Harvatek Surface Mount LED Data Sheet
HT-F196 Series

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DISCLAIMER

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LIFE SUPPORT POLICY

HARVATEK's products are not authorized for use as critical components in life support devices or systems without the express written approval of the President of HARVATEK or HARVATEK INTERNATIONAL. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.

2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

Product Specifications

Product	Emission Color	Technology	Test Current I_F (mA)	Luminous Intensity I_V (mcd)	Forward Voltage V_F (V)	Orderable Part Number
HT-F196UYG	Ultra Bright Yellow Green	AlInGaP	20	112.5 typ	2.0 typ	HT-F196UYG-YYYY
HT-F196UY	Ultra Bright Yellow	AlInGaP	20	112.5 typ	1.9 typ	HT-F196UY-YYYY
HT-F196UD	Ultra Bright Orange	AlInGaP	20	112.5 typ	1.9 typ	HT-F196UD-YYYY
HT-F196USD	Ultra Bright Red	AlInGaP	20	112.5 typ	1.9 typ	HT-F196USD-YYYY
HT-F196NB5	Blue	InGaN	5	28 typ	2.8 typ	HT-F196NB-YYYY
HT-F196NG5	True Green	InGaN	5	180 typ	2.8 typ	HT-F196NG-YYYY
HT-F196TW5	White	InGaN	5	180 typ	2.8 typ	HT-F196TW-YYYY

	Specification	Material	Quantity
Resin	Diffused	Epoxy resin	
Carrier tape	Per EIA 481-1A specs	Conductive black tape	4000pcs per reel
Reel	Per EIA 481-1A specs	Conductive black	
Label	HT standard	Paper	
Packing bag	220x240mm	Aluminum laminated bag/ no-zipper	One reel per bag
Carton	HT standard	Paper	

Others:

Each immediate box consists of 5 reels. The 5 reels may not necessarily have the same lot number or the same bin combinations of Iv, λ_D and Vf. Each reel has a label identifying its specification; the immediate box consists of a product label as well.

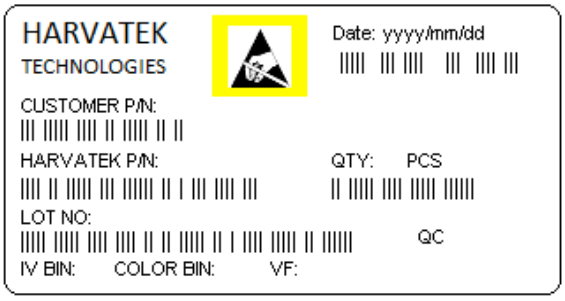
ATTENTION: Electrostatic Discharge (ESD) protection



The symbol to the left denotes that ESD precaution is needed. ESD protection for GaP and AlGaAs based chips is necessary even though they are relatively safe in the presence of low static-electric discharge. Parts built with AlInGaP, GaN, or/and InGaN based chips are **STATIC SENSITIVE devices**. ESD precaution must be taken during design and assembly.

If manual work or processing is needed, please ensure the device is adequately protected from ESD during the process.

Label Specifications



■ Harvatek P/N:

H T - F 19 6 XXX - YYYY

Series Name	Emitting Color	Customer Code
HT-F196 **HT: Harvatek** **F196: Side-emitting series** **1.6 (L) x 0.8(W) x 0.35 (H) mm**	**XXX** **UYG: Ultra Bright Yellow Green** **UY: Ultra Bright Yellow** **UD: Ultra Bright Orange** **USD: Ultra Bright Red** **NB5: Blue @5mA** **NG5: True Green @5mA** **TW5: White @5mA**	**YYYY** **Customer Product Code (TBD)**

Lot No.:

1	2	3	4	5	6	7	8	9	10
E	1	A	1	A	2	2	L	1	2

Code 1 2		Code 3	Code 4	Code 5	Code 6	Code 7	Code 8	Code 9	Code 10
		Mfg. Year	Mfg. Month	Mfg. Date	Consecutive number		Special code		
Internal Tracing Code		2010-A 2011-B 2012-C 2013-D . .	1:Jan. 2:Feb. .... A:Oct. B:Nov. C:Dec.	1:A 2:B 3:C ... 26:Z 27:7 28:8 29:9 30:3 31:4	01~ZZ		000~ZZZ		

■ Luminous Intensity (Iv) Bin:

Bin	Luminous Intensity Range (mcd)		Bin	Luminous Intensity Range (mcd)	
	Minimum	Maximum		Minimum	Maximum
N1	28.5	36.0	N2	36.0	45.0
P1	45.0	57.0	P2	57.0	71.5
Q1	71.5	90.0	Q2	90.0	112.5
R1	112.5	142.0	R2	142.0	180.0
S1	180.0	227.0	S2	227.0	285.0
T1	285.0	360.0	T2	360.0	450.0
U1	450.0	570.0	U2	570.0	715.0

@20mA / Ta=25^{O} C, Tolerance: ± 10%

■ Wavelength (λ_D) Bin:

