PMT Manual by SarTEC

第一部分

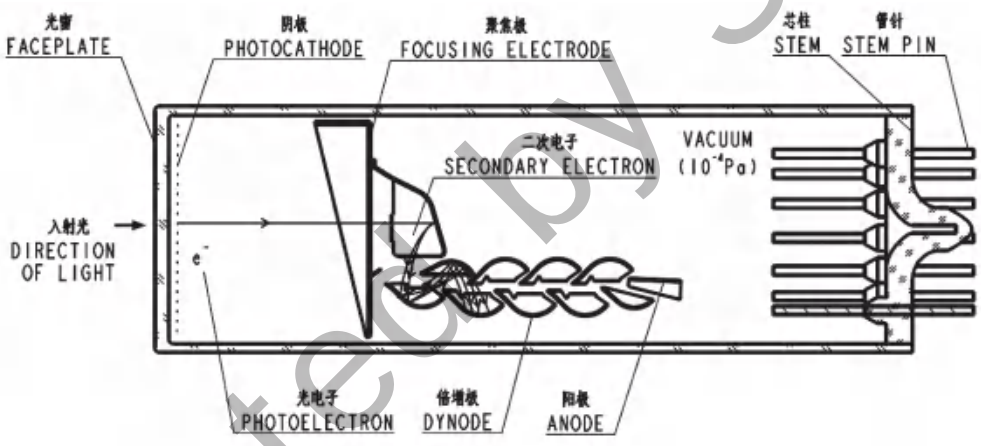
第二部分

第三部分

打拿极型光电倍增管 Dynode photomultiplier tube

光电倍增管是一种能将微弱的光信号转换成电信号的光电转换器件，它能使进入的微弱光信号增强至原来的10^6~10^8倍。打拿极型光电倍增管可根据光信号入射方式，分为端窗型光电倍增管和侧窗型光电倍增管。

The photomultiplier tube is a photoelectric conversion device that can convert weak light signals into electrical signals. It can increase the incoming weak light signals by 10^6 to 10^8 times. Dynode photomultiplier tubes can be divided into head-on type and side-on type according to the angle of incident light.



打拿极型光电倍增管结构原理图

Structure of dynode PMT

N2002型光电倍增管 0.5" /Head-on type/10 stage

技术参数 Technical Specification

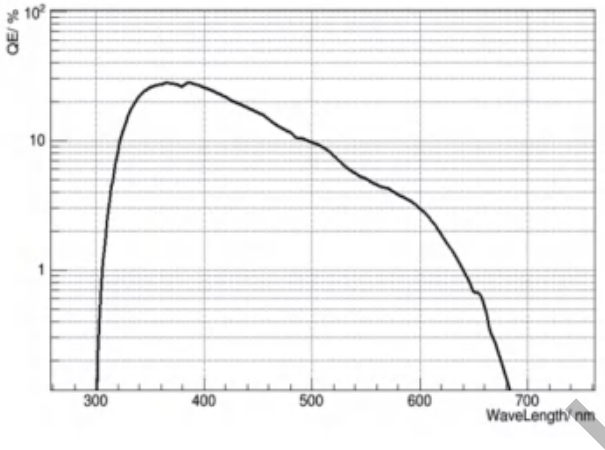
玻璃材料/Window material		硼硅玻璃/ Borosilicate glass			
光电阴极材料/Photocathode material		双碱/Bialkali			
倍增结构/Dynode structure		线性聚焦/ Linear focused			
N2002		Min.	Typ.	Max.	Unit.
阴极参数Cathode parameters	阴极有效直径/Cathode effective diameter	10			mm
	光谱响应范围/Spectral response range	290-650			nm
	量子效率峰值波长/Quantum efficiency peak wavelength		380		nm
	积分灵敏度/Luminous sensitivity	30	100		μ A/lm
	蓝光灵敏度/Blue sensitivity	--	8		μ A/lmf
阳极参数 Anode parameters	阳极光照灵敏度/For an anode sensitivity of	30	100		A/lm
	工作电压/Supply voltage		--	1250	V
	增益/Gain		6×10^6		--
	暗电流/Anode dark current		1	15	nA
时间参数 Time response	上升时间/Rise time		2.1		ns
工作环境温度/Operating ambient temperature		-30~+50			℃
储藏温度/Storage temperature		-50~+50			℃

应用领域 Application

环境监测	Environmental Monitoring

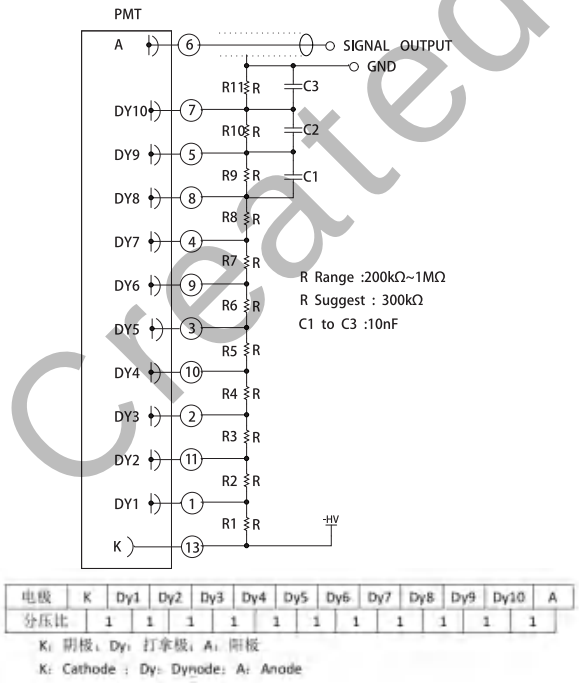
产品特点 Features

高增益	High Gain
小尺寸	Small Size
线性化	Linearization



典型光谱响应曲线
Typical spectral response curve

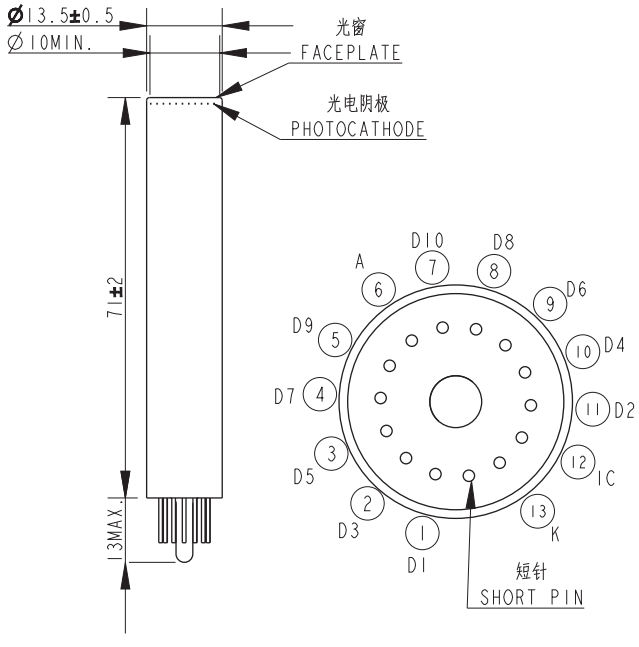
典型增益曲线
Typical gain curve



电极	K	Dy1	Dy2	Dy3	Dy4	Dy5	Dy6	Dy7	Dy8	Dy9	Dy10	A
分压比	1	1	1	1	1	1	1	1	1	1	1	

K：阴极，Dy：打拿极，A：阳极

N2002型光电倍增管分压比图
N2002 PMT voltage distribution ratio



N2002型光电倍增管结构图
N2002 PMT structure

N2013型光电倍增管 1 1/8" /Head-on type/11 stage

技术参数 Technical Specification

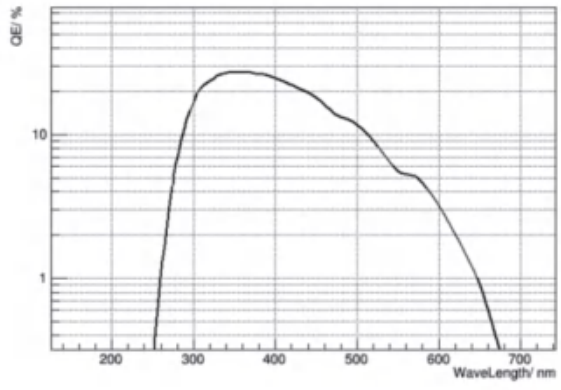
			Min.	Typ.	Max.	Unit.
玻璃材料/Window material			硼硅玻璃/Borosilicate glass			
光电阴极材料/Photocathode material			双碱/Bialkali			
倍增结构/Dynode structure			盒栅和线性聚焦/ Box and linear focused			
阴极参数 Cathode parameters	阴极有效直径/Cathode effective diameter		25			mm
	光谱响应范围/Spectral response range			290-650		nm
	量子效率峰值波长/Quantum efficiency peak wavelength			380		nm
	积分灵敏度Luminous sensitivity			80		μA/lm
	蓝光灵敏度/Blue sensitivity		9	11		μA/lmf
阳极参数 Anode parameters	阳极蓝光灵敏度/Anode blue sensitivity			30		A/lmf
	工作电压/Supply voltage				1150	V
	增益/Gain			7×10^6		--
	暗计数率/Dark count rate	N2013-1			140	Hz
		N2013-2			300	
		N2013-3			1000	
	暗电流/Anode dark current			2	10	nA
时间参数 Time response	上升时间/Rise time			1.9		ns
	渡越时间离散/TTS			3		ns
工作环境温度/Operating ambient temperature			-30~+50			℃
储藏温度/Storage temperature			-50~+50			℃

产品应用 Application

闪烁计数	Scintillation Counting
高能物理	High Energy Physics

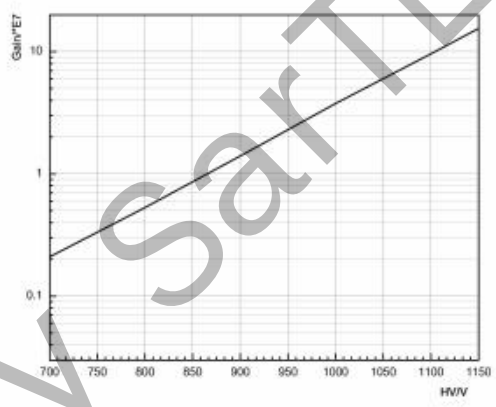
产品特点 Features

响应快	Fast Response
低噪声	Low Noise



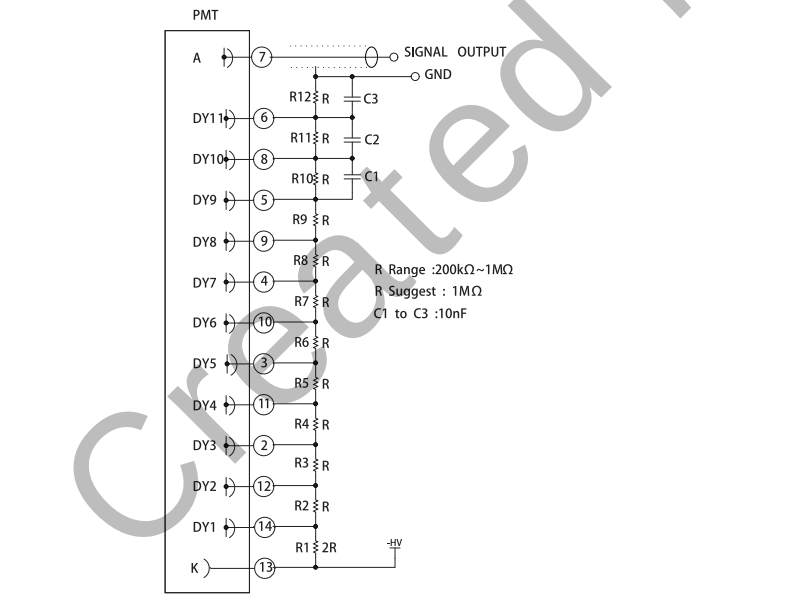
典型光谱响应曲线

Typical spectral response curve



典型增益曲线

Typical gain curve



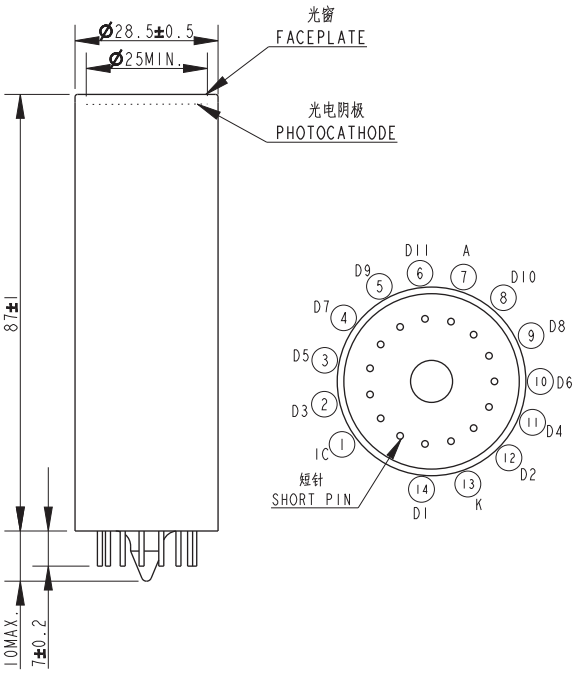
电极	K	Dy1	Dy2	Dy3	Dy4	Dy5	Dy6	Dy7	Dy8	Dy9	Dy10	Dy11	A
分压比	2	1	1	1	1	1	1	1	1	1	1	1	

K：阴极；Dy：打拿极；A：阳极

K：Cathode；Dy：Dynode；A：Anode

N2013型光电倍增管分压比图

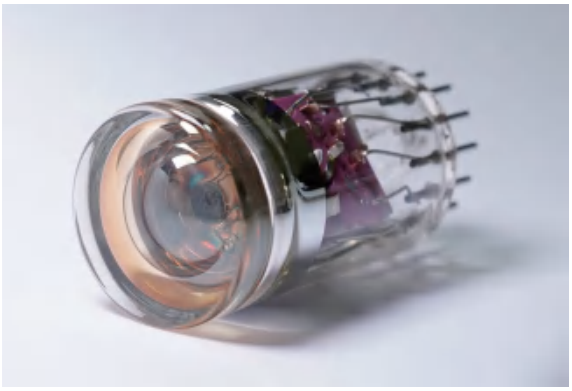
N2013 PMT voltage distribution ratio



N2013型光电倍增管结构图

N2013 PMT structure

N2014型光电倍增管 1" / Head-on type/10-stage



技术参数 Technical Specification

玻璃材料/Window material			硼硅玻璃/Borosilicate glass			
光电阴极材料/Photocathode material			双碱/Bialkali			
倍增结构/Dynode structure			环形和线性聚焦/Circular and linear focused			
N2014			Min.	Typ.	Max.	Unit.
阴极参数 Cathode parameters	阴极有效直径/Cathode effective diameter		22			mm
	光谱响应范围/Spectral response range		290-650			nm
	量子效率峰值波长/Quantum efficiency peak wavelength		380			nm
	积分灵敏度Luminous sensitivity			60		μA/lm
	蓝光灵敏度/Blue sensitivity		8	9		μA/lm
阳极参数 Anode parameters	阳极蓝光灵敏度/Anode blue sensitivity			30		A/lm
	工作电压/Supply voltage				1150	V
	增益/Gain			7×10^6		--
	暗电流/Anode dark current (N2014-1 @1000V) (N2014-2 @1050V) (N2014-3 @1100V)	N2014-1		3	5	nA
		N2014-2		3	5	
		N2014-3			20	
	暗计数率/Dark count rate	N2014-1			100	Hz
		N2014-2			500	Hz
时间参数 Time response	上升时间/Rise time			1.2		ns
	渡越时间离散/TTS			1.5		ns
工作环境温度/Operating ambient temperature			-30~+50			℃
储藏温度/Storage temperature			-50~+50			℃

产品应用 Application

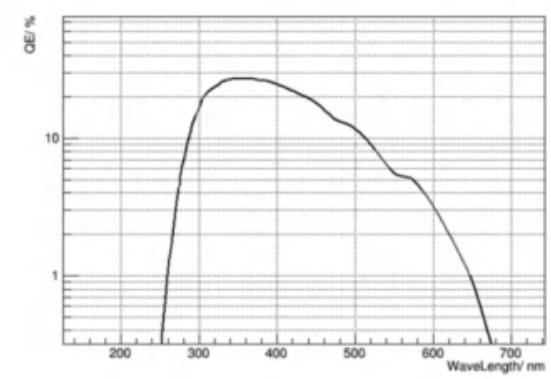
医疗测量　　Medical Measurement

辐射测量　　Radiation Measurement

产品特点 Features

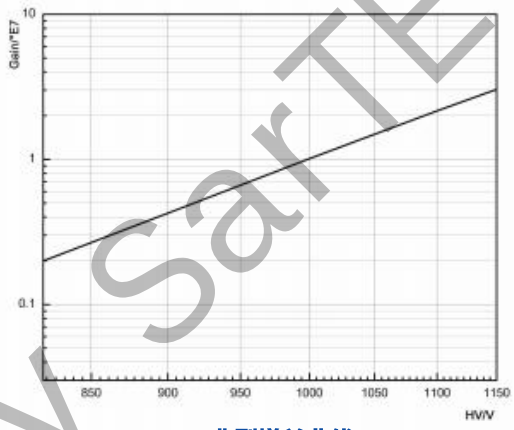
响应快　　Fast Response

结构紧凑　　Compact Structure



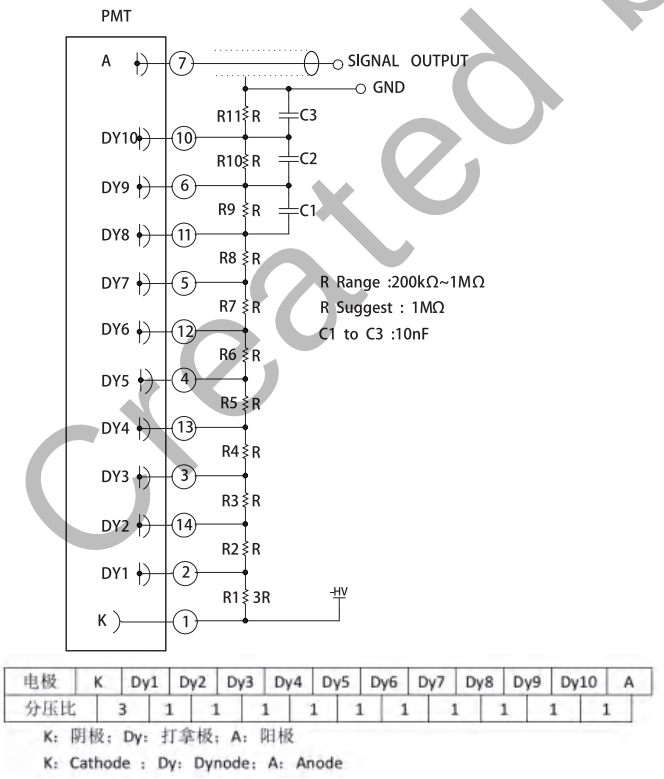
典型光谱响应曲线

Typical spectral response curve



典型增益曲线

Typical gain curve



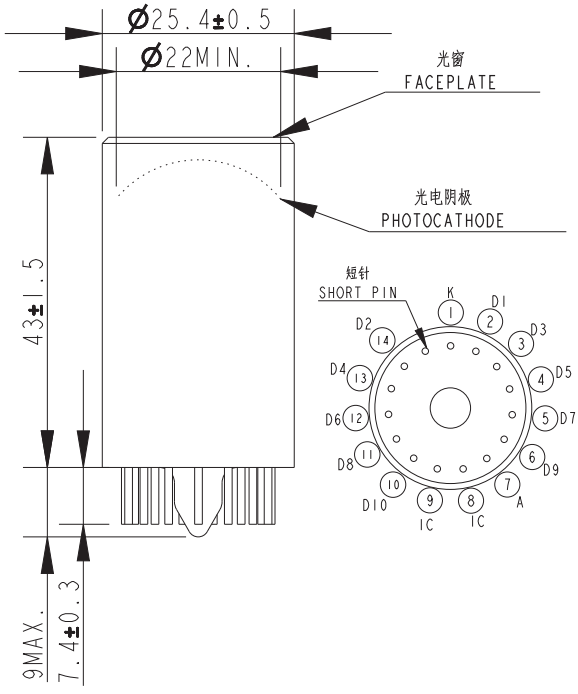
电极	K	Dy1	Dy2	Dy3	Dy4	Dy5	Dy6	Dy7	Dy8	Dy9	Dy10	A
分压比	3	1	1	1	1	1	1	1	1	1	1	

K：阴极；Dy：打拿极；A：阳极

K：Cathode ； Dy：Dynode；A：Anode

N2014型光电倍增管分压比图

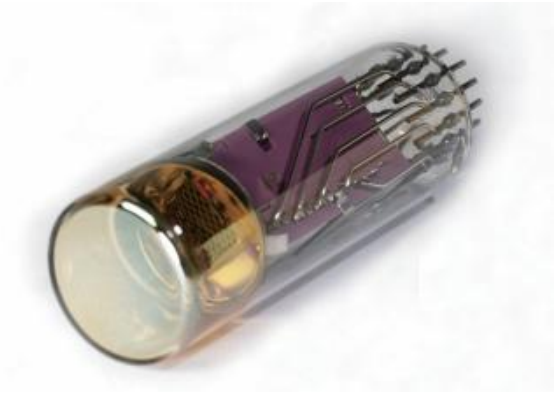
N2014 PMT voltage distribution ratio



N2014型光电倍增管结构图

N2014 PMT structure

N2016型光电倍增管 1" /Head-on type/11 stage



技术参数 Technical Specification

玻璃材料/Window material		硼硅玻璃/Borosilicate glass			
光电阴极材料/Photocathode material		双碱/Bialkali			
倍增结构/Dynode structure		盒栅和线性聚焦/Box and Linear Focused			
N2016		Min.	Typ.	Max.	Unit.
阴极参数 Cathode parameters	阴极有效直径/Cathode effective diameter	25			mm
	光谱响应范围/Spectral response range	290-650			nm
	量子效率峰值波长/Quantum efficiency peak wavelength		380		nm
	积分灵敏度/Luminous sensitivity	60	80		μA/lm
	蓝光灵敏度/Blue sensitivity	8	11		μA/lmf
阳极参数 Anode parameters	阳极光照灵敏度/Anode sensitivity	50	200		A/lmf
	工作电压/Supply voltage		1000	1500	V
	增益/Gain		4×10^6		--
	暗电流/Anode dark current		2	10	nA
时间参数 Time response	上升时间/Rise time		1.9		ns
	渡越时间离散/TTS		3		ns
工作环境温度/Operating ambient temperature		-30~+50			℃
储藏温度/Storage temperature		-50~+50			℃

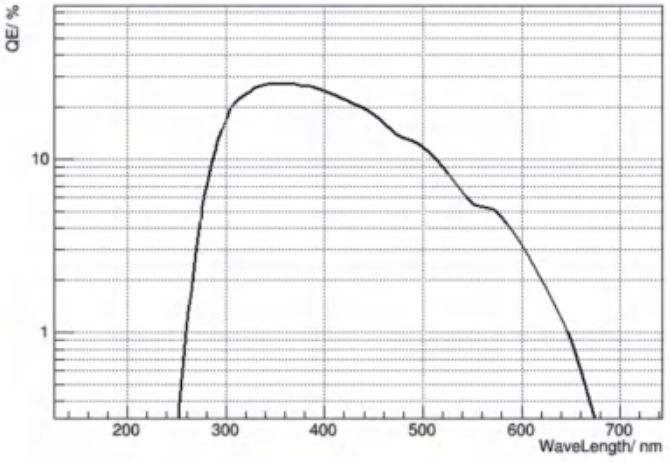
应用领域 Application

辐射测量　　Radiation Measurement

产品特点 Features

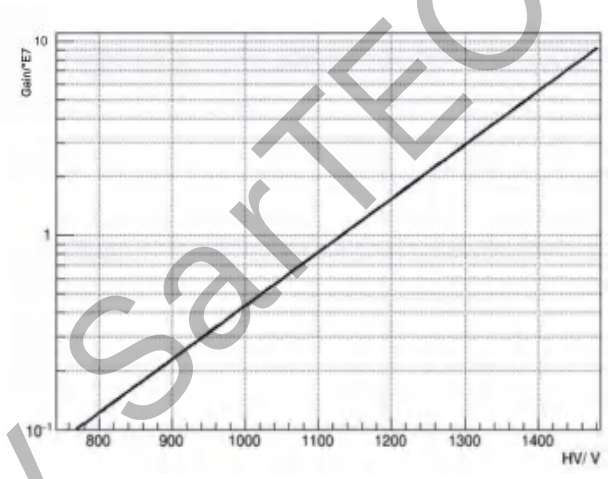
高增益　　High Gain

稳定性好　　Good Stability



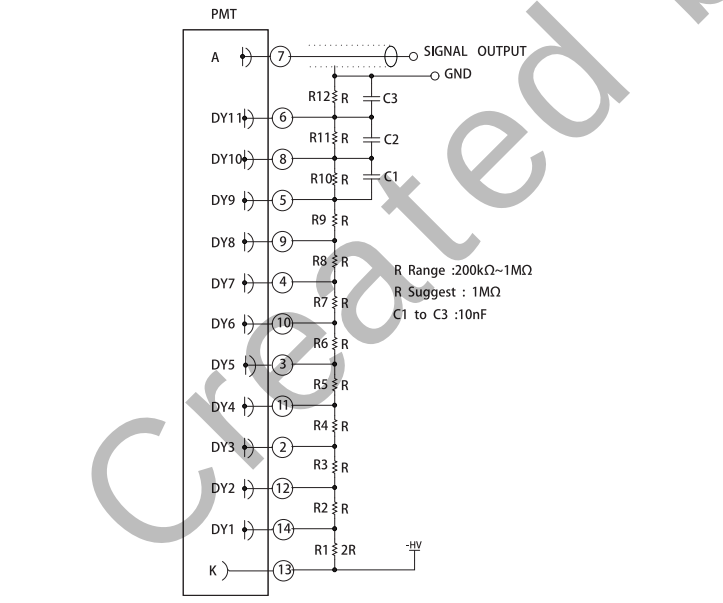
典型光谱响应曲线

Typical spectral response curve



典型增益曲线

Typical gain curve



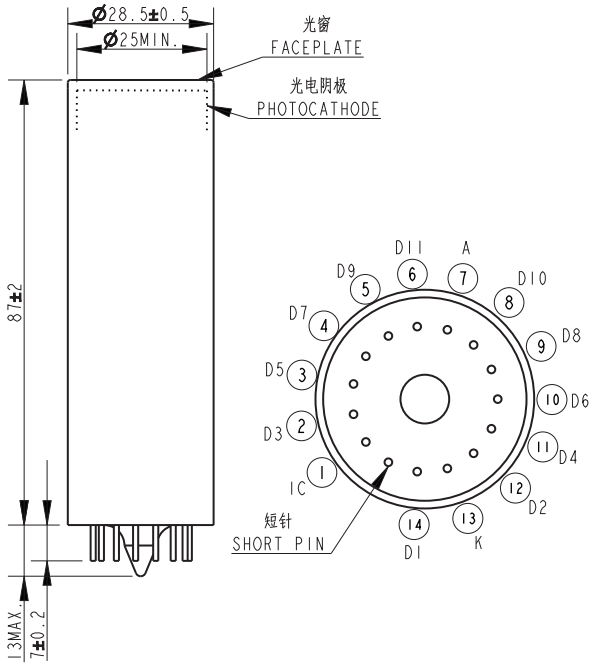
电极	K	Dy1	Dy2	Dy3	Dy4	Dy5	Dy6	Dy7	Dy8	Dy9	Dy10	Dy11	A
分压比	2	1	1	1	1	1	1	1	1	1	1	1	

