



## Features

- RoHS compliant\*
- Conductive plastic or cermet
- Linear and audio tapers
- PC board and bushing mount
- Gangable
- Metal bushing and shaft
- Sealed for board washing



## 51/53 - Sealed 1/2" (12.5 mm) Square Control

| Electrical Characteristics <sup>1</sup>                                                                               | Conductive Plastic                                                                                                                                                                                                                                                                       | Cermet                |
|-----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Standard Resistance Range                                                                                             |                                                                                                                                                                                                                                                                                          |                       |
| Linear .....                                                                                                          | 1 K ohms to 1 megohm.....                                                                                                                                                                                                                                                                | 150 ohms to 1 megohm  |
| Audio .....                                                                                                           | 1 K ohms to 1 megohm.....                                                                                                                                                                                                                                                                | 1 K ohms to 1 megohm  |
| Total Resistance Tolerance                                                                                            |                                                                                                                                                                                                                                                                                          |                       |
| Linear Tapers .....                                                                                                   | ±10 % or ±20 % .....                                                                                                                                                                                                                                                                     | ±10 % or ±5 %         |
| Audio Tapers .....                                                                                                    | ±10 % or ±20 % .....                                                                                                                                                                                                                                                                     | ±10 %                 |
| Independent Linearity .....                                                                                           | ±5 % .....                                                                                                                                                                                                                                                                               | ±5 %                  |
| Absolute Minimum Resistance .....                                                                                     | 2 ohms maximum .....                                                                                                                                                                                                                                                                     | 2 ohms maximum        |
| Effective Electrical Angle .....                                                                                      | 270 ° ±5 ° .....                                                                                                                                                                                                                                                                         | 270 ° ±5 °            |
| Contact Resistance Variation .....                                                                                    | 2 % .....                                                                                                                                                                                                                                                                                | 2 %                   |
| Dielectric Withstanding Voltage (MIL-STD-202 – Method 301)                                                            |                                                                                                                                                                                                                                                                                          |                       |
| Sea Level .....                                                                                                       | 1,500 VAC minimum .....                                                                                                                                                                                                                                                                  | 1,500 VAC minimum     |
| 70,000' .....                                                                                                         | 500 VAC minimum .....                                                                                                                                                                                                                                                                    | 500 VAC minimum       |
| Insulation Resistance .....                                                                                           | 1,000 megohms minimum .....                                                                                                                                                                                                                                                              | 1,000 megohms minimum |
| Power Rating At 70 °C (Derate To 0 At 125 °C)<br>(Voltage Limited By Power Dissipation or 350 VAC, Whichever Is Less) |                                                                                                                                                                                                                                                                                          |                       |
| Linear Tapers .....                                                                                                   | 0.5 watt .....                                                                                                                                                                                                                                                                           | 1.0 watt              |
| Audio Tapers .....                                                                                                    | 0.25 watt .....                                                                                                                                                                                                                                                                          | 0.5 watt              |
| Theoretical Resolution .....                                                                                          | Essentially infinite .....                                                                                                                                                                                                                                                               | Essentially infinite  |
| Environmental Characteristics <sup>1</sup>                                                                            |                                                                                                                                                                                                                                                                                          |                       |
| Operating Temperature Range .....                                                                                     | +1 °C to +125 °C .....                                                                                                                                                                                                                                                                   | +1 °C to +125 °C      |
| Storage Temperature Range .....                                                                                       | -55 °C to +125 °C .....                                                                                                                                                                                                                                                                  | -55 °C to +125 °C     |
| Temperature Coefficient Over Storage Temperature Range .....                                                          | ±1,000 ppm/°C .....                                                                                                                                                                                                                                                                      | ±150 ppm/°C           |
| Vibration (Single Section) .....                                                                                      | 15 G .....                                                                                                                                                                                                                                                                               | 15 G                  |
| Total Resistance Shift .....                                                                                          | ±2 % maximum .....                                                                                                                                                                                                                                                                       | ±2 % maximum          |
| Voltage Ratio Shift .....                                                                                             | ±5 % maximum .....                                                                                                                                                                                                                                                                       | ±5 % maximum          |
| Shock (Single Section) .....                                                                                          | 30 G .....                                                                                                                                                                                                                                                                               | 30 G                  |
