

# T-1 3/4 Sub-Miniature LED Replacement Lamp



Direct incandescent replacement LED lamp that delivers improved illumination, durability and long life. The T-1 3/4 Sub-Miniature LED lamps are drop in replacements for the less efficient filament lamps, typically used within pushbutton switches and indicators.



## Key Features

- T-1 3/4 sub-miniature LED lamp (light bulb)
- Voltage: 2-28 VDC
- Base: bi-pin, bayonet, flange, groove, screw, wedge
- Available in six LED single colors: red, amber, green, orange, blue, white
- Available in one bi-color: red/green
- Low power consumption
- Mounts directly into industry standard sockets
- Single chip based LED
- Direct incandescent replacement
- Low power consumption - uses up to 90% less energy than an incandescent lamp
- Low heat generation, LEDs operate significantly cooler than traditional lamps
- Designed for quick installation and reduces overall cost due to less-frequent replacements
- Fast on/off cycling, shock resistance, and long operating life
- Compliant with RoHS and REACH

**1 Model<sup>[1]</sup>**

BP202 <sup>[5]</sup>	Bi-Pin
MB200	Bayonet
MF200 <sup>[6]</sup>	Flange
MG200	Groove
MS200	Screw
WB201	Wedge

**TO ORDER, FOLLOW THE EXAMPLE:**

Select one **BOLD** component from each SHADED column in the tables below.

<b>1 Model</b>	<b>2 LED</b>	<b>3 Voltage</b>
WB201	-BCG	12H

→Part Number **WB201-BCG12H**

**2 MEDIUM INTENSITY - TINTED ENCAPSULATION**

LED	Color	λpk (nm)	Iv <sup>[2]</sup> (mcd)	Viewing Angle	V/C Table <sup>[3]</sup>
-BCR	RED	635	120	35	I
-BCA	AMB	583	100	35	I
-BCG	GRN	565	80	24	I

**Voltage/Current**

Design Vf/If	Max Vf/If
<b>V/C Table I</b>	
5V/22mA	5.5V/28mA
6V/21mA	7V/27mA
12V/20mA	14V/25mA
15V/24mA	16.5V/28mA
24V/17mA	26V/20mA
28V/16.5mA	30V/18mA

**3 Voltage<sup>[4]</sup>**

2
5H
6H
12H
15H
24H
28H
120

**HIGH INTENSITY- WATERCLEAR ENCAPSULATION**

LED	Color	λpk (nm)	Iv <sup>[2]</sup> (mcd)	Viewing Angle	V/C Table <sup>[3]</sup>
-NWR	RED	634	2800	30	I
-NWO	ORG	605	2000	30	I
-NWA	AMB	592	2800	30	I
-NWG	GRN	520	2400	45	II
-NWB	BLU	465	700	45	II
-NWW	CWHT		2500	50	II
-NWL	WWHT		1800	50	II
-NKR	RED	634	3600	15	I
-NKO	ORG	605	8000	15	I
-NKA	AMB	592	3600	15	I
-NKG	GRN	520	10000	15	II
-NKB	BLU	465	3000	15	II
-NKW	CWHT		9200	20	II
-NKL	WWHT		9200	15	II

**Voltage/Current**

Design Vf/If	Max Vf/If
<b>V/C Table II</b>	
5V/15mA	5.5V/23mA
6V/15mA	7V/25mA
12V/15mA	14V/20mA
15V/15mA	16.5V/18mA
24V/15mA	26V/18mA
28V/15mA	30V/17mA

**WIDE ANGLE/FLAT-TOPPED-WATERCLEAR ENCAPSULATION**

LED	Color	λpk (nm)	Iv <sup>[2]</sup> (mcd)	Viewing Angle	V/C Table <sup>[3]</sup>
-NFR	RED	634	780	75	I
-NFA	AMB	592	600	75	I
-NFG	GRN	520	780	75	II
-NFB	BLU	465	168	75	II
-NFW	WHT		280	75	II

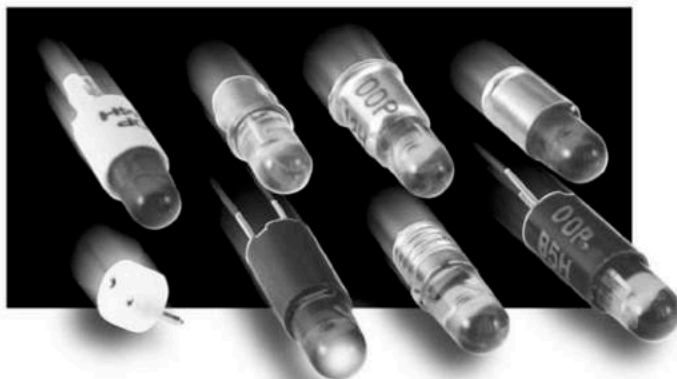
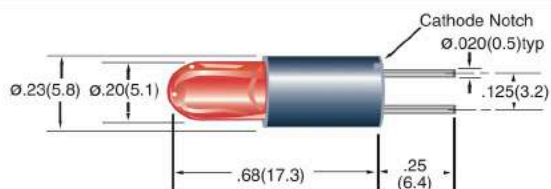
**SPECIALTY LEDs**