K：阴极；Dy：打拿极；A：阳极

K：Cathode；Dy：Dynode；A：Anode

N2016型光电倍增管分压比图

N2016 PMT voltage distribution ratio



N2016型光电倍增管结构图

N2016 PMT structure

N2017型光电倍增管 1" /Head-on type/10-stage

技术参数 Technical Specification

玻璃材料/Window material		硼硅玻璃/Borosilicate glass			
光电阴极材料/Photocathode material		双碱/Bialkali			
倍增结构/Dynode structure		环形和线性聚焦/Circular and linear focused			
N2017		Min.	Typ.	Max.	Unit.
阴极参数Cathode parameters	阴极有效直径/Cathode effective diameter	22			mm
	光谱响应范围/Spectral response range	290-650			nm
	量子效率峰值波长/Quantum efficiency peak wavelength		380		nm
	积分灵敏度/Luminous sensitivity		60		μA/lm
	蓝光灵敏度/Blue sensitivity	8	10		μA/lmf
阳极参数Anode parameters	工作电压/Supply voltage		1000	1150	V
	增益/Gain		7×10^6		--
	暗电流/Anode dark current		3	20	nA
时间参数 Time response	上升时间/Rise time		1.4		ns
	渡越时间离散/TTS		1.5		ns
工作环境温度/Operating ambient temperature		-30~+50			℃
储藏温度/Storage temperature		-50~+50			℃

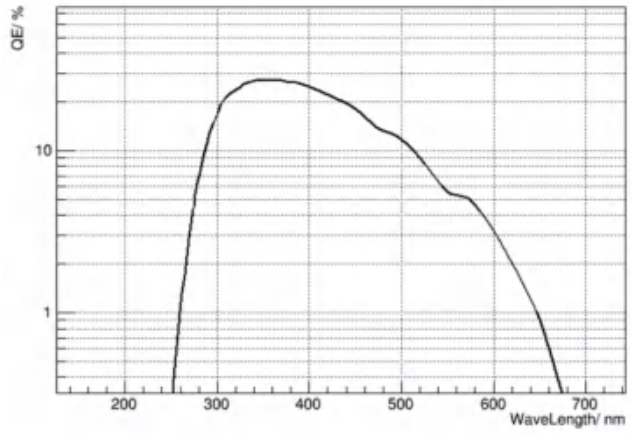
应用领域 Application

闪烁和光子计数 Scintillation Counting

辐射测量 Radiation Measurement

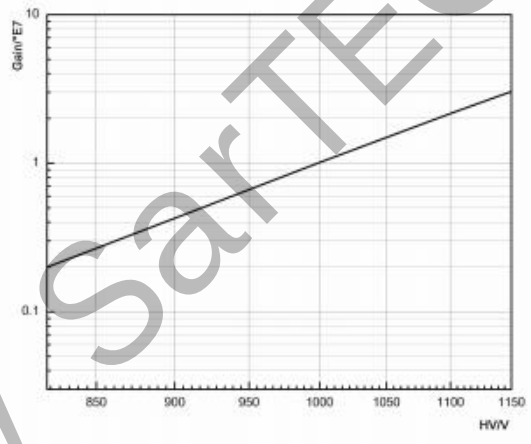
产品特点 Features

结构紧凑 Compact Strcture



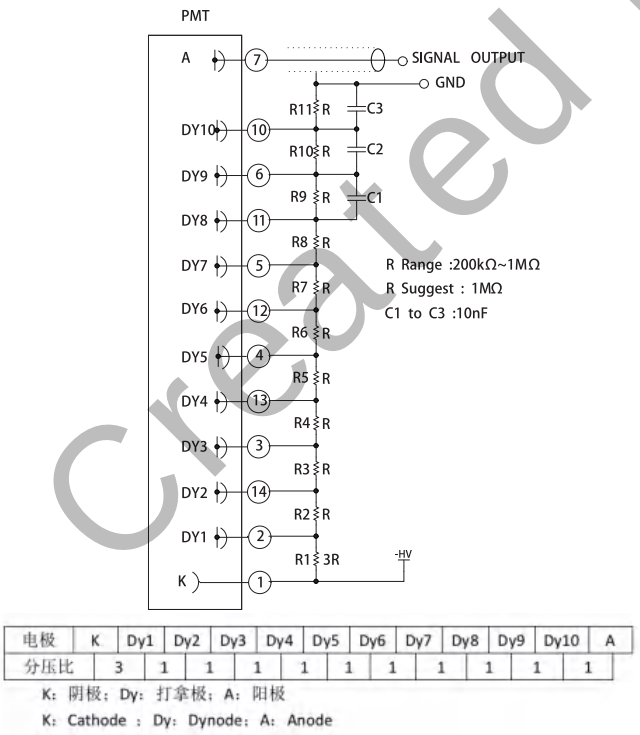
典型光谱响应曲线

Typical spectral response curve



典型增益曲线

Typical gain curve



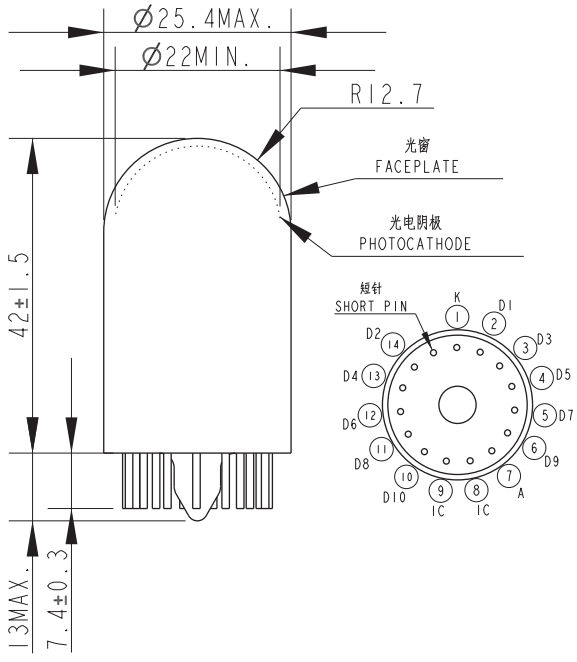
电极	K	Dy1	Dy2	Dy3	Dy4	Dy5	Dy6	Dy7	Dy8	Dy9	Dy10	A
分压比	3	1	1	1	1	1	1	1	1	1	1	

K：阴极；Dy：打拿极；A：阳极

K：Cathode ； Dy：Dynode；A：Anode

N2017型光电倍增管分压比图

N2017 PMT voltage distribution ratio



N2017型光电倍增管结构图

N2017 PMT structure

N2018型光电倍增管 1" /Head-on type/10-stage

技术参数 Technical Specification

玻璃材料/Window material	硼硅玻璃/Borosilicate glass
光电阴极材料/Photocathode material	高温双碱/High temp. bialkali
倍增结构/Dynode structure	圆笼+线性聚焦/Circular and linear focused
冲击/Shock	5000 m/s^2（500g）0.5ms
振动/Sine vibration	200 m/s^2（20g）

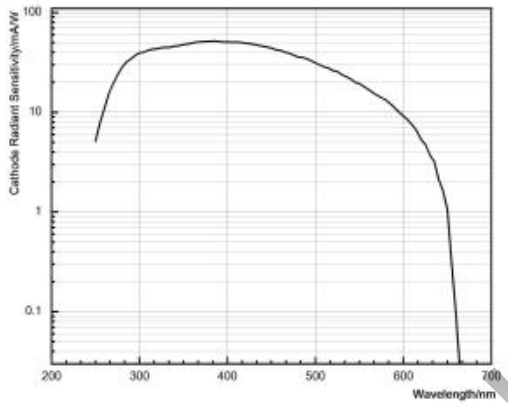
N2018		Min.	Typ.	Max.	Unit.
阴极参数 Cathode sensitivity	阴极有效直径/Cathode effective diameter	22			mm
	光谱响应范围/Spectral response range	290-650			nm
	量子效率峰值波长/Quantum efficiency peak wavelength		380		nm
	量子效率/Quantum efficiency		12		%
	积分灵敏度@25℃/Luminous sensitivity@25℃	20	40		μA/lm
	蓝光灵敏度@25℃/Blue sensitivity@25℃	4	6		μA/lm
阳极参数 Anode sensitivity	阳极积分灵敏度@25℃/Anode luminous sensitivity@25℃	8	20		A/lm
	工作电压/Supply voltage		1500	1800	V
	增益@25℃/Gain@25℃		5×10^5		--
	暗电流/Dark current		0.1 @25℃	10 @25℃ 1000 @175℃	nA
时间参数 Time response	上升时间/Rise time		1.5		ns
	渡越时间离散/TTS		15		ns

应用领域 Application

石油测井	Oil Well Logging
地质勘测	Geological Exploration

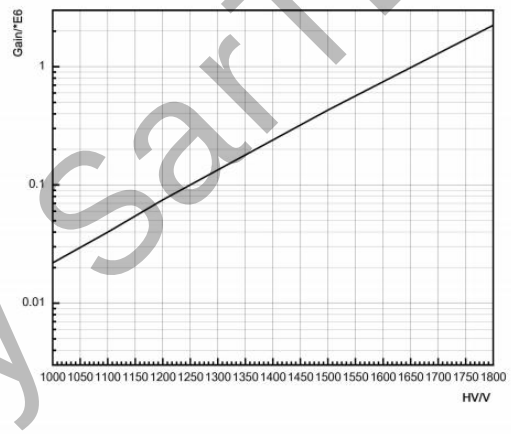
产品特点 Features

耐高温特性	High Temp. Resistance
加固、紧凑结构	Ruggedized, Low Profile Structure



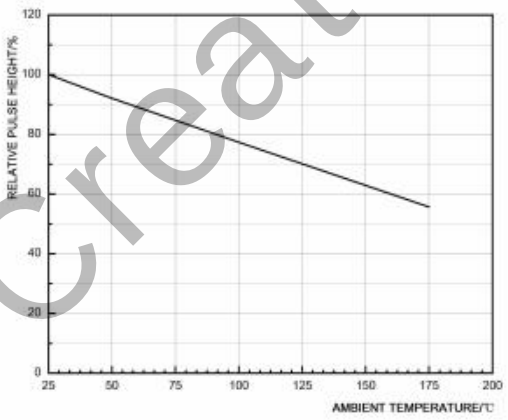
典型光谱响应曲线

Typical spectral response curve



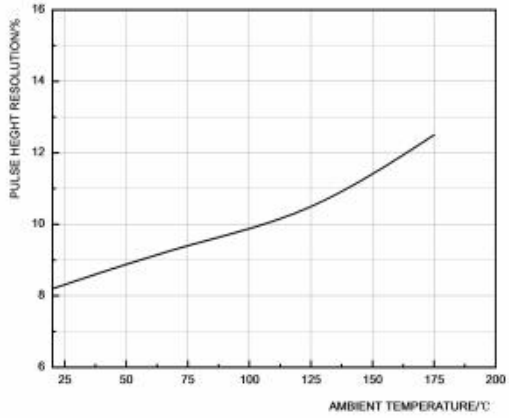
典型增益曲线

Typical gain curve



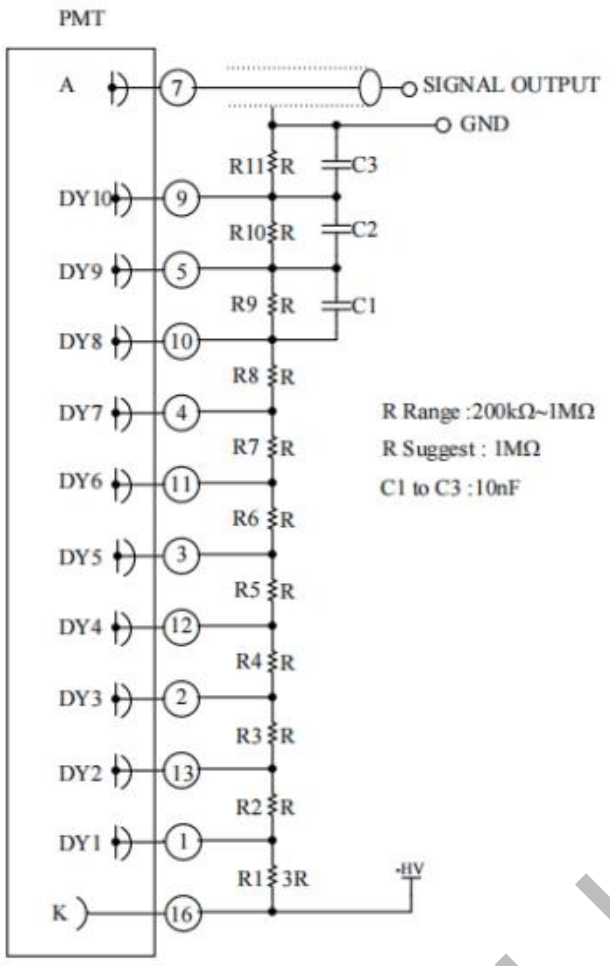
能量分辨率随温度变化图

Typical pulse height resolution as a function of temperature



增益下降率随温度变化图

Typical pulse height as a function of temperature



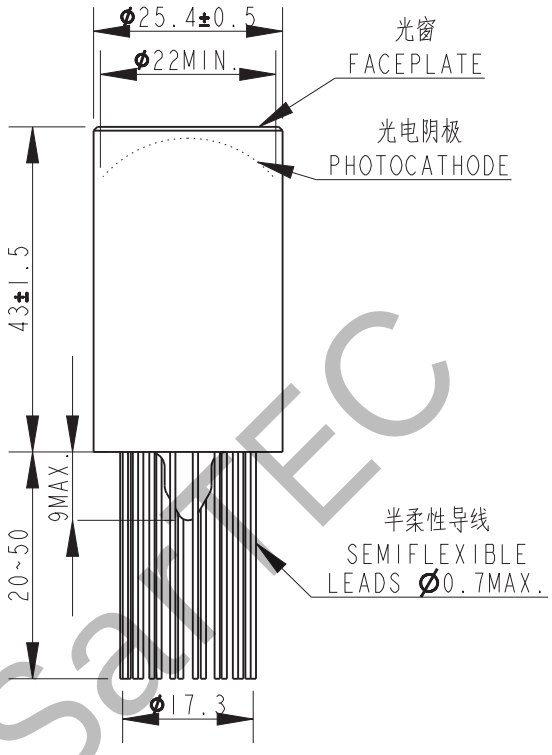
电极	K	Dy1	Dy2	Dy3	Dy4	Dy5	Dy6	Dy7	Dy8	Dy9	Dy10	A
分压比	3	1	1	1	1	1	1	1	1	1	1	

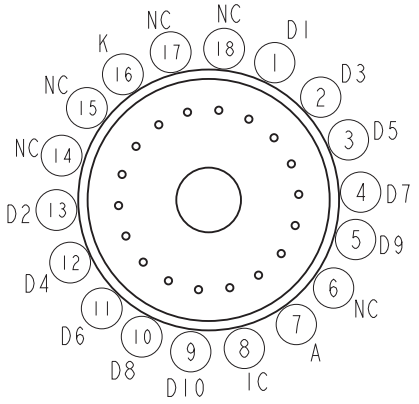
K：阴极；Dy：打拿极；A：阳极

K：Cathode ； Dy：Dynode；A：Anode

N2018型光电倍增管分压比图

N2018 PMT voltage distribution ratio

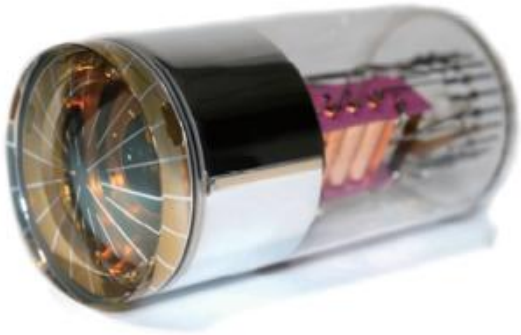




N2018 型光电倍增管结构图

N2018 PMT structure

N2021型光电倍增管 2.5" /Head-on type/9-stage



技术参数 Technical Specification

玻璃材料/Window material	硼硅玻璃/Borosilicate glass
光电阴极材料/Photocathode material	双碱/Bialkali
倍增结构/Dynode structure	线性聚焦/Linear focused

N2021		Min.	Typ.	Max.	Unit.
阴极参数 Cathode Sensitivity	阴极有效直径/Cathode effective diameter	58			mm
	光谱响应范围/Spectral response range	290-650			nm
	量子效率/Quantum efficiency		18		%
	积分灵敏度Luminous sensitivity		70		μA/lm
	蓝光灵敏度/Blue sensitivity	8	9		μA/lmf
阳极参数 Anode Sensitivity	阳极灵敏度/Anode sensitivity		35		A/lm
	工作电压/Supply voltage	1500	1800	3000	V
	增益/Gain		5×10^5		--
	暗电流/Anode dark current		3	5	nA
	最大脉冲线性电流@10ns时间宽度@10%线性偏差/Maximum pulse linear current@10ns time width@10% linear deviation		300		mA
时间参数 Time response	上升时间/Rise time		1.8		ns

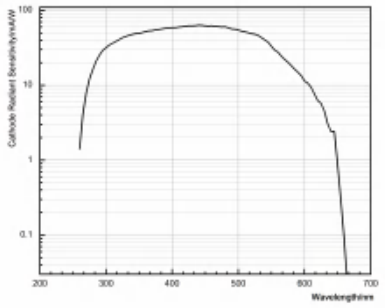
应用领域 Application

辐射测量　　Radiation Measurement

产品特点 Features

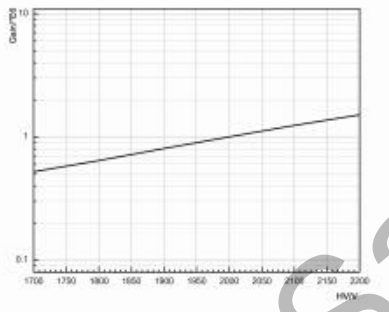
响应快　　Fast Response

大脉冲线性　　High Pulse Linearity



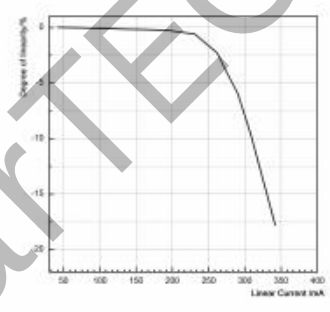
典型光谱响应曲线

Typical spectral response curve



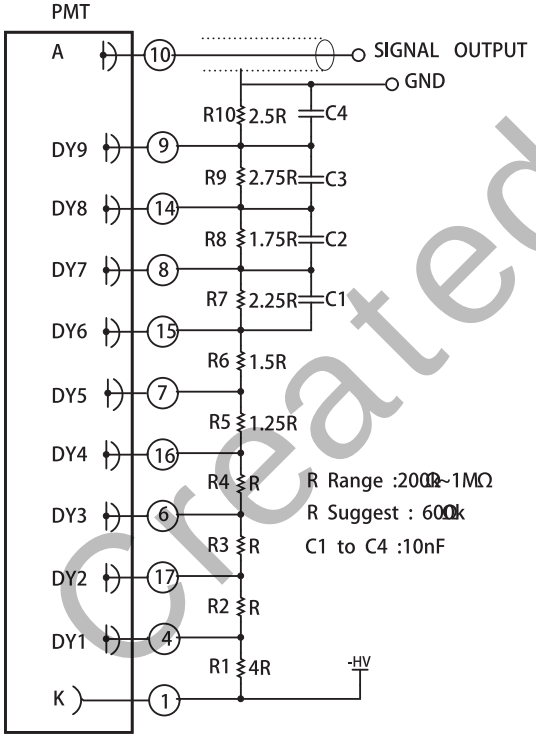
典型增益曲线

Typical gain curve



典型线性曲线

Typical linear current characteristics



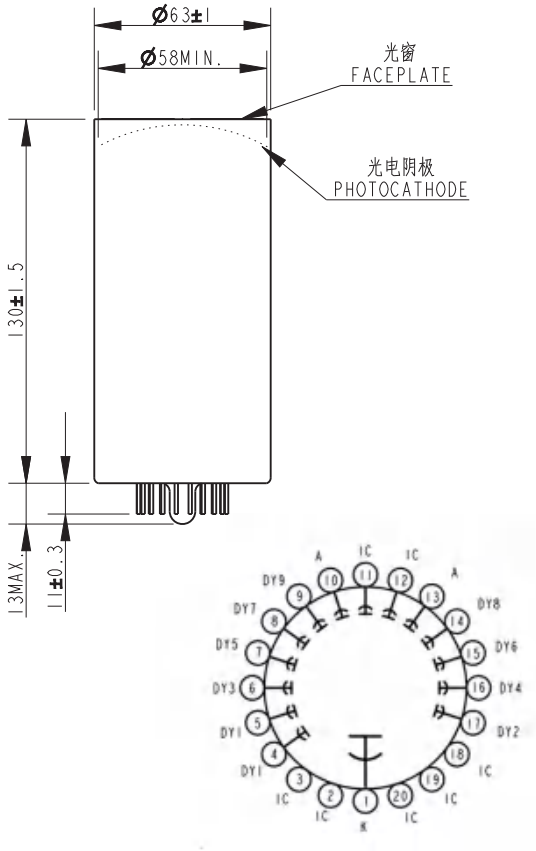
电极	K	Dy1	Dy2	Dy3	Dy4	Dy5	Dy6	Dy7	Dy8	Dy9	A
分压比	4	1	1	1	1.25	1.5	2.25	1.75	2.75	2.5	

K：阴极；Dy：打拿极；A：阳极

K：Cathode ；Dy：Dynode；A：Anode

N2021型光电倍增管分压比图

N2021 PMT voltage distribution ratio



N2021 型光电倍增管结构图

N2021 PMT structure

N4021型光电倍增管 2" /Head-on type/10-stage

技术参数 Technical Specification

玻璃材料/Window material			硼硅玻璃/Borosilicate glass			
光电阴极材料/Photocathode material			双碱/Bialkali			
倍增结构/Dynode structure			盒栅聚焦/Box-and-grid focused			
N4021			Min.	Typ.	Max.	Unit.
阴极参数Cathode parameters	阴极有效直径/Cathode effective diameter		46			mm
	光谱响应范围/Spectral response range		290-650			nm
	量子效率峰值波长/Quantum efficiency peak wavelength			380		nm
	积分灵敏度/Luminous sensitivity		60	--		μA/lm
	蓝光灵敏度/Blue sensitivity	N4021-1	10.5	--		μA/lmf
		N4021-2	9			
		N4021-3	7			
阳极参数Anode parameters	阳极光照灵敏度/For an anode sensitivity of	N4021-1	1500	2000		A/lm
		N4021-2	1000	1250		
		N4021-3	100	400		
	工作电压/Supply voltage			1250	1500	V
	增益/Gain	N4021-1		2.5×10^7		
		N4021-2		1.6×10^7		
		N4021-3		1.6×10^6		
	暗电流/Anode dark current	N4021-1		--	30	nA
		N4021-2			50	
		N4021-3			100	
时间参数 Time response	上升时间/Rise time		7		ns	
工作环境温度/Operating ambient temperature			-30~+50			℃
储藏温度/Storage temperature			-50~+50			℃

