

Mini Half-Watt SMD 3.5mm (120° Viewing Angle)



OVS5MxBCR4 Series

Features:

- Compact Package Outline of 3.5 x 3.5 x 1.2 mm
- Robust energy-efficient design with long operating life
- Low thermal resistance
- Exceptional spatial uniformity
- Compatible to IR reflow soldering
- High Lumens output



Description:

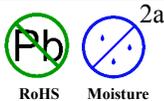
The mini-half watt is an energy-efficient packaged LED source that offers high luminance, and a long operating lifespan. This device offers a 120° viewing angle and an ultra-low profile (1.2 mm) making it highly suitable for conventional lighting and specialized applications.

Applications:

- Automotive exterior and interior lighting
- Architectural indoor and outdoor lighting
- General lighting
- Display Backlighting
- Electronic signs and signals

| Part Number | Viewing Angle | Emitted Color | Typ. Luminous Flux (lm) | Forward Voltage V_F | Power Dissipation @ 150 mA | Lens Color |
|-------------|---------------|---------------|-------------------------|-----------------------|----------------------------|------------|
| OVS5MWBCR4 | 120 | White | 50 | 3.4 | 0.51 W | Clear |
| OVS5MWWBCR4 | | Warm White | 30 | 3.6 | 0.54 W | |
| OVS5MBBCR4 | | Blue | 8.2 | 3.4 | 0.51 W | |
| OVS5MGBCR4 | | Green | 22 | 3.4 | 0.51 W | |

| Part Number | Viewing Angle | Emitted Color | Typ. Luminous Intensity (mcd) | Forward Voltage V_F | Power Dissipation @ 150 mA | Lens Color |
|-------------|---------------|---------------|-------------------------------|-----------------------|----------------------------|------------|
| OVS5MRBCR4 | 120 | Red | 7150 | 2.2 | 0.33 W | Clear |
| OVS5MABCR4 | | Amber | 7150 | 2.2 | 0.33 W | |
| OVS5MYBCR4 | | Yellow | 7150 | 2.2 | 0.33 W | |



DO NOT LOOK DIRECTLY AT LED WITH UNSHIELDED EYES OR DAMAGE TO RETINA MAY

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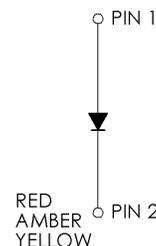
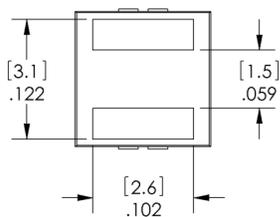
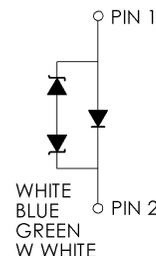
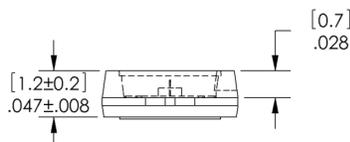
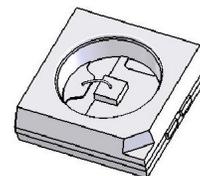
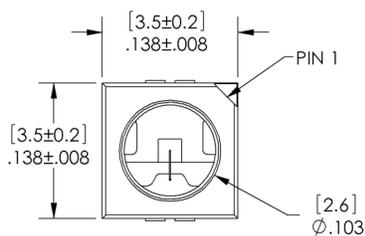
OVS5MxBCR4 Series

Electrical Specifications

| Absolute Maximum Ratings (T _A = 25° C unless otherwise noted) | | | | |
|--|--------------------|-------------------------------|-------------------------------|-------------------------------|
| | Red, Amber, Yellow | Green, Blue | White | Warm White |
| DC Forward Current | 200 mA a | 180 mA | 180 mA | 180 mA |
| Peak Pulsed Forward Current ¹ | 1000 mA | 350 mA | 350 mA | 350 mA |
| Reverse Voltage | 12V @ 10 uA | Not designed for reverse bias | Not designed for reverse bias | Not designed for reverse bias |
| Junction Temperature ² | 125°C | 125°C | 125°C | 125°C |
| Power Dissipation | 750mW | 750mW | 750mW | 750mW |
| Storage and Operating Temperature | -40° ~ +100 ° C | -40° ~ +100 ° C | -40° ~ +100 ° C | -40° ~ +100 ° C |
| ESD (JEDEC-JESD22-A114F) | Class 2 | Class 2 | Class 2 | Class 2 |
| MSL (IPC / JEDEC J-STD-020C) | 2a / 672 Hrs | 2a / 672 Hrs | 2a / 672 Hrs | 2a / 672 Hrs |

Notes:

1. Pulse width $t_p \leq 10\mu s$, Duty cycle = 0.1
2. Thermal Resistance = 5 C/W



DIMENSIONS ARE IN INCHES [MM].

| | |
|-------|---------|
| PIN 1 | ANODE |
| PIN 2 | CATHODE |

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Mini Half-Watt SMD 3.5mm (120° Viewing Angle)



