

Trimmer Potentiometers



1

SMD Open Type 2mm Size PVZ2 Series

■ Features

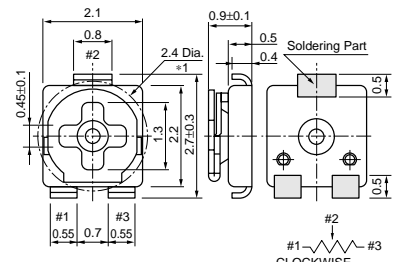
1. Ultra-small and thin external dimensions of 2.1 (W) x2.7 (L) x1.0 max. (T) mm.
2. Au plated termination achieve a high density P. C. B. mounting.
3. Cross-shaped driver slot allows for in-process automatic adjustment and it provides superior adjustability.
4. Two pieces parts construction achieve low cost and excellent quality.
5. Special resin substrate allow high peak temperature for reflow soldering.

■ Applications

- | | |
|-------------------|------------------------|
| 1. Pick-up module | 2. LCD |
| 3. Cellular-phone | 4. PHS |
| 5. Pager | 6. DVC |
| 7. Digital camera | 8. Portable audio, etc |



PVZ2A

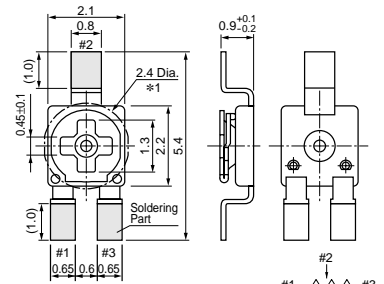


*1 Driver Plate Rotation Area :
Please do not place any components more than 0.7mm in height within this area.

in mm
(Tolerance : ±0.2)



PVZ2K



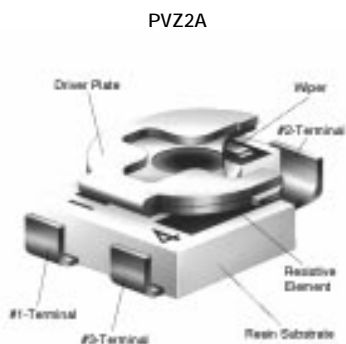
*1. Driver Plate Rotation Area :
Please do not place any components more than 0.7mm in height within this area.

in mm
(Tolerance : ±0.2)

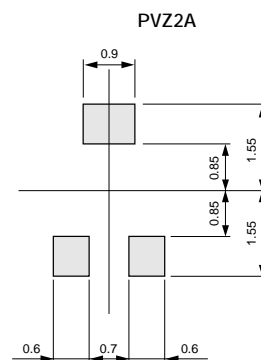
Part Number	Power Rating (W)	Soldering Method	Number of Turns (Effective Rotation Angle)	Total Resistance Value	TCR (ppm/°C)
PVZ2□501A01	0.1(50°C)	Reflow	1(240°±10°)	500ohm ±30%	±500
PVZ2□102A01	0.1(50°C)	Reflow	1(240°±10°)	1k ohm ±30%	±500
PVZ2□202A01	0.1(50°C)	Reflow	1(240°±10°)	2k ohm ±30%	±500
PVZ2□302A01	0.1(50°C)	Reflow	1(240°±10°)	3k ohm ±30%	±500
PVZ2□502A01	0.1(50°C)	Reflow	1(240°±10°)	5k ohm ±30%	±500
PVZ2□103A01	0.1(50°C)	Reflow	1(240°±10°)	10k ohm ±30%	±500
PVZ2□203A01	0.1(50°C)	Reflow	1(240°±10°)	20k ohm ±30%	±500
PVZ2□303A01	0.1(50°C)	Reflow	1(240°±10°)	30k ohm ±30%	±500
PVZ2□503A01	0.1(50°C)	Reflow	1(240°±10°)	50k ohm ±30%	±500
PVZ2□104A01	0.1(50°C)	Reflow	1(240°±10°)	100k ohm ±30%	±500
PVZ2□204A01	0.1(50°C)	Reflow	1(240°±10°)	200k ohm ±30%	±500
PVZ2□304A01	0.1(50°C)	Reflow	1(240°±10°)	300k ohm ±30%	±500
PVZ2□504A01	0.1(50°C)	Reflow	1(240°±10°)	500k ohm ±30%	±500
PVZ2□105A01	0.1(50°C)	Reflow	1(240°±10°)	1M ohm ±30%	±500

The blank column is filled with the code of adjustment direction A (top) or K (rear).

