

Trimmer Potentiometers



SMD Open Type 3mm Size PVZ3 Series

2

PVZ3 Series

■ Features

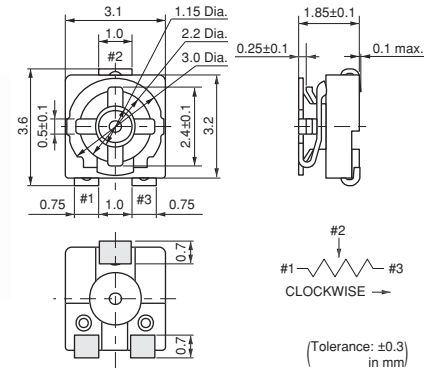
1. Excellent solderability characteristics are achieved via special plating techniques on each termination.
2. Specially designed substrate prevents wicking of flux onto the top of the part body.
3. Funnel shaped adjustment slot allows for in-process automatic adjustment.
(PVZ3A/PVZ3H/PVZ3K Series)
4. High-heat resistance type is available
(PVZ3A_C01/PVZ3K_E01).
5. Enlarged bottom termination enhances soldering strength while reducing the necessary land area required, promoting high-density PCB mounting
(PVZ3A/PVZ3H/PVZ3G Series).
6. The standard position of the driver plate is adjusted at the center normally, but another position is also available.
7. This product meets PB-free standards.
8. Complies with RoHS directive.

■ Applications

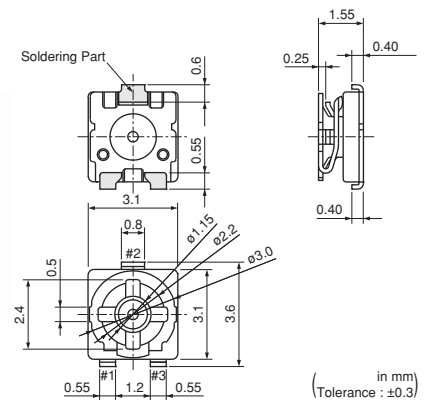
- | | |
|------------------------|----------------------|
| 1. Optical pick up | 6. CD-ROMs |
| 2. Cordless telephones | 7. Car stereos |
| 3. CD players | 8. TFT-LCD TV sets |
| 4. E-Book | 9. Headphone stereos |
| 5. Motor | |



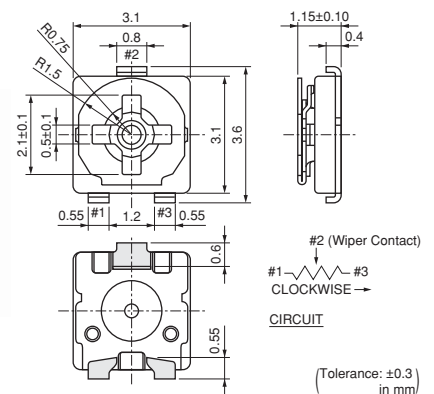
PVZ3A



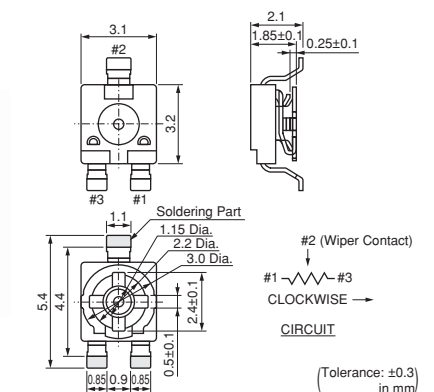
PVZ3H



PVZ3G



PVZ3K



Top Adjustment (H 1.85)

