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SMB1N-405V-02

- Violet High Power LED
- 405 nm, 710 mW
- Integrated ESD Protection
- AlInGaN chip, 1000 x 1000 μm
- Beam Angle: $\pm 10^\circ$



Description

SMB1N-405V-02 is a surface mount AlInGaN based high power violet LED, with a typical peak wavelength of 405 nm, optical output power of 710 mW @ 500 mA, and **integrated ESD protection**. It comes in polyamide resin SMD package (PA9T) with silver plated soldering pads (lead free solderable), copper heat sink, and silicone resin molded lens. Additional variants with different beam angles are available on request.

Maximum Ratings*

Parameter	Symbol	Values		Unit
		Min.	Max.	
Power Dissipation	P_D		2100	mW
Forward Current	I_F		500	mA
Pulse Forward Current **	I_{FP}		700	mA
Reverse Voltage	U_R	not designed for reverse operation		
Reverse Current ($U_R = 5\text{V}$)	I_R			
Thermal Resistance	R_{THJA}		10	K/W
Junction Temperature	T_J		120	$^\circ\text{C}$
Operating Temperature	T_{CASE}	- 40	+ 100	$^\circ\text{C}$
Storage Temperature	T_{STG}	- 40	+ 100	$^\circ\text{C}$
Lead Solder Temperature ($t_{max} = 5\text{s}$)	T_{SLD}		+ 250	$^\circ\text{C}$

* Operating close to or exceeding these parameters may damage the device

** duty cycle = 1 %, pulse width = 10 μs

Electro-Optical Characteristics ($T_{CASE} = 25^\circ\text{C}$)

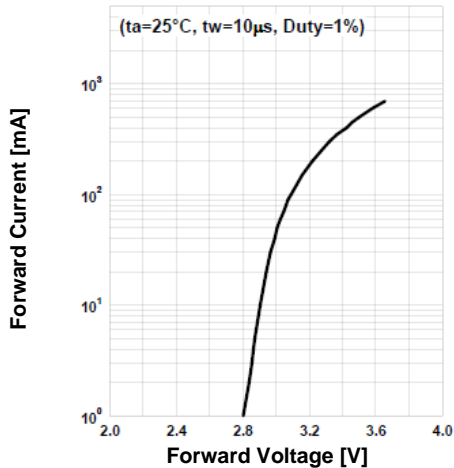
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Peak Wavelength	λ_P	$I_F = 500\text{ mA}$	400		410	nm
Half Width	λ_{Δ}	$I_F = 500\text{ mA}$		14		nm
Forward Voltage	U_F	$I_F = 500\text{ mA}$		3.5	4.2	V
	U_{FP}	$I_{FP} = 700\text{ mA}^*$		3.7		
Total Radiated Power	P_O	$I_F = 500\text{ mA}$		710		mW
		$I_{FP} = 700\text{ mA}^*$		960		
Radiant Intensity	I_E	$I_F = 500\text{ mA}$		2400		mW/sr
		$I_{FP} = 700\text{ mA}^*$		3200		
Beam Angle	$2\theta_{1/2}$	$I_F = 100\text{ mA}$		20		deg.
Rise Time	t_r	$I_F = 500\text{ mA}$		55		ns
Fall Time	t_f	$I_F = 500\text{ mA}$		75		ns

* duty cycle = 1 %, pulse width = 10 μs

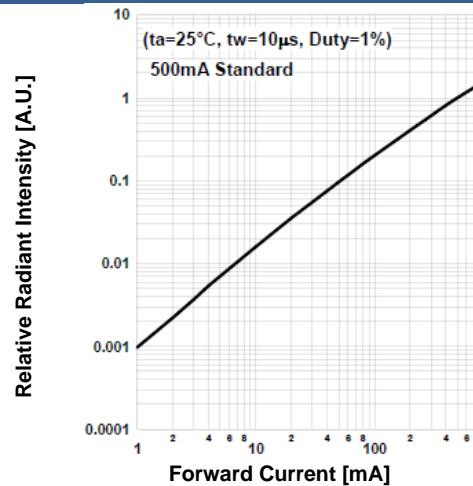


Typical Performance Curves

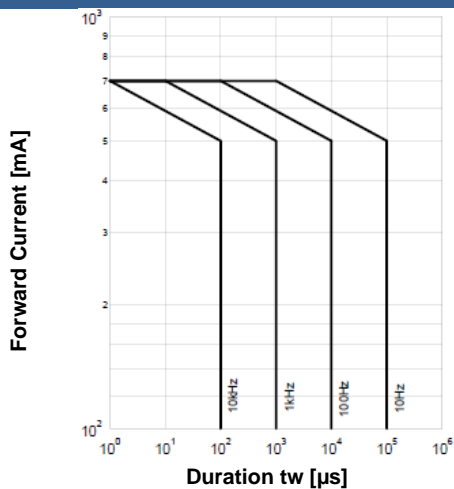
Forward Current vs. Forward Voltage



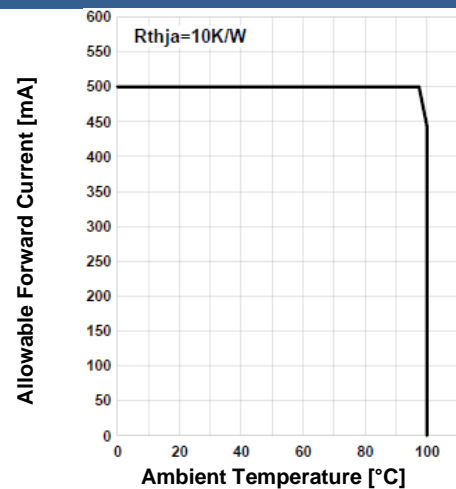
Relative Radiant Intensity vs. Forward Current



