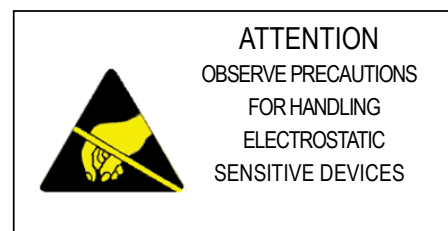
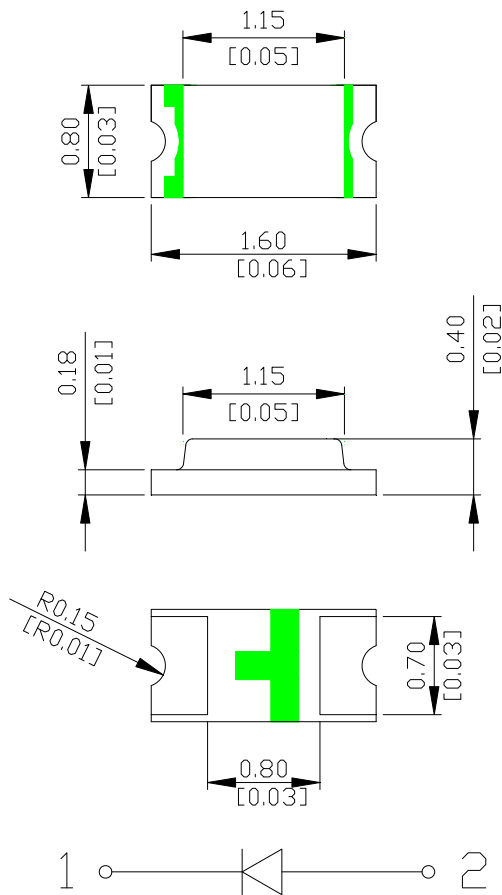


RF-WNM190DS-DB-B

Feature

- ◆ Viewing angle:140 deg
- ◆ The materials of the LED dice is InGaN
- ◆ 1.60mm×0.80mm×0.40mm
- ◆ RoHS compliant lead-free soldering compatible

Package Outline



NOTES:

1. All dimensions are in millimeters (inches);
2. Tolerances are $\pm 0.1\text{mm}$ (0.004inch) unless otherwise noted.

Absolute maximum ratings at Ta=25°C

Parameter	Symbol	Value	Unit
Forward current	If	20	mA
Reverse voltage	Vr	5	V
Operating temperature range	Top	-20 ~+85	°C
Storage temperature range	Tstg	-35 ~+85	°C
Peak pulsing current	Ifp	100	mA
Electrostatic Discharge	ESD	1000(HBM)	V

