

Advanced Power Top View LEDs EHP-A09K-YFTC-2J000BBDAE1K-1T8-AM



Features

- P-LCC-6 package
- Small package with high efficiency
- Colorless clear resin
- Wide viewing angle 120°
- Moisture Sensitivity Level: 2 (according to JEDEC J-STD 020D)
- Qualification according to AEC-Q101 rev. C
- IR reflow or wave soldering

Applications

- Interior and exterior automotive lighting (e.g. turn light, indicating sign, etc.)
- Warning signs applied
- Signal and symbol luminaries
- Portable light source
- Marker lights (e.g. steps, exit ways, etc.)
- Display for indoor and outdoor application
- Substitution of traditional light for automotive use
- General applications

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Product Nomenclature

EHP-A09K	-	R7T	C	-	A4000	DAEA	BA	K	-	1	T	8	-	AM
1		2	3		4	5	6	7		8	9	10		11

The product name is designated as below:

1.	Product type
2.	Chip code
3.	Resin color
4.	Wavelength or CIE coordinates
5.	Code of luminous intensity
6.	Forward voltage specification
7.	Operation current
8.	Packing quantities
9.	Packing method
10.	Forming types
11.	Automotive specified

PN of the A09K Series: Color LEDs

The below table lists the binning options for the Everlight A09K series Color LED. Standard Everlight color bins are listed according to wavelength and represent the standard primary colors of the spectrum.

Color, A09K series LEDs at 150mA are listed below.

Group	Type	Luminous Intensity (mcd)	Wavelength (nm)	Forward Voltage (V)
Red	EHP-A09K-S7TC-9Q000CADBE1K-1T8-AM	2800-7100	617-626	1.7-3.2
Yellow	EHP-A09K-YFTC-2J000BBDAE1K-1T8-AM	2240-5600	585-594	1.7-3.2
Green	EHP-A09K-G8TC-X0000DAEAD9K-1T8-AM	4500-9000	515-530	2.75-4.25
Blue	EHP-A09K-BRTC-7J000V2BBD9K-1T8-AM	900-2800	448-457	2.75-4.25
	EHP-A09K-BRTC-8J000V2BBD9K-1T8-AM	900-2800	451-460	2.75-4.25
	EHP-A09K-BRTC-9J000V2BBD9K-1T8-AM	900-2800	454-464	2.75-4.25
	EHP-A09K-BRTC-6H000V2BBD9K-1T8-AM	900-2800	457-467	2.75-4.25

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Rating	Unit
Forward Current	I_F	150	mA
Peak Forward Current (Duty 1/10 @1KHz)	I_{FP}	250	mA
Power Dissipation	P_d	400	mW
Junction Temperature	T_j	150	°C
Operating Temperature	T_{opr}	-40 ~ +100	°C
Storage Temperature	T_{stg}	-40 ~ +110	°C
Thermal Resistance (AlGaInP)	$R_{th\ J-A}$	110	K/W
	$R_{th\ J-S}$	60	K/W
Thermal Resistance (InGaN)	$R_{th\ J-A}$	90	K/W
	$R_{th\ J-S}$	40	K/W
ESD (Classification acc. AEC Q101)	ESD_{HBM}	2000	V
	ESD_{MM}	200	V
Soldering Temperature	T_{sol}	Reflow Soldering : 260 °C for 30 sec. Hand Soldering : 350 °C for 3 sec.	

Electro-Optical Characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Peak Wavelength	R	---	---	630	---	nm
	Y			598		
	G			522		
	B			460		
Dominant Wavelength	R	---	---	617	---	nm
	Y			585		
	G			515		
	B			448		
Spectrum Radiation Bandwidth	R	---	---	18	---	nm
	Y			16		
	G			30		
	B			20		
Viewing Angle	$2\theta_{1/2}$	----	120	----	deg	I _F =150mA
Forward Voltage(AlGaInP)	V _F	1.70	----	3.20	V	I _F =150mA
Forward Voltage(InGaN)	V _F	2.75	----	4.25	V	I _F =150mA
Temperature coefficient of λ_p	TC _{λ_p}	----	0.12	----	nm/K	I _F =150mA
Temperature coefficient of λ_d	TC _{λ_d}	----	0.05	----	nm/K	I _F =150mA
Temperature coefficient of V _F (AlGaInP)	TC _V	----	-2.3	----	mV/K	I _F =150mA
Temperature coefficient of V _F (InGaN)	TC _V	----	-3.1	----	mV/K	I _F =150mA

