

# NMOP-10153-60

## Surface Mount LED Tape and Reel

### Features:

1. Top view LED
2. White SMT package
3. Leadframe package with individual 2 pin.
4. Wide viewing angle.
5. Soldering methods: IR reflow soldering
6. Feature of the device: more light due to higher optical efficiency; extremely wide viewing angle; ideal for backlighting and coupling in light guide
7. Qualification according to AEC-Q101

### Descriptions:

The NMOP-10153-60 SMD has wide viewing angle and optimized light coupling by inter reflector. The low current requirement makes this device ideal for portable equipment or any other application where power is at a premium.

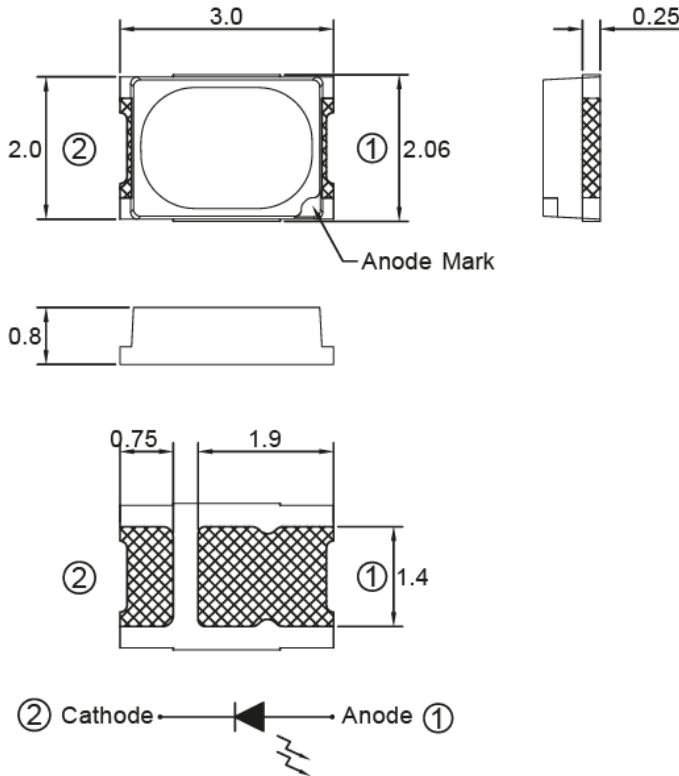
### Applications:

1. Telecommunication: indicator and backlighting in telephone and fax.
2. Indicators.
3. Switch lights.
4. Automotive backlighting or indicator

### Device Selection Guide

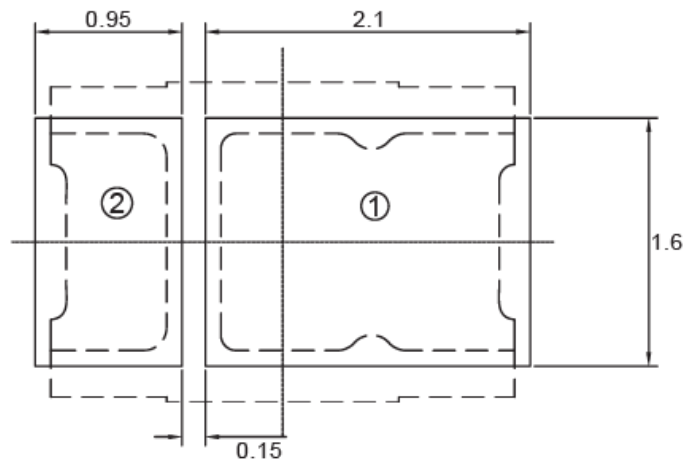
Part No	Material	Color	
		Emitted	Lens
NMOP-10153-60	AlGaInP	Yellow	Water Clear

## Package Dimensions



Note : 1. All dimension are in millimeter tolerance is  $\pm 0.2\text{mm}$  unless otherwise noted.  
 2. Specifications are subject to change without notice.

## Recommended Soldering Pad Dimensions



Note : The tolerances unless mentioned is  $\pm 0.1\text{mm}$ , Unit=mm.

