0.5W 21mm 12V AC LED Starboard

AC LED Technology by Lynk Labs
Compatible with Phase-cut Dimmers
5 yr. Warranty when used with TRP 12V AC power supply

Specifications

Drive Voltage:	Power with TRP #99002, 99004, 99006, or suitable 12V magnetic transformer. Not to exceed 13V.
AC Current:	50 mA @25ºC typical; 75 mA max
Power Dissipation:	0.5W typical; 0.75W max
Life:	50,000 Hrs, if used as specified
Luminous Flux:	33 lm @3000K
Luminous Efficacy:	66 LPW ±10% @3000K
Viewing Angle:	120 deg
Operating Temp:	-25ºC to +100ºC
Storage Temp:	-40ºC to +100ºC
Soldering Temp:	370ºC

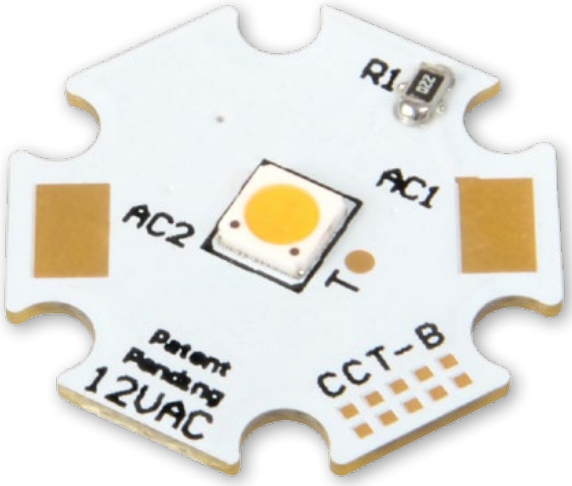
Features

- Compatible with existing 12V AC Power Supplies
- Polarity Independent
- Reliable, fast and easy - “Plug & Play”
- Compatible with most existing leading edge or trailing edge phase cut AC Dimmers
- High Power Efficiency
- High Power Factor
- Significant Energy Savings
- Durable Light Source
- Long Operating life

Applications

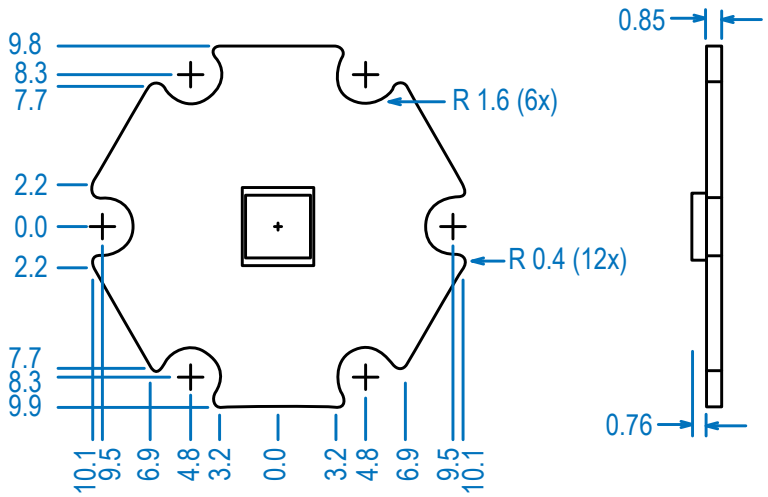
- Under Cabinet Lights
- Step Lights
- Accent Lights
- Garden Lights
- Display Lights

Low voltage AC LED modules offer an effective replacement for incandescent, Xenon or Halogen lamps. Patented AC LED technology eliminates the need for an AC-DC driver. Compatible with existing magnetic or electronic 12V AC power supplies.



21mm 12V AC Starboard LED Module

Model Number	Input Power *(W)*	Input Voltage *(Vac)*	Color Temp *(K)*	Lumens	LPW
99222	0.5	12	2200	28	56
99223	0.5	12	2700	31	63
99224	0.5	12	3000	33	66
99225	0.5	12	4000	38	75
99226	0.5	12	5000	41	82