OVS5MxBCR4 Series

Optical and Electrical Characteristics - Red, Amber, Yellow ($I_F = 140 \text{ mA}$, $T_A = 25^\circ \text{ C}$)

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | |
|------------------|------------------------|--------|------|------|---------------|-----|
| V_F | Forward Voltage | 1.9 | 2.2 | 2.65 | V | |
| Φ | Luminous Intensity | Red | 4500 | 7150 | 9000 | mcd |
| | | Amber | | | | |
| | | Yellow | | | | |
| λ_D | Dominant Wavelength | Red | 620 | 625 | 630 | nm |
| | | Amber | 610 | 615 | 621 | |
| | | Yellow | 585 | 590 | 594 | |
| I_R | Reverse Current @ 12 V | ---- | 10 | ---- | μA | |
| $2 \Theta_{1/2}$ | 50% Power Angle | ---- | 120 | ---- | deg | |

Optical and Electrical Characteristics - Blue, Green ($I_F = 150 \text{ mA}$, $T_A = 25^\circ \text{ C}$)

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | |
|------------------|---------------------|-------|------|------|-------|----|
| V_F | Forward Voltage | 3.0 | 3.4 | 3.9 | V | |
| Φ | Luminous Flux | Blue | 6.3 | 8.2 | 10.7 | lm |
| | | Green | 18.1 | 22.0 | 30.6 | |
| λ_D | Dominant Wavelength | Blue | 460 | 465 | 470 | nm |
| | | Green | 520 | 525 | 535 | |
| $2 \Theta_{1/2}$ | 50% Power Angle | ---- | 120 | ---- | deg | |

Optical and Electrical Characteristics - White, Warm White ($I_F = 150 \text{ mA}$, $T_A = 25^\circ \text{ C}$)

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | |
|------------------|-----------------|------------|------|------|-------|----|
| V_F | Forward Voltage | White | 3.0 | 3.4 | 4.1 | V |
| | | Warm White | | 3.6 | | |
| Φ | Luminous Flux | White | 30.6 | 50 | 67.2 | lm |
| | | Warm White | 23.5 | 30 | 39.8 | |
| $2 \Theta_{1/2}$ | 50% Power Angle | ---- | 120 | ---- | deg | |

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Mini Half-Watt SMD 3.5mm (120° Viewing Angle)



OVS5MxBCR4 Series

Standard Bins

LEDs are sorted to luminous intensity (I_V) or luminous flux (Φ) and dominant wavelength (nm) bins shown. Each reel consists of a single intensity bin and a single color bin. Orders are filled using all intensity and color bins listed in the following tables. Optek will not accept orders for single intensity bins or single color bins.

Luminous Flux (Φ) @ 150mA (lm)

| Blue: OVS5MBBCR4 | | |
|-------------------|----------|----------|
| IV Code | Min (lm) | Max (lm) |
| J2 | 6.3 | 7.1 |
| J3 | 7.1 | 8.2 |
| K2 | 8.2 | 9.3 |
| K3 | 9.3 | 10.7 |
| Green: OVS5MGBCR4 | | |
| IV Code | Min (lm) | Max (lm) |
| N2 | 18.1 | 20.6 |
| N3 | 20.6 | 23.5 |
| P2 | 23.5 | 26.8 |
| P3 | 26.8 | 30.6 |

Dominant Wavelength (nm)

| Blue: OVS5MBBCR4 | | |
|-------------------|----------|----------|
| nm Code | Min (nm) | Max (nm) |
| A | 460 | 465 |
| B | 465 | 470 |
| Green: OVS5MGBCR4 | | |
| nm Code | Min (nm) | Max (nm) |
| A | 520 | 525 |
| B | 525 | 530 |
| C | 530 | 535 |

Luminous Intensity (I_V) @ 140mA

| Amber: OVS5MABCR4 | | |
|--------------------|-----------|-----------|
| IV Code | Min (mcd) | Max (mcd) |
| Z1 | 4500 | 5600 |
| Z2 | 5600 | 7150 |
| AA | 7150 | 9000 |
| Red: OVS5MRBCR4 | | |
| IV Code | Min (mcd) | Max (mcd) |
| Z1 | 4500 | 5600 |
| Z2 | 5600 | 7150 |
| AA | 7150 | 9000 |
| Yellow: OVS5MYBCR4 | | |
| IV Code | Min (mcd) | Max (mcd) |
| Z1 | 4500 | 5600 |
| Z2 | 5600 | 7150 |
| AA | 7150 | 9000 |

Dominant Wavelength (nm)

| Amber: OVS5MABCR4 | | |
|--------------------|----------|----------|
| nm Code | Min (nm) | Max (nm) |
| W | 610 | 615 |
| X | 615 | 621 |
| Red: OVS5MRBCR4 | | |
| nm Code | Min (nm) | Max (nm) |
| Full | 620 | 630 |
| Yellow: OVS5MYBCR4 | | |
| nm Code | Min (nm) | Max (nm) |
| X | 585 | 588 |
| Y | 588 | 591 |
| Z | 591 | 594 |

