

ELECTROMECHANICAL COMPONENTS BUSINESS UNIT
 AUTOMOTIVE DEVICE COMPANY
Matsushita Electronic Components Co.,Ltd.
 OSAKA JAPAN
SAMPLE SUBMISSION SHEET

TO: DIGI-KEY CORPORATION Ref. No. 3116951-4
 ATT: _____ Date Jun.3.'03
 CC: _____
 CIISD: _____
 DEM: Ms.ITO
 TM: Mr.MATSUMOTO

Part Name VARIABLE RESISTOR Refer to _____

- A) First submission for approval introduction
 Resubmission
- B) The samples are our standard product.
 The samples meet your specifications (Dwg No. _____ Rev. _____)

Part No.	Spec. No.	Quantity	Cost or Quotation No.
EVW AE4 001 B14	REFERENCE ONLY	3pcs.	

Remarks

- This product has not been manufactured with any ozone depleting chemical controlled under the Montreal Protocol.
- All the materials used in this part contain no brominated materials or PPBOs or PBBs as the flame-retadant.
- All the materials used in this part are registered material under the
- Law Concerning the Examination and Regulation of Manufacture etc. or Chemical Substances.

 Name

File:

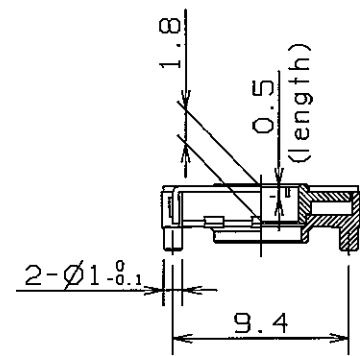
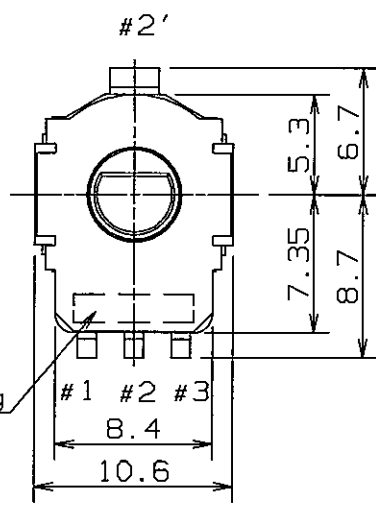
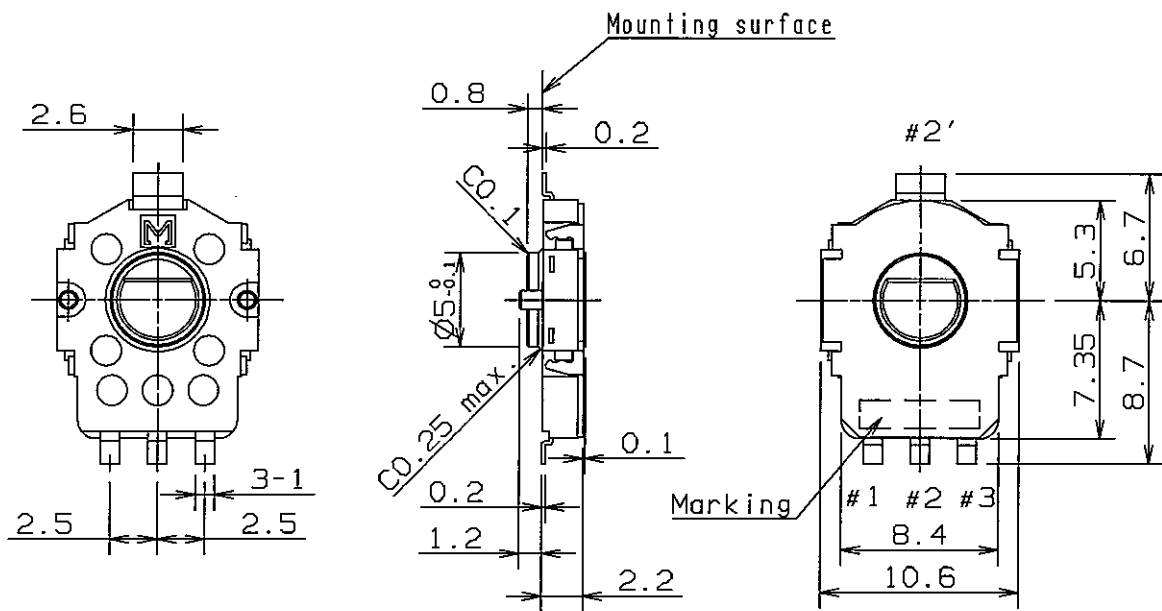
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THIRD ANGLE PROJECTION

ALL DIMENSIONS ARE IN MILLIMETERS.

