High Power LED T-Series

9W White SPHWHTT3N9A0



Features

- Package : Ceramic package
- Dimension : 4.60 mm x 3.75 mm
- Chip Technology : Thin GaN
- ESD : 8 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM)
- Qualifications : AEC-Q102 Qualified with RV-level 1



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1. Characteristics

a) Typical Characteristics

Item	Symbol	Value	Unit.
Chromaticity Coordinate	Cx Cy	0.32 0.33	
Luminous Flux (I _F = 1,000 mA)	Φv	Тур. 1,170	lm
Forward Voltage (I _F = 1,000 mA)	VF	Тур. 9.45	V
Viewing Angle	Φ	Тур. 120	0
Reverse Current	۱ _R	Not designed for reverse operation	
Real Thermal Resistance	D	Тур. 1.6	KVV
(Junction to Board)	K th_J-B (Real)	Max. 2.6	rv vv
Electrical Thermal Resistance	D	Тур. 1.1	
(Junction to Board)	Rth_J-B (Elec.)	Max. 1.7	rv vv
Radian Surface	А	3.33	mm²
Radian Surface	Α	3.33	mm²

Note:

[1] The measurement condition means that temperature dependence is excluded by applying pulse current for typically 25ms.

b) Absolute Maximum Rating

ltem	Symbol	Rating	Unit
Ambient / Operating Temperature	Ta	-40 ~ +135	٥C
Storage Temperature	T _{stg}	-40 ~ +135	٥C
LED Junction Temperature	Tj	150	٥C
Maximum Forward current ^[2] (T _b : 25°C) ^[3]	lF	1,500	mA
Minimum Forward current ^[2] (T _b : 25°C) ^[3]	I _F	50	mA
Maximum Reverse current		Do not apply for reverse current	
ESD Sensitivity ^[4]	-	±8 HBM	kV

Note:

[2] Driving the product at forward current (IF) below Min. IF or above Max. IF may result in unpredictable behavior of the product.

[3] The measurement condition means that temperature dependence is excluded by applying pulse current for typically 25ms.

[4] It is included the device to protect the product from ESD.

2. Product Code Information

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
S	Р	Н	W	Н	т	т	3	N	9	Α	0	Α	В	С	D	E	F
Di	git								PKG Info	ormatior	ı						
1 2	2	Comp	Company name and Samsung LED PKG (SP for Samsung PKG)														
3		Power	variant	t (H for a	automol	ive high	n power)									
4 క	5	Color	variant	(WH for	automo	otive WI	nite colo	or)									
6		LED F	YKG ver	sion (T	for initia	I versio	n)										
78	8	Produ	ct confi	guration	and typ	be (T3 f	or 3chip	PKG ty	/pe)								
9		Lens o	configur	ation (N	l for no	lens)											
10		Туріса	al powe	r (Intern	al code))											
11 1	2	Specif	Specific property (A0 for T Series)														
13 1	14	Forwa	Forward voltage property														
15 1	16	CIE coordination property															
17 1	18	Lumin	ous flux	(proper	ty												

a) Voltage Bins $^{[5]}$ (IF= 1,000 mA, T_b= 25 °C)

Sumbol	Pin Codo	Voltage Range (lm)		
Symbol	Bin Code	Min	Max	
VF	CE	8.15	10.40	

b) Luminous Flux Bins $^{[5]}(I_{F}= 1,000 \text{ mA}, T_{b}= 25 \text{ °C})$

Symbol	Pin Codo	Flux Range (lm)		
Symbol	BinCode	Min	Max	
	7J	1082	1188	
Φv	8J	1135	1247	
	1K	1188	1306	

c) Color Bins ^[6] (I_F= 1,000 mA)

Symbol	Color Bin Code	Сх				(Су		
	S2	0.3190	0.3203	0.3299	0.3298	0.3430	0.3274	0.3361	0.3526
Cx, Cy	T2	0.3163	0.3145	0.3246	0.3253	0.3181	0.3330	0.3424	0.3266
	U2	0.3127	0.3104	0.3199	0.3212	0.3093	0.3234	0.3325	0.3175

Note:

[6] Chromaticity coordinates: Cx, Cy according to CIE 1931. Cx and Cy tolerances are ±0.005, respectively.

