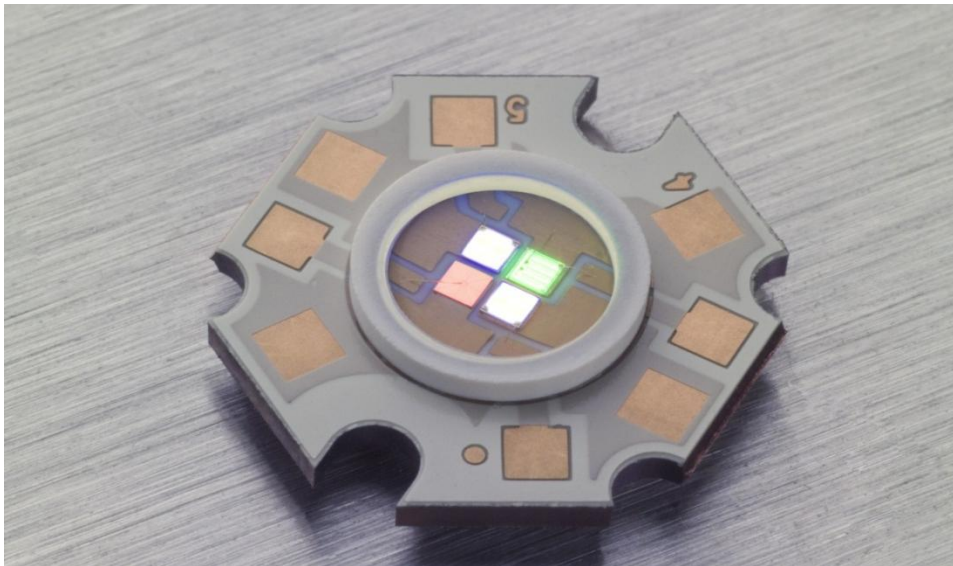




## PRELIMINARY DATASHEET Lighting Solutions

# White ACULED® – Model R3C6 For High CRI, High R9 Medical OEM Applications

Specifications Provided  
Upon Request



*Excelitas' White ACULED® - Model R3C6 - delivers High CRI and High R9 light output ideal for Surgical and Dental lights.*

### Overview

Excelitas' newest ACULED® Model consists of 4 separately-addressable LED chips to provide widely tunable color temperatures (CCT) from 3500 to 5500 K, while maintaining the high CRI, high R<sub>9</sub> value, and light output required for medical applications such as surgical lighting and dental lighting.

Excelitas' ACULED Model R3C6 is a standard COB package that comes with four different LED dice: Warm-white, Cool-white, Cyan, and Red. The LED dice are mounted on a copper circuit board with dielectric film (Cu-IMS-PCB). To protect the LEDs, a ring is mounted on the PCB and filled with a silicone encapsulant.

Benefits of the ACULED platform include excellent heat transfer from the chips to the substrate and heat sink, and its compact design with the chips extremely closely-spaced allows for superior color mixing and compact optics.

In addition to the standard White ACULED, model R3C6, a variety of design-your-own (DYO) chip combinations are available from Excelitas Technologies to achieve just the right combination of CRI, R<sub>9</sub>, luminous flux, and CCT range for specific medical lighting requirements.

### Key Features

- High Color Rendering Index (CRI)
- High R<sub>9</sub> value, an indication of how well the light shows deep, saturated shades of red
- Widely tunable CCT - from 3500 to 5500 K
- 4-chip design with independent control of the drive current of each chip
- Chromaticity lies close to the ideal Planckian line
- Good color mixing
- Excellent thermal properties, advantageous for high-performance applications
- Near-Lambertian emission
- RoHS-compliant

### Applications

- Surgical operating room lighting
- Medical lights
- Medical diagnostic lighting
- Dental surgery lighting
- Dental exam lights

# White ACULED™ – Model R3C6

## For High CRI, High R9

### Medical OEM Applications

PRELIMINARY

## Performance Specifications

**Table 1. Absolute Maximum Ratings of Individual Dice**

Parameter	Symbol	Unit	Red	Cyan	Warm-white	Cool-white
Junction temperature	$T_J$	°C	125	125	125	125
DC forward current	$I_F$	mA	700	500	700	700
Reverse voltage	$V_R$	V	10	5	10	10
Reverse current	$I_R$	μA	10	10	10	10