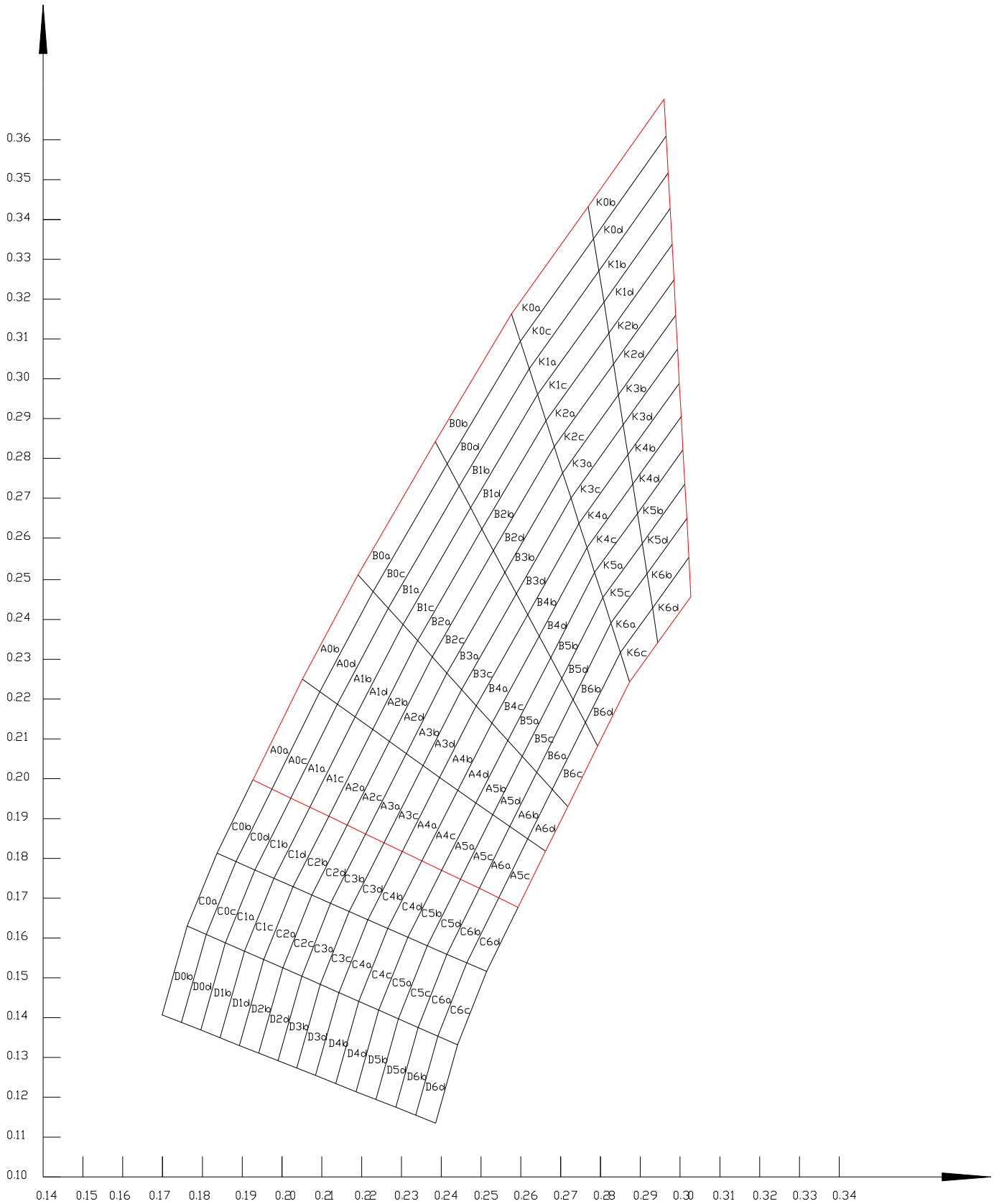
Electro-optical characteristics at Ta=25°C

Parameter	Test Condition	Symbol	Value			Unit
			Min.	Typ.	Max.	
Forward voltage	If=5mA	Vf	2.7	--	2.8	V
			2.8	--	2.9	V
			2.9	--	3.0	V
			3.0	--	3.1	V
			3.1	--	3.2	V
			3.2	--	3.3	V
			3.3	--	3.4	V
			3.4	--	3.5	V
Luminous intensity	If=5mA	Iv	70	--	90	mcd
			90	--	120	mcd
			120	--	150	mcd
			150	--	200	mcd
			200	--	250	mcd
			250	--	300	mcd
Viewing angle at 50% Iv	If=5mA	2 θ 1/2	--	140	--	Deg
Reverse current	Vr=5V	Ir	--	--	10	μA

NOTE: (Tolerance: Iv ±10%, Vf ±0.05V, X, Y ±0.01)

IFP Conditions: Pulse Width ≤ 10msec. and Duty ≤ 1/10.

Chromaticity Bin



Bin data:

BIN CODE	CIE-X1	CIE-Y1	CIE-X2	CIE-Y2	CIE-X3	CIE-Y3	CIE-X4	CIE-Y4
A0a	0.1975	0.1974	0.1927	0.1997	0.2051	0.2250	0.2095	0.2219
A0b	0.2095	0.2219	0.2051	0.2250	0.2191	0.2512	0.2229	0.2470
A0c	0.2022	0.1951	0.1975	0.1974	0.2095	0.2219	0.2139	0.2187
A0d	0.2139	0.2187	0.2095	0.2219	0.2229	0.2470	0.2267	0.2428
A1a	0.2070	0.1929	0.2022	0.1951	0.2139	0.2187	0.2184	0.2156
A1b	0.2184	0.2156	0.2139	0.2187	0.2267	0.2428	0.2304	0.2388
A1c	0.2118	0.1906	0.2070	0.1929	0.2184	0.2156	0.2228	0.2124
A1d	0.2228	0.2124	0.2184	0.2156	0.2304	0.2388	0.2341	0.2347
A2a	0.2164	0.1884	0.2118	0.1906	0.2228	0.2124	0.2270	0.2094
A2b	0.2270	0.2094	0.2228	0.2124	0.2341	0.2347	0.2378	0.2306
A2c	0.2210	0.1861	0.2164	0.1884	0.2270	0.2094	0.2312	0.2063
A2d	0.2312	0.2063	0.2270	0.2094	0.2378	0.2306	0.2414	0.2265
A3a	0.2256	0.1839	0.2210	0.1861	0.2312	0.2063	0.2354	0.2033
A3b	0.2354	0.2033	0.2312	0.2063	0.2414	0.2265	0.2451	0.2224
A3c	0.2302	0.1817	0.2256	0.1839	0.2354	0.2033	0.2396	0.2003
A3d	0.2396	0.2003	0.2354	0.2033	0.2451	0.2224	0.2488	0.2183
A4a	0.2352	0.1794	0.2302	0.1817	0.2396	0.2003	0.2442	0.1971
A4b	0.2442	0.1971	0.2396	0.2003	0.2488	0.2183	0.2528	0.2140
A4c	0.2401	0.1770	0.2352	0.1794	0.2442	0.1971	0.2487	0.1939
A4d	0.2487	0.1939	0.2442	0.1971	0.2528	0.2140	0.2567	0.2096
A5a	0.2449	0.1748	0.2401	0.1770	0.2487	0.1939	0.2530	0.1910
A5b	0.2530	0.1910	0.2487	0.1939	0.2567	0.2096	0.2604	0.2056
A5c	0.2496	0.1725	0.2449	0.1748	0.2530	0.1910	0.2572	0.1880
A5d	0.2572	0.1880	0.2530	0.1910	0.2604	0.2056	0.2640	0.2016
A6a	0.2545	0.1701	0.2496	0.1725	0.2572	0.1880	0.2617	0.1849
A6b	0.2617	0.1849	0.2572	0.1880	0.2640	0.2016	0.2679	0.1973
A6c	0.2593	0.1677	0.2545	0.1701	0.2617	0.1849	0.2662	0.1818
A6d	0.2662	0.1818	0.2617	0.1849	0.2679	0.1973	0.2718	0.1930
B1a	0.2304	0.2388	0.2267	0.2428	0.2445	0.2735	0.2474	0.2681
B0a	0.2229	0.2470	0.2191	0.2512	0.2385	0.2847	0.2415	0.2791
B0b	0.2415	0.2791	0.2385	0.2847	0.2577	0.3168	0.2599	0.3099
B0c	0.2267	0.2428	0.2229	0.2470	0.2415	0.2791	0.2445	0.2735
B0d	0.2445	0.2735	0.2415	0.2791	0.2599	0.3099	0.2621	0.3030
B1b	0.2474	0.2681	0.2445	0.2735	0.2621	0.3030	0.2642	0.2965
B1c	0.2341	0.2347	0.2304	0.2388	0.2474	0.2681	0.2502	0.2627
B1d	0.2502	0.2627	0.2474	0.2681	0.2642	0.2965	0.2663	0.2899
B2a	0.2378	0.2306	0.2341	0.2347	0.2502	0.2627	0.2531	0.2573
B2b	0.2531	0.2573	0.2502	0.2627	0.2663	0.2899	0.2684	0.2834
B2c	0.2414	0.2265	0.2378	0.2306	0.2531	0.2573	0.2560	0.2518
B2d	0.2560	0.2518	0.2531	0.2573	0.2684	0.2834	0.2705	0.2768
B3a	0.2451	0.2224	0.2414	0.2265	0.2560	0.2518	0.2589	0.2465

