PLW3014ACA Series

Product Datasheet

Bulb | Wall Light | Floor Light | Tube Light | General Lighting

Introduction

Plessey PLW3014ACA SMT LEDs are designed for flashlights, backlighting, linear tubes and other general lighting applications. The light is emitted close to a Lambertian distribution and hence this SMT package is naturally suitable for backlighting panels and symbols. The LEDs are packed in reels containing 4,000 pcs; each individual reel will be shipped in single intensity and colour bin, to provide close uniformity.

Description	Features and Benefits
• Best luminous and colour uniformity. • Enables halogen and CDM replacement. • The article itself presents the actual colour.	• High luminous Intensity and high efficiency. • Based on Blue: InGaN technology. • Wide viewing angle: 120°. • Excellent performance and visibility. • Suitable for all SMT assembly methods. • IR reflow process compatible. • Environmental friendly; RoHS compliance.

Contents

Order Codes

CCT /K	CRI 80	CRI 90
6500	PLW3014ACA65B5	PLW3014ACA65C5
5700	PLW3014ACA57B5	PLW3014ACA57C5
5000	PLW3014ACA50B5	PLW3014ACA50C5
4000	PLW3014ACA40B5	PLW3014ACA40C5
3500	PLW3014ACA35B5	PLW3014ACA35C5
3000	PLW3014ACA30B5	PLW3014ACA30C5
2700	PLW3014ACA27B5	PLW3014ACA27C5

Absolute Maximum Ratings

T_{amb} = +25°C unless otherwise stated.

Parameter			Value	Units
DC Forward Current		I_F	90	mA
Pulse Forward Current (tp≤100μs, Duty cycle=0.25)		I_{pulse}	120	mA
Reverse Current [1]		I_R	10	μA
Reverse Voltage [1]		V_R	5	V
LED Junction Temperature [2]		T_J	125	°C
Operating Temperature		T_{opr}	-40 ~ +85	°C
Storage Temperature		T_{stg}	-40 ~ +125	°C
Power Dissipation		P_D	200	mW
ESD Sensitivity (HBM)		V_B	2,000	V
Soldering Temperature	Reflow Soldering	T_S	255~260°C/10~30sec	-
	Manual Soldering		350°C/3sec	-

Notes [1] : LEDs are not designed to operate in reverse bias mode.

[2] : Current derating must be applied to ensure that the maximum junction temperature is not exceeded.

General Characteristics

T_{amb} = +25°C unless otherwise stated.

Parameter			Value	Units
Viewing angle [1]		$2Ø_{1/2}$	120	°
Thermal resistance		$R_{thj\text{-}sp}$	30	°C/W
Correlated Colour Temperature [2]	Cool White	CCT	6500	K
			5700	
			5000	
	Neutral White		4000	
	Warm White		3500	
			3000	
			2700	
Colour Rendering Index [3]		CRI	80 / 90	V
JEDEC Moisture Sensitivity [4]		-	2a (4 weeks)	-

Notes [1] : Viewing angle, 2Ø1/2, is the off-axis angle where the luminous intensity is 50% of the axial luminous intensity.

[2] : The CIE x/y tolerance is ±0.005

[3] : The CRI tolerance is ±2

[4] : MSL 2a Floor life conditions: ≤30°C/60%RH.
Soak Requirement (Standard): 120 +1/-0 hr, 60°C/5%RH.

Luminous Flux Characteristics

Luminous flux at I_F=60mA, T_J=25°C.

CCT /K	CRI	Group	Luminous Flux /lm [1]	
			min	max
Cool White: 6500 5700 5000	80	6E	18	20
		7E	20	22
		8E	22	24
		9E	24	26
		1F	26	28
Neutral White: 4000		6E	18	20
		7E	20	22
		8E	22	24
		9E	24	26
		1F	26	28
Warm White: 3500 3000 2700		5E	16	18
		6E	18	20
		7E	20	22
		8E	22	24
		9E	24	26

CCT /K	CRI	Group	Luminous Flux /lm [1]	
			min	max
Cool White: 6500 5700 5000	90	6E	18	20
		7E	20	22
		8E	22	24
Neutral White: 4000		5E	16	18
		6E	18	20
		7E	20	22
		8E	22	24
Warm White: 3500 3000 2700		5E	16	18
		6E	18	20
		7E	20	22
		8E	22	24

Notes [1] : The luminous flux tolerance is ±10%

Forward Voltage Bins

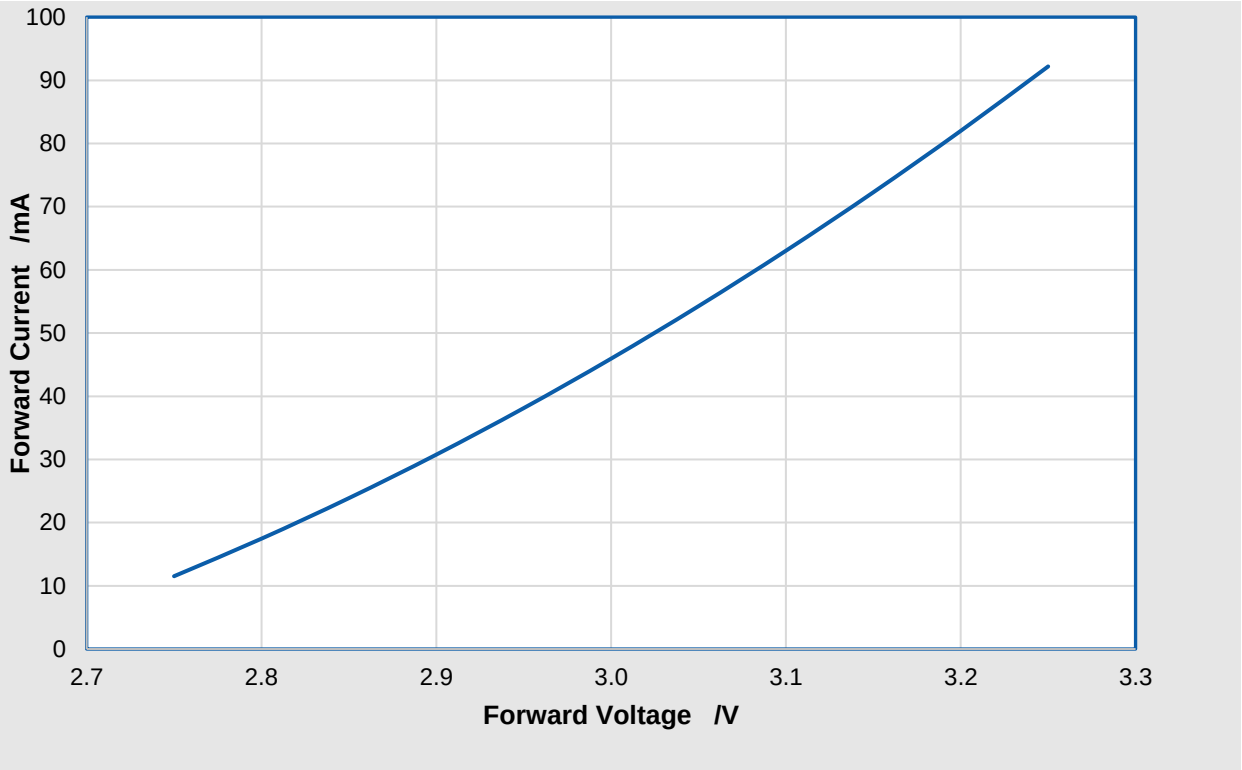
Forward Voltage at I_F=60mA, T_J=25°C.

