

SML10R4H-TR

Hi-Eff Red

Surface Mount LED

3.2 × 1.6 × 1.1 mm Chip LED

120° viewing angle

DWG BY:
BL / GP
10-19-07

CHK BY:
PL
10-22-07

QA:

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MFG:

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REVISION LTR: -

10-19-07

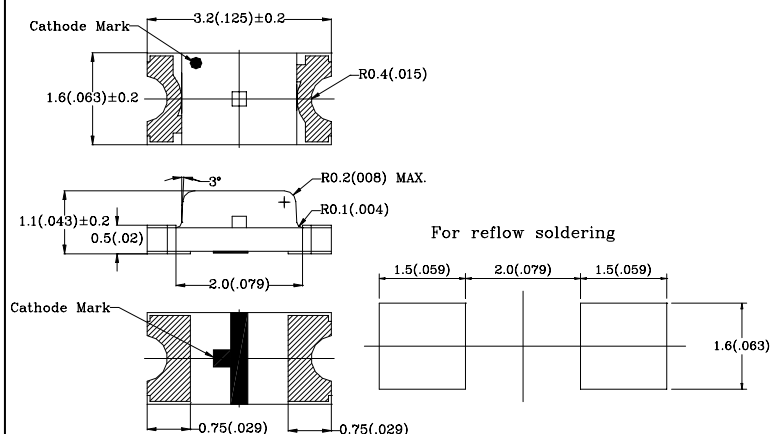
● Features:

1. Emitted Color : Hi-Eff Red
2. Lens Appearance : Water Clear.
3. Mono-color type.
4. 3.2x1.6x1.1mm(1206) 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($T_a=25^\circ\text{C}$)

Parameter	Symbol	Rating	Unit
Power Dissipation	P_d	80	mW
Forward Current	I_F	30	mA
Peak Forward Current * 1	I_{FP}	100	mA
Reverse Voltage	V_R	5	V
Operating Temperature	T_{opr}	$-25^\circ\text{C} \sim 80^\circ\text{C}$	-
Storage Temperature	T_{stg}	$-30^\circ\text{C} \sim 85^\circ\text{C}$	-
Soldering Temperature	T_{sol}	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	$I_F=20\text{mA}$	-	2.0	2.6	V
Luminous Intensity	I_v	$I_F=20\text{mA}$	2.4	8.0	-	mcd
Reverse Current	I_R	$V_R=5\text{V}$	-	-	100	μA
Peak Wave Length	λ_p	$I_F=20\text{mA}$	-	646	-	nm
Dominant Wave Length	λ_d	$I_F=20\text{mA}$	-	630	-	nm
Spectral Line Half-width	$\Delta\lambda$	$I_F=20\text{mA}$	-	45	-	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	$I_F=20\text{mA}$	-	0.70	-	
	Y		-	0.29	-	

