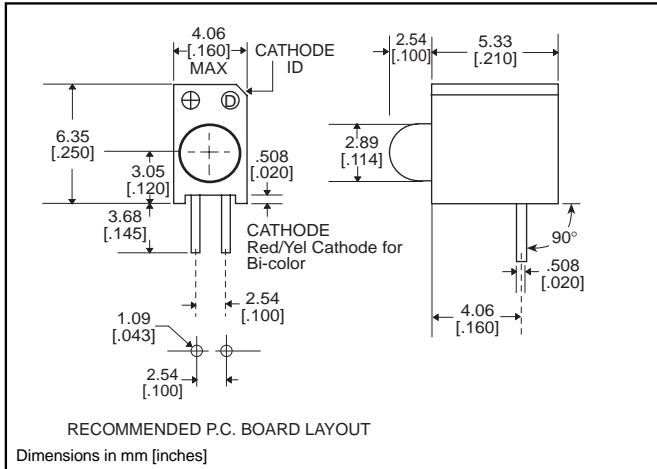


3mm

# LED CBI® Circuit Board Indicator .120" High LED Centerline



## 551-xx09



### Features

- Multiple CBIs form horizontal LED arrays on 4.2mm (0.165") center-lines
- High Contrast, UL 94 V-0 rated, black housing
- Oxygen index: 31.5%
- Polymer content: PBT, 0.128 g
- Housing stand-offs facilitate PCB cleaning
- Solderability per MIL-STD-202F, method 208F
- LEDs are safe for direct viewing per IEC 825-1, EN-60825-1

### Tolerance note: As noted, otherwise:

- LED Protrusion: ±0.04 mm [±0.016]
- CBI Housing: ±0.02mm[±0.008]

### PART NO.

#### HIGH EFFICIENCY

- 551-0209
- 551-0309
- 551-0409
- 551-0809
- 551-2509

### COLOR

- Green
- Yellow
- Red
- Blue<sup>3</sup>
- Orange



#### INTEGRAL RESISTOR, 5 VOLTS

- 551-0509
- 551-0609
- 551-0709

- Red
- Green
- Yellow

#### LOW CURRENT

- 551-1109
- 551-1209
- 551-1309

- Red
- Yellow
- Green



#### BI-COLOR

- 551-3009
- 551-3109

- Red/Green
- Yellow/Green



**ATTENTION**  
OBSERVE PRECAUTIONS  
FOR HANDLING  
ELECTROSTATIC  
SENSITIVE  
DEVICES

## Typical Operating Characteristics ( $T_A=25^{\circ}\text{C}$ )

See LED data sheet for additional information  
See page 4-70 and 4-71 for Reference Only LED Drive Circuit Examples. See page 4-72 for Pin Out

### HIGH EFFICIENCY

| Part Number | Color  | Peak Wavelength nm | $I_V$ mcd | $V_F$ Volts | Test Current (mA) | Viewing Angle $2\theta_{\%}$ | LED Data sheet | Page # |
|-------------|--------|--------------------|-----------|-------------|-------------------|------------------------------|----------------|--------|
| 551-0209    | Green  | 563                | 16        | 2.1         | 10                | 45°                          | 521-9408       | 4-64   |
| 551-0309    | Yellow | 585                | 6.3       | 2.1         | 10                | 45°                          | 521-9428       | 4-64   |
| 551-0409    | Red    | 650                | 10        | 2           | 10                | 45°                          | 521-9427       | 4-64   |
| 551-0809    | Blue   | 428                | 12        | 3.5         | 10                | 70°                          | 521-9831       | 4-57   |
| 551-2509    | Orange | 600                | 7         | 2.2         | 10                | 60°                          | 521-9498       | 4-58   |

### INTEGRAL RESISTOR, 5 VOLTS

| Part Number | Color  | Peak Wavelength nm | $I_V$ mcd | Test Voltage | Forward Current (mA) | Viewing Angle $2\theta_{\%}$ | LED Data sheet | Page # |
|-------------|--------|--------------------|-----------|--------------|----------------------|------------------------------|----------------|--------|
| 551-0509    | Red    | 635                | 29        | 5            | 10                   | 60°                          | 521-9215       | 4-59   |
| 551-0609    | Green  | 565                | 19        | 5            | 10                   | 60°                          | 521-9323       | 4-59   |
| 551-0709    | Yellow | 585                | 12.6      | 5            | 10                   | 60°                          | 521-9322       | 4-59   |

