Super Flux LEDs

LTL911SEKSA **LTL912SEKSA**

LTL911SYKSA **LTL912SYKSA**

Selection Guide

Part No.	Color	Φv (mlm)	Va(deg.)	λd(nm)
LTL911SEKSA	Red	3750	90	628
LTL911SYKSA	Amber	2090	90	594
LTL912SEKSA	Red	3750	60	628
LTL912SYKSA	Amber	2090	60	594

Benefits

- Fewer LEDs Required
- Lower lighting System Cost

Features

- High Current Operation
- High Flux Output
- Low Thermal Resistance
- Low Profile
- Wide Viewing Angle
- Meet SAE/ ECE/ JIS Automotive Color Requirement
- Tube Package for Automatic Loading and Insertion Process

Applications

- Automotive Lighting
  - CHMSL
  - Stop Lamp
  - Rear Turn Signal Lamp
  - Front Turn Signal Lamp
  - Indirect Lighting
- Signs and Signals

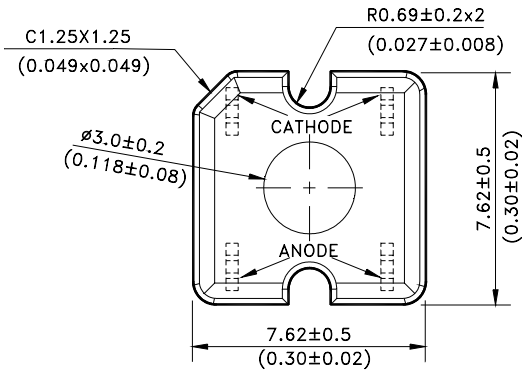
Description

These parts are designed for high current operation and high flux output applications. In order to solve the high temperature produced by the higher current operation, the package's design features better thermal management characteristics than other LED solutions coupled with an efficient optical design. This package design allows the lighting designer to reduce the number of LEDs required as well as the overall lighting system cost. The low profile package can be easily coupled to reflectors or lenses to efficiently distribute light and provide the desired illuminated appearance. This product family employs the world's brightest red, red-orange, amber, blue, cyan, green, and white LED materials etc., which allow designers to match the color of popular lighting applications, such as automotive lighting and electronic signs.

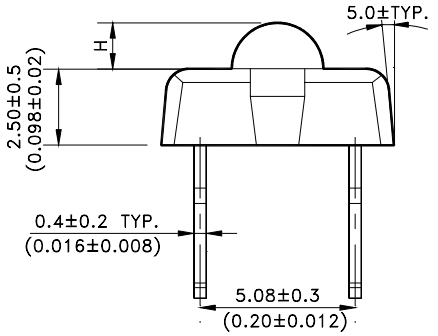
Devices

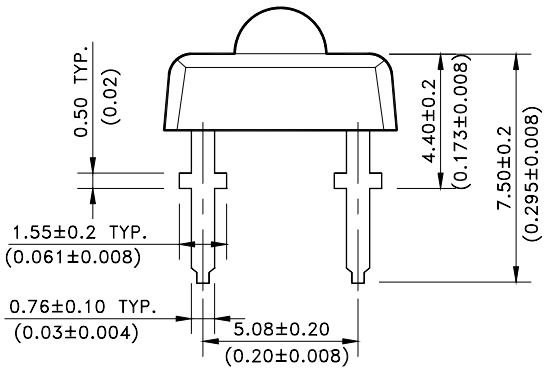
Part No. (LTL)	Lens	Source Color
LTL911SEKSA / LTL912SEKSA	Water Clear	TS AlInGaP Red
LTL911SYKSA / LTL912SYKSA	Water Clear	TS AlInGaP Amber

Package Dimensions



Part No.	H
LTL911XXXXX	1.50(0.059)
LTL912XXXXX	1.90(0.075)





NOTES:

1. All dimensions are in millimeters (inches).
2. Protruded resin is 1.0mm(.04") max.
3. Lead spacing is measured where the leads emerge from the package.
4. Specifications are subject change to without notice.

