Chip/Module Series Manual

High-power Sterilizing Chip/Module Series
Detector and Module Series

DYNGA Semiconductor

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Jiaxing DYNGA Semiconductor

Create the future with ingenuity

www.dynga-semi.com

Company Profile

Jiaxing DYNGA Semiconductor Co., Ltd., headquartered in Jiaxing City, Zhejiang Province, China, is a new high-tech enterprise specializing in third-generation semiconductor epitaxial wafer preparation, chip design and related application product development. Our products are mainly made of third-generation semiconductor materials, including GaN UV photoelectric semiconductor chips (DUV LED chips), DUV detectors, gallium nitride power chips and related application products. We supply the above high-tech products to domestic and international markets.

As a young semiconductor enterprise, owing to China's vigorous implementation of the innovation-driven development and autonomous control strategies, under the premise of breaking through the existing technological blockade, we keep up with the pace of international semiconductor industry development, deepen product development and innovation, insist on the autonomy of homemade chips, and strive to be the most professional gallium nitride chip supplier in China.

Headquarters of Jiaxing DYNGA Semiconductor Co., Ltd.

Qualification Certificates

Trademark Registration Certificates/Patent Certificates/Certificate Authentication/Authoritative Test Reports

Type 40/11 trademark registration certificate

Patent certificates

Authoritative authentication: CE\FCC\ROSH

Microbiological test report: Sterilization rate - 99.99%

Human coronavirus test report: Sterilization rate - 99.9%

Biosafety: Man-machine symbiosis compliance report

Waste gas disposal test report: Several hazardous waste gases such as dioxins have been removed

