

Standard LED-Sortiment 300 pcs

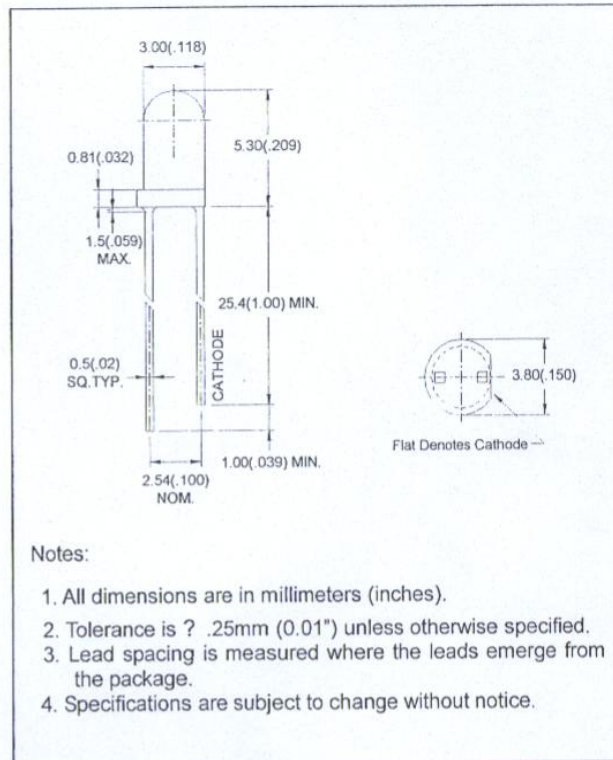
● Features:

1. Chip material: GaAsP/GaP
2. Emitted color : Hi-Eff Red
3. Lens Appearance : Water Clear
4. Low power consumption.
5. High efficiency.
6. Versatile mounting on P.C. Board or panel.
7. Low current requirement.
8. 3mm diameter package.
9. This product don't contained restriction substance, compliance ROHS standard.

● Applications:

1. TV set
2. Monitor
3. Telephone
4. Computer
5. Circuit board

● Package dimensions



● Absolute Maximum Ratings(Ta=25°C)

Parameter	Symbol	Rating	Unit
Power Dissipation	Pd	80	mW
Forward Current	I _F	30	mA
Peak Forward Current* ¹	I _{FP}	150	mA
Reverse Voltage	V _R	5	V
Operating Temperature	Topr	-40°C~80°C	
Storage Temperature	Tstg	-40°C~85°C	
Soldering Temperature	Tsol	260°C(for 5 seconds)	

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

Standard LED-Sortiment 300 pcs

● Electrical and optical characteristics(Ta=25°C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	$I_F=20mA$	-	2.0	2.6	V
Luminous Intensity	I_v	$I_F=20mA$	-	80	-	mcd
Reverse Current	I_R	$V_R=5V$	-	-	100	μA
Peak Wave Length	λ_p	$I_F=20mA$	-	640	-	nm
Dominant Wave Length	λ_d	$I_F=20mA$	617	-	638	nm
Spectral Line Half-width	$\Delta \lambda$	$I_F=20mA$	-	40	-	nm
Viewing Angle	$2\theta_{1/2}$	$I_F=20mA$	-	30	-	deg

● Typical Electro-Optical Characteristics Curves

Fig.1 Relative intensity vs. Wavelength

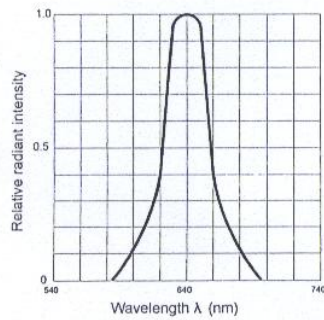


Fig.2 Forward current derating curve vs. Ambient temperature

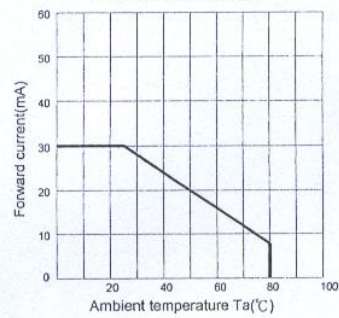


Fig.3 Forward current vs. Forward voltage

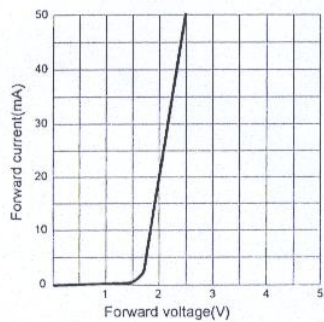


Fig.4 Relative luminous intensity vs. Ambient temperature

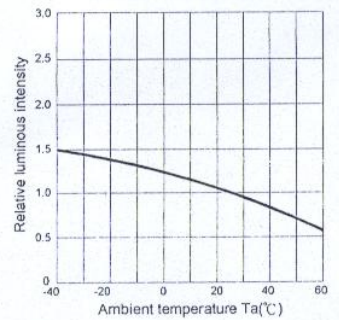


Fig.5 Relative luminous intensity vs. Forward current

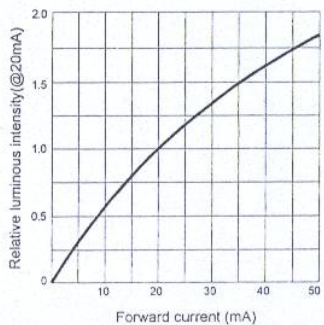
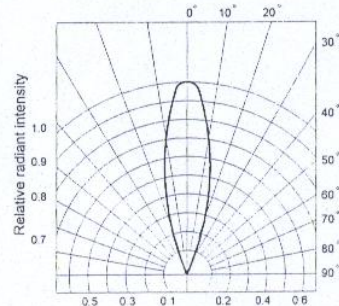


Fig.6 Radiation diagram



Datasheet

Item no. 1564910

V1_0917_01_en

Standard LED-Sortiment 300 pcs

LED LAMPS SPECIFICATION

●COMMODITY : T-1 Standard 1.0"Lead, 3 ϕ

●DEVICE NUMBER : BL-B2141

VERSION : 1.2/2000/01.28

●ELECTRICAL AND OPTICAL CHARACTERISTICS (Ta=25°C)

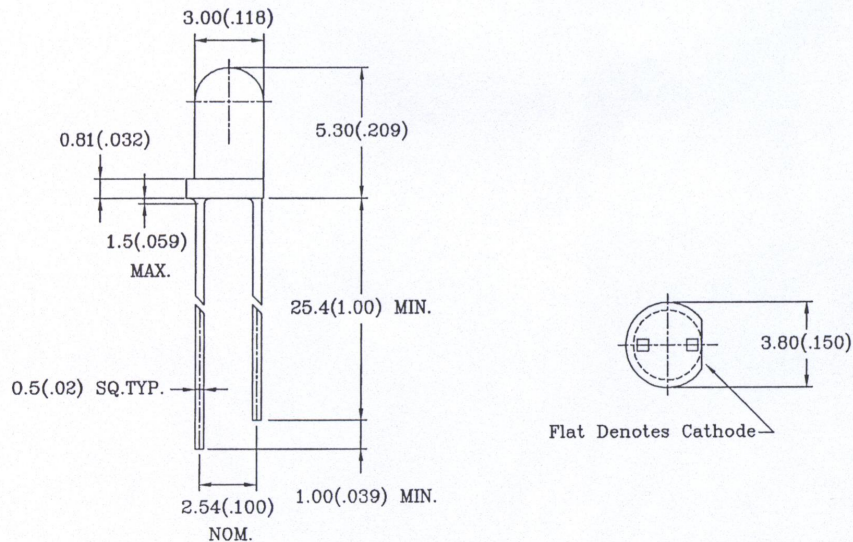
Chip		Lens Appearance	Absolute Maximum Rating				Electro-optical Data (At 20mA)			Viewing Angle 2 θ 1/2 (deg)
Emitted Color	Peak Wave Length λ P(nm)		$\Delta \lambda$ (nm)	Pd (mW)	If (mA)	Peak If (mA)	Vf(V)		Iv Typ. (mcd)	
							Typ.	Max.		
Green	568	Green Diffused	30	80	30	150	2.2	2.6	40.0	35

Remark : Viewing angle is the Off-axis angle at which the luminous intensity is half the axial luminous intensity.

●ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Reverse Voltage 5V
 Reverse Current (-Vr=5V) 100 μ A
 Operating Temperature Range -40°C ~ 85°C
 Storage Temperature Range -40°C ~ 85°C
 Lead Soldering Temperature 260°C For 5 Seconds

●PACKAGE DIMENSIONS



NOTES: 1.All dimensions are in millimeters (inches).

2.Tolerance is ± 0.25 mm (0.01") unless otherwise specified.

3.Lead spacing is measured where the leads emerge from the package.

4.Specifications are subject to change without notice.

RELEASED : 2000.11.01



ENGINEER :



Datasheet

Item no. 1564910

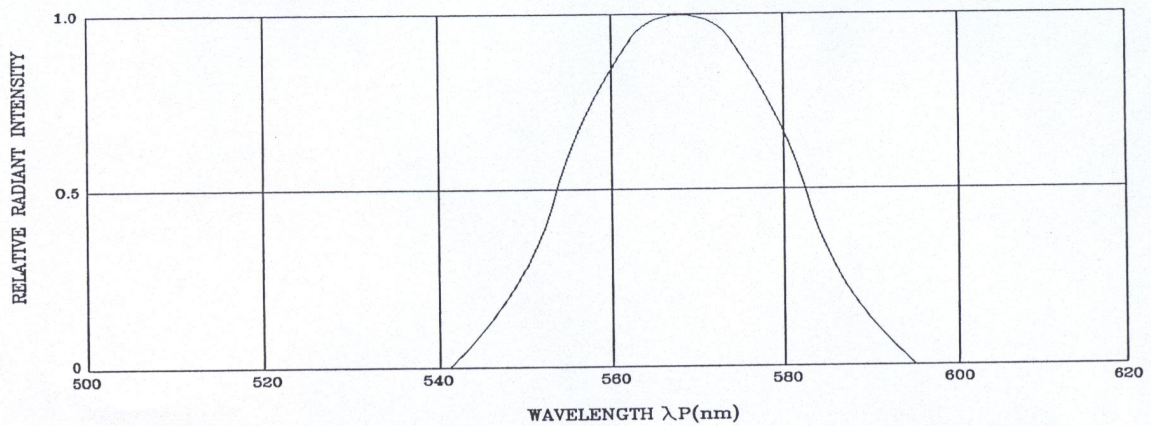
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Standard LED-Sortiment 300 pcs