Bin	Wavelength Range (nm)							
	Red (USD)		Orange (UD)		Yellow (UY)		Yellow Green (UYG)	
	Min	Max	Min	Max	Min	Max	Min	Max
-	615.0	630.0						
A			597.0	600.0	582.0	584.5	561.5	564.5
B			600.0	603.0	584.6	587.0	564.5	567.5
C			603.0	606.0	587.0	589.5	567.5	570.5
D			606.0	609.0	589.5	592.0	570.5	573.5
E			609.0	612.0	592.0	594.5	573.5	576.5
F			612.0	615.0	594.5	597.0		

@20mA / Ta=25^{O} C, Tolerance: $\pm$ 0.5nm

Bin	Wavelength Range (nm)			
	True Green (NG)		Blue (NB)	
	Min	Max	Min	Max
-				
A	515.0	520.0	460.0	464.0
B	520.0	525.0	464.0	468.0
C	525.0	530.0	468.0	472.0
D	530.0	535.0	472.0	476.0
E	535.0	540.0	476.0	480.0
F			480.0	485.0
H				
J				

@20mA / Ta=25^{O} C, Tolerance: $\pm$ 0.5nm

■ Forward Voltage (V_F) Bin:

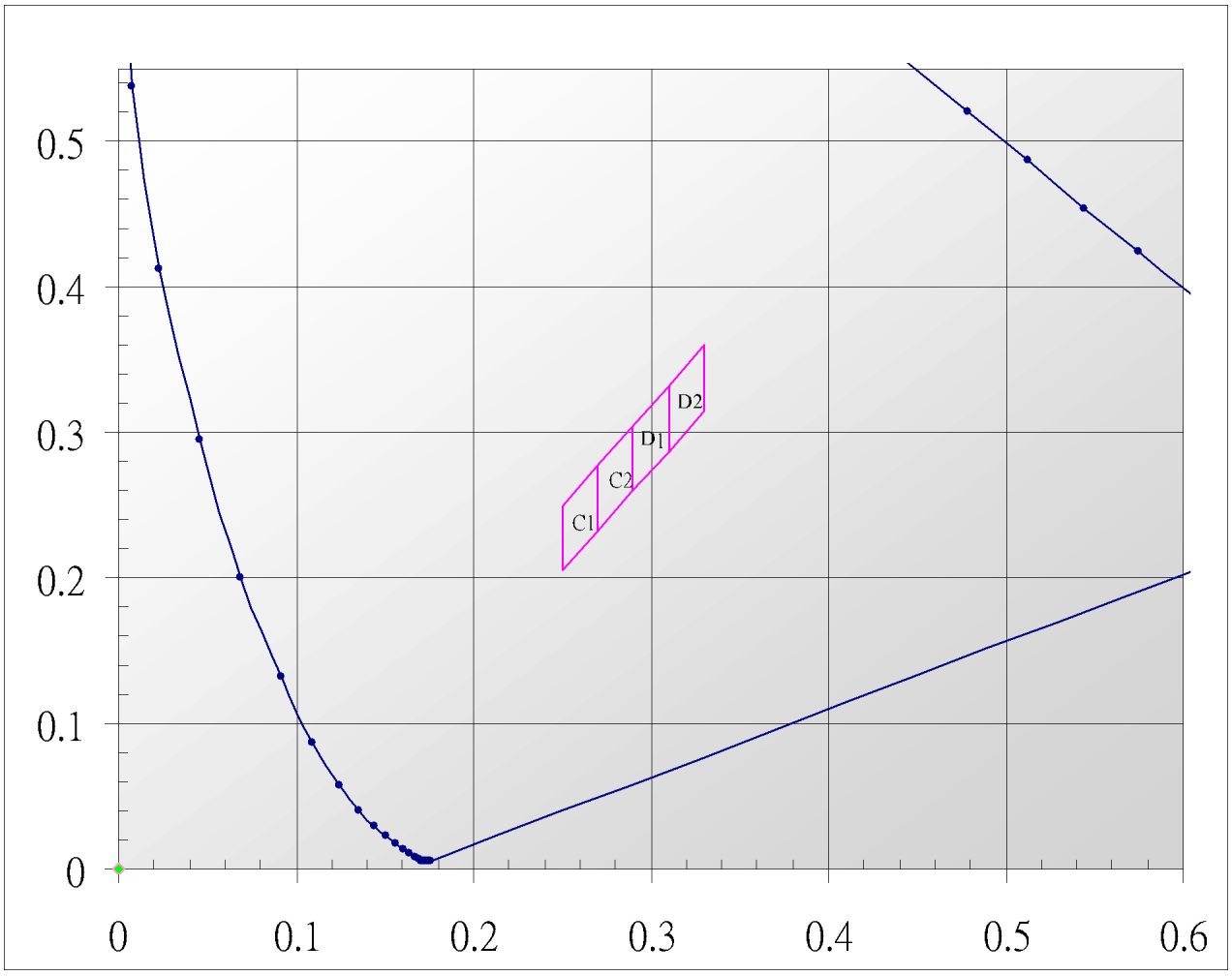
Color	Bin Code	Spec. Range
Blue (NB) Green (NG) White (TW)	G2T	2.55 – 2.65V
	G3T	2.65 – 2.75V
	G4T	2.75 – 2.85V
	H1T	2.85 – 2.95V
	H2T	2.95 – 3.05V
	H3T	3.05 – 3.15V
Ultra Bright (UYG, UY, UD, USD)	-	2.4 V max

