



Specification

Acrich2 – Downlight

120V 17W

SMJD-2V16W1P3

SS	SC	Customer
Drawn	Approval	Approval





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Acrich2 – 120V 17W Downlight



Description

The Acrich 2 series of products are designed to be driven directly off of AC line voltage, therefore they do not need the standard converter essential for conventional general lighting products.

The converter or driver found in most general lighting products can limit the overall life of the product, but with the Acrich 2 series of products the life of the product can more closely be estimated from the LED itself.

This will also allow for a much smaller form factor from an overall fixture design allowing for higher creativity in the fixture.

The modules have a high power factor which can contribute to a higher energy savings in the end application.

Acrich2

Features

- Connects directly to AC line voltage
- High Power Efficiency
- High Power Factor
- Low THD
- Long Life Time
- Simple BOM
- Miniaturization
- Lead Free product
- RoHS compliant

Applications

- Down light
- Factory Ceiling light
- Industrial Light



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1. Characteristics of 120V 17W Downlight

1-1-1. Electro-Optical characteristics of SMJD-2V16W1P3-B rank

Parameter	Symbol		Unit		
Farameter	Symbol	Min	Тур	Max	Unit
Luminous Flux ^[2]	Φ _V ^[3]	1360	1420		lm
Correlated Color Temperature [4]	ССТ	5300	5600	6000	К
CRI	R _a	80	82	-	-
Operating Voltage ^[5]	V _{opt}	120		Vrms ^[1]	
Power Dissipation	P _D	16.5	17.0	17.5	W
Operating Frequency	Freq	50 / 60		Hz	
Power Factor	PF	Over 0.95		-	
View Angle	2 0 1/2		120		deg.

1-1-2. Electro-Optical characteristics of SMJD-2V16W1P3-C rank

Parameter	Symbol		Unit		
Faidilielei	Symbol	Min	Тур	Max	Unit
Luminous Flux ^[2]	Φ _V ^[3]	1310	1370	-	lm
Correlated Color Temperature	ССТ	4700	5000	5300	К
CRI	R _a	80	82	-	-
Operating Voltage [5]	V _{opt}		120		Vrms ^[1]
Power Dissipation	P _D	16.5	17.0	17.5	W
Operating Frequency	Freq	50 / 60		Hz	
Power Factor	PF	Over 0.95		-	
View Angle	2O 1/2		120		deg.

1-1-3. Electro-Optical characteristics of SMJD-2V16W1P3-E rank

Parameter	Symbol		Unit		
Farameter	Symbol	Min	Тур	Max	Unit
Luminous Flux ^[2]	Φ _V ^[3]	1260	1320	-	lm
Correlated Color Temperature [4]	ССТ	3700	4000	4200	К
CRI	R _a	80	82	-	-
Operating Voltage ^[5]	V _{opt}		120		Vrms ^[1]
Power Dissipation	P _D	16.5	17.0	17.5	W
Operating Frequency	Freq		50 / 60		Hz
Power Factor	PF	Over 0.95		-	
View Angle	2 0 1/2		120		deg.

1-1-4. Electro-Optical characteristics of SMJD-2V16W1P3-G rank

Parameter	Symbol		Unit		
Faiameter	Symbol	Min	Тур	Max	Unit
Luminous Flux ^[2]	Φ _V ^[3]	1230	1290	-	lm
Correlated Color Temperature [4]	ССТ	2900	3000	3200	К
CRI	R _a	80	82	-	-
Operating Voltage [5]	V _{opt}		120		Vrms ^[1]
Power Dissipation	P _D	16.5	17.0	17.5	W
Operating Frequency	Freq	50 / 60		Hz	
Power Factor	PF	Over 0.95		-	
View Angle	2O 1/2		120		deg.

1-1-5. Electro-Optical characteristics of SMJD-2V16W1P3-H rank

Deremeter	Symbol		Unit		
Parameter	Symbol	Min	Тур	Max	Unit
Luminous Flux ^[2]	Φ _V ^[3]	1200	1260	-	lm
Correlated Color Temperature [4]	ССТ	2600	2700	2900	К
CRI	R _a	80	82	-	-
Operating Voltage ^[5]	V _{opt}		120		Vrms ^[1]
Power Dissipation	P _D	16.5	17.0	17.5	W
Operating Frequency	Freq	50 / 60		Hz	
Power Factor	PF	Over 0.95		-	
View Angle	2O 1/2		120		deg.

1-2. Absolute Maximum Ratings of 120V 17W Downlight

Parameter	Symbol	Value	Unit
Max. Voltage	V _{opt}	140	Vrms
Power Dissipation	P _d	23	W
Operating Temperature	T _{opr}	-30 ~ 85	٥C
Storage Temperature	T _{stg}	-40 ~ 100	٥C
ESD Sensitivity	-	±4,000V HBM	-

* Notes :

[1] At 120V RMS, Ta=25℃

[2] Acrich 2 series maintain the tolerance of $\pm 10\%$ on flux and power measurements.

