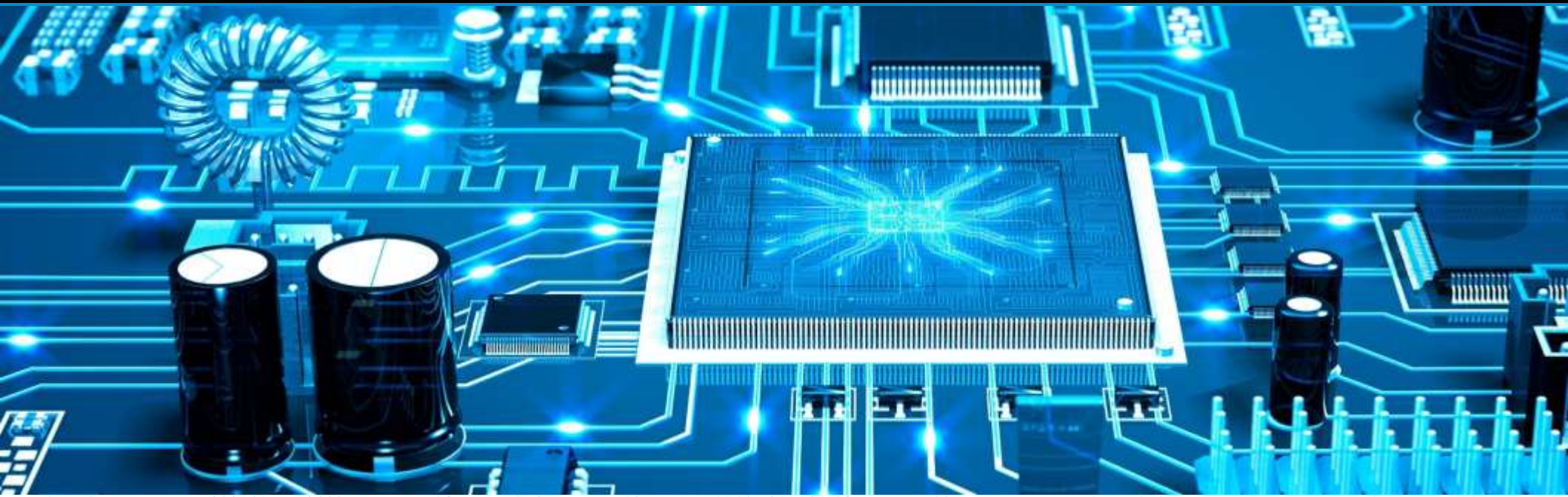
- DEFINITION AND APPLICATIONS SELLING POINTS
- TECHNICAL DETAILS
- CALCULATION
- TARGET MARKETS, APPLICATIONS
- UV LED RUTRONIK PORTFOLIO
- FACTSHEETS

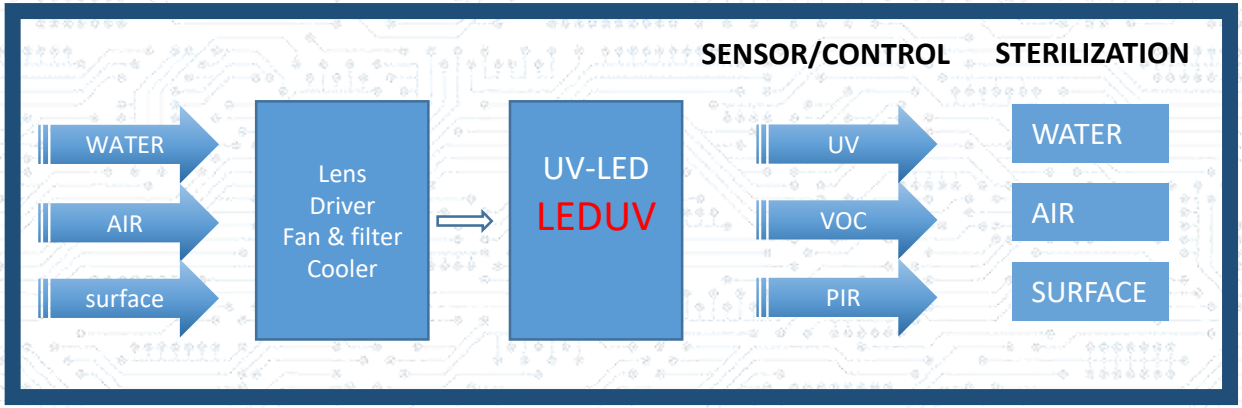
UV LED

Water, air and surface sterilization by UV LED



UVA, UVB, UVC DEFINITION AND APPLICATIONS SELLING POINTS

Workflow of sterilization and benefits



- ✓ Less energy costs
- ✓ Less maintenance effort due UV modules can be removed without tools and cleaned with small effort
- ✓ Less energy consumption due to ventilation ducts without deposits
- ✓ Success stories tell us, the break even point can be reached within two years

Sterilization, degermination and curing

- water, air and surface purification by UV-LED
- Best Fit for smart, integrated and intelligent disinfection systems (VOC, UV and PIR sensors)

Key Parts

- PU35CM1 V3 (Lexar)
- SU CULDN1.VC (Osram)
- ZEUBE265-2CA (Stanley)
- S6060-DR250-W272-P100 (Bolb)
- VLMU35CT20-275-120 (Vishay)
- LTPL-G35UVC275GH (LiteOn)

Key Applications

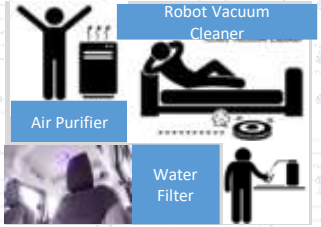
- Consumers (air conditioner, fridge, Toilet, air cleaner, Insect attracting lamps,)
- Medicine (disinfection box, skin therapy, water quality sensor, cleaning robots)
- Industry (filling machine, water quality sensor, Cloth, cartons, bottles, cans)
- Breeding, horticulture, Fishery (conservation, photosynthesis, artificial light)
- Curing/drying (plastic coatings, 3D/ink printers, photoresist, Nail, resin)

Key Benefits

- Small and robust SMD package
- Flexibility: broad range of wavelengths
- scratch resistance for curing process
- UV-LEDs type A, B and C for dedicated applications

Why should I buy this product?

- Contain no mercury (Vapor Lamps), obviating need for disposal/recycling
- No maintenance and Inactivation of Bacteria, Protozoa, Viruses and Algae (Filter)
- Energy efficient and infinite on/off Switching -> battered, wearable solutions
- Ecologically friendly (no produce hazardous air pollutants -> Ozone…)



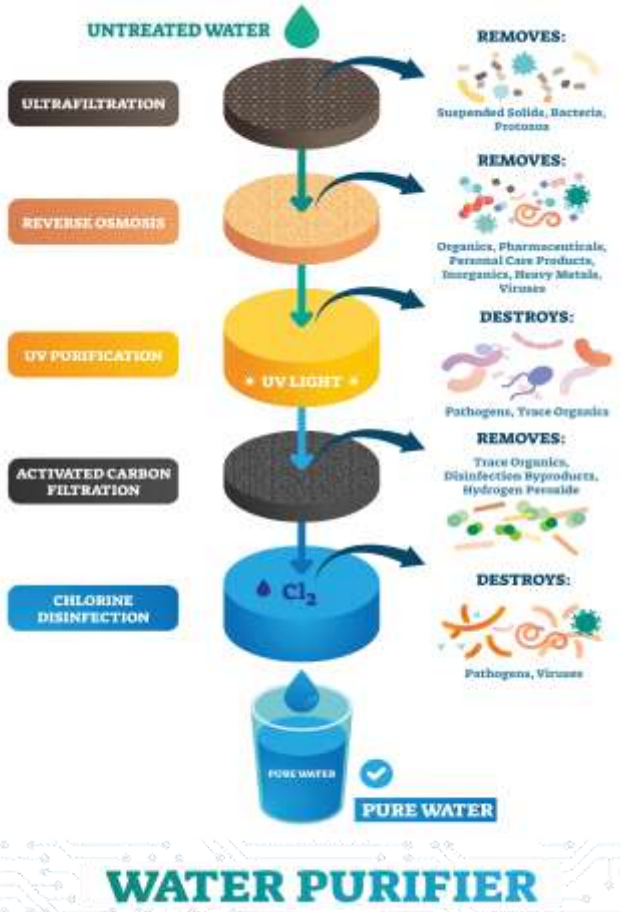
Comparaison of differents Degermination and odour disinfection systems

Passiv solutions	Activ solutions
Filters (Hepa, activated carbon, ceramic ...) – Based on the storage effect (the pollutants are only retained, but not destroyed) – Need a maintenance	Ozone generator (Ionisator and Plasma systems) – Ozone is harmful for human health – hazardous air pollutants
Chemical products (Chlorine…) – Pathogen resistant – Only for static situation (no flow) – Produces volatile hydrocarbons (Chlorine dioxide…)	UV-Light (UV-LEDs and traditional Mercury Vapor Lamps) ✓ No volatile hydrocarbons ✓ No hazardous air pollutants – Dangerous in open system (human body radiation)

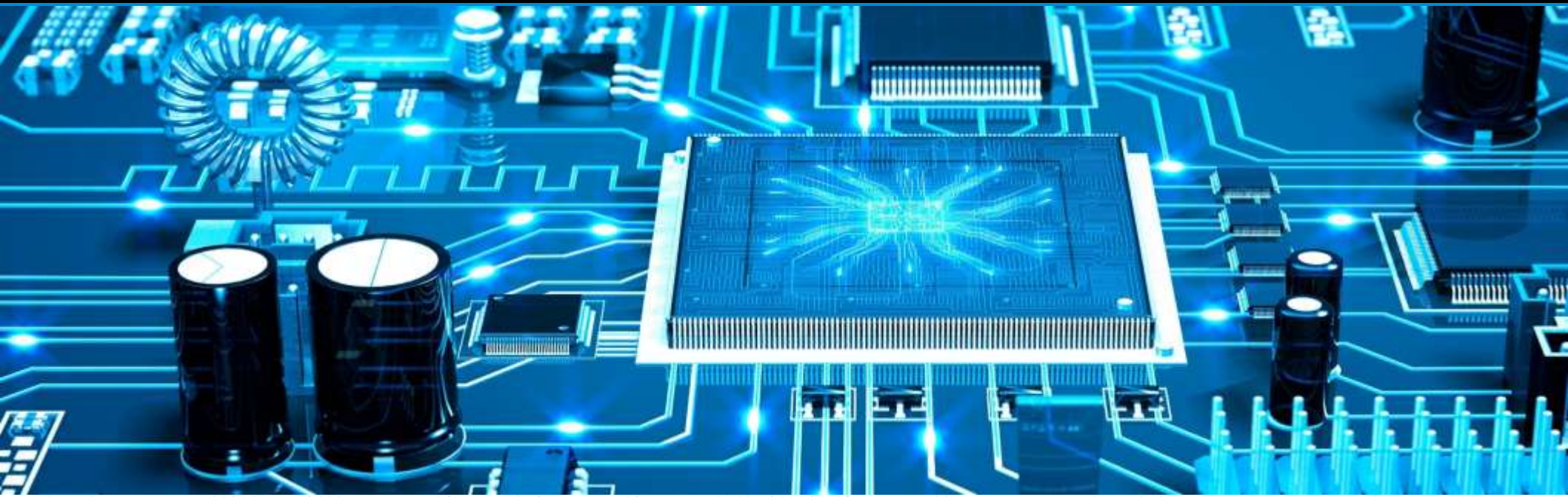
Advantages of UV LED vs. traditional Mercury Vapor Lamps

- ✓Consistent UV spectral output for a given temperature
- ✓Flexibility: broad range of wavelengths
- ✓Package form: smaller and more robust, SMD available
- ✓No degradation of intensity with toggling
- ✓Contain no mercury, obviating need for disposal/recycling
- ✓Energy efficient and infinite on/off Switching ➡ battered, portable solutions
- ✓ with instant full light output
- ✓Efficiency UVA-LED 30%
- ✓ Costs UVA-LEDs < 1€/W

– UV-LED minimal wavelength 265nm
– Power UVC_LED 100 mW (Lamps in Watts)
– efficiency UVC LED 2-5% (30-40% for Lamps)



WATER PURIFIER



TECHNICAL DETAILS

Definition and principle of operation of odour eliminator via photocatalysis

- Pollutant in building industry formaldehyde HCHO:

$HCHO + 2O_3 = CO_2 + H_2O + 2O_2$

- Pollutant carbon monoxide CO:

$CO + O_3 = CO_2 + O_2$

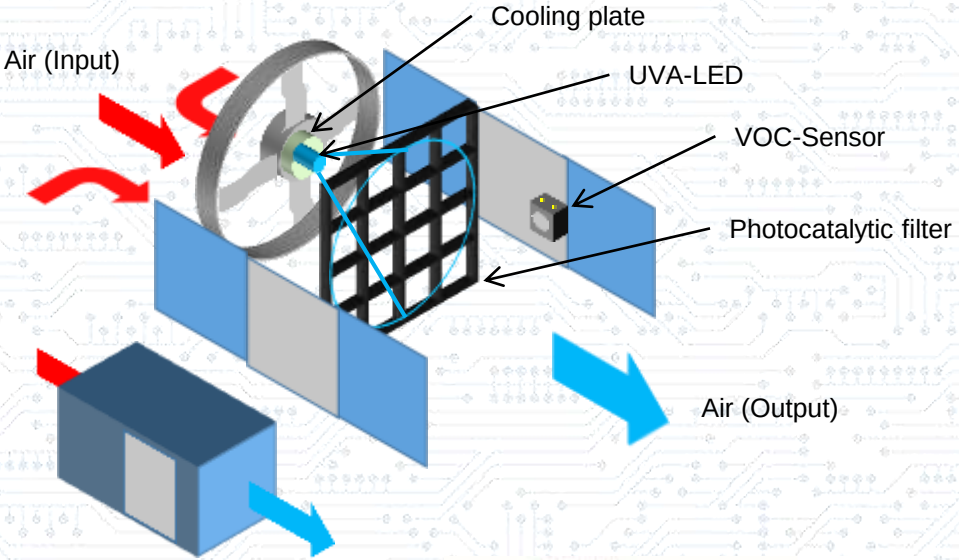
- Pollutant benzene /hydrocarbon C_6H_6:

$C_6H_6 + 5O_3 = 6CO_2 + 3H_2O$

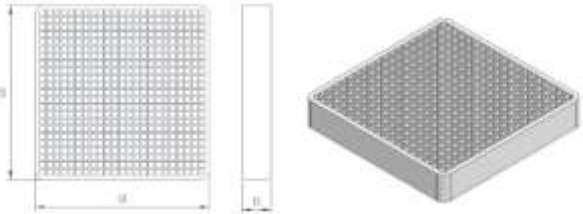
- Pollutant Ammonia NH_3:

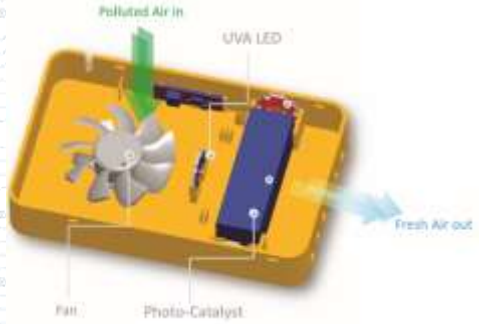
$2NH_3 + 3O_3 = N_2 + 3H_2O + O_2$

Small amounts of ozone are harmless for human health

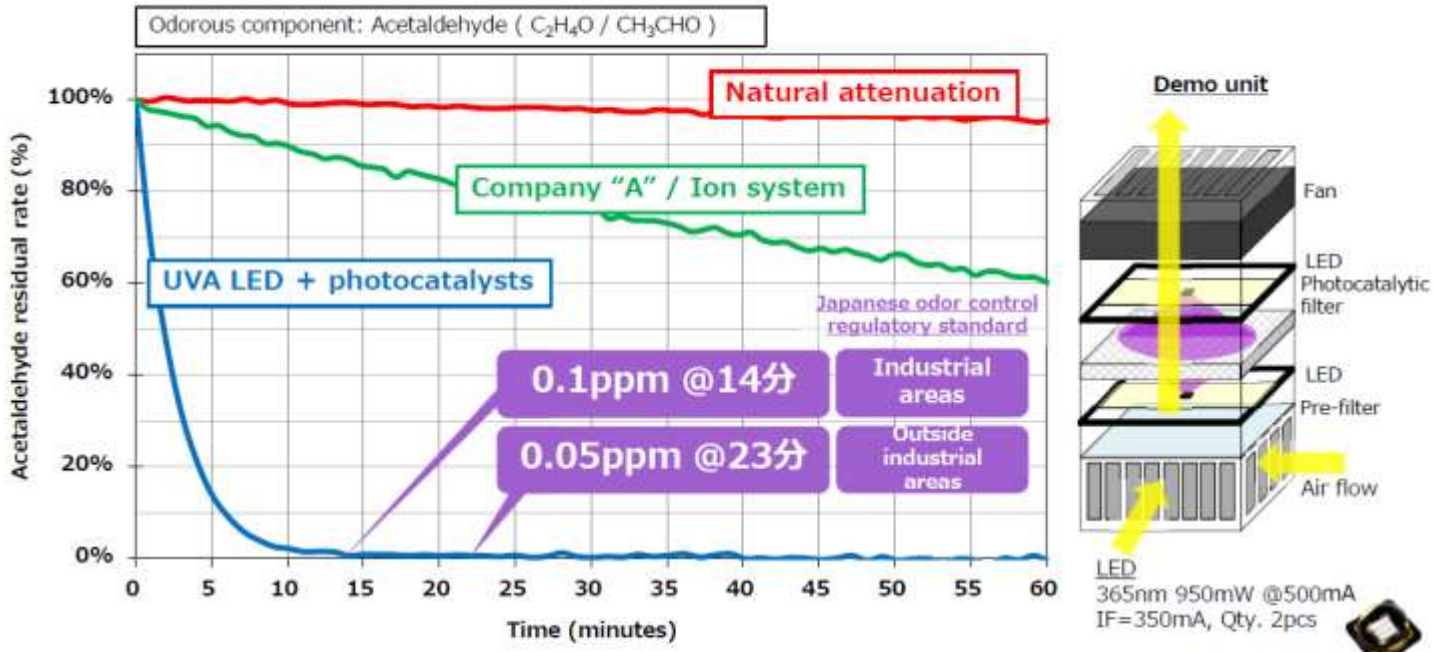


Filter Al_2O_3 (Coating material TiO2)





Definition and principle of operation of odour eliminator via photocatalysis

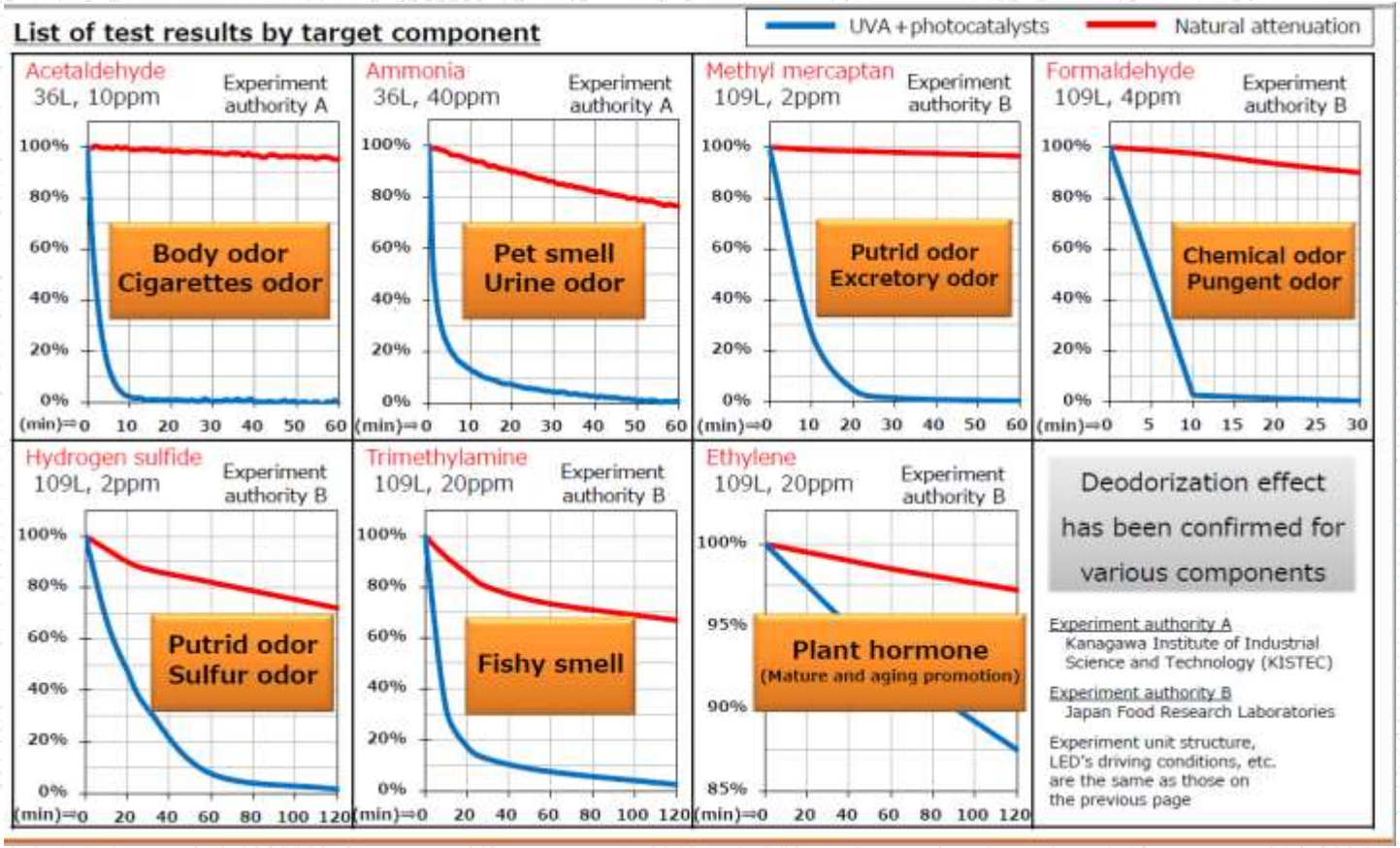


Method
Introduced acetaldehyde gas into a 36L reactor at 10ppm; measured with photoacoustic multi-gas monitor after turning on the deodorization unit.

Evaluated by: Kanagawa Institute of Industrial Science and Technology (KISTEC)
···Independent administrative agency conducting evaluation and research on photocatalysis

UVA+photocatalysts can break down and eliminate odorous components

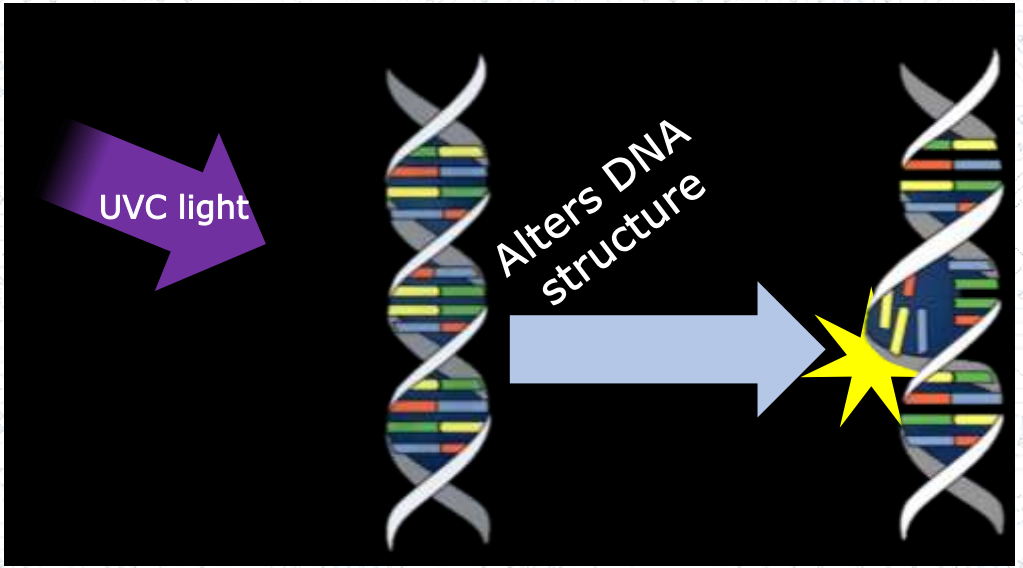
Definition and principle of operation of odour eliminator via photocatalysis



Principle of operation of disinfection via UV LED

Effectiveness of UV-C disinfection: UVC light is optimal for sterilization

The UVC range of light (wavelength: 200 to 280 nm) can change and rearrange the “strands” constituting the helical structure of DNA. Using this principle, sterilizing with light becomes possible.



