Kingbright

PSA23-11SURKWA

56.8mm (2.3 inch) 16 Segment Single Digit Alphanumeric Display

DESCRIPTIONS

- The Hyper Red source color devices are made with AlGaInP on GaAs substrate Light Emitting Diode
- Electrostatic discharge and power surge could damage the LEDs
- It is recommended to use a wrist band or anti-electrostatic glove when handling the LEDs
- All devices, equipments and machineries must be electrically grounded

FEATURES

- 2.3 inch character height
- Low current operation
- High contrast and light output
- Easy mounting on P.C. boards or sockets
- Mechanically rugged
- Standard: gray face, white segment
- RoHS compliant

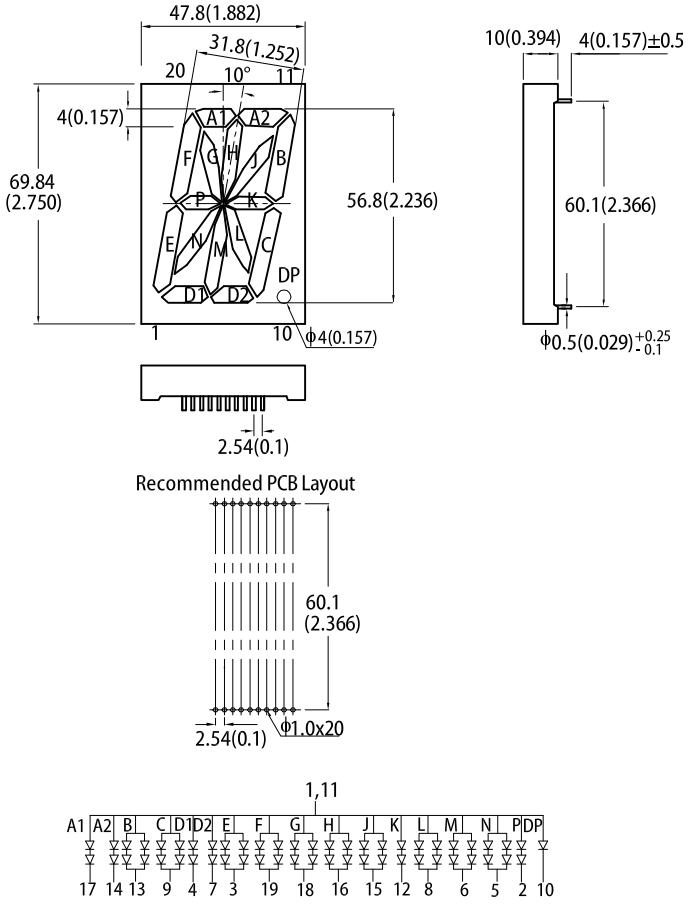
APPLICATIONS

- Home and smart appliances
- Display time and digital combination
- Industrial and instrumental applications
- Numeric status

ATTENTION

Observe precautions for handling electrostatic discharge sensitive devices

PACKAGE DIMENSIONS



Notes:
1. All dimensions are in millimeters (inches), Tolerance is ±0.25(0.01")unless otherwise noted.
2. The specifications, characteristics and technical data described in the datasheet are subject to change without prior notice.

SELECTION GUIDE

Part Number	Emitting Color (Material)	Lens Type	Iv (ucd) @ 10mA [1]		Description
			Min.	Typ.	
PSA23-11SURKWA	Hyper Red (AlGaInP)	White Diffused	52000	95000	Common Anode, Rt. Hand Decimal
			*9000	*25000	

Notes:
1. Luminous intensity / luminous Flux: +/-15%.
** Luminous intensity value is traceable to CIE127-2007 standards.*