@20mA / Ta=25℃, Tolerance: ± 0.05 V

■ Chromaticity Bin (for TW only):

	Rank C2			
x	0.27	0.29	0.29	0.27
y	0.2775	0.305	0.26	0.2325

	Rank D1			
x	0.29	0.31	0.31	0.29
y	0.305	0.3325	0.2875	0.26



@20mA / Ta=25℃, Tolerance: ± 0.01

Product Characteristics

Absolute Maximum Ratings

Product	Emission Color	P_d (mW)	I_F (mA)	I_{FP}* (mA)	V_R (V)	T_{OP} (°C)	T_{ST} (°C)
HT-F196UYG	Ultra Bright Yellow Green	72	30	100	5	-30°C~+80°C	-40°C~+85°C
HT-F196UY	Ultra Bright Yellow						
HT-F196UD	Ultra Bright Orange						
HT-F196USD	Ultra Bright Red						
HT-F196NB5	Blue	117	30	120			
HT-F196NG5	True Green						
HT-F196TW5	White						

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

**Remarks: This product should be operated in forward bias. If a reverse voltage is continuously applied to the product, such operation can cause migration resulting in LED damage.

Electro-Optical Characteristics

(T_a 25 °C)

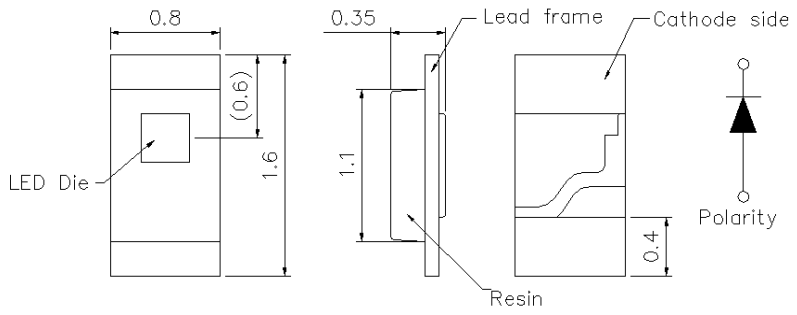
Product	Emission Color	I_F(mA)	V_F(V)		λ(nm)			I^*_V(mcd)
			typ	max	λ_D	λ_P	$\triangle\lambda$	typ
HT-F196UYG	Ultra Bright Yellow Green	20	2.0	2.4	573	574	20	112.5
HT-F196UY	Ultra Bright Yellow	20	1.9	2.4	589	593	15	112.5
HT-F196UD	Ultra Bright Orange	20	1.9	2.4	605	609	17	112.5
HT-F196USD	Ultra Bright Red	20	1.9	2.4	622	636	17	112.5
HT-F196NB5	Blue	5	2.8	3.15	470	468	40	28
HT-F196NG5	True Green	5	2.8	3.15	527	520	40	180
HT-F196TW5	White	5	2.8	3.15	C2/D1	-	-	180

* Per NIST standards

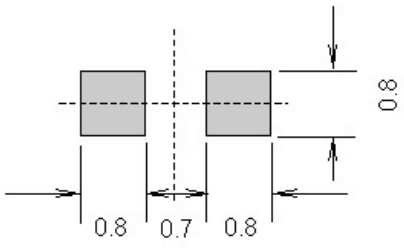
Package Outline Dimension
Recommended Soldering Pattern for Reflow Soldering

Unit: mm Tolerance: +/-0.1

Outline Dimension



Solder Pattern

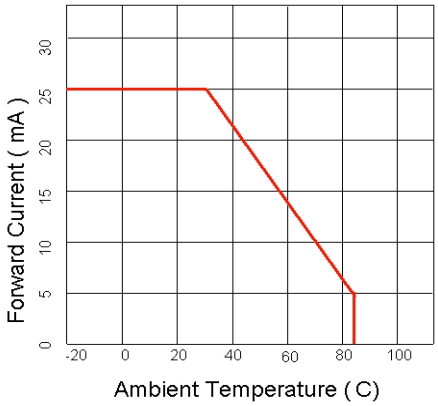


Soldering terminals may shift in the x, y direction.

