

1. Scope of Application

These specifications apply to chip type LED lamp, CITILED, model CL-480S-WHS-D-TS.

2. Part code

CL-480S-WHS-D-TS

Series _____

480S : Mono-color

Ultra small, thin, sideways
light emission type

Lighting color _____

WHS : High brightness white

Low VF type

This specification applies to Soho project.

Diffusion _____

D: Diffused

Shipping mode _____

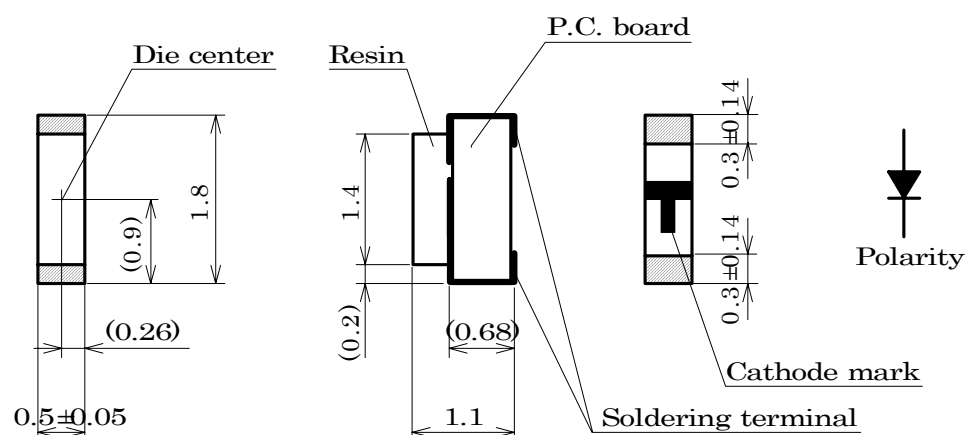
Non-coded: Bulk

TS: Taping (standard)

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						Drawing No	
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3. Outline drawing

Unit: mm
Tolerance: ± 0.1



4. Performance

(1) Absolute Maximum Rating (Ta=25°C)

Parameter	Symbol	Rating Value	Unit
Power Dissipation	Pd	35	mW
Forward Current	I _F	10	mA
Forward Pulse Current *	I _{FP}	100 *	mA
Reverse Voltage	V _R	5	V
Operating Temperature	T _{OP}	-40 ~ +85	°C
Storage Temperature	T _{st}	-40 ~ +85	°C
Thermal Resistance (Junction/ambient)	R _{th-JA}	1200	°C/W
Thermal Resistance (Junction/solder point)	R _{th-JS}	350	°C/W

* Duty $\leq 1/10$, Pulse width ≤ 0.1 msec

(2) Electro-optical Characteristic (Ta=25°C)

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit
Forward Voltage *1	V _F	I _F =5mA	Please refer to an attachment ("CL-480S-WHS-D rank")			
Reverse Current	I _R	V _R =5V	—	—	2	μA
Luminous Intensity *2	I _v	I _F =5mA	Please refer to an attachment ("CL-480S-WHS-D rank")			
Chromaticity coordinates *3	Please refer to an attachment ("CL-480S-WHS-D rank")					

*1 The tolerance of Forward Voltage measurement is $\pm 3\%$ at our tester.

