

Data Sheet

Dynasty® Z Integrated Power LEDs

3400x-A, 3400x-B Series, White



Description:

Dynasty® Z Integrated Power LED is a revolutionary high flux LED product that applies a completely new concept of packaging. It uses a 3 dimensional (3D) lead frame which can achieve a Butterfly-Beam™ pattern (see figure 6) with a 360°horizontal and 275°vertical viewing angle.

Dynasty® Z Integrated Power LED features the optimum heat management of multiple LED chips in one package with the highest emitting efficiency. No additional heat sink is required for standard operation.

The packaging of Dynasty® Z Integrated Power LED is environmentally sealed, similar to regular oval and round LED lamps and is highly resistant to moisture.

Dynasty™ Integrated Power LED is available in twist in through-hole type (Dynasty® Z) and surface mount type is coming soon.

Features:

- High lumen output
- Wide view angle with 360°horizontal and 275° vertical
- Unique Butterfly-Beam™
- Long lifetime
- Color Temperature available in 2700, 3500, 5000 Kelvin.
- Twist in through-hole package
- No additional heat sink required
- RoHS compliant
- Superior performance in outdoor environment
- Copper lead frame for best heat dissipation

Applications:

- Task lighting
- Ambient lighting
- Automotive lighting
- General lighting
- Backlighting
- Portable lighting
- Signaling
- Displays

This product is covered by US patent 6,465,961, 6,746,885 and other pending patents.

Device Selection Guide

Part Number	Typical Color Temperature CCT ^[1] (K)	Luminous Flux Φ_V ^[2] (lm)		Forward Voltage V_F ^[3] (V)			Viewing Angle $\theta_{0.10V}$ ^[4]	Thread Polarity
		Min.	Typ.	Min.	Typ.	Max.		
34001-A	2700	40	70	2.8	3.4	3.8	275°/360°	Cathode
34002-A	3500	40	70	2.8	3.4	3.8	275°/360°	Cathode
34003-A	5000	40	70	2.8	3.4	3.8	275°/360°	Cathode
34001-B	2700	50	85	2.8	3.1	3.6	275°/360°	Cathode
34002-B	3500	50	85	2.8	3.1	3.6	275°/360°	Cathode
34003-B	5000	50	85	2.8	3.1	3.6	275°/360°	Cathode

Notes:

- The color temperature CCT is derived from the CIE 1931 Chromaticity Diagram and represents the perceived color of the device.
- Luminous flux Φ_V is measured with an integrating sphere after the device is stabilized.
- CAO Group, Inc. maintains a tolerance of ± 0.1 V on forward voltage measurements.
- $\theta_{0.10V}$ is the included angle at which luminous intensity is 10% of the maximum.

Absolute Maximum Rating at $T_A = 25^\circ\text{C}$

Parameters	3400x-A	3400x-B
DC Forward Current ^[1]	320 mA	480 mA
Peak Pulse Forward Current ^[2]	1.2A	1.6A
Power Dissipation	1.2 W	1.7 W
Reverse Breakdown Voltage ^[3]	5 V	5 V
Operating Temperature Range	-30°C to +80°C	-40°C to +100°C
ESD Sensitivity (HBM)	1000 V	1000 V
LED Junction Temperature	125°C	120°C
Storage Temperature Range	-30°C to +80°C	-40°C to +100°C
Lead Soldering Temperature ^[4]	260°C for 5 Seconds	260°C for 5 Seconds

Notes:

- Proper current derating must be observed to maintain junction temperature below the maximum.
- Pulse forward current condition: 1/10 duty cycle, 0.1ms pulse width.
- Reverse breakdown voltage is the voltage at the pins when reverse current $I_R=32\mu\text{A}$
- Soldering temperature measured at leads.