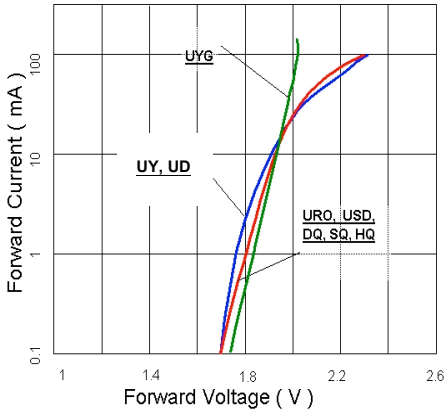
Unit: mm

Characteristic Curves for UYG, UY, UD and USD

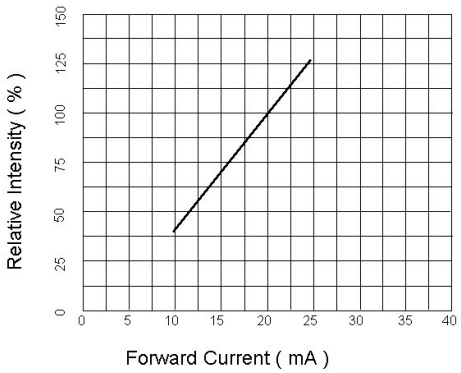
Forward Current vs. Ambient Temperature



Forward Voltage vs. Forward Current

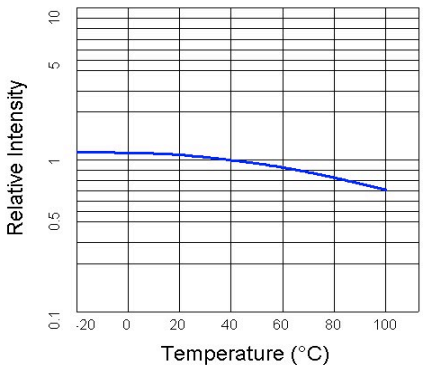


Relative Intensity vs. Forward Current

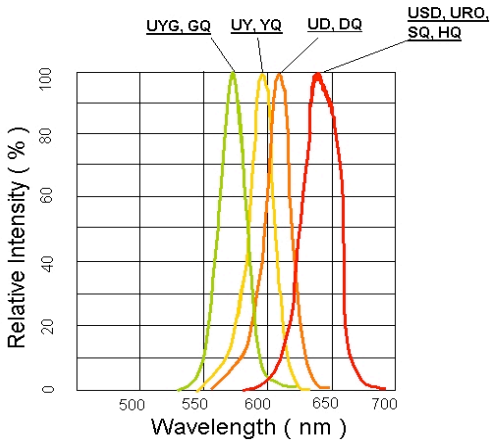


Relative Intensity vs. Ambient Temperature

Plused 20mA; 300us pulse, 10ms peroid

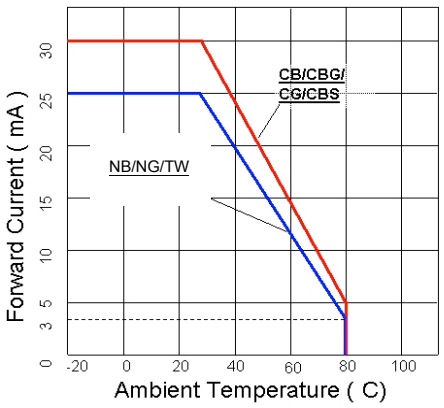


Relative Intensity vs. Wavelength

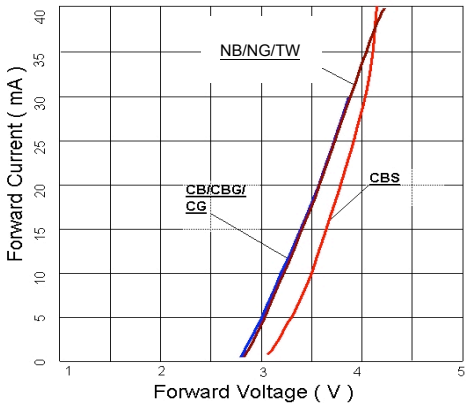


Characteristic Curves for NB, NG and TW