### LOW CURRENT

| Part Number | Color  | Peak Wavelength nm | $I_V$ mcd | $V_F$ Volts | Test Current (mA) | Viewing Angle $2\theta_{\%}$ | LED Data sheet | Page # |
|-------------|--------|--------------------|-----------|-------------|-------------------|------------------------------|----------------|--------|
| 551-1109    | Red    | 635                | 1.6       | 1.7         | 2                 | 60°                          | 521-9324       | 4-60   |
| 551-1209    | Yellow | 585                | 1.6       | 1.8         | 2                 | 60°                          | 521-9325       | 4-60   |
| 551-1309    | Green  | 565                | 1.6       | 1.9         | 2                 | 60°                          | 521-9326       | 4-60   |

### BI-COLOR

| Part Number | Color        | Peak Wavelength nm | $I_V$ mcd | $V_F$ Volts | Test Current (mA) | Viewing Angle $2\theta_{\%}$ | LED Data sheet | Page # |
|-------------|--------------|--------------------|-----------|-------------|-------------------|------------------------------|----------------|--------|
| 551-3009    | Red/Green    | 635/565            | 4.7/10    | 2           | 10                | 50°                          | 521-9459       | 4-63   |
| 551-3109    | Yellow/Green | 585/565            | 4.3/6.3   | 2.1*/2.1*   | 10                | 80°                          | 521-9478       | 4-62   |

\*  $I_F = 20\text{mA}$





# 3mm Discrete LED Tinted, Diffused

# Dialight

## 521-9831



**PART NO.** 521-9831  
**COLOR** Blue<sup>3</sup>

**MOUNTING CLIP:** 515-0006  
located on page 4-65



**ATTENTION**  
OBSERVE PRECAUTIONS  
FOR HANDLING  
ELECTROSTATIC  
SENSITIVE  
DEVICES

4

### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C)

Blue  
-9831

|                            |                                    |
|----------------------------|------------------------------------|
| Power Dissipation (mW)     | 100                                |
| Forward Current (mA)       | 20                                 |
| Derating (mA/°C) From 55°C | .44                                |
| Operating Temperature (°C) | -40/+100                           |
| Storage Temperature (°C)   | -40/+100                           |
| Soldering Temperature      | 260°C, 5 seconds, 1.6 mm from case |

Solder Adherence per MIL-STD-202E, Method 208C

### OPERATING CHARACTERISTICS (T<sub>A</sub>=25°C)

Blue  
-9831

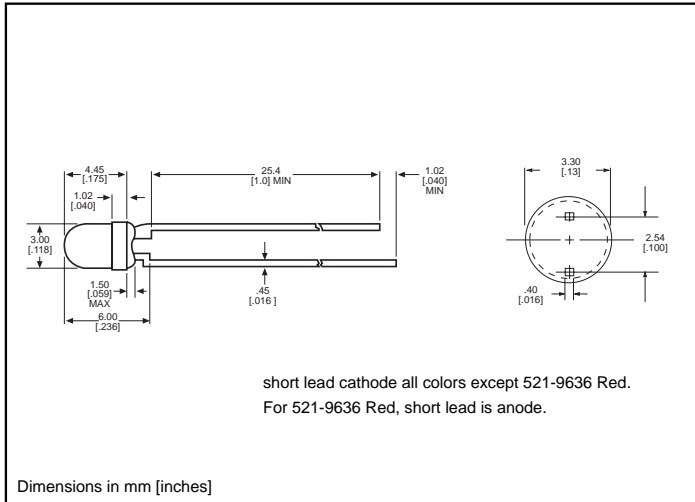
|  |         |     |
|--|---------|-----|
| Luminous Intensity (mcd)                 | Min.    | 6.3 |
| I <sub>F</sub> =10mA                     | Typical | 12  |
| Peak Wavelength (nm)                     | Typical | 428 |
| λ Peak                                   |         |     |
| Viewing Angle (2Θ <sub>1/2</sub> )       | Typical | 70° |
| Forward Voltage (V)                      | Typical | 3.5 |
| I <sub>F</sub> =10mA                     | Max.    | 4.2 |
| Reverse Voltage (V) I <sub>R</sub> =10μA | Min.    | 3   |

