

SML0603-G4-TR

Hi-Eff Green

Surface Mount LED

1.6 × 0.8 × 0.8mm Chip LED

120° viewing angle

DWG BY:
BL / GP
09-25-06

CHK BY:
PL
12-27-06

QA:
__-__-06

MFG:
__-__-__

REVISION LTR: -
12-27-06

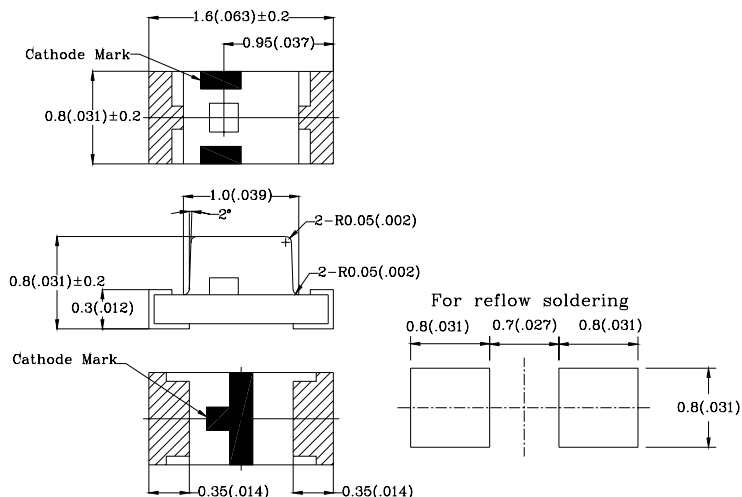
● **Features:**

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

● **Applications:**

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

● **Package Dimensions:**



NOTES:

1. All dimensions are in millimeters (inches).
2. Tolerance is $\pm 0.10\text{mm}$ (0.004") unless otherwise specified.
3. Specifications are subject to change without notice.

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

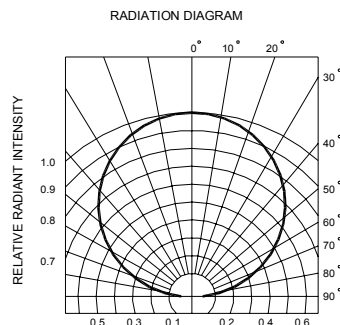
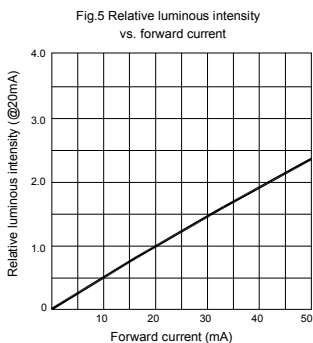
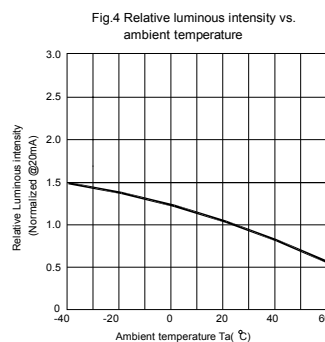
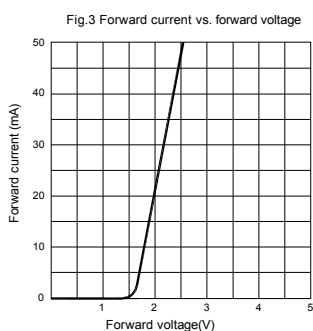
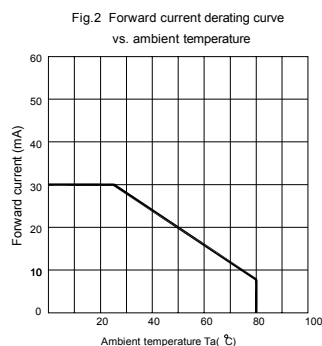
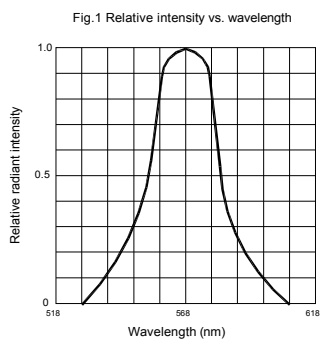
Parameter	Symbol	Rating	Unit
Power Dissipation	Pd	80	mW
Forward Current	I _F	30	mA
Peak Forward Current *1 *	I _{FP}	100	mA
Reverse Voltage	V _R	5	V
Operating Temperature	Topr	-55°C~85°C	-
Storage Temperature	Tstg	-55°C~85°C	-
Soldering Temperature	Tsol	See Page6	-