DO NOT SCALE DRAWING

General dimension tolerance : ± 0.3

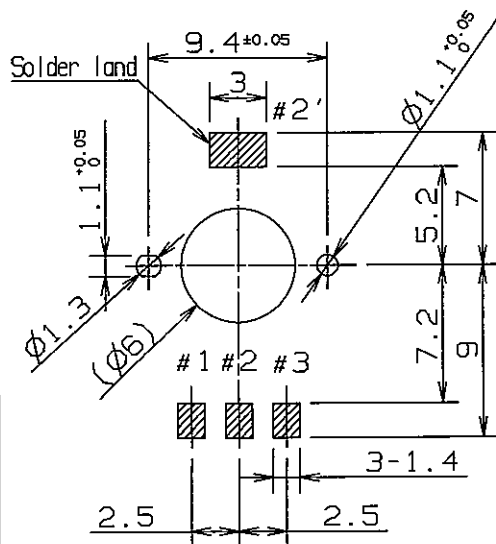


P.W.B piercing plan

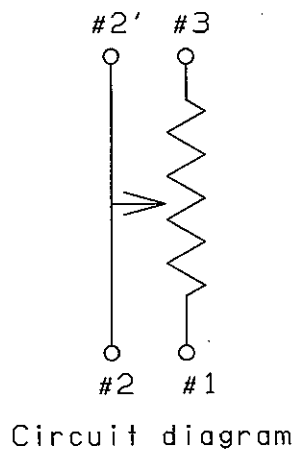
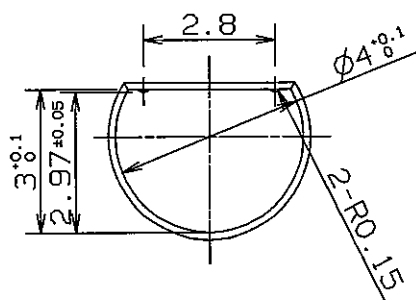
(View from parts side.)

P.C.B thickness $t=1.6$

Tolerance : ± 0.1



Shaft hole's figure



DESIGN	Y.Sakamoto Jun. 6. '03	NAME	VARIABLE RESISTOR	ISSUE	REVISIONS	DATE
DRAW		TYPE NO.	EVW AE4 001 B14	DRAWING NO.	1	6
CHECK	A.Matsumoto Jun 6 '03			RV-H-REFERENCE ONLY		
APPROVAL	J.Sato Jun 6 '03					

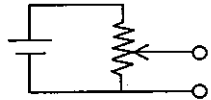
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Scope:

- 1) Control shown is designed in reference with our specifications.
- 2) Also see sample attached.

General specifications:

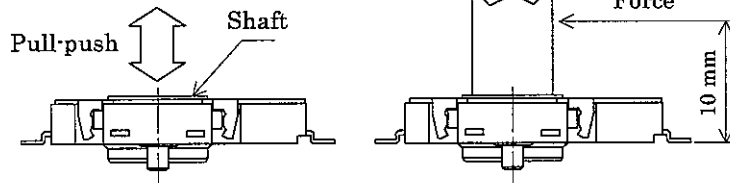
- 1) Measurement condition Environment : Standard condition (According to JIC C5020)
 Temperature : 15 °C to 35 °C
 Humidity : 25 %RH to 85 %RH
- 2) Operating temperature range : -40 °C to 90 °C
- 3) Storage temperature range : -40 °C to 105 °C
- 4) Usage Voltage divided method (Potentiometer Connection)



Input impedance --- 1 MΩ min.

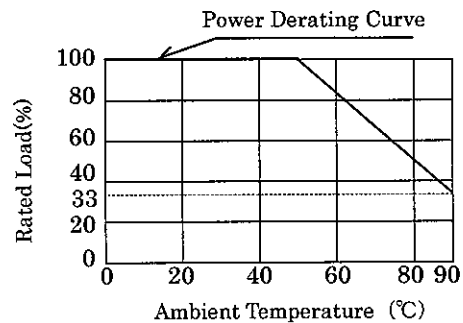
Mechanical specifications:

- 1) Mechanical Operating angle : 360 ° (Endless)
- 2) Rotational torque : 3 mN·m or less (at 5 °C to 35 °C)
 (expect No-output range)
- 3) Shaft pull-push strength : 10 N min.
- 4) Side thrust strength : 10 mN·m min.



