



SMT870-23



TECHNICAL DATA

Infrared LED, SMD

AlGaAs

SMT870-23 is a AlGaAs LED, mounted on a lead frame as TOP LED package with plastic ball lens. On forward bias, it emits a radiation of typical 22 mW at a peak wavelength of 870 nm.

Specifications

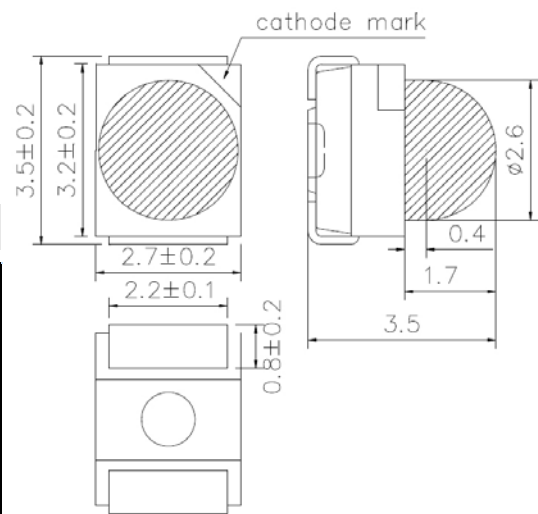
- Structure: AlGaAs
- Peak Wavelength: 870 nm
- Optical Output Power: 22 mW
- Package: SMD, PPA resin
- Lead frame die: silver plated
- Lens: epoxy resin (Ø2.6 mm)

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$)

Item	Symbol	Value	Unit
Power Dissipation	P_D	160	mW
Forward Current	I_F	100	mA
Pulse Forward Current * ¹	I_{FP}	1000	mA
Reverse Voltage	V_R	5	V
Junction Temperature	T_J	100	°C
Thermal Resistance	R_{thja}	190	K/W
Operating Temperature	T_{opr}	-20 ... +80	°C
Storage Temperature	T_{stg}	-30 ... +80	°C
Soldering Temperature * ²	T_{sol}	255	°C

*¹ duty = 1%, pulse width = 10 μs

*² must be completed within 3 seconds at 260°C



(Unit: mm)

Electro-Optical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	$I_F = 50 \text{ mA}$	-	1.45	1.60	V
Pulse Forward Voltage	V_{FP}	$I_{FP} = 100 \text{ mA}, t_p = 20 \text{ ms}$	-	1.50	1.80	V
Reverse Current	I_R	$V_R = 5 \text{ V}$	-	-	10	μA
Total Radiated Power	P_O	$I_F = 50 \text{ mA}$	16	22	-	mW
		$I_{FP} = 100 \text{ mA}, t_p = 20 \text{ ms}$	-	44	-	
Radiant Intensity	I_E	$I_F = 50 \text{ mA}$	-	40	-	mW/sr
		$I_{FP} = 100 \text{ mA}, t_p = 20 \text{ ms}$	-	80	-	
Peak Wavelength	λ_P	$I_F = 50 \text{ mA}$	855	870	885	nm
Half Width	$\Delta\lambda$	$I_F = 50 \text{ mA}$	-	40	-	nm
Viewing Half Angle	$\Theta_{1/2}$	$I_F = 50 \text{ mA}$	-	± 15	-	deg.
Rise Time	t_r	$I_F = 50 \text{ mA}$	-	15	-	ns
Fall Time	t_f	$I_F = 50 \text{ mA}$	-	10	-	ns