**Table 2. Absolute Maximum Ratings of Complete ACULED**

Parameter	Symbol	Unit	Maximum rating
Operating temperature	$T_{OP}$	°C	- 40 to +85
Storage temperature	$T_{st}$	°C	- 40 to +100
ESD sensitivity		kV	2

**Table 3. Electrical and Optical Properties for Individual Dice, Red and Cyan**

Parameter	Symbol	Unit	Red			Cyan		
			Min	Typ	Max	Min	Typ	Max
Peak wavelength	$\lambda_{peak}$	nm	620	635	645	500	502	505
Dominant wavelength	$\lambda_{dom}$	nm	615	625	630	-	503	-
Chromaticity coordinate x	$x_{2^{\circ}}$		-	0.700	-	-	0.103	-
Chromaticity coordinate y	$y_{2^{\circ}}$		-	0.300	-	-	0.529	-
Radiant flux	$\Phi_e$	mW	-	155	-	-	93	-
Forward voltage	$V_F$	V	1.8	2.1	2.6		3.3	3.6

Characteristics for Red and Cyan die at  $I_F=350$  mA and 25°C board temperature

**Table 4. Electrical and Optical Properties for Individual Dice, Warm-white and Cool-white**

Parameter	Symbol	Unit	Warm-white			Cool-white		
			Min	Typ	Max	Min	Typ	Max
Correlated color temperature	CCT	K	3200	3560	3900	3900	5730	7600
Chromaticity coordinate x	$x_{2^{\circ}}$		0.381	0.401	0.422	0.306	0.328	0.351
Chromaticity coordinate y	$y_{2^{\circ}}$		0.362	0.388	0.413	0.287	0.321	0.355
Luminous flux	$\Phi_v$	lm	72	80	-	78	88	-
Forward voltage	$V_F$	V	-	3.4	-	-	3.4	-

Characteristics for Warm-white and Cool-white die at  $I_F=700$  mA and 25°C board temperature

**White ACULED® – Model R3C6**  
**For High CRI, High R9**  
**Medical OEM Applications**

**PRELIMINARY**

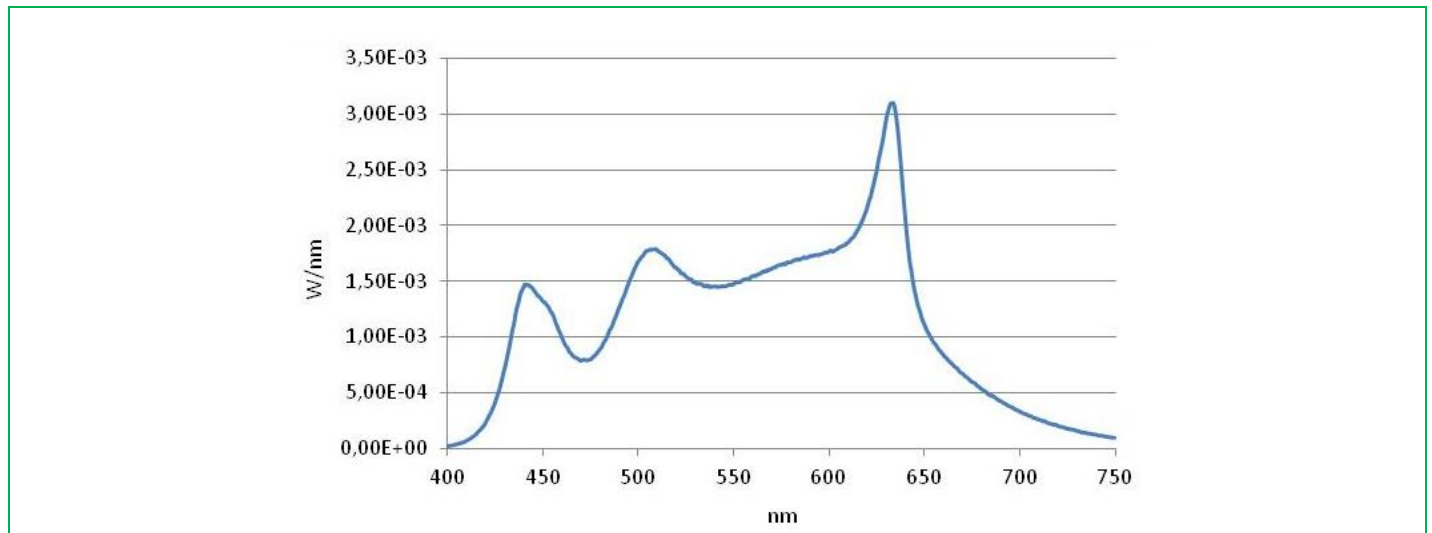
**Table 5. Optical Characteristics with All Dice On**

Typical characteristics at 25°C, with each die driven at optimal current to achieve CCT and CRI.