Absolute Maximum Ratings at TA=25℃

Parameter	Maximum Rating	Unit
Power Dissipation	242	mW
Peak Forward Current (1/10 Duty Cycle, 0.1ms Pulse Width)	100	mA
DC Forward Current	70	mA
AlInGaP Derating Linear From 60°C <Note2>	0.875	mA/°C
Reverse Voltage (I_R =100 μA)	10	V
Operating Temperature Range	-40°C to + 100°C	
Storage Temperature Range	-55°C to + 100°C	
LED Junction Temperature	125°C	
Soldering Preheat Temperature	100°C for 30 Seconds	
Lead Soldering Temperature	260°C for 5 Seconds [1.5mm (.06”) From Seating Plane]	

Notes:

1. Operation at currents below 10mA is not recommended.
2. Derating linear as shown in Fig. 4

Electrical / Optical Characteristics at TA=25℃

Parameter	Symbol	Part No.	Min.	Typ.	Max.	Unit	Test Condition
Total Flux <Note1>	ØV	LTL91xSEKSA LTL91xSYKSA	1050 1050	3750 2090		mlm	IF=70mA
Luminous Intensity / Total Flux	Iv / ØV	LTL911SxKSA LTL912SxKSA		0.6 0.9		mcd /mlm	IF=70mA
Viewing Angle <Note2, Fig 5>	2θ1/2	LTL911SxKSA LTL912SxKSA		90 60		deg.	
Peak Emission Wavelength <Fig 1>	λP	LTL91xSEKSA LTL91xSYKSA		638 596		nm	IF=70mA
Dominant Wavelength <Note 3>	λd	LTL91xSEKSA LTL91xSYKSA		628 594		nm	IF=70mA
Forward Voltage	VF		2.15	2.50	3.45	V	IF=70mA
Reverse Voltage	VR		10	20		V	IR = 100μA
Thermal resistance	$R\theta_{J\text{-}PIN}$			125		℃/W	

Note: 1. ØV is the total luminous flux output as measured with an integrating sphere.

2. θ1/2 is the off-axis angle at which the luminous intensity is half the axial luminous intensity.

3. The dominant wavelength, λd is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device.

Typical Electrical / Optical Characteristics Curves

(25℃ Ambient Temperature Unless Otherwise Noted)

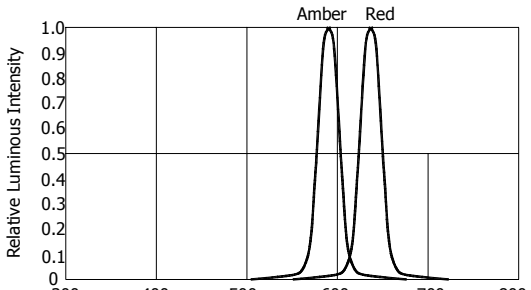


Fig.1 Relative Luminous Intensity vs. Wavelength

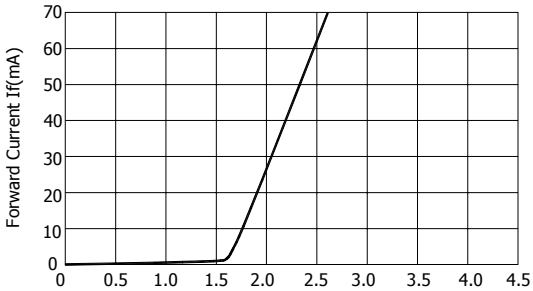


Fig.2 Forward Current vs. Forward Voltage

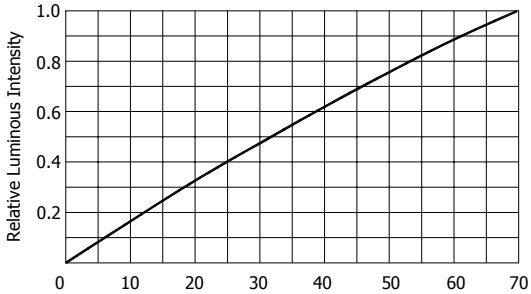


Fig.3 Relative Luminous Flux vs Forward Current

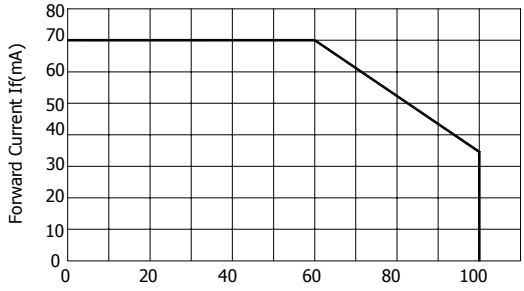


Fig.4 Forward Current vs. Ambient Temperature
(R_{θ} j-a=300 °C/W)