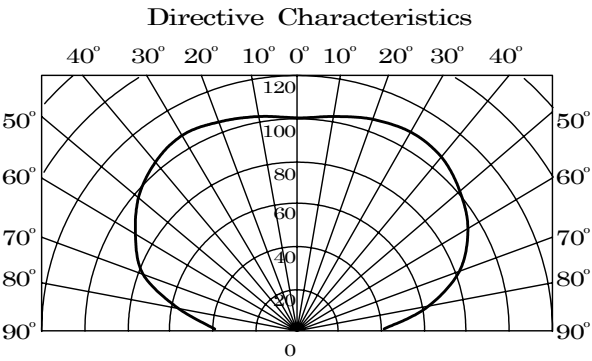
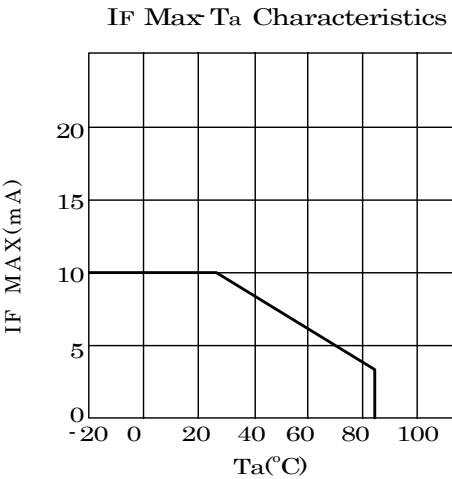
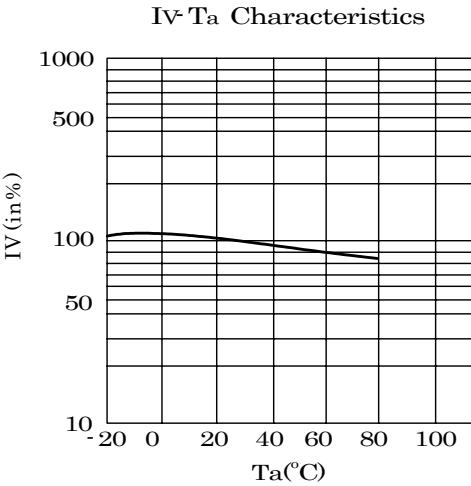
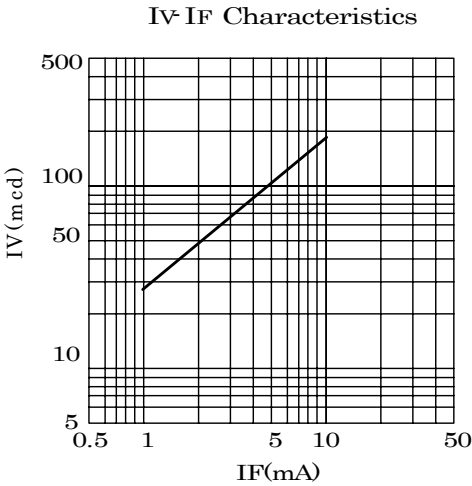
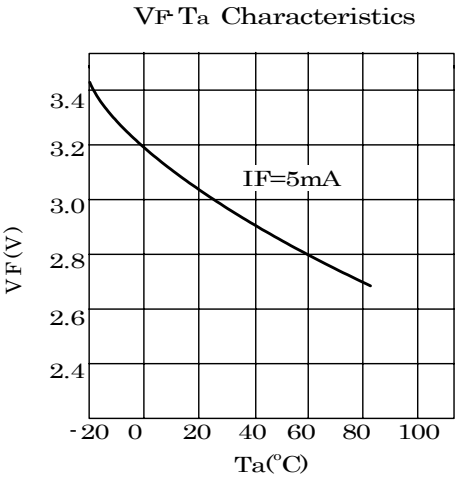
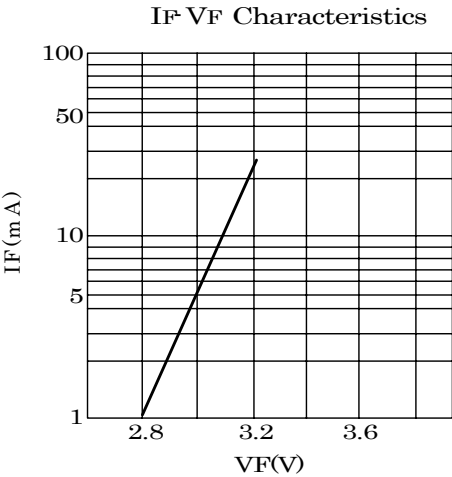
*2 The tolerance of Luminous Intensity measurement is $\pm 10\%$ at our tester.
In accordance with NIST standard

*3 Chromaticity coordinates is the area surrounded with a,b,c,d

Note) For handling, please apply CMOS LSI or equivalent to prevent any electrostatic effect.