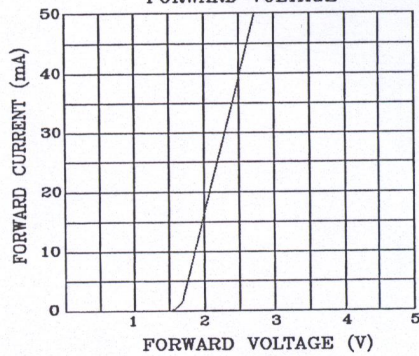
TYPICAL CHARACTERISTICS

DEVICE NUMBER: BL-B2141

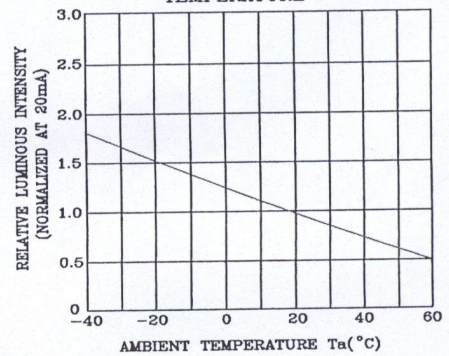
SPECTRAL DISTRIBUTION



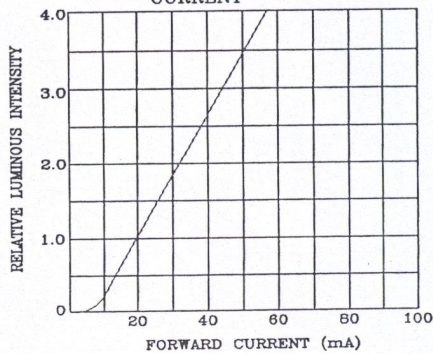
FORWARD CURRENT VS. FORWARD VOLTAGE



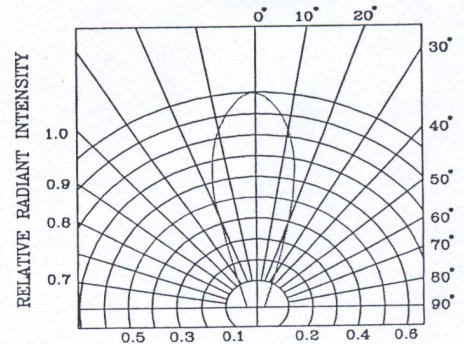
RELATIVE LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE



RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT



RADIATION DIAGRAM



Datasheet

Item no. 1564910

V1_0917_01_en

Standard LED-Sortiment 300 pcs

RELIABILITY TEST

DEVICE NO.: BL-B2141

Classification	Test Item	Reference Standard	Test Conditions	Result
Endurance Test	Operation Life	MIL-STD-750:1026 MIL-STD-883:1005 JIS C 7021 :B-1	Connect with a power $I_f=30\text{mA}$ T_a =Under room temperature Test time=1,000hrs	0/100
	High Temperature High Humidity Storage	MIL-STD-202:103B JIS C 7021 :B-11	$T_a=85^\circ\text{C}\pm 5^\circ\text{C}$ RH=90%-95% Test time=1,000hrs	0/100
	High Temperature Storage	MIL-STD-883:1008 JIS C 7021 :B-10	High $T_a=105^\circ\text{C}\pm 5^\circ\text{C}$ Test time=1,000hrs	0/100
	Low Temperature Storage	JIS-C-7021 :B-12	Low $T_a=-55^\circ\text{C}\pm 5^\circ\text{C}$ Test time=1,000hrs	0/100
Environmental Test	Temperature Cycling	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1010 JIS C 7021 :A-4	$-55^\circ\text{C} \sim 25^\circ\text{C} \sim 105^\circ\text{C} \sim 25^\circ\text{C}$ 30min 5min 30min 5min Test Time=10cycle	0/100
	Thermal Shock	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1011	$105^\circ\text{C}\pm 5^\circ\text{C} \sim -55^\circ\text{C}\pm 5^\circ\text{C}$ 10min 10min Test Time=10cycle	0/100
	Solder Resistance	MIL-STD-202:201A MIL-STD-750:2031 JIS C 7021 :A-1	$T_{\text{sol}}=260\pm 5^\circ\text{C}$ Dwell Time=10±1sec.	0/50
	Solderability	MIL-STD-202:208D MIL-STD-750:2026 MIL-STD-883:2003 JIS C 7021 :A-2	$T_{\text{sol}}=230\pm 5^\circ\text{C}$ Dwell Time=5±1sec.	0/50
	Lead Bending Stress	MIL-STD-750:2036 JIS C 7021 :A-11	$0^\circ\sim 90^\circ\sim 0^\circ$ bend , 3 cycles Weight 250g	0/50

JUDGMENT CRITERIA OF FAILURE FOR THE RELIABILITY

Measuring items	Symbol	Measuring conditions	Judgement criteria for failure
Forward voltage	VF	$I_f=20\text{mA}$	Over $U_x1.2$
Reverse current	IR	$V_R=5\text{V}$	Over U_x2
Luminous intensity	IV	$I_f=20\text{mA}$	Below $S_x0.5$

Note: 1.U means the upper limit of specified characteristics. S means initial value.

2.Measurment shall be taken between 2 hours and after the test pieces have been returned to normal ambient conditions after completion of each test.

Datasheet

Item no. 1564910

V1_0917_01_en

Standard LED-Sortiment 300 pcs

LED LAMPS SPECIFICATION

●COMMODITY : T-1 Standard 1.0"Lead, 3 ϕ

●DEVICE NUMBER : BL-B3141

●ELECTRICAL AND OPTICAL CHARACTERISTICS (Ta=25°C)

VERSION : 1.0

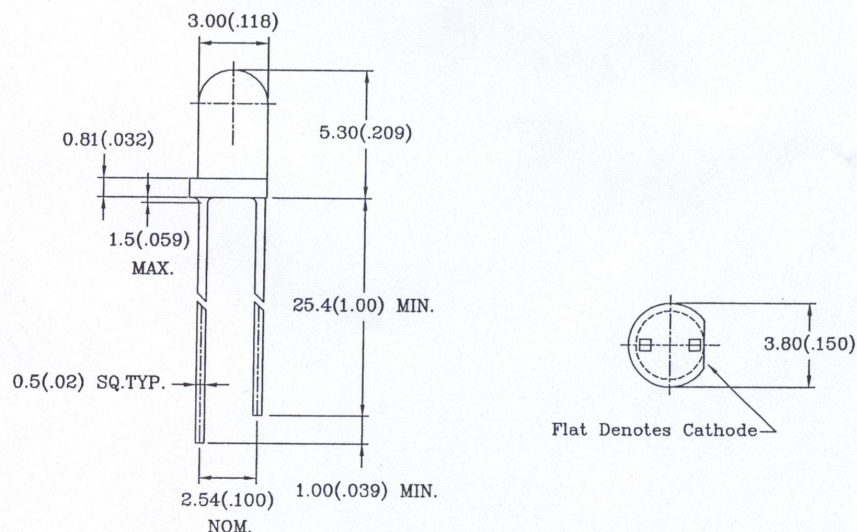
Chip		Lens Appearance	Absolute Maximum Rating				Electro-optical Data (At 20mA)			Viewing Angle 2 θ 1/2 (deg)
Emitted Color	Peak Wave Length λP (nm)		$\Delta \lambda$ (nm)	Pd (mW)	If (mA)	Peak If(mA)	Vf(V)		Iv Typ. (mcd)	
							Typ.	Max.		
Yellow	585	Yellow Diffused	35	100	30	150	2.1	2.2	30	35

Remark : Viewing angle is the Off-axis angle at which the luminous intensity is half the axial luminous intensity.

●ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Reverse Voltage	5V
Reverse Current (-Vr=5V)	100 μ A
Operating Temperature Range	-40°C ~ 80°C
Storage Temperature Range	-40°C ~ 85°C
Lead Soldering Temperature	260°C For 5 Seconds

●PACKAGE DIMENSIONS



NOTES: 1.All dimensions are in millimeters (inches).

2.Tolerance is ± 0.25 mm (0.01") unless otherwise specified.

3.Lead spacing is measured where the leads emerge from the package.

4.Specifications are subject to change without notice.

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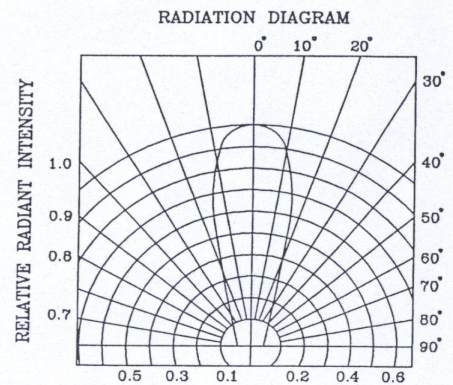
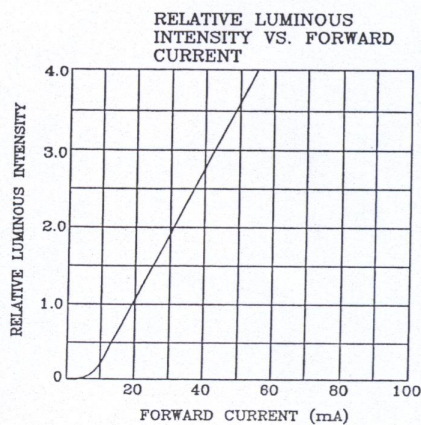
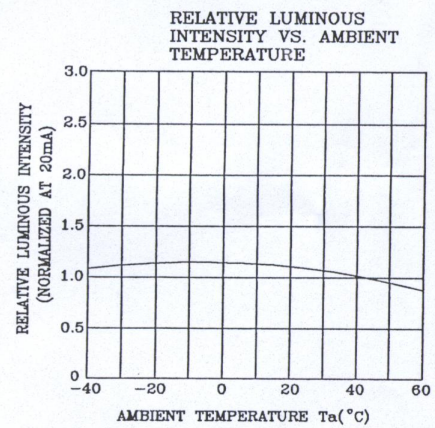
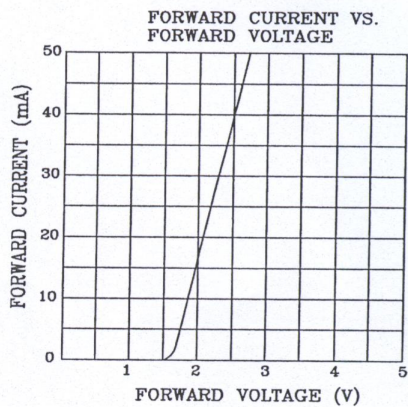
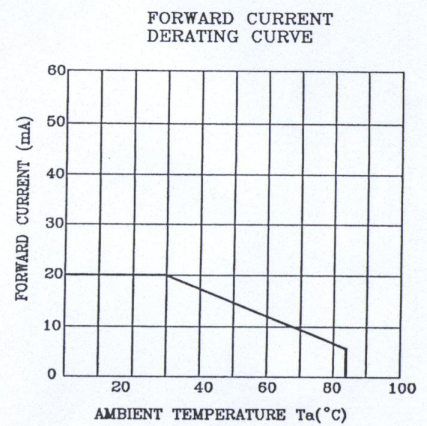
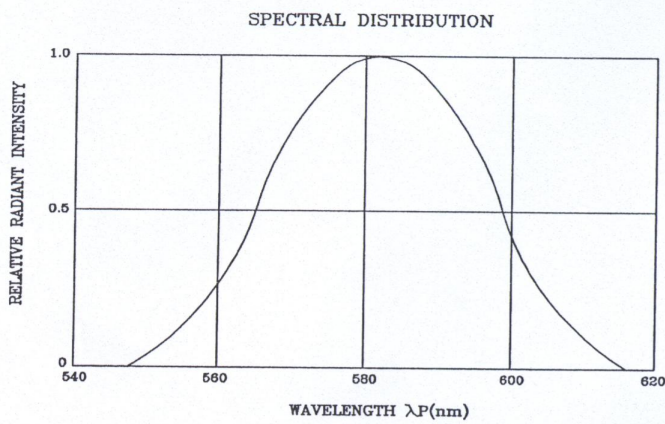
V1_0917_01_en

