

CSM-360 LEDs



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Introduction:

This document describes the binning and labeling nomenclature for CSM-360 Big Chip LED™ product as well as the orderable bin kits for each part.

With each build of parts, there is a distribution of performance in both flux and wavelength or chromaticity. In order to guarantee specific performance for customers, each device is measured and subsequently grouped into flux and wavelength or chromaticity bins. Each individual package or reel of parts contains only one combination of flux and wavelength or chromaticity bin. Furthermore, bins are combined into orderable bin kits comprising of a selection of flux and wavelength or chromaticity bins to ease the ordering process.

Table of Products

Products	Ordering Part Number	Description
CSM-360-W65S	CSM-360-W65S-D22-xx123	White Big Chip LED™ CSM-360 consisting of four 9 mm ² LEDs wired in series, thermistor, connector, and a copper-core PCB
CSM-360-W57S	CSM-360-W57S-D22-xx123	
CSM-360-WDLS	CSM-360-WDLS-D22-xx123	
CSM-360-W45S	CSM-360-W45S-D22-xx123	
CSM-360-W40S	CSM-360-W40S-D22-xx123	
CSM-360-WCLS	CSM-360-WCLS-D22-xx123	
CSM-360-W30M	CSM-360-W30M-D22-xx123	
CSM-360-WWRM	CSM-360-WWRM-D22-xx123	

CSM-360 Shipping and Labeling Nomenclature

All CSM-360 products are packaged and labeled with their respective bin as outlined in the following pages. Each package will only contain one bin. The part number designation is as follows:

A B C — 1 2 3 — D 4 5 E — F 6 7 — G H — I 8

Product Family	Chip Area	Color	Package Configuration	Flux Bin	Chromaticity Bin
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Product Family	A - Package type: "C" denotes chip-on board B - Lens type: "S" denotes dome C - Chip quantity: "M" denotes multi-chip				
Chip Area	1 2 3 - Total LED chip area (mm ²) x 10: "360" denotes 36mm ²				
Color	D - Color: "W" denotes white 4 5 - Color temperature: "65" denotes 6500K, "DL" denotes daylight white (6500K through 5700K) etc. E - Color rendering: "S" (standard) denotes a typical CRI of 70, "M" (moderate) denotes a typical CRI of 83				
Package Config.	F 6 7 - Package configuration (for internal use)				
Flux Bin	G H - Flux bin				
Chromaticity Bin	I 8 - Chromaticity bin				

Example:

The part number CSM-360-W65S-D22-GV-G4 refers to a 6500K standard CRI white, CSM-360 emitter, with a flux range from 3,000 to 3,600 lumens and a chromaticity value within the box defined by the four points (0.313, 0.338), (0.321, 0.348), (0.322, 0.336), (0.312, 0.328).

CSM-360 Bin Kit Ordering Nomenclature

All CSM-360 White products are sold in sets of flux and chromaticity bins called bin kits. Each bin kit specifies a minimum flux bin and a specific selection of chromaticity bins. The ordering part number designation is as follows:

A B C — **1 2 3** — **D 4 5 E** — **F 6 7** — **G H 8 9 0**

Product Family	Chip Area	Color	Package Configuration	Bin Kit Code
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Product Family	A - Package type: "C" denotes chip-on board B - Lens type: "S" denotes dome C - Chip quantity: "M" denotes multi-chip			
Chip Area	1 2 3 - Total LED chip area (mm ²) x 10: "360" denotes 36mm ²			
Color	D - Color: "W" denotes white 4 5 - Color temperature: "65" denotes 6500K, "DL" denotes daylight white (6500K through 5700K) etc. E - Color rendering: "S" (standard) denotes a typical CRI of 70, "M" (moderate) denotes a typical CRI of 83			
Package Config.	F 6 7 - Package configuration (for internal use)			
Bin Kit Code	G H - Flux bin 8 9 0 - Chromaticity bin kit code			

Example:

The ordering part number CSM-360-W65S-D22-GV101 refers to a 6500K standard CRI white, CSM-360 emitter, with a minimum flux value of 3,000 lumens and falling in the F4, F3, G4, G3, EF, and DG chromaticity bins.