Θ<sub>1/2</sub> is the off axis angle at which the luminous intensity is half the axial luminous intensity

**3mm Discrete LED**  
**High Efficiency**  
**Diffused**



**521-9210, -9211, -9216, -9498, -9636**



**PART NO. COLOR**

- 521-9210 Green
- 521-9211 Yellow
- 521-9216 Red
- 521-9498 Orange
- 521-9636 Red



**MOUNTING CLIP: 515-0006**  
 located on page 4-65

| <b>ABSOLUTE MAXIMUM RATINGS</b> (T <sub>A</sub> =25°C) | Green<br><b>-9210</b>              | Yellow<br><b>-9211</b> | Red<br><b>-9216</b> | Orange<br><b>-9498</b> | Red<br><b>-9636</b> |
|--|------------------------------------|------------------------|---------------------|------------------------|---------------------|
| Power Dissipation (mW)                                 | 100                                | 60                     | 100                 | 135                    | 100                 |
| Forward Current (mA)                                   | 30                                 | 20                     | 30                  | 25                     | 40                  |
| Derating (mA/°C) From 50°C 1 from 25°C                 | .4                                 | .25                    | .4                  | .5                     | .5 <sup>1</sup>     |
| Operating Temperature (°C)                             | -55/+100                           | -55/+100               | -55/+100            | -55/+100               | -55/+100            |
| Storage Temperature (°C)                               | -55/+100                           | -55/+100               | -55/+100            | -55/+100               | -55/+100            |
| Soldering Temperature                                  | 260°C, 5 seconds, 1.6 mm from body |                        |                     |                        |                     |

*Solder Adherence per MIL-STD-202E, Method 208C*

| <b>OPERATING CHARACTERISTICS</b> (T <sub>A</sub> =25°C) |   | Green<br><b>-9210</b> | Yellow<br><b>-9211</b> | Red<br><b>-9216</b> | Orange<br><b>-9498</b> | Red<br><b>-9636</b> |
|---|---|-----------------------|------------------------|---------------------|------------------------|---------------------|
| Luminous Intensity (mcd)                                | Min.  | 4.7                   | 7.4                    | 7.4                 | 3.4                    | 8.7 <sup>1</sup>    |
|   | I <sub>F</sub> =10mA 1 I <sub>F</sub> =20mA | Typical               | 12.6                   | 10                  | 10                     | 7                   |
| Peak Wavelength (nm)                                    | Typical                                     | 565                   | 585                    | 635                 | 600                    | 660                 |
| Viewing Angle (2θ °)                                    | Typical                                     | 60°                   | 60°                    | 60°                 | 60°                    | 60°                 |
| Forward Voltage (V)                                     | Typical                                     | 2.1 <sup>1</sup>      | 2.1 <sup>1</sup>       | 2 <sup>1</sup>      | 2.2                    | 1.8 <sup>1</sup>    |
|   | I <sub>F</sub> =10mA 1 I <sub>F</sub> =20mA | Max.                  | 2.8 <sup>1</sup>       | 2.8 <sup>1</sup>    | 2.8 <sup>1</sup>       | 3                   |
| Reverse Voltage (V), I <sub>R</sub> =100µA              | Max.  | 5                     | 5                      | 5                   | 5                      | 4                   |

<sup>1</sup> θ is the off axis angle at which the luminous intensity is half the axial luminous intensity

**3mm Discrete LED  
Integral Resistor, 5V  
Diffused**

**Dialight**

**521-9215, -9322, -9323**



| PART NO. | COLOR  |
|----------|--------|
| 521-9215 | Red    |
| 521-9322 | Yellow |
| 521-9323 | Green  |

