

Harvatek Surface Mount CHIP LEDs Data Sheet
Model: HT-PC56H01

Official Product	HT Part No. HT-PC56H01	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0	Page 1/24

DISCLAIMER	3
PRODUCT SPECIFICATION	4
ATTENTION: ELECTROSTATIC DISCHARGE (ESD) PROTECTION	4
PRODUCT CHARACTERISTICS	5
ELECTRO-OPTICAL CHARACTERISTICS	5
PACKAGE OUTLINE DIMENSION	5
ABSOLUTE MAXIMUM RATINGS	6
LABEL SPEC.	6
BIN CODE.	7
COLOR TEMPERATURE CORRINATES	9
CHARACTERISTICS OF HT-PC56H01	14
PACKAGING	19
TAPE DIMENSION	19
REEL DIMENSION	20
PACKING	21
DRY PACK	22
PRECAUTIONS	22
REFLOW SOLDERING	23
REWORKING	23
CLEANING	24
REVISE HISTORY	24

Official Product	HT Part No. HT-PC56H01	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0	Page 2/24

DISCLAIMER

HARVATEK reserves the right to make changes without further notice to any products herein to improve reliability, function or design. HARVATEK does not assume any liability arising out of the application or use of any product or circuit described herein; neither does it convey any license under its patent rights, nor the rights of others.

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 TECHNOLOGIES CORPORATION. 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.

Official Product	HT Part No. HT-PC56H01	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0	Page 3/24

Product Specification

	Specification	Material	Quantity
Lm	Typ. 40lm @ 2600k~3700k Typ. 44lm @ 3700k~7000k @120mA/ Ta= 25° C Tolerance: ± 10%		
Correlated Color Temperature	Refer to page 8 @120mA/ Ta= 25° C Tolerance: ± 0.01		
Vf	3.0~3.6V(0.1V/bin) @120mA/ Ta= 25° C Tolerance: ± 0.1V		
Resin	Yellow	Silicone resin	
Carrier tape	According to EIA 481-1A specs	Conductive black tape	1000 or 2000pcs per reel
Reel	According to EIA 481-1A specs	Conductive black	
Label	HT standard	Paper	
Packing bag	220x240mm	Aluminum laminated bag/ no-zipper	One reel one bag
Carton	HT standard	Paper	Non-specified
	Specification	Material	Quantity

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.

Official Product	HT Part No. HT-PC56H01	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0	Page 4/24

Product Characteristics

Electro-Optical Characteristics

(I_F @ 120mA, T_a 25 °C)

Product No.	Lighting Color	Material	V _F (V)		CCT:	Luminous Flux(Lm)
			min	max	Correlated Color Temperature(K)	typ
HT-PC56H01	White	InGaN	3.0	3.6	2600k-3700K	40 lm
			3.0	3.6	3700k-7000K	44 lm

Package Outline Dimension

Unit: mm Tolerance: +/-0.1

Outline Dim.	Soldering Pattern
Soldering terminals may shift in the x, y direction.	

Official Product	HT Part No. HT-PC56H01	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0	Page 5/24

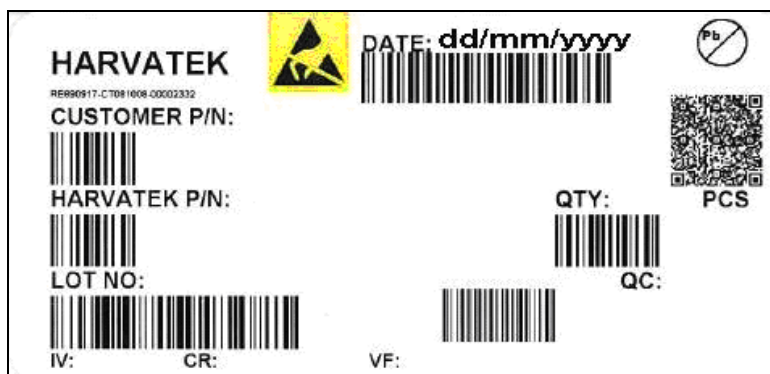
Absolute Maximum Ratings

Parameter	Symbol	value	Unit
DC Forward Current ⁽¹⁾	I _F	180	mA
Power Dissipation	P _d	0.65	W
Pulse Forward Current ⁽²⁾	I _{FP}	360	mA
Storage Temperature	T _s	-40 ~ 100	°C
Operating Temperature	T _{opr}	-40 ~ 85	°C
Junction Temperature	T _J	120	°C
Soldering Temperature	T _{sol}	260 (10sec)	°C

(T_a 25 °C)

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

Label Spec.



■ Customer P/N: To Be Defined

■ Harvatek P/N

HT - PC56H01



Series Name
HT-PC50H01: 5.6x 3.0x 0.77mm

Official Product	HT Part No. HT-PC56H01	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0	Page 6/24

Bin Code.