## Absolute Maximum Ratings

(Ta=25°C)

Parameter	Symbol	Ratings	UNIT
		UY(R)	
Forward Current	$I_F$	60	mA
Peak Forward Current Duty 1/10@10KHz	$I_{FP}$	120	mA
Power Dissipation	PD	156	mW
Reverse Voltage	$V_r$	10	$\mu$ A
Electrostatic Discharge (Classification acc. AEC Q101)	$ESD_{(HBM)}$	2000	V
Operating Temperature	$T_{opr}$	-40 ~ +85	°C
Storage Temperature	$T_{stg}$	-40 ~ +100	°C

## Typical Electrical & Optical Characteristics

(Ta=25° C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Luminous Intensity	$I_v$	2000	2550	---	mcd	IF=60mA
Dominant Wavelength	$\lambda_D$	---	590	---	nm	IF=60mA
Spectral Line Half-Width	$\Delta\lambda$	---	20	---	nm	IF=60mA
Forward Voltage	$V_F$	1.8	---	2.6	V	IF=60mA
Viewing Angle	$2\theta$	---	120	---	deg	IF=60mA

Note:

1. The forward voltage data did not including  $\pm 0.1V$  testing tolerance
2. The luminous intensity data did not including  $\pm 15\%$  testing tolerance
3. The dominant wavelength data did not including  $\pm 1nm$  testing tolerance

## Luminous Intensity Classification

BIN Code	Iv(mcd) at 60mA	
	min	max
X-1	2000	2550
X-2	2550	3200
Y-1	3200	4000

## Dominant Wavelength Classification

BIN Code	$\lambda_D$ (nm) at 60mA	
	min	max
15	585	587
16	587	589
17-1	589	590
17-2	590	591
17-3	591	592
18	592	595
19	595	598

