

Agilent HSMW-A400-xxxxx Surface Mount LED Indicator Data Sheet

Description

The Agilent PLCC-4 family of SMT LEDs is packaged in the industry standard PLCC-4 Package and is an extension of our PLCC-2 SMT LEDs. The product is able to dissipate heat more efficiently compared to the conventional PLCC-2 SMT LEDs. In proportion to the increase in driving current, this family of LEDs is able to produce higher light output compared to the conventional PLCC-2 SMT LEDs.

These SMT LEDs have higher reliability and better performance and are designed to work under a wide range of environment conditions. This higher reliability makes them suitable for use in harsh conditions such as the Interior Automotive, Electronics Signs and Signals and Office automation and Industrial applications.

The super wide viewing angle at 120° makes these LEDs ideally suited for panel, push button, or general backlighting in automotive interior, office

equipment, industrial equipment, and home appliances. The flat top emitting surface makes it easy for these LEDs to mate with light pipes. With the built-in reflector pushing up the intensity of the light output, these LEDs are also suitable to be used as LED pixels in interior electronic signs. These super high brightness LEDs can be used in localized area ambience lighting in applications such as vanity mirror light, cabin light, and car door puddle light. The white color backlighting is suitable to backlight color LCD screens in applications such as GPS (global positioning system) screens in cars.

To facilitate easy pick and place assembly, the LEDs are packed in EIA-compliant tape and reel. Every reel will be shipped in single intensity and color bin, to provide close uniformity.

These LEDs are compatible with IR solder reflow process. Due to the high reliability feature of these products, they can also be mounted using through-the-wave soldering process.

Features

- Industry Standard PLCC-4
- High reliability LED package
- High brightness using InGaN dice technologies
- High optical efficiency
- Super wide viewing angle at 120°
- Available in 8mm carrier tape on 7-inch reel
- Tight White color Binning
- Compatible with both IR and TTW soldering process