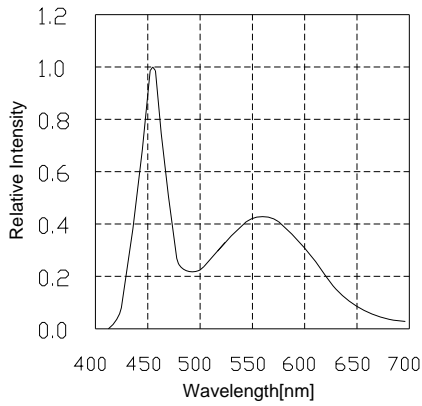


B3b	0.2589	0.2465	0.2560	0.2518	0.2705	0.2768	0.2726	0.2705
B3c	0.2488	0.2183	0.2451	0.2224	0.2589	0.2465	0.2617	0.2412
B3d	0.2617	0.2412	0.2589	0.2465	0.2726	0.2705	0.2746	0.2641
B4a	0.2528	0.2140	0.2488	0.2183	0.2617	0.2412	0.2646	0.2358
B4b	0.2646	0.2358	0.2617	0.2412	0.2746	0.2641	0.2766	0.2580
B4c	0.2567	0.2096	0.2528	0.2140	0.2646	0.2358	0.2675	0.2304
B4d	0.2675	0.2304	0.2646	0.2358	0.2766	0.2580	0.2785	0.2518
B5a	0.2604	0.2056	0.2567	0.2096	0.2675	0.2304	0.2703	0.2252
B5b	0.2703	0.2252	0.2675	0.2304	0.2785	0.2518	0.2806	0.2455
B5c	0.2640	0.2016	0.2604	0.2056	0.2703	0.2252	0.2731	0.2199
B5d	0.2731	0.2199	0.2703	0.2252	0.2806	0.2455	0.2826	0.2391
B6a	0.2679	0.1973	0.2640	0.2016	0.2731	0.2199	0.2762	0.2141
B6b	0.2762	0.2141	0.2731	0.2199	0.2826	0.2391	0.2850	0.2317
B6c	0.2718	0.1930	0.2679	0.1973	0.2762	0.2141	0.2793	0.2082
B6d	0.2793	0.2082	0.2762	0.2141	0.2850	0.2317	0.2873	0.2243
K0a	0.2599	0.3099	0.2577	0.3168	0.2769	0.3437	0.2782	0.3356
K0b	0.2782	0.3356	0.2769	0.3437	0.2960	0.3707	0.2965	0.3614
K0c	0.2621	0.3030	0.2599	0.3099	0.2782	0.3356	0.2796	0.3275
K0d	0.2796	0.3275	0.2782	0.3356	0.2965	0.3614	0.2970	0.3521
K1a	0.2642	0.2965	0.2621	0.3030	0.2796	0.3275	0.2809	0.3197
K1b	0.2809	0.3197	0.2796	0.3275	0.2970	0.3521	0.2975	0.3432
K1c	0.2663	0.2899	0.2642	0.2965	0.2809	0.3197	0.2821	0.3119
K1d	0.2821	0.3119	0.2809	0.3197	0.2975	0.3432	0.2980	0.3342
K2a	0.2684	0.2834	0.2663	0.2899	0.2821	0.3119	0.2833	0.3042
K2b	0.2833	0.3042	0.2821	0.3119	0.2980	0.3342	0.2985	0.3253
K2c	0.2705	0.2768	0.2684	0.2834	0.2833	0.3042	0.2845	0.2964
K2d	0.2845	0.2964	0.2833	0.3042	0.2985	0.3253	0.2989	0.3164
K3a	0.2726	0.2705	0.2705	0.2768	0.2845	0.2964	0.2857	0.2889
K3b	0.2857	0.2889	0.2845	0.2964	0.2989	0.3164	0.2994	0.3079
K3c	0.2746	0.2641	0.2726	0.2705	0.2857	0.2889	0.2869	0.2814
K3d	0.2869	0.2814	0.2857	0.2889	0.2994	0.3079	0.2998	0.2993
K4a	0.2766	0.2580	0.2746	0.2641	0.2869	0.2814	0.2881	0.2740
K4b	0.2881	0.2740	0.2869	0.2814	0.2998	0.2993	0.3003	0.2910
K4c	0.2785	0.2518	0.2766	0.2580	0.2881	0.2740	0.2893	0.2666
K4d	0.2893	0.2666	0.2881	0.2740	0.3003	0.2910	0.3007	0.2826
K5a	0.2806	0.2455	0.2785	0.2518	0.2893	0.2666	0.2905	0.2591
K5b	0.2905	0.2591	0.2893	0.2666	0.3007	0.2826	0.3012	0.2740
K5c	0.2826	0.2391	0.2806	0.2455	0.2905	0.2591	0.2917	0.2515
K5d	0.2917	0.2515	0.2905	0.2591	0.3012	0.2740	0.3017	0.2654
K6a	0.2850	0.2317	0.2826	0.2391	0.2917	0.2515	0.2931	0.2429
K6b	0.2931	0.2429	0.2917	0.2515	0.3017	0.2654	0.3022	0.2556
K6c	0.2873	0.2243	0.2850	0.2317	0.2931	0.2429	0.2944	0.2342
K6d	0.2944	0.2342	0.2931	0.2429	0.3022	0.2556	0.3027	0.2457