Electrical specifications:

- 1) Nominal total resistance : 10 kΩ ± 30 %
- 2) Taper : Our code "B"
- 3) Power rating : 0.05 W

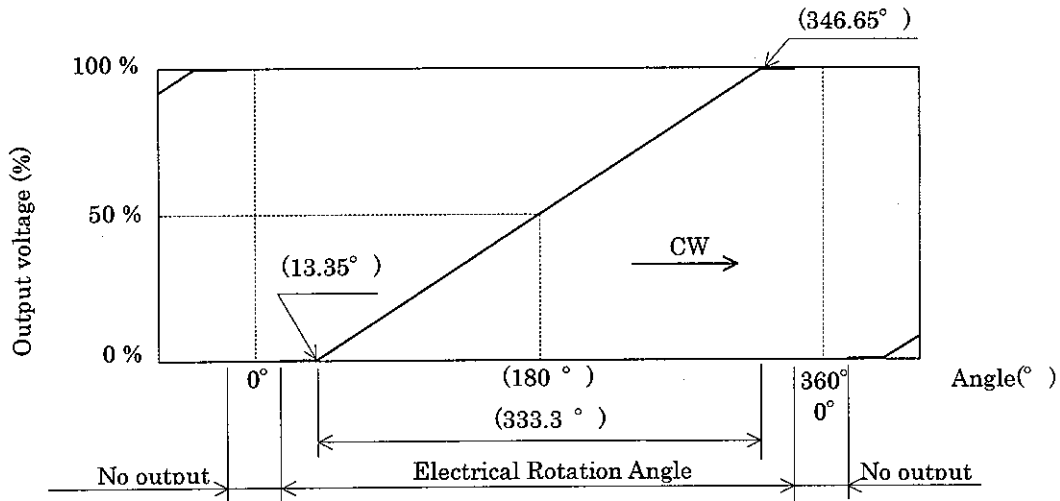


- 4) Maximum voltage : D·C 5 V
- 5) Insulation resistance : 50 MΩ min. At D·C 100 V
 (Between all VR terminals and a mounting bracket.)
- 6) Withstand voltage : A·C 100 V for 1 min.
 (Between all VR terminals and a mounting bracket.)
- 7) Noise level : Less than 100 mV (at D·C 5 V)
 (Micro linearity)

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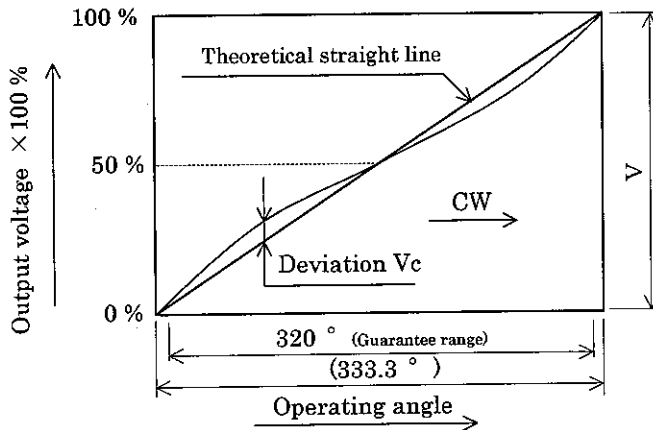
8) Out put characteristic

Reference resistance taper

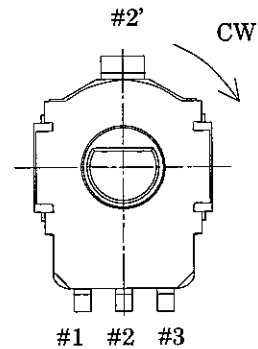


$$\text{Output} = \frac{\text{Voltage between terminal \#1 - \#2}}{\text{Voltage between terminal \#1 - \#3}} \times 100(\%)$$

9) Linearity : Less than $\pm 2.5\%$



Shaft shown in 180° position.