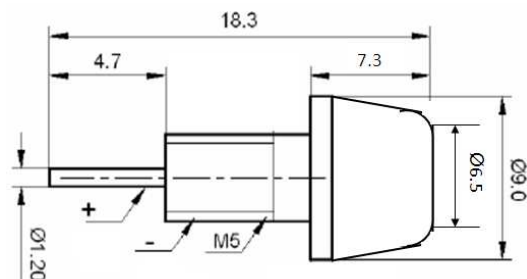
Electrical Characteristics at 320mA, Ambient Temperature $T_A=25^\circ\text{C}$

Part Number	White Color	Forward Voltage V_F ^[1] (V)			Dynamic Resistance ^[2] R_D (Ω)	Thermal Resistance Junction to Case $R_{\theta_{JC}}$ ($^\circ\text{C}/\text{W}$)
		Min.	Typ.	Max.		
3400x-A	All White Colors	2.8	3.4	3.8	10.0	15.0
3400x-B	All White Colors	2.8	3.1	3.6	10.0	15.0

Notes:

- CAO Group, Inc. maintains a tolerance of ± 0.1 V on forward voltage measurements.
- Dynamic resistance is the inverse of the slope in linear forward voltage model for LEDs (See Figures 2). $25^\circ\text{C} \leq T_J \leq 110^\circ\text{C}$ at $I_F = 350\text{mA}$, where T_J is the junction temperature of LEDs

Mechanical Dimensions



Notes:

1. All dimensions are in millimeters.
2. The tolerance is ± 0.1 mm.
3. + and - denote the polarity of the lead and thread.

Color Measurements

Typical Color Temperature CCT (K)	Color Name	CIE 1931 Chromaticity Coordinates							
		a		b		c		d	
		x	y	x	y	x	y	x	y
2700	Incandescent White	0.4813	0.4319	0.4562	0.4260	0.4373	0.3893	0.4593	0.3944
3500	White	0.4299	0.4165	0.3996	0.4015	0.3889	0.3690	0.4147	0.3814
5000	Sun White	0.3551	0.3760	0.3376	0.3616	0.3366	0.3369	0.3515	0.3487

Note: 1. Tolerance for color coordinates measurement is ± 0.01 .

Reliability

Test Item	Reference	Test Condition	Sample Size	Failure Rate [1]
Operation Life	MIL-STD-750:1026 MIL-STD-883:1005 JIS C 7021: B-1	Connect With a power $I = 320$ mA $T_a = 25$ °C Test Time = 1,000 hrs	50	0
High Temperature High Humidity Storage	MIL-STD-202:103B JIS C 7021: B-11	$T_a = 60^\circ\text{C} \pm 5^\circ\text{C}$ RH = 90% - 95% Test time = 500 hrs	50	0
High Temperature Storage	MIL-STD-883:1008 JIS C 7021: B-10	High $T_a = 100^\circ\text{C} \pm 5^\circ\text{C}$ Test time = 1,000 hrs	50	0
Low Temperature Storage	JIS C 7021 B-12	Low $T_a = -40^\circ\text{C} \pm 5^\circ\text{C}$ Test time = 1,000 hrs	50	0
Temperature Cycling	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1010 JIS C 7021: A-4	$-40^\circ\text{C} - 25^\circ\text{C} - 100^\circ\text{C} - 25^\circ\text{C}$ 30 min - 5 min - 30 min - 5 min Test time = 100 cycles	50	0
Thermal Shock	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1011	$100^\circ\text{C} \pm 5^\circ\text{C}$ to $-40^\circ\text{C} \pm 5^\circ\text{C}$ 10 min - 10 min Test time = 100 cycles	50	0
Solder Resistance	MIL-STD-202:201A MIL-STD-750:2031 JIS C 7021:A-1	$T_{\text{slid}} = 260 \pm 5^\circ\text{C}$ Dwell time = 10 ± 1 sec	22	0
Solderability	MIL-STD-202:208D MIL-STD-750:2026 MIL-STD-883:2003 JIS C 7021: A-2	$T_{\text{slid}} = 230 \pm 5^\circ\text{C}$ Dwell time = 5 ± 1 sec	22	0
Lead Bending Stress	MIL-STD-750:2036 JIS C 7021 :A-11	$0^\circ - 90^\circ - 0^\circ$ bend, 3 cycles Weight 250g	22	0

Notes:

1. The criteria of failure is tested Forward Voltage $V_f \geq 1.1 \times \text{Initial Level}$ or Luminous Flux $\Phi_v \leq 0.7 \times \text{Initial Level}$ at the test condition of $I_f = 320$ mA.
2. If Dynasty™ X LED contains air bubbles, the bubbles and their location may affect the result of thermal shock test. According to the experimental results by CAO Group, when the emitter has no more than 2 bubbles with diameter less than 1 mm (for bubbles located at functional areas such as die bonding and wire bonding area) or 1.25mm (for bubbles located at non-functional area), the bubbles have little effect on thermal shock test.

