

V O L V O

LED,MINILED,MICROLED

OEM STAKES INSIGHT

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Topic

Although they are widely used in different industries, i.e. [automotive lightings](#), buildings, wearables, imaging and more, [LEDs](#) and [micro-LEDs](#) are facing a few challenges including size, light production, thermal management, efficiency and long-term performance. This meeting will be a get together of manufacturing leaders and end-users to face those challenges and create new development opportunities.

What are the usage ?



Lighting



Signaling & communication

Road marking



Source : Google

Lighting

Target : To have always the maximum light on the road whatever the traffic to improve safety

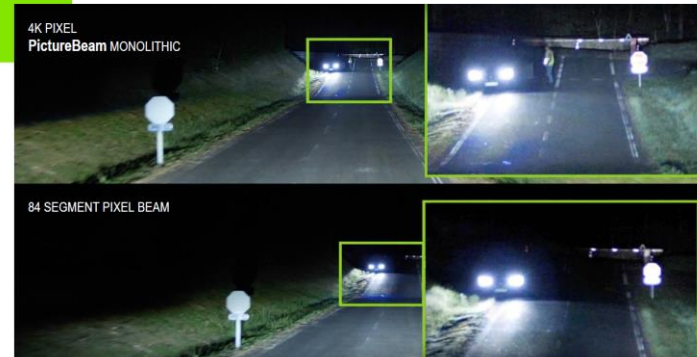
Solution : Adaptive driving beam with partial high beam that will not glare oncoming cars

Resolution is one of the key aspect of the success of this function



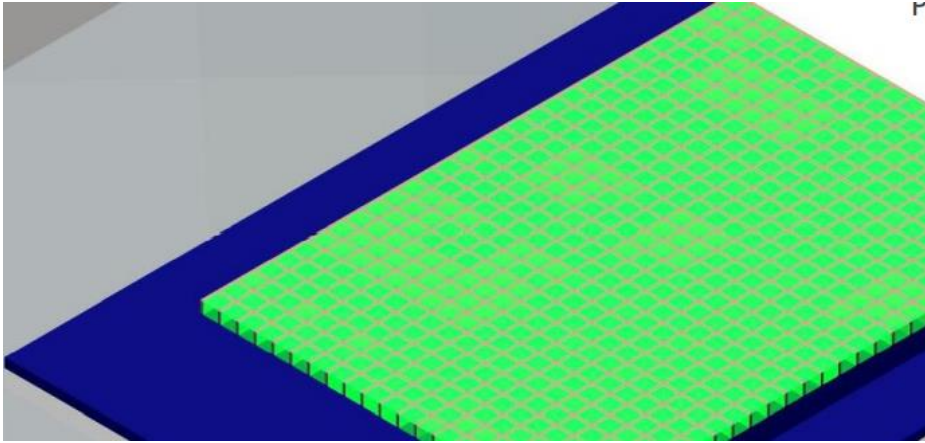
Camera detection

BEST-IN-CLASS LIGHTING SOLUTION THROUGH HIGH PRECISION



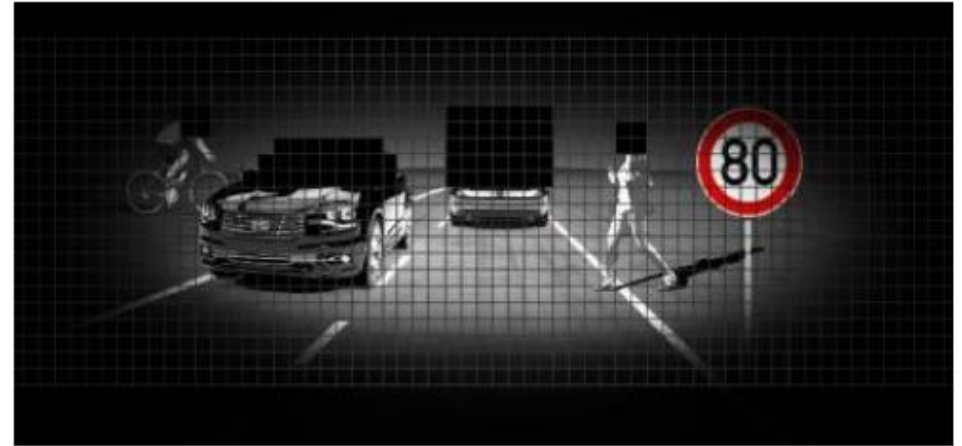
Source : DVN Munich 2020

Lighting beam pattern



From light source to beam pattern

1 LED = 1 pixel on the road



Signaling and communication



Signaling and communication

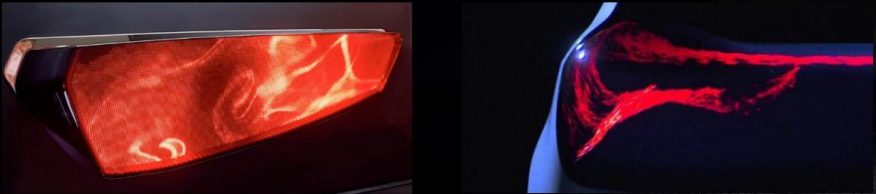
Which technology to select ?