应用领域 Application

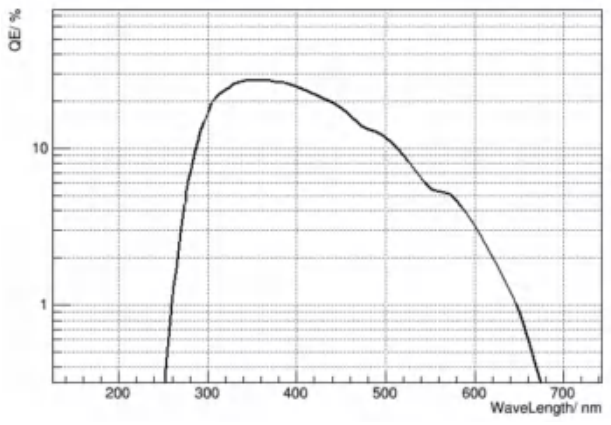
闪烁和光子计数 Scintillation Counting

辐射测量 Radiation Measurement

产品特点 Features

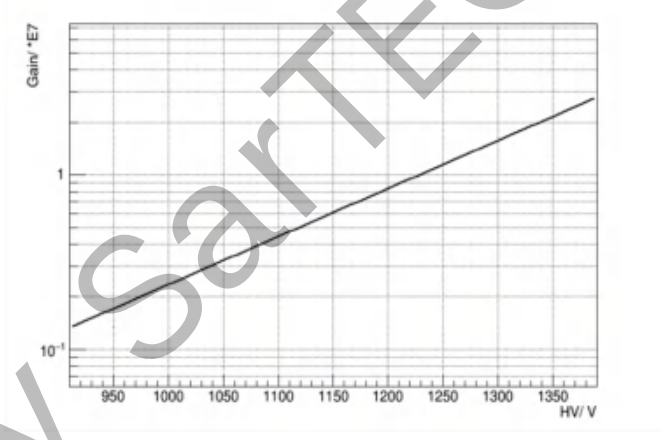
高增益 High Gain

高收集效率 High Collection Efficiency



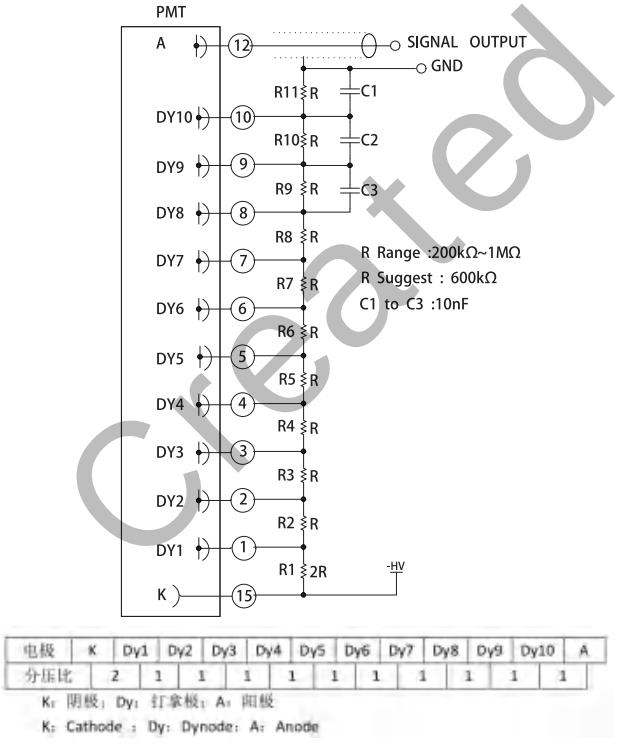
典型光谱响应曲线

Typical spectral response curve



典型增益曲线 (N4021-2)

Typical gain characteristics (N4021-2)



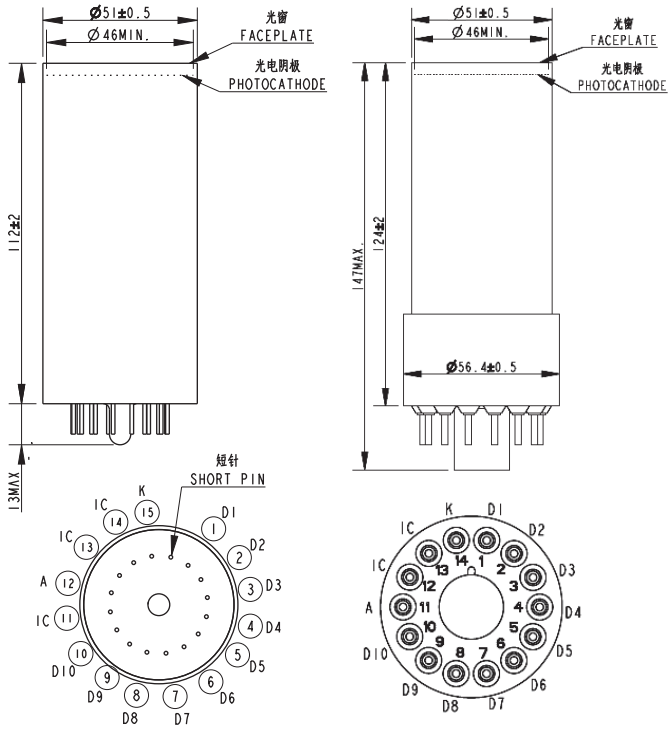
电极	K	Dy1	Dy2	Dy3	Dy4	Dy5	Dy6	Dy7	Dy8	Dy9	Dy10	A
分压比	2	1	1	1	1	1	1	1	1	1	1	

K：阴极；Dy：打拿极；A：阳极

K：Cathode ；Dy：Dynode；A：Anode

N4021型光电倍增管分压比图

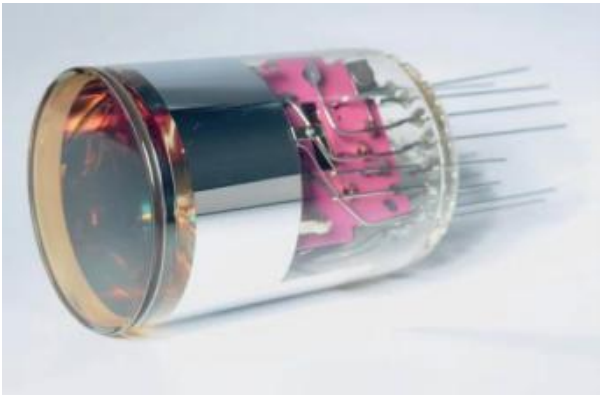
N4021 PMT voltage distribution ratio



N4021型光电倍增管结构图

N4021 PMT structure

N4022型光电倍增管 2" /Head-on type/8-stage



技术参数 Technical Specification

玻璃材料/Window material		硼硅玻璃/ Borosilicate glass			
光电阴极材料/Photocathode material		双碱/Bialkali			
倍增结构/Dynode structure		盒栅和线性聚焦/ Box and linear focused			
N4022		Min.	Typ.	Max.	Unit.
阴极参数 Cathode parameters	光谱响应范围/Spectral response range		290-650		nm
	辐射灵敏度峰值波长/Peak wavelength of radiant sensitivity		420		nm
	蓝光灵敏度/Blue sensitivity	8	10		μA/lmf
阳极参数 Anode parameters	阳极光照灵敏度/Anode sensitivity	3	30		A/lm
	工作电压/Supply voltage		1000		V
	增益/Gain		2.73×10^5		--
	暗电流/Anode dark current		2	10	nA
时间参数 Time response	上升时间/Rise time		6		ns
工作环境温度/Operating ambient temperature		-30~+50			℃
储藏温度/Storage temperature		-50~+50			℃

应用领域 Application

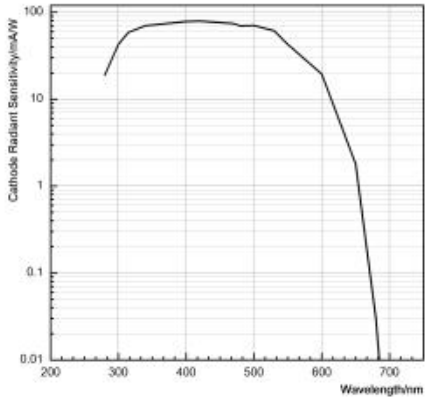
辐射测量　　Radiation Measurement

核医学仪器　　Nuclear Medical Instrument

产品特点 Features

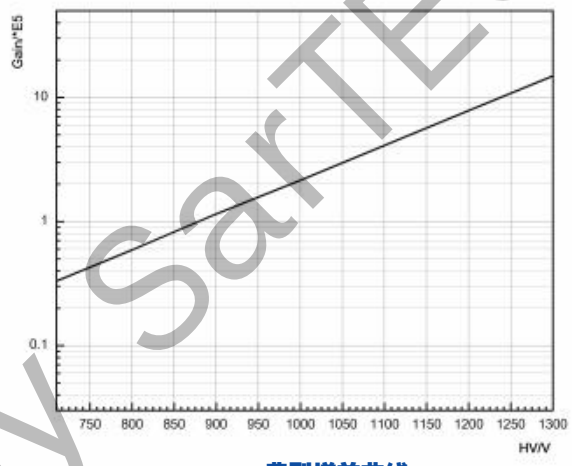
能量分辨率好　　High Energy Resolution

高收集效率　　High Collection Efficiency



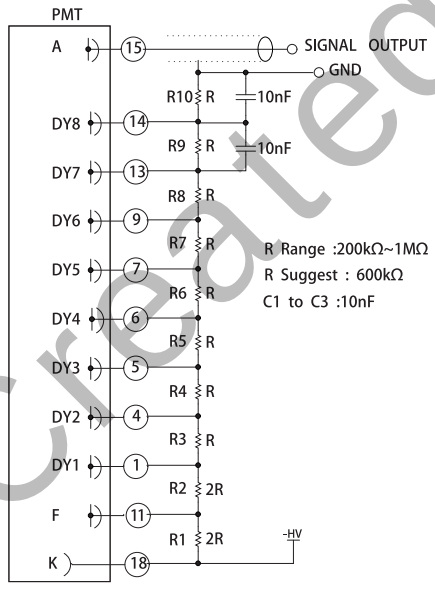
典型光谱响应曲线

Typical spectral response curve



典型增益曲线

Typical gain characteristics



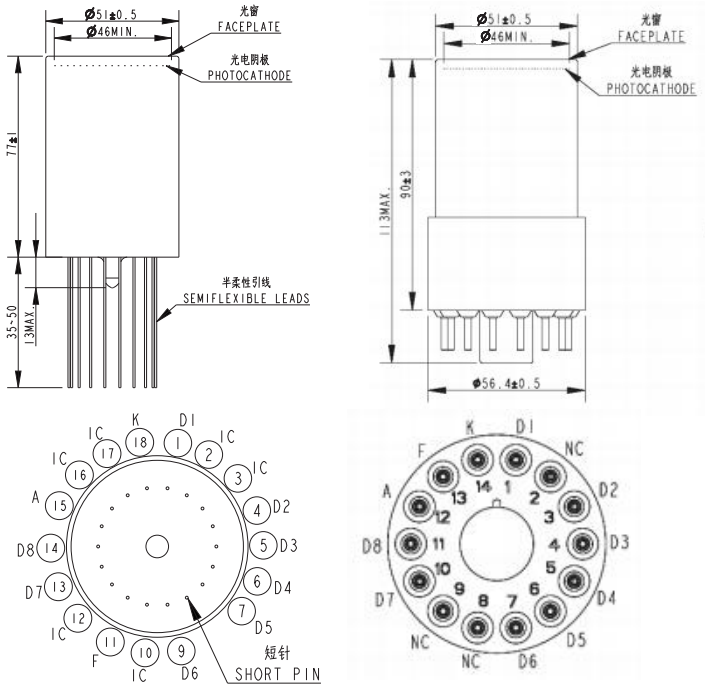
电极	K	F	Dy1	Dy2	Dy3	Dy4	Dy5	Dy6	Dy7	Dy8	A
分压比	2	2	1	1	1	1	1	1	1	1	

K：阴极；Dy：打拿极；A：阳极

K：Cathode ； Dy：Dynode；A：Anode

N4022型光电倍增管分压比图

N4022 PMT voltage distribution ratio



N4022型光电倍增管外型结构及管脚定义图

N4022 PMT dimentional outline and basing diagram

N2031型光电倍增管 3" /Head-on type/10 stage

技术参数 Technical Specification

玻璃材料/Window material		硼硅玻璃/Borosilicate glass			
光电阴极材料/Photocathode material		双碱/Bialkali			
倍增结构/Dynode structure		环型和线性聚焦/Circular and linear focused			
N2031		Min.	Typ.	Max.	Unit.
阴极参数 Cathode parameters	光谱响应范围/Spectral response range	290-650			nm
	量子效率@410 nm /Quantum efficiency @ 410 nm		28		%
	量子效率@450 nm /Quantum efficiency @ 450 nm		24		%
阳极参数 Anode parameters	工作电压/Supply voltage	900	1250	1300	V
	增益/Gain		1×10^7		--
	暗计数率/Dark count rate		1500	3000	Hz
	单光子峰谷比/Single PE charge spectrum peak/valley		2.5		--
时间参数 Time response	上升时间/Rise time		1.9		ns
	渡越时间离散/Transit time spread (FWHM)		1.4	1.8	ns
工作环境温度/Operating ambient temperature		-30~+50			℃
储藏温度/Storage temperature		-50~+50			℃

应用领域 Application

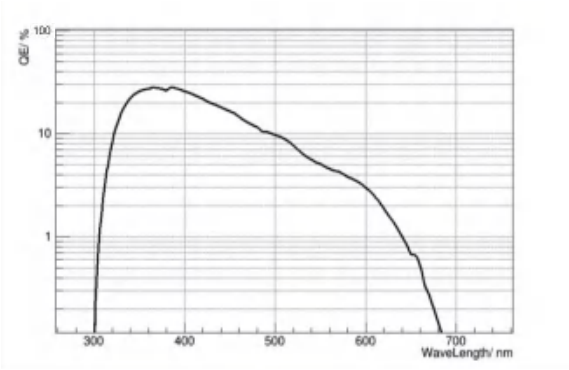
高能物理　　High Energy Physcis

产品特点 Features

高量子效率

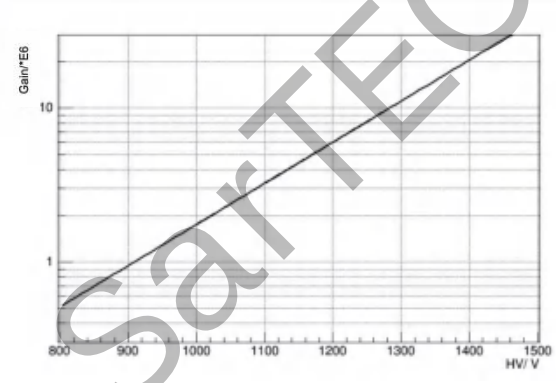
快时间

低噪声



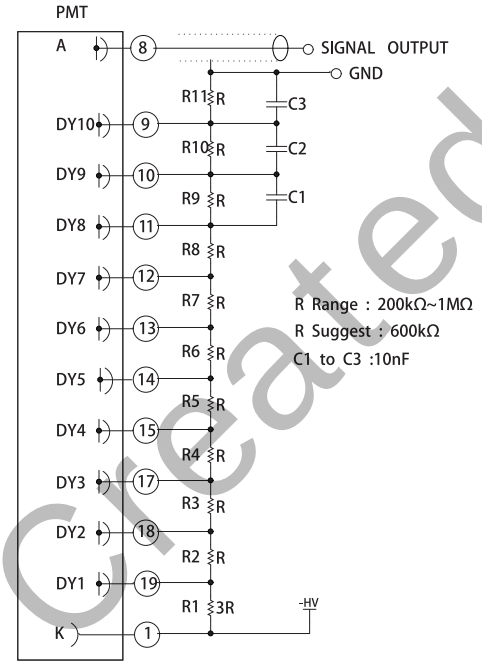
典型光谱响应曲线

Typical spectral response curve



典型增益曲线

Typical gain curve



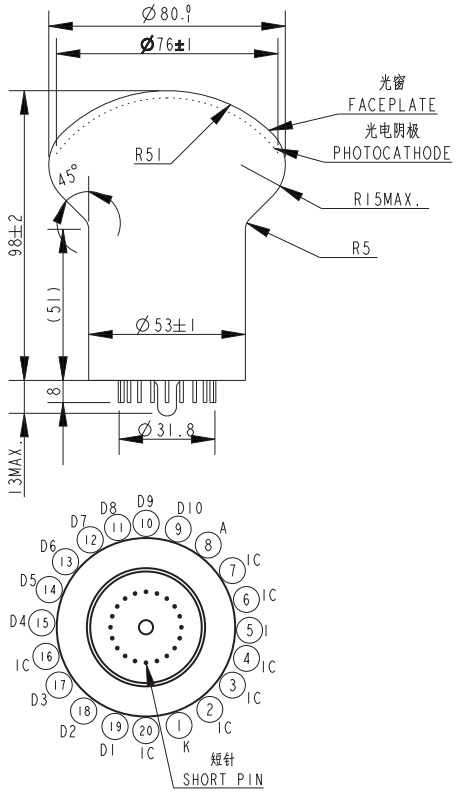
电极	K	Dy1	Dy2	Dy3	Dy4	Dy5	Dy6	Dy7	Dy8	Dy9	Dy10	A
分压比	3	1	1	1	1	1	1	1	1	1	1	

K：阴极；Dy：打拿极；A：阳极

K：Cathode ； Dy：Dynode；A：Anode

N2031型光电倍增管分压比图

N2031 PMT voltage distribution ratio



N2031型光电倍增管结构图

N2031 PMT structure

N2041型光电倍增管 4" /Head-on type/10-stage

技术参数 Technical Specification

玻璃材料/Window material		硼硅玻璃/ Borosilicate glass			
光电阴极材料/Photocathode material		双碱/Bialkali			
倍增结构/Dynode structure		环型和线性聚焦/Circular and linear focused			
N2041		Min.	Typ.	Max.	Unit.
阴极参数 Cathode parameters	光谱响应范围/Spectral response range		290-650		nm
	@410 nm量子效率 /Quantum efficiency @ 410 nm	25	28		%
	顶部探测效率/Top detection efficiency	22	24		%
	顶部收集效率/Top collection efficiency		90		%
阳极参数 Anode parameters	工作电压/Supply voltage		1050	1350	V
	增益/Gain		5×10^6		--
	暗计数率/Dark count rate@0.2pe at room temperature			1000	Hz
	能量分辨率/Charge resolution		40		%
	单光子峰谷比/Single PE charge spectrum peak/valley	2	2.5		--
时间参数Time Response	上升时间/Anode pulse rise time		2.7		ns
	渡越时间离散/Transit time spread (FWHM)		2.5	3	ns
	前脉冲/Pre pulsing		0.1		%
	延迟脉冲/late pulsing		3		%
	后脉冲/after pulsing		8		%
工作环境温度/Operating ambient temperature		-30~+50			℃
储藏温度/Storage temperature		-50~+50			℃

应用领域 Application

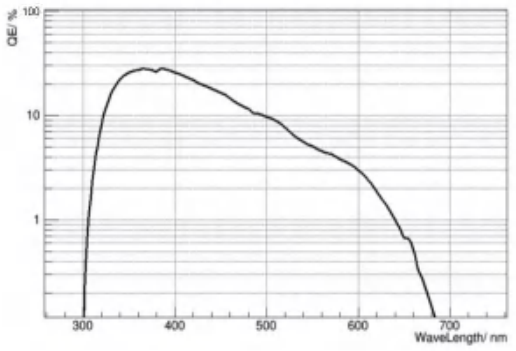
高能物理　　High Energy Physcis

产品特点 Features

高量子效率　　High Quantum Efficiency

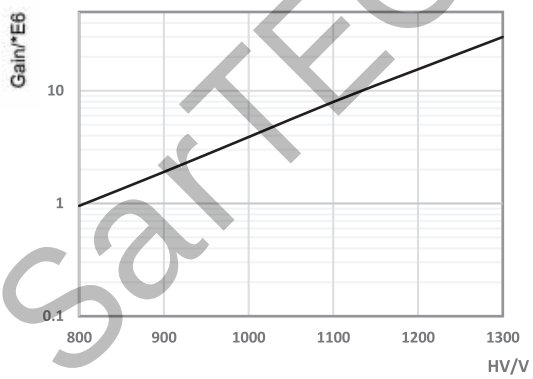
快时间　　Fast Response

低噪声　　Low Noise



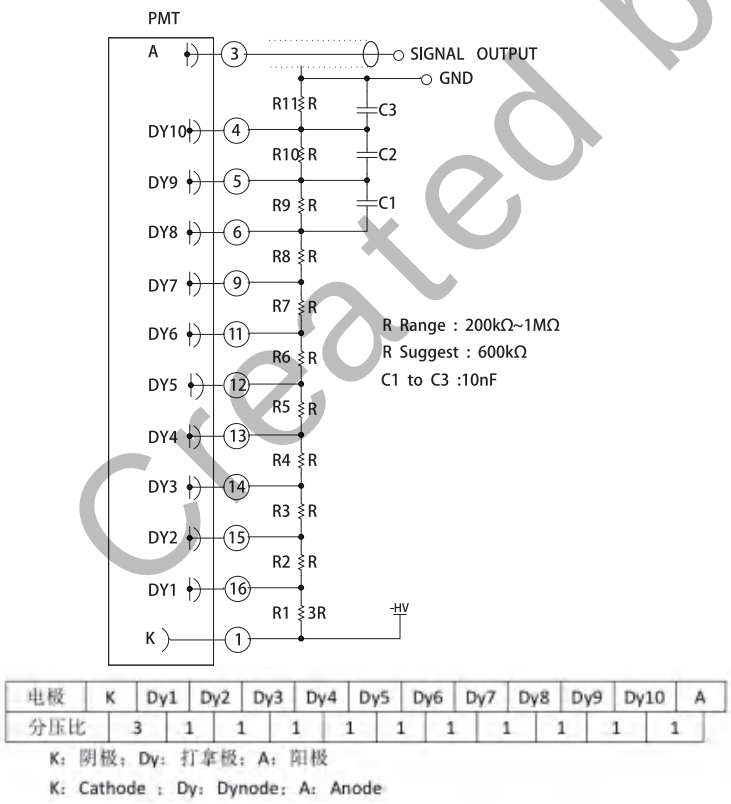
典型光谱响应曲线

Typical spectral response curve



典型增益曲线

Typical gain curve



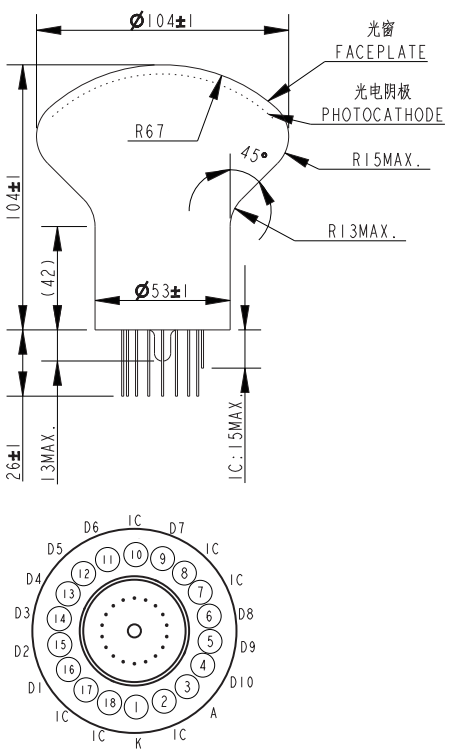
电极	K	Dy1	Dy2	Dy3	Dy4	Dy5	Dy6	Dy7	Dy8	Dy9	Dy10	A
分压比	3	1	1	1	1	1	1	1	1	1	1	

K：阴极；Dy：打拿极；A：阳极

K：Cathode ； Dy：Dynode；A：Anode

N2041型光电倍增管分压比图

N2041 PMT voltage distribution ratio



N2041型光电倍增管结构图

N2041 PMT structure

N4031型光电倍增管 3" /Head-on type/8-stage

技术参数 Technical Specification

玻璃材料/Window material		硼硅玻璃/ Borosilicate glass			
光电阴极材料/Photocathode material		双碱/Bialkali			
倍增结构/Dynode structure		盒栅和线性聚焦/ Box and Linear focused			
N4031		Min.	Typ.	Max.	Unit.
阴极参数Cathode parameters	光谱响应范围/Spectral response range		290-650		nm
	辐射灵敏度峰值波长/Peak wavelength of radiant sensitivity		420		nm
	蓝光灵敏度/Blue sensitivity	10	11.5		μA/lmf
阳极参数 Anode parameters	阳极光照灵敏度/Anode sensitivity	3	30		A/lm
	工作电压/Supply voltage		1000		V
	增益/Gain		2.73×10^5		--
	暗电流/Anode dark current		2	10	nA
时间参数 Time response	上升时间/Rise time		6		ns
工作环境温度/Operating ambient temperature		-30~+50			℃
储藏温度/Storage temperature		-50~+50			℃

应用领域 Application

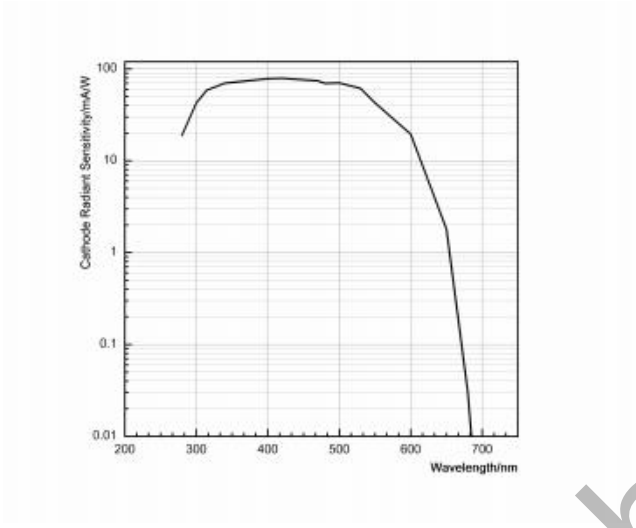
辐射测量 Radiation Measurement

核医学仪器 Nuclear Medical Instrument

产品特点 Features

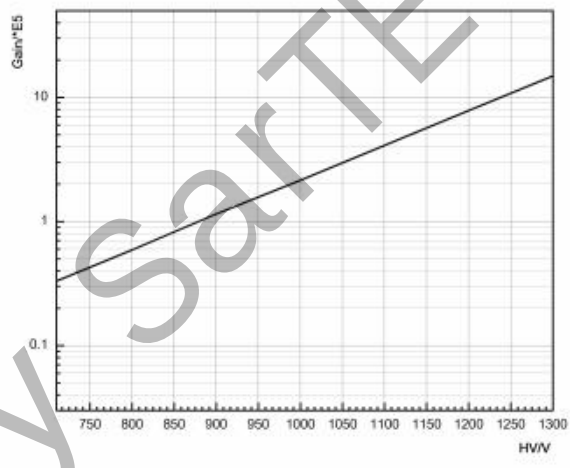
能量分辨率好 High Energy Resolution

高收集效率 High Collection Efficiency



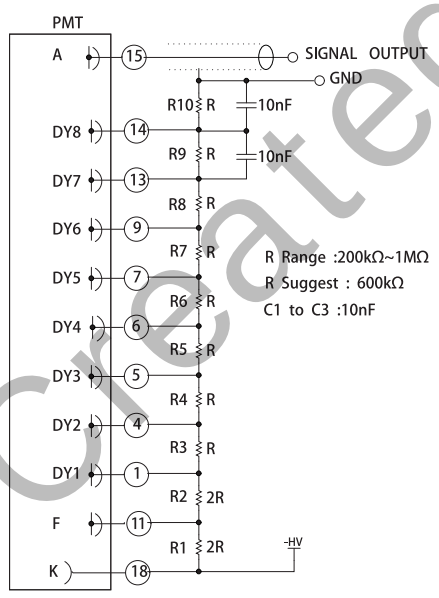
典型光谱响应曲线

Typical spectral response curve



典型增益曲线

Typical gain characteristics



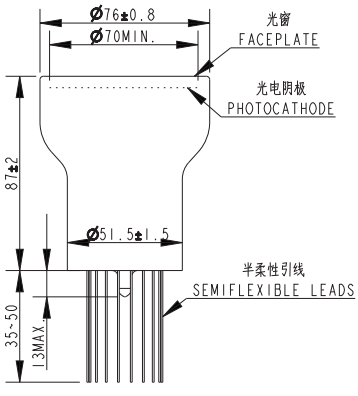
电极	K	F	Dy1	Dy2	Dy3	Dy4	Dy5	Dy6	Dy7	Dy8	A
分压比	2	2	1	1	1	1	1	1	1	1	