UV germicidal irradiation: features

- No chemicals used
- No odor residue

Sterilization process

Deep-UV/UVC irradiation

Modification of DNA structure

“Inactivation”: blocks cell growth by stopping cell division

Sterilization

⇒This method is optimal for:

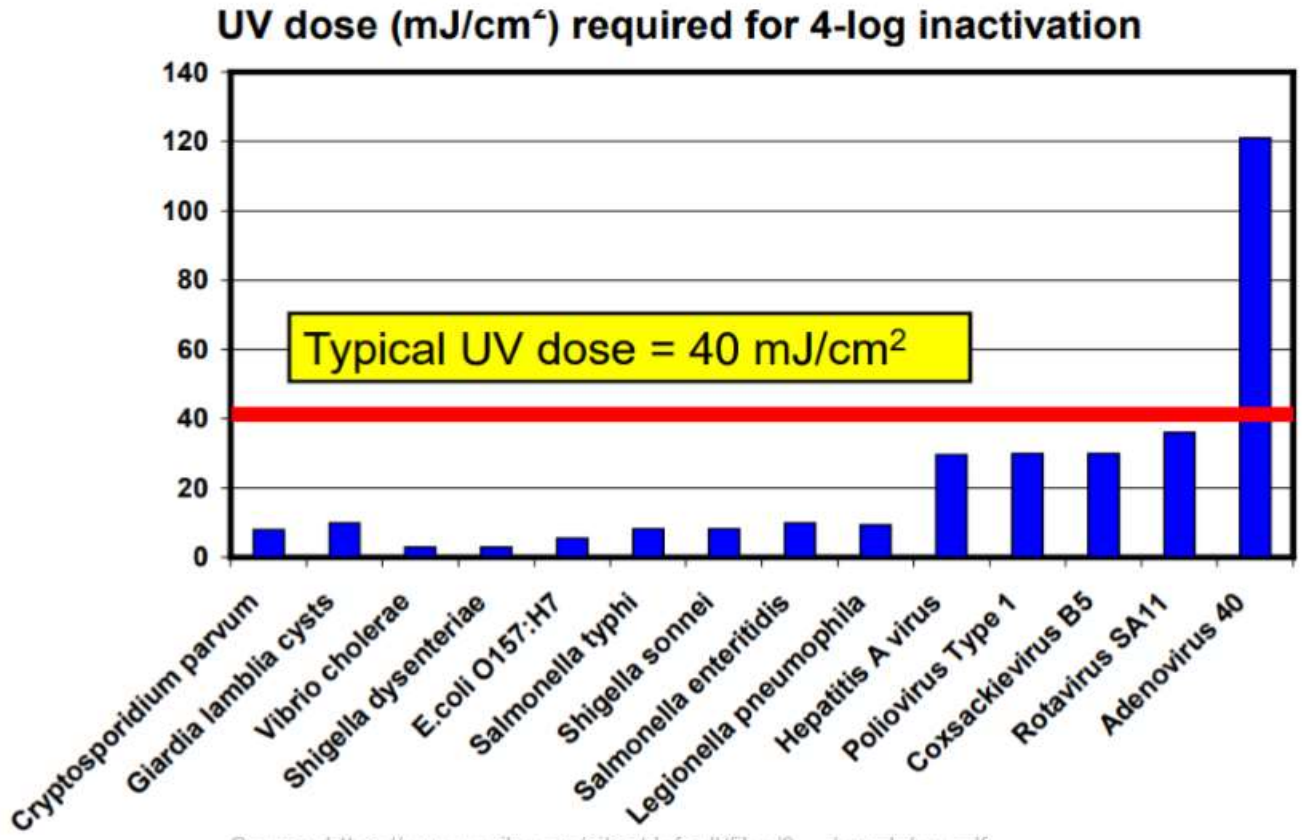
✓sterilizing objects that people may touch or put in their mouth

✓sterilizing food, medicines, etc., for which a high sterilizing capability is required

✓maintaining a safe environment around children and pets.

Principle of operation of disinfection via UV LED

Effectiveness of UV-C disinfection and types of microorganisms

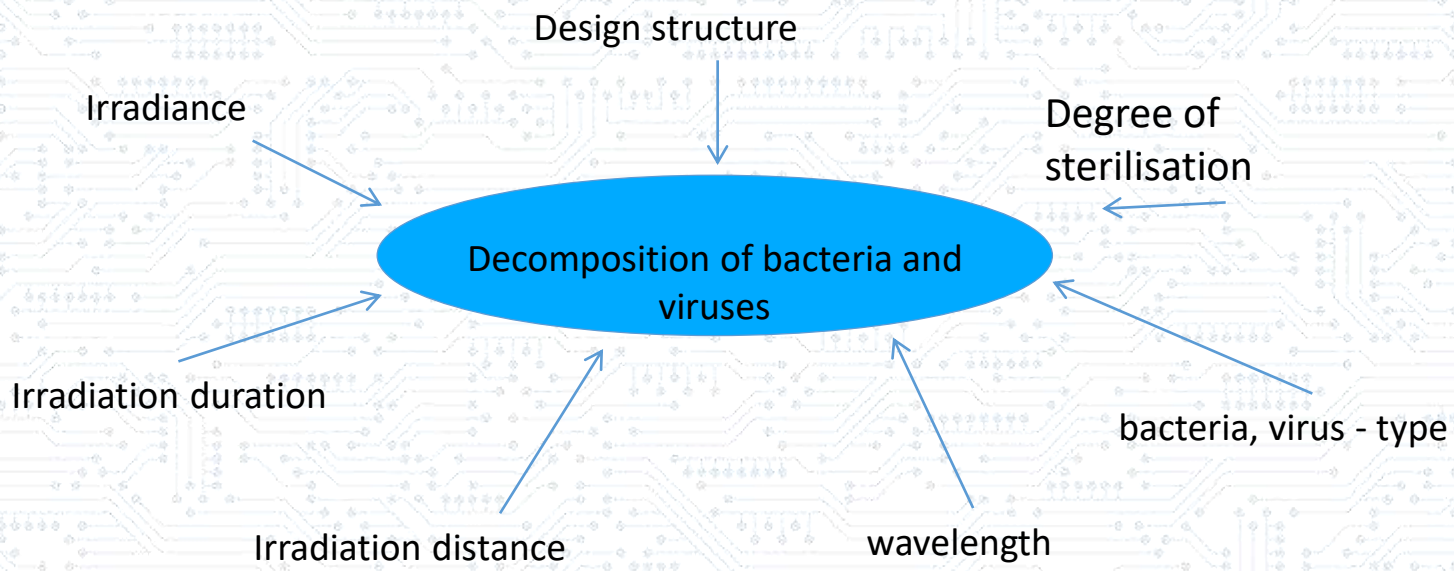


Source: https://www.un-ihe.org/sites/default/files/3_-_templeton.pdf

More dosages for different micro organisms:

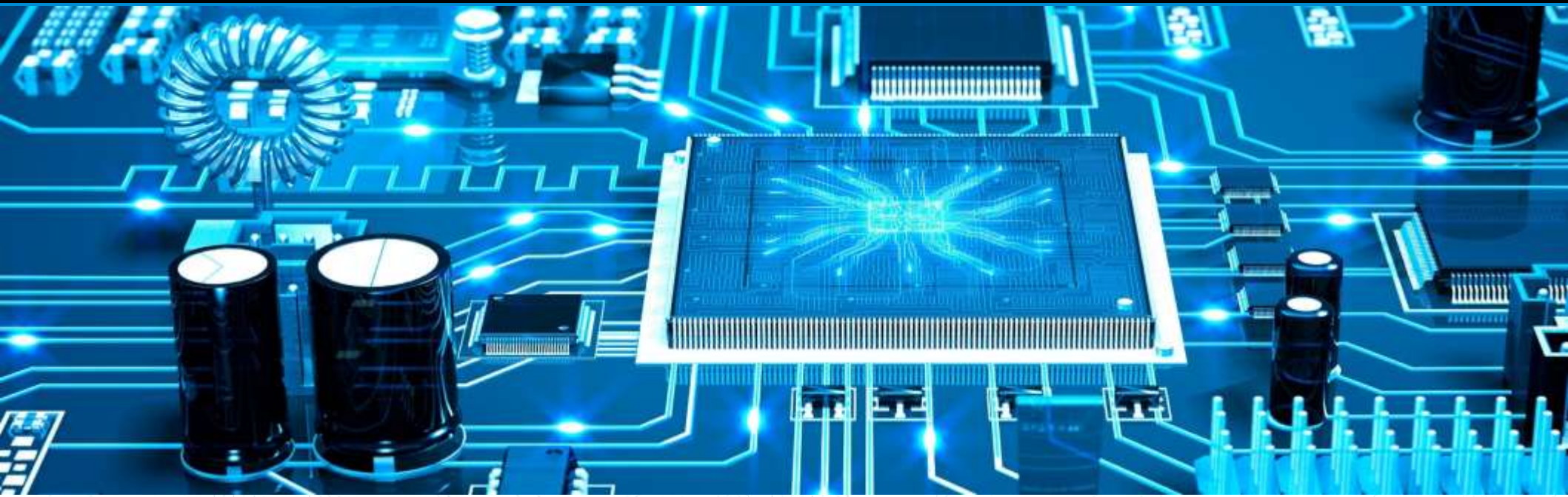
https://iuvanews.com/stories/pdf/archives/080104Cairns_Article_2006.pdf

Principle of operation of disinfection via UV LED

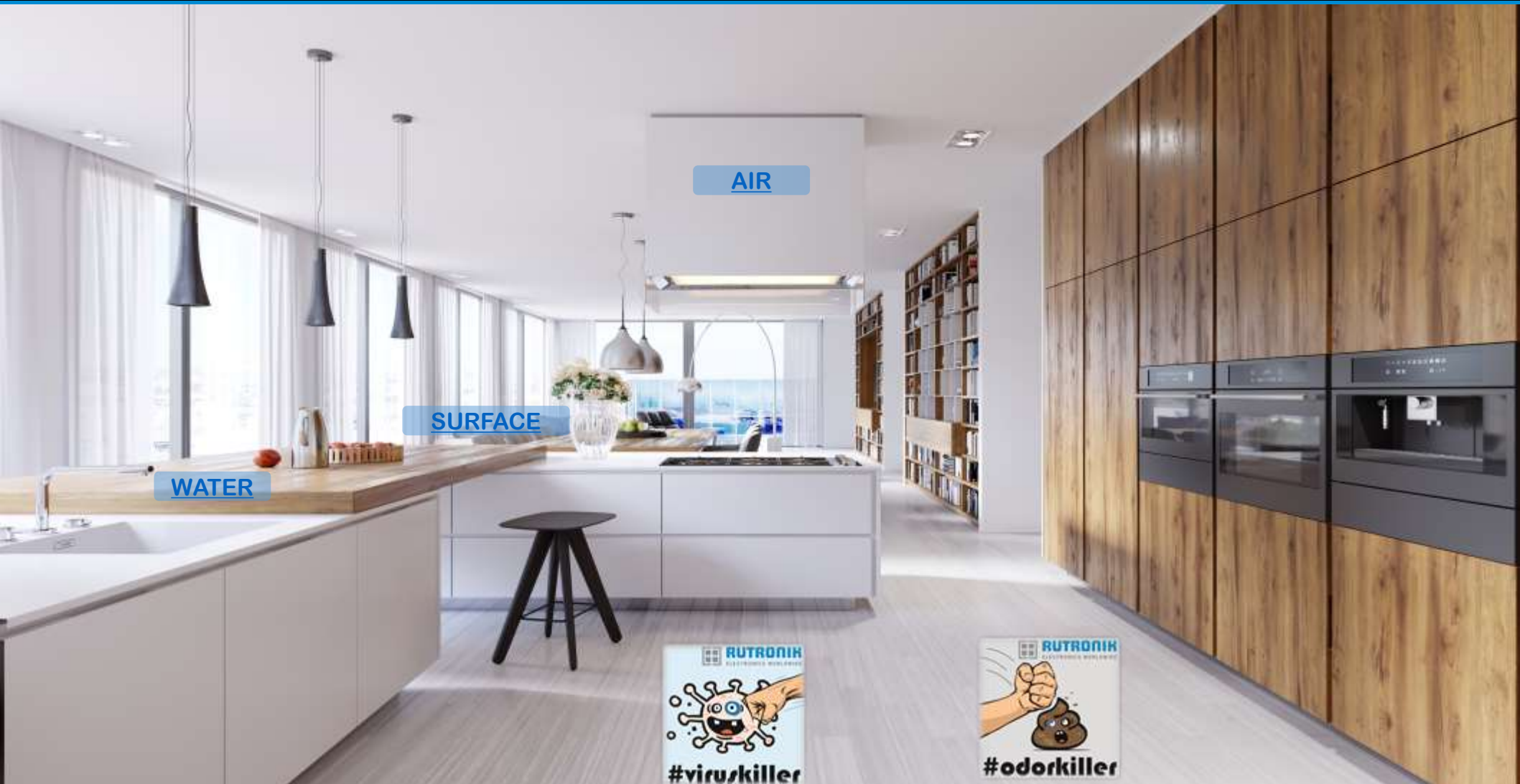


Irradiation duration: depending on bacteria and virus type* and the respective output of the UVC LED
Degree of sterilisation: Depending on where the filter is used. In medical facilities, such as an operating theatre, a higher degree of sterilisation is required than in a hallway.

