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	

RoHS Moisture 2a

ATTENTION
OBSERVE PRECAUTIONS
ELECTROSTATIC
SENSITIVE DEVICES

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

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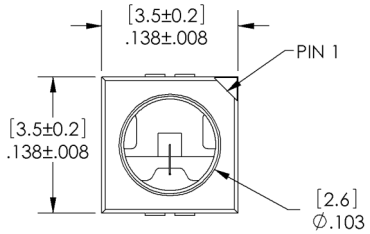
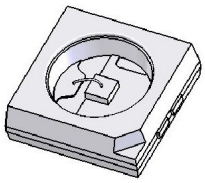
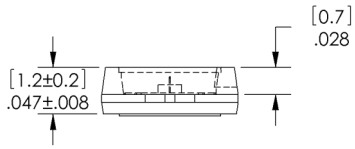
Electrical Specifications

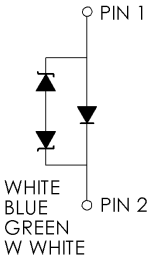
Absolute Maximum Ratings (T_A = 25° C unless otherwise noted)				
	Red, Amber, Yellow	Green, Blue	White	Warm White
DC Forward Current	200 mA a	180 mA	180 mA	180 mA
Peak Pulsed Forward Current[1]	1000 mA	350 mA	350 mA	350 mA
Reverse Voltage	12V @ 10 uA	Not designed for reverse bias	Not designed for reverse 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

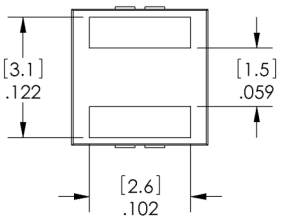
Notes:
1. Pulse width tp ≤ 10µs, Duty cycle = 0.1
2. Thermal Resistance = 5 C/W

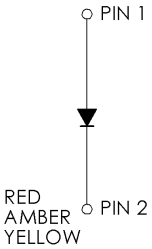












DIMENSIONS ARE IN INCHES [MM].

PIN 1	ANODE
PIN 2	CATHODE

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Optical and Electrical Characteristics - Red, Amber, Yellow (I_F = 140 mA, T_A = 25° 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 Θ½	50% Power Angle		----	120	----	deg

Optical and Electrical Characteristics - Blue, Green (I_F = 150 mA, T_A = 25° 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 Θ½	50% Power Angle		----	120	----	deg

Optical and Electrical Characteristics - White, Warm White (I_F = 150 mA, T_A = 25° 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 Θ½	50% Power Angle		----	120	----	deg

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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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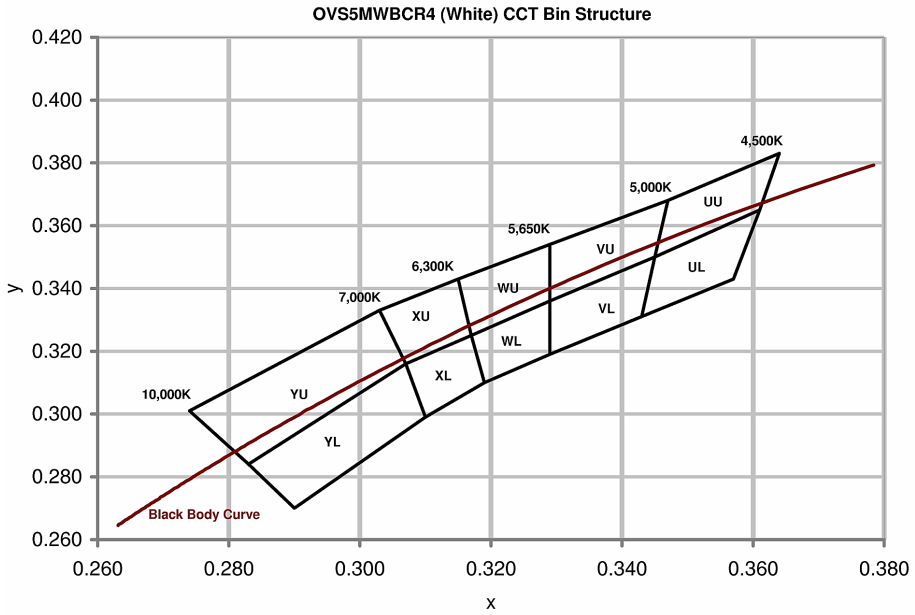
Standard Bins (IF = 150mA)