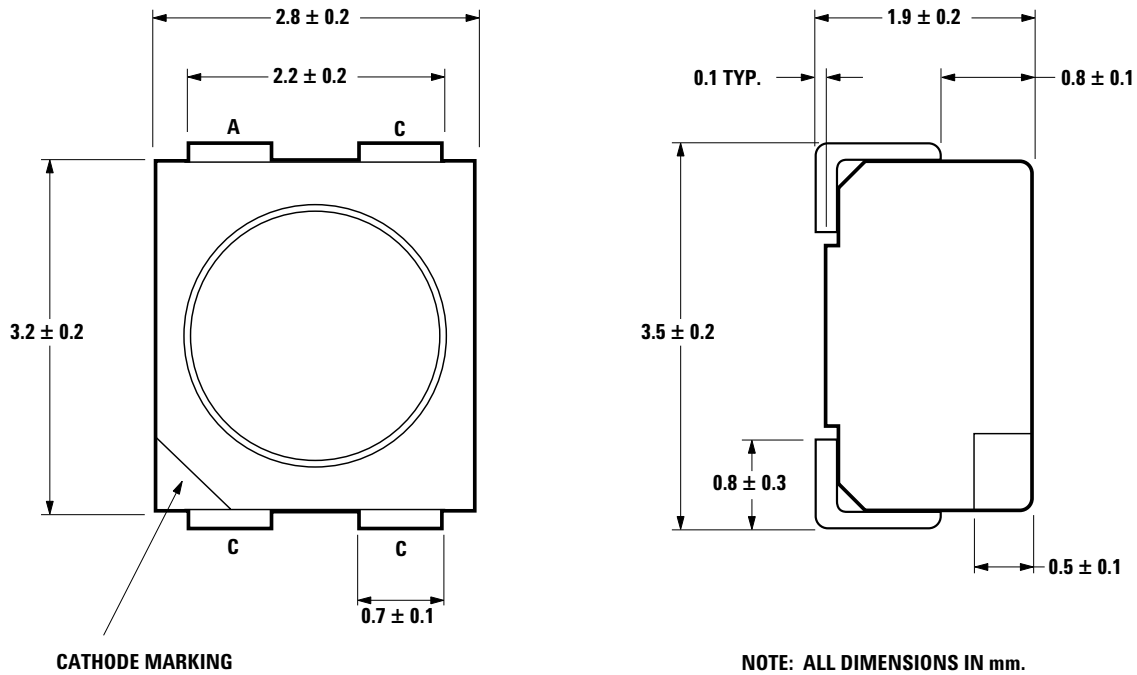
Applications

- Interior automotive
 - Instrument panel backlighting
 - Central console backlighting
 - Cabin lighting
 - Navigation and audio system
 - Dome lighting
 - Push button backlighting
- Electronic signs and signals
 - Variable message sign
 - Garden lighting
- Office automation, home appliances, industrial equipment
 - Front panel backlighting
 - Push button backlighting

CAUTION: HSMW-A400-xxxxx LEDs are Class 2 ESD sensitive. Please observe appropriate precautions during handling and processing. Refer to Agilent Application Note AN-1142 for additional details



Package Dimensions



Device Selection Guide

Color	Part Number	Min. I_V (mcd)	Typ. I_V (mcd)	Max. I_V (mcd)	Test Current (mA)	Dice Technology
White	HSMW-A400-U00M2	400.00	700.00	-	30	InGaN

Notes:

- The luminous intensity I_V is measured at the mechanical axis of the lamp package. The actual peak of the spatial radiation pattern may not be aligned with this axis.

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$)

Parameters	HSMW
DC Forward Current ^[1]	30 mA
Peak Forward Current ^[2]	100 mA
Power Dissipation	114 mW
Reverse Voltage	5 V
Junction Temperature	110 °C
Operating Temperature	- 40 °C to + 100 °C
Storage Temperature	- 40 °C to + 100 °C

Notes:

- Derate linearly as shown in Figure 3
- Duty factor = 10%, Frequency = 1kHz

Optical Characteristics (T_A = 25 °C)

Color	Part Number	Dice Technology	Typical Chromaticity Coordinates ^[1]		Viewing Angle	Luminous Efficacy η_v ^[3]	Luminous Intensity / Total Flux
			x	y	2 $\theta_{1/2}$ ^[2] (Degrees)	(lm/W)	I _v (mcd) / Φ_v (lm)
			Typ.	Typ.	Typ.	Typ.	Typ.
White	HSMW-A400	InGaN	0.31	0.31	120	260	0.45

Notes:

1. The chromaticity coordinates are derived from the CIE 1931 Chromaticity Diagram and represent the perceived color of the device.
2. $\theta_{1/2}$ is the off-axis angle where the luminous intensity is 1/2 the peak intensity.
3. Radiant intensity, I_e in watts / steradian, may be calculated from the equation $I_e = I_v / \eta_v$, where I_v is the luminous intensity in candelas and η_v is the luminous efficacy in lumens / watt.

Electrical Characteristics (T_A = 25 °C)

Part Number	Forward Voltage V _F (Volts) @ I _F = 20 mA		Reverse Voltage V _R @ 100 μ A	Reverse Voltage V _R @ 10 μ A
	Typ.	Max.	Min.	Min.
HSMW	3.8	4.6	-	5