*Fluence (UV Dose) Required to Achieve Incremental Log Inactivation of Bacteria, Protozoa, Viruses and Algae



CALCULATION


AIR
SURFACE
WATER
RUTRONIK
#viruskiller
RUTRONIK
#odorkiller

Water disinfection calculation

1 liter water boiler or kettle

Requirements: 20cm maximal high of device, 1 LED PU35CH1

Led PU35CH1 irradiance in 20cm: 0.06mw/cm², therefore

99% LOG2 Sterilization time =5mJ/ cm² ÷0.06mw/cm²=

83 seconds

99.999% LOG6 Sterilization time =22mJ/cm² ÷0.06mw/cm²=366 seconds

Water in Faucet (water cook)

Module available with 1 led PU35CH1 3 Liter/Minute for 99% LOG2

Surface disinfection calculation

Work space 8m² (4m length, 2m wide und 1m high):

Requirements: 60 Leds PU35CH1 (Array 10x6) 1.25m far from work space.

Leds PU35CH1 with 120° angle, therefore the led-Array can sterilize a minimal surface of 4.25mx4.25m.

60 Leds PU35CH1 irradiance=60x0.001536 mw/cm²=0.09216 mw/cm², therefore

99% LOG2 Sterilization time =5mJ/ cm² ÷0.09216 mw/cm²= 55 seconds

99.999% LOG6 Sterilization time =22mJ/ cm² ÷0.09216 mw/cm²= 239 seconds

Surface with wearable sterilizator.

Requirements: 1 Led PU35CH1 in 1cm far from surface.

Led PU35CH1 irradiance in 1cm: 13.56mw/cm², therefore

99% LOG2 Sterilization time =5mJ/ cm² ÷13.56mw/cm²= 0,39 seconds

99.999% LOG6 Sterilization time =22mJ/ cm² ÷13.56mw/cm²= 1.63 seconds

Air disinfection calculation

Conditions:

1. Room: 50m³ , that means 5m length, 4m wide, 2,5m high
2. Dimension of fan : Delta
3. Flow rate：1177.37 m³/H（19.6m³/min）
4. Target bacteria：SARS-COV-2 Virus ：
5. Using 20 LEDs of PU35CH1

Opto-Electrical Characteristics

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Radiant Power*(1)	P_O	I_F = 350mA	30		50	mW
Forward Voltage*(2)	V_F		5.0	6.4	7.5	V
Wavelength*(3)	W_P		270	278	285	nm
View Angle	θ		--	125	--	deg
Reverse Current	I_R	V_R = 5V			10	μ A

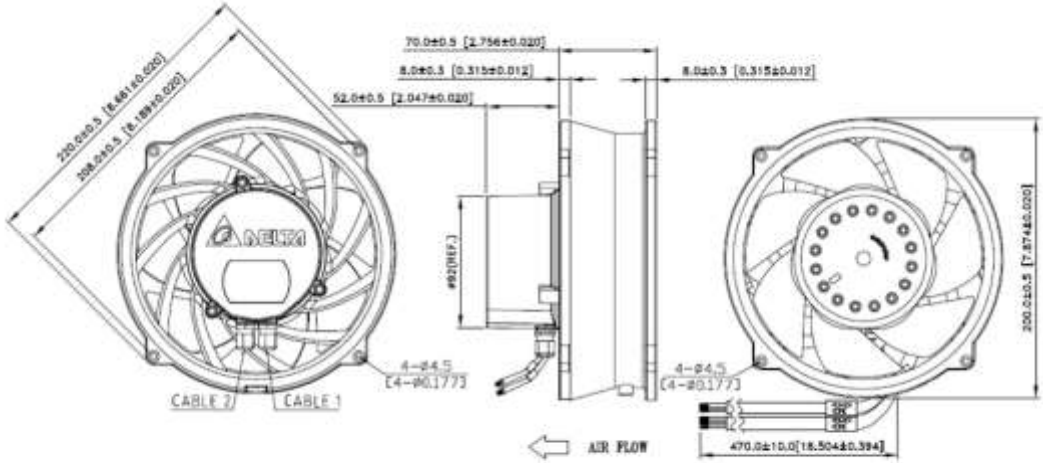
	Dose	Virus reduction
SARS-CoV-2	5 mJ / cm², 6s	99%
SARS-CoV-2	22 mJ / cm², 25s	99,9999%

Source: Boston University National Emerging Infectious Diseases Laboratories (NEIDL)

$$1\ mJ / cm^2 = 10\ J / m^2$$

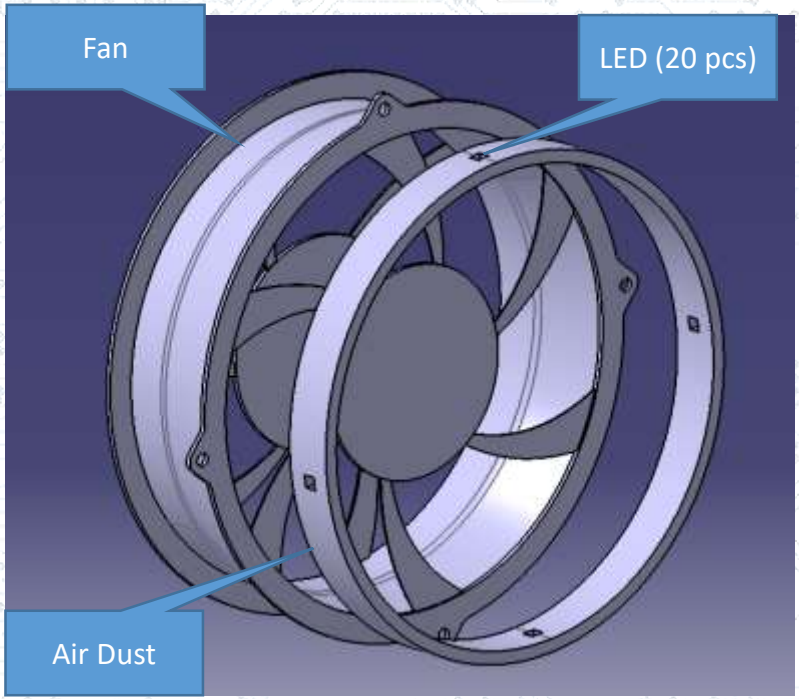
Dose:

$$D = \frac{Optical\ Power\ (W) * Exposure\ Time\ (s)}{Surface\ of\ Illumination\ (m^2)}$$



Design Recommendation:

1. We recommend to install an air duct at the outlet of the fan in order to stabilize the air flow and provide the LED installation position
2. Using 20 LEDs of PU35CH1 are all placed in the air duct. the average irradiance is about 5.36mw/cm².
3. The air velocity is 1177.37 m³/H (19.6m³/min). The cross-sectional area of the fan is about (R:100)²*π=31400mm²
4. The linear velocity of air can be about 19.6m³/min÷0.0314m²=624.2m/min
5. When the air duct length is 100mm, the actual sterilization time for air flowing through the air duct is 100mm÷624.2m/min=0.16 seconds
6. Therefore, the irradiance obtained through one flow is approximately 5.36mw/cm²×0.16 seconds=0.86mJ/cm²



Conclusion:

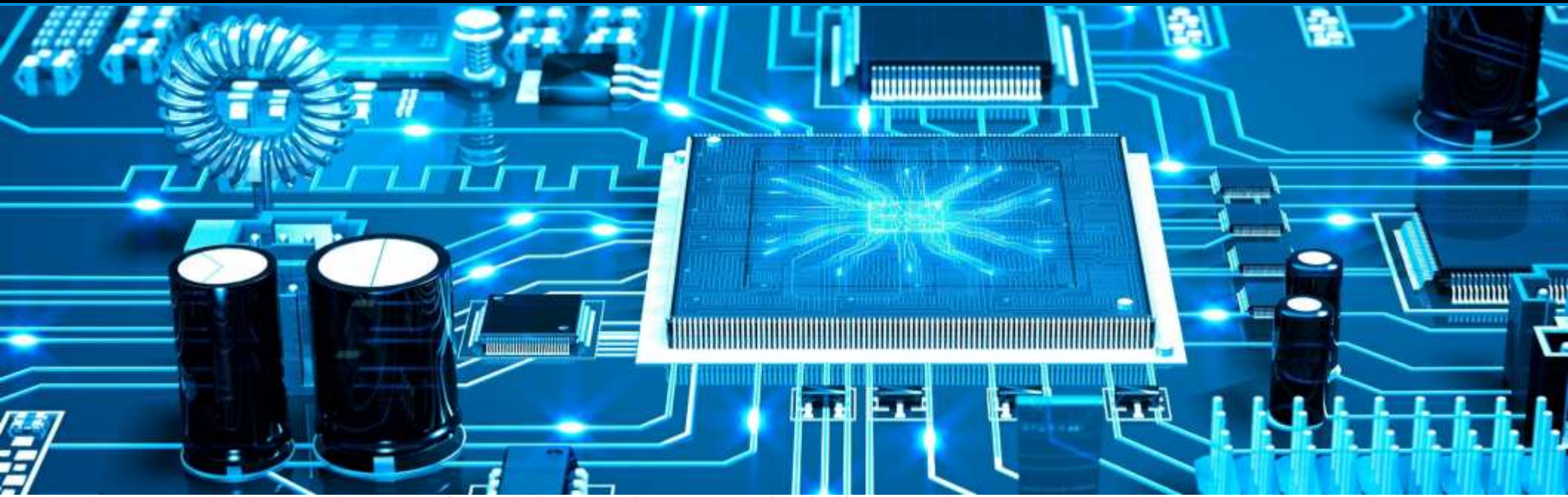
	Dose	Virus reduction
SARS-CoV-2	5 mJ / cm², 6s	99%
SARS-CoV-2	22 mJ / cm², 25s	99,9999%

sterilization is 99% (Log2)

1. The irradiance required is 5mJ/cm², and the irradiance obtained by air flow is about 0.86mJ/cm²
2. so it needs 5mJ/cm²÷0.86mJ/cm²=5.8 cycles
3. Since the flow rate is 19.6m³/min and the room size is 50m³, the air in the room needs to be fully circulated, it needs 50m³÷19.6m³/min=2.55min
4. Sterilization 99% requires 5.8 cycles, so the actual sterilization time is 2.55min*5.8=14.79min.

sterilization is 99.9999% (Log6)

1. In the same way, irradiance is 22mJ/cm², and 25.5 cycles are required. The actual sterilization time is 2.55min*25.5=65.03min



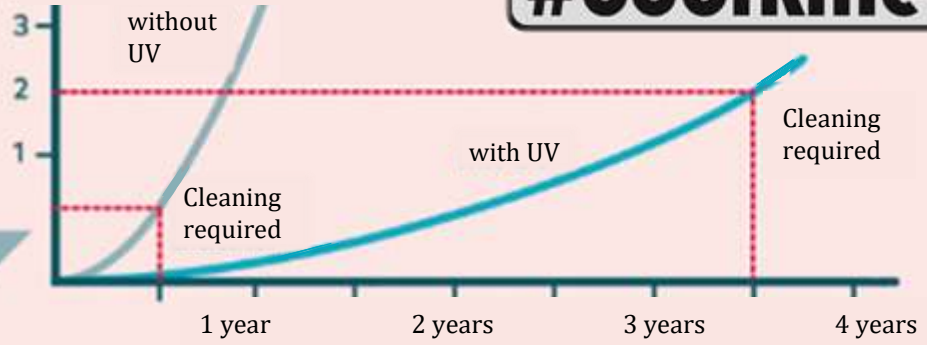
TARGET MARKETS, APPLICATION AND SUCCESS STORIES

Fire prevention

The costs of cleaning, in aprox 3.5 years, is 7 times higher without the usage of UV systems.