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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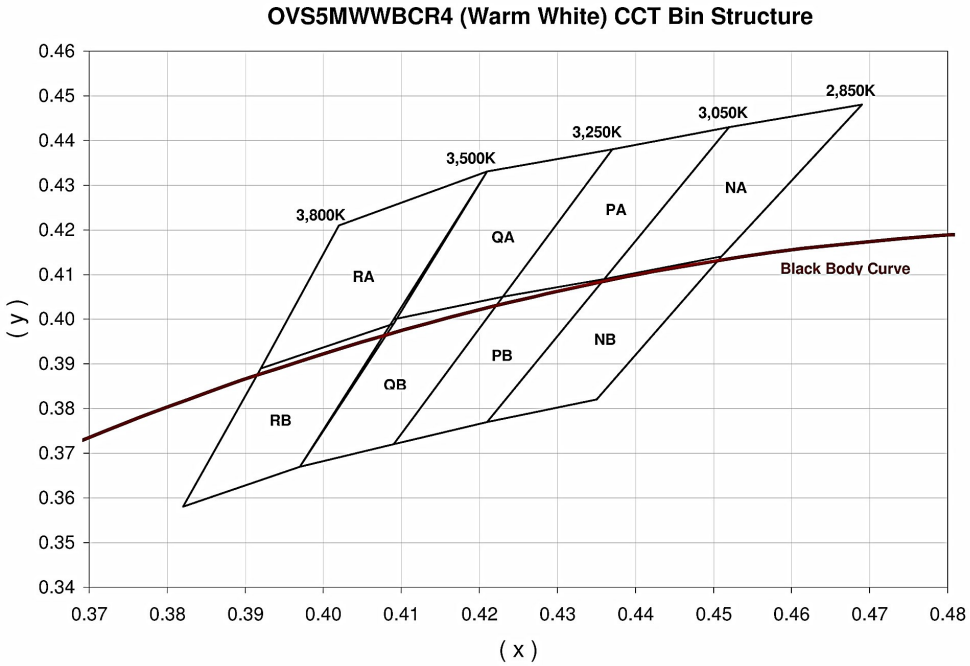
Standard Bins (IF = 150mA)

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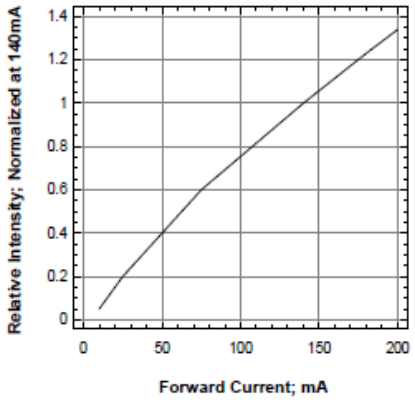
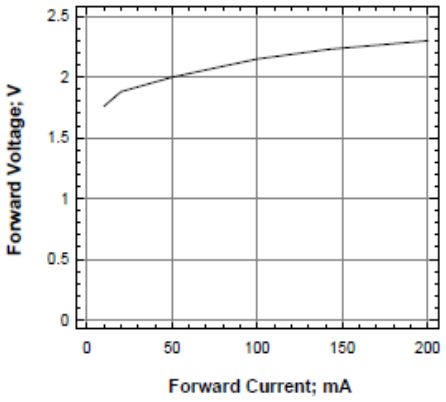
OVS5MABCR4 (Amber), OVS5MRBCR4 (Red) and OVS5MYBCR4 (Yellow)