Standard LED-Sortiment 300 pcs

LED LAMPS SPECIFICATION

- COMMODITY: T-1 Standard 1.0"Lead,3ø
- DEVICE NUMBER: BL-B3141
- ELECTRICAL AND OPTICAL CHARACTERISTICS(Ta=25°C)

REVISION: 1.0



Datasheet

Item no. 1564910

V1_0917_01_en

Standard LED-Sortiment 300 pcs

LED LAMP SPECIFICATION

RELIABILITY TEST

REVISION: 1.0

Classification	Test Item	Reference Standard	Test Conditions	Result
Endurance Test	Operation Life	MIL-STD-750:1026 MIL-STD-883:1005 JIS C 7021 :B-1	Connect with a power $I_f=30\text{mA}$ T_a =Under room temperature Test time=1,000hrs	0/100
	High Temperature High Humidity Storage	MIL-STD-202:103B JIS C 7021 :B-11	$T_a=85^\circ\text{C}\pm 5^\circ\text{C}$ RH=90%-95% Test time=1,000hrs	0/100
	High Temperature Storage	MIL-STD-883:1008 JIS C 7021 :B-10	High $T_a=105^\circ\text{C}\pm 5^\circ\text{C}$ Test time=1,000hrs	0/100
	Low Temperature Storage	JIS-C-7021 :B-12	Low $T_a=-55^\circ\text{C}\pm 5^\circ\text{C}$ Test time=1,000hrs	0/100
Environmental Test	Temperature Cycling	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1010 JIS C 7021 :A-4	$-35^\circ\text{C} \sim 25^\circ\text{C} \sim 85^\circ\text{C} \sim 25^\circ\text{C}$ 30min 5min 30min 5min Test Time=10cycle	0/100
	Thermal Shock	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1011	$105^\circ\text{C}\pm 5^\circ\text{C} \sim -55^\circ\text{C}\pm 5^\circ\text{C}$ 10min 10min Test Time=10cycle	0/100
	Solder Resistance	MIL-STD-202:201A MIL-STD-750:2031 JIS C 7021 :A-1	$T_{\text{sol}}=260\pm 5^\circ\text{C}$ Dwell Time= $10\pm 1\text{sec.}$	0/50
	Solderability	MIL-STD-202:208D MIL-STD-750:2026 MIL-STD-883:2003 JIS C 7021 :A-2	$T_{\text{sol}}=230\pm 5^\circ\text{C}$ Dwell Time= $5\pm 1\text{sec.}$	0/50
	Lead Bending Stress	MIL-STD-750:2036 JIS C 7021 :A-11	$0^\circ\sim 90^\circ\sim 0^\circ$ bend , 3 cycles Weight 250g	0/50

JUDGMENT CRITERIA OF FAILURE FOR THE RELIABILITY

Measuring items	Symbol	Measuring conditions	Judgement criteria for failure
Forward voltage	VF	$I_F=20\text{mA}$	Over $U_x1.2$
Reverse current	IR	$V_R=5\text{V}$	Over U_x2
Luminous intensity	IV	$I_F=20\text{mA}$	Below $S_x0.5$

Note: 1.U means the upper limit of specified characteristics. S means initial value.

2.Measurment shall be taken between 2 hours and after the test pieces have been returned to normal ambient conditions after completion of each test.

Standard LED-Sortiment 300 pcs

LED LAMPS SPECIFICATION

● COMMODITY : T-1 Standard 1.0" Lead, 3 ϕ

● DEVICE NUMBER : BL-BB53V1

VERSION : 1.1

● ELECTRICAL AND OPTICAL CHARACTERISTICS (Ta=25°C)

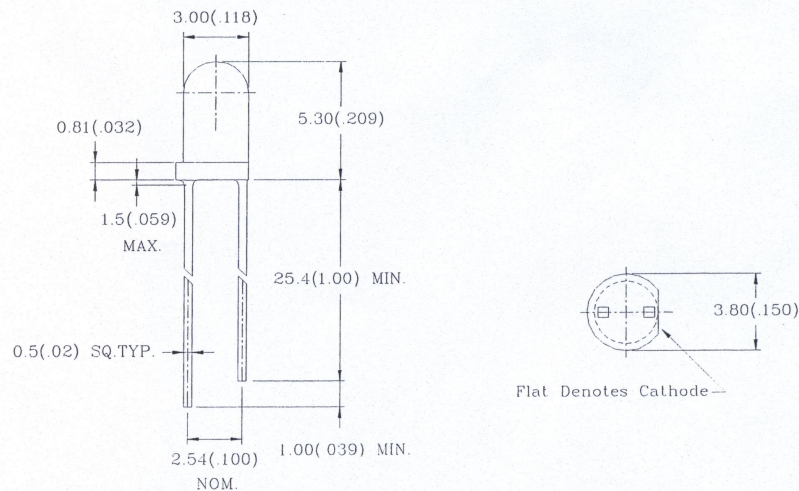
Chip		Lens Appearance	Absolute Maximum Rating				Electro-optical Data (At 20mA)		Viewing Angle 2 θ 1/2 (deg)	
Emitted Color	Peak Wave Length λP (nm)		$\Delta \lambda$ (nm)	Pd (mW)	If (mA)	Peak If(mA)	Vf(V)			Iv Typ. (mcd)
							Typ.	Max.		
Super Blue	470	Water Clear	30	120	30	150	3.5	4.0	2000	20

Remark : Viewing angle is the Off-axis angle at which the luminous intensity is half the axial luminous intensity.

● ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Reverse Voltage	5V
Reverse Current (V _R =5V)	100 μ A
Operating Temperature Range	-40°C ~ 80°C
Storage Temperature Range	-40°C ~ 85°C
Lead Soldering Temperature	260°C For 5 Seconds

● PACKAGE DIMENSIONS



NOTES: 1.All dimensions are in millimeters (inches).

2.Tolerance is ± 0.25 mm (0.01") unless otherwise specified.

3.Lead spacing is measured where the leads emerge from the package.

4.Specifications are subject to change without notice.

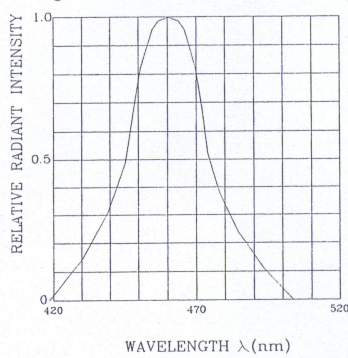
Standard LED-Sortiment 300 pcs

LED LAMPS SPECIFICATION

- COMMODITY : T-1 Standard 1.0"Lead, 3 ϕ
- DEVICE NUMBER : BL-BB53V1
- ELECTRICAL AND OPTICAL CHARACTERISTICS (Ta=25°C)

VERSION : 1.0

Fig.1 RELATIVE INTENSITY VS. WAVELENGTH



FORWARD CURRENT DERATING CURVE

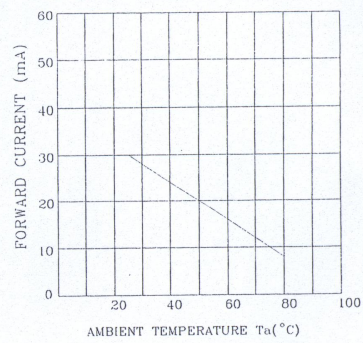


Fig.3 FORWARD CURRENT VS. FORWARD VOLTAGE

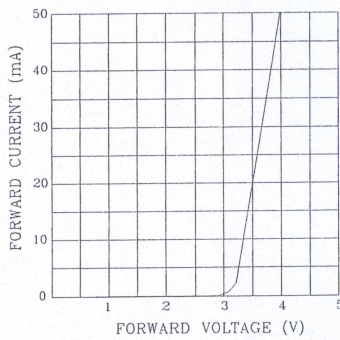


Fig.4 RELATIVE LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE

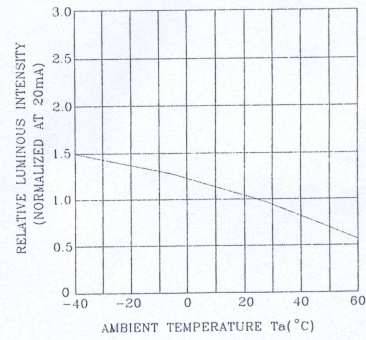
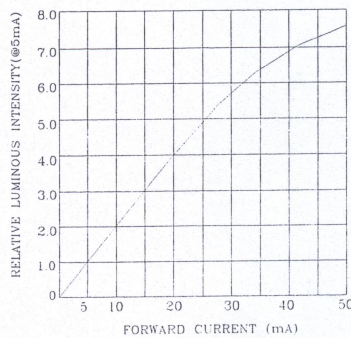
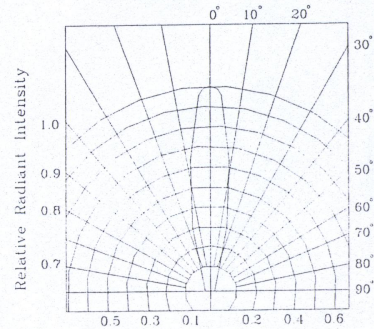


Fig.5 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT



RADIATION DIAGRAM



Datasheet

Item no. 1564910

V1_0917_01_en

Standard LED-Sortiment 300 pcs

LED LAMPS SPECIFICATION RELIABILITY TEST

VERSION : 1.0

Classification	Test Item	Reference Standard	Test Conditions	Result
Endurance Test	Operation Life	MIL-STD-750:1026 MIL-STD-883:1005 JIS C 7021 :B-1	Connect with a power $I_f=20\text{mA}$ T_a =Under room temperature Test time=1,000hrs	0/100
	High Temperature High Humidity Storage	MIL-STD-202:103B JIS C 7021 :B-11	$T_a=85^\circ\text{C} \pm 5^\circ\text{C}$ RH=90%-95% Test time=240hrs	0/100
	High Temperature Storage	MIL-STD-883:1008 JIS C 7021 :B-10	High $T_a=105^\circ\text{C} \pm 5^\circ\text{C}$ Test time=1,000hrs	0/100
	Low Temperature Storage	JIS-C-7021 :B-12	Low $T_a=-55^\circ\text{C} \pm 5^\circ\text{C}$ Test time=1,000hrs	0/100
Environmental Test	Temperature Cycling	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1010 JIS C 7021 :A-4	$-55^\circ\text{C} \sim 25^\circ\text{C} \sim 105^\circ\text{C} \sim 25^\circ\text{C}$ 30min 5min 30min 5min Test Time=10cycle	0/100
	Thermal Shock	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1011	$-55^\circ\text{C} \pm 5^\circ\text{C} \sim 105^\circ\text{C} \pm 5^\circ\text{C}$ 10min 10min Test Time=10cycle	0/100
	Solder Resistance	MIL-STD-202:201A MIL-STD-750:2031 JIS C 7021 :A-1	$T_{\text{sol}}=260 \pm 5^\circ\text{C}$ Dwell Time=5 \pm 1sec.	0/50
	Solder ability	MIL-STD-202:208D MIL-STD-750:2026 MIL-STD-883:2003 JIS C 7021 :A-2	$T_{\text{sol}}=230 \pm 5^\circ\text{C}$ Dwell Time=5 \pm 1sec.	0/50
	Lead Bending Stress	MIL-STD-750:2036 JIS C 7021 :A-11	$0^\circ \sim 90^\circ \sim 0^\circ$ bend , 3 cycles Weight 250g	0/50

JUDGMENT CRITERIA OF FAILURE FOR THE RELIABILITY

Measuring items	Symbol	Measuring conditions	Judgement criteria for failure
Forward voltage	V_F	$I_f=20\text{mA}$	Over $U_x1.2$
Reverse current	I_r	$V_r=5\text{V}$	Over U_x2
Luminous intensity	I_v	$I_f=20\text{mA}$	Below $S_x0.5$

Notes: 1.U means the upper limit of specified characteristics. S means initial value.

