

## Harvatek Surface Mount LED Data Sheet

### 1 Watt HT-MR16 Series

Official Product	HT Part No. HT-MR16XXXU-A1 Series	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-MR16XXXU-A1 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.

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## Orderable Part Numbers

Product	Emission Color	Technology	Input Voltage	Luminous Flux(lm)*	Viewing Angle	Color Temperature	Orderable Part Number
HT-MR16UYU-A1	Yellow	AlInGaP	12V AC/DC	25 typ	6°		HT-MR16UYU-A1
					15°		HT-MR16UYU-A1(15)
					30°		HT-MR16UYU-A1(30)
HT-MR16USDU-A1	Red	AlInGaP	12V AC/DC	25 typ	6°		HT-MR16USDU-A1
					15°		HT-MR16USDU-A1(15)
					30°		HT-MR16USDU-A1(30)
HT-MR16NBU-A1	Blue	InGaN	12V AC/DC	10 typ	6°		HT-MR16NBU-A1
					15°		HT-MR16NBU-A1(15)
					30°		HT-MR16NBU-A1(30)
HT-MR16NGU-A1	True Green	InGaN	12V AC/DC	30 typ	6°		HT-MR16NGU-A1
					15°		HT-MR16NGU-A1(15)
					30°		HT-MR16NGU-A1(30)

\*  $I_F = 350\text{mA}$

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Product	Emission Color	Technology	Input Voltage	Luminous Flux(lm)*	Viewing Angle	Color Temperature	Orderable Part Number
HT-MR16TWU-A1	White	InGaN	12V AC/DC	40 typ	6°	Cold White	HT-MR16TWU-A1-AC
						Pure White	HT-MR16TWU-A1-DG
						Warm White	HT-MR16TWU-A1-HL
					15°	Cold White	HT-MR16TWU-A1(15)-AC
						Pure White	HT-MR16TWU-A1(15)-DG
						Warm White	HT-MR16TWU-A1(15)-HL
					30°	Cold White	HT-MR16TWU-A1(30)-AC
						Pure White	HT-MR16TWU-A1(30)-DG
						Warm White	HT-MR16TWU-A1(30)-HL

### Compliance and Certification

RoHS compliant and IS9002, QS9000 and ISO14001 certified.



### ATTENTION: Electric Static 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.

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## Description of Part Number and Lot Number

### Part Number

**HT - MR16 X<sub>A</sub> X<sub>B</sub> - X<sub>C</sub> - X<sub>D</sub>**

Company	Series Code	Emitter Color	Current Code	Package Code	Color Temperature
HT: Harvatek	MR16: Multifaceted Reflector Type with 50mm Lens Diameter	USD: Red UY: Yellow NG: Green NB: Blue TW: White	U : 350mA	A1: Type A, 6° A1(15): Type A, 15° A1(30): Type A, 30°	(For White Only) AC: Cold DG: Pure HL: Warm

### Lot Number

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. .... 9: Sep. A: Oct.	1~31/ (30)	01~99, A,B,C...	D: Milky White	T: Taped Reel

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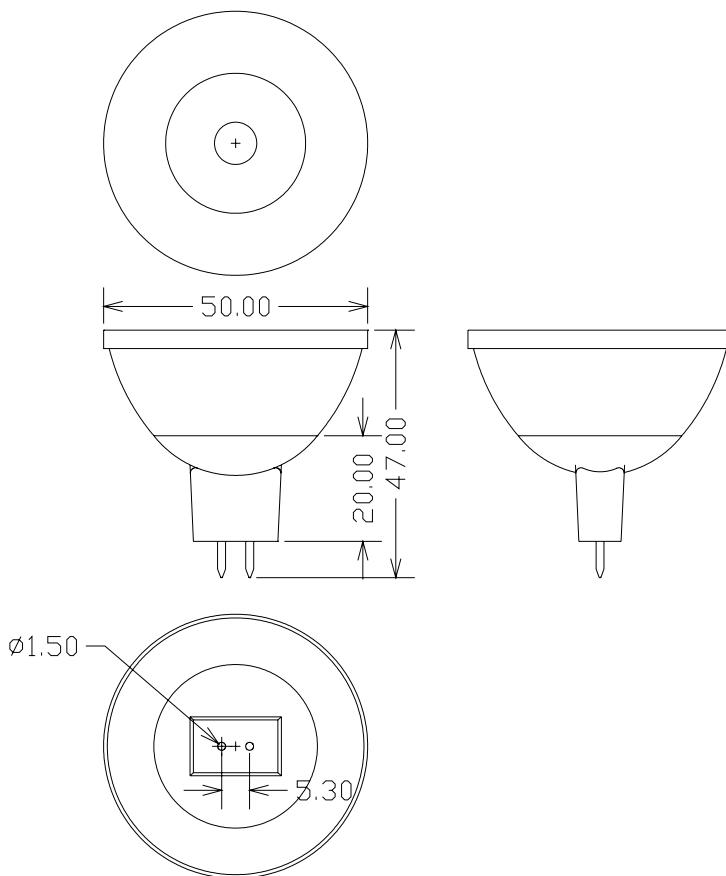
## Product Feature

- Bulb Type: Socket drop-in replacement lamp
- Front Lens: 6° / 15° / 30° viewing angle
- Long operating time (Up to 50,000hrs)
- Front Lens Diameter: 27mm
- Front Lens Type: Optical grade plastic
- Total Length: 47.0mm
- Model Power: 1 W
- Power Input: 12V AC/DC
- LED Light Source: 350mA
- No UV or IR radiation
- Net Weight: 34g

## Application

- Entertainment lighting
- City Beautification
- Landscape Lighting
- Garden lighting
- Machine Lighting g
- LCD Backlights
- Interior Lighting
- Architectural lighting

## Product Outline Dimension



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**Absolute Maximum Ratings** (T<sub>a</sub> =25°C)

Parameter	Rating	Unit	Conditions
DC Voltage	14	V	-
AC Voltage	14	V	-
Average LED Driver Current	350	mA	-
Operating Ambient Temperature	-40~+50	°C	-
Storage Temperature	-40~+80	°C	

**Electro-Optical Characteristics** (T<sub>a</sub> =25°C)

**Yellow ( UYU )**

Parameter	Symbol	Min.	TYP.	Max.	Unit
Viewing angle	2θ ½	-	6/15/30	-	Deg.
Luminous Flux	Flux	15	25	-	lm
Dominant Wavelength	λd	584.5	-	597	nm
Operating Current(12V AC/DC)	Iin	-	350	400	mA