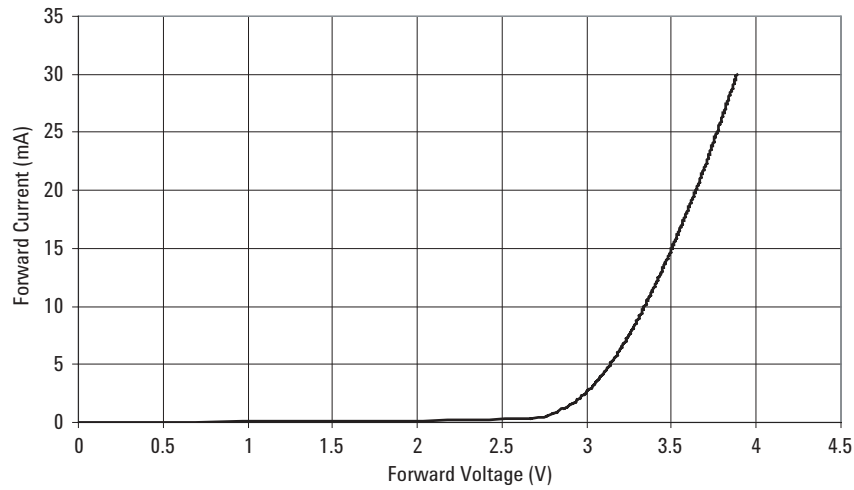


Figure 1. Forward Current Vs. Forward Voltage.

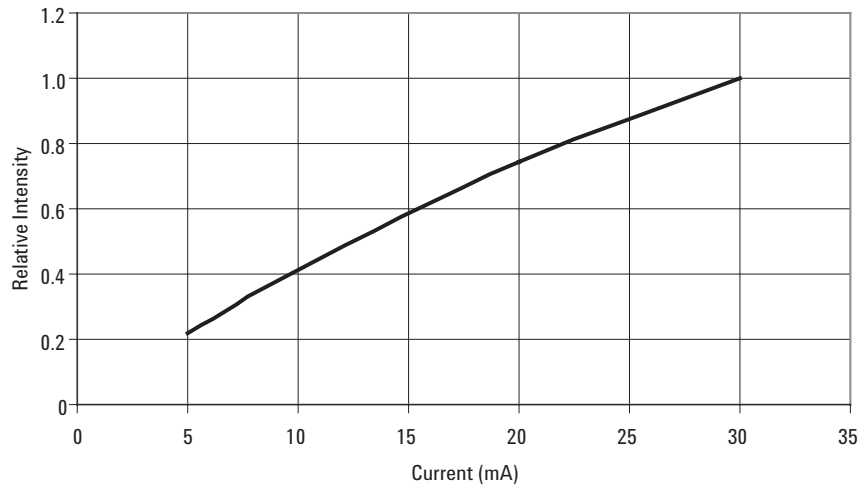


Figure 2. Relative Intensity Vs. Forward Current

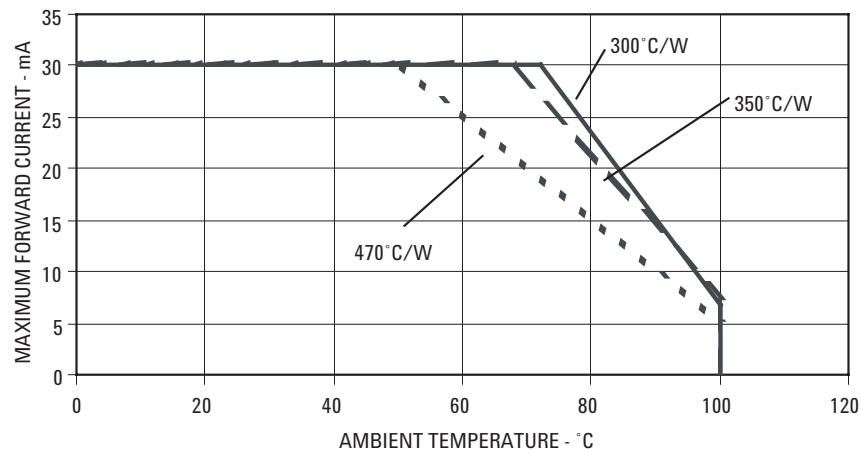


Figure 3. Maximum Forward Current Vs. Ambient Temperature. Derated Based on $T_{JMAX} = 110^{\circ}C$.