Product Catalogue

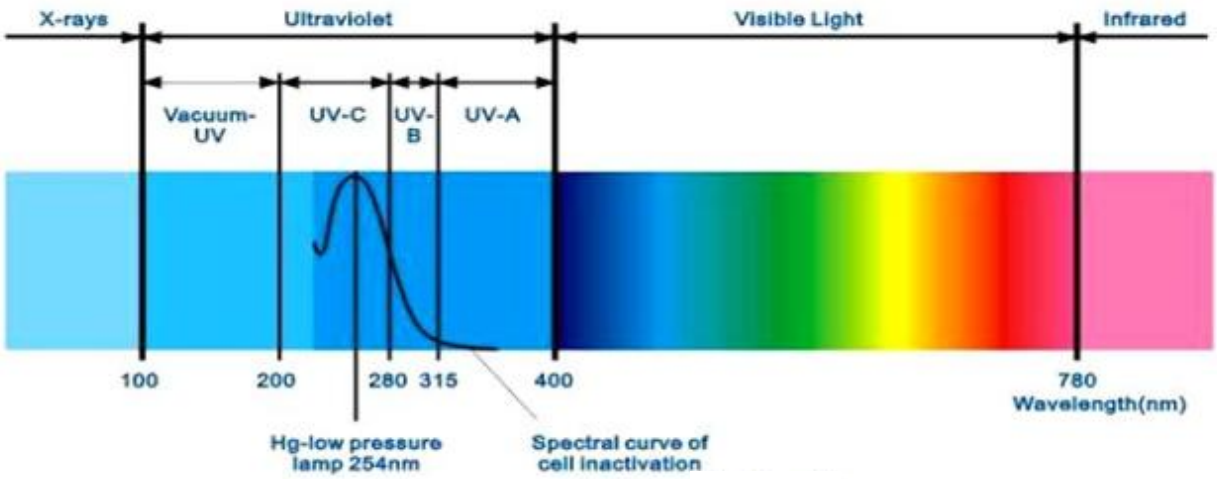
UV-LED

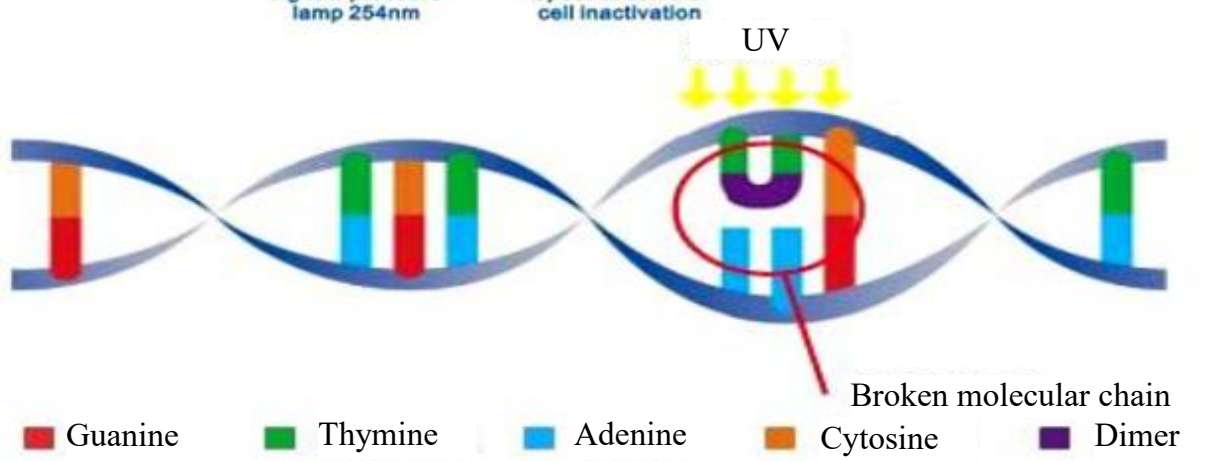
MODULE

DETECTOR

Principle of UV sterilization

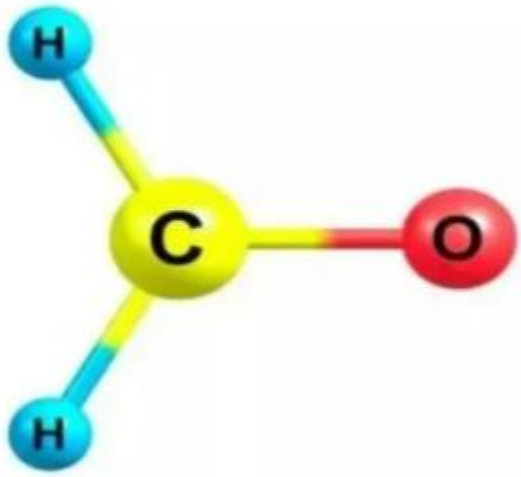
UV sterilization is, through UV irradiation,
to destroy and change the DNA (deoxyribonucleic acid) structure of microorganisms,
so that bacteria die immediately or are unable to reproduce, thus to achieve the purpose of sterilization.
What's really germicidal is UVC, because the main peak of UV absorption by deoxyribonucleic acid (DNA),
ribonucleic acid (RNA) and nucleoprotein in bacteria is 265nm.
The UV absorption by bacteria causes the DNA chain to break, so that the crosslinking between nucleic acid and protein is broken and
further the bioactivity of nucleic acid is killed, thus resulting in the death of bacteria.
Taking the opportunity of the COVID-19 epidemic,
China has newly issued *Hygienic Requirements for UV Sterilizer* (GB28235-2020),
which specifically clarifies and standardizes UVC sterilization.
UVC is easily absorbed by the DNA of organisms, especially UV around 265nm. UV sterilization is widely used in hospitals, schools, nurseries, cinemas, buses, offices, families, and so on, being able to purify air, eliminate musty smell and produce a certain amount of negative oxygen ions,
so that the air in the rooms sterilized by UV is very fresh. UV sterilization of public places can prevent some germs from spreading through the air or by the surface of any objects.


X-rays
Ultraviolet
Visible Light
Infrared
Vacuum-UV
UV-C
UV-B
UV-A
100
200
280
315
400
780
Wavelength(nm)
Hg-low pressure lamp 254nm
Spectral curve of cell inactivation


UV
Broken molecular chain
Guanine
Thymine
Adenine
Cytosine
Dimer

Principle of formaldehyde degradation and odor removal by UVC

Formaldehyde, also known as aldeide formica, is an organic compound. Its chemical formula is HCHO or CH2O. Skin exposure to formaldehyde can cause allergic dermatitis, stains, cutaneous necrosis and other lesions. Oral ingestion of 10~20mL formaldehyde solution can cause human death.