Part Number	Power Rating (W)	Number of Turns (Effective Rotation Angle)	Mechanical Rotation Angle	Total Resistance Value	TCR (ppm/°C)
PVZ3A221C01	0.1(50°C)	1(230°±10°)	Endless	220ohm±30%	±500
PVZ3A471C01	0.1(50°C)	1(230°±10°)	Endless	470ohm±30%	±500
PVZ3A102C01	0.1(50°C)	1(230°±10°)	Endless	1k ohm±30%	±500
PVZ3A222C01	0.1(50°C)	1(230°±10°)	Endless	2.2k ohm±30%	±500
PVZ3A472C01	0.1(50°C)	1(230°±10°)	Endless	4.7k ohm±30%	±500
PVZ3A103C01	0.1(50°C)	1(230°±10°)	Endless	10k ohm±30%	±500
PVZ3A223C01	0.1(50°C)	1(230°±10°)	Endless	22k ohm±30%	±500
PVZ3A473C01	0.1(50°C)	1(230°±10°)	Endless	47k ohm±30%	±500
PVZ3A104C01	0.1(50°C)	1(230°±10°)	Endless	100k ohm±30%	±500
PVZ3A224C01	0.1(50°C)	1(230°±10°)	Endless	220k ohm±30%	±500
PVZ3A474C01	0.1(50°C)	1(230°±10°)	Endless	470k ohm±30%	±500
PVZ3A105C01	0.1(50°C)	1(230°±10°)	Endless	1M ohm±30%	±500
PVZ3A225C01	0.1(50°C)	1(230°±10°)	Endless	2.2M ohm±30%	±500

Operating Temperature Range: -25 to 85 °C
 Soldering Method: Reflow/Soldering Iron

Top Adjustment (H 1.55)

Part Number	Power Rating (W)	Number of Turns (Effective Rotation Angle)	Mechanical Rotation Angle	Total Resistance Value	TCR (ppm/°C)
PVZ3H221C01	0.1(50°C)	1(230°±10°)	Endless	220ohm±30%	±500
PVZ3H471C01	0.1(50°C)	1(230°±10°)	Endless	470ohm±30%	±500
PVZ3H102C01	0.1(50°C)	1(230°±10°)	Endless	1k ohm±30%	±500
PVZ3H222C01	0.1(50°C)	1(230°±10°)	Endless	2.2k ohm±30%	±500
PVZ3H472C01	0.1(50°C)	1(230°±10°)	Endless	4.7k ohm±30%	±500
PVZ3H103C01	0.1(50°C)	1(230°±10°)	Endless	10k ohm±30%	±500
PVZ3H223C01	0.1(50°C)	1(230°±10°)	Endless	22k ohm±30%	±500
PVZ3H473C01	0.1(50°C)	1(230°±10°)	Endless	47k ohm±30%	±500
PVZ3H104C01	0.1(50°C)	1(230°±10°)	Endless	100k ohm±30%	±500
PVZ3H224C01	0.1(50°C)	1(230°±10°)	Endless	220k ohm±30%	±500
PVZ3H474C01	0.1(50°C)	1(230°±10°)	Endless	470k ohm±30%	±500
PVZ3H105C01	0.1(50°C)	1(230°±10°)	Endless	1M ohm±30%	±500
PVZ3H225C01	0.1(50°C)	1(230°±10°)	Endless	2.2M ohm±30%	±500

Operating Temperature Range: -25 to 85 °C
 Soldering Method: Reflow/Soldering Iron

Top Adjustment and Thin Type (H 1.15)

