FOR YOUR REFERENCE

TO : Guangzhou Hongshi

OMRON CORPORATION
Omron Switch & Devices Corporation
Production Division
Consumer & Commercial Switch Product Engineering Group

Prepared by	Checked by	Approved by
K.Yoshimura		T.Abe

RoHS Directive Compliant Part

~~☐For Receipt~~ ■For reference

PRODUCT SPECIFICATIONS

Description : Ultra Sub Miniature Basic Switch

Part Number : D2LS-21

~~■ Please make a signature, stamp or other equivalent mark indicating your receipt on one copy of this sheet and return it to Omron on or before . . . If you place an order of a product described in this sheet, you will be deemed to accept this specification.~~

Registration part number for customer
Type name : Type number :

Signature, Stamp or Other Equivalent Mark (for receipt confirmation)

Release of Drawings
Sales

Distribution

	Copy
Customer	
Sales ( )	

OMRON

PRODUCT SPECIFICATIONS	Description : Ultra Subminiature Basic Switch
	Part number : D2LS-21

1. Safety Standard (File No.)

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2. Structure

2.1 Outline drawing No. 2267332-1
2.2 Mechanism Snap action
2.3 Contact form Single pole Single throw (SPST) C-NO
2.4 Protective structure IP40 Conforming to *IEC standard *IEC : International Electrotechnical Commission
2.5 Terminal SMD type

3. Mechanical Characteristics

3.1 Operating characteristics (Initial value)

	Item	Abbr.	Unit	Specification value	
1	Operating force	OF	N		0.6±0.2
2	Releasing force	RF	N	Min.	0.15
3	Overtravel	OT	mm	Min.	0.1
4	Movement differential	MD	mm	Max.	0.12
5	Free position	FP	mm		3.5±0.2
6	Operating position	OP	mm		3.2±0.2

3.2 Malfunction vibration

Open contact duration shall be 1msec. max. when the following vibration is applied;
Amplitude : 1.5mm
Frequency : 10 to 55Hz
Cycle : 3 to 5 minutes
Direction : X, Y and Z axis
Time : 10 minute per axis

3.3 Vibration durability

No electrical or mechanical defect after the following vibration is applied;
Amplitude : 1.5mm
Frequency : 10 to 55Hz
Cycle : 3 to 5 minutes
Direction : X, Y and Z axis
Time : 2 hours per axis

3.4 Malfunction shock

Open contact duration shall be 1msec. max. when the following shock is applied;
Shock : 300m/s^2 Max.
Direction : X, Y and Z axis
Time : 3 times per axis

3.5 Shock durability

No electrical or mechanical defect after the following shock is applied;
Shock : 1000m/s^2 Max.
Direction : X, Y and Z axis
Time : 3 times per axis

Condition common to Section 3.2 and 3.4
Applied voltage : 5VDC
Applied current : 1mA
Actuator position :total travel position (detected by oscilloscope)

3.6 Actuator strength
No electrical or mechanical defect when the following force is applied to the actuator;
Direction : Actuator operation direction
Force : 10 times of the specified operating force (OF) 8N
Time : 1 minute

3.7 Permissible operating frequency
300 operations/minute max.

3.8 Permissible operating speed
1 to 500mm/second

4. Electrical Characteristics

4.1 Ratings
1mA, 6VDC (resistive load)

4.2 Contact resistance
Initial value 100mΩ max.
Measured by milliohm meter at total travel position (TTP)

4.3 Insulation resistance, Dielectric strength

Item / Measuring part	Insulation resistance (500VDC megger)	Dielectric strength (50/60Hz for 1 minute)
Between terminals of the same polarity	100MΩ Min.	600VAC

4.4 Bouncing
Bouncing should be 5msec max. after 5million life test.
At DC5V 1mA Resistive load, 3 to 4 operations/sec.

5. Environmental Characteristics

5.1 Heat resistance
No electrical or mechanical defect at the standard test condition after leaving at room temperature and humidity for about 1 hour, after soaking under the ambience of 85±2°C for 96 hours.

5.2 Cold resistance
No electrical or mechanical defect at the standard test condition after leaving at room temperature and humidity for about 1 hour, after soaking under the ambience of –40±2°C for 96 hours.
There shall be no icing at a lower temperature range.

5.3 Humidity resistance
No electrical or mechanical defect at the standard test condition after leaving at room temperature and humidity for about 1 hour, after soaking under the ambience of 40±2°C and 90 to 95%RH for 96 hours.