Typical Electrical / Optical Characteristic Curves TA = 25°C

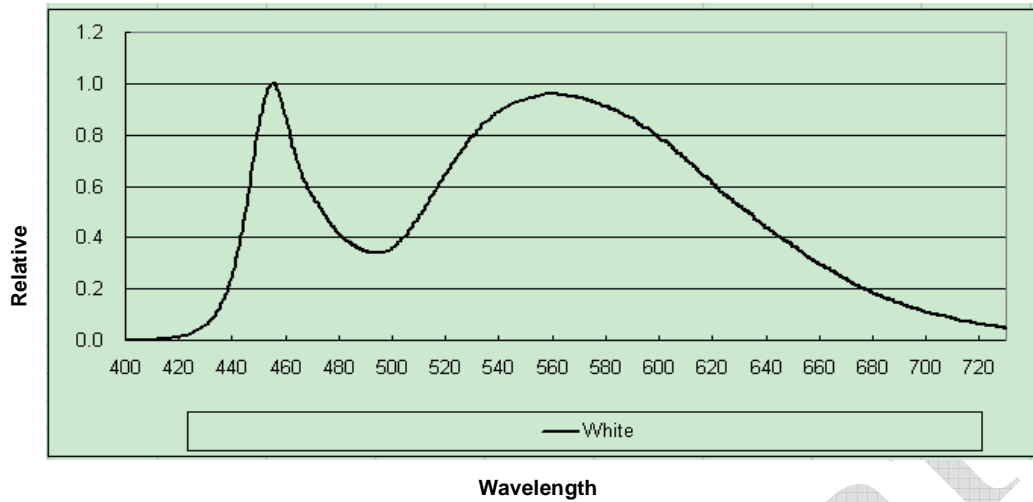


Figure 1: Relative Intensity vs. Wavelength

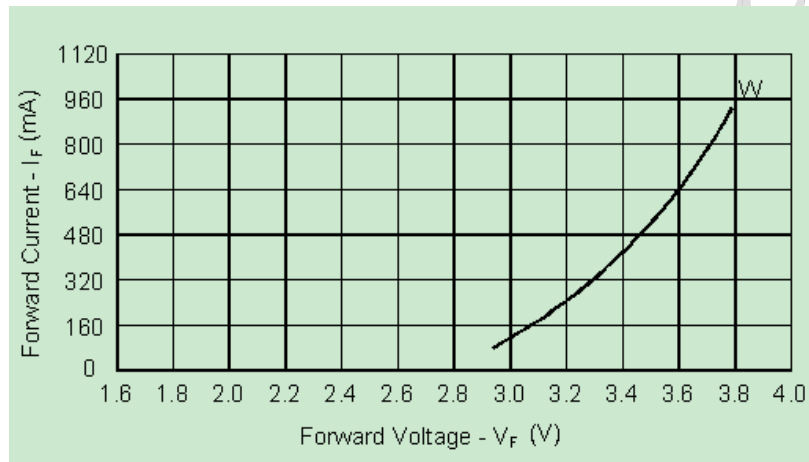


Figure 2: Forward Current vs. Forward Voltage