2.Measurement shall be taken between 2 hours and after the test pieces have been returned to normal ambient conditions after completion of each test.

Standard LED-Sortiment 300 pcs

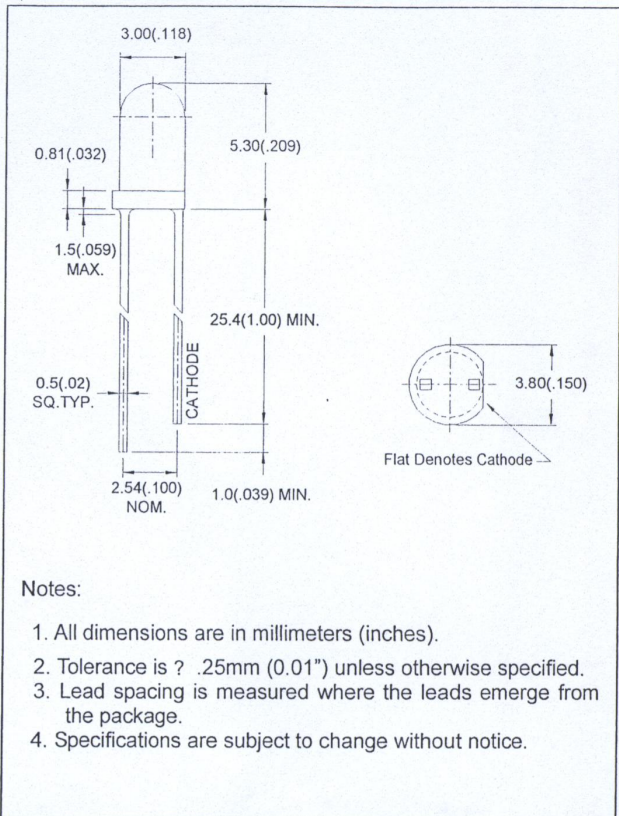
● Features:

1. Chip material: AlInGaN
2. Emitted color : White
3. Lens Appearance : Water Clear
4. Low power consumption.
5. High efficiency.
6. Versatile mounting on P.C. Board or panel.
7. Low current requirement.
8. 5mm diameter package.
9. This product don't contained restriction substance, compliance ROHS standard.

● Applications:

1. TV set
2. Monitor
3. Telephone
4. Computer
5. Circuit board

● Package dimensions:



● Absolute maximum ratings($T_a=25^\circ\text{C}$)

Parameter	Symbol	Rating	Unit
Power Dissipation	P_d	100	mW
Forward Current	I_F	30	mA
Peak Forward Current* ¹	I_{FP}	100	mA
Reverse Voltage	V_R	5	V
Operating Temperature	T_{opr}	$-40^\circ\text{C} \sim 80^\circ\text{C}$	
Storage Temperature	T_{stg}	$-40^\circ\text{C} \sim 85^\circ\text{C}$	
Soldering Temperature	T_{sol}	260°C (for 5 seconds)	

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

Standard LED-Sortiment 300 pcs

Electrical and optical characteristics(Ta=25°C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	$I_F=20\text{mA}$	-	3.5	4.0	V
Luminous Intensity	I_v	$I_F=20\text{mA}$	-	1200	-	mcd
Reverse Current	I_R	$V_R=5\text{V}$	-	-	100	μA
Peak Wave Length	X	$I_F=20\text{mA}$	-	0.32	-	nm
Dominant Wave Length	Y	$I_F=20\text{mA}$	-	0.31	-	nm
Spectral Line Half-width	$\Delta \lambda$	$I_F=20\text{mA}$	-	35	-	nm
Viewing Angle	$2\theta_{1/2}$	$I_F=20\text{mA}$	-	25	-	deg

Typical electro-optical characteristics curves

Fig.1 Relative intensity vs. Wavelength

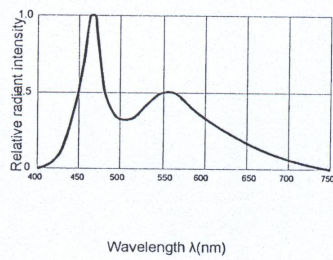


Fig.2 Forward current derating curve vs. Ambient temperature

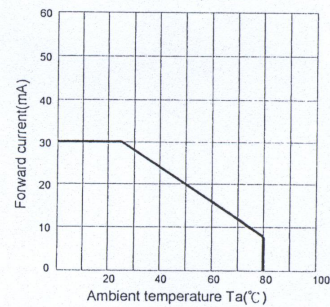


Fig.3 Forward current vs. Forward voltage

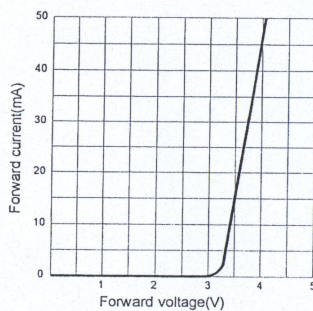


Fig.4 Relative luminous intensity vs. Ambient temperature

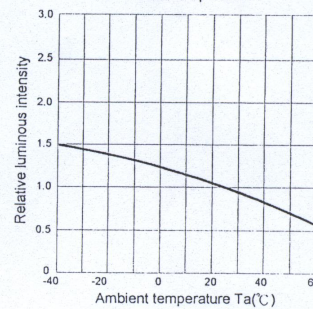


Fig.5 Relative luminous intensity vs. Forward current

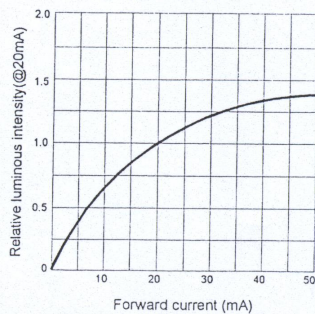
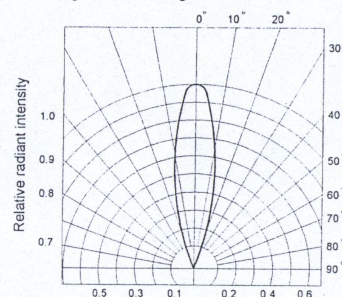


Fig.6 Radiation diagram

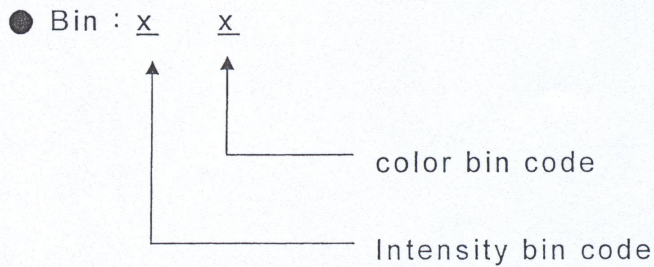


Standard LED-Sortiment 300 pcs

● Bin Limits

1. Intensity Bin Limits (At $I_F=20\text{mA}$)

Bin Code	Min. (mcd)	Max. (mcd)
:	:	:
U	410	820
V	620	1230
W	930	1840
X	1390	2760
Y	2090	4260
:	:	:



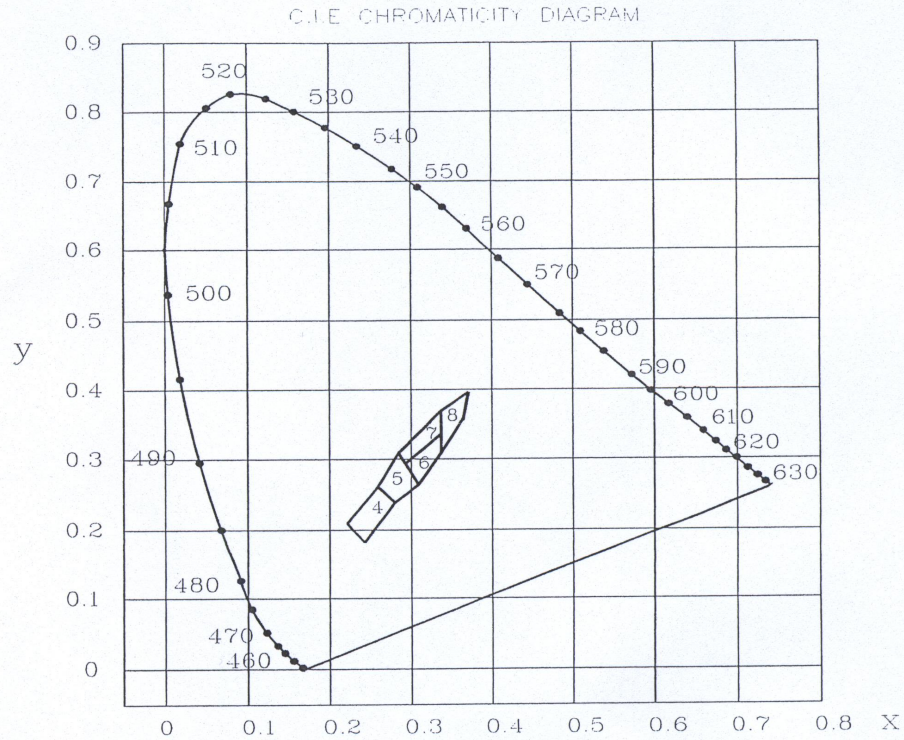
Datasheet

Item no. 1564910

V1_0917_01_en

Standard LED-Sortiment 300 pcs

2. Color Bin Limits (nm at 20mA)



Bin	Chromaticity coordinates				
	x				
4	x	0.245	0.225	0.260	0.279
	y	0.190	0.215	0.262	0.242
5	x	0.279	0.260	0.283	0.305
	y	0.242	0.262	0.305	0.265
6	x	0.305	0.287	0.330	0.330
	y	0.265	0.295	0.339	0.305
7	x	0.287	0.283	0.330	0.330
	y	0.295	0.305	0.360	0.339
8	x	0.330	0.330	0.361	0.356
	y	0.305	0.360	0.385	0.351

Standard LED-Sortiment 300 pcs

LED LAMPS SPECIFICATION

●COMMODITY : T-1 3/4 Standard 1.0"Lead, 5 ϕ

●DEVICE NUMBER : BL-B4534

VERSION : 1.0 /2000.12.21

●ELECTRICAL AND OPTICAL CHARACTERISTICS (Ta=25°C)

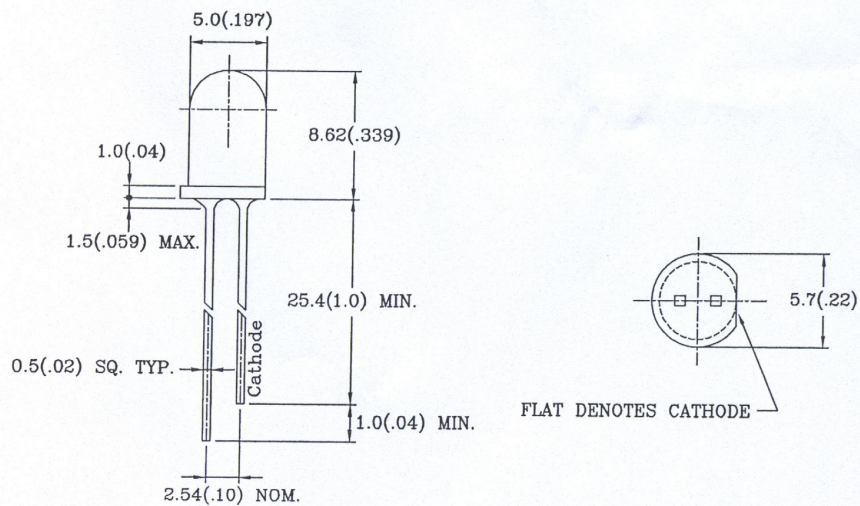
Chip		Lens Appearance	Absolute Maximum Rating				Electro-optical Data (At 20mA)			Viewing Angle 2 θ 1/2 (deg)
Emitted Color	Peak Wave Length λP (nm)		$\Delta \lambda$ (nm)	Pd (mW)	If (mA)	Peak If(mA)	Vf(V)		Iv Typ. (mcd)	
							Typ.	Max.		
Hi-Eff Red	635	Red Diffused	45	80	30	150	2.0	2.6	80.0	35

Remark : Viewing angle is the Off-axis angle at which the luminous intensity is half the axial luminous intensity.

●ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Reverse Voltage	5V
Reverse Current (-Vr=5V)	100 μ A
Operating Temperature Range	-40°C ~ 80°C
Storage Temperature Range	-40°C ~ 85°C
Lead Soldering Temperature	260°C For 5 Seconds

●PACKAGE DIMENSIONS




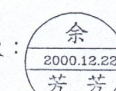
NOTES: 1.All dimensions are in millimeters (inches).

2.Tolerance is ± 0.25 mm (0.01") unless otherwise specified.

3.Lead spacing is measured where the leads emerge from the package.

4.Specifications are subject to change without notice.

RELEASED : 

ENGINEER : 

Datasheet

Item no. 1564910

V1_0917_01_en

Standard LED-Sortiment 300 pcs

LED LAMPS SPECIFICATION

● COMMODITY : T-1 3/4 Standard 1.0"Lead, 5 ϕ

● DEVICE NUMBER : BL-B2134

VERSION : 1.2/2000.02.21

● ELECTRICAL AND OPTICAL CHARACTERISTICS (Ta=25°C)

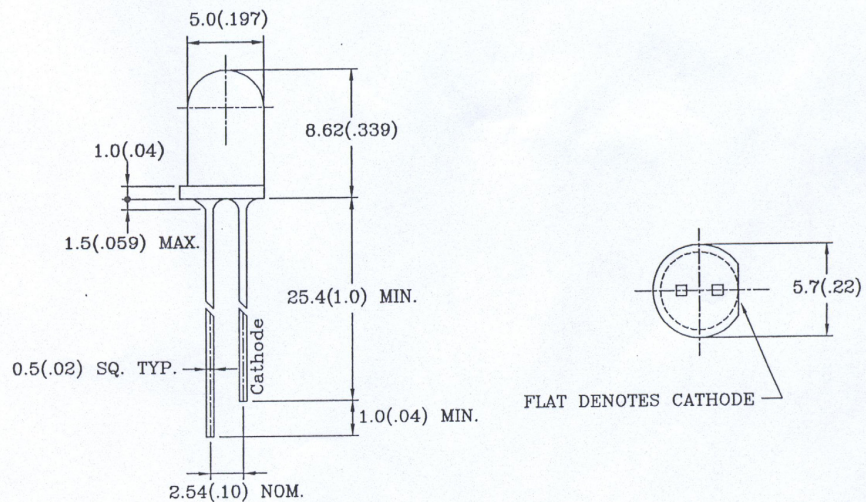
Chip		Lens Appearance	Absolute Maximum Rating				Electro-optical Data (At 20mA)		Viewing Angle 2 θ 1/2 (deg)	
Emitted Color	Peak Wave Length λ P(nm)		$\Delta \lambda$ (nm)	Pd (mW)	If (mA)	Peak If(mA)	Vf(V)			Iv Typ. (mcd)
		Typ.					Max.			
Green	568	Green Diffused	30	80	30	150	2.2	2.6	80.0	35

Remark : Viewing angle is the Off-axis angle at which the luminous intensity is half the axial luminous intensity.

● ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Reverse Voltage	5V
Reverse Current (VR=5V)	100 μ A
Operating Temperature Range	-40°C ~ 80°C
Storage Temperature Range	-40°C ~ 85°C
Lead Soldering Temperature	260°C For 5 Seconds

● PACKAGE DIMENSIONS



- NOTES: 1.All dimensions are in millimeters (inches).
 2.Tolerance is ± 0.25 mm (0.01") unless otherwise specified.
 3.Lead spacing is measured where the leads emerge from the package.
 4.Specifications are subject to change without notice.

RELEASED : 曾志宏
2000.07.20

ENGINEER : 余愛萍
2000.07.20

Standard LED-Sortiment 300 pcs

LED LAMPS SPECIFICATION

● COMMODITY : T-1 3/4 Standard 1.0"Lead, 5 ϕ

● DEVICE NUMBER : BL-B3134

VERSION : 1.2/2000/02/21

● ELECTRICAL AND OPTICAL CHARACTERISTICS (Ta=25°C)

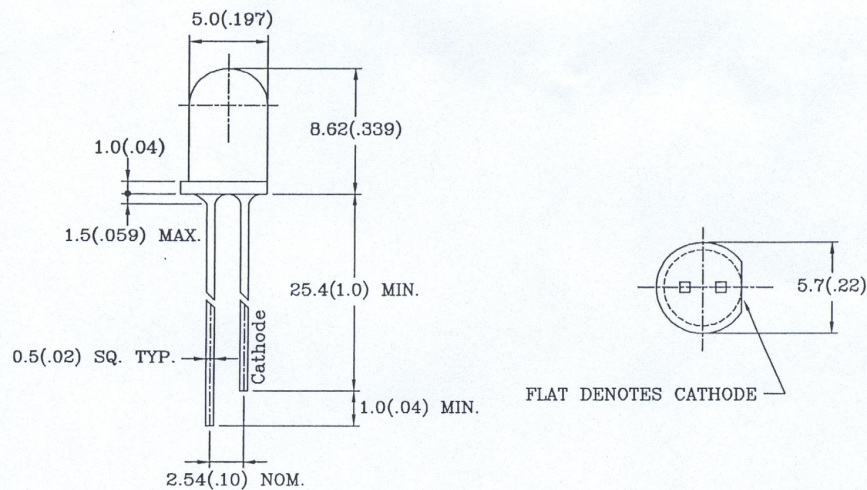
Chip		Lens Appearance	Absolute Maximum Rating				Electro-optical Data (At 20mA)			Viewing Angle 2 θ 1/2 (deg)
Emitted Color	Peak Wave Length λ P(nm)		$\Delta \lambda$ (nm)	Pd (mW)	If (mA)	Peak If(mA)	Vf(V)		Iv Typ. (mcd)	
							Typ.	Max.		
Yellow	585	Yellow Diffused	35	80	30	150	2.1	2.6	70.0	35

Remark : Viewing angle is the Off-axis angle at which the luminous intensity is half the axial luminous intensity.

● ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Reverse Voltage	5V
Reverse Current (V _R =5V)	100 μ A
Operating Temperature Range	-40°C ~ 80°C
Storage Temperature Range	-40°C ~ 85°C
Lead Soldering Temperature	260°C For 5 Seconds

● PACKAGE DIMENSIONS





NOTES: 1.All dimensions are in millimeters (inches).

2.Tolerance is ± 0.25 mm (0.01") unless otherwise specified.

3.Lead spacing is measured where the leads emerge from the package.

4.Specifications are subject to change without notice.

RELEASED : 

ENGINEER : 

Standard LED-Sortiment 300 pcs

LED LAMPS SPECIFICATION

● COMMODITY : T-1 3/4 Standard 1.0"Lead, 5 ϕ

● DEVICE NUMBER : BL-BB53V4V

● ELECTRICAL AND OPTICAL CHARACTERISTICS (Ta=25°C)

VERSION : 1.0

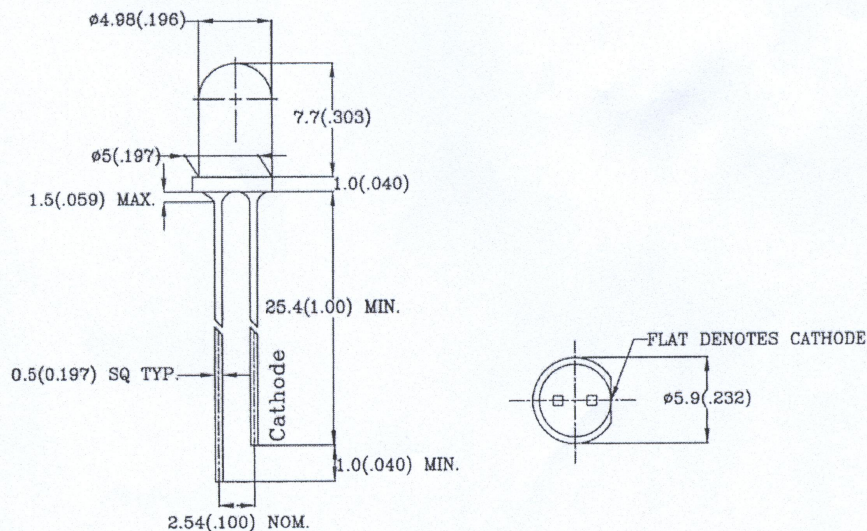
Chip		Lens Appearance	Absolute Maximum Rating				Electro-optical Data (At 20mA)		Viewing Angle 2 θ 1/2 (deg)	
Emitted Color	Peak Wave Length λ_p (nm)		$\Delta \lambda$ (nm)	Pd (mW)	If (mA)	Peak If(mA)	Vf(V)			Iv Typ. (mcd)
							Typ.	Max.		
Super Blue	470	Water Clear	20	100	30	100	2.6	3.0	1000	12

Remark : Viewing angle is the Off-axis angle at which the luminous intensity is half the axial luminous intensity.

● ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Reverse Voltage	5V
Reverse Current (V _R =5V)	100 μ A
Operating Temperature Range	-40°C ~ 80°C
Storage Temperature Range	-40°C ~ 85°C
Lead Soldering Temperature	260°C For 5 Seconds

● PACKAGE DIMENSIONS



NOTES: 1.All dimensions are in millimeters (inches).

2.Tolerance is ± 0.25 mm (0.01) unless otherwise specified.

3.The products are sensitive to static electricity and care must be fully taken when handling products.

4.Lead spacing is measured where the leads emerge from the package.

5.Specifications are subject to change without notice.