Note:

1. Tolerance of Luminous Intensity: ±10%
2. Tolerance of Dominant Wavelength: ±1nm
3. Tolerance of Forward Voltage: ±0.1V

Color Bins

Group	Bin	Minimum Dominant Wavelength (nm)	Maximum Dominant Wavelength (nm)	Condition
Red	1	617	620	$I_F = 150\text{mA}$
	2	620	623	
	3	623	626	
Yellow	1	585	588	
	2	588	591	
	3	591	594	
Green	1	515	520	
	2	520	525	
	3	525	530	
Blue	1	448	451	
	2	451	454	
	3	454	457	
	4	457	460	
	5	460	464	
	6	464	467	

Note:

1. The standard shipping format for serial types includes a family bin of 3 individual wavelength bins. Individual wavelength bins cannot be ordered.
2. Only one bin will be shipped on each reel (there will be no mixing of two bins on each reel).

Bin Range of Forward Voltage

Group	Min.	Max.	Unit	Condition
1	1.70	1.85		
2	1.85	2.00		
3	2.00	2.15		
4	2.15	2.30		
5	2.30	2.45		
6	2.45	2.60		
7	2.60	2.75		
8	2.75	2.90		
9	2.90	3.05	V	$I_F = 150\text{mA}$
10	3.05	3.20		
11	3.20	3.35		
12	3.35	3.50		
13	3.50	3.65		
14	3.65	3.80		
15	3.80	3.95		
16	3.95	4.10		
17	4.10	4.25		

Note:

1. Forward Voltage Bins for Standard (AlGaInP $V_F = 1.7\sim 3.2\text{V}$, InGaN $V_F = 2.75\sim 4.25\text{V}$)

Bin Range of Luminous Intensity

Color	Min.	Max.	Unit	Luminous Flux (Φ_v)	Unit	Condition	Min.	Max.	Unit	Condition
R	2800	7100	mcd	12500(typ.)	mlm	$I_F = 150\text{mA}$	140	450	mcd	$I_F = 10\text{mA}$
Y	2240	5600		11200(typ.)			140	355		
G	4500	9000		19900(typ.)			450	1120		
B	900	2800		4600(typ.)			71	280		