**MOUNTING CLIP: 515-0006**  
located on page 4-65

| <b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_A=25^\circ\text{C}$ ) | Red  | Yellow       | Green        |
|--|--|--------------|--------------|
|  | <b>-9215</b>                                       | <b>-9322</b> | <b>-9323</b> |
| Forward Voltage (V)  | 7.5  | 7.5          | 7.5          |
| Derating ( $V/^\circ\text{C}$ ) From $50^\circ\text{C}$    | .086   | .086         | .071         |
| Operating Temperature ( $^\circ\text{C}$ )                 | -40/+85  | -40/+85      | -20/+85      |
| Storage Temperature ( $^\circ\text{C}$ )                   | -55/+100   | -55/+100     | -55/+100     |
| Soldering Temperature                                      | 260 $^\circ\text{C}$ , 5 seconds, 1.6 mm from case |              |              |

Solder Adherence per MIL-STD-202E, Method 208C

| <b>OPERATING CHARACTERISTICS</b> ( $T_A=25^\circ\text{C}$ ) |         | Red          | Yellow       | Green        |
|---|---------|--------------|--------------|--------------|
|   |         | <b>-9215</b> | <b>-9322</b> | <b>-9323</b> |
| Luminous Intensity (mcd)                                    | Min.    | 8.7          | 3.7          | 5.6          |
|   | Typical | 29           | 12.6         | 19           |
| Peak Wavelength (nm)  | Typical | 635          | 585          | 565          |
| Viewing Angle ( $2\theta_{1/2}$ )                           | Typical | 60 $^\circ$  | 60 $^\circ$  | 60 $^\circ$  |
| Forward Current (mA)  | Typical | 10           | 10           | 10           |
|   | Max.    | 20           | 20           | 20           |
| Reverse Voltage (V), $I_R=100\mu\text{A}$                   | Min.    | 5            | 5            | 5            |

$\theta_{1/2}$  is the off axis angle at which the luminous intensity is half the axial luminous intensity

**4**

# 3mm Discrete LED

## Low Current

## Diffused

# Dialight

## 521-9324, -9325, -9326



### PART NO. COLOR

|          |        |
|----------|--------|
| 521-9324 | Red    |
| 521-9325 | Yellow |
| 521-9326 | Green  |

**MOUNTING CLIP:** 515-0006  
located on page 4-65

### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C)

|  | Red<br>-9324                       | Yellow<br>-9325 | Green<br>-9326 |
|--|------------------------------------|-----------------|----------------|
| Power Dissipation (mW)                   | 20                                 | 20              | 20             |
| Forward Current (mA)                     | 7                                  | 7               | 7              |
| Derating (mA/°C) From 90°C               | .7                                 | .7              | .7             |
| Peak Current (mA)<br>Pulse width = 10 μs | 500                                | 500             | 500            |
| Operating Temperature (°C)               | -55/+100                           | -55/+100        | -55/+100       |
| Storage Temperature (°C)                 | -55/+100                           | -55/+100        | -55/+100       |
| Soldering Temperature                    | 260°C, 5 seconds, 1.6 mm from case |                 |                |

Solder Adherence per MIL-STD-202E, Method 208C

### OPERATING CHARACTERISTICS (T<sub>A</sub>=25°C)

|   |         | Red<br>-9324 | Yellow<br>-9325 | Green<br>-9326 |
|---|---------|--------------|-----------------|----------------|
| Luminous Intensity (mcd)<br>I <sub>F</sub> =2mA | Min.    | 1            | 1               | 1              |
|   | Typical | 1.6          | 1.6             | 1.6            |
| Peak Wavelength (nm)<br>λ Peak                  | Typical | 635          | 585             | 565            |
| Viewing Angle (2Θ °)                            | Typical | 60°          | 60°             | 60°            |
| Forward Voltage (V)<br>I <sub>F</sub> =2mA      | Typical | 1.7          | 1.8             | 1.9            |
|   | Max.    | 2.2          | 2.7             | 2.2            |
| Reverse Voltage (V), I <sub>R</sub> =50μA       | Min.    | 5            | 5               | 5              |

Θ is the off axis angle at which the luminous intensity is half the axial luminous intensity

