About Samsung Electronics Co., Ltd.

Samsung Electronics Co. Ltd inspires the world and shapes the future with transformative ideas and technologies. The company is redefining the worlds of TVs, smartphones, wearable devices, tablets, digital appliances, network systems, and semiconductor and LED solutions. For the latest news, please visit the Samsung Newsroom at http://news.samsung.com.

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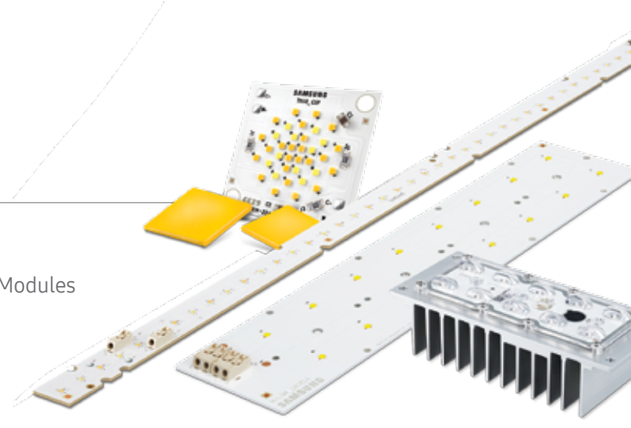
www.samsungled.com

Rev. 1, May 2017

SAMSUNG

Samsung LED
CSP LEDs

- Mid-power LEDs
- High Power LEDs
- Indoor Linear Modules
- Down & Spot Modules
- Outdoor Modules



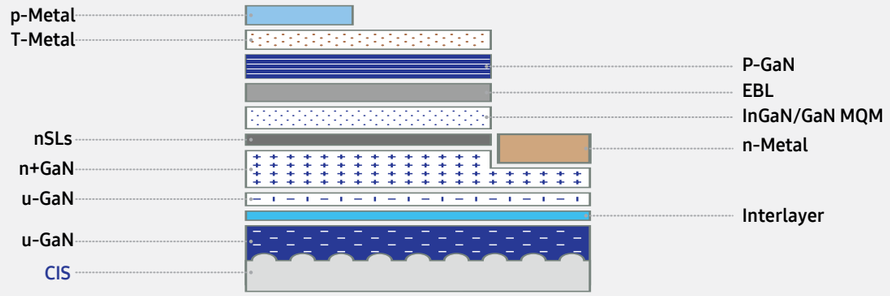
May 2017

SAMSUNG

Technology Leadership

High-efficieny epitaxial technology

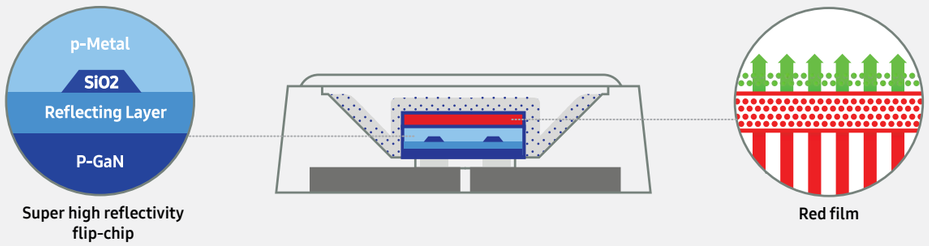
Epitaxial growth technology such as carrier injection, internal radiative efficiency and light extraction



CIS: Corrugated Interface Substrate

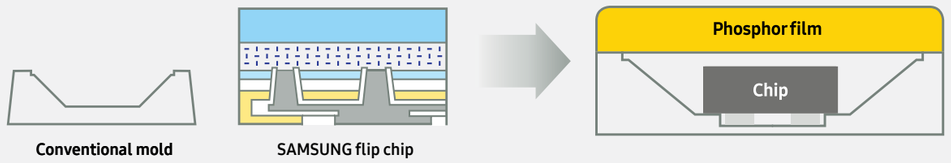
High-efficieny phosphor technology

Reducing interference of red and green phosphors



High-efficieny process technology

Achieving high extraction efficiency by embedded mold, phosphor film and color uniformity



