

SML0603-0IW-TR

Warm White

Surface Mount LED

1.6 × 0.8 × 0.8mm Chip LED

120° viewing angle

DWG BY:
BL / GP
12-11-08

CHK BY:
PL
12-12-08

REVISION LTR: -
12-11-08

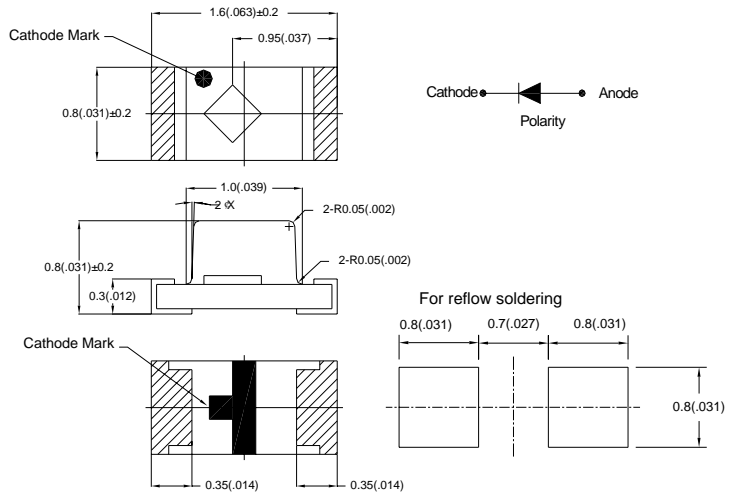
● **Features:**

1. Emitted Color : White
2. Mono-color type.
3. 1.6x0.8x0.8mm(0603)standard package
4. Suitable for all SMT assembly methods.
5. Compatible with infrared and vapor phase reflow solder process.
6. Compatible with automatic placement equipment.
7. This product is RoHS compliant.

● **Applications:**

1. Automotive : Dashboards, stop lamps, turn signals.
2. Backlighting : LCDs, Key pads advertising.
3. Status indicators : Comsumer & industrial electronics.
4. General use.

● **Package Dimensions:**



NOTES:

1. All dimensions are in millimeters (inches).
2. Tolerance is ±0.10mm (0.004") unless otherwise specified.
3. Specifications are subject to change without notice.

● **Absolute Maximum Ratings(Ta=25°C)**

Parameter	Symbol	Rating	Unit
Power Dissipation	Pd	120	mW
Forward Current	I _F	30	mA
Peak Forward Current * 1	I _{FP}	100	mA
Reverse Volage	V _R	5	V
Operating Temperature	Topr	-25°C~85°C	-
Storage Temperature	Tstg	-40°C~100°C	-
Soldering Temperature	Tsol	See Page 8	-

* 1 Condition for I_{FP} is pulse of 1/10 duty and 0.1msec width.

● **Electrical and optical characteristics(Ta=25°C)**

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V _F	I _F =20mA		3.2	3.6	V
Luminous Intensity	I _v	I _F =20mA	210	500		mcd
Reverse Current	I _R	V _R =5V	-	-	1	μA
Chromaticity	x	I _F =20mA		0.42		-
Coordinates	y	I _F =20mA		0.42		-
Viewing Angle	2θ _{1/2}	I _F =20mA	-	120	-	deg

