Harvatek Surface Mount CHIP LEDs Approval Sheet Model No.: HT-297HQ5/CB5

Acknowledged by

Section Manager Production Engineering Dept. **Manager Production Engineering Dept.**

Official Product	HT Part No. HT-297HQ5/CB5	Your Part No.		Data Sheet No.	
Tentative Product	*******	********		HDS-297-K306	
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Introduction

- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by HARVATEK for any infringements of intellectual property or other rights of the third parties which may result from it use.
- Harvatek is continually effort to improve the quality of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing HARVATEK products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such HARATEK products cause loss of human life, bodily injury or damage to property.
- The HARVATEK products listed in this document are intended for usage in general electronics (computer, personal equipment, office equipment, industrial robotics, domestic, etc...) These products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury.
- In developing your designs, please ensure that HARVATEK products are used within specified operating ranges as set forth in the most recent HARVATEK products specifications.
- Also, please keep in mind the precautions listed in this document.

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Product Specification

HQ: 18-45mcd CB: 11.2-28mcd @5mA / Ta= 25 ^o C		
@5mA / Ta= 25 ⁰ C		
9011/1/ Id= 20 0		
Tolerance:+/-10%		
HQ: 620-650nm		
CB: 465-480nm		
@5mA / Ta= 25 ^o C		
Tolerance:+/-0.5nm		
HQ: 1.6-2.2V		
CB: 2.55-3.05V		
@5mA / Ta= 25 ^o C		
Tolerance+/- 0.05V		
Milky diffused	Epoxy resin	
According to EIA 481-1A specs	Conductive tape /black	4000pcs per reel
According to EIA 481-1A specs	Conductive / black	
HT standard	Paper	
220x240mm	Aluminum laminated bag/	One reel one bag
	no-zipper	
HT standard	Paper	Non-specified
	Tolerance:+/-10% HQ: 620-650nm CB: 465-480nm @5mA / Ta= 25° C Tolerance:+/-0.5nm HQ: 1.6-2.2V CB: 2.55-3.05V @5mA / Ta= 25° C Tolerance+/- 0.05V Milky diffused According to EIA 481-1A specs According to EIA 481-1A specs HT standard 220x240mm	Tolerance:+/-10% HQ: 620-650nm CB: 465-480nm @5mA / Ta= 25° C Tolerance:+/-0.5nm HQ: 1.6-2.2V CB: 2.55-3.05V @5mA / Ta= 25° C Tolerance+/- 0.05V Milky diffused According to EIA 481-1A specs According to EIA 481-1A specs Conductive tape /black HT standard Paper 220x240mm Aluminum laminated bag/ no-zipper

Others:

Every small-box will be loaded 5 reels. These 5 reels can be different in lot, lv, lambda, or Vf. Every reel will have an independent label to identify its specification and the small-box there will have a corresponding label post on it.

ATTENTION: Electric static Discharge (ESD) protection



The symbol shown on the page herein to introduce 'Electro-Optical Characteristics'. ESD protection for GaP and AlGaAs is based chips is still necessary even though they are safe in low static-electric discharge. Material in

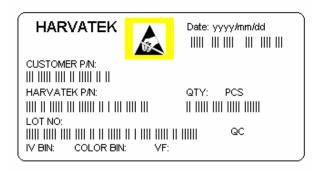
AllnGaP, GaN, or/and InGaN based chips are **STATIC SENSITIVE devices**. ESD protection has to considered and taken in the initial design stage.

If manual work/process is needed, please ensure the device is well protective from ESD during all the process.

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Label Spec.:



■ Customer P/N: To Be Defined

■ Harvatek P/N

H T - 2 9 7 HQ5/CB5

	★
Series Name	Emitting Color
	HQ:Ultra Bright Red
HT-297: 1.6x0.8x0.5mm	CB:Blue
	@5mA

Lot No.

1 2 3 4 5 6 7 8 9 10

P 1 2 2 3 0 A - D T

Code 1	Code 2	Code 3	Code 4, 5	Code 6, 7	Code 9	Code 10
	Mfg. Year	Mfg. Month	Mfg. Date	Lots	Resin Color	Packaging
		1: Jan.				
	Z: 2000	2: Feb.				
Internal	1: 2001			04 00	D. Millar White	T. Tonad Book
	2: 2002	9: Sep.	1~31/ (30)	01~99,	D: Milky White	T: Taped Reel
Tracing Code	3: 2003	A: Oct.		A,B,C		
		B: Nov.				
		C: Dec.				