The First and Biggest

I

First manufacturer of CSP LEDs started in 2014

II

High reliability backed by thousands of installations around the world

III

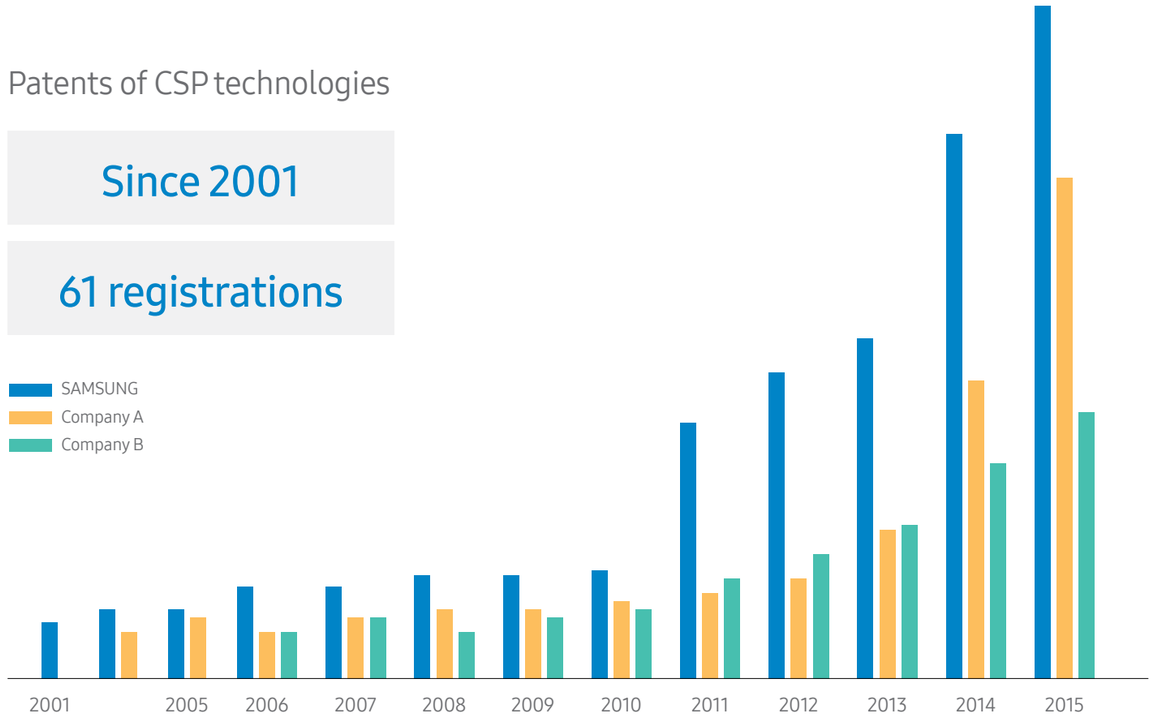
Unmatched versatility to suit virtually any application

The World's Best IP Position

Patents of CSP technologies

Since 2001

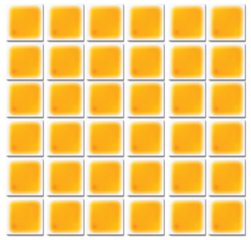
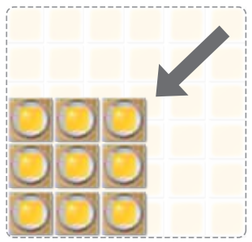
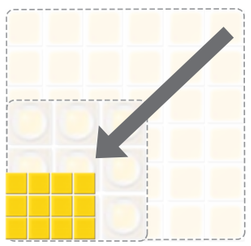
61 registrations



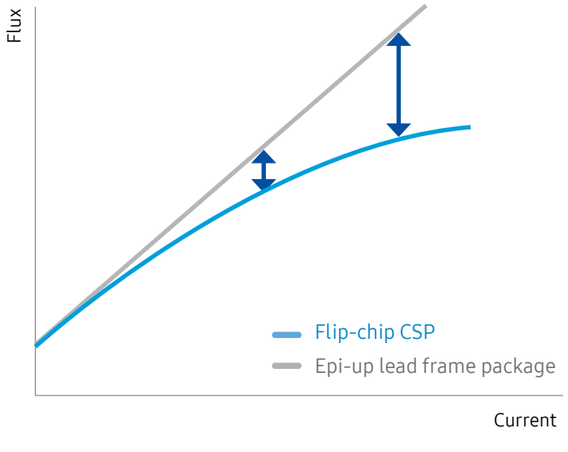
New technology provides high performance and energy conserving

