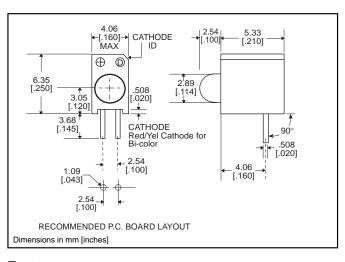
### 3<sub>mm</sub> LED CBI® Circuit Board Indicator .120" High LED Centerline



Red/Green

Yellow/Green



### **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.	<u>COLOR</u>
HIGH EFFICIENCY	
551-0209	Green
551-0309	Yellow
551-0409	Red
551-0809	Blue <sup>3</sup> NEW
551-2509	Orange
INTEGRAL RESISTOR, 5 VOLTS	
551-0509	Red
551-0609	Green
551-0709	Yellow
LOW CURRENT	
551-1109	Red
551-1209	Yellow
551-1309	Green
BI-COLOR	_

551-3009

551-3109



 $\label{top:characteristics} \textbf{T}_{A}=25^{\circ}\textbf{C}) \qquad \qquad \textbf{See LED data sheet for additional information} \\ \textbf{See page 4-70 and 4-71 for Reference Only LED Drive Circuit Examples. See page 4-72 for Pin Out to the Circuit Examples of the Circuit Exa$ 

### **HIGH EFFICIENCY**

Part Number	Color	Peak Wavelength nm	ly mcd	V <sub>F</sub> Volts	Test Current (mA)	Viewing Angle 2⊖ <sub>%</sub>	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	ly mcd	Test Voltage	Forward Current (mA)	Viewing Angle 2⊖ <sub>%</sub>	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	ly mcd	V <sub>F</sub> Volts	Test Current (mA)	Viewing Angle 2⊖ <sub>%</sub>	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	ly mcd	V <sub>F</sub> Volts	Test Current (mA)	Viewing Angle 2⊖ <sub>%</sub>	LED Data sheet	Page #
	551-3009	Red/Green	635/565	4.7/10	2	10	50°	521-9459	4-63
I	551-3109	Yellow/Green	585/565	4.3/6.3	2.1*/2.1*	10	80°	521-9478	4-62

 $<sup>*</sup>I_{F} = 20mA$ 

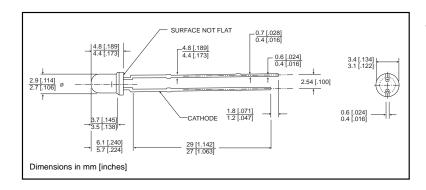




# 3mm Discrete LED Tinted, Diffused



521-9831



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

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



ABSOLUTE MAXIMUM RATINGS (TA=25°C)	Blue <b>-9831</b>
Power Dissipation (mW)	100
Forward Current (mA) Derating (mA/°C) From 55°C	20 .44
Operating Temperature (°C)	-40/+100
Storage Temperature (°C)	-40/+100
Soldering Temperature	260°C, 5 seconds, 1.6 mm from case

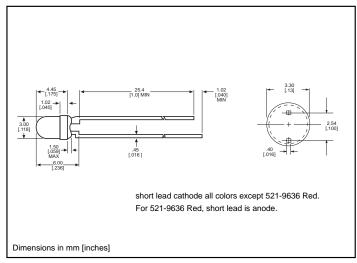
OPERATING CHARACTERISTICS (TA=	25°C)	Blue <b>-9831</b>	
Luminous Intensity (mcd) I <sub>F</sub> =10mA	Min. Typical	6.3 12	
Peak Wavelength (nm) λ Peak	Typical	428	
Viewing Angle $(2\Theta\frac{1}{2})$	Typical	70°	
Forward Voltage (V) I <sub>F</sub> =10mA	Typical Max.	3.5 4.2	
Reverse Voltage (V) IR=10μA	Min.	3	

 $<sup>\</sup>Theta^{\top}$  is the off axis angle at which the luminous intensity is half the axial luminous intensity

# 3mm Discrete LED **High Efficiency**



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



#### 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> $(T_A=25^{\circ}C)$	Green <b>-9210</b>	Yellow <b>-9211</b>	Red <b>-9216</b>	Orange <b>-9498</b>	Red <b>-9636</b>
Power Dissipation (mW)	100	60	100	135	100
Forward Current (mA)  Derating (mA/°C) From 50°C 1 from 25°C	30 .4	20 .25	30 .4	25 .5	40 .5¹
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				