The risk of fire is substantially reduced by installing a UV systems.

Pollution degree + deposits in the system in mm



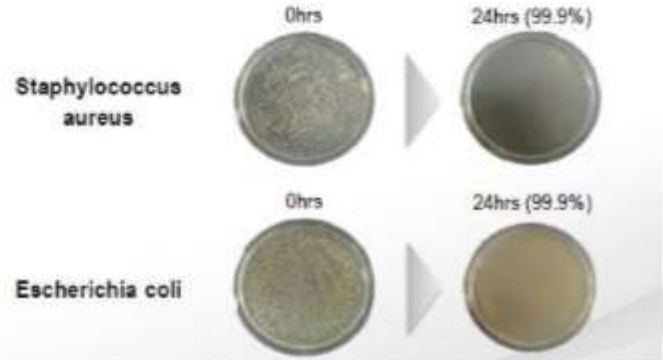
New Approach

405nm Light for Continuous Disinfection

New Applications

- **Lighting for disinfection**

	UV-C Light	405nm Light
Disinfection Characteristic	Terminal Disinfection	**Continuous Disinfection**
Safety	Safety hazards	**Can be used safely**
Efficacy	Rapid Inactivation	**Slower Inactivation**
Compatibility	Polymer Damage	**More Materials Compatible**
Penetrability	Does not penetrate	**Can penetrate**



- **405nm light** is also able to be used for disinfection and infection control
- Causing oxidation damage
- Successful inactivation demonstrated for a wide range of organisms†
- Safe disinfection for human body

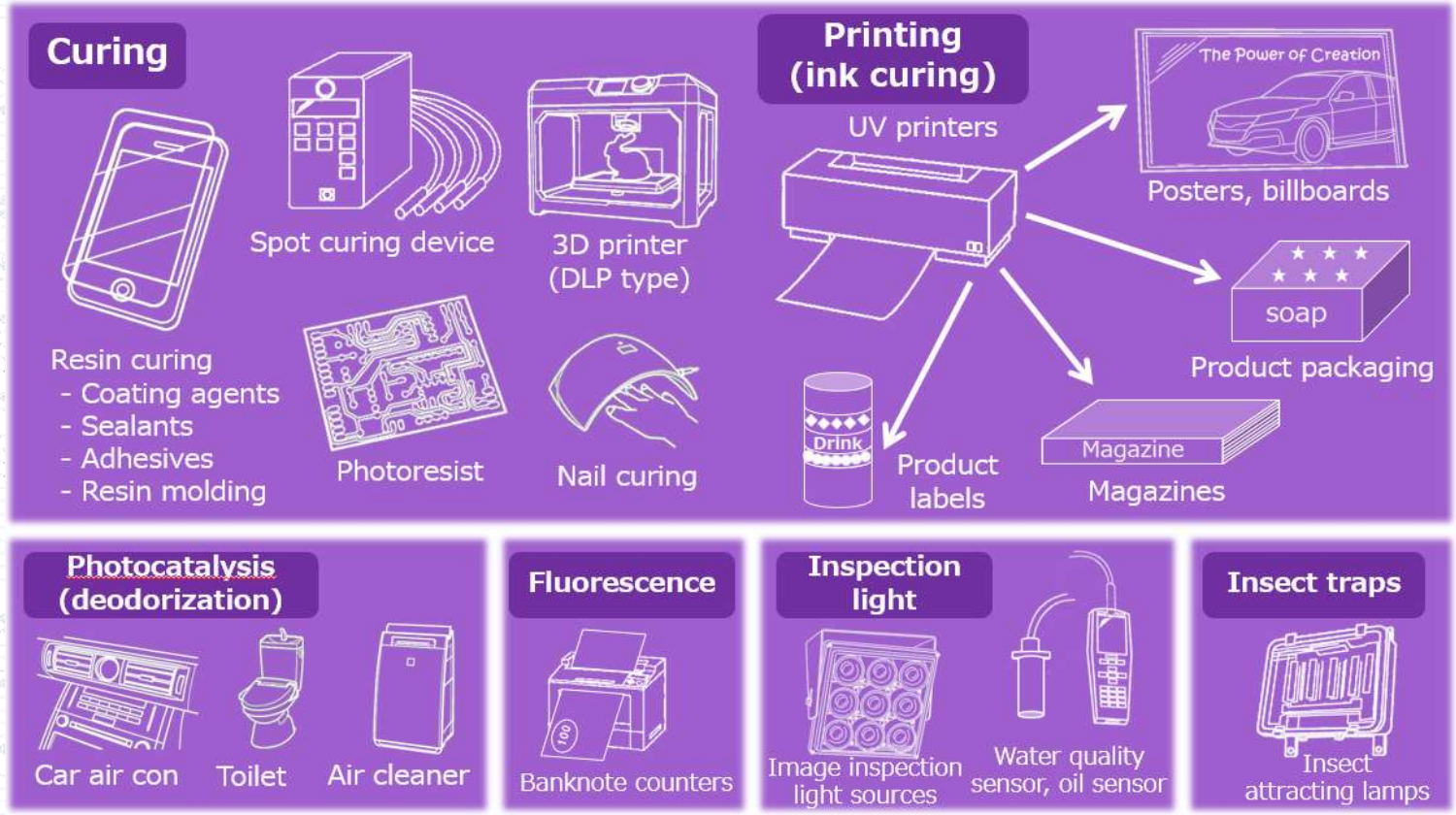
† S. aureus, Clostridium difficile, Acinetobacter baumannii, Escherichia coli etc.

UVA, UVB and UVC LED: Target markets and applications

UVC-LED

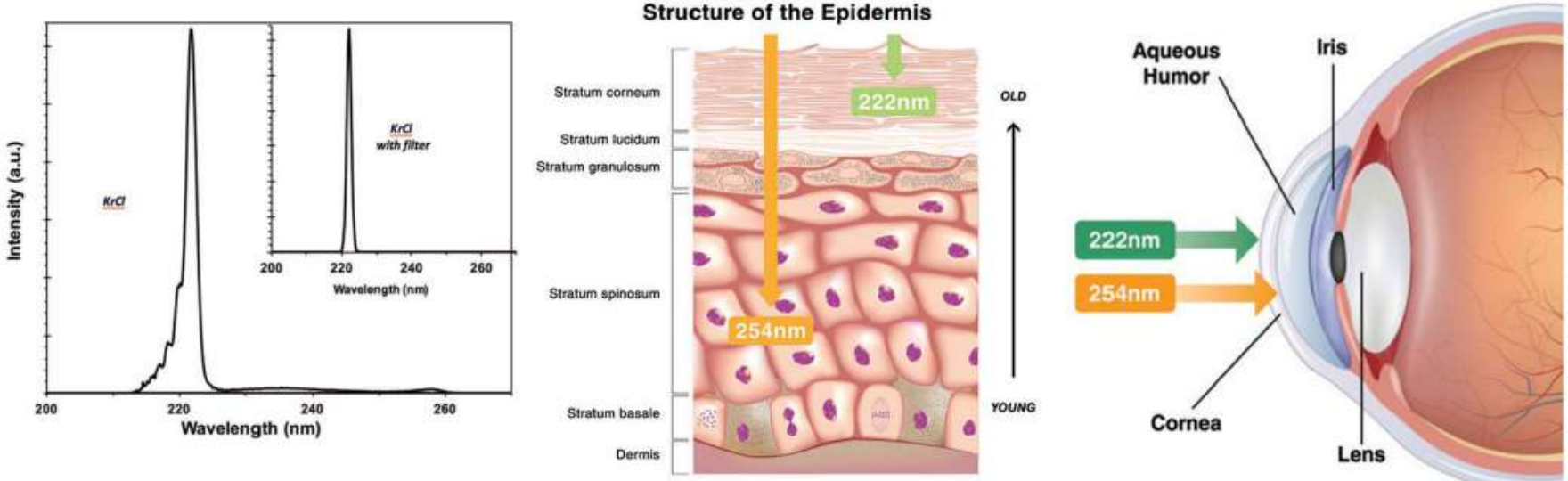
UVA, UVB and UVC LED: Target markets and applications

UVA-LED



Harmless for Human "safe" 222nm UV-C radiation

There are studies and publications on potentially safe UV-C radiation around 222nm.



SOURCE: USHIO - White Paper - care222-in-the-workplace-testing-effectiveness-of-long-range-surface-infection-prevention

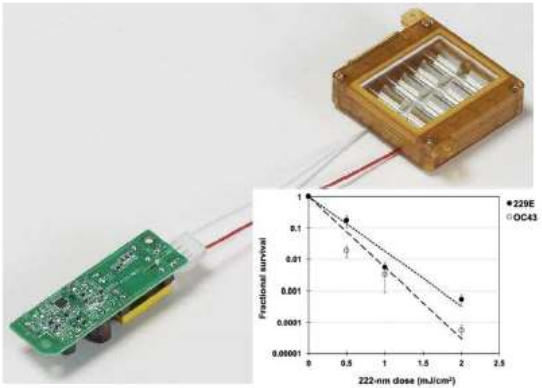
The Idea:
UV-C Radiation at 222nm is also germicidal because it will destroy the proteins in the DNA of germs. The penetration depth of the 222nm into human skin is significantly smaller and is therefore absorbed in the old / dead layer of the skin. The 222nm is also absorbed in the tear film of the eye. Therefore it is considered to be safe for human being and the treatment can be done with humans present.

UVC Excimer lamp at 222nm

(Mercury-free but with Ozone risk)

Less damage than 254 nm, but long-term safety data is lacking

Dimensions: 9.2 cm x 7 cm
Output: 5.4 mW/cm2
(2 cm from the window)
0.9 mw/cm2 @5 cm



SCIENTIFIC REPORTS
nature research

continuous far-UVC exposure in occupied public locations at the current regulatory exposure limit **(~3 mJ/cm2/hour)** would result in ~90% viral inactivation in ~8minutes, 95% in ~11minutes, 99% in ~16minutes and 99.9% inactivation in ~25minutes. Thus while staying within current regulatory dose limits, low-dose-rate far-UVC exposure can potentially safely provide a major reduction in the ambient level of airborne coronaviruses in occupied public locations."

FDA U.S. FOOD & DRUG ADMINISTRATION

There is some evidence that excimer lamps, with peak wavelength of 222-nm may cause less damage to the skin, eyes, and DNA than the 254 nm wavelength, but long-term safety data is lacking. Some UVC lamps will generate ozone. Ozone inhalation can be irritating to the airway.