Group	Forward Voltage /V [1]	
	min	max
V02	2.8	2.9
V03	2.9	3.0
V04	3.0	3.1
V05	3.1	3.2
V06	3.2	3.3
V07	3.3	3.4
V08	3.4	3.5
V09	3.5	3.6

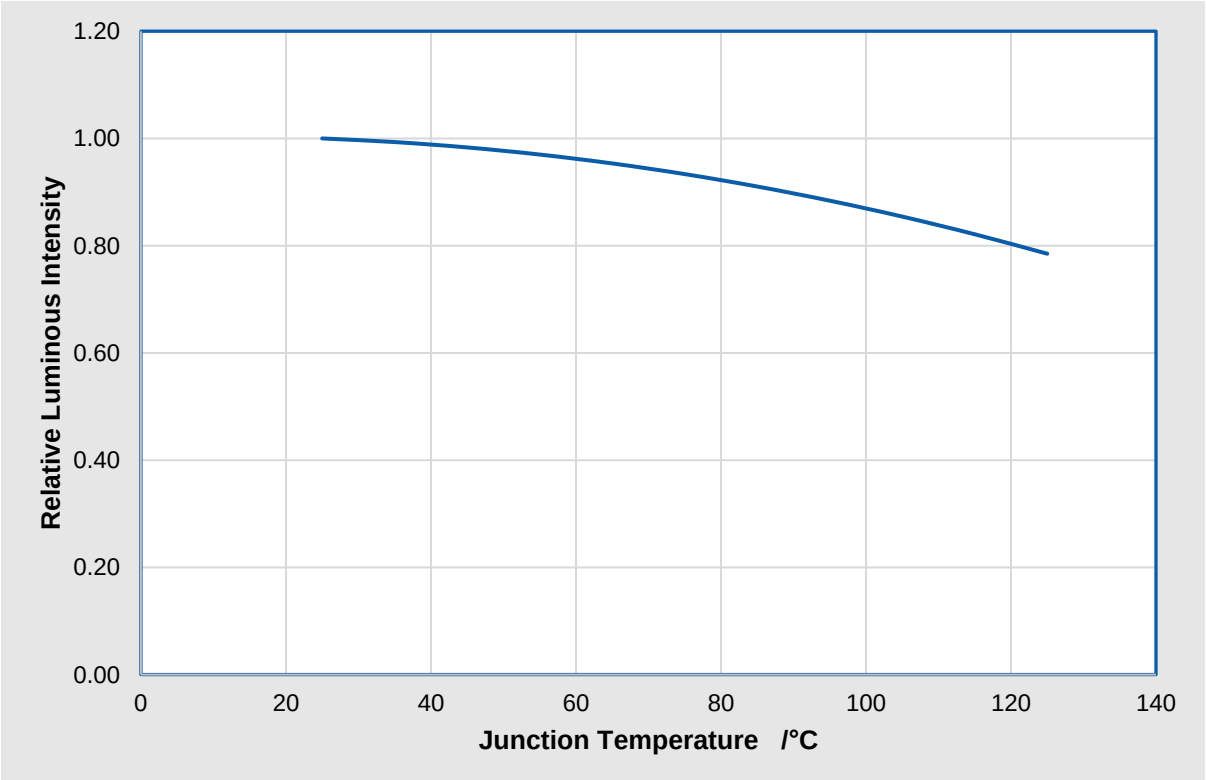
Notes [1] : The forward voltage tolerance is ±0.06V

Characteristic Curves

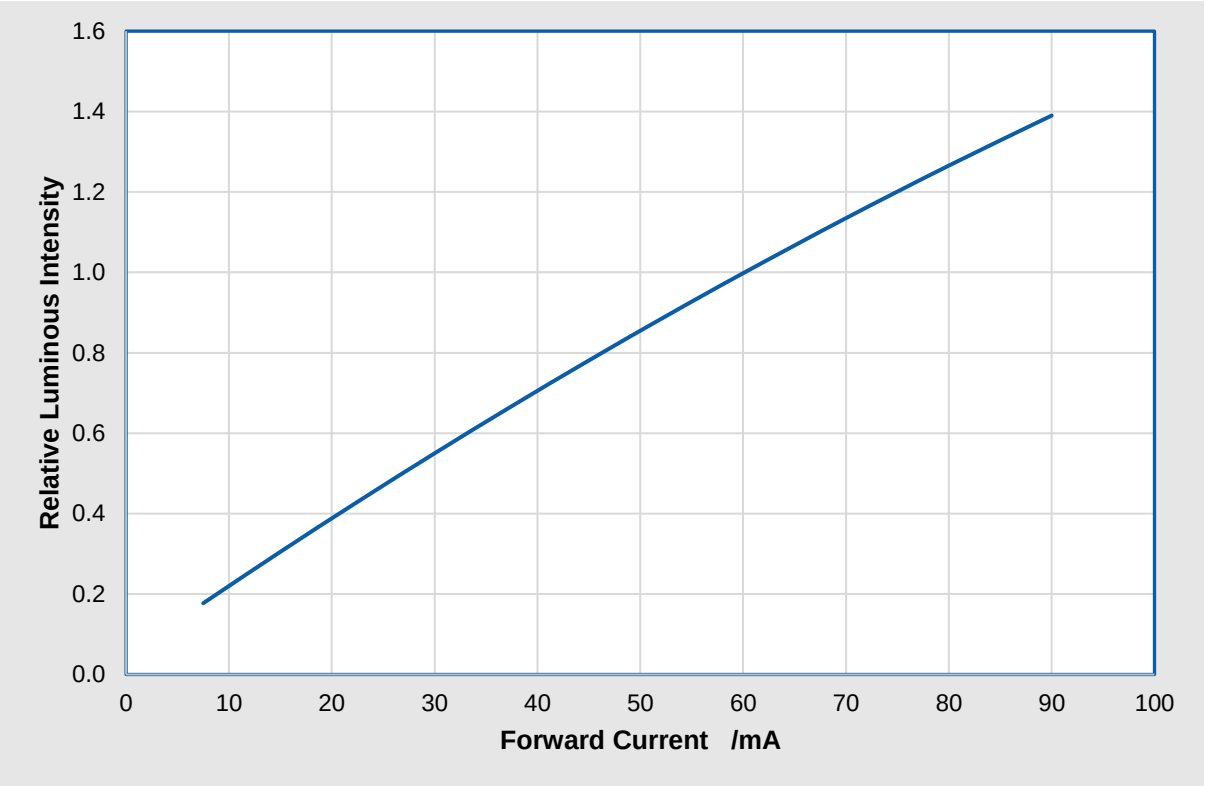
Forward Current vs. Forward Voltage (@ T_J = 25°C)