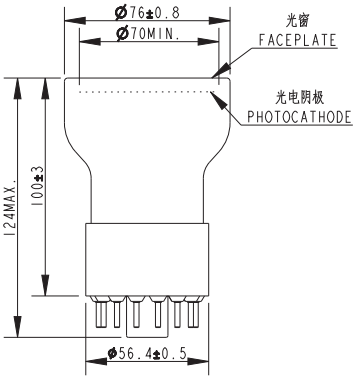
K：阴极；Dy：打拿极；A：阳极

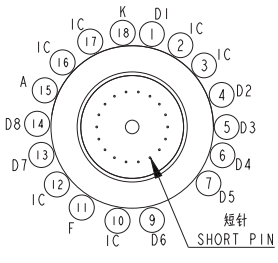
K：Cathode ； Dy：Dynode；A：Anode

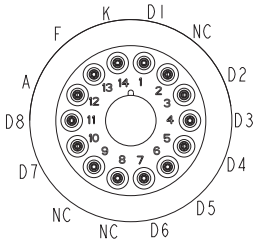
N4031型光电倍增管分压比图

N4031 PMT voltage distribution ratio





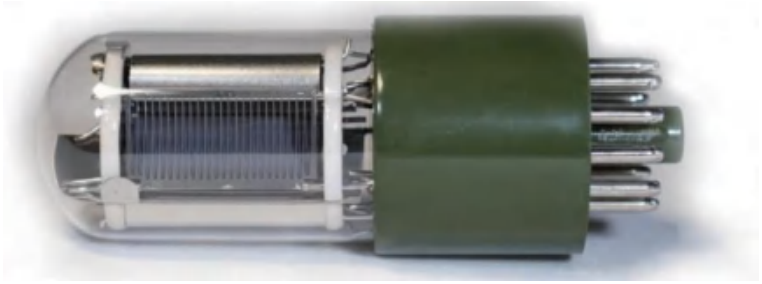




N4031型光电倍增管结构图

N4031 PMT structure

N1012型光电倍增管 1 1/8" Side-on type/ 9-stages



技术参数 Technical Specification

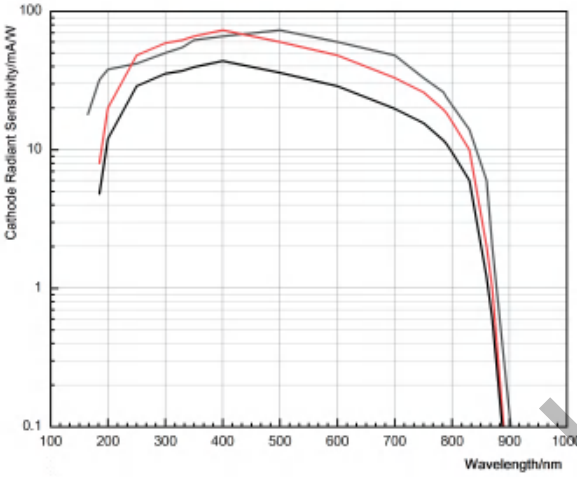
玻璃材料/Window material		石英玻璃/Quartz glass									
光电阴极材料/Photocathode material		多碱/Multi-alkali									
阴极面积/Proportion of cathode		8 x 24 mm^2									
倍增结构/Dynode structure		环形/Circular									
型 号/Model		N1012- 1			N1012-2			N1012-3			单位Unit
阴极参数 Cathode parameters	光谱响应范围/Spectral response range	165-900									nm
	阳极到阴极电压/Supply voltage	1250									V
	产品性能/Product performance	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
	阴极光照灵敏度/Photocathode luminous sensitivity	140	250		140	250		80	150		μ A/lm
阳极参数 Anode parameters	阳极光照灵敏度/Anode luminous sensitivity	1400	2500		1500	2000		300	500		A/lm
	阳极暗电流（30分钟后）Anode dark current(30min later)		3	50		3	50		3	50	nA
	增 益/ Gain	1 x 10^7			8 x 10^6			3.3 x 10^6			--
时间参数 Time response	上升时间/Rise time	2.2									ns
	渡越时间离散/TTS	1.2									ns
工作环境温度/Operating ambient temperature		-30~+50									℃
储藏温度/Storage temperature		-50~+50									℃

应用领域 Application

环境监测	Environment Monitoring
半导体检测	Semiconductor Detection
生物荧光检测	Bioluminescence Detection

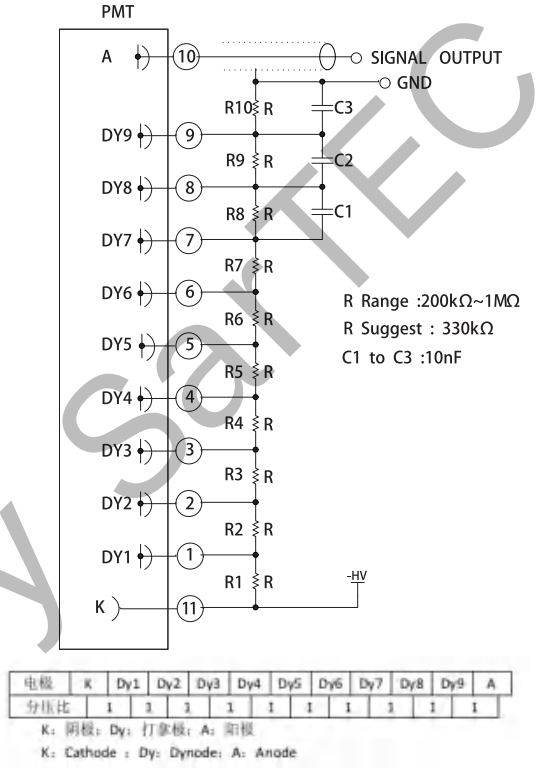
产品特点 Features

光谱响应范围广	Wide Spectral Response
高增益	High Gain



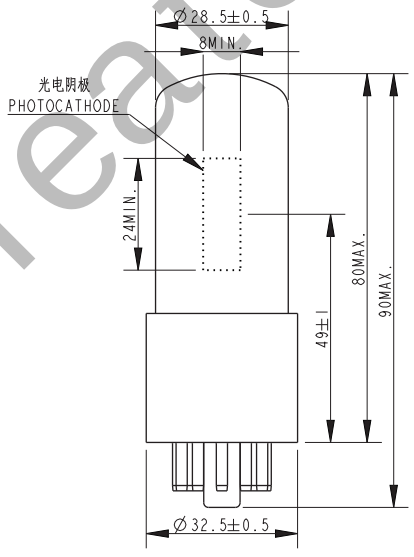
典型光谱响应曲线

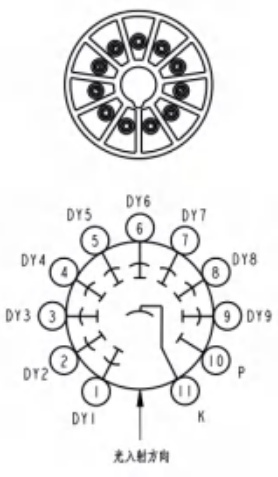
Typical spectral response curve



N1012型光电倍增管分压比图

N1012 PMT voltage distribution ratio





N1012型光电倍增管结构图

N1012 PMT structure

N1013型光电倍增管 1 1/8" /Side-on type/ 9-stage

技术参数 Technical Specification

光电阴极/Photocathode	双碱/Bialkali
阴极面积/Proportion of cathode	8 x 24 mm^2
倍增结构/Dynode structure	环形/Circular
工作环境温度/Operating ambient temperature	-30℃~+50℃
储藏温度/Storage temperature	-50℃~+50℃

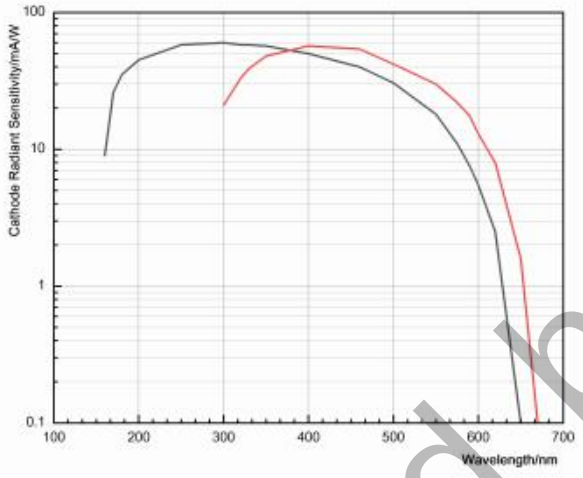
型号	玻璃材料/Window material	光谱范围/Spectral response（nm）	阴极灵敏度/Photocathode luminous sensitivity（μA/lm）		增益/ Gain	阳极光照灵敏度/Anode luminous sensitivity （A/lm）		暗电流/Anode current（nA）	
			Min.	Typ.	Typ.	Min.	Typ.	Typ.	Max.
N1013-1	石英玻璃/Quartz glass	160-650	40	60	6.7×10^6	200	400	0.5	2
N1013-2A	石英玻璃/Quartz glass	160-650	40	60	2×10^7	1000	1500	2	10
N1013-2B	硼硅玻璃/Borosilicate glass	290-650	40	60	2×10^7	1000	1500	2	10
N1013-3A	石英玻璃/Quartz glass	160-650	25	40	7.5×10^6	200	400	2	10
N1013-3B	硼硅玻璃/Borosilicate glass	290-650	25	40	7.5×10^6	200	400	2	10
N1013-4	石英玻璃/Quartz glass	160-650	25	40	1×10^7	200	400	10	50

应用领域 Application

环境监测	Environment Monitoring
半导体检测	Semiconductor Detection
生物荧光检测	Bioluminescence Detection
体外诊断	In Vitro Diagnosis

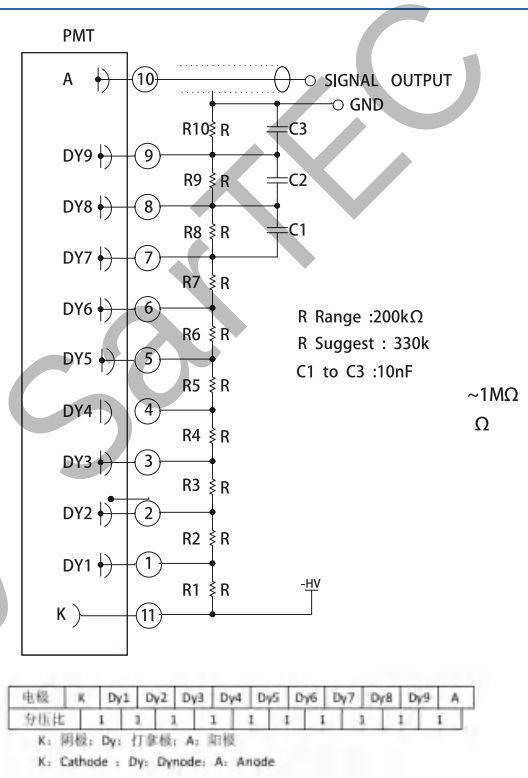
产品特点 Features

光谱响应范围广	Wide Spectral Response
高增益	High Gain
高阴极灵敏度	High Cathode Sensitivity



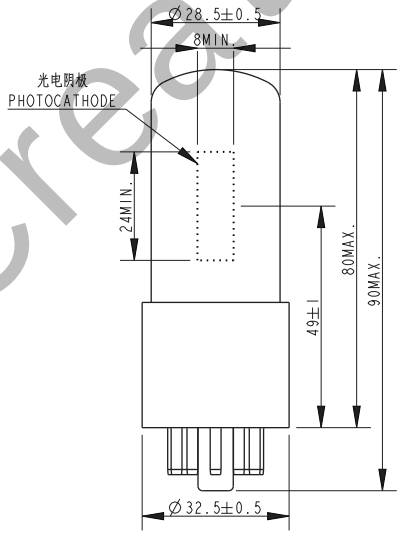
典型光谱响应曲线

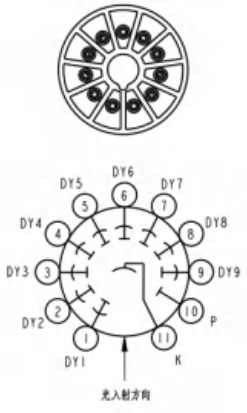
Typical spectral response curve



N1013型光电倍增管分压比图

N1013 PMT voltage distribution ratio





N1013型光电倍增管结构图

N1013 PMT structure

M1011型光子计数探测器 M1011 photon counter

M1011型光子计数器主要应用于生物、医学、化学等多重领域，主要涉及弱光探测、精密测量。本公司研发的M1011型光子计数探测器主要由端窗光电倍增管、高压电源模块、信号成形电路组成。本产品在出厂前，已经过各方面测试，接通电源，将输出端与计数单元连接即可使用。产品性能可以按客户需求订做。

The M1011 photon counter is mainly used in biology, medicine, chemistry and other fields, mainly involving weak light detection, precision measurement. The M1011 photon counting detector developed by our company is mainly composed of photomultiplier tube, high voltage power supply module and signal forming circuit. Before leaving the factory, this product has been tested in all aspects, switch on the power supply, the output end and the counting unit can be connected to use. Product performance can be customized according to customer demand.

技术参数 Technical Specification

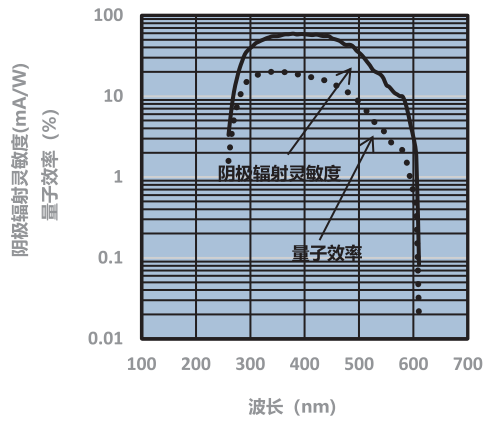
（测试环境温度25℃）

参数/Paramater		Min.	Typ.	Max.	单位/Unit
输入电压/Input voltage			+4.75~+5.25		V
最大输入电流/Max input current			60		mA
有效面积/Effective area			Φ25		mm
光谱响应范围/Spectral range			290-650		nm
峰值波长/Peak wavelength			420		nm
输出脉冲逻辑/Output pulse logic			TTL		--
输出脉冲幅度[1]/Output pulse amplitude		2	2.5	--	V
脉冲对分辨时间/ Pulse pairs resolve time			20		ns
辐射计数灵敏度/Radiation counting sensitivity	400nm		4.5×10^5		$s^{-1}\cdot pW^{-1}$
最大线性计数率[2]/Maximum linear count rate			6×10^6（校正前） 20×10^6（校正后）		s^{-1}
暗计数率[3]/Dark count			80	200	Hz
一致性（相对偏差）[4]/Consistency				±10	%
8小时不稳定性[5]/8 hour instability			0.60%	3	%
推荐负载/Recommended load resistance			50		Ω
重量/Weight			280		g
工作环境[6]/Work environment	温度/Temperature		+5~+40		℃
	湿度/Humidity			90%RH	--
存放环境[6]/Storage environment	温度/Temperature		-20~+50		℃
	湿度/Humidity			93%RH	--

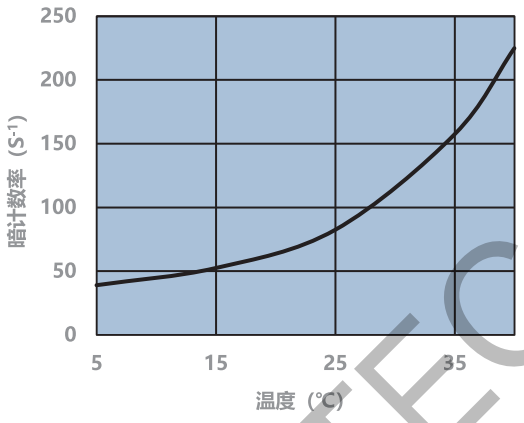
1）负载50Ω。
2）校正后为M1011配合北方夜视计数单元校正功能所得。
3）避光 30 分钟后，室温 25℃，测试 300s，计算均值。
4）光源波长在 400~500nm 之间，探测器输出计数率约 $15ks^{-1}$。
5）探测器输出计数率约 $30ks^{-1}$。
6）无冷凝。

1) Load 50Ω.
2) After correction, it is obtained by M1011 with the correction function of the northern night vision counter unit.
3) After 30 minutes of light avoidance, the room temperature was 25℃, the test was conducted for 300s, and the mean value was calculated.
4) The light source wavelength is between 400~500nm, and the detector output counting rate is about $15ks^{-1}$.
5) The detector output counting rate is about $30ks^{-1}$.
6) No condensation.

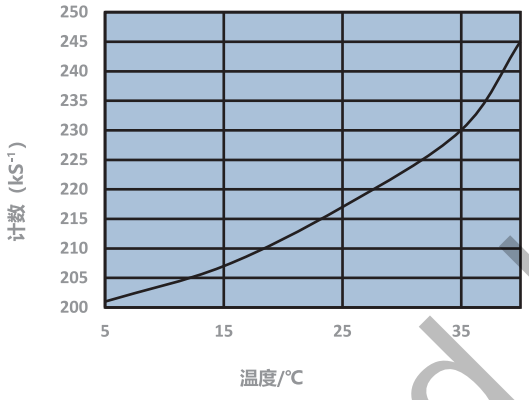
特性曲线 Technical Specification



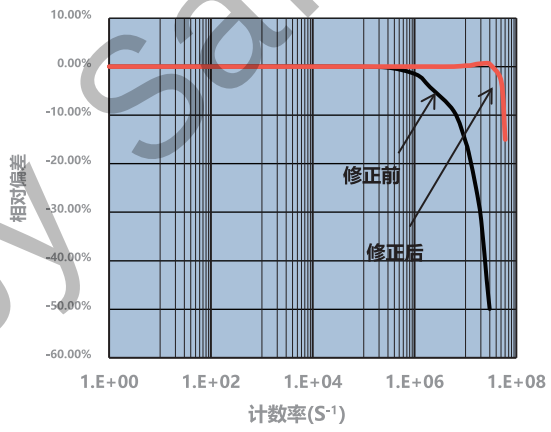
光谱响应曲线
Spectral response curve



暗计数随温度变化图
Graph of dark count variation with temperature

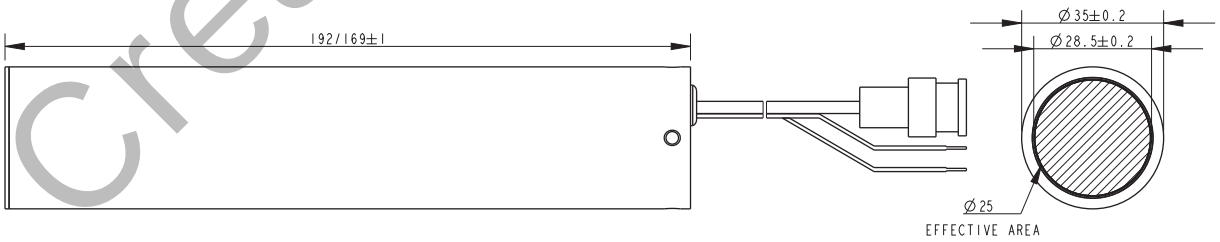


计数率随温度变化图
Graph of counting rate with temperature



计数率校正曲线
Count rate correction curve

外形尺寸图 Outline Dimensional Drawing



棕线：电源输入+5V
蓝线：电源地
BNC为信号线

外形尺寸图（单位mm 线长可定制）

参数测试方法请详询厂家

M2011型光子计数探测器 M2011 photon counter

光子计数器主要应用于生物、医学、化学等多重领域，主要涉及弱光探测、精密测量。本公司研发的M2011型光子计数探测器主要由端窗光电倍增管、高压电源模块、信号成形电路组成。本产品在出厂前，已经过各方面测试，接通电源，将输出端与计数单元连接即可使用。产品性能可以按客户需求订做。

Photon counter is mainly used in biology, medicine, chemistry and other fields, mainly involving weak light detection, precision measurement. The M2011 photon counting detector developed by our company is mainly composed of photomultiplier tube, high voltage power supply module and signal forming circuit. Before leaving the factory, this product has been tested in all aspects, switch on the power supply, the output end and the counting unit can be connected to use. Product performance can be customized according to customer demand.

技术参数 Technical Specification

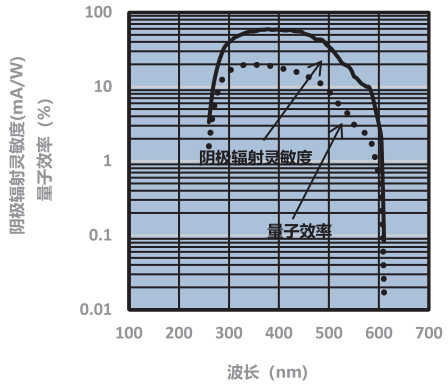
（测试环境温度25℃）

参数/Paramater		Min.	Typ.	Max.	单位/Unit
输入电压/Input voltage			+11.5~+12.5		V
最大输入电流/Max.input current			70		mA
有效面积/Effective area			Φ25		mm
光谱响应范围/Spectral range			290-650		nm
峰值波长/Peak wavelength			420		nm
输出脉冲逻辑/Output pulse logic			TTL		--
输出脉冲幅度[1]/Output pulse amplitude		2	2.5	--	V
脉冲对分辨时间/ Pulse pairs resolving time			20		ns
辐射计数灵敏度/Radiation counting sensitivity 400nm			4.5×10^5		$s^{-1}\cdot pW^{-1}$
最大线性计数率[2]/Maximum linear count rate			6×10^6(校正前) 20×10^6(校正后)		s^{-1}
暗计数率[3]/Dark count			80	200	s^{-1}
一致性（相对偏差）[4]/Consistency				±10	%
8小时不稳定性[5]/8 hour instability			0.60%	3	%
推荐负载/Recommended load resistance			50		Ω
重量/Weight			445		g
工作环境[6]/Work environment	温度/Temperature		+5~+40		℃
	湿度/Humidity			90%RH	--
存放环境[6]/Storage environment	温度/Temperature		-20~+50		℃
	湿度/Humidity			93%RH	--

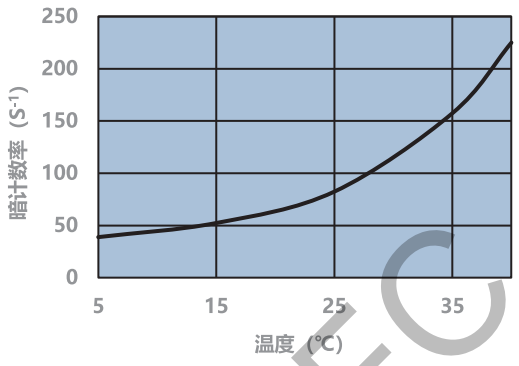
1）负载50Ω。
2）校正后为M2011配合北方夜视计数单元校正功能所得。
3）避光 30 分钟后，室温 25℃，测试 300s，计算均值。
4）光源波长在 400~500nm 之间，探测器输出计数率约 15ks^{-1}。
5）探测器输出计数率约 30ks^{-1}。
6）无冷凝。

1) Load 50Ω.
2) After correction, it is obtained by M2011 with the correction function of the northern night vision counter unit.
3) After 30 minutes of light avoidance, the room temperature was 25℃, the test was conducted for 300s, and the mean value was calculated.
4) The light source wavelength is between 400~500nm, and the detector output counting rate is about 15ks^{-1}.
5) The detector output counting rate is about 30ks^{-1}.
6) No condensation.