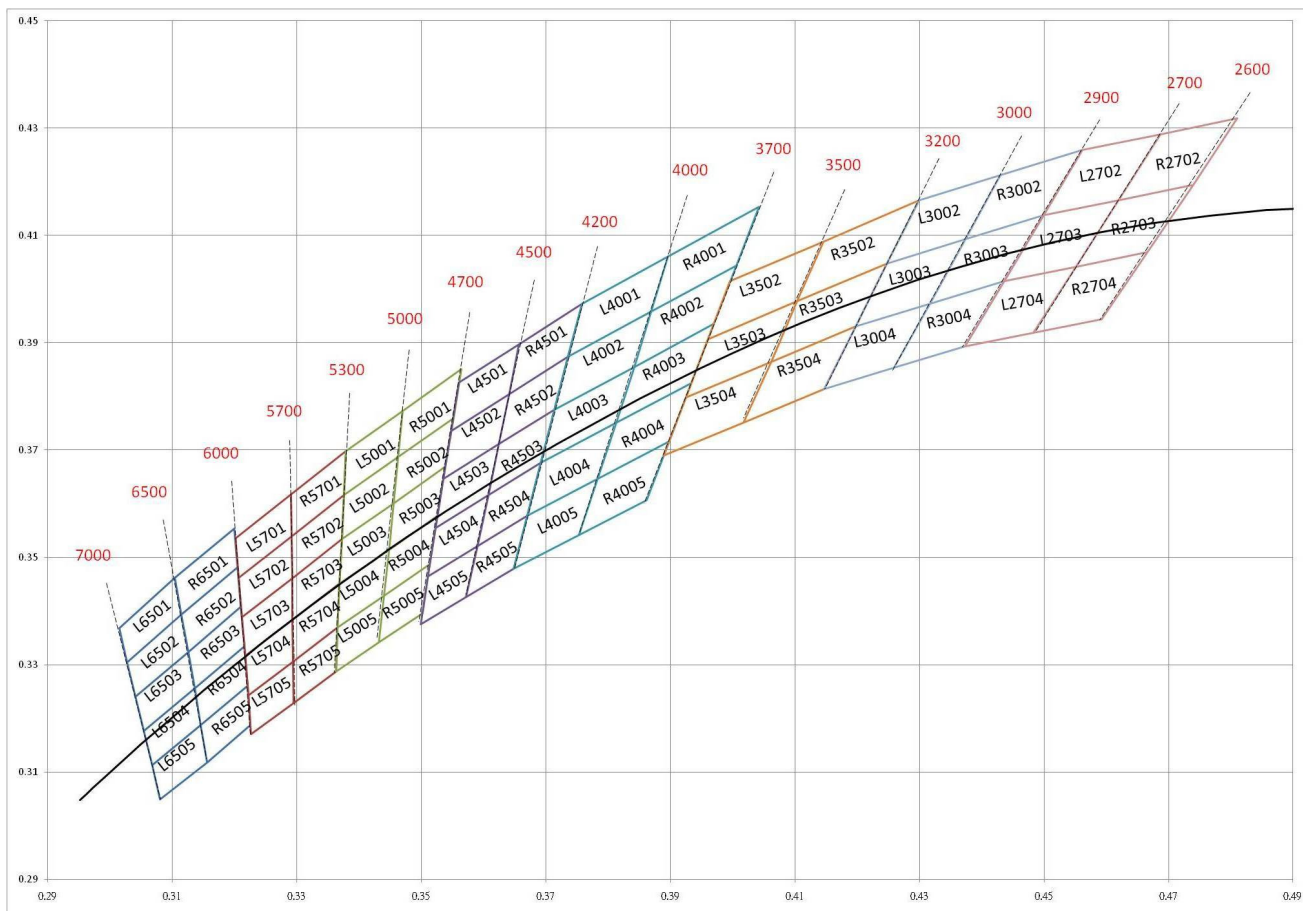
■ **Luminous Flux Bin:**

Luminous Flux Rank	Condition	Min.	Max.
VH	$I_F = 120 \text{ mA}$	31.5	36
VI		36	40.5
VJ		40.5	45
VK		45	49.5

Luminous Flux Measurement Allowance is $\pm 10\%$

Official Product	HT Part No. HT-PC56H01	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0	Page 7/24

■ **Correlated Color Temperature Rank:**



Correlated color Temperature is derived from the CIE 1931 Chromaticity diagram

Official Product	HT Part No. HT-PC56H01	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0	Page 8/24

Color Temperature Corrdinates

CCT	CIE Rank	CIE X	CIE Y		CIE X	CIE Y
2700	L2702	0.4562	0.426	R2702	0.4687	0.4289
		0.4499	0.4138		0.462	0.4166
		0.462	0.4166		0.474	0.4194
		0.4687	0.4289		0.481	0.4319
	L2703	0.4499	0.4138	R2703	0.462	0.4166
		0.4436	0.4015		0.4551	0.4042
		0.4551	0.4042		0.4666	0.4069
		0.462	0.4166		0.474	0.4194
	L2704	0.4436	0.4015	R2704	0.4551	0.4042
		0.4373	0.3893		0.4483	0.3919
		0.4483	0.3919		0.4593	0.3944
		0.4551	0.4042		0.4666	0.4069
3000	L3002	0.4299	0.4165	R3002	0.443	0.4212
		0.4248	0.4048		0.4374	0.4093
		0.4374	0.4093		0.4499	0.4138
		0.443	0.4212		0.4562	0.426
	L3003	0.4248	0.4048	R3003	0.4374	0.4093
		0.4198	0.3931		0.4317	0.3973
		0.4317	0.3973		0.4436	0.4015
		0.4374	0.4093		0.4374	0.4093
	L3004	0.4198	0.3931	R3004	0.4317	0.3973
		0.4147	0.3814		0.4259	0.3853
		0.4259	0.3853		0.4373	0.3893
		0.4317	0.3973		0.4436	0.4015
3500	L3502	0.3996	0.4015	R3502	0.4146	0.4089
		0.396	0.3907		0.4104	0.3978

Official Product	HT Part No. HT-PC56H01	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0	Page 9/24

		0.4104	0.3978		0.4248	0.4048		
		0.4146	0.4089		0.4299	0.4165		
	L3503		0.396	0.3907	R3503	0.4104	0.3978	
			0.3925	0.3798		0.4062	0.3865	
			0.4062	0.3865		0.4198	0.3931	
			0.4104	0.3978		0.4248	0.4048	
	L3504		0.3925	0.3798	R3504	0.4062	0.3865	
			0.3889	0.369		0.4017	0.3751	
			0.4017	0.3751		0.4147	0.3814	
			0.4062	0.3865		0.4198	0.3931	
	4000	L4001		0.3758	0.3973	R4001	0.3896	0.4061
				0.3736	0.3874		0.3869	0.3958
0.3869				0.3958	0.4006		0.4044	
0.3896				0.4061	0.4042		0.4153	
L4002			0.3736	0.3874	R4002	0.3869	0.3958	
			0.3714	0.3775		0.3842	0.3855	
			0.3842	0.3855		0.397	0.3935	
			0.3869	0.3958		0.4006	0.4044	
L4003			0.3714	0.3775	R4003	0.3842	0.3855	
			0.3692	0.3677		0.3813	0.3751	
			0.3813	0.3751		0.3934	0.3825	
			0.3842	0.3855		0.397	0.3935	
L4004			0.3692	0.3677	R4004	0.3813	0.3751	
			0.367	0.3578		0.3783	0.3646	
			0.3783	0.3646		0.3898	0.3716	
			0.3813	0.3751		0.3934	0.3825	
L4005			0.367	0.3578	R4005	0.3783	0.3646	
			0.3648	0.3479		0.3753	0.3541	
			0.3753	0.3541		0.3862	0.3607	
			0.3783	0.3646		0.3898	0.3716	
4500		L4501	0.356	0.3826	R4501	0.3657	0.3897	
			0.3548	0.3736		0.3641	0.3804	

Official Product	HT Part No. HT-PC56H01	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0	Page 10/24

