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	REV.	DESCRIPTION	APPROVED
	1	V 2.1	2006-05-15

## Data Sheet

# MTCSiCS

## Integral True Colour Sensor – LCC8

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## 1. FUNCTION

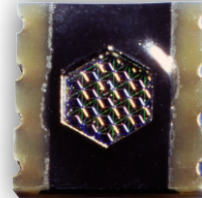
The True Colour Sensors are made of 19 x 3 photo diodes (special PIN silicon technology with extended sensibility) integrated on chip. The diodes are carried out as segments of a multiple-element hexagonal matrix structure with the diameter of 2,0 mm.

The design as Si-PIN photo diodes allows signal frequencies up to MHz-range. In order to achieve a small cross talk between the photodiodes the individual sectors were separated from each other by additional structures.

Each of these photodiodes is sensitised with new dielectric spectral filter (named True Colour Filter<sup>1</sup>) for its colour range, preferably for the primary colour standard CIE (Commission Internationale de l'Eclairage or International Commission on Illumination) colour space.

## 2. APPLICATION

- Quality control
- Monitoring the production
- Control of manufacturing
- Detection of colour marks
- Colour measurement



## 3. FEATURES

Dielectric filters guaranties the good optical properties of the colour sensors, such as:

- high transmission
- slight ageing of the filter
- high temperature stability
- high signal frequency
- reduced cross talk
- small size (diameter of the optical sensitive surface ca. 2 mm)
- alike tri-stimulus interference filter for colour measurement to DIN 5033 (&CIE XYZ & La\*b\*)
- LCC package
- RoHS-conform



<sup>1</sup> The new generation of JENCOLOUR sensors is committed to implementing (see relative sensitivity) the standard distribution functions as defined under DIN 5033 Part 2 – Color Measurement; CIE 1931 Standard Colorimetric Systems. This implementation method allows colors to be determined according to the three-range procedure that is defined in part 6 of DIN 5033.

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**4. MAXIMUM RATINGS / CHARACTERISTICS**(T<sub>A</sub> = 25°C; per single diode)

Description	Symbol	Condition	min.	typ.	max.	Unit
Diameter of the light sensitivity area	D			2,0		mm
Light sensitivity area per single colour array (19 diodes)	A			0,76		mm <sup>2</sup>
Typical photo sensitivity of colour ranges	S <sub>max</sub>	$\lambda_z = 445 \text{ nm}$	0,21	0,23	0,25	A/W
		$\lambda_y = 555 \text{ nm}$	0,30	0,33	0,36	
		$\lambda_{xk} = 445 \text{ nm}$	0,11	0,12	0,13	
		$\lambda_{xl} = 600 \text{ nm}$	0,31	0,35	0,38	
Spectral tolerance of filter curve	$\Delta\lambda(\lambda)$				<1%* $\lambda$	nm
Reverse voltage	V <sub>R</sub>		0	2,5	5	V
Dark current	I <sub>R</sub>	V <sub>R</sub> = 2,5V			10	pA
Terminal capacitance	C	V <sub>R</sub> = 2V			70	pF
Rise and fall time of the photo-current	t <sub>r</sub> , t <sub>f</sub>				2	μs
Noise equivalent power	NEP	f <sub>R</sub> = 100 Hz			<10 <sup>-13</sup>	W/√Hz
Cross-talk					<1	%
Angle of incidence	φ	$\Delta\lambda_{\text{(Filter)}} < 1\% * \lambda$			10	Grad
Operating temperature range <sup>2</sup>	T <sub>op</sub>		-20		+85	°C
Storage temperature range	T <sub>st</sub>		-40		+100	°C
Soldering temperature	T	2...3 sec			240	°C

