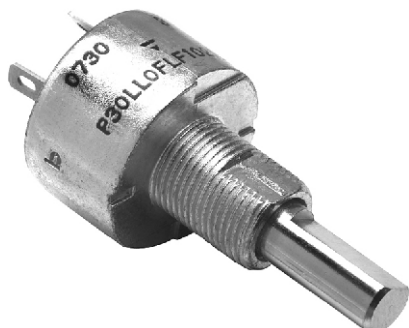




# Long Life Potentiometer - 2 Million Cycles, Heavy Duty - Cermet, Fully Sealed



## FEATURES

- 2 million cycles
- High power rating 3 W at 70 °C
- Cermet element
- Low temperature coefficient ( $\pm 150$  ppm/°C typical)
- Custom designs on request
- Tests according to CECC 41000 or IEC 60393-1
- Construction: fully sealed
- Professional grade
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

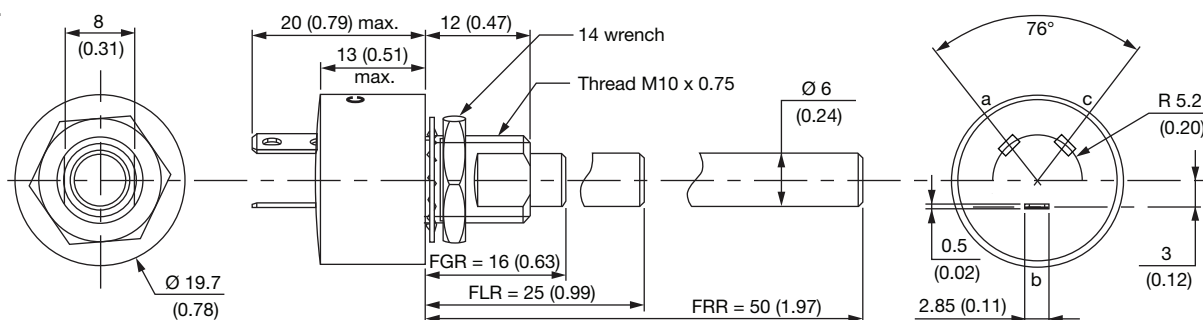
## LINKS TO ADDITIONAL RESOURCES



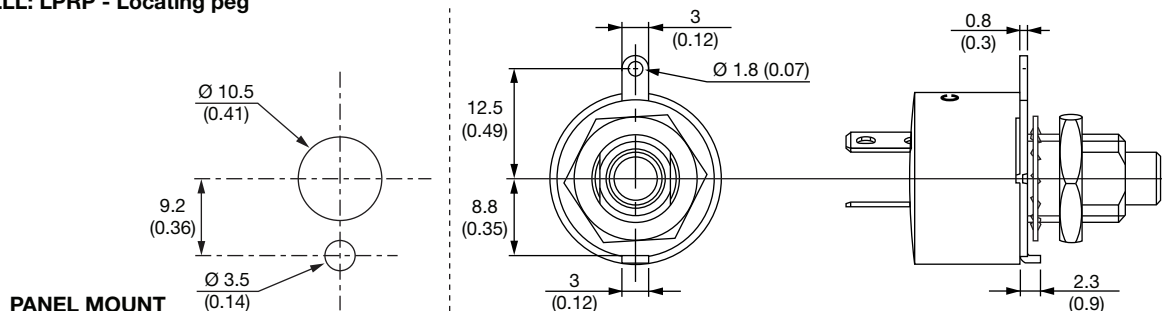
| QUICK REFERENCE DATA    |                                                   |
|-------------------------|---------------------------------------------------|
| Multiple module         | No                                                |
| Switch module           | n/a                                               |
| Detent module           | n/a                                               |
| Special electrical laws | A: linear, L: logarithmic, F: reverse logarithmic |
| Sealing level           | IP 67                                             |
| Lifespan                | 2M cycles                                         |