**Red ( USDU )**

Parameter	Symbol	Min.	TYP.	Max.	Unit
Viewing angle	2θ ½	-	6/15/30	-	Deg.
Luminous Flux	Flux	15	25	-	lm
Dominant Wavelength	λd	610	-	645	nm
Operating Current(12V AC/DC)	Iin	-	350	400	mA

**Blue ( NBU )**

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Parameter	Symbol	Min.	TYP.	Max.	Unit
Viewing angle	2θ ½	-	6/15/30	-	Deg.
Luminous Flux	Flux	5	10	-	lm
Dominant Wavelength	λd	450	-	490	nm
Operating Current(12V AC/DC)	Iin	-	350	400	mA

### True Green ( NGU )

Parameter	Symbol	Min.	TYP.	Max.	Unit
Viewing angle	2θ ½	-	6/15/30	-	Deg.
Luminous Flux	Flux	20	30	-	lm
Dominant Wavelength	λd	510	-	550	nm
Operating Current(12V AC/DC)	Iin	-	350	400	mA

### White ( TWU )

Parameter	Symbol	Min.	TYP.	Max.	Unit
Viewing angle	2θ ½	-	6/15/30	-	Deg.
Luminous Flux	Flux	20	40	-	lm
Correlated Color Temperature	CCT	3000	-	9000	K
Operating Current(12V AC/DC)	Iin	-	350	400	mA

Note: Brightness output tolerance is +/- 10%

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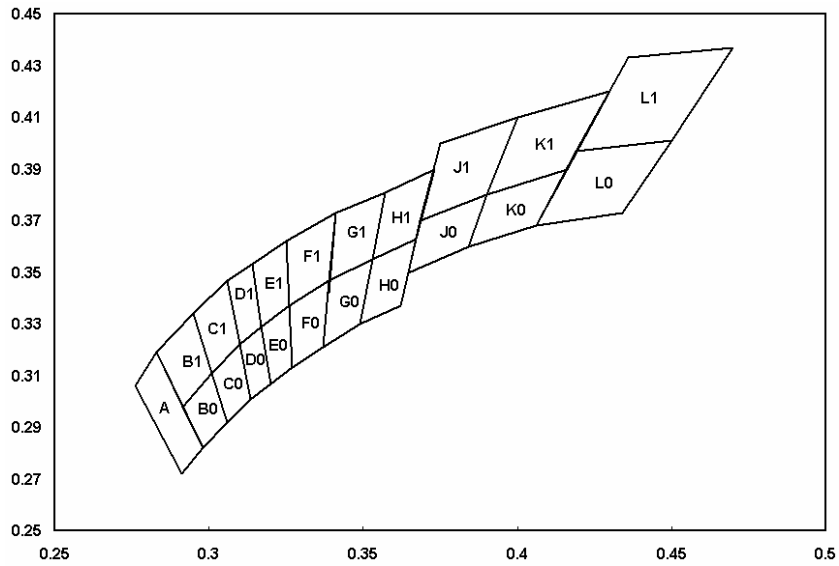
## Correlated Color Temperature Rank for White (X<sub>D</sub>)

Color	Condition	Bin Code	Min.	Typ.	Max.
Warm White	I <sub>F</sub> =350mA	L1	2,750	3,000	3,250
		L0	2,750	3,000	3,250
		K1	3,250	3,500	3,750
		K0	3,250	3,500	3,750
		J1	3,750	4,000	4,250
		J0	3,750	4,000	4,250
		H1	4,250	4,500	4,750
		H0	4,250	4,500	4,750
Pure White		G1	4,750	5,000	5,250
		G0	4,750	5,000	5,250
		F1	5,250	5,500	5,750
		F0	5,250	5,500	5,750
		E1	5,750	6,000	6,250
		E0	5,750	6,000	6,250
		D1	6,250	6,500	6,750
		D0	6,250	6,500	6,750
Cold White		C1	6,750	7,000	7,500
		C0	6,750	7,000	7,500
		B1	7,500	8,000	8,500
		B0	7,500	8,000	8,500
		A	8,500	9,000	9,500

Tolerance: ±5%

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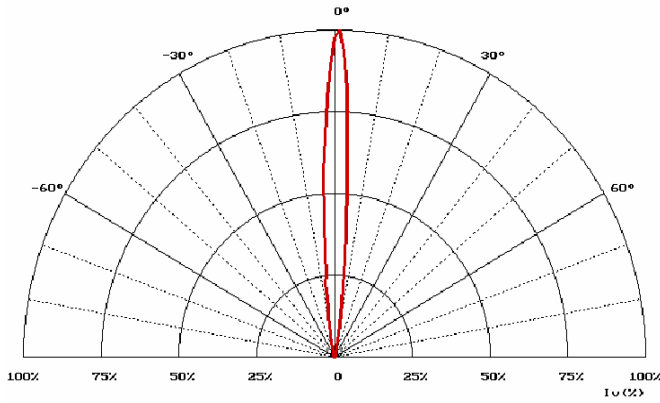
## Correlated Color Temperature and Chromaticity Correlation (for White)



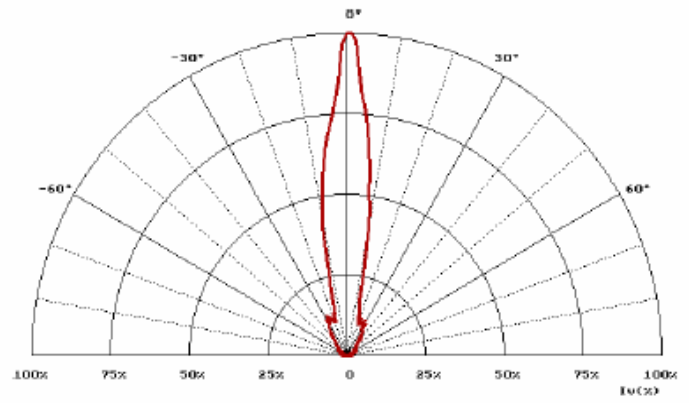
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## Characteristics Curves

