Emission Angle Characteristics at I_F=350mA(Tj=25℃):

Part Name	Color	2Θ½(Typ.) Lambertian	Batwing	Focusing	Units
EDEW-1xAx	White	*130*	*110*	*80*	Degrees
EDEW-1LA6	White	*130*	--	--	Degrees
EDEW-1LA7	White	*120*	--	--	Degrees
EDEX-1xAx	Warm White	*130*	*110*	*80*	Degrees
EDER-1xAx	Red	*120*	*100*	*35*	Degrees
EDEO-1xAx	Red Orange	*120*	*100*	*35*	Degrees
EDEA-1xAx	Amber	*120*	*100*	*35*	Degrees
EDET-1xAx	True Green	*150*	*110*	*40*	Degrees
EDEB-1xAx	Blue	*150*	*110*	*40*	Degrees
EDEC-1xAx	Royal Blue	*150*	*110*	*40*	Degrees

Part Name	Color	ΘPEAK(Typ.) Batwing	Side emitting	Units
EDEW-1xAx	White	*±40*	*±80*	Degrees
EDEW-1SA6	White	--	*±80*	Degrees
EDEW-1SA7	White	--	*±80*	Degrees
EDEX-1xAx	Warm White	*±40*	*±80*	Degrees
EDER-1xAx	Red	*±35*	*±80*	Degrees
EDEO-1xAx	Red Orange	*±35*	*±80*	Degrees
EDEA-1xAx	Amber	*±35*	*±80*	Degrees
EDET-1xAx	True Green	*±40*	*±80*	Degrees
EDEB-1xAx	Blue	*±40*	*±80*	Degrees
EDEC-1xAx	Royal Blue	*±40*	*±80*	Degrees

Note

1. Flux is measured with an accuracy of ± 10%.
2. CCT selection acc. to CCT groups and an accuracy of ± 200K
3. Forward Voltage is measured with an accuracy of ± 0.1V
4. Wavelength is measured with an accuracy of ± 0.5nm
5. All white · warm white · True green and blue emitters are built with InGaN
6. All red · red-orange and amber emitters are built with AlGaInP

JEDEC Moisture Sensitivity:

Level	Floor Life		Soak Requirements			
			Standard		Accelerated Environment	
	Time	Conditions	Time (hours)	Conditions	Time (hours)	Conditions
4	72hours	≦30℃ / 60% RH	96 +2/-0	30℃ / 60% RH	20 +0.5/-0	60℃ / 60% RH

LEVEL	FLOOR LIFE		SOAK REQUIREMENTS			
			STANDARD		ACCELERATED EQUIVALENT [1]	
	TIME	CONDITIONS	TIME (hours)	CONDITIONS	TIME (hours)	CONDITIONS
1	Unlimited	≤30°C/85% RH	168 +5/-0	85°C/85% RH		
2	1 year	≤30°C/60% RH	168 +5/-0	85°C/60% RH		
2a	4 weeks	≤30°C/60% RH	696[2] +5/-0	30°C/60% RH	120 +1/-0	60°C/60% RH
3	168 hours	≤30°C/60% RH	192[2] +5/-0	30°C/60% RH	40 +1/-0	60°C/60% RH
4	72 hours	≤30°C/60% RH	96[2] +2/-0	30°C/60% RH	20 +0.5/-0	60°C/60% RH
5	48 hours	≤30°C/60% RH	72[2] +2/-0	30°C/60% RH	15 +0.5/-0	60°C/60% RH
5a	24 hours	≤30°C/60% RH	48[2] +2/-0	30°C/60% RH	10 +0.5/-0	60°C/60% RH
6	Time on Label (TOL)	≤30°C/60% RH	TOL	30°C/60% RH		

Note 1. The standard soak time includes a default value of 24 hours for semiconductor manufacturer's exposure time (MET) between bake and bag and includes the maximum time allowed out of the bag at the distributor's facility.

Operating life, mechanical, and environmental tests performed on Edixeon® package:

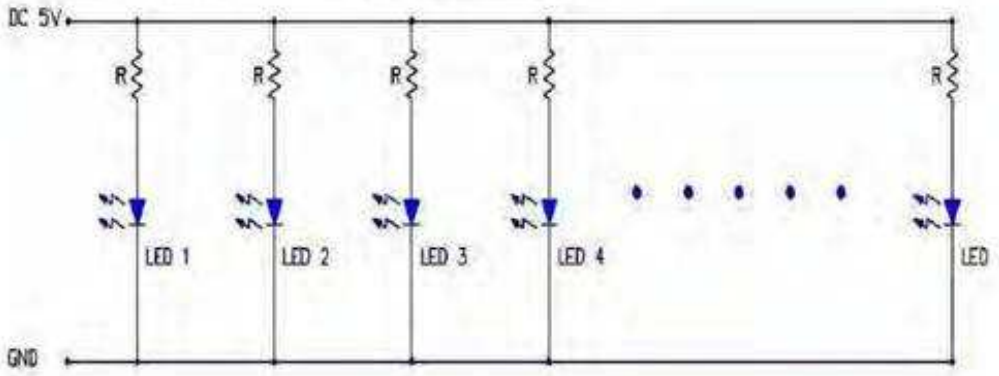
Stress Test	Stress Conditions	Stress Duration	Failure Criteria
Room Temperature Operating Life	25℃, I_F = max DC (Note 1)	1000 hours	Note 2
High Temperature High Humidity	85℃ / 85%RH	1000 hours	Note 2
Temperature Cycle	-40℃/100℃ ,30 min dwell / < 5min transfer	200 cycles	Note 2
High Temperature Storage Life	110℃	1000 hours	Note 2
Low Temperature Storage Life	-55℃	1000 hours	Note 2
Thermal Shock	-40 / 120℃, 20 min dwell / < 20 sec transfer	200 cycles	No catastrophics
Mechanical Shock	1500 G, 0.5 msec pulse, 5 shocks each 6 axis		No catastrophics
Natural Drop	On concrete from 1.2 m, 3X		No catastrophics
Variable Vibration Frequency	10-2000-10 Hz, log or linear sweep rate, 20 G about 1 min, 1.5 mm, 3X/axis		No catastrophics
Solder Heat Resistance (SHR)	260℃ ± 5℃, 10 sec		No catastrophics
Solderability	Steam age for 16 hr, then solder dip at 260℃ for 5 sec		Solder coverage on lead

Note

1. Depending on the maximum derating curve.
2. Failure Criteria:

Electrical failures	V_F shift >=10% I_R<50uA @Vr=5V
Light Output Degradation	% Iv shift >= 30% @1,000hrs or 200cycle
Visual failures	Broken or damaged package or lead Solderability < 95% wetting Dimension out of tolerance

Burn-in Condition Edixeon® Reliability



When we talk about MTBF of Edixeon®, we can provide a formula for customers.

$$\log(\text{Life}) = \frac{1{,}600}{Tj(^{\circ}C)+273}$$

Life means the time light output becomes 70%

Tj (°C)	Life (hours)	Tj (°C)	Life (hours)
25	234,000	85	29,500
30	191,000	90	25,700
35	157,000	95	22,300
40	129,000	100	19,500
45	107,000	105	17,100
50	90,000	110	15,100
55	75,000	115	13,300
60	64,000	120	11,700
65	54,000	125	10,500
70	46,000	130	9,300
75	39,600	140	7,500
80	34,000	150	6,000

When we talk about MTTF of Edixeon®, we can provide a formula for customers_

MTTF is assumed to be 100,000,000

The failure rates at different hours and different systems(LED quantity) are as below:

if there is 1 failure of 1 emitter in a system

Tj=75℃ is giving 0.01%(100ppm) at 10,000hrs

if there is 1 failure of 10 emitters in a system

Tj=75℃ is giving 0.1%(1,000ppm) at 10,000hrs

if there is 1 failure of 1 emitter in a system

Tj=75℃ is giving 0.05%(500ppm) at 50,000hrs

if there is 1 failure of 10 emitters in a system

Tj=75℃ is giving 0.5%(5,000ppm) at 50,000hrs if there are 10 emitters

How to Know Tj in Your Application?

If it is white Edixeon®, Rth(junction to case)=15°C/W

The thermal grease is 200um.
K(Aluminum PCB)=2.6 W/mk

Then Rth(case to board)$=\frac{200}{2.6\times(6.4/2)^2\pi}$ =2.4 °C/W

The Rth between board and air is mainly dependent on the total surface air.

Rth(board-air)$\fallingdotseq\frac{500}{\text{Area}(cm^2)}$

If Area is 30cm^2	Rth=16.7	ΔT(junction-air)=(15+2.4+16.7)x1=34.1 °C
If Area is 60cm^2	Rth=8.3	ΔT (junction-air)=(15+2.4+8.3)x1=25.7 °C
If Area is 90cm^2	Rth=5.5	ΔT (junction-air)=(15+2.4+5.5)x1=22.9 °C

ASSIST FORM about High Power LED Reliability(White Edixeon®)

	Ts=45°C	Ts=65°C	Ts=85°C
Voltage	3.5V	3.5V	3.5V
Current	350mA	350mA	350mA
Wattage	1.2W	1.2W	1.2W
Heat	1.0W	1.0W	1.0W
Rth	15 °C/W	15 °C/W	15 °C/W
Tj	60 °C	80 °C	100 °C
$L_{70\%}$	64,000hrs	34,000hrs	19,500hrs