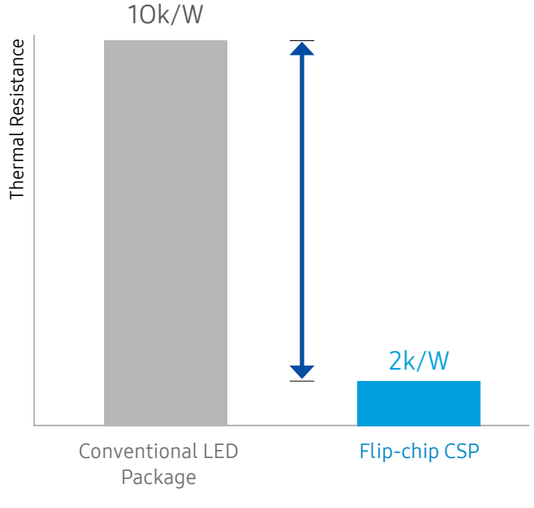
Samsung's CSP significantly scales down the size of an LED package, which enables more flexible and compact designs and lowers the manufacturing and operational costs of an LED lighting system

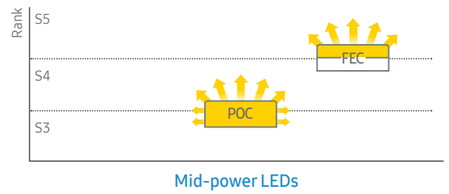
Design Flexibility

Mid Power LED	Ceramic High Power LED	CSP High Power LED
		
LM301A / 36ea	LH351B / 9ea	LH181A /12ea
389㎟ (100%)	132㎟ (34%)	53㎟ (14%)

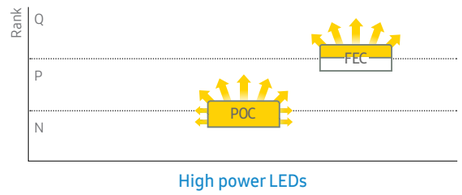
Thermal management



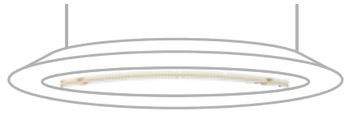
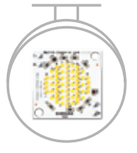
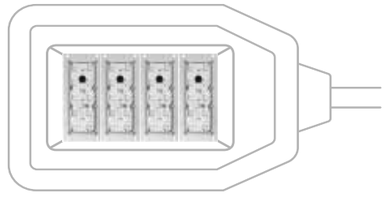




Mid-power LEDs



High power LEDs

	FEC	POC
	120° beam distribution Easy to design lens	140-150° beam distribution Suitable for flood lighting
Ambient	 **Mainstream linear fixture** FEC could be an LED platform of mainstream lumimaire with 190lm/W LED performance.	 **Flexible edge lit fixture** POC makes beautiful light with wide beam distribution (volume emission).
Downlight	 **Spot light** FEC helps to make extremely tight LES without concern of X-talk by surface emitted light  **Tunable** POC and FEC could naturally mix warm and cool color by tiny form factor	 **ACOM (Flood light)** POC can make an even-illumination lighting fixture with a wide beam angle
Outdoor	 **Street light** PoC could be profitable for flood light by wide beam distribution and FEC is easy to adapt In lens based design for special distribution	