Parameter	Symbol	Unit	3800 K	4500 K	5500 K
Luminous flux	$\Phi_v$	lm	120	145	140
Color Rendering Index (CRI)	$R_a$	-	95	96	93
CRI Red Tile (R9)	$R_9$	-	98	98	96
Distance to Planckian Locus (according to CIE1960 u/v color space)	$\Delta(u,v)$	-	0.00006	0.0006	0.0011

**Spectral Output of ACULED – Model R3C6 - with All Four LED Dice On**

**Figure 1. Typical Spectral Output at 3800 K, with the Warm-white, Cool-white, Red, and Cyan LED dice running at 700 mA, 100 mA, 100 mA and 130 mA, respectively.**



# White ACULED™ – Model R3C6 For High CRI, High R9 Medical OEM Applications

PRELIMINARY

Figure 2. Typical Spectral Output at 4500 K, with the Warm-white, Cool-white, Red and Cyan LED dice running at 700 mA, 300 mA, 110 mA and 180 mA, respectively.

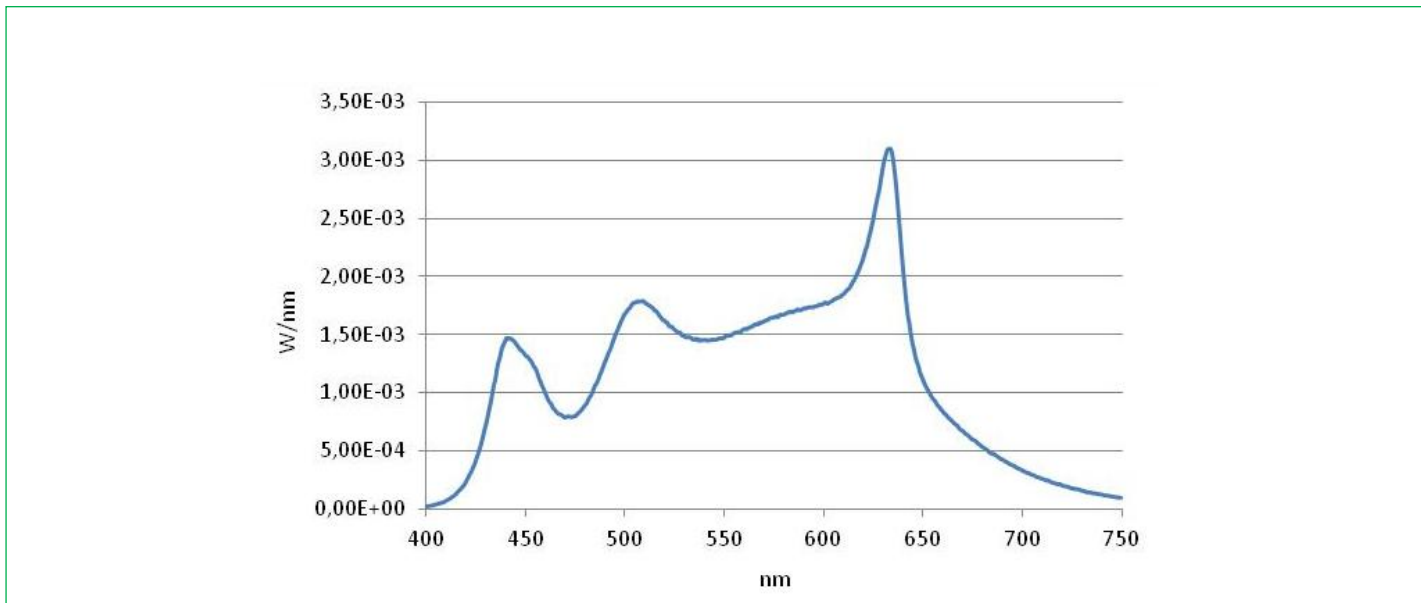
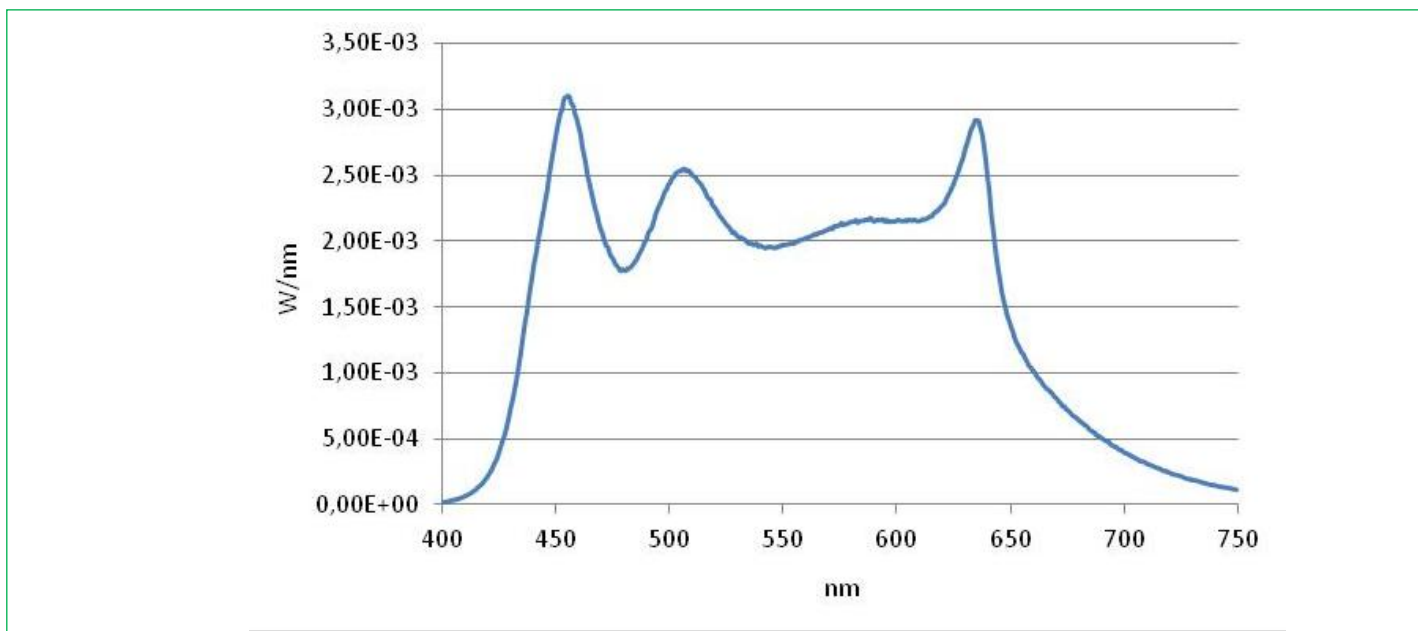


Figure 3. Typical Spectral Output at 5500 K, with the Warm-white, Cool-white, Red, and Cyan LED dice running at 400 mA, 700 mA, 100 mA and 200 mA, respectively.



