



ProLight

ProLight UV-A Products for Curing Application

Background



ProLight Since 2004

Focus on **High Power LED package** in Lighting Market.

Chairman: FM Chen (Ex-Senior VP Philips Lighting Asia Pacific)

General Manager: Michael Hsing (Ex-GELcore)

HQ & Factory : Taiwan Taoyuan

Branch : Shanghai / Shenzhen

Employees : 300 people

Production : 200 KK/ month

Revenue : 40% Standard LED

60% Customized Design

2012, **Epistar Group** invested ProLight

2012, **IPO** in Taiwan (Stock code:5277)

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Supplier Chain Position



- Focus on level 1, 2 & 3
- Focused on light and professional niche application.
- Develop **good quality** and **competitive product** for customer.(**customized /niche/value-added**)

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ProLight Business Segments

Entertainment



Commercial Lighting



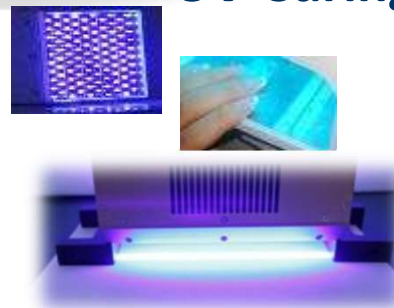
Outdoor /
Architecture



Automotive



UV Curing



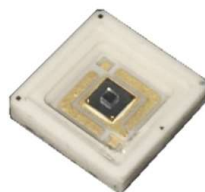
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UV Product Portfolio