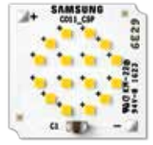
Line-up

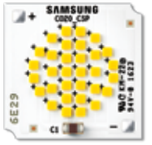
	Product	Key Features	Efficacy (lm/W)	Lifespan
	CSP Spot	• Designed following Zhaga specification, excellent compatibility of eco-partner's component • Possible to design various sizes of downlights	●●●○○	●●●●○
	CSP Spot Tunable	• 1,000/2,000lm color tunable solutions with a small LES	●●●○○	●●●●○
	T-series	• White tunable mixing 2700K+6500K • Same foot-print with Samsung's Indoor linear modules, H/S/V-series	●●●○○	●●●●○
	Modular Platform T-type Gen2.5	• Total solution integrating LED+Optics+Thermal • With LH181A, higher lumen denstiy of 2,850lm • IP66	●●●●○	●●●●○
	HiLOM	• Greater design flexibility for various fixture designs • High performance, 4,400lm (700mA) with efficacy of 132lm/W	●●●●●	●●●●○
	LM101A	• 0.5W class mid power LED • Wider beam angle than lead-frame type • High degree of reliability with plastic-free structure	●●●○○	●●●●○
	LM102A	• 1 W class mid power LED • Wider beam angle than lead-frame type • High degree of reliability with plastic-free structure	●●●○○	●●●●○
	LH141A	• 2W class high power LED • Phosphor film directly attached to flip chip surface • Plastic-free structure delivers low thermal resistance	●●●●○	●●●●○
	LH181A	• 3W class high power LED • Low thermal resistance • Wider beam angle than lead-frame type	●●●●○	●●●●○
	LH181B	• Operates at a maximum current of up to 1.4A • Maximized efficiency by fillet structure, 173lm/W (@350mA) • Less cross-talk	●●●●●	●●●●○




Modules

CSP Spot


CO10


CO20

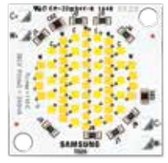

CO30


CO40

Product	Luminous Flux (lm)	Power Consumption (W)	Input Voltage (V)	IF (mA)	Imax (mA)	Efficacy (lm/W)	Tp (°C)	CRI	CCT (K)	Beam Angle (°)	Size (mm)	Temperature Range (°C)	Life time (hrs)	Certification	Part Number
CO10	1010	9.4	23.5	400	700	107	65	80+	2700	150	19x19x2.2	-20~+50	50000	CE, ENEC, UL, cUL	SI-N8W0916E0WW
	1050					112			3000						SI-N8V0916E0WW
	1070					114			3500						SI-N8U0916E0WW
	1140					121			4000						SI-N8T0916E0WW
CO20	1980	18.3	23.4	780	1400	108	65	80+	2700	140	19x19x2.2	-20~+50	50000	CE, ENEC, UL, cUL	SI-N8W1816E0WW
	2060					113			3000						SI-N8V1816E0WW
	2110					116			3500						SI-N8U1816E0WW
	2240					123			4000						SI-N8T1816E0WW
CO30	2980	27.4	23.4	1170	2100	109	65	80+	2700	145	28x28x2.2	-20~+50	50000	CE, ENEC, UL, cUL	SI-N8W2716E0WW
	3090					113			3000						SI-N8V2716E0WW
	3160					115			3500						SI-N8U2716E0WW
	3360					123			4000						SI-N8T2716E0WW
CO40	3970	36.5	23.4	1560	2800	109	65	80+	2700	140	28x28x2.2	-20~+50	50000	CE, ENEC, UL, cUL	SI-N8W3616E0WW
	4120					113			3000						SI-N8V3616E0WW
	4220					115			3500						SI-N8U3616E0WW
	4490					123			4000						SI-N8T3616E0WW

CSP Spot Tunable


TO10


TO20

Product	Luminous Flux (lm)	Power Consumption (W)	Input Voltage (V)	IF (mA)	Imax (mA)	Efficacy (lm/W)	Tp (°C)	CRI	CCT (K)	Beam Angle (°)	Size (mm)	Temperature Range (°C)	Life time (hrs)	Certification	Part Number
TO10	990	8.5	33.9	250	350	117	65	80+	2700	150	28x28x2.2	-20~+50	50000	CE, ENEC, UL, cUL	SI-N8A1016E0WW
	1020	9.0	35.9	250		114			6500	145					
	990	8.5	33.9	250	350	117	65	80+	2700	150	28x28x2.2	-20~+50	50000	CE, ENEC, UL, cUL	SI-N8B1016E0WW
	1080	9.0	35.9	250		120			5000	145					
TO20	1940	17.4	34.7	500	700	112	65	80+	2700	140	28x28x2.2	-20~+50	50000	CE, ENEC, UL, cUL	SI-N8A1816E0WW
	2040	18.0	35.9	500		114			6500						
	1940	17.4	34.7	500	700	112	65	80+	2700	140	28x28x2.2	-20~+50	50000	CE, ENEC, UL, cUL	SI-N8B1816E0WW
	2160	18.0	35.9	500		120			5000						