ELECTRICAL / OPTICAL CHARACTERISTICS at T_A=25°C

Parameter	Symbol	Emitting Color	Value		Unit
			Typ.	Max.	
Wavelength at Peak Emission I_F = 10mA	λ_{peak}	Hyper Red	645	-	nm
Dominant Wavelength I_F = 10mA	λ_{dom} [1]	Hyper Red	630	-	nm
Spectral Bandwidth at 50% Φ REL MAX I_F = 10mA	Δλ	Hyper Red	28	-	nm
Capacitance	C	Hyper Red	35	-	pF
Forward Voltage I_F = 10mA (A1,A2,D1,D2,P,K) Forward Voltage I_F = 20mA (B,C,E,F,G,H,J,L,M,N) Forward Voltage I_F = 10mA (DP)	V_F [2]	Hyper Red	3.7 3.7 1.85	4.7 4.7 2.35	V
Reverse Current (V_R = 5V) (A1,A2,D1,D2,P,K) Reverse Current (V_R = 5V) (B,C,E,F,G,H,J,L,M,N) Reverse Current (V_R = 5V) (DP)	I_R	Hyper Red	-	10 20 10	μA

Notes:
1. The dominant wavelength (λd) above is the setup value of the sorting machine. (Tolerance λd : ±1nm.)
2. Forward voltage: ±0.1V.
3. Wavelength value is traceable to CIE127-2007 standards.
4. Excess driving current and / or operating temperature higher than recommended conditions may result in severe light degradation or premature failure.

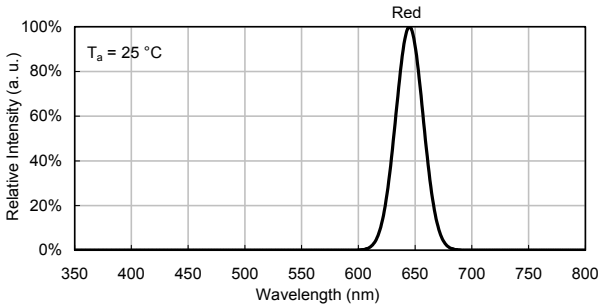
ABSOLUTE MAXIMUM RATINGS at T_A=25°C

Parameter	Symbol	Value	Unit
Power Dissipation (A1,A2,D1,D2,P,K) Power Dissipation (B,C,E,F,G,H,J,L,M,N) Power Dissipation (DP)	P_D	150 300 75	mW
Reverse Voltage (Per chip)	V_R	5	V
Junction Temperature	T_j	115	°C
Operating Temperature	T_{op}	-40 to +85	°C
Storage Temperature	T_{stg}	-40 to +85	°C
DC Forward Current (A1,A2,D1,D2,P,K) DC Forward Current (B,C,E,F,G,H,J,L,M,N) DC Forward Current (DP)	I_F	30 60 30	mA
Peak Forward Current (A1,A2,D1,D2,P,K) Peak Forward Current (B,C,E,F,G,H,J,L,M,N) Peak Forward Current (DP)	I_{FM} [1]	185 370 185	mA
Electrostatic Discharge Threshold (HBM)	-	3000	V
Lead Solder Temperature [2]		260°C For 3-5 Seconds	

Notes:
1. 1/10 Duty Cycle, 0.1ms Pulse Width.
2. 2mm below package base.
3. Relative humidity levels maintained between 40% and 60% in production area are recommended to avoid the build-up of static electricity – Ref JEDEC/JESD625-A and JEDEC/J-STD-033.

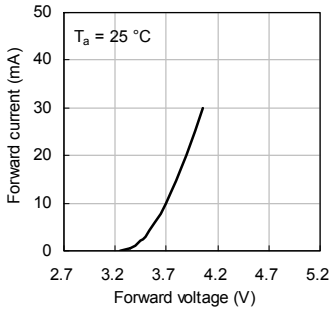
TECHNICAL DATA

RELATIVE INTENSITY vs. WAVELENGTH

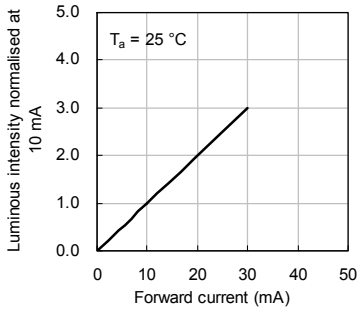


HYPER RED (A1,A2,D1,D2,P,K)