■ Construction

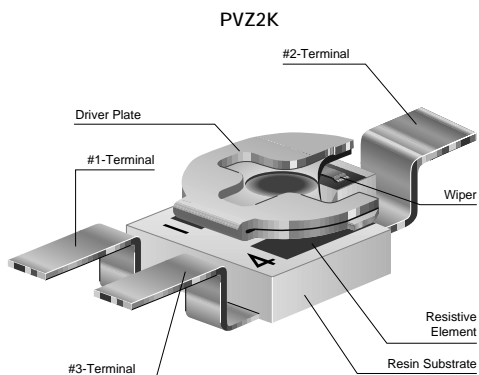


■ Standard Land Pattern

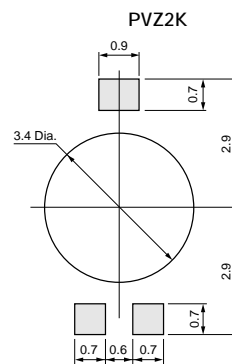


(in mm)
(Tolerance : ±0.1)

■ Construction



■ Standard Land Pattern



(in mm)
(Tolerance : ±0.1)

■ Characteristics

Humidity Exposure	Res. Change : +10, -2%
High Temperature Exposure	Res. Change : $R \leq 100\text{kohm} \dots +2, -10\%$ $100\text{kohm} < R \dots +2, -15\%$
Humidity Load Life	Res. Change : ±10%
Load Life	Res. Change : $R \leq 100\text{kohm} \dots +2, -10\%$ $100\text{kohm} < R \dots +2, -15\%$
Temperature Cycle	Res. Change : ±5%
Temperature Coefficient of Resistance	±500ppm/°C
Rotational Life	Res. Change : ±10% (10 cycles)

■ Notice (Operating and Storage Conditions)

1. Store that the temperature is -10 to +40deg. C and the relative humidity is 30-85%RH.
2. Do not store in or near corrosive gases.
3. Use within six months after delivery.
4. Open the package just before using.
5. Do not store under direct sunlight.
6. The trimmer potentiometer should not be used under the following environmental conditions:
If you use the trimmer potentiometer in an environment other these listed below, please consult with Murata factory representative prior to

using.

- (1) Corrosive gaseous atmosphere.
(Ex. Chlorine gas, Hydrogen sulfide gas, Ammonia gas, Sulfuric acid gas, Nitric oxide gas, etc.)
- (2) In liquid.
(Ex. Oil, Medical liquid, Organic solvent, etc.)
- (3) Dusty/dirty atmosphere.
- (4) Direct sunlight.
- (5) Static voltage nor electric/magnetic fields.
- (6) Direct sea breeze.
- (7) Other variations of the above.

■ Notice (Rating)

1. When using with partial load (rheostat), minimize the power depend on the resistance value.
2. The maximum input voltage to a trimmer potentiometer should not exceed $(P \cdot R)^{1/2}$ or the maximum operating voltage, whichever is smaller.
3. The maximum input current to a trimmer potentiometer should not exceed $(P/R)^{1/2}$ or the allowable wiper current, whichever is smaller.

■ Notice (Soldering and Mounting)

1. Soldering

- (1) Reflow soldering and Soldering Iron are available. Can not be soldered using the flow soldering method. If you use the flow soldering method, the trimmer potentiometer may not function.
- (2) Use our standard land dimension. Excessive land area causes displacement due to effect of the surface tension of the solder. Insufficient land area leads to insufficient soldering strength of the chip.
- (3) Standard soldering condition
 - (a) Reflow soldering :
Refer to the standard temperature profile.
 - (b) Soldering iron:
 - >Temperature of tip 260deg. C max.
 - >Soldering time 3sec. max.
 - >Diameter 1mm max.Before using other soldering conditions than those listed above, please consult with Murata factory representative prior to using. If the soldering conditions are not suitable, e. g., excessive time and/or excessive temperature, the trimmer potentiometer may deviate from the specified characteristics.
- (4) Apply the appropriate amount of solder paste. The thickness of solder paste should be printed from 100micro m to 150micro m and the dimension

of land pattern should be used Murata's standard land pattern at reflow soldering.

