chanhvinh.com

209 SERIES
BULB REPLACEMENT LED



FEATURES

- T5.5 Slide Base
- Flat topped LED
- Range of LED colour options
- Range of voltage options
- Fit and Forget
- Warm White version available

BENEFITS

- Direct replacement for standard bulb fitting
- Flat topping gives even illumination of large lens areas
- No colour filter required
- Manufactured with internal resistor
- Outstanding reliability
- Warm White LED may be used behind coloured lens as a true replacement for a filament lamp

MARL Part Number	LED Colour	Typical Voltage DC Vopr	Typical Current DC Iopr	Typical LED Luminous Intensity	Typical LED Wavelength λp	Operating Temp Topr *	Storage Temp Tstg
209-501-20-38	Red	5-6	20	458	625	-30 to +75	-40 to +100
209-521-20-38	Yellow	5-6	20	440	590	-30 to +75	-40 to +100
209-532-20-38	Green	5-6	20	2157	520	-30 to +75	-40 to +100
209-930-20-38	Blue	5-6	20	452	470	-30 to +75	-40 to +100
209-993-20-38	Warm White	5-6	20	799	See Below	-30 to +75	-40 to +100
209-997-20-38	Cool White	5-6	20	1359	See Below	-30 to +75	-40 to +100
209-501-21-38	Red	12	20	458	625	-30 to +75	-40 to +100
209-521-21-38	Yellow	12	20	440	590	-30 to +75	-40 to +100
209-532-21-38	Green	12	20	2157	520	-30 to +75	-40 to +100
209-930-21-38	Blue	12	20	452	470	-30 to +75	-40 to +100
209-993-21-38	Warm White	12	20	799	See Below	-30 to +75	-40 to +100
209-997-21-38	Cool White	12	20	1359	See Below	-30 to +75	-40 to +100
209-501-23-38	Red	24-28	15	346	625	-30 to +75	-40 to +100
209-521-23-38	Yellow	24-28	15	330	590	-30 to +75	-40 to +100
209-532-23-38	Green	24-28	15	1815	520	-30 to +75	-40 to +100
209-930-23-38	Blue	24-28	15	364	470	-30 to +75	-40 to +100
209-993-23-38	Warm White	24-28	15	618	See Below	-30 to +75	-40 to +100
209-997-23-38	Cool White	24-28	15	1063	See Below	-30 to +75	-40 to +100
209-501-24-38	Red	48	12	236	625	-30 to +75	-40 to +100
209-521-24-38	Yellow	48	12	217	590	-30 to +75	-40 to +100
209-532-24-38	Green	48	12	1360	520	-30 to +75	-40 to +100
209-930-24-38	Blue	48	12	270	470	-30 to +75	-40 to +100
209-993-24-38	Warm White	48	12	420	See Below	-30 to +75	-40 to +100
209-997-24-38	Cool White	48	12	743	See Below	-30 to +75	-40 to +100
		Vdc	mA	mcd	nm	°C	°C

Typical Emission Colours Warm White LED				
X	0.4255	0.4390	0.4970	0.4770
Y	0.4000	0.4310	0.4466	0.4137

Typical Emission Colours Cool White LED			
X	0.275	0.28	0.29
Y	0.27	0.28	0.30

NOTES

Intensities (Iv) and colour shades of white (X-Y co-ordinates) may vary between LEDs within a batch. Additional LED Colours, Voltage Options and Reverse Polarity options available for semi-custom projects. Please contact our Sales Team. All LED components are supplied in anti-static packaging.
* Characteristics at Ta = 25°C. For operating temperature derating graphs, please refer to sheet 2.

