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 Harvatek 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.

Product Specification

	Specification	Material	Quantity
Total Flux	Typ. 18 lm @300mA/ Ta= 25℃(USD) Typ. 30 lm @350mA/ Ta= 25℃(NG) Typ. 8 lm @350mA/ Ta= 25℃(NB)		
Lambda	613.5nm-645nm @300mA/ Ta= 25℃(USD) 510nm-550nm @350mA/ Ta= 25℃(NG) 450nm-490nm @350mA/ Ta= 25℃(NB)		
V_F	HT Standard		
I_R	HT standard		
Resin	White	Epoxy resin	
Tube	HT standard	Conductive	50pcs per tube
Label	HT standard	Paper	
Carton	HT standard	Paper	Non-specified

Others:

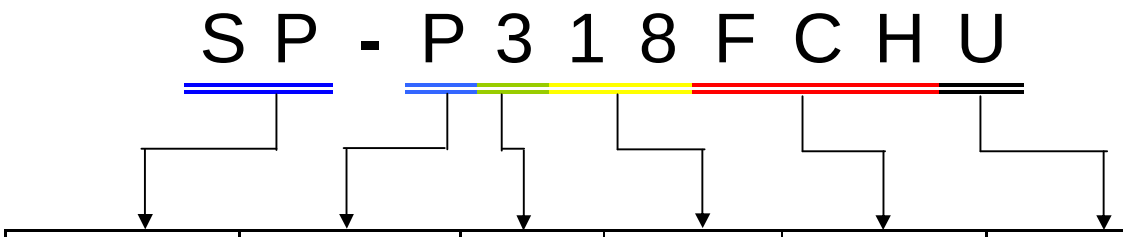
ATTENTION: Electric Static Discharge (ESD) protection

The symbol shown on the page herein to introduce 'Electro-Optical Characteristics'. ESD protection for GaP and AlGaAs based chips is still necessary even though they are safe in low static-electric discharge. Parts built with AlInGaP, 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 protected from ESD during all the process.

Description of Model No. and Lot No.

Model No.



Company	Product Name	Dice	Package	Emitter Color	Current code
HT: For Harvatek	P: Power Package	1: Single 2: Twin 3:Triple .	Outline dimension	FCH: Full Color	U:350mA

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**
Internal Tracing Code	**Z: 2000 1: 2001 …..**	**1: Jan. 2: Feb. …. 9: Sep. A: Oct. B: Nov. C: Dec.**	**1~31/ (30)**	**01~99, A,B,C…**	**D: Milky White**	**T: Taped Reel**

Product Feature

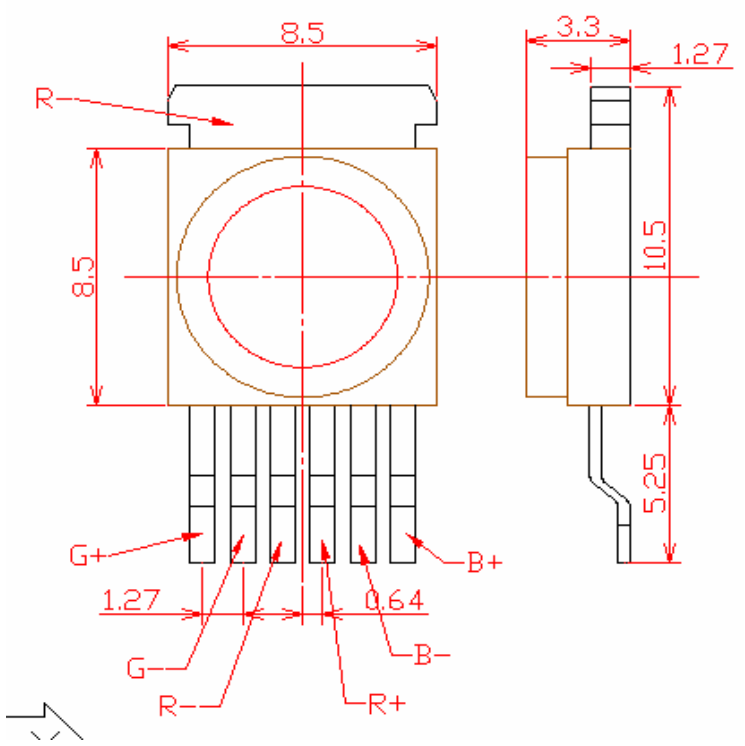
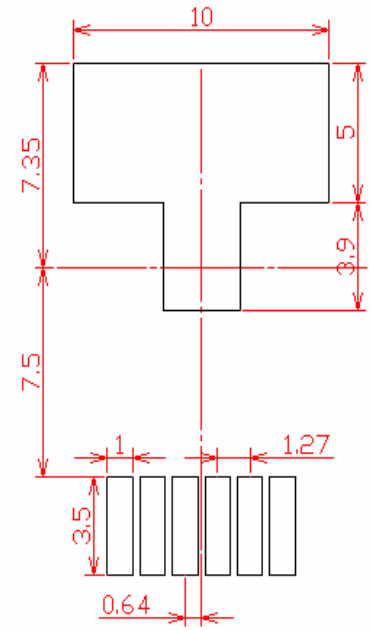
- Wide view angle
- Easy to fixed
- No UV
- Long operating time (Up to 50,000hrs)
- Lower forward voltage operated
- More energy efficient than incandescent and most halogen lamps
- ESD: InGaN/Al_2O_3 with 8KV (acc. to EOS/ESD-5.1-1993)
- Instant light (less than 100nS)