LED	Color	λpk (nm)	Iv <sup>[2]</sup> (mcd)	Viewing Angle	V/C Table <sup>[3]</sup>	Description
-RLP <sup>[7]</sup>	RED	635	2.3	50	[3]	Low Power
-ALP <sup>[7]</sup>	AMB	583	2.1	50	[3]	Low Power
-GLP <sup>[7]</sup>	GRN	565	2.3	50	[3]	Low Power
-LRG	RED/GRN	660/565	90/40	60	I	Bi-Color, Red Cathode

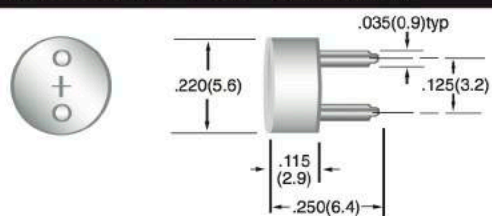
[1] All Models are center anode (note cathode notch for BP202, BP203 and WB201). Insert C after Model for center cathode (e.g. MF200C).  
 [2] Iv = typical luminous intensity @ If = 20mA (Ta=25°C). Low Power LEDs = 2mA.  
 [3] See Voltage/Current table for design specifications. Design current for low power LEDs = 2mA.  
 [4] Ta = 25°C. Voltage 2 indicates external resistor required. Voltages 5H through 28H are VDC. For AC operation, insert D after Voltage (e.g. 24HD). D indicates built-in rectifier: not required for 5H.

[5] Optional Socket available. See Model BPS-1 (pg. 72).  
 [6] Optional Socket available. See Model MFS1-B (pg. 74).  
 [7] Omit "H" Voltage designation (e.g. MG200-RLP12).

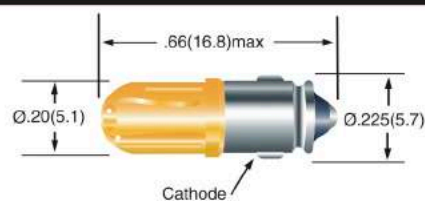
## BP202



## BPS-1 (Socket for BP202 Lamp)

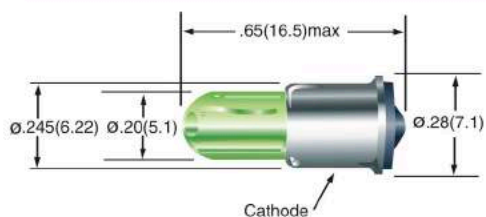


## MB200



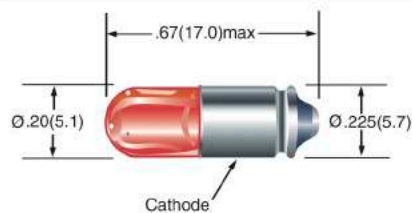
Available with Center Cathode

## MF200



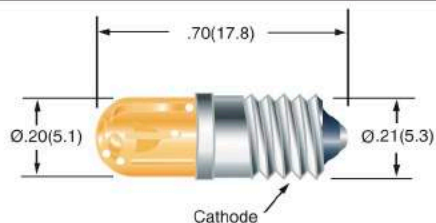
Available with Center Cathode

## MG200



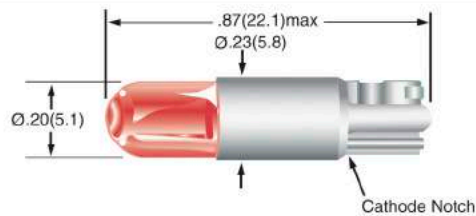
Available with Center Cathode

## MS200



Available with Center Cathode

## WB201

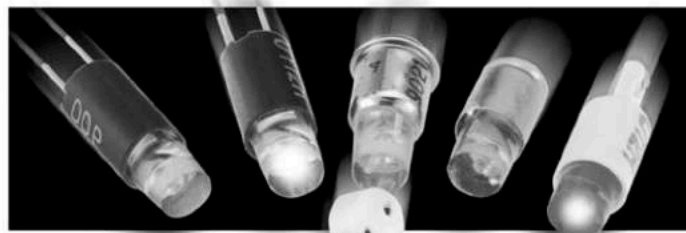
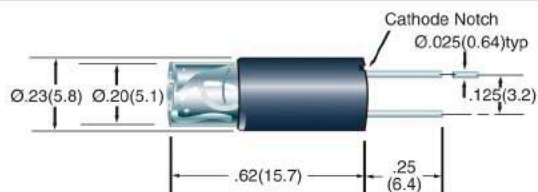


### All dimensions are in inches (mm)

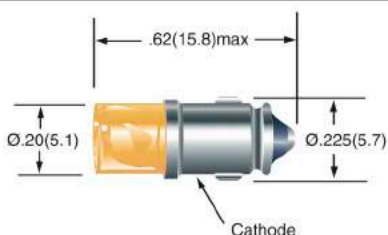
Tolerances: .xx"(.x) ±.025"(.63) / .xxx"(.xx)±.010"(.25)  
Specifications are subject to change without notice.