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5. Characteristic



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6. Reliability

(1) Details of the tests

Test Item	Test Condition
Life Test in Continuous Operation	$25 \pm 3^{\circ}\text{C}$, $I_F = 10 \text{ mA} \times 500^{+24}_{-12}$ hours
Low Temperature Storage Test	$-40^{+3}_{-5}^{\circ}\text{C} \times 500^{+24}_{-12}$ hours
High Temperature Storage Test	$85^{+5}_{-3}^{\circ}\text{C} \times 500^{+24}_{-12}$ hours
Moisture-proof Test	$60 \pm 2^{\circ}\text{C}$, $90 \pm 5\% \text{RH}$ for 500^{+24}_{-12} hours
Thermal Shock Test	$-40^{\circ}\text{C} \times 30 \text{ minutes} - 85^{\circ}\text{C} \times 30 \text{ minutes}$, 5-cycle
Solder Heat Resistance Test	Recommended temperature profile (reflow soldering) $\times 2$, (2 nd test must be started after the samples are stabilized thermally.)
Electrostatic Discharge	Applying $\pm 100\text{V}$ that is specified in IEC61000-4-2

(2) Judgment Criteria of Failure for Reliability Test

Measuring Item	Symbol	Measuring Condition	Judgement Criteria for Failure
Forward Voltage	V_F	$I_F = 5 \text{ mA}$	$>U \times 1.2$
Reverse Current	I_R	$V_R = 5 \text{ V}$	$>U \times 2$
Luminous Intensity	I_V	$I_F = 5 \text{ mA}$	$<S \times 0.5$

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

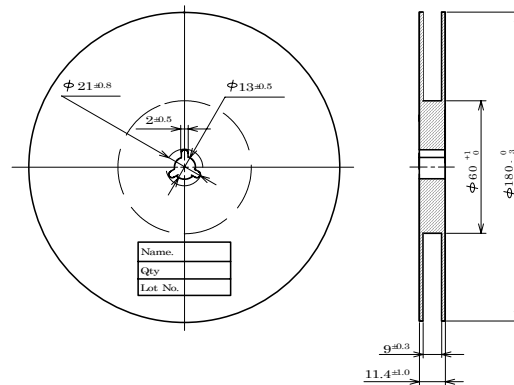
Note: Measurement shall be taken between 2 hours and 24 hours, having returned the test pieces to the normal ambient conditions after the completion of each test.

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7. Taping Specifications (in accordance with JIS standard)

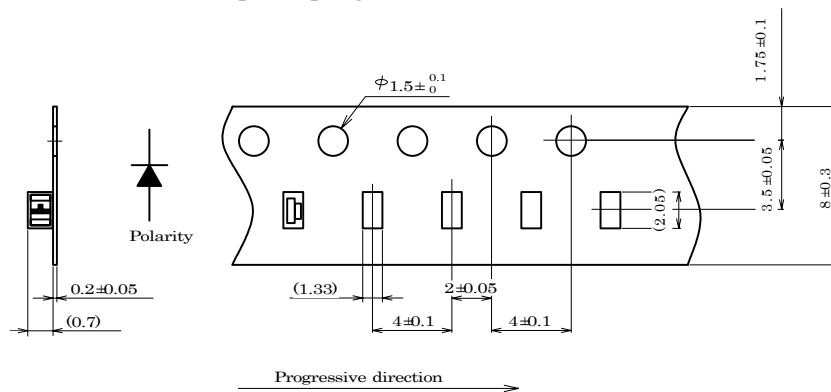
(1) Shape and Dimensions of Reel

(Unit: mm)



(2) Dimensions of Tape (Taping material : PC)

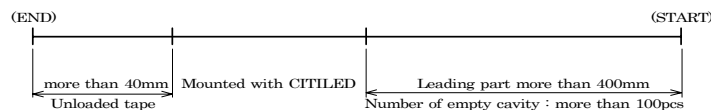
(Unit: mm)



(3) Cavity Play

Each part must rest in the part cavity so that angle between the part centerline and the cavity centerline is no more than 20°.

(4) Configuration of Tape



(5) Tape break force, peel strength and angle.

Tape break force: min 10N.

Top cover tape strength: min 10N.

Top cover tape peel force: 0.1-1.3N, at peel speed of 300-10mm/min.

Angle between the top cover tape and the direction of feed during peel off: 165 ~ 180°.