Application

- Reading lights (car, bus, aircraft)
- Portable (flashlight, bicycle)
- Task lighting
- Garden lighting
- Rail lighting
- Wayside lighting
- LCD Backlights
- Light Guides
- Traffic signaling
- Architectural lighting

Product Out Line Dimension (SP-P318FCHU)

Tolerance: +/-0.1

Outline Dimension	Soldering Pattern
	 Unit: mm
Soldering terminals may shift in x, y direction.	

Electro-Optical

Absolute Maximum Ratings (General)

(T_a =25°C)

Parameter	Rating	Unit	Conditions
Reverse Voltage	5	V	-
LED junction Temperature	120	℃	-
Operating Temperature	-30~+85	℃	-
Storage Temperature	-40~+120	℃	-
Soldering Temperature	260	℃	For 5 sec. Max.

Absolute Maximum Ratings (USD) (T_a =25°C)

Parameter	Rating	Unit	Conditions
DC Forward Current	300	mA	-
Peak Pulsed Forward Current *1	350	mA	-
Average Forward Current	300	mA	-

Absolute Maximum Ratings (NG/NB) (T_a =25°C)

Parameter	Rating	Unit	Conditions
DC Forward Current	350	mA	-
Peak Pulsed Forward Current *1	500	mA	-
Average Forward Current	350	mA	-

***1:tp≦10μs, Duty cycle=0.1**

Electro-Optical Characteristics (General)

(T_a =25°C)

Parameter	Symbol	Min.	TYP.	Max.	Unit
Viewing angle	2θ ½	-	120	-	Deg.
Temperature Coefficient of Forward Voltage	$\Delta V_F/\Delta T$	-	-2	-	mV/℃
Thermal Resistance Junction to Board (I_F=350mA)	$R\theta_{J-B}$	-	22	-	℃/W

Electro-Optical Characteristics (USD) (T_a =25°C)

Parameter	Symbol	Min.	TYP.	Max.	Unit
Forward Voltage (I_F=300mA)	V_F	2.07	-	2.79	V
Luminous Flux	Flux	13.9	18	-	lm
Dominant Wavelength	λd	613.5	-	645	nm

Electro-Optical Characteristics (NG) (T_a =25°C)

Parameter	Symbol	Min.	TYP.	Max.	Unit
Forward Voltage (I_F=350mA)	V_F	3.03	-	3.99	V
Luminous Flux	Flux	18.1	25	-	lm
Dominant Wavelength	λd	510	-	550	nm

Electro-Optical Characteristics (NB) (T_a =25°C)

Parameter	Symbol	Min.	TYP.	Max.	Unit
Forward Voltage (I_F=350mA)	V_F	3.03	-	3.99	V
Luminous Flux	Flux	4.9	8	-	lm
Dominant Wavelength	λd	450	-	490	nm

Luminous Flux Rank

Rank Code	Symbol	Condition	Min.	Typ.	Max.	Unit
PF	ΦV	I_F=300mA$_{(USD)}$ I_F=350mA$_{(NG/NB)}$	2.9	-	3.8	lm
PG			3.8	-	4.9	
PH			4.9	-	6.3	
PJ			6.3	-	8.2	
PK			8.2	-	10.7	
PL			10.7	-	13.9	
PM			13.9	-	18.1	
PN			18.1	-	23.5	
PP			23.5	-	30.6	
PQ			30.6	-	39.8	
PR			39.8	-	51.7	