<sup>2</sup> special on request

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## 5. CHARACTERISTIC CURVE

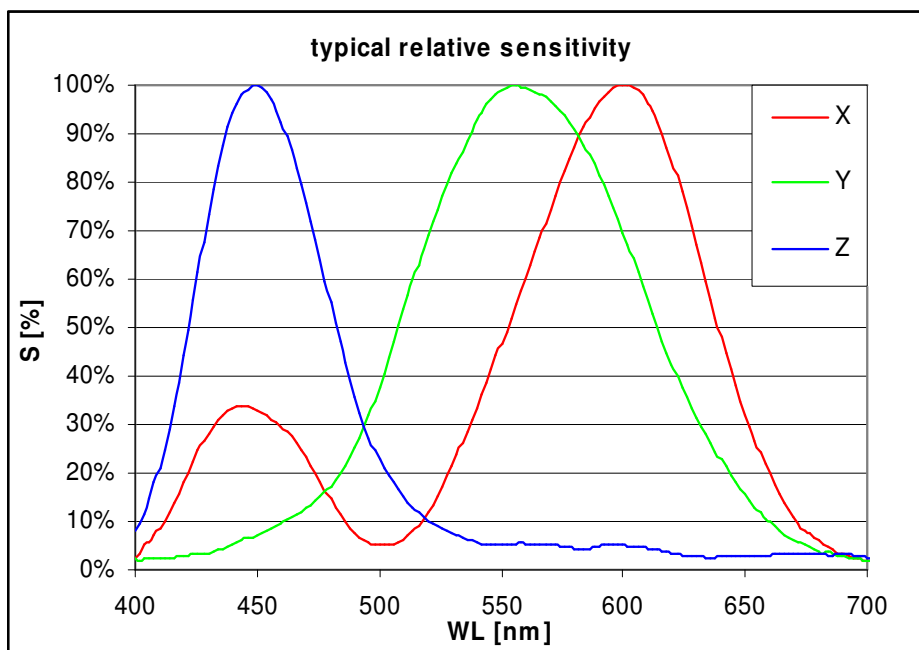


Figure: Typical (relative) sensitivity (XYZ) of the colour sensor (MTCSiCS)<sup>3</sup>, scanned by wide broadband light