Ready for exterior communication ?

SAMSUNG
Mini LED | Grid.

Mini LED vs OLED

Each technology has pros and cons



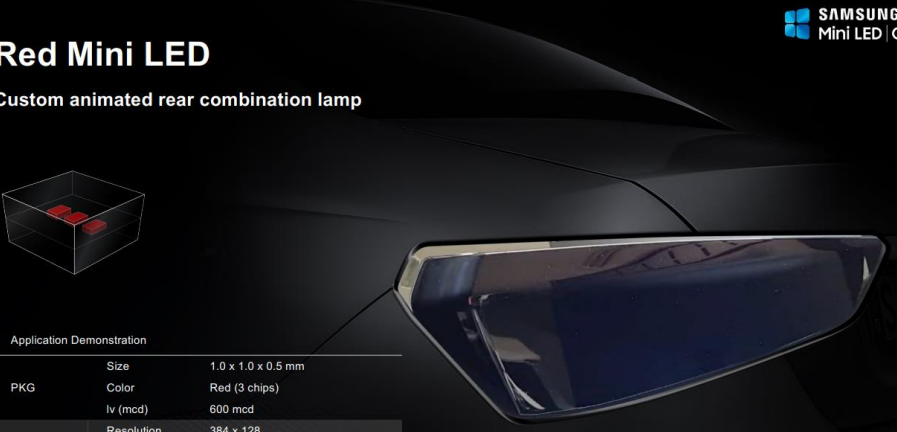
Mini LED		OLED	
+++	Brightness	++	
+++	Reliability	++	
+++	Scalability	++	
++	Color Quality	+++	

Samsung proprietary and confidential

SAMSUNG
Mini LED | Grid.

Red Mini LED

Custom animated rear combination lamp



Application Demonstration

PKG	Size	1.0 x 1.0 x 0.5 mm
	Color	Red (3 chips)
	lv (mcd)	600 mcd
Display	Resolution	384 x 128
	LED	49,152 ea
	Pitch	1.5 mm

Samsung proprietary and confidential

Source : DVN 2021, Novi

Signaling and communication

What are the needs ?

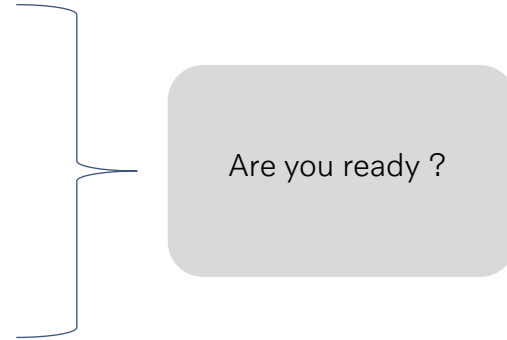
TV : ~ 100 cd/m²

Phone : ~ 200 cd/m²

Luminance for a rear position light : ~ 1 500 cd/m²

Luminance for a Stop Lamp : ~ 10000 cd/m²

Luminance for a Day time running lamp (front) : ~ 15000 cd/m²



Source : DVN 2021, Novi

Efficiency

Light source

Bulb : 20 lm / watt
Xenon : 100 lm/watt
Led : 100 lm/watt

Optical system

Collimators : 80%
Reflector : 50%
Light guide : 10%

Total efficiency

Led : 10-80 lm/watt

Miniled / Microled technology should be able to compete with LED system total efficiency

What about LED ?

Less flux/thermal loss

Higher maximum junction temperature

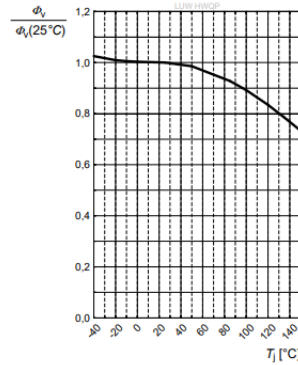
Always More lumen / watt

Standard package to be able to use different LED sourcing on the same PCB (standardization)

Lifetime : 10 000 hour not enough for BEV car → go to 50 000 hours

LUW HWQP

Relative Luminous Flux ^{5) page 23}
 Relativer Lichtstrom ^{5) Seite 23}
 $\Phi_v/\Phi_v(25^\circ\text{C}) = f(T_j); I_f = 1000 \text{ mA}$



Possibility to avoid heatsink and/or IMS
 PCB : cost saving, weight saving

Source : Osram on Google

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Thank you !