Part Number	Power Rating (W)	Number of Turns (Effective Rotation Angle)	Mechanical Rotation Angle	Total Resistance Value	TCR (ppm/°C)
PVZ3G221C01	0.1(50°C)	1(230°±10°)	Endless	220ohm±30%	±500
PVZ3G471C01	0.1(50°C)	1(230°±10°)	Endless	470ohm±30%	±500
PVZ3G102C01	0.1(50°C)	1(230°±10°)	Endless	1k ohm±30%	±500
PVZ3G222C01	0.1(50°C)	1(230°±10°)	Endless	2.2k ohm±30%	±500
PVZ3G472C01	0.1(50°C)	1(230°±10°)	Endless	4.7k ohm±30%	±500
PVZ3G103C01	0.1(50°C)	1(230°±10°)	Endless	10k ohm±30%	±500
PVZ3G223C01	0.1(50°C)	1(230°±10°)	Endless	22k ohm±30%	±500
PVZ3G473C01	0.1(50°C)	1(230°±10°)	Endless	47k ohm±30%	±500
PVZ3G104C01	0.1(50°C)	1(230°±10°)	Endless	100k ohm±30%	±500
PVZ3G224C01	0.1(50°C)	1(230°±10°)	Endless	220k ohm±30%	±500
PVZ3G474C01	0.1(50°C)	1(230°±10°)	Endless	470k ohm±30%	±500
PVZ3G105C01	0.1(50°C)	1(230°±10°)	Endless	1M ohm±30%	±500
PVZ3G225C01	0.1(50°C)	1(230°±10°)	Endless	2.2M ohm±30%	±500

Operating Temperature Range: -25 to 85 °C
 Soldering Method: Reflow/Soldering Iron

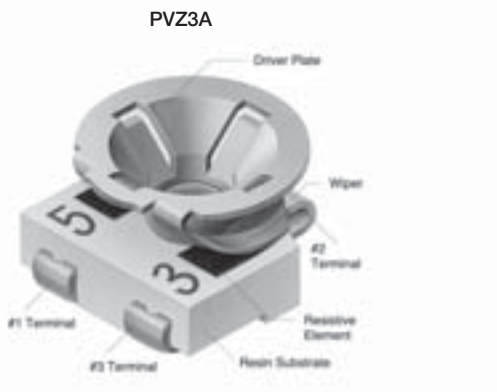
Rear Adjustment

2

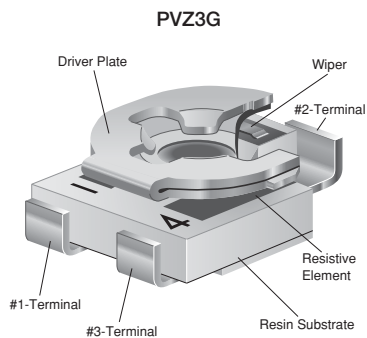
Part Number	Power Rating (W)	Number of Turns (Effective Rotation Angle)	Mechanical Rotation Angle	Total Resistance Value	TCR (ppm/°C)
PVZ3K221E01	0.1(50°C)	1(230°±10°)	Endless	220ohm±30%	±500
PVZ3K471E01	0.1(50°C)	1(230°±10°)	Endless	470ohm±30%	±500
PVZ3K102E01	0.1(50°C)	1(230°±10°)	Endless	1k ohm±30%	±500
PVZ3K222E01	0.1(50°C)	1(230°±10°)	Endless	2.2k ohm±30%	±500
PVZ3K472E01	0.1(50°C)	1(230°±10°)	Endless	4.7k ohm±30%	±500
PVZ3K103E01	0.1(50°C)	1(230°±10°)	Endless	10k ohm±30%	±500
PVZ3K223E01	0.1(50°C)	1(230°±10°)	Endless	22k ohm±30%	±500
PVZ3K473E01	0.1(50°C)	1(230°±10°)	Endless	47k ohm±30%	±500
PVZ3K104E01	0.1(50°C)	1(230°±10°)	Endless	100k ohm±30%	±500
PVZ3K224E01	0.1(50°C)	1(230°±10°)	Endless	220k ohm±30%	±500
PVZ3K474E01	0.1(50°C)	1(230°±10°)	Endless	470k ohm±30%	±500
PVZ3K105E01	0.1(50°C)	1(230°±10°)	Endless	1M ohm±30%	±500
PVZ3K225E01	0.1(50°C)	1(230°±10°)	Endless	2.2M ohm±30%	±500

Operating Temperature Range: -25 to 85 °C
 Soldering Method: Reflow/Soldering Iron