		0.3641	0.3804		0.3736	0.3874	
		0.3657	0.3897		0.3758	0.3973	
	L4502		0.3548	0.3736	R4502	0.3641	0.3804
			0.3536	0.3646		0.3625	0.3711
			0.3625	0.3711		0.3714	0.3775
			0.3641	0.3804		0.3736	0.3874
	L4503		0.3536	0.3646	R4503	0.3625	0.3711
			0.3523	0.3555		0.3608	0.3616
			0.3608	0.3616		0.3692	0.3677
			0.3625	0.3711		0.3714	0.3775
	L4504		0.3523	0.3555	R4504	0.3608	0.3616
			0.3511	0.3465		0.359	0.3521
			0.359	0.3521		0.367	0.3578
			0.3608	0.3616		0.3692	0.3677
	L4505		0.3511	0.3465	R4505	0.359	0.3521
			0.3499	0.3375		0.3572	0.3426
0.3572			0.3426	0.3648		0.3479	
0.359			0.3521	0.367		0.3578	
5000	L5001	0.3379	0.3698	R5001	0.347	0.3773	
		0.3376	0.3616		0.3463	0.3687	
		0.3463	0.3687		0.3552	0.376	
		0.347	0.3773		0.3565	0.3851	
	L5002		0.3376	0.3616	R5002	0.3463	0.3687
			0.3373	0.3534		0.3456	0.3601
			0.3456	0.3601		0.3539	0.3669
			0.3463	0.3687		0.3552	0.376
	L5003		0.3373	0.3534	R5003	0.3456	0.3601
			0.3369	0.3451		0.3448	0.3514
			0.3448	0.3514		0.3526	0.3578
			0.3456	0.3601		0.3539	0.3669
	L5004		0.3369	0.3451	R5004	0.3448	0.3514
			0.3366	0.3369		0.344	0.3428
			0.344	0.3428		0.3514	0.3487
			0.3448	0.3514		0.3526	0.3578
5000	L5005	0.3366	0.3369	R5005	0.344	0.3428	
		0.3363	0.3287		0.3432	0.3342	

Official Product	HT Part No. HT-PC56H01	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0	Page 11/24

		0.3432	0.3342		0.3502	0.3396
		0.344	0.3428		0.3514	0.3487
5700	L5701	0.3202	0.3535	R5701	0.3291	0.3617
		0.3207	0.3462		0.3292	0.3539
		0.3292	0.3539		0.3376	0.3616
		0.3291	0.3617		0.3379	0.3698
	L5702	0.3207	0.3462	R5702	0.3292	0.3539
		0.3212	0.3389		0.3293	0.3461
		0.3293	0.3461		0.3373	0.3534
		0.3292	0.3539		0.3376	0.3616
	L5703	0.3212	0.3389	R5703	0.3293	0.3461
		0.3217	0.3316		0.3293	0.3384
		0.3293	0.3384		0.3369	0.3451
		0.3293	0.3461		0.3373	0.3534
	L5704	0.3217	0.3316	R5704	0.3293	0.3384
		0.3222	0.3243		0.3294	0.3306
		0.3294	0.3306		0.3366	0.3369
		0.3293	0.3384		0.3369	0.3451
	L5705	0.3222	0.3243	R5705	0.3294	0.3306
		0.3227	0.317		0.3295	0.3228
		0.3295	0.3228		0.3363	0.3287
		0.3294	0.3306		0.3366	0.3369
6500	L6501	0.3015	0.3368	R6501	0.3104	0.3462
		0.3028	0.3304		0.3115	0.3393
		0.3115	0.3393		0.3205	0.3481
		0.3104	0.3462		0.32	0.3554
	L6502	0.3028	0.3304	R6502	0.3115	0.3393
		0.3041	0.324		0.3126	0.3324
		0.3126	0.3324		0.321	0.3408
		0.3115	0.3393		0.3205	0.3481
	L6503	0.3041	0.324	R6503	0.3126	0.3324
		0.3055	0.3177		0.3136	0.3256
		0.3136	0.3256		0.3216	0.3334
		0.3126	0.3324		0.321	0.3408
6500	L6504	0.3055	0.3177	R6504	0.3136	0.3256
		0.3068	0.3113		0.3146	0.3187

Official Product	HT Part No. HT-PC56H01	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0	Page 12/24

		0.3146	0.3187		0.3221	0.3261
		0.3136	0.3256		0.3216	0.3334
	L6505	0.3068	0.3113	R6505	0.3146	0.3187
		0.3081	0.3049		0.3156	0.3118
		0.3156	0.3118		0.3226	0.3188
		0.3146	0.3187		0.3221	0.3261

**Measurement tolerance is ± 0.01

■ **V_F Bin:**

V _F Rank	Condition	Min.	Max.
1	I _F = 120 mA	2.9	3.0
2		3.0	3.1
3		3.1	3.2
4		3.2	3.3
5		3.3	3.4
6		3.4	3.5
7		3.5	3.6