The cover tapes may not extend over the edge carrier tape or cover any part of the sprocket holes.

(6) Breaking intensity of cover tape. (Test method: JIS-K-6745)

Length: $4.85 \pm 0.85 \text{ kg/mm}^2$.

Width: $5.10 \pm 1.50 \text{ kg/mm}^2$.

(7) Quantity: 5,000pcs/reel

(8) Reel weight with LEDs: 88.5g.

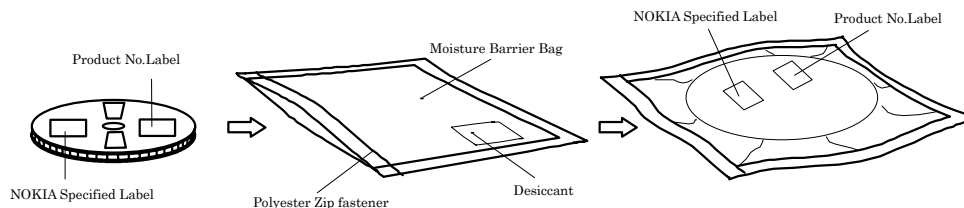
Reel weight without LEDs: 79g.

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8. Packing Specifications

8-1. Moisture-proof Packing

To prevent moisture absorption during transportation and storage, reels are packed in moisture barrier bag which contain a desiccant with product number label.



CUSTOMER		CITIZEN E		XXXXXX	
TYPE	CL-480S-WHS-D-TS	(P)	XXXXXX	CL-480S-WHS-D-TS	
P.NO	:XXXXXXX	JEDEC			
LotNo	:XXXXXX	(Q)	5000	Moisture Level	
Q'ty	5000	1			
CITIZEN ELECTRONICS JAPAN		(Z)	XXXXXXXXXXXXXXXXXX		

Moisture/Reflow sensitivity classification
IPC/JEDEC J-STD-020C:Level 1.

8-2. Expected shipping and storage conditions

Relative humidity: 15 to 70%

Temperature: -5 to 40 °C

8-3. Storage

To prevent moisture absorption, it is strongly recommended that reels (in bulk or taped) should be stored in the dry box (or the desiccator) with a desiccant as the appropriate storage place. If not, the following is recommended.

Temperature: 5 ~ 30 °C

Humidity: 60%RH max.

The devices should be mounted as soon as possible after unpacking. If you store the unpacked reels, please store them in the dry box or seal them into the envelop again.

8-4. Baking

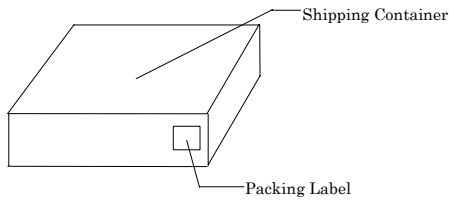
If the devices have been stored over 6 months or unpacked over 15 days, it should be baked under the following conditions.

Baking conditions: 60°C × 12 hours or more (reeled one)
100°C × 45 minutes or more (loose one)
150°C × 15 minutes or more (loose one)

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9.Packing form

For absorbing damage during transport styrofoam and air bag cushion are used for around goods and box space. Packing Label is stuck on the side surface of the shipping container.



(I) LICENCE PLATE XXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXX	FROM Consigner Address	
(K) PO NUMBER XXXXXXXXXX XXXXXXXXXXXXXXXXXXXX	TO : Consignee Address	
(P) CUSTOMER XXXXXXXX PROD ID XXXXXXXXXXXXXXXXXXXX	(4L) COO JP XXXXXXXXXXXXXXXXXXXX	
(Q) QUANTITY XXXXXXXXXXXXXXXXXXXX	SUPPLIER'S PROD CL-480S-WHS-D-TS	
(Z) TRACEABILITY XXXXXXXXXXXXXXXXXXXX	PACKAGE X OF PACKAGE XXLB XX	DATE XXXXXX