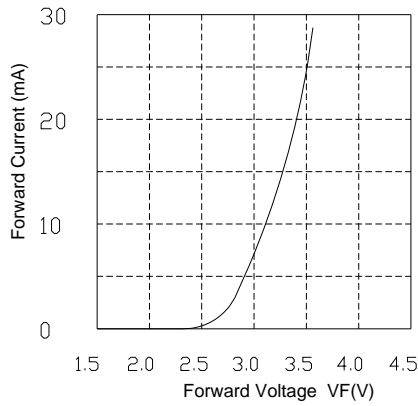
Typical optical characteristics curves

Spectral Distribution

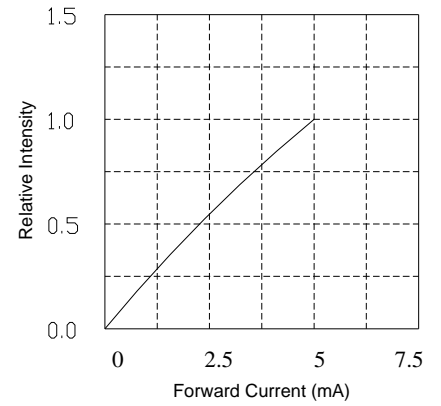
Relative Intensity vs. Wavelength (Ta=25°C)



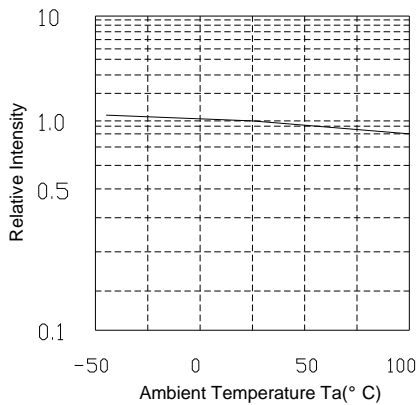
Forward Current vs. Forward Voltage (Ta=25°C)



Relative Intensity vs. Forward Current (Ta=25°C)

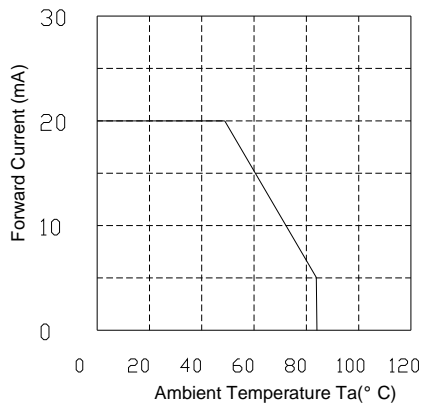


Relative Intensity vs. Ambient Temperature



Derating

Maximum Forward Current vs. Ambient Temperature



Forward Current vs. Chromaticity (Ta=25°C)

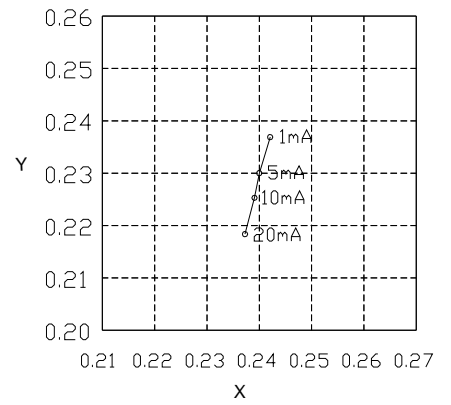
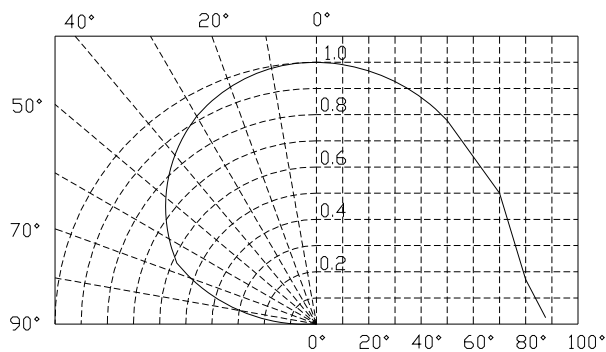