Forward Voltage Measurement Allowance is $\pm 0.1V$

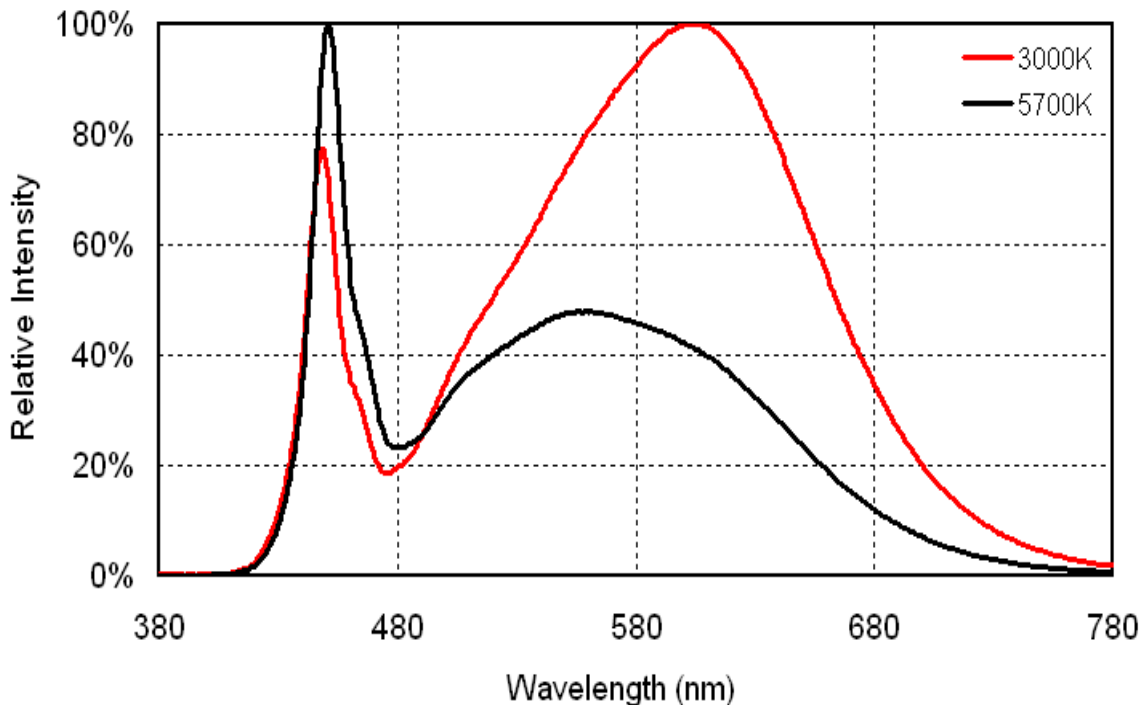
■ **Bin Code Definition:**

V _F Rank	Luminous Flux Rank	CIE Rank
2	YL	R2702

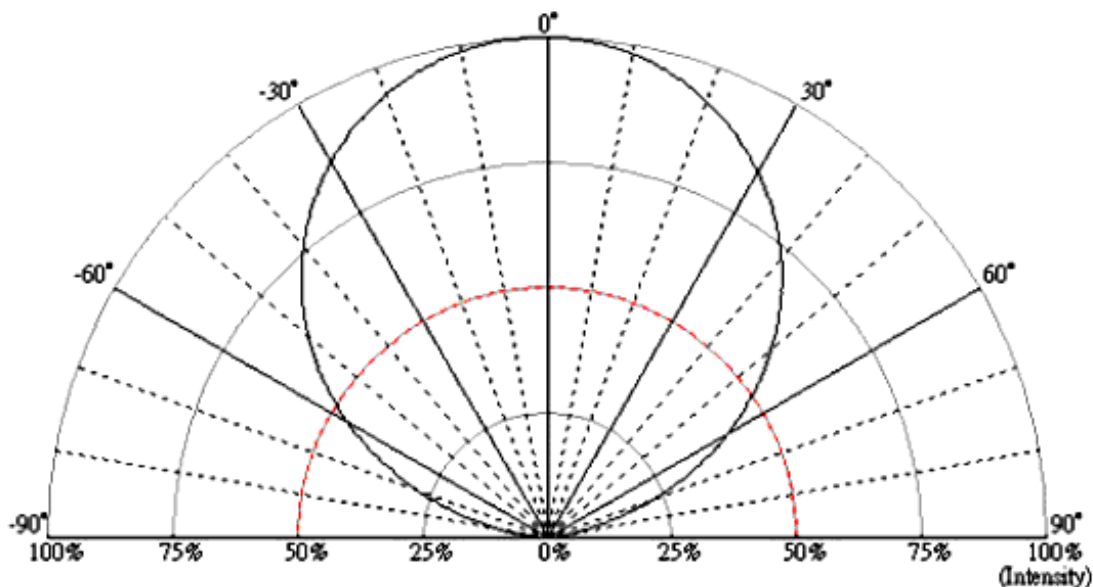
Official Product	HT Part No. HT-PC56H01	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0	Page 13/24

Characteristics of HT-PC56H01

Spectrum

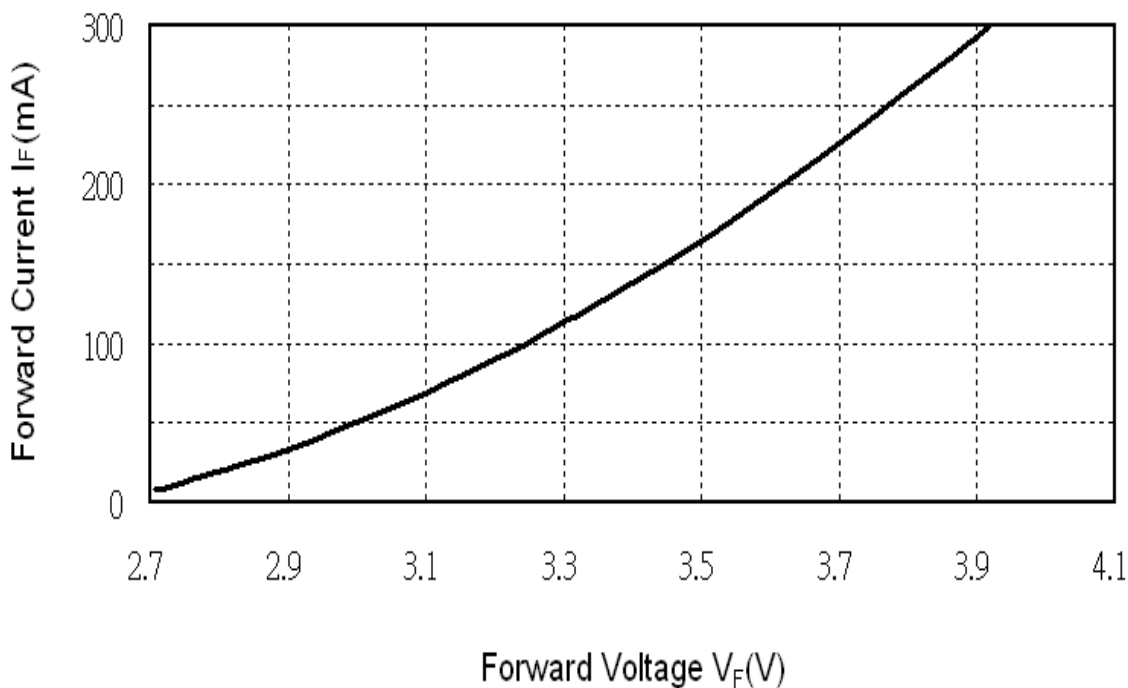


Radiation Pattern

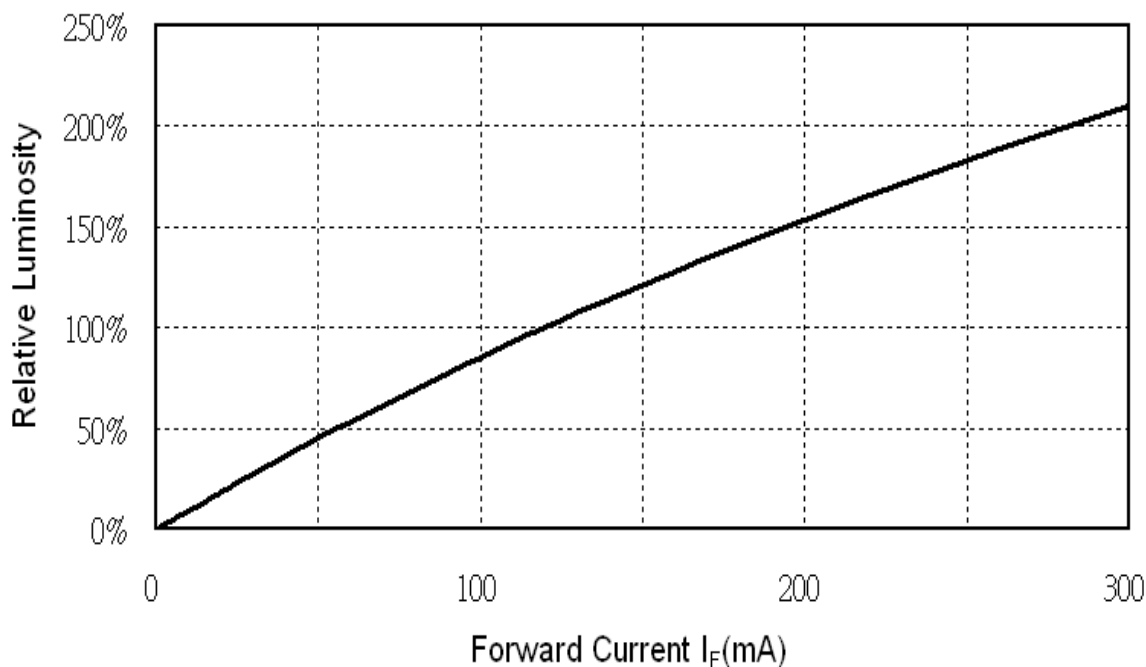


Official Product	HT Part No. HT-PC56H01	Your Part No.	Data Sheet No.
Tentative Product	*****	*****	HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0
			Page 14/24

