

# New Product

# CONTACT

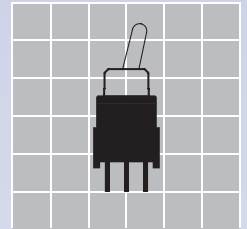
No.102



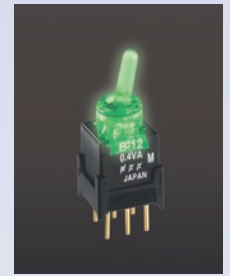
## Series **B**

# Illuminate-Status Toggles

## Fully Illuminated Toggle Switch



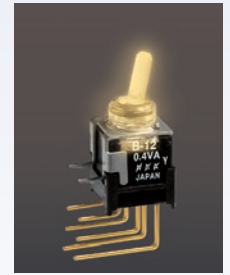
Actual Size



B12CCPF



B12CCHC



B12CCVD

# Brilliant Illumination

Fully Illuminated Toggle Switch

Illuminated-Status Toggles

# Series B

The actuator and the bushing are entirely illuminated for outstanding visibility. (Patent pending)

**Actuator with Excellent Visibility**

- Fully illuminated toggle for highly visible status indication with LED in green, red, or amber for single color and red/green for bicolor. (Patent pending)
- The angle of throw is 26°, which makes the position unmistakably clear.

**Environmentally Friendly**

- Suited to lead-free solder processing applications because of heat resistant resin materials.
- Components and packaging materials meet RoHS Directive of March 31, 2004, restricting use of hazardous materials such as lead, cadmium, mercury, hexavalent chromium, PBB, and PBDE.

**Washable**

Totally sealed body construction prevents contact contamination and allows time- and money-saving automated soldering and washing.

**Light Touch**

Specially designed mechanism gives reliable switching and a light sense of touch.

**Insert-molded Terminals**

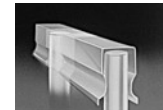
Insert-molded terminals prevent the entry of flux, solvents, and other contaminants and prevent loosening of terminals.

**Super Bright LED**

The switch features a super bright LED to maximize the visibility of the actuator.

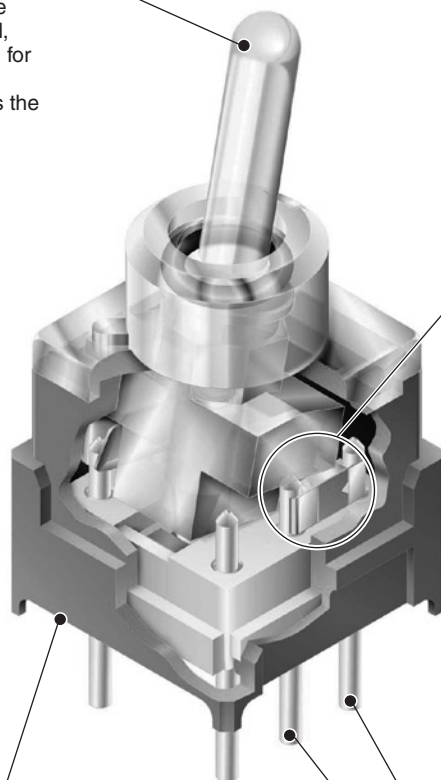
**Award-winning Contact Mechanism**

The sliding twin crossbar (STC) contact mechanism results in smoother, positive detent actuation, increased contact stability, and unparalleled logic-level reliability.



**Standard PCB Spacing**

Terminal-to-terminal spacing (2.54 mm) matches standard PC board grid spacing.

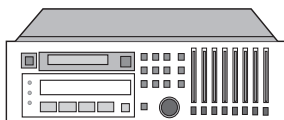


**Applications**

Office equipment, video camcorders, control panels, etc.