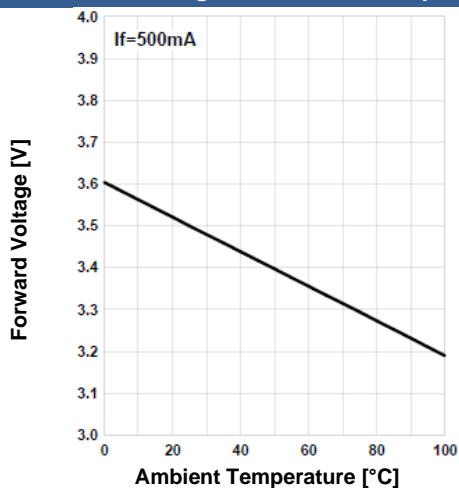
Forward Current vs. Pulse Duration



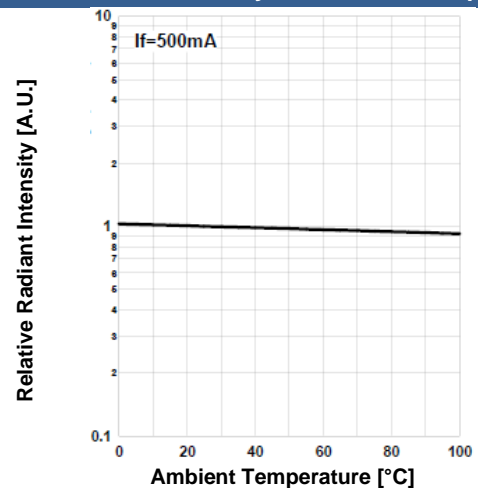
Allowed Forward Current vs. Amb. Temperature



Forward Voltage vs. Ambient Temperature



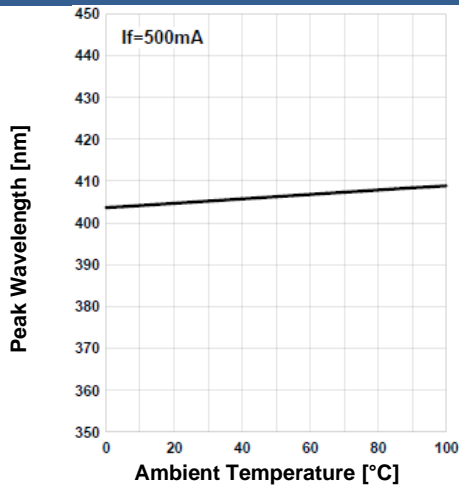
Rel. Radiant Intensity vs. Ambient Temperature



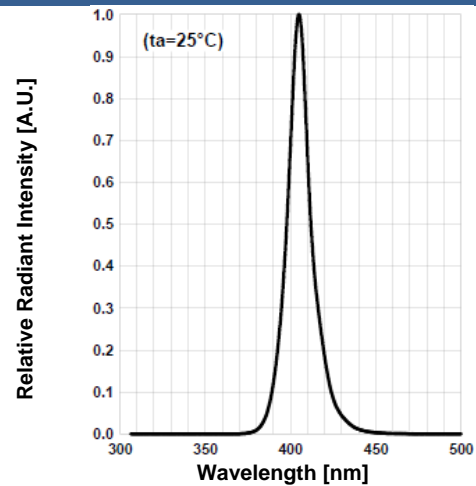


Typical Performance Curves

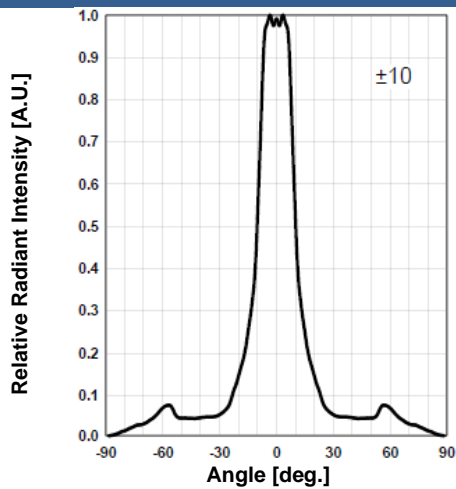
Peak Wavelength vs. Amb. Temp.