## Forward Voltage Classification

BIN Code	Vf(v) at 60mA	
	min	max
1	1.8	2
2	2	2.2
3	2.2	2.4
4	2.4	2.6

# Typical Electro-Optical Characteristics Curve UYR Chip

Fig.1 Forward current vs. Forward Voltage

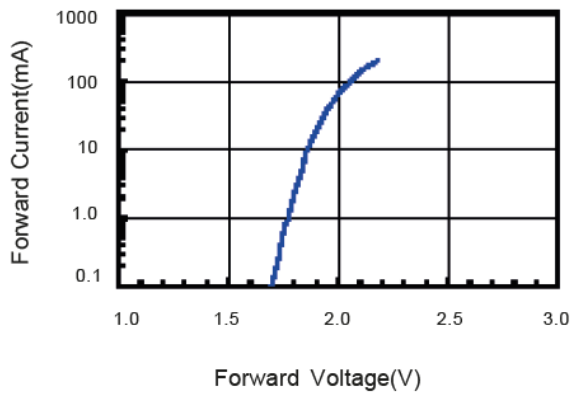


Fig.2 Relative Intensity vs. Forward Current

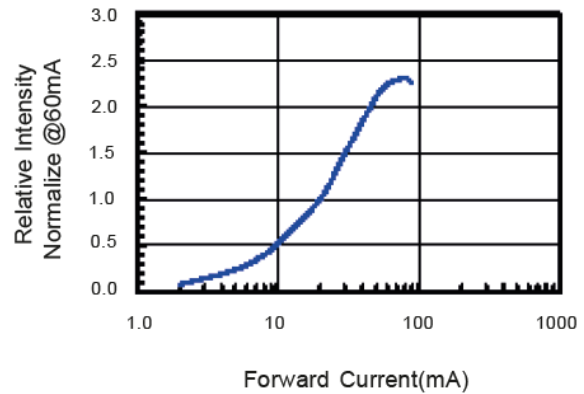


Fig.3 Forward Voltage vs. Temperature

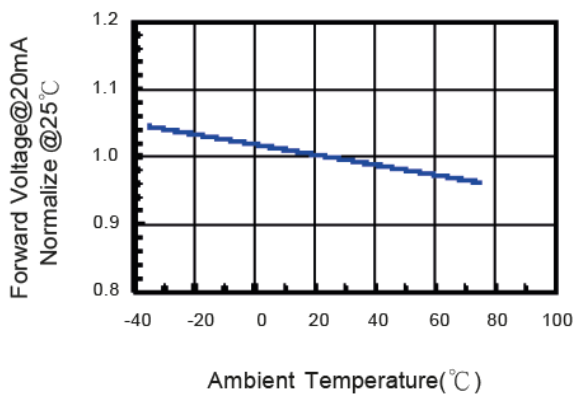


Fig.4 Relative Intensity vs. Temperature

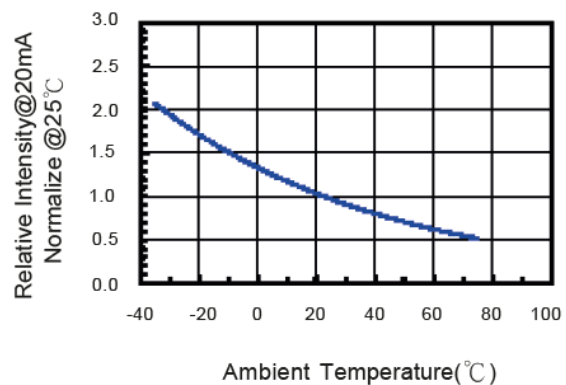


Fig.5 Relative Intensity vs. Wavelength

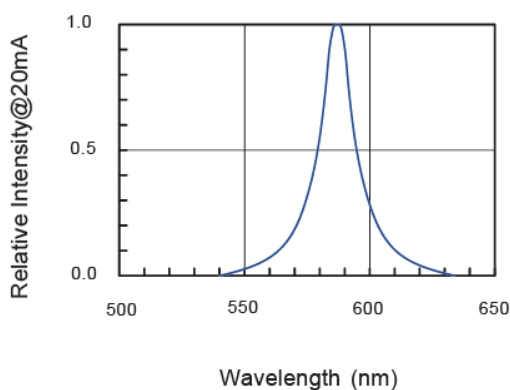
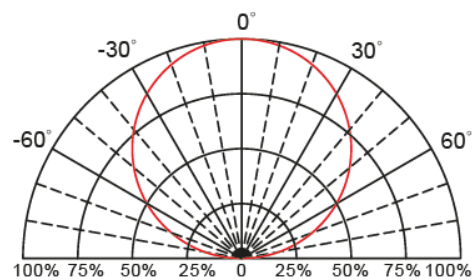
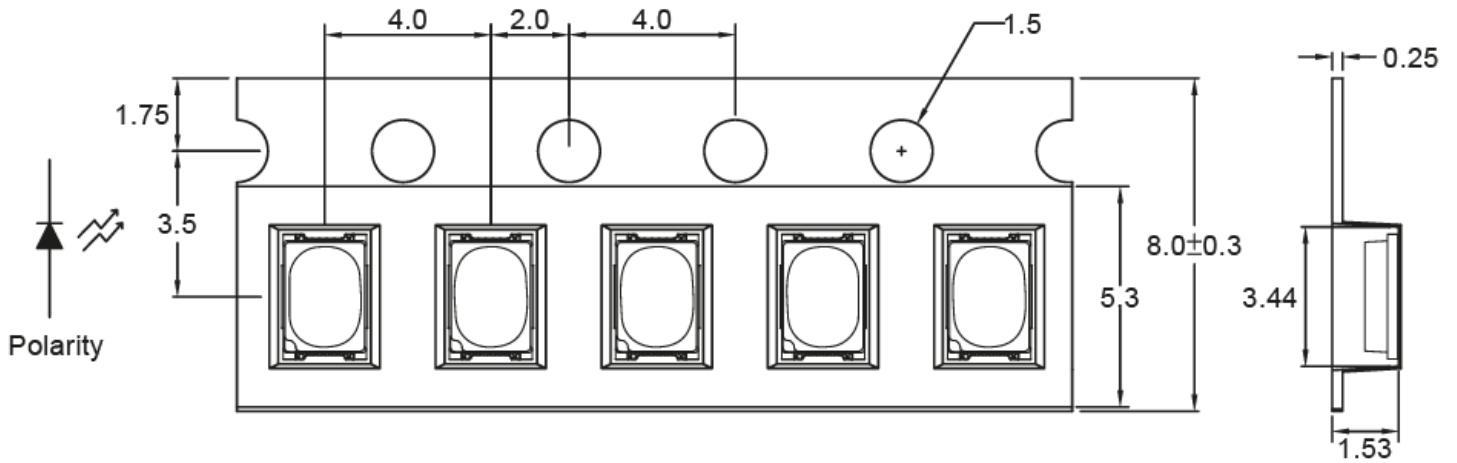