Insufficient amounts of solder can lead to insufficient soldering strength on PCB.

Excessive amounts of solder may cause the bridging between the terminals.

- (5) The soldering iron should not come in contact with the case of the trimmer potentiometer. If such contact does occur, the trimmer potentiometer may be damaged.

2. Mounting

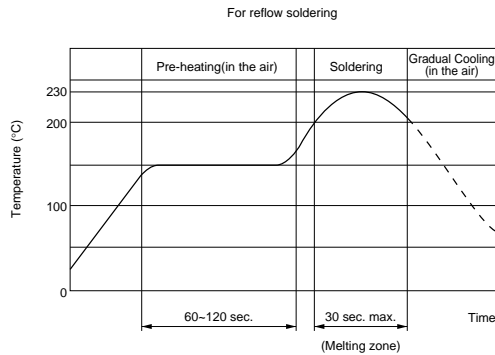
- (1) Do not apply excessive force (preferable 4.9N (Ref.; 500gf) max.), when the trimmer potentiometer is mounted to the PCB.
- (2) Do not warp and/or bend PC board to prevent trimmer potentiometer from breakage.
- (3) In chip placers, the recommended size of the cylindrical pick-up nozzle should be outer dimension 1.5-1.8mm dia. and inner dimension 1.3mm dia..

3. Cleaning

- (1) In case there is flux on the resistive element, clean sufficiently by cleaning solvents and remove all residual flux perfectly.
- (2) Isopropyl-alcohol and Ethyl-alcohol are applicable solvent for cleaning. If you use any other types of solvents, please consult with Murata factory representative prior to using.

PVZ2 Series Notice

■ Reflow Soldering Standard Profile



■ Notice (Handling)

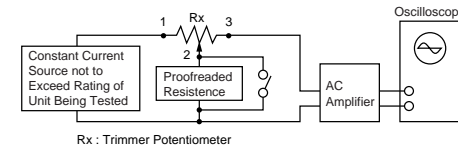
- Use suitable screwdrivers that fit comfortably in driver slot. We recommend the below screwdriver.
* Recommended screwdriver for manual adjustment
Murata P/N : KMDR090
- Don't apply more than 4.9N (Ref.: 500gf) of twist and stress after mounted onto PCB to prevent contact intermittence. If excessive force is applied, the trimmer potentiometer may not function.
- Please use within the effective rotational angle.
The potentiometer does not have a mechanical stop for over rotation. In case out of effective rotational angle, the trimmer potentiometer may not function.
- When using a lock paint to fix slot position, please consult with Murata factory representative prior to using to prevent corrosion and contact intermittence.

■ Notice (Other)

- Please make sure that your product has been evaluated and confirmed against your specifications when our product is mounted to your product.
- Murata cannot guarantee trimmer potentiometer integrity when used under conditions other than those specified in this document.

SMD Open Type and PVM4A_A01 Series Specifications and Test Methods

The tests and measurements shall be conducted under the condition of 15 to 35°C of temperature, 25 to 75% of relative humidity and 86 to 106 kpa of atmospheric pressure unless otherwise specified. In case when entertained a doubt in judgment obtained from results measured in accordance with the above mentioned conditions, the tests and measurements shall be conducted under the condition of 25±2°C of temperature and, 45 to 55% of relative humidity and 86 to 106 kpa of atmospheric pressure.