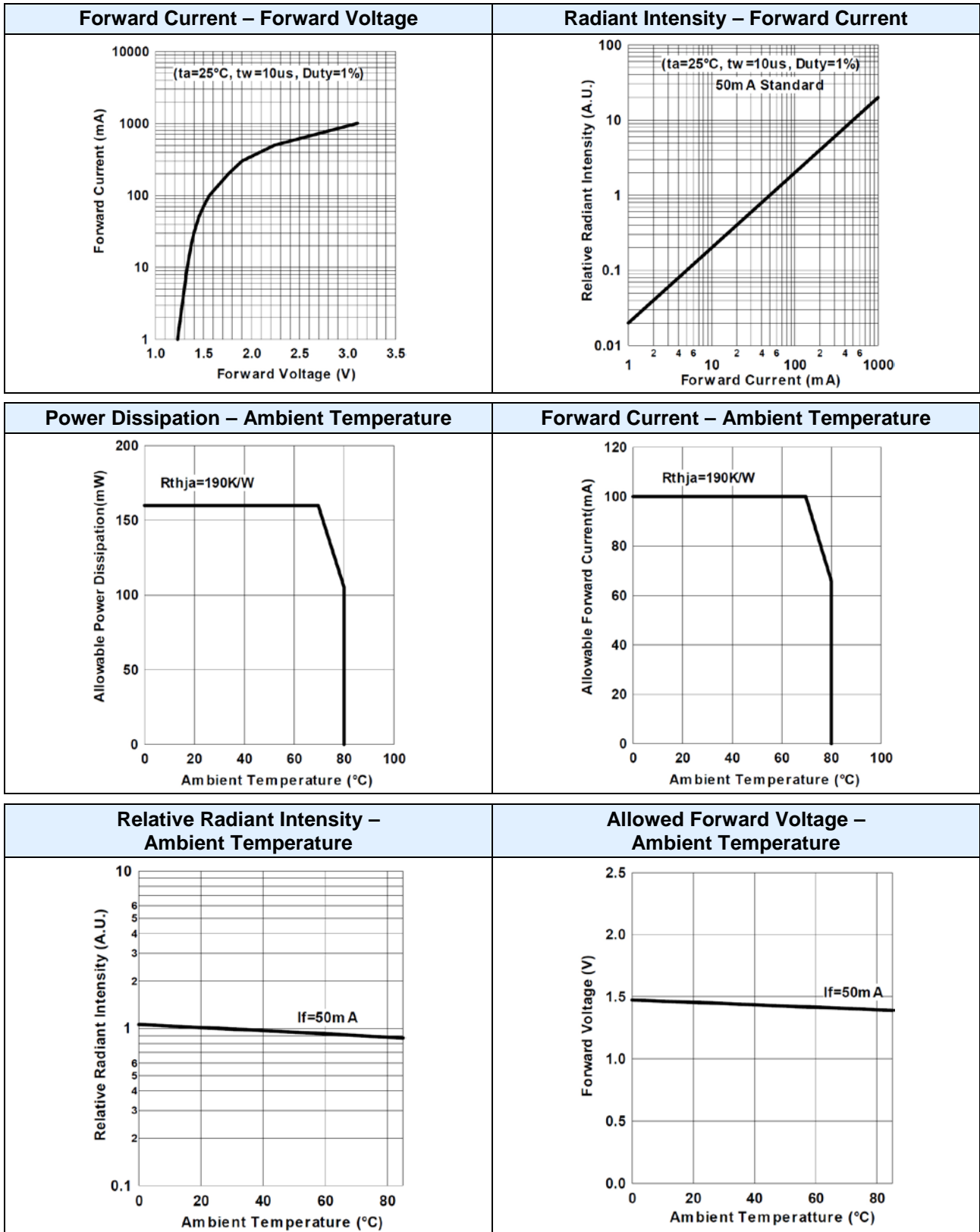
Radiated Power is measured by Photodyne #500

Radiant Intensity is measured by Tektronix J-6512

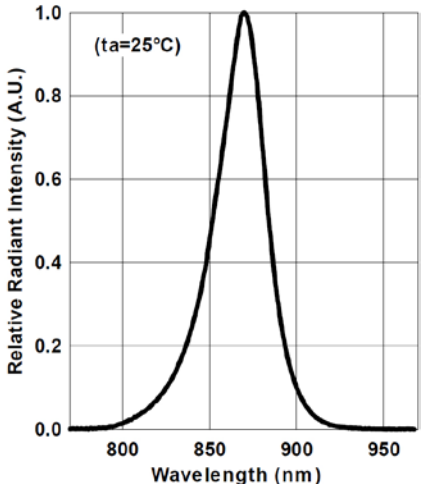
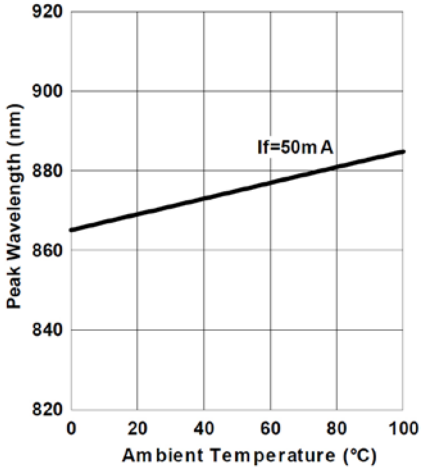
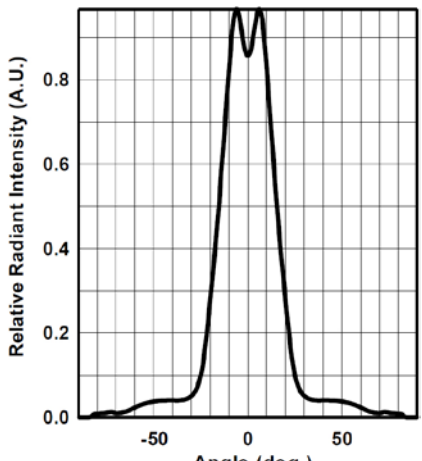
Note: The above specifications are for reference purpose only and subjected to change without prior notice.