| Total Resistance Shift .....                                                                                          | ±2 % maximum .....                                                                                                                                                                                                                                                                       | ±2 % maximum          |
| Voltage Ratio Shift .....                                                                                             | ±5 % maximum .....                                                                                                                                                                                                                                                                       | ±5 % maximum          |
| Load Life .....                                                                                                       | 1,000 hours .....                                                                                                                                                                                                                                                                        | 1,000 hours           |
| Total Resistance Shift .....                                                                                          | ±10 % TRS maximum .....                                                                                                                                                                                                                                                                  | ±5 % TRS maximum      |
| Rotational Life (No Load) .....                                                                                       | 50,000 cycles .....                                                                                                                                                                                                                                                                      | 25,000 cycles         |
| Total Resistance Shift .....                                                                                          | ±10 % TRS maximum .....                                                                                                                                                                                                                                                                  | ±10 % TRS maximum     |
| Contact Resistance Variation @ 25,000 Cycles .....                                                                    | ±2 % .....                                                                                                                                                                                                                                                                               | ±4 %                  |
| Moisture Resistance (MIL-STD-202, Method 103, Condition B)                                                            |                                                                                                                                                                                                                                                                                          |                       |
| Total Resistance Shift .....                                                                                          | ±10 % TRS .....                                                                                                                                                                                                                                                                          | ±5 % TRS              |
| IP Rating                                                                                                             |                                                                                                                                                                                                                                                                                          |                       |
| Entire Unit .....                                                                                                     | IP64 .....                                                                                                                                                                                                                                                                               | IP64                  |
| Shaft/Bushing .....                                                                                                   | IP65 .....                                                                                                                                                                                                                                                                               | IP65                  |
| Mechanical Characteristics                                                                                            |                                                                                                                                                                                                                                                                                          |                       |
| Stop Strength .....                                                                                                   | 56 N-cm (5 lb.-in.)                                                                                                                                                                                                                                                                      |                       |
| Mechanical Angle .....                                                                                                | 290 ° ±5 °                                                                                                                                                                                                                                                                               |                       |
| Torque                                                                                                                |                                                                                                                                                                                                                                                                                          |                       |
| Starting (Dual Sections) .....                                                                                        | +0.35 N-cm (+0.5 oz.-in.) maximum                                                                                                                                                                                                                                                        |                       |
| Running (Single Section) .....                                                                                        | 0.15 to 1.4 N-cm (0.2 to 2.0 oz.-in.)                                                                                                                                                                                                                                                    |                       |
| Running (Dual Section) .....                                                                                          | 0.35 to 1.8 N-cm (0.5 to 2.5 oz.-in.)                                                                                                                                                                                                                                                    |                       |
| Detent (Single Section) .....                                                                                         | 1.94 N-cm (2.75 oz.-in.) minimum                                                                                                                                                                                                                                                         |                       |
| Mounting (Torque on Bushing) .....                                                                                    | 1.7 to 2.0 N-m (15 to 18 lb.-in.) maximum                                                                                                                                                                                                                                                |                       |
| Weight (Single Section) .....                                                                                         | 5.5 grams                                                                                                                                                                                                                                                                                |                       |
| (Additional Section) .....                                                                                            | 3.0 grams                                                                                                                                                                                                                                                                                |                       |
| Terminals .....                                                                                                       | PC pin or solder lug                                                                                                                                                                                                                                                                     |                       |
| Soldering Condition .....                                                                                             | Recommended hand soldering using Sn95/Ag5 no clean solder, 0.025" wire diameter.<br>Maximum temperature 399 °C (750 °F) for 3 seconds. No wash process to be used with no clean flux.<br>Part can be wave soldered at 260 °C (500 °F) for 5 seconds, no wash process with no clean flux. |                       |
| Marking .....                                                                                                         | Manufacturer's trademark, part number, resistance value and date code.                                                                                                                                                                                                                   |                       |
| Ganging (Multiple Section Potentiometer) .....                                                                        | 2 sections maximum**                                                                                                                                                                                                                                                                     |                       |
| Hardware .....                                                                                                        | One lockwasher and one mounting nut is shipped with each potentiometer, except where noted in the part number.                                                                                                                                                                           |                       |

<sup>1</sup>At room ambient: +25 °C nominal and 50 % relative humidity nominal, except as noted.