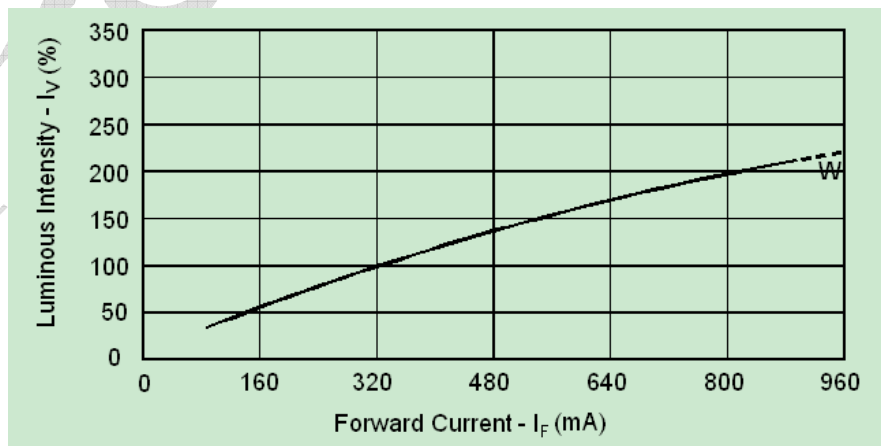


Figure 3: Relative Intensity vs. Forward Current

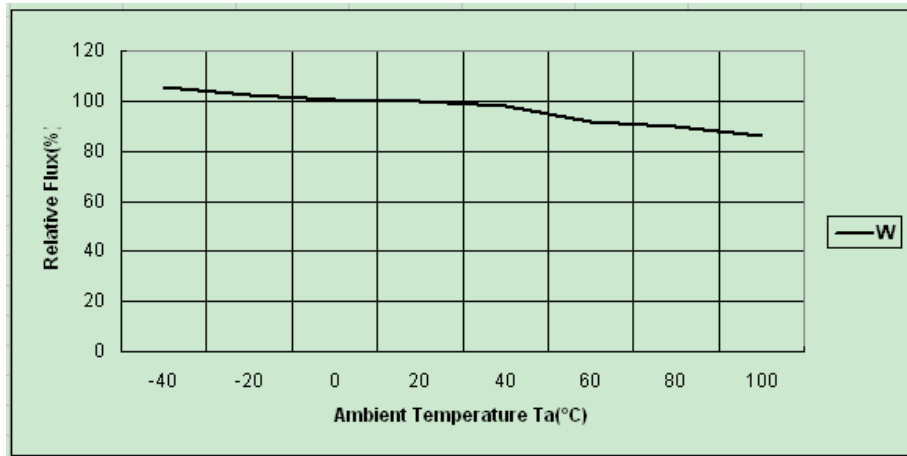


Figure 4: Relative Intensity vs. Ambient Temperature

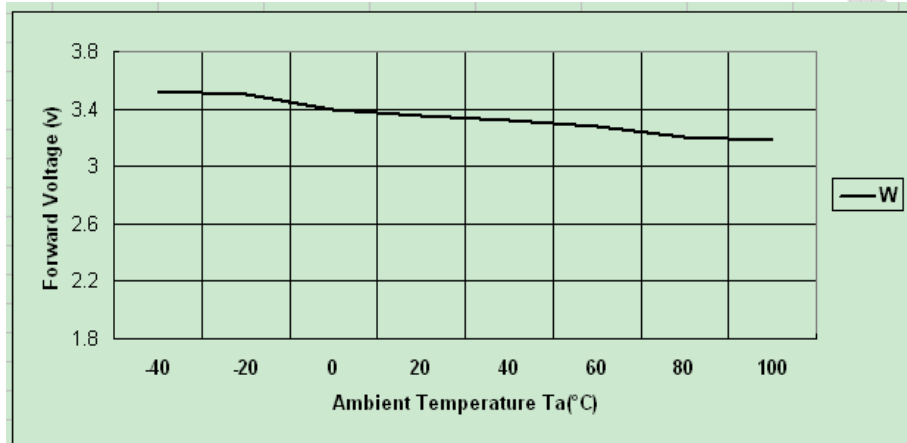


Figure 5: Forward Voltage vs. Ambient Temperature