The formaldehyde molecule C-H bond energy is 368.4(±)0.67kj/mol

According to the photon-related Planck equation E=HV,

265nm UVC, with a single photon energy of 504.03kj/mol, much higher than the formaldehyde molecule bond energy,

can break the formaldehyde molecule C-H bond in an instant, then combine with oxygen, and finally produce carbon dioxide and water:

UVC photolysis

$$CH_2O+O_2 \overset{=}{} CO_2+H_2O$$

UV-LED

UVB

Product features	♦ Chip with radiant flux (output) of 50mW
	♦ Peak wavelength: 308-312nm
	♦ Used in medical treatment, dermatitis treatment, skin phototherapy, and other areas

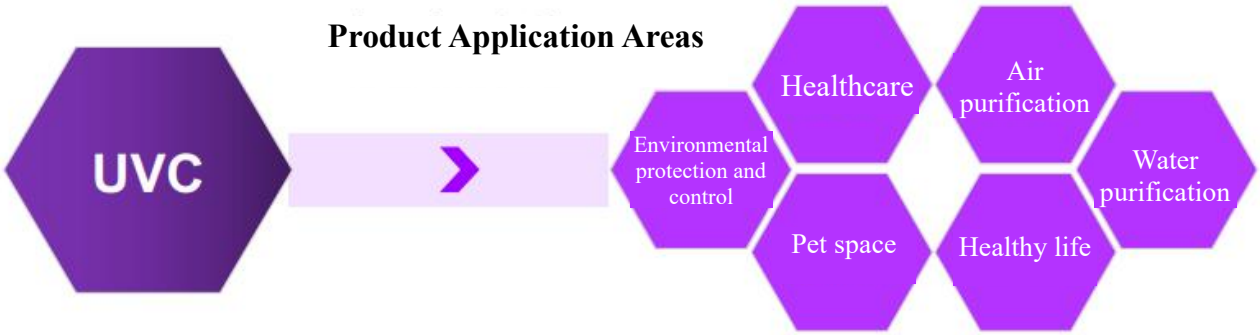
Name	UVB series chip					
Model	**DLP(COBCu)-045M45M312**					
Parameters						
Parameter	**Symbol**	**If**	**Min**	**Typ**	**Max**	**Unit**
Peak wavelength	λp	350mA	310	312	320	nm
Radiant flux (output)	Φe	350mA	40	50.0	50	mW
Forward voltage (input)	V_f	350mA	5.2	5.5	7.0	V
Full width at half maximum	Δλ	350mA		10.0		nm
Viewing angle	$2\theta_{1/2}$	350mA		125		°
Thermal resistance (test temperature)	$R\theta_{J-s}$	350mA		21.0		°C

Name	UVB series chip					
Model	**DLP(COBCu)-047M45M308**					
Parameters						
Parameter	**Symbol**	**If**	**Min**	**Typ**	**Max**	**Unit**
Peak wavelength	λp	350mA	300	308	310	nm
Radiant flux (output)	Φe	350mA	30	50.0	50	mW
Forward voltage (input)	V_f	350mA	5.2	5.5	7.0	V
Full width at half maximum	Δλ	350mA		10.0		nm
Viewing angle	$2\theta_{1/2}$	350mA		125		°
Thermal resistance (test temperature)	$R\theta_{J-s}$	350mA		21.0		°C

UV-LED

UVC New Applications for Sterilization, Purification and Health

Product Application Areas



Product Application Scenarios

Home living spaces, cars, hospitals, schools, supermarkets, logistics spaces, warehousing spaces, ships, factories, construction sites, stations, airports, public living spaces, etc.

Portable sterilizing equipment

Desktop air purifying equipment

Sterilizing modules for kitchen/home appliance

Odor removing equipment for car/home appliance/pet/storage space

Sterilizing equipment for warehousing/logistics space

Sterilizing equipment for public space

Sterilizing equipment for hospital/factory

Clear/running water sterilizing equipment

Hazardous waste substance degradation equipment for environmental protection

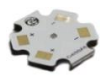
UV-LED

UVC (WHO standard: 265nm)

Product features

Product features	♦ Chip with radiant flux (output) of 50mW
	♦ Peak wavelength 265nm, optimum for sterilization
	♦ 35C6 packaged chip carried on high thermal conductivity alumina substrate, better heat dissipation

Name	DUV sterilizing chip 265					
Model	**DLP(SMD)-050M35C6**					
Parameters						
Parameter	**Symbol**	**If**	**Min**	**Typ**	**Max**	**Unit**
Peak wavelength	λp	350mA	260	265	270	nm
Radiant flux (output)	Φe	350mA	-	50.0	-	mW
Forward voltage (input)	V_f	350mA	5.2	5.5	7.0	V
Full width at half maximum	Δλ	350mA		10.0		nm
Viewing angle	$2\theta_{1/2}$	350mA		125		°
Thermal resistance (test temperature)	$R\theta_{J-s}$	350mA		21.0		°C