Forward Voltage vs. Forward Current

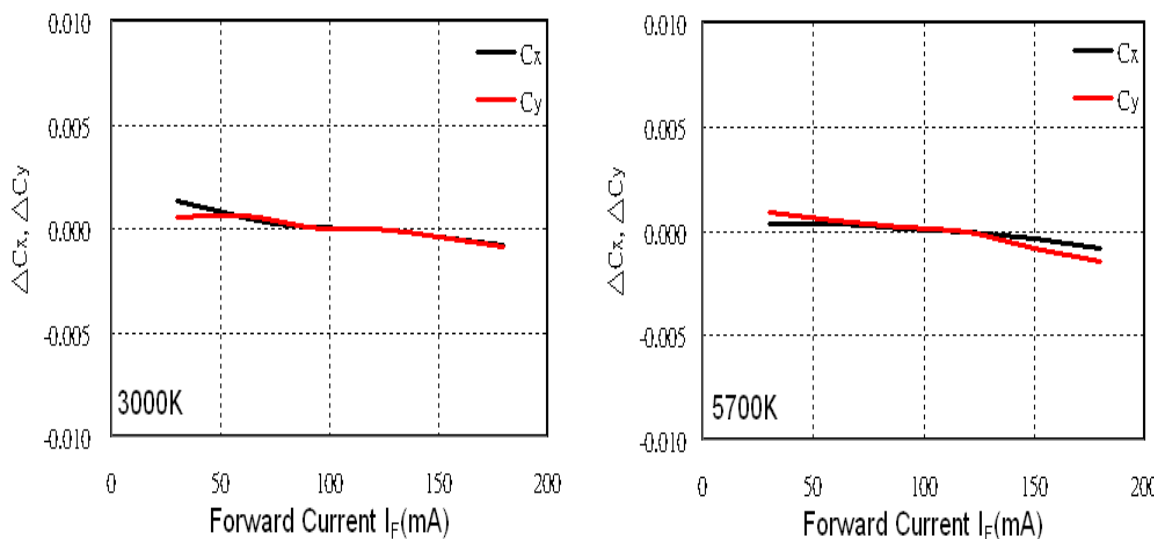


Forward Current vs. Relative Luminosity

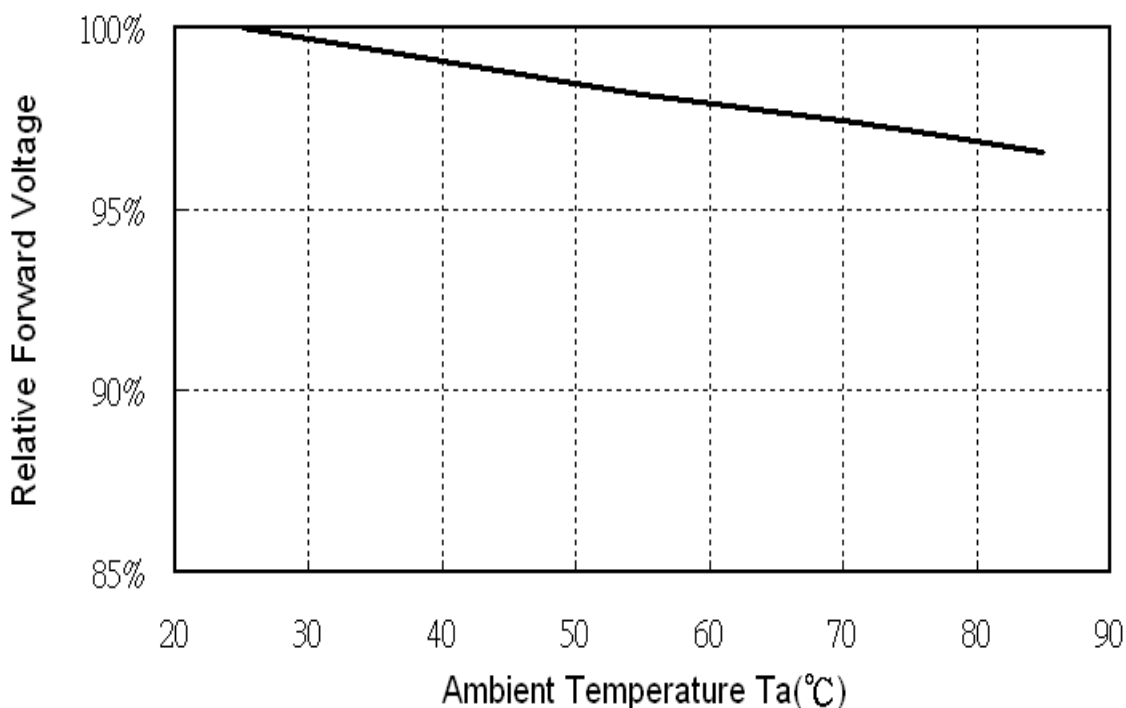


Official Product	HT Part No. HT-PC56H01	Your Part No.	Data Sheet No.
Tentative Product	*****	*****	HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0
			Page 15/24