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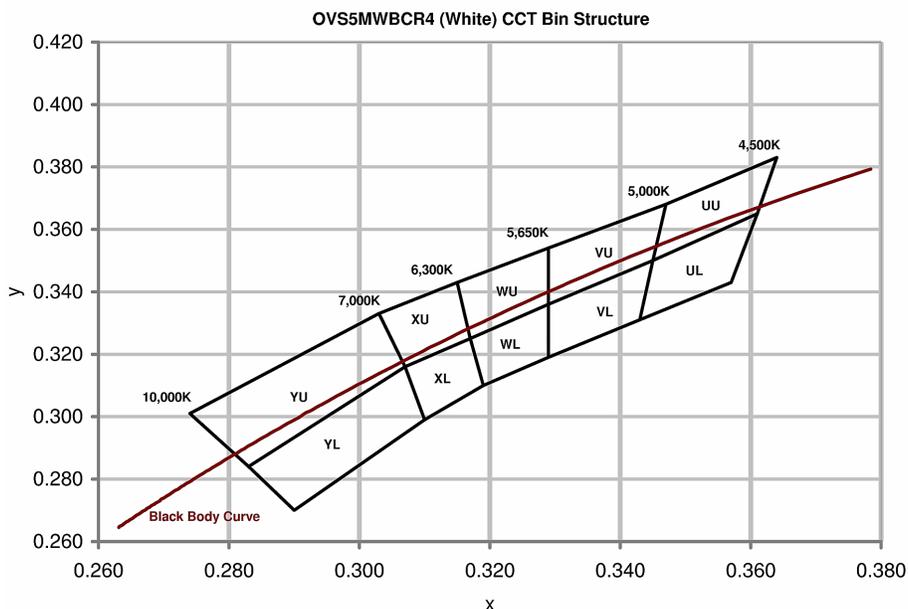
Mini Half-Watt SMD 3.5mm (120° Viewing Angle)



OVS5MxBCR4 Series

Standard Bins (IF = 150mA)

LEDs are sorted to luminous flux (Φ) and chromaticity coordinates (x, y) bins shown. Each reel consists of a single intensity bin and a single chromaticity bin. Orders are filled using all intensity and chromaticity bins listed in the following table. Optek will not accept orders for single intensity bins or single chromaticity bins.



Chromaticity Coordinates (x, y)

| Rank | YU | | | | YL | | | |
|------|-------|-------|-------|-------|-------|-------|-------|-------|
| Cx | 0.274 | 0.283 | 0.307 | 0.303 | 0.283 | 0.290 | 0.310 | 0.307 |
| Cy | 0.301 | 0.284 | 0.316 | 0.333 | 0.284 | 0.270 | 0.299 | 0.316 |
| Rank | XU | | | | XL | | | |
| Cx | 0.303 | 0.307 | 0.317 | 0.315 | 0.307 | 0.310 | 0.319 | 0.317 |
| Cy | 0.333 | 0.316 | 0.325 | 0.343 | 0.316 | 0.299 | 0.310 | 0.325 |
| Rank | WU | | | | WL | | | |
| Cx | 0.315 | 0.317 | 0.329 | 0.329 | 0.317 | 0.319 | 0.329 | 0.329 |
| Cy | 0.343 | 0.325 | 0.336 | 0.354 | 0.325 | 0.310 | 0.319 | 0.336 |
| Rank | VU | | | | VL | | | |
| Cx | 0.329 | 0.329 | 0.345 | 0.347 | 0.329 | 0.329 | 0.343 | 0.345 |
| Cy | 0.354 | 0.336 | 0.350 | 0.368 | 0.336 | 0.319 | 0.331 | 0.350 |
| Rank | UU | | | | UL | | | |
| Cx | 0.347 | 0.345 | 0.361 | 0.364 | 0.345 | 0.343 | 0.357 | 0.361 |
| Cy | 0.368 | 0.350 | 0.365 | 0.383 | 0.350 | 0.331 | 0.343 | 0.365 |

| Φ | Luminous Flux (lm) | |
|--------|--------------------|------|
| Bin | Min | Max |
| Q2 | 30.6 | 34.8 |
| Q3 | 34.8 | 39.8 |
| R2 | 39.8 | 45.2 |
| R3 | 45.2 | 51.7 |
| S2 | 51.7 | 59.0 |
| S3 | 59.0 | 67.2 |