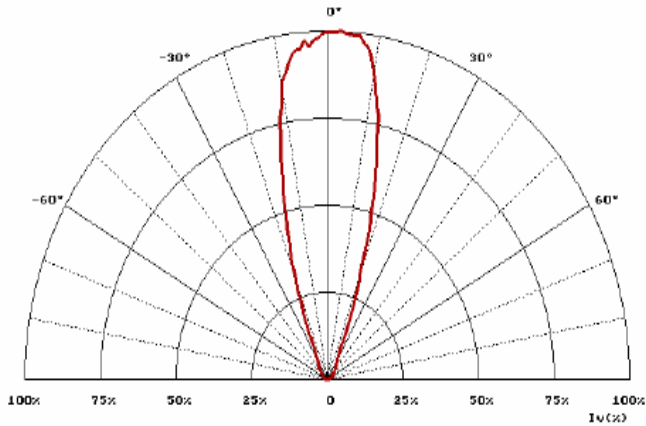
Package Code: A1



Package Code: A1 (15)

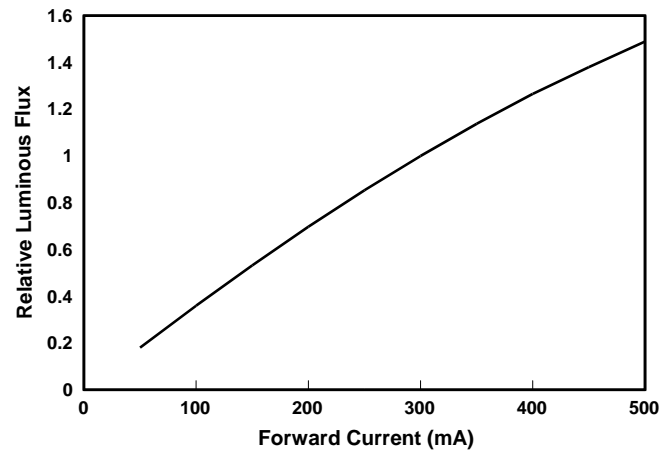
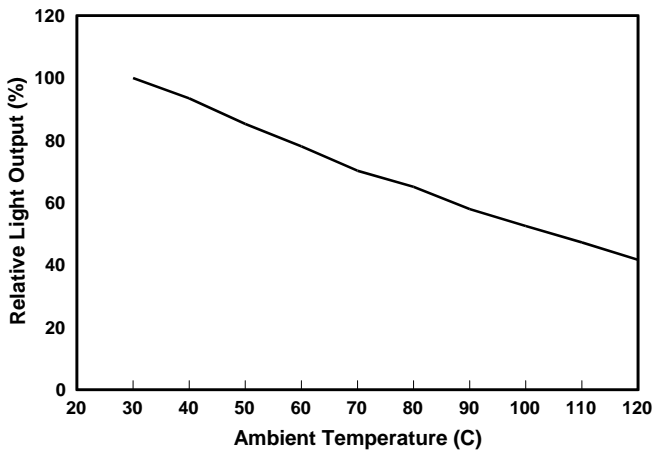
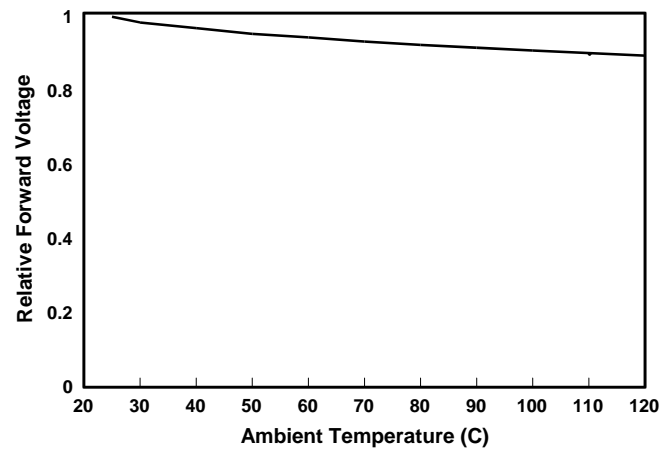
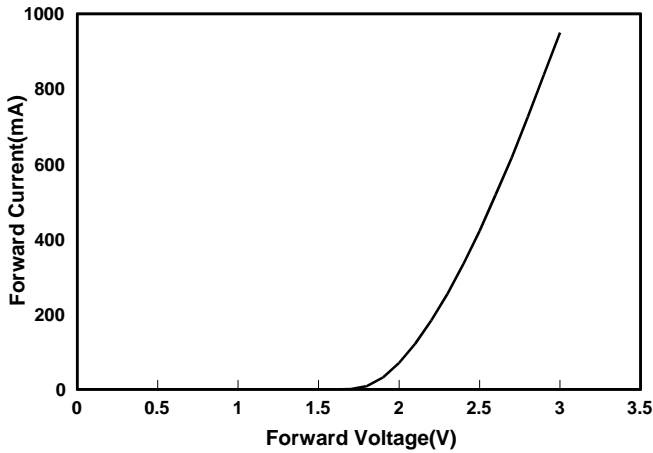
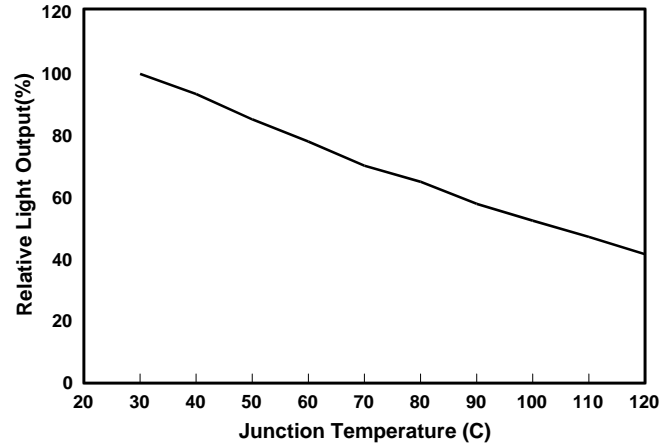
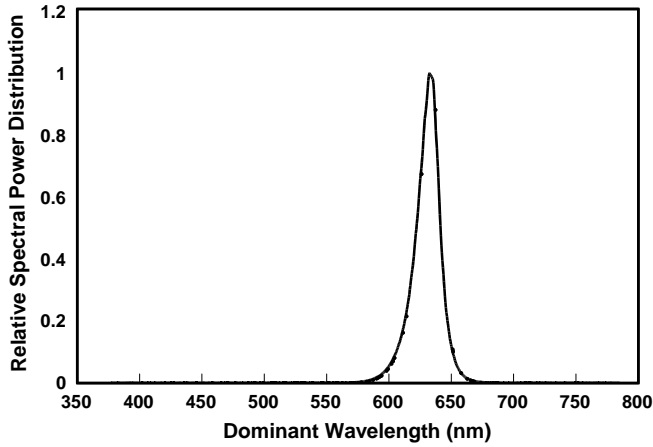