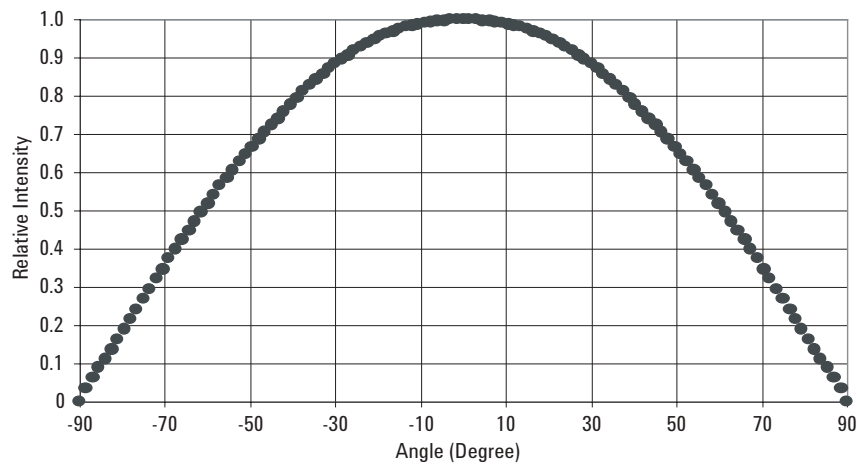


Figure 4. Radiation Pattern

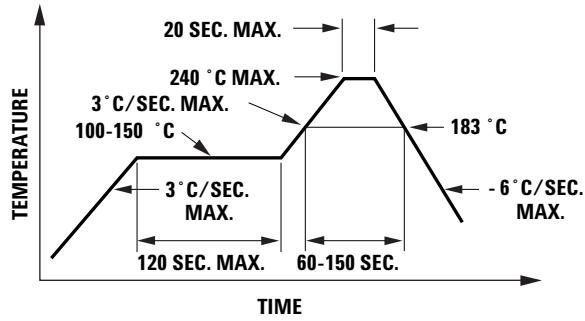
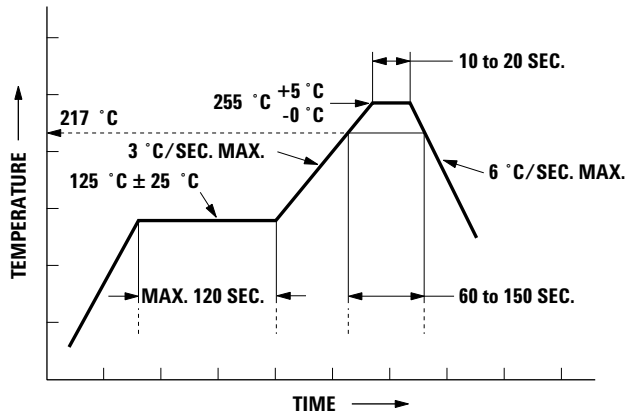


Figure 5a. Recommended SnPb Reflow Soldering Profile.



* THE TIME FROM 25 °C TO PEAK TEMPERATURE = 6 MINUTES MAX.

Figure 5b. Recommended Pb-free Reflow Soldering Profile.