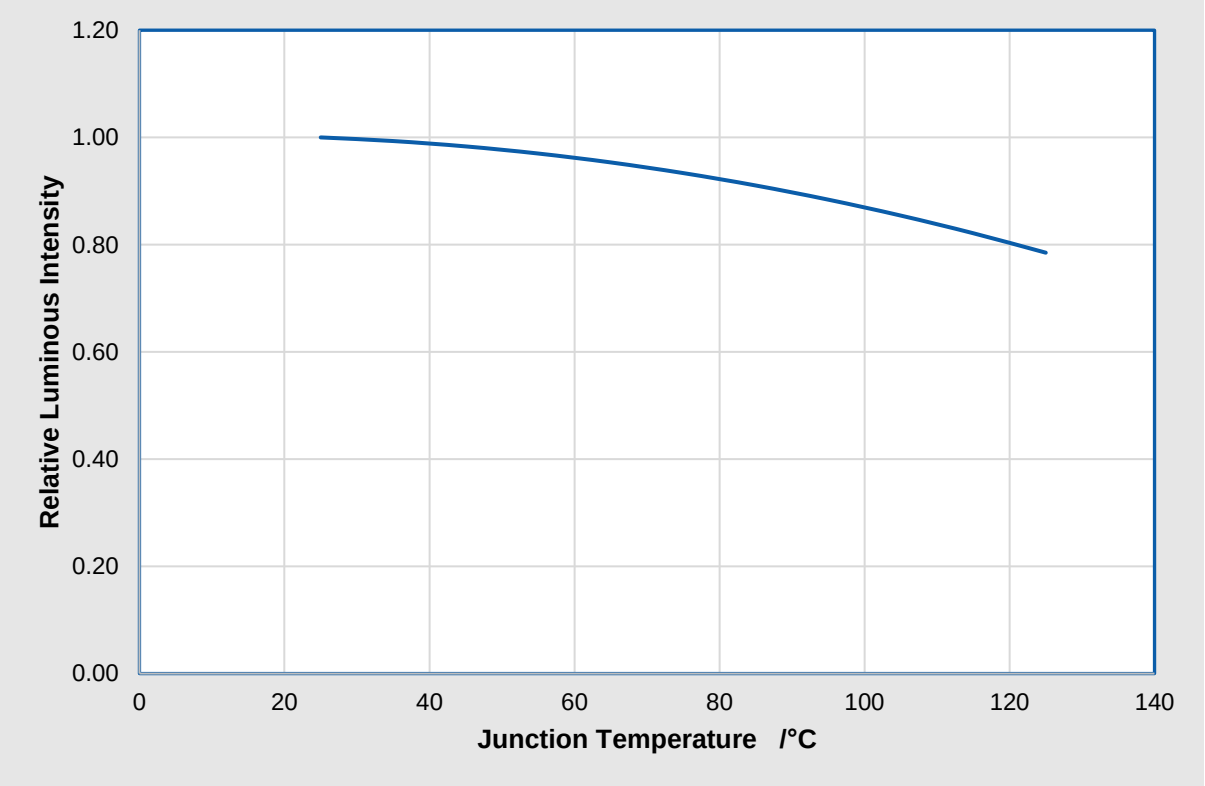
Forrward Voltage vs. Junction Temperature (@ I_F = 60 mA)



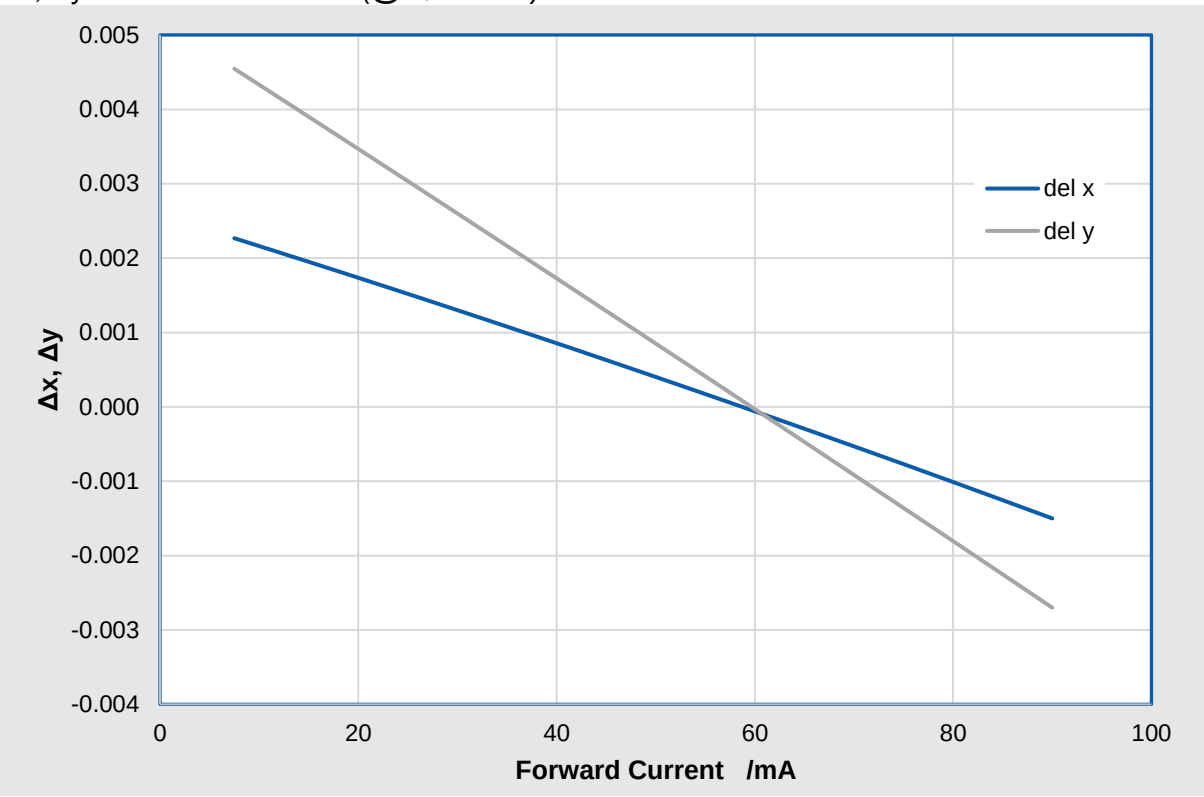
Relative Luminous Intensity vs. Forward Current (@ T_J = 25°C)



