

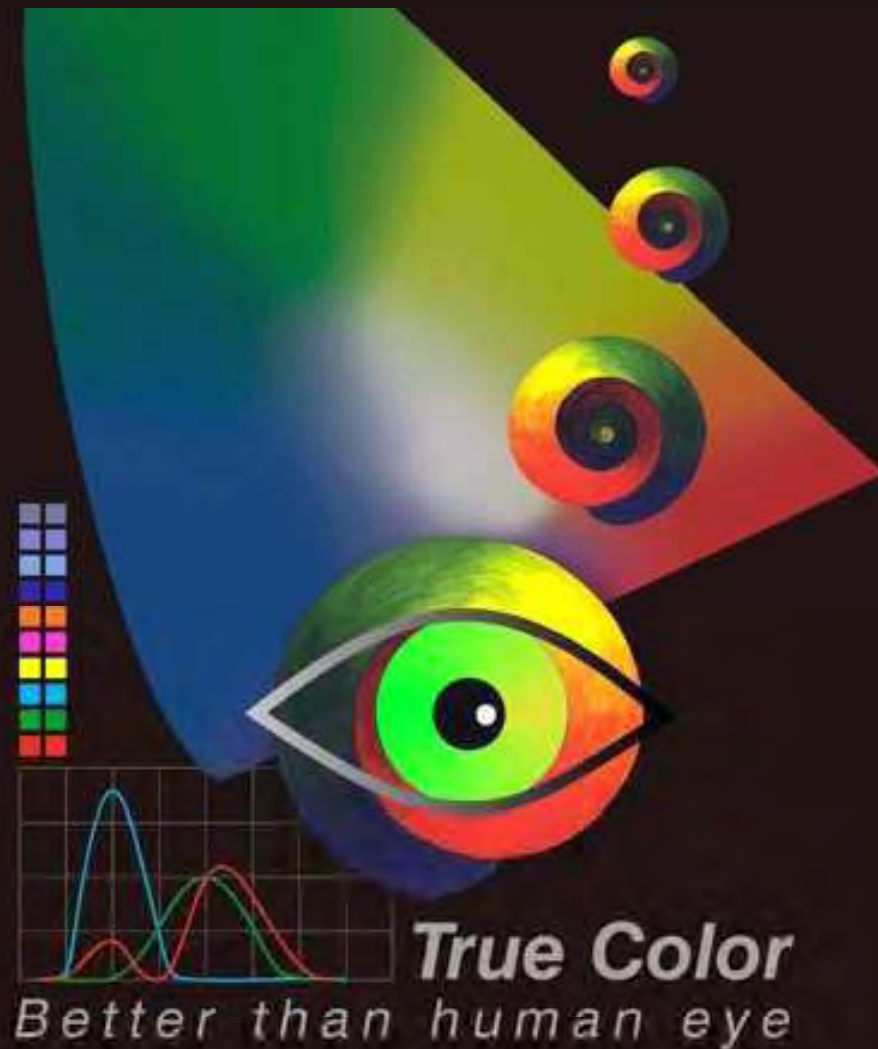
# JENCOLOR

Germany

The Experts for  
color sensors  
technologies...

Color measurement,  
regulation and management

expertise, design and  
components





# JENCOLOR dimension





# JENCOLOR typical application





# JENCOLOR typical application cont.

## Light applications in increasing markets

- *displays and television screens*
- *projection and backlighting systems*
- *designer lighting*
- *special effects lighting*

## Video wall



Goal:

**adjustable colors**

in the case of required True Color  
and/or direct comparison of  
multiple screens