Construction

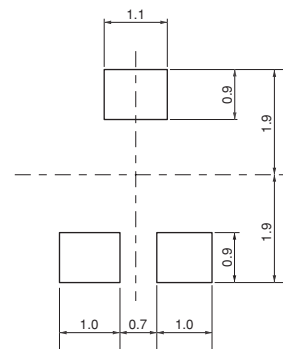


Construction



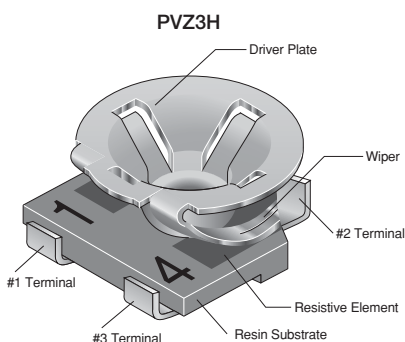
Standard Land Pattern

PVZ3A/PVZ3G/PVZ3H



(Tolerance : ±0.1 in mm)

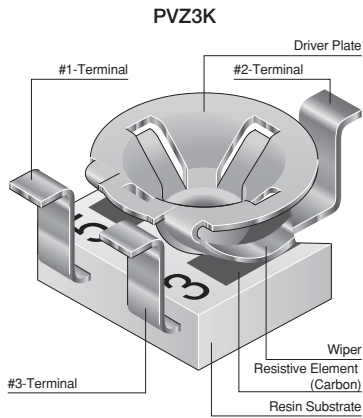
Construction



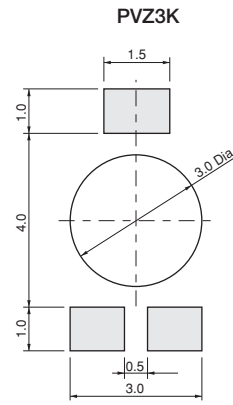
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■ Construction



■ Standard Land Pattern



(Tolerance : ±0.1 in mm)

■ Characteristics

Humidity Exposure	Res. Change: +10, -2%
High Temperature Exposure	Res. Change: $R \leq 100\text{kohm}$: +2, -10% $100\text{kohm} < R$: +2, -15%
Humidity Load Life	Res. Change: ±10%
Load Life	Res. Change: $R \leq 100\text{kohm}$: +2, -10% $100\text{kohm} < R$: +2, -15%
Temperature Cycle	Res. Change: ±5%
Rotational Life	Res. Change: ±10% (10 cycles)

2

PVZ3 Series Notice

2

■ Notice (Operating and Storage Conditions)

1. Store in temperatures of -10 to +40°C and relative humidity of 30-85%.
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. If you use the trimmer potentiometer in an environment other than listed at right, please consult with a Murata factory representative prior to using.

The trimmer potentiometer should not be used under the following environmental conditions:

- (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 or 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 depending 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. If the trimmer potentiometer is used in DC and high humidity conditions, please connect wiper (#2) for plus and resistive element (#1 or #3) for minus.

■ Notice (Soldering and Mounting)

1. Soldering
 - (1) Soldering conditions
Refer to the temperature profile.
If the soldering conditions are not suitable, e.g., excessive time and/or excessive temperature, the trimmer potentiometer may deviate from the specified characteristics.
Do not use flow soldering method (dipping).
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 the effect of the surface tension of the solder. Insufficient land area leads to insufficient soldering strength of the chip.
 - (3) Apply the appropriate amount of solder paste.
The thickness of solder paste should be printed from 100 micro m to 150 micro m and the dimension of land pattern used should be 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 bridging between the terminals.


- (4) 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. (PVZ Series only)

2. Mounting

- (1) Do not apply excessive force, preferably 4.9N max. (Ref. 500gf) when the trimmer potentiometer is mounted to the PCB.
- (2) Do not warp and/or bend the PC board to protect trimmer potentiometer from breakage.
- (3) In chip placers, the recommended size of the cylindrical pick-up nozzle should be outer dimension 2.5-2.8mm dia. and inner dimension 2mm dia.