Product features	♦ New III-generation packaging technology, radiant flux (output) 263mW
	♦ Chip carried on copper substrate, better heat dissipation,
	♦ Shorter sterilization time, enhanced sterilization effect

Name	DUV sterilizing chip 265					
Model	**DLP(COBCu)-263M35C6**					
Parameters						
Parameter	**Symbol**	**If**	**Min**	**Typ**	**Max**	**Unit**
Peak wavelength	λp	700mA	260	265	270	nm
Radiant flux (output)	Φe	700mA	-	263.0	-	mW
Forward voltage (input)	V_f	700mA	5.2	5.5	7.0	V
Full width at half maximum	Δλ	700mA		10.0		nm
Viewing angle	$2\theta_{1/2}$	700mA		125		°
Thermal resistance (test temperature)	$R\theta_{J-s}$	700mA		21.0		°C

UV-LED

UVC (WHO standard: 265nm)

Product features	♦ High-power chip (industrial grade) with radiant flux (output) of 1.2W
	♦ Peak wavelength 265nm, optimum for sterilization
	♦ 35C6 packaged chip carried on high thermal conductivity alumina substrate, better heat dissipation

Name	**DUV sterilizing chip 265**					
Model	**DLP(COBCu)-001W48M6**					
Parameters						
Parameter	**Symbol**	**If**	**Min**	**Typ**	**Max**	**Unit**
Peak wavelength	λp	350mA	260	265	270	nm
Radiant flux (output)	Φe	350mA	-	1200	-	mW
Forward voltage (input)	V_f	350mA	5.7	6	7.0	V
Full width at half maximum	Δλ	350mA		10.0		nm
Viewing angle	$2\theta_{1/2}$	350mA		125		°
Thermal resistance (test temperature)	$R\theta_{J-s}$	350mA		21.0		°C

Product features	♦ Ultra-high-power chip (industrial grade) with radiant flux (output) of 4.2W
	♦ Chip carried on upgraded ultra-high thermal conductivity alumina substrate, better heat dissipation and high thermal resistance
	♦ Shorter sterilization time, enhanced sterilization effect

Name	**DUV sterilizing chip 265**					
Model	**DLP(COBCu)-004W96M6**					
Parameters						
Parameter	**Symbol**	**If**	**Min**	**Typ**	**Max**	**Unit**
Peak wavelength	λp	350mA	260	265	270	nm
Radiant flux (output)	Φe	350mA	3500	3900	4200	mW
Forward voltage (input)	V_f	350mA	11.4	12	14	V
Full width at half maximum	Δλ	350mA		10.0		nm
Viewing angle	$2\theta_{1/2}$	350mA		125		°
Thermal resistance (test temperature)	$R\theta_{J-s}$	350mA		21.0		°C

UV-LED

UVC (Chinese national standard: 254nm)

Product features	♦ Chinese national standard for sterilization waveband: 254nm
	♦ Radiant flux (output) 40mW
	♦ Chip carried on copper substrate, better heat dissipation

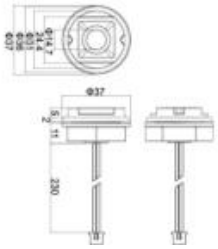
Name	DUV sterilizing chip 254					
Model	**DLP(SMD)-040M35C5**					
Parameters						
Parameter	**Symbol**	**If**	**Min**	**Typ**	**Max**	**Unit**
Peak wavelength	λp	350mA	260	265	270	nm
Radiant flux (output)	Φe	350mA	30	40	50	mW
Forward voltage (input)	V_f	350mA	5.2	5.5	7.0	V
Full width at half maximum	Δλ	350mA		10.0		nm
Viewing angle	$2\theta_{1/2}$	350mA		125		°
Thermal resistance (test temperature)	$R\theta_{J-s}$	350mA		21.0		°C

Product features	♦ New III-generation packaging technology, radiant flux (output) 263mW
	♦ Chip carried on copper substrate, better heat dissipation,
	♦ Shorter sterilization time, enhanced sterilization effect