Bin Code of Luminous Intensity

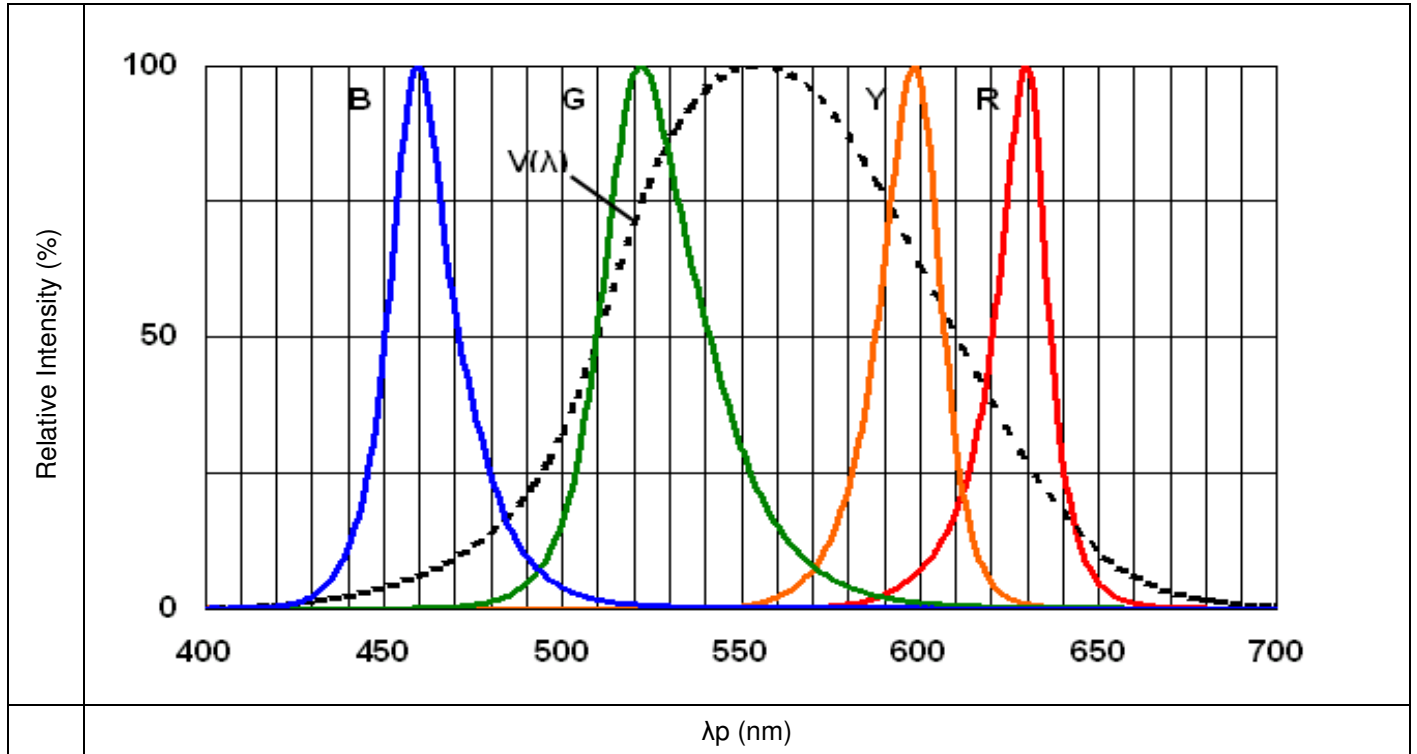
Group	Min.	Max.	Unit	Condition
V2	900	1120	mcd	$I_F = 150\text{mA}$
AA	1120	1400		
AB	1400	1800		
BA	1800	2240		
BB	2240	2800		
CA	2800	3550		
CB	3550	4500		
DA	4500	5600		
DB	5600	7100		
EA	7100	9000		

Note:

Luminous Intensity Bins for Standard (Yellow $I_v = 2240 \sim 5600\text{mcd}$, Red $I_v = 2800 \sim 7100\text{mcd}$, Blue $I_v = 900 \sim 2800$, Green $I_v = 4500 \sim 9000$)

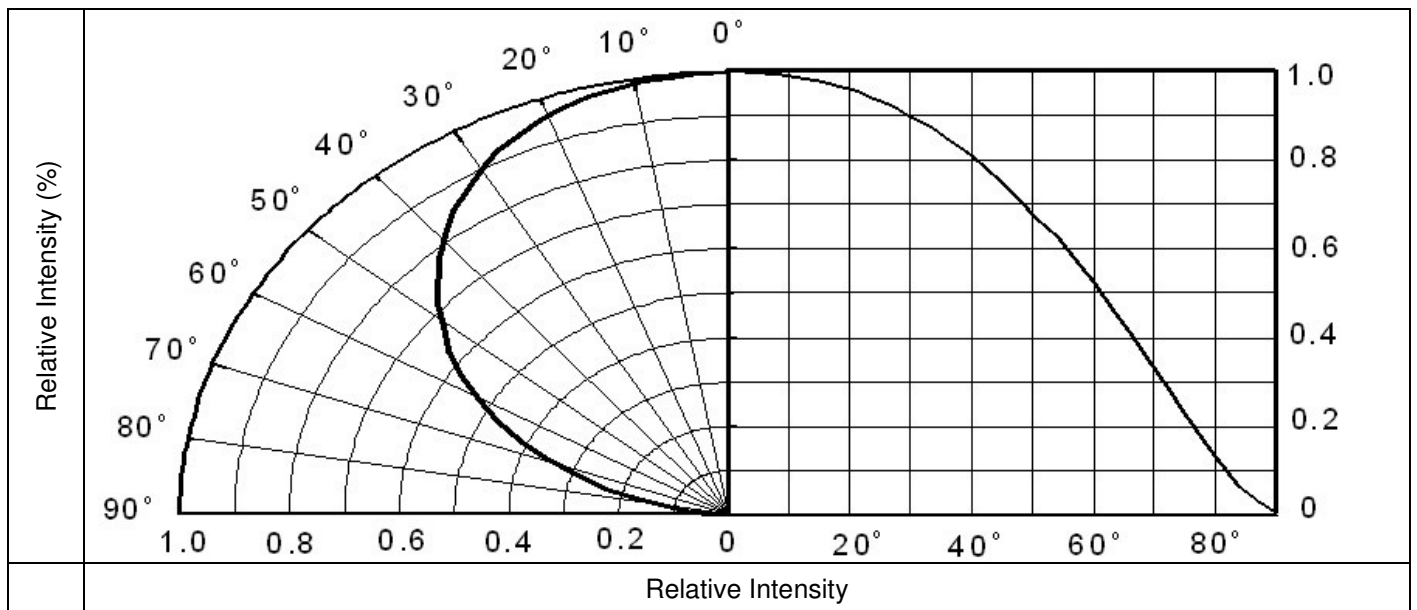
Typical Electro-Optical Characteristics Curves