\*\* Additional sections available on special request with higher minimum order quantities.

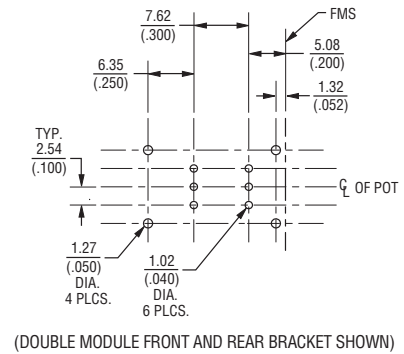
\*RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.

Specifications are subject to change without notice.

The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time.  
Users should verify actual device performance in their specific applications.

**BOURNS®**

## PACKAGE DIMENSIONS



Technical drawing of a Tee fitting with the following dimensions:

- Top horizontal dimension:  $1.64$  ( $.025$ )
- Left vertical dimension:  $0.91 \pm .05$  ( $.036 \pm .002$ )
- Bottom left horizontal dimension:  $6.35 \pm .25$  ( $.250 \pm .010$ )
- Bottom middle horizontal dimension:  $7.62 \pm 0.30$  ( $.300 \pm .012$ )
- Bottom right horizontal dimension:  $5.08 \pm 0.30$  ( $.200 \pm .012$ )
- Right vertical dimension:  $1.32 \pm 0.25$  ( $.052 \pm .010$ )

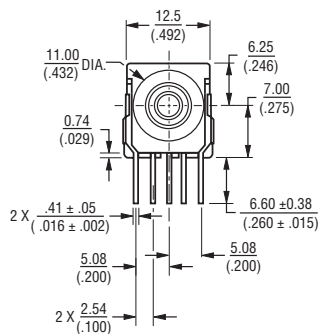


Diagram of a spring element with nodes 1, 2, and 3. Node 1 is on the left, node 3 is on the right, and node 2 is in the middle. Arrows indicate degrees of freedom: CCW for node 1, CW for node 3, and an upward arrow for node 2.

"A" Shown)

Technical drawing showing the "A" view of a component. The drawing includes a side view of a cylindrical component with a threaded section and a pin. Dimensions are given in inches and millimeters.

Dimensions:

- 0.80 ± 0.30 (0.031 ± .012)
- 0.41 (0.016)
- 1.52 (0.060)
- 5.70 (0.224)

FOR TOLERANCES SHOWN: .XX =  $\pm \frac{.25}{(.010)}$   
 .XXX =  $\pm \frac{.13}{(.005)}$   
 SHAFT DIMENSIONS  $\pm \frac{.80}{(1/32)}$

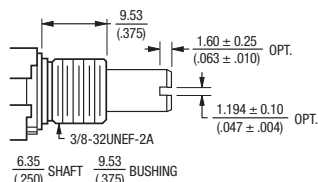
DIMENSIONS:  $\frac{\text{MM}}{(\text{INCHES})}$

Specifications are subject to change without notice.  
The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time.  
Users should verify actual device performance in their specific applications.