# White ACULED<sup>®</sup> – Model R3C6

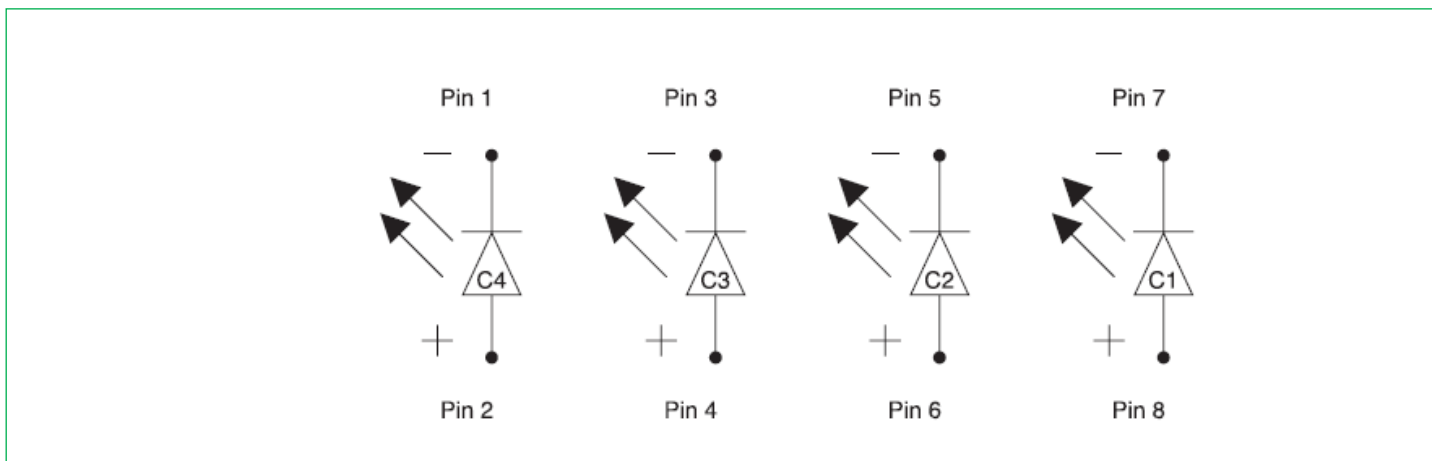
## For High CRI, High R9

### Medical OEM Applications

PRELIMINARY

#### Electrical Schematic – ACULED – Model R3C6

Figure 4. Electrical schematic, ACULED – Model R3C6



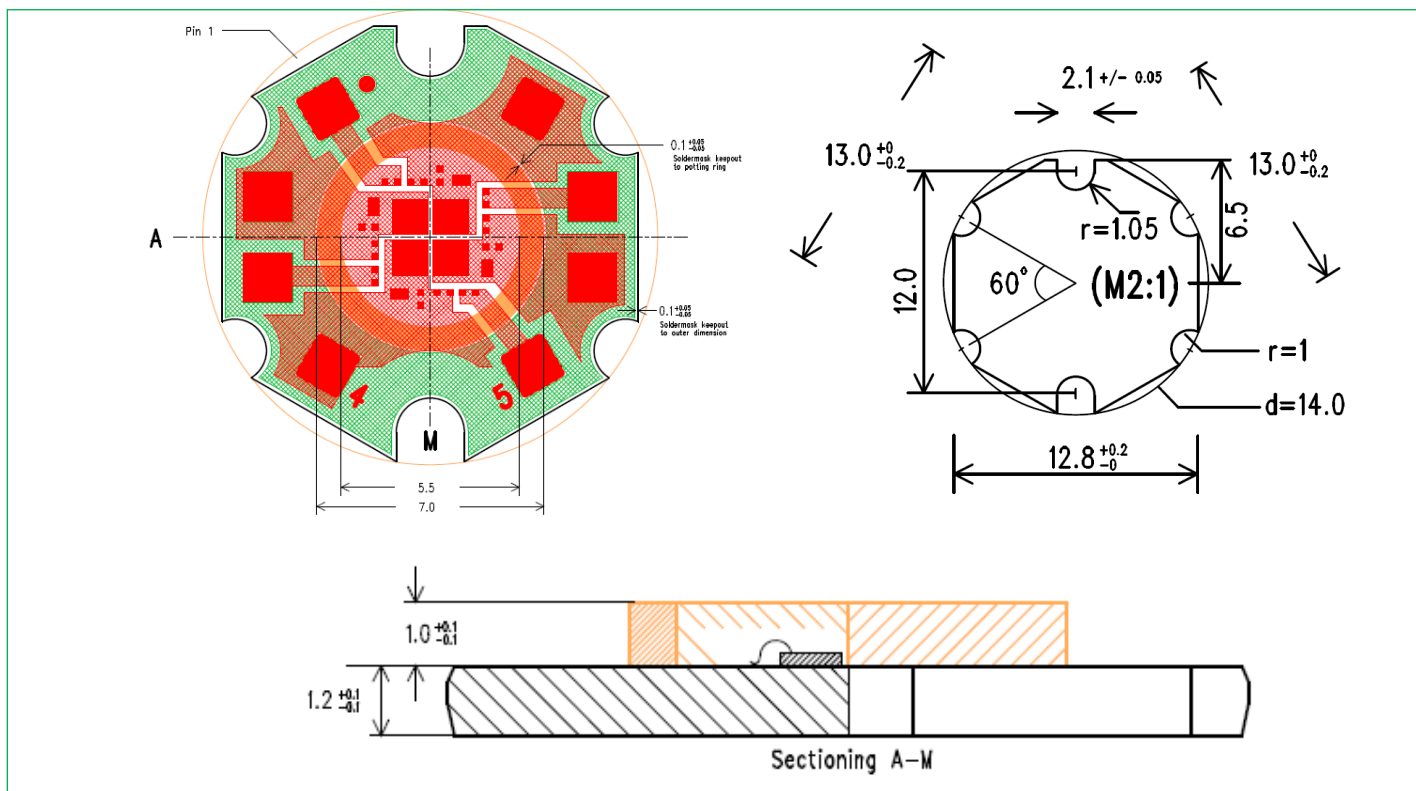
Pin	Connection
Pin 1	Cathode Cool-white
Pin 2	Anode Cool-white
Pin 3	Cathode Cyan
Pin 4	Anode Cyan
Pin 5	Cathode Warm-white
Pin 6	Anode Warm-white
Pin 7	Cathode Red
Pin 8	Anode Red