Standard LED-Sortiment 300 pcs

LED LAMPS SPECIFICATION

- COMMODITY: T-1 3/4 1.0"Lead,5 ϕ
- DEVICE NUMBER: BL-BB53V4V
- ELECTRICAL AND OPTICAL CHARACTERISTICS(Ta=25 C)

REVISION: 1.0

Fig.1 RELATIVE INTENSITY VS. WAVELENGTH

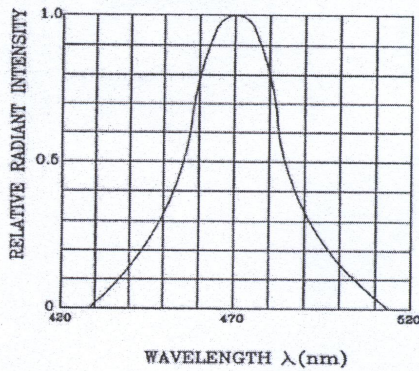


Fig.2 FORWARD CURRENT DERATING CURVE

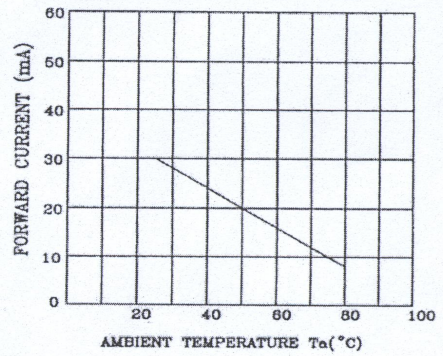


Fig.3 FORWARD CURRENT VS. FORWARD VOLTAGE

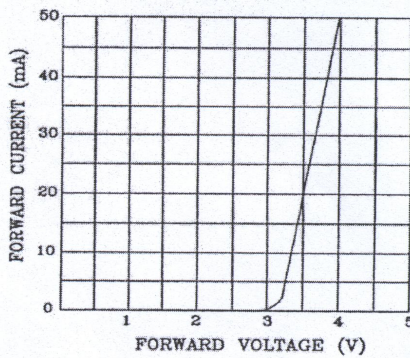


Fig.4 RELATIVE LUMINOUS INTENSITY VS. AMBIENT TEMPERATURE

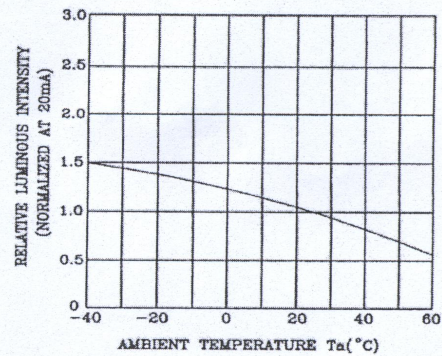
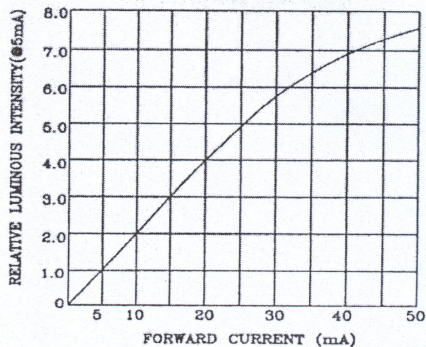
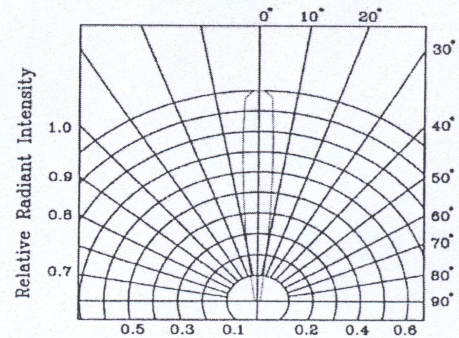


Fig.5 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT



RADIATION DIAGRAM



Datasheet

Item no. 1564910

V1_0917_01_en

Standard LED-Sortiment 300 pcs

LED LAMPS SPECIFICATION

RELIABILITY TEST

REVISION: 1.0

Classification	Test Item	Reference Standard	Test Conditions	Result
Endurance Test	Operation Life	MIL-STD-750:1026 MIL-STD-883:1005 JIS C 7021 :B-1	Connect with a power $I_f=20\text{mA}$ T_a =Under room temperature Test time=1,000hrs	0/100
	High Temperature High Humidity Storage	MIL-STD-202:103B JIS C 7021 :B-11	$T_a=85^\circ\text{C}\pm 5^\circ\text{C}$ RH=90%-95% Test time=240hrs	0/100
	High Temperature Storage	MIL-STD-883:1008 JIS C 7021 :B-10	High $T_a=105^\circ\text{C}\pm 5^\circ\text{C}$ Test time=1,000hrs	0/100
	Low Temperature Storage	JIS-C-7021 :B-12	Low $T_a=-55^\circ\text{C}\pm 5^\circ\text{C}$ Test time=1,000hrs	0/100
Environmental Test	Temperature Cycling	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1010 JIS C 7021 :A-4	$-55^\circ\text{C} \sim 25^\circ\text{C} \sim 105^\circ\text{C} \sim 25^\circ\text{C}$ 30min 5min 30min 5min Test Time=10cycle	0/100
	Thermal Shock	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1011	$-55^\circ\text{C}\pm 5^\circ\text{C} \sim 105^\circ\text{C}\pm 5^\circ\text{C}$ 10min 10min Test Time=10cycle	0/100
	Solder Resistance	MIL-STD-202:201A MIL-STD-750:2031 JIS C 7021 :A-1	$T_{\text{sol}}=260\pm 5^\circ\text{C}$ Dwell Time= 5 ± 1 sec.	0/50
	Solder ability	MIL-STD-202:208D MIL-STD-750:2026 MIL-STD-883:2003 JIS C 7021 :A-2	$T_{\text{sol}}=230\pm 5^\circ\text{C}$ Dwell Time= 5 ± 1 sec.	0/50
	Lead Bending Stress	MIL-STD-750:2036 JIS C 7021 :A-11	$0^\circ\sim 90^\circ\sim 0^\circ$ bend , 3 cycles Weight 250g	0/50

JUDGMENT CRITERIA OF FAILURE FOR THE RELIABILITY

Measuring items	Symbol	Measuring conditions	Judgement criteria for failure
Forward voltage	V_F	$I_f=20\text{mA}$	Over $U_x1.2$
Reverse current	I_r	$V_r=5\text{V}$	Over U_x2
Luminous intensity	I_v	$I_f=20\text{mA}$	Below $S_x0.5$

Note: 1.U means the upper limit of specified characteristics. S means initial value.

2.Measurment shall be taken between 2 hours and after the test pieces have been returned to normal ambient conditions after completion of each test.

Datasheet

Item no. 1564910

V1_0917_01_en

Standard LED-Sortiment 300 pcs

LED LAMPS SPECIFICATION

●COMMODITY : T-1 3/4 1.0"Lead, 5 ϕ

●DEVICE NUMBER : BL-BZ43V4V =BL-BZ53V4V-M36

●ELECTRICAL AND OPTICAL CHARACTERISTICS (Ta=25°C)

VERSION : 1.0

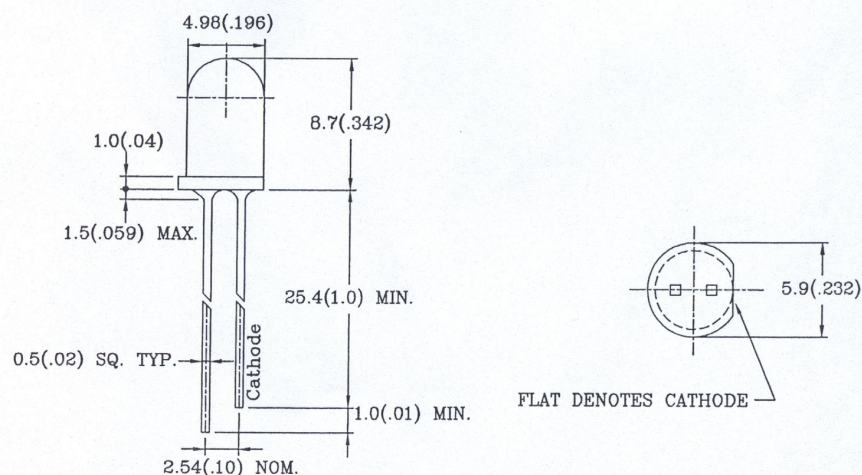
Chip			Lens Appearance	Absolute Maximum Rating			Electro-optical Data (At 20mA)			Viewing Angle 2 θ 1/2 (deg)
Emitted Color	Chromatically Coordinates(note 4) (At 20mA)			Pd (mW)	If (mA)	Peak If(mA)	Vf(V)		Iv Typ. (mcd)	
	X	Y					Typ.	Max.		
White	0.31	0.32	Water Clear	100	30	100	3.5	4.0	3000	12 \pm 2

Remark : Viewing angle is the Off-axis angle at which the luminous intensity is half the axial luminous intensity.

●ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Reverse Voltage	5V
Reverse Current (VR=5V)	100 μ A
Operating Temperature Range	-40°C ~ 80°C
Storage Temperature Range	-40°C ~ 85°C
Lead Soldering Temperature	260°C For 5 Seconds

●PACKAGE DIMENSIONS



NOTES: 1.All dimensions are in millimeters (inches).

2.Tolerance is \pm 0.25mm (0.01") unless otherwise specified.

3.The products are sensitive to static electricity and care must be fully taken when handling products.

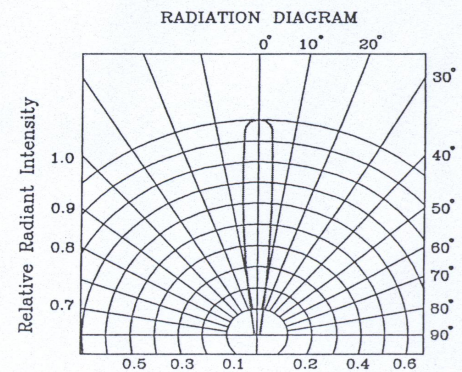
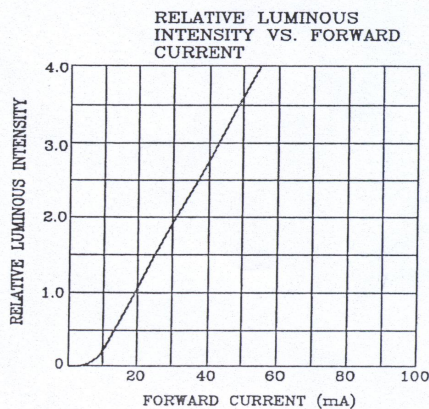
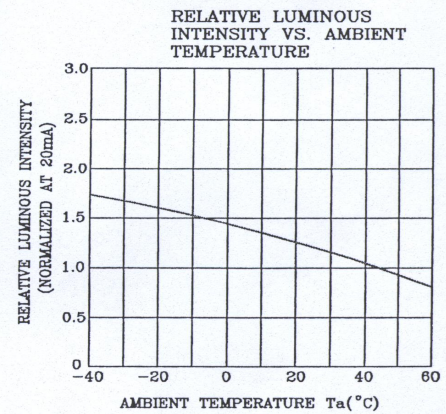
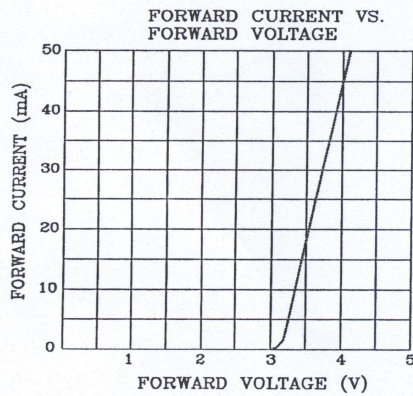
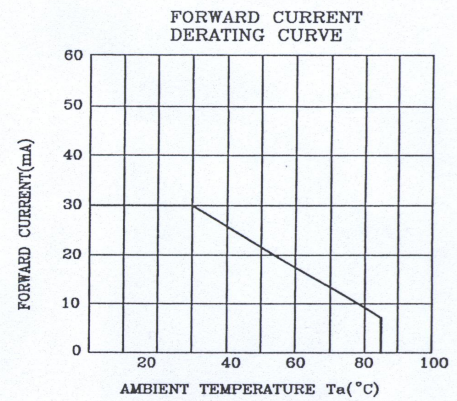
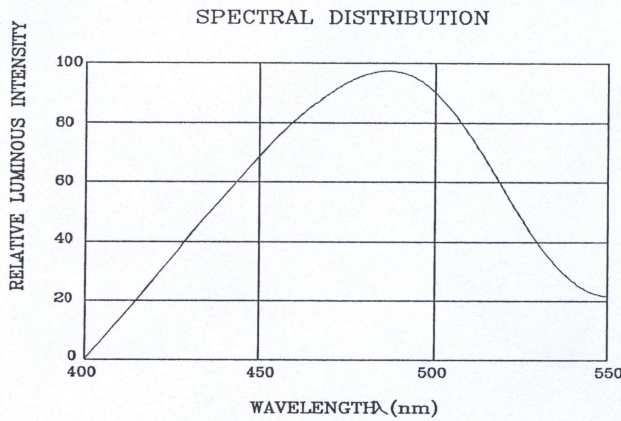
4.Lead spacing is measured where the leads emerge from the package.