Forward Current vs. Chromaticity Coordinate

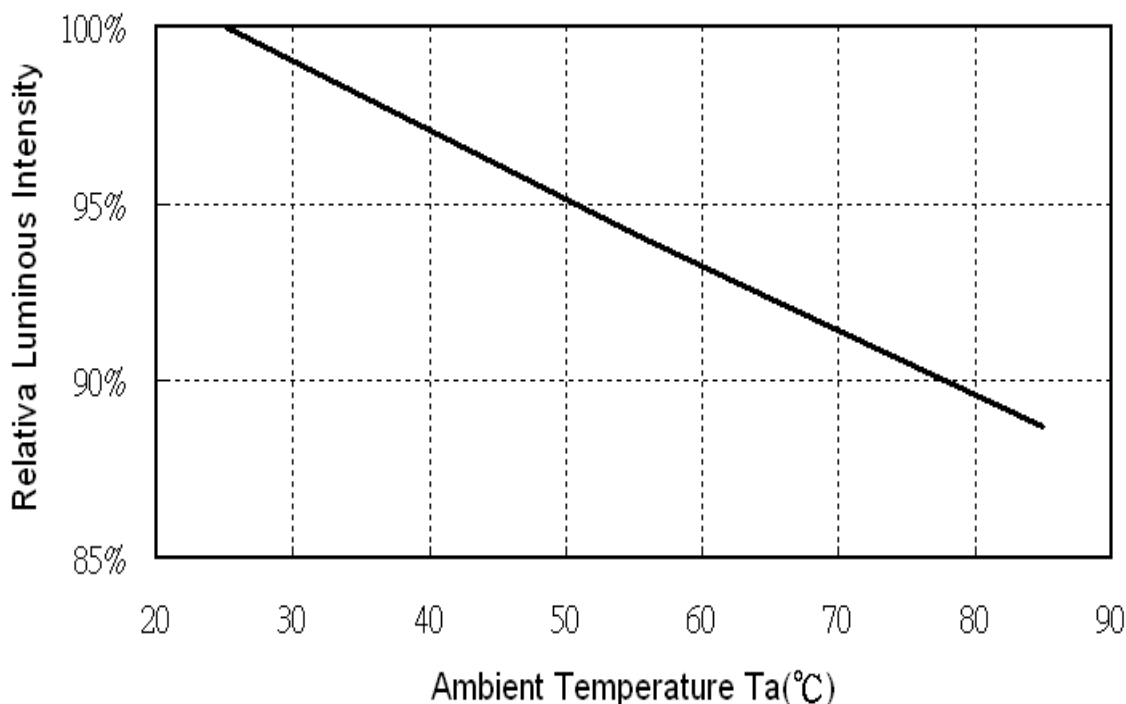


Relative Forward Voltage vs. Ambient Temperature

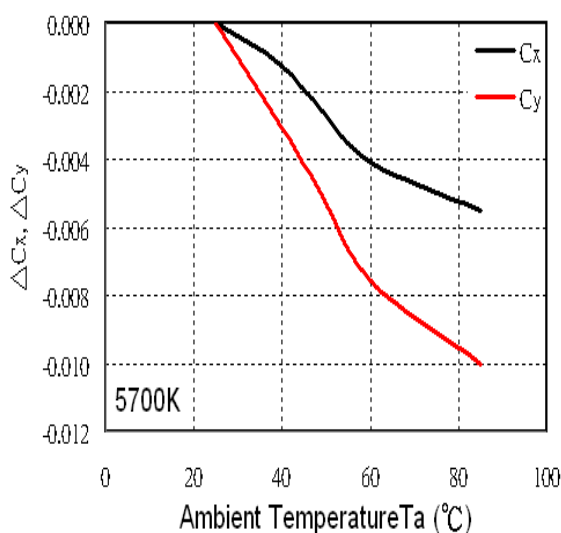
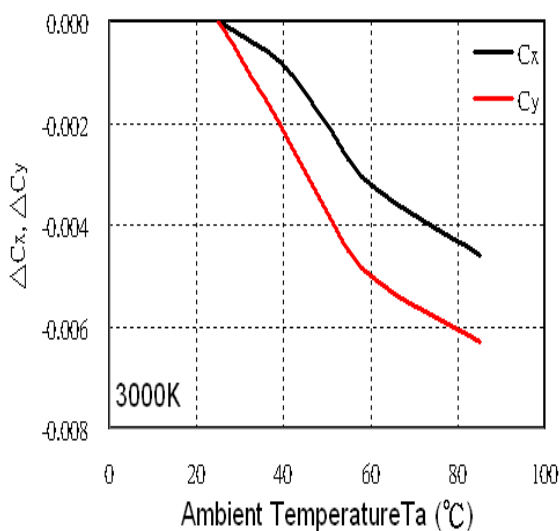


Official Product	HT Part No. HT-PC56H01	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0	Page 16/24

Relative Luminous Intensity vs. Ambient Temperature

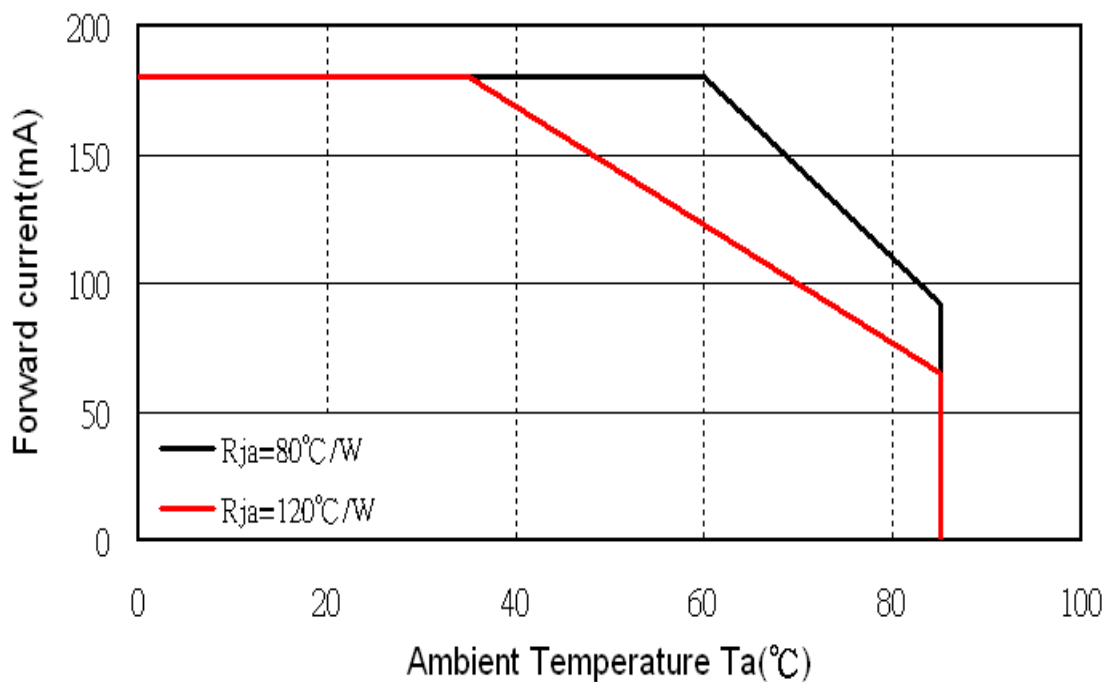


Chromaticity vs. Ambient Temperature



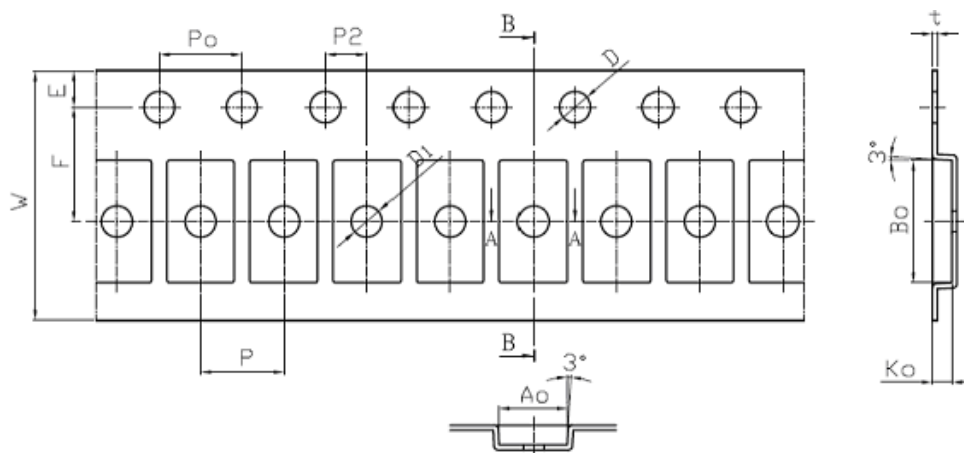
Official Product	HT Part No. HT-PC56H01	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0	Page 17/24