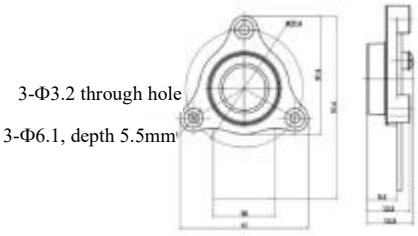
Name	DUV sterilizing chip 254					
Model	**DLP(COBCu)-066M48M254**					
Parameters						
Parameter	**Symbol**	**If**	**Min**	**Typ**	**Max**	**Unit**
Peak wavelength	λp	350mA	250	254	260	nm
Radiant flux (output)	Φe	350mA	80	86	90	mW
Forward voltage (input)	V_f	350mA	5.2	5.5	7.0	V
Full width at half maximum	Δλ	350mA		10.0		nm
Viewing angle	$2\theta_{1/2}$	350mA		125		°
Thermal resistance (test temperature)	$R\theta_{J-s}$	350mA		21.0		°C

MODULE

Static water sterilizing module



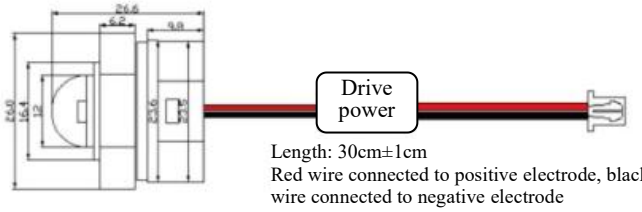
Name	74 series DUV sterilizing module				
Model	**DLM-050M0074**	**DLM-109M0074**	**DLM-263M0074**	**DLM-218M0074**	**DLM-526M0074**
Voltage(V)	12	12	12	12	12
Radiant flux (mW)	50	109	263	218	526
Power consumption (W)	1.925	1.925	1.925	1.925	1.925
Mounting hole (mm)	27.1	27.1	27.1	27.1	27.1
Input interface	HX25043-2P	HX25043-2P	HX25043-2P	HX25043-2P	HX25043-2P
Waterproofing level	Front waterproof IPX8	Front waterproof IPX8	Front waterproof IPX8	Front waterproof IPX8	Front waterproof IPX8
Operating temperature (°C)	-25~50	-25~50	-25~50	-25~50	-25~50
Sterilization rate	≥99.99%	≥99.99%	≥99.99%	≥99.99%	≥99.99%



Name	83 series DUV sterilizing module				
Model	DLM-050M0083	DLM-109M0083	DLM-263M0083	DLM-218M0083	DLM-526M0083
Voltage(V)	12	12	12	12	12
Radiant flux (mW)	50	109	263	218	526
Power consumption (W)	1.925	1.925	1.925	1.925	1.925
Mounting hole (mm)	23	23	23	23	23
Input interface	HX25043-4P	HX25043-4P	HX25043-4P	HX25043-4P	HX25043-4P
Waterproofing level	Front waterproof IPX5	Front waterproof IPX5	Front waterproof IPX5	Front waterproof IPX5	Front waterproof IPX5
Operating temperature (°C)	-25~25	-25~25	-25~25	-25~25	-25~25
Sterilization rate	≥99.99%	≥99.99%	≥99.99%	≥99.99%	≥99.99%

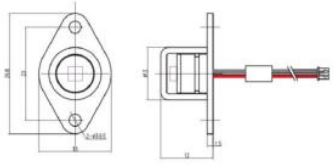
MODULE

Static water sterilizing module



Length: 30cm±1cm
Red wire connected to positive electrode, black wire connected to negative electrode

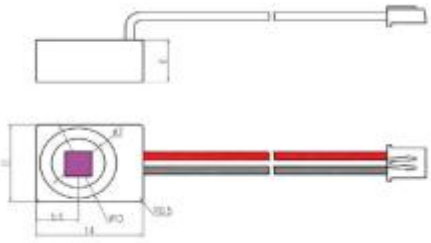
Name	85 series DUV sterilizing module				
Model	**DLM-050M0085**	**DLM-109M0085**	**DLM-263M0085**	**DLM-218M0085**	**DLM-526M0083**
Voltage(V)	12	12	12	12	12
Radiant flux (mW)	50	109	263	218	526
Power consumption (W)	1.925	1.925	1.925	1.925	1.925
Mounting hole (mm)	16.6	16.6	16.6	16.6	16.6
Input interface	XH-2Y	XH-2Y	XH-2Y	XH-2Y	XH-2Y
Waterproofing level	Front waterproof IPX8	Front waterproof IPX8	Front waterproof IPX8	Front waterproof IPX8	Front waterproof IPX8
Operating temperature (°C)	-25~50	-25~50	-25~50	-25~50	-25~50
Sterilization rate	≥99.99%	≥99.99%	≥99.99%	≥99.99%	≥99.99%