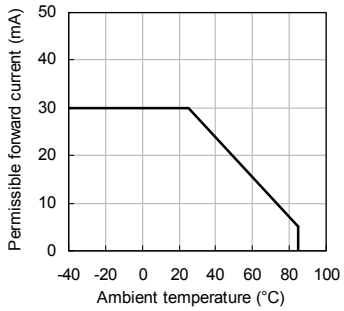
Forward Current vs. Forward Voltage



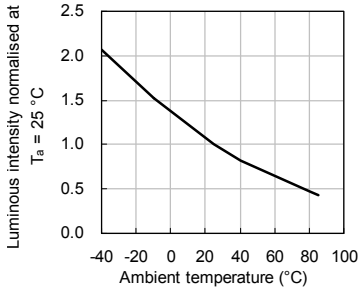
Luminous Intensity vs. Forward Current



Forward Current Derating Curve

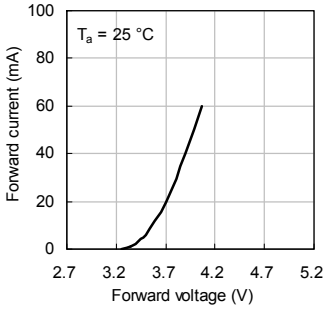


Luminous Intensity vs. Ambient Temperature

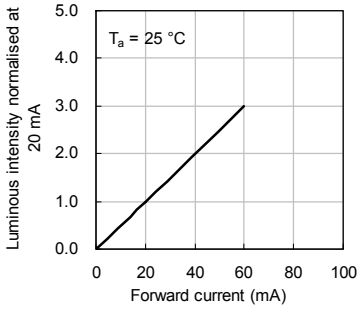


HYPER RED (B,C,E,F,G,H,J,L,M,N)

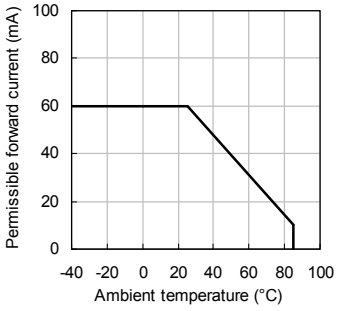
Forward Current vs. Forward Voltage



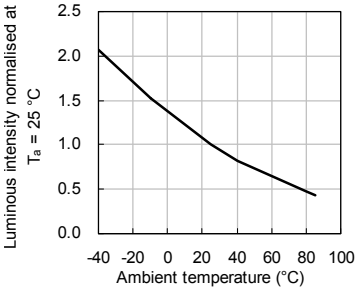
Luminous Intensity vs. Forward Current



Forward Current Derating Curve

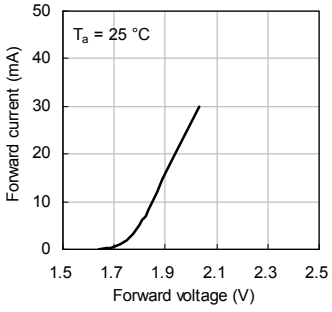


Luminous Intensity vs. Ambient Temperature

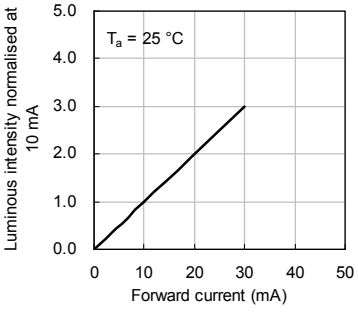


HYPER RED (DP)