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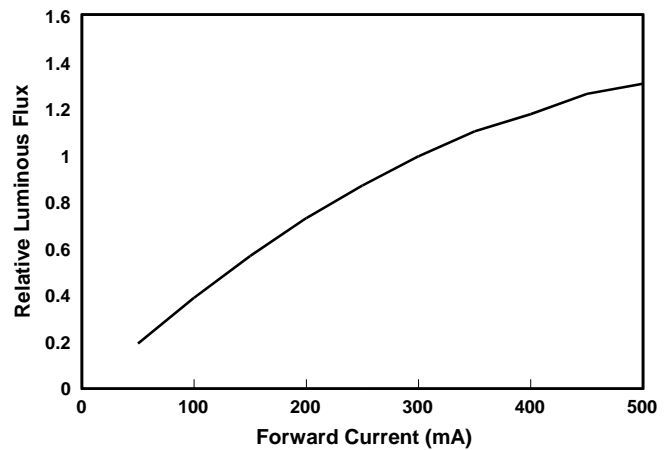
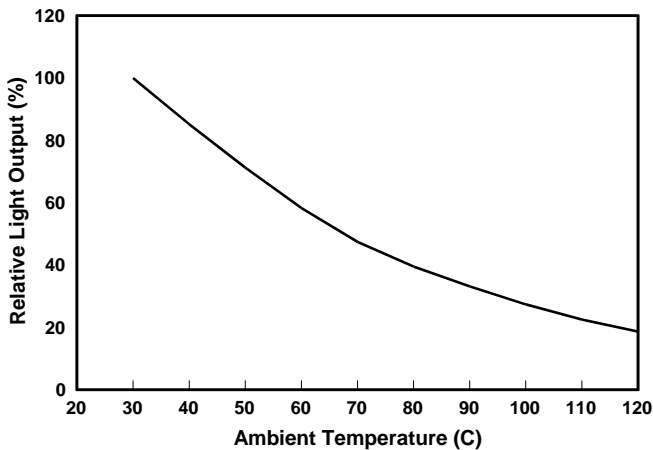
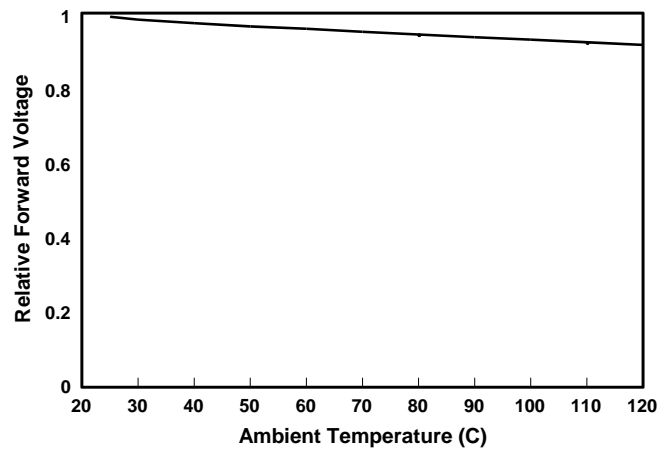
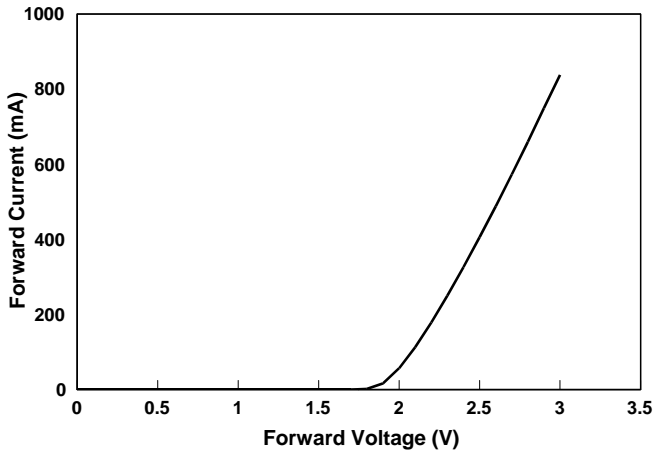
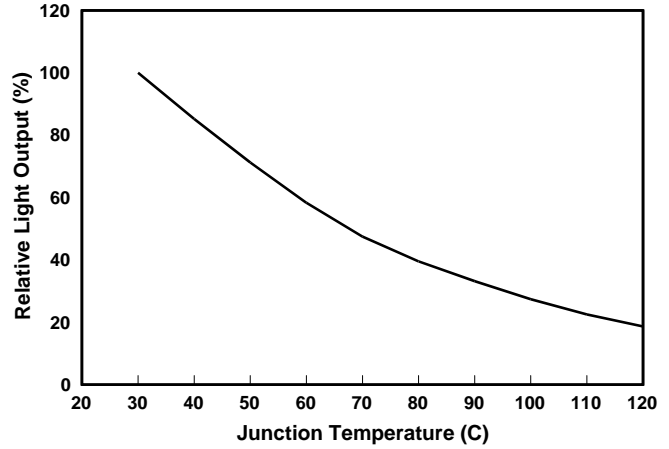
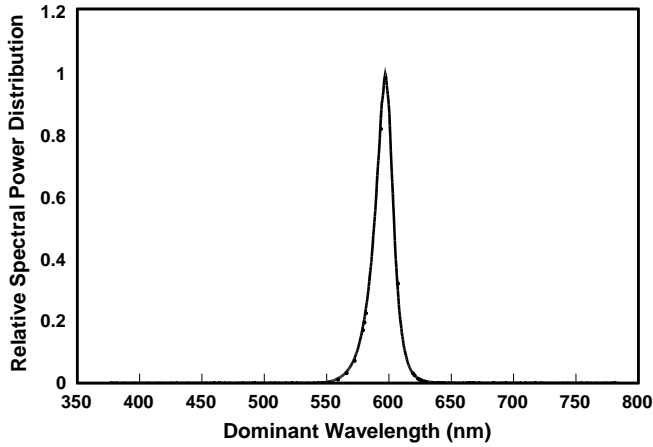
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## Characteristics Curves (Red)



