



**THE DATASHEET OF
SPHWH1L3D30DD4QTK3**



CODE & BINNING

LH351B – 3535 Ceramic LED @85°C



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SAMSUNG ELECTRONICS

95, Samsung2-Ro, Giheung-Gu,
Yongin-City, Gyeonggi-Do 446-711, KOREA



1. Product Code Information

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| S | P | H | W | H | 1 | L | 3 | D | 3 | 0 | E | D | 4 | V | 0 | G | 3 |

| Code | | | PKG information | Specification | | | | | |
|--|---------------------|----------------|----------------------------|---------------|------------------|----|----|----|----|
| 1 | 2 | 3 | Samsung Package High Power | | | | | | |
| 4 | 5 | Color | WH | White | | | | | |
| 6 | Product Version | | | | | | | | |
| 7 | 8 | Product | L3 | LH351 | | | | | |
| 9 | Lens type | | | | | | | | |
| 9 | | | D | Dome Lens | | | | | |
| 10 | Operating condition | | | | | | | | |
| 10 | | | 3 | Max 3 Watt | | | | | |
| 11 | Not defined | | | | | | | | |
| 11 | | | 0 | Default | | | | | |
| 12 | | CRI | C | Min. 70+ | | | | | |
| | | | D | Min. 75+ | | | | | |
| | | | E | Min. 80+ | | | | | |
| | | | G | Min. 90+ | | | | | |
| 13 | 14 | V _F | D1 | 2.6~2.7 V | D4 | | | | |
| | | | E1 | 2.7~2.8 V | | | | | |
| | | | F1 | 2.8~2.9 V | | | | | |
| | | | G1 | 2.9~3.0 V | | | | | |
| 15 | 16 | CCT | W0 | 2700K | | | | | |
| | | | V0 | 3000K | | | | | |
| | | | U0 | 3500K | | | | | |
| | | | T0 | 4000K | | | | | |
| | | | R0 | 5000K | | | | | |
| | | | Q0 | 5700K | | | | | |
| | | | P0 | 6500K | | | | | |
| | | | N0 | 7600K | | | | | |
| 17 | 18 | Luminous Flux | E1 | 80~90 lm | E8 ¹⁾ | | | | |
| | | | F1 | 90~100 lm | | F7 | | | |
| | | | G1 | 100~110 lm | | | G6 | | |
| | | | H1 | 110~120 lm | | | | H5 | |
| | | | J1 | 120~130 lm | | | | | J4 |
| | | | K1 | 130~140 lm | | | | | |
| | | | M1 | 140~150 lm | | | | | |
| | | | N1 | 150~160 lm | | | | | |
| 1) Digit 17 : Min. spec. Digit 18 : The number of high bin rank from Min. spec. Ex) F1 = 90~100 lm, F7 = 90~160 lm | | | | | | | | | |

2. Luminous Flux Bins ($T_j = 85^\circ\text{C}$)

| Nominal CCT | Product Code | Flux Rank | Sorting Condition Flux @350mA | |
|--------------------|--------------------|-----------|-------------------------------|------------|
| | | | Flux Bin | Flux Range |
| 2700K | SPHWH1L3D30ED4W0F3 | F3 | F1 | 90 ~ 100 |
| | | | G1 | 100 ~ 110 |
| | | | H1 | 110 ~ 120 |
| | SPHWH1L3D30ED4WPF3 | F3 | F1 | 90 ~ 100 |
| | | | G1 | 100 ~ 110 |
| | | | H1 | 110 ~ 120 |
| | SPHWH1L3D30ED4WMF3 | F3 | F1 | 90 ~ 100 |
| | | | G1 | 100 ~ 110 |
| | | | H1 | 110 ~ 120 |
| | SPHWH1L3D30ED4W0G3 | G3 | G1 | 100 ~ 110 |
| | | | H1 | 110 ~ 120 |
| | | | J1 | 120 ~ 130 |
| | SPHWH1L3D30ED4WPG3 | G3 | G1 | 100 ~ 110 |
| | | | H1 | 110 ~ 120 |
| | | | J1 | 120 ~ 130 |
| | SPHWH1L3D30ED4WMG3 | G3 | G1 | 100 ~ 110 |
| | | | H1 | 110 ~ 120 |
| | | | J1 | 120 ~ 130 |
| | SPHWH1L3D30ED4W0H3 | H3 | H1 | 110 ~ 120 |
| | | | J1 | 120 ~ 130 |
| | | | K1 | 130 ~ 140 |
| | SPHWH1L3D30ED4WPH3 | H3 | H1 | 110 ~ 120 |
| | | | J1 | 120 ~ 130 |
| | | | K1 | 130 ~ 140 |
| SPHWH1L3D30ED4WMH3 | H3 | H1 | 110 ~ 120 | |
| | | J1 | 120 ~ 130 | |
| | | K1 | 130 ~ 140 | |