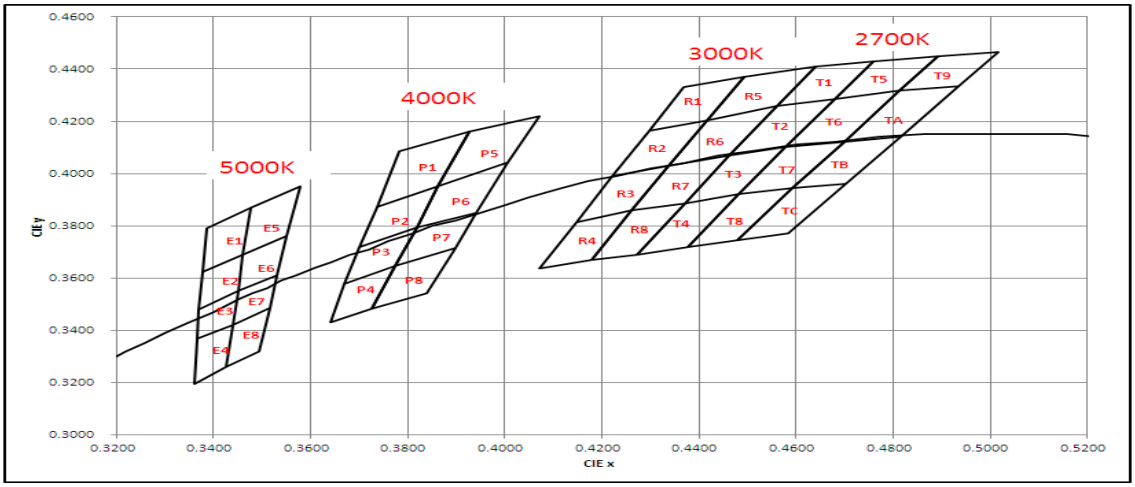


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Rev 4-9-15

CIE Chromaticity Coordinates:

(VF=12Vrms, Ta=25°C, pulsed measurement)