Deep UV



3535 2mW



3535 10mW



Under develop

3535 30mW

Near UV

120°

130°



3020



K1

130°

150°



CSP 1.6x1.6



Smallest 4W Pkg

30° /60° /130°



3535

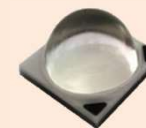
35° /60° /130°



3535



60°



5050

45° /65°

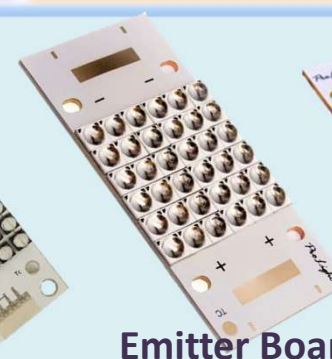


7070

Quartz Lens/ Inorganic Pkg



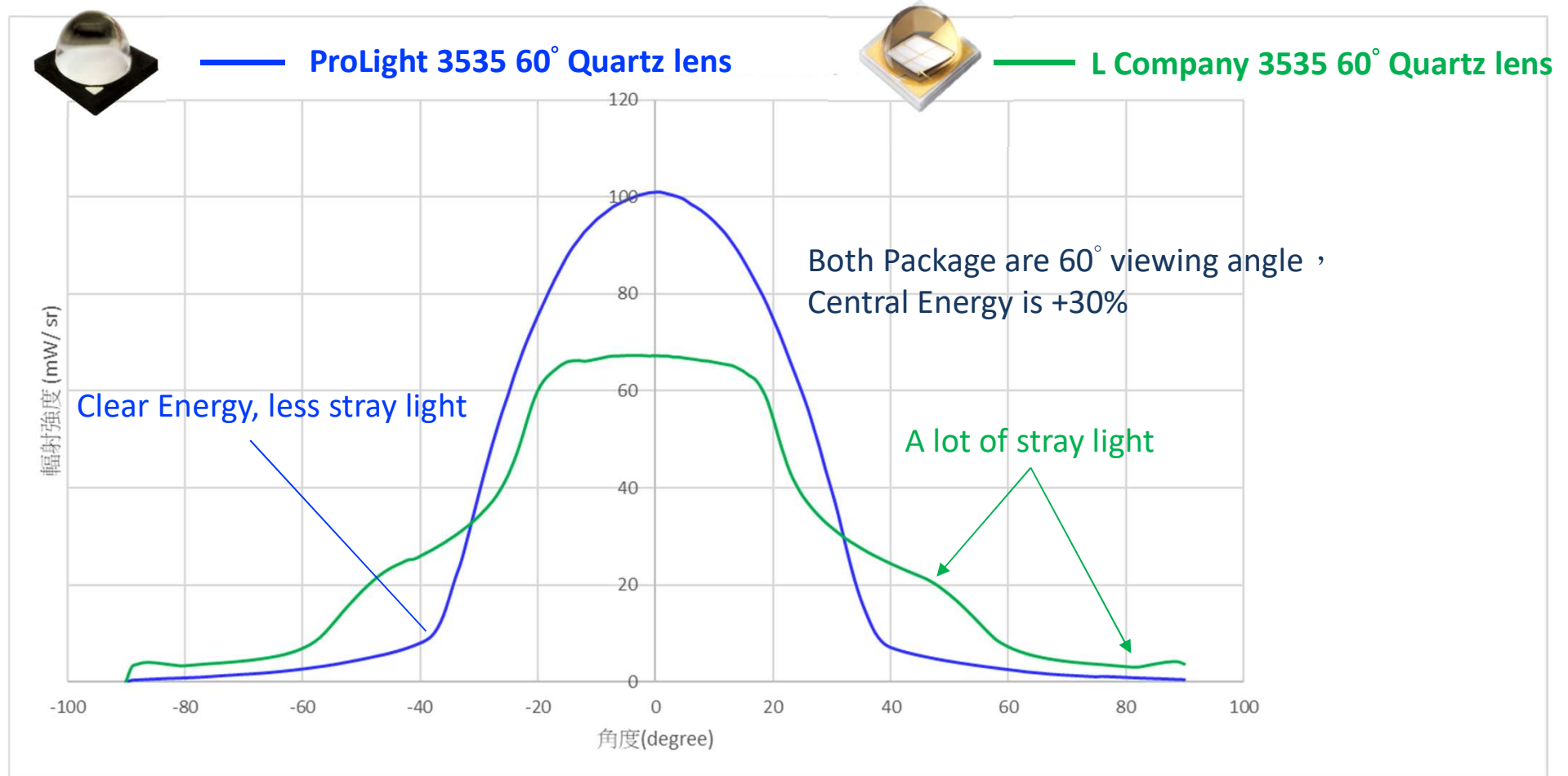
Quartz COB



Emitter Board

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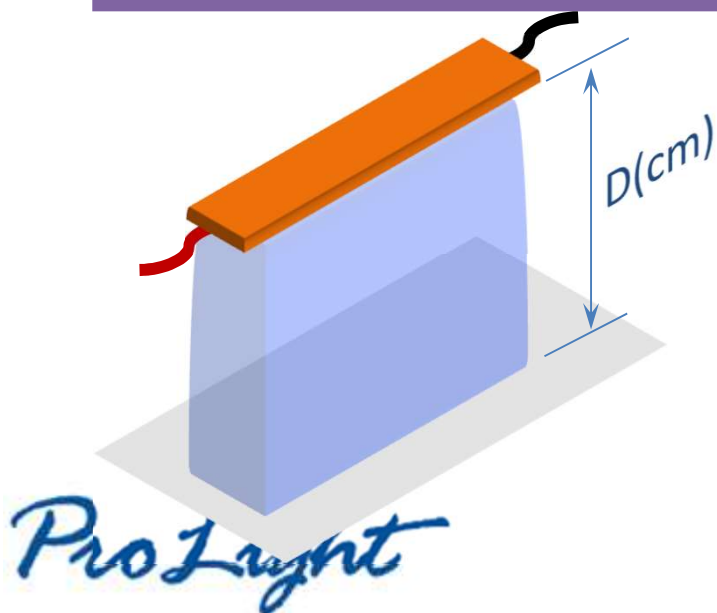
3535 UV Package Viewing Angle & Intensity Comparison



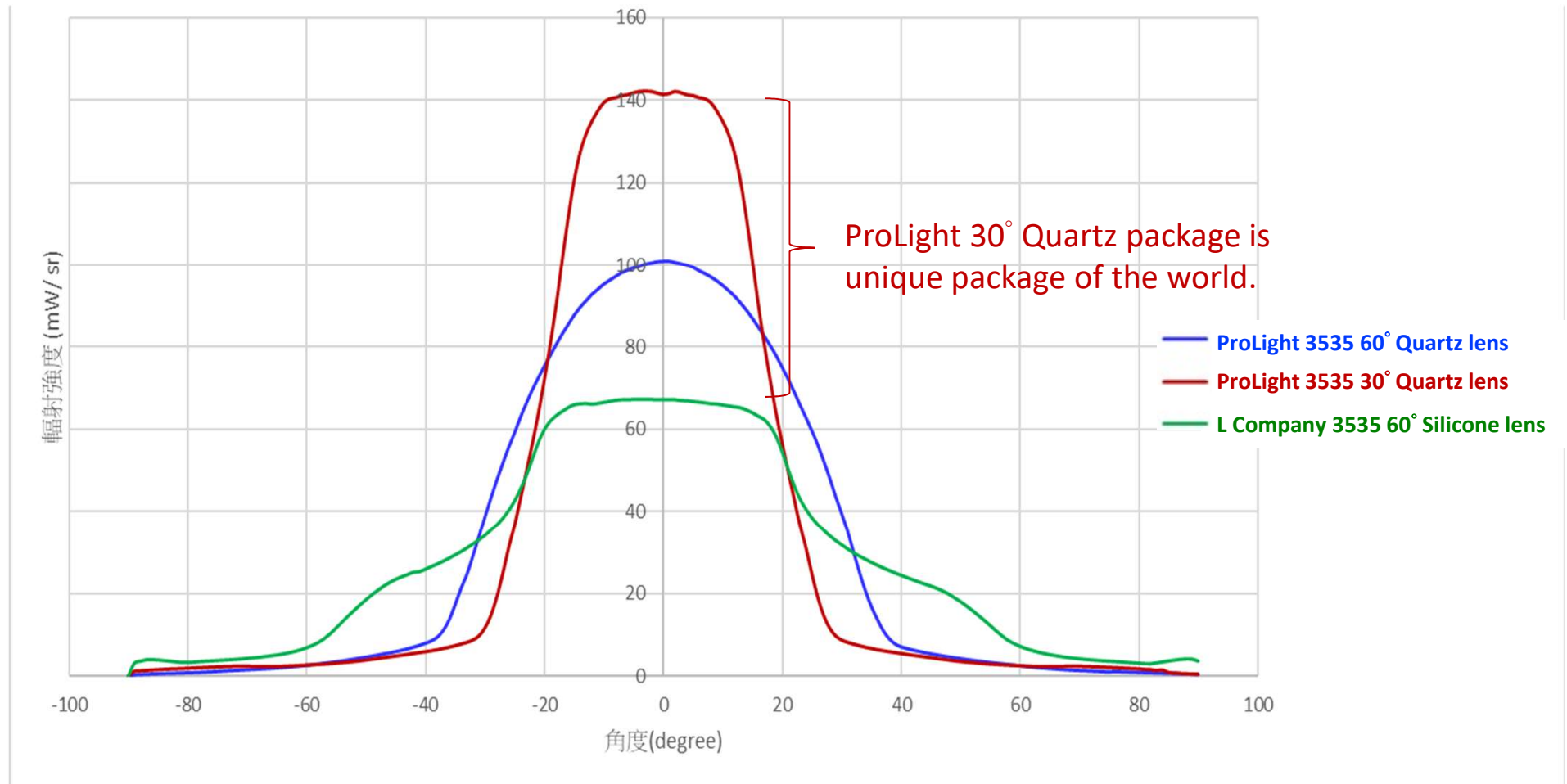
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3535 UV Energy Lux Comparison with Lx

Package Type \ Eng. lux(W/cm ²) \ Distance(cm)	2	3	5	10	15	20
ProLight Quartz lens 60° UV395nm	9.009	7.787	5.265	2.015	1.001	0.650
L Company Silicone lens 60° UV395nm	8.736	6.006	3.796	1.469	0.702	0.455
Deviation (%)	3%	23%	28%	27%	30%	30%