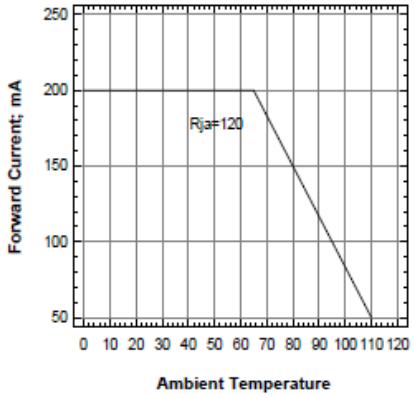
Relative Intensity Vs Forward Current



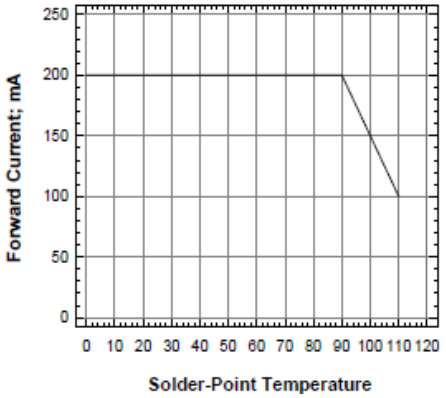
Forward Voltage Vs Forward Current



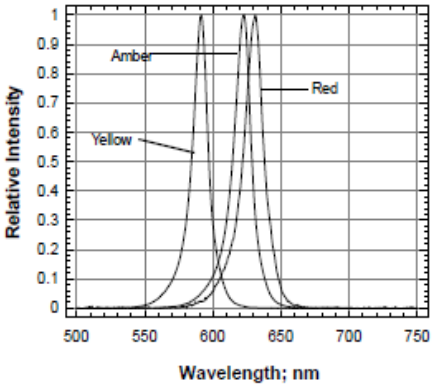
Maximum Current Vs Ambient Temperature



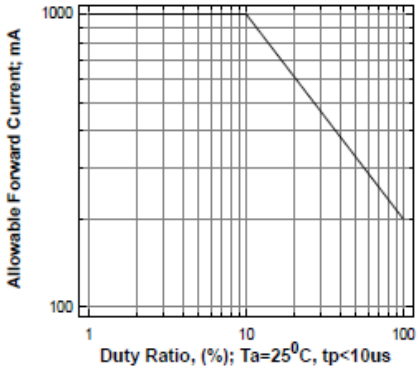
Maximum Current vs Solder-Point Temperature



Relative Intensity Vs Wavelength



Allowable Forward Current Vs Duty Ratio



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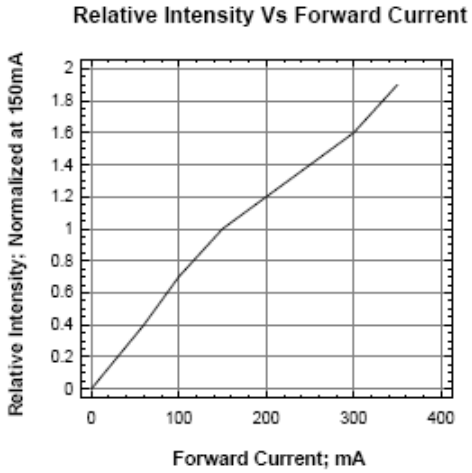
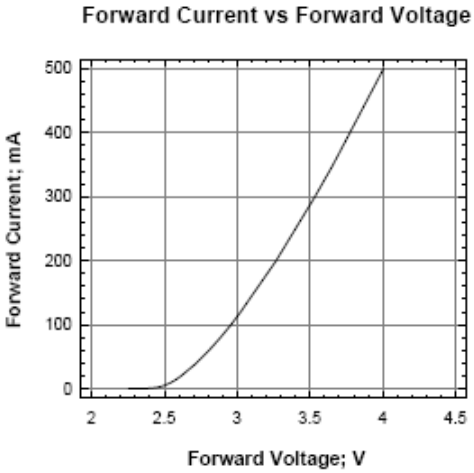
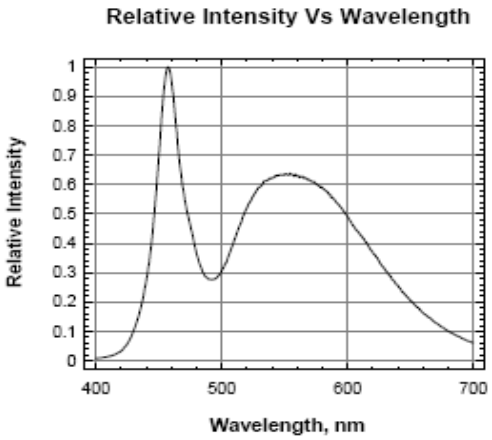
OVS5MBBCR4 (Blue), OVS5MGBCR4 (Green), OVS5MWBCR4 (White) and OVS5MWWBCR4 (Warm White)