European

IEC

Table 1.1 of Directive 2006/25/EC for artificial sources of non-coherent optical radiation

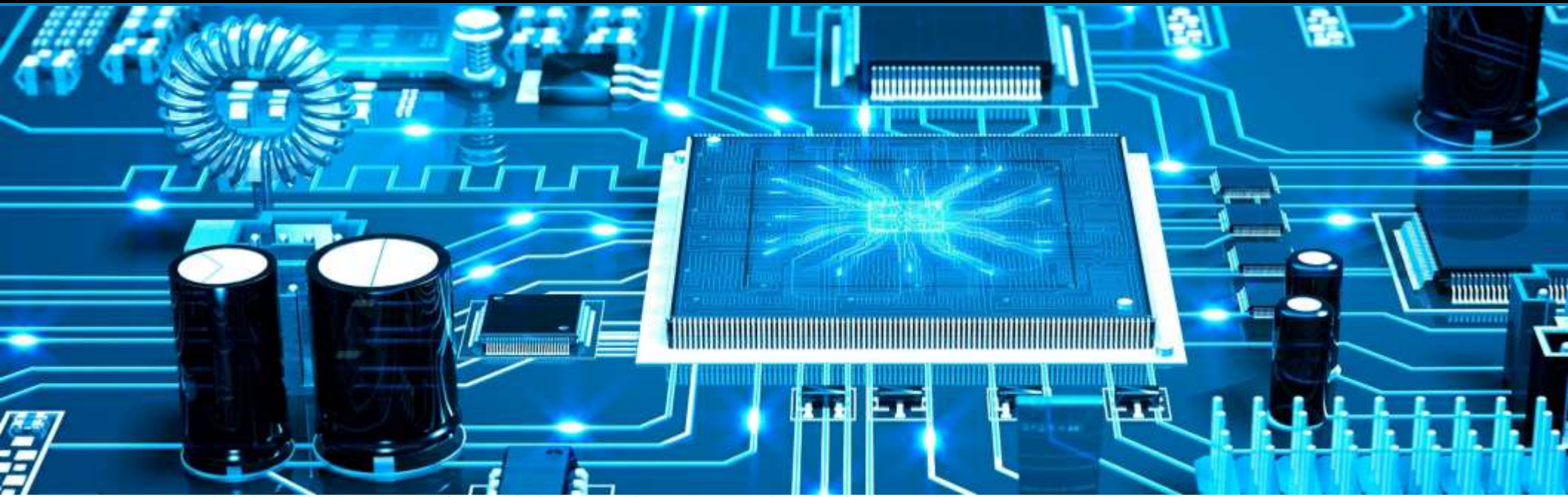
Wavelength, nm	Exposure Limit Value, ELV	Units	Part of the body	Hazard
180-400 (UVA, UVB and UVC)	H_{eff} = 30 Daily value 8 hours	[J m^{-2}]	eye cornea conjunctiva lens skin	photokeratitis conjunctivitis cataractogenesis erythema

additional risk assessment of the associated production of ozone in the environment. （<200 µg/m3 ）

Marketing trends - UVC LEDs replace Mercury lamp

The Minamata Convention requires the prohibition of the production and import of mercury-containing products from 1st/Jan., 2021, and mercury lamps are also listed here.

https://www.unenvironment.org/news-and-stories/story/minamata-convention-mercury-marks-three-years-protecting-human-health-and



UV LED RUTRONIK PORTFOLIO

UV-LED Rutronik portfolio, benchmark and roadmap

Type of light source	LEDs		CCL (Lamps)	
	Small size, low voltage, strong against repeated switching ON/OFF		High power output, low price, long lifetime compared to hot cathode lamps	
	Device	Module & unit	Device	Module & unit
Curing Printing UVA / Near-UV (315 to 400 nm)		 High density light source module	-	-
Disinfection UVC / Deep-UV (100 to 280 nm)		 High density light source module  Water sterilization module		 Water sterilization module

*The above product table includes products under development & products being planned.

UV-LED Rutronik portfolio, benchmark and roadmap

STANLEY UV LED product lineup

STANLEY ELECTRIC CO.,LTD.

Function	Disinfection		Curing/Printing/Photocatalysis (deodorization)/Fluorescence			
Wave length	UVC (100 to 280 nm)		UVA (315 to 400 nm)			
	265 nm	275 nm	365 nm	385 nm	395 nm	405 nm
Output	50mW @440mA	2.6mW @20mA	1,400mW @1,000mA	1,600mW @1,000mA	1,600mW @1,000mA	1,600mW 1,000mA
	High ● ZEUBE265-2CA	Low ● LEU9E275	High ● NEU1103EAE (広配光) ● NEU1108EAE (狭配光)			
			950mW @500mA	1,100mW @500mA	1,100mW @500mA	1,100mW @500mA
			Middle ● NDU1104ESE			

● Available ● New product ● Under Development

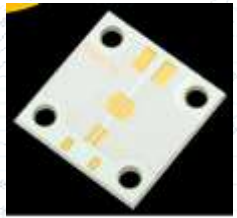
Stanley's lineup centers on the high-power range

UV-LED Rutronik portfolio, benchmark and roadmap

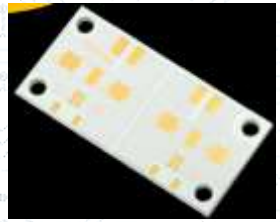
STANLEY【For evaluation – Substrate-mounted LED samples】 STANLEY ELECTRIC CO.,LTD.

4p-A

1p-B



4p-B



1p-A

ZEUBE265-2CA-4p-A

ZEUBE265-2CA-1p-B

ZEUBE265-2CA-4p-B

ZEUBE265-2CA-1p-A

UV-LED Rutronik portfolio, benchmark and roadmap

type		part number	

	wavelength		description
6060 PKG 1 in 1	272	S6060-DR250-W272-P100	typ. 272nm +6/-7nm, 100mW @ 250mA & 6-7V, SMD6060, 150° viewing angle
3535 PKG 1 in 1	272	S3535-DR100-W272-P40	typ. 272nm +6/-7nm, 40mW @ 100mA & 6-7V, SMD3535, 150° viewing angle
6060 PKG on hex PCB	272	Hex-S6060-100	typ. 272nm +6/-7nm, 100mW @ 350mA & 6-7V, SMD6060 on Hex PCB, 150° viewing angle
1x4 array	272	2S2P-S6060 UVC SMD LED array	typ. 272nm +6/-7nm, 360mW @ 250mA/chip, lensed LED 150°, 2S2P SMD LED Module
1x12 array	272	3S4P-S6060 UVC SMD LED array	typ. 272nm +6/-7nm, 1.2W @ 250mA/chip, lensed LEDs 150°, 3S4P SMD LED Module
5x5 array	272	5S5P-S6060 UVC SMD LED array	typ. 272nm +6/-7nm, 2W @ 250mA/chip, lensed LED 150°, 5S5P SMD LED module
flood lamp with 5x5 array	272	BLAZAR flood lamp	typ. 272nm +6/-7nm, 2W @ 1250mA, typ. 36V, max. 40V, viewing angle 55° with reflector

UV-LED Rutronik portfolio, benchmark and roadmap

UVA LED PKG Roadmap

Lextar

Printing curing

- >4000mW/cm2
- Ultra high radiant intensity
- Focus light

PCB curing/exposure

- 250~4000mW/cm2
- Ultra high radiant intensity
- Focus light/ Collimated Light

Lower power curing

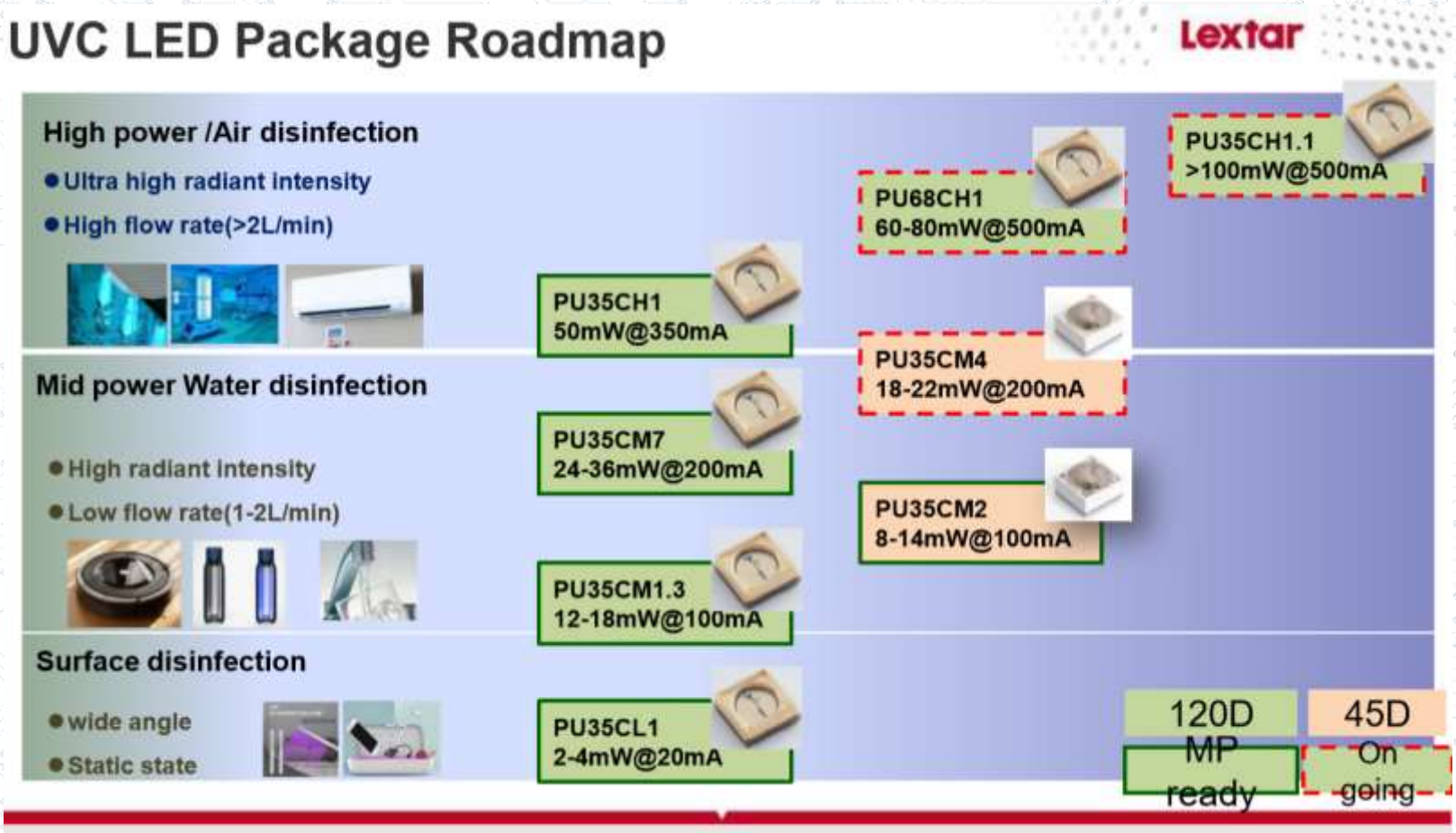
- wide angle
- High performance/ low Cost

End Product / Current	20mA	350mA	500mA	1000mA
	20mW 120° 2016 PU21S31.0 365nm Al_2O_3	500mW 120° 3535 PU88S11.0 365nm Al_2O_3	570mW 120° 3535 PU88S04.0 395nm Al_2O_3	850mW 120° 3535 PU88S01.0 365nm Al_2O_3	1000mW 120° 3535 PU88S01.0 395nm Al_2O_3	1200mW 60° 3535 PU88S05 365nm AlN MP: Q4 20 Under Development (Sample Ready)	1400mW 60° 3535 PU88S05 395nm AlN MP: Q4 20
---	---	---	---	---	---	---	---

PU88S01_365nm
Current: 1000mA
Reported
L70>20000hrs

PU88S01_395nm
Current: 1000mA
Reported
L70>50000hrs

UV-LED Rutronik portfolio, benchmark and roadmap



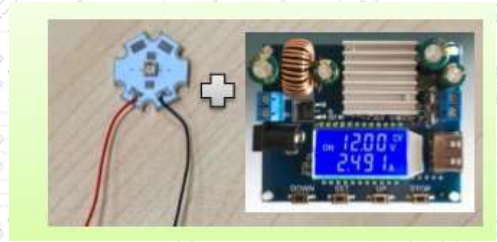
Air Clean in Car

Kettle

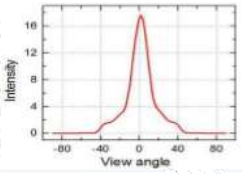
UV-LED Rutronik portfolio, benchmark and roadmap

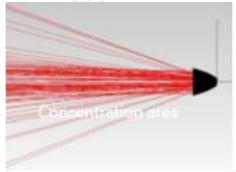
- Test Sample # Type-1
- UVC LED Driver Board
- 15mW Version: LED @150mA (6/M available)
- 30mW Version: LED @350mA (7/E available)
- LED PKG for 15mW: PU35CM1 Power input VDC: 10~24V available