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■ Iv Bin: Orange/Blue

Color	Bin Code	Spec. Range
Dod	М	18-28mcd
Red	N	28-45mcd
	L	11.2-18mcd
Blue	М	18-28mcd

■ Color Bin: Orange/Blue

Color	Bin Code	Spec. Range
Red	-	620-650nm
Blue	В	465-470nm
	С	470-475nm
	D	475-480nm

■ Vf Bin: Orange/Blue

Color	Bin Code	Spec. Range
Red	-	1.6-2.2
Blue	-	2.55-3.05V

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Product Feature

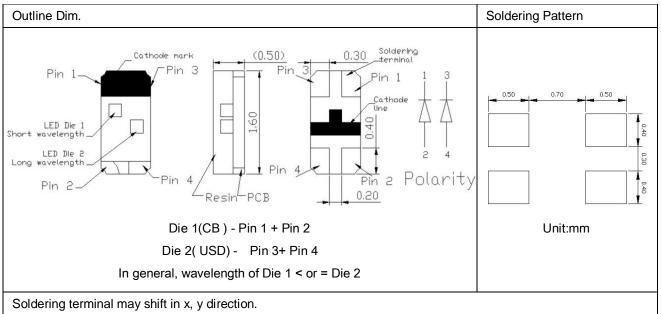
Electro-Optical Characteristics

(I_F @ 5mA, T_a 25 °C)

Code for porte	for parts Lighting Color Material -		V _F ($V_F(V)$		λ (nm)		
Code for parts			typ	max	λь	λР	Δλ	Min
HT-297HQ5/CB5	Ultra Bright Red (HQ)	AllnGaP	1.7	2.2	632	645	17	18
	Blue(CB)	InGaN	2.9	3.05	472	470	26	11.2

Package Outline Dimension and Recommended Soldering Pattern for Reflow Soldering

Unit: mm Tolerance: +/-0.1



Absolute Maximum Ratings

(Ta 25 °C)

Series	P _d (mW)	I _F (mA)	I _{FP} (mA)	V _R (V)	T _{OP} (°C)	T _{ST} (°C)
HT-297 AllnGaP	69	20	100**	5	-30~+80	-40~+85
HT-297 InGaN	65	20	100**	5	-30~+80	-40~+85

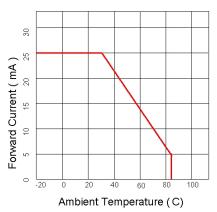
^{**} Condition for I_{FP} is pulse of 1/10 duty and 0.1msec width

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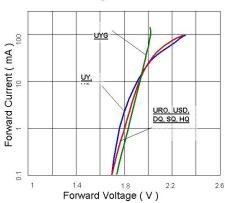


Characteristics of HT-297 Series

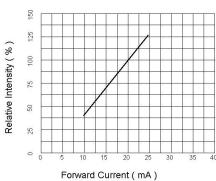
Forward Current vs. Ambient Temperature



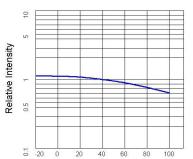
Forward Voltage vs. Forward Current



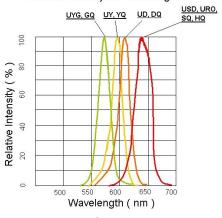
Relative Intensity vs. Forward Current



Relative Intensity vs. Ambient Temperature
Plused 20mA; 300us pulse, 10ms peroid

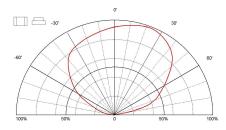


Relative Intensity vs. Wavelength

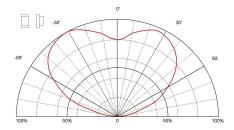


Directive Characteristics

Temperature (°C)



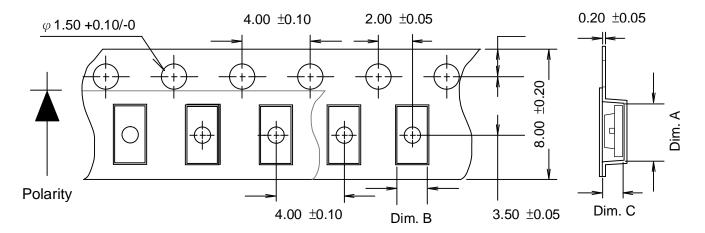
Directive Characteristics



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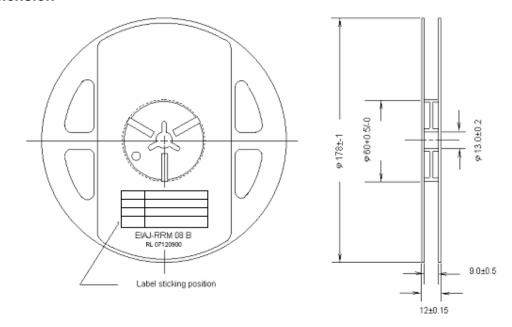