Fig.6 Directive Radiation



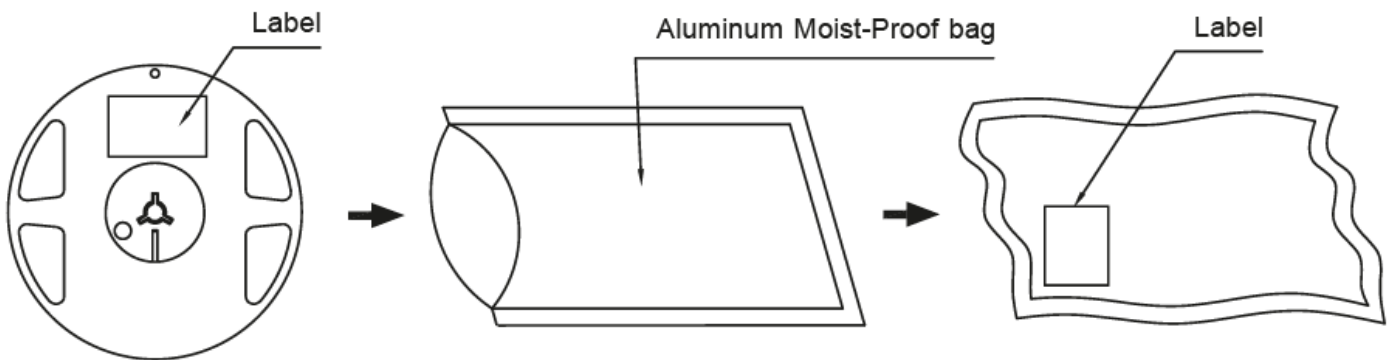
NMOP-10153-60

## Carrier Type Dimensions



Note : The tolerances unless mentioned is  $\pm 0.1$  mm, Unit=mm.

## Packing Specifications



Part No.	Description	Quantity/Reel
NMOP-10153-60	8.0mm tape, 7" reel	2000 PCS

## Label Explanation

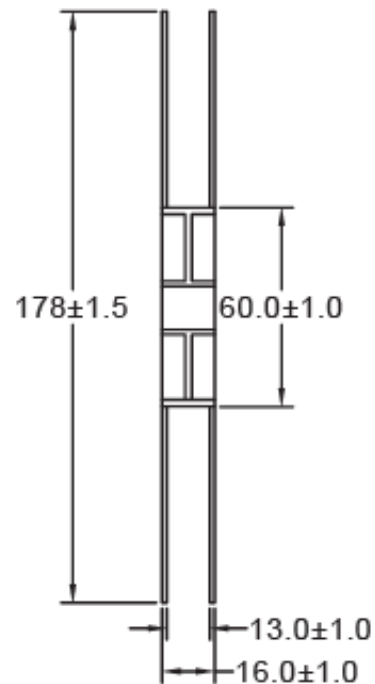
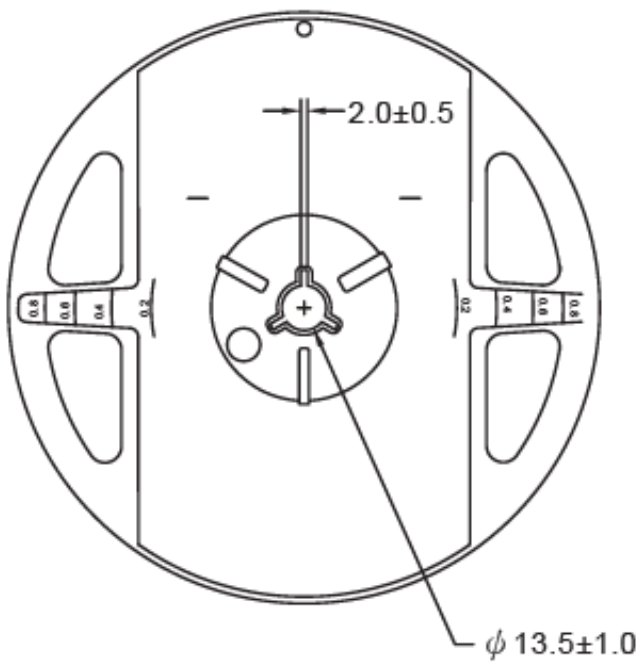