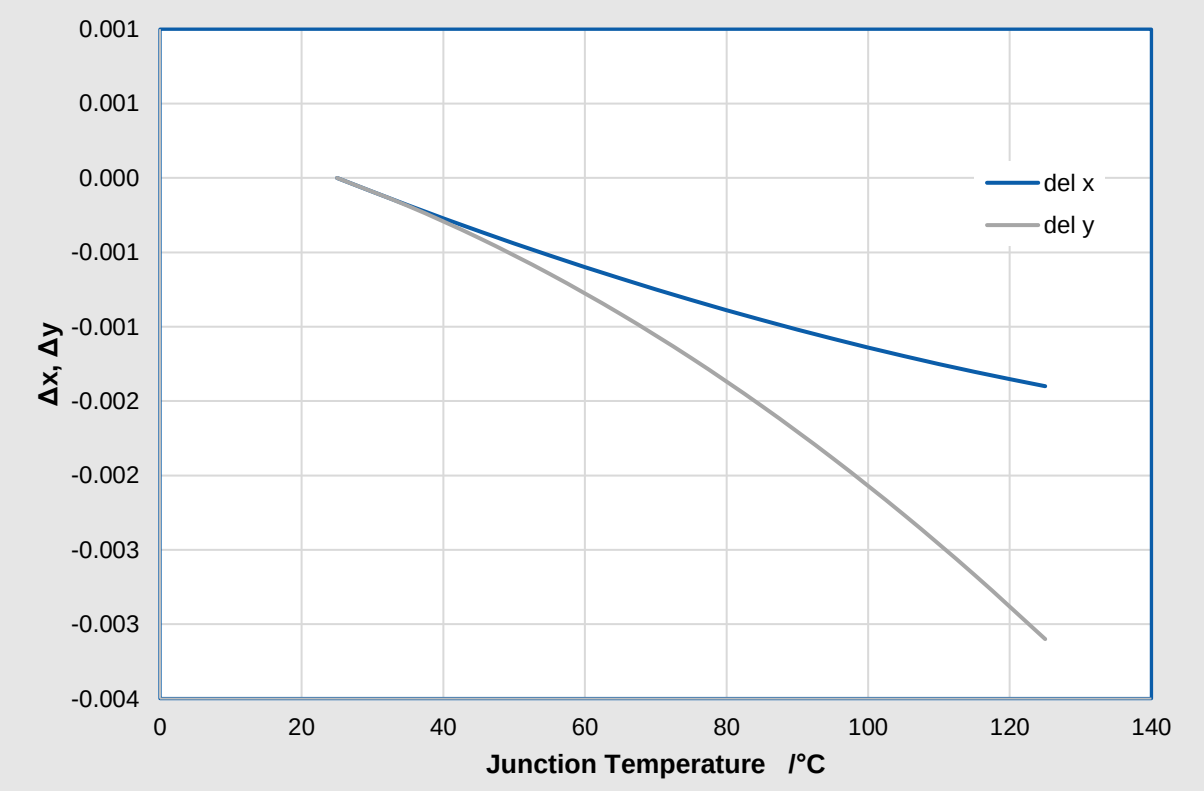
Relative Luminous Intensity vs. Junction Temperature (@ I_F = 60 mA)



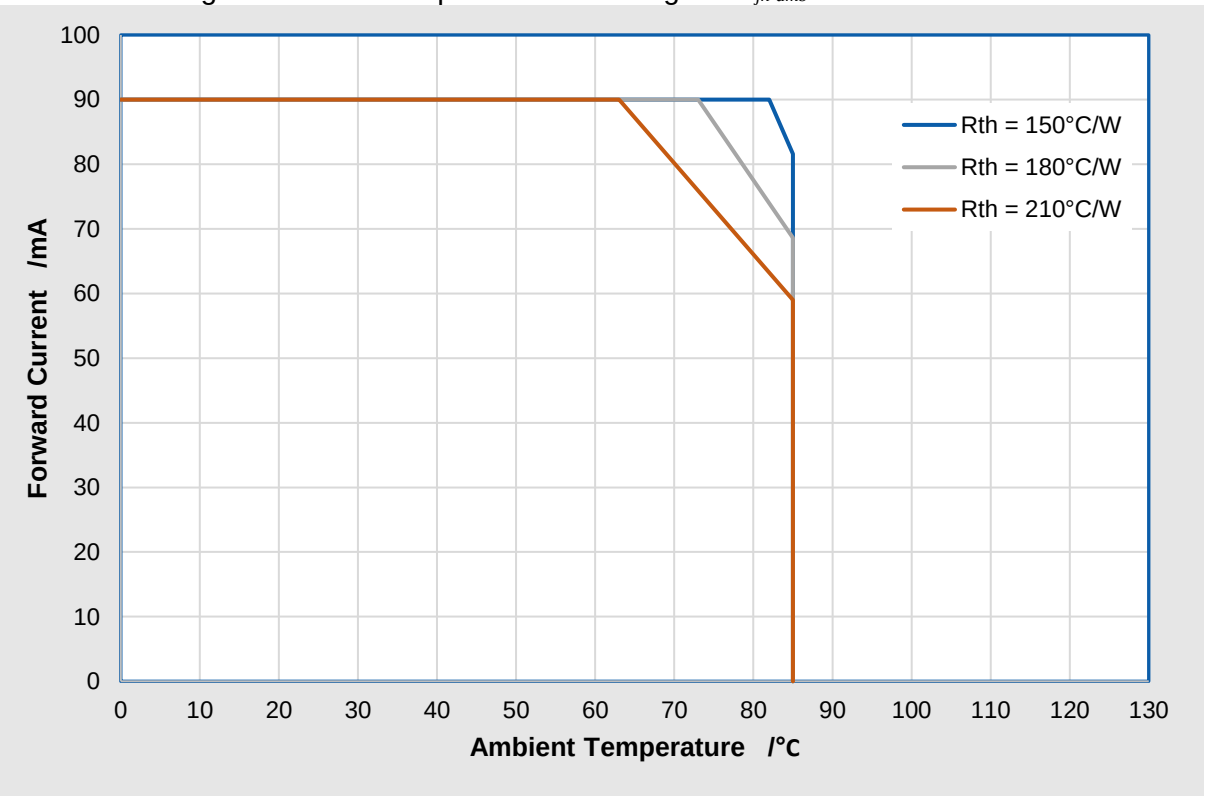
Δx, Δy vs. Forward Current (@ T_J = 25°C)