Best Choice of **LONG** Distance Curing Condition

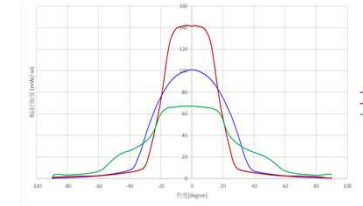


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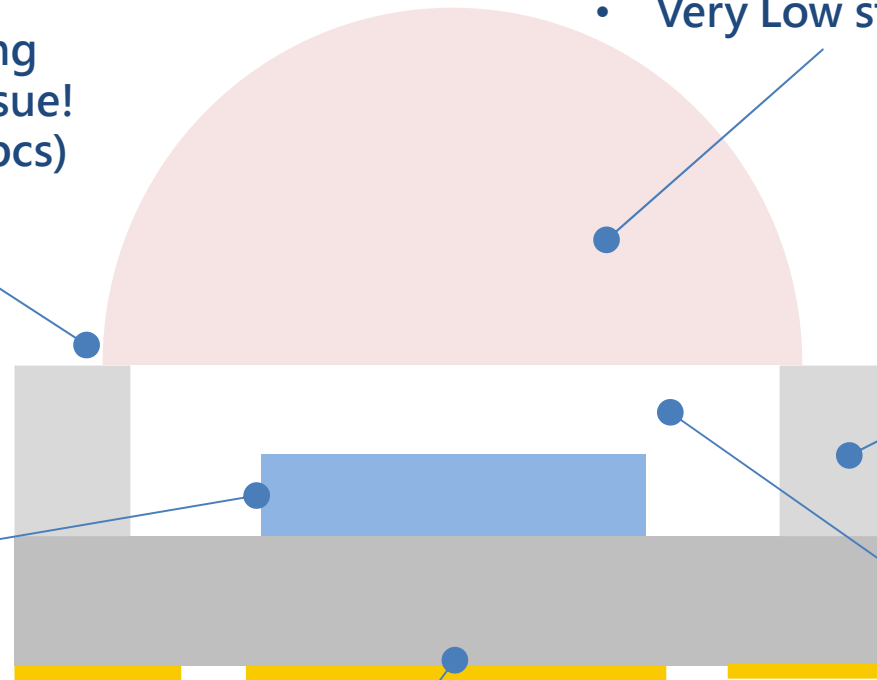
ProLight Quartz Lens Advantage

- Inorganic Sealing
- No lens drop issue! (experience >2KKpcs)

- High Purity Quartz Lens from Germany
- 120° / 60° / 30° available.
- Unique 30° Quartz of the world!
- Very Low stray light



- LG or Epistar chip warranty



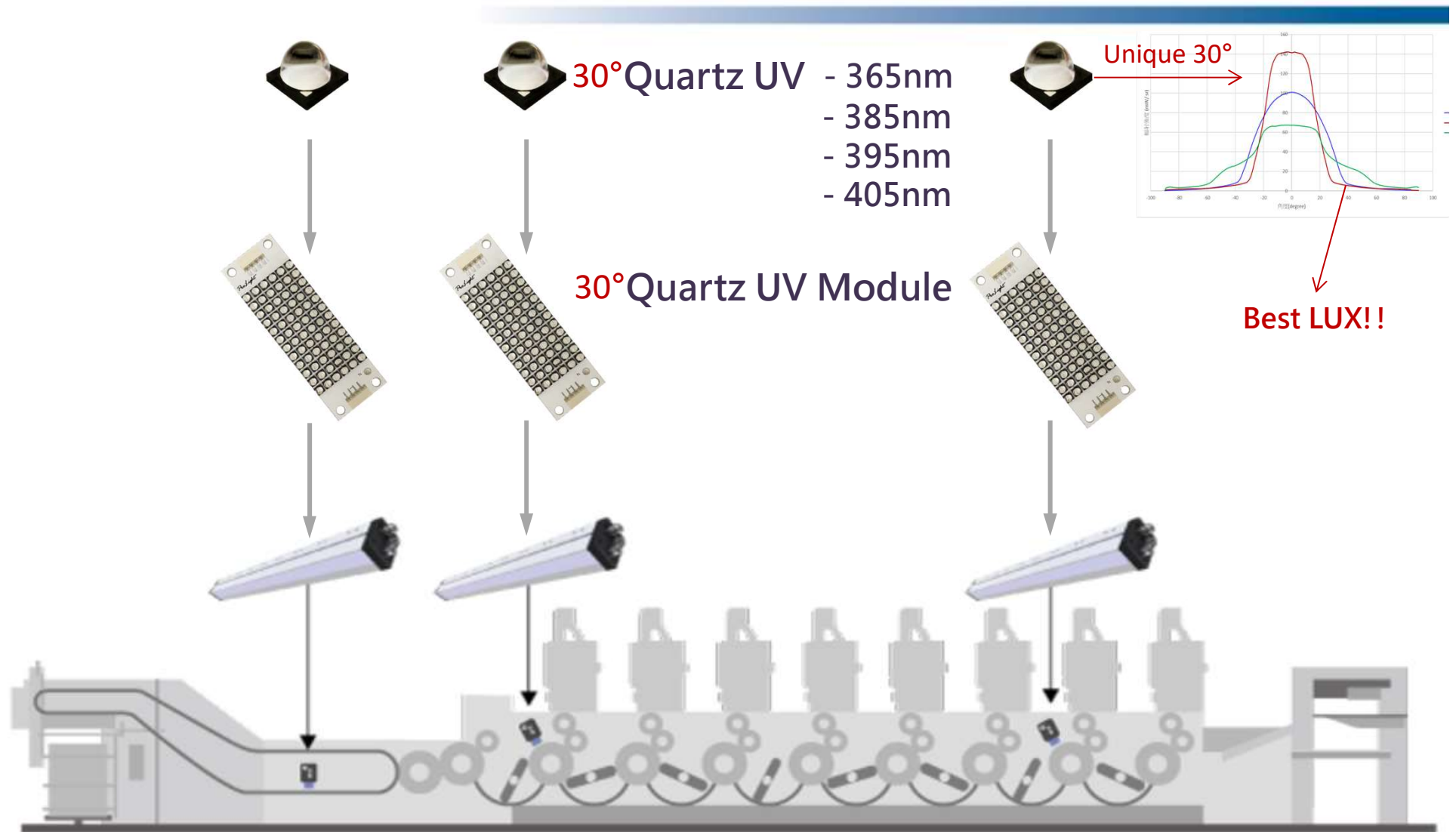
Ceramic Reflector

- AlN with Au plating

- No silicone inside
- No silicone crack/ yellowish or decay issue
- No stress inside, no wire bond issue!