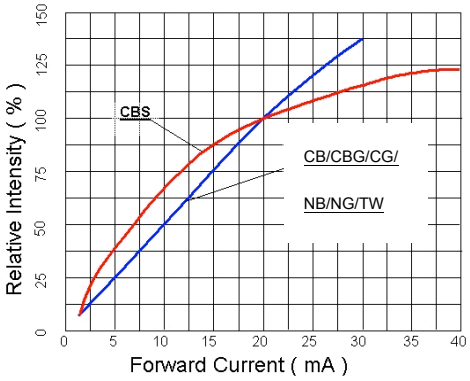
Forward Current vs. Ambient Temperature



Forward Voltage vs. Forward Current

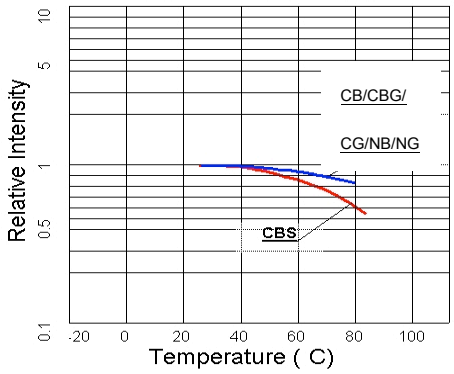


Relative Intensity vs. Forward Current

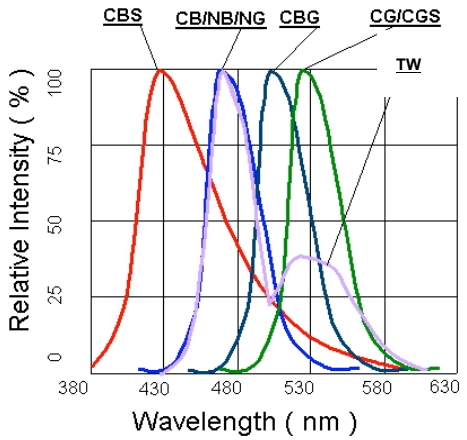


Relative Intensity vs. Ambient Temperature

Plused 20mA; 300us pulse, 10ms peroid

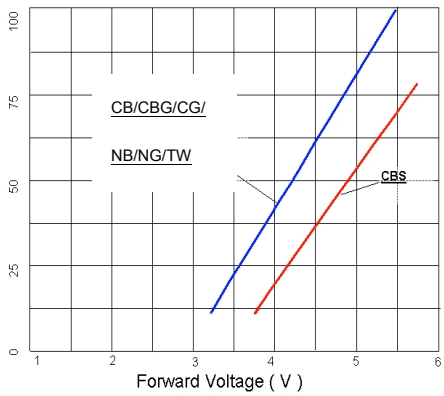


Relative Intensity vs. Wavelength



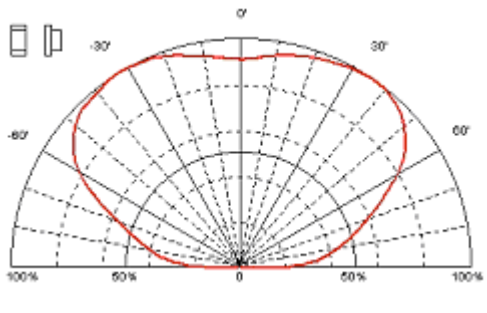
Peak Forward Voltage vs. Forward Current

100's test pulse, 1% duty cycle

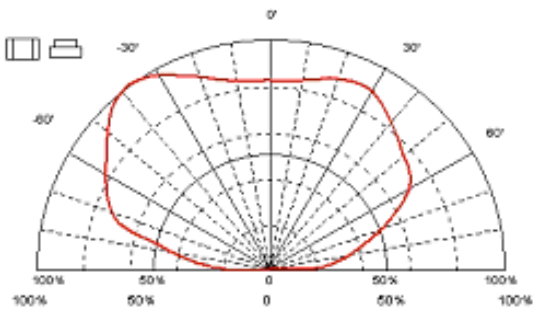


Characteristic Curves for All Colors (Radiation Pattern)