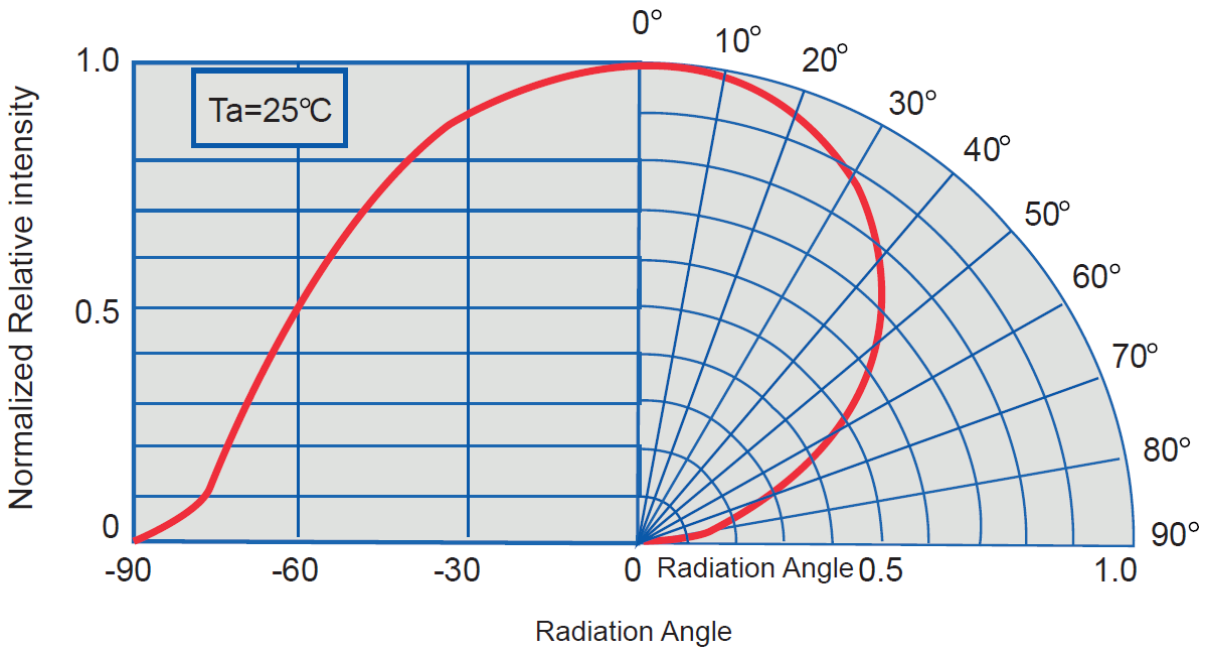
Δx, Δy vs. Temperature (@ T_J = 25°C)



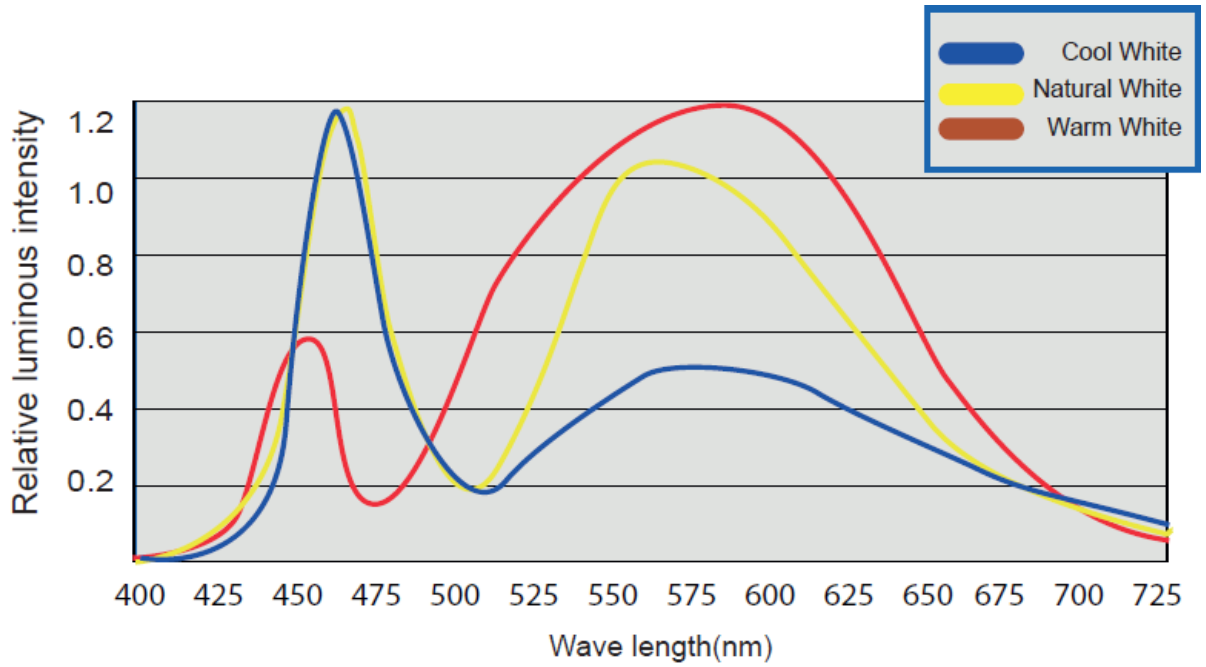
Current Derating vs Ambient Temperature for a range of $R_{jn\text{-}amb}$