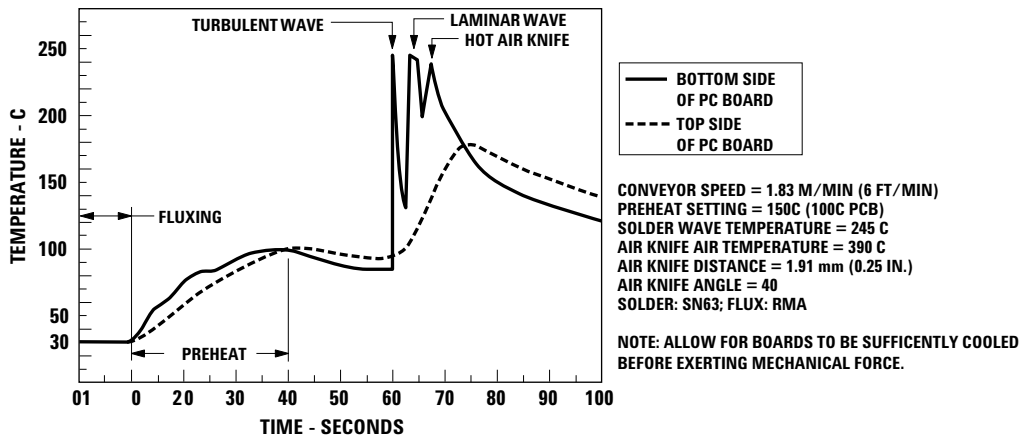


Figure 6. Recommended Wave Soldering Profile.

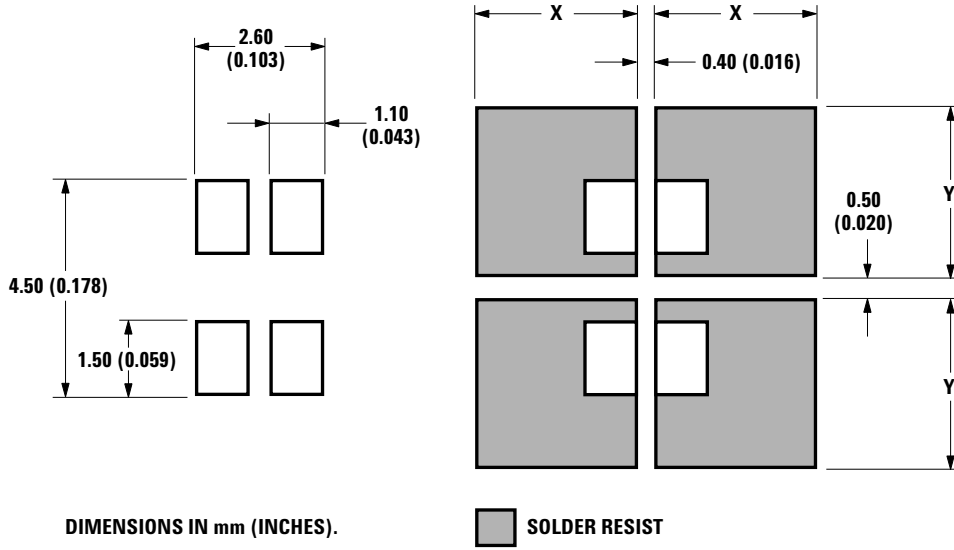
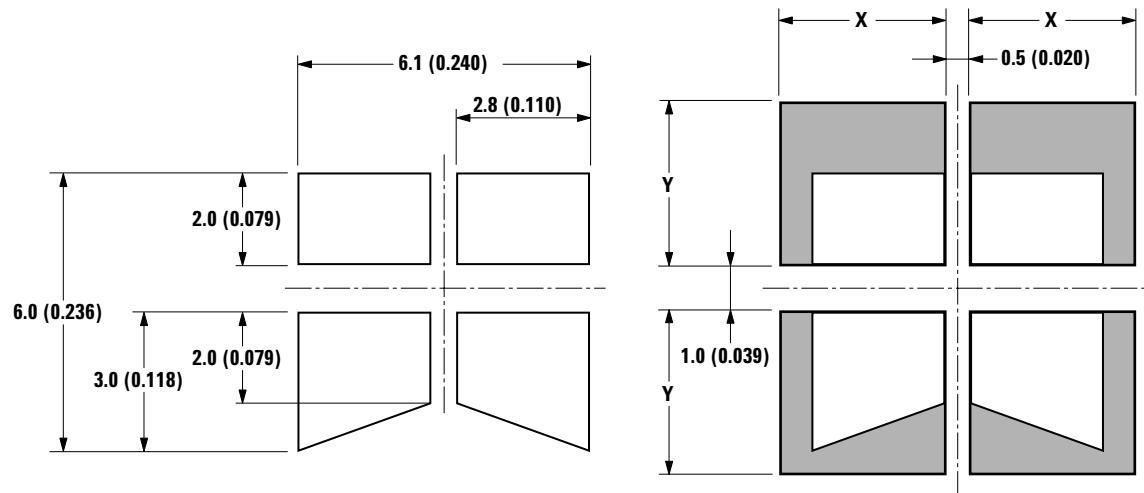