2. Luminous Flux Bins ($T_j = 85^\circ\text{C}$)

| Nominal CCT | Product Code | Flux Rank | Sorting Condition Flux @350mA | |
|--------------------|--------------------|-----------|-------------------------------|------------|
| | | | Flux Bin | Flux Range |
| 3000K | SPHWH1L3D30ED4V0G3 | G3 | G1 | 100 ~ 110 |
| | | | H1 | 110 ~ 120 |
| | | | J1 | 120 ~ 130 |
| | SPHWH1L3D30ED4VPG3 | G3 | G1 | 100 ~ 110 |
| | | | H1 | 110 ~ 120 |
| | | | J1 | 120 ~ 130 |
| | SPHWH1L3D30ED4VMG3 | G3 | G1 | 100 ~ 110 |
| | | | H1 | 110 ~ 120 |
| | | | J1 | 120 ~ 130 |
| | SPHWH1L3D30ED4V0H3 | H3 | H1 | 110 ~ 120 |
| | | | J1 | 120 ~ 130 |
| | | | K1 | 130 ~ 140 |
| | SPHWH1L3D30ED4VPH3 | H3 | H1 | 110 ~ 120 |
| | | | J1 | 120 ~ 130 |
| | | | K1 | 130 ~ 140 |
| SPHWH1L3D30ED4VMH3 | H3 | H1 | 110 ~ 120 | |
| | | J1 | 120 ~ 130 | |
| | | K1 | 130 ~ 140 | |
| 3500K | SPHWH1L3D30ED4U0G3 | G3 | G1 | 100 ~ 110 |
| | | | H1 | 110 ~ 120 |
| | | | J1 | 120 ~ 130 |
| | SPHWH1L3D30ED4UPG3 | G3 | G1 | 100 ~ 110 |
| | | | H1 | 110 ~ 120 |
| | | | J1 | 120 ~ 130 |
| | SPHWH1L3D30ED4UMG3 | G3 | G1 | 100 ~ 110 |
| | | | H1 | 110 ~ 120 |
| | | | J1 | 120 ~ 130 |
| | SPHWH1L3D30ED4U0H3 | H3 | H1 | 110 ~ 120 |
| | | | J1 | 120 ~ 130 |
| | | | K1 | 130 ~ 140 |
| | SPHWH1L3D30ED4UPH3 | H3 | H1 | 110 ~ 120 |
| | | | J1 | 120 ~ 130 |
| | | | K1 | 130 ~ 140 |
| SPHWH1L3D30ED4UMH3 | H3 | H1 | 110 ~ 120 | |
| | | J1 | 120 ~ 130 | |
| | | K1 | 130 ~ 140 | |



2. Luminous Flux Bins ($T_j = 85^\circ\text{C}$) (Continued)

| Nominal CCT | Product Code | Flux Rank | Sorting Condition Flux @350mA | |
|--------------------|--------------------|-----------|-------------------------------|------------|
| | | | Flux Bin | Flux Range |
| 4000K | SPHWH1L3D30ED4T0G3 | G3 | G1 | 100 ~ 110 |
| | | | H1 | 110 ~ 120 |
| | | | J1 | 120 ~ 130 |
| | SPHWH1L3D30ED4TPG3 | G3 | G1 | 100 ~ 110 |
| | | | H1 | 110 ~ 120 |
| | | | J1 | 120 ~ 130 |
| | SPHWH1L3D30ED4TMG3 | G3 | G1 | 100 ~ 110 |
| | | | H1 | 110 ~ 120 |
| | | | J1 | 120 ~ 130 |
| | SPHWH1L3D30ED4T0H3 | H3 | H1 | 110 ~ 120 |
| | | | J1 | 120 ~ 130 |
| | | | K1 | 130 ~ 140 |
| | SPHWH1L3D30ED4TPH3 | H3 | H1 | 110 ~ 120 |
| | | | J1 | 120 ~ 130 |
| | | | K1 | 130 ~ 140 |
| | SPHWH1L3D30ED4TMH3 | H3 | H1 | 110 ~ 120 |
| | | | J1 | 120 ~ 130 |
| | | | K1 | 130 ~ 140 |
| | SPHWH1L3D30ED4T0J3 | J3 | J1 | 120 ~ 130 |
| | | | K1 | 130 ~ 140 |
| | | | M1 | 140 ~ 150 |
| | SPHWH1L3D30ED4TPJ3 | J3 | J1 | 120 ~ 130 |
| | | | K1 | 130 ~ 140 |
| | | | M1 | 140 ~ 150 |
| SPHWH1L3D30ED4TMJ3 | J3 | J1 | 120 ~ 130 | |
| | | K1 | 130 ~ 140 | |
| | | M1 | 140 ~ 150 | |



2. Luminous Flux Bins ($T_j = 85^\circ\text{C}$) (Continued)

| Nominal CCT | Product Code | Flux Rank | Sorting Condition Flux @350mA | |
|--------------------|--------------------|-----------|-------------------------------|------------|
| | | | Flux Bin | Flux Range |
| 4000K | SPHWH1L3D30CD4T0J3 | J3 | J1 | 120 ~ 130 |
| | | | K1 | 130 ~ 140 |
| | | | M1 | 140 ~ 150 |
| | SPHWH1L3D30CD4TPJ3 | J3 | J1 | 120 ~ 130 |
| | | | K1 | 130 ~ 140 |
| | | | M1 | 140 ~ 150 |
| | SPHWH1L3D30CD4TMJ3 | J3 | J1 | 120 ~ 130 |
| | | | K1 | 130 ~ 140 |
| | | | M1 | 140 ~ 150 |
| | SPHWH1L3D30CD4T0K3 | K3 | K1 | 130 ~ 140 |
| | | | M1 | 140 ~ 150 |
| | | | N1 | 150 ~ 160 |
| | SPHWH1L3D30CD4TPK3 | K3 | K1 | 130 ~ 140 |
| | | | M1 | 140 ~ 150 |
| | | | N1 | 150 ~ 160 |
| | SPHWH1L3D30CD4TMK3 | K3 | K1 | 130 ~ 140 |
| | | | M1 | 140 ~ 150 |
| | | | N1 | 150 ~ 160 |
| | SPHWH1L3D30CD4T0M3 | M3 | M1 | 140 ~ 150 |
| | | | N1 | 150 ~ 160 |
| | | | P1 | 160 ~ 170 |
| | SPHWH1L3D30CD4TPM3 | M3 | M1 | 140 ~ 150 |
| | | | N1 | 150 ~ 160 |
| | | | P1 | 160 ~ 170 |
| SPHWH1L3D30CD4TMM3 | M3 | M1 | 140 ~ 150 | |
| | | N1 | 150 ~ 160 | |
| | | P1 | 160 ~ 170 | |