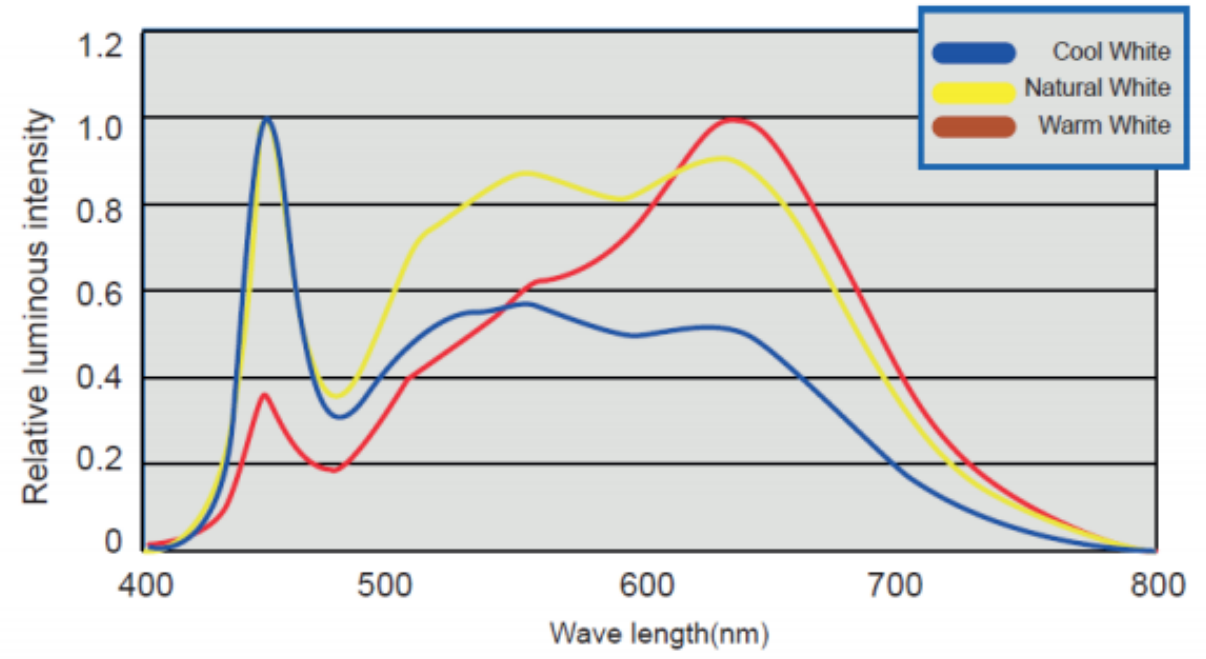
Beam Pattern



Colour Spectrum CRI80

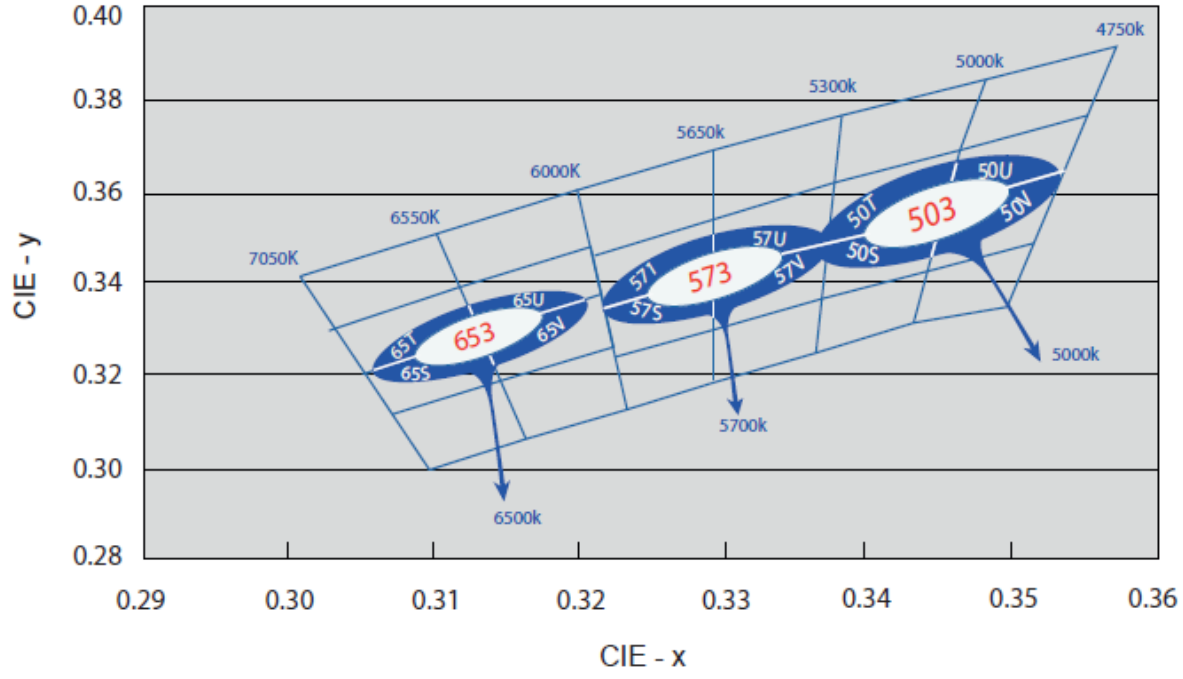


Colour Spectrum CRI90



Chromaticity Groups

Cool White; 5000, 5700 and 6500K

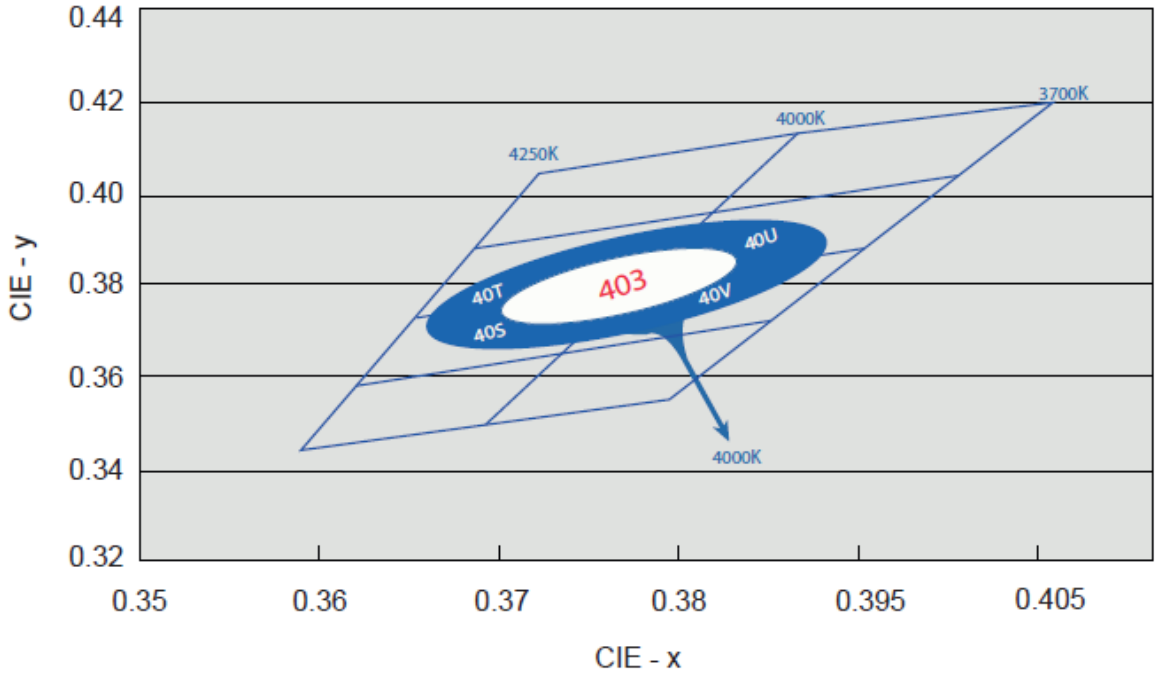


CCT	MacAdam Steps	Cx	Cy	a	b	theta °
5000	5	0.3447	0.3553	0.01370	0.00590	59.62
5700	5	0.3287	0.3417	0.01243	0.00533	59.09
6500	5	0.3123	0.3282	0.01115	0.00475	58.57