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Best UV LED Solutions for Sheet-fed Printing Machine



(Schematic Diagram)

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Strength of Products

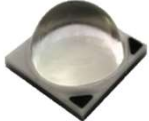
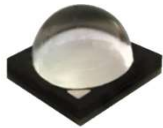
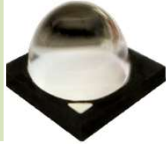
ProLight provides best unique solution for Curing Application

- **High Reliability**
 - **No Organic Material** in UV LED package such as silicone gel, no any risk to damage by UV.
 - **Quartz Lens** for Optics lens, the best transparent material in UV wavelength.
 - **No** any trouble for **Lens Drop** issue!!
- **High Performance**
 - LG or Epistar UV chip inside
 - Unique 30° Quartz emitter of the world
 - 120° / 60° /30° Quartz 3535 4W available
- **Good Light Quality**
 - Very low stray light, good for light uniformity
- **Superior Life Time**
 - Inorganic UV LED Package
 - Quartz Lens
- **Eco-Friendly**
 - Mercury free

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Product – Quartz Series

Package Type	Wavelength (nm)	Part No.	View Angle	
3535 Quartz	365	PB2D-3KLA-GS	60°	
	385	PK2D-3JLE-NVM		
	395	PK2D-3JLE-PNV		
	365	PB2D-3JLA-GS	35°	
	385	PB2D-3JLA-M		
	395	PB2D-3JLA		
5050 Quartz	365	PBRD-10KLA-GS	60°	
	385	PBRD-10KLA-M		
	395	PBRD-10KLA		
7070 Quartz	365	PBSD-10KLA-GS	60°	
	385	PBSD-10KLA-M		
	395	PBSD-10KLA		
	365	PBSD-10JLA-GS	48°	
	385	PBSD-10JLA-M		
	395	PBSD-10JLA		

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Product – Silicone Series

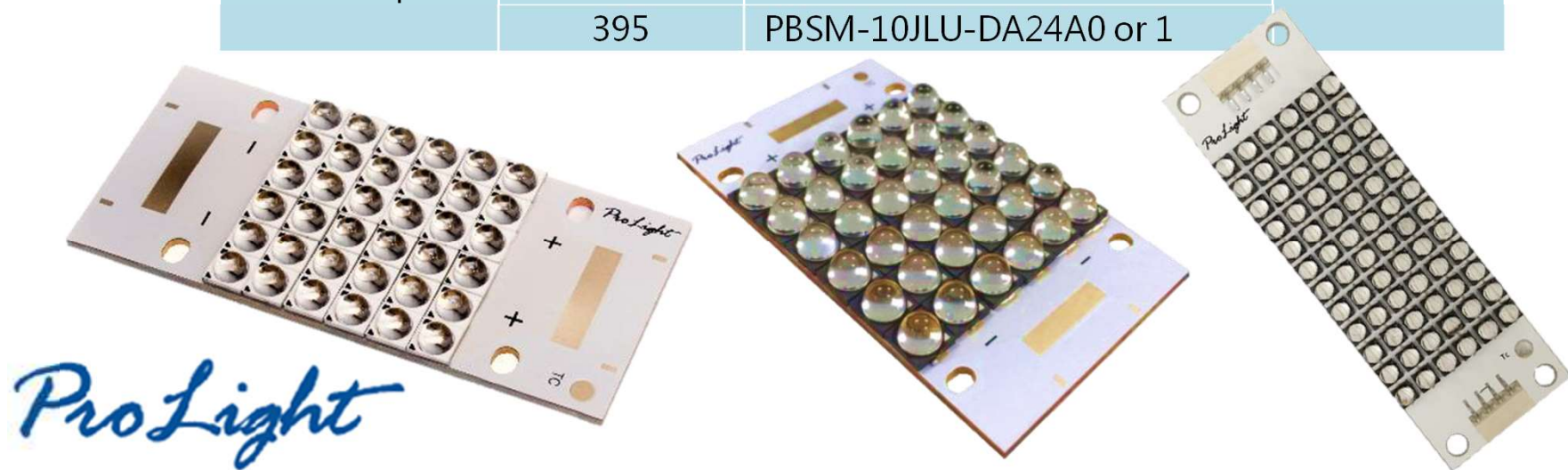
Package Type	Wavelength (nm)	Part No.	View Angle
3535 Silicone	385	PK2B-3LLE-NVM	130°
	395	PK2B-3LLE-PNV	
	385	PK2B-3JLE-NVM	60°
	395	PK2B-3JLE-PNV	
	385	PK2B-3HLE-NVM	35°
	395	PK2B-3HLE-NV	



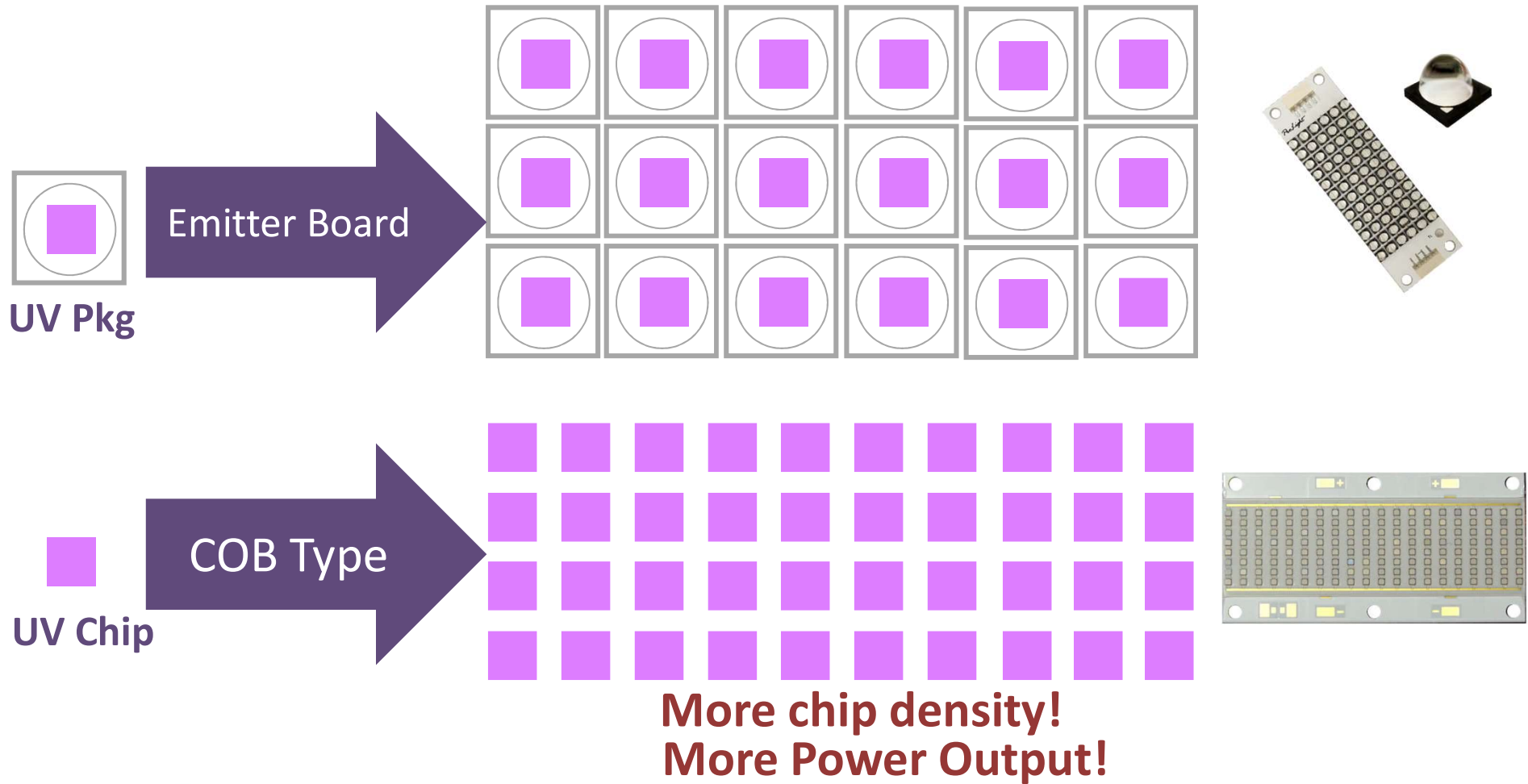
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Product – Module Series