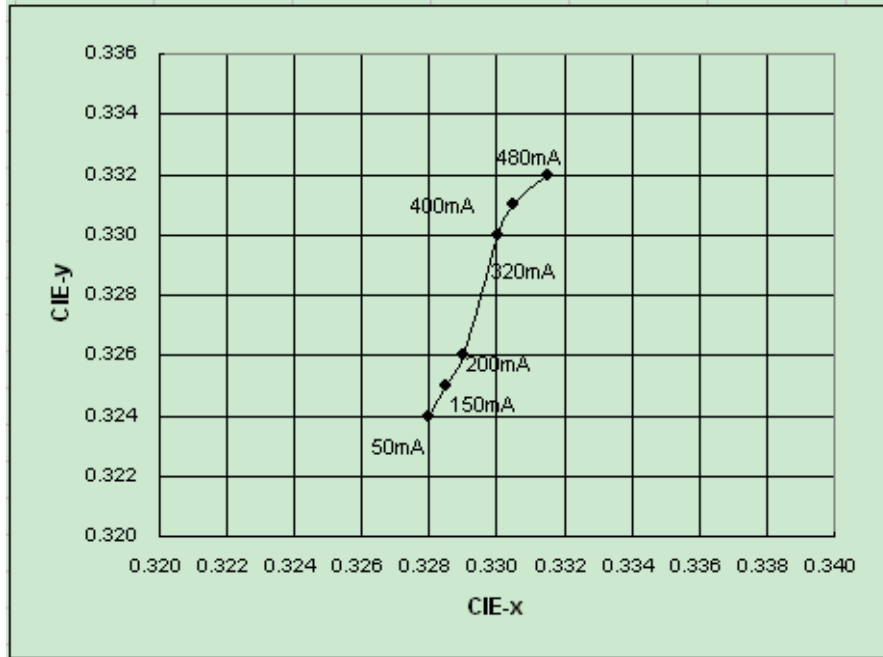


Figure 8: Forward Current vs. Chromaticity Coordinate

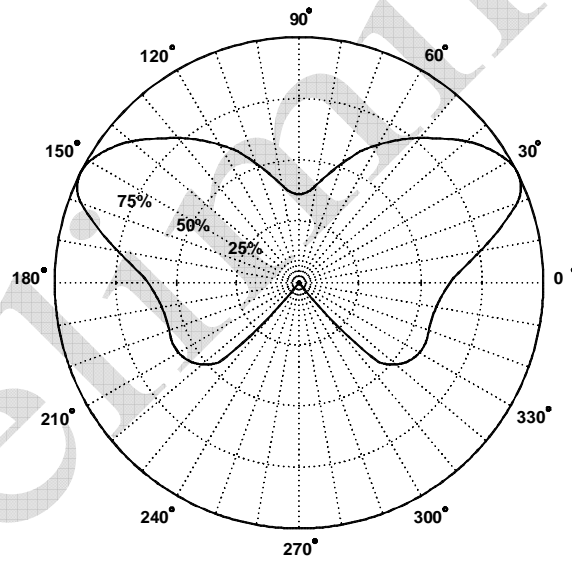


Figure 6: Butterfly-Beam™ - 3D Spatial Radiation Pattern: Relative Intensity vs. Angle