## Wide Angle LED Lamps

### BP202, NFX Series (75°)

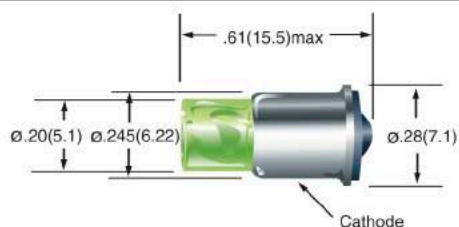


### MB200, NFX Series (75°)



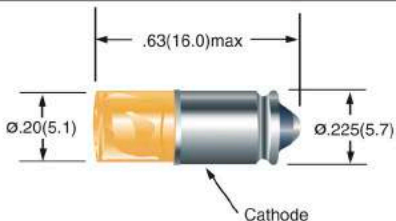
Available with Center Cathode

### MF200, NFX Series (75°)



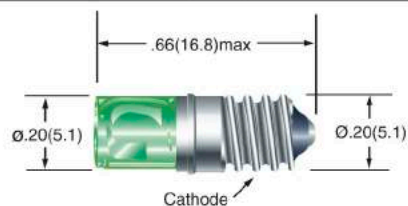
Available with Center Cathode

### MG200, NFX Series (75°)



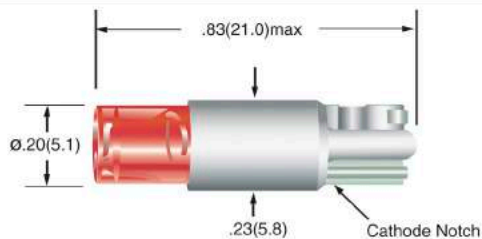
Available with Center Cathode

### MS200, NFX Series (75°)



Available with Center Cathode

### WB201, NFX Series (75°)



**All dimensions are in inches (mm)**

Tolerances: .xx"(x) ±.025"(.63) / .xxx"(xx)±.010"(.25)  
Specifications are subject to change without notice.

Series	LED	Voltage	Operating Temp (°C)	Storage Temp (°C)
T-1 3/4 Sub-miniature LED lamp	NFR	-	-30 to +60	-40 to +100
	NFA	-	-30 to +60	-40 to +100
	NFG	-	-30 to +60	-40 to +100
	NFW	-	-30 to +60	-40 to +100
	NFB	-	-30 to +60	-40 to +100
	NWR	24H	-40 to +100	-40 to +100
	NWR	28H	-40 to +100	-40 to +120
	NWW	24H	-30 to +85	-40 to +100
	NWW	28H	-30 to +80	-40 to +100
	NWG	24H	-30 to +85	-40 to +100
	NWG	28H	-20 to +80	-30 to +100
	NWA	24H	-40 to +100	-40 to +100
	NWA	28H	-40 to +100	-40 to +120
	NWB	24H	-30 to +85	-40 to +100
	NWB	28H	-20 to +80	-30 to +100
	BCG	-	-20 to +100	-55 to +100
	BCR	-	-55 to +100	-55 to +100
	BCA	-	-55 to +100	-55 to +100