Package Type	Wavelength (nm)	Part No.	View Angle
3535 72pcs	365		60°
	385	PK2M-3JLU-D72A1M	
	395	PK2M-3JLU-D72A1	
5050 36pcs	365	PBRM-10KLU-GDA36A0S or 1S	60°
	385	PBRM-10KLU-DA36A0M or 1M	
	395	PBRM-10KLU-DA36A0 or 1	
7070 36pcs	365	PBSM-10JLU-GDA36A0S or 1S	35°
	385	PBSM-10JLU-DA36A0M or 1M	
	395	PBSM-10JLU-DA36A0 or 1	
7070 24pcs	365	PBSM-10JLU-GDA24A0S or 1S	35°
	385	PBSM-10JLU-DA24A0M or 1M	
	395	PBSM-10JLU-DA24A0 or 1	

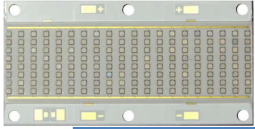


UV COB or UV emitter Board?



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UV COB or UV emitter Board?



UV COB

- Different equipment / situation need different type of COBs. COB redesign is costly, development take times and not flexible °
- COB is not easy to rework · Scrap Rate is high and Cost is high °
- Easy wire broken if no silicone inside or Quartz protect. However, it can be a reliability issue if uses silicone.
- 2nd Optics for COB is bulk and expensive
- Need to use AlN substrate, or thermal is not good. However, it's expensive!



UV emitter Board

- Only design new PCB · Design a new CoB is simple 、flexible and fast.
- PCB is easy to rework. Vary Low scrap cost.
- No any wire broken risk after package. (Inorganic Package)
- Emitter already have 2nd optics, the view angle can be from 30°~120°
- AlN + Copper PCB is a best choice!

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Life Time Prediction List

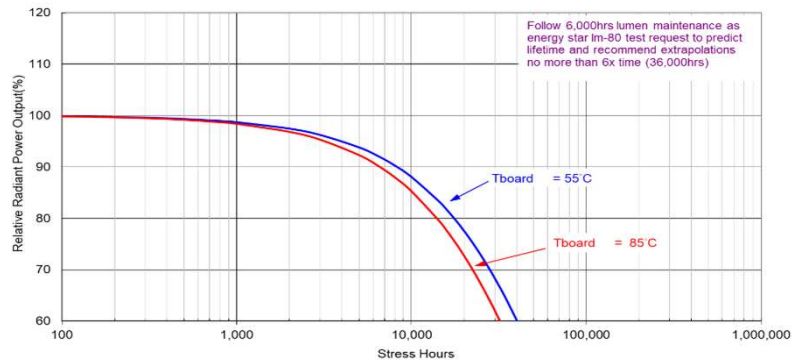
Wavelength Range (nm)	Package Series	Description	L ₇₀ Lifetime (hrs) @700mA/chip T _b (°C) / T _j (°C)	
			55 / 75	85 / 105
380-410	PK2B- / PK2N-	3535 Silicone Lens	25000	20000
	PK2D- / PB2D-	3535 Quartz Lens	28000	22000
	PBSD-	7070 Quartz Lens	25000	20000
365-370	PK2B- / PK2N-	3535 Silicone Lens	8000	6500
	PK2D- / PB2D-	3535 Quartz Lens	20000	16000
	PBSD-	7070 Quartz Lens	18000	14000

- Rated Radiometric Power Maintenance Life (L₇₀ time to 70% Radiant Power)
- T_b: Board Temperature
- T_j : Chip Junction Temperature

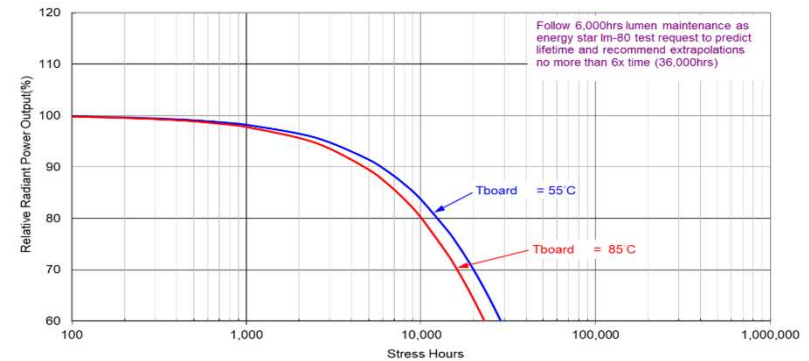
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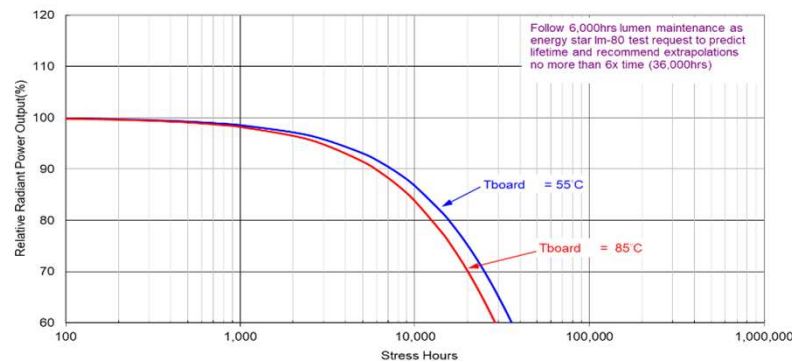
Lumen Maintenance & Lifetime Prediction for
3535 Quartz Lens UV-A 380-410nm stressed at 700mA