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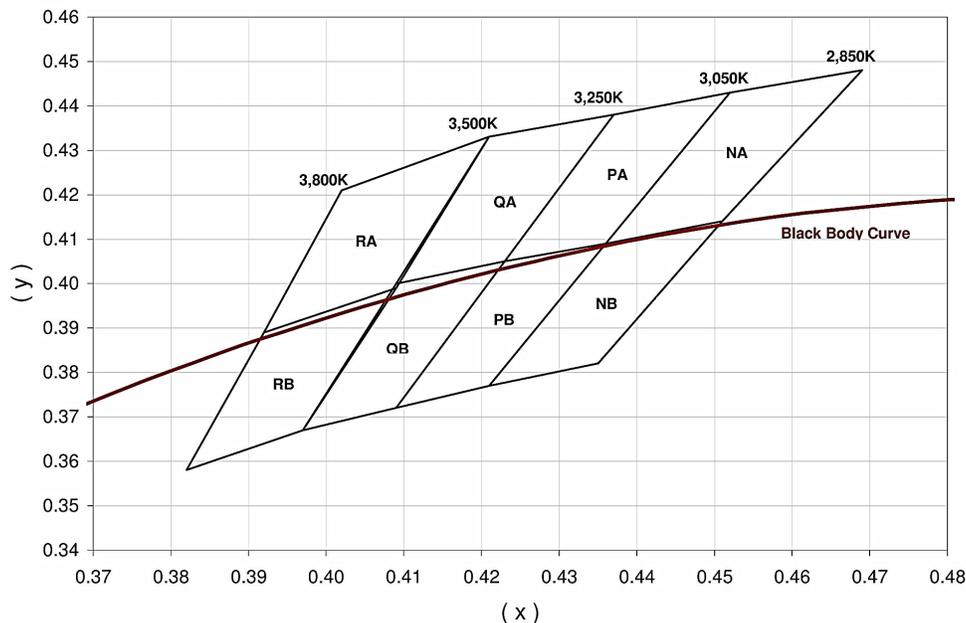


OVS5MxBCR4 Series

Standard Bins (IF = 150mA)

LEDs are sorted to luminous flux (Φ) and chromaticity coordinates (x, y) bins shown. Each reel consists of a single intensity bin and a single chromaticity bin. Orders are filled using all intensity and chromaticity bins listed in the following table. Optek will not accept orders for single intensity bins or single chromaticity bins.

OVS5MWWBCR4 (Warm White) CCT Bin Structure



Chromaticity Coordinates (x, y)

| Rank | RA | | | | RB | | | |
|------|-------|-------|-------|-------|-------|-------|-------|-------|
| Cx | 0.402 | 0.392 | 0.409 | 0.421 | 0.392 | 0.382 | 0.397 | 0.409 |
| Cy | 0.421 | 0.389 | 0.399 | 0.433 | 0.389 | 0.358 | 0.367 | 0.399 |
| Rank | QA | | | | QB | | | |
| Cx | 0.421 | 0.409 | 0.423 | 0.437 | 0.409 | 0.397 | 0.409 | 0.423 |
| Cy | 0.433 | 0.400 | 0.405 | 0.438 | 0.400 | 0.367 | 0.372 | 0.405 |
| Rank | PA | | | | PB | | | |
| Cx | 0.437 | 0.423 | 0.436 | 0.452 | 0.423 | 0.409 | 0.421 | 0.436 |
| Cy | 0.438 | 0.405 | 0.409 | 0.443 | 0.405 | 0.372 | 0.377 | 0.409 |
| Rank | NA | | | | NB | | | |
| Cx | 0.452 | 0.436 | 0.451 | 0.469 | 0.436 | 0.421 | 0.435 | 0.451 |
| Cy | 0.443 | 0.409 | 0.414 | 0.448 | 0.409 | 0.377 | 0.382 | 0.414 |

| Φ | Luminous Flux (lm) | |
|--------|--------------------|------|
| Bin | Min | Max |
| P2 | 23.5 | 26.8 |
| P3 | 26.8 | 30.6 |
| Q2 | 30.6 | 34.8 |
| Q3 | 34.8 | 39.8 |

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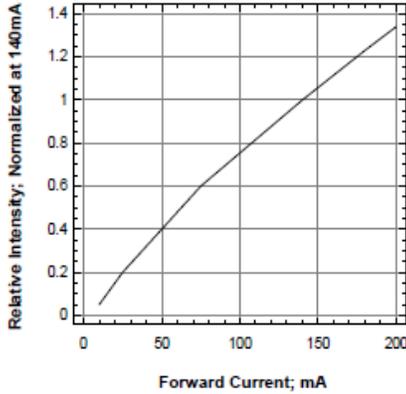
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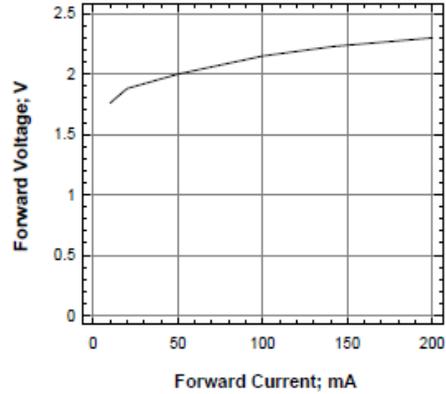
OVS5MxBCR4 Series

OVS5MABCR4 (Amber), OVS5MRBCR4 (Red) and OVS5MYBCR4 (Yellow)