# 51/53 - Sealed 1/2 " (12.5 mm) Square Control

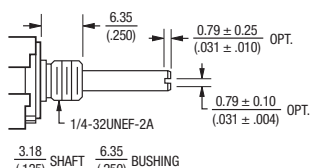
**BOURNS®**

## Shaft/Bushing Styles



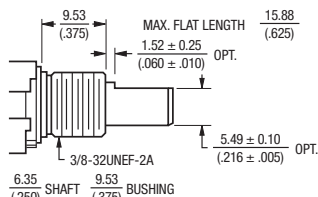
### A Style Bushing

| STD. LENGTH "L" |
|-----------------|
| .500 (12.7)     |
| .625 (15.88)    |
| .750 (19.05)    |
| .875 (22.23)    |
| 1.000 (25.4)    |



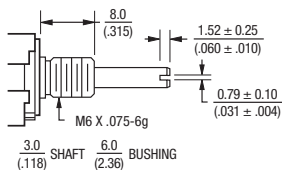
### C Style Bushing

| STD. LENGTH "L" |
|-----------------|
| .375 (9.53)     |
| .500 (12.7)     |
| .625 (15.88)    |
| .750 (19.05)    |
| .875 (22.23)    |
| 1.000 (25.4)    |



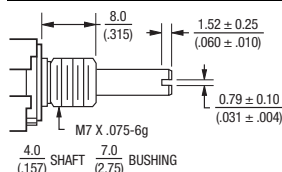
### A Style Bushing - Flatted Shaft

| STD. LENGTH "L" |
|-----------------|
| .625 (15.88)    |
| .750 (19.05)    |
| .875 (22.23)    |
| 1.000 (25.4)    |



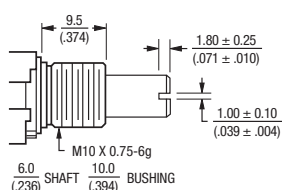
### S Style Bushing

| STD. LENGTH "L" |
|-----------------|
| .630 (16.0)     |
| .866 (22.0)     |
| .984 (25.0)     |



### U Style Bushing

| STD. LENGTH "L" |
|-----------------|
| .630 (16.0)     |
| .866 (22.0)     |
| .984 (25.0)     |



### R Style Bushing

| STD. LENGTH "L" |
|-----------------|
| .630 (16.0)     |
| .866 (22.0)     |
| .984 (25.0)     |

DIMENSIONS:  $\frac{\text{MM}}{(\text{INCHES})}$

## How To Order

|    |   |   |   |   |   |    |   |   |    |   |     |   |
|----|---|---|---|---|---|----|---|---|----|---|-----|---|
| 51 | A | A | D | - | B | 28 | - | A | 15 | / | A15 | L |
|----|---|---|---|---|---|----|---|---|----|---|-----|---|

Part number for multiple section potentiometers must have a taper and resistance value for each section.

| RoHS IDENTIFIER |
|-----------------|
| L Compliant     |

### MOUNTING BRACKET/ ANTI-ROTATION LUG

| Code | Description            |
|------|------------------------|
| A    | AR Lug 90 °CW          |
| D    | No AR Lug or Bracket   |
| L    | Front Bracket          |
| M    | Rear Bracket           |
| N    | Front and Rear Bracket |

### # SECTIONS/DETENTS

| Code | Description            |
|------|------------------------|
| A    | Single No Detent       |
| B    | Double No Detent       |
| E    | Single w/Center Detent |
| F    | Double w/Center Detent |

### BUSHING CONFIGURATION

| Code | Description        |
|------|--------------------|
| A    | 3/8 " D x 3/8 " L  |
| C    | 1/4 " D x 1/4 " L  |
| R    | 10 mm D x 9.5 mm L |
| S    | 6 mm D x 8 mm L    |
| U    | 7 mm D x 8 mm L    |