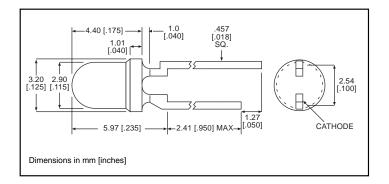
OPERATING CHARACTERISTICS	(T <sub>A</sub> =25°C)	Green <b>-9210</b>	Yellow <b>-9211</b>	Red <b>-9216</b>	Orange <b>-9498</b>	Red <b>-9636</b>
Luminous Intensity (mcd) I <sub>F</sub> =10mA <sup>1</sup> I <sub>F</sub> =20mA	Min. Typical	4.7 12.6	7.4 10	7.4 10	3.4 7	8.7¹ 48¹
Peak Wavelength (nm) λ Peak	Typical	565	585	635	600	660
Viewing Angle (2Θ ½)	Typical	60°	60°	60°	60°	60°
Forward Voltage (V) I <sub>F</sub> =10mA <sup>1</sup> I <sub>F</sub> =20mA	Typical Max.	2.1¹ 2.8¹	2.1¹ 2.8¹	2¹ 2.8¹	2.2 3	1.8¹ 2.4¹
Reverse Voltage (V), I <sub>R</sub> =100µA	Max.	5	5	5	5	4

 $<sup>\</sup>Theta^{\perp}$  is the off axis angle at which the luminous intensity is half the axial luminous intensity

# 3mm Discrete LED Integral Resistor, 5V Diffused



521-9215, -9322, -9323



COLOR
Red
Yellow
Green

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

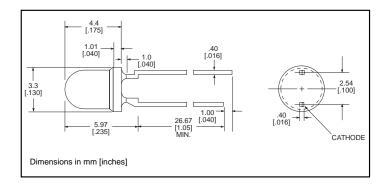
ABSOLUTE MAXIMUM RATINGS $(T_A=25^{\circ}C)$	Red <b>-9215</b>	Yellow <b>-9322</b>	Green <b>-9323</b>	
Forward Voltage (V) Derating (V/°C) From 50°C	7.5 .086	7.5 .086	7.5 .071	
Operating Temperature (°C)	-40/+85	-40/+85	-20/+85	
Storage Temperature (°C)	-55/+100	-55/+100	-55/+100	
Soldering Temperature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

OPERATING CHARACTERISTICS (TA	=25°C)	Red <b>-9215</b>	Yellow <b>-9322</b>	Green <b>-9323</b>
Luminous Intensity (mcd) V <sub>F</sub> =5V	Min. Typical	8.7 29	3.7 12.6	5.6 19
Peak Wavelength (nm) λ Peak	Typical	635	585	565
Viewing Angle (2Θ½)	Typical	60°	60°	60°
Forward Current (mA) V <sub>F</sub> =5V	Typical Max.	10 20	10 20	10 20
Reverse Voltage (V), I <sub>R</sub> =100μA	Min.	5	5	5

 $<sup>\</sup>Theta^{\top}$  is the off axis angle at which the luminous intensity is half the axial luminous intensity

## 3mm Discrete LED **Low Current Diffused**





COLOR
Red
Yellow
Green

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

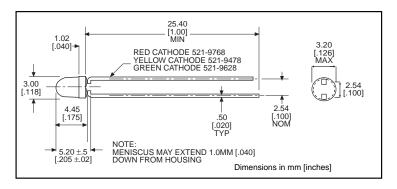
ABSOLUTE MAXIMUM RATINGS $(T_A=25^{\circ}C)$	Red <b>-9324</b>	Yellow <b>-9325</b>	Green <b>-9326</b>
Power Dissipation (mW)	20	20	20
Forward Current (mA) Derating (mA/°C) From 90°C	7 .7	7 .7	7 .7
Peak Current (mA)  Pulse width = 10 µs	500	500	500
Operating Temperature (°C)	-55/+100	-55/+100	-55/+100
Storage Temperature (°C)	-55/+100	-55/+100	-55/+100
Soldering Temperature	260°C, 5 seconds, 1.6 mm from case		

OPERATING CHARACTERISTICS (T <sub>A</sub> =25	°C)	Red <b>-9324</b>	Yellow <b>-9325</b>	Green <b>-9326</b>
Luminous Intensity (mcd) I <sub>F</sub> =2mA	Min. Typical	1 1.6	1 1.6	1 1.6
Peak Wavelength (nm) λ Peak	Typical	635	585	565
Viewing Angle (2Θ ½)	Typical	60°	60°	60°
Forward Voltage (V) I <sub>F</sub> =2mA	Typical Max.	1.7 2.2	1.8 2.7	1.9 2.2
Reverse Voltage (V), I <sub>R</sub> =50μA	Min.	5	5	5