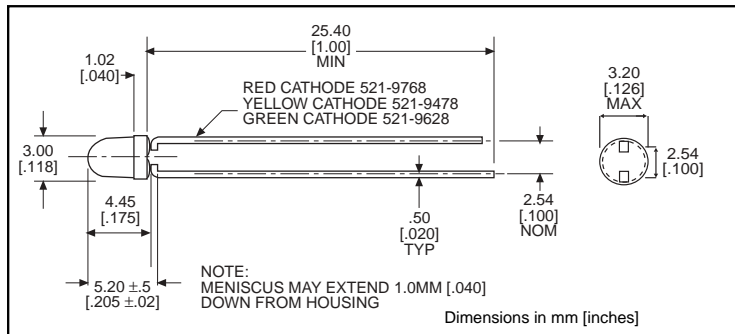
# 3mm Discrete LED

## Bi-Color

### Non-Tinted, Diffused



# 521-9478, -9628, -9768



| PART NO. | COLOR        |
|----------|--------------|
| 521-9478 | Yellow/Green |
| 521-9628 | Red/Green    |
| 521-9768 | Red/Yellow   |

**MOUNTING CLIP: 515-0006**  
located on page 4-65

| <b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_A=25^\circ\text{C}$ ) | Yellow/Green<br><b>-9478</b>        | Red/Green<br><b>-9628</b> | Red/Yellow<br><b>-9768</b>        |
|--|-------------------------------------|---------------------------|-----------------------------------|
| Power Dissipation (mW)                                     | 60/100                              | 140/100                   | 100/60                            |
| Forward Current (mA)                                       | 20/30                               | 40/30                     | 30/20                             |
| Derating (mA/°C) From 25°C From 50°C                       | .25 <sup>1</sup> /.40 <sup>1</sup>  | .5/.4                     | .4 <sup>1</sup> /.25 <sup>1</sup> |
| Peak Current (mA)<br>Pulse width = 10µs                    | 80/120                              | 200/120                   | 120/80                            |
| Operating Temperature (°C)                                 | -55/+100                            | -55/+100                  | -55/+100                          |
| Storage Temperature (°C)                                   | -55/+100                            | -55/+100                  | -55/+100                          |
| Soldering Temperature                                      | 260°C, 5 seconds, 1.66 mm from case |                           |                                   |

Solder Adherence per MIL-STD-202E, Method 208C

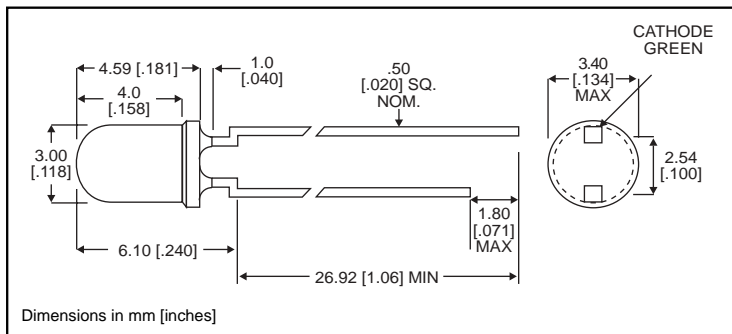
| <b>OPERATING CHARACTERISTICS</b> ( $T_A=25^\circ\text{C}$ ) |         | Yellow/Green<br><b>-9478</b> | Red/Green<br><b>-9628</b> | Red/Yellow<br><b>-9768</b> |
|---|---------|------------------------------|---------------------------|----------------------------|
| Luminous Intensity (mcd)                                    | Min.    | 2.5/2.5                      | 3.7*/1.1*                 | 1.7*/1.7*                  |
|   | Typical | 4.3/6.3                      | 12.6*/3.7*                | 5.6*/5.6*                  |
| Peak Wavelength (nm)<br>λ Peak                              | Typical | 585/565                      | 660/565                   | 630/585                    |
| Viewing Angle (2θ °)  | Typical | 80°                          | 200°                      | 80°                        |
| Forward Voltage (V)   | Typical | 2.1/2.1                      | 1.8/2.1                   | 2/2.1                      |
|   | Max.    | 2.8/2.8                      | 2.4/2.8                   | 2.8/2.8                    |
| Reverse Voltage (V) I <sub>R</sub> =100ua                   | Min.    | 5                            | 5                         | 5                          |