3. Cleaning

- (1) In case there is flux on the resistive element, clean sufficiently with cleaning solvents and completely remove all residual flux.
- (2) Isopropyl alcohol and ethyl alcohol are applicable solvents for cleaning. If you use any other types of solvents, please evaluate performance with your product.

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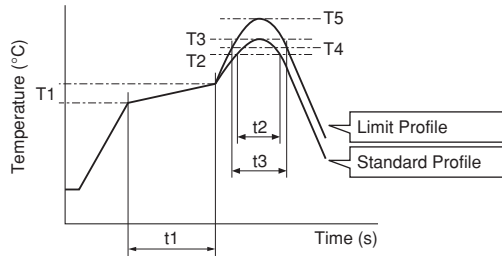
PVZ3 Series Notice

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■ Soldering Profile

● Reflow Soldering Profile

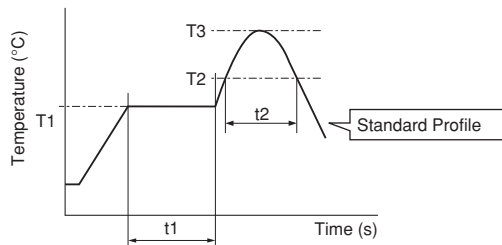
1. Soldering profile for lead free solder (96.5Sn/3.0Ag/0.5Cu)



Series	Standard Profile						Limit Profile					
	Pre-heating		Heating		Peak Temperature (T3)	Cycle of Reflow	Pre-heating		Heating		Peak Temperature (T5)	Cycle of Reflow
	Temp. (T1)	Time (t1)	Temp. (T2)	Time (t2)			Temp. (T1)	Time (t1)	Temp. (T4)	Time (t3)		
°C	sec.	°C	sec.	°C	Time	°C	sec.	°C	sec.	°C	Time	
PVZ3	150 to 180	60 to 120	220	30 to 60	245±3	2	150 to 180	60 to 120	220	30 to 60	260	2

2. Soldering profile for Eutectic solder (63Sn/37Pb)

(Limit profile: refer to 1)



Series	Standard Profile					
	Pre-heating		Heating		Peak Temperature (T3)	Cycle of Reflow
	Temp. (T1)	Time (t1)	Temp. (T2)	Time (t2)		
°C	sec.	°C	sec.	°C	Time	
PVZ3	150	60 to 120	183	30	230 max.	1

● Soldering Iron

Series	Standard Condition			
	Temperature of Soldering Iron Tip	Soldering Time	Soldering Iron Power Output	Cycle of Soldering Iron
	°C	sec.	W	Time
PVZ3	350±10	3 max.	30 max.	1

■ Notice (Handling)

1. Use suitable screwdrivers that fit comfortably in the driver slot. We recommend the screwdrivers below.

* Recommended screwdriver for manual adjustment
 >VESSEL MFG.: NO.9000+1.7x30
 (Murata P/N: KMDR080)

* Recommended screwdriver for automatic adjustment
 >TORAY MFG.: JB-2225 (Murata P/N: KMBT070)

2. Don't apply more than 4.9N (Ref.: 500gf) of twist and stress after mounting onto PCB to prevent contact intermittence. If excessive force is applied, the trimmer potentiometer may not function.

3. Please use within the effective rotational angle. Do not have a mechanical stop for over rotation. In cases out of effective rotational angle, the trimmer potentiometer may not function.

4. When using a lock paint to fix the slot position or cover the rotor, please evaluate performance with your product. Lock paint may cause corrosion or electrical contact problems.

■ Notice (Other)

1. Please make sure that your product has been evaluated and confirmed against your specifications when our product is mounted to your product.

2. Murata cannot guarantee trimmer potentiometer integrity when used under conditions other than those specified in this document.