2. Luminous Flux Bins ($T_j = 85^\circ\text{C}$) (Continued)

| Nominal CCT | Product Code | Flux Rank | Sorting Condition Flux @350mA | |
|--------------------|--------------------|-----------|-------------------------------|------------|
| | | | Flux Bin | Flux Range |
| 5000K | SPHWH1L3D30CD4RTJ3 | J3 | J1 | 120 ~ 130 |
| | | | K1 | 130 ~ 140 |
| | | | M1 | 140 ~ 150 |
| | SPHWH1L3D30CD4RTK3 | K3 | K1 | 130 ~ 140 |
| | | | M1 | 140 ~ 150 |
| | | | N1 | 150 ~ 160 |
| | SPHWH1L3D30CD4RTM3 | M3 | M1 | 140 ~ 150 |
| | | | N1 | 150 ~ 160 |
| | | | P1 | 160 ~ 170 |
| | SPHWH1L3D30DD4RTJ3 | J3 | J1 | 120 ~ 130 |
| | | | K1 | 130 ~ 140 |
| | | | M1 | 140 ~ 150 |
| SPHWH1L3D30DD4RTK3 | K3 | K1 | 130 ~ 140 | |
| | | M1 | 140 ~ 150 | |
| | | N1 | 150 ~ 160 | |
| 5700K | SPHWH1L3D30CD4QTJ3 | J3 | J1 | 120 ~ 130 |
| | | | K1 | 130 ~ 140 |
| | | | M1 | 140 ~ 150 |
| | SPHWH1L3D30CD4QTK3 | K3 | K1 | 130 ~ 140 |
| | | | M1 | 140 ~ 150 |
| | | | N1 | 150 ~ 160 |
| | SPHWH1L3D30CD4QTM3 | M3 | M1 | 140 ~ 150 |
| | | | N1 | 150 ~ 160 |
| | | | P1 | 160 ~ 170 |
| | SPHWH1L3D30DD4QTJ3 | J3 | J1 | 120 ~ 130 |
| | | | K1 | 130 ~ 140 |
| | | | M1 | 140 ~ 150 |
| SPHWH1L3D30DD4QTK3 | K3 | K1 | 130 ~ 140 | |
| | | M1 | 140 ~ 150 | |
| | | N1 | 150 ~ 160 | |
| 6500K | SPHWH1L3D30CD4PTJ3 | J3 | J1 | 120 ~ 130 |
| | | | K1 | 130 ~ 140 |
| | | | M1 | 140 ~ 150 |
| | SPHWH1L3D30CD4PTK3 | K3 | K1 | 130 ~ 140 |
| | | | M1 | 140 ~ 150 |
| | | | N1 | 150 ~ 160 |



3. Color Bins ($T_j = 85^\circ\text{C}$)

3-1) Color Binning

| Nominal CCT | Product Code | Color Rank | Chromaticity Bins |
|-------------|--------------------|------------------------|---|
| 2700K | SPHWH1L3D30ED4W0F3 | W0 (Whole Bin) | W1,W2,W3,W4,W5,W6,W7,W8, W9,WA,WB,WC,WD,WE,WF,WG |
| | SPHWH1L3D30ED4WPF3 | WP (Quarter Bin) | W6,W7,WA,WB |
| | SPHWH1L3D30ED4WMF3 | WM (MacAdam 3-Step) | - |
| | SPHWH1L3D30ED4W0G3 | W0 (Whole Bin) | W1,W2,W3,W4,W5,W6,W7,W8, W9,WA,WB,WC,WD,WE,WF,WG |
| | SPHWH1L3D30ED4WPG3 | WP (Quarter Bin) | W6,W7,WA,WB |
| | SPHWH1L3D30ED4WMG3 | WM (MacAdam 3-Step) | - |
| | SPHWH1L3D30ED4W0H3 | W0 (Whole Bin) | W1,W2,W3,W4,W5,W6,W7,W8, W9,WA,WB,WC,WD,WE,WF,WG |
| | SPHWH1L3D30ED4WPH3 | WP (Quarter Bin) | W6,W7,WA,WB |
| | SPHWH1L3D30ED4WMH3 | WM (MacAdam 3-Step) | - |
| 3000K | SPHWH1L3D30ED4V0G3 | V0 (Whole Bin) | V1,V2,V3,V4,V5,V6,V7,V8, V9,VA,VB,VC,VD,VE,VF,VG |
| | SPHWH1L3D30ED4VPG3 | VP (Quarter Bin) | V6,V7,VA,VB |
| | SPHWH1L3D30ED4VMG3 | VM (MacAdam 3-Step) | - |
| | SPHWH1L3D30ED4V0H3 | V0 (Whole Bin) | V1,V2,V3,V4,V5,V6,V7,V8, V9,VA,VB,VC,VD,VE,VF,VG |
| | SPHWH1L3D30ED4VPH3 | VP (Quarter Bin) | V6,V7,VA,VB |
| | SPHWH1L3D30ED4VMH3 | VM (MacAdam 3-Step) | - |



