

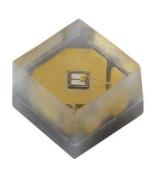
RoHS

HALOGEN

FREE

GREEN (5-2008)

UV SMD LED with Silicone Lens





DESCRIPTION

VLMU1610-365-135 is a ceramic based mid power UV LED with silicone lens for long life time. The package size is 1.6 mm x 1.6 mm and the radiant power up to 26 mW at 20 mA in a wavelength range of 362.5 nm to 370 nm.

PRODUCT GROUP AND PACKAGE DATA

• Product group: LED

Package: SMD ceramic mid power
Product series: mid power UV LED
Angle of half intensity: ± 67.5°

· Lead-finishing: Au

SAFETY ADVICES

Depending on the mode of operation, these devices emit highly concentrated non visible ultraviolet light which can be hazardous to the human eye. Products which incorporate these devices have to follow the safety precautions given in IEC 62471 "Photobiological Safety of Lamps and Lamp Systems".

FEATURES

- Ceramic SMT package with silicone lens
- Dimension (L x W x H) in mm: 1.6 x 1.6 x 1.4
- Forward current: up to 60 mA_{DC}
- Radiant power (typ.): 23 mW at 20 mA, 63 mW at 60 mA
- · Materials:
 - Die: InGaN
 - Resin: silicone (water clear)
 - Leads / terminations finish: gold plated (Au)
- · Grouping parameters:
 - Radiant power
 - Peak wavelength
 - Forward voltage
- Reflow soldering method
- MSL 3 according to J-STD-020
- Packaging: MOQ = 6000 pieces; 12 mm tape with 1500 pieces per reel, Ø 180 mm (7")
- Material categorization: for definitions of compliance please see www.vishav.com/doc?99912

APPLICATIONS

- Industrial curing
- · Photocatalytic purification
- Poster printing curing
- · Counterfeit money detector
- Blood detector
- Nail curing
- · Teeth curing

PARTS TABLE														
PART	COLOR	RADIANT POWER (mW)		at I _F	WAVELENGTH (nm)		at I _F	()		at I-	TECHNOLOGY			
		MIN.	TYP.	MAX.	(IIIA)	MIN.	TYP.	MAX.	(IIIA)	MIN.	TYP.	MAX.	(11174)	
VLMU1610-365-135	Ultraviolet	14	23	26	20	362.5	367	370	20	2.8	3.5	4.0	20	InGaN

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25$ °C, unless otherwise specified) VLMU1610-365-135							
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT			
DC forward current		IF	60	mA			
Pulse forward current	$t_p = 2 \text{ ms}, t_p/T = 0.1$	I _{FP}	300	mA			
Power dissipation		P _V	240	mW			
Reverse voltage Not designed for reverse operation							
Electrostatic discharge	HBM: MIL-STD-883 C 3B	ESD	2000	V			
Junction temperature		Tj	+90	°C			
Operating temperature range		T _{amb}	-40 to +85	°C			
Storage temperature range		T _{stg}	-40 to +90	°C			
Solder temperature		T _{sol}	260	°C			



OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_{amb} = 25 ^{\circ}$ C, unless otherwise specified) VLMU1610-365-135, ULTRAVIOLET								
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT		
Forward voltage	I _F = 20 mA	V _F	2.8	3.5	4.0	V		
Dedient news	I _F = 20 mA	4	14	23	26	mW		
Radiant power	I _F = 60 mA	фe	-	63	-			
Ratio: radiant intensity/radiant flux	I _F = 20 mA	l _e /φ _e	-	0.2	-	sr ⁻¹		
Peak wavelength	I _F = 20 mA	λ_{p}	362.5	367	370	nm		
Angle of half intensity	I _F = 20 mA	φ	-	± 67.5	-	deg		
Reverse voltage (1)	I _R = 10 μA	V _R	-	-	1.2	V		
Thermal resistance junction to case		R _{thJC}	-	53	-	K/W		

Notes

- Tolerances: \pm 11 % for $\varphi_e,$ \pm 0.1 V for $V_F,$ \pm 3 nm for λ_p
- (1) Reverse current is applied for reverse voltage test only (function test of Zener diode). The device is not designed for reverse operation. Operating the LED under reverse current condition for long time might result in damage or failure of the component