Diagram characteristics of radiation



Reflow profile

■ Soldering condition

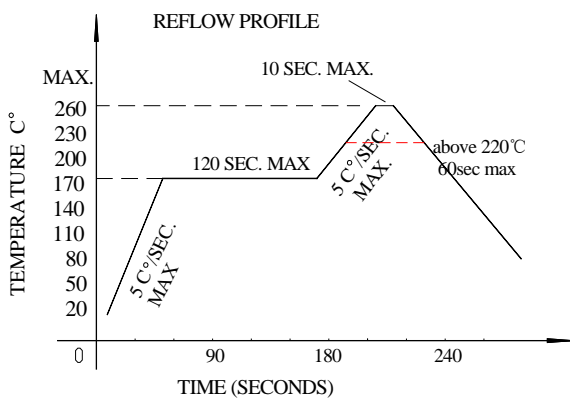
- Recommended soldering conditions

Reflow Soldering		Hand Soldering	
Pre-heat	160~180°C	Temperature	300°C Max.
Pre-heat time	120 seconds Max.	Soldering time	3 second Max. (one time only)
Peak temperature	260°C Max.		
Soldering time	10 seconds Max.		
Condition	Refer to Temperature-profile		

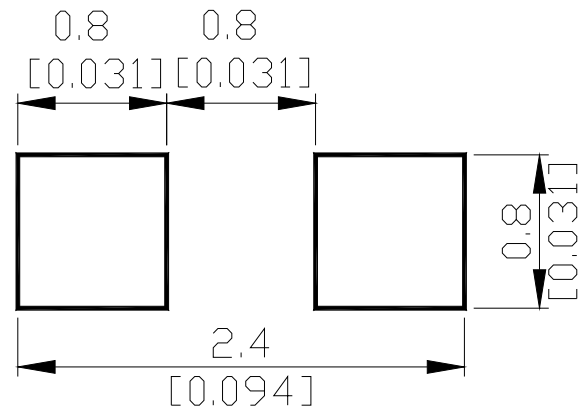
- After reflow soldering rapid cooling should be avoided

■ Temperature-profile (Surface of circuit board)

Use the following conditions shown in the figure.



RECOMMEND PAD DESIGN (Units: mm)



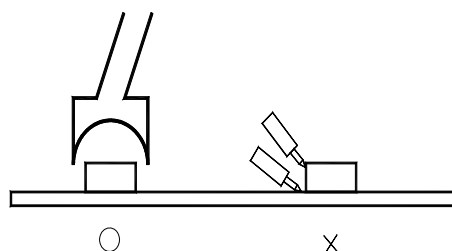
1. Reflow soldering should not be done more than two times
2. When soldering ,do not put stress on the LEDs during heating

■ Soldering iron

1. When hand soldering, keep the temperature of the iron under 300°C, and at that temperature keep the time under 3 sec.
2. The hand soldering should be done only a time
3. The basic spec is ≤ 5 sec. when the temperature of 260°C, do not contact the resin when hand soldering

■ Rework

1. Customer must finish rework within 5 sec under 260°C
2. The head of iron can not touch the resin
3. Twin-head type is preferred.





Reliability

(1) TEST ITEMS AND RESULTS

Type	Test Item	Ref. Standard	Test Conditions	Note	Number of Damaged
Environmental Sequence	Resistance to Soldering Heat(Reflow Soldering)	JESD22-B106	Tsld=260°C,10sec	2 times	0/22
	Temperature Cycle	JESD22-A104	-40°C 30min 25°C↑↓5min 100°C 30min	100 cycle	0/22
	Thermal Shock	JESD22-A106	-35°C 15min ↑↓ 85°C 15min	100 cycle	0/22
	High Temperature Storage	JESD22-A103	T _a =100°C	1000 hrs	0/22
	Low Temperature Storage	JESD22-A119	T _a =-40°C	1000 hrs	0/22
Operation Sequence	Life Test	JESD22-A108	T _a =25°C I _F =5mA	1000 hrs	0/22

(2) CRITERIA FOR JUDGING THE DAMAGE

Item	Symbol	Test Conditions	Criteria for Judgement	
			Min.	Max.
Forward Voltage	VF	IF=5mA	-	U.S.L*)×1.1
Reverse Current	IR	VR=5V	-	U.S.L*)×2.0
Luminous Intensity	IV	IF=5mA	L.S.L**)×0.5	-

U.S.L.: Upper Standard Level

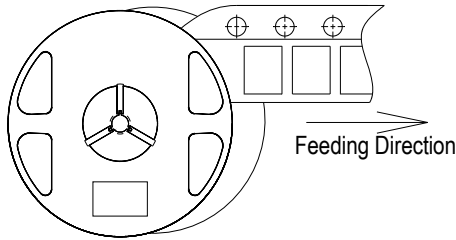
L.S.L.: Lower Standard Level

NOTES:

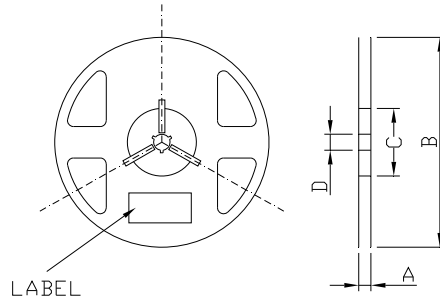
1. Any reliability test standard change is confidential.