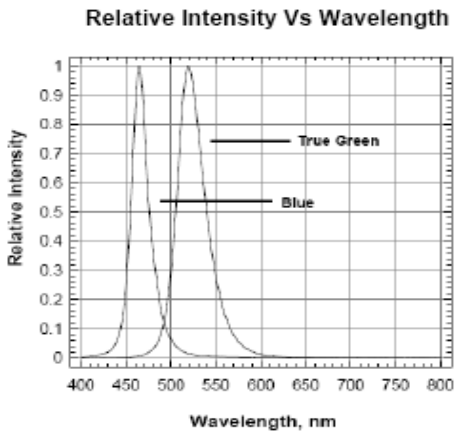


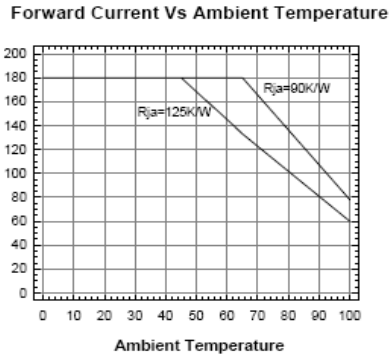


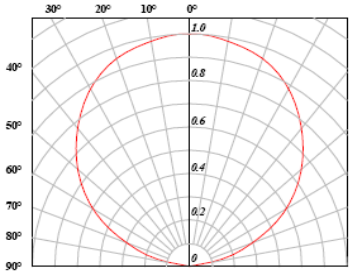
White & Warm White



Blue & Green







Beam Angle: All Col-

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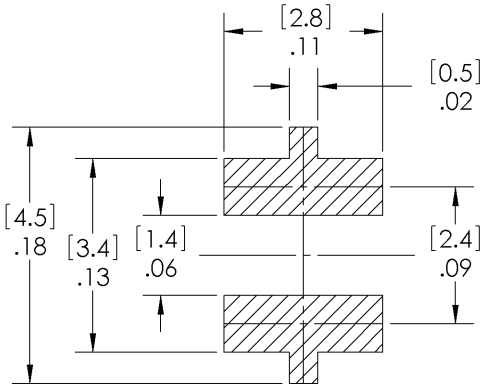
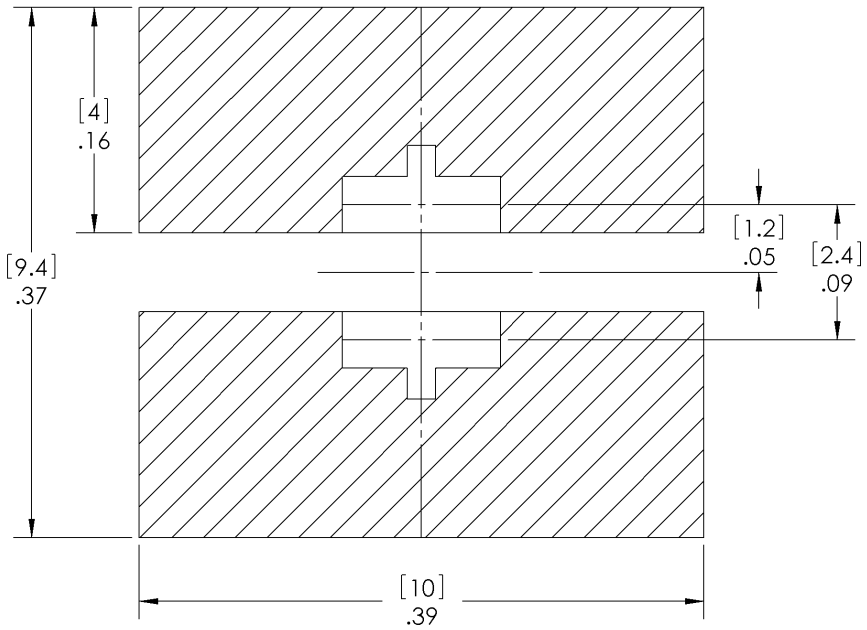
Solder Pad Design

Note: Metal core circuit board (MCPCB) is highly recommended for high density applications. FR-4 board is recommended for other applications