Allowable Forward Current vs. Ambient Temperature



Official Product	HT Part No. HT-PC56H01	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0	Page 18/24

Packaging
Tape Dimension

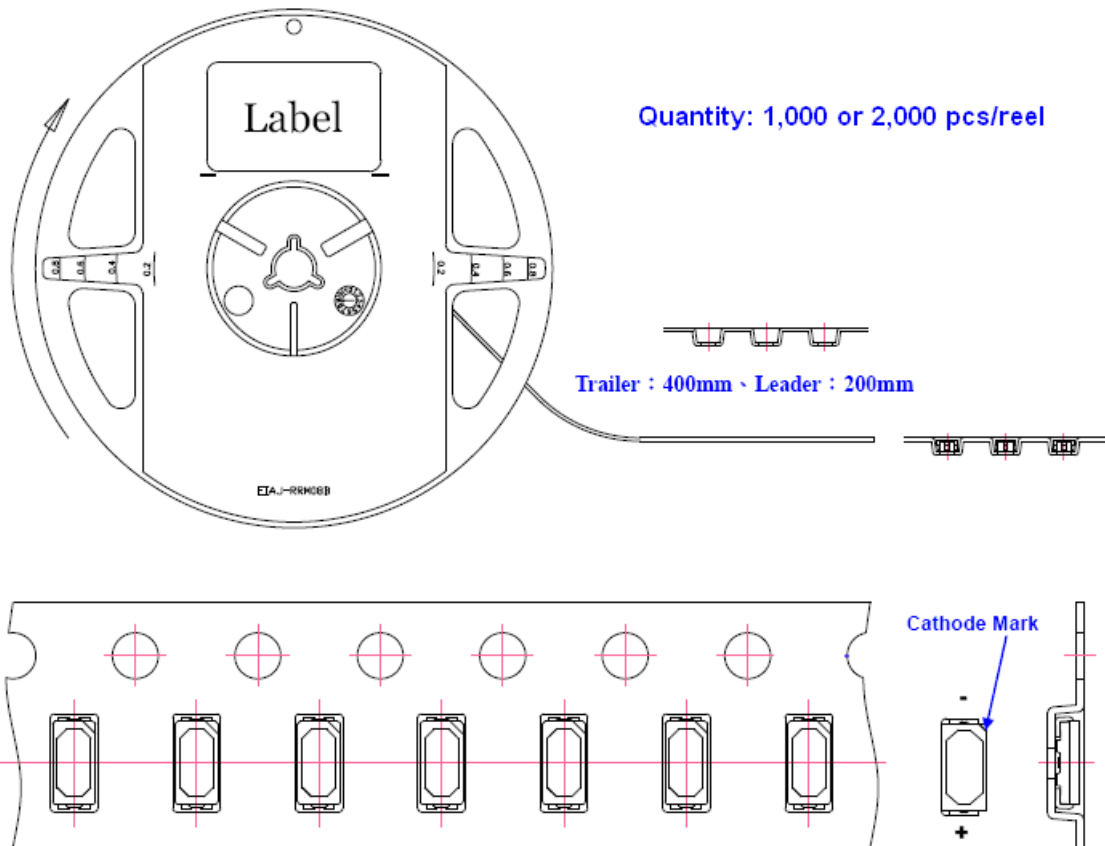


Unit: mm

Item	Spec	To1. (+/-)	Item	Spec	To1. (+/-)
W	12.00	±0.10	P2	2.00	±0.05
E	1.75	±0.10	P0 x 10	40.00	±0.20
F	5.50	±0.05	t1	0.25	±0.05
D	1.50	+0.10, -0.00	A0	3.25	±0.10
D1	1.50	±0.10	B0	5.90	±0.10
P0 ~ P1	4.00	±0.20	K0	0.95	±0.10

Official Product	HT Part No. HT-PC56H01	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0	Page 19/24

Reel Dimension



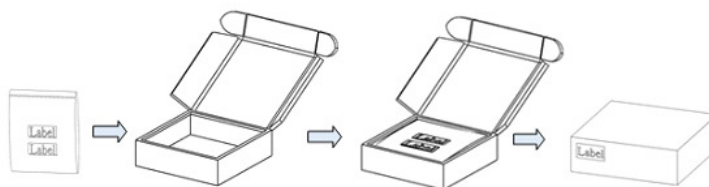
Official Product	HT Part No. HT-PC56H01	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0	Page 20/24

Packing

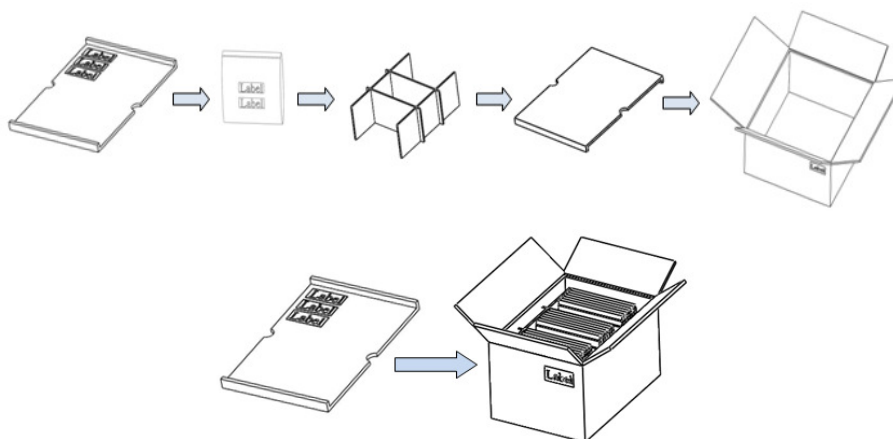
■ Packing Box

Type	Large Box		Medium Box		Small Box	
Dimension	541X511X276mm		385X303X260mm		283X235x70mm	
Maximum Reels	7"X12mm Reel	64/R	7"X12mm Reel	21/R	7"X12mm Reel	4/R
Minimum Reels	7"X12mm Reel	32/R	7"X12mm Reel	9/R	7"X12mm Reel	1/R