RADIANT POWER CLASSIFICATION (I _F = 20 mA)						
GROUP	MIN.	MAX.	UNIT			
R3	14	16				
R4	16	18				
R5	18	20	mW			
R6	20	22	THIVV			
R7	22	24				
R8	24	26				

PEAK WAVELENGTH CLASSIFICATION (I _F = 20 mA)						
GROUP MIN. MAX. UNIT						
P3M2	362.5	365				
P3N1	365	367.5	nm			
P3N2	367.5	370				

FORWARD VOLTAGE CLASSIFICATION (I _F = 20 mA)						
GROUP	MIN.	MAX.	UNIT			
V1	2.8	3.2				
V2	3.2	3.6	V			
V3	3.6	4.0				

Note

The optical and electrical specification table shows the parameter ranges, comprising only a few classification groups. In order to ensure
availability, single groups for radiant intensity, wavelength, and forward voltage will not be orderable. Only one group for radiant intensity,
wavelength, and forward voltage will be shipped in any one reel

MARKING EXAMPLE FOR SELECTION CODE ON LABEL

Selection code: R5-P3N1-V2
R5 range: 18 mW to 20 mW
P3N1 range: 365 nm to 367.5 nm

• V2 range: 3.2 V to 3.6 V

TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

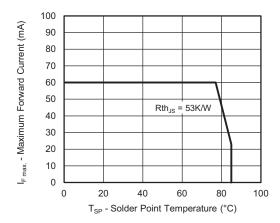


Fig. 1 - Maximum Forward Current vs. Solder Point Temperature

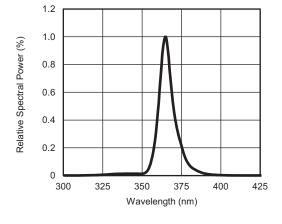


Fig. 4 - Relative Spectral Power vs. Wavelength

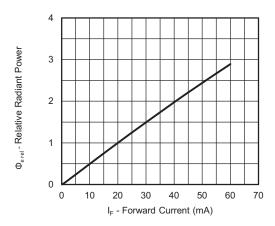


Fig. 2 - Relative Radiant Power vs. Forward Current

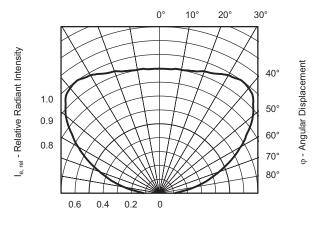


Fig. 5 - Relative Radiant Intensity vs. Angular Displacement

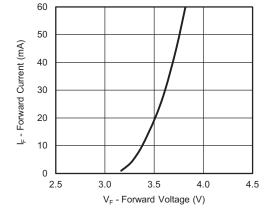


Fig. 3 - Forward Current vs. Forward Voltage

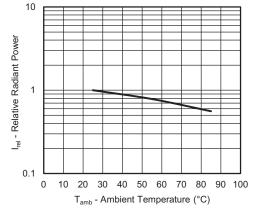
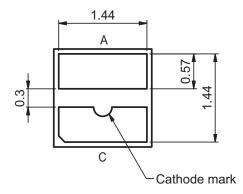
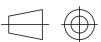


Fig. 6 - Relative Radiant Power vs. Ambient Temperature

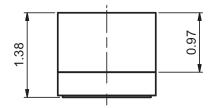
PACKAGE DIMENSIONS in millimeters



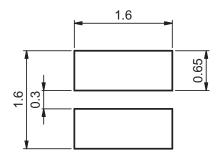


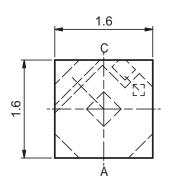
Technical drawings according to DIN specification.