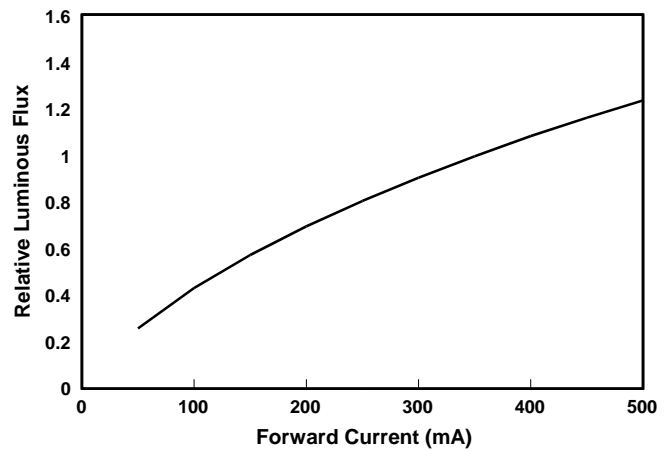
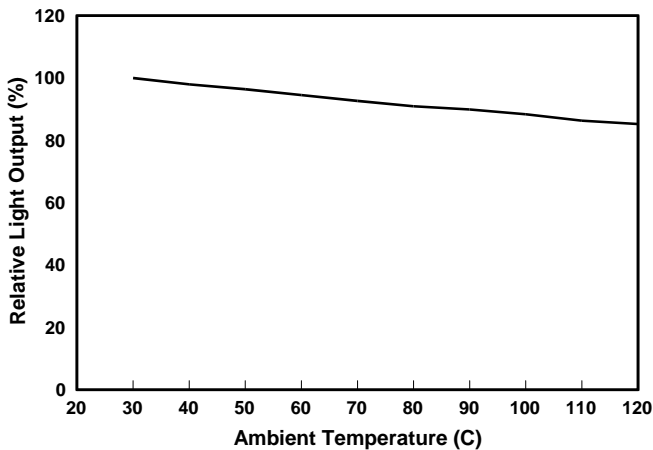
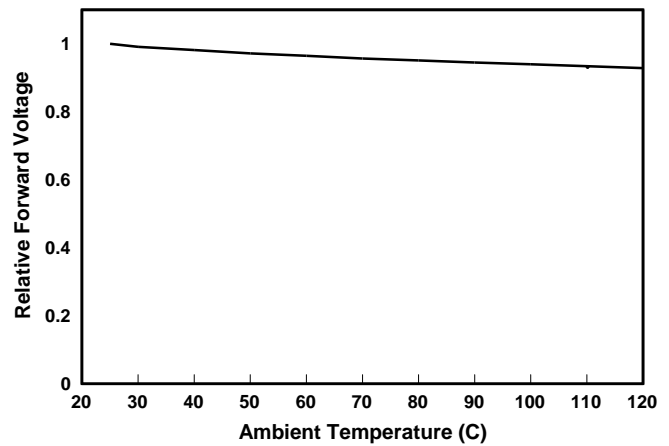
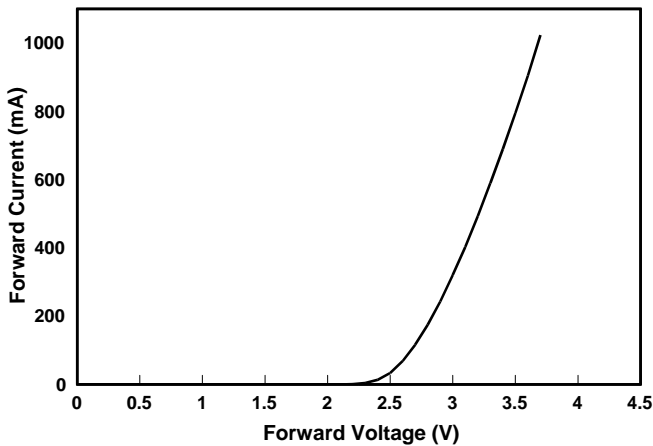
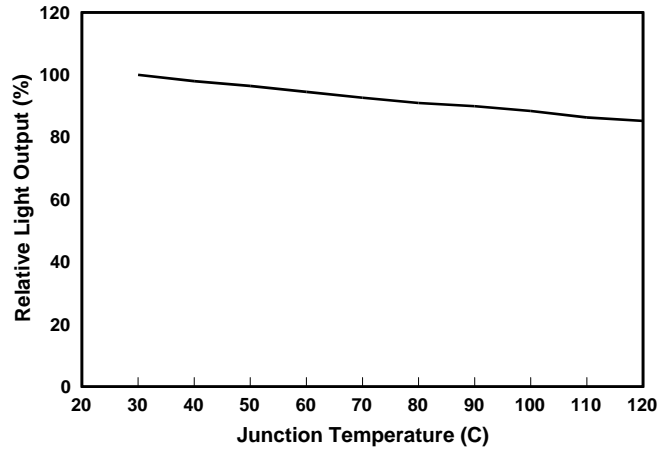
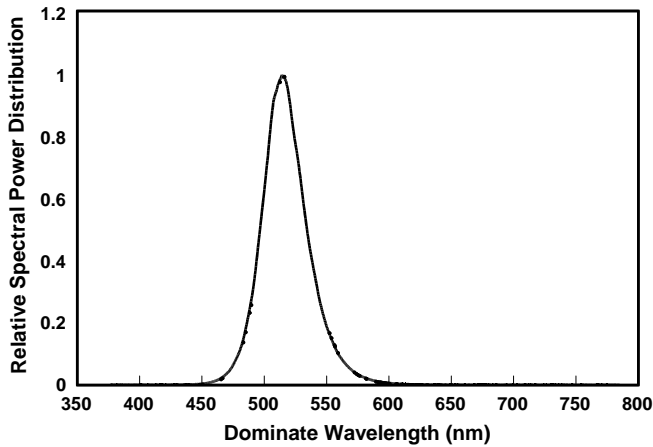
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## Characteristics Curves (Yellow)