Directive Characteristics

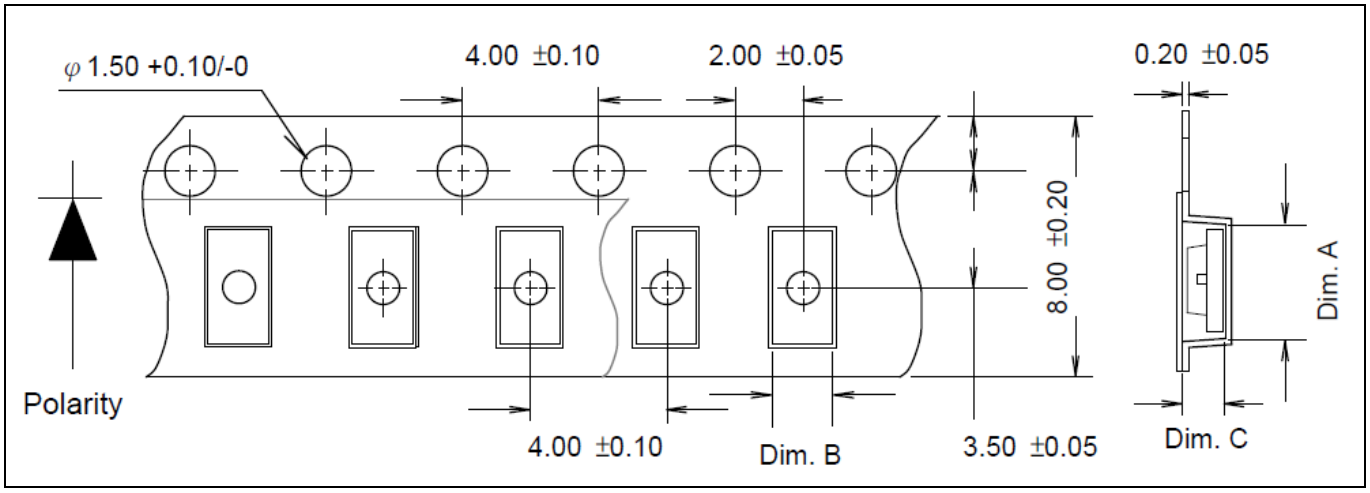


Directive Characteristics



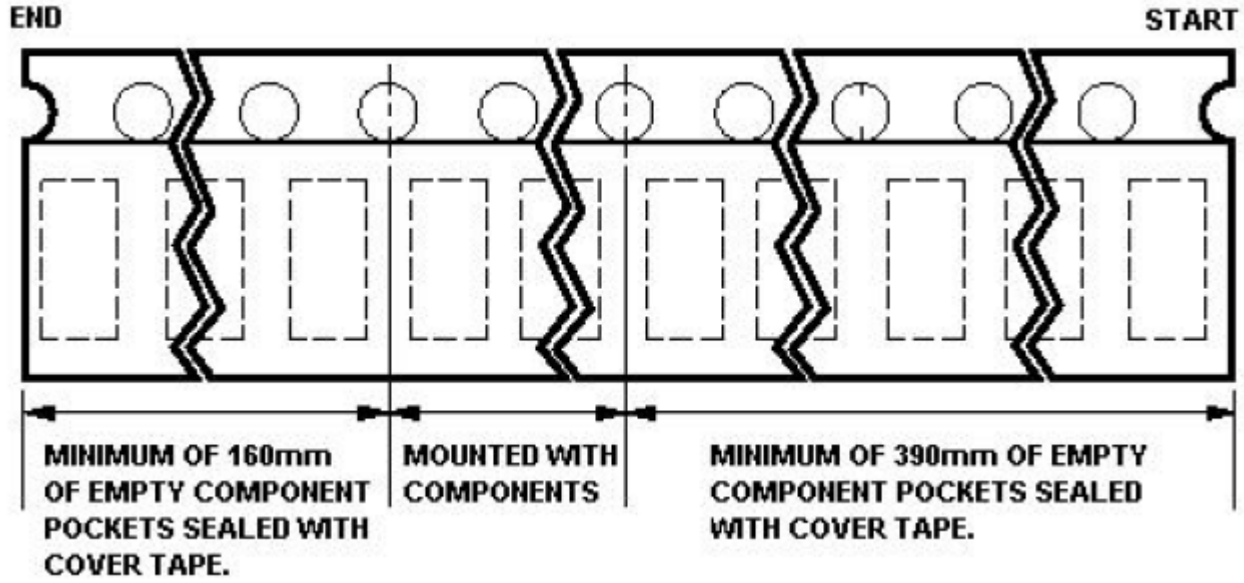
Packaging

Tape Dimension

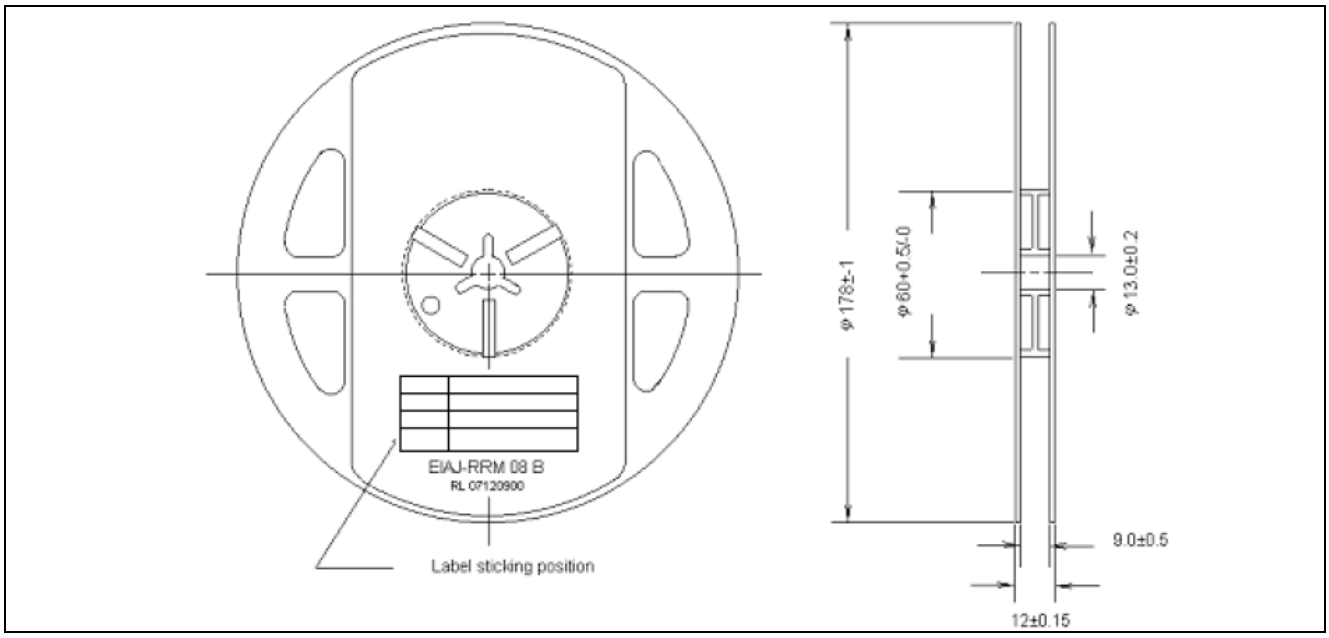


Part No.	Dim. A	Dim. B	Dim. C	Q'ty/Reel