Modules

T-series


LT-T562A


LT-T282A


LT-T562B


LT-T282B

Product	Luminous Flux (lm)	Power Consumption (W)	Input Voltage (V)	IF (mA)	Imax (mA)	Efficacy (lm/W)	CRI	CCT (K)	Beam Angle (°)	Size (mm)	Temperature Range (℃)	Life time (hrs)	Certification	Part Number WW
LT-T562A	1860	16.1	18	900	1000	115	80+	2700	140	560×18×5.8	-20~+50	50000	UL, cUL	SI-B8A161560US
	2040					126		6500						
LT-T282A	930	8.1	9	900	1000	115	80+	2700	140	275x18x5.8	-20~+50	50000	UL, cUL	SI-B8A081280US
	1020					126		6500						
LT-T562B	1860	16.1	18	900	1000	115	80+	2700	140	560×24×5.8	-20~+50	50000	CE, ENEC	SI-B8A161560EU
	2040					126		6500						
LT-T282B	930	8.1	9	900	1000	115	80+	2700	140	280x24x5.8	-20~+50	50000	CE, ENEC	SI-B8A081280EU
	1020					126		6500						

Modular Platform Engine


T-type Gen2.5 (LH181A)

Model	Heat Sink	Connector	Luminous Flux (lm)	Power Consumption (W)	Input Voltage (V)	IF (mA)	Imax (mA)	Efficacy (lm/W)	CRI	CCT (K)	Weight (g)	Waterproof/ Dustproof Grade	Temperature Range (Operation, Tc)	Certification	Part Number
T-type Gen2.5 (LH181A)	Fin	Connector	2600	20	28	700	1,000	130.0	80+	3000	290	IP66	+10~+95	-	SL-P8V2W6RA1WW
			2800					140.0		4000					SL-P8T2W6RA1WW
			2850					142.5		5000					SL-P8R2W6RA1WW
			2850					142.5		5700					SL-P8Q2W6RA1WW

* E-type: with fin (themal management by engine), F-type: without fin (thermal management by fixture), T-type: Flange with fin (H/S with Tetra screw-holes)

HiLOM


HiLOM(LH181A)

Model	Connector	Luminous Flux (lm)	Power Consumption (W)	Input Voltage (V)	IF (mA)	Imax (mA)	Efficacy (lm/W)	CRI	CCT (K)	Weight (g)	Temperature Range (Operation, Tc)	Certification	Part Number
HiLOM (LH181A)	Poke-in	4300	33	24	1400	2000	130	70+	3000	36	+10 ~ +92	CE, UL	SL-B7V3N80L1WW
		4600	33	24			139		4000	36			SL-B7T3N80L1WW
		4650	33	24			140		5000	36			SL-B7R3N80L1WW

* HiLOM: High Luminance Outdoor Module

Packages

LM101A

[150mA, 85°C]