Packaging Tape, Reel, and Packing Model Tape Dimension



Part No.	Dim. A	Dim. B	Dim. C	Q'ty/Reel
HT-297	1.75±0.05	0.90±0.05	0.60±0.05	4K

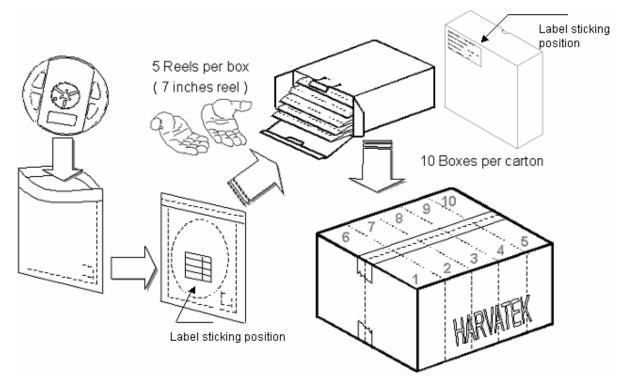
Reel Dimension



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Packing Model



5 boxes per carton is available according to shipping quantity.

Dry Pack

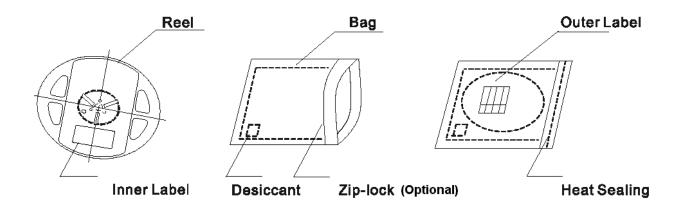
Any SMD optical device, like this chip LED, is **MOISTURE SENSITIVE device**. Avoid absorbing moisture at any time during transportation or storage. Every reel will be packaged in the moisture barrier anti-static bag (Specific bag material will depend upon customers' requirement or option). And the bag is well sealed before shipment.

By customer's requirement, we will put a humidity indicator in each moisture barrier anti-static bag before shipment.

The package is the following:

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Cautions of Pick and Place

It should be avoided to load stress on the resin during high temperature.

Avoid rubbing or scraping the resin by any object.

Electric-static may cause damage to the component. Please confirm that the equipment grounding well. Using an ionizer fan is recommended.

PRECAUTIONS

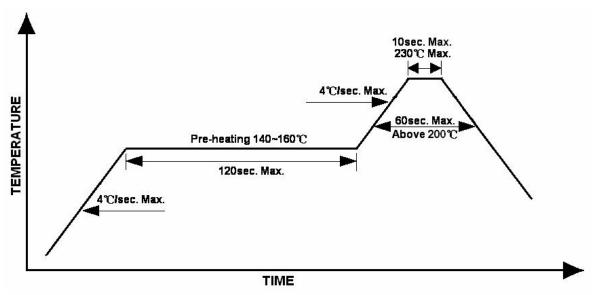
- 1. Avoid absorbing moisture at any time during transportation or storage.
- Anti-Static process is needed especially when handling GaN, InGaN, and AllnGaP products.
- It is suggested to connect the unit with a proper series current limit resistor. Avoid driving reverse voltage over the specification of LEDs when turning the unit ON/OFF.
- 4. Any application should refer to the specifications of absolute maximum ratings.
- 5. Avoid any direct contact with the viewing area.
- 6. If possible, assemble the unit in a clean room or dust-free environment.

Reflow Soldering

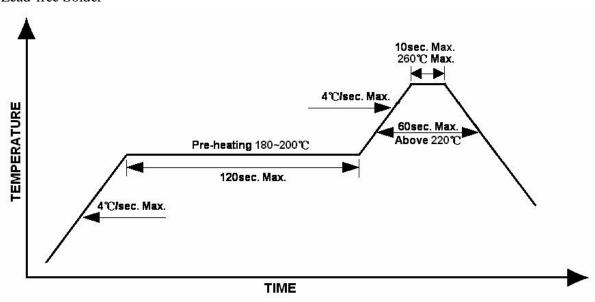
- Recommend tin glue specifications:
 Melting temperature: 178~192 °C
- Never take next process until the component is cooled down to room temperature after reflow.
- The recommended reflow soldering profile (measuring on the surface of the LED resin) is following:

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Lead-free Solder



Rework

- Customer must finish rework within 5 sec. under 260 °C.
- The head of iron cannot touch copper foil.
- ◆ Twin-head type is preferred.