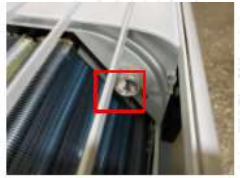
- Test Sample # Type-2
- UVC LED on Star Board with Driver
- LED PKG type: PU35CM1/ PU35CL1
- Driver: voltage/current adjustable

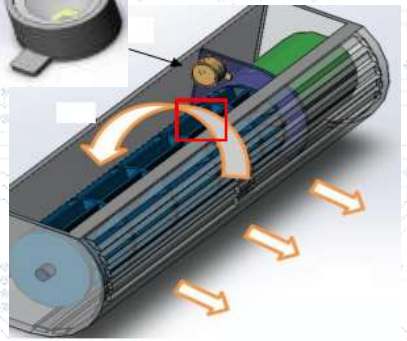


- Test Sample # Type-3
- Size with 20mm & 24V voltage to work
- The module is reserved for screw holes
- The ultraviolet light is highly concentrated is about 15° (<5% outside)









UV-LED Rutronik portfolio, benchmark and roadmap

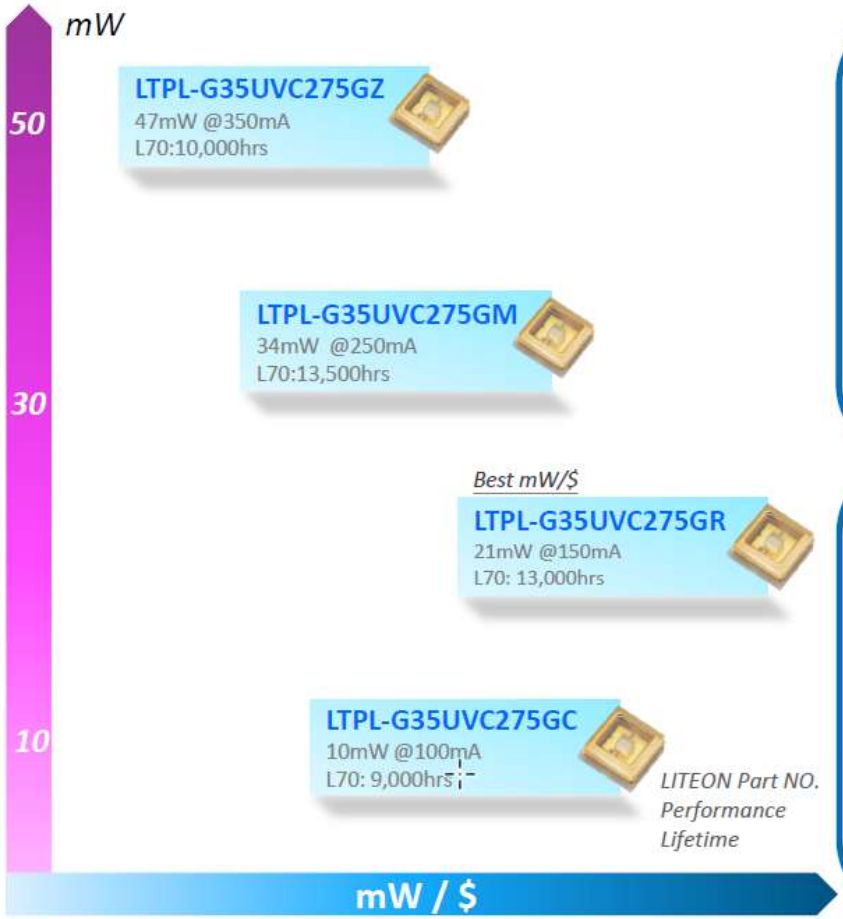
The Applications of Sterilization Modules

Lextar

	Water Purification Module	Water Purification Module	Air Sterilization Module	Surface Sterilization Module
Model	Static Purification Module	Dynamic Purification Module	Air flow Module	Surface treatment Module
Function	2L~3L 7L~8L	0.6L 2L	700m3/h (0.77m/s) @ the space of 30m^3	1cm for 1~10s
Radiant Power	3mW 14mW	30mW 120mW	3mW 14mW 25mW	3mW 14mW
UVC model	LBM3502 V0 LBM3502 V1 LBM1101 V0 LBM1801 V0 LBM1801 V1	LBM3501 V0 LBM4201 V0	LBM2101 V0 LBM2101 V1 LBM2101 V2	PU35CL1.1 PU35CM1.3
Application	Water dispenser tank Dehumidifier water tank Fish tank	Water purifier waterway Water dispenser waterway Smart toilet Coffee machine Ice maker	Various air conditioners Air filter Refrigerator air duct	Humidifier Insulation cup Free-treatment toilet nozzle Escalator Vacuum Cleaner
Pictures				

Test Module available

UV-LED Rutronik portfolio, benchmark and roadmap



UV-LED Rutronik portfolio, benchmark and roadmap

LITEON UVA LEDs Portfolio

- **Curing** in 3D Printer, Dental, Nail Oil & UV Ink Printing
- **Photo-catalyst** for deodorization in Air purifier & Refrigerator

Radiant Power (mW)

E30

M Series
@20mA
VA 135°
- 21mW
- 21mW
- 20mW
- 20mW
- 17mW

C16

E Series
@350mA
VA 135°
- 440mW
- 440mW
- 420mW
- 410mW
- 340mW

C034

E Series	G Series
@350mA	@700mA
VA 130°	VA 130°
690mW	1230mW
690mW	1230mW
670mW	1210mW
660mW	1190mW
530mW	1140mW

C036

E Series	G Series
@350mA	@700mA
VA 30°	VA 55°
810mW	1455mW
810mW	1455mW
780mW	1425mW
760mW	1400mW
630mW	1340mW

S35

G Series
@1000mA
VA 60°
- 1610mW
- 1610mW
- 1590mW
- 1560mW
- 1500mW

2020.Q3 MP

- 430nm
- 405nm
- 395nm
- 385nm
- 365nm

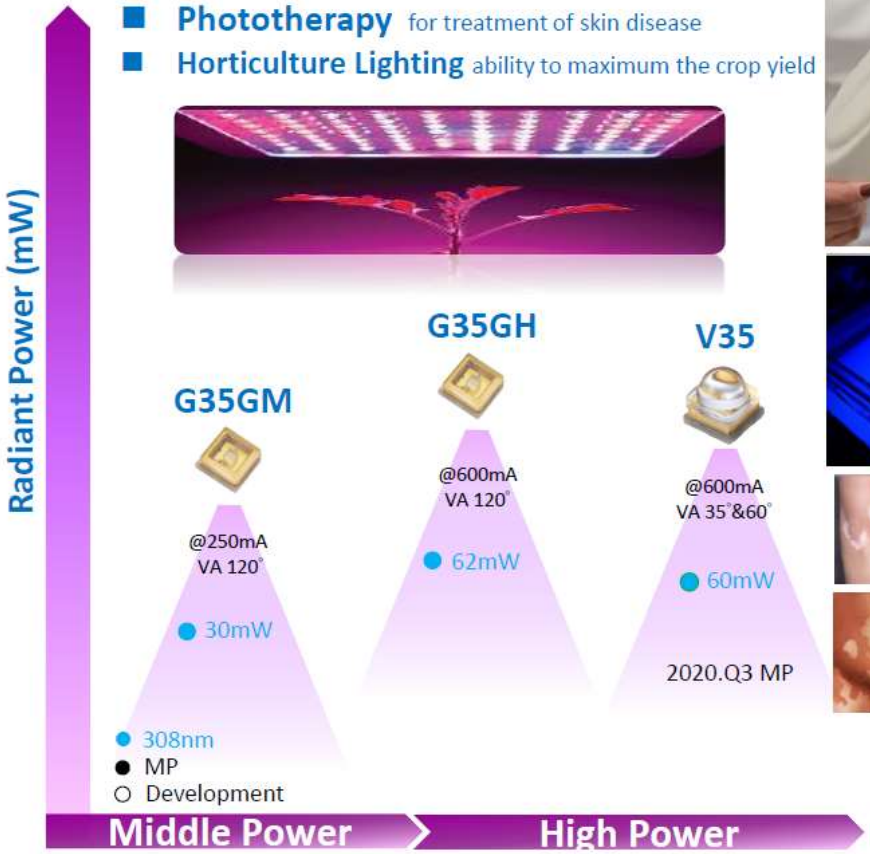
● MP
○ Development

Low Power | **Middle Power** | **High Power**

UV-LED Rutronik portfolio, benchmark and roadmap

LITEON UVB LEDs Portfolio

- **Phototherapy** for treatment of skin disease
- **Horticulture Lighting** ability to maximum the crop yield

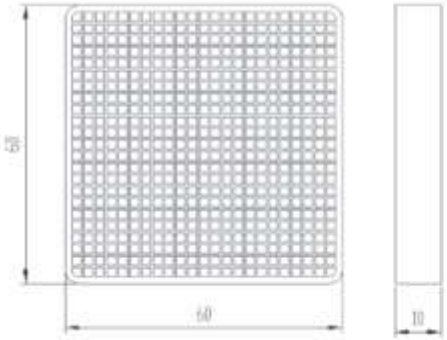


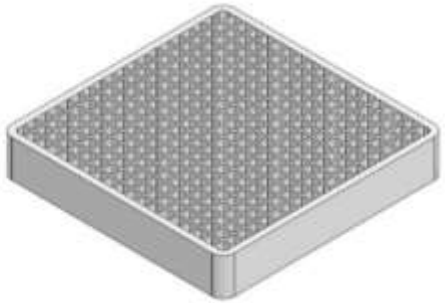
UVB light are most effective and proven for treatment of skin diseases the most effective lamps currently available for the treatment of Psoriasis and Vitiligo, as well as other less common skin diseases.

UV-LED Rutronik portfolio, benchmark and roadmap

Purify Module example: 4x UVA LED + Photocatalyst filter: available

4pcs of LTPL-C034UVG365 + Filter Al_2O_3 (Coating Material TiO2 Photocatalyst part number LTPL-R6060BSH)





UV-LED Rutronik portfolio, benchmark and roadmap

VISHAY

UV A LEDS

± 30 °	± 60 °	± 65 °	± 65 °	± 60 °	± 30 °	± 67 °
VLMU3500…-060	VLMU3500...-120	VLMU3510...-130	VLMU3511-120	VLMU3520…120	VLMU3520…060	VLMU1610...-135
385, 395, 405 nm	385, 395, 405 nm	365 nm	365 nm	385, 395, 405 nm	385, 395, 405 nm	365 nm
3.5 x 3.5 x 2.9	3.5 x 3.5 x 2.0	3.45 x 3.45 x 2.1	3.5 x 3.5 x 2.1	3.5 x 3.5 x 2.2	3.5 x 3.5 x 2.9	1.6 x 1.6 x 1.4
typ. 1037 mW @ 700 mA	typ. 1037 mW @ 700 mA	typ. 945 mW @ 700 mA	Typ 1000 mW @ 600 mA	Typ 2.000 mW @ 1.2 A	Typ 2.000 mW @ 1.2 A	typ. 13 mW/sr @ 60 mA
				SOP 2020	SOP 2020	

UV-LED Rutronik portfolio, benchmark and roadmap

VISHAY

OVERVIEW – NEW COST EFFICIENT UVC SERIES

UV-C LED Update OSRAM OS

Product roadmap & sample timing

	2020			2021			
	CQ2	CQ3	CQ4	CQ1	CQ2	CQ3	CQ4
Low power LED Output <5mW SU CULBN1.VC		▲ Samples & draft DS	▲ Datasheet & spec	▲ Launch			
Mid power LED Output 5-50mW SU CULDN1.VC		▲ Samples & draft DS	▲ Datasheet & spec	▲ Launch			
High power LED (>50 mW[1])					▲ Tentative Launch		