Chromaticity Bins

CCT	
5000	503, 50S, 50T, 50U, 50V
5700	573, 57S, 57T, 57U, 57V
6500	653, 65S, 65T, 65U, 65V

Neutral White; 4000K

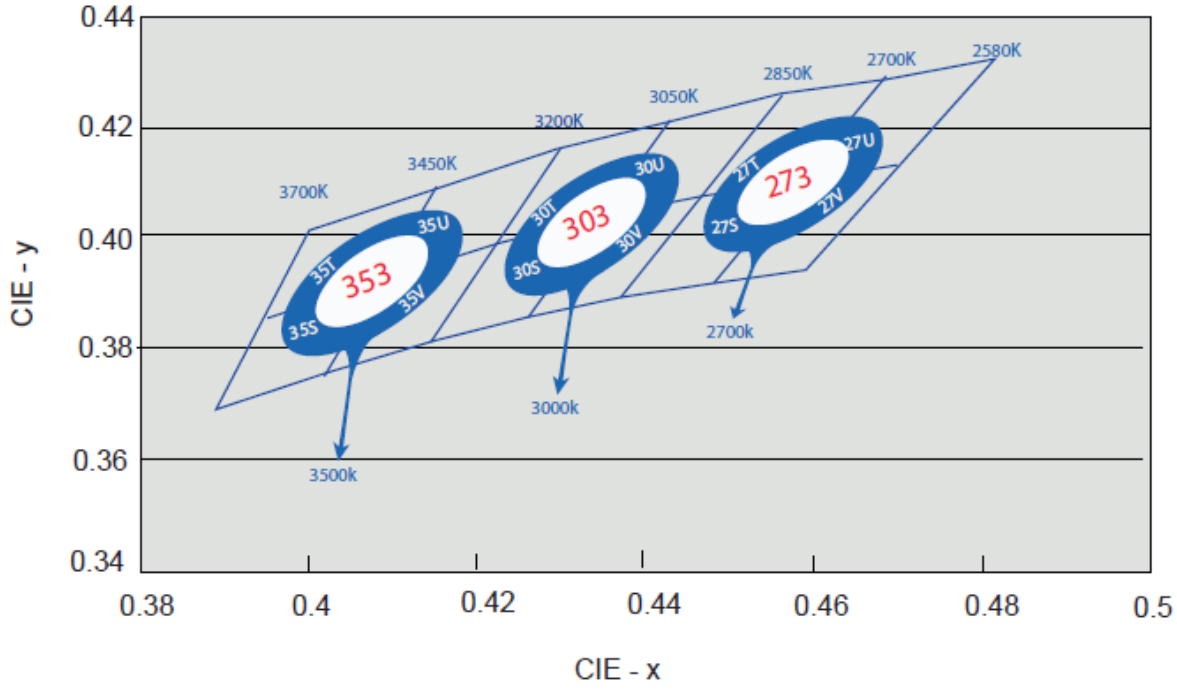


CCT	MacAdam Steps	Cx	Cy	a	b	theta °
4000	5	0.3818	0.3797	0.01565	0.00670	53.72

Chromaticity Bins

CCT	
4000	403, 40S, 40T, 40U, 40V

Warm White; 2700, 3000 and 3500K

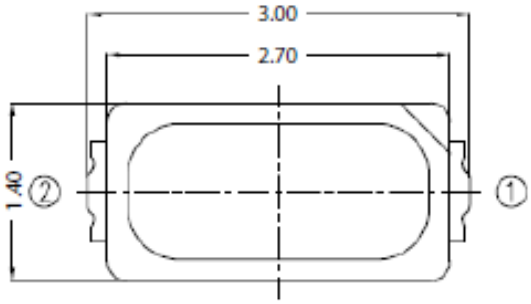


CCT	MacAdam Steps	Cx	Cy	a	b	theta °
2700	5	0.4578	0.4101	0.01350	0.00700	53.70
3000	5	0.4338	0.4030	0.01390	0.00680	53.22
3500	5	0.4073	0.3917	0.01545	0.00690	54.00

Chromaticity Bins

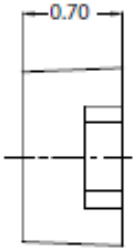
CCT	
2700	273, 27S, 27T, 27U, 27V
3000	303, 30S, 30T, 30U, 30V
3500	353, 35S, 35T, 35U, 35V

Mechanical Dimensions

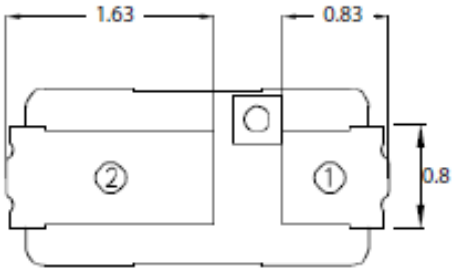


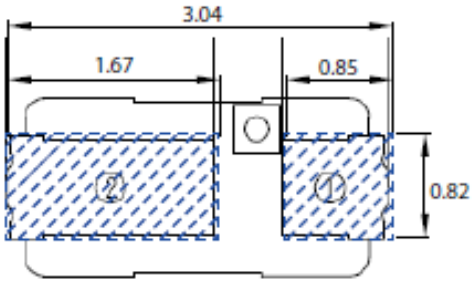
Circuit

Polarity



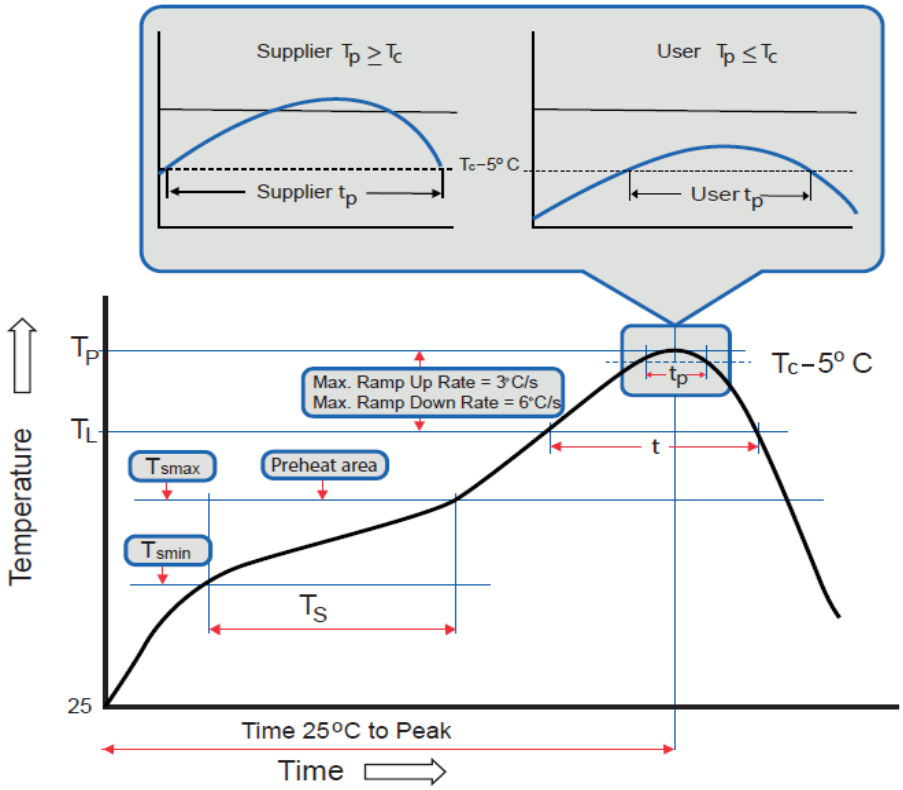
Solder Pad





Notes:
1. All dimensions are measured in mm.
2. Tolerance : ± 0.20 mm

Soldering Temperature Profile



Profile Feature	Pb-Free Assembly
Preheat & Soak Temperature min (Tsmin) Temperature max (Tsmax) Time (Tsmin to Tsmax) (ts)	150 °C 200 °C 60 – 120 seconds
Average ramp-up rate (Tsmax to Tp)	3 °C/second max.
Liquid temperature (TL) Time at liquid (tL)	217 °C 60 – 150 seconds
Peak package body temperature (Tp) [1]	255 °C ~260 °C [1]
Classification temperature (Tc)	260 °C
Time (tp) [2] within 5 °C of the specified classification temperature (Tc)	30 seconds [2]
Average ramp-down rate (Tp to Tsmax)	6 °C/second max.
Time 25 °C to peak temperature	8 minutes max.