Note: It maintains a tolerance of ±10% on flux

Dominant Wavelength Rank (USD)

Rank Code	Symbol	Condition	Min.	Typ.	Max.	Unit
Full	λ_d	I_F=300mA	613.5	-	645	nm
1			613.5	-	620.5	
2			620.5	-	631	
3			631	-	645	

Note: It maintains a tolerance of ±0.5nm on dominant wavelength

Dominant Wavelength Rank (NG)

Rank Code	Symbol	Condition	Min.	Typ.	Max.	Unit
Full	λ_d	I_F=350mA	510	-	550	nm
1			510	-	515	
2			515	-	520	
3			520	-	525	
4			525	-	530	
5			530	-	535	
6			535	-	540	
7			540	-	545	
8			545	-	550	

Note: It maintains a tolerance of ±0.5nm on dominant wavelength

Dominant Wavelength Rank (NB)

Rank Code	Symbol	Condition	Min.	Typ.	Max.	Unit
Full	λ_d	I_F=350mA	450	-	490	nm
1			450	-	455	
2			455	-	460	
3			460	-	465	
4			465	-	470	
5			475	-	475	
6			475	-	480	
7			480	-	485	
8			485	-	490	

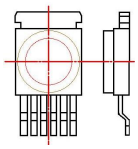
Note: It maintains a tolerance of ±0.5nm on dominant wavelength

Electrical Rank

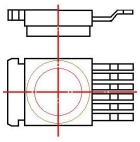
Rank Code	Symbol	Condition	Min.	Typ.	Max.	Unit
P01	V_F	I_F=300mA$_{(USD)}$ I_F=350mA$_{(NG/NB)}$	2.07	-	2.31	V
P02			2.31	-	2.55	
P03			2.55	-	2.79	
P04			2.79	-	3.03	
P05			3.03	-	3.27	
P06			3.27	-	3.51	
P07			3.51	-	3.75	
P08			3.75	-	3.99	

Note: It maintains a tolerance of ±0.1V on forward voltage measurements

Characteristics (General)



Horizontal



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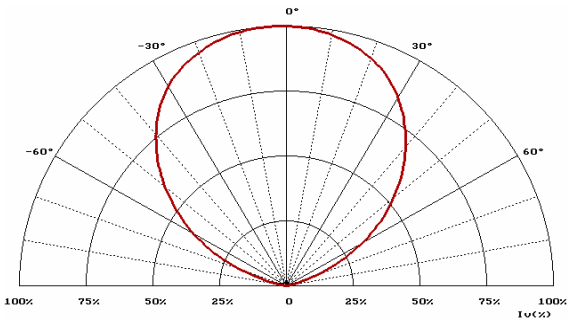