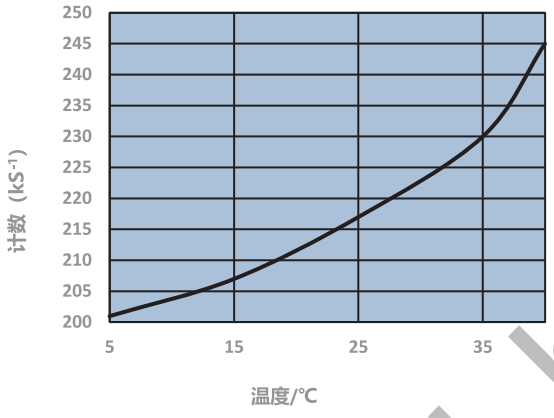
特性曲线 Technical Specification



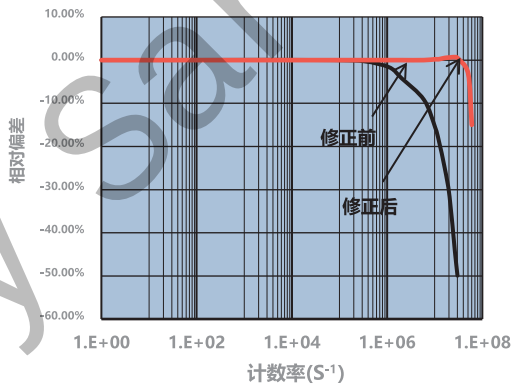
光谱响应曲线
Spectral response curve



暗计数率随温度变化图
Graph of dark count variation with temperature

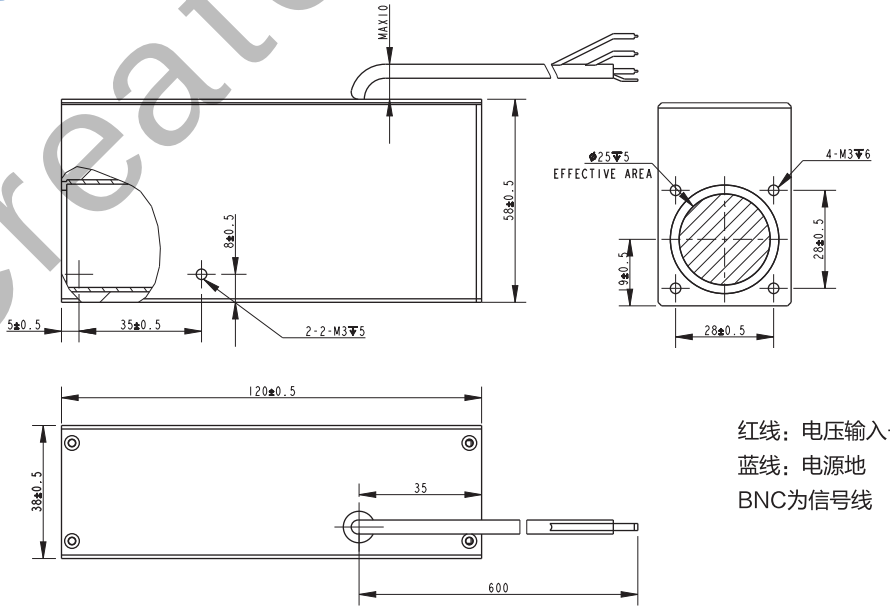


计数率随温度变化图
Graph of counting rate with temperature



计数率校正曲线
Count rate correction curve

外形尺寸图 Outline Dimensional Drawing



红线：电压输入+12V
蓝线：电源地
BNC为信号线

外形尺寸图（单位mm 线长可定制）

参数测试方法请详询厂家

M2012型光子计数探测器 M2012 photon counting detector

M2012光子计数探测器是由端窗光电倍增管、高压电源模块以及比较成型电路组成的高灵敏度光子计数探测器。产品出厂前，各参数点已预设为最优值，用户只需接通电源，将输出端与计数单元连接即可使用。

The M2012 photon counting detector is a high sensitivity photon technology detector which is composed of head-on photomultiplier, high voltage power supply module and comparative forming circuit. Before the product leaves the factorch parameter point has been preset as the optimal value, the user only neey, eads to switch on the power supply, the output terminal and the counter can be used.

技术参数 Technical Specification

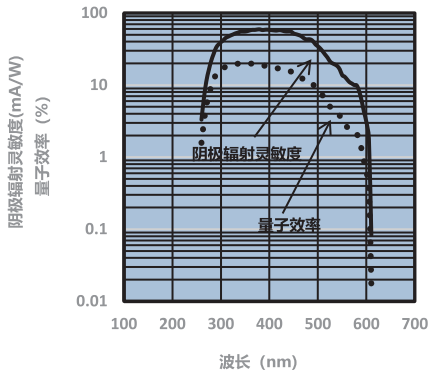
（测试环境温度25℃）

参数/Paramater			Min.	Typ.	Max.	单位/Unit
输入电压/Input voltage				+4.75~+5.25		V
最大输入电流/Max.input current				100		mA
有效面积/Effective area				Φ22		mm
光谱响应范围/Spectral range				290-650		nm
峰值波长/Peak wavelength				420		nm
输出脉冲逻辑/Output pulse logic				正TTL		--
输出脉冲幅度[1]/Output pulse amplitude				2.2	2.5	V
计数灵敏度/Sensitivity of counting	400nm			4.5×10^{5}		$s^{-1}\cdot pW^{-1}$
最大线性计数率[2]/Maximum linear counting	校正前			1.0×10^{7}		s^{-1}
	校正后			4.0×10^{7}		
暗计数[3] /Dark noise				100	200	s^{-1}
8小时不稳定性[4])/8 hours of instability				1%		--
脉冲对分辨时间/Pulse pair resolution time				17		ns
推荐负载/Recommended load resistance				50		Ω
重量/Weight				220		g
工作环境/Work environment	温度/Temperature			+5~+40		℃
	湿度/Humidity	Max.		90%RH		--
存放环境/Storage environment	温度/Temperature			-20~+50		℃
	湿度/Humidity	Max.		93%RH		--

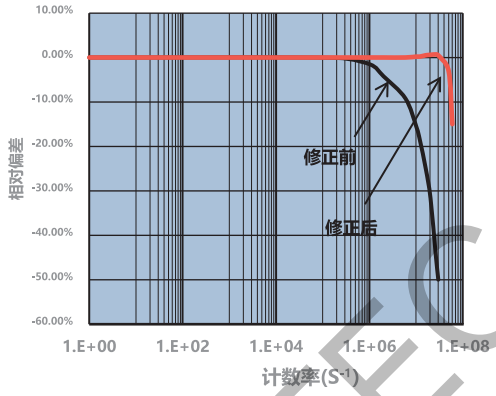
1）负载50Ω。
2）随机脉冲；校正前为M2012所得；校正后为M2012配合计数单元M4011校正功能所得。
3）避光30min后测试。
4）探测器输出计数率30ks^{-1}左右。

1) Load 50Ω.
2) Random pulse; M2012 income before correction; After correction, it is obtained by M2012 cooperating with the correction function of counter unit M4011.
3) Test after 30min of light avoidance.
4) The detector output counting rate is about 30k/s.

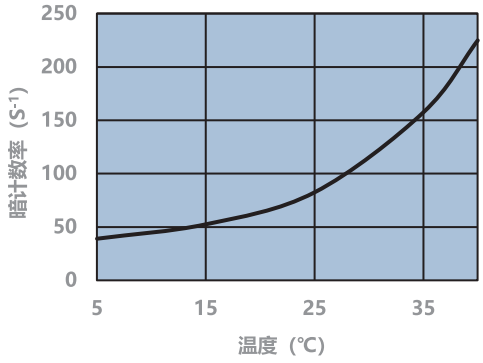
特性曲线 Technical Specification



光谱响应曲线
spectral response curve

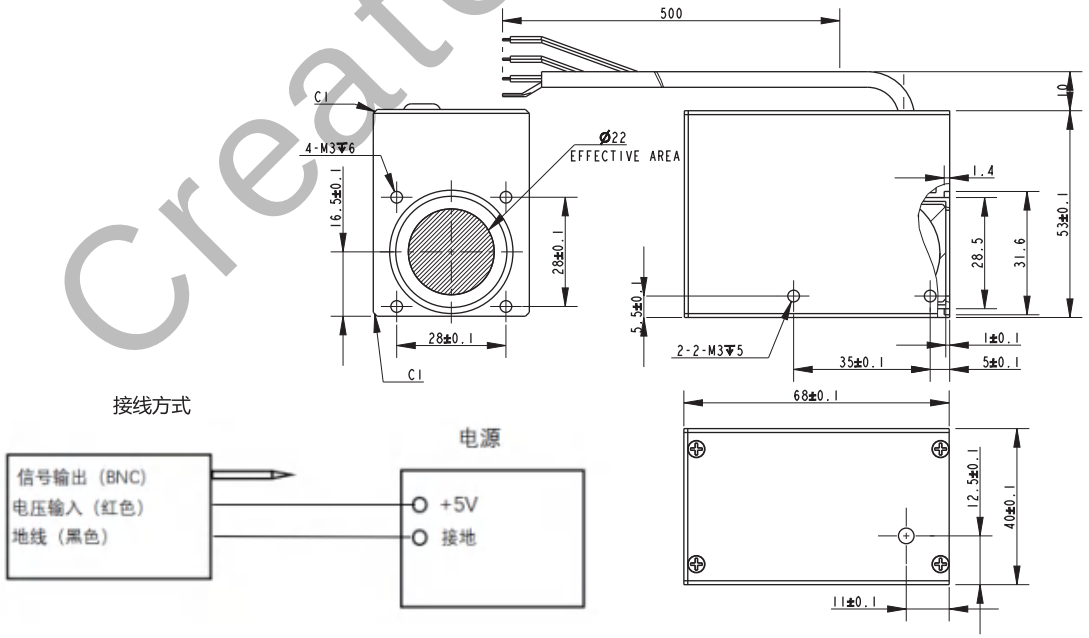


计数率校正曲线
Count rate correction curve



暗计数率随温度变化图
Graph of dark counting rate with temperature

外形尺寸图 Outline Dimensional Drawing



接线方式

外形尺寸图（单位mm 线长可定制）

参数测试方法请详询厂家

M2021型测光探测器 M2021 light detector

M2021测光探测器是由端窗光电倍增管、电源电路和放大电路组成。光电倍增管输出的电流信号经I-V放大后变为电压输出信号。该测光探测器可以采用电阻调节或电压调节两种方式控制增益。

M2021 light detector is composed of head-on photomultiplier tube, power supply circuit and amplifier circuit. The current signal output by the photomultiplier tube is changed into a voltage output signal after I-V amplification. The gain of the light detector can be controlled by resistance adjustment or voltage adjustment.

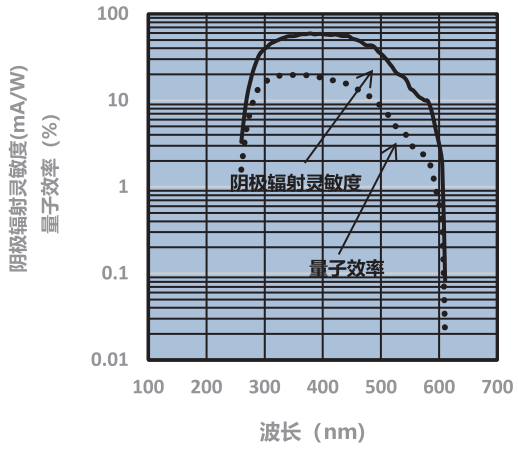
技术参数 Technical Specification

（测试环境温度25℃）

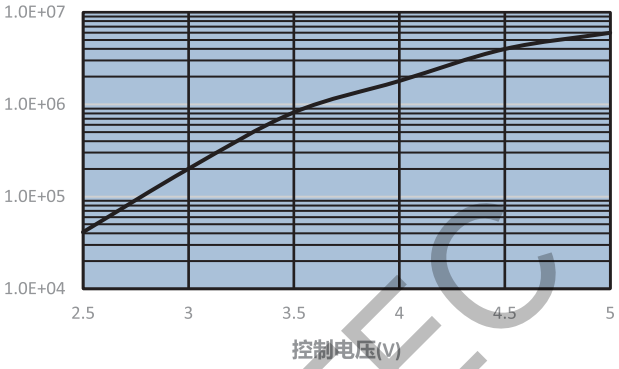
参数/Paramater			描述/值/Description/value	单位/Unit
输入电压/Input voltage			±11.75~±12.25	V
最大输入电流/Max.input current			150	mA
有效面积/Effective area			Φ22	mm
光谱响应范围/Spectral range			290-650	nm
峰值波长/Peak wavelength			420	nm
推荐控制电压/ Remommend control voltage			+2~+4.5（输入阻抗10kΩ）	V
阴极光照灵敏度[1] /Cathode luminous sensitivity			90	μA/lm
阴极辐射灵敏度[1] /Cathode radiant sensitivity			100	mA/W
阳极辐射灵敏度[1] /Anode radiant sensitivity			2×10^5	A/W
频率带宽(-3dB)/Frequency bandwidth			DC to 20	kHz
电流-电压转换比/current to voltage conversion fator			1	V/μA
最大线性输出电压[1] /Max linear output voltage			5	V
纹波噪声[1)2)] /Ripple noise			4	mV
重量/Weight			220	g
工作环境/work environment	温度/Temperature		+5~+40	℃
	湿度/Humidity	Max.	90%RH	--
存放环境/Storage environment	温度/Temperature		-10~+50	℃
	湿度/Humidity	Max.	93%RH	--

1）控制电压+4V。
2）负载电阻1MΩ，电容22pF测试。
1) Control voltage +4V.
2) Load resistance 1MΩ, capacitance 22pF test.

特性曲线 Technical Specification

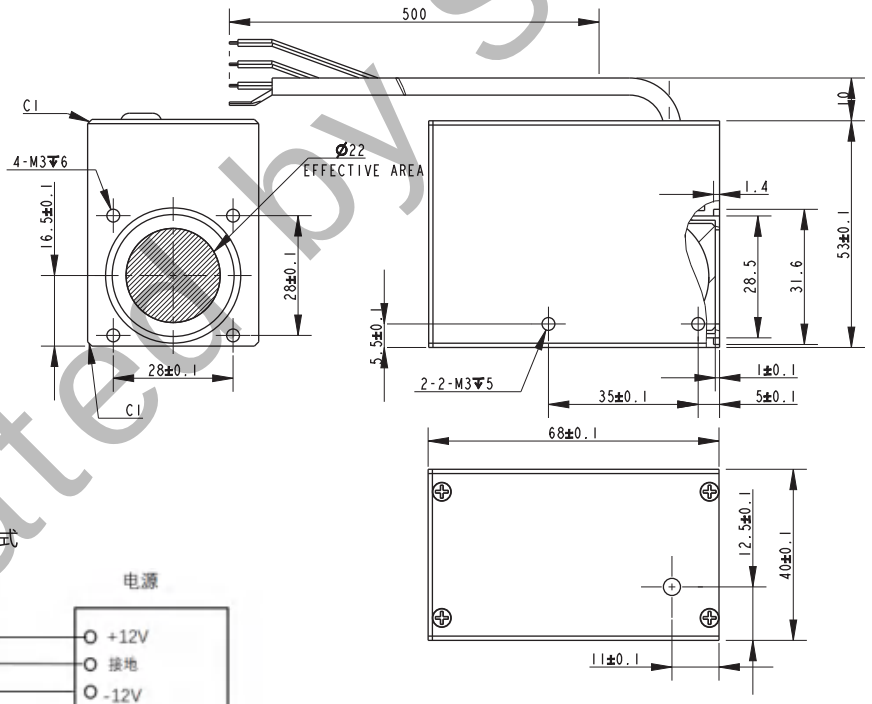


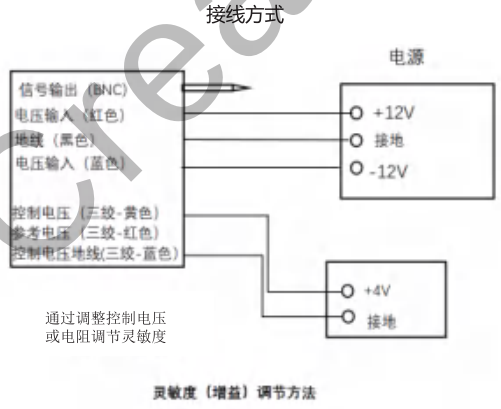
光谱响应曲线
Spectral response curve



增益随控制电压变化
The gain varies with the control voltage

外形尺寸图 Outline Dimensional Drawing





灵敏度（增益）调节方法

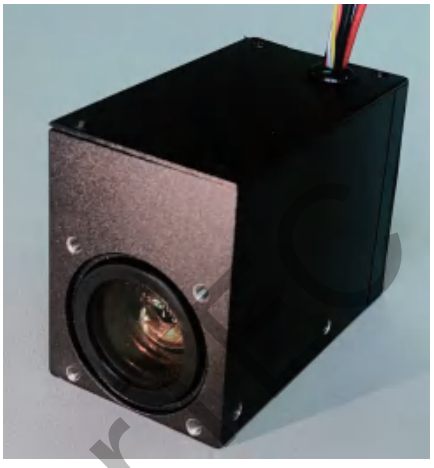
外形尺寸图（单位mm 线长可定制）

参数测试方法请详询厂家

M2031型测光探测器 M2031 light detector

M2031型测光探测器是由端窗光电倍增管、电源电路组成。该测光探测器直接输出电流信号，可以采用电阻调节或电压调节两种方式控制增益。

M2031 light detector is composed of head-on photomultiplier tube and power supply circuit. The light detector directly outputs the current signal, and the gain can be controlled by resistance regulation or voltage regulation.



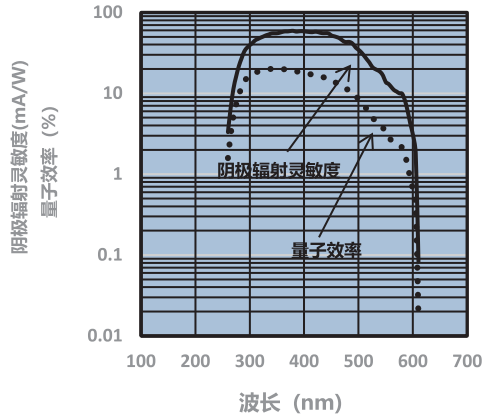
技术参数 Technical Specification

（测试环境温度25℃）

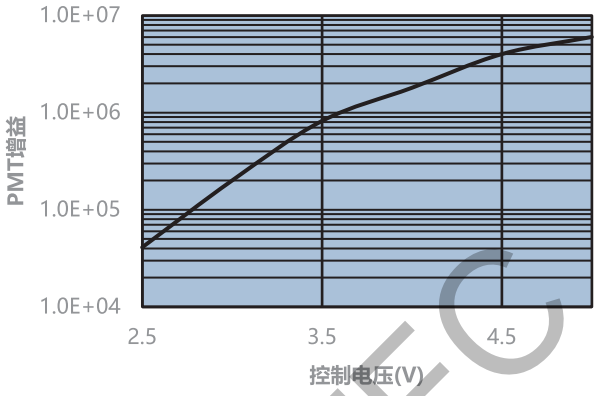
参数/Paramater			描述/值/Description/value	单位/Unit
输入电压/Input voltage			+11.75~+12.25	V
最大输入电流/Max.input current			150	mA
有效面积/Effective area			Φ22	mm
光谱响应范围/Spectral range			290-650	nm
峰值波长/Peak wavelength			420	nm
最大平均输出电流/Max.average output signal current			100	μA
推荐控制电压/ Remommend control voltage			+2~+4.5(输入阻抗10kΩ)	V
阴极光照灵敏度[1)] /Cathode luminous sensitivity			90	μA/lm
阴极辐射灵敏度[1)] /Cathode radiant sensitivity			100	mA/W
阳极辐射灵敏度[1)] /Anode radiant sensitivity			2×10^5	A/W
暗电流[3)]Dark current			10	nA
纹波噪声[1)4)] /Ripple noise			4	mV
重量/Weight			220	g
工作环境/work environment	温度/Temperature		+5~+40	℃
	湿度/Humidity	Max.	90%RH	--
存放环境/Storage environment	温度/Temperature		-10~+50	℃
	湿度/Humidity	Max.	93%RH	--

1）控制电压+4V。
2）负载50Ω。
3）避光30min后测试。
4）负载电阻1MΩ，电容22pF测试。
1) Control voltage +4V.
2) Load 50Ω.
3) Test after 30min of light avoidance.
4) Load resistance 1MΩ, capacitance 22pF test.

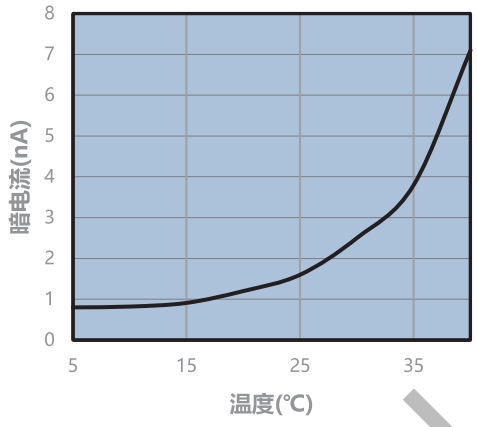
特性曲线 Technical Specification



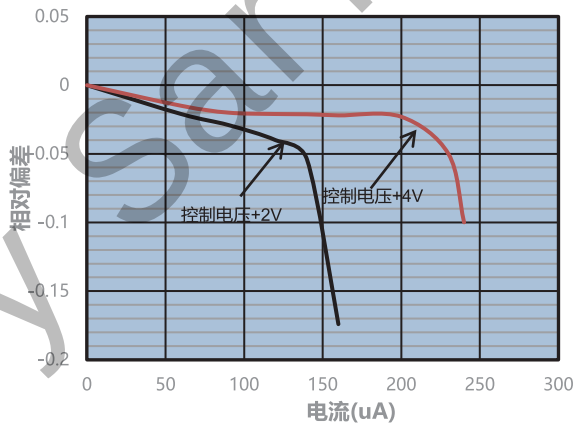
光谱响应曲线
spectral response curve



增益随控制电压变化
The gain varies with the control voltage

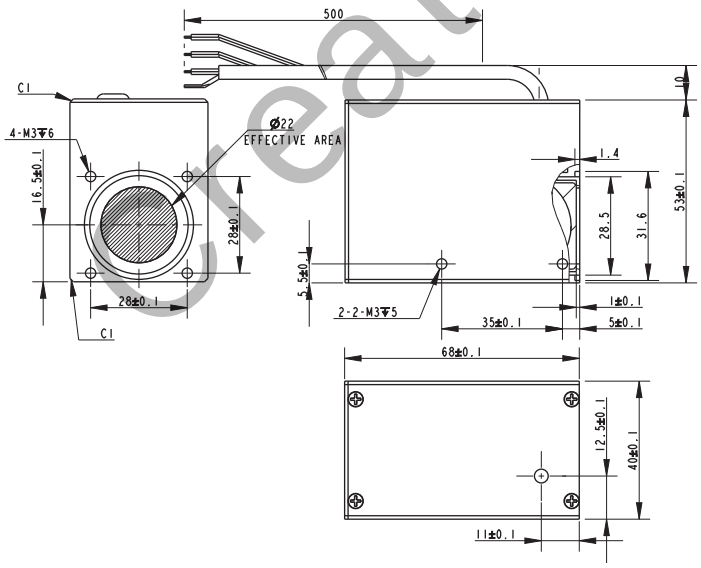


暗电流温度特性曲线
Dark current temperature characteristic curve

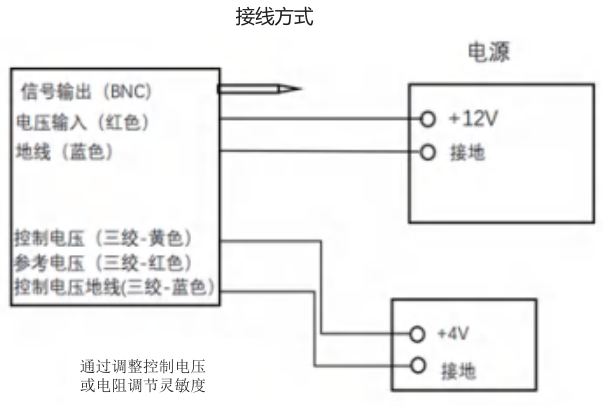


输出电流线性
Output current linearity

外形尺寸图 Outline Dimensional Drawing



外形尺寸图（单位mm 线长可定制）



灵敏度（增益）调节方法

参数测试方法请详询厂家

M2111型测光探测器 M2111 photometric detector

本公司研发的M2111型测光探测器主要应用于高能物理、体外诊断、精密测量等领域。M2111测光探测器由侧窗光电倍增管、高压电源模块及放大电路组成。本产品具有简单方便、可靠性高及探测效率高等优点，可以采用多方式（电压调节或电阻调节）控制增益。

The M2111 photometric detector developed by our company is mainly used in high energy physics, vitro diagnosis, precision measurement and other fields. M2111 photometric detector consists of side window photomultiplier tube, high voltage power supply module and amplifier circuit. The product has the advantages of simple and convenient, high reliability and high detection efficiency, and can be controlled by multiple ways (voltage regulation or resistance regulation) gain.

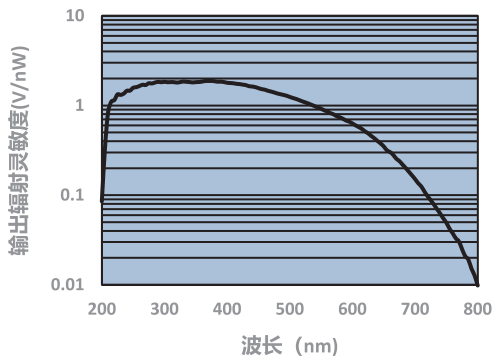
技术参数 Technical Specification

（测试环境温度25℃）

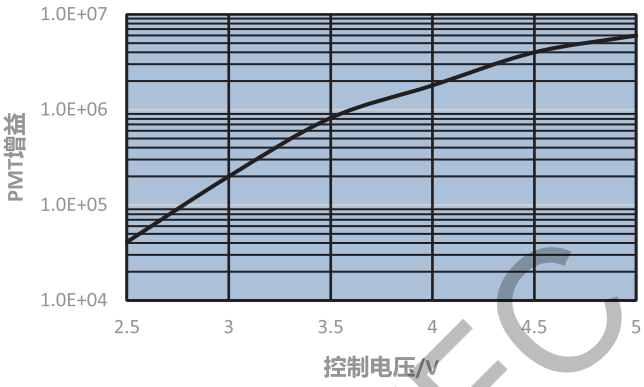
参数/Paramater		M2111-01	M2111-02	单位/Unit
输入电压/Input voltage		±11.5~±12.5		V
最大输入电流/Max input current		100		mA
有效面积/Effective area		8×24		mm
光谱响应范围/Spectral range		165-900	160-650	nm
辐射灵敏度峰值波长/Peak wavelength of radiant sensitivity		420	400	nm
控制电压/Control voltage		+2~+5		V
阴极光照灵敏度/Cathode luminous sensitivity		250	60	μA/lm
阴极辐射灵敏度[2]/Cathode radiant sensitivity		70	25	mA/W
输出光照灵敏度[1]/Output luminous sensitivity		1.2×10^7	4×10^6	V/lm
输出辐射灵敏度[1)2)]/Output ardiant sensitivity		3.5	1.7	V/nW
红白比/Red and white ratio		0.3	--	--
IV变换比/IV conversion ratio		0.05		V/μA
最大线性输出电压[1)]/Maximum linear output voltage		5		V
失调电压[1)3)]/Offset voltage		±2		mV
纹波噪声/Ripple noise		4		mV
频率带宽/ Frequency bandwidth		500		kHz
重量/Weight		225		g
工作环境/work environment	温度/Temperature	+5~+40		℃
	湿度/Humidity	90%RH		--
存放环境/Storage environment	温度/Temperature	-20~+50		℃
	湿度/Humidity	93%RH		--

1) 控制电压：+4.0V。2) 入射光波长：400nm。3) 预热时间：30min。
1) Control voltage: +4.0V. 2) Wavelength of incident light: 400nm. 3) Preheating time: 30min.