● Part Numbering

Trimmer Potentiometers

(Part Number)

PV	Z3	A	103	C01	R00
①	②	③	④	⑤	⑥

① Product ID

Product ID	
PV	Trimmer Potentiometers

② Series

③ Adjustment Direction /Lead Type

Code	Series	Code	Adjustment Direction/ Lead Type
Z2	SMD Open 2mm Size Carbon Resistive Element	A	Top
		R	Rear
A2	SMD Open 2mm Size	A	Top
Z3	SMD Open 3mm Size Carbon Resistive Element	A	Top
		G	Top
		H	Top
		K	Rear
G3	SMD Sealed 3mm Size	A	Top, J-hook
		G	Top, Gull-wing
M4	SMD Sealed 4mm Size	A	Top
G5	SMD Sealed 5mm Square 11 turns	A	Top
		H	Side
32	Lead Sealed 6mm Round Single turn	H	Top, Triangle
		N	Side, Triangle
12	Lead Sealed 7mm Round 4 turns	P	Top, Triangle
		T	Side, Triangle
36	Lead Sealed 10mm Square 25 turns	W	Top, Inline
		X	Side, Inline
37	Lead Sealed 6mm Square 12 turns	W	Top, Triangle
		X	Side, Triangle

④ Total Resistance

Expressed by three figures. The unit is ohm. The first and second figures are significant digits, and the third figure expresses the number of zeros that follow the two figures.

Ex.)	Code	Total Resistance
	100	10Ω
	102	1000Ω
	104	100000Ω (=100kΩ)

⑤ Individual Specification

Series	Code	Individual Specification Code
PVA2	A01	Standard Type
PVZ2	C04	Standard Type (High-heat Resistance Type/Ultra-thin Type)
	C01	Standard Type (High-heat Resistance Type/Top Adjustment)
PVZ3	F01	High Characteristic Carbon Type (only PVZ3G)
	E01	High-heat Resistance Type (for Rear Adjustment)
	C01	Standard Type
PVM4	D01	High-reliability Type
	A01	Standard Type
PV32/PV12	A01	Standard Type
PVG3/ PV36/PV37	C01	Standard Type
PVG5	C03	Standard Type

⑥ Packaging

Code	Packaging
B00	Bulk
R00	Reel

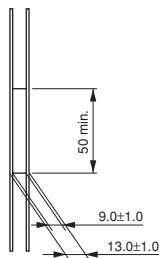
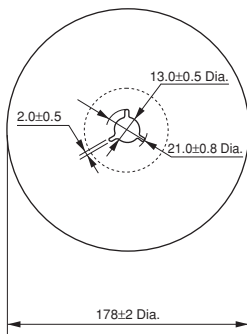
Packaging

Minimum Quantity

Part Number	Minimum Quantity (pcs.)	
	ø180mm reel	Bulk
PVZ2A	3000	1000
PVZ2R	3000	1000
PVA2	3000	1000
PVZ3A/H	2000	1000
PVZ3G	2500	1000
PVZ3K	1500	1000
PVG3A/G	1000	500
PVM4	500	500
PVG5A	250	100
PVG5H	500	100
PV32	—	100
PV12	—	50
PV36	—	100
PV37	—	100

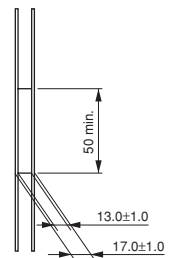
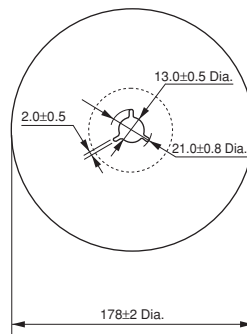
Dimensions of Reel