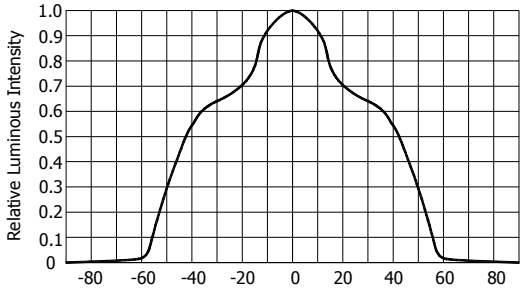


Fig.5a LTL911SxKSA
Relative Luminous Intensity vs. Viewing Angle

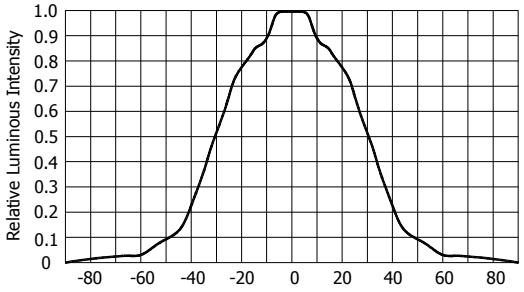


Fig.5b LTL912SxKSA
Relative Luminous Intensity vs. Viewing Angle

Bin Code List For Reference

1. Luminous Flux Bin Table

Bin	Luminous Flux (mlm)	
	Min.	Max.
3X	210	310
3Y	310	470
3Z	470	700
A	700	1050
B	1050	1570
C	1570	2090
D	2090	2600
E	2600	3130
F	3130	3650
G	3650	4170
H	4170	5300
J	5300	6350
L	6350	8430

Note: Tolerance of each bin limit is ±15%

2. Forward voltage Bin Table (For LTL911S- Series and LTL912S- Series)

Bin	Forward Voltage (mlm)	
	Min.	Max.
1	2.25	2.37
2	2.37	2.49
3	2.49	2.61
4	2.61	2.73
5	2.73	2.85
6	2.85	2.97
7	2.97	3.09
8	3.09	3.21
9	3.21	3.33

Note: Tolerance of each bin limit is ±0.06V

3. Hue Bin Table

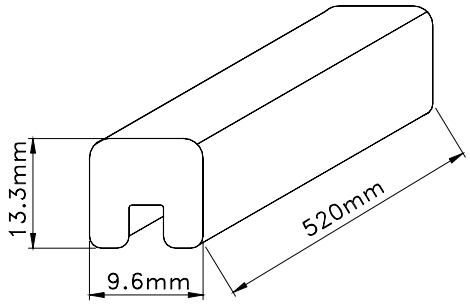
Hue Bin	Amber	
	Min.	Max.
Y0	586	588
Y1	588	590
Y2	590	593
Y3	593	596
Y4	596	599
Y5	599	602