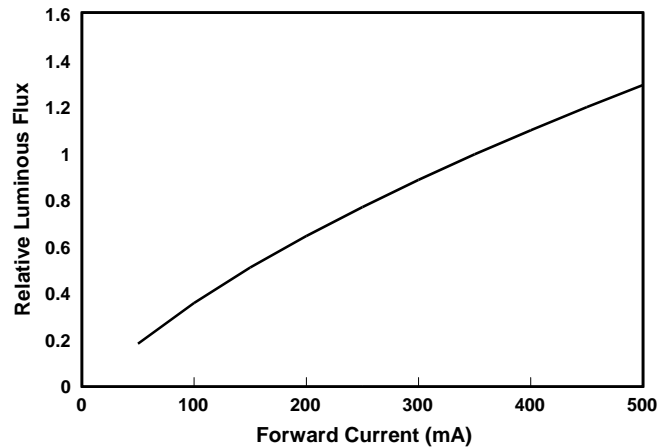
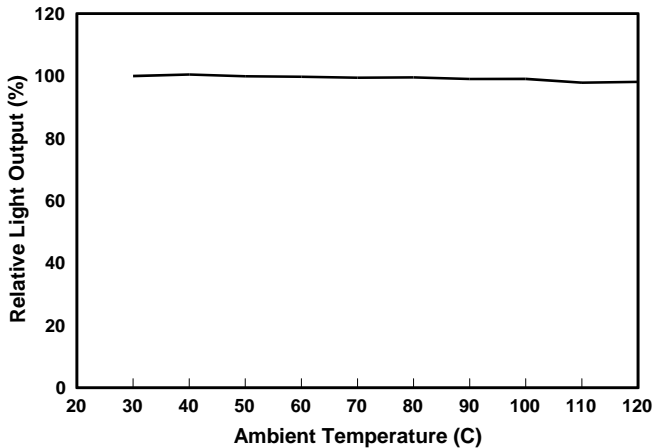
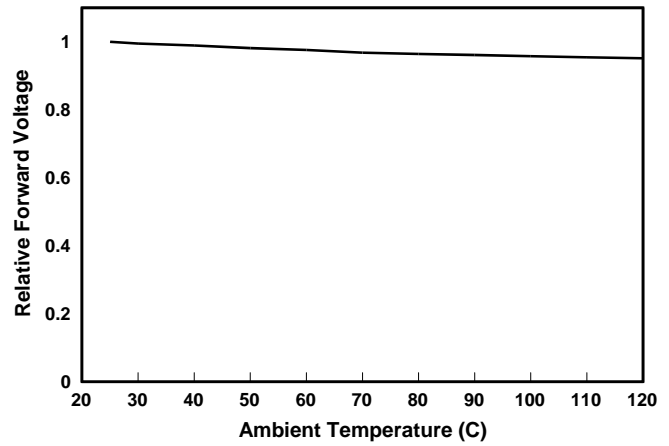
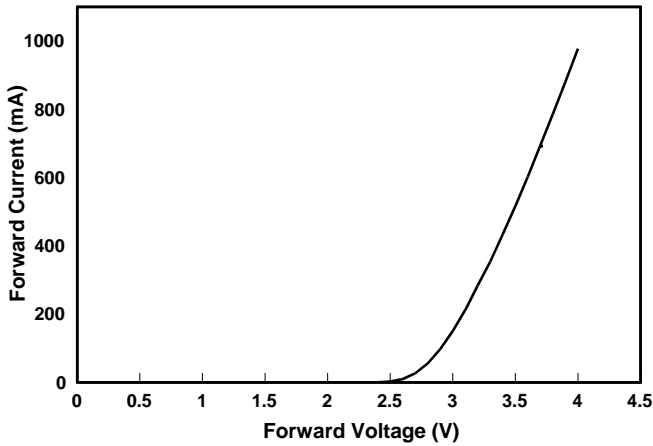
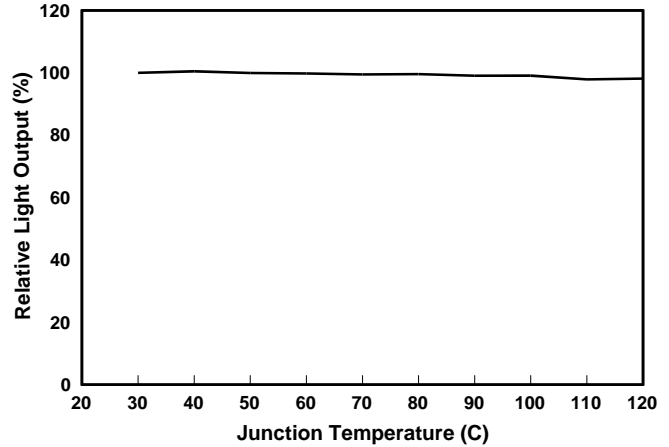
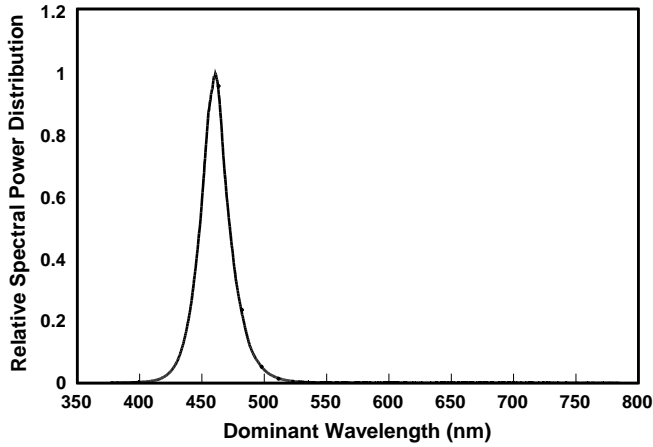
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## Characteristics Curves (Green)