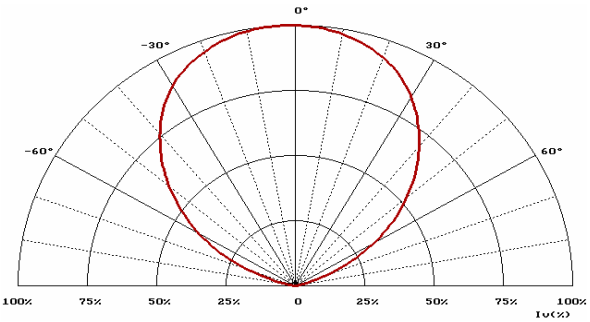

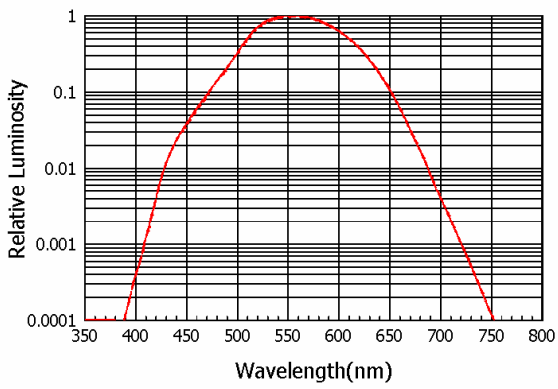

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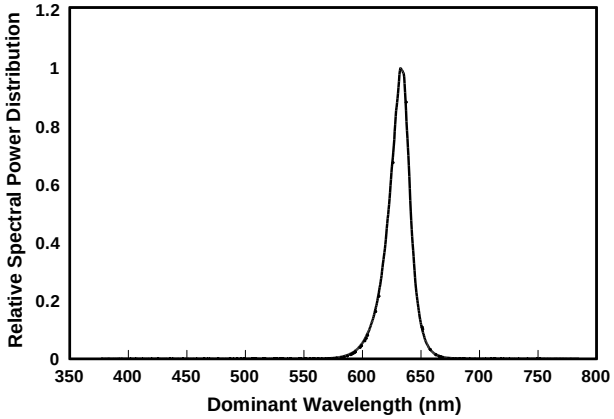
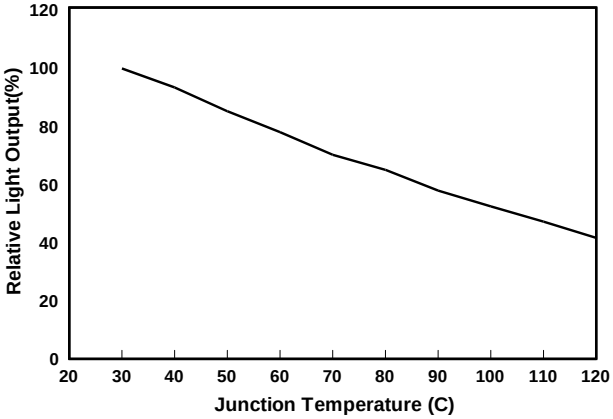
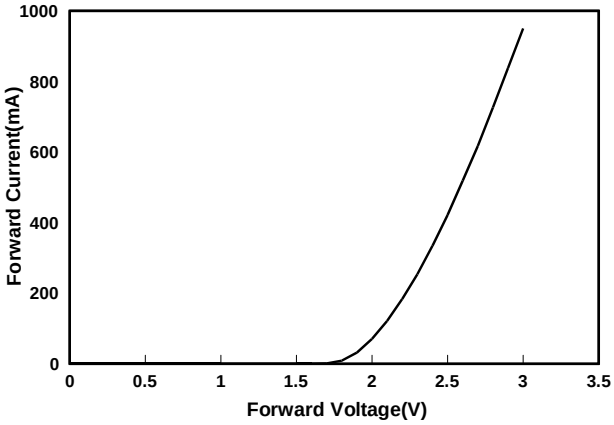
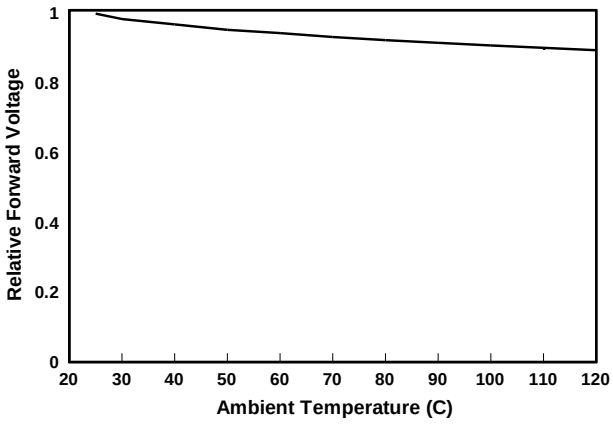
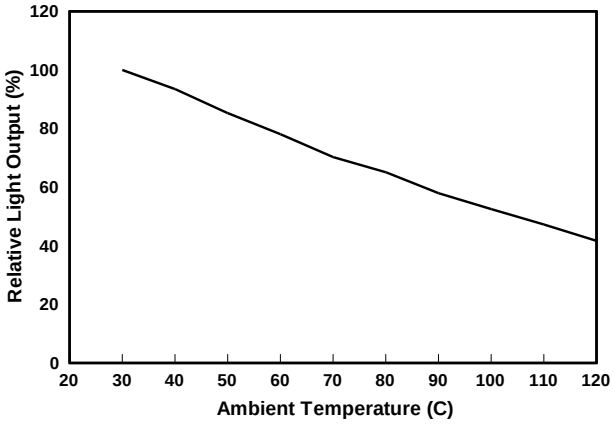
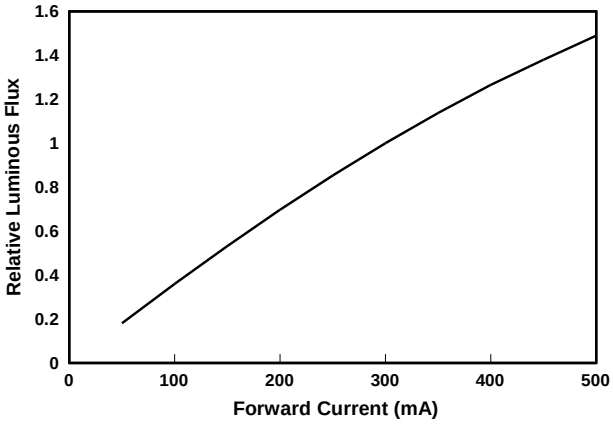