resolution better than human eye

$$\Delta u'v' < 0,005$$

## Mood illumination (SSL)



## Backlights



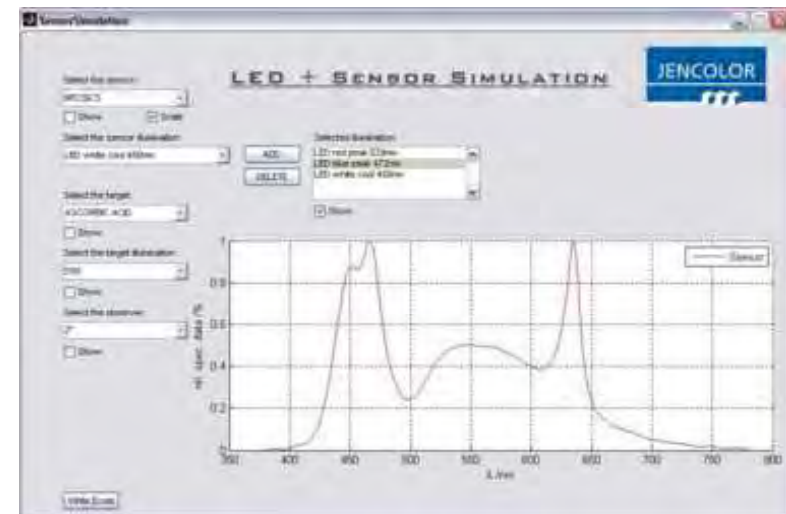
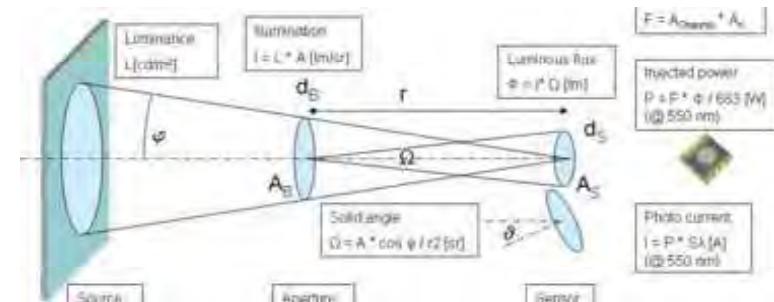
# Custom Specific Optoelectronic Components cont.



Sensor Design  
and Manufacturing Services

In the design step „Feasibility + Design“ MAZeT offers some simulation tools to calculate

- the photo current by given optical parameters for TIA and CCC based amplifying
- numbers of digital bits those will be the result of a signal amplifying
- the behavior of a product “filter and light source(s)
- the possible (simulated) accuracy of several filters by given light sources / optimized light sources with/without noise



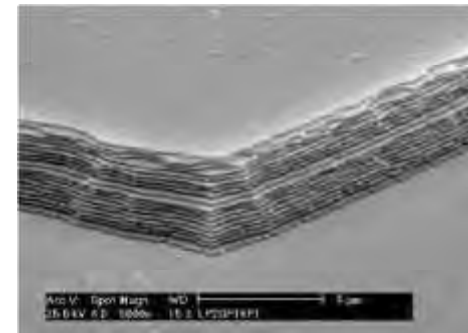
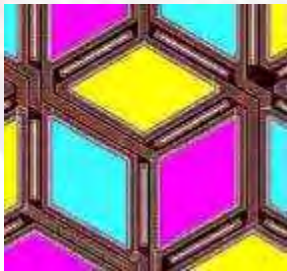


# JENCOLOR Filter technologies

Via optical filter structures -  
color sensitized silicon photodiodes

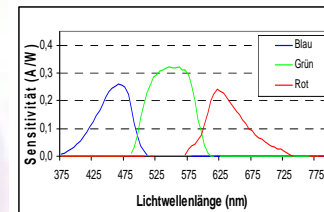
Dielectric (interference) filters:

- ▶ on-chip, micro-structured
- ▶ high transmission
- ▶ ageing resistant
- ▶ hard surface
- ▶ extremely temperature-stabile
- ▶ high filter slopes

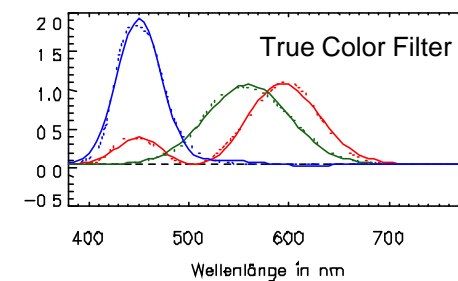
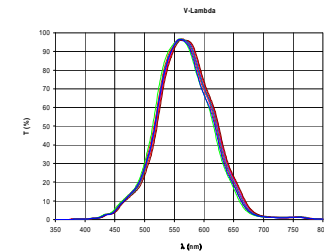