To order please contact us on +44 (0) 1229 582 430
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in company/marl-international-limited

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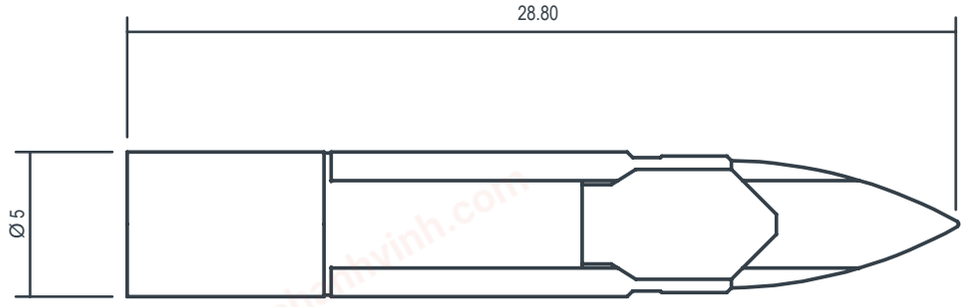
TECHNICAL DATA

Series	Lamp Base Style	Max. Power Dissipation
209	T5.5 Slide Base	500
		mW

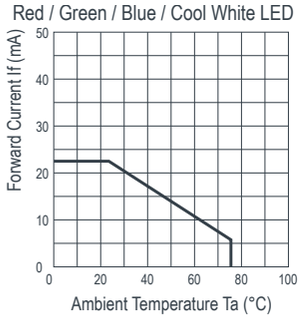
TECHNICAL DRAWING

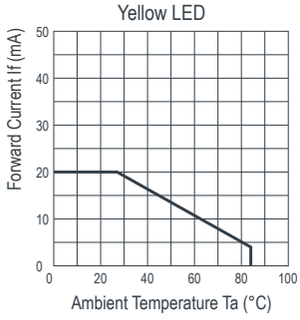
Weight (g): 2.5

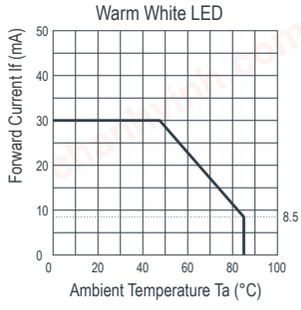
Dimensions in mm (typical). Not to scale. + printed on base denotes Anode. Colour dot on product denotes LED colour.



DE-RATING GRAPHS







DESIGN CONSIDERATIONS

Single-Chip LEDs

All devices feature water clear high intensity LEDs as standard. In devices where discrete LEDs are used, the single chip LED devices have been modified by the removal of the domed portion of the encapsulation (flat-topped) to provide even illumination of switches and annunciators. Non flat topped versions are also available.

Flat-topping does not apply to devices using surface-mounted device (SMD) LEDs.

Product Evaluation

Filament replacement LEDs have been specifically designed to meet the primary objective of providing improved reliability. As this product range is suitable for both new-build and retro-fit, (sometimes in very old systems), a wide range of illuminated push button switches and lamp holders can be encountered. Due to subjectivity, evaluation of the LED type is recommended, (samples of all standard models are available). Care should be taken to correctly simulate operating ambient light conditions to ensure that the correct device has been selected to maximise viewing characteristics such as viewing angle, colour compatibility and on/ off contrast ratio.

Electro-Static Discharge (ESD)

Build up of electro-static discharge occurs in many situations involving people moving and handling products. The range of possible situations is very diverse but voltage levels as high as several thousand volts can and do arise in many individual situations. When an operator charged up to these levels handles a static sensitive device, there is a very probable likelihood that the device will be irreversibly damaged. It is essential that precautions are taken at all stages during manufacture and assembly of these products. Although LEDs were never considered to be static sensitive devices, changes in manufacturing technology and materials used to produce higher intensity products over a large range of the wavelength spectrum have changed this. MARL has an approved system of ESD control from goods in, through production and into final packing and despatch. MARL recommend all users of LED based products follow the current BSI guidelines for protection of electronic devices from electrostatic phenomena.

Voltage, Current and Temperature

The forward voltage / current value of an LED is dependent upon the ambient temperature of the environment in which it is operated. Therefore, care must be taken to operate the LED at the correct voltage / current values, depending upon the ambient temperature.

MARL should be contacted if the device is to be operated outside the temperature range specified. MARL accept no liability for any product that is operated outside the stated voltage or temperature range.

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