CSM-360 White Binning Structure

CSM-360 LEDs are tested for luminous flux and chromaticity at a drive current of 3.15 A (350 mA/mm²) and placed into one of the following luminous flux (FF) and chromaticity (WW) bins:

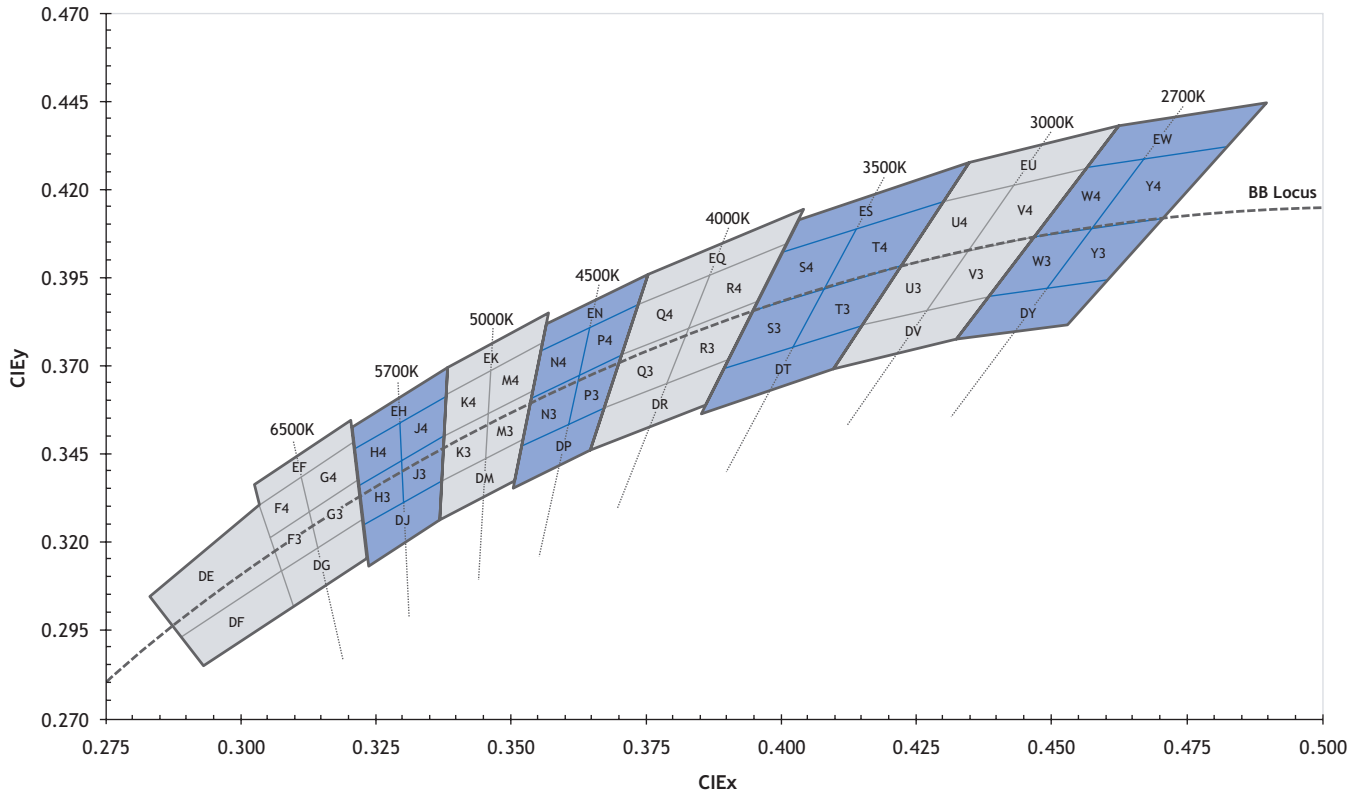
Flux Bins (T_j = 25 °C)

Flux Bin (FF)	Minimum Flux (lm) @ 3.15A	Maximum Flux (lm) @ 3.15A
S	1,750	2,100
T	2,100	2,500
U	2,500	3,000
V	3,000	3,600
X	3,600	4,300

*Note: Luminus maintains a +/- 6% tolerance on flux measurements.