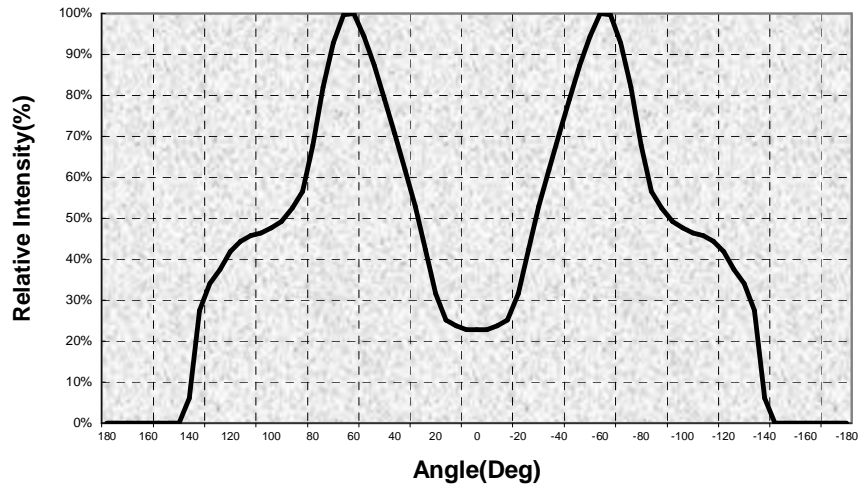
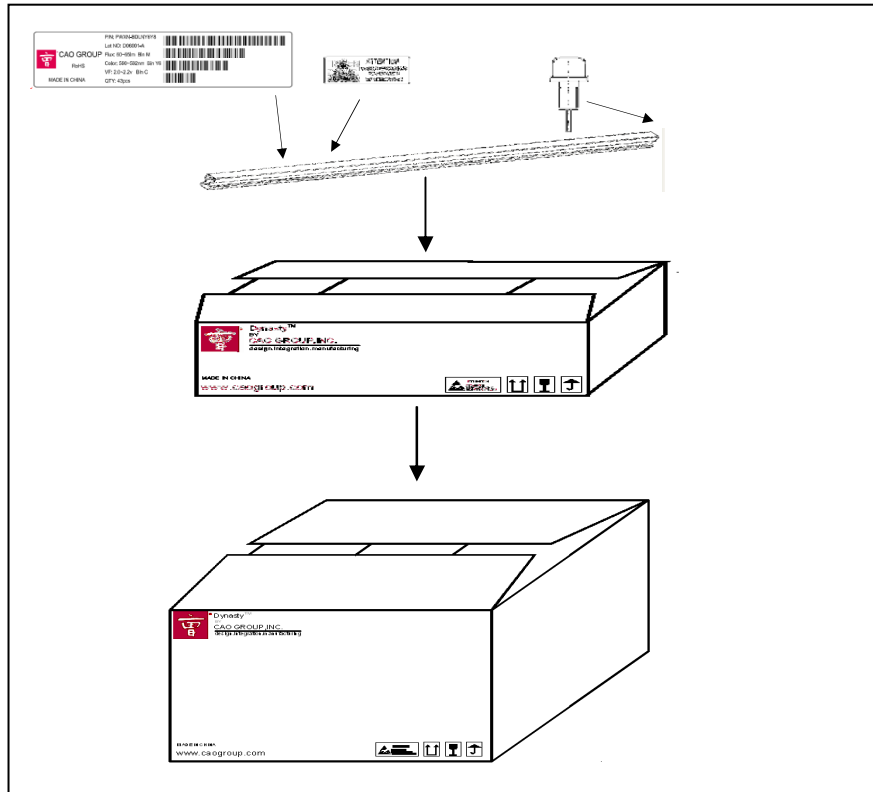


Figure 7: 2D Vertical Spatial Radiation Pattern – Relative Intensity vs. View Angle

Safety and Handling Instructions

1. Dynasty® Z is packaged in antistatic tubes. It is recommended to store Dynasty® Z at 30°C and 70%RH or less. It is recommended to assemble Dynasty® Z within five days after unpacking. Avoid direct contact with corrosive gas and liquid.
2. Static electricity or surge voltage may damage Dynasty® Z. Wrist band or anti-electrostatic glove is required when handling the Dynasty® Z. All devices, equipments and machineries must be properly grounded.
3. Isopropyl alcohol is recommended to clean the Dynasty® Z surface, while Dynasty® Z cannot be immersed in the isopropyl alcohol. Do not clean the Dynasty® Z with ultrasound.
4. The light output of Dynasty® Z is intense enough to injure human eyes. Avoid looking directly at Dynasty® Z or it may damage eyes.
5. CAO Group, Inc. does not take responsibility or quality issues caused by improper maintenance and handling of our products.

Packaging



Notes:

1. Dynasty® Z is packaged in an anti-static tube with a capacity of 43 pieces per tube.
2. 60 tubes per inner box, 2580 pieces per inner box.
3. 4 inner boxes per outer box, 10320 pieces per outer box.

www.caogroup.com/ssl

For product information and a complete list of sales representatives, please go to our website. For technical assistance call: US/Canada: +1 (877) 877-9778 or (801) 256-9282

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