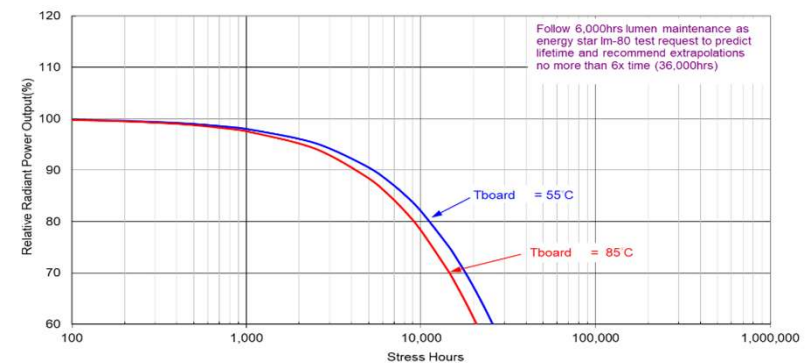
Lumen Maintenance & Lifetime Prediction for
3535 Quartz Lens UV-A 365nm stressed at 700mA



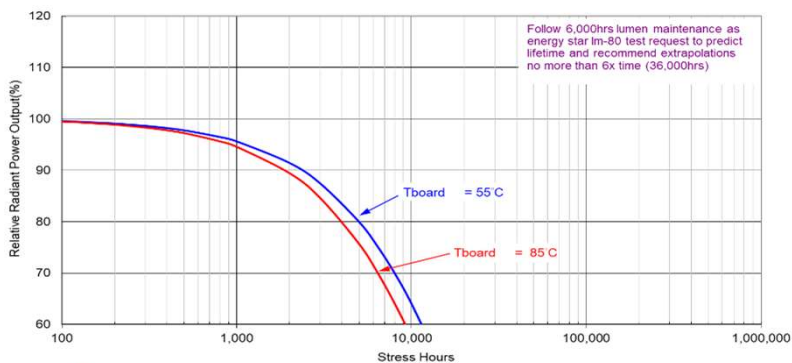
Lumen Maintenance & Lifetime Prediction for
7070 Quartz Lens UV-A 380-410nm stressed at 1.4A



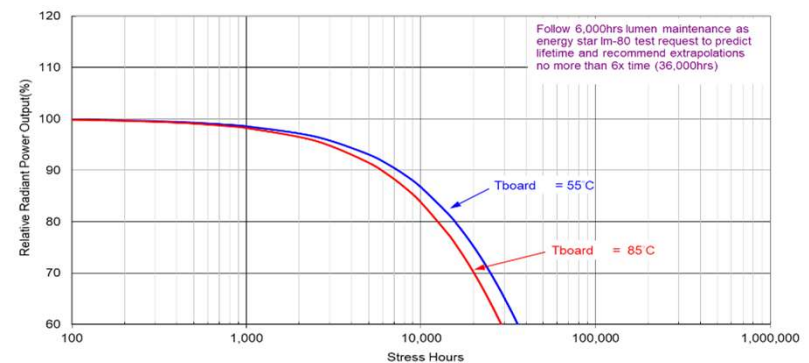
Lumen Maintenance & Lifetime Prediction for
7070 Quartz Lens UV-A 365nm stressed at 1.4A



Lumen Maintenance & Lifetime Prediction for
3535 UV-A 365nm Molding Lens stressed at 700mA

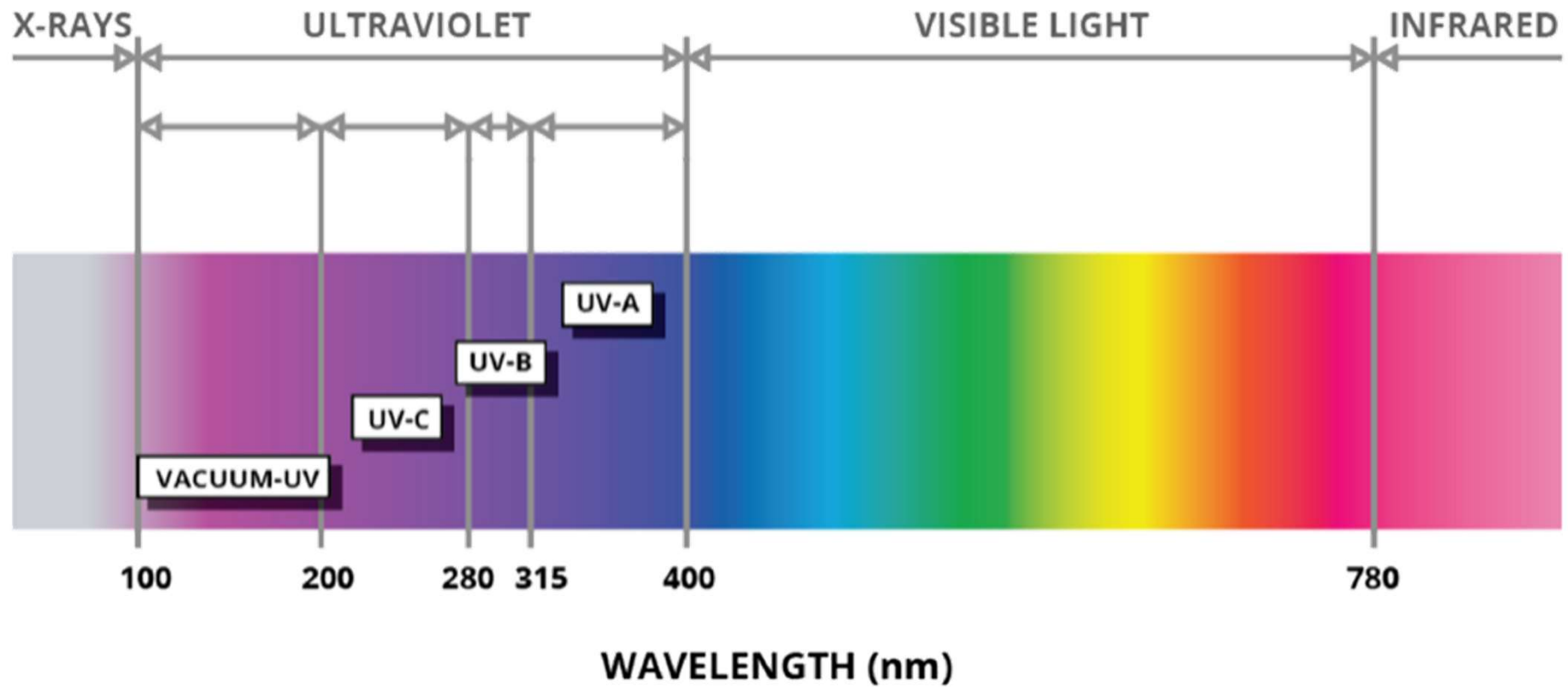


Lumen Maintenance & Lifetime Prediction for
3535 UV-A 380-410nm Molding Lens stressed at 700mA