Name	243 series DUV sterilization module				
Model	**DLM-050M0243**	**DLM-109M0243**	**DLM-263M0243**	**DLM-218M0243**	**DLM-526M0243**
Voltage(V)	5.7	5.7	5.7	5.7	5.7
Radiant flux (mW)	50	109	263	218	526
Power consumption (W)	1.925	1.925	1.925	1.925	1.925
Mounting hole (mm)	13.2	13.2	13.2	13.2	13.2
Input interface	XH-2Y	XH-2Y	XH-2Y	XH-2Y	XH-2Y
Waterproofing level	Front waterproof IPX8	Front waterproof IPX8	Front waterproof IPX8	Front waterproof IPX8	Front waterproof IPX8
Operating temperature (°C)	-25~50	-25~50	-25~50	-25~50	-25~50
Sterilization rate	≥99.99%	≥99.99%	≥99.99%	≥99.99%	≥99.99%

MODULE

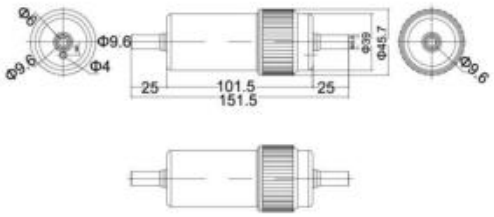
Static water sterilizing module



Name	241 series DUV sterilizing module				
Model	**DLM-050M0241**	**DLM-109M0241**	**DLM-263M0241**	**DLM-218M0241**	**DLM-526M0241**
Voltage(V)	12	12	12	12	12
Radiant flux (mW)	50	109	263	218	526
Power consumption (W)	1.925	1.925	1.925	1.925	1.925
Mounting hole (mm)	/	/	/	/	/
Input interface	XH-2Y	XH-2Y	XH-2Y	XH-2Y	XH-2Y
Waterproofing level	Front waterproof IPX8	Front waterproof IPX8	Front waterproof IPX8	Front waterproof IPX8	Front waterproof IPX8
Operating temperature (°C)	-10~40	-10~40	-10~40	-10~40	-10~40
Sterilization rate	≥99.99%	≥99.99%	≥99.99%	≥99.99%	≥99.99%

MODULE

Water-through dynamic water sterilizing module



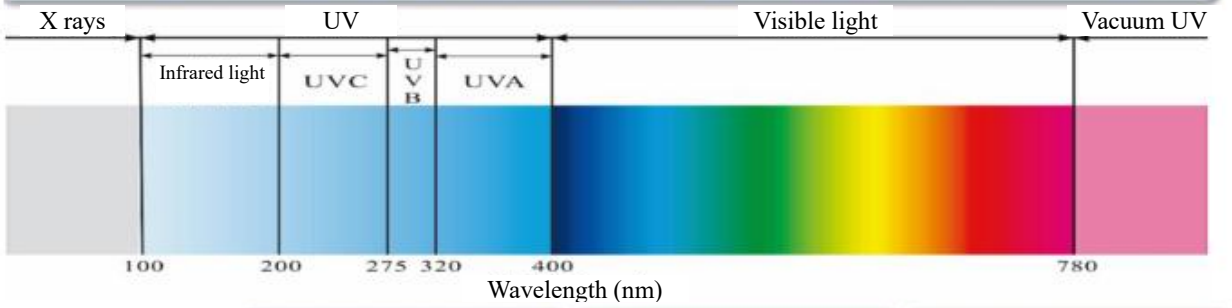
Name	241 series DUV sterilizing module				
Model	DLM-050M0241	DLM-109M0241	DLM-263M0241	DLM-218M0241	DLM-526M0241
Voltage(V)	12	12	12	12	12
Radiant flux (mW)	50	109	263	218	526
Power consumption (W)	1.925	1.925	1.925	1.925	1.925
Mounting hole (mm)	/	/	/	/	/
Input interface	XH-2Y	XH-2Y	XH-2Y	XH-2Y	XH-2Y
Waterproofing level	Front waterproof IPX8	Front waterproof IPX8	Front waterproof IPX8	Front waterproof IPX8	Front waterproof IPX8
Operating temperature (°C)	-10~40	-10~40	-10~40	-10~40	-10~40
Sterilization rate	≥99.99%	≥99.99%	≥99.99%	≥99.99%	≥99.99%