Figure 7a. Recommended Soldering Pad Pattern.



Thermal Resistance	Solder Pad Area (xy)
300 C/W	>16 mm ²
350 C/W	>12 mm ²
470 C/W	>8 mm ²

Figure 7b. Recommended soldering pad pattern (TTW).

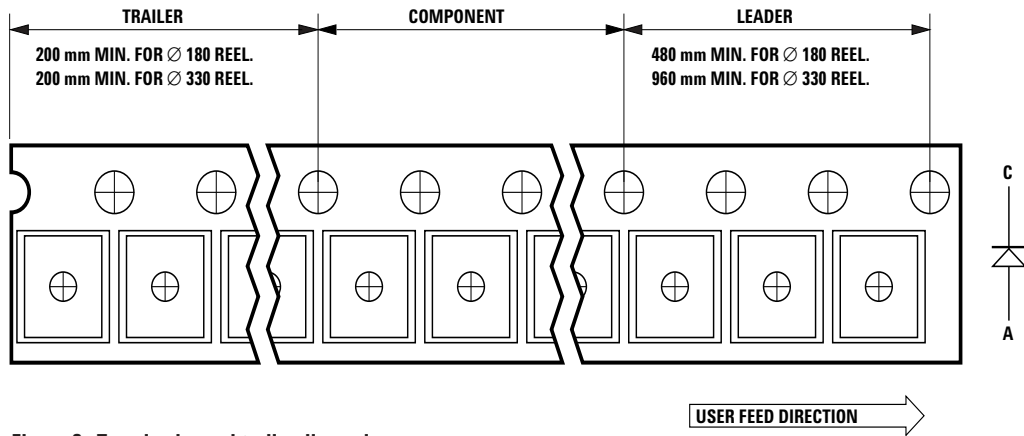


Figure 8. Tape leader and trailer dimensions.