HT-F196	1.75±0.05	0.90±0.05	0.50±0.05	4K

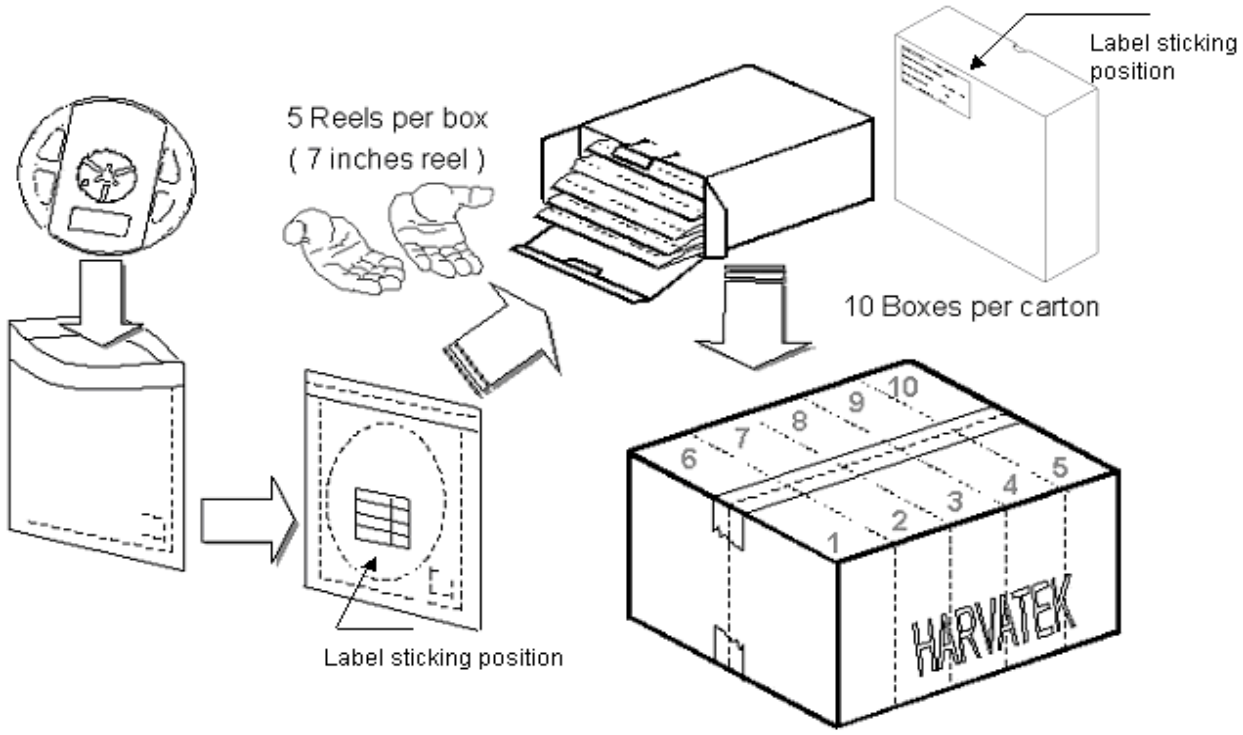
Unit: mm



Reel Dimension



Packing



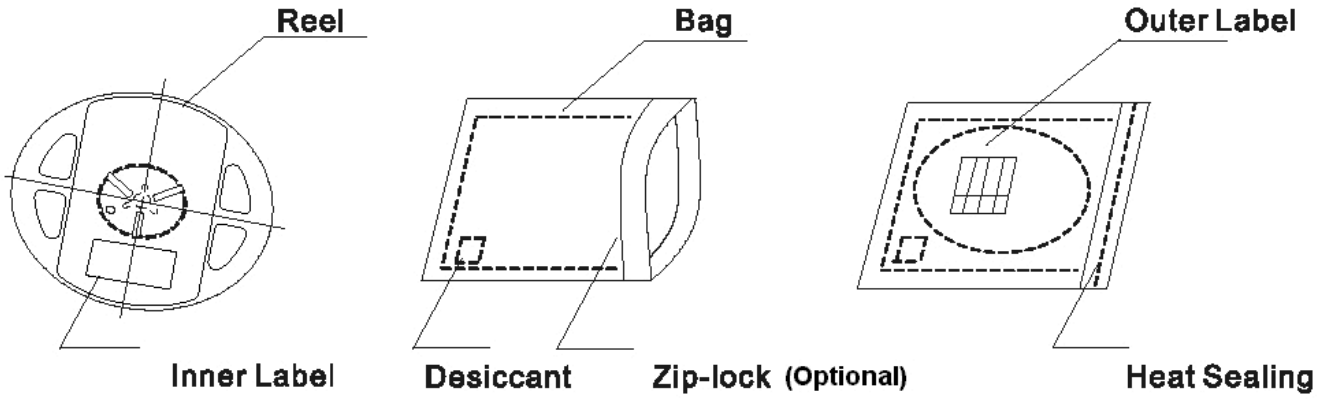
5 boxes per carton is available depending on shipment quantity.