● **Typical Electro-Optical Characteristics Curves**

Fig.1 Relative intensity vs. wavelength

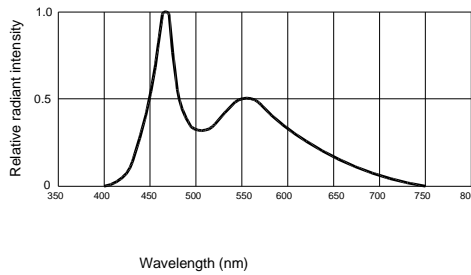


Fig.2 Forward current derating curve vs. ambient temperature

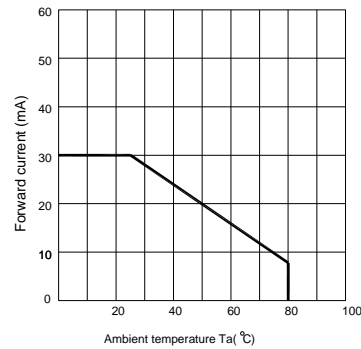


Fig.3 Forward current vs. forward voltage

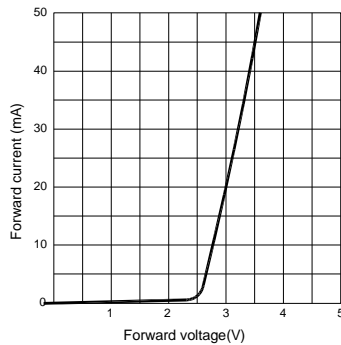


Fig.4 Relative luminous intensity vs. ambient temperature

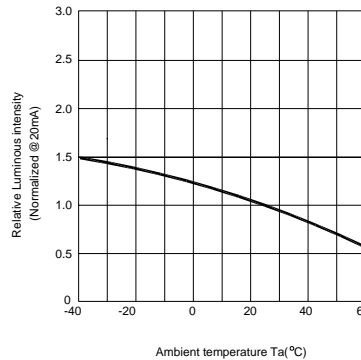


Fig.5 Relative luminous intensity vs. forward current

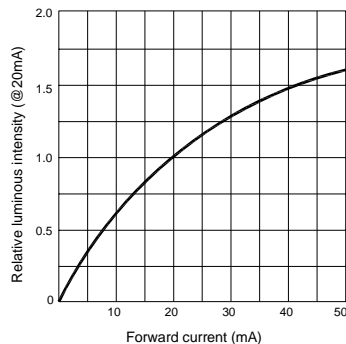
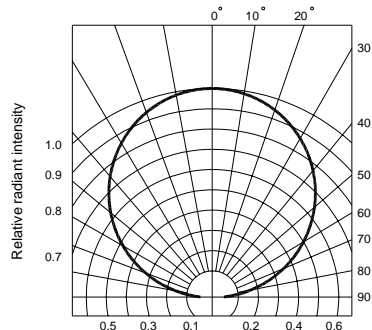
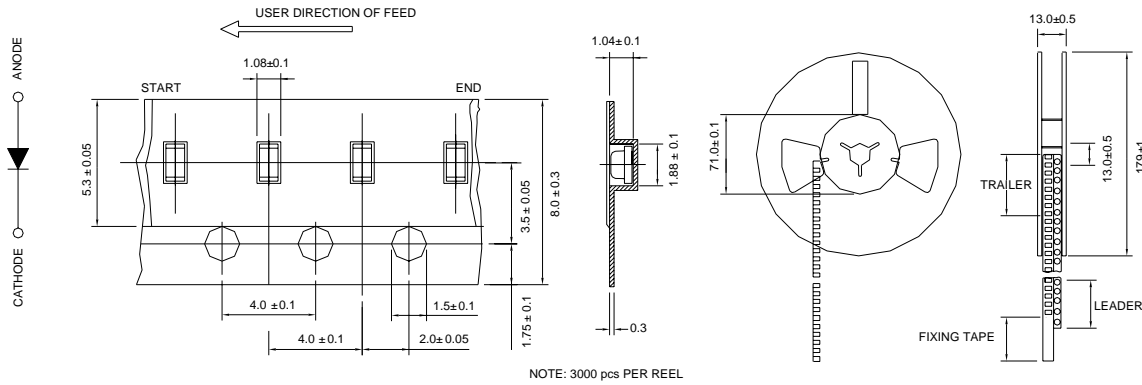


Fig.6 Radiation diagram



● **Tapping and packaging specifications(Units: mm)**



● **Bin Limits**

Intensity Bin Limits (At 20mA):

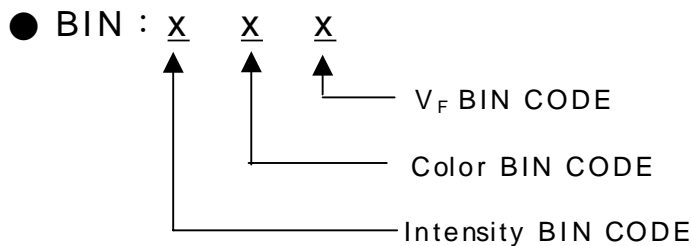
BIN CODE	Min. (mcd)	Max. (mcd)
S	210	317
T	317	475
U	475	715
V	715	1070