3. Color Bins ($T_j = 85^\circ\text{C}$)

3-1) Color Binning

| Nominal CCT | Product Code | Color Rank | Chromaticity Bins |
|-------------|--------------------|------------------------|---|
| 3500K | SPHWH1L3D30ED4U0G3 | U0 (Whole Bin) | U1,U2,U3,U4,U5,U6,U7,U8, U9,UA,UB,UC,UD,UE,UF,UG |
| | SPHWH1L3D30ED4UPG3 | UP (Quarter Bin) | U6,U7,UA,UB |
| | SPHWH1L3D30ED4UMG3 | UM (MacAdam 3-Step) | - |
| | SPHWH1L3D30ED4U0H3 | U0 (Whole Bin) | U1,U2,U3,U4,U5,U6,U7,U8, U9,UA,UB,UC,UD,UE,UF,UG |
| | SPHWH1L3D30ED4UPH3 | UP (Quarter Bin) | U6,U7,UA,UB |
| | SPHWH1L3D30ED4UMH3 | UM (MacAdam 3-Step) | - |
| 4000K | SPHWH1L3D30ED4T0G3 | T0 (Whole Bin) | T1,T2,T3,T4,T5,T6,T7,T8, T9,TA,TB,TC,TD,TE,TF,TG |
| | SPHWH1L3D30ED4TPG3 | TP (Quarter Bin) | T6,T7,TA,TB |
| | SPHWH1L3D30ED4TMG3 | TM (MacAdam 3-Step) | - |
| | SPHWH1L3D30ED4T0H3 | T0 (Whole Bin) | T1,T2,T3,T4,T5,T6,T7,T8, T9,TA,TB,TC,TD,TE,TF,TG |
| | SPHWH1L3D30ED4TPH3 | TP (Quarter Bin) | T6,T7,TA,TB |
| | SPHWH1L3D30ED4TMH3 | TM (MacAdam 3-Step) | - |
| | SPHWH1L3D30ED4T0J3 | T0 (Whole Bin) | T1,T2,T3,T4,T5,T6,T7,T8, T9,TA,TB,TC,TD,TE,TF,TG |
| | SPHWH1L3D30ED4TPJ3 | TP (Quarter Bin) | T6,T7,TA,TB |
| | SPHWH1L3D30ED4TMJ3 | TM (MacAdam 3-Step) | - |

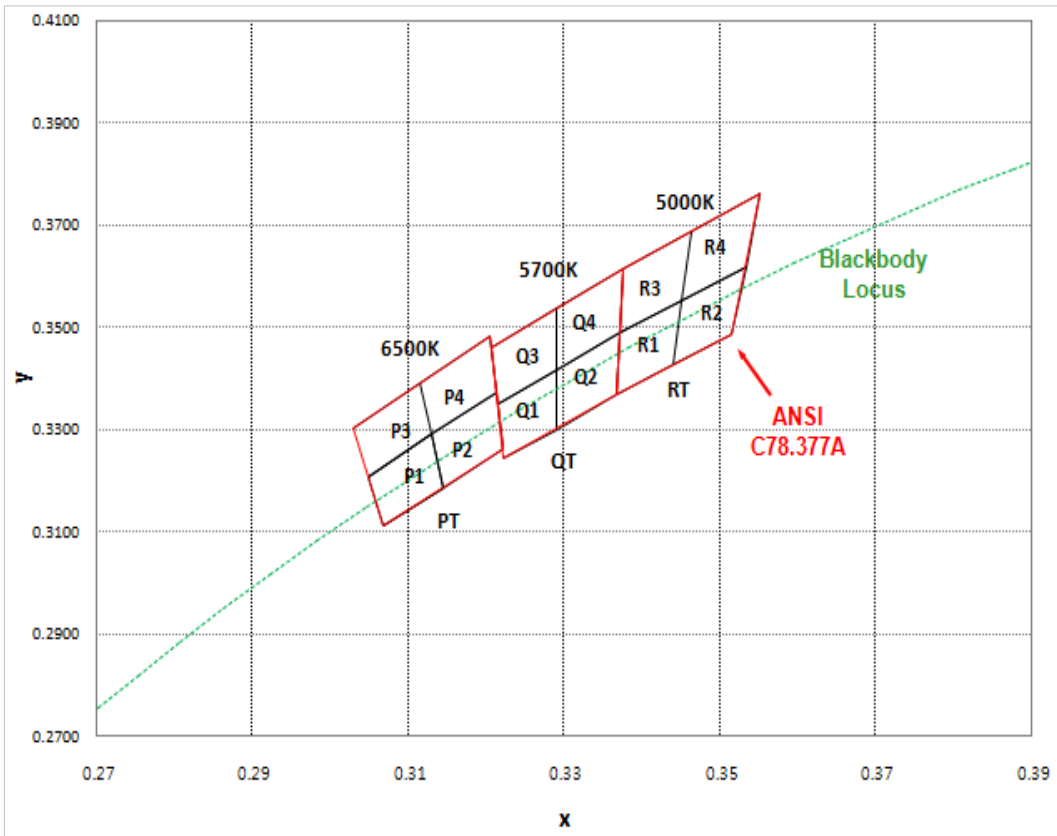
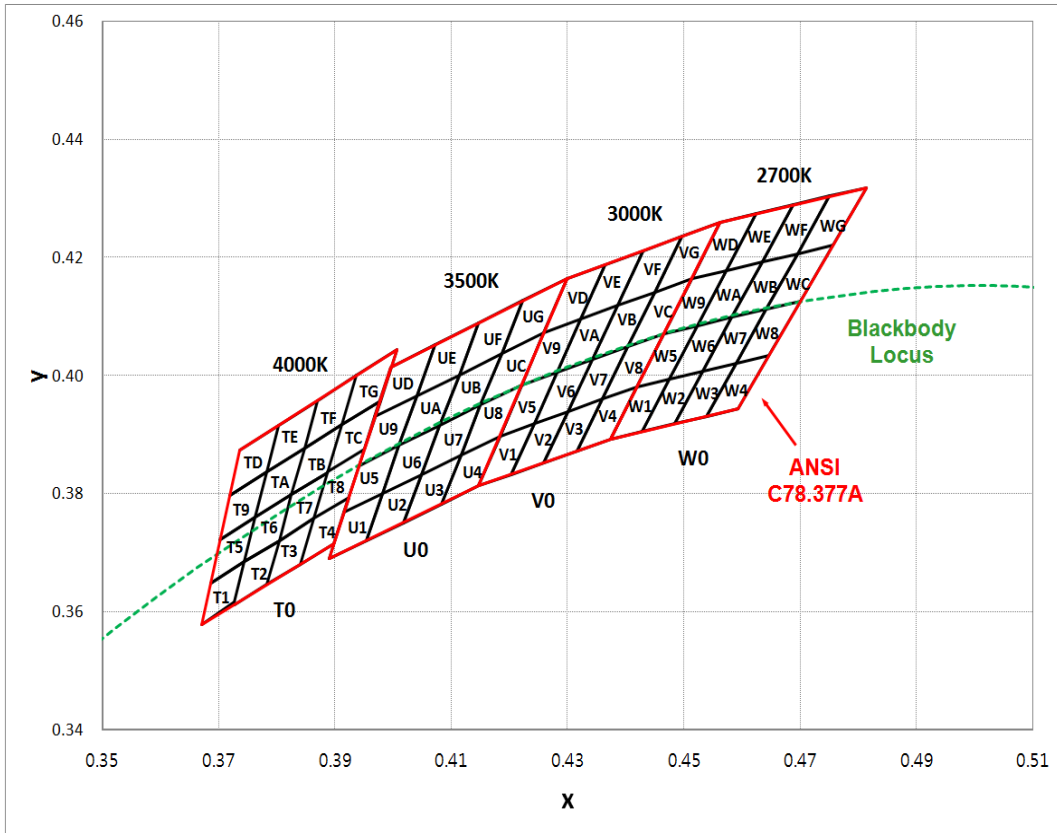