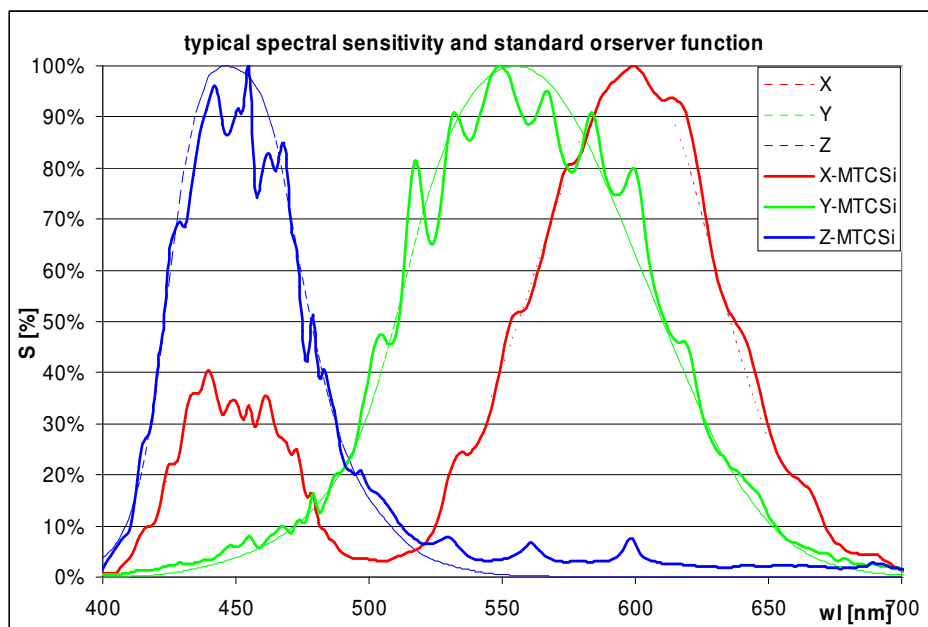


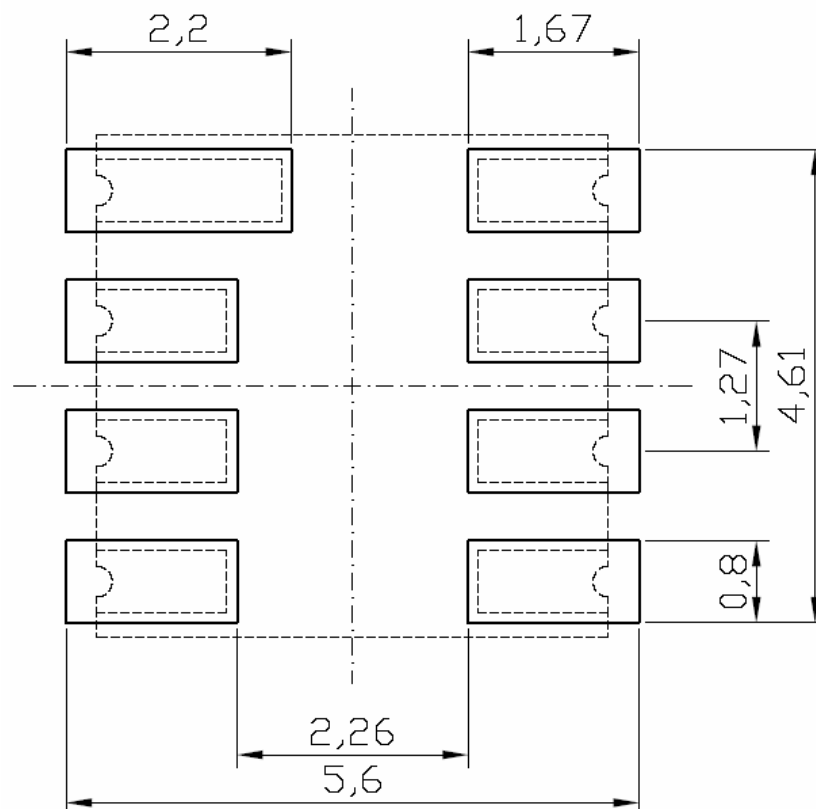
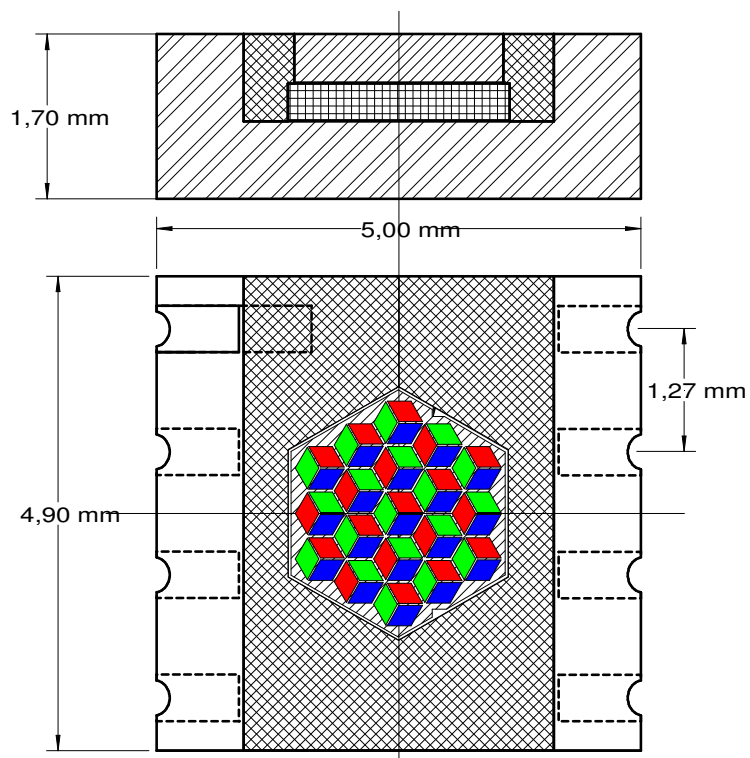
Figure: Typical (relative) sensitivity (XYZ) of the colour sensor (MTCSiCS)<sup>4</sup>, scanned by narrow-band light

<sup>3</sup> Typical characteristic sensitivity; scanned by monochromatic light with FWHM 27nm

<sup>4</sup> Typical characteristic sensitivity; scanned by monochromatic light with FWHM 2nm