特性曲线 Technical Specification

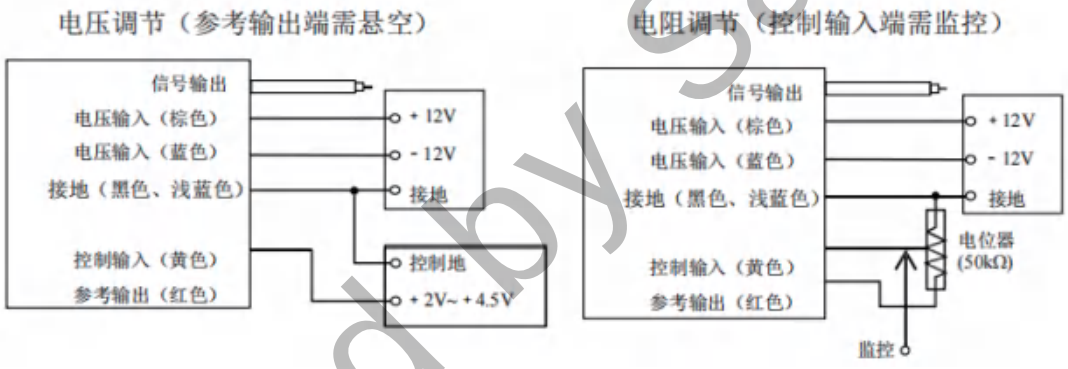


光谱响应曲线
Spectral response curve

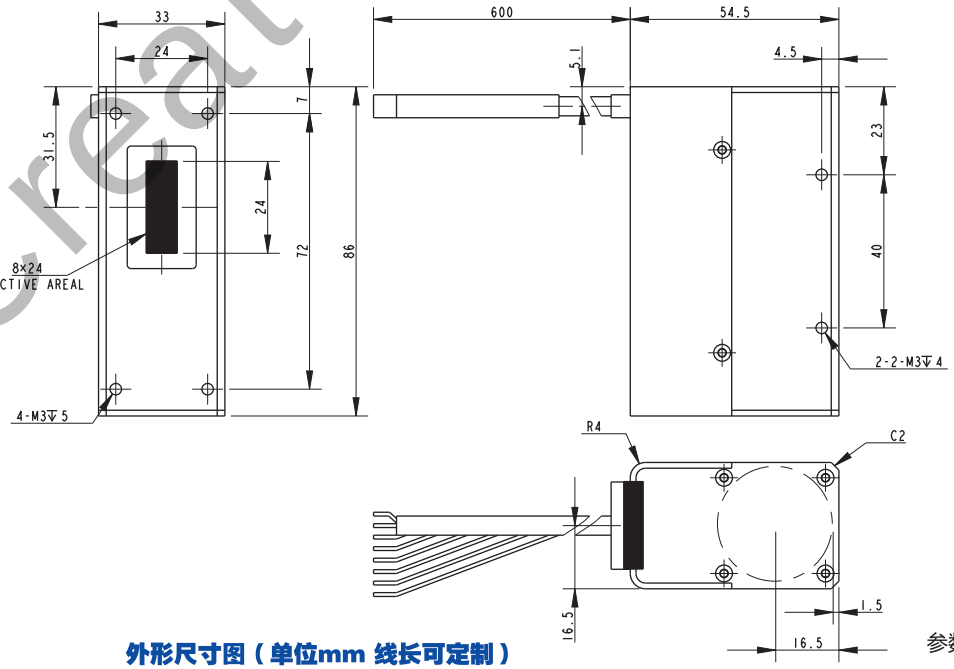


增益随控制电压变化
The gain varies with the control voltage

接线及增益调节方法 Wiring And Gain Adjustment Method



外形尺寸图 Outline Dimensional Drawing



外形尺寸图（单位mm 线长可定制）

参数测试方法请详询厂家

M1111型β探测器 M1111 β detector

M1111型β探测器能够测量低能β射线，因其优异的抗干扰能力，能够广泛用于环境检测、精密测量、科研等领域。本公司研发的M1111型β探测器主要由端窗光电倍增管、高压电源模块、信号成形电路、闪烁体等组成。

本产品具有简单方便、可靠性高及探测效率高等优点。在出厂前，已经过各项性能测试，接通电源，将输出端与计数单元连接即可使用。

M1111 β detector can measure low energy β ray, because of its excellent anti-interference ability, can be widely used in environmental detection, precision measurement, scientific research and other fields. The M1111 β detector is mainly composed of photomultiplier, high voltage power supply module, signal forming circuit and scintillator .

The product has the advantages of simplicity, high reliability and high detection efficiency.Before leaving the factory, it has been tested in all aspects, connected to the power supply, the output end can be used with the counting unit.

技术参数 Technical Specification

（测试环境温度25℃）

参数/Paramater		Min.	Typ.	Max.	单位/Unit
输入电压/Input voltage			+11.5~+12.5		V
输入电流/Inputcurrent				70	mA
有效窗口直径/Effective area			Φ10		mm
输出脉冲逻辑/Output pulse logic			正向TTL		--
输出脉冲幅度/Output pulse amplitude			5±0.5		V
输出脉冲宽度/Output pulse width			500±100		ns
本底计数率/Background counting rate				3	s^{-1}
观测计数率[1]/Observed counting rate			8.8-9k		s^{-1}
1小时不稳定性[2]/1 hour instability			0.2	0.4	%
工作环境/Work environment	温度/Temperature		+5~+40		℃
	湿度/Humidity			90%RH	--
存放环境/Storage environment	温度/Temperature		-20~+50		℃
	湿度/Humidity			93%RH	--

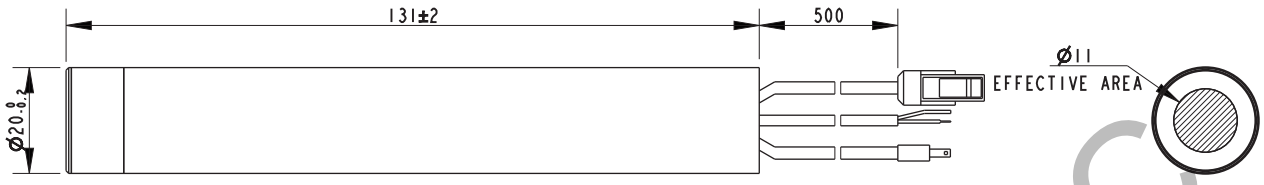
注：1) 使用60μCi的^{14}C源测试，源距离探测器3mm。

2) 1小时不稳定性测试过程：探测器采集的计数率在10.0±0.5ks^{-1}，设置每个数据采集时间为4min，每组数据累积\采集15个数据（1小时），计算每组数据的各个值与均值的偏差的绝对值，连续测试3组（3小时），取3组中的最大值为1小时工作不稳定性测试值。

Note: 1) Test with a 60μCi ^{14}C source 3mm from the detector.

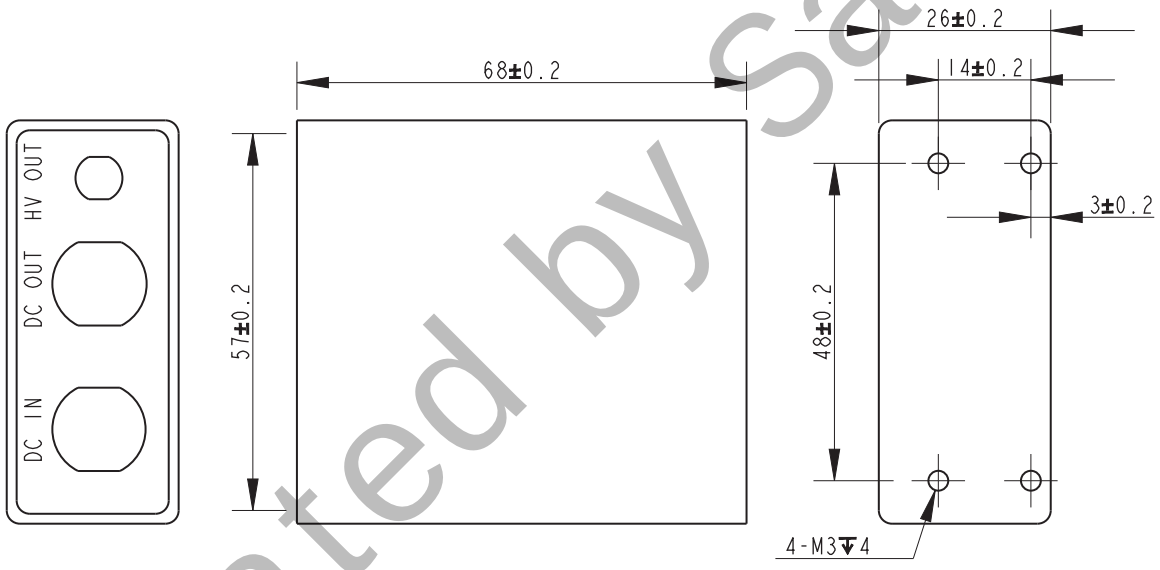
2) 1-hour instability test process: The count rate of detector acquisition was 10.0±0.5ks^{-1}, the collection time of each data was set as 4min, and 15 data were collected cumulatively (1 hour) for each set of data. The absolute value of deviation between each value of each set of data and the mean value was calculated, and the three groups were tested continuously (3 hours). The maximum value of the three groups was the 1-hour operating instability test value. The maximum value is the one-hour operating instability test value.The maximum value is the 1-hour operating instability test value.

探头



BNC为信号线
LEMO为高压线
红色：+12V
蓝色：接地

电源模块



外形尺寸图（单位mm 线长可定制）

参数测试方法请详询厂家

M3013型β探测器 M3013 β detector

M3013型β探测器能够测量低能β射线，因其优异的抗干扰能力，能够广泛用于环境检测、精密测量、科研等领域。本公司研发的M3013型β探测器主要由端窗光电倍增管、高压电源模块、信号成形电路、闪烁体等组成。

本产品具有简单方便、可靠性高及探测效率高等优点。在出厂前，已经过各方面测试，接通电源，将输出端与计数单元连接即可使用。

M3013 β detector can measure low energy β ray, because of its excellent anti-interference ability, can be widely used in environmental detection, precision measurement, scientific research and other fields. The M3013 β detector is mainly composed of end window photomultiplier, high voltage power supply module, signal forming circuit, scintillator and so on.

The product has the advantages of simplicity, high reliability and high detection efficiency. Before leaving the factory, it has been tested in all aspects, connected to the power supply, and the output end can be used with the counting unit.

技术参数 Technical Specification

（测试环境温度25℃）

参数/Paramater			Min.	Typ.	Max.	单位/Unit
输入电压/Input voltage			±11.5~±12.5			V
最大输入电流/Max.input current			≤60(+12V); ≤10(-12V)			mA
有效窗口直径/Effective area			Φ25			mm
输出脉冲逻辑/Output pulse logic			TTL			--
输出脉冲幅度/Output pulse amplitude			5±0.2			V
输出脉冲宽度/Output pulse width			500±100			ns
本底计数率/Background counting rate					3	s^{-1}
观测计数率[1]/Observed counting rate			26.5-28k			s^{-1}
1小时不稳定性[2]/1 hour instability				0.2	0.4	%
工作环境/Work environment	温度/Temperature		+5~+40			℃
	湿度/Humidity	Max.	90%RH			--
存放环境/Storage environment	温度/Temperature		-20~+50			℃
	湿度/Humidity	Max.	93%RH			--

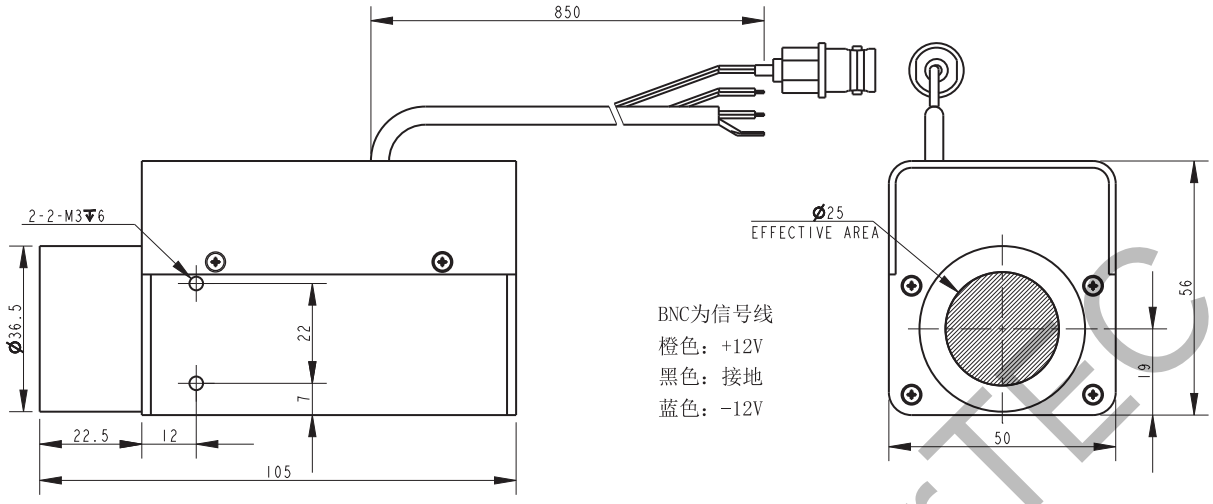
注：1) 使用60μCi的^{14}C源测试，源距离探测器3mm。

2) 1小时不稳定性测试过程：探测器采集的计数率在6.0±0.5ks^{-1}，设置每个数据采集时间为4min，每组数据累积采集15个数据（1小时），计算每组数据的各个值与均值的偏差的绝对值，连续测试3组（3小时），取3组中的最大值为1小时工作不稳定性测试值。

Note: 1) Test with a 60μCi ^{14}C source 3mm from the detector.

2) 1-hour instability test process: The count rate of detector acquisition was 6.0±0.5ks, the collection time of each data was set to 4min, and 15 data were collected cumulatively (1 hour) for each set of data.
The absolute value of deviation between each value of each set of data and the mean value was calculated.
The three groups were tested continuously (3 hours), and the maximum value of the three groups was taken as the 1-hour operating instability test value.

外形尺寸图 Outline Dimensional Drawing



外形尺寸图（单位mm 线长可定制）

参数测试方法请详询厂家

M3111型闪烁体探头 M3111 scintillator probe

本公司研发M3111闪烁体探头是由NaI闪烁体、光电倍增管组成。由于其具有能量分辨率好、光产额高、使用简单、可靠性高等特点，被广泛应用于工业探测、放射医疗、X射线荧光分析、油井检测等领域。

The M3111 scintillator probe developed by our company is composed of NaI scintillator, photomultiplier tube. Due to its outstanding energy resolution, high optical yield, simple use and high reliability, it is widely used in industrial detection, radiology, X-ray fluorescence analysis, oil well detection and other fields.

技术参数 Technical Specification

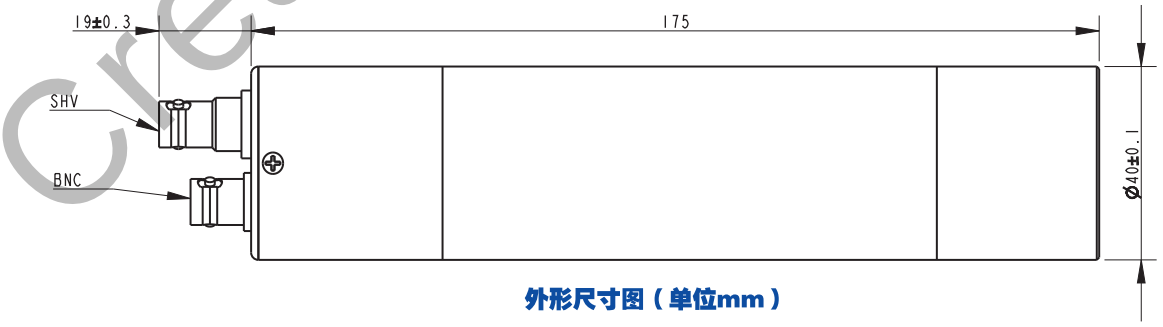
（测试环境温度25℃）

参数/Paramater		范围/Range	单位/Unit
适用电压/Application voltage		0~+1250	V
适配PMT型号/Applicable to the PMT		N2013	--
闪烁体有效尺寸/Effective size of scintillator		Φ25×25	mm
接口类型/Interface type		BNC、SHV	--
能量分辨率(^{137}Cs)[1]/Energy resolution		≤8.5	%
工作环境/Work environment	温度/Temperature	0~+40	℃
	湿度/Humidity	≤90%RH	--
存放环境/Storage environment	温度/Temperature	-20~+50	℃
	湿度/Humidity	≤93%RH	--

注：1）使用^{137}Cs放射源测试，探测器出厂调节的输出状态。

Note：1）The output state of the detector is adjusted by using ^{137}Cs radioactive source test.

外形尺寸图 Outline Dimensional Drawing



外形尺寸图（单位mm）

接线说明

接口类型/Interface type	SHV接口/SHV interface	BNC接口/BNC interface
接口定义/Interface definition	+12V供电 /+12V power supply	信号接口/Signal interface

参数测试方法请详询厂家

M3021型NaI闪烁体探测器 M3021 NaI scintillator detector

本公司研发的M3021型NaI闪烁体探测器是由NaI闪烁体、光电倍增管、高压模块、前置放大器等组成的高度集成化探测器。由于其具有能量分辨率好、光产额高、使用简单、可靠性高等特点，被广泛应用于工业探测、放射医疗、X射线荧光分析、油井检测等领域。

The M3021 NaI scintillator detector developed by our company is a highly integrated detector composed of NaI scintillator, photo-multiplier tube, high voltage module, preamplifier and so on. Because of its characteristics of good energy resolution, high light yield, simple use and high reliability, it is widely used in industrial detection, radiation medicine, X-ray fluorescence analysis, oil well detection and other fields .

技术参数 Technical Specification

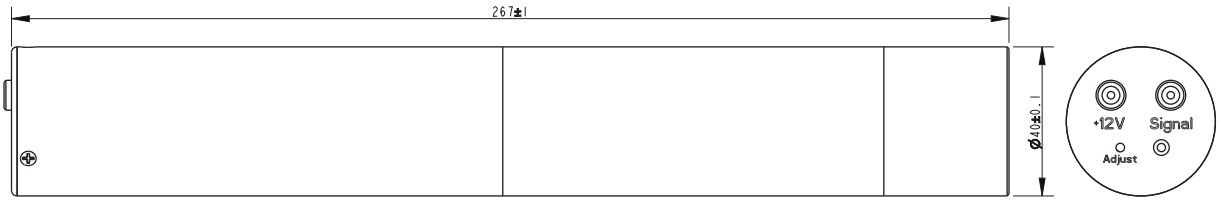
（测试环境温度25℃）

参数/Paramater		范围/Range	单位/Unit
输入电压/Input voltage		+11.5~+12.5	V
最大输入电流/Max.input current		50	mA
闪烁体有效尺寸/Effective size of scintillator		Φ25×25	mm
输出信号极性/Output signal polarity		负极性/Negative	--
输出信号幅度[1)]/Output signal amplitude		1	V
输出信号幅度（Max)/Output signal amplitude		6	V
能量分辨率(^{137}Cs)/Energy resolution		≤8.5	%
工作环境/Work environment	温度/Temperature	0~+40	℃
	湿度/Humidity	≤90%RH	--
存放环境/Storage environment	温度/ Temperature	-20~+50	℃
	湿度/Humidity	≤93%RH	--

注：1）使用^{137}Cs放射源测试，探测器出厂调节的输出状态。

Note: 1) The output state of the detector is adjusted by using ^{137}Cs radioactive source test.

外形尺寸图 Outline Dimensional Drawing



外形尺寸图（单位mm 线长可定制）

接线说明

接口类型/Interface type	LEMO电源接口 /LEMO power interface	LEMO信号接口 /LEMO signal interface
接口定义/Interface definition	+12V输入/+12V input	信号输入/Signal input
配线/wiring	LEMO接口电源线 /LEMO interface power cable	LEMO接口信号线 /LEMO interface signal cable

注：电位器调节口为调节内部高压用，顺时针调节高压增大，逆时针调节高压减小。

Note: The potentiometer adjustment interface is used to adjust the internal high voltage, adjust the high voltage clockwise to increase, and adjust the high voltage counterclockwise to decrease.

参数测试方法请详询厂家

M3112型闪烁体探头 M3112 scintillator probe

本公司研发M3112闪烁体探头是由NaI闪烁体、光电倍增管分压电路组成。由于其具有能量分辨率好、光产额高、使用简单、可靠性高等特点，被广泛应用于工业探测、放射医疗、X射线荧光分析、油井检测等领域。

The M3112 scintillator probe developed by our company is composed of NaI scintillator, photomultiplier tube. Due to its outstanding energy resolution, high optical yield, simple use and high reliability, it is widely used in industrial detection, radiology, X-ray fluorescence analysis, oil well detection and other fields.

技术参数 Technical Specification

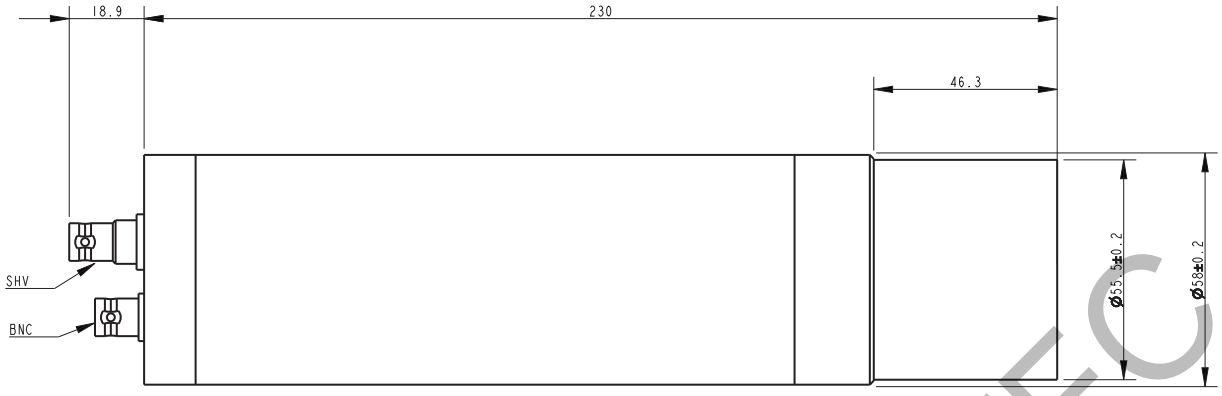
（测试环境温度25℃）

参数/Paramater		范围/Range	单位/Unit
适用电压/Application voltage		0~+1250	V
适配PMT型号/Applicable to the PMT		N4021	--
闪烁体有效尺寸/Effective size of scintillator		Φ50×50	mm
接口类型/Interface type		BNC、SHV	--
能量分辨率(^{137}Cs)[1]/Energy resolution		≤8.5	%
工作环境/Work environment	温度/Temperature	0~+40	℃
	湿度/Humidity	≤90%RH	--
存放环境/Storage environment	温度/Temperature	-20~+50	℃
	湿度/Humidity	≤93%RH	--

注：1）使用^{137}Cs放射源测试，探测器出厂调节的输出状态。

Note：1）The output state of the detector is adjusted by using ^{137}Cs radioactive source test.

外形尺寸图 Outline Dimensional Drawing



外形尺寸图（单位mm 线长可定制）

接线说明

接口类型/Interface type	SHV接口/SHV interface	BNC接口/BNC interface
接口定义/Interface definition	+12V供电 /+12V Power supply	信号接口/Signal interface

参数测试方法请详询厂家

M3022型NaI闪烁体探测器 M3022 NaI scintillator detector

本公司研发的M3022型NaI闪烁体探测器是由NaI闪烁体、光电倍增管、高压模块、前置放大器等组成的高度集成化探测器。由于其具有能量分辨率好、光产额高、使用简单、可靠性高等特点，被广泛应用于工业探测、放射医疗、X射线荧光分析、油井检测等领域。

The M3022 NaI scintillator detector developed by our company is a highly integrated detector composed of NaI scintillator, photomultiplier tube, high voltagemodule, preamplifier and so on. Because of its characteristics of good energyresolution, high light yield, simple use and high reliability, it is widely used inindustrial detection, radiation medicine, X-ray fluorescence analysis, oil well detectionand other fields .