3. Color Bins ($T_j = 85^\circ\text{C}$)

3-1) Color Binning

| Nominal CCT | Product Code | Color Rank | Chromaticity Bins |
|-------------|--------------------|------------------------|---|
| 4000K | SPHWH1L3D30CD4T0J3 | T0 (Whole Bin) | T1,T2,T3,T4,T5,T6,T7,T8, T9,TA,TB,TC,TD,TE,TF,TG |
| | SPHWH1L3D30CD4TPJ3 | TP (Quarter Bin) | T6,T7,TA,TB |
| | SPHWH1L3D30CD4TMJ3 | TM (MacAdam 3-Step) | - |
| | SPHWH1L3D30CD4T0K3 | T0 (Whole Bin) | T1,T2,T3,T4,T5,T6,T7,T8, T9,TA,TB,TC,TD,TE,TF,TG |
| | SPHWH1L3D30CD4TPK3 | TP (Quarter Bin) | T6,T7,TA,TB |
| | SPHWH1L3D30CD4TMK3 | TM (MacAdam 3-Step) | - |
| | SPHWH1L3D30CD4T0M3 | T0 (Whole Bin) | T1,T2,T3,T4,T5,T6,T7,T8, T9,TA,TB,TC,TD,TE,TF,TG |
| | SPHWH1L3D30CD4TPM3 | TP (Quarter Bin) | T6,T7,TA,TB |
| | SPHWH1L3D30CD4TMM3 | TM (MacAdam 3-Step) | - |
| 5000K | SPHWH1L3D30CD4RTJ3 | RT (Half Bin) | R1,R2,R3,R4 |
| | SPHWH1L3D30CD4RTK3 | | |
| | SPHWH1L3D30CD4RTM3 | | |
| | SPHWH1L3D30DD4RTJ3 | | |
| | SPHWH1L3D30DD4RTK3 | | |
| 5700K | SPHWH1L3D30CD4QTJ3 | QT (Half Bin) | Q1,Q2,Q3,Q4 |
| | SPHWH1L3D30CD4QTK3 | | |
| | SPHWH1L3D30CD4QTM3 | | |
| | SPHWH1L3D30DD4QTJ3 | | |
| | SPHWH1L3D30DD4QTK3 | | |
| 6500K | SPHWH1L3D30CD4PTJ3 | PT (Half Bin) | P1,P2,P3,P4 |
| | SPHWH1L3D30CD4PTK3 | | |