Packaging Specifications

● Feeding Direction

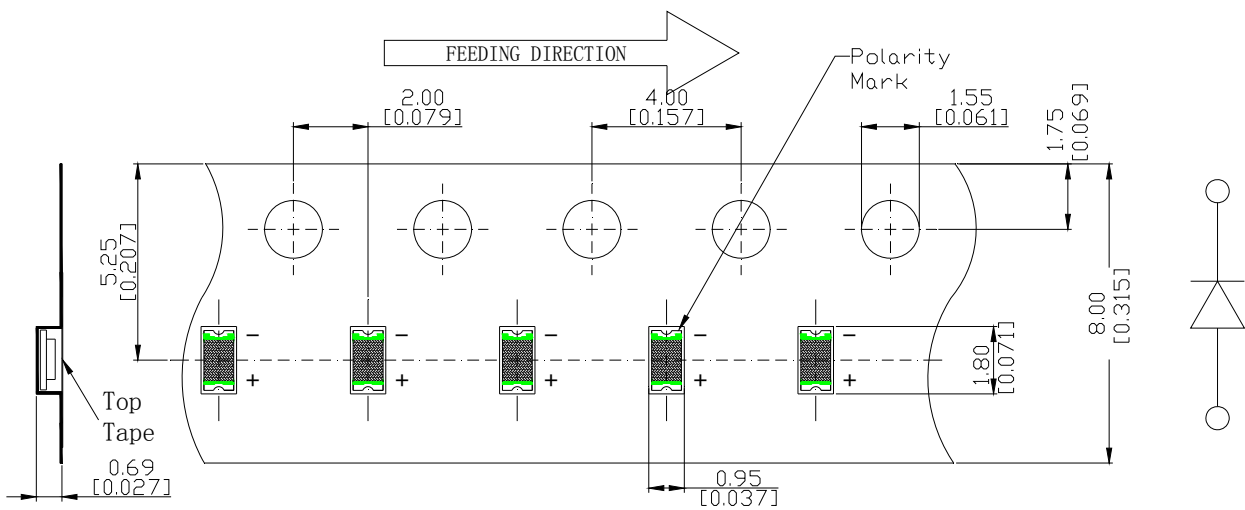


● Dimensions of Reel (Unit: mm)

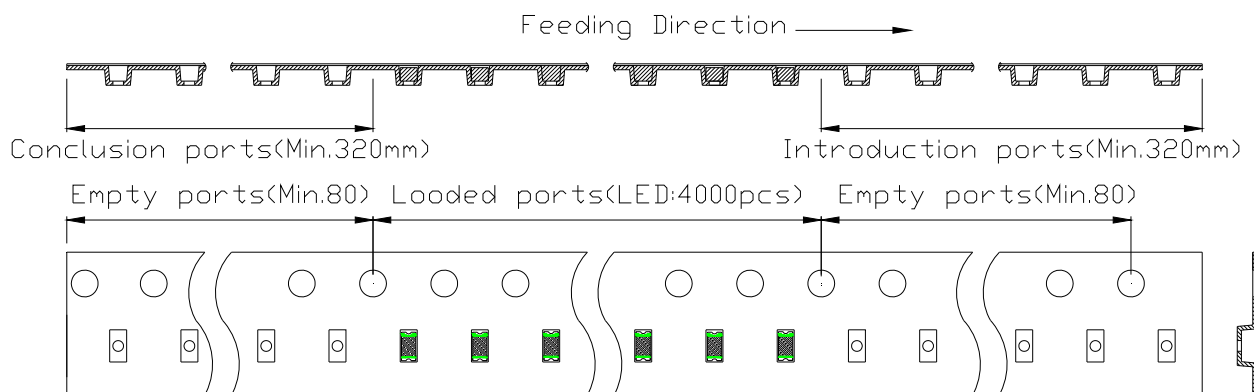


A	8.0±0.1mm
B	178±1mm
C	60±1mm
D	13.0±0.5mm

● Dimensions of Tape (Unit: mm)