 $<sup>\</sup>Theta^{\top}$  is the off axis angle at which the luminous intensity is half the axial luminous intensity

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





<u>COLOR</u>
Yellow/Green
Red/Green
Red/Yellow

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

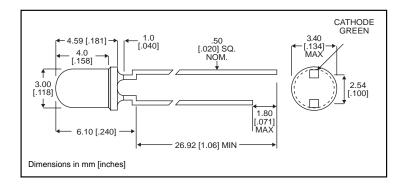
ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> =25°C)	Yellow/Green <b>-9478</b>	Red/Green <b>-9628</b>	Red/Yellow -9768
Power Dissipation (mW)	60/100	140/100	100/60
Forward Current (mA) Derating (mA/°C) From 25°C From 50°C	20/30 .25 <sup>1</sup> /.40 <sup>1</sup>	40/30 .5/.4	30/20 .4¹/.25¹
Peak Current (mA)  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		

OPERATING CHARACTERISTICS (TA	=25°C)	Yellow/Green -9478	Red/Green <b>-9628</b>	Red/Yellow -9768
Luminous Intensity (mcd) I <sub>F</sub> =10mA * I <sub>F</sub> =20mA	Min. Typical	2.5/2.5 4.3/6.3	3.7*/1.1* 12.6*/3.7*	1.7*/1.7* 5.6*/5.6*
Peak Wavelength (nm) λ Peak	Typical	585/565	660/565	630/585
Viewing Angle (2Θ ½)	Typical	80°	200°	80°
Forward Voltage (V) I <sub>F</sub> =20mA	Typical Max.	2.1/2.1 2.8/2.8	1.8/2.1 2.4/2.8	2/2.1 2.8/2.8
Reverse Voltage (V) I <sub>R</sub> =100ua	Min.	5	5	5

 $<sup>\</sup>Theta^{\perp}$  is the off axis angle at which the luminous intensity is half the axial luminous intensity

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





PART NO. COLOR 521-9459 Red/Green

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

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)	1000
Pulse width = 10μs	
Operating Temperature (°C)	-55/+100
Storage Temperature (°C)	-55/+100
Soldering Temperature	260°C, 5 seconds, 1.6 mm from case

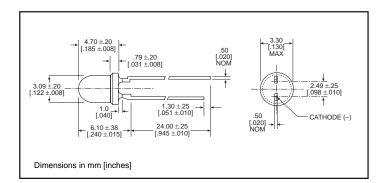
OPERATING CHARACTERISTICS (T <sub>A</sub> =25°C)		Red/Green -9459
Luminous Intensity (mcd) I <sub>F</sub> =10mA	Min. Typical	2.5/3.7 4.7/10
Peak Wavelength (nm) λ Peak	Typical	635/565
Viewing Angle $(2\Theta\frac{1}{2})$	Typical	50°
Forward Voltage (V) I <sub>F</sub> =10mA	Typical Max.	2/2.1 2.8/2.8

 $<sup>\</sup>Theta^{\perp}$  is the off axis angle at which the luminous intensity is half the axial luminous intensity

# 3mm Discrete LED High Efficiency Diffused



521-94xx



<u>TYPE</u>	COLOR
521-9408	Green
521-9427	Red
521-9428	Yellow

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

ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> =25°C)	Green <b>-9408</b>	Red <b>-9427</b>	Yellow -9428
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		

OPERATING CHARACTERISTICS (	(T <sub>A</sub> =25°C)	Green -9408	Red <b>-9427</b>	Yellow -9428
Luminous Intensity (mcd) I <sub>F</sub> =10mA	Min. Typical	5.6 16	3.6 10	2.2 6.3
Peak Wavelength (nm) λ Peak	Typical	563	650	585
Viewing Angle (2Θ ½)	Typical	45°	45°	45°
Forward Voltage (V) I <sub>F</sub> =10mA	Typical Max.	2.1 3	2 3	2.1 3
Reverse Voltage (V), I <sub>R</sub> =10µA	Min.	3	3	3

 $<sup>\</sup>Theta^{\top}$  is the off axis angle at which the luminous intensity is half the axial luminous intensity