Color Bin Definition



d) Luminous Flux Bins according to Color Bin (I_F = 1,000 mA, T_b = 25 °C)

		7	J.	8	31	ıK	
Symbol	Flux Bin Code	Min	Max	Min	Max	Min	Max
		1082	1188	1135	1247	1188	1306
	S2	0		Ο		0	
Φ _V	T2	0		О		Ο	
	U2	0		0			

3. Typical Characteristics Graphs



a) Spectrum Distribution (I_F = 1,000 mA, T_b = 25 °C)^[7]

b) Typical Chromaticity Coordinate Shift vs Radiation Angle (I_F = 1,000 mA, T_b = 25 °C)^[7]



Note:

[7] The measurement condition means that temperature dependence is excluded by applying pulse current for typically 25ms.

c) Forward Current Characteristics (T_b= 25 $^{o}\text{C})^{[8]}$



Note:

[8] The measurement condition means that temperature dependence is excluded by applying pulse current for typically 25ms.

d) Temperature Characteristics (I_F= 1,000 mA)



e) Derating Curve ^[9]



Note:

[9] The measurement condition means that temperature dependence is excluded by applying pulse current for typically 25ms.

f) Permissible Pulse Handling Capability ($I_F = f(t_p)$; D: Duty cycle)



g) Beam Angle Characteristics (I_F= 1,000 mA, T_b= 25 °C)



4. Soldering Temperature Location



T_j : Temperature of Junction

T_b: Temperature of Board

 $\mathsf{Rth}_{j\text{-}\mathsf{b}}$: Thermal Resistance from Junction to Board

5. Mechanical Dimension



Note:

The dimensions in parentheses are for reference purposes. Unit: mm, Approximate Weight : 38mg There may be occasional probing marks on the Submount, but no problem with wedge bonding.

a) Pick and Place

Do not place pressure on the resin molded part

It is recommended to use a pick & place nozzle AM03-024820A(Hanhwa Techwin), etc.

b) Electric Schematic Diagram



c) Material Information

Description	Material	
Substrate	AIN Substrate	
LED Die	Thin GaN	
Phosphor	Phosphor In Glass	
Zener Diode	Silicon	
Wire	Au	
Resin Mold	Silicone	
Sub Mount	Silicon	

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6. Tape & Reel

a) Taping Dimension



Note:

Unit: mm, LED taping quantity: 1,000EA / Reel

b) Reel Dimension



Notes:

Unit: mm, Tolerance: ±0.2mm

7. Label Structure

a) Label Structure



Note: Denoted bin code and product code above is only an example (see description on page 5)

Bin Code:

- (a)(b): Forward Voltage (V_F) Bin (refer to page 5)
- cd: Chromaticity (Cx, Cy) Bin (refer to page 5)
- ef: Luminous Flux(Iv) Bin (refer to page 5)

b) Lot Number

The lot number is composed of the following characters:



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123323456789/Iabc / 1,000 pcs

12	Production site (S: SAMSUNG LED, L : Kiheung , Korea)
3	Product state (A: Normal, B: Bulk, C: First Production, R: Reproduction, S: Sample)
4	Year (F: 2021, G: 2022, H: 2023)
5	Month (1~9, A, B, C)
6	Day (1~9, A, B~V)
789	Serial number (001 ~ 999)
abc	Product serial number (001 ~ 999)

8. Packing Structure

a) Packing Process



Dimension of Transportation Box in mm

Width	Length	Height
220	245	182

9. Precautions in Handling & Use

- 1) For over-current protection, we recommend the use of resistors to prevent sudden current surges caused by slight shifts in voltage
- 2) LEDs should not be contacted to any type of fluid (i.e. water, oil, organic solvent, etc.). If cleaning is required, only use isopropyl alcohol.
- 3) The maximum ambient temperature must be considered in order for the maximum temperature ratings not to be exceeded.
- 4) LEDs must be stored in a clean environment. If the LEDs are to be stored for 3 months or more after being shipped from Samsung Electronics, they should be packed by a sealed container with nitrogen gas injected. (Shelf life of sealed bags: 12 months, temp. ~40℃, ~90% RH)
- 5) After storage bag is open, LED subjected to soldering, solder reflow, or other high temperature processes must be:
 - a) Mounted within 672 hours (28 days) at an assembly line with a condition of no more than 30°C / 60% RH.
 - b) Stored at <10% RH.
- Repack unused products using anti-moisture packing, fold to close any openings and store in a dry place with <10% RH.
- 7) LEDs require baking before mounting, if humidity card reading is >60% at 23±5℃.
- 8) If baking is required, LEDs must be baked for 1 day at $60\pm5^{\circ}$ C.
- 9) LEDs are sensitive to electrostatic discharge and surges. Applying any voltage exceeding the absolute maximum rating of the LED can cause permanent damage to the device. Damaged LEDs may have some unusual characteristics such as increased leakage current, lower turn-on voltage or may light abnormally at low current. When handling LEDs, using grounding wrist-bands or anti-static gloves is recommended.
- 10) VOCs (volatile organic compounds) present in adhesives, flux, hardeners or organic additives, etc. that are used in luminaires may lead to discoloration of the LED when exposed to heat or light. Note that VOCs can permeate silicone bags. This phenomenon can significantly affect light output from the luminaire. To avoid this issue, please carefully evaluate materials used in your process and/or luminaire to be free of VOCs.

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