Typical Curve of Spectral Distribution

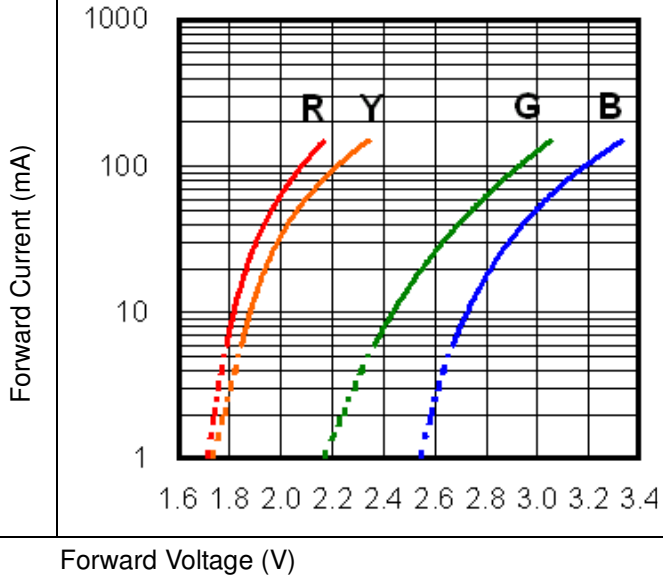


Note: $V(\lambda)$ =Standard eye response curve; $I_f = 150\text{mA}$

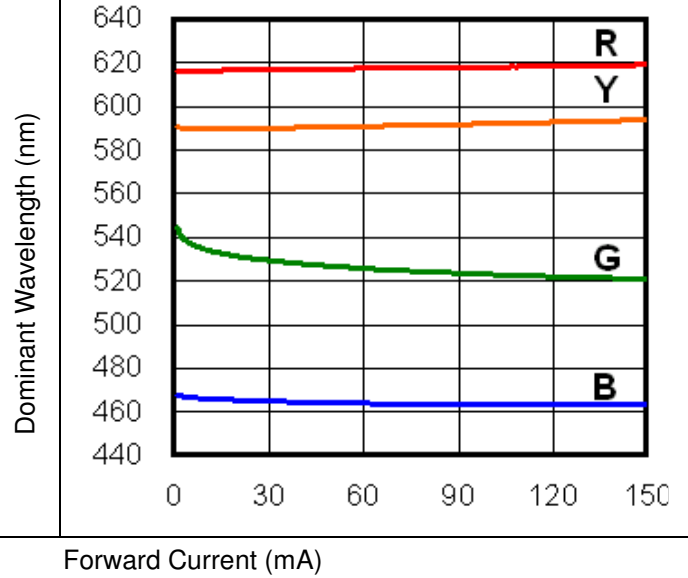
Diagram Characteristics of Radiation



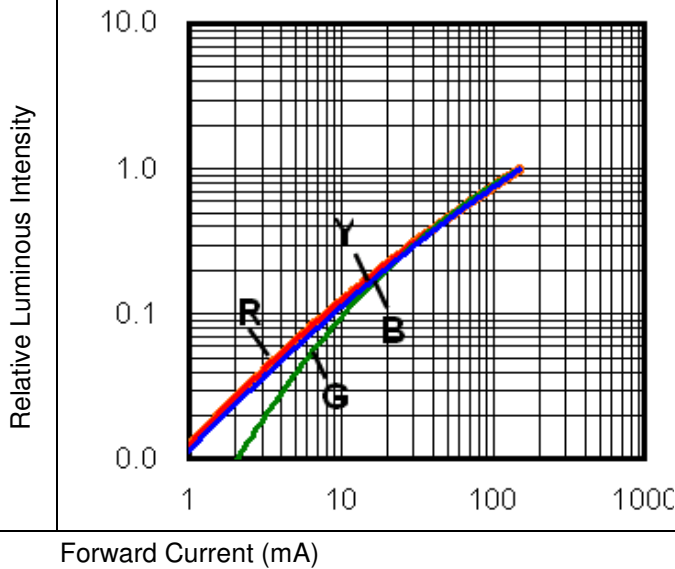
Forward Current vs. Forward Voltage
($T_a=25^\circ\text{C}$)



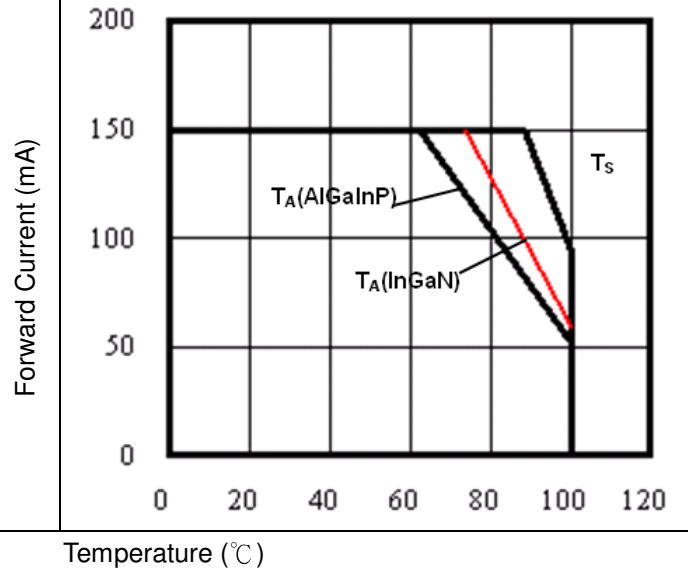
Dominant Wavelength vs. Forward Current
($T_a=25^\circ\text{C}$)