Chromaticity Bins

Luminus' Standard Chromaticity Bins: 1931 CIE Curve



The following tables describe the four chromaticity points that bound each chromaticity bin. Chromaticity bins are grouped together based on the color temperature.

6500K Chromaticity Bins		
Bin Code (WW)	CIEx	CIEy
DG	0.307	0.311
	0.322	0.326
	0.323	0.316
	0.309	0.302
F3*	0.305	0.321
	0.313	0.329
	0.315	0.319
	0.307	0.311
F4*	0.303	0.330
	0.312	0.339
	0.313	0.329
	0.305	0.321
G3*	0.313	0.329
	0.321	0.337
	0.322	0.326
	0.315	0.319
G4*	0.312	0.339
	0.321	0.348
	0.321	0.337
	0.313	0.329
EF	0.302	0.335
	0.320	0.354
	0.321	0.348
	0.303	0.330
DE	0.283	0.304
	0.303	0.330
	0.307	0.311
	0.289	0.293
DF	0.289	0.293
	0.307	0.311
	0.309	0.302
	0.293	0.285

5700K Chromaticity Bins		
Bin Code (WW)	CIEx	CIEy
DJ	0.322	0.324
	0.337	0.337
	0.336	0.326
	0.323	0.314
H3*	0.321	0.335
	0.329	0.342
	0.329	0.331
	0.322	0.324
H4*	0.321	0.346
	0.329	0.354
	0.329	0.342
	0.321	0.335
J3*	0.329	0.342
	0.337	0.349
	0.337	0.337
	0.330	0.331
J4*	0.329	0.354
	0.338	0.362
	0.337	0.349
	0.329	0.342
EH	0.320	0.352
	0.338	0.368
	0.338	0.362
	0.321	0.346

*Sub-bins within ANSI defined quadrangles per ANSI C78.377-2008

5000K Chromaticity Bins		
Bin Code (WW)	CIEx	CIEy
EK	0.338	0.368
	0.356	0.384
	0.355	0.376
	0.338	0.362
K3*	0.337	0.349
	0.345	0.355
	0.345	0.343
	0.337	0.337
K4*	0.338	0.362
	0.347	0.369
	0.345	0.355
	0.337	0.349
M3*	0.345	0.355
	0.353	0.349
	0.352	0.372
	0.344	0.343
M4*	0.346	0.369
	0.355	0.376
	0.353	0.362
	0.345	0.355
DM	0.337	0.337
	0.352	0.349
	0.350	0.337
	0.336	0.326

4500K Chromaticity Bins		
Bin Code (WW)	CIEx	CIEy
EN	0.356	0.384
	0.376	0.396
	0.374	0.387
	0.355	0.374
N3*	0.353	0.360
	0.361	0.366
	0.359	0.352
	0.351	0.347
N4*	0.355	0.374
	0.364	0.381
	0.361	0.366
	0.353	0.360
P3*	0.361	0.366
	0.370	0.373
	0.367	0.358
	0.359	0.352
P4*	0.364	0.381
	0.374	0.387
	0.370	0.373
	0.361	0.366
DP	0.351	0.347
	0.367	0.358
	0.364	0.346
	0.350	0.335