Solder Paste Pattern



Copper Pattern

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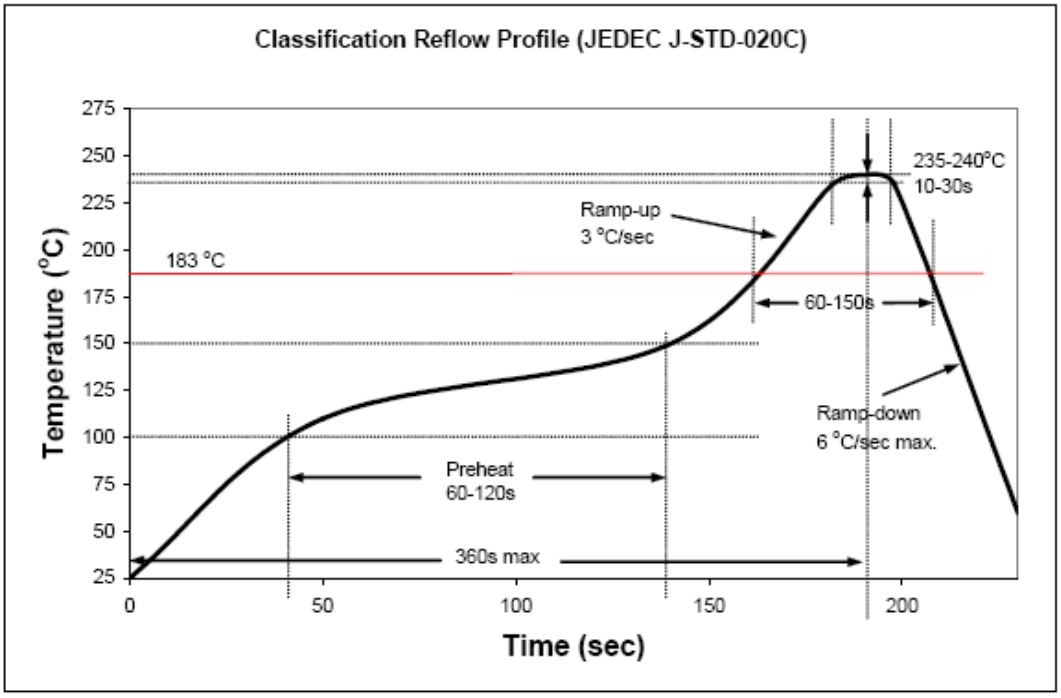
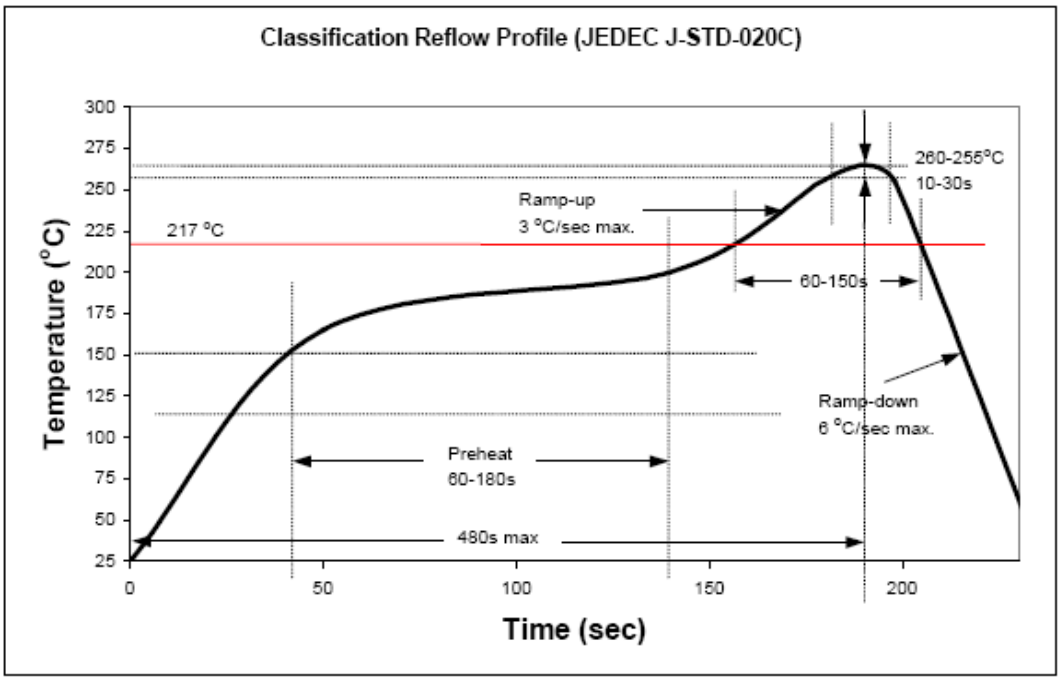
Recommended Sn-Pb IR-Reflow Soldering Profile.