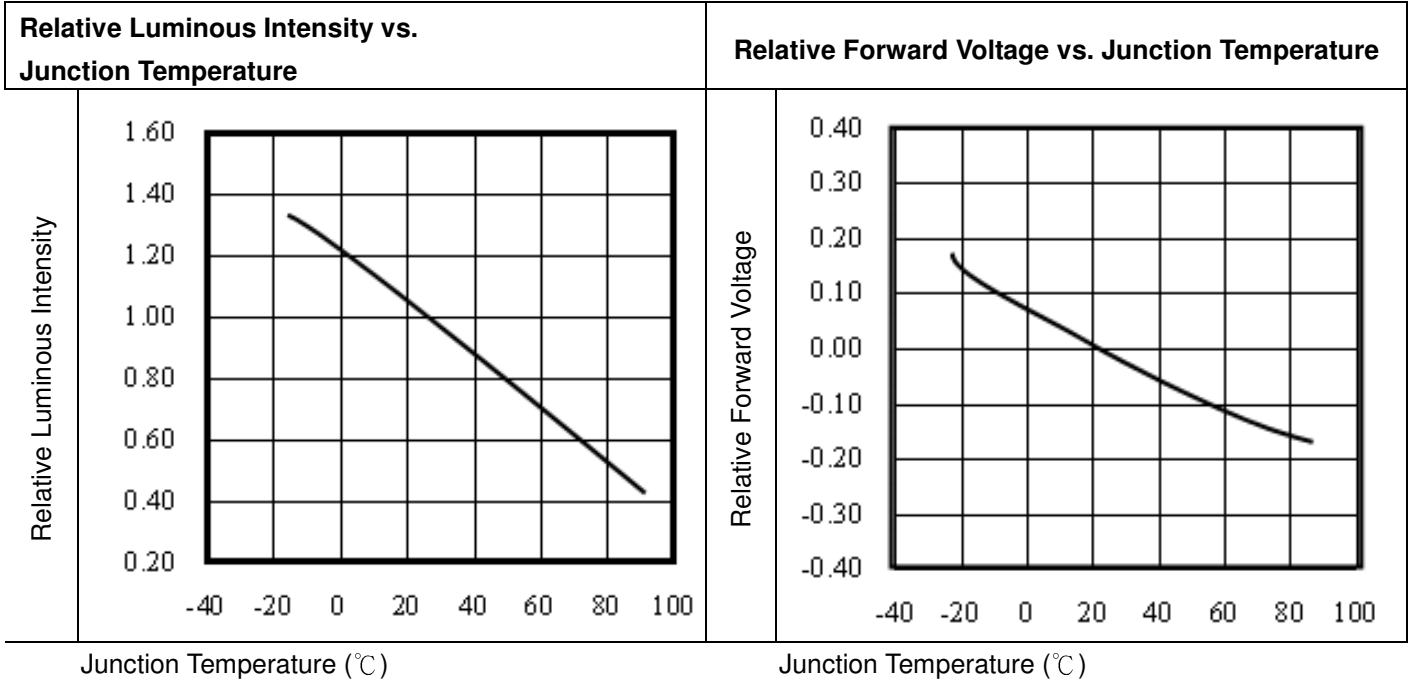


Relative Luminous Intensity vs. Forward Current
($T_a=25^\circ\text{C}$)



Max. Permissible Forwarded Current