5.Specifications are subject to change without notice.

Standard LED-Sortiment 300 pcs

SURFACE MOUNT CHIP LED LAMP SPECIFICATION

- COMMODITY: T-1 Standard 1.0" Lead 5 ϕ
- DEVICE NUMBER: BL-BZ43V4V= BL-BZ53V4V-M36
- ELECTRICAL AND OPTICAL CHARACTERISTICS(T_a=25°C) REVISION:1.0



Datasheet

Item no. 1564910

V1_0917_01_en

Standard LED-Sortiment 300 pcs

LED LAMP SPECIFICATION

RELIABILITY TEST

REVISION: 1.0

Classification	Test Item	Reference Standard	Test Conditions	Result
Endurance Test	Operation Life	MIL-STD-750:1026 MIL-STD-883:1005 JIS C 7021 :B-1	Connect with a power $I_f=30\text{mA}$ T_a =Under room temperature Test time=1,000hrs	0/100
	High Temperature High Humidity Storage	MIL-STD-202:103B JIS C 7021 :B-11	$T_a=85^\circ\text{C}\pm 5^\circ\text{C}$ RH=90%-95% Test time=1,000hrs	0/100
	High Temperature Storage	MIL-STD-883:1008 JIS C 7021 :B-10	High $T_a=105^\circ\text{C}\pm 5^\circ\text{C}$ Test time=1,000hrs	0/100
	Low Temperature Storage	JIS-C-7021 :B-12	Low $T_a=-55^\circ\text{C}\pm 5^\circ\text{C}$ Test time=1,000hrs	0/100
Environmental Test	Temperature Cycling	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1010 JIS C 7021 :A-4	$-35^\circ\text{C} \sim 25^\circ\text{C} \sim 85^\circ\text{C} \sim 25^\circ\text{C}$ 30min 5min 30min 5min Test Time=10cycle	0/100
	Thermal Shock	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1011	$105^\circ\text{C}\pm 5^\circ\text{C} \sim -55^\circ\text{C}\pm 5^\circ\text{C}$ 10min 10min Test Time=10cycle	0/100
	Solder Resistance	MIL-STD-202:201A MIL-STD-750:2031 JIS C 7021 :A-1	$T_{\text{sol}}=260\pm 5^\circ\text{C}$ Dwell Time=10±1sec.	0/50
	Solderability	MIL-STD-202:208D MIL-STD-750:2026 MIL-STD-883:2003 JIS C 7021 :A-2	$T_{\text{sol}}=230\pm 5^\circ\text{C}$ Dwell Time=5±1sec.	0/50
	Lead Bending Stress	MIL-STD-750:2036 JIS C 7021 :A-11	$0^\circ\sim 90^\circ\sim 0^\circ$ bend , 3 cycles Weight 250g	0/50

JUDGMENT CRITERIA OF FAILURE FOR THE RELIABILITY

Measuring items	Symbol	Measuring conditions	Judgement criteria for failure
Forward voltage	VF	$I_F=20\text{mA}$	Over $U_x1.2$
Reverse current	IR	$V_R=5\text{V}$	Over U_x2
Luminous intensity	IV	$I_F=20\text{mA}$	Below $S_x0.5$

Note: 1.U means the upper limit of specified characteristics. S means initial value.

2.Measurment shall be taken between 2 hours and after the test pieces have been returned to normal ambient conditions after completion of each test.

Standard LED-Sortiment 300 pcs

CARBON FILM RESISTORS,FLAMEPROOF

1. Applicable Scope:

This standard specification is for use in consumer electronics, computers, telecommunications, control instruments...etc.

2. Part Number:

It is composed by Type, Rated Wattage, Nominal Resistance, Tolerance and Package/Terminal Form. e.g.

<u>RD</u>	<u>1/4W</u>	<u>100Ω</u>	<u>J</u>	<u>T/B</u>
Type	Rated Wattage	Nominal Resistance	Tolerance	Package/Terminal Form

2.1 Type :

Carbon Film Resistors are called "RD". "RDN" represents flameproof.

2.2 Rated Wattage:

Shown by "W", such as RD 1/8W(1/6W, 1/4WS), 1/4W(1/2WS), 1/2W; RDN 1W, 2W.

2.3 Nominal Resistance:

Ω, KΩ, MΩ are its unit, which be in accordance with JIS-C6409 article 6 (EIA RS-196A) series.

2.4 Tolerance:

It is measured by Bridge-method at room temperature and expressed by a capital letter.

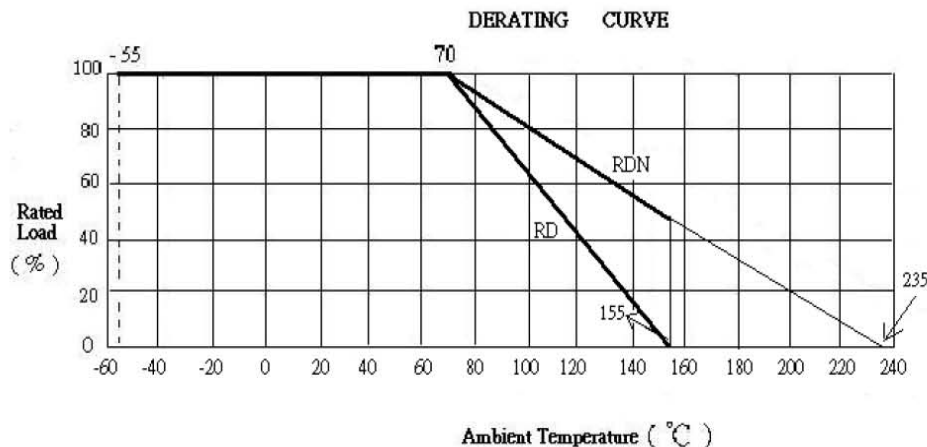
G=± 2% , J=± 5% ,K= ± 10%.

2.5 Package/Terminal Form:

T/R = tape & reel ; T/B=tape in box; Bulk=axial form in plastic bag; F1...F4 forms, M form and MG form.

3. Rated Power:

Rated power is the value of Max load voltage specified at the ambient temperature of 70°C, and shall meet the functions of electrical and mechanical performance. When the ambient temperature surpasses above mentioned temperature, the value declines as per following DERATING CURVE



Standard LED-Sortiment 300 pcs

CARBON FILM RESISTORS, FLAMEPROOF

3.1 Rated Voltage:

It is calculated through the following formula:

where E: rated voltage (V)

P: rated power (W)

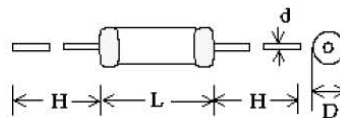
R: nominal resistance value (Ω)

$$E = \sqrt{PXR}$$

However, in case the voltage calculated exceeds the maximum load voltage, such the maximum load voltage shall be regarded as its rated voltage, means whichever less.

4. Dimension and structure:

4.1 Dimension:



TYPE	L \pm 0.5	D \pm 0.5	H \pm 3	d \pm 0.05	Resistance Range	Unit mm Max Working Voltage
RD1/8W, 1/6W, (1/4WS)	3.7 Max	1.7 \pm 0.2	30	0.45	3.9 Ω ~4.7M Ω	200V
RD1/4W(1/2WS)	6.4	2.4	30	0.6	3.9 Ω ~10M Ω	250V
RD1/2W	9	3.5	30	0.65	3.9 Ω ~10M Ω	350V
RDN1W	11	4.5	30	0.8	3.9 Ω ~10M Ω	500V
RDN2W	15	5.0	30	0.8	3.9 Ω ~10M Ω	750V

- © Notes: 1. too low or too high ohm value can be supplied only case by case.
 2. Max Overload Voltage is 2 times of Max Working voltage.
 3. Resistance value over 4.7M Ω (\geq 4.7M Ω), while RD 1/6W is \geq 1M Ω , the tolerance shall be \pm 10%.
 4.RD 1/4W, 1/2W can also supply flameproof form (RDN).
 5.RDN-form Dielectric Withstanding, please refer to RSN page similar size column.

4.2 STRUCTURE

4.2.1 Ceramic Rod:

It is made of Forsterite imported from Japan.

4.2.2 Carbon Film:

Under high vacuum and high temperature to split and oxidize the pure carbon-hydric.

4.2.3 Terminal:

Terminal is to be firmly connected with resistors element, both electrically and mechanically, and allow easy soldering.

4.2.4 Coating:

Coating is done by EPOXY insulating paint which is solid enough to be free from looseness, crack and easy breakage. The paint shall be limited within 1mm of lead wires from resistors body while the rated wattage is 2W the paint is limited within 2mm. RDN type is coated by flameproof paint which is resistant to 800 $^{\circ}$ C without causing looseness, crack and easy breakage.

4.2.5 Marking:

Marking is made by color coding on surface.

Standard LED-Sortiment 300 pcs

CARBON FILM RESISTORS, FLAMEPROOF

5. Operating Temperature Range: -55°C ~ 155°C

6. Mechanical Performance:

6.1 Terminal tensile:

To Fix the resistor body, a static load of 1.5kgs. (1/8W & 1/4W axial form:1kg.) is to be gradually applied into the terminal for 10 seconds without causing any looseness and fall.

6.2 Twist withstand:

To bend the lead wire at the point of about 6mm from resistor body to 90°, then catch the wire at 1.2 ± 0.4mm apart from the bent point end and turn it (clockwise) by 360 degrees perpendicular to the resistor axis at speed of 5 seconds per turn, and do the same counterclockwise again which constitute a whole turn. Repeat the turn 2 times without causing any break and looseness.

7. Electrical Performance:

7.1 Resistance Temperature Coefficient:

It shall be as following:

TYPE	T.C.			
	0~450	0~700	0~1000	0~1300
1/6W, 1/8W	≤47KΩ	51KΩ~100KΩ	110KΩ~330KΩ	360KΩ~1MΩ
1/4W & OVER	≤100KΩ	110KΩ~1MΩ	1.1MΩ~2.2MΩ	2.4MΩ~4.7MΩ

$$T.C. (ppm/°C) = [(R2 - R1) \div R1] \times [1 \div (T2 - T1)] \times 10^6$$

where

R1: resistance value at reference temperature

R2: resistance value at test temp.