\* For operating temperature of a specific part number contact VCC

Incandescent Lamp #	Design Voltage	Base Description	VCC Model #	Suggested VCC Part Number
2314	28	Sub-Miniature Bi-Pin	BP202	BP202-NFX28H
2324	28	Sub-Miniature Bi-Pin	BP202	BP202-NFX28H
2335	14	Sub-Miniature Bi-Pin	BP202	BP202-NFX15H
2337	6.3VAC	Sub-Miniature Bi-Pin	BP202	BP202-NFX6H
3149	5	Sub-Miniature Bi-Pin	BP202	BP202-NFX5H
7001	24	Sub-Miniature Bi-Pin	BP202	BP202-NFX24H
7003	24	Sub-Miniature Bi-Pin	BP202	BP202-NFX24H
7327	28	Sub-Miniature Bi-Pin	BP202	BP202-NFX28H
7328	6	Sub-Miniature Bi-Pin	BP202	BP202-NFX6H
7330	14	Sub-Miniature Bi-Pin	BP202	BP202-NFX15H
7349	6.3VAC	Sub-Miniature Bi-Pin	BP202	BP202-NFX6H
7361	5	Sub-Miniature Bi-Pin	BP202	BP202-NFX5H
7371	12	Sub-Miniature Bi-Pin	BP202	BP202-NFX12H
7373	14	Sub-Miniature Bi-Pin	BP202	BP202-NFX15H
7376	28	Sub-Miniature Bi-Pin	BP202	BP202-NFX28H
7377	6.3VAC	Sub-Miniature Bi-Pin	BP202	BP202-NFX6H
7380	6.3VAC	Sub-Miniature Bi-Pin	BP202	BP202-NFX6H
7381	6.3VAC	Sub-Miniature Bi-Pin	BP202	BP202-NFX6H
7382	14	Sub-Miniature Bi-Pin	BP202	BP202-NFX15H
7387	28	Sub-Miniature Bi-Pin	BP202	BP202-NFX28H
7876	28	Sub-Miniature Bi-Pin	BP202	BP202-NFX28H
7945	6	Sub-Miniature Bi-Pin	BP202	BP202-NFX6H
327	28	Sub-Miniature Flange	MF200	MF200-NFX28H
328	6	Sub-Miniature Flange	MF200	MF200-NFX6H
330	14	Sub-Miniature Flange	MF200	MF200-NFX15H
345	6	Sub-Miniature Flange	MF200	MF200-NFX6H
349	6.3VAC	Sub-Miniature Flange	MF200	MF200-NFX6H
350	6.3VAC	Sub-Miniature Flange	MF200	MF200-NFX6H
370	18	Sub-Miniature Flange	MF200	MF200-NFX24H
376	28	Sub-Miniature Flange	MF200	MF200-NFX28H
377	6.3VAC	Sub-Miniature Flange	MF200	MF200-NFX6H
380	6.3VAC	Sub-Miniature Flange	MF200	MF200-NFX6H
381	6.3VAC	Sub-Miniature Flange	MF200	MF200-NFX6H
382	14	Sub-Miniature Flange	MF200	MF200-NFX15H
385	28	Sub-Miniature Flange	MF200	MF200-NFX28H
387	28	Sub-Miniature Flange	MF200	MF200-NFX28H
394	12	Sub-Miniature Flange	MF200	MF200-NFX12H
459	22	Sub-Miniature Flange	MF200	MF200-NFX24H
7332	5	Sub-Miniature Flange	MF200	MF200-NFX5H
7333	5	Sub-Miniature Flange	MF200	MF200-NFX5H
7335	5	Sub-Miniature Flange	MF200	MF200-NFX5H
7341	28	Sub-Miniature Flange	MF200	MF200-NFX28H
8918	14	Sub-Miniature Flange	MF200	MF200-NFX15H

Incandescent Lamp #	Design Voltage	Base Description	VCC Model #	Suggested VCC Part Number
334	28	Sub-Miniature Groove	MG200	MG200-NFX28H
336	14	Sub-Miniature Groove	MG200	MG200-NFX15H
337	6	Sub-Miniature Groove	MG200	MG200-NFX6H
379	6.3VAC	Sub-Miniature Groove	MG200	MG200-NFX6H
386	14	Sub-Miniature Groove	MG200	MG200-NFX15H
388	28	Sub-Miniature Groove	MG200	MG200-NFX28H
398	6.3VAC	Sub-Miniature Groove	MG200	MG200-NFX6H
335	28	Sub-Miniature Screw	MS200	MS200-NFX28H
342	6	Sub-Miniature Screw	MS200	MS200-NFX6H
369	28	Sub-Miniature Screw	MS200	MS200-NFX28H
373	14	Sub-Miniature Screw	MS200	MS200-NFX15H
378	6.3VAC	Sub-Miniature Screw	MS200	MS200-NFX6H
383	14	Sub-Miniature Screw	MS200	MS200-NFX15H
399	28	Sub-Miniature Screw	MS200	MS200-NFX28H
17	28	Sub-Miniature Groove	WB201	WB201-NFX28H
18	14	Sub-Miniature Screw	WB201	WB201-NFX15H
37	14	Sub-Miniature Screw	WB201	WB201-NFX15H
56	5	Sub-Miniature Screw	WB201	WB201-NFX5H
73	14	Sub-Miniature Screw	WB201	WB201-NFX15H
74	14	Sub-Miniature Screw	WB201	WB201-NFX15H
79	6	Sub-Miniature Screw	WB201	WB201-NFX6H
84	6.3VAC	Sub-Miniature Screw	WB201	WB201-NFX6H
85	28	Sub-Miniature Screw	WB201	WB201-NFX28H
86	6.3VAC	Sub-Miniature Screw	WB201	WB201-NFX6H

**Note:** The X in the part number represent the LED color (Ex. WB201-NFA6H is with an Amber LED)

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