Air cleaning and sterilizing module

Name	224 series DUV sterilizing module				
Model	DLM-050M0224	DLM-109M0224	DLM-263M0224	DLM-218M0224	DLM-526M0224
Voltage(V)	12	12	12	12	12
Radiant flux (mW)	50	109	263	218	526
Power consumption (W)	1.925	1.925	1.925	1.925	1.925
Mounting hole (mm)	/	/	/	/	/
Input interface	XH-2A	XH-2A	XH-2A	XH-2A	XH-2A
Waterproofing level	/	/	/	/	/
Operating temperature (°C)	-25~50	-25~50	-25~50	-25~50	-25~50
Sterilization rate	≥99.99%	≥99.99%	≥99.99%	≥99.99%	≥99.99%

UV detector introduction

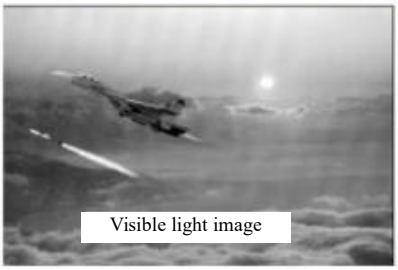
UV photodetector: It can detect the solar-blind UV radiation in the atmosphere, superior in high sensitivity and low rate of required alarm

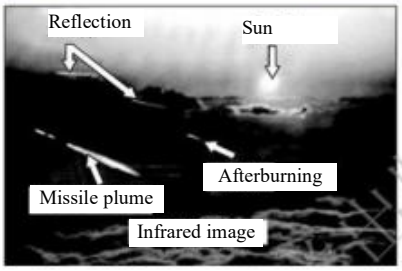


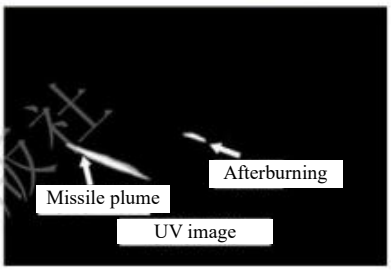
UV classification: UVC 200~275nm | UVB 275~320nm | UVA 320~400nm

The UV radiation on the earth's surface comes from the sun → The atmospheric ozone, haze and others absorb the UV radiation → UVC is impenetrable

There is no UVC-band UV noise on the earth's surface → UVC is solar-blind UV







Characteristics of UV detection technology

- Characteristics of UV radiation: Strong scattering and solar-blind UV
- Application prospects: The military application of the UV detection technology has attracted much attention and is developing rapidly;
- Application areas: UV guidance, UV communication, UV alarming, UV explosion suppression, UV surveillance, UV hiding, airborne radar, etc.

DETECTOR

UV detector chip series

Product features	♦ Excellent single photon detection sensitivity
	♦ Long optical detection work distance (spectrum response: 210~280nm), effective detection area 0.965mm^2, good temperature stability ♦ Excellent single photon detection sensitivity
	♦ Long optical detection work distance (spectrum response: 210~280nm), effective detection area 0.965mm^2, good temperature stability
	♦ Excellent single photon detection sensitivity

Name	DUV single-PD detector					
Model	**DTP01P-254AA01-01**	**DTP01P-254AA01-02**	**DTP01P-254AA01-03**	**DTP01P-254AA01-04**	**DTP01P-254AA01-05**	**DTP01P-254AA01-06**
Response wavelength range (nm)	210-280	210-280	210-280	210-280	210-280	210-280
Response center wavelength (nm)	254	254	254	254	254	254
Sensitive area (	0.965	0.965	0.965	0.965	0.965	0.965
Dark current (μA)						
Feedback resistance (MΩ)	10	100	1000	10	100	1000
Dark voltage (mV) (Test condition: E=0 lx)	±1	±2	±3	±1	±2	±3
Noise voltage (mV_{rms}) (Test condition: B=1 kHz)	1	1	1	1	1	
Short circuit current (mA)	±50	±50	±50	±50	±50	±50
Saturation voltage (V) (Test condition: R_L=2 kΩ)	4.68(4.6)	4.68(4.6)	4.68(4.6)	4.68(4.6)	4.68(4.6)	4.68(4.6)
Maximum peak responsivity (mV/nW)	0.6	6	60	0.6	6	60
Operating voltage (V)	2.7~5	2.7~5	2.7~5	2.7~13.2	2.7~13.2	2.7~13.2
Maximum input current (μA)	750(1100)	750(1100)	750(1100)	550(660)	550(660)	550(660)
Rise time (μS)	30	150	600	30	150	600
Bandwidth (kHz) (Test condition : -3dB)	10	2	0.5	10	2	0.5
Operating temperature (°C)	-25~+85	-25~+85	-25~+85	-25~+85	-25~+85	-25~+85
Storage temperature (°C)	-40~+100	-40~+100	-40~+100	-40~+100	-40~+100	-40~+100
Welding temperature (°C)	300	300	300	300	300	300