● **Typical Electro-Optical Characteristics Curves**

Fig.1 RELATIVE INTENSITY VS. WAVELENGTH

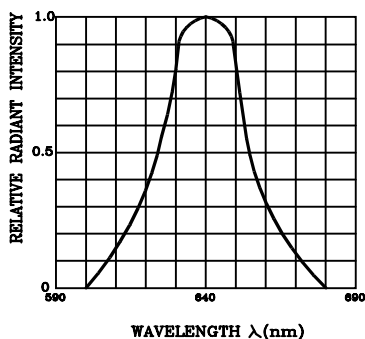


Fig.2 FORWARD CURRENT DERATING CURVE

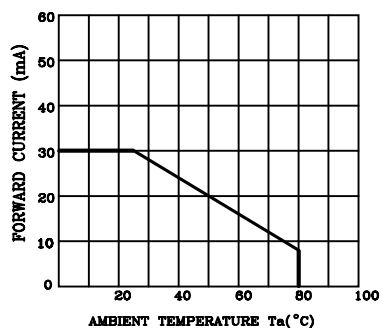


Fig.3 FORWARD CURRENT VS. FORWARD VOLTAGE

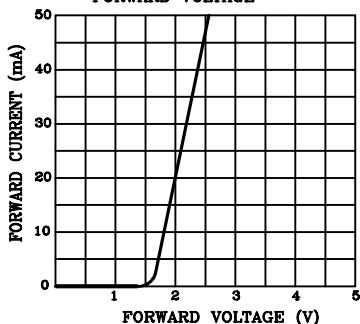


Fig.4 RELATIVE LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE

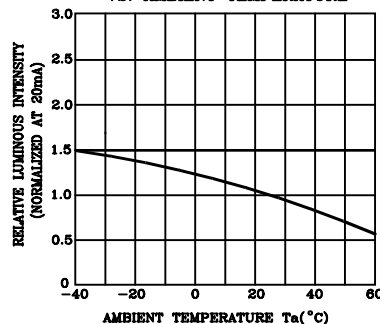


Fig.5 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

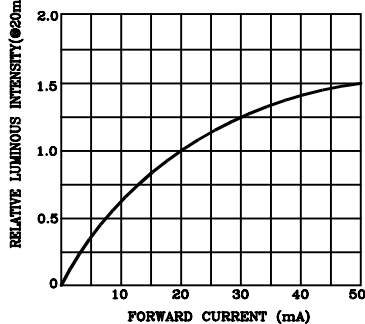
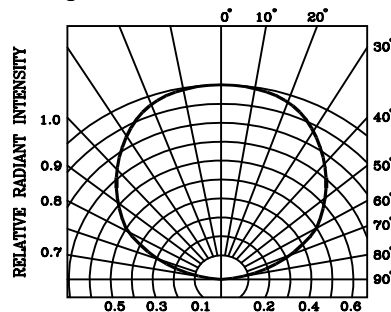
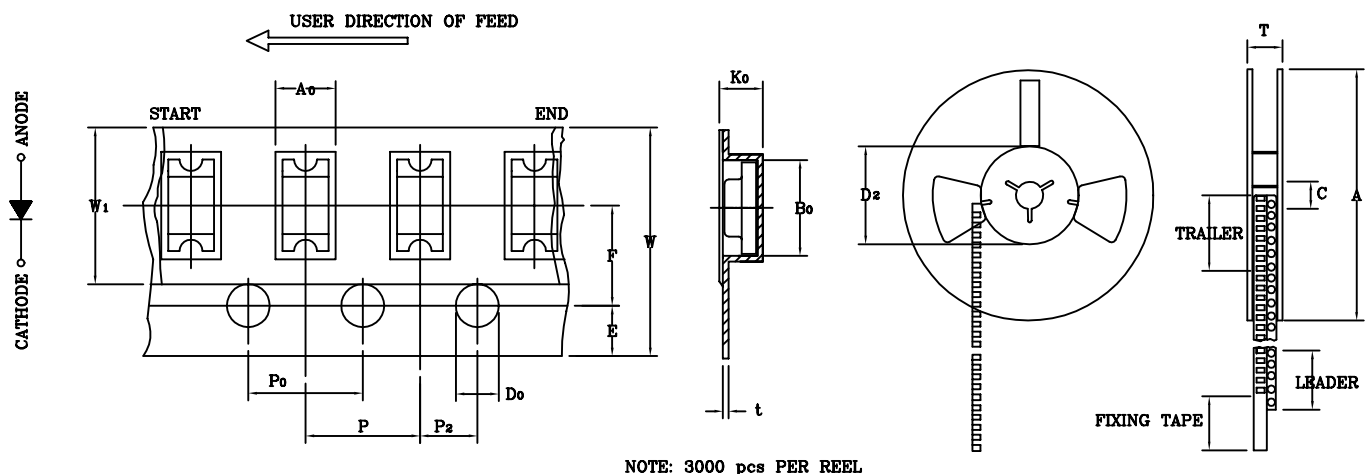