- [3] $\Phi_{\rm V}$ is the total luminous flux output measured with an integrated sphere.
- [4] Correlated Color Temperature is derived from the CIE 1931 Chromaticity diagram.
- [5] Operating Voltage doesn't indicate the maximum voltage which customers use but means tolerable voltage according to each country's voltage variation rate. It is recommended that the solder pad temperature should be below 70°C.



2. Thermal Resistance of 120V 17W Down light

Part	Package Power Dissipation [W]	Maximum Junction Temp[℃]	Rθ _{j-s} [℃/W]
Acrich2 LED	SAW8KG0B Max 0.5	125	27
Acrich2 IC	Max 1.0	125	16.4

The Acrich2 LED has a thermal resistance of 27 $^{\circ}$ /W from junction of the LED to the LED lead. The maximum junction temperature of the Acrich2 LED package is 125 $^{\circ}$, therefore the maximum lead temperature T_{s max} is

 $\mathsf{T}_{s_max} = \mathsf{T}_{j_max} - (\mathsf{R}\theta_{j-s} * \mathsf{P}_{\mathsf{D}})$

= 125°C - (27°C/W * 0.5W) = 111.5°C

Although this is the maximum lead temperature, it is recommended to keep the lead temperature under 70 $^\circ C$

The Acrich2 IC has a 16.4degC/W thermal resistance from junction to the top surface.

The maximum junction temperature (T $_{t_max}$) of the IC is 125 $^\circ\!\!\!C$, therefore the maximum temperature of the top of the IC is

$$\mathsf{T}_{t_max} = \mathsf{T}_{j_max} - (\psi_{j-t} * \mathsf{P}_{\mathsf{D}})$$