技术参数 Technical Specification

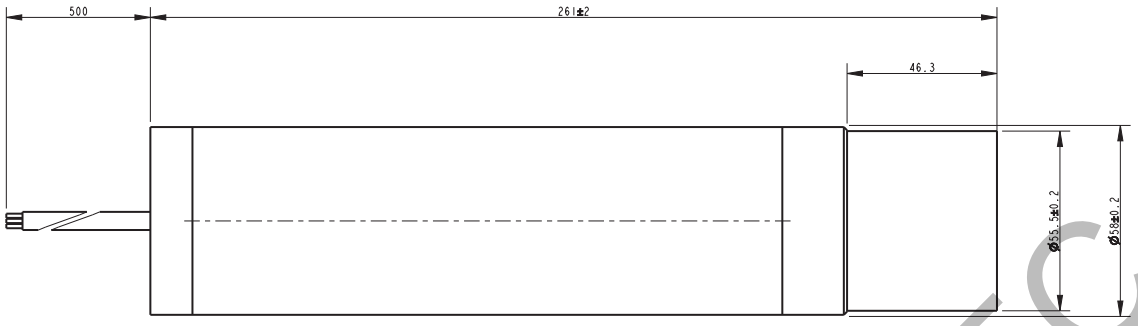
（测试环境温度25℃）

参数/Parameter		范围/Range	单位/Unit
输入电压/Input voltage		+11.5~+12.5	V
最大输入电流/Max.input current		50	mA
闪烁体有效尺寸/Effective size of scintillator		Φ50×50	mm
输出信号极性/Output signal polarity		负极性/Negative	--
输出信号幅度[1]/Output signal amplitude		1	V
最大输出信号幅度/Max output signal amplitude		6	V
能量分辨率(^{137}Cs)/Energy resolution		≤8.5	%
工作环境/Work environment	温度/Temperature	0~+40	℃
	湿度/Humidity	≤90%RH	--
存放环境/Storage environment	温度/Temperature	-20~+50	℃
	湿度/Humidity	≤93%RH	--

注：1）使用^{137}Cs放射源测试，探测器出厂调节的输出状态。

Note: 1) The output state of the detector is adjusted by using ^{137}Cs radioactive source test.

外形尺寸图 Outline Dimensional Drawing



外形尺寸图（单位mm 线长可定制）

接线说明

线缆颜色 /Cable color	红线/Red cable	黑线/Black cable	绿线/Green cable	黄线/Yellow cable	屏蔽层/Shielding
接线定义 /Wiring definition	+12V输入 /+12V input	电源地 /Power ground	信号地 /Signal ground	信号输出 /Signal output	接地/Grounding

注：电位器调节口为调节内部高压用，顺时针调节高压增大，逆时针调节高压减小。

Note: The potentiometer adjustment interface is used to adjust the internal high voltage, adjust the high voltage clockwise to increase, and adjust the high voltage counterclockwise to decrease.

参数测试方法请详询厂家

M3113型闪烁体探头 M3113 scintillator probe

本公司研发M3113闪烁体探头是由NaI闪烁体、光电倍增管组成。由于其具有能量分辨率好、光产额高、使用简单、可靠性高等特点，被广泛应用于工业探测、放射医疗、X射线荧光分析、油井检测等领域。

The M3113 scintillator probe developed by our company is composed of NaI scintillator, photomultiplier tube. Due to its outstanding energy resolution, high optical yield, simple use and high reliability, it is widely used in industrial detection, radiology, X-ray fluorescence analysis, oil well detection and other fields.

技术参数 Technical Specification

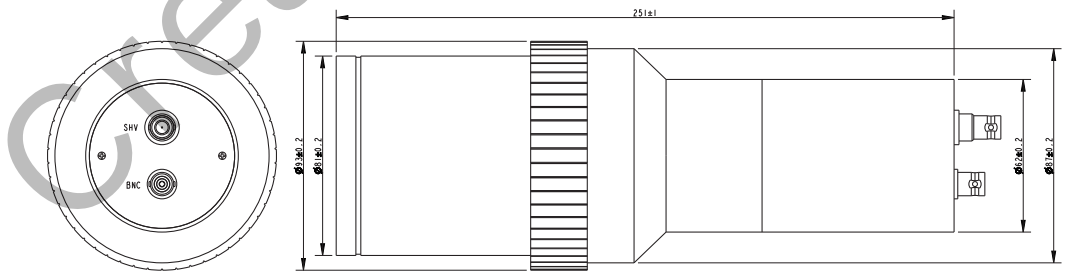
（测试环境温度25℃）

参数/Paramater		范围/Range	单位/Unit
适用电压/Application voltage		0~+1250	V
适配PMT型号/Applicable to the PMT		N2032	--
闪烁体有效尺寸/Effective size of scintillator		Φ75×75	mm
接口类型/Interface type		BNC、SHV	--
能量分辨率(^{137}Cs)[1]/Energy resolution		≤8.5	%
工作环境/Work environment	温度/Temperature	0~+40	℃
	湿度/Humidity	≤90%RH	--
存放环境/Storage environment	温度/Temperature	-20~+50	℃
	湿度/Humidity	≤93%RH	--

注：1）使用^{137}Cs放射源测试，探测器出厂调节的输出状态。

Note：1）The output state of the detector is adjusted by using ^{137}Cs radioactive source test.

外形尺寸图 Outline Dimensional Drawing



外形尺寸图（单位mm 线长可定制）

接线说明

接口类型/Interface type	SHV接口/SHV interface	BNC接口/BNC interface
接口定义/Interface definition	+12V供电 /+12V power supply	信号接口/Signal interface

参数测试方法请详询厂家

M3023型NaI闪烁体探测器 M3023 NaI scintillator detector

本公司研发的M3023型NaI闪烁体探测器是由NaI闪烁体、光电倍增管、高压模块、前置放大器等组成的高度集成化探测器。由于其具有能量分辨率好、光产额高、使用简单、可靠性高等特点，被广泛应用于工业探测、放射医疗、X射线荧光分析、油井检测等领域。

The M3023 NaI scintillator detector developed by our company is a highly integrated detector composed of NaI scintillator, photomultiplier tube, high voltage module, preamplifier and so on. Because of its characteristics of good energy resolution, high light yield, simple use and high reliability, it is widely used in industrial detection, radiation medicine, X-ray fluorescence analysis, oil well detection and other fields .

技术参数 Technical Specification

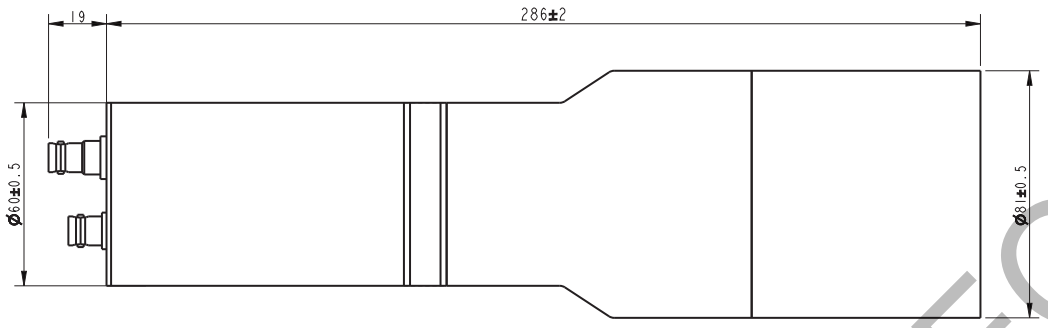
（测试环境温度25℃）

参数/Paramater		范围/Range	单位/Unit
输入电压/Input voltage		+11.5~+12.5	V
最大输入电流/Max.Input current		50	mA
闪烁体有效尺寸/Effective size of scintillator		Φ75×75	mm
输出信号极性/Output signal polarity		负极性/Negative	--
输出信号幅度[1]/Output signal amplitude		1	V
最大输出信号幅度/Max output signal amplitude		6	V
能量分辨率(^{137}Cs)/Energy resolution		≤8.5	%
工作环境/Work environment	温度/Temperature	0~+40	℃
	湿度/Humidity	≤90%RH	--
存放环境/Storage environment	温度/Temperature	-20~+50	℃
	湿度/Humidity	≤93%RH	--

注：1）使用^{137}Cs放射源测试，探测器出厂调节的输出状态。

Note：1）The output state of the detector is adjusted by using ^{137}Cs radioactive source test.

外形尺寸图 Outline Dimensional Drawing



外形尺寸图（单位mm 线长可定制）

接线说明

接口类型/Interface type	7芯接口/7-pin Interface	BNC接口/BNC interface
接口定义 /Interface definition	+12V输入/+12V input	信号输入/Signal input
配线/Wiring	7芯接头电源线/7-pin connector power cable	BNC接头信号线/BNC connector signal cable

注：电位器调节口为调节内部高压用，顺时针调节高压增大，逆时针调节高压减小。

Note: The potentiometer adjustment interface is used to adjust the internal high voltage, adjust the high voltage clockwise to increase, and adjust the high voltage counterclockwise to decrease.

参数测试方法请详询厂家

M4011型计数单元 M4011 counting unit

M4011计数单元包括计数控制电路和上位机采集软件。计数单元可直接与光子计数探测器或闪烁探测器组合作为计数器使用。计数软件具有简单、易操作的用户界面。

The M4011 counting unit includes counting control circuit and upper computer acquisition software. The counting unit can be used directly in combination with a photon counting detector or scintillation detector as a counter. The counting software has a simple and easy user interface.

技术参数 Technical Specification

（测试环境温度25℃）

参数/Paramater			描述/值/Description/value
输入		输入通道	1通道
		输入信号电平	正向3.3VTTL（兼容5VTTL电平）
		信号脉冲宽度	≥10ns
		输入阻抗	50Ω
计数		计数模式	门控
		最大计数率	$5\times10^{7}s^{-1}$
		最大计数值	2^{32}
门控		门控时间范围	10~655350ms
脉冲分辨时间[1)]			0~255ns
输入电压			+11.5~+12.5V
接口			RS232
系统			WindowsXP/7/10
工作环境	温度	0~+40	℃
	湿度	≤90%RH	--
存放环镜	温度	-20~+50	℃
	湿度	≤93%RH	--

1）脉冲对分辨时间需要根据匹配的探测器性能指标进行设置。

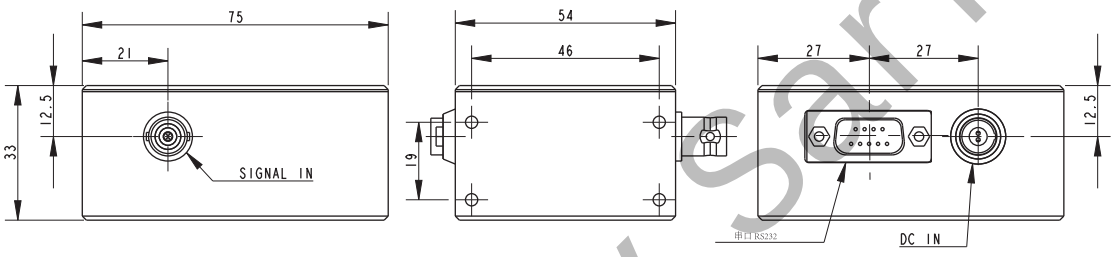
1）The pulse pair resolution time needs to be tested against the matched detector performance.

功能介绍 Function Introduction

- 对正逻辑TTL电平脉冲计数，通过RS-232接口输入到计算机；
- 门控时间可调；
- 内嵌线性校正程序（与光子计数探测器匹配使用）；
- 串口波特率：19200（1位起始位，8位数据位，1位停止位，无校验位）。

- Count the positive logic TTL level pulses and input them to the computer through RS-232 interface;
- Gating time is adjustable;
- Built-in linear correction program (for use with photon counting detectors);
- Serial port baud rate: 19200 (1 bit start bit, 8 bit data bit, 1 bit stop bit, no check bit).

外形尺寸图 Outline Dimensional Drawing



外形尺寸图（单位mm 线长可定制）

接线说明

接口类型/Interface type	2 芯接口/2-pin interface	BNC 接口/BNC interface	DB9 母头/DB9 Female
接口定义/Interface definition	+12V 输入/+12V input	信号输入/Signal input	信号输出/Signal output
配线/wiring	2 芯接头电源线/2-pin connector power cable		

注：电位器调节口为调节内部高压用，顺时针调节高压增大，逆时针调节高压减小。

Note: The potentiometer adjustment interface is used to adjust the internal high voltage, adjust the high voltage clockwise to increase, and adjust the high voltage counterclockwise to decrease.

参数测试方法请详询厂家

D317-11型侧窗高压管座 D317-11 high voltage tube socket for side window

D317-11侧窗高压管座，采用+15V电压输入，50kΩ电位器或0-5V电压控制，使用简单方便。主要特点为内置分压器采用有源分压设计，可使光电倍增管拥有很高的直流输出线性。本产品适用于侧窗型光电倍增管，具有直流输出线性高、响应速度快、纹波噪声低等优点。

The high voltage tube socket uses ±15V voltage input, 50kΩ potentiometer or 0-5V voltage control, easy to use and convenient. The main feature is that the built-in voltage divider adopts active voltage divider design, which can make the photomultiplier tube have high DC output linearity. This product is suitable for side-on photomultiplier tube, which has the advantages of high linear DC output, wide output voltage range, fast response speed, low ripple noise and so on.

技术参数 Technical Specification

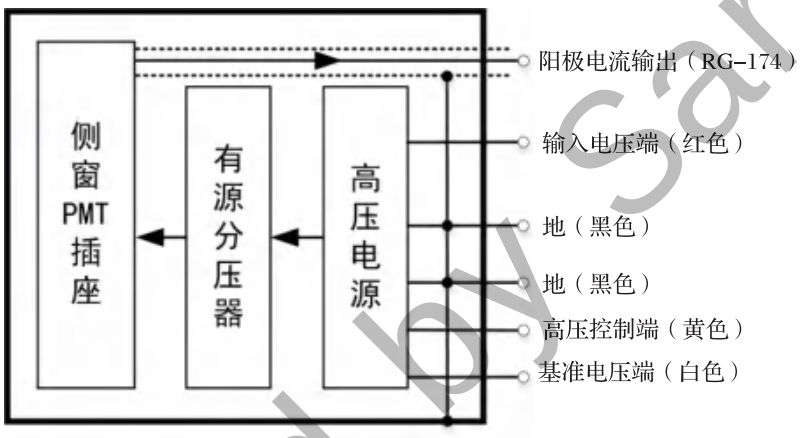
参数/Paramater	描述/值/Description/value	单位/Unit
适用PMT型号/Suitable photomultiplier tube	侧窗型/side-on PMT	-
输入电压/Input voltage	+15±1	V
输入电流/Input current[1)]	80(Max)	mA
输出电压/Output voltage	0~-1250	V
电压控制方式/Voltage control mode	0~+5V或50KΩ电位器 /potentiometers	-
基准电压/Reference voltage	5.33	V
PMT输出线性电流值[1)]（-1000V） /The PMT outputs a linear current value[1)]（-1000V）	180(Typ)	μA
输入调整率/Input regulation	0.01(Typ)	%
通断瞬态响应上升时间[2)] /On-off transient response rise time [2)]	80(Typ)	ms
温度系数/Temperature coefficient	0.03(Typ)	%/℃
阳极输出纹波（峰-峰值）[3)] /Anodic output ripple (peak-to-peak)[3)]	2	mV
工作温度/Operating temperature	0~+40	℃
工作湿度/Operating humidity	≤70%	-

1）线性电流变化小于2%。
2）高压变化0~99%。
3）测试带宽20MHz，负载电阻1MΩ。

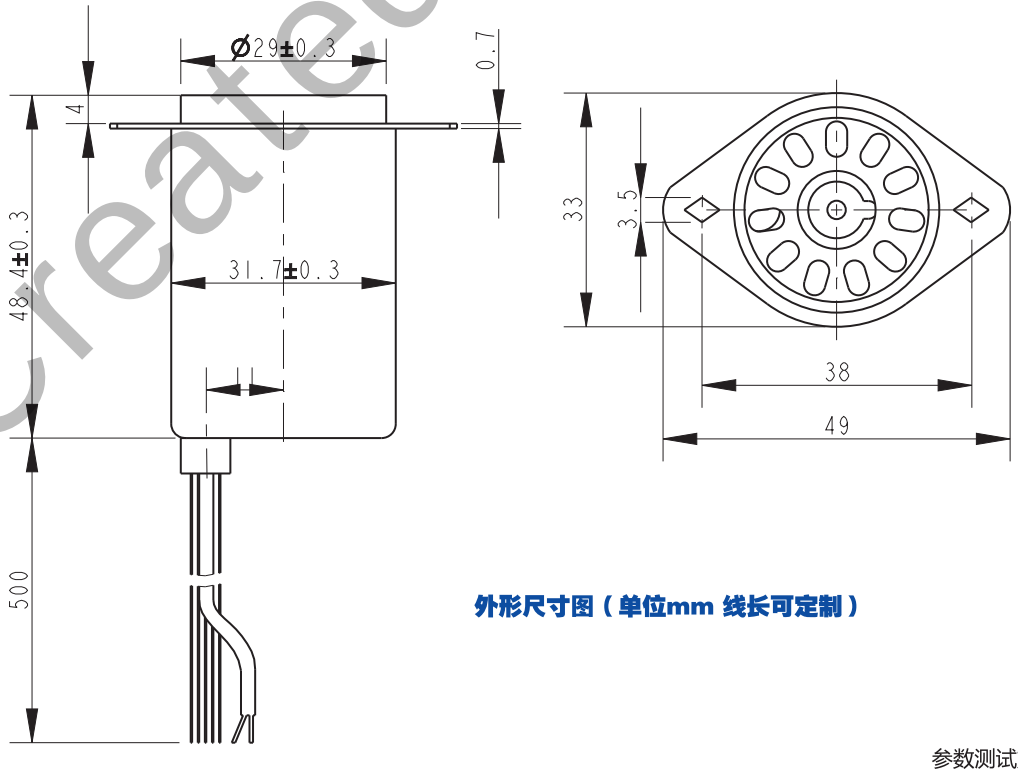
1) Linear current variation is less than 2%.
2) high voltage change 0~99%.
3) test bandwidth 20MHz, load resistance 1MΩ.

尺寸与接线 Dimensions and Wiring

线缆Cable	电压控制Voltage control	电阻控制Resistance control
红线/Red line	+15V输入-15V Input	+15V输入/+15V input
黄线/Yellow line	0~5V控制电压/0~5Vcontrol voltage	电位器中心抽头/Potentiometer center tap
白线/White line	悬空/Vacant	电位器一端/Potentiometer end
黑线/Black line	地/Ground	地/Ground
黑线/Black line	地/Ground	地/Ground
屏蔽线/Shielded wire	信号输出/Signal output	



接线示意图



外形尺寸图（单位mm 线长可定制）

参数测试方法请详询厂家

D701A-14型高压管座 D701A-14 high voltage tube socket

本公司研发的D701A-14高压管座，采用±15V电压输入，50kΩ电位器或0-6V电压控制，使用简单方便。主要特点为内置分压器采用有源分压设计，可使光电倍增管拥有很高的直流输出线性。本产品适用于N2013型光电倍增管，具有直流输出线性高、输出电压范围宽、响应速度快、纹波噪声低等优点。

The D701A-14 high voltage tube socketr developed by the company uses ±15V voltage input, 50kΩ potentiometer or 0-6V voltage control, easy to use and convenient. The main feature is that the built-in voltage divider adopts active voltage divider design, which can make the photomultiplier tube have high DC output linearity. This product is suitable for N2013 photomultiplier tube, which has the advantages of high linear DC output, wide output voltage range, fast response speed, low ripple noise and so on.

技术参数 Technical Specification

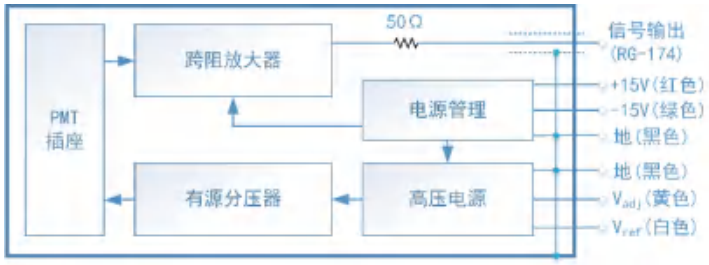
（测试环境温度25℃）

参数/Paramater			描述/值Description/value	单位/Unit
适用光电倍增管/Suitable photomultiplier tube			Φ28mm 端窗类型	——
输入电压/Input voltage			±15	V
输入电流1）/Input current1）		最大值/max.	VCC：85，VEE：20	mA
放大器/Amplifier	-3dB带宽/-3dBbandwidth	典型值/typ.	8	MHz
	增益/Gain	典型值/typ.	0.3（负载阻抗1 MΩ）	V/μA
	输出信号偏置/Output signal bias	典型值/typ.	10	mV
	输出信号噪声/纹波/Output signal noise/ripple	最大值/max.	10	mV
	输出脉冲极性/Output pulse polarity		正极性	——
高压电源/High-voltage power supply	输出电压范围/Output voltage range		0~-1500	V
	输出参考电压/Oouput voltage referenced		5.33	V
	输出关系/Output relation		Vo=-250×Vadj	——

1）不带光电倍增管。

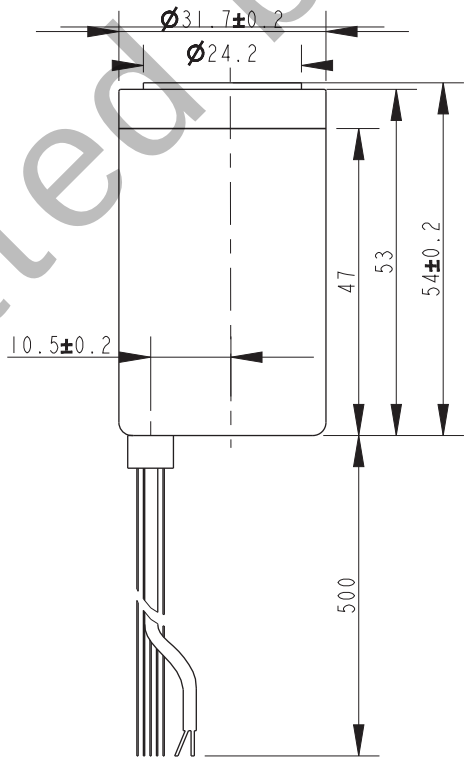
1）Without PMT.

尺寸与接线 Size and Wiring



高压管座框图

线缆cable	电压控制voltage control	电阻控制Resistance control
红线/Red line	+15V输入/+15V input	+15V输入
绿线/Green line	-15V输入/-15V input	-15V输入
黄线/Yellow line	0~6V控制电压/ 0~6Vcontrol voltage	电位器中心抽头/Potentiometer center tap
白线/White line	悬空/Vacant	电位器一端/Potentiometer end
黑线/Black line	地/Ground	地/Ground
黑线/Black line	地/Ground	地/Ground
屏蔽线/Shielded wire	信号输出/Signal output	



外形尺寸图（单位mm 线长可定制）

参数测试方法请详询厂家

D454型高压电源 D454 High voltage power supply

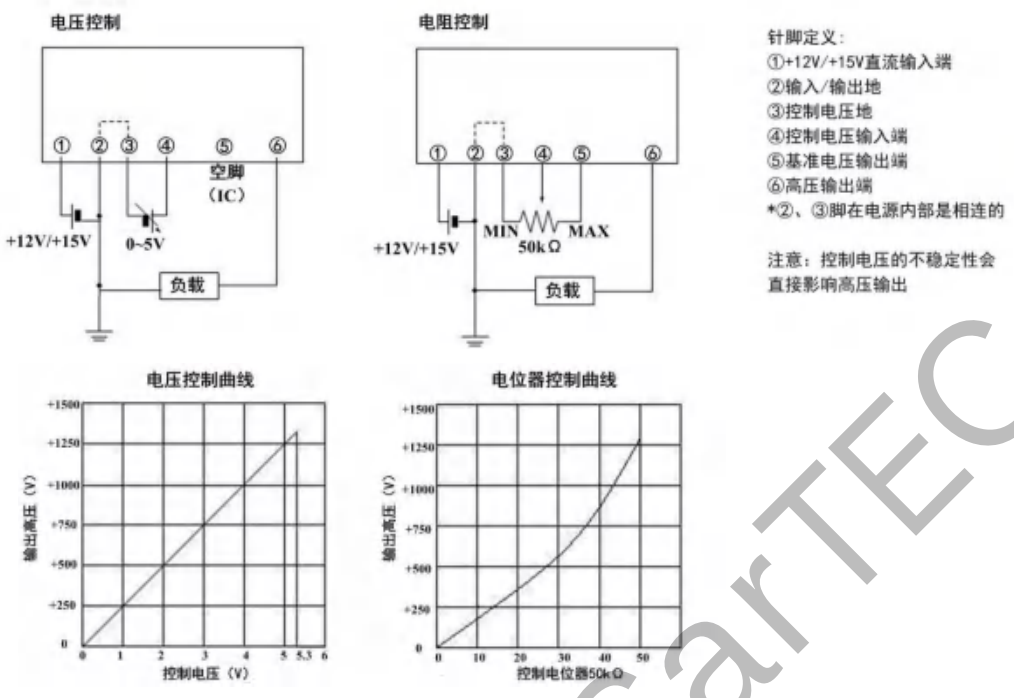
D454高压电源是一种专门为光电倍增管设计的、小型紧凑的高压模块，性能稳定，自我保护功能强大。

D454 high voltage power supply is a small and compact high voltage module specially designed for photomultiplier tubes, with stable performance and strong self-protection function.