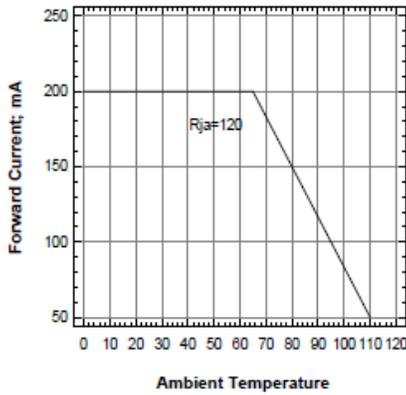
Relative Intensity Vs Forward Current



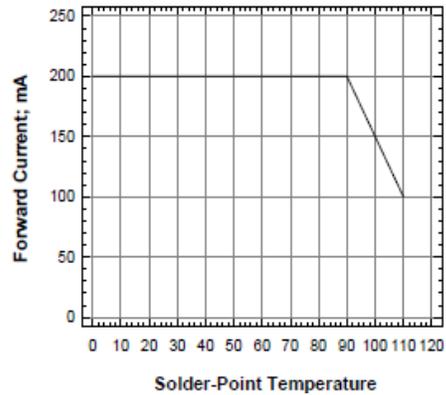
Forward Voltage Vs Forward Current



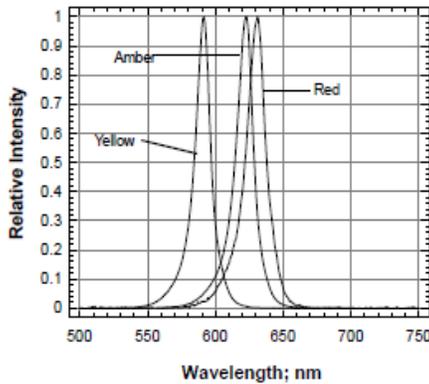
Maximum Current Vs Ambient Temperature



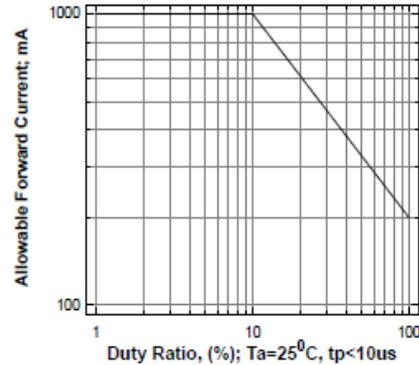
Maximum Current vs Solder-Point Temperature



Relative Intensity Vs Wavelength



Allowable Forward Current Vs Duty Ratio



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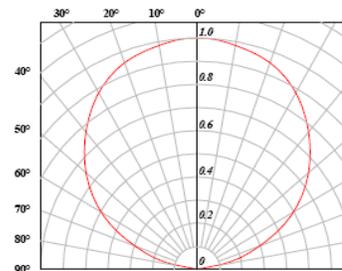
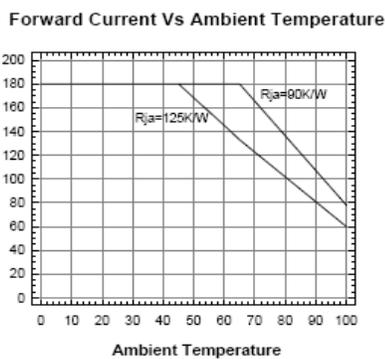
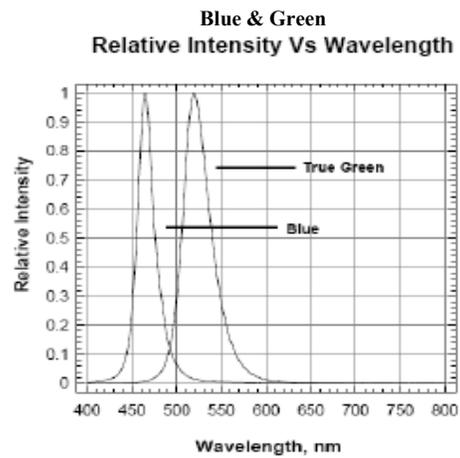
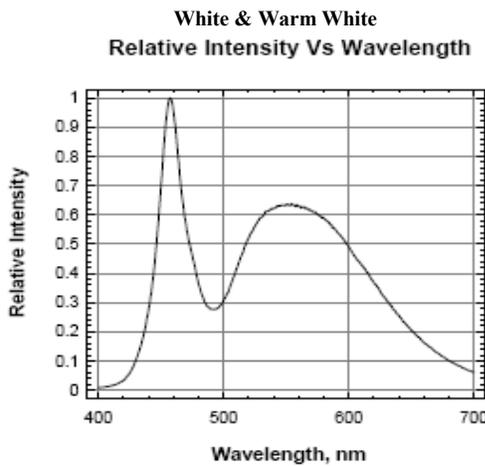
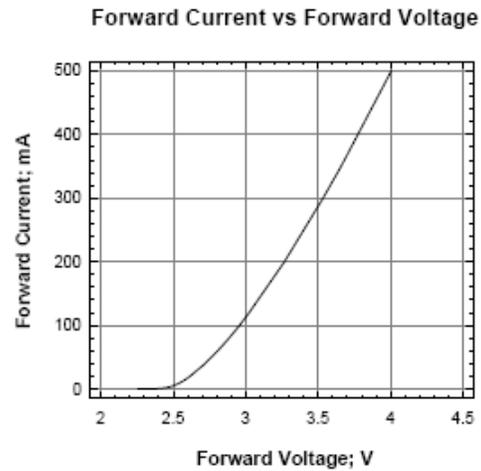
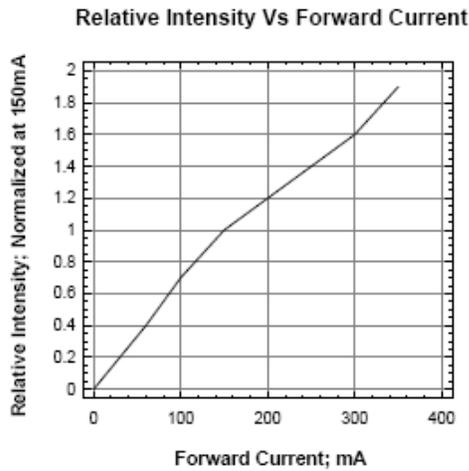
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OVS5MxBCR4 Series