6. Usage Environment

6.1 Ambient temperature range
-25 to +85°C 60%RH Max. (No dewing or icing)

6.2 Ambient humidity range
85%RH Max. (at +5 to +35°C, No dewing)

7. Durability

7.1 Durability
No electrical or mechanical defect at the standard test condition when switching the rated load at 1mA, 6VDC (resistive load) by 5,000,000 operations at the operating frequency of 300 operations/minute at the full stroke.
The contact resistance shall be 100Ω max. and the dielectric strength between terminals of the same polarity shall be excluded.

8. Standard Test Condition and Criteria

8.1 Standard test condition
Temperature : 20±15°C Humidity : 65±20%RH

8.2 Definition of "No electrical or mechanical defect"
Operating characteristics : Not exceeding ±20% of the specification value
Contact resistance : 10Ω Max.
Insulation resistance : 10MΩ Min.
Dielectric strength : Meeting the specification value

9. Correct use

9.1 Stroke setting for switch

・Setting an operating dog in the direction where the actuator moves and detaching the dog from the actuator completely when the switch is at the free position (FP).

・Avoiding an impact operation as much as possible as it can cause life deterioration.

・Do not depress push button more than total travel position(TTP).

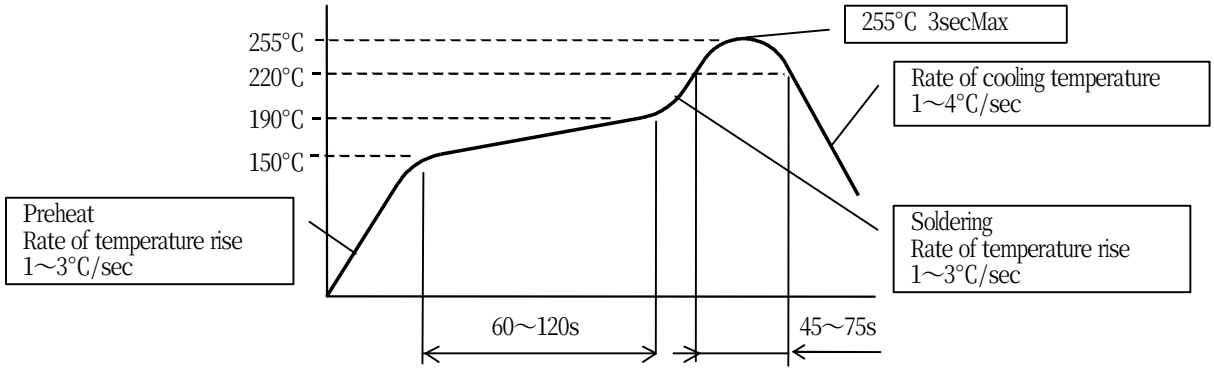
9.2 Soldering

・Reflow soldering with infrared irradiation

1) Set reflow bath to keep peak terminal temperature at 255°C max.

2) After soldering never clean the PC board nor the terminals.

3) Solder the terminals within the soldering temperature profile curve shown in the diagram.



・Soldering condition for manual soldering

1) Soldering temperature : 350°C max.

2) Soldering time : 3sec. max.

・Cautions

1) When soldering twice, wait until the first soldered portion returns to the normal temperature. Continuous heating may deform the external portions, make terminals loose or come off or deteriorate electrical characteristics.

2) This switch is not seal type. It cannot be washed or cleaned by solvents after soldering. After the soldering, flux or PCB powder can be entered to the switch if it is treated under dirty condition, such as when PCB is piled up or PCB is de-paneled by hands wearing dirty gloves with much PCB powder. Those must be avoided to prevent contacting failure.

9.3 Usage/storage environment for switch

・Avoiding the location where a corrosive gas is generated or temperature changes suddenly, the ambience of high temperature or humidity, dusts, water, dewing and others.

・It is recommended that the switch should be inspected before use if it is stored for more than 6 months after the production, depending on the location.

10. Warranty and Limited Warranty

(1) Definition

The definition of terms used in these Terms and Conditions are as follows:

1) *Usage conditions*: Usage conditions, rating, performance, operating environment, handling instructions, cautions, prohibited use, etc. of *Omron products* described in specifications, documentations or manuals.

2) *Customer application*: Application of *Omron products* by customers which include embedding and/or using *Omron products* in their parts/components, electronic substrates, devices, equipment or systems manufactured by customers.

3) *Fitness*: (a)Fitness, (b)performance, (c) non-infringement of third-party intellectual property, (d) compliance with laws and regulations and (e)conformity to various standards.