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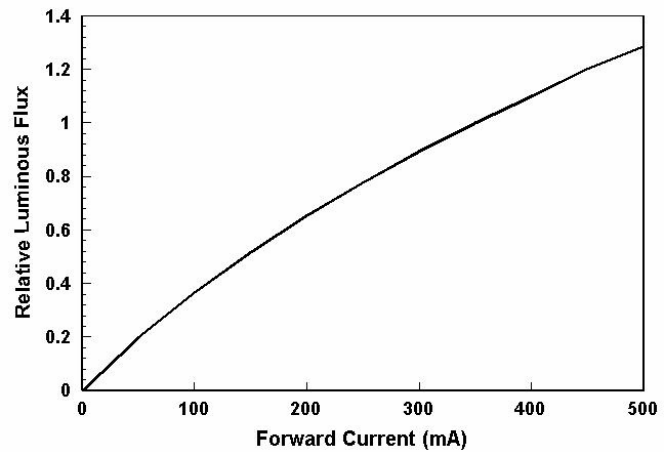
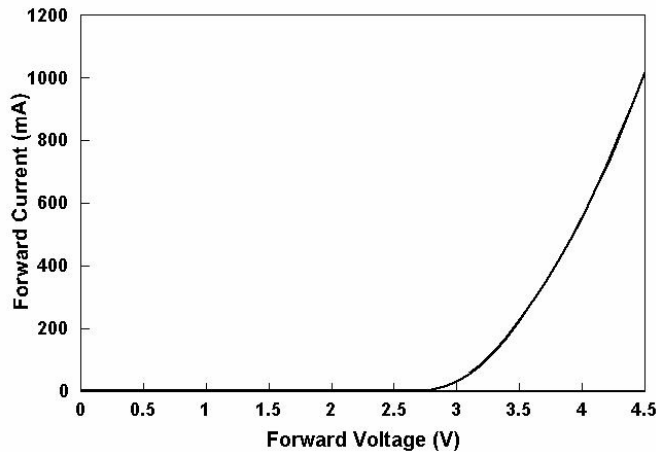
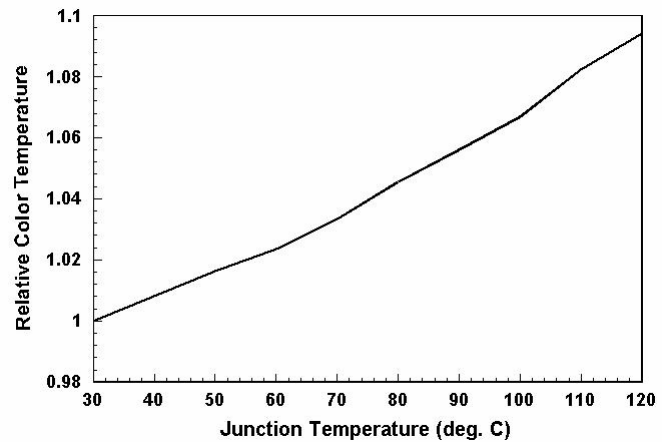
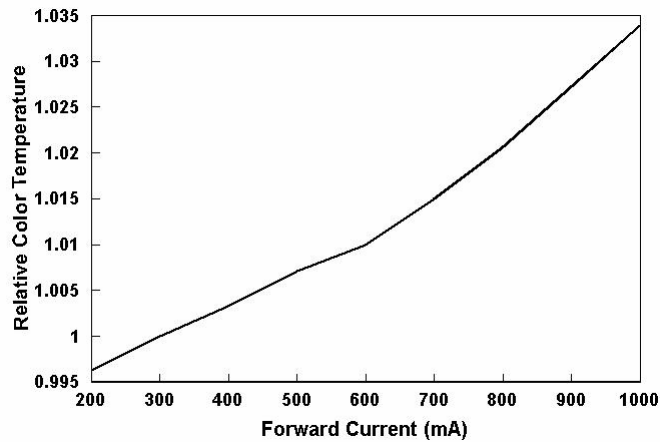
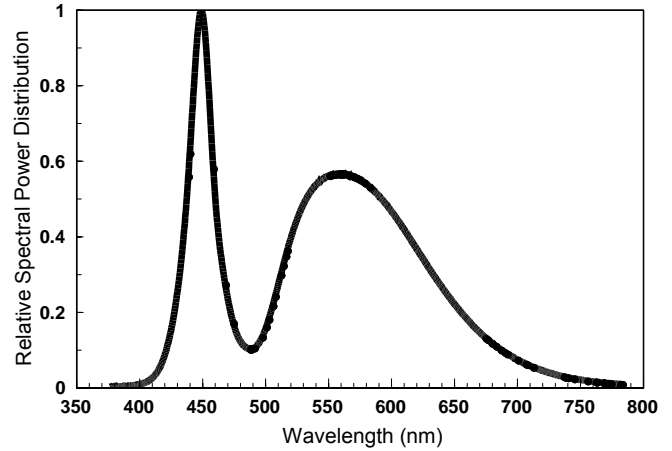
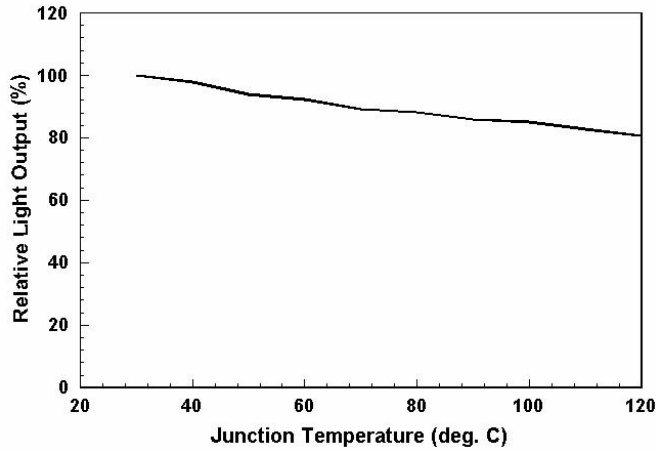
## Characteristics Curves (Blue)



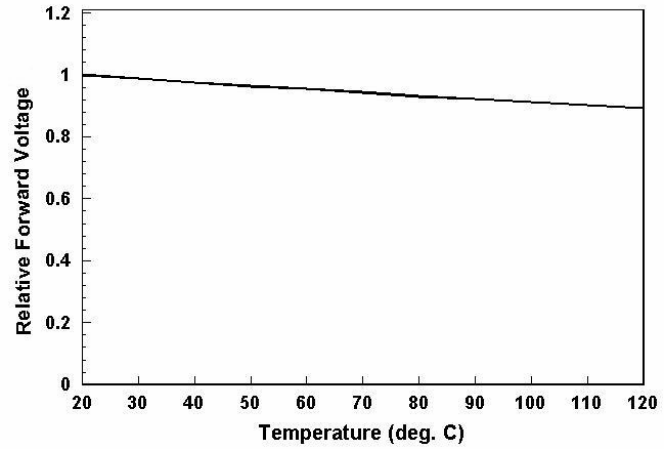
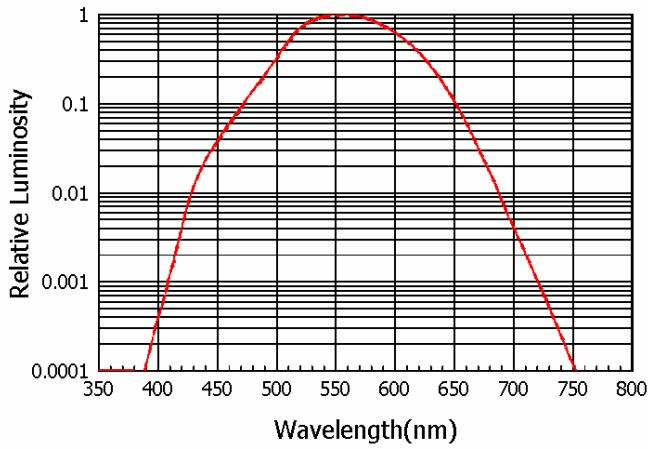
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## Characteristics Curves (White)