Note: Tolerance of each bin limit is ±2nm

Packing Spec

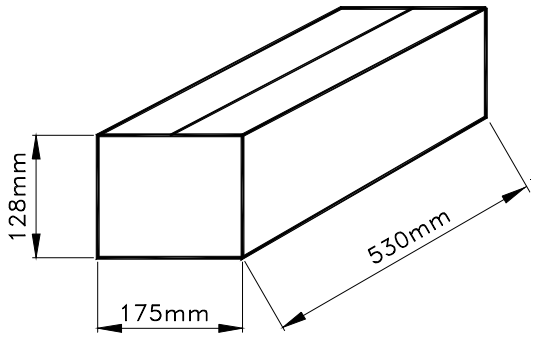
1. Tube: 65pcs

   Dim: 520mm x 9.6mm x 13.3mm



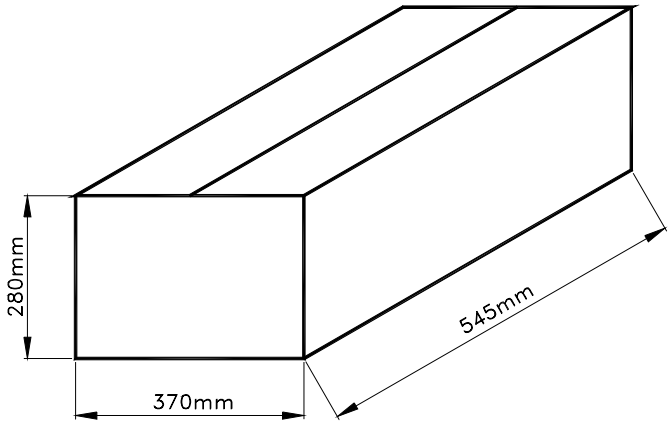
2. Inner carton: 153 tubes x 65 pcs = 9,945 pcs

   Dim: 530mm x 175mm x 128mm



3. Outer carton: 4 inner cartons x 9,945 pcs = 39,780 pcs

   Dim: 545mm x 370mm x 280mm



CAUTIONS

1. Application

The LEDs described here are intended to be used for ordinary electronic equipment (such as office equipment, communication equipment and household applications).Consult Liteon's Sales in advance for information on applications in which exceptional reliability is required, particularly when the failure or malfunction of the LEDs may directly jeopardize life or health (such as in aviation, transportation, traffic control equipment, medical and life support systems and safety devices).

2. Storage

The storage ambient for the LEDs should not exceed 30°C temperature or 70% relative humidity.
It is recommended that LEDs out of their original packaging are used within three months.
For extended storage out of their original packaging, it is recommended that the LEDs be stored in a sealed container with appropriate desiccant or in desiccators with nitrogen ambient.

3. Cleaning

Use alcohol-based cleaning solvents such as isopropyl alcohol to clean the LEDs if necessary.

4. Lead Forming & Assembly

During lead forming, the leads should be bent at a point at least 3mm from the base of LED lens.

Do not use the base of the lead frame as a fulcrum during forming.

Lead forming must be done before soldering, at normal temperature.
During assembly on PCB, use minimum clinch force possible to avoid excessive mechanical stress.

5. Soldering

When soldering, leave a minimum of 2mm clearance from the base of the lens to the soldering point.
Dipping the lens into the solder must be avoided.
Do not apply any external stress to the lead frame during soldering while the LED is at high temperature.

Recommended soldering conditions :

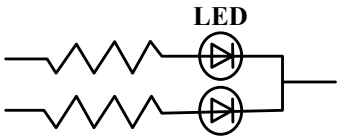
Soldering iron		Wave soldering	
Temperature Soldering time	300°C Max. 3 sec. Max. (one time only)	Pre-heat Pre-heat time Solder wave Soldering time	100°C Max. 30 sec. Max. 260°C Max. 5 sec. Max.

Note: Excessive soldering temperature and/or time might result in deformation of the LED lens or catastrophic failure of the LED

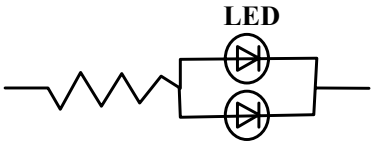
6. Drive Method

An LED is a current-operated device. In order to ensure intensity uniformity on multiple LEDs connected in parallel in an application, it is recommended that a current limiting resistor be incorporated in the drive circuit, in series with each LED as shown in Circuit A below.

Circuit model A



Circuit model B



(A) Recommended circuit

(B) The brightness of each LED might appear different due to the differences in the I-V characteristics of those LEDs

7. ESD (Electrostatic Discharge)

Static Electricity or power surge will damage the LED.

Suggestions to prevent ESD damage:

- Use a conductive wrist band or anti- electrostatic glove when handling these LEDs
- All devices, equipment, and machinery must be properly grounded
- Work tables, storage racks, etc. should be properly grounded
- Use ion blower to neutralize the static charge which might have built up on surface of the LEDs plastic lens as a result of friction between LEDs during storage and handing

ESD-damaged Leeds will exhibit abnormal characteristics such as high reverse leakage current, low forward voltage, or “no light up” at low currents. To verify for ESD damage, check for “light up” and Vf of the suspect LEDs at low currents.

