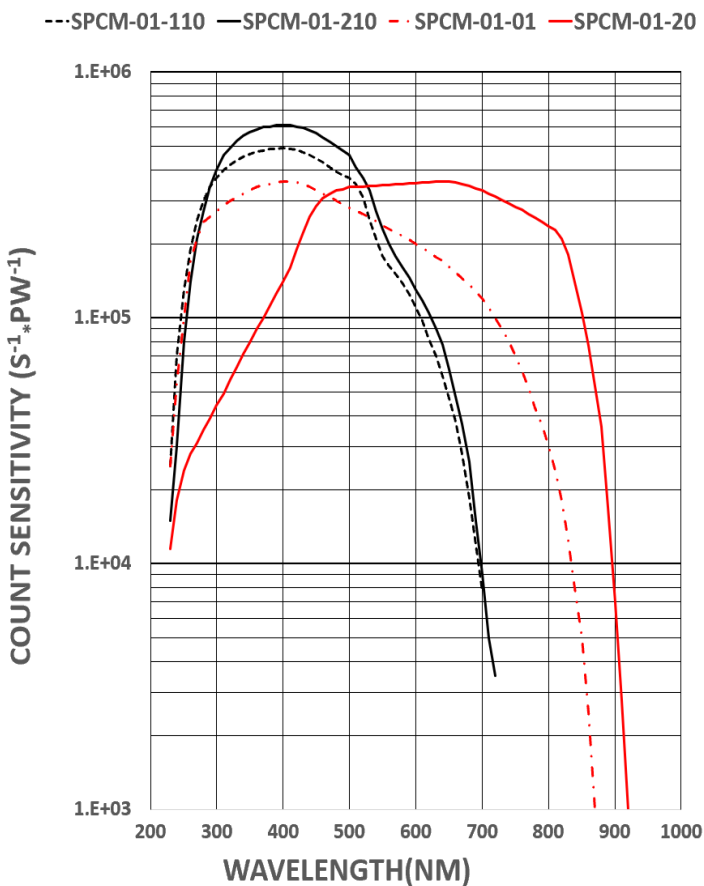
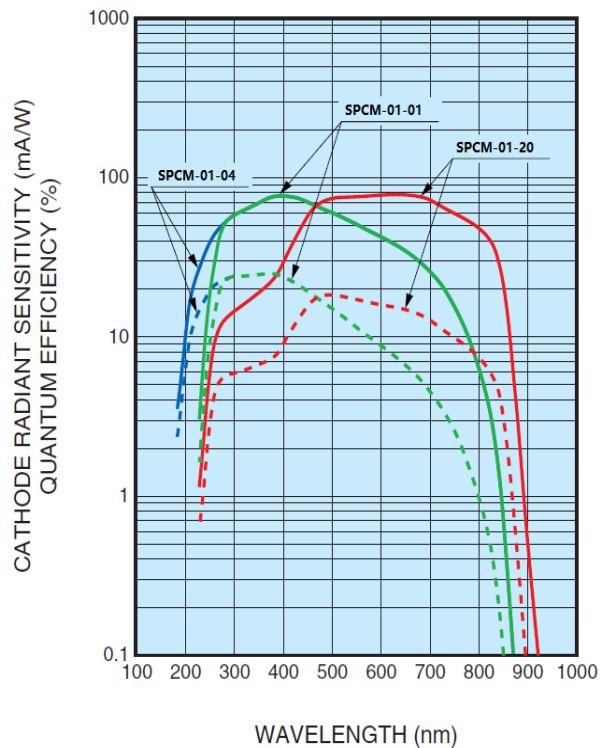
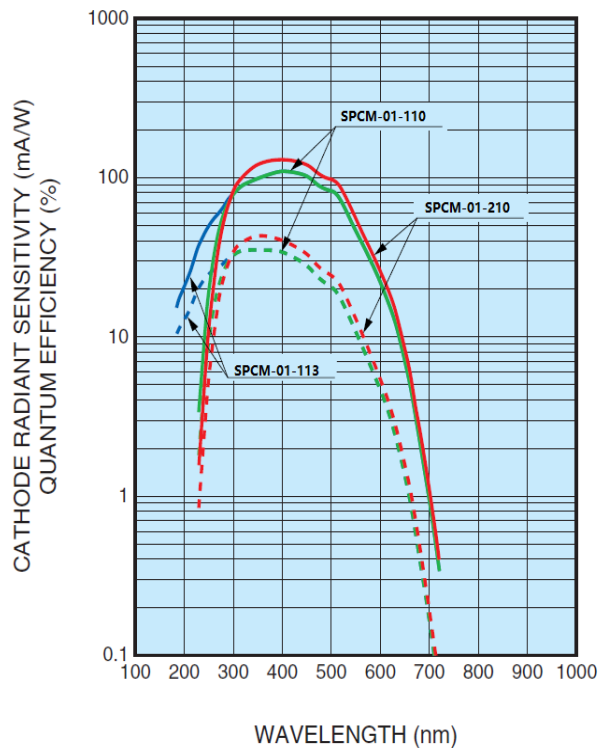
TYPE No.	Spectral Response	Features
SPCM-01-110	230 - 700nm	Super Biakali Photocathode,high sensitivity in visible range
SPCM-01-113	185 – 700nm	Super Biakali Photocathode,For UV to red range
SPCM-01-210	230 - 700nm	Ultra Biakali photocathode,high sensitivity in visible range
SPCM-01-01	230 - 870nm	Multiakali Photocathode,For UV to near IR range
SPCM-01-04	185 – 870nm	Multiakali Photocathode,For UV to near IR range
SPCM-01-20	230 – 920nm	Multiakali Photocathode,For UV to near IR range