## DIMENSIONS in millimeters (inches) $\pm 0.5$ mm ( $\pm 0.02$ " )

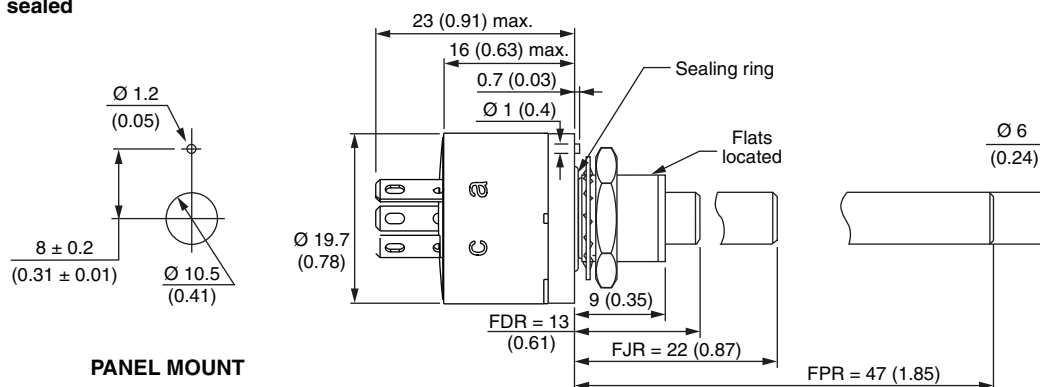
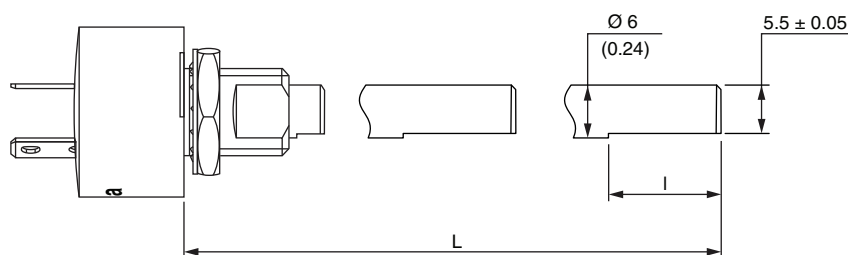
### P30LL



### P30LLL: LPRP - Locating peg



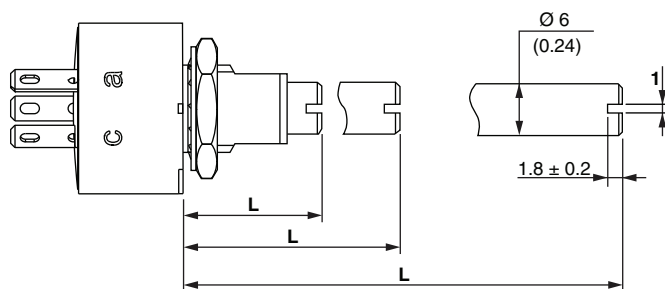
**DIMENSIONS** in millimeters (inches)  $\pm 0.5$  mm ( $\pm 0.02$ ")

**P30LME: Panel sealed**

**PANEL MOUNT**
**Standard shaft style F (flatted)**


| MODEL | SHAFT CONFIGURATION | L (mm) | I (mm) |
|-------|---------------------|--------|--------|
| P30LL | FGF                 | 16     | 3.17   |
|       | FLF                 | 25     | 12     |
|       | FRF                 | 30     | 12     |
| P30LM | FDF                 | 13     | 3.17   |
|       | FJF                 | 22     | 12     |
|       | FPF                 | 47     | 12     |