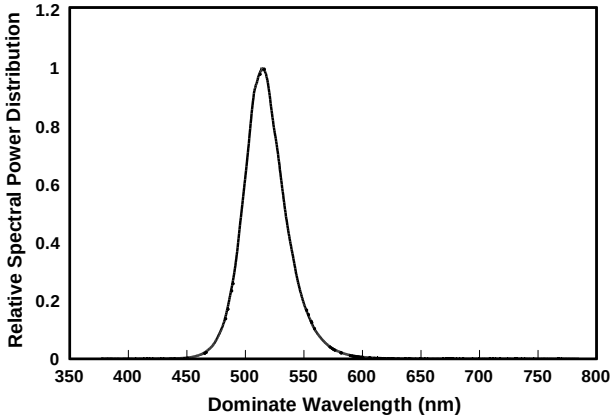


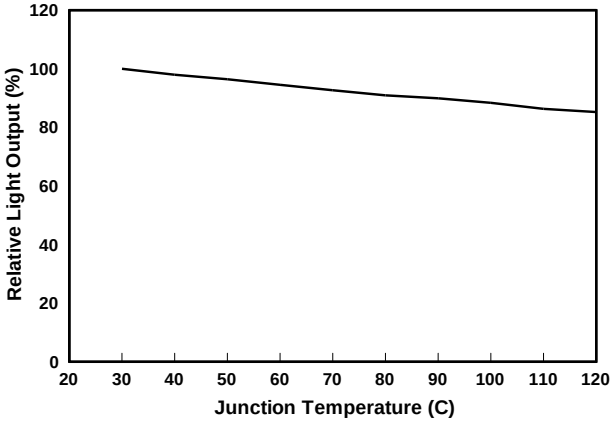


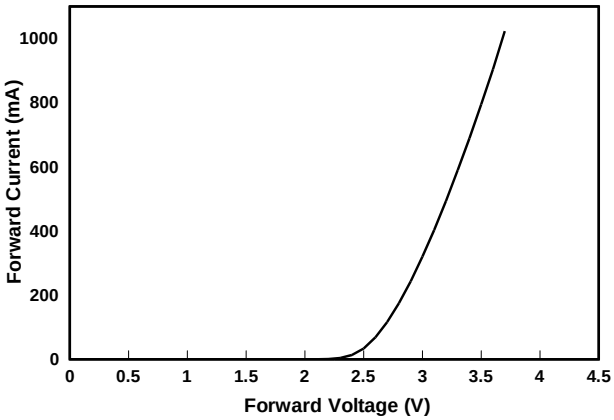


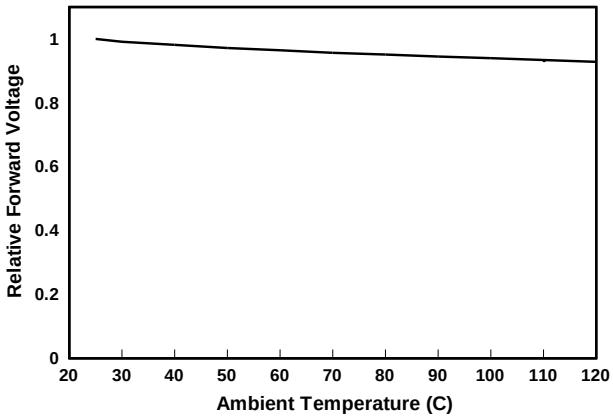


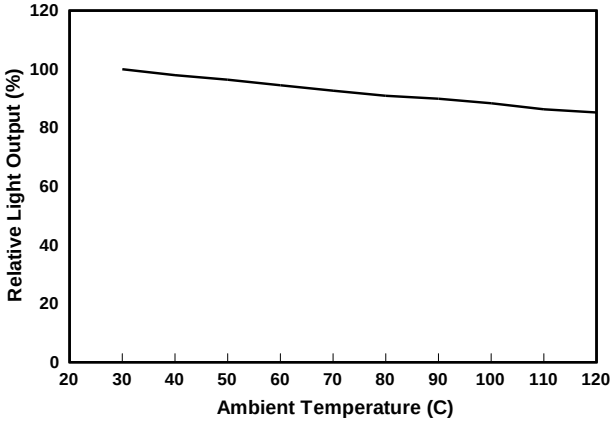
Characteristics (NG)