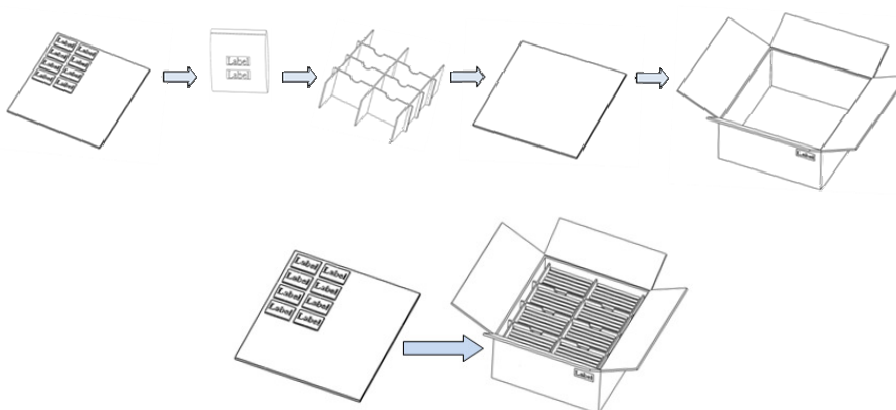
■ Small Box



■ Large Box



■ Large Box



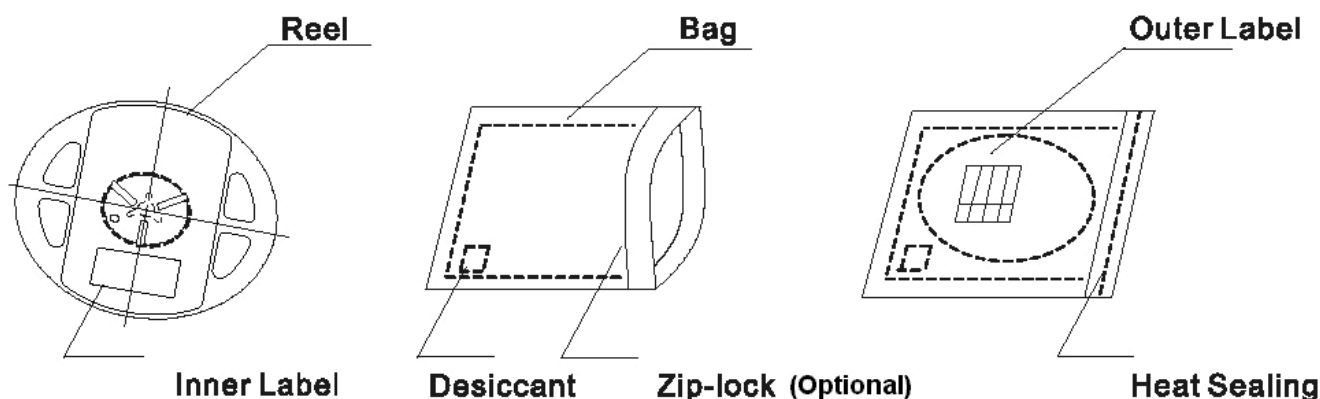
Official Product	HT Part No. HT-PC56H01	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0	Page 21/24

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

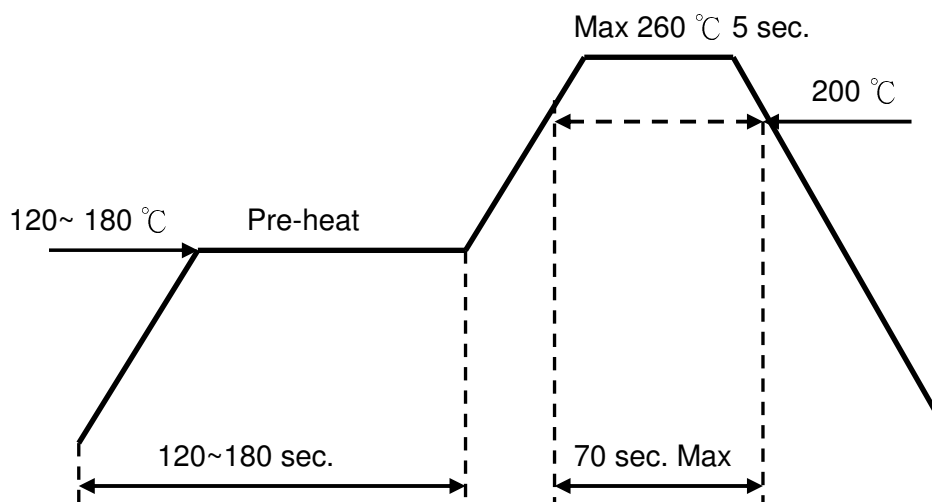
1. Avoid exposure to moisture at all times during transportation or storage.
2. Anti-Static precaution must be taken when handling GaN, InGaN, and AlInGaP products.
3. It is suggested to connect the unit with a current limiting resistor of the proper size. Avoid applying a reverse voltage beyond the specified limit.
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.
6. If possible, assemble the unit in a clean room or dust-free environment.
7. Before opening the package, the LEDs should storage under 30°C, 70% RH.
Recommend to use within one year.
8. After opening the package bag, the LEDs should be keep under 30°C, 70% RH.
Recommend to use within 2days. If unused LEDs remain, suggest to store into moisture proof bag or original package bag with moisture absorbent material such as silica gel.
Reseal well is necessary.
9. If the product exceeded the storage period or the moisture absorbent material faded away, baking treatment should be done by following conditions. Bake condition: 60°C, 12hours (One time only).

Official Product	HT Part No. HT-PC56H01	Your Part No.	Data Sheet No.
Tentative Product	*****	*****	HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.	2012/10/14	Version 1.0	Page 22/24

Reflow Soldering

When soldering LEDs:

1. Do not solder/reflow the same LED over two times.
2. Recommend soldering conditions:
Hand soldering: 350 °C max , 3 sec. max.
Reflow soldering: Pre-heat 150 °C max , 180 sec. max.
Peak 245 °C max , 5 sec. max.
3. Reflow temperature profile as below: (lead-free solder)



- When soldering, don't put stress on the LEDs
- After LEDs have been soldered, strongly recommend not to repair to keep the LEDs performance.

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.

Official Product	HT Part No. HT-PC56H01	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0	Page 23/24

Cleaning

- If washing is required, recommend to use alcohol as a solvent.
- Recommend to avoid cleaning the LEDs by ultrasonic.
If necessary, pre-test the LED is necessary to confirm whether any damage occur after the process.

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.

•

• **Revise History**

Rev.	Descriptions	Date	Page
1.0	New Format	2012/10/14	-

Official Product	HT Part No. HT-PC56H01	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-PC56H01
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, and company confidential all rights reserved.		2012/10/14	Version 1.0	Page 24/24