= 125°C - (16.4°C/W * 1.0W) = 108.6°C





3. Color spectrum



Warm White Relative Spectral Distribution vs. Wavelength Characteristic

Neutral White Relative Spectral Distribution vs. Wavelength Characteristic





Cool White Relative Spectral Distribution vs. Wavelength Characteristic



4. Power characteristic



Relative Power Distribution vs. Voltage at Ta=25oC





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5. Radiation Pattern









0.3919

0.3944

0.4069

0.4483

0.4593

0.4666

6. Color & Binning

	0.4	4							
	0.43	3 -						7	
	0.42	2 -			G1	Но	H1		
	0.4 >	1 -		GO	\square	н2 Н	3		
	А́ Эр 0.4	0 -	/	G2	G3 H4	H5 /			
	0.3	9 -	G4	4 G5					
	0.3	8 -							
	0.3		I I	I		I	I		
		0.40 0.4	41 0.42	0.43	0.44 0.4	5 0.46	0.47	0.48 0.4	9
-					CIEx				
-	Bin code	Х	Y	Bin code	CIEx X	Y	Bin code	x	Y
	Bin code	X 0.4299	Y 0.4165	Bin code	CIEx X 0.4430	Y 0.4212	Bin code	X 0.4248	Y 0.4048
				-	X		-		
	G0	0.4299	0.4165	Bin code G1	X 0.4430	0.4212	Bin code G2	0.4248	0.4048
		0.4299 0.4248	0.4165 0.4048	-	X 0.4430 0.4374	0.4212 0.4093	-	0.4248 0.4198	0.4048 0.3931
_		0.4299 0.4248 0.4374	0.4165 0.4048 0.4093	-	X 0.4430 0.4374 0.4499	0.4212 0.4093 0.4138	-	0.4248 0.4198 0.4317	0.4048 0.3931 0.3973
_	G0	0.4299 0.4248 0.4374 0.4430	0.4165 0.4048 0.4093 0.4212	G1	X 0.4430 0.4374 0.4499 0.4562	0.4212 0.4093 0.4138 0.4260	G2	0.4248 0.4198 0.4317 0.4374	0.4048 0.3931 0.3973 0.4093
_		0.4299 0.4248 0.4374 0.4430 0.4374	0.4165 0.4048 0.4093 0.4212 0.4093	-	X 0.4430 0.4374 0.4499 0.4562 0.4198	0.4212 0.4093 0.4138 0.4260 0.3931	-	0.4248 0.4198 0.4317 0.4374 0.4317	0.4048 0.3931 0.3973 0.4093 0.3973
_	G0	0.4299 0.4248 0.4374 0.4430 0.4374 0.4317	0.4165 0.4048 0.4093 0.4212 0.4093 0.3973	G1	X 0.4430 0.4374 0.4499 0.4562 0.4198 0.4147	0.4212 0.4093 0.4138 0.4260 0.3931 0.3814	G2	0.4248 0.4198 0.4317 0.4374 0.4374 0.4317 0.4259	0.4048 0.3931 0.3973 0.4093 0.3973 0.3853
-	G0	0.4299 0.4248 0.4374 0.4430 0.4374 0.4317 0.4436	0.4165 0.4048 0.4093 0.4212 0.4093 0.3973 0.4015	G1	X 0.4430 0.4374 0.4499 0.4562 0.4198 0.4147 0.4259	0.4212 0.4093 0.4138 0.4260 0.3931 0.3814 0.3853	G2	0.4248 0.4198 0.4317 0.4374 0.4317 0.4259 0.4373	0.4048 0.3931 0.3973 0.4093 0.3973 0.3853 0.3893
_	G0 G3	0.4299 0.4248 0.4374 0.4430 0.4374 0.4317 0.4436 0.4499	0.4165 0.4048 0.4093 0.4212 0.4093 0.3973 0.4015 0.4138	G1 G4	X 0.4430 0.4374 0.4499 0.4562 0.4198 0.4147 0.4259 0.4317	0.4212 0.4093 0.4138 0.4260 0.3931 0.3814 0.3853 0.3973	G2 G5	0.4248 0.4198 0.4317 0.4374 0.4374 0.4317 0.4259 0.4373 0.4436	0.4048 0.3931 0.3973 0.4093 0.3973 0.3853 0.3893 0.4015
_	G0	0.4299 0.4248 0.4374 0.4430 0.4374 0.4317 0.4436 0.4499 0.4562	0.4165 0.4048 0.4093 0.4212 0.4093 0.3973 0.4015 0.4138 0.4260	G1	X 0.4430 0.4374 0.4499 0.4562 0.4198 0.4198 0.4147 0.4259 0.4317 0.4687	0.4212 0.4093 0.4138 0.4260 0.3931 0.3814 0.3853 0.3973 0.4289	G2	0.4248 0.4198 0.4317 0.4374 0.4317 0.4259 0.4373 0.4436 0.4499	0.4048 0.3931 0.3973 0.4093 0.3973 0.3853 0.3893 0.4015 0.4138
_	G0 G3	0.4299 0.4248 0.4374 0.4430 0.4374 0.4317 0.4436 0.4499 0.4562 0.4499	0.4165 0.4048 0.4093 0.4212 0.4093 0.3973 0.4015 0.4138 0.4260 0.4138	G1 G4	X 0.4430 0.4374 0.4499 0.4562 0.4198 0.4147 0.4259 0.4317 0.4687 0.4687	0.4212 0.4093 0.4138 0.4260 0.3931 0.3814 0.3853 0.3973 0.4289 0.4166	G2 G5	0.4248 0.4198 0.4317 0.4374 0.4374 0.4317 0.4259 0.4259 0.4373 0.4436 0.4499 0.4436	0.4048 0.3931 0.3973 0.4093 0.3973 0.3853 0.3893 0.4015 0.4138 0.4015
_	G0 G3	0.4299 0.4248 0.4374 0.4430 0.4374 0.4317 0.4436 0.4499 0.4562 0.4499 0.4620	0.4165 0.4048 0.4093 0.4212 0.4093 0.3973 0.4015 0.4138 0.4260 0.4138 0.4166	G1 G4	X 0.4430 0.4374 0.4499 0.4562 0.4198 0.4147 0.4259 0.4317 0.4687 0.4687 0.4620 0.4740	0.4212 0.4093 0.4138 0.4260 0.3931 0.3814 0.3853 0.3973 0.4289 0.4166 0.4194	G2 G5	0.4248 0.4198 0.4317 0.4374 0.4317 0.4259 0.4373 0.4436 0.4499 0.4436 0.44551	0.4048 0.3931 0.3973 0.4093 0.3973 0.3853 0.3893 0.4015 0.4138 0.4015 0.4042

0.4373

0.4483

0.4551

H4

0.3893

0.3919

0.4042

H5

6-1. Warm White binning structure (2,600K to 3,200K)

H3

0.4551

0.4666

0.4740

0.4042

0.4069

0.4194





6-2. Neutral White binning structure (3,700K to 4,200K)

Bin code	Х	Y	Bin code	Х	Y	Bin code	Х	Y
	0.3736	0.3874		0.3869	0.3958		0.3714	0.3775
50	0.3714	0.3775		0.3842	0.3855	E2 -	0.3692	0.3677
E0	0.3841	0.3855	E1	0.3970	0.3935		0.3813	0.3751
	0.3869	0.3958		0.4006	0.4044		0.3842	0.3855
	0.3842	0.3855		0.3692	0.3677		0.3813	0.3751
50	0.3813	0.3751		0.3670	0.3578	E5	0.3783	0.3646
E3	0.3934	0.3825	E4	0.3783	0.3646		0.3898	0.3716
	0.3970	0.3935		0.3813	0.3751		0.3934	0.3825