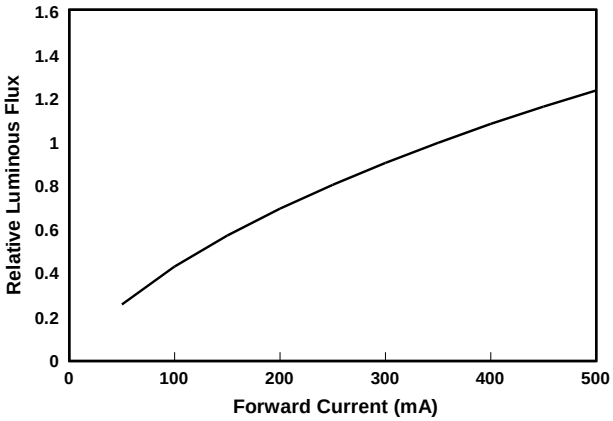




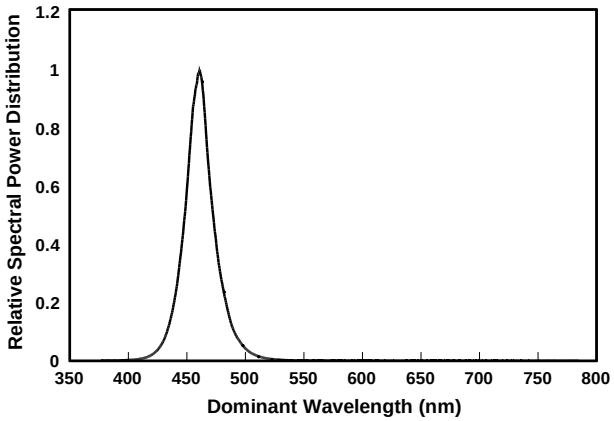


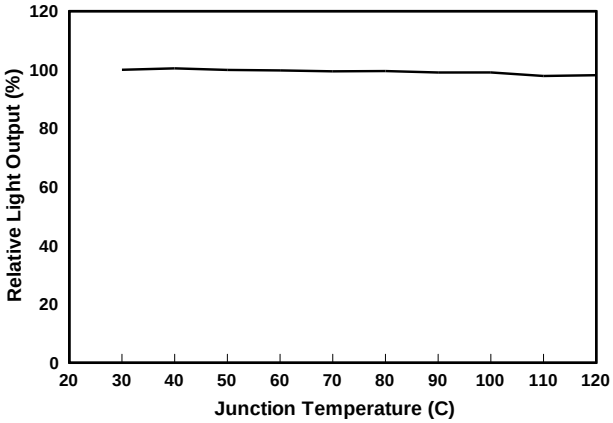


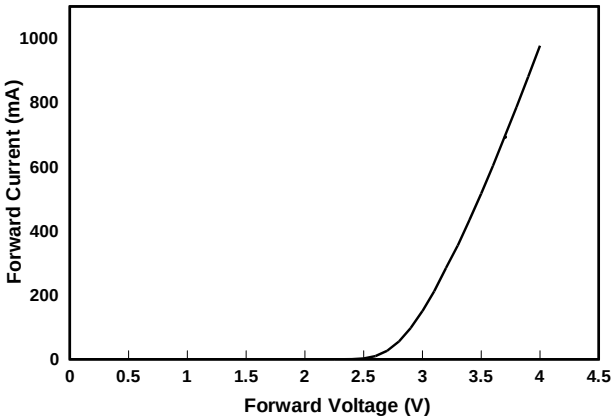


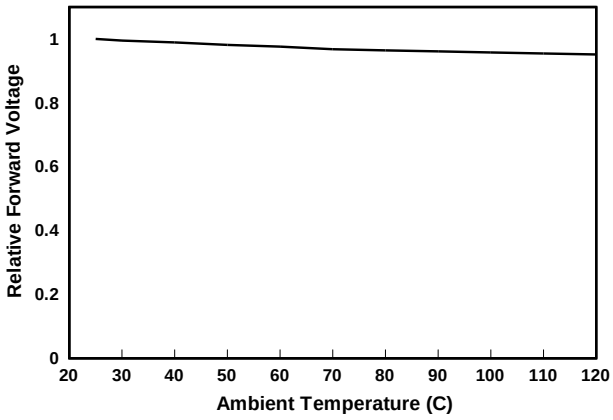


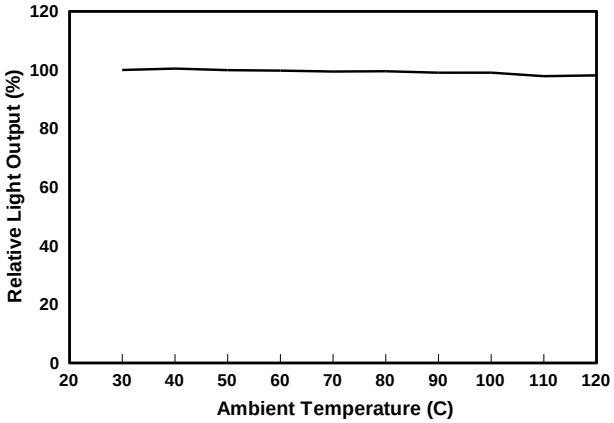
Characteristics (NB)

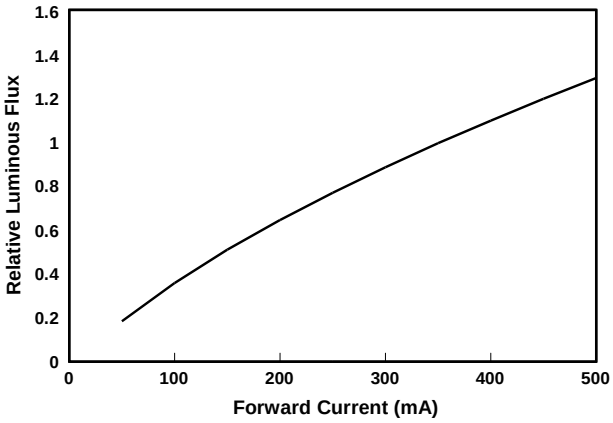












LEDs and Eye Safety:

In the 1993 edition of IEC-60825-1, LEDs were included: “Throughout this part 1 light emitting diodes (LED) are included whenever the word “laser” is used. ”The CENELEC document EN 60825-1 contains all the technical content of the IEC standard.

The scope of the IEC standard status that “…products which are sold to other manufacturers for use as components of any system for subsequent sale are not subject to IEC 60825-1, since