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Cleaning

The conditions of cleaning after soldering:

An alcohol-based solvent such as isopropyl alcohol (IPA) is recommended.

Temperature×Time: <50 °C×30sec, or <30 °C×3min

Ultra sonic cleaning: < 15W/ bath; Bath volume: 1liter max.

Curing: 100 °C max, <3min

Do not contact with component on the assembly board.

Cautions of Pick and Place

It should be avoided to load stress on the resin during high temperature.

Avoid rubbing or scraping the resin by any object.

Electric-static may cause damage to the component. Please confirm that the equipment grounding well. Using an ionizer fan is recommended.

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Review of Reliability Tests Performance

Test Type	Test Requirement	Result	Conclusion(Meet/Not Meet)
TMCL @-40/85°C	Decision point= 300xTMCL A/R=0/1	No failure up to 300 cycles.	All units meet test requirement.
Solder-ability 215°C/3sec	0/1		MEET
Solder-ability 260°C/10sec	0/1		MEET
Resistance to Soldering heat (IR Reflowx3)	0/1		MEET
RTOL @25°C/20mA	Decision point= 1000hrs Iv AVG<35%	HT-297USD/CB5 Iv AVG=-12.53% Iv MAX=-4.55%	MEET
	degradation Iv MAX<50% degradation	HT-297USD/CB5 Iv AVG=-10.54% Iv MAX=6.98%	
WHTOL @85°C85%RH	Decision point= 1000hrs Iv AVG<35%	HT-297USD/CB5 Iv AVG=-18.31% Iv MAX=-9.79%	MEET
/5mA	degradation Iv MAX<50% degradation	HT-297USD/CB5 Iv AVG=-3.98% Iv MAX=7.82%	

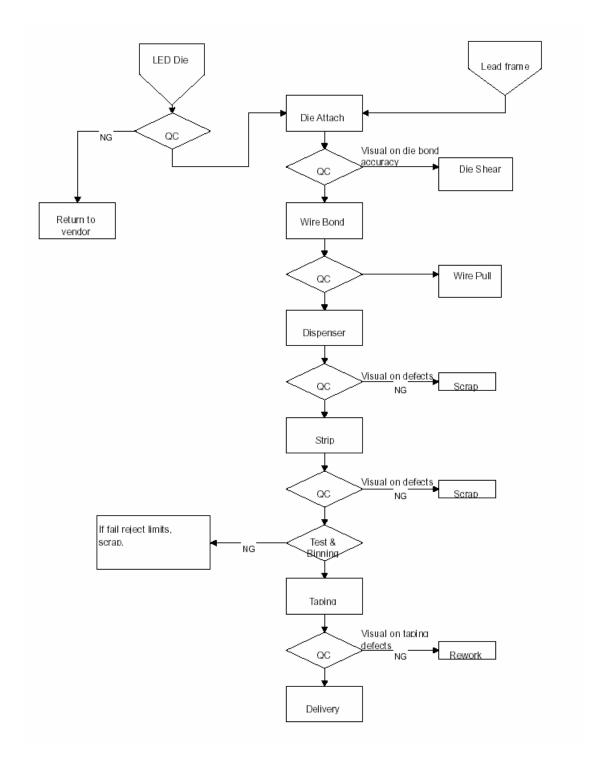
CONCLUSION

- The TMCL test has completed up to 300X without failure.
- 2. The Solder-ability test-215°C/3sec,260°C/10sec, all sample units passed.
- 3. The Resistance to Soldering heat test all sample units passed.
- From life test results of –RTOL and WHTOL all sample units passed.
- In RTOL and WHTOL life test, all the HT-297USD/CB5 sample units have met the requirement of AVG/MAX Iv degradation within the spec (AVG <35%/ MAX <50%) after 1000 hrs burning test. Meanwhile, they also passed 300X TMCL(-40 °C/15min:+85°C/15min) reliability test.

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Quality Chip LED Process Flow



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Revision History:

Rev.	Subject (Major changes since last revision)	Date
2.0.	Revised Iv & Vf spec	2005/09/12
3.0	Revised color bin spec & part code	2005/12/12

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