No.	Item	Test Methods																														
1	Total Resistance	<p>Measure total resistance between the resistance element and terminals (terminals #1 and #3) with the contact arm positioned against a stop. The positioning of the contact arm and terminal shall be the same for subsequent total resistance measurements on the same device. Use the test voltage specified in Table-1 for total resistance measurements. This voltage shall be used whenever a subsequent total resistance measurement is made.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Total resistance, Nominal (ohm)</th> <th>Maximum Test Voltage (V)</th> </tr> </thead> <tbody> <tr> <td>10≤R≤100</td> <td>1.0</td> </tr> <tr> <td>100<R≤1k</td> <td>3.0</td> </tr> <tr> <td>1k<R≤10k</td> <td>10.0</td> </tr> <tr> <td>10k<R≤100k</td> <td>30.0</td> </tr> <tr> <td>100k<R</td> <td>100.0</td> </tr> </tbody> </table> <p style="text-align: center;">Table-1 Total resistance test voltage</p>	Total resistance, Nominal (ohm)	Maximum Test Voltage (V)	10≤R≤100	1.0	100<R≤1k	3.0	1k<R≤10k	10.0	10k<R≤100k	30.0	100k<R	100.0																		
Total resistance, Nominal (ohm)	Maximum Test Voltage (V)																															
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10k<R≤100k	30.0																															
100k<R	100.0																															
2	Residual Resistanc	<p>Position the contact arm at the extreme counterclockwise limit of mechanical travel and measure the resistance between the contact arm and the corresponding end terminal. Then, position the contact arm at the extreme clockwise limit of mechanical travel and measure the resistance between the contact arm and the corresponding end terminal. During this test, take suitable precautions to ensure that the rated current of the resistance element is not exceeded.</p>																														
3	Contact Resistance	<p>Contact resistance variation shall be measured with the measuring circuit shown in below, or its equivalent. The operating wiper shall be rotated in both directions through 90% of the actual effective-electrical travel for a total of 6 cycles. The rate of rotation of the operating wiper shall be such that the wiper completes 1 countin determining whether or not a contact resistance variation is observed at least twice in the same location. The test current shall follow the value given in Table-2 unless otherwise limited by the power rating.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Standard total resistance R (ohm)</th> <th>Test Current</th> </tr> </thead> <tbody> <tr> <td>100≤R<10k</td> <td>10mA Max.</td> </tr> <tr> <td>10k≤R<100k</td> <td>1mA Max.</td> </tr> <tr> <td>100≤R</td> <td>100µA Max.</td> </tr> </tbody> </table> <p style="text-align: center;">Table-2 Test current for CRV</p> <div style="text-align: center;">  <p style="font-size: small;">Rx : Trimmer Potentiometer Oscilloscope bandwidth :100Hz to 50kHz</p> <p style="text-align: center;">Figure-1 CRV measuring circuit</p> </div>	Standard total resistance R (ohm)	Test Current	100≤R<10k	10mA Max.	10k≤R<100k	1mA Max.	100≤R	100µA Max.																						
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4	Humidity Exposure	<p>The wiper contact point shall be pre-setted at about 50% position of effective rotational angle. After that, the potentiometer shall be placed in a chamber at 40±2°C and 90 - 95% without loading for 500±12 hours. The resistance value shall be measured after keeping the potentiometer in a room for 5±1/6 hours.</p>																														
5	High Temperature Exposure	<p>The wiper contact point shall be pre-setted at about 50% position of effective rotational angle. After that, the potentiometer shall be placed in a chamber at 70±2°C without loading for 500±12 hours. The resistance value shall be measured after keeping the potentiometer in a room for 1.5±1/6 hours.</p>																														
6	Humidity Load Life	<p>The wiper contact point shall be pre-setted at about 50% position of effective rotational angle. After that, the potentiometer shall be placed in a chamber at 40±2°C and 90 - 95% with loading the 1/2 rated voltage between #1 and #2 terminals, intermittently 1.5 hours ON and 0.5 hours OFF for 1000±12hours. The resistance value shall be measured after keeping the potentiometer in a room for 5±1/6 hours.</p>																														
7	Load Life	<p>The wiper contact point shall be pre-setted at about 50% position of effective rotational angle. After that, the potentiometer shall be placed in a chamber at 70±2°C (50±2°C for PVZ) with loading the 1/2 rated voltage between #1 and #2 terminals, intermittently 1.5 hours ON and 0.5 hours OFF for 1000±12 hours. The resistance value shall be measured after keeping the potentiometer in a room for 1.5±1/6 hours.</p>																														
8	Temperature Cycle	<p>The wiper contact point shall be pre-setted at about 50% position of effective rotational angle. After that, the potentiometer shall be subjected to Table-3, Table-4 temperature for 5 cycles. The resistance value shall be measured after keeping the potentiometer in a room for 1.5±10 minutes.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Sequence</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>Temp. (°C)</td> <td>-25±3</td> <td>+25±2</td> <td>+85±3</td> <td>+25±2</td> </tr> <tr> <td>Time (min.)</td> <td>30±3</td> <td>10Max.</td> <td>30±3</td> <td>10Max.</td> </tr> </tbody> </table> <p style="text-align: center;">Table-3 PVZ</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Sequence</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>Temp. (°C)</td> <td>-55±3</td> <td>+25±2</td> <td>+125±3</td> <td>+25±2</td> </tr> <tr> <td>Time (min.)</td> <td>30±3</td> <td>10Max.</td> <td>30±3</td> <td>10Max.</td> </tr> </tbody> </table> <p style="text-align: center;">Table-4 PVA3/PVS3/PVM4A□□□A01</p>	Sequence	1	2	3	4	Temp. (°C)	-25±3	+25±2	+85±3	+25±2	Time (min.)	30±3	10Max.	30±3	10Max.	Sequence	1	2	3	4	Temp. (°C)	-55±3	+25±2	+125±3	+25±2	Time (min.)	30±3	10Max.	30±3	10Max.
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Time (min.)	30±3	10Max.	30±3	10Max.																												