the final product will itself be subject to this standard. ”Therefore, it is important to determine the Laser Safety Class of the final product. However, it is important that employees working with LEDs are trained to use them safely.

Most of the products containing LEDs will fall in either Class 1 or Class 2. A Class 1 label is optional:

CLASS 1 LED PRODUCT

If a label is not used, this description must be included in the information for the user.

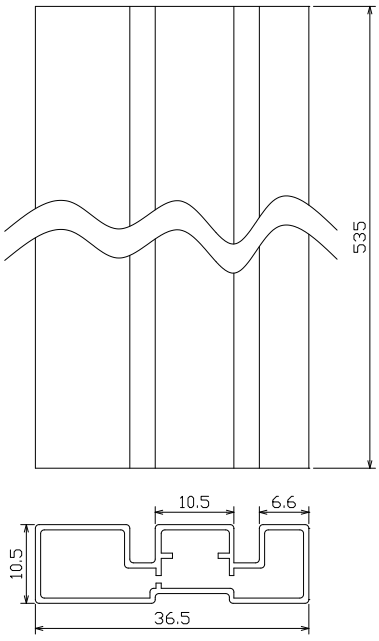
Amendment 2 to IEC 60825-1 is expected to be published in January 2001. The CENELEC equivalent is expected to follow three months after the IEC publication. This document contains increased Class 1 and Class 2 limits, as well as the introduction of less restrictive Class 1M and Class 2M.