Packing Label

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10. Precautions

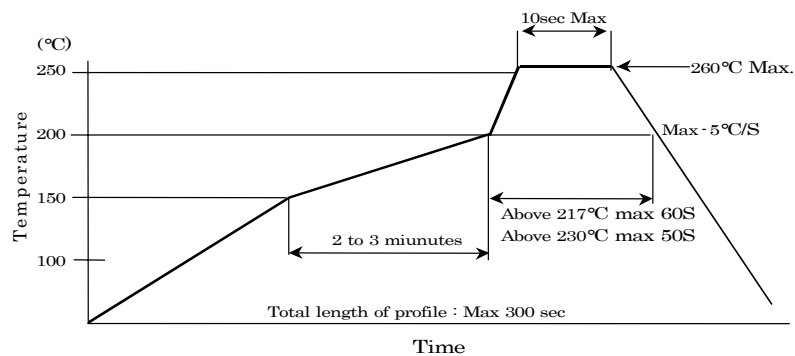
10-1. Soldering

(1) Manual soldering

- 1) Use 6/4 solder or solder containing silver (Ag)
If using Pb-free solder, solder of Sn 3.5Ag 0.75Cu is recommended.
 - 2) Before soldering every time, make baking to units. By manual soldering, it is the possibility of crack due to the moisture absorption in the resin portion.
 - 3) Use a soldering iron of 25W or smaller. Adjust the temperature of the soldering iron below 350°C.
 - 4) Force or stress must not be applied to the resin portion while soldering.
 - 5) Finish soldering within 3 seconds.
 - 6) Handle the devices only after temperature is cooled down.
- Note) Manual Hot Gas Soldering is not recommended.

(2) Lead free soldering

- 1) Following soldering paste is recommended
Melting temperature: 217 ~ 219°C.
Composition: Sn Ag3.0 to 4.0% Cu 0.5 to 0.9%
- 2) The temperature profile at the top surface of the parts is recommended as shown below.
- 3) It is requested that products should be handled after their temperature has dropped down to the normal room temperature.



Reflow soldering of the above profile is allowed three times.

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10-2. Washing

(1) When washing after soldering is needed, following conditions are requested.

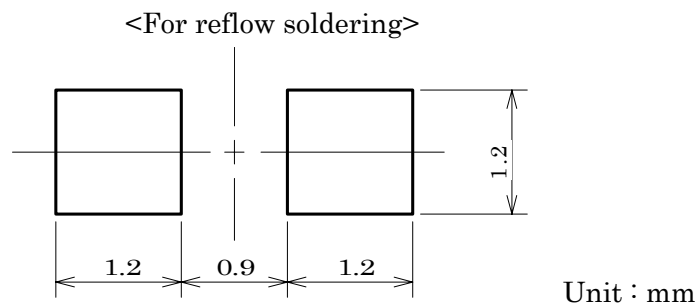
- a) Washing solvent: Alcohol
- b) Temperature, time: 50°C or less × 30 seconds max.
or 30°C or less × 3 minutes max.
- c) Ultrasonic washing: 300W or less

10-3. Other directions

- (1) It is requested to avoid any stress added to the resin portion while it is heated.
- (2) It is requested to avoid any friction by sharp metal nail etc. to the resin portion.

11. Designing precautions

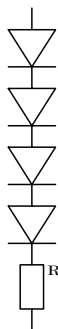
- (1) The current limiting resistor should be placed in the circuit so that is driven within its rating. Also avoid reverse voltage (over-current) applied instantaneously when ON or OFF.
- (2) When pulse driving current is applied, average current consumption should be within the rating. Also avoid reverse voltage applied when put off.
- (3) Recommended soldering pattern



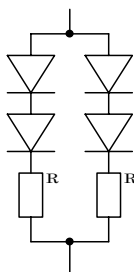
The above dimensions are recommended,
but the mountability study should be conducted in advance at your site.