OSRAM
Opto Semiconductors

Product details

OSLON UV

3.8 x 3.8 mm²

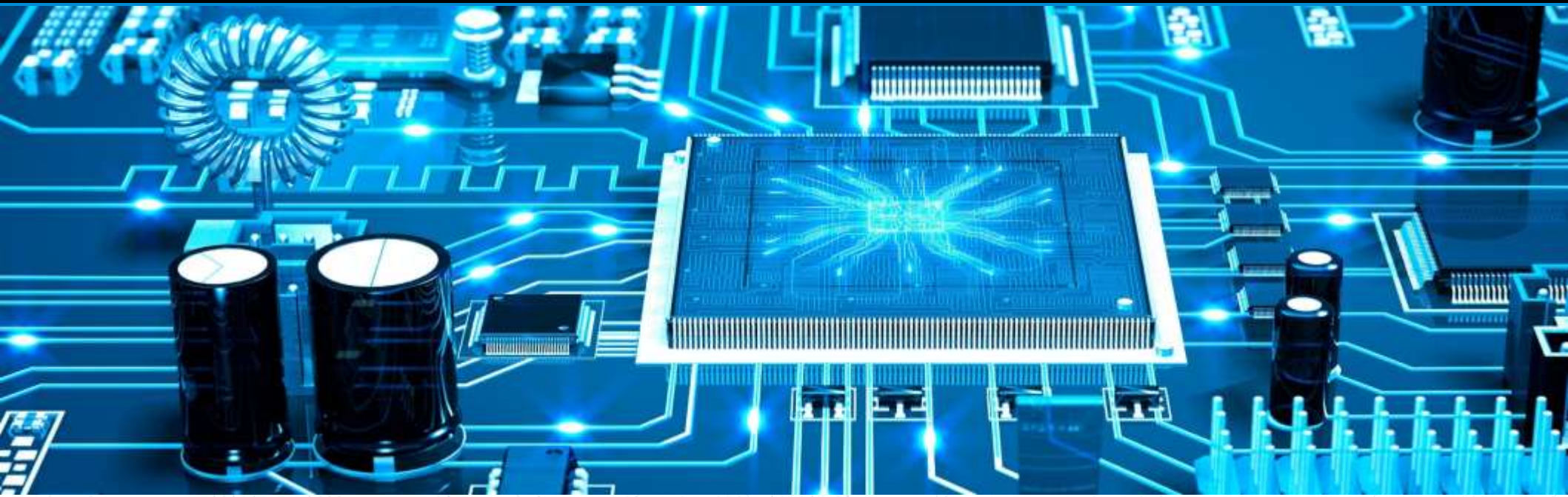
Features

- High radiant flux
- Good reliability
- Low power dissipation
- ROHS compliant
- ESD capability up to 5 kV (low power) / 8 kV (mid power)

Purification applications

- Consumer
- Industrial (e.g. white goods)
- Other disinfection

Type	Radiant flux [mW]	Peak wavelength [nm]	Emission angle [°]	Voltage [V]	Binning current [mA]	Max. current [mA]	EQE [%]	Lifetime[1] [h]
Low power Output SU CULBN1.VC	3.8	275	120	6.4	30	50	2	≥ 9,000 (under constant update)
Mid power Output SU CULDN1.VC	42	275	120	6.2	350	500	2	> 5,000 (under constant update)



FACTSHEETS

Lens for UV-LEDs

Ideal for odour elimination and disinfection applications

Key Parts
- FN17294_VIOLET-12X1-S
- ~20° wide beam when used with one UV LED
- 295 x 42 x 8,8 mm
- 12-Lens row

Key Applications
- Surface disinfection
- Water disinfection
- Air disinfection

Key Benefits
- Resistent Silicone
- RoHS-Conformity
- Clusters or single LEDs 3535, 6868, CSP

Why should I buy this product?
- Compression of the UV-Light Diffusionangle
- Can be used with up to 4 LED clusters
- Compatible with UV LEDS from Viosys and Nichia

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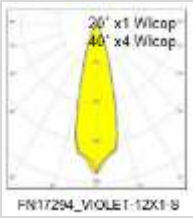

UV-Sensor

SiC-UV-Photodiodes

Key Parts

- Spectral sensitivity ranges from 205 to 355 nm
- Adaptation of spectral sensitivity through filter technologies for UV-A, UV-B and UV-BC
- integrated signal processing, also Solar Blind

Key Applications

- **Water disinfection** (snow cannons, waterworks, washbasin)
- **Monitoring** (of Uv emitters in disinfection plants, flame monitoring, irradiance during paint and adhesive curing)

Key Benefits

- Outstanding long-term stability - even at high UV-C radiation doses of up to 1000 W/m2
- Extreme temperature stability:The temperature coefficient is at Tk < - 0.06 %/K continuous operating temperature up to + 150 °C

Why should I buy this product?

- Extremely low dark current level in the fA range
- Hermetic TO-package
- The user only has to install the sensor in the housing corresponding to the respective standard or his plant in order to realise the required geo-metric optical conditions.

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LED Driver for germ contamination and odor killer applications

AL8843 – 40V 3A DC-DC buck LED driver IC

The AL8843 is a hysteresismode DC-DC step-down converter, designed for driving single or multiple series connected LEDs efficiently from a voltagesource higher than the LED voltage. The device can operate from an input supply between 4.5V and 40V and provide an externally adjustable output current up to 3A. Depending upon supply voltage and external components, this converter can provide up to 60W of output power.

Features

- Wide Input Voltage Range: 4.5V to 40V
- Output Currentup to 3A
- Internal 40V NDMOS Switch
- Typical 4% Output Current Accuracy
- Single Pin for On/Off and Brightness Control by DC Voltage or PWM Signal
- Recommended Analog Dimming Range: 10% to 100%
- Soft-Start
- High Efficiency (Up to 97%)
- LED Short Protection
- Inherent Open-Circuit LED Protection
- Over Temperature Protection (OTP)
- Up to 1MHz Switching Frequency
- SO-8EP Packages

DIODES INCORPORATED

ILD6150 – 60 V DC-DC buck LED driver IC

ILD6150 is a DC-DC LED driver IC with 60 V break-down voltage with an integrated MOSFET.

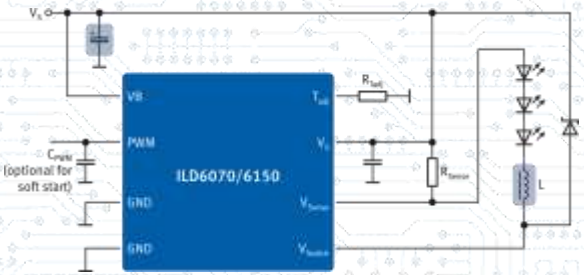
Benefits

- Well suited for LED drivers with SELV
- Optimal BOM due to integrated MOSFET
- Flexibility for dimming input
- Thermally robust product

Features

- Input voltage up to 60 V
- Integrated MOSFET for up to 1.5 A output current
- PWM or analog input for dimming
- Thermally enhanced DSO-8 exposed pad package

Infineon



VOC Sensor

Multi-Pixel Gas Sensors SGP

Enabling accurate measurements of Volatile Organic Compounds (VOC) to improve IAQ and your quality of life

Key Features

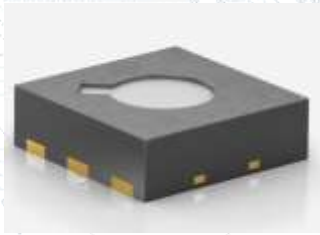
- Relative Measurement
- Easy integration
- metal-oxide gas sensor technology
- I2C Interface

Key Applications

- Air purifiers
- Kitchen hoods
- Toilets
- IoT Aplications
- Demand-controlled ventilation
- Thermostats
- Indoor air quality monitoring

Key Benefits

- long-term stability and accuracy.
- On-chip humidity compensation
- Small footprint
- Reliable sensor hardware



Why should I buy SGP?

- Suitable for battery-powered devices
- Suitable for both mobile and hardwired devices (Voltage range of 1.7–3.6 V)
- Best performance-price ratio
- Excellent longevity of > 10 years

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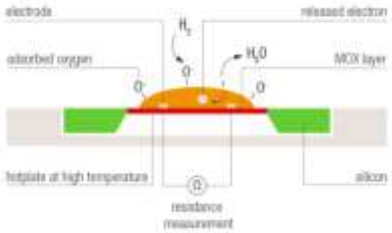

SENSIRION

HMI

ST's 3 axis digital gyroscopes

ST's latest gyroscopes feature excellent accuracy as a result of their unique and patented mechanical structure based on a single driving mass.

Key Features

- Full-scale range (from 30 to 4000 dps)
- Digital Output
- Extended operated temperature range (-40 °C to +85 °C)
- ECOPACK®, RoHS and "Green" compliant
- Low power Comsumption

Key Applications

- Industrial applications
- Navigation systems and telematics
- Motion control and image Stabilization
- Appliances and robotics
- Gaming and virtual reality input devices

Key Benefits

- 3-axis gyroscopes with 1 structure sensing
- Increased accuracy and reliability of motion-controlled functionalities.
- superior stability over time and temperature

Why should I buy SGP?

- Higher stability, accuracy and reliability
- Best performance-price ratio
- Perfect fit for a wide range of applications

life.augmented

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Murata IRA series

Pyroelectric infrared sensor

Key Features

- Functionality: Conversion of a signal generated by temperature change into a corresponding electric current.
- Low power
- IRA series covera different target detection area

Key Applications

- Security systems
- Motion sensor
- Lighting automation

Key Benefits

- Compact design
- Energy efficiency
- Module comprising ambient light sensor, proximity sensor and signal processing IC
- Desing-in capable
- Automotive certified

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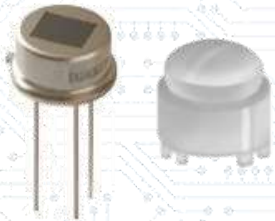

Fan portfolio DC

Best Fit for Project Odor Killer and Germ Contarmination Application

Key Features

- Bearing: Dual Ball, Sleeve, Ball
- Rated Voltage:5-48V
- Air Flow: 0.2 - 290CFM
- Speed: 900 – 26500R.P.M
- Lifetime: 50K - 100K hours
- Size: 25 x 25 -172 x 51mm

Key Applications

- Interior Vehicle
- Small portable devised

Key Benefits

- Compact design
- Longevity (Dual Ball Bearing)
- Wide range of sizes

Why should I buy this product?

- IP protection according to the requirement
- PWM, speedometer according to the requirement
- Specification according to customer requirements (connector, cable length)
- Good price-performance ratio

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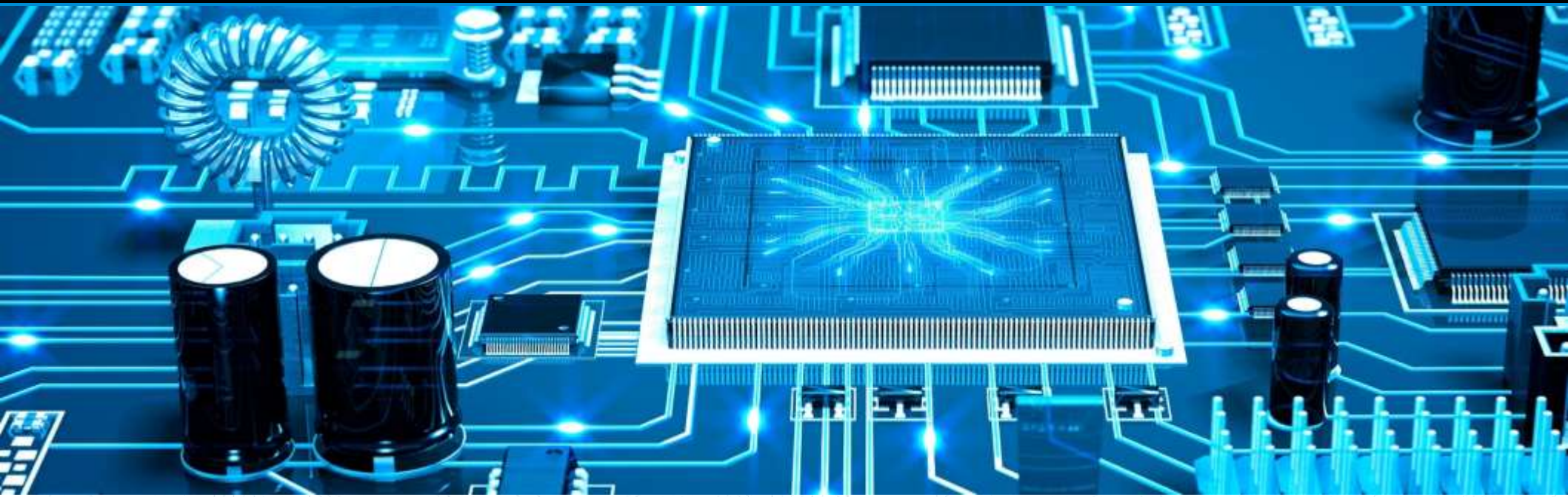
ADDA
DELTA
JAMICON



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