- * Linearity : $V_c / V \times 100\%$ (Deviation for theoretical straight line.)
- * Theoretical straight line : The straight line passing 50% out put voltage. and having inclination of $100\% / 333.3^\circ$.
- * Measurement direction : CW

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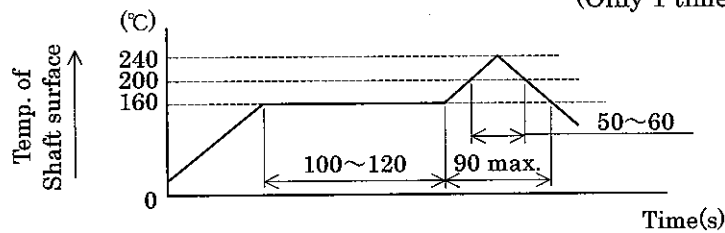
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Environmental specifications:

ITEM	TEST CONDITION	SPECIFICATION
Rotation life	100,000 cycles (CW,CCW;1cycle) Operation angle : 320 ° Operation speed : 600 cycles/1 h, non-load At normal temp. : 15 °C to 35 °C	Total resistance Change ratio for initial : ±15 % Linearity : Within ±3.5 %
High temperature	85 °C±3 °C, 240 h, non-load (Measurement should be after normalization in room temperature for 2 h)	Total resistance Change ratio for initial : $\begin{matrix} +10 \\ -20 \end{matrix}$ % Linearity : Within ±3.5 %
Humidity	40 °C±3 °C, 90 %RH to 95 %RH 240 h, non-load. (Measurement should be after normalization in room temperature for 2 h)	Total resistance Change ratio for initial : $\begin{matrix} +20 \\ -10 \end{matrix}$ % Linearity : Within ±3.5 %
Low temperature	-40 °C±3 °C, 240 h, non-load. (Measurement should be after normalization in room temperature for 2 h)	Total resistance Change ratio for initial : ±20 % Linearity : Within ±3.5 %
Temperature cycling (Heat shock)	20 cycles, non-load <u>Below condition cycling.</u> 1-2-3-4-1..... 1. -40 °C±3 °C, 1h 2. Deviations time 5 min. 3. 85 °C±3 °C, 1 h 4. Deviations time 5 min (Measurement should be after normalization in room temperature for 2 h)	Total resistance Change ratio for initial : ±15 % Linearity : Within ±3.5 %

Soldering heat

: No intermittent and breakdown after the below soldering.
In case of hand soldering ... 300 °C max. 3 s max.
In case of reflow soldering ... In the below temperature profile.
(Only 1 time)



Notes:

1) Marking

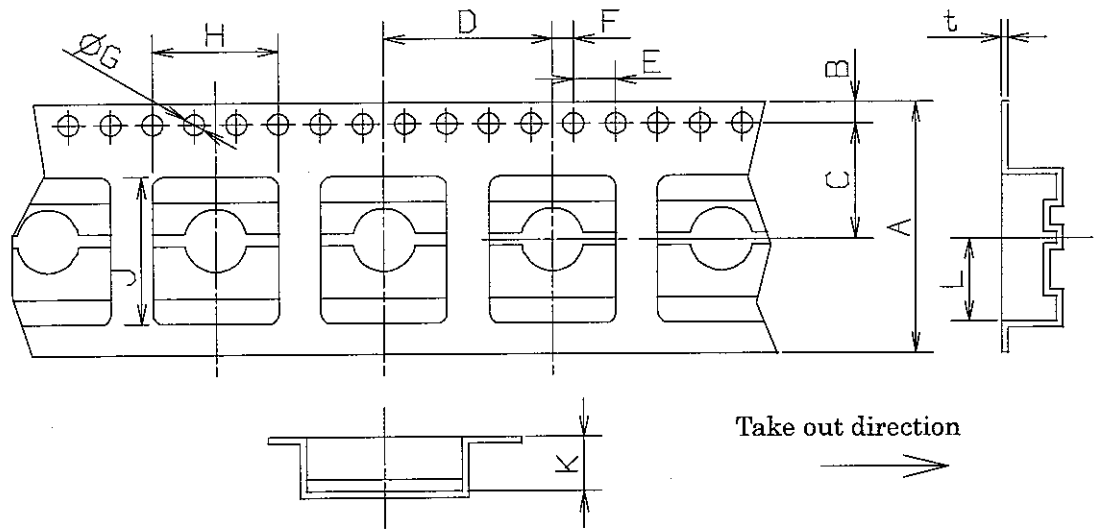
: (1) Our identification mark **(M)**
(2) Nominal total resistance (3) Taper code (4) Date code

2) Others

: Correspond to JIS-C-6443 requirements.