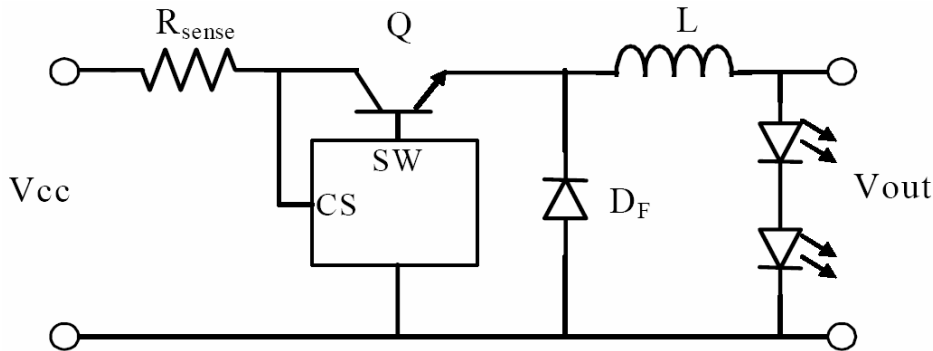


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## Device Block Diagram



## 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 states 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.

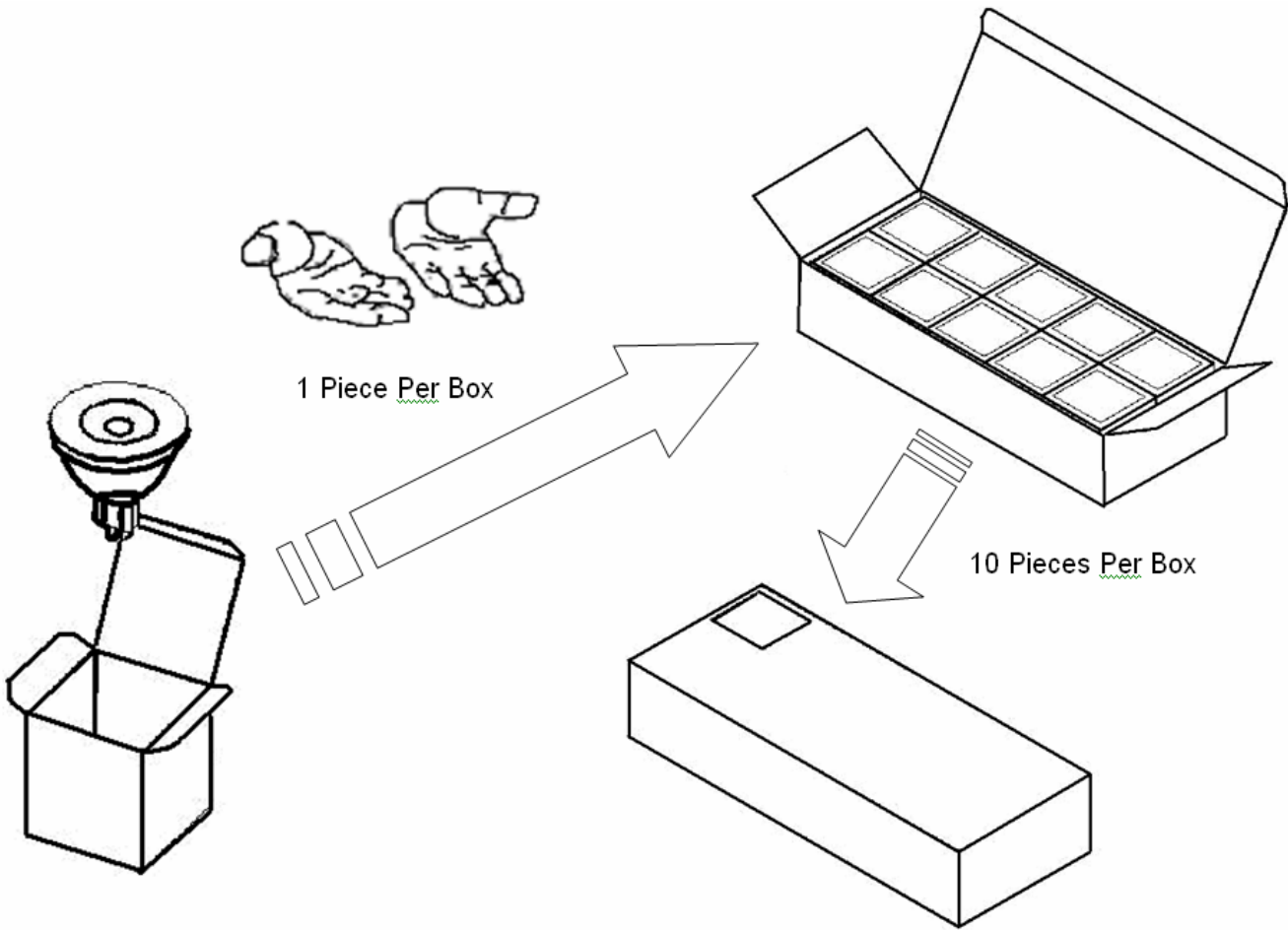
Amendment 2 to IEC 60825-1 is expected to be published in January 2001. The CENELEC equivalent is expected to follow three months after the IEC publication. This document contains increased Class 1 and Class 2 limits, as well as the introduction of less restrictive Class 1M and Class 2M.

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

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

Official Product	HT Part No. HT-MR16XXXU-A1 Series	Your Part No.		Data Sheet No.
Tentative Product	*****	*****		HT-MR16XXXU-A1 Series
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## Packaging



## 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. Avoid operation beyond the limits as specified by the absolute maximum ratings.

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## Reliability Test

Item No.	Test Item	Stress Condition	Sample Size	Test Point
1	Ambient Lift Test	Ta=25°C, Vin=14V DC	10	1000 Hrs
2	High Temperature Humidity Life Test	Ta=50°C, 85% RH, Vin=14V DC	10	1000 Hrs
3	Temperature Cycle	Air to air, -40°C~50°C, 30min dwell, <5min transfer	10	50 cycles
4	High Temperature Storage	Ta=50°C, Vin=14V DC	10	1000 Hrs
5	Low Temperature Storage	Ta=-40°C, Vin=14V DC	10	1000 Hrs

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## Revision History

Changes since last revision	Page	Version No.	Revision Date
New format		1.0	01-25-2006
Update viewing angle; correct type	8-10	1.1	01-31-2006
Update part number system	All	2.0	08-16-2006

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