- (4) When assembling the circuit board into the finished products, care must be taken to avoid the component parts from touching other parts.
- (5) When using multiple LEDs, it is required to connect a current limiting resistor on each path which the current flows to the LEDs

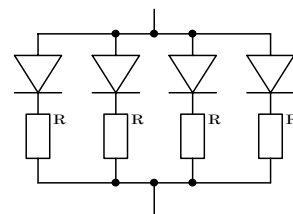
(ex-1)



(ex-2)



(ex-3)



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CL-480S-WHS-D rank**1.Rank data**

IV Rank

rank	IV(mcd)
A	150 - 200
B	110 - 150
C	80 - 110

Tolerance:±10%

VF Rank

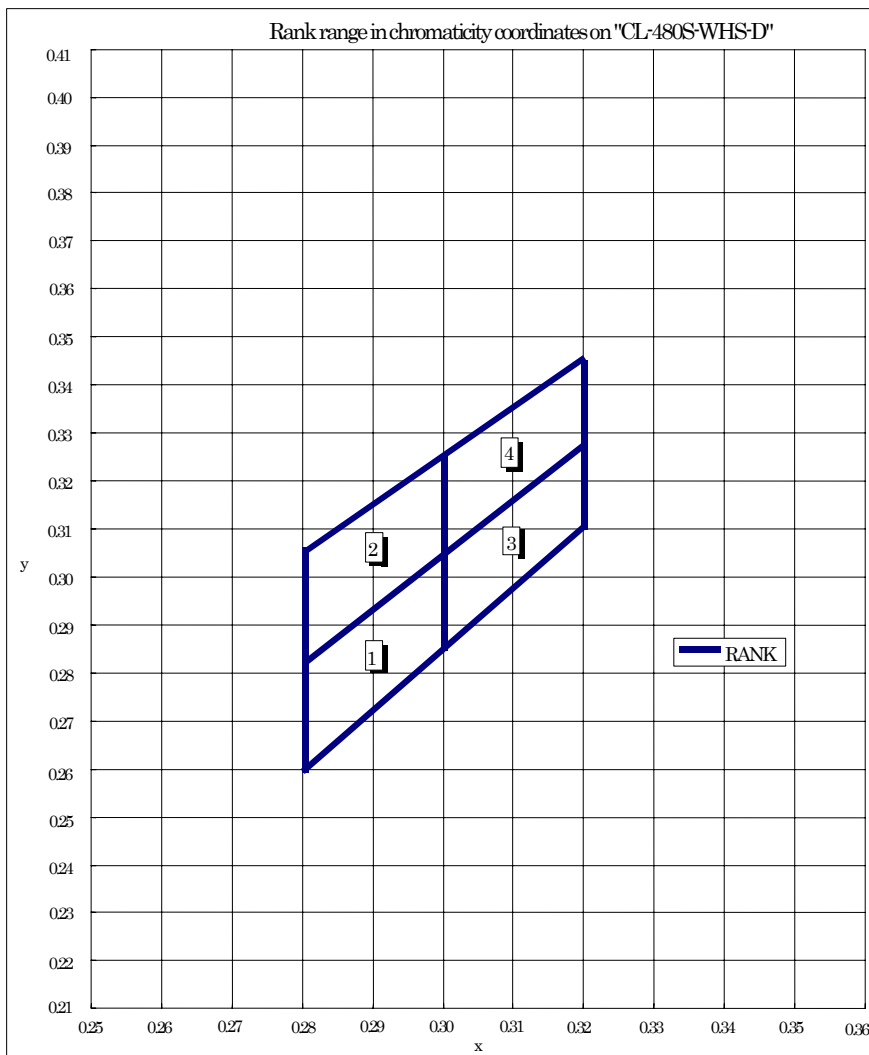
rank	VF(V)
F	2.70 - 2.80
G	2.80 - 2.90
H	2.90 - 3.00
I	3.00 - 3.10
J	3.10 - 3.20
K	3.20 - 3.30
L	3.30 - 3.40

Tolerance:±3%

Condition : IF=5mA

Chromaticity coordinates

Condition : IF=5mA



rank 1	x(±0.01)	y(±0.01)
a	0.280	0.260
b	0.280	0.283
c	0.300	0.305
d	0.300	0.285

rank2	x(±0.01)	y(±0.01)
a	0.280	0.283
b	0.280	0.306
c	0.300	0.325
d	0.300	0.305

rank3	x(±0.01)	y(±0.01)
a	0.300	0.285
b	0.300	0.305
c	0.320	0.328
d	0.320	0.310

rank4	x(±0.01)	y(±0.01)
a	0.300	0.305
b	0.300	0.325
c	0.320	0.345
d	0.320	0.328

Chromaticity coordinates are within the area surrounded by a, b, c and d.

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