(2) Caution on Descriptions

Attention is required to the following points on descriptions in specifications.

1) Rated values and performance values are the product of tests performed for separate single conditions, including but not limited to temperature and humidity. It is not intended to warrant rated values and performance values for multiple combined conditions.

2) Reference data are provided for reference only. *Omron* does NOT warrant that *Omron product*s work properly at all time in the range of reference data.

3) Application examples are provided for reference only. *Omron* does NOT warrant the *Fitness* of *Omron products* under such application.

4) *Omron* may discontinue the production of *Omron products* or change the specifications of them for the purpose of improving such products or other reasons entirely at its own discretion.

(3) Precautions

Please be aware of and accept the following when you introduce or use *Omron products*.

1) Please use *Omron products* in compliance with *usage conditions* including rating and performance.
2) Please confirm *fitness* of *Omron products* in your application and use your own judgment to determine the appropriateness of using them in such application. *Omron* shall not warrant the *fitness* of *Omron products* in customer application.
3) Please confirm that *Omron products* are properly wired and installed for their intended use in your overall system.
4) When using *Omron products*, please make sure to (i) maintain a margin of safety vis-à-vis the published rated and performance values, (ii) design to minimize risks to customer application in case of failure of *Omron products*, such as introducing redundancy, (iii) introduce system-wide safety measures to notify risks to users, and (iv) conduct regular maintenance on *Omron products* and *customer application*.
5) *Omron products* are designed and manufactured as general-purpose products for use in general industrial products. They are not intended to be used in the following applications. If you are using *Omron products* in the following applications, *Omron* shall not provide any warranty for such *Omron products*.
   (a) Applications with stringent safety requirements, including but not limited to nuclear power control equipment, combustion equipment, aerospace equipment, railway equipment, elevator/lift equipment, amusement park equipment, medical equipment, safety devices and other applications that could cause danger/harm to people's body and life.
   (b) Applications that require high reliability, including but not limited to supply systems for gas, water and electricity, etc., 24 hour continuous operating systems, financial settlement systems and other applications that handle rights and property.
   (c) Applications under severe condition or in severe environment, including but not limited to outdoor equipment, equipment exposed to chemical contamination, equipment exposed to electromagnetic interference and equipment exposed to vibration and shocks
   (d) Applications under conditions and environment not described in specification
6) In addition to the applications listed from (a) to (d) above, *Omron products* are not intended for use in automotive applications (including two wheel vehicles). Please do NOT use *Omron products* for automotive applications. Please contact *Omron* sales staff for products for automotive use.

(4) Warranty Terms and Conditions

The terms and conditions for warranty of *Omron products* are as follows:

1) Warranty period: One year after the purchase.
2) Coverage: *Omron* will provide free replacement of the malfunctioning *Omron products* with the same number of replacement/alternative products.
3) Exceptions: *Omron* will not cover *Omron products* under its warranty if the cause of the malfunction falls under any of the following.
   (a) Usage in a manner other than the original intended use for the *Omron products*.
   (b) Usage outside of the *usage conditions*.
   (c) Modification or repair made to the Omron product by other than Omron personnel.
   (d) Software program embedded by other than Omron or usage of such software.
   (e) Cause which could not have been foreseen with the level of science and technology at the time of shipping from *Omron*.
   (f) Causes originating from other than *Omron* or *Omron products* (including force majeure such as but not limited to natural disasters).