Tolerance for each Bin limit is ± 15 %

VF Bin Limits (At 20mA):

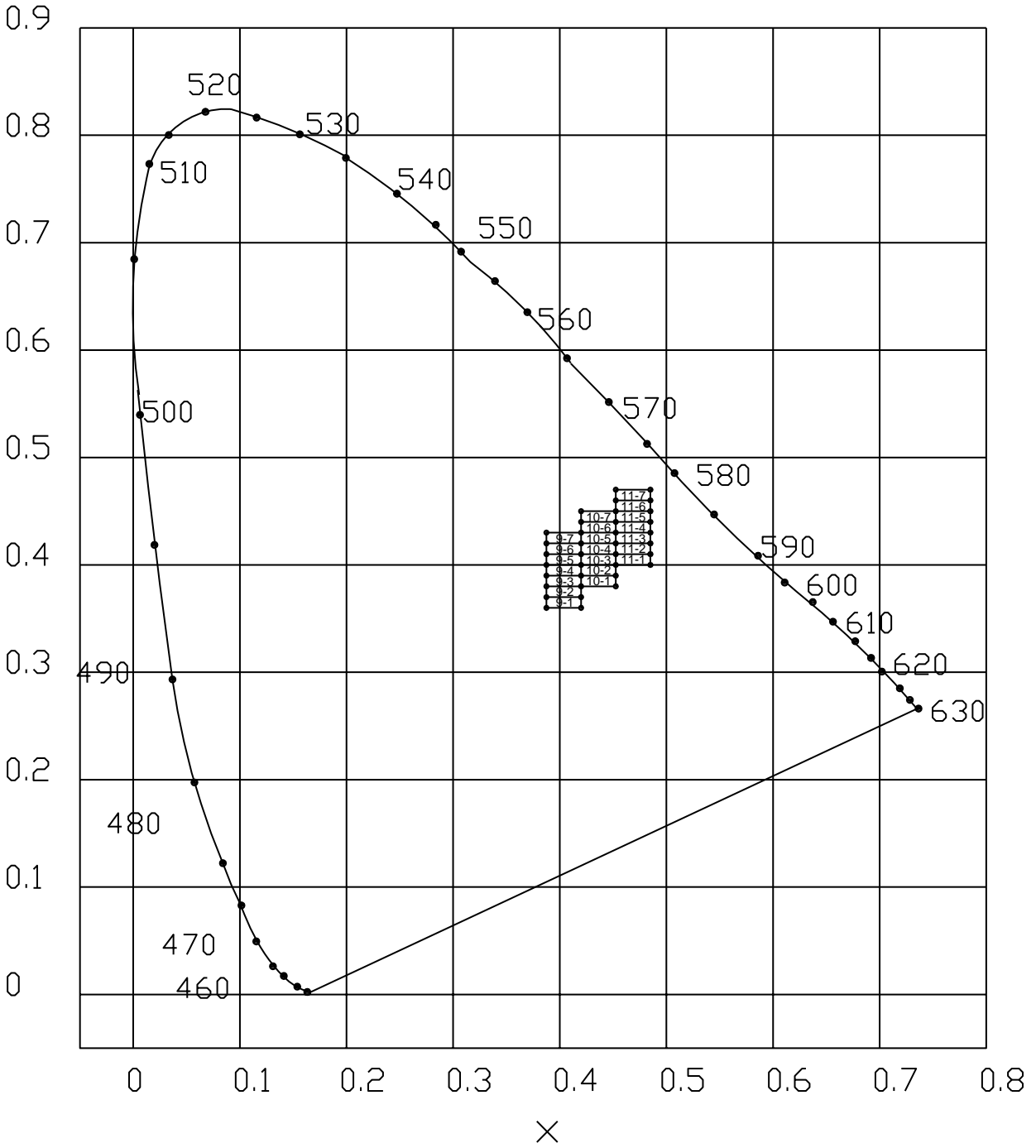
BIN CODE	Min.(v)	Max.(v)
G	2.8	3.0
H	3.0	3.2
J	3.2	3.4
K	3.4	3.6