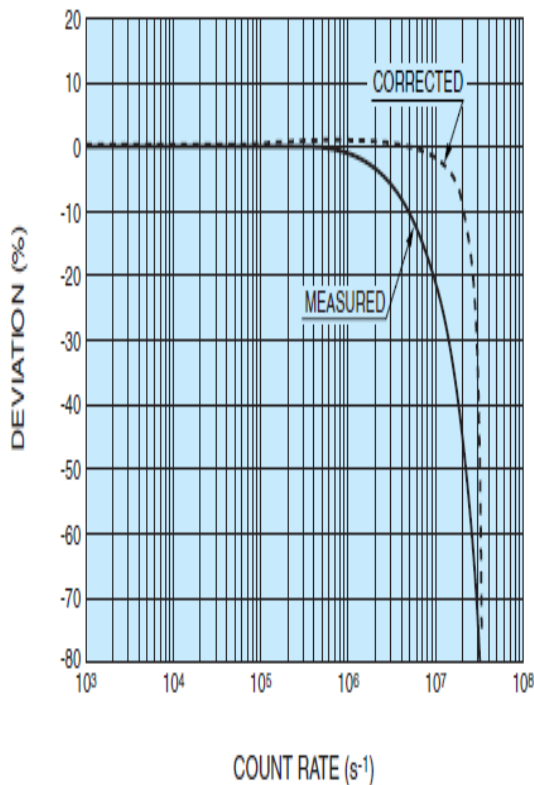
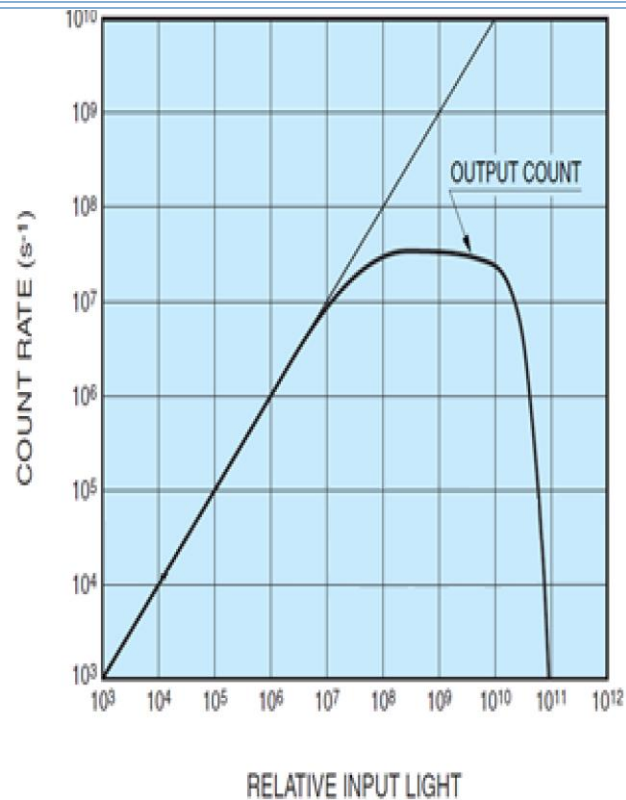
参数说明 (Specifications)

Parameter	Min	Typ	Max	Unit	
Supply voltage ⁽¹⁾	4.75	5	5.25	V	
Supply current		0.1	0.2	A	
Case operating temperature ⁽²⁾			50	°C	
Active area diameter		φ 8		mm	
Peak Sensitivity Wavelength		400	650	nm	
Count Sensitivity	SPCM-01-110	SPCM-01-210	SPCM-01-01	SPCM-01-20	S ⁻¹ *PW ⁻¹
300nm	3.7 x 10 ⁵	3.9 x 10 ⁵	2.7 x 10 ⁵	4.4 x 10 ⁴	
400nm	4.9 x 10 ⁵	6.1 x 10 ⁵	3.6 x 10 ⁵	1.4 x 10 ⁵	
500nm	3.7 x 10 ⁵	4.6 x 10 ⁵	2.8 x 10 ⁵	3.4 x 10 ⁵	
600nm	1.1 x 10 ⁵	1.3 x 10 ⁵	2.0 x 10 ⁵	3.5 x 10 ⁵	
700nm	7.7 x 10 ³	9.1 x 10 ³	1.2 x 10 ⁵	3.3 x 10 ⁵	
800nm	--	--	3.0 x 10 ⁴	2.4 x 10 ⁵	
Dark Count ⁽³⁾					Counts / second (CPS)
SPCM-01-110	10	50	100		
SPCM-01-113	15	55	110		
SPCM-01-210	10	50	100		
SPCM-01-01	100	600	1000		
SPCM-01-20	200	1000	70000		
Output pulse width	6	8	10		ns
Dead time		16			ns
Recommended Load Resistance		50			Ω
Signal Output Logic		Positive logic			-
Output pulse amplitude @1K Ohm (50 Ohm)					V
TTL HIGH	4(2)	4.4(2.2)			V
TTL LOW			0.8		
Output count rate before saturation		40			Mc/s