Recommended Pb Free IR-Reflow Soldering Profile.



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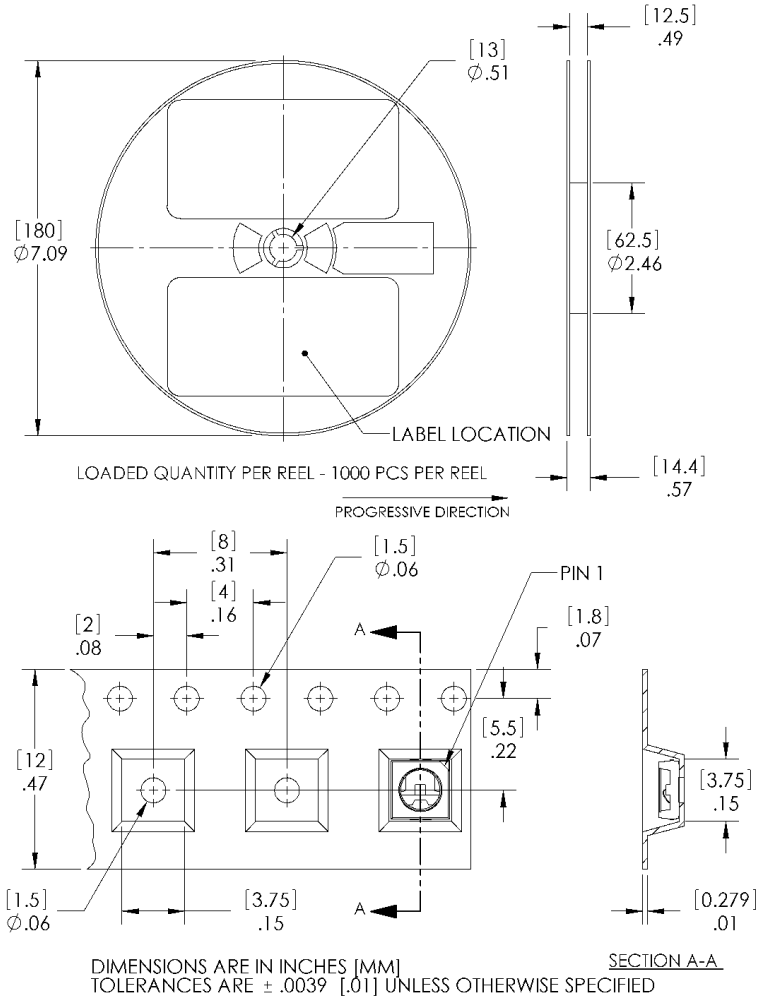
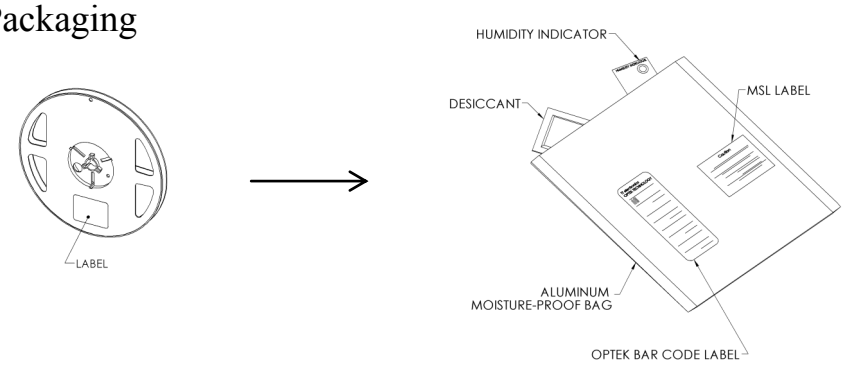
Reel Dimensions: 7-inch reel



Carrier Tape Dimensions: Loaded quantity 1000 pieces per reel

Moisture Resistant Packaging



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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

General Note
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Issue	Change Description	Approval	Date
D	**Master Page:** Changed from Issue C 10/2011 to Issue D 02/2013. **OVS5MBBCR4: 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). **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) .	K. Bland / J. Plaster	2/8/2013

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