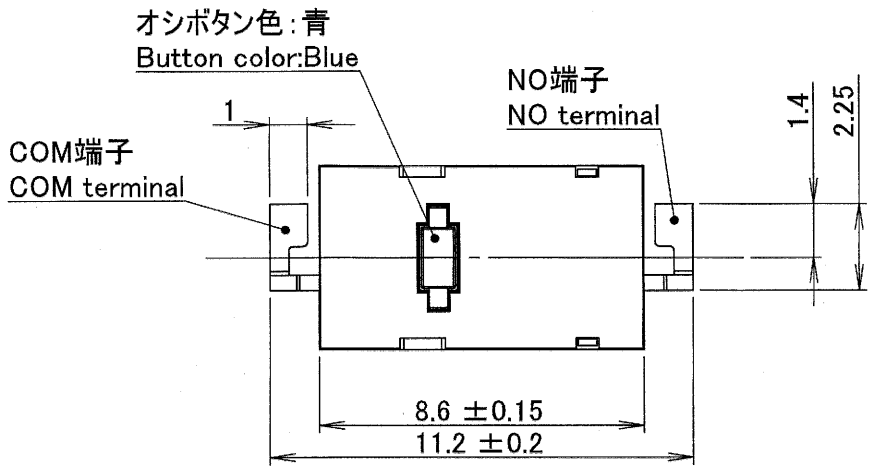
(5) Limitation of Liability

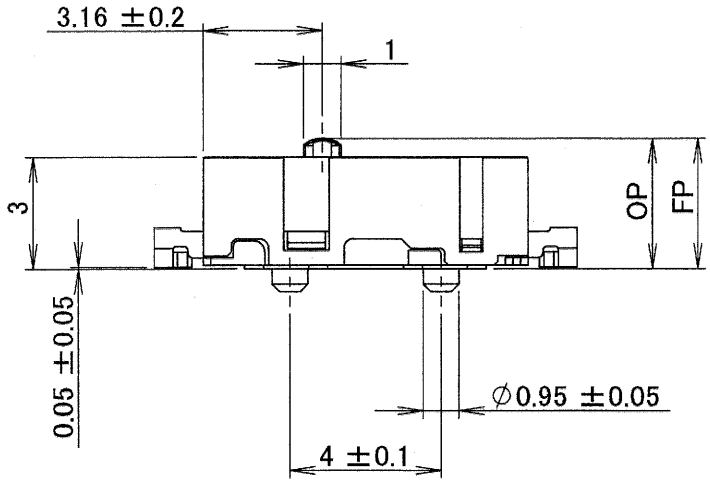
The warranty set out in these Terms and Conditions is the whole and sole liability for *Omron products*. There are no other warranties, expressed or implied. *Omron* and the distributors of *Omron products* are not liable for any damages which may arise from or be related to *Omron products*.

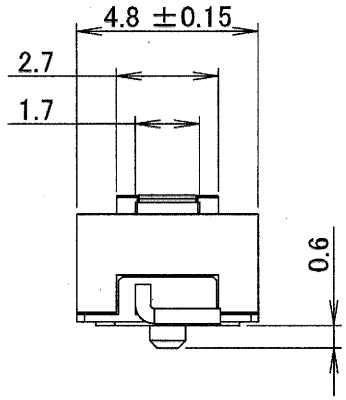
(6) Export Controls

Customers of *Omron products* shall comply with all applicable laws and regulations of Japan and/or other relevant countries with regard to security export control, when exporting *Omron products* and/or technical documents or providing such products and/or documents to a non-resident. *Omron* may not provide customers with Omron products and/or technical documents should they fail to comply with such laws and regulations.

A	2013/11/12	Newly prepared	K.Yoshimura		T.Abe
Code	Date	Revision content	Issue	Check	Approval



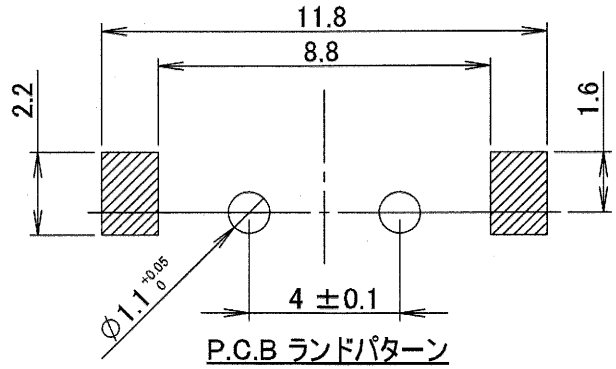




1.動作特性
Characteristics

動作に必要な力 Operating force	0.6±0.2 N
もどりの力 Releasing force	0.15 N MIN.
動作後の動き Over travel	0.1 mm MIN.
応差の動き Movement Differential	0.12 mm MAX.
自由位置 Free Position	3.5±0.2 mm
動作位置 Operating Position	3.2±0.2 mm

2.電気定格
Electrical ratings
1mA 6VDC



P.C.B ランドパターン
P.C.B Mounting holes

SYM	DATE	E/C CONTENTS	E/C NO.	SIGN
A2	20130820	図面名英文化	#2110094	井尻
A1	20130325	英文追加	#2110087	井尻

MATERIAL
FINISH
TOLERANCES UNLESS SPECIFIED ±0.4
DESIGNED 2013/02/14 OES開業 井尻
CHECKED OES 開業G 13.8.20 課長 田
APPROVED OES 開業G長 13.8.20
SCALE 5:1
3RD ANGLE
SHEET 1/1

A2 Type D2LS-21 Outline drawing
DRWG NO. 2267332-1 A2
DESIGNED FOR D2LS-21

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A4