1. Connection to incorrect voltage or reverse voltage may damage or destroy the module. The warranty is invalid should such damage occur. The green wire is analog voltage input for high voltage, the red wire is +5V and the black wire is GND.
2. No condensation.
3. After 30 minutes storage in darkness. SPCM-01-20 need cooling system.

Characteristics (Count Sensitivity, Dark count @ 1000V)





Correction Formula

$$N = \frac{M}{1 - Mt}$$
 N: Real Count Rate (s⁻¹)
 M: Measured Count Rate (s⁻¹)
 t: Pulse Pair Resolution (s)

注：以上指标为 PMT 高压为 1000V 时进行测量；

模块功能框图(Module Block Diagram)

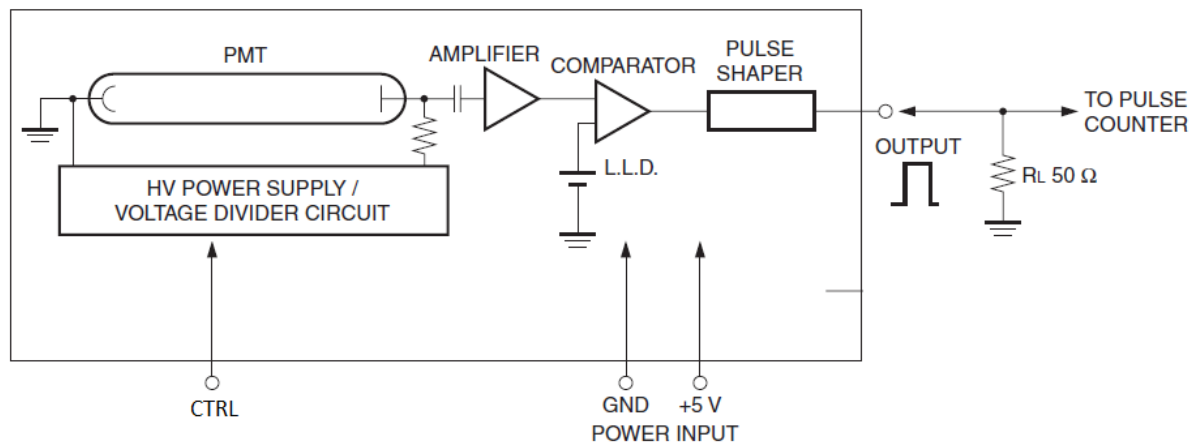


图1 电路功能框图

电压设置

使用绿色端子，进行PMT高压控制；PMT供电电压满足如下公式：

$$V_{PMT} = (3.558 - V_{CTRL}) * 293.1 + 1.255.$$

注：若以最大电压（1045V）运行，可将绿色线接GND；若绿色线悬空，则内部电压为733V；V_{CTRL} = 2V 时，内部高压为460V左右。

尺寸图(Dimensional Outline) unit : mm

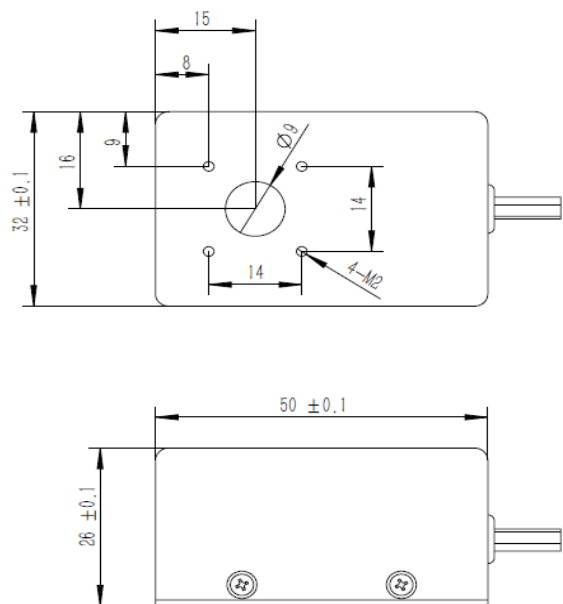


图2 SPCM-PMT-01外部尺寸图