**White ACULED™ – Model R3C6**  
**For High CRI, High R9**  
**Medical OEM Applications**

**PRELIMINARY**

**Mechanical Dimensions**

**Figure 5. Mechanical arrangement and dimensions.**



**Thermal Properties**

Nominal thermal resistance ( $R_{th}$ ) of the package is 5 K/W from the LED junction to the backside of the package.

Approximate temperature of the LED junction may be calculated by the following formula:

$$T_J = T_B + P \cdot R_{th}$$

$T_B$  = temperature on the back side of the package

$P$  = power dissipated in the package ( $V_F \cdot I_F$ )

$T_J$  = resulting junction temperature

# White ACULED® – Model R3C6

## For High CRI, High R9

### Medical OEM Applications

**PRELIMINARY**

#### RoHS Compliance

The White ACULED Model R3C6 has been designed and built to be fully compliant with the European Union Directive 2002/95/EC – Restriction of the use of certain Hazardous Substances in Electrical and Electronic equipment.



#### To Order

Part Number: E002329

Order Number: ACL01-MC--R3C6-E09-C01-L-0000

#### About Excelitas Technologies

Excelitas Technologies is a global technology leader focused on delivering innovative, customized solutions to meet the lighting, detection, and other high-performance technology needs of OEM customers.

From medical lighting to analytical instrumentation, clinical diagnostics, industrial, safety and security, and aerospace and defense applications, Excelitas Technologies is committed to enabling our customers' success in their specialty end-markets.

Excelitas Technologies has approximately 3,000 employees in North America, Europe and Asia, serving customers across the world.

**Excelitas Technologies**  
**LED Solutions, Inc.**  
160 E. Marquardt Drive  
Wheeling, Illinois  
60090 USA  
Telephone: (+1) 847.537.4277  
Fax: (+1) 847.537.4785  
ledsolutions.na@excelitas.com

**Excelitas Technologies**  
**Elcos GmbH**  
Luitpoldstrasse 6  
Pfaffenhofen, 85276  
Germany  
Telephone: (+49) 8441.8917.0  
Fax: (+49) 8441.7191.0  
ledsolutions.europe@excelitas.com

**Excelitas Technologies**  
**Shenzhen Co., Ltd.**  
Wearnes Technology Center  
No.10 Kefa Road, Science &  
Industry Park, Nanshan District,  
Shenzhen, Guangdong  
P.R. of China 518057  
Telephone: (+86) 2655 3861  
Fax: (+86) 755 2661 7311  
ledsolutions.asia@excelitas.com

**EXCELITAS**  
TECHNOLOGIES

For a complete listing of our global offices, visit [www.excelitas.com/locations](http://www.excelitas.com/locations)

© 2012 Excelitas Technologies Corp. All rights reserved. The Excelitas logo and design are registered trademarks of Excelitas Technologies Corp. All other trademarks not owned by Excelitas Technologies or its subsidiaries that are depicted herein are the property of their respective owners. Excelitas reserves the right to change this document at any time without notice and disclaims liability for editorial, pictorial or typographical errors.