The Vf of “good” LEDs should be >2.0V@0.1mA for InGaN product and >1.4V@0.1mA for AlInGaP product.

Chip ESD level	Machine Model	Human Body Model
InGaN / Sapphire	100 V	300 V
AlInGaP	200 V	500 V
InGaN / SiC	600 V	1000 V

Suggested checking list :

Training and Certification

1. Everyone working in a static-safe area is ESD-certified?
2. Training records kept and re-certification dates monitored?

Static-Safe Workstation & Work Areas

1. Static-safe workstation or work-areas have ESD signs?
2. All surfaces and objects at all static-safe workstation and within 1 ft measure less than 100V?
3. All ionizer activated, positioned towards the units?
4. Each work surface mats grounding is good?

Personnel Grounding

1. Every person (including visitors) handling ESD sensitive (ESDS) items wear wrist strap, heel strap or conductive shoes with conductive flooring?
2. If conductive footwear used, conductive flooring also present where operator stand or walk?
3. Garments, hairs or anything closer than 1 ft to ESD items measure less than 100V*?
4. Every wrist strap or heel strap/conductive shoes checked daily and result recorded for all DSL?
5. All wrist strap or heel strap checkers calibration up to date?

   Note: *50V for Blue LED.

Device Handling

1. Every ESDS items identified by EIA-471 labels on item or packaging?
2. All ESDS items completely inside properly closed static-shielding containers when not at static-safe workstation?
3. No static charge generators (e.g. plastics) inside shielding containers with ESDS items?
4. All flexible conductive and dissipative package materials inspected before reuse or recycle?

Others

1. Audit result reported to entity ESD control coordinator?
2. Corrective action from previous audits completed?
3. Are audit records complete and on file?

8. Reliability Test

Classification	Test Item	Test Condition	Reference Standard
Endurance Test	Operation Life	Ta= Under Room Temperature As Per Data Sheet Maximum Rating *Test Time= 1000HRS (-24HRS,+72HRS)	MIL-STD-750D:1026 (1995) MIL-STD-883D:1005 (1991) JIS C 7021:B-1 (1982)
	High Temperature High Humidity Storage	Ta= 65±5℃ RH= 90 ～ 95% Test Time= 240HRS±2HRS	MIL-STD-202F: 103B(1980) JIS C 7021 : B-11(1982)
	High Temperature High Humidity Reverse BIAS	Ta= 85℃ RH= 85% VR=5V Test Time = 1000HRS (-24HRS, +48HRS)	INTERNAL REFERENCE
	High Temperature Storage	Ta= 105±5℃ *Test Time= 1000HRS (-24HRS,+72HRS)	MIL-STD-883D:1008 (1991) JIS C 7021:B-10 (1982)
	Low Temperature Storage	Ta= -55±5℃ *Test Time=1000HRS (-24HRS,+72HRS)	JIS C 7021:B-12 (1982)
Environmental Test	Temperature Cycling	105℃ ～ 25℃ ～ -55℃ ～ 25℃ 30mins 5mins 30mins 5mins 100 Cycles	MIL-STD-202F:107D (1980) MIL-STD-750D:1051(1995) MIL-STD-883D:1010 (1991) JIS C 7021: A-4(1982)
	Thermal Shock	105 ± 5℃ ～ -55℃ ± 5℃ 15mins 15mins 10 Cycles	MIL-STD-202F:107D(1980) MIL-STD-750D:1051(1995) MIL-STD-883D:1011 (1991)
	Solder Resistance	T.sol = 260 ± 5℃ Dwell Time= 5 ± 1secs	
	Solderability	T. sol = 230 ± 5℃ Dwell Time= 5 ± 1secs	MIL-STD-202F:208D(1980) MIL-STD-750D:2026(1995) MIL-STD-883D:2003(1991) JIS C 7021: A-2(1982)

9. Others

The appearance and specifications of the product may be modified for improvement, without prior notice. Liteon may make process or materials changes affecting the performance or other characteristics of our products. These products supplied after such changes will continue to meet published specifications, but may not be identical to products supplied as samples or under prior orders.