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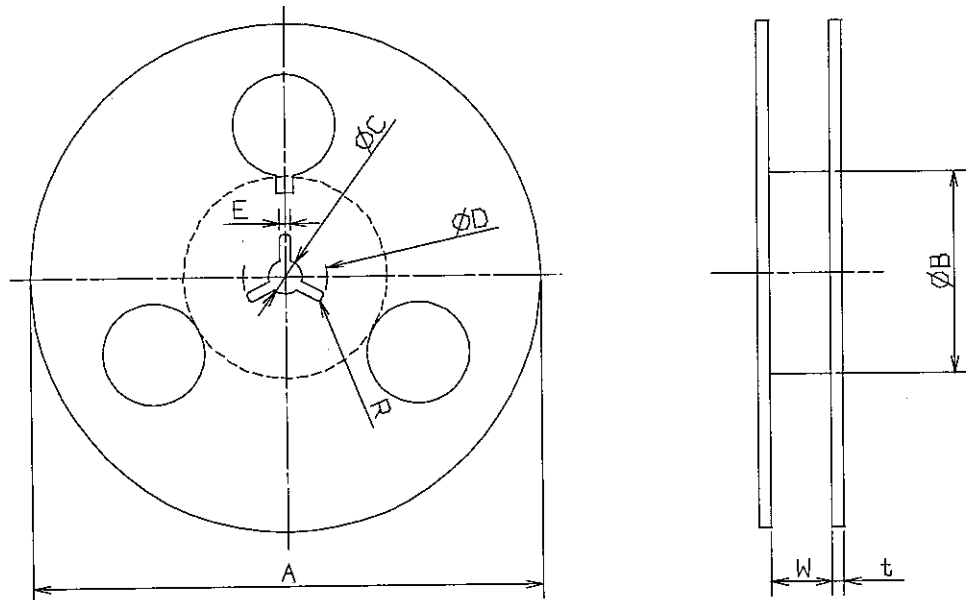
Carrier tape



A	B	C	D	E	F	G	H	J	K	L	t
24±0.3	1.75±0.2	11.5±0.2	16±0.2	4±0.2	2±0.2	1.5±0.1	(11.3)	(16.4)	(3.9)	(9.2)	0.4±0.1

* Top tape (shall tape) strip strength : 0.2 N to 1.2 N

Reel
(1500pcs./reel)



A	B	C	D	E	W	t	R
φ 380±2	φ 50 min.	φ 13±0.5	φ 21±2	2±0.5	26±2	3±1	1±0.5

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Prohibitions and precautions for handling.

- 1) Because of the construction of this product, an excessive stress, pressure to the body, or pressure or excessive force other than rotation to the hollow shaft portion may cause performance degradation in electrical, mechanical, life, or, feeling.
To prevent this, please avoid any stress, pressure or force other than rotational one to the hollow shaft, and mounting the body should be by soldering pads only.
- 2) Avoid storing the products in a place at high temperature, high humidity and in corrosive gases.
- 3) Be careful to avoid excessive force when handling products, especially when inserting into P.W.B. so as to avoid deformation of terminals.
- 4) Prohibited items on fire and smoking
 - Absolutely avoid use of a potentiometer beyond its rated range because doing so may cause a fire. If misuse or abnormal use may result in conditions in which the potentiometer is used out of its rated range, take proper measures such as current interruption using a protective circuit.
 - The grade of nonflammability for resin used in potentiometers is "94HB", which is based on UL94 Standards (flammability test for plastic materials). Prohibit use in a location where a spreading fire may be generated or prepare against a spreading fire.
- 5) For use in equipment for which safety requested
 - Although care is taken to ensure potentiometer quality, inferior characteristics, short circuits, open circuits are some problems that might be generated. To design a set which places maximum emphasis on safety, review the affect of any single fault of a potentiometer in advance and perform virtually fail-safe design to ensure maximum safety by:
 - Preparing a protective circuit or a protective device to improve system safety, and
 - Preparing a redundant circuit to improve system safety so that the single fault of a potentiometer does not cause a dangerous situation.
- 6) Reliability
 - The item designed mainly corresponds to JIS(Japan Industry Standard) on the reliability conditions.

Handling of reference specification.

- Since the contents of this reference specification are subjected to change without prior notifications, please request us a formal specification again for your investigations before using.

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