OVS5MBCR4 (Blue), OVS5MGBCR4 (Green), OVS5MWBCR4 (White) and OVS5MWWBCR4 (Warm White)



Beam Angle: All Col-

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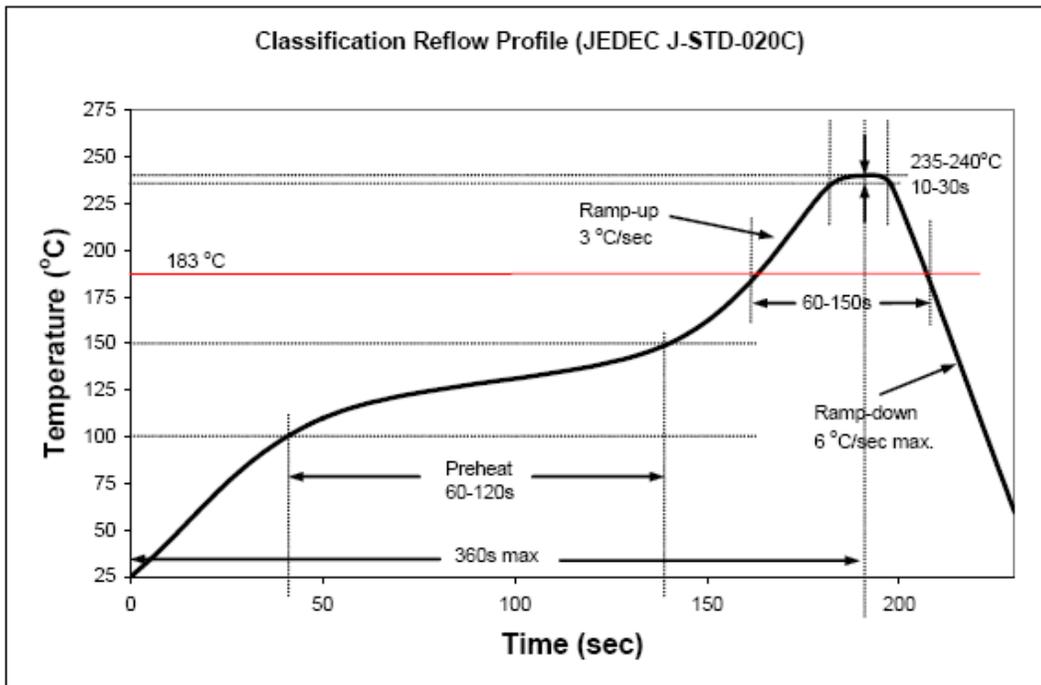
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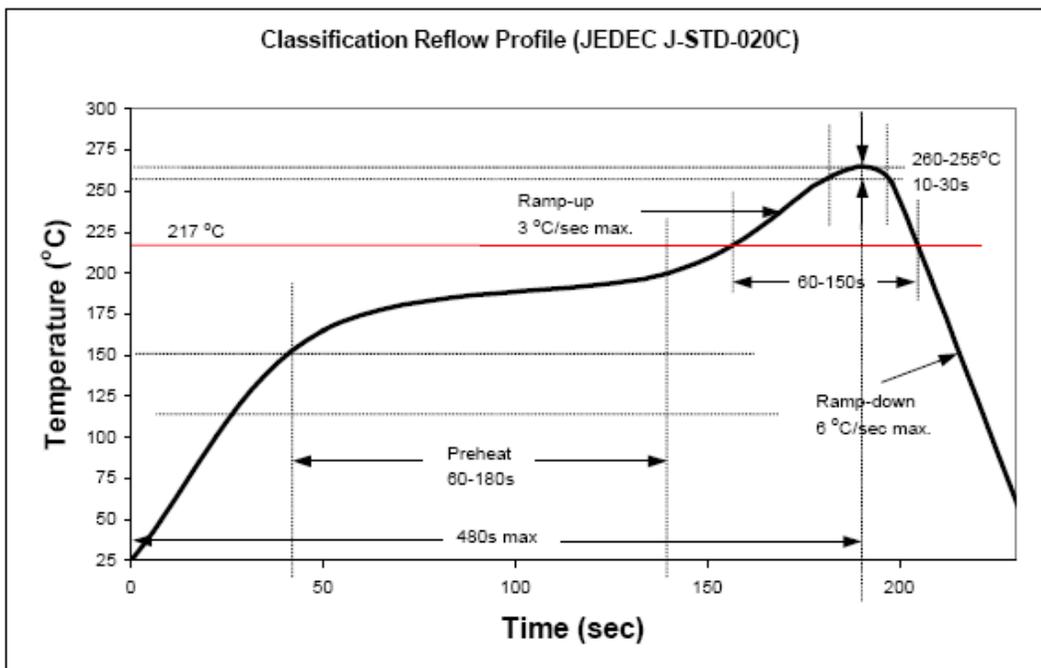