**Note**

- Shaft shown at center position. Flat opposite to the wiper

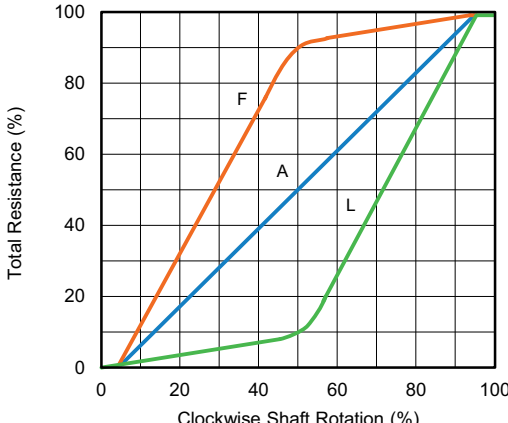
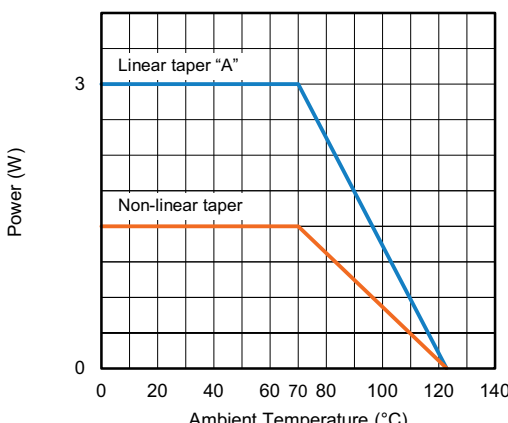
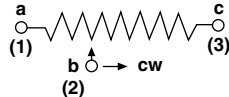
**Standard shaft style S (slotted)**


| MODEL | SHAFT CONFIGURATION | L (mm) |
|-------|---------------------|--------|
| P30LL | FGS                 | 16     |
|       | FLS                 | 25     |
|       | FRS                 | 50     |
| P30LM | FDS                 | 13     |
|       | FJS                 | 22     |
|       | FPS                 | 47     |