PVZ2A/PVA2/PVZ3A/PVZ3G/PVZ3H



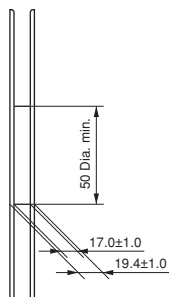
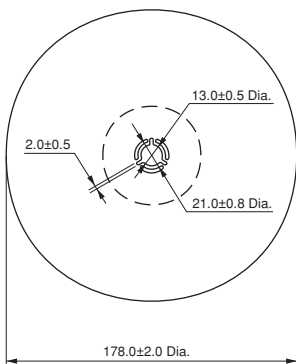
(in mm)

PVZ2R/PVZ3K/PVM4/PVG3/PVG5H



(in mm)

PVG5A



(in mm)

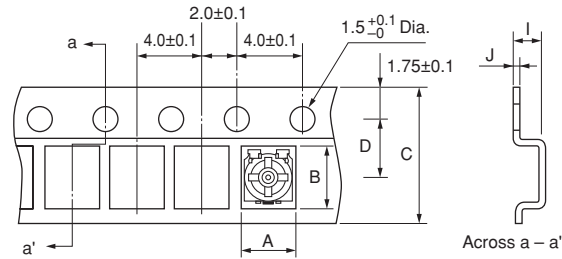
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Packaging

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■ Dimensions of Plastic Tape

PVZ2 / PVA2 / PVZ3



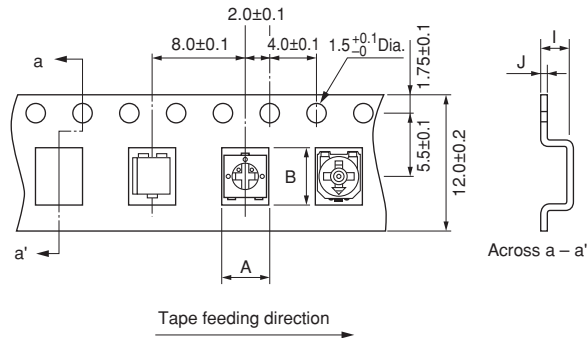
Part Number	A	B	C	D	I	J
PVZ2A	2.4±0.2	3.1±0.1	8.0±0.2	3.5±0.1	1.1±0.1	0.2±0.1
PVZ2R		5.1±0.2	12.0±0.2	5.5±0.1	1.0±0.1	0.3±0.1
PVA2		3.1±0.1	8.0±0.2	3.5±0.1	1.1±0.1	0.2±0.1
PVZ3A/H	3.8±0.2	1.95±0.1				
PVZ3G	3.3±0.2	3.8±0.2	8.0±0.2	3.5±0.1	1.3±0.1	0.3±0.1
PVZ3K	3.3±0.2	5.8±0.2	12.0±0.2	5.5±0.1	2.3±0.1	0.3±0.1

• The side containing terminals #1 and #3 faces the plastic tape pilot holes.

(in mm)

■ Dimensions of Plastic Tape

PVG3A / PVG3G / PVM4 / PVG5H



Part Number	A	B	I	J
PVG3A	4.0±0.1	4.0±0.1	2.1±0.1	0.3±0.1
PVG3G		4.9±0.1		
PVM4	4.5±0.2	5.5±0.2	2.15±0.1	0.3±0.1
PVG5H	5.4±0.2	5.8±0.2	4.0±0.1	0.4±0.1

• The side containing terminals #1 and #3 faces the plastic tape pilot holes (except PVG3).