Tolerance for each Bin limit is ± 0.05V



Color Bin Limits (At 20mA):

C.I.E CHROMATICITY DIAGRAM



Color Bin Limits (At 20mA):

BIN	Chromaticity Coordinates				
9-1	x	0.420	0.385	0.385	0.420
	y	0.360	0.360	0.370	0.370
9-2	x	0.420	0.385	0.385	0.420
	y	0.370	0.370	0.380	0.380
9-3	x	0.420	0.385	0.385	0.420
	y	0.380	0.380	0.390	0.390
9-4	x	0.420	0.385	0.385	0.420
	y	0.390	0.390	0.400	0.400
9-5	x	0.420	0.385	0.385	0.420
	y	0.400	0.400	0.410	0.410
9-6	x	0.420	0.385	0.385	0.420
	y	0.410	0.410	0.420	0.420
9-7	x	0.420	0.385	0.385	0.420
	y	0.420	0.420	0.430	0.430
10-1	x	0.453	0.420	0.420	0.453
	y	0.380	0.380	0.390	0.390
10-2	x	0.453	0.420	0.420	0.453
	y	0.390	0.390	0.400	0.400
10-3	x	0.453	0.420	0.420	0.453
	y	0.400	0.400	0.410	0.410
10-4	x	0.453	0.420	0.420	0.453
	y	0.410	0.410	0.420	0.420
10-5	x	0.453	0.420	0.420	0.453
	y	0.420	0.420	0.430	0.430
10-6	x	0.453	0.420	0.420	0.453
	y	0.430	0.430	0.440	0.440
10-7	x	0.453	0.420	0.420	0.453
	y	0.440	0.440	0.450	0.450
11-1	x	0.485	0.453	0.453	0.485
	y	0.400	0.400	0.410	0.410
11-2	x	0.485	0.453	0.453	0.485
	y	0.410	0.410	0.420	0.420
11-3	x	0.485	0.453	0.453	0.485
	Y	0.420	0.420	0.430	0.430
11-4	X	0.485	0.453	0.453	0.485
	y	0.430	0.430	0.440	0.440
11-5	x	0.485	0.453	0.453	0.485
	y	0.440	0.440	0.450	0.450
11-6	x	0.485	0.453	0.453	0.485
	y	0.450	0.450	0.460	0.460
11-7	x	0.485	0.453	0.453	0.485
	y	0.460	0.460	0.470	0.470

● Reliability Test

Classification	Test Item	Reference Standard	Test Conditions	Result
Endurance Test	Operation Life	MIL-STD-750:1026 MIL-STD-883:1005 JIS-C-7021 :B-1	Connect with a power $I_f=20\text{mA}$ T_a =Under room temperature Test time=1,000hrs	0/20
	High Temperature High Humidity Storage	MIL-STD-202:103B JIS-C-7021 :B-11	$T_a=+65^\circ\text{C}\pm 5^\circ\text{C}$ RH=90%-95% Test time=240hrs	0/20
	High Temperature Storage	MIL-STD-883:1008 JIS-C-7021 :B-10	High $T_a=+85^\circ\text{C}\pm 5^\circ\text{C}$ Test time=1,000hrs	0/20
	Low Temperature Storage	JIS-C-7021 :B-12	Low $T_a=-35^\circ\text{C}\pm 5^\circ\text{C}$ Test time=1,000hrs	0/20
Environmental Test	Temperature Cycling	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1010 JIS-C-7021 :A-4	$-35^\circ\text{C} \sim +25^\circ\text{C} \sim +85^\circ\text{C} \sim +25^\circ\text{C}$ 60min 20min 60min 20min Test Time=5cycle	0/20
	Thermal Shock	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1011	$-35^\circ\text{C}\pm 5^\circ\text{C} \sim +85^\circ\text{C}\pm 5^\circ\text{C}$ 20min 20min Test Time=10cycle	0/20
	Solder Resistance	MIL-STD-202:201A MIL-STD-750:2031 JIS-C-7021 :A-1	Preheating : 140°C-160°C, within 2 minutes. Operation heating : 260°C(Max.), within 10seconds. (Max.)	0/20