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## 6. PACKAGE OVERVIEW



MTCSiCS in 8 Pin LCC package

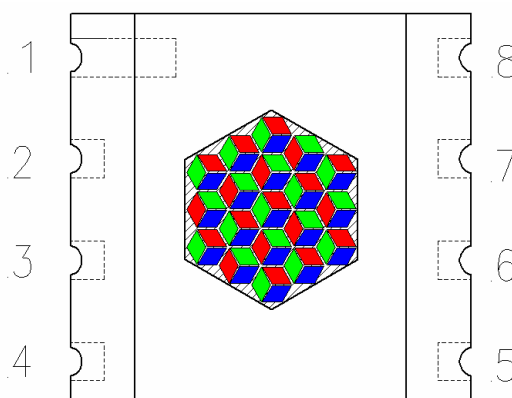
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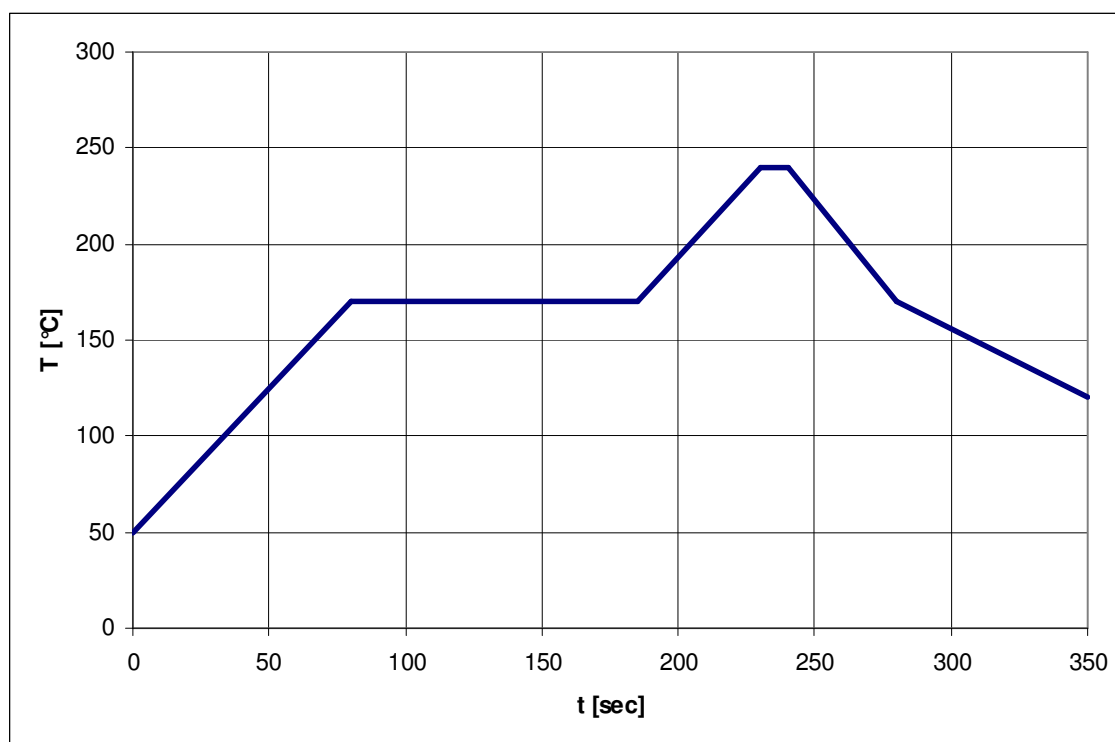
**7. PIN-CONFIGURATION**

(Top view)

PIN	description
1	Y (green)
2	nc
3	nc
4	Z (blue)
5	X (red)
6	nc
7	TrD
8	K common cathode



LCC 8 package

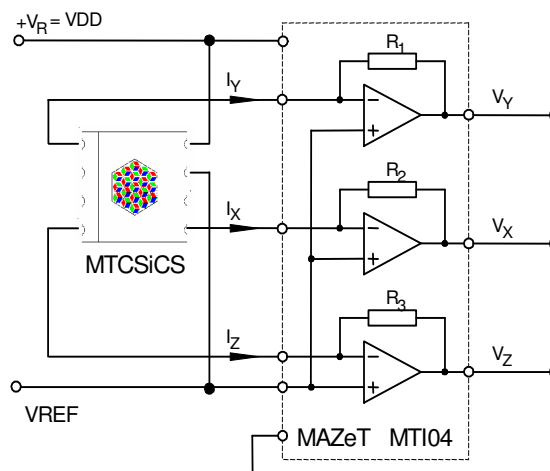
**8. SOLDERING PROFILE**

SOLDERING PROFILE

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## 9. APPLICATION CIRCUIT

Opposite figure shows a circuit for the conversion of photo current to an equivalent voltage. These voltage can be processed e.g. with an ADC. By the selection of suitable resistors the output voltage range can be adjusted to the photo current value. (for example the pin-programmable transimpedance amplifier MTI04).



## 10. ORDERING INFORMATION

True Colour sensor with LCC8-package  
Modular application board modEVA  
Functional application board Colorimeter II

**MTCSiCS**  
**MTCS-ME1**  
**MTCS-C2**

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