BIN : Luminous Intensity

HUE: Dominant Wavelength

VF: Forward Voltage

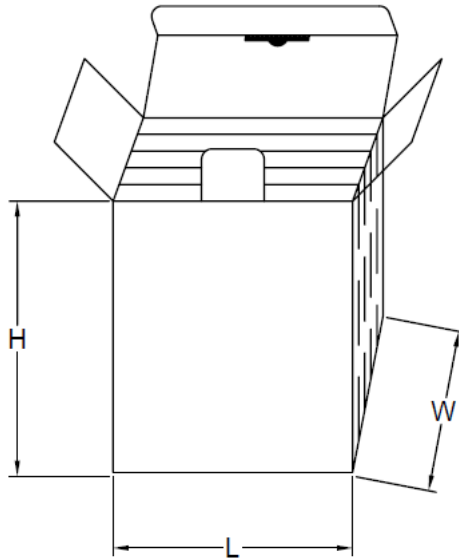
## Reel Dimensions



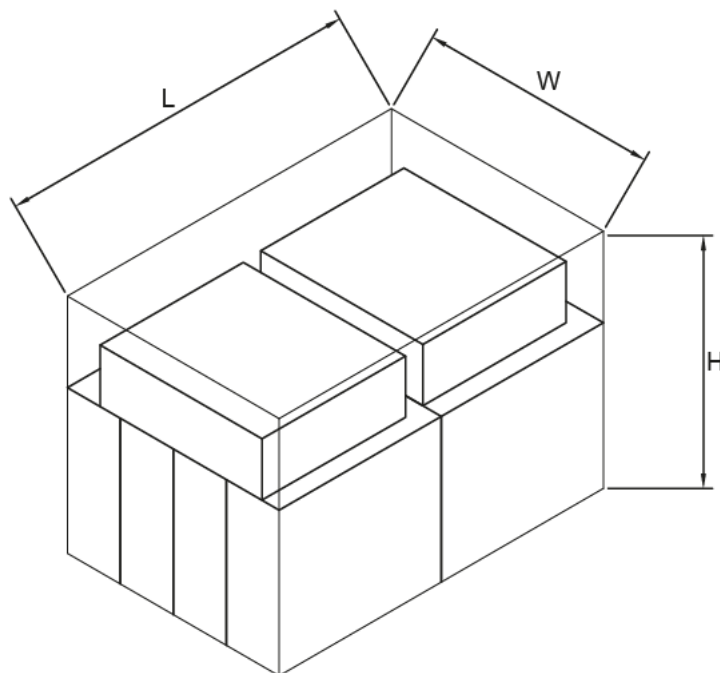
**NMOP-10153-60**

## Box Explanation

1. 5 BAG / INNER BOX
2. INNER BOX SIZE : L X W X H 23cm X 8.5cm x 26cm



3. 10 INNER BOXES / CARTON
4. CARTON SIZE : L X W X H 58cm X 34cm x 35cm



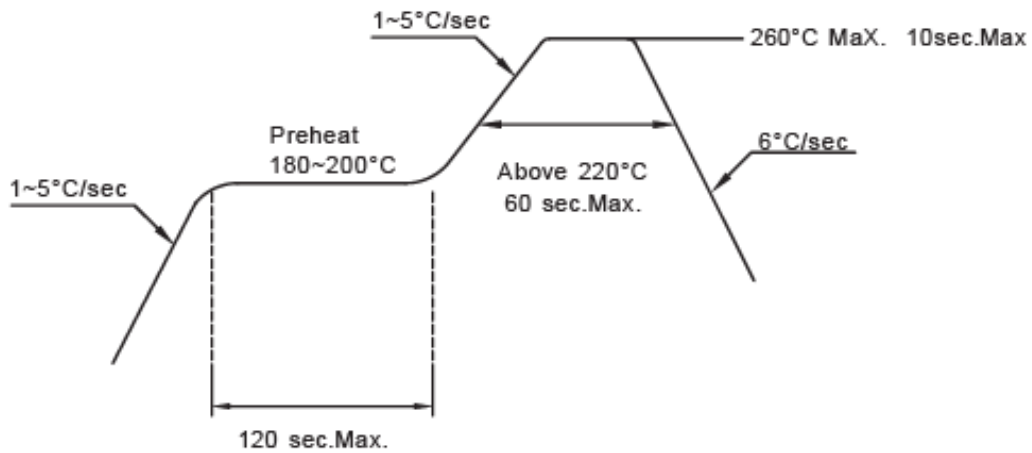


## Recommended Soldering Conditions

### 1. Hand solder

Basic spec is  $\leq 320^{\circ}\text{C}$  3 sec. one time only

### 2. PB-Free Reflow Solder



- Note:
1. Reflow soldering should not be done more than two times.
  2. When soldering, do not put stress on the LEDs during heating.
  3. After soldering, do not warp the circuit board.

## Precautions For Use:

### Storage time:

1. Calculated shelf life before opening is 12 months at <math><30^{\circ}\text{C}</math> and <math><90\%</math> relative humidity (RH)
2. After bag is opened, devices which will be subjected to reflow soldering or other high temperature processes must be:
  - a) Assembled with 168 hours in an environment of  $\leq 30^{\circ}\text{C}/60\% \text{ RH}$ , or
  - b) Stored at ambient of 10% RH or less
3. Devices are required baking before assembly if:
  - a) Humidity Indicator Card reads <math><10\%</math> (for level 2a-5a) or <math>>60\%</math> (for level 2 ) at ambient temperature  $23\pm 5^{\circ}\text{C}$
  - b) 2a) or 2b) doesn't meet
4. If baking is required, devices should be baked for >72 hours at  $60\pm 5^{\circ}\text{C} / 5\% \text{ RH}$ . Performing baking only once, and using the baked devices within 72 hours.