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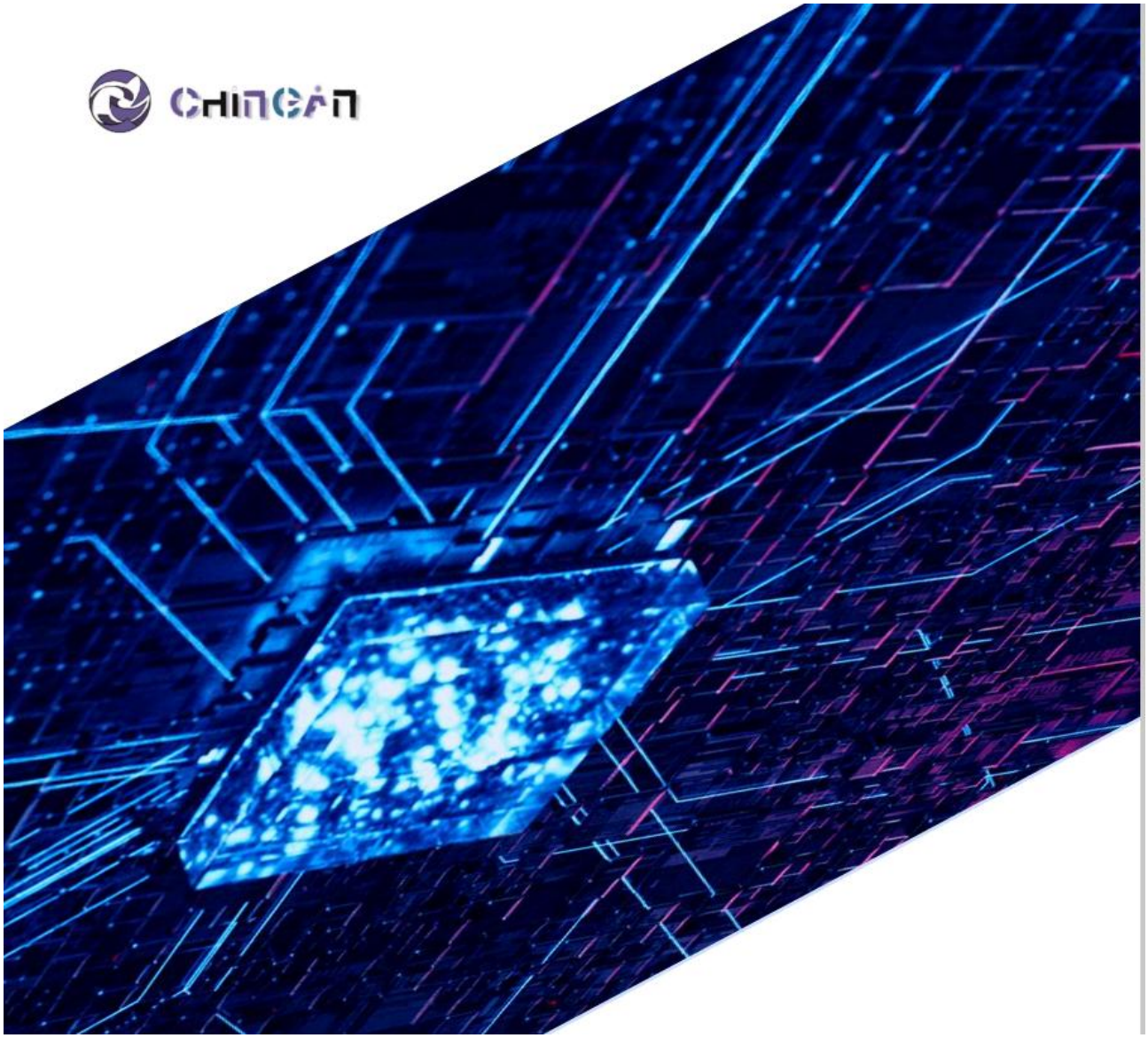

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