Notes [1] : Tolerance for peak profile temperature (Tp) is defined as a supplier minimum and a user maximum.

[2] : Tolerance for time at peak profile temperature (tp) is defined as a supplier minimum and a user maximum.

Reliability - Environmental Evaluation

#	Test		
1	Temperature Cycling.	-40°C~100°C, 30, 30, mins	100 Cycles
2	Thermal Shock.	-40°C~100°C, 15, 15 mins ≦10 sec	100 Cycles
3	Resistance to Soldering Heat.	TSOL=260°C, 30 sec	3 times
4	Moisture Resistance.	25°C~65°C 90% RH, 24 hrs / 1 cycle	10 Cycles
5	High-Temperature Storage.	T_A=100°C	1000 hrs
6	Humidity Heat Storage.	T_A =85°C RH=85%	1000 hrs
7	Low-Temperature Storage.	T_A=-40°C	1000 hrs
8	Operating Life.	T_A=25°C	1000 hrs
9	High Temperature Operation Life.	T_A=85°C	1000 hrs
10	High Humidity Heat Life Test.	T_A =85°C RH=85%	1000 hrs
11	Power Cycling.	30 sec ON, 30 sec OFF	1.5W times

Failure Criteria

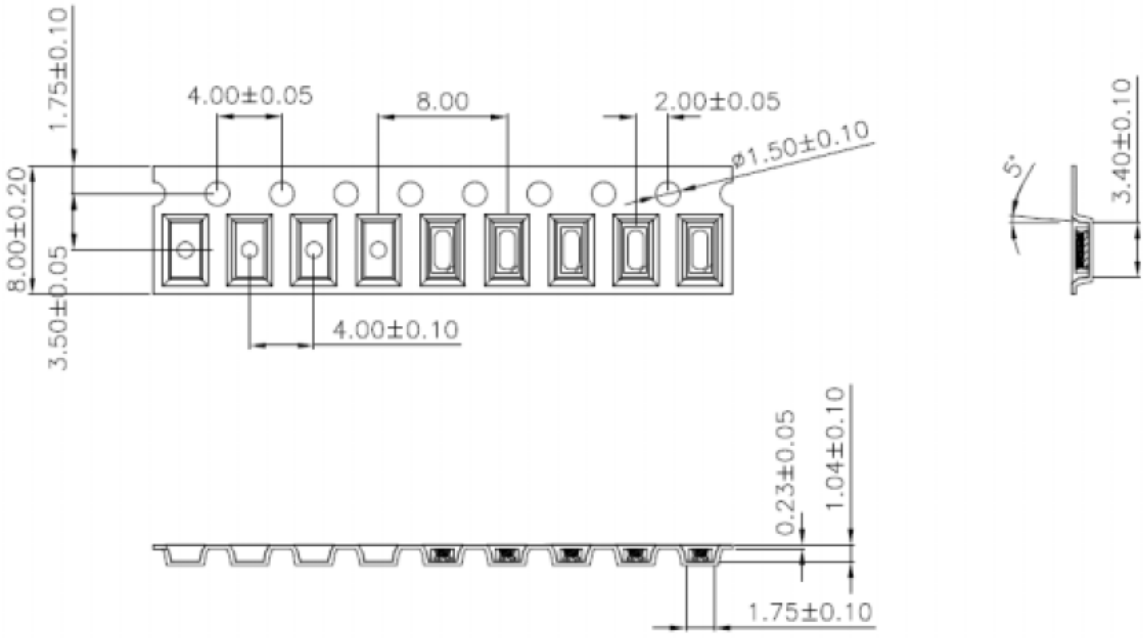
Mode	Failure Criteria	
	Min.	Max
Lumen Maintenance.	85%	-
Δu'v'	-	0.006
Forward Voltage.	-	Initial data x 1.1
Reverse Current.	-	10μA
Resistance to soldering heat.	No dead lamps or visual damage	

Reliability - Lumen Maintenance

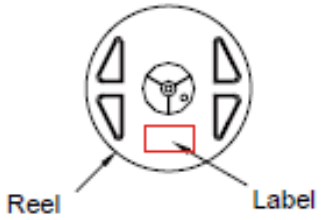
LM-80 verification is conducted according to standardized IES LM-80-08 and TM-21-11 methods. Based on the different testing intervals data, we can extrapolate LED lumen maintenance. For more details on lumen maintenance testing, chromaticity and LED case temperatures please refer to our LM-80 reports.

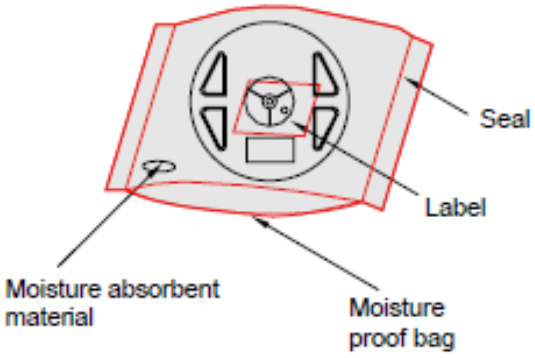
Product Packing Information

Tape specification

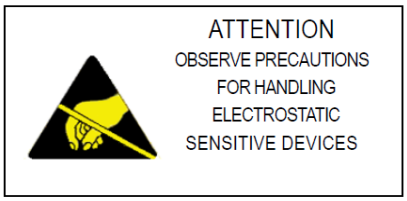


Reel and Reel Packing Specification





Cautions

Sulphur	Avoid storing or operation the LEDs in a sulphur containing environment. Some materials, such as seals, printing ink, enclosure and adhesives, may contain sulphur. Avoiding the exposure in acid or halogen environment.
Reverse Bias	These LEDs are not designed to operate in reverse bias. Precautions are required to prevent reverse bias in applications and during handling.
ESD	 These LEDs are ESD sensitive. Safe ESD handling precautions are required.

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Products are intended for normal commercial applications. For applications requiring unusual environmental requirements, extended temperature range, or high reliability capability (e.g. military, or medical applications), special processing/testing/conditions of sale may be available on application to Plessey.

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