3-2) Chromaticity Region & Coordinates





3-2) Chromaticity Region & Coordinates (Continued)

| Region | CIE X | CIE Y | Region | CIE X | CIE Y | Region | CIE X | CIE Y | Region | CIE X | CIE Y |
|----------------|--------|--------|--------|--------|--------|----------------|--------|--------|--------|--------|--------|
| W rank (2700K) | | | | | | V rank (3000K) | | | | | |
| W1 | 0.4373 | 0.3893 | W9 | 0.4465 | 0.4071 | V1 | 0.4147 | 0.3814 | V9 | 0.4221 | 0.3984 |
| | 0.4418 | 0.3981 | | 0.4513 | 0.4164 | | 0.4183 | 0.3898 | | 0.4259 | 0.4073 |
| | 0.4475 | 0.3994 | | 0.4573 | 0.4178 | | 0.4242 | 0.3919 | | 0.4322 | 0.4096 |
| | 0.4428 | 0.3906 | | 0.4523 | 0.4085 | | 0.4203 | 0.3833 | | 0.4281 | 0.4006 |
| W2 | 0.4428 | 0.3906 | WA | 0.4523 | 0.4085 | V2 | 0.4203 | 0.3833 | VA | 0.4281 | 0.4006 |
| | 0.4475 | 0.3994 | | 0.4573 | 0.4178 | | 0.4242 | 0.3919 | | 0.4322 | 0.4096 |
| | 0.4532 | 0.4008 | | 0.4634 | 0.4193 | | 0.4300 | 0.3939 | | 0.4385 | 0.4119 |
| | 0.4483 | 0.3919 | | 0.4582 | 0.4099 | | 0.4259 | 0.3853 | | 0.4342 | 0.4028 |
| W3 | 0.4483 | 0.3919 | WB | 0.4582 | 0.4099 | V3 | 0.4259 | 0.3853 | VB | 0.4342 | 0.4028 |
| | 0.4532 | 0.4008 | | 0.4634 | 0.4193 | | 0.4300 | 0.3939 | | 0.4385 | 0.4119 |
| | 0.4589 | 0.4021 | | 0.4695 | 0.4207 | | 0.4359 | 0.3960 | | 0.4449 | 0.4141 |
| | 0.4538 | 0.3931 | | 0.4641 | 0.4112 | | 0.4316 | 0.3873 | | 0.4403 | 0.4049 |
| W4 | 0.4538 | 0.3931 | WC | 0.4641 | 0.4112 | V4 | 0.4316 | 0.3873 | VC | 0.4403 | 0.4049 |
| | 0.4589 | 0.4021 | | 0.4695 | 0.4207 | | 0.4359 | 0.3960 | | 0.4449 | 0.4141 |
| | 0.4646 | 0.4034 | | 0.4756 | 0.4221 | | 0.4418 | 0.3981 | | 0.4513 | 0.4164 |
| | 0.4593 | 0.3944 | | 0.4700 | 0.4126 | | 0.4373 | 0.3893 | | 0.4465 | 0.4071 |
| W5 | 0.4418 | 0.3981 | WD | 0.4513 | 0.4164 | V5 | 0.4183 | 0.3898 | VD | 0.4259 | 0.4073 |
| | 0.4465 | 0.4071 | | 0.4562 | 0.4260 | | 0.4221 | 0.3984 | | 0.4299 | 0.4165 |
| | 0.4523 | 0.4085 | | 0.4624 | 0.4274 | | 0.4281 | 0.4006 | | 0.4364 | 0.4188 |
| | 0.4475 | 0.3994 | | 0.4573 | 0.4178 | | 0.4242 | 0.3919 | | 0.4322 | 0.4096 |
| W6 | 0.4475 | 0.3994 | WE | 0.4573 | 0.4178 | V6 | 0.4242 | 0.3919 | VE | 0.4322 | 0.4096 |
| | 0.4523 | 0.4085 | | 0.4624 | 0.4274 | | 0.4281 | 0.4006 | | 0.4364 | 0.4188 |
| | 0.4582 | 0.4099 | | 0.4687 | 0.4289 | | 0.4342 | 0.4028 | | 0.4430 | 0.4212 |
| | 0.4532 | 0.4008 | | 0.4634 | 0.4193 | | 0.4300 | 0.3939 | | 0.4385 | 0.4119 |
| W7 | 0.4532 | 0.4008 | WF | 0.4634 | 0.4193 | V7 | 0.4300 | 0.3939 | VF | 0.4385 | 0.4119 |
| | 0.4582 | 0.4099 | | 0.4687 | 0.4289 | | 0.4342 | 0.4028 | | 0.4430 | 0.4212 |
| | 0.4641 | 0.4112 | | 0.4750 | 0.4304 | | 0.4403 | 0.4049 | | 0.4496 | 0.4236 |
| | 0.4589 | 0.4021 | | 0.4695 | 0.4207 | | 0.4359 | 0.3960 | | 0.4449 | 0.4141 |
| W8 | 0.4589 | 0.4021 | WG | 0.4695 | 0.4207 | V8 | 0.4359 | 0.3960 | VG | 0.4449 | 0.4141 |
| | 0.4641 | 0.4112 | | 0.4750 | 0.4304 | | 0.4403 | 0.4049 | | 0.4496 | 0.4236 |
| | 0.4700 | 0.4126 | | 0.4813 | 0.4319 | | 0.4465 | 0.4071 | | 0.4562 | 0.4260 |
| | 0.4646 | 0.4034 | | 0.4756 | 0.4221 | | 0.4418 | 0.3981 | | 0.4513 | 0.4164 |