### MODEL

| Code | Description              |
|------|--------------------------|
| 51   | PC Pins (.100 " centers) |
| 53   | Solder Lugs              |

| ELEMENT TAPER TYPE/TOLERANCE      | RESISTANCE (CODE)         |
|-----------------------------------|---------------------------|
| (A) Linear Cermet ±10 %           | (28) - 150 (14) - 7.5 K   |
| (H) Linear Cermet ±5 %            | (06) - 200 (30) - 15 K    |
|                                   | (07) - 250 (30) - 15 K    |
|                                   | (08) - 500 (16) - 20 K    |
|                                   | (09) - 750 (17) - 25 K    |
|                                   | (10) - 1 K (18) - 50 K    |
|                                   | (29) - 1.5 K (19) - 75 K  |
|                                   | (11) - 2 K (20) - 100 K   |
|                                   | (12) - 2.5 K (23) - 500 K |
|                                   | (13) - 5 K (25) - 1 M     |
| (B) Linear C-P ±20 %              | (10) - 1 K (18) - 50 K    |
| (E) Linear C-P ±10 %              | (12) - 2.5 K (20) - 100 K |
|                                   | (13) - 5 K (22) - 250 K   |
|                                   | (15) - 10 K (23) - 500 K  |
|                                   | (16) - 20 K (25) - 1 M    |
|                                   | (17) - 25 K               |
| (C) CW Audio Cermet ±10 %         | (10) - 1 K (18) - 50 K    |
| (F) CCW Audio Cermet ±10 %        | (12) - 2.5 K (20) - 100 K |
|                                   | (13) - 5 K (23) - 500 K   |
|                                   | (15) - 10 K (25) - 1 M    |
|                                   | (17) - 25 K               |
| (D) CW Audio C-P ±20 %            | (10) - 1 K (18) - 50 K    |
| (S) CW Audio C-P ±10 %            | (12) - 2.5 K (20) - 100 K |
|                                   | (13) - 5 K (22) - 250 K   |
|                                   | (15) - 10 K (23) - 500 K  |
|                                   | (17) - 25 K (25) - 1 M    |
| (G) CCW Audio C-P ±20 %           | (10) - 1 K (18) - 50 K    |
| (T) CCW Audio C-P ±10 %           | (12) - 2.5 K (20) - 100 K |
|                                   | (13) - 5 K (22) - 250 K   |
|                                   | (15) - 10 K (23) - 500 K  |
|                                   | (17) - 25 K (25) - 1 M    |
| (Y) CW Dual Audio Taper C-P ±20 % | (10) - 1 K (18) - 50 K    |
|                                   | (12) - 2.5 K (20) - 100 K |
|                                   | (13) - 5 K (22) - 250 K   |
|                                   | (15) - 10 K (23) - 500 K  |
|                                   | (17) - 25 K (25) - 1 M    |

| SHAFT TYPE |                       | AVAILABLE ONLY IN |                |
|------------|-----------------------|-------------------|----------------|
| Code       | Description           | BUSHINGS          | LENGTHS        |
| B          | Single Slotted 1/4 "D | A                 | 24,28          |
| C          | Single Flatted 1/4 "D | A                 | 20,24,28,32    |
| E          | Single Slotted 1/8 "D | C                 | 12,16,20,24,28 |
| R          | Single Slotted 6 mmD  | R                 | 16,22,25       |
| T          | Single Slotted 4 mmD  | U                 | 16,22,25       |
| U          | Single Slotted 3 mmD  | S                 | 16,22,25       |

| SHAFT LENGTH (FMS) |             | AVAILABLE ONLY IN BUSHING |
|--------------------|-------------|---------------------------|
| Code               | Description | Code                      |
| 12                 | 3/8 "       | C                         |
| 16                 | 1/2 "       | A, C                      |
| 20                 | 5/8 "       | A, C                      |
| 24                 | 3/4 "       | A, C                      |
| 28                 | 7/8 "       | A, C                      |
| 32                 | 1 "         | A, C                      |
| Metric             |             |                           |
| 16                 | 16 mm       | R, S, U                   |
| 22                 | 22 mm       | R, S, U                   |
| 25                 | 25 mm       | R, S, U                   |

Boldface features are Bourns standard options. All others are available with higher minimum order quantities.

REV. 05/13

Specifications are subject to change without notice. The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time. Users should verify actual device performance in their specific applications.

## Данный компонент на территории Российской Федерации

**Вы можете приобрести в компании MosChip.**

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru

moschip.ru\_4

moschip.ru\_6

moschip.ru\_9