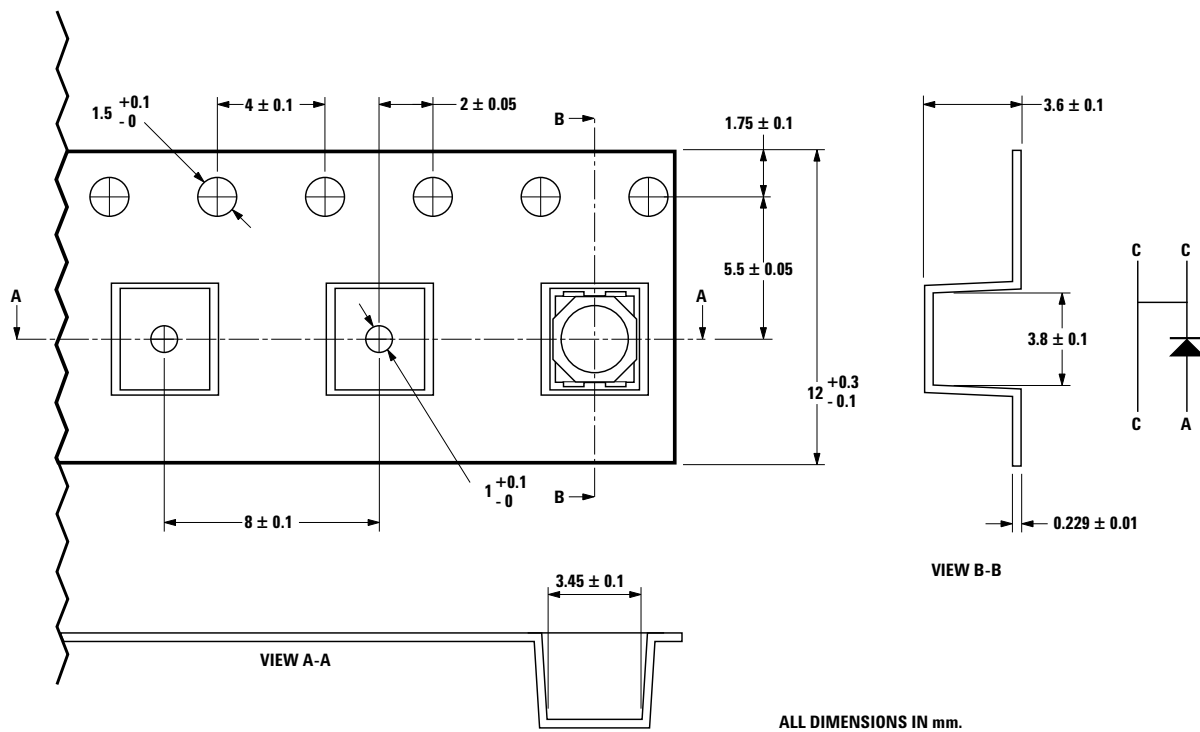


Figure 9. Tape Dimensions.

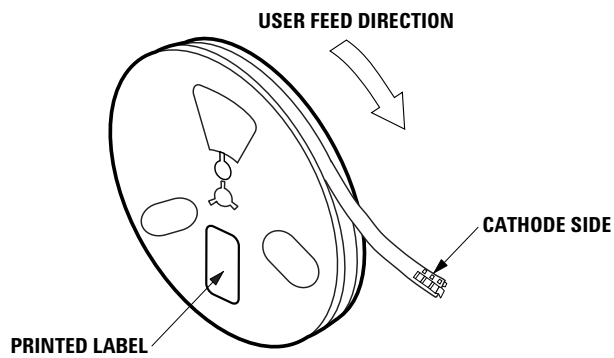


Figure 10. Reeling Orientation.

Storage Condition: 5 to 30° C @ 60% RH max.

Baking is required under the condition:

- a) the humidity indicator card turns pink
- b) the pack has been opened for more than four weeks

Baking recommended condition: 60 +/- 5°C for 20 hours.

Intensity Bin Select (X₅X₆)

Individual reel will contain parts from one half bin only

X ₅	Min I _v Bin
X ₆	
0	Full Distribution
3	3 half bins starting from X ₅ 1
4	4 half bins starting from X ₅ 1
5	5 half bins starting from X ₅ 1
7	3 half bins starting from X ₅ 2
8	4 half bins starting from X ₅ 2
9	5 half bins starting from X ₅ 2

Color Bin Select (X₇)

Individual reel will contain parts from one full bin only.

X ₇	
0	Full Distribution
Z	A and B only
Y	B and C only
W	C and D only
V	D and E only
U	E and F only
Q	A, B and C only
P	B, C and D only
N	C, D and E only
M	D, E and F only
1	A, B, C and D only
3	B, C, D and E only
4	C, D, E and F only
5	A, B, C, D and E only
6	B, C, D, E, and F only

Intensity Bin Limits

Bin ID	Min. (mcd)	Max. (mcd)
S1	180.00	224.00
S2	224.00	285.00
T1	285.00	355.00
T2	355.00	450.00
U1	450.00	560.00
U2	560.00	715.00
V1	715.00	900.00
V2	900.00	1125.00
W1	1125.00	1400.00
W2	1400.00	1800.00