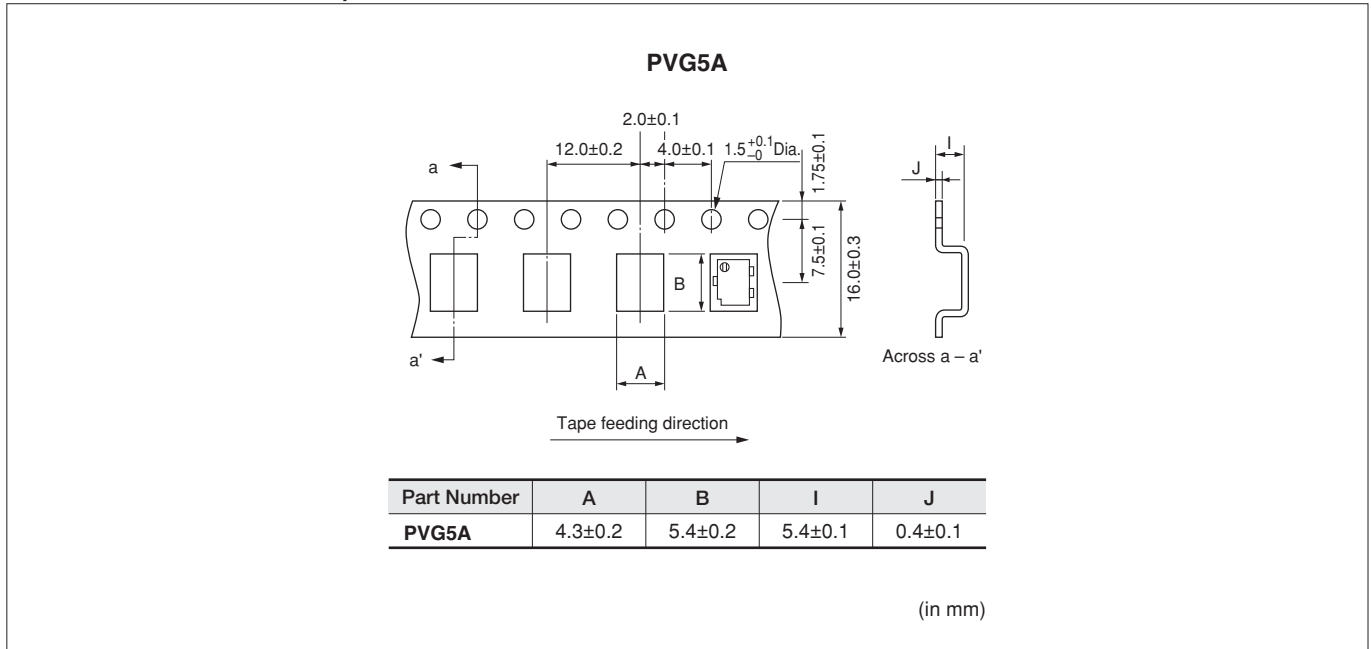
(in mm)

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Packaging

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■ Dimensions of Plastic Tape



Recommended Adjustment Tools/Qualified Standards

■ Recommended Adjustment Tools

Trimmer Potentiometer Series	Manufacturers	Model Number	MURATA Model Number	Blade
PVZ2/PVA2	MURATA MFG.	KMDR190	KMDR190	+ Cross
PVZ3G	VESSEL MFG.	No.9000+1.7×30	KMDR080	+ Cross
PVZ3A/PVZ3H/PVG3	TORAY INDUSTRIES, INC.	SA-2225	KMDR070	– Minus (round edge)
PVM4	VESSEL MFG.	No.9000–2.6×30	KMDR120	– Minus
PVG5	VESSEL MFG.	No.9000–1.3×30	KMDR130	– Minus
others	VESSEL MFG.	No.9000–1.8×30	KMDR110	– Minus

■ For Automatic Adjustment

Trimmer Potentiometer Series	Manufacturers	Model Number	MURATA Model Number	Blade
PVZ3 PVG3	TORAY INDUSTRIES, INC	JB-2225	KMBT070	– Minus (round edge)

■ Qualified Standards

The products listed here have been produced by the ISO9001 and ISO/TS16949 certified factory.

MURATA FACTORY	Qualified Date	Standard	Qualified Number
Wuxi Murata Electronics Co.,Ltd.	May 12, 1999	UNDERWRITERS LABORATORIES INC.	A7924

* No ODCs (Ozone Depleting Chemicals) are used on all Murata's trimmer potentiometers.