**Note**

- Slot aligned to the wiper at  $\pm 10^\circ$



| <b>ELECTRICAL SPECIFICATIONS</b>             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                |                               |                                |                             |              |  |                  |  |                               |                                |                               |                                |   |   |      |     |      |   |   |     |     |      |    |   |     |     |     |    |     |     |     |     |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------|--------------------------------|-----------------------------|--------------|--|------------------|--|-------------------------------|--------------------------------|-------------------------------|--------------------------------|---|---|------|-----|------|---|---|-----|-----|------|----|---|-----|-----|-----|----|-----|-----|-----|-----|
| Resistive element                            | Cermet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                |                               |                                |                             |              |  |                  |  |                               |                                |                               |                                |   |   |      |     |      |   |   |     |     |      |    |   |     |     |     |    |     |     |     |     |
| Electrical travel                            | 270° ± 10°                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                |                               |                                |                             |              |  |                  |  |                               |                                |                               |                                |   |   |      |     |      |   |   |     |     |      |    |   |     |     |     |    |     |     |     |     |
| Standard resistance values                   | 1 kΩ - 5 kΩ - 10 kΩ - 50 kΩ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                |                               |                                |                             |              |  |                  |  |                               |                                |                               |                                |   |   |      |     |      |   |   |     |     |      |    |   |     |     |     |    |     |     |     |     |
| Tolerance                                    | ± 20 % - ± 10 %                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                |                               |                                |                             |              |  |                  |  |                               |                                |                               |                                |   |   |      |     |      |   |   |     |     |      |    |   |     |     |     |    |     |     |     |     |
| Taper                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                |                               |                                |                             |              |  |                  |  |                               |                                |                               |                                |   |   |      |     |      |   |   |     |     |      |    |   |     |     |     |    |     |     |     |     |
| Power rating                                 | <div> <div>Linear</div> <div>Non-linear taper</div> </div> <div> 3 W at 70 °C<br/>1.5 W at 70 °C </div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                |                               |                                |                             |              |  |                  |  |                               |                                |                               |                                |   |   |      |     |      |   |   |     |     |      |    |   |     |     |     |    |     |     |     |     |
| Circuit diagram                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                |                               |                                |                             |              |  |                  |  |                               |                                |                               |                                |   |   |      |     |      |   |   |     |     |      |    |   |     |     |     |    |     |     |     |     |
| Standard resistance element data             | <table border="1"> <thead> <tr> <th rowspan="2">RESISTANCE<br/>VALUE<br/>(kΩ)</th><th colspan="2">LINEAR TAPER</th><th colspan="2">NON-LINEAR TAPER</th></tr> <tr> <th>MAX. POWER<br/>AT 70 °C<br/>(W)</th><th>MAX. WORKING<br/>VOLTAGE<br/>(V)</th><th>MAX. POWER<br/>AT 70 °C<br/>(W)</th><th>MAX. WORKING<br/>VOLTAGE<br/>(V)</th></tr> </thead> <tbody> <tr> <td>1</td><td>3</td><td>54.8</td><td>1.5</td><td>38.7</td></tr> <tr> <td>5</td><td>3</td><td>122</td><td>1.5</td><td>86.6</td></tr> <tr> <td>10</td><td>3</td><td>173</td><td>1.5</td><td>122</td></tr> <tr> <td>50</td><td>1.8</td><td>300</td><td>1.5</td><td>274</td></tr> </tbody> </table> |                                |                               |                                | RESISTANCE<br>VALUE<br>(kΩ) | LINEAR TAPER |  | NON-LINEAR TAPER |  | MAX. POWER<br>AT 70 °C<br>(W) | MAX. WORKING<br>VOLTAGE<br>(V) | MAX. POWER<br>AT 70 °C<br>(W) | MAX. WORKING<br>VOLTAGE<br>(V) | 1 | 3 | 54.8 | 1.5 | 38.7 | 5 | 3 | 122 | 1.5 | 86.6 | 10 | 3 | 173 | 1.5 | 122 | 50 | 1.8 | 300 | 1.5 | 274 |
| RESISTANCE<br>VALUE<br>(kΩ)                  | LINEAR TAPER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                | NON-LINEAR TAPER              |                                |                             |              |  |                  |  |                               |                                |                               |                                |   |   |      |     |      |   |   |     |     |      |    |   |     |     |     |    |     |     |     |     |
|                                              | MAX. POWER<br>AT 70 °C<br>(W)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | MAX. WORKING<br>VOLTAGE<br>(V) | MAX. POWER<br>AT 70 °C<br>(W) | MAX. WORKING<br>VOLTAGE<br>(V) |                             |              |  |                  |  |                               |                                |                               |                                |   |   |      |     |      |   |   |     |     |      |    |   |     |     |     |    |     |     |     |     |
| 1                                            | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 54.8                           | 1.5                           | 38.7                           |                             |              |  |                  |  |                               |                                |                               |                                |   |   |      |     |      |   |   |     |     |      |    |   |     |     |     |    |     |     |     |     |
| 5                                            | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 122                            | 1.5                           | 86.6                           |                             |              |  |                  |  |                               |                                |                               |                                |   |   |      |     |      |   |   |     |     |      |    |   |     |     |     |    |     |     |     |     |
| 10                                           | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 173                            | 1.5                           | 122                            |                             |              |  |                  |  |                               |                                |                               |                                |   |   |      |     |      |   |   |     |     |      |    |   |     |     |     |    |     |     |     |     |
| 50                                           | 1.8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 300                            | 1.5                           | 274                            |                             |              |  |                  |  |                               |                                |                               |                                |   |   |      |     |      |   |   |     |     |      |    |   |     |     |     |    |     |     |     |     |
| Temperature coefficient (typical)            | ± 150 ppm/°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                |                               |                                |                             |              |  |                  |  |                               |                                |                               |                                |   |   |      |     |      |   |   |     |     |      |    |   |     |     |     |    |     |     |     |     |
| Limiting element voltage                     | 300 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                |                               |                                |                             |              |  |                  |  |                               |                                |                               |                                |   |   |      |     |      |   |   |     |     |      |    |   |     |     |     |    |     |     |     |     |
| End resistance (typical)                     | 1 Ω                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                |                               |                                |                             |              |  |                  |  |                               |                                |                               |                                |   |   |      |     |      |   |   |     |     |      |    |   |     |     |     |    |     |     |     |     |
| Dielectric strength (RMS)                    | 2500 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                |                               |                                |                             |              |  |                  |  |                               |                                |                               |                                |   |   |      |     |      |   |   |     |     |      |    |   |     |     |     |    |     |     |     |     |
| Insulation resistance (300 V <sub>DC</sub> ) | 10 <sup>5</sup> MΩ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                |                               |                                |                             |              |  |                  |  |                               |                                |                               |                                |   |   |      |     |      |   |   |     |     |      |    |   |     |     |     |    |     |     |     |     |
| Independent linearity (typical)              | ± 5 %                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                |                               |                                |                             |              |  |                  |  |                               |                                |                               |                                |   |   |      |     |      |   |   |     |     |      |    |   |     |     |     |    |     |     |     |     |