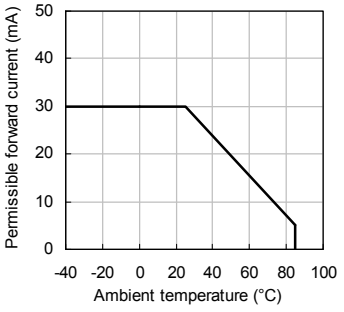
Forward Current vs. Forward Voltage



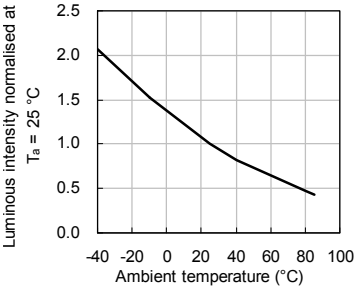
Luminous Intensity vs. Forward Current



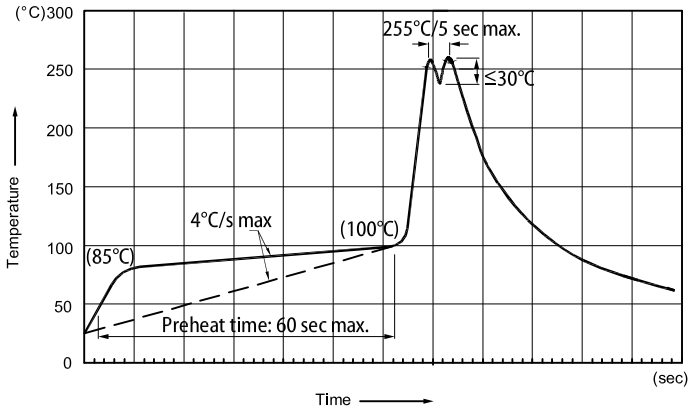
Forward Current Derating Curve



Luminous Intensity vs. Ambient Temperature



RECOMMENDED WAVE SOLDERING PROFILE



Notes:
1. *Recommend pre-heat temperature of 105°C or less (as measured with a thermocouple attached to the LED pins) prior to immersion in the solder wave with a maximum solder bath temperature of 260°C*
2. *Peak wave soldering temperature between 245°C ~ 255°Cfor 3 sec (5 sec max).*
3. *Do not apply stress to the epoxy resin while the temperature is above 85°C.*
4. *Fixtures should not incur stress on the component when mounting and during soldering process.*
5. *SAC 305 solder alloy is recommended.*
6. *No more than one wave soldering pass.*
7. *During wave soldering, the PCB top-surface temperature should be kept below 105°C.*

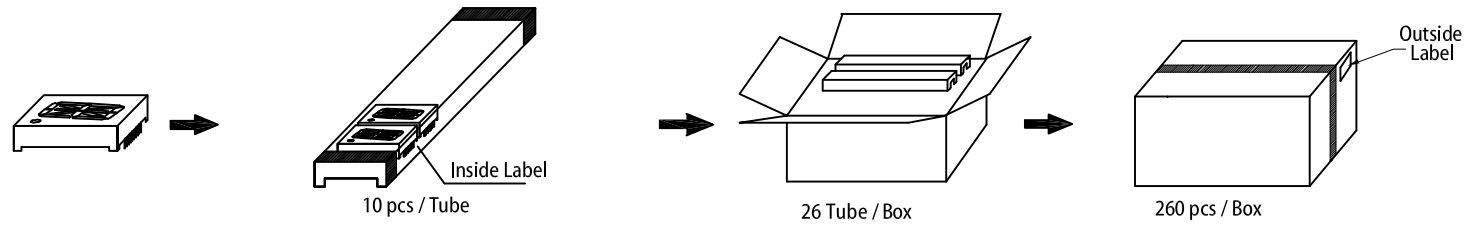
Soldering General Notes

1. Through-hole displays are incompatible with reflow soldering.
2. If components will undergo multiple soldering processes, or other processes where the components may be subjected to intense heat, please check with Kingbright for compatibility.