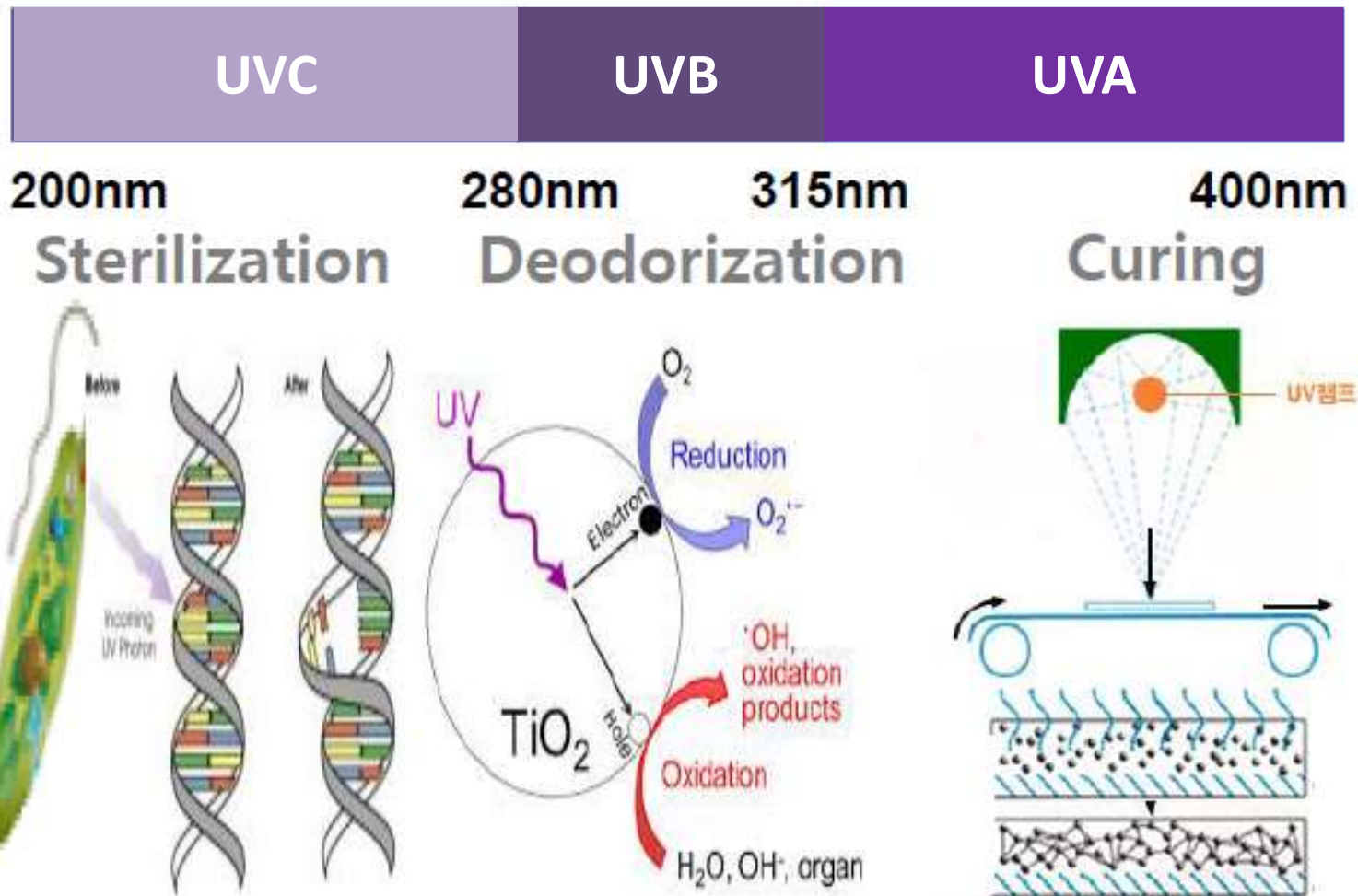
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Spectrum Definition