Dry Pack

All SMD optical devices are **MOISTURE SENSITIVE**. Avoid exposure to moisture at all times during transportation or storage. Every reel is packaged in a moisture protected anti-static bag. Each bag is properly sealed prior to shipment.

Upon request, a humidity indicator will be included in the moisture protected anti-static bag prior to shipment.

The packaging sequence is as follows:



PRECAUTIONS

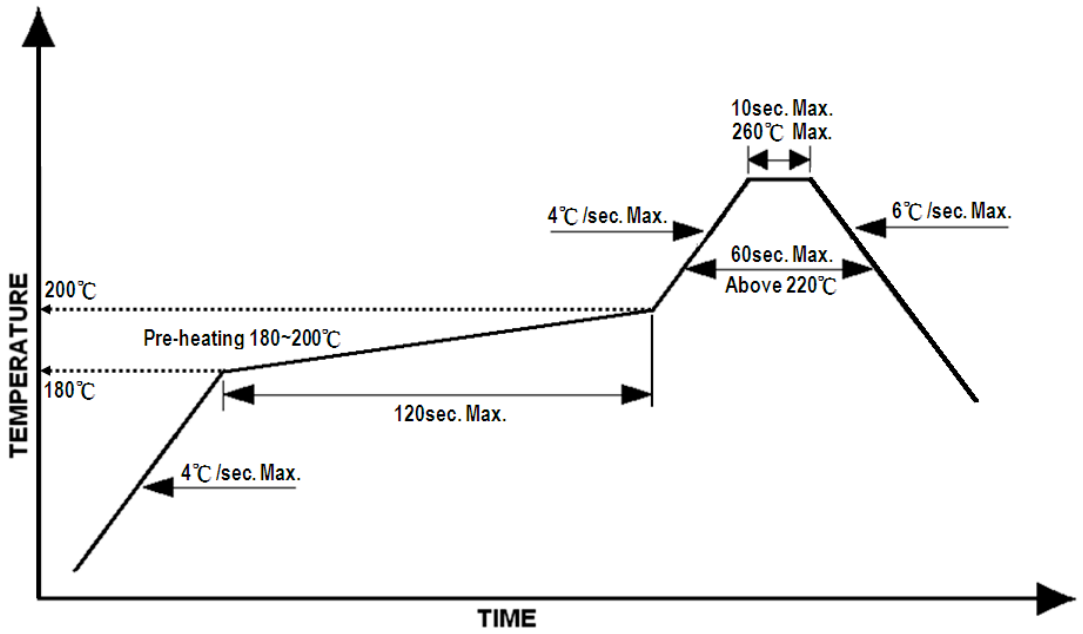
1. Avoid exposure to moisture at all times during transportation or storage.
2. Anti-Static precaution must be taken when handling GaN, InGaN, and AlInGaP products.
3. It is suggested to connect the unit with a current limiting resistor of the proper size. Avoid applying a reverse voltage.
4. Avoid operation beyond the limits as specified by the absolute maximum ratings.
5. Avoid direct contact with the surface through which the LED emits light.

Reflow Soldering

Recommend soldering paste specifications:

1. Operating temp.: Above 220°C, 60sec
2. Peak temp.:260°C Max., 10sec Max.
3. Never take next process until the component is cooled down to room temperature after reflow.
4. The recommended reflow soldering profile (measuring on the surface of the LED terminal) is following:

Lead-free Solder Profile



Reworking

- Rework should be completed within 5 seconds under 260°C.
- The iron tip must not come in contact with the copper foil.
- Twin-head type is preferred.

Cleaning

Following are cleaning procedures after soldering:

- An alcohol-based solvent such as isopropyl alcohol (IPA) is recommended.
- Temperature x Time should be 50°C x 30sec. or <30°C x 3min
- Ultra sonic cleaning: < 15W/ bath; bath volume ≤ 1liter
- Curing: 100°C max, <3min

Cautions of Pick and Place

- Avoid stress on the resin at elevated temperature.
- Avoid rubbing or scraping the resin by any object.
- Electric-static may cause damage to the component. Please ensure that the equipment is properly grounded. Use of an ionizer fan is recommended.

Revision History

Changes since last revision	Page	Version No.	Revision Date
Initial release		1.0	06-23-2013