3-2) Chromaticity Region & Coordinates (Continued)

| Region | CIE X | CIE Y | Region | CIE X | CIE Y | Region | CIE X | CIE Y | Region | CIE X | CIE Y |
|----------------|--------|--------|--------|--------|--------|----------------|--------|--------|--------|--------|--------|
| U rank (3500K) | | | | | | T rank (4000K) | | | | | |
| U1 | 0.3889 | 0.3690 | U9 | 0.3941 | 0.3848 | T1 | 0.367 | 0.3578 | T9 | 0.3702 | 0.3722 |
| | 0.3915 | 0.3768 | | 0.3968 | 0.3930 | | 0.3726 | 0.3612 | | 0.3763 | 0.376 |
| | 0.3981 | 0.3800 | | 0.4040 | 0.3966 | | 0.3744 | 0.3685 | | 0.3782 | 0.3837 |
| | 0.3953 | 0.3720 | | 0.4010 | 0.3882 | | 0.3686 | 0.3649 | | 0.3719 | 0.3797 |
| U2 | 0.3953 | 0.3720 | UA | 0.4010 | 0.3882 | T2 | 0.3726 | 0.3612 | TA | 0.3763 | 0.376 |
| | 0.3981 | 0.3800 | | 0.4040 | 0.3966 | | 0.3783 | 0.3646 | | 0.3825 | 0.3798 |
| | 0.4048 | 0.3832 | | 0.4113 | 0.4001 | | 0.3804 | 0.3721 | | 0.3847 | 0.3877 |
| | 0.4017 | 0.3751 | | 0.4080 | 0.3916 | | 0.3744 | 0.3685 | | 0.3782 | 0.3837 |
| U3 | 0.4017 | 0.3751 | UB | 0.4080 | 0.3916 | T3 | 0.3783 | 0.3646 | TB | 0.3825 | 0.3798 |
| | 0.4048 | 0.3832 | | 0.4113 | 0.4001 | | 0.384 | 0.3681 | | 0.3887 | 0.3836 |
| | 0.4116 | 0.3865 | | 0.4186 | 0.4037 | | 0.3863 | 0.3758 | | 0.3912 | 0.3917 |
| | 0.4082 | 0.3782 | | 0.4150 | 0.3950 | | 0.3804 | 0.3721 | | 0.3847 | 0.3877 |
| U4 | 0.4082 | 0.3782 | UC | 0.4150 | 0.3950 | T4 | 0.384 | 0.3681 | TC | 0.3887 | 0.3837 |
| | 0.4116 | 0.3865 | | 0.4186 | 0.4037 | | 0.3898 | 0.3716 | | 0.395 | 0.3875 |
| | 0.4183 | 0.3898 | | 0.4259 | 0.4073 | | 0.3924 | 0.3794 | | 0.3978 | 0.3958 |
| | 0.4147 | 0.3814 | | 0.4221 | 0.3984 | | 0.3863 | 0.3758 | | 0.3912 | 0.3917 |
| U5 | 0.3915 | 0.3768 | UD | 0.3968 | 0.3930 | T5 | 0.3686 | 0.3649 | TD | 0.3719 | 0.3797 |
| | 0.3941 | 0.3848 | | 0.3996 | 0.4015 | | 0.3744 | 0.3685 | | 0.3782 | 0.3837 |
| | 0.4010 | 0.3882 | | 0.4071 | 0.4052 | | 0.3763 | 0.376 | | 0.3802 | 0.3916 |
| | 0.3981 | 0.3800 | | 0.4040 | 0.3966 | | 0.3702 | 0.3722 | | 0.3736 | 0.3874 |
| U6 | 0.3981 | 0.3800 | UE | 0.4040 | 0.3966 | T6 | 0.3744 | 0.3685 | TE | 0.3782 | 0.3837 |
| | 0.4010 | 0.3882 | | 0.4071 | 0.4052 | | 0.3804 | 0.3721 | | 0.3847 | 0.3877 |
| | 0.4080 | 0.3916 | | 0.4146 | 0.4089 | | 0.3825 | 0.3798 | | 0.3869 | 0.3958 |
| | 0.4048 | 0.3832 | | 0.4113 | 0.4001 | | 0.3763 | 0.376 | | 0.3802 | 0.3916 |
| U7 | 0.4048 | 0.3832 | UF | 0.4113 | 0.4001 | T7 | 0.3804 | 0.3721 | TF | 0.3847 | 0.3877 |
| | 0.4080 | 0.3916 | | 0.4146 | 0.4089 | | 0.3863 | 0.3758 | | 0.3912 | 0.3917 |
| | 0.4150 | 0.3950 | | 0.4222 | 0.4127 | | 0.3887 | 0.3836 | | 0.3937 | 0.4001 |
| | 0.4116 | 0.3865 | | 0.4186 | 0.4037 | | 0.3825 | 0.3798 | | 0.3869 | 0.3958 |
| U8 | 0.4116 | 0.3865 | UG | 0.4186 | 0.4037 | T8 | 0.3863 | 0.3758 | TG | 0.3912 | 0.3917 |
| | 0.4150 | 0.3950 | | 0.4222 | 0.4127 | | 0.3924 | 0.3794 | | 0.3978 | 0.3958 |
| | 0.4221 | 0.3984 | | 0.4299 | 0.4165 | | 0.395 | 0.3875 | | 0.4006 | 0.4044 |
| | 0.4183 | 0.3898 | | 0.4259 | 0.4073 | | 0.3887 | 0.3836 | | 0.3937 | 0.4001 |