### MECHANICAL SPECIFICATIONS

|                                   |                   |                     |
|-----------------------------------|-------------------|---------------------|
| Mechanical travel                 | 300° ± 5°         |                     |
| Operating torque / typical value  | 2 Ncm             | 2.83 oz.-inch       |
| End stop torque                   | 70 Ncm max.       | 99 oz.-inch max.    |
| Tightening torque of mounting nut | 250 Ncm max.      | 22.13 lb-inch max.  |
| Unit weight                       | 23 g to 32 g max. | 0.8 oz. to 1.13 oz. |
| Terminals                         | e3: pure Sn       |                     |

### ENVIRONMENTAL SPECIFICATIONS

|                   |                               |  |
|-------------------|-------------------------------|--|
| Temperature range | -55 °C to +125 °C             |  |
| Climatic category | 55/125/56                     |  |
| Sealing           | Fully sealed - container IP67 |  |

### OPTIONS

|                               |                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Special feature command shaft | Length is measured from the mounting surface to the free end of the shaft. The screwdriver slot is aligned with the wiper within ± 10°. Special shafts are available, in accordance to drawings supplied by customers. We recommend that customers should not machine tool shafts, in order to avoid damage. Bending or torsion of terminals should also be avoided. |
| Panel sealing                 | The panel sealing device consists of a ring located in a groove on the potentiometer face. Sealing is obtained by tightening the ring against the panel when mounting the potentiometer.                                                                                                                                                                             |
| Locating peg                  | Location is obtained by fitting a special washer on the mounting face of the potentiometer.                                                                                                                                                                                                                                                                          |

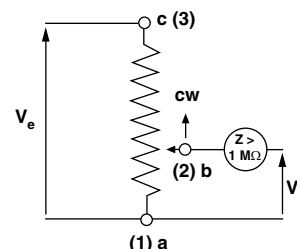
### MARKING

- Vishay trademark
- Full ordering information (see Ordering Information table)
- Manufacturing date code
- Marking of terminals 3, and a, b, c

### APPLICATION NOTE

The potentiometer shall be used in voltage divider with an impedance load at least 100 times higher than the total potentiometer nominal resistance value.

Advised load impedance:  
1 MΩ min. for resistance range of 1kΩ to 50 kΩ



| PERFORMANCE             |                                                                                                   |                           |                              |                                    |
|-------------------------|---------------------------------------------------------------------------------------------------|---------------------------|------------------------------|------------------------------------|
| TESTS                   | CONDITIONS                                                                                        | TYPICAL VALUES AND DRIFTS |                              |                                    |
|                         |                                                                                                   | $\Delta R_T/R_T$ (%)      | $\Delta R_{1-2}/R_{1-2}$ (%) | OTHER                              |
| Electrical endurance    | 1000 h at rated power<br>90°/30° - ambient temp. 70 °C                                            | ± 20 %                    | ± 20 %                       | -                                  |
| Climatic sequence       | Phase A dry heat 125 °C<br>Phase B damp heat<br>Phase C cold -55 °C<br>Phase D damp heat 5 cycles | ± 0.5 %                   | ± 1 %                        | -                                  |
| Damp heat, steady state | 56 days<br>40 °C 93 % HR                                                                          | ± 0.5 %                   | ± 1 %                        | Insulation resistance:<br>> 100 MΩ |
| Change of temperature   | 5 cycles<br>-55 °C at +125 °C                                                                     | ± 0.5 %                   | -                            | -                                  |
| Mechanical endurance    | 2 000 000 cycles at rated power<br>Turn angle: ± 60°<br>Temperature: 20 °C                        | ± 20 %                    | -                            | Independent linearity:<br>± 10 %   |
| Shock                   | 50 g's at 11 ms<br>3 successive shocks<br>in 3 directions                                         | ± 0.1 %                   | ± 0.2 %                      | -                                  |
| Vibration               | 10 Hz to 55 Hz<br>0.75 mm or 10 g's<br>during 6 h                                                 | ± 0.1 %                   | ± 0.2 %                      | -                                  |