OVS5MxBCR4 Series

Recommended Sn-Pb IR-Reflow Soldering Profile.



Recommended Pb Free IR-Reflow Soldering Profile.



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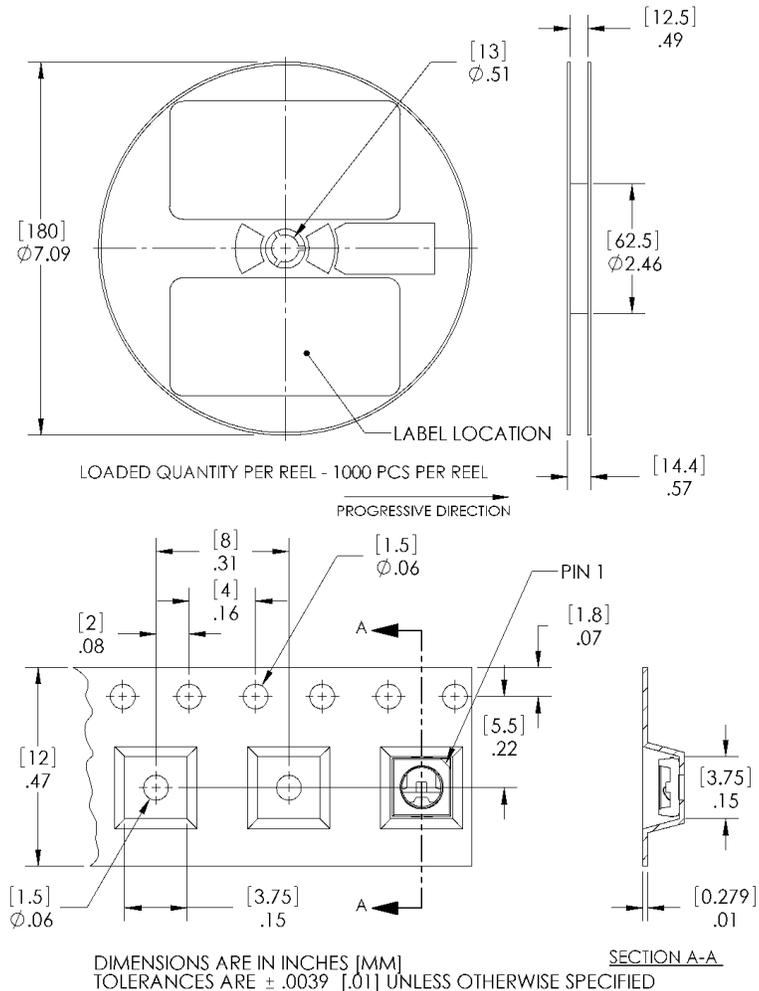
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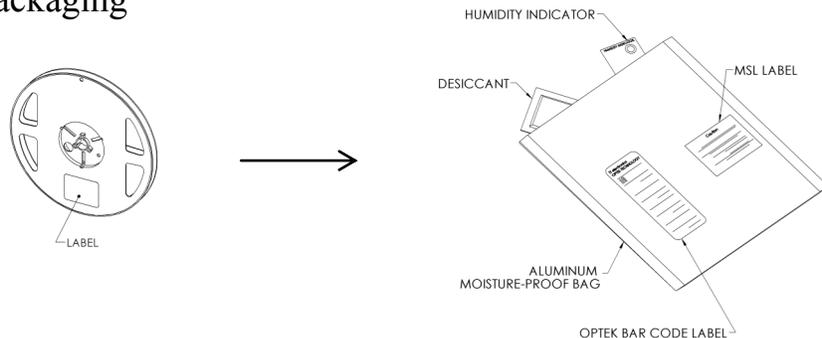
OVS5MxBCR4 Series