CRI	CCT (K)	Part Number	Luminous Flux (lm)		
			Bin	Min.	Max.
70+	3000	SCP7VT78HPL1V☆SD6E	SD	55	59
		SCP7VT78HPL1V☆SE6E	SE	59	63
		SCP7VT78HPL1V☆SF6E	SF	63	67
	3500	SCP7UT78HPL1U☆SD6E	SD	55	59
		SCP7UT78HPL1U☆SE6E	SE	59	63
		SCP7UT78HPL1U☆SF6E	SF	63	67
	4000	SCP7TT78HPL1T☆SE6E	SE	59	63
		SCP7TT78HPL1T☆SF6E	SF	63	67
		SCP7TT78HPL1T☆SG6E	SG	67	71
	5000	SCP7RT78HPL1R☆SE6E	SE	59	63
		SCP7RT78HPL1R☆SF6E	SF	63	67
		SCP7RT78HPL1R☆SG6E	SG	67	71
	5700	SCP7QT78HPL1Q☆SE6E	SE	59	63
		SCP7QT78HPL1Q☆SF6E	SF	63	67
		SCP7QT78HPL1Q☆SG6E	SG	67	71
	6500	SCP7PT78HPL1P☆SE6E	SE	59	63
		SCP7PT78HPL1P☆SF6E	SF	63	67
		SCP7PT78HPL1P☆SG6E	SG	67	71
80+	2700	SCP8WT78HPL1W☆SB6E	SB	47	51
		SCP8WT78HPL1W☆SC6E	SC	51	55
		SCP8WT78HPL1W☆SD6E	SD	55	59
	3000	SCP8VT78HPL1V☆SC6E	SC	51	55
		SCP8VT78HPL1V☆SD6E	SD	55	59
		SCP8VT78HPL1V☆SE6E	SE	59	63
	3500	SCP8UT78HPL1U☆SC6E	SC	51	55
		SCP8UT78HPL1U☆SD6E	SD	55	59
		SCP8UT78HPL1U☆SE6E	SE	59	63
	4000	SCP8TT78HPL1T☆SD6E	SD	55	59
		SCP8TT78HPL1T☆SE6E	SE	59	63
		SCP8TT78HPL1T☆SF6E	SF	63	67
	5000	SCP8RT78HPL1R☆SD6E	SD	55	59
		SCP8RT78HPL1R☆SE6E	SE	59	63
		SCP8RT78HPL1R☆SF6E	SF	63	67
	5700	SCP8QT78HPL1Q☆SC6E	SC	51	55
		SCP8QT78HPL1Q☆SD6E	SD	55	59
		SCP8QT78HPL1Q☆SE6E	SE	59	63
	6500	SCP8PT78HPL1P☆SC6E	SC	51	55
		SCP8PT78HPL1P☆SD6E	SD	55	59
		SCP8PT78HPL1P☆SE6E	SE	59	63
90+	2700	SCP9WT78HPL1W☆SY6E	SY	35	39
		SCP9WT78HPL1W☆SZ6E	SZ	39	43
		SCP9WT78HPL1W☆SA6E	SA	43	47
	3000	SCP9VT78HPL1V☆SY6E	SY	35	39
		SCP9VT78HPL1V☆SZ6E	SZ	39	43
		SCP9VT78HPL1V☆SA6E	SA	43	47
	3500	SCP9UT78HPL1U☆SZ6E	SZ	39	43
		SCP9UT78HPL1U☆SA6E	SA	43	47
		SCP9UT78HPL1U☆SB6E	SB	47	51

Note: "☆" can be "L" (MacAdam 5-step), "U" (MacAdam 3-step)

LM102A

[150mA, 85°C]

CRI	CCT (K)	Part Number	Luminous Flux (lm)		
			Bin	Min.	Max.
70+	3000	SCS7VT93HPL2V☆SD3F	SD	103	111
		SCS7VT93HPL2V☆SE3F	SE	111	119
	3500	SCS7UT93HPL2U☆SD3F	SD	103	111
		SCS7UT93H PL2U☆SE3F	SE	111	119
	4000	SCS7TT93HPL2T☆SE3F	SE	111	119
		SCS7TT93HPL2T☆SF3F	SF	119	127
	5000	SCS7RT93HPL2R☆SE3F	SE	111	119
		SCS7RT93HPL2R☆SF3F	SF	119	127
	5700	SCS7QT93HPL2Q☆SE3F	SE	111	119
		SCS7QT93HPL2Q☆SF3F	SF	119	127
	6500	SCS7PT93HPL2P☆SE3F	SE	111	119
		SCS7PT93HPL2P☆SF3F	SF	119	127
80+	2700	SCS8WT93HPL2W☆SC3F	SC	95	103
		SCS8WT93HPL2W☆SD3F	SD	103	111
	3000	SCS8VT93HPL2V☆SC3F	SC	95	103
		SCS8VT93HPL2V☆SD3F	SD	103	111
	3500	SCS8UT93HPL2U☆SD3F	SD	103	111
		SCS8UT93HPL2U☆SE3F	SE	111	119
	4000	SCS8TT93HPL2T☆SD3F	SD	103	111
		SCS8TT93HPL2T☆SE3F	SE	111	119
	5000	SCS8RT93HPL2R☆SE3F	SE	111	119
		SCS8RT93HPL2R☆SF3F	SF	119	127
	5700	SCS8QT93HPL2Q☆SD3F	SD	103	111
		SCS8QT93HPL2Q☆SE3F	SE	111	119
	6500	SCS8PT93HPL2P☆SD3F	SD	103	111
		SCS8PT93HPL2P☆SE3F	SE	111	119
90+	2700	SCS9WT93HPL2W☆SA3F	SA	79	87
		SCS9WT93HPL2W☆SB3F	SB	87	95
	3000	SCS9VT93HPL2V☆SA3F	SA	79	87
		SCS9VT93HPL2V☆SB3F	SB	87	95
	3500	SCS9UT93HPL2U☆SA3F	SA	79	87
		SCS9UT93HPL2U☆SB3F	SB	87	95