Not indicated tolerances ±0.1









Drawing-No.: 6.541-5113.01-4 Issue: prel; 27.04.16

WIRING

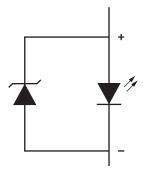
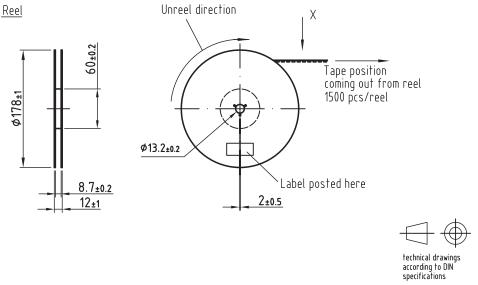
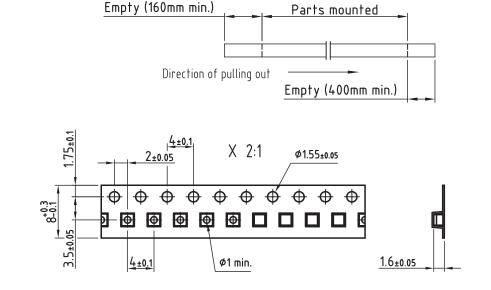


Fig. 7 - Wiring Diagram

TAPE AND REEL DIMENSIONS in millimeters



Leader and trailer tape:



Reel dimensions and tape

Drawing-No.: 9.800-5141.01-4 Issue: prel; 27.04.16

MOQ: 6000 pieces (4 reels each with 1500 pieces)

SOLDERING PROFILE

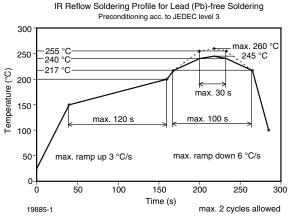
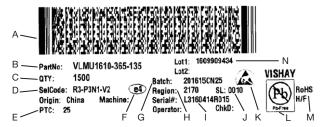


Fig. 8 - Vishay Lead (Pb)-free Reflow Soldering Profile (according to J-STD-020C)

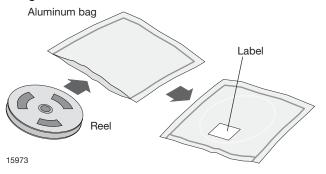
BAR CODE PRODUCT LABEL (example only)



- A. 2D bar code
- B. Vishay part number
- C. Quantity
- D. Selection code (bin): P_e , λ_p , and V_F group
- E. Code of manufacturing plant
- F. Termination plating finish
- G. Batch = date code: year / week / plant code
- H. Region code
- I. Internal serial number
- J. Sales location
- K. ESD symbol
- L. Lead (Pb)-free symbol
- M. RoHS symbol, halogen-free symbol
- N. Internal lot number

DRY PACKING

The reel is packed in an anti-humidity bag to protect the devices from absorbing moisture during transportation and storage.



FINAL PACKING

The sealed reel is packed into a cardboard box. A secondary cardboard box is used for shipping purposes.

RECOMMENDED METHOD OF STORAGE

Dry box storage is recommended as soon as the aluminum bag has been opened to prevent moisture absorption. The following conditions should be observed, if dry boxes are not available:

- Storage temperature 10 °C to 30 °C
- Storage humidity ≤ 60 % RH max.

After more than 168 h under these conditions moisture content will be too high for reflow soldering.

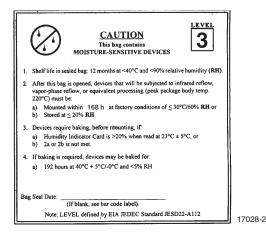
In case of moisture absorption, the devices will recover to the former condition by drying under the following condition:

192 h at 40 °C + 5 °C / - 0 °C and < 5 % RH (dry air / nitrogen) or

24 h at 60 °C + 5 °C and < 5 % RH for all device containers or

24 h at 100 °C + 5 °C not suitable for reel or tubes.

An EIA JEDEC® standard JESD22-A112 level 3 label is included on all dry bags.



Example of JESD22-A112 level 3 label

ESD PRECAUTION

Proper storage and handling procedures should be followed to prevent ESD damage to the devices especially when they are removed from the antistatic shielding bag. Electrostatic sensitive devices warning labels are on the packaging.

VISHAY SEMICONDUCTORS STANDARD BAR CODE LABELS

The Vishay Semiconductors standard bar code labels are printed at final packing areas. The labels are on each packing unit and contain Vishay Semiconductors specific data.



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Vishay

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