TiO<sub>2</sub> / SiO<sub>2</sub>  
Filter Stacks

RGB Filter



V-Lambda Filter



# Advantages of interference filters

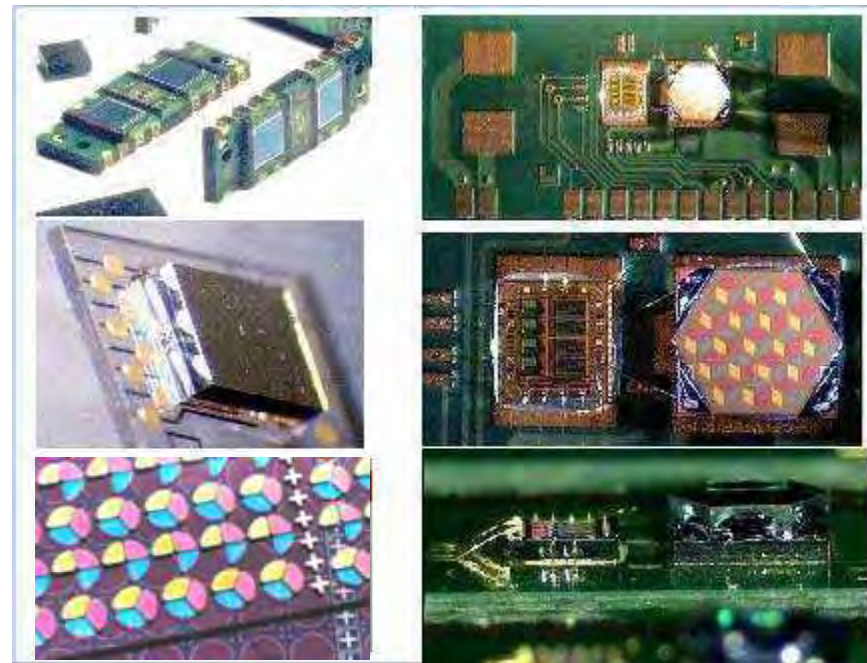
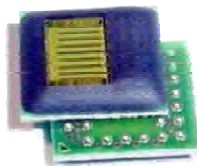
## Differences between absorption and interference filters

Characteristic	Absorption filter	Interference filter
Maximum transmission in the transmission range	Typical Range 60...70%	<b>&gt; 95%</b>
Remaining transmission in the cut-off region	Typical Range 10...20%	<b>&lt; 1%</b>
Temperature stability	Dependant on filter material	<b>Independent from temperature – high temperature stable</b>
Transmission characteristic	Ageing due to absorption	<b>Long-term stability without drifts</b>