Typical Performance Curves





Relative Spectral Emission	Peak Wavelength – Ambient Temperature																														
 <p>($t_a=25^\circ\text{C}$)</p> <p>Relative Radiant Intensity (A.U.)</p> <p>Wavelength (nm)</p> <table border="1"><caption>Approximate data for Relative Spectral Emission at 25°C</caption><thead><tr><th>Wavelength (nm)</th><th>Relative Radiant Intensity (A.U.)</th></tr></thead><tbody><tr><td>800</td><td>0.00</td></tr><tr><td>850</td><td>0.30</td></tr><tr><td>870</td><td>0.95</td></tr><tr><td>880</td><td>1.00</td></tr><tr><td>890</td><td>0.95</td></tr><tr><td>900</td><td>0.30</td></tr><tr><td>950</td><td>0.00</td></tr></tbody></table>	Wavelength (nm)	Relative Radiant Intensity (A.U.)	800	0.00	850	0.30	870	0.95	880	1.00	890	0.95	900	0.30	950	0.00	 <p>Peak Wavelength (nm)</p> <p>Ambient Temperature ($^\circ\text{C}$)</p> <p>$I_f=50\text{mA}$</p> <table border="1"><caption>Approximate data for Peak Wavelength vs Ambient Temperature at $I_f=50\text{mA}$</caption><thead><tr><th>Ambient Temperature ($^\circ\text{C}$)</th><th>Peak Wavelength (nm)</th></tr></thead><tbody><tr><td>0</td><td>865</td></tr><tr><td>20</td><td>870</td></tr><tr><td>40</td><td>875</td></tr><tr><td>60</td><td>880</td></tr><tr><td>80</td><td>885</td></tr><tr><td>100</td><td>890</td></tr></tbody></table>	Ambient Temperature ($^\circ\text{C}$)	Peak Wavelength (nm)	0	865	20	870	40	875	60	880	80	885	100	890
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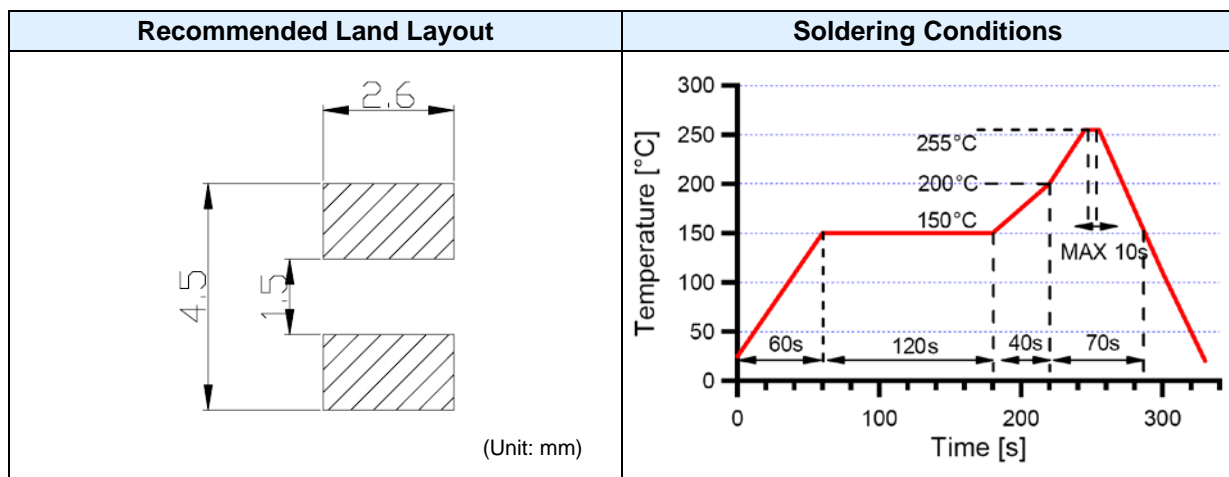
Precaution for Use

1. Cautions

- DO NOT look directly into the emitting area of the LED during operation!
- **WARNING: LED is emitting invisible light!**

2. Soldering Conditions

- DO NOT apply any stress to the lead particularly when heat.
- After soldering the LEDs should be protected from mechanical shock or vibration until the LEDs return to room temperature.
- When it is necessary to clamp the LEDs to prevent soldering failure, it is important to minimize the mechanical stress on the LEDs.



3. Static Electricity

- The LEDs are very sensitive to Static Electricity and surge voltage. So it is recommended that a wrist band and/or an anti-electrostatic glove be used when handling the LEDs.
- All devices, equipment and machinery must be grounded properly. It is recommended that precautions should be taken against surge voltage to the equipment that mounts the LEDs.



4. Heat Generation

- Thermal design of the end product is of paramount importance. Please consider the heat generation of the LED when making the system design. The coefficient of temperature increase per input electric power is affected by the thermal resistance of the circuit board and density of LED placement on the board, as well as other components. It is necessary to avoid intense heat generation and operate within the maximum ratings given in the specification.
- The operating current should be decided after considering the ambient maximum temperature of LEDs.

5. Storage

- The LEDs should be stored at 30°C or less and 60%RH or less after being shipped and the storage life limits are 3 months. If the LEDs are stored for 3 months or more, they can be stored for a year in a sealed container with nitrogen atmosphere and moisture absorbent material at less than 30%RH.
- Please avoid rapid transitions in ambient temperature, especially in high humidity environments where condensation can occur.