T1: reference temp. (usu. 25°C)

T2: test temp. (about 75°C)

7.2 Temperature Cycle:

Following temp. cycles are to be made 5 times and then put at room temp. for one hour, the resistance value change rate between pre-and-post test shall be within ± 1%.

Steps	Temperature(°C)	Time (minutes)
1 st step	-55 ± 3	30
2 nd step	Room temp.	3
3 rd step	155 ± 3	30
4 th step	Room temp.	3

7.3 Short Time Over Load:

When the resistors are applied 2.5 times as much as rated wattage for 5 seconds continuously, it shows no evidence of arc, flame...etc. Removing the voltage and place the resistors to the normal condition for 30 minutes, the resistance value change rate between pre-and-post test shall be within ± 1%.

7.4 Insulation Character :

Resistors are located in a V-shaped metal trough. Using the DC500V megger instrument 2 poles to clutch either side of lead wires and metal trough, measuring the Insulation Resistance which shall be over 10000MΩ.

Standard LED-Sortiment 300 pcs

CARBON FILM RESISTORS, FLAMEPROOF

7.5 Voltage Withstanding:

Resistors are located in a V-shaped metal trough. RD: applying Max overload voltage for one minute (RDN: applying Max Working Voltage for one minute) and should find no physical damage to the resistors. The resistance value change shall be within $\pm 0.5\%$.

7.6 Load Life:

The resistors arrayed are sent into the 70°C oven, applying rated voltage at the cycle of 1.5 hours ON, 0.5 hour OFF for 1000_{-0}^{+48} hours in total. Then, after removing the voltage, take the resistors out of the oven and left under normal temp. for one hour cooling. The resistance value change rate between pre-and-post test shall be within $\pm 5\%$.

7.7 Moisture-proof Load Life:

The resistors arrayed are placed into a constant temp./humidity oven at the temp. of $40 \pm 2^{\circ}\text{C}$ and the humidity of $90\sim 95\%$, then rated power is applied for 1.5 hours and cut off for 0.5 hour. The similar cycle will be repeated for 500_{-0}^{+24} hours in total (including cut-off time). Then remove the voltage, taking the resistors out of the oven and leaving them at room temp. for one hour. The resistance value change rate between pre-and-post test shall be within $\pm 5\%$. There also shall be no evidence of remarkable change on appearance, and the marking shall not be illegible.

7.8 Solder-ability:

The leads with flux are dipped in a melted solder of $235 \pm 5^{\circ}\text{C}$ for 2 seconds, more than 95% of the circumference of the lead wires shall be covered with solder.

7.9 Resistance to Soldering Heat:

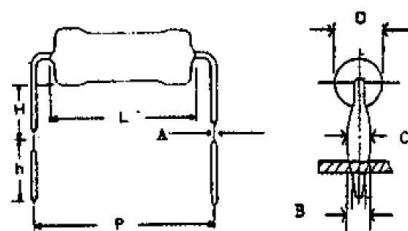
Two leads are together dipped in a melted solder of $270 \pm 5^{\circ}\text{C}$ for 10 ± 1 seconds, or $350 \pm 10^{\circ}\text{C}$ for 3.5 ± 0.5 seconds, Then remove the resistors and leaving them at room temp. for one hour. The resistance value change rate between pre-and-post test shall be within $\pm 1\%$.

7.10 Incombustibility:(only for RDN)

The resistors are applied the power of 16 times the rated wattage for 5 min. and shall not get flame.

8. Forming:

8.1 MG Form:



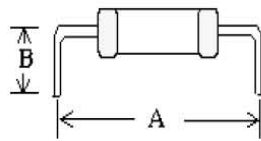
Unit: mm

Wattage	L ± 1	D ± 0.5	P	H	h ± 1	A ± 0.02	B ± 0.05	C ± 0.2
1/4W(1/2WS)	6.5	2.6	10 ± 1	7 ± 1	4.5	0.2	0.8	12
1/2W	9	3.5	15 ± 1.5	7 ± 1	4.5	0.2	0.8	12
1W	11	4.5	15 ± 1.5	7 ± 1	4.5	0.3	1	14
2W	15	5.0	20 ± 2	10 ± 2	4.5	0.3	1	14

Standard LED-Sortiment 300 pcs

CARBON FILM RESISTORS, FLAMEPROOF

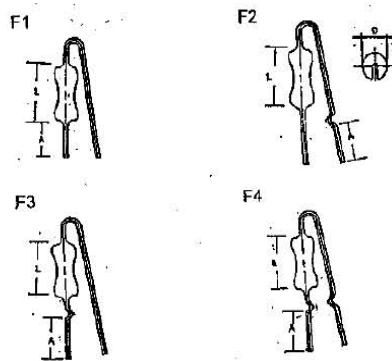
8.2 M Form



Unit: mm				
Form	M0	M1	M2	M3
A	5	10±0.5	12.5±0.5	15±0.5
B	14	7±1	6±1	6±1
	14	10±1	6±1	6±1

RD 1/6W:M0, RD1/4W:M1 & M2, RD 1/2W:M2 & M3

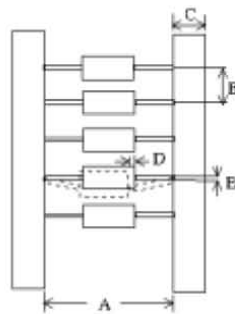
8.3 F Form



Unit: mm				
Wattage	L±1	D±0.5	A±0.5	Applicable
1/2W	9	3.5	4	F1~F4
1W	11	4.5	4	F1~F4
2W	15	5.0	4	F1~F4

9. Packing:

9.1 Taping Specifications:



Unit: mm						
Wattage	Size	A	B	C±1	D Max	E Max
	Type					
≤ 1/4W	T-26	26+1 -0	5±0.5	6	0.6	1.2
	T-52	52±1	5±0.5	6	0.6	1.2
1/2W	T-52	52±1	5±0.5	6	0.6	1.2
1W	T-63	63±1	5±0.5	6	0.6	1.2
2W	T-63	63±1	10±1	6	0.6	1.2
	T-76	76±1.5	10±1	6	0.6	1.2

Datasheet

Item no. 1564910

V1_0917_01_en

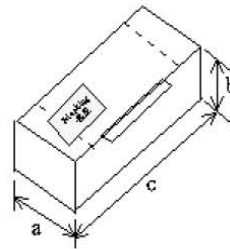
Standard LED-Sortiment 300 pcs

CARBON FILM RESISTORS, FLAMEPROOF

9.2 Tape in Box:

Unit: mm

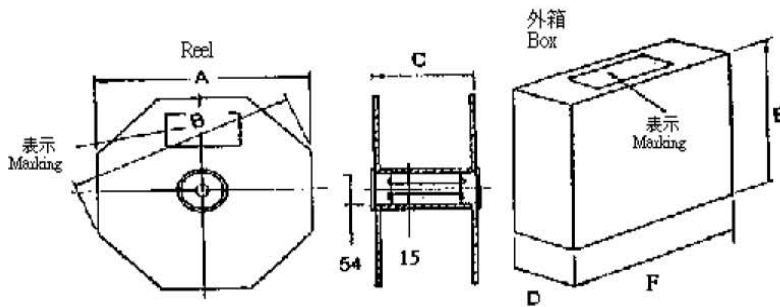
Wattage	TYPE	QTY PER BOX	a	b	c
1/8W(1/4WS)	T-26	5,000	50	70	255
	T-52	5,000	75	70	255
1/4W(1/2WS)	T-26	4,000	50	90	255
	T-52	5,000	75	100	255
1/2W	T-52	1,000	75	55	255
1W	T-63	1,000	85	105	260
2W	T-63	1,000	100	110	265



9.3 Tape & Reel:

Unit: mm

Wattage	TYPE	QTY PER REEL	A	B	C	D	E	F
1/4W(1/2WS)	T-52	5,000	285	310	75	80	295	295
1/2W	T-52	2,500	285	310	75	80	295	295
1W	T-63	2,000	285	310	75	95	295	295
2W	T-63	1,000	285	310	75	95	295	295
	T-76	1,000	285	310	90	105	295	295



A

B

C

D

E

F

G

H

1

2

3

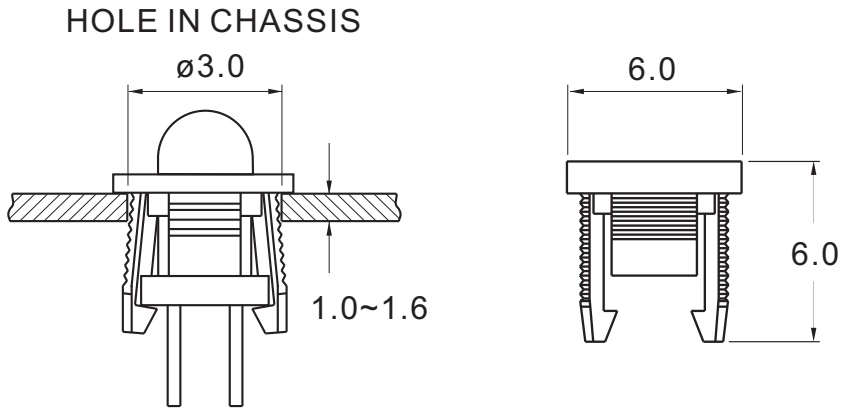
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SPECIFICATION

MATERIAL : NYLON 94V-2 (UL)
 COLOR : BLACK
 TOLERANCE : ±0.2



				DRAW No		SU-0708001	
DATE	REVISION	APPROVAL BY	DIMENSION	mm	PART No	LEDA-03	
			DRAW BY	Rikki	NAME	LED HOLDER	
			APPROVAL BY	Andy			
			DATE	30-09-05			

A

B

C

D

E

F

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1

2

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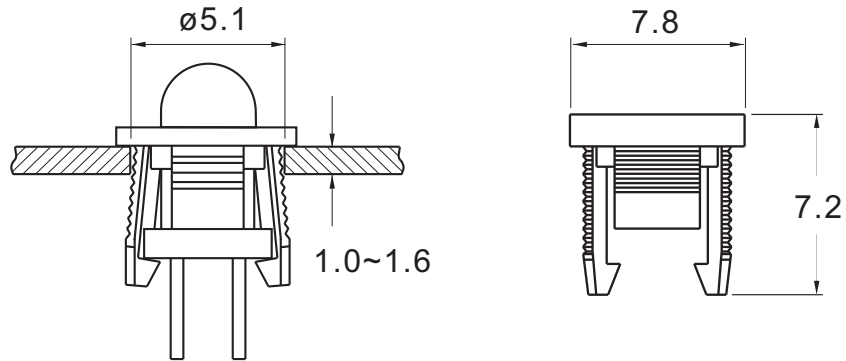
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SPECIFICATION

MATERIAL : NYLON 94V-2 (UL)
 COLOR : BLACK
 TOLERANCE : ±0.2

HOLE IN CHASSIS



				DRAW No	SU-0600206	
DATE	REVISION	APPROVAL BY	DIMENSION	mm	PART No	LEDA-05
			DRAW BY	T.C. CHENG	NAME	LED HOLDER
			APPROVAL BY	Andy		
			DATE	30-09-05		