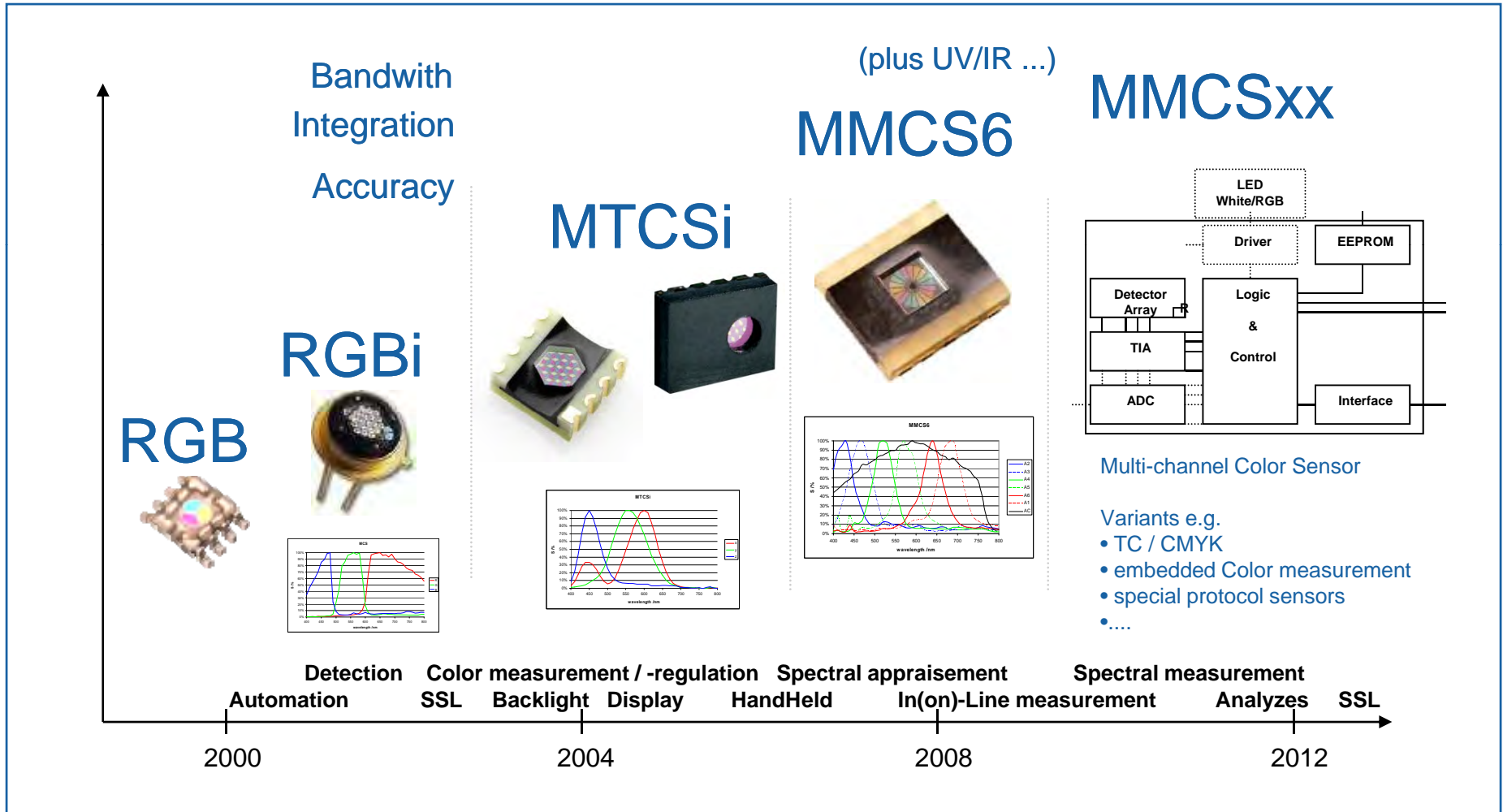
# JENCOLOR Packaging

- naked Chips on foil
- Chip on Board Technology, FlipChip, Die stacking
- Special optical epoxy adhesive
- Optical filter / window
- SMT mountable





# JENCOLOR RoadMap



# MTCS Range – XYZ sensors Color Sensor ICs and Accessories

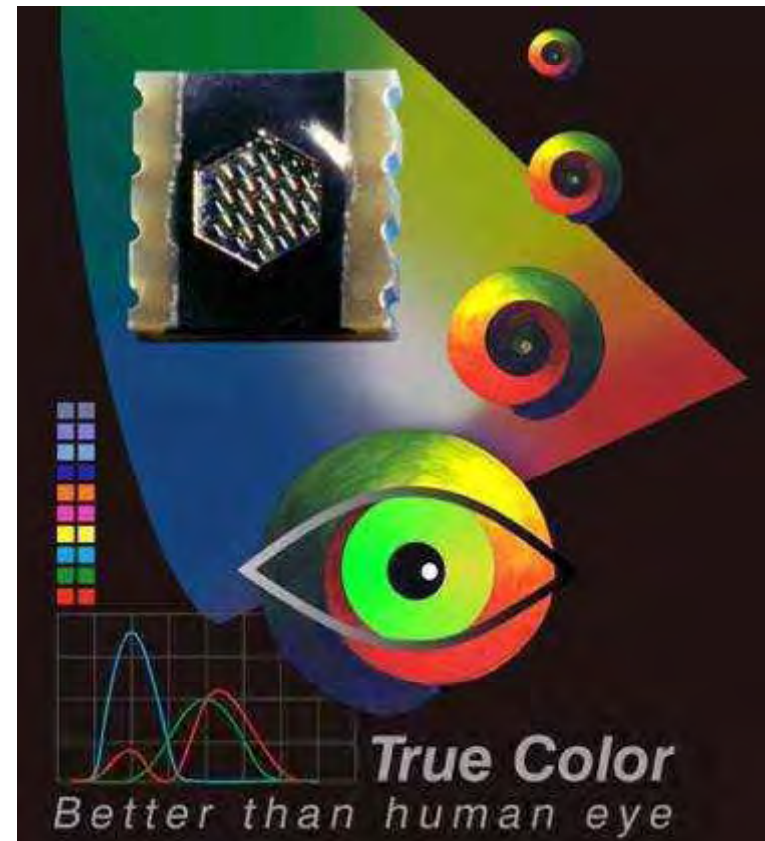
## ► Filter

implementation of tri-stimulus value function - Color measurement according to DIN 5033 Part 2/6 – Colorimetry; Measurement with Tri-Stimulus value systems – CIE 1931