技术参数 Technical Specification

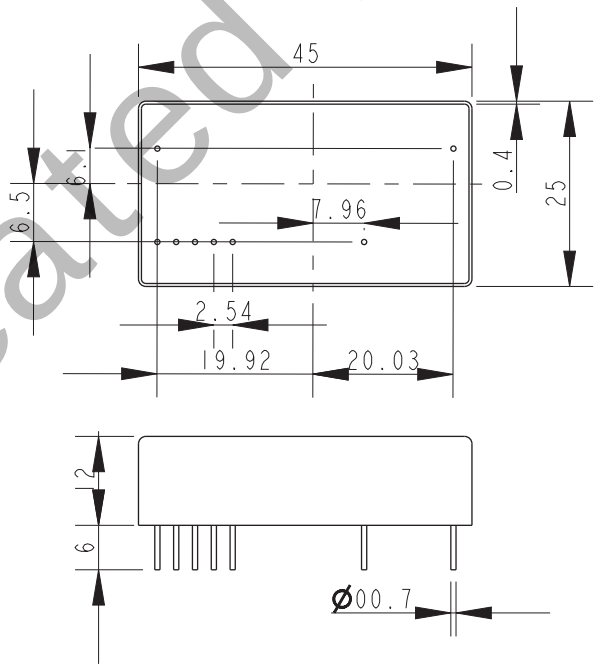
型号/Model	D454-01	D454-02	单位单位/Unit
输入电压范围/Input voltage range	+11.5~+12.5	+11.5~12.5	V_{DC}
输入电流[1]/Input current[1] 空载no-load	16	16	mA(Typ)
输出电压范围/Output voltage range	0~-1250	0~+1250	V_{DC}
保证输出电压范围/Ensure output voltage range	-200~-1250	200~+1250	V_{DC}
输出电流[2]/Current output[2]	0.5		mA(Max)
输入调整率[2]/Input regulation[2]	0.01		%(Max)
负载调整率[1]/Load regulation[1]	0.01		%(Typ)
纹波（峰-峰）[1]/Ripple (peak-to-peak)[1]	30		mV(Typ)
输出稳定性（8小时）/Output stability (8 hours)	0.01		%(Typ)
输出电压控制方式/Output voltage control mode	外加控制电压（0~+5V），外加控制电阻（50kΩ±2.5kΩ)Applied control voltage（0~+5V），Applied control resistor（50kΩ±2.5kΩ）		--
控制端输入阻抗/Control terminal input impedance	80		kΩ
参考电压/Reference voltage	+5.15(外加50kΩ电位器时）(When a 50kΩ potentiometer is applied）		V（Typ）
输出电压计算/Output voltage calculation	（控制电压×250）（control voltage×250）±0.5%		V(Typ)
通断瞬态响应上升时间[2] /On-off transient response rise time[2]	250		ms(Max)
温度系数[2]/Temperature coefficient[2]	0.01		%/℃（Typ）
工作温度[2]/Operating temperature[2]	0~+40		℃
工作湿度[2] /operating humidity[2]	≤85%		--
贮藏温度/Storage temperature	-20~+70		℃
尺寸大小/Size dimension	45.6×25×12.3		mm
重量/Weight	33±1		g
保护功能/Protect function	当输入电压或控制电压反向、过载、输出短路时产生保护Protection is generated when the input voltage or control voltage is reversed, overloaded, and the output is short-circuited		--

1)在最大输出电压处。
2)在最大输出电压和最大输出电流处。
测试条件：负载电阻大于2.5MΩ，应避免在强磁场、酸碱环境下使用。
1)At the maximum output voltage.
2)At the maximum output voltage and the maximum output current.
Test conditions: Load resistance is greater than 2.5MΩ, it should be avoided to use in strong magnetic field and acid-base environment.



注：以上控制曲线均以正高压为例（ 负高压曲线与正高压曲线相同）
Note: The above control curves are taken as examples of positive high pressure
(the negative high pressure curve is the same as the positive high pressure curve)

输出电压控制图
Output voltage control chart



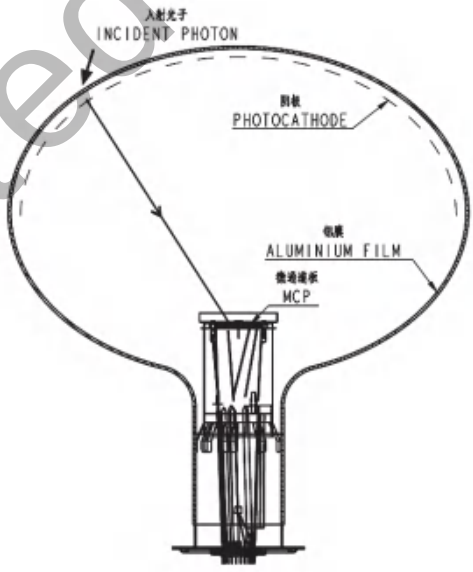
外形尺寸图（单位mm ）
outline dimensional drawing（unit mm ）

参数测试方法请详询厂家

微通道板型光电倍增管 MCP-PMT

MCP-PMT主要由光电阴极、微通道板型倍增系统和阳极组成，其中倍增系统可包含单片或多片微通道板。当微弱光信号照射光电阴极后，激发出光电子，在近贴聚焦电场或静电聚焦电场的作用下，输运到微通道板进行电子倍增，最后经放大的电子信号被阳极接收，经过信号线输出，从而实现对单光子量级微弱光信号的探测。

MCP-PMT mainly consists of a photocathode, a microchannel plate multiplication system and an anode. The multiplication system contains a single or multiple microchannel plates. When the weak light signal passes through the photocathode, it will excite the photoelectrons, which will be transported to MCP for multiplication under the proximity-focus electric field or the electrostatic focusing electric field. Finally, the amplified electronic signal will be received by the anode and output through the signal line, so as to realize the detection of single photon and other weak signals.



微通道板型光电倍增管

Large area of MCP-PMT

大尺寸微通道板型光电倍增管 Large Area MCP-PMT

大面积微通道板型光电倍增管是一种将极微弱光信号转换成电信号的真空电子器件，具有探测面积大、探测效率高等优点的自主知识产权的静电聚焦型光电倍增管。本产品使用Sb-K-Cs阴极作为光电转换阴极，该阴极对350-450nm 波段光子的转换效率高；应用微通道板作为电子倍增管系统，两片微通道板叠加使用可以实现10^7 以上的电子增益。微通道板的倍增距离短，因而具有优越的时间响应。

产品性能可以按客户需求订做，目前主要产品有8英寸和20英寸微通道板型光电倍增管。

The large-area MCP-PMT is a vacuum electronic device that converts extremely weak light signals into electrical signals. It is a large-area, high-detection efficiency electrostatic focusing pho- tomultiplier tube with independent intellectual property rights. This product uses Sb-K-Cs cathode as a photoelectric conversion cathode, which has high quantum efficiency for photons in the 350-450nm wavelength; using a microchannel plate as an electron multiplier tube system, the superposition of two microchannel plates can achieve an electron gain of more than 10^7 . The multiplication distance of the microchannel plate is short, so it has superior time response.

Product performance can be customized according to customer needs. At present, the main products are 8-inch and 20-inch MCP-PMT.

应用领域 Application

高能物理	High Energy Physics

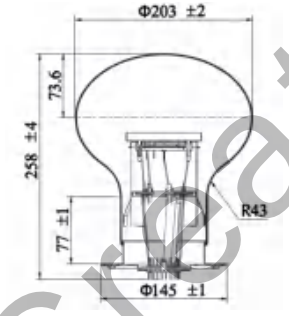
产品特点 Features

增益高	High Gain
噪声低	Low Noise
响应快	Fast Response
单光子峰谷比好	Good Single Photon Peak-To-Valley Ratio

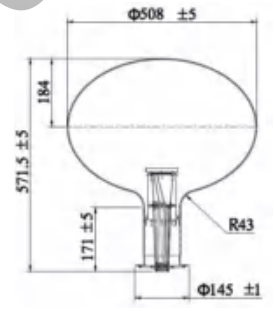
技术参数 Technical Specification

玻璃材料/Window material	硼硅/Borosilicate glass
光电阴极/Photocathode material	Sb-K-Cs
倍增结构/Multiplier structure	微通道板型/MCP
工作环境温度/Operating ambient temperature	-30℃~+50℃
储藏温度/Storage temperature	-50℃~+50℃

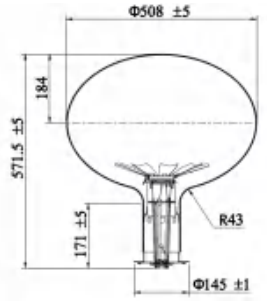
		8英寸/8-inch			20英寸/20-inch						
		N6082(GDB-6082)			N6201(GDB-6201)			N6203(GDB-6203)			
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Unit
阴极参数Cathode parameters	光谱范围/Spectral range	290-650									nm
	峰值波长/QE Peak wavelength		380			380			380		nm
	阴极积分灵敏度/photocathode integral luminious		90			90			90		A/lm
	量子效率@410nm/QE		30			30			30		%
阳极参数 Anode parameters	工作电压/Supply voltage	1500	1750	2000	1500	1750	2000	1650	1900	2100	V
	增益/Gain		1×10^7			1×10^7			1×10^7		
	阳极灵敏度/Anode sensitivity		900			900			900		A/lm
	暗计数率/Dark count rate		10	25		30	100		20	60	kHz
	单光电子谱峰谷比/Peak to valley ratio	3	7		3	7		2.5	4		
	能量分辨率/Charge resolution		35	50		35	60		40	60	%
时间参数 Time response	上升时间/Rise time		4			1.4			1.4		ns
	渡越时间离散/TTS		1.6			15			5		ns
	后脉冲比例/After pulse ratio		1			1			1		%



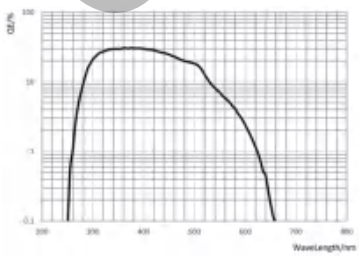
N6082(GDB-6082)



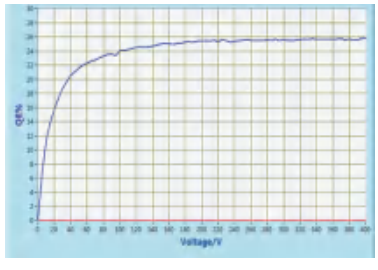
N6201 (GDB-6201)



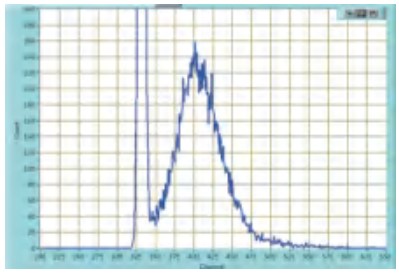
N6203(GDB-6203)



光谱响应曲线
Typical spectral response curve



坪曲线
Plateau characteristics



单光子谱曲线
Typical single photoelectron spectrum

N6011微通道板型光电倍增管 N6011 MCP-PMT

应用领域 Application

紫外通信 Ultraviolet Communication

空间探测 Space Exploration

产品特点 Features

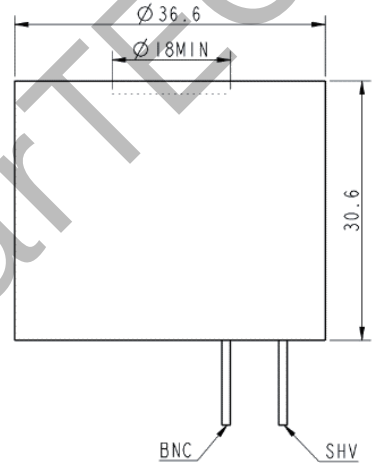
响应快 Fast Response

灵敏度高 High Sensitivity

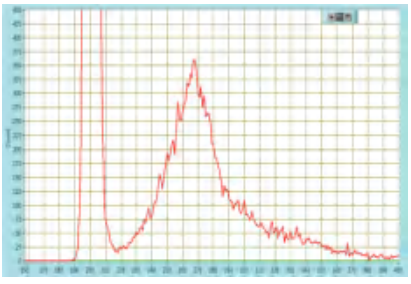
脉冲电流大 Large Pulsed Peak Current

技术参数 Technical Specification

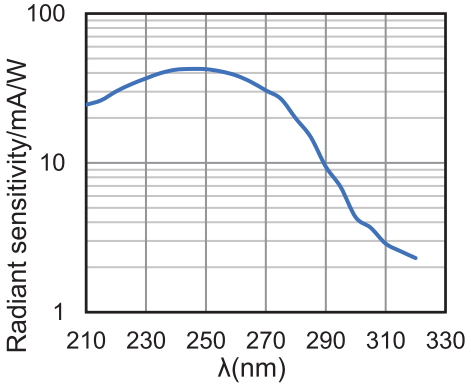
玻璃材料/Window material		MgF_2 glass			
光电阴极/Photocathode material		CsTe			
倍增结构/Multiplier structure		2片微通道板型/2 MCP			
N6011		Min.	Typ.	Max.	Unit.
阴极参数 Cathode parameters	光谱范围/Spectral respone		115-320		nm
	量子效率峰值波长/Quantum efficiency peak wavelength		250		nm
	量子效率@250nm/QE		15		%
	辐射灵敏度/Radiant sensitivity@250nm		30		mA/W
阳极参数 Anode parameters	工作电压/Supply voltage		1800	2500	V
	增益/Gain		1×10^6		
	暗计数/Dark count rate@0.2pe		500	2000	Hz
	能量分辨率/Charge resolution		35		%
	单光电子谱峰谷比/Peak to valley ratio		3		
	脉冲线性电流/Pulsed peak current		150		mA
时间参数 Time response	上升时间/Rise time		1.2		ns
	脉冲宽度/Pulse width		2		ns
	下降时间/Fall time		1.6		ns
	渡越时间弥散/TTS@σ (SPE)		50		ps
	渡越时间弥散/TTS@σ (MPE)		20		ps
工作环境温度/Operating ambient temperature		-30~+50			℃
储藏温度/Storage temperature		-50~+50			℃



N6011 光电倍增管外型结构
N6011 PMT dimentional outline



典型单光电子谱
Typical single photoelectron spectrum



典型光谱响应曲线
Typical spectral response characteristics

N6012微通道板型光电倍增管 N6012 MCP-PMT

应用领域 Application

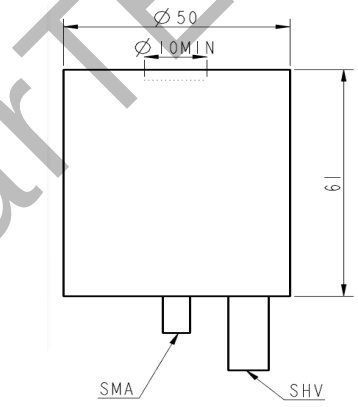
分子科学	Molecular Science
医学科学	Medical Science
生物化学	Biochemistry
材料工程	Material Engineering

产品特点 Features

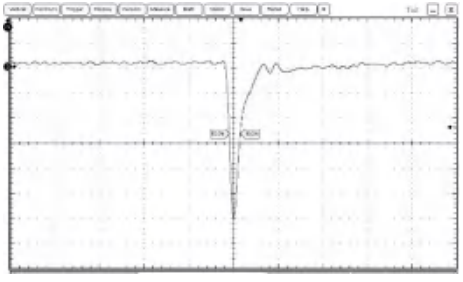
响应快	Fast Response
增益高	High Gain
噪声低	Low Noise

技术参数 Technical Specification

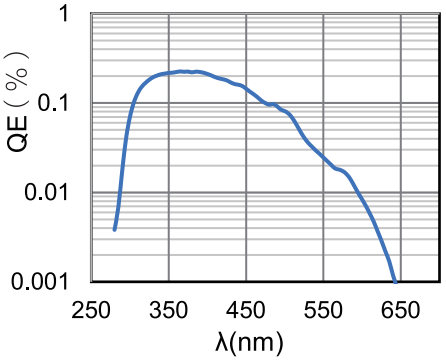
玻璃材料/Window material		AVG glass			
光电阴极/Photocathode material		双碱/Bialkali			
倍增结构/Multiplier structure		2片微通道板型/2 MCP			
N6012		Min.	Typ.	Max.	Unit.
阴极参数 Cathode parameters	光谱范围/Spectral response		290-650		nm
	量子效率峰值波长/ Quantum efficiency peak wavelength		380		nm
	积分灵敏度/Luminous sensitivity		70		μA/lm
	量子效率@410nm/QE @410nm		22		%
	辐射灵敏度/Radiant sensitivity@410nm		72		mA/W
阳极参数 Anode parameters	工作电压/Supply voltage		2500	3400	V
	增益/Gain		1×10^6		
	暗计数/Dark count rate@0.2pe		1000	5000	Hz
	能量分辨率/Charge resolution		45		%
	单光电子谱峰谷比/Peak to valley ratio		2		
时间参数Time response	上升时间/Rise time		180		ps
	脉冲宽度/Pulse width		400		ps
	下降时间/Fall time		750		ps
	渡越时间弥散/TTS@σ(SPE)		40		ps
	渡越时间弥散/TTS@σ (MPE)		15		ps
工作环境温度/Operating ambient temperature		-30~+50			℃
储藏温度/Storage temperature		-50~+50			℃



N6012 光电倍增管外型结构
N6012 PMT dimentional outline



典型脉冲信号
Typical single photoelectron spectrum



典型光谱响应曲线
Typical spectral response chara

N6014微通道板型光电倍增管 N6014 MCP-PMT

应用领域 Application

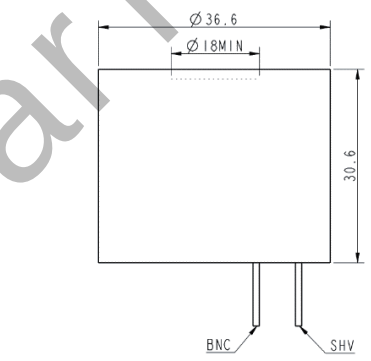
分子科学	Molecular Science
医学科学	Medical Science
生物化学	Biochemistry
材料工程	Material Engineering

产品特点 Features

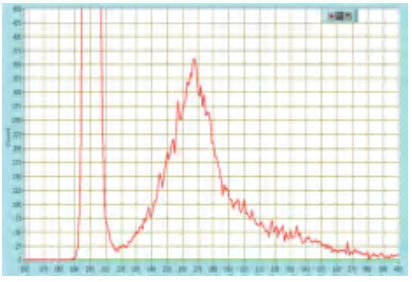
响应快	High Speed
增益高	High Gain
噪声低	Low Noise

技术参数 Technical Specification

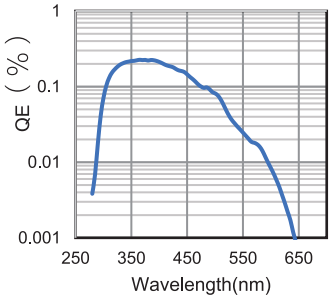
玻璃材料/Window material		AVG glass			
光电阴极/Photocathode material		双碱/Bialkali			
倍增结构/Multiplier structure		2片微通道板型/2 MCP			
N6014		Min.	Typ.	Max.	Unit.
阴极参数 Cathode parameters	光谱范围/Spectral response		290-650		nm
	量子效率峰值波长/Quantum efficiency peak wavelength		380		nm
	积分灵敏度/Luminous sensitivity		70		μA/lm
	量子效率@410nm/QE @410nm		22		%
	辐射灵敏度/Radiant sensitivity@410nm		72		mA/W
阳极参数 Anode parameters	工作电压/Supply voltage		1800	2500	V
	增益/Gain		1×10^6		
	暗计数/Dark count rate@0.2pe		1000	5000	Hz
	能量分辨率/Charge resolution		30		%
	单光电子谱峰谷比/Peak to valley ratio		10		
时间参数Time response	上升时间/Rise time		1.2		ns
	脉冲宽度/Pulse width		2		ns
	下降时间/Fall time		1.6		ns
	渡越时间弥散/TTS@σ(SPE)		50		ps
	渡越时间弥散/TTS@σ (MPE)		20		ps
工作环境温度/Operating ambient temperature		-30~+50			℃
储藏温度/Storage temperature		-50~+50			℃



N6014 光电倍增管外型结构
N6014 PMT dimentional outline



典型单光电子谱
Typical single photoelectron spectrum



典型光谱响应曲线
Typical spectral response chara

N6015微通道板型光电倍增管 N6015 MCP-PMT

应用领域 Application

医学影像/Specialized Medical Imaging

Cherenkov – RICH, TOF, TOP, DIRC

高能物理/High Energy Physics

国土安全/Security

产品特点 Features

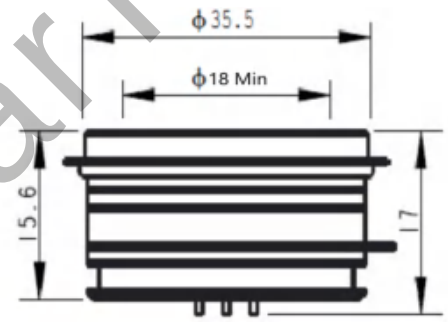
响应快 High Speed

增益高 High Gain

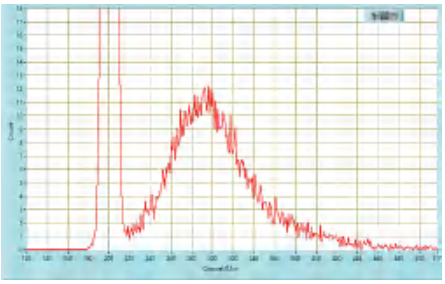
噪声低 Low Noise

技术参数 Technical Specification

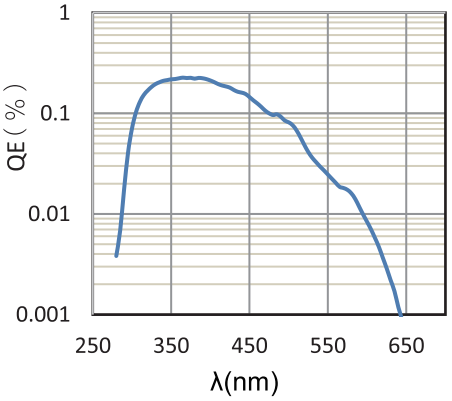
玻璃材料/Window material		AVG glass			
光电阴极/Photocathode material		双碱/Bialkali			
倍增结构/Multiplier structure		2片微通道板型/2 MCP			
阳极结构/Anode structure		2×2			
N6015		Min.	Typ.	Max.	Unit.
阴极参数 Cathode parameters	光谱范围/Spectral response		290-650		nm
	量子效率峰值波长/Quantum efficiency peak wavelength		380		nm
	积分灵敏度/Luminous sensitivity		70		μA/lm
	量子效率@410nm/QE @410nm		22		%
	辐射灵敏度/Radiant sensitivity@410nm		72		mA/W
阳极参数 Anode parameters	工作电压/Supply voltage		1700	2500	V
	增益/Gain		1×10^6		
	暗计数/Dark count rate@0.2pe(单阳极)		1000	5000	Hz
	能量分辨率/Charge resolution		35		%
	单光电子谱峰谷比/Peak to valley ratio		3		
时间参数Time response	上升时间/Rise time		250		ps
	脉冲宽度/Pulse width		650		ps
	下降时间/Fall time		650		ps
	渡越时间弥散/TTS@σ (SPE)		50		ps
	渡越时间弥散/TTS@σ (MPE)		10		ps
工作环境温度/Operating ambient temperature		-30~+50			℃
储藏温度/Storage temperature		-50~+50			℃



N6015型光电倍增管结构图
MCP-PMT dimensional outline



典型单光电子谱
Typical single photoelectron spectrum



典型光谱响应曲线
Typical spectral response chara

N6021微通道板型光电倍增管 N6021 MCP-PMT

应用领域 Application

医学影像/Specialized Medical Imaging

Cherenkov – RICH, TOF, TOP, DIRC

高能物理/High Energy Physics

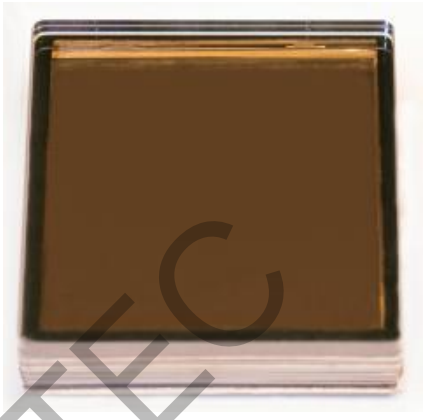
国土安全/Security

产品特点 Features

响应快 High Speed

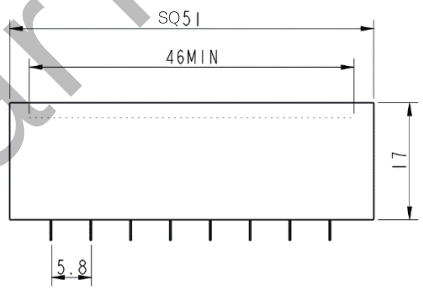
增益高 High Gain

噪声低 Low Noise

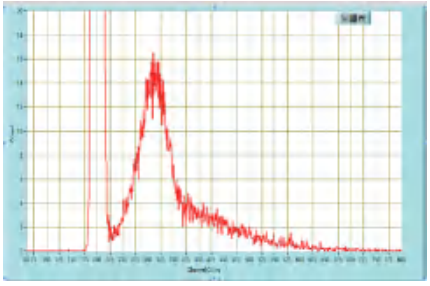


技术参数 Technical Specification

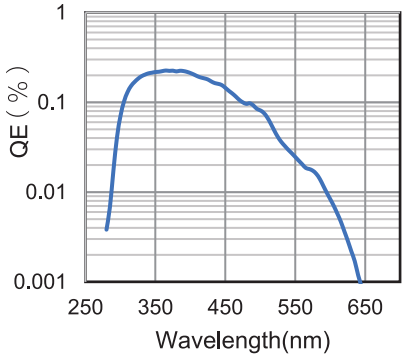
玻璃材料/Window material		AVG glass			
光电阴极/Photocathode material		双碱/Bialkali			
倍增结构/Multiplier structure		2片微通道板型/2 MCP			
阳极结构/Anode structure		8 × 8			
N6021		Min.	Typ.	Max.	Unit.
阴极参数Cathode parameters	光谱范围/Spectral response		280-650		nm
	量子效率峰值波长/Quantum efficiency peak wavelength		380		nm
	积分灵敏度/Luminous sensitivity		70		μA/lm
	量子效率@410nm/QE @410nm		22		%
	辐射灵敏度/Radiant sensitivity@410nm		72		mA/W
阳极参数Anode parameters	工作电压/Supply voltage		2500	3200	V
	增益/Gain		2×10^6		
	暗计数/Dark count rate@0.2pe(单阳极)		500	5000	Hz
	能量分辨率/Charge resolution		35		%
	单光电子谱峰谷比/Peak to valley ratio		3		
时间参数Time response	上升时间/Rise time		300		ps
	脉冲宽度/Pulse width		650		ps
	下降时间/Fall time		800		ps
	渡越时间弥散/TTS@σ(SPE)		50		ps
	渡越时间弥散/TTS@σ (MPE)		15		ps
工作环境温度/Operating ambient temperature		-30~+50			℃
储藏温度/Storage temperature		-50~+50			℃



N6021 光电倍增管外型结构
N6021 PMT dimentional outline



典型单光电子谱
Typical single photoelectron spectrum



典型光谱响应曲线
Typical spectral response chara