CLEANING

1. Mild "no-clean" fluxes are recommended for use in soldering.
2. If cleaning is required, Kingbright recommends to wash components with water only. Do not use harsh organic solvents for cleaning because they may damage the plastic parts .
3. The cleaning process should take place at room temperature and the devices should not be washed for more than one minute.
4. When water is used in the cleaning process, Immediately remove excess moisture from the component with forced-air drying afterwards.

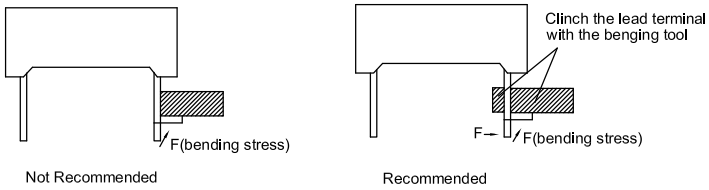
PACKING & LABEL SPECIFICATIONS



THROUGH HOLE DISPLAY MOUNTING METHOD

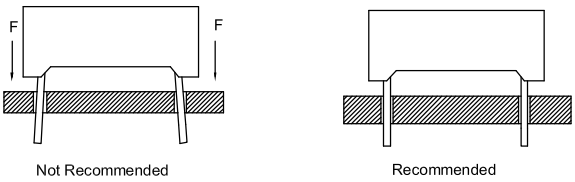
Lead Forming

Do not bend the component leads by hand without proper tools. The leads should be bent by clinching the upper part of the lead firmly such that the bending force is not exerted on the plastic body.

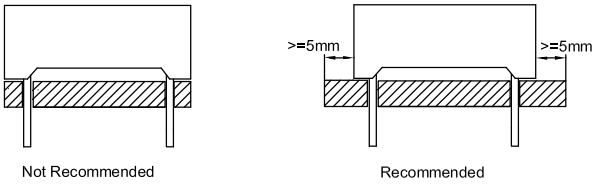


Installation

1. The installation process should not apply stress to the lead terminals.
2. When inserting for assembly, ensure the terminal pitch matches the substrate board's hole pitch to prevent spreading or pinching the lead terminals. *(Fig.1)*
3. The component shall be placed at least 5mm from edge of PCB to avoid damage caused excessive heat during wave soldering.*(Fig.2)*



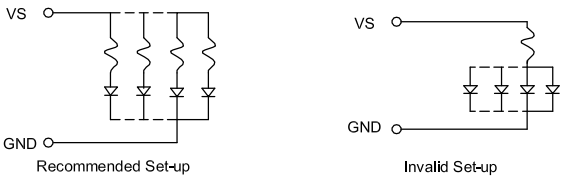
(Fig.1)



(Fig.2)

CIRCUIT DESIGN NOTES

1. Protective current-limiting resistors may be necessary to operate the LEDs within the specified range.
2. LEDs mounted in parallel should each be placed in series with its own current-limiting resistor.*(Fig.3)*
3. The driving circuit should be designed to protect the LED against reverse voltages and transient voltage spikes when the circuit is powered up or shut down.
4. The safe operating current should be chosen after considering the maximum ambient temperature of the operating environment.
5. Prolonged reverse bias should be avoided, as it could cause metal migration, leading to an increase in leakage current or causing a short circuit.



(Fig.3)

PRECAUTIONARY NOTES

1. The information included in this document reflects representative usage scenarios and is intended for technical reference only.
2. The part number, type, and specifications mentioned in this document are subject to future change and improvement without notice. Before production usage customer should refer to the latest datasheet for the updated specifications.
3. When using the products referenced in this document, please make sure the product is being operated within the environmental and electrical limits specified in the datasheet. If customer usage exceeds the specified limits, Kingbright will not be responsible for any subsequent issues.
4. The information in this document applies to typical usage in consumer electronics applications. If customer's application has special reliability requirements or have life-threatening liabilities, such as automotive or medical usage, please consult with Kingbright representative for further assistance.
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6. When any special process such as potting is required for LED assembly, please consult with Kingbright representative before proceeding.
7. All design applications should refer to Kingbright application notes available at https://www.KingbrightUSA.com/ApplicationNotes