● Judgment criteria of failure for the reliability

Measuring items	Symbol	Measuring conditions	Judgement criteria for failure
Forward voltage	V_F (V)	$I_F=20\text{mA}$	Over $U_x1.2$
Reverse current	I_R (μA)	$V_R=5\text{V}$	Over U_x2
Luminous intensity	I_v (mcd)	$I_F=20\text{mA}$	Below $SX0.5$

Note: 1.U means the upper limit of specified characteristics. S means initial value.

2.Measurment shall be taken between 2 hours and after the test pieces have been returned to normal ambient conditions after completion of each test.

● **Soldering :**

1. Manual Of Soldering

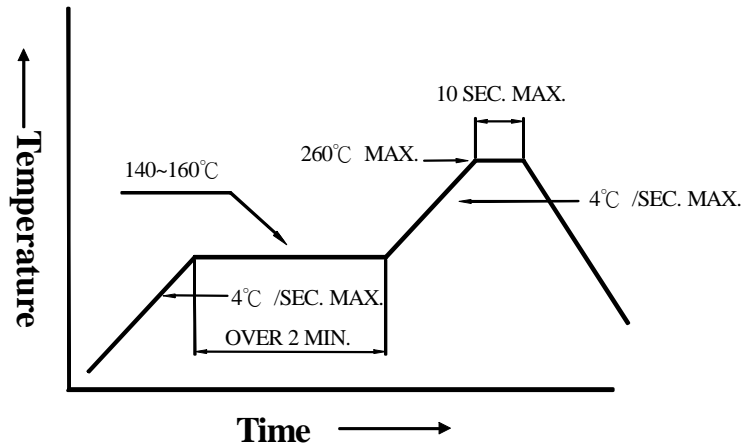
The temperature of the iron tip should not be higher than 300°C(572°F) and Soldering within 3 seconds per solder-land is to be observed.

2. Reflow Soldering

Preheating : 140°C~160°C±5°C, within 2 minutes.

Operation heating : 260°C(Max.) within 10 seconds.(Max)

Gradual Cooling (Avoid quenching).

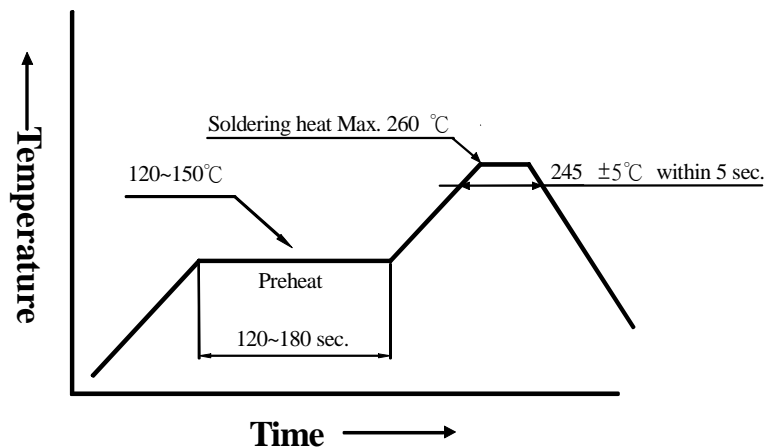


3. DIP soldering (Wave Soldering) :

Preheating : 120°C~150°C, within 120~180 sec.

Operation heating : 245°C±5°C within 5 sec. 260°C (Max)

Gradual Cooling (Avoid quenching).



● **Handling :**

Care must be taken not to cause to the epoxy resin portion of LEDs while it is exposed to high temperature.

Care must be taken not rub the epoxy resin portion of LEDs with hard or sharp article such as the sand blast and the metal hook.