Fig.6 RADIATION DIAGRAM



ITEM	SYMBOL	SPECIFICATION			
		Minimum		Maximum	
		mm	inch	mm	inch
Tape Feed Hole Diameter (DIA)	D ₀	1.40	0.055	1.60	0.063
Feed Hole Location	E	1.65	0.064	1.85	0.073
Centers Line Dimensions Length Direction	F	3.45	0.135	3.55	0.139
Compartment Depth	K ₀	1.19	0.047	1.39	0.055
Compartment Pitch	P	3.90	0.153	4.10	0.161
Sprocket Hole Diameter	P ₀	3.90	0.153	4.10	0.161
Centers Line Dimensions Length Direction	P ₂	1.95	0.076	2.05	0.080
Carrier Tape Thickness	t	—	—	0.30	0.012
Carrier Tape Width	W	7.70	0.303	8.30	0.326
Flange Diameter	A	178.0	7.008	180.0	7.087
Hub Spindle Hole	C	12.50	0.492	13.50	0.531
Hub Diameter	D ₂	70.00	2.755	72.00	2.830
Fixing Tape Width	W ₁	5.25	0.206	5.35	0.210
Flange Space Between Flanges	T	12.50	0.492	13.50	0.531
Compartment Length	A ₀	1.68	0.066	1.88	0.074
Compartment Width	B ₀	3.30	0.130	3.50	0.138



● **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 : $140^{\circ}\text{C} \sim 160^{\circ}\text{C}$, within 2 minutes. Operation heating : 235°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 $U \times 1.2$
Reverse current	I_R (μA)	$V_R=5\text{V}$	Over $U \times 2$
Luminous intensity	I_v (mcd)	$I_F=20\text{mA}$	Below $S \times 0.5$

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

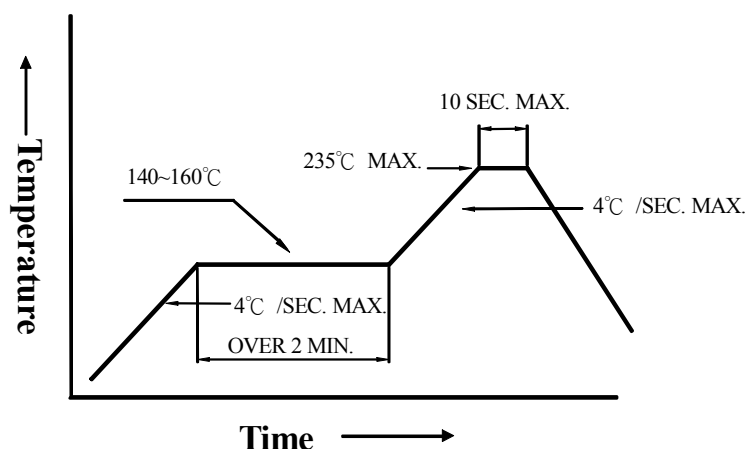
The temperature of the iron tip should not be higher than 300°C (572°F) and Soldering within 3 seconds per solder-land is to be observed.

2. Reflow Soldering

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

Operation heating : 235°C (Max.) within 10 seconds.(Max)

Gradual Cooling (Avoid quenching).

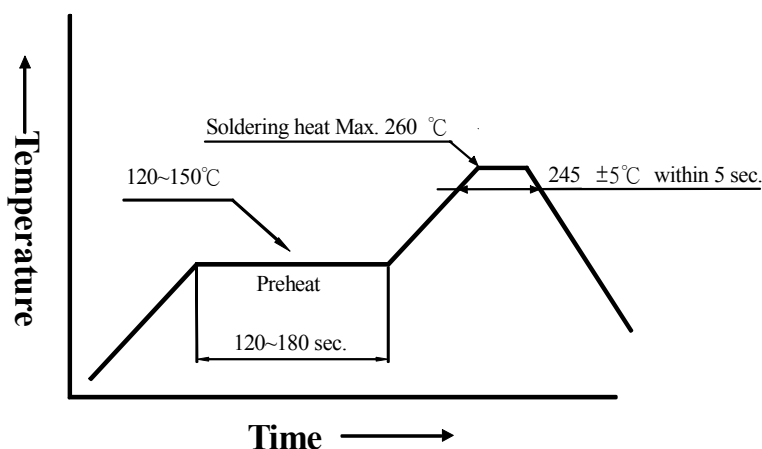


3. DIP soldering (Wave Soldering) :

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.