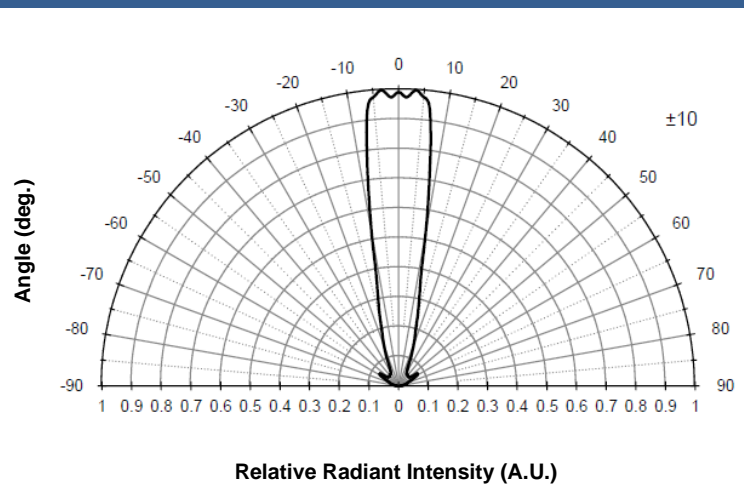
Relative Spectral Emission



Radiation Characteristics

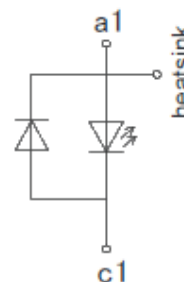
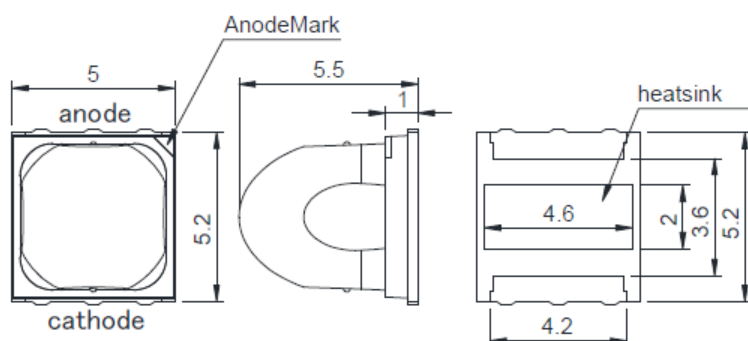


Radiation Characteristics



Outline Dimensions

PA9T



Lead	Function
Pin a1	Anode
Pin c1	Cathode

all dimensions in mm

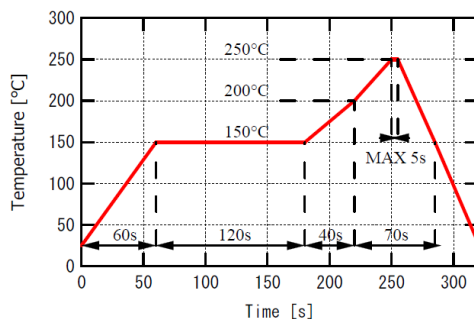


General Notes

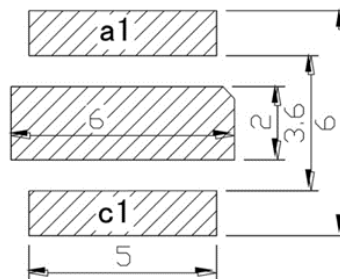
Soldering

- Do avoid overheating of the LED
- Do avoid electrostatic discharge (ESD)
- Do avoid mechanical stress, shock, and vibration
- Do only use non-corrosive flux
- Do not apply current to the LED until it has cooled down to room temperature after soldering

Recommended soldering conditions



Recommended soldering patterns



Unit: mm

Cleaning

- **Cleaning with isopropyl alcohol, propanol, or ethyl alcohol is recommended**
- DO NOT USE acetone, chloroform, trichloroethylene, or MKS
- DO NOT USE ultrasonic cleaners

Static Electricity

- **LEDs are sensitive to electrostatic discharge (ESD).**
- Precautions against ESD must be taken when handling or operating these LEDs
- Surge voltage or electrostatic discharge can result in complete failure of the LED.

Radiation

- During operation these LEDs do emit light, which **could be hazardous to skin and eyes, and may cause cancer.**
- Do avoid exposure to the emitted light. Protective glasses if needed
- It is further advised to attach a warning label on products/systems.

Operation

- **Do only operate LEDs with a current source.**
- Running these LEDs from a voltage source will result in complete failure of the device.
- Current of a LED is an exponential function of the voltage across it. Usage of current regulated drive circuits is mandatory.

Storage

- The **maximum shelf life** of LEDs in the originally sealed aluminum bag is **12 months**.
- Before opening the aluminum bag, please store it at **<30 °C, <60 % RH**.
- After opening the aluminum bag, please solder the LEDs within **72 hours (floor life)** at **5 – 30 °C, <50 % RH**.
- Put any unused, remaining LEDs and silica gel back in the same aluminum bag and then vacuum-seal the bag.
- It is recommended to keep the re-sealed bag in a desiccator at **<30%RH**.