*Sub-bins within ANSI defined quadrangles per ANSI C78.377-2008

4000K Chromaticity Bins		
Bin Code (WW)	CIEx	CIEy
EQ	0.376	0.396
	0.404	0.414
	0.401	0.404
	0.374	0.387
Q3*	0.370	0.373
	0.382	0.380
	0.378	0.365
	0.367	0.358
Q4*	0.374	0.387
	0.387	0.396
	0.382	0.380
	0.370	0.373
R3*	0.382	0.380
	0.395	0.388
	0.390	0.372
	0.378	0.365
R4*	0.387	0.396
	0.401	0.404
	0.395	0.388
	0.382	0.380
DR	0.367	0.358
	0.390	0.372
	0.386	0.359
	0.364	0.346

3500K Chromaticity Bins		
Bin Code (WW)	CIEx	CIEy
ES	0.403	0.411
	0.435	0.427
	0.430	0.417
	0.400	0.402
S3*	0.394	0.385
	0.407	0.392
	0.402	0.375
	0.389	0.369
S4*	0.400	0.402
	0.415	0.409
	0.407	0.392
	0.394	0.385
T3*	0.407	0.392
	0.422	0.399
	0.415	0.381
	0.402	0.375
T4*	0.415	0.409
	0.430	0.417
	0.422	0.399
	0.407	0.392
DT	0.389	0.369
	0.415	0.381
	0.409	0.369
	0.385	0.357

*Sub-bins within ANSI defined quadrangles per ANSI C78.377-2008

3000K Chromaticity Bins		
Bin Code (WW)	CIE _x	CIE _y
EU	0.435	0.427
	0.462	0.437
	0.456	0.426
	0.430	0.417
U3*	0.422	0.399
	0.434	0.403
	0.426	0.385
	0.415	0.381
U4*	0.430	0.417
	0.443	0.421
	0.434	0.403
	0.422	0.399
V3*	0.434	0.403
	0.447	0.408
	0.437	0.389
	0.426	0.385
V4*	0.443	0.421
	0.456	0.426
	0.447	0.408
	0.434	0.403
DV	0.415	0.381
	0.437	0.389
	0.431	0.377
	0.409	0.369

2700K Chromaticity Bins		
Bin Code (WW)	CIE _x	CIE _y
EW	0.462	0.437
	0.488	0.444
	0.481	0.432
	0.456	0.426
W3*	0.447	0.408
	0.458	0.410
	0.448	0.392
	0.437	0.389
W4*	0.456	0.426
	0.469	0.429
	0.458	0.410
	0.447	0.408
Y3*	0.458	0.410
	0.70	0.413
	0.459	0.394
	0.448	0.392
Y4*	0.469	0.429
	0.481	0.432
	0.470	0.413
	0.458	0.410
DY	0.437	0.389
	0.459	0.394
	0.452	0.382
	0.431	0.377

*Sub-bins within ANSI defined quadrangles per ANSI C78.377-2008

CSM-360 Bin Kit Order Codes

The following tables describe the bin kit ordering codes for the CSM-360 and the flux and chromaticity bins included in the bin kit. Each kit specifies a minimum flux and the listed chromaticity bins. A maximum flux is not specified. Within each kit, Luminus may ship any part meeting or exceeding the minimum flux specification. Shipments will always meet the listed chromaticity bins. For information on ordering bin kits not listed below, please contact Luminus or an official distributor.