● Arrangement of Tape



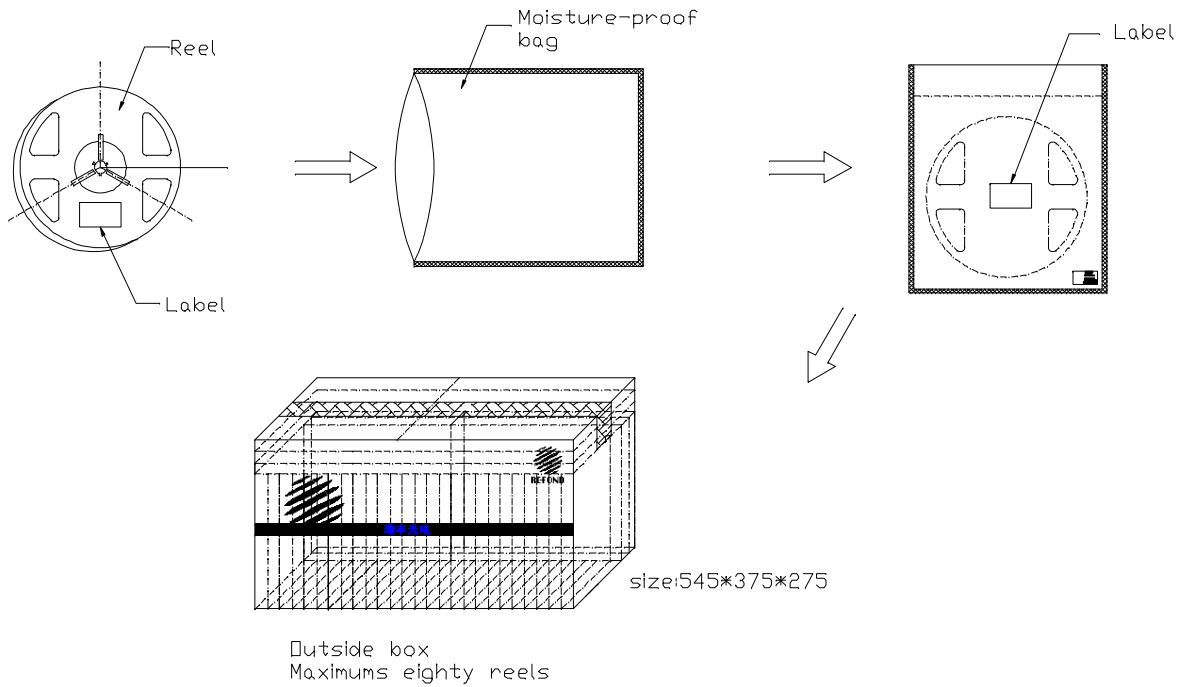
NOTES

1. Empty component pockets are sealed with top cover tape;
2. The maximum number of missing lamps is two;
3. The cathode is oriented towards the tape sprocket hole in accordance with ANSI/EIA RS-481 specifications.
4. 4,000 pcs/ Reel.



REFOND

Packaging specifications



Label

PART NO:
SPEC NO:
LOT NO:

BIN CODE:
IV:
VF:
X/Y:

QTY: PCS
DATE:

CAUTIONS

Package specifications

Reeled products (numbers of products are 4,000pcs) packed in a seal off moisture-proof bag along with a desiccant one by one, Eighty moisture-proof bag of maximums are put the outside box (size: about 545mm x about 375mm x about 275mm) Together with buffer material, and it is packed. (Pare No., Lot No., quantity should appear on the label on the moisture-proof bag, part No. And quantity should appear on the label on the cardboard box.) The number of the loading steps of outside box (cardboard box) has two steps.

Storage conditions

Before opening the package:

The LEDs should be kept at 30°C or less and 70%RH or less. The LEDs should be used within a year. When storing the LEDs, moisture proof packaging with absorbent material is recommended.

After opening the package:

The LEDs should be kept at 30°C or less and 50%RH or less. The LEDs should be soldered within 168 hours (7days) after opening the package. If unused LEDs remain, they should be stored in moisture proof packages, such as sealed containers with packages of moisture absorbent material. It is also recommended to return the LEDs to the original moisture proof bag and to reseal the moisture proof bag again.