Reel Dimensions: 7-inch reel



Carrier Tape Dimensions: Loaded quantity 1000 pieces per reel

Moisture Resistant Packaging



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OVS5MxBCR4 Series

| Issue | Change Description | Approval | Date |
|-------|---|---------------------------|----------|
| A | Initial Release—conforms to Dominant specifications: Primax - 0.5 watt (150mA) V1.0 (dated 11-21-08) Blue: 0.5 watt Red: 0.3 W Green: 0.5 watt Amber: 0.3 W White: 0.5 watt Yellow: 0.3 W Warm White: 0.5 watt Per Factory spec dated 5-27-09, the following changes were made: Page 1: Warm White Typ Luminous Flux (lm) changed from 18 to 25. Page 3: Combined the White & Warm White Luminous Flux Min & Max to read the same. Page 7: Replaced CCT graph with new one (removed the MA & MB range). Removed the MA & MB Cx/Cy data. Luminous Flux Table: removed M2 & M3. Added P2 & P3. | R. Bailey | 06/10/09 |
| A.1 | Page 12: Removed the tape/reel configuration & 2k reel quantity. Replaced with new drawing & correct 1k reel quantity. | K. Bland | 8/20/09 |
| A.2 | Page 2: ABSOLUTE MAX RATINGS—Peak Pulsed Forward Current. Removed “TBD” and added Red-Amber-Yellow @ 1000mA, Green-Blue-White-WarmWhite @ 350ma | K. Bland | 10/12/09 |
| B | Master Page: Change Issue A.2 dated 10/09 to Issue B dated 03/2011. Page 1: Updated all information tables. Page 2: Updated Absolute Maximum table with new data & added ESD & MSL ratings. Replaced all mechanical drawings & added Pin 1 & Pin 2 locations & Anode/Cathode information. Page 3: Updated all Optical Electrical Characteristics tables. Page 4 & 5: Removed Spectral Response graph. Replaced IV & Wavelength tables with new tables; all fitting on one page. Page 5: Added OVS5MWBCR4 (White) CCT bin structure with Black Body Curve, replaced Chromaticity Coordinate table with new one and updated Luminous Flux information. Page 6: Removed the OVS5MWBCR4 charts and replaced with OVS5MWWBCR4 (Warm White) CCT bin structure with Black Body Curve, replaced Chromaticity Coordinate table with new one. Luminous Flux remained the same. Page 7: Removed OVS5MWWBCR4 Warm White charts and tables. Replaced with Graphs for OVS5MABCR4, OVS5MRBCR4 & OVS5MYBCR4. Page 8: Removed graphs. Replaced with Graphs for OVS5MBBCR4, OVS5MGBCR4, OVS5MWBCR4 & OVS5MWWBCR4. Also moved the Beam Angle graph to this page. Page 9: Removed reliability data. Replaced with Solder & Copper Patterns. Page 10: Removed Radiation Pattern & Solder Pad Design. Replaced with SN-PB & PB IR reflow solder profiles. Page 11: Removed SN-PB & PB IR reflow solder profiles. Replaced with Reel / Tape and Moisture Packaging drawings. Page 12: Deleted. | K. Bland | 3/31/11 |
| C | Master Page: Changed from Issue B 04/2011 to Issue C 10/2011. OVS5MWWBCR4 Changes: Page 1: Typ Luminous Flux changed from 23 to 30. Page 3: Optical & Electrical Characteristics Table (Warm White) changed from Min 18.1 / Typ 23.5 / Max 30.6 TO: Min 23.5 / Typ 30 / Max 39.8. Page 6: Luminous Flux Table: Removed N2 & N3. Added Q2 & Q3. | K. Bland J. Plaster | 10/26/11 |

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Mini Half-Watt SMD 3.5mm (120° Viewing Angle)



OVS5MxBCR4 Series

| Issue | Change Description | Approval | Date |
|-------|--|-----------------------|----------|
| D | <p>Master Page: Changed from Issue C 10/2011 to Issue D 02/2013.</p> <p>OVS5MBCR4: Page 1: Changed Typ Luminous Flux from 6 to 8.2 Page 3: Changed Luminous Flux FROM Min=4.9, Typ=6.0, Max=8.2 TO: Min=6.3, Typ=8.2, Max=10.7 Page 4: Removed IV codes H2 (4.9-5.5) & H3 (5.5-6.3). Added K2 (8.2-9.3) & K3 (9.3-10.7).</p> <p>OVS5MWBCR4: Page 1: Changed Typ Luminous Flux from 30 to 50. Page 3: Changed Luminous Flux FROM Min=23.5, Typ=30, Max=39.8 TO: Min=30.6, Typ=50, Max=67.2 Page 5: Removed IV codes P2 (23.5-26.8) & P3 (26.8-30.6). Added R2 (39.8-45.2), R3 (45.2-51.7), S2 (51.7-59.0) & S3 (59.0-67.2) .</p> | K. Bland / J. Plaster | 2/8/2013 |

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