Note: "☆" can be "L" (MacAdam 5-step), "U" (MacAdam 3-step)

LH141A

[350mA, 25°C]

CRI	CCT (K)	Part Number	Luminous Flux (lm)		
			Bin	Min.	Max.
68+	5000	SCS6RTB6EFL1R0FZ6K	FH	110	120
			HZ	120	-
	6000	SCS6JTB6EFL1J0FZ6K	FH	110	120
			HZ	120	-
	7600	SCS6NTB6EFL1N0FZ6K	FH	110	120
			HZ	120	-

LH181A

[350mA, 85°C]

CRI	CCT (K)	Part Number	Luminous Flux (lm)		
			Bin	Min.	Max.
70+	2700	SCP7WTF1HPL1W0J34E	J1, K1, M1	120	150
	3000	SCP7VTF1HPL1V0K34E	K1, M1, N1	130	160
	3500	SCP7UTF1HPL1U0K34E	K1, M1, N1	130	160
	4000	SCP7TTF1HPL1T0M34E	M1, N1, P1	140	170
	5000	SCP7RTF1HPL1RTM34E	M1, N1, P1	140	170
	5700	SCP7QTF1HPL1QTM34E	M1, N1, P1	140	170
	6500	SCP7PTF1HPL1PTM34E	M1, N1, P1	140	170
80+	2700	SCP8WTF1HPLAW0J34E	J1, K1, M1	120	150
	3000	SCP8VTF1HPLAV0K34E	K1, M1, N1	130	160
	3500	SCP8UTF1HPLAU0K34E	K1, M1, N1	130	160
	4000	SCP8TTF1HPLAT0K34E	K1, M1, N1	130	160
	5000	SCP8RTF1HPLARTK34E	K1, M1, N1	130	160
	5700	SCP8QTF1HPLAQTK34E	K1, M1, N1	130	160
	6500	SCP8PTF1HPLAPTK34E	K1, M1, N1	130	160

LH181B

[350mA, 85°C]

CRI	CCT (K)	Part Number	Luminous Flux (lm)		
			Bin	Min.	Max.
70+	2700	SCP7WTF1HEL1WLM34E	M1, N1, P1	140	170
	3000	SCP7VTF1HEL1VLM34E	M1, N1, P1	140	170
	3500	SCP7UTF1HEL1ULN34E	N1, P1, Q1	150	180
	4000	SCP7TTF1HEL1TLN34E	N1, P1, Q1	150	180
	5000	SCP7RTF1HEL1RLP34E	P1, Q1, R1	160	190
	5700	SCP7QTF1HEL1QLP34E	P1, Q1, R1	160	190
	6500	SCP7PTF1HEL1PLP34E	P1, Q1, R1	160	190
80+	2700	SCP8WTF1HEL1WLK34E	K1, M1, N1	130	160
	3000	SCP8VTF1HEL1VLK34E	K1, M1, N1	130	160
	3500	SCP8UTF1HEL1ULM34E	M1, N1, P1	140	170
	4000	SCP8TTF1HEL1TLM34E	M1, N1, P1	140	170
	5000	SCP8RTF1HEL1RLN34E	N1, P1, Q1	150	180
	5700	SCP8QTF1HEL1QLN34E	N1, P1, Q1	150	180
90+	2700	SCP9WTF1HEL1WLG34E	G1, H1, J1	100	130
	3000	SCP9VTF1HEL1VLG34E	G1, H1, J1	100	130
	3500	SCP9UTF1HEL1ULH34E	H1, J1, K1	110	140