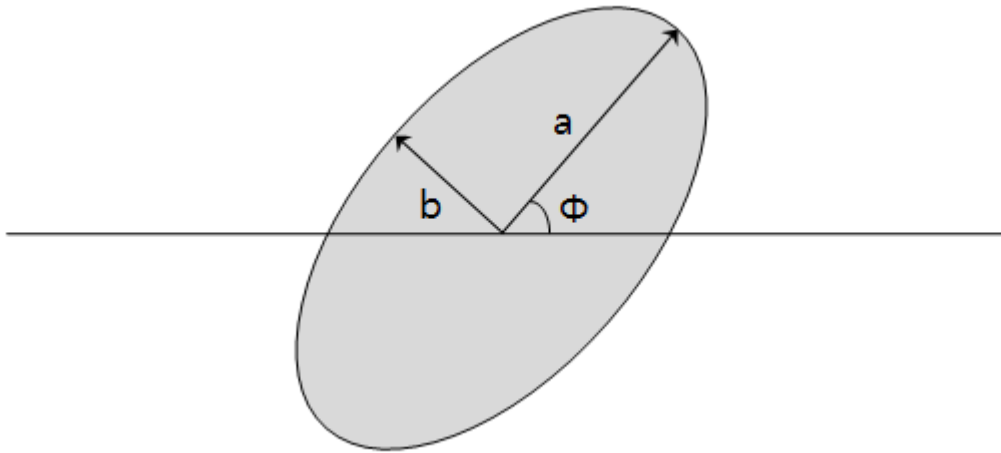
3-2) Chromaticity Region & Coordinates (Continued)

| Region | CIE X | CIE Y | Region | CIE X | CIE Y | Region | CIE X | CIE Y |
|----------------|--------|--------|----------------|--------|--------|----------------|--------|--------|
| R rank (5000K) | | | Q rank (5700K) | | | P rank (6500K) | | |
| R1 | 0.3371 | 0.3490 | Q1 | 0.3215 | 0.3350 | P1 | 0.3068 | 0.3113 |
| | 0.3451 | 0.3554 | | 0.3290 | 0.3417 | | 0.3144 | 0.3186 |
| | 0.3440 | 0.3427 | | 0.3290 | 0.3300 | | 0.3130 | 0.3290 |
| | 0.3366 | 0.3369 | | 0.3222 | 0.3243 | | 0.3048 | 0.3207 |
| R2 | 0.3451 | 0.3554 | Q2 | 0.3290 | 0.3417 | P2 | 0.3144 | 0.3186 |
| | 0.3533 | 0.3620 | | 0.3371 | 0.3490 | | 0.3221 | 0.3261 |
| | 0.3515 | 0.3487 | | 0.3366 | 0.3369 | | 0.3213 | 0.3373 |
| | 0.3440 | 0.3427 | | 0.3290 | 0.3300 | | 0.3130 | 0.3290 |
| R3 | 0.3376 | 0.3616 | Q3 | 0.3207 | 0.3462 | P3 | 0.3048 | 0.3207 |
| | 0.3463 | 0.3687 | | 0.3290 | 0.3538 | | 0.3130 | 0.3290 |
| | 0.3451 | 0.3554 | | 0.3290 | 0.3417 | | 0.3115 | 0.3391 |
| | 0.3371 | 0.3490 | | 0.3215 | 0.3350 | | 0.3028 | 0.3304 |
| R4 | 0.3463 | 0.3687 | Q4 | 0.3290 | 0.3538 | P4 | 0.3130 | 0.3290 |
| | 0.3551 | 0.3760 | | 0.3376 | 0.3616 | | 0.3213 | 0.3373 |
| | 0.3533 | 0.3620 | | 0.3371 | 0.3490 | | 0.3205 | 0.3481 |
| | 0.3451 | 0.3554 | | 0.3290 | 0.3417 | | 0.3115 | 0.3391 |

Notes:

SAMSUNG ELECTRONICS maintains ± 0.005 tolerance of CCx, CCy

3-3) MacAdam 3-step Ellipse



| Nominal CCT | Center | | Rotation Angle | a | b |
|-------------|--------|--------|----------------|--------|--------|
| | CIE X | CIE Y | | | |
| 2700K | 0.4578 | 0.4101 | 53.70 | 0.0081 | 0.0042 |
| 3000K | 0.4338 | 0.4030 | 53.22 | 0.0083 | 0.0041 |
| 3500K | 0.4073 | 0.3917 | 54.00 | 0.0093 | 0.0041 |
| 4000K | 0.3818 | 0.3797 | 53.72 | 0.0094 | 0.0040 |

Notes:

SAMSUNG ELECTRONICS maintains ± 0.005 tolerance of CC_x , CC_y

| |
|------------------|
| Revision History |
|------------------|

| Date | Revision History | Writer | |
|------------|---|-----------|----------|
| | | Drawn | Approved |
| 2013.12.03 | New version | I.J.PYEON | Y.T.KIM |
| 2013.12.19 | <ul style="list-style-type: none"> - Added New Flux Rank • 2700K (CRI80) G3 rank • 4000K (CRI70) K3 rank | I.J.PYEON | Y.T.KIM |
| 2014.04.02 | <ul style="list-style-type: none"> - Added New Flux Rank • 2700K (CRI80) H3 rank • 3000K (CRI80) H3 rank • 3500K (CRI80) H3 rank • 4000K (CRI80) H3, J3 rank • 4000K (CRI70) M3 rank • 5000K (CRI70) M3 rank • 5700K (CRI70) M3 rank • 6500K (CRI70) K3 rank | G.E.CHO | M.Y.SONE |

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