($T_a=25^\circ\text{C}$)





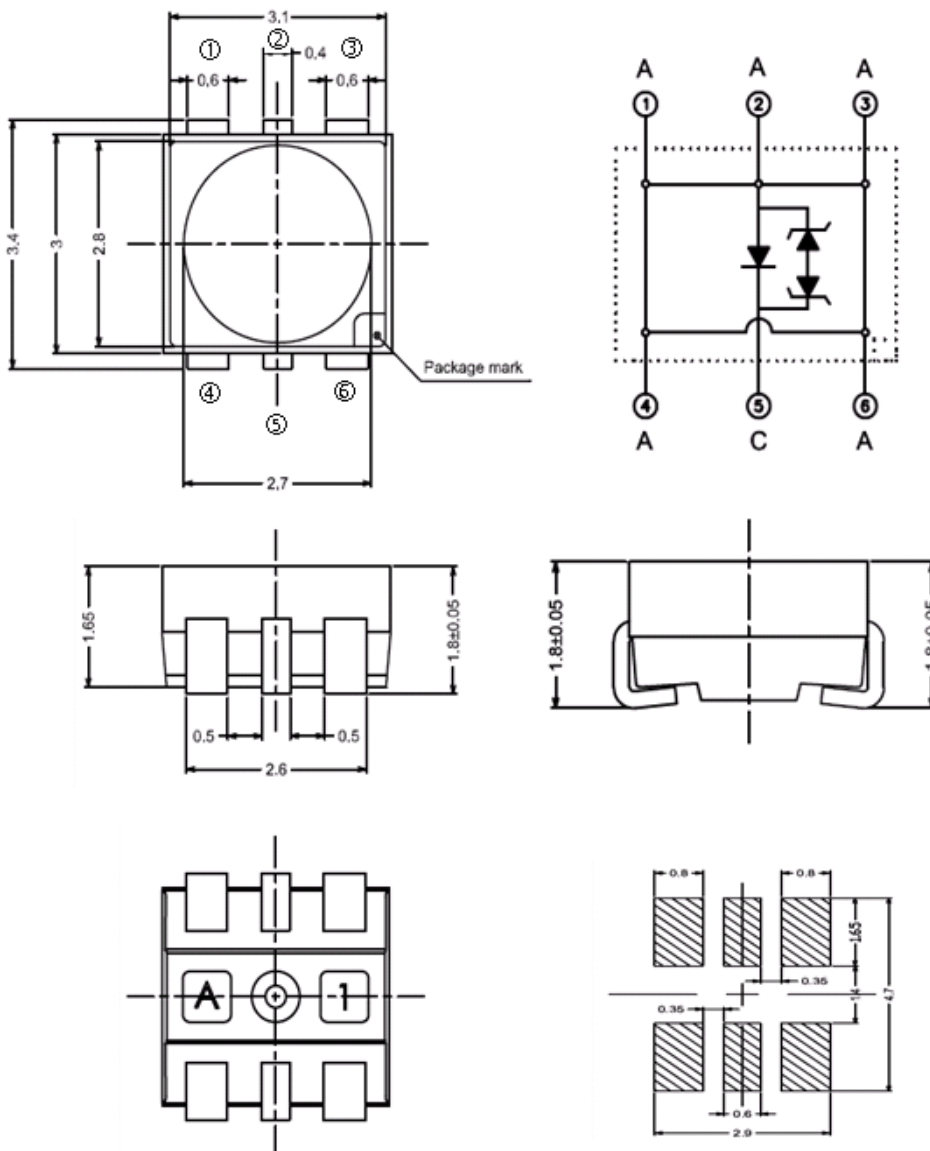
Note: $f(T_j) = I_v / I_v(25^\circ\text{C})$; $I_F = 150\text{mA}$