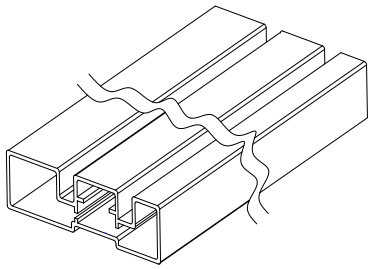
For the exact classification and further information, the IEC document can be used:

EC-60825-1 ISBN 2-8318-4169-0

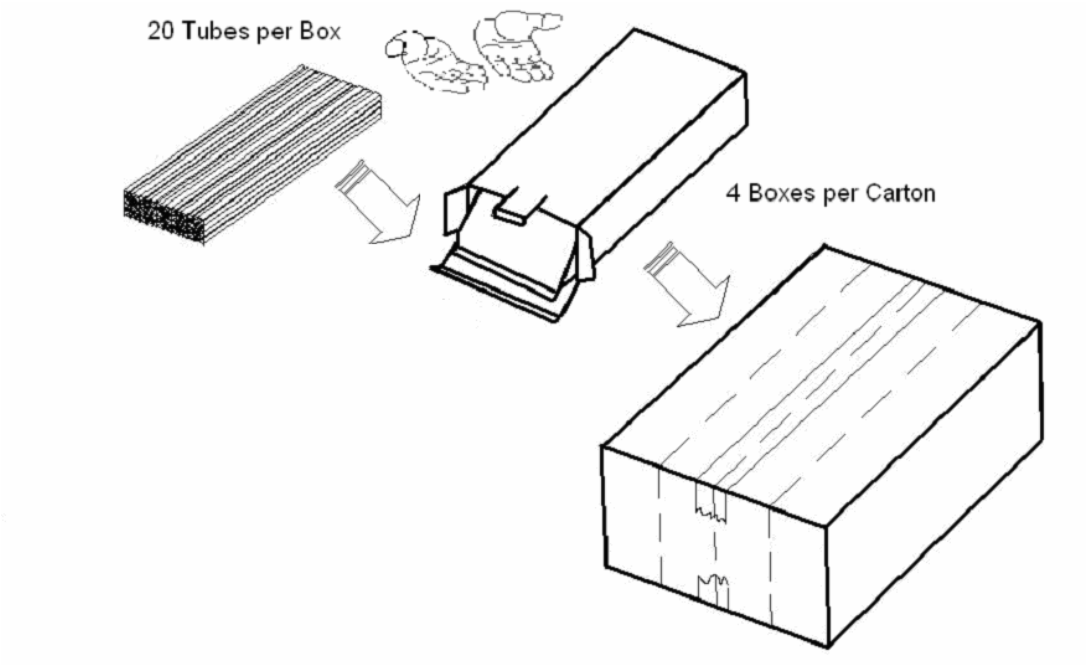
Tube and Packing

Tube Dimension



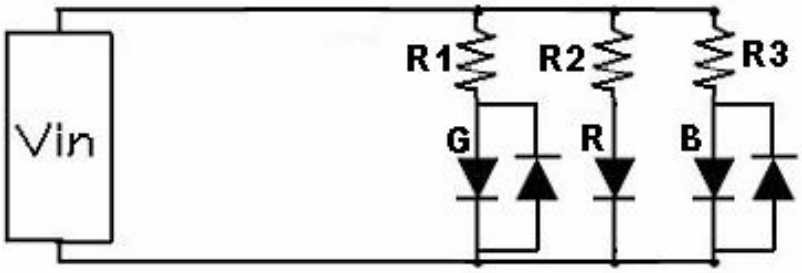


Packing Model



Precaution of Application

Designing 1: Circuit Layout



Designing 2: Max Rating

Any application should refer to the specifications of absolute maximum ratings.

Storage

It's recommended to store the products in the following conditions:

Humidity: 60 %RH Max.

Temperature: 5℃ ~30℃ (41℉~86℉)

Shelf life in sealed bag: 6 month at<40℃ and <90%RH.

Soldering

Manual soldering

Soldering tin material: tin 6/4 alloy or contained Ag.

To prevent cracking, please bake before manual soldering.

Temperature at tip of iron : 300℃±5℃ Max.(25W)

It's banned to load any stress on the resin during soldering.

Soldering time : 3±1sec

Cleaning

The conditions of cleaning after soldering:

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

Temperature Time: <50℃x30sec, or <30℃x3min

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

Curing: 100℃max, <3min

Revise Notes

Rev.	Descriptions	Date	Name
1.0	-	12/20/2006	Kate_Lei