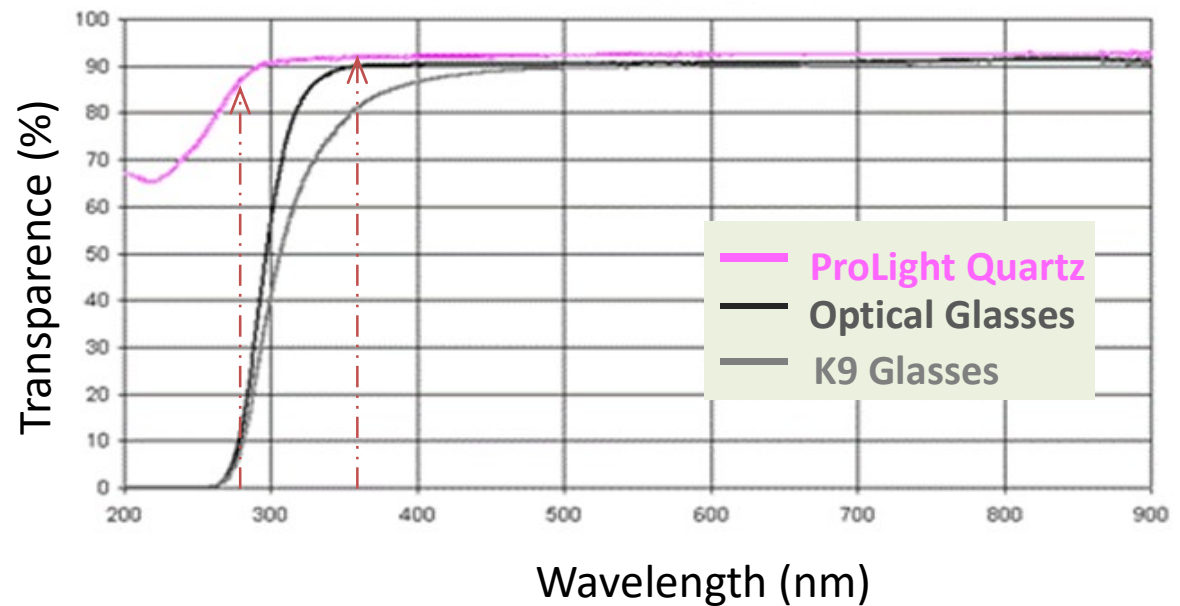
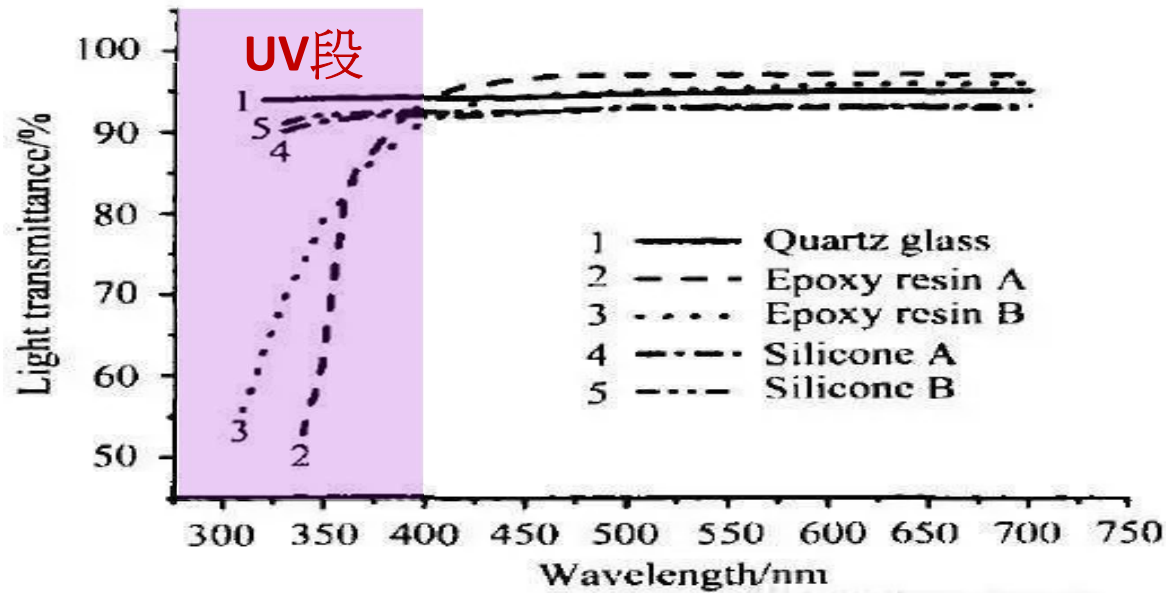
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UV Application



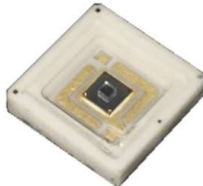
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Quartz – The Best Transparent Material in UV

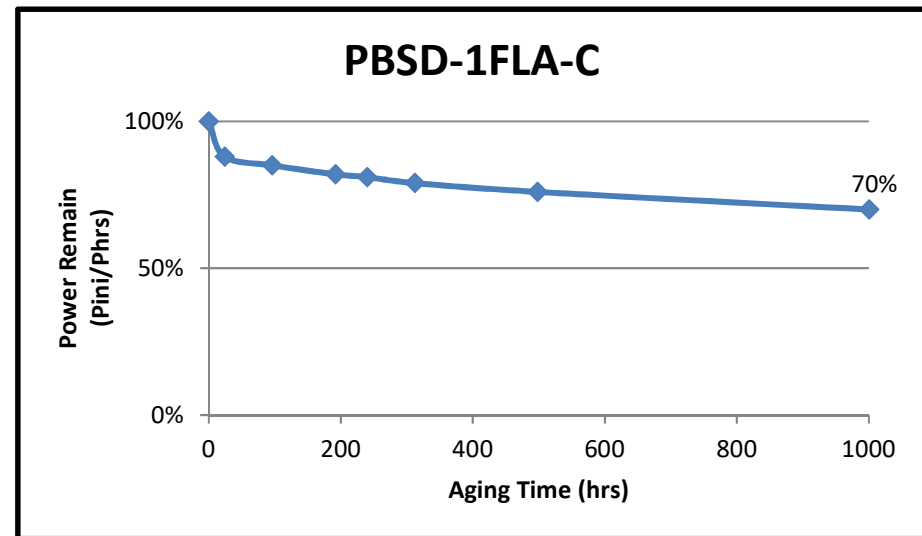
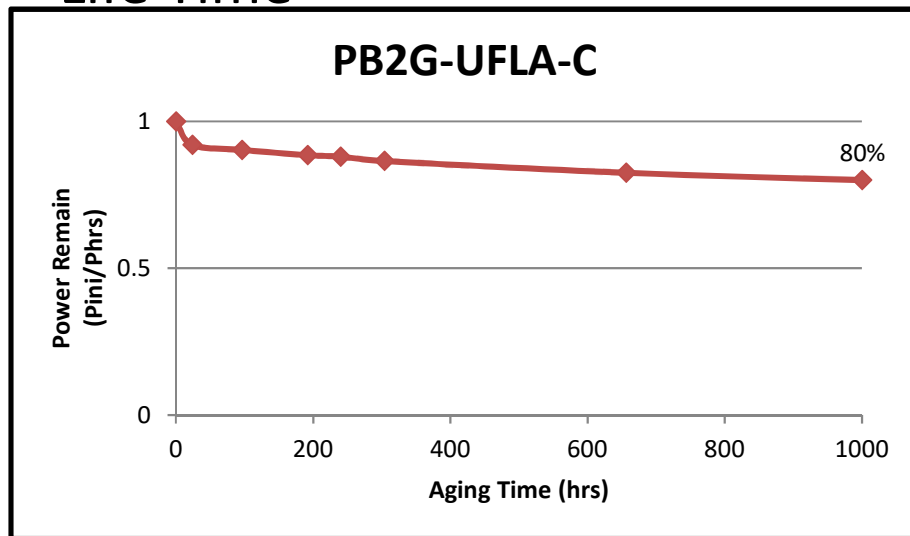


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UVC Life Time Prediction

PN	Photo	Feature	Dimension	Po(mW)	Wp(nm)	If(mA)	Vf(V)
PB2G-UFLA-C		- Quartz Glass Lens - RoHS compliant - View angle 125°	3.5x3.5x1.43	2	278	20	6.3
PBSG-1FLA-C		- Quartz Glass Lens - RoHS compliant - View angle 125°	6.0x6.0x1.35	10	278	100	7.0

• Life Time



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UVC : L50 ~ 1000 hrs expected