Note: $\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j)$; $I_F = 150\text{mA}$

Exemplary median Lifetime for median Brightness Group

Condition	Lifetime	Unit
$I_F=150\text{mA}$ $T_A=25^\circ\text{C}$	40000	Operating hours
$I_F=80\text{mA}$ $T_A=100^\circ\text{C}$	90000	Operating hours

Package Dimension



Note: Tolerances unless mentioned ±0.1mm. Unit = mm

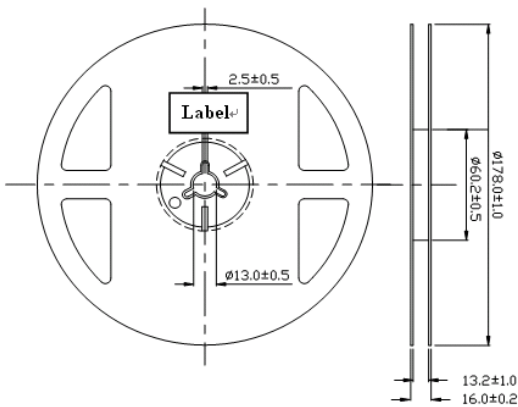
Moisture Resistant Packing Materials

Label Explanation

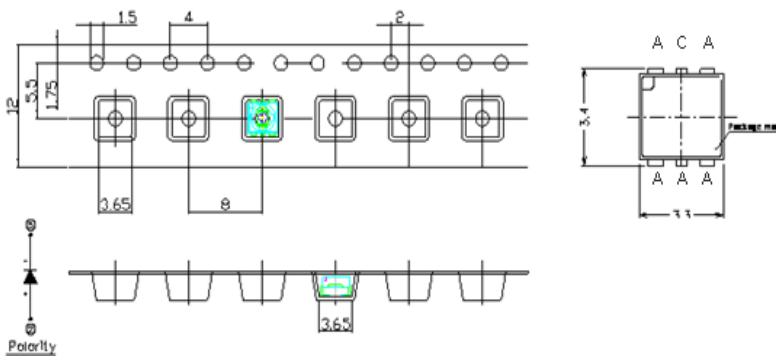


- CPN: Customer's Product Number
- P/N: Product Number
- QTY: Packing Quantity
- CAT: Luminous Intensity Rank
- HUE: Dom. Wavelength Rank
- REF: Forward Voltage Rank
- LOT No: Lot Number