6-3. Cool White binning structure (4,700K to 6,000K)

Bin code	Х	Y	Bin code	Х	Y	Bin code	Х	Y
	0.3207	0.3462		0.3292	0.3539		0.3212	0.3389
DO	0.3212 0.3389	D1	0.3293	0.3461		0.3217	0.3316	
B0	0.3293	0.3461	B1	0.3373	0.3534	B2	0.3293	0.3384
	0.3292	0.3539		0.3376	0.3616		0.3293	0.3461
	0.3293	0.3461		0.3217	0.3316		0.3293	0.3384
БЭ	0.3293	0.3384	D4	0.3222	0.3243	DE	0.3294	0.3306
B3	0.3369	0.3451	B4	0.3294	0.3306	B5	0.3366	0.3369
	0.3373	0.3534		0.3293	0.3384		0.3369	0.3451
	0.3376	0.3616		0.3463	0.3687	C2	0.3373	0.3534
<u></u>	0.3373	0.3534		0.3456	0.3601		0.3369	0.3451
C0	0.3456	0.3601	C1	0.3539	0.3669		0.3448	0.3514
	0.3463	0.3687		0.3552	0.3760		0.3456	0.3601
	0.3456	0.3601		0.3369	0.3451		0.3448	0.3514
00	0.3448	0.3514		0.3366	0.3369		0.3440	0.3428
C3	0.3526	0.3578	C4	0.3440	0.3428	C5	0.3514	0.3487
	0.3539	0.3669		0.3448	0.3514		0.3526	0.3578





7. Marking



YYMMDD - Year / Month / date AABB - LED PKG Flux Rank / Color Bin Rank Acrich semiconductor eco lighting

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8. Outline dimensions – 120V 17W Downlight



* Notes :

- [1] All dimensions are in millimeters. (Tolerance : ± 0.2)
- [2] Scale : none
- [3] The appearance and specifications of the product may be changed for improvement without notice

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10. Packing



• 1Box : 20 PCS per tray x Max 10 layer = Max 200 PCS

about 6.5kg

Box size(L x W x H) = 590 x 330 x 260





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11. Cautions for use

- Please review the Acrich2 Module Application Note for porper protective circuitry usage
- Please note, Acrich products run off of high voltage, therefore caution should be taken when working near Acrich products.
- DO NOT touch any of the circuit board, components or terminals with body or metal while circuit is active.
- · Please do not add or change wires while Acrich circuit is active
- Long time exposure to sunlight or UV can cause the lens to discolor.
- Please do not use adhesives to attach the LED that outgas organic vapor.
- Please do not use together with the materials containing Sulfur.
- Please do not assemble in conditions of high moisture and/or oxidizing gas such as Cl, H2S,NH3,SO2,NOX,etc.
- Please do not make any modification on module.
- Please be cautious when soldering to board so as not to create a short between different trace patterns.

12. Handling of silicone resin for LEDs

- Acrich series is encapsulated with silicone resin for high optical efficiency.
- Please do not touch the silicone resin area with sharp objects such as pincette(tweezers).
- Finger prints on silicone resin area may affect the performance.
- Please store LEDs in covered containers to prevent dust accumulation as this may affect performance.
- Excessive force more than 3000gf to the silicone lens can result in fatal or permanent damage with LEDs.
- Please do not cover the silicone resin area with any other resins such as epoxy, urethane, etc.





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13. Handling with regards to static electricity

- The Acrich2 modules use an integrated circuit (IC) which can be damaged when exposed to static electricity. Please handle using equipment that prevents static electricity. Do not touch unless ESD protection is used.
- The Acrich2 modules should also not be installed in end equipment with out ESD protection.

14. Storage before use

• Do not impact or place pressure on this product because even a small amount of pressure can damage the product. The product should also not be placed in high temperatures, high humidity or direct sunlight since the device is sensitive to these conditions.

- (1) When storing devices for a long period of time before usage, please
 - following these guidelines:
- * The devices should be stored in the anti-static bag that it was shipped in
 - from Seoul-Semiconductor with opening.
- * If the anti-static bag has been opened, re-seal preventing air and moisture from being present in the bag.

15. Guidelines for properly working with Acrich modules.

- Discharge the lighting system a minimum of 2-3 times prior to working with the module.
- Use only properly rated test equipment and tools for the rated voltage and current of the product being tested.
- It is strongly suggested to wear rubber insulated gloves and rubber bottom shoes.
- Do not wear any conductive items (such as jewelry) which could accidentally contact electric circuits.
- · Perform several tests with power off and the lighting system unplugged.
- Faults, lightning, or switching transients can cause voltage surges in excess of the normal ratings.
- Internal component failure can cause excessive voltages.
- Stored or residual electricity in long wire could be hazardous.
- Make sure proper discharge prior to starting work.