Tolerance of each bin limit = ± 12%

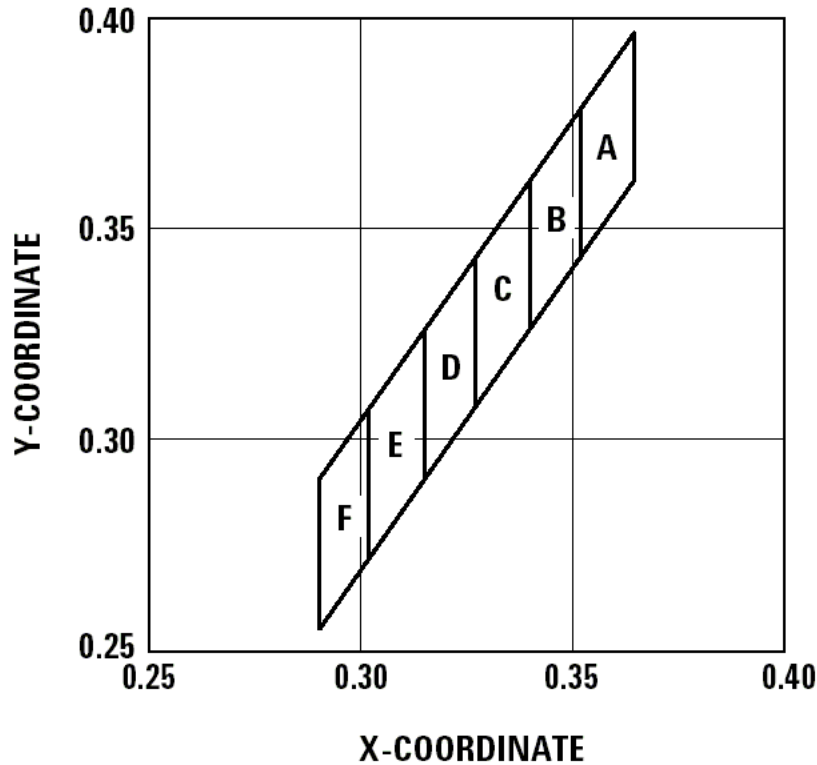
Color Bin Limits

Bin ID	Limits (Chromaticity Coordinates)				
A	X	0.352	0.365	0.365	0.352
	Y	0.377	0.395	0.360	0.341
B	X	0.340	0.352	0.352	0.340
	Y	0.360	0.377	0.341	0.325
C	X	0.327	0.340	0.340	0.327
	Y	0.342	0.360	0.325	0.306
D	X	0.315	0.327	0.327	0.315
	Y	0.325	0.342	0.306	0.290
E	X	0.302	0.315	0.315	0.302
	Y	0.307	0.325	0.290	0.271
F	X	0.290	0.302	0.302	0.290
	Y	0.290	0.307	0.271	0.255

Tolerance of each bin limit = ± 0.02 .

Packaging Option (X₈X₉)

Option	Test Current	Package Type	Reel Size
M2	30 mA	Top Mount	7 inch



**[www.agilent.com/
semiconductors](http://www.agilent.com/semiconductors)**

For product information and a complete list of distributors, please go to our web site.

For technical assistance call:

Americas/Canada: +1 (800) 235-0312
or (916) 788-6763

Europe: +49 (0) 6441 92460

China: 10800 650 0017

Hong Kong: (+65) 6756 2394

India, Australia, New Zealand: (+65) 6755 1939

Japan: (+81 3) 3335-8152(Domestic/International), or 0120-61-1280(Domestic Only)

Korea: (+65) 6755 1989

Singapore, Malaysia, Vietnam, Thailand, Philippines, Indonesia: (+65) 6755 2044

Taiwan: (+65) 6755 1843

Data subject to change.

Copyright © 2005 Agilent Technologies, Inc.

July 27, 2005

5989-3445EN



Agilent Technologies