θ<sup>1</sup> is the off axis angle at which the luminous intensity is half the axial luminous intensity

# 3mm Discrete LED Bi-Color Non-Tinted, Diffused

# Dialight

## 521-9459



**PART NO.**

521-9459

**COLOR**

Red/Green

**MOUNTING CLIP:** 515-0006

located on page 4-65

4

### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C)

Red/Green  
**-9459**

|   |                                    |
|---|------------------------------------|
| Power Dissipation (mW)                  | 140                                |
| Forward Current (mA)                    | 45                                 |
| Derating (mA/°C) From 25°C              | .6                                 |
| Peak Current (mA)<br>Pulse width = 10µs | 1000                               |
| Operating Temperature (°C)              | -55/+100                           |
| Storage Temperature (°C)                | -55/+100                           |
| Soldering Temperature                   | 260°C, 5 seconds, 1.6 mm from case |

Solder Adherence per MIL-STD-202E, Method 208C

### OPERATING CHARACTERISTICS (T<sub>A</sub>=25°C)

Red/Green  
**-9459**

|  |                 |                   |
|--|-----------------|-------------------|
| Luminous Intensity (mcd)<br>I <sub>F</sub> =10mA | Min.<br>Typical | 2.5/3.7<br>4.7/10 |
| Peak Wavelength (nm)<br>λ Peak                   | Typical         | 635/565           |
| Viewing Angle (2Θ <sub>1/2</sub> )               | Typical         | 50°               |
| Forward Voltage (V)<br>I <sub>F</sub> =10mA      | Typical<br>Max. | 2/2.1<br>2.8/2.8  |

Θ<sub>1/2</sub> is the off axis angle at which the luminous intensity is half the axial luminous intensity



# 3mm Discrete LED High Efficiency Diffused

# Dialight

## 521-94xx



**TYPE**  
521-9408  
521-9427  
521-9428

**COLOR**  
Green  
Red  
Yellow

**MOUNTING CLIP: 515-0006**  
located on page 4-65

### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C)

|                            | Green<br><b>-9408</b>              | Red<br><b>-9427</b> | Yellow<br><b>-9428</b> |
|----------------------------|------------------------------------|---------------------|------------------------|
| Power Dissipation (mW)     | 75                                 | 60                  | 60                     |
| Forward Current (mA)       | 25                                 | 20                  | 20                     |
| Derating (mA/°C) From 50°C | .5                                 | .5                  | .5                     |
| Peak Current (mA)          | 60                                 | 60                  | 60                     |
| Operating Temperature (°C) | -25/+85                            | -25/+85             | -25/+85                |
| Storage Temperature (°C)   | -30/+100                           | -30/+100            | -30/+100               |
| Soldering Temperature      | 260°C, 5 seconds, 1.6 mm from case |                     |                        |

Solder Adherence per MIL-STD-202E, Method 208C

### OPERATING CHARACTERISTICS (T<sub>A</sub>=25°C)

|   |         | Green<br><b>-9408</b> | Red<br><b>-9427</b> | Yellow<br><b>-9428</b> |
|---|---------|-----------------------|---------------------|------------------------|
| Luminous Intensity (mcd)                  | Min.    | 5.6                   | 3.6                 | 2.2                    |
|   | Typical | 16                    | 10                  | 6.3                    |
| Peak Wavelength (nm)                      | Typical | 563                   | 650                 | 585                    |
| Viewing Angle (2θ <sup>1/2</sup> )        | Typical | 45°                   | 45°                 | 45°                    |
| Forward Voltage (V)                       | Typical | 2.1                   | 2                   | 2.1                    |
|   | Max.    | 3                     | 3                   | 3                      |
| Reverse Voltage (V), I <sub>R</sub> =10μA | Min.    | 3                     | 3                   | 3                      |

θ<sup>1/2</sup> is the off axis angle at which the luminous intensity is half the axial luminous intensity

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



## JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



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