**Release date**

May 26, 2004



Consumer electronics



Office equipment

## ► Specifications

Switch Specifications			
Electrical Capacity Common to AC/DC	<ul style="list-style-type: none"> <li>► Recommended range 0.4 VA max., 28 V max. (Applicable voltage range: 20 mV to 28 V) (Applicable current range: 0.1 mA to 0.1 A)</li> <li>► For 28 V max. at 0.1 A: life is 10,000 operations.</li> <li>► Operation is possible at the minimum of 20 mV, 0.1 μA. (For a current of less than 0.1 mA, the specified contact resistance will not be applied.)</li> </ul>	Dielectric Strength	500 V AC for one minute min.
		Mechanical Life	100,000 operations min.
		Electrical Life	50,000 operations min.
		Angle of Throw of the Lever (α)	26°±4°
		Operating Temp. Range	-25 to +55°C
Contact Resistance	50 mΩ or less (at 20 mV, 10 mA) (Contacts not including conductor resistance show 50 mΩ or less.)	Soldering Time & Temperature	<ul style="list-style-type: none"> <li>► Manual Solder: 4 seconds max. at 390°C max.</li> <li>► Solder Pot: 6 seconds max. at 265°C max. (Preheating: 40 seconds max. at 110°C max.)</li> </ul>
Insulation Resistance	500 MΩ min. at 500 V DC		

## ► LED Specifications

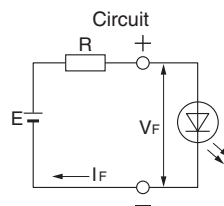
Super-Bright LED							
Ambient temperature Ta = 25°C							
LED Specification	Single-color Illumination			Bicolor Illumination			
LED Color	Green (F)	Red (C)	Amber (D)	Red (C)	Green (F)	Unit	
Maximum Operating Current I <sub>FM</sub>	20	30	30	30	20	mA	
Recommended Operating Current I <sub>F</sub>	10	20	20	20	10	mA	
Forward Voltage (Typical Value) V <sub>F</sub>	3.4	1.9	1.9	1.9	3.4	V	
Maximum Reverse Voltage V <sub>RM</sub>	5			5			V
Current Reduction Ratio at an Operating Temp. of 25°C, ΔI <sub>F</sub>	0.28	0.43	0.43	0.43	0.28	mA/°C	
Operating Temp. Range	-25 to +55			-25 to +55			°C

### LED Circuit Ballast Resistance

To calculate the ballast resistance [R] of the LED circuit, substitute the forward voltage V<sub>F</sub> and recommended operating current I<sub>F</sub> of each LED's specifications into the following equation.

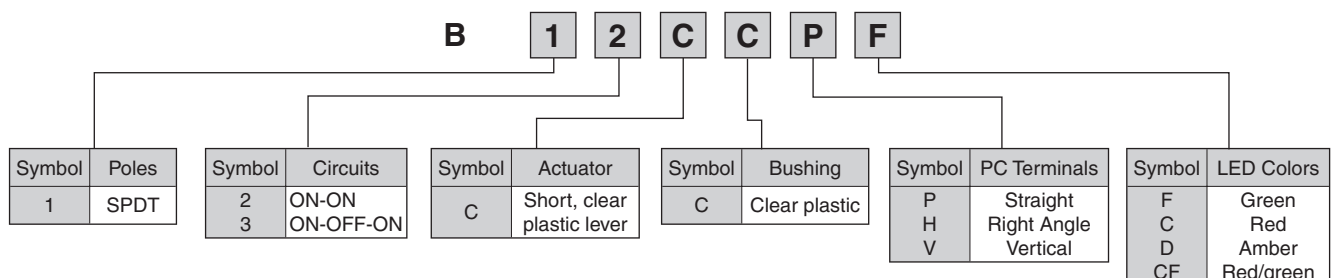
$$R = \frac{E - V_F}{I_F \text{ (recommended value)}}$$

where : E = source voltage  
 V<sub>F</sub> = forward voltage  
 I<sub>F</sub> = recommended operating current  
 R = ballast resistance



The wattage of resistance R should be twice to three times greater than usual as a safety margin such as for operating ambient temperature.

## ► Structure of Part Number



Type 3: Bicolor LED available for ON-OFF-ON circuit only.