Reel Dimensions

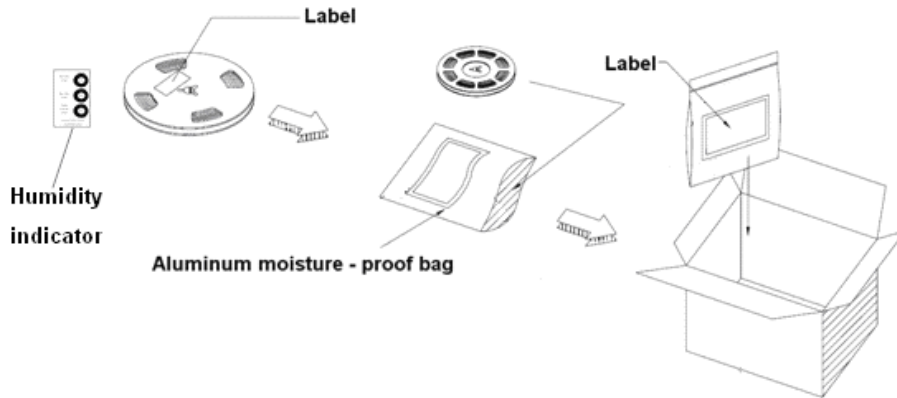


Carrier Tape Dimensions: Loaded Quantity 1000 pcs Per Reel



Note: Tolerances unless mentioned ± 0.1 mm. Unit = mm

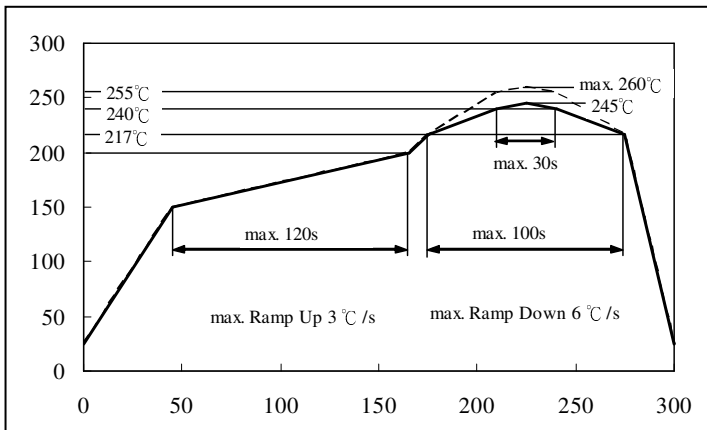
Moisture Resistant Packing Process



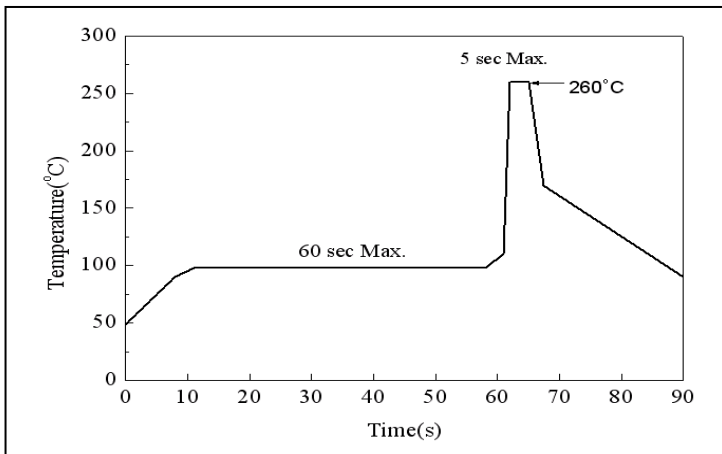
Note: Tolerances unless mentioned $\pm 0.1\text{mm}$. Unit = mm

Precautions for Use

**1. Soldering Condition (Reference: IPC/JEDEC J-STD-020D)
IR Reflow**



2. Wave Soldering Reflow



2. Current Limiting

Though A09K has conducted ESD protection mechanism, customers must not use the device in reverse and should apply resistors for extra protection. Otherwise, slight voltage difference may cause enormous current shift and burn out failure would happen.

3. Storage

3.1 Moisture proof bag should only be opened immediately prior to usage.

3.2 Environment should be less than 30 °C and 60 % RH when moisture proof bag is opened.

3.3 If the moisture sensitivity card indicates higher than acceptable moisture, the component should be baked at min. 60 deg +/-5 deg for 24 hours.

4. Thermal Management

4.1 For maintaining the high flux output and achieving reliability, A09K series LEDs should be mounted on a metal core printed circuit board (MCPCB) or other kinds of heat sink with proper thermal connection to dissipate approximate 0.5 W of thermal energy at 150 mA operation.

4.2 Sufficient thermal management must be implemented. Otherwise, the junction temperature of dies might be over the limit at high current driving condition and LEDs' lifetime might be decreases dramatically.

5. Iron Soldering

Hand soldering is not recommended for regular production. These guidelines are for rework only. Soldering iron tip should contact each terminal no more than 3 sec at 350 °C, using soldering iron with nominal power less than 25 W. Allow min. 2 sec. between soldering intervals.

6. Usage

Do not exceed the values given in this specification.

Application Restrictions

High reliability applications such as military/aerospace, automotive safety/security systems, and medical equipment may require different product. If you have any concerns, please contact Everlight before using this product in your application. This specification guarantees the quality and performance of the product as an individual component. Do not use this product beyond the specification described in this document.