**Note**

- Nothing stated herein shall be construed as a guarantee of quality or durability

| OPTION RELATIVE TO APPLICATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>"K14" OPTION</b> for AMS applications (avionics, military, and space)                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |
| <b>"K17" OPTION</b> for MEDICAL applications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| Option guarantees: <ul style="list-style-type: none"> <li>Reinforced incoming inspection on raw material</li> <li>Traceability of all materials used in the composition of the product</li> <li>50-year traceability (AMS market) / 20-year traceability (MEDICAL market)</li> <li>Customer information for any process or product modification having an impact on the function, mountability, shape or reliability of the product</li> <li>Periodic product monitoring</li> <li>Dedicated technical specification</li> </ul> |  |

| ORDERING INFORMATION (part number) |                                               |                                                                    |                                 |                                                                                                                  |                                                                                      |                                                        |                      |                                                                    |                                                   |
|------------------------------------|-----------------------------------------------|--------------------------------------------------------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------|----------------------|--------------------------------------------------------------------|---------------------------------------------------|
| P                                  | 3                                             | 0                                                                  | L                               | L                                                                                                                | 0                                                                                    | F                                                      | G                    | R                                                                  | 1 0 3 M A                                         |
| MODEL                              | BUSHING                                       | OPTION                                                             | SHAFT                           |                                                                                                                  |                                                                                      | RESISTANCE CODE / TOLERANCE CODE / TAPER               |                      |                                                                    | SPECIAL NUMBER                                    |
| P30L                               | L = M10 x 0.75<br>M = panel sealed M10 x 0.75 | 0 = none<br>E = with locating peg (for M bushing only)<br>L = LPRP | Diameter                        | Length                                                                                                           | End Shaft Shape                                                                      | Ohmic Value                                            | Tolerance            | Taper                                                              | (if applicable) Given by Vishay for custom design |
|                                    |                                               |                                                                    | F = Ø 6 mm<br>AP = custom shaft | For L bushing<br>G = 16 mm<br>L = 25 mm<br>R = 50 mm<br><br>For M bushing<br>D = 13 mm<br>J = 22 mm<br>P = 47 mm | R = round<br><br>On request:<br>S = slotted<br>D = custom end shaft<br>F = flattened | 102 = 1 kΩ<br>502 = 5 kΩ<br>103 = 10 kΩ<br>503 = 50 kΩ | M = 20 %<br>K = 10 % | A = linear<br>L = logarithmic<br>F = inverse clockwise logarithmic |                                                   |



| PART NUMBER DESCRIPTION (for information only) |         |        |       |       |           |       |         |           |         |         |                   |
|------------------------------------------------|---------|--------|-------|-------|-----------|-------|---------|-----------|---------|---------|-------------------|
| P30L                                           | L       | 0      | FGR   | 10K   | 20 %      | A     |         | BO10      |         |         | e3                |
| MODEL                                          | BUSHING | OPTION | SHAFT | VALUE | TOLERANCE | TAPER | SPECIAL | PACKAGING | SPECIAL | SPECIAL | LEAD<br>(Pb)-FREE |

| ACCESSORIES                                                    |                                                                        |
|----------------------------------------------------------------|------------------------------------------------------------------------|
| Potentiometers are delivered with accessories (nut, washer...) |                                                                        |
| Additional Accessories (to order separately)                   | <a href="http://www.vishay.com/doc?51051">www.vishay.com/doc?51051</a> |
| Control knobs                                                  | <a href="http://www.vishay.com/doc?51101">www.vishay.com/doc?51101</a> |

| RELATED DOCUMENTS                                                 |                                                                        |
|-------------------------------------------------------------------|------------------------------------------------------------------------|
| APPLICATION NOTES                                                 |                                                                        |
| Potentiometers and Trimmers                                       | <a href="http://www.vishay.com/doc?51001">www.vishay.com/doc?51001</a> |
| Guidelines for Vishay Sfernice Resistive and Inductive Components | <a href="http://www.vishay.com/doc?52029">www.vishay.com/doc?52029</a> |
| Capabilities and Custom Options                                   | <a href="http://www.vishay.com/doc?48485">www.vishay.com/doc?48485</a> |



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