

CUSTOMER'S NAME

MOUSER ELECTRONICS

ALPHA REFERENCE NO.

SP15050131



**SPECIFICATION**

PART NO.	ALPHA MODEL NAME
	RA60D2F-210-13D1-B10K

MODEL NAME

MODEL NO.

APPROVAL

PREPARED BY	REVIEWED BY	APPROVED BY
 2015.5.15 彩霞		 2015-5-15 延玲



**ALPHA**

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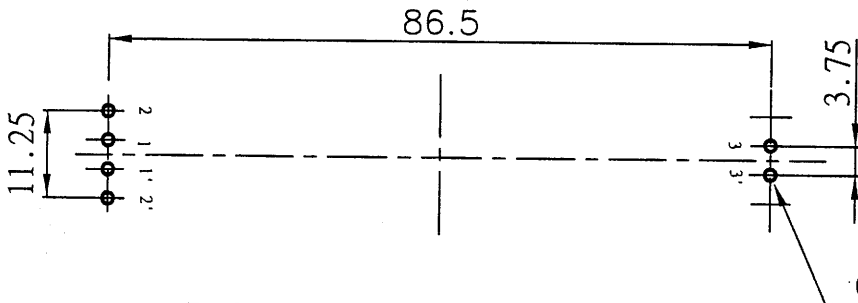
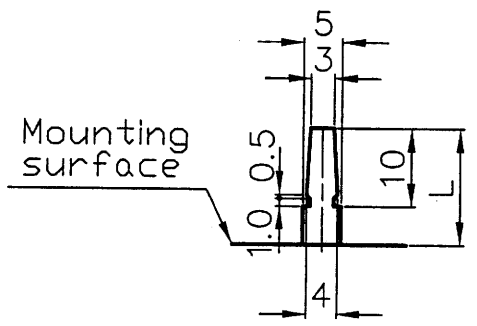
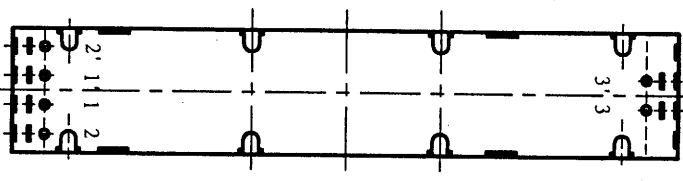
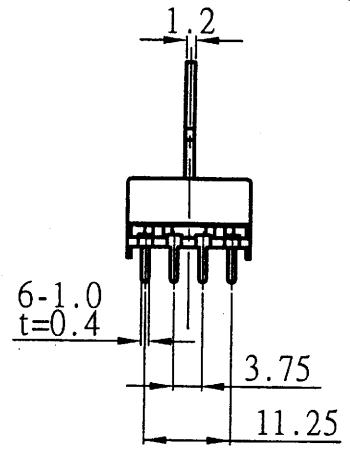