## Drive Method

LED is a current operated device, and therefore, requires some kind of current limiting incorporated into the driver circuit. This current limiting typically takes the form of a current limiting resistor placed in series with the LED.

Consider worst case voltage variations that could occur across the current limiting resistor. The forward current should not be allowed to change by more than 40% of its desired value.



(A) Recommended circuit.

(B) The difference in brightness between LEDs could be found due to the V<sub>F</sub>-I<sub>F</sub> characteristics of LEDs.

## Cleaning

Use alcohol-based cleaning solvents such as isopropyl alcohol to clean the LED.

## ESD(Electrostatic Discharge):

Static Electricity or power surge will damage the LED. Use of a conductive wrist band or anti-electrostatic glove is recommended when handling these LEDs. All devices, equipment and machinery must be properly grounded.

## Reliability Test:

Classification	Test Item	Test Condition	Sample Size
Endurance Test	Operating Life Test	1.Ta=25°C 2.If=60mA 3.t=1000 hrs (-24hrs,+72hrs)	22
	High Temperature Storage Test	1.Ta=100°C±5°C 2.t=1000 hrs (-24hrs,+72hrs)	22
	Low Temperature Storage Test	1.Ta=-40°C±5°C 2.t=1000 hrs (-24hrs,+72hrs)	22
	High Temperature High Humidity Storage Test	1.Ta=85°C 2.RH=85% 3.t=1000hrs(-24hrs,+72hrs)	22
Environmental Test	Thermal Shock Test	1.Ta=100°C±5°C ~ -40°C±5°C 20min/ 10sec / 20min 2.total 100 cycles	22
	Temperature Cycling	1.100°C±5°C ~ -40°C±5°C 30mins / 5mins / 30mins 2.100 Cycles	22
	IR Reflow	1.T=260°C Max. 10sec.Max. 2. 6 Min	22