► Fully Illuminated Toggle Switches


Toggle Position			Straight PC Part No.	Right Angle PC Part No.	Vertical PC Part No.	Contact Terminal Number			
Left	Center	Right	SPDT	SPDT	SPDT	Circuit	Left	Center	Right
ON	–	ON	<b>B12CCP</b>	<b>B12CCH</b>	<b>B12CCV</b>	SPDT	2-3	–	1-2
ON	OFF	ON	<b>B13CCPCF</b>	<b>B13CCHF</b>	<b>B13CCVCF</b>				

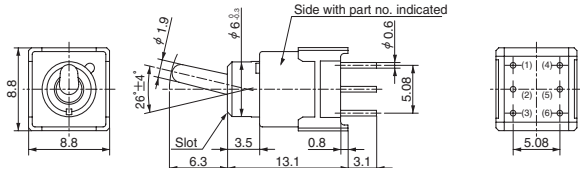
Symbol in : F (green), C (red), D (amber), or CF (red/green)

**Straight PC terminal**

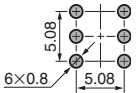
► The terminal numbers are not indicated on the case.

SPDT





**Footprint**  
(Top view of PC board)




Terminal 4 is a support pin on single color models.

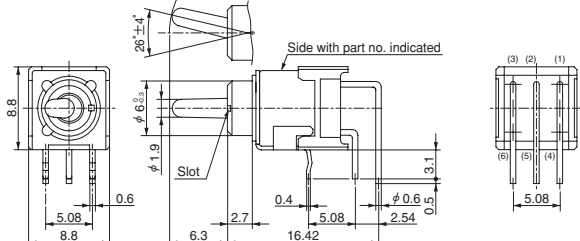
► The LED circuit is isolated and requires external power source.

**Right Angle PC terminal**

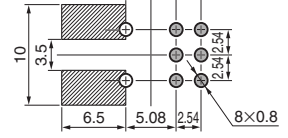
► The terminal numbers are not indicated on the case.

SPDT





**Footprint**  
(Top view of PC board)



Terminal 4 is a support pin on single color models.


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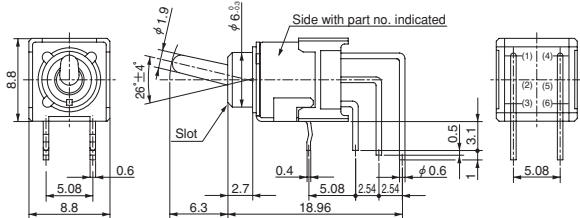
PCB Design Caution: Shaded area indicates mounting bracket.

**Vertical PC terminal**

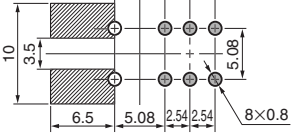
► The terminal numbers are not indicated on the case.

SPDT





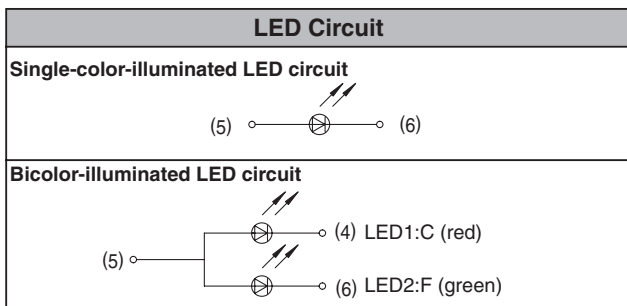
**Footprint**  
(Top view of PC board)



Terminal 4 is a support pin on single color models.

► The LED circuit is isolated and requires external power source.

PCB Design Caution: Shaded area indicates mounting bracket.



► Handling Instructions

**Flux Removal:**

- Alcohol-based cleaning fluid is recommended.
- Do not use an organic solvent.
- Use of high-purity alcohol (an alcohol concentration of 50% or more) may damage the actuator or the bushing.

**Cleaning Conditions:**

- Liquid bath 10 cm deep
- Cleaning time 5 minutes maximum
- Do not actuate the switch or exert force on the actuator.

**Conductivity:**

- Bushing material is not antistatic resin.

\* Note that the specifications are subject to change without notice.