CSM-360 Bin Kit Order Codes

Color	Luminous Flux		Chromaticity Bins	Kit Number
	Bin Kit Flux Code	Min. Flux		
White W65S 6500K, Standard CRI (typ. 70)	U	2,500	F4, F3, G4, G3, EF, DG, DE, DF	GU100
			F4, F3, G4, G3, EF, DG	GU101
			F4, F3, G4, G3	GU102
	V	3,000	F4, F3, G4, G3, EF, DG, DE, DF	GV100
			F4, F3, G4, G3, EF, DG	GV101
			F4, F3, G4, G3	GV102
	X	3,600	F4, F3, G4, G3, EF, DG, DE, DF	GX100
			F4, F3, G4, G3, EF, DG	GX101
			F4, F3, G4, G3	GX102
White WDLS 6500K & 5700K Standard CRI (typ. 70)	U	2,500	F4, F3, G4, G3, EF, DG, DE, DF H4, H3, J4, J3, EH, DJ	GU150
	V	3,000	F4, F3, G4, G3, EF, DG, DE, DF H4, H3, J4, J3, EH, DJ	GV150
	X	3,600	F4, F3, G4, G3, EF, DG, DE, DF H4, H3, J4, J3, EH, DJ	GX150
White W57S 5700K, Standard CRI (typ. 70)	U	2,500	H4, H3, J4, J3, EH, DJ	GU200
			H4, H3, J4, J3	GU201
	V	3,000	H4, H3, J4, J3, EH, DJ	GV200
			H4, H3, J4, J3	GV201
	X	3,600	H4, H3, J4, J3, EH, DJ H4, H3, J4, J3	GX200 GX201
White WDLS 5700K & 5000K Standard CRI (typ. 70)	U	2,500	H3, H4, J3, J4, DJ, EH K3, K4, M3, M4, DM, EK	GU250
	V	3,000	H3, H4, J3, J4, DJ, EH K3, K4, M3, M4, DM, EK	GV250
	X	3,600	H3, H4, J3, J4, DJ, EH K3, K4, M3, M4, DM, EK	GX250



White WCLS 5000K & 4500K Standard CRI (typ. 70)	U	2,500	K3, K4, M3, M4, DM, EK N3, N4, P3, P4, DP, EN	GU350
	V	3,000	K3, K4, M3, M4, DM, EK N3, N4, P3, P4, DP, EN	GV350
	X	3,600	K3, K4, M3, M4, DM, EK N3, N4, P3, P4, DP, EN	GX350
White W45S 4500K, Standard CRI (typ. 70)	T	2,100	N4, N3, P4, P3, EN, DP	GT400
			N4, N3, P4, P3	GT401
	U	2,500	N4, N3, P4, P3, EN, DP	GU400
			N4, N3, P4, P3	GU401
	V	3,000	N4, N3, P4, P3, EN, DP	GV400
			N4, N3, P4, P3	GV401
White WCLS 4500K & 4000K Standard CRI (typ. 70)	T	2,100	N3, N4, P3, P4, DP, EN Q3, Q4, R3, R4, DR, EQ	GT450
	U	2,500	N3, N4, P3, P4, DP, EN Q3, Q4, R3, R4, DR, EQ	GU450
	V	3,000	N3, N4, P3, P4, DP, EN Q3, Q4, R3, R4, DR, EQ	GV450
White W40S 4000K, Standard CRI (typ. 70)	S	1,750	Q3, Q4, R3, R4, DR, EQ	GS500
			Q3, Q4, R3, R4	GS501
	T	2,100	Q3, Q4, R3, R4, DR, EQ	GT500
			Q3, Q4, R3, R4	GT501
	U	2,500	Q3, Q4, R3, R4, DR, EQ Q3, Q4, R3, R4	GU500 GU501
White WWRM 3500K & 3000K Moderate CRI (typ. 83)	S	1,750	S3, S4, T3, T4, DT, ES U3, U4, V3, V4, DV, EU	GS650
	T	2,100	S3, S4, T3, T4, DT, ES U3, U4, V3, V4, DV, EU	GT650
White W30M 3000K, Moderate CRI (typ. 83)	S	1,750	U4, U3, V4, V3, EU, DV	GS700
			U4, U3, V4, V3	GS701
	T	2,100	U4, U3, V4, V3, EU, DV	GT700
			U4, U3, V4, V3	GT701
White WWRM 3000K & 2700K Moderate CRI (typ. 83)	S	1,750	U3, U4, V3, V4, DV, EU W3, W4, Y3, Y4, DY, EW	GS750
	T	2,100	U3, U4, V3, V4, DV, EU W3, W4, Y3, Y4, DY, EW	GT750

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