Continued on the following page.

SMD Open Type and PVM4A_A01 Series Specifications and Test Methods

Continued from the preceding page.

No.	Item	Test Methods																				
9	Temperature Coefficient of Resistance	<p>The trimmer potentiometer shall be subjected to the following each temperature (see Table-5, Table-6) for 30 to 45 minutes. The resistance value shall be measured in the chamber.</p> $TCR = \frac{R_2 - R_1}{R_1 (T_2 - T_1)} \times 10^6 \text{ (ppm/}^\circ\text{C)}$ <p style="margin-left: 40px;"> T₁ : Reference temperature in degrees celsius T₂ : Test temperature in degrees celsius R₁ : Resistance at reference temperature in ohm R₂ : Resistance at test temperature in ohm </p> <table style="width: 100%; margin-top: 10px;"> <tr> <td style="border: 1px solid black; padding: 2px;">Sequence</td> <td style="border: 1px solid black; padding: 2px;">1*</td> <td style="border: 1px solid black; padding: 2px;">2</td> <td style="border: 1px solid black; padding: 2px;">3*</td> <td style="border: 1px solid black; padding: 2px;">4</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">Temp. (°C)</td> <td style="border: 1px solid black; padding: 2px;">+25±2</td> <td style="border: 1px solid black; padding: 2px;">-25±3</td> <td style="border: 1px solid black; padding: 2px;">+25±2</td> <td style="border: 1px solid black; padding: 2px;">+85±3</td> </tr> </table> <p style="margin-left: 40px;">(Note)*: Norm Temp.</p> <p style="text-align: center; margin-left: 40px;">Table-5 PVZ</p> <table style="width: 100%; margin-top: 10px;"> <tr> <td style="border: 1px solid black; padding: 2px;">Sequence</td> <td style="border: 1px solid black; padding: 2px;">1</td> <td style="border: 1px solid black; padding: 2px;">2</td> <td style="border: 1px solid black; padding: 2px;">3*</td> <td style="border: 1px solid black; padding: 2px;">4</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">Temp. (°C)</td> <td style="border: 1px solid black; padding: 2px;">+25±2</td> <td style="border: 1px solid black; padding: 2px;">-55±3</td> <td style="border: 1px solid black; padding: 2px;">+25±2</td> <td style="border: 1px solid black; padding: 2px;">+125±3</td> </tr> </table> <p style="text-align: center; margin-left: 40px;">Table-6 PVA3/PVS3/PVM4A□□□A01</p>	Sequence	1*	2	3*	4	Temp. (°C)	+25±2	-25±3	+25±2	+85±3	Sequence	1	2	3*	4	Temp. (°C)	+25±2	-55±3	+25±2	+125±3
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Temp. (°C)	+25±2	-55±3	+25±2	+125±3																		
10	Rotational Life	<p>The wiper shall be rotated over 90% of the effective rotational angle without loading at a speed of 10 cycles per minute, for 10 cycles continuously. The resistance value shall be measured after keeping the potentiometer in a room for 10±5 minutes.</p>																				