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

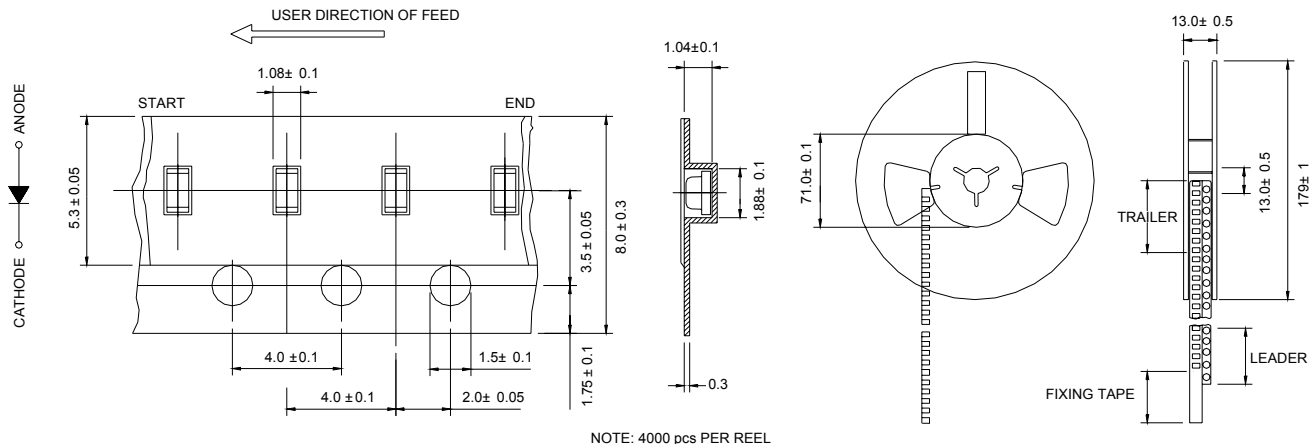
● **Electrical and optical characteristics (Ta=25°C)**

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	$I_F=20\text{mA}$	-	2.2	2.6	V
Luminous Intensity	I_v	$I_F=20\text{mA}$	3.7	10	-	mcd
Reverse Current	I_R	$V_R=5\text{V}$	-	-	100	μA
Peak Wave Length	λ_p	$I_F=20\text{mA}$	562	565	569	nm
Dominant Wave Length	λ_d	$I_F=20\text{mA}$	565	570	572	nm
Spectral Line Half-width	$\Delta\lambda$	$I_F=20\text{mA}$	-	29	-	nm
Viewing Angle	$2\theta_{1/2}$	$I_F=20\text{mA}$	-	120	-	deg
Radiant Intensity		$I_F=20\text{mA}$	-	-	-	$\mu\text{W/sr}$
Chromaticity Coordinates	X	$I_F=20\text{mA}$	-	0.45	-	
	Y		-	0.54	-	

● **Typical Electro-Optical Characteristics Curves**



• Tapping and packaging specifications (Units: mm)



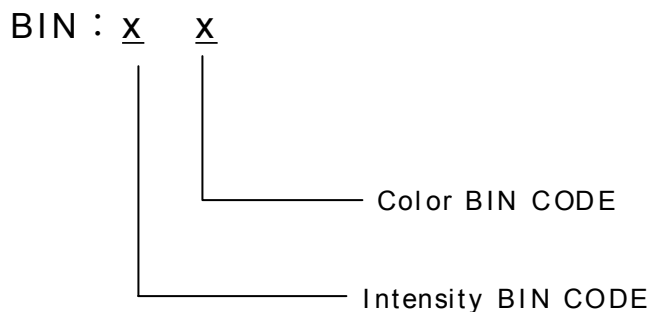
• Bin Limits

Intensity Bin Limits (At 20mA)

BIN CODE	Min. (mcd)	Max. (mcd)
G	3.2	6.3
H	4.8	9.4
J	7.0	14.0
K	11.0	21.0

Color Bin Limits (At 20mA)