## ► Sensor-ICs



sensors - single element, modules, integrated components and PCBs  
signal-ICs – TIA and current-to-capacity based

## ► Evaluation, functional boards and software libraries





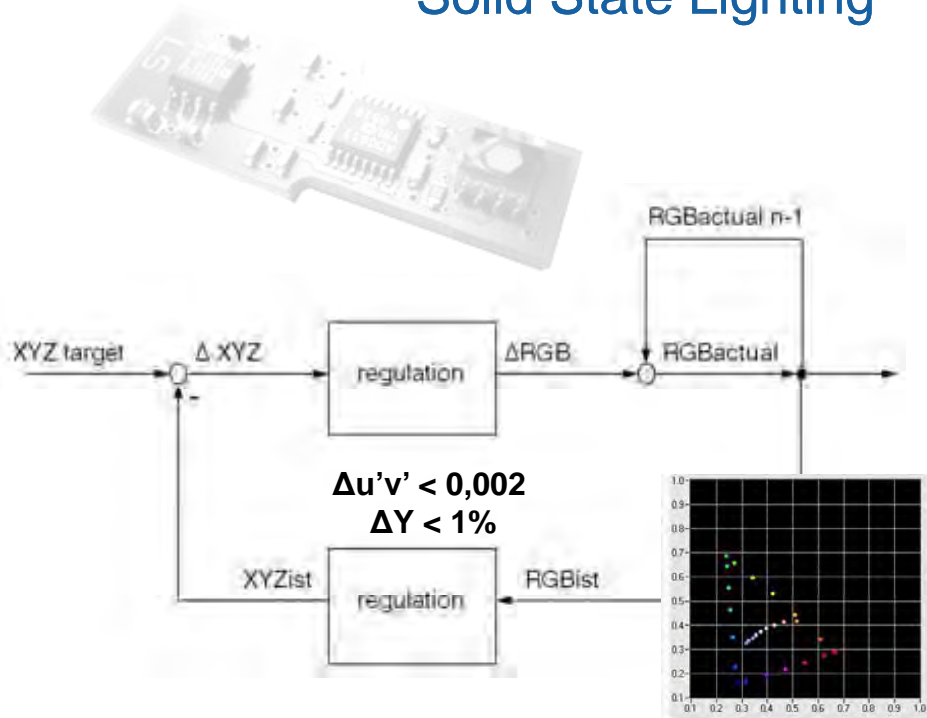
# MTCS-TIAM True Color Sensors

		
<b>Name</b>	<b>MTCS - TIAM2</b>	<b>MTCS - TIAM3</b>
<b>Detector</b>	•True-Color-Sensor MTCSi with XYZ filters based on Tri-Stimulus value function CIE 1931 / DIN5033	
<b>Amplifier</b>	•MTI04Ci: programmable integrated amplifier (8 stages) with power down mode	
<b>Dimension</b>	•with shutter 6,5 x 6,0 x 5,0mm (A) •6,5 x 1,5 x 5,0mm	•with shutter 6,5 x 6,0 x 5,0mm (A) •6,5 x 1,2 x 5,0mm (B)
<b>Application</b>	<ul style="list-style-type: none"> <li>▶ General Color Measurements, checks and regulations</li> <li>▶ Portable color reader for consumer and industrial applications</li> <li>▶ Closed loop for RGB lighting (SSL) – regulation of temperature shifts</li> <li>▶ Sensor for display color adjustment and backlight/contrast control</li> <li>▶ Color sensitive sensor for “True Color” reproduction and system calibration</li> <li>▶ Detector for various light sources, mood lighting, regulated color temperature</li> </ul>	



# Test reguLED

## Solid State Lighting



- ▶ White point and RGB regulation
- ▶ Compensation of LED temperature drifts

# Regulation by 3 element color sensors



Sensor Design  
and Manufacturing Services

## Differences between Absorption and Interference filters

Characteristic	Absorption filter	Interference filter
Maximum transmission in the transmission range	Typical Range 60...70%	> 95%
Remaining transmission in the cut-off region	Typical Range 10...20%	< 1%
Temperature stability	Most none but dependant on filter material	Independent from temperature – high temperature stable
Transmission characteristic	Ageing due to absorption	<b>Long-term stability without drifts</b>