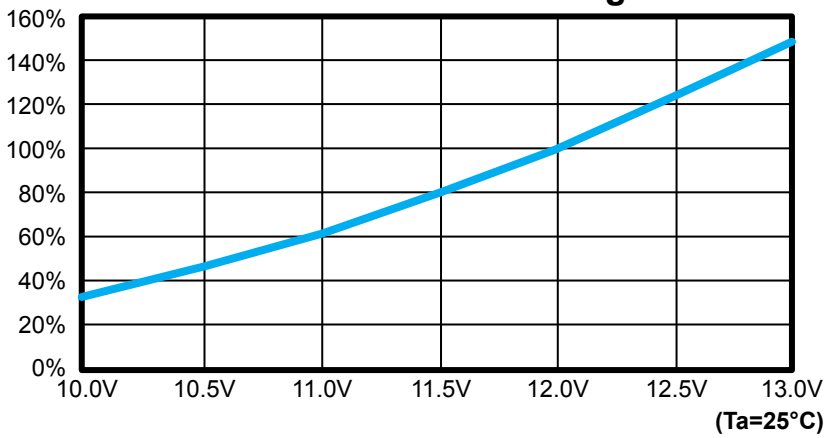


Energy Star ANSI	Rank	x1	y1	x2	y2	x3	y3	x4	y4	Center CCT(K)
TY	T2	0.4562	0.426	0.4463	0.407	0.4578	0.4101	0.468	0.4285	
	T3	0.4463	0.407	0.4371	0.3885	0.4482	0.392	0.4578	0.4101	
	T6	0.468	0.4285	0.4578	0.4101	0.47	0.412	0.4813	0.4319	
	T7	0.4578	0.4101	0.4482	0.392	0.4593	0.3944	0.47	0.412	
	T1	0.464	0.441	0.4562	0.426	0.468	0.4285	0.476	0.443	
	T4	0.4371	0.3885	0.4273	0.369	0.4376	0.372	0.4482	0.392	
	T5	0.476	0.443	0.468	0.4285	0.4813	0.4319	0.4892	0.445	
	T8	0.4482	0.392	0.4376	0.372	0.448	0.3745	0.4593	0.3944	
	T9	0.4892	0.445	0.4813	0.4319	0.4935	0.4335	0.5017	0.4465	
	TA	0.4813	0.4319	0.47	0.412	0.4815	0.414	0.4935	0.4335	
	TB	0.47	0.412	0.4593	0.3944	0.4702	0.396	0.4815	0.414	
	TC	0.4593	0.3944	0.448	0.3745	0.4585	0.377	0.4702	0.396	2700
RY	R2	0.4299	0.4165	0.422	0.399	0.4338	0.403	0.4416	0.4205	
	R3	0.422	0.399	0.4147	0.3814	0.4262	0.386	0.4338	0.403	
	R6	0.4416	0.4205	0.4338	0.403	0.4463	0.407	0.4562	0.426	
	R7	0.4338	0.403	0.4262	0.386	0.4371	0.3885	0.4463	0.407	
	R1	0.437	0.4332	0.4299	0.4165	0.4416	0.4205	0.4493	0.437	
	R4	0.4147	0.3814	0.407	0.3636	0.4178	0.367	0.4262	0.386	
	R5	0.4493	0.437	0.4416	0.4205	0.4562	0.426	0.464	0.441	
	R8	0.4262	0.386	0.4178	0.367	0.4273	0.369	0.4371	0.3885	3000
PY	P2	0.374	0.3888	0.37	0.372	0.3818	0.3795	0.3863	0.395	
	P3	0.37	0.372	0.367	0.3568	0.377	0.363	0.3818	0.3795	
	P6	0.3863	0.395	0.3818	0.3795	0.3941	0.385	0.3996	0.4015	
	P7	0.3818	0.3795	0.377	0.363	0.3889	0.369	0.3941	0.385	
	P1	0.3783	0.4085	0.374	0.3888	0.3863	0.395	0.3926	0.416	
	P4	0.367	0.3568	0.364	0.343	0.3727	0.3482	0.377	0.363	
	P5	0.3926	0.416	0.3863	0.395	0.3996	0.4015	0.407	0.422	
	P8	0.377	0.363	0.3727	0.3482	0.384	0.354	0.3889	0.369	4000
EY	E2	0.3377	0.3625	0.3368	0.348	0.345	0.355	0.3461	0.369	
	E3	0.3368	0.348	0.3366	0.3369	0.344	0.342	0.345	0.355	
	E6	0.3461	0.369	0.345	0.355	0.353	0.361	0.3551	0.376	
	E7	0.345	0.355	0.344	0.342	0.3515	0.3487	0.353	0.361	
	E1	0.3385	0.379	0.3377	0.3625	0.3461	0.369	0.3477	0.387	
	E4	0.3366	0.3369	0.336	0.3195	0.3425	0.326	0.344	0.342	
	E5	0.3477	0.387	0.3461	0.369	0.3551	0.376	0.358	0.395	
	E8	0.344	0.342	0.3425	0.326	0.3495	0.332	0.3515	0.3487	5000

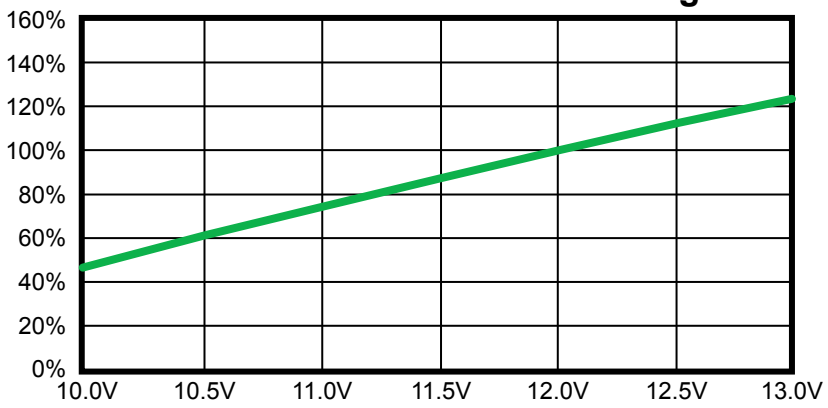
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Typical Electrical & Optical Characteristic Curves:

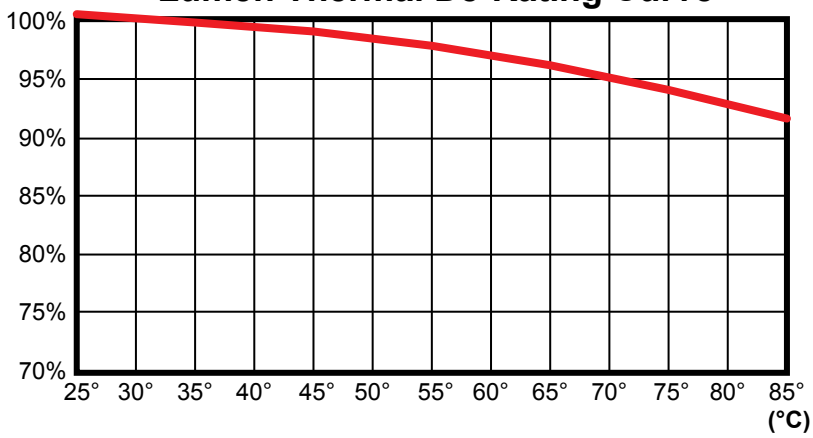
Relative Power / Voltage



Relative Luminous Flux / Voltage



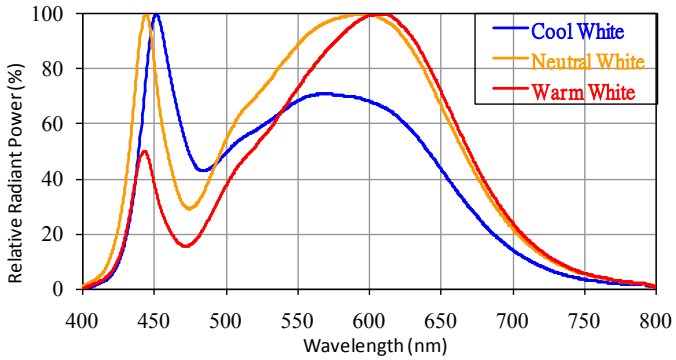
Lumen Thermal De-Rating Curve



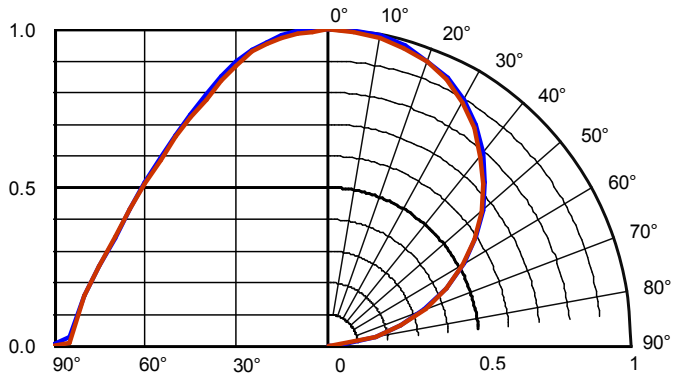
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Typical Electrical & Optical Characteristic Curves:

Spectrum (VF=12Vrms, Ta=25°C, pulsed measurement)



Radiant Angle & Pattern (VF=12Vrms, Ta=25°C, pulsed measurement)



Emitting Color	Center CCT (K)	Flux Code	Min	Max
Warm White	2700	F28	45	50
		F29	50	55
		F30	55	60
		F31	60	68
		F32	68	75
		F33	75	85
		F34	85	95
Warm White	3000	F28	45	50
		F29	50	55
		F30	55	60
		F31	60	68
		F32	68	75
		F33	75	85
		F34	85	95
		F35	95	110
Neutral White	4000	F29	50	55
		F30	55	60
		F31	60	68
		F32	68	75
		F33	75	85
		F34	85	95
		F35	95	110
Cool White	5000	F30	55	60
		F31	60	68
		F32	68	75
		F33	75	85
		F34	85	95
		F35	95	110
		F36	110	125

Packaging

- LED Modules will be packaged in trays for primary protection.
- According to the total delivery amount, cardboard boxes will be used to protect the trays of LED Modules from mechanical shocks during transportation.
- The boxes are not water resistant and therefore must be kept away from water and moisture.

Reliability and Average Lumen Maintenance

Before releasing new products the manufacturer puts a representative product sample set through an entire suite of qualification tests, including the most stressful test for high power LEDs, the Wet High-Temperature Operating Life (WHTOL) test at 85°C/85%RH for 1000 hours at the specified operating current.

LED lifetime has been extrapolated based on the accumulated operating and accelerated aging data. Based on this data, the manufacturer projects that the LED products will deliver, on average, 70% lumen maintenance at 50,000 hours of operation at the specified operating current, provided that the case temperature is maintained at or below 80°C.

Design Considerations/Specifications

Thermal Management Requirements
- Heat Sink Required (22 square cm/watt surface area)
- Thermal epoxy – No mechanical mounting required
- Thermal tape – No mechanical mounting required
- Thermal grease – Mechanical mounting required

Mechanical Mounting
- Use nylon washers for all mounting holes when using screws.
- Do not put force on LEDs.
- Do not bend PCB.

Electrical Interface
- Solder Pads

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