BIN CODE	Min. (mcd)	Max. (mcd)
4	565	569
5	567	571
6	569	573
7	571	575
8	573	577



• **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	Ta=Under Room Temperature As Per Data Sheet Maximum Rating Test Time=1000HRS(-24HRS,+72HRS) @ 20mA	0/20
	High Temperature High Humidity Storage	MIL-STD-202:103B JIS-C-7021 :B-11	Ta=+65°C±5°C RH=90%-95% Test time=240hrs±2HRS	0/20
	High Temperature Storage	MIL-STD-883:1008 JIS-C-7021 :B-10	High Ta=+105°C±5°C Test time=1,000hrs(-24HRS,+72HRS)	0/20
	Low Temperature Storage	JIS-C-7021 :B-12	Low Ta=-55°C±5°C Test time=1,000hrs(-24HRS,+72HRS)	0/20
Environmental Test	Temperature Cycling	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1010 JIS-C-7021 :A-4	+105°C ~ +25°C ~ -55°C ~ +25°C 30min 5min 30min 5min Test Time=10cycle	0/20
	Thermal Shock	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1011	IR-Reflow In-Board, 2 Times 85±5°C (10min)~-40±5°C(10min) Test Time=10cycle	0/20
	Solder Resistance	MIL-STD-202:201A MIL-STD-750:2031 JIS-C-7021 :A-1	T.sol=260±5 Dwell Time=10±1secs	0/20
	IR-Reflow	-	Ramp-up rate(183°C to Peak)+3°C 1sec max	0/20
	Solderability	-	Temp maintain at 125±25°C 120sec max	0/20
			Temp maintain above 183°C 60 ~ 150sec	0/20
			Peak temperature range 235°C~ 240°C	0/20
			Time within 5°C of actual Pwck Temperature 10-30sec	0/20
	Solderability	-	Ramp-down rate+6°C 1sec max	0/20
			T.sol=235±5°C	0/20
			Immersion time 2±0.5sec	0/20
			Immersion rate 25±2.5mm/sec	0/20
			Coverage ≥ 95% of the dipped surface	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 =20mA	Over Ux1.2
Reverse current	I _R (uA)	V _R =5V	Over Ux2
Luminous intensity	I _v (mcd)	I _F =20mA	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.

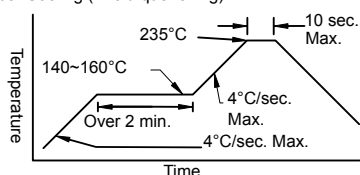
1. Soldering

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.

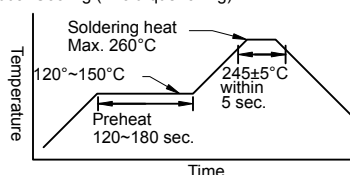
Reflow Soldering

Preheating: 140°C~160°C $\pm 5^{\circ}\text{C}$, within 2 minutes.
 Operation heating: 260°C (Max.) within 10 seconds. (Max.)
 Gradual Cooling (Avoid quenching).



DIP Soldering (Wave Soldering)

Preheating: 120°C~150°C, within 120~180 sec.
 Operation heating: 245°C $\pm 5^{\circ}\text{C}$ within 5 sec.
 260°C (Max.)
 Gradual Cooling (Avoid quenching).



2. Handling

Care must be taken not to cause damage to the epoxy resin portion of LEDs while it is exposed to high temperatures, or abrade the epoxy resin portion of LEDs with hard or sharp items as from sand blasting and the use of sharp metallic objects.

3. Notes for designing

Care must be taken to provide the current limiting resistor in the circuit so as to drive the LEDs within the rated figures. Also, caution should be taken not to overload LEDs with instantaneous voltage at the turning ON and OFF of the circuit. When using the pulse drive care must be taken to keep the average current within the rated figures. Also, the circuit should be designed so as to be subjected to reverse voltage when turning off the LEDs.

4. Storage:

In order to avoid the absorption of moisture, it is recommended to solder LEDs as soon as possible after unpacking the sealed envelope. If the envelope is still packed, store it in the following environment:

- (1) Temperature: 5°C~30°C (41°F~86°F) Humidity: RH 60% Max.
- (2) After this bag is opened, devices that will be applied to infrared reflow, vapor-phase reflow, or equivalent soldering process must be:
 - a. Completed within 24 hours.
 - b. Stored at less than 30% RH
- (3) Devices require baking before mounting if: (2)a or (2)b is not met.
- (4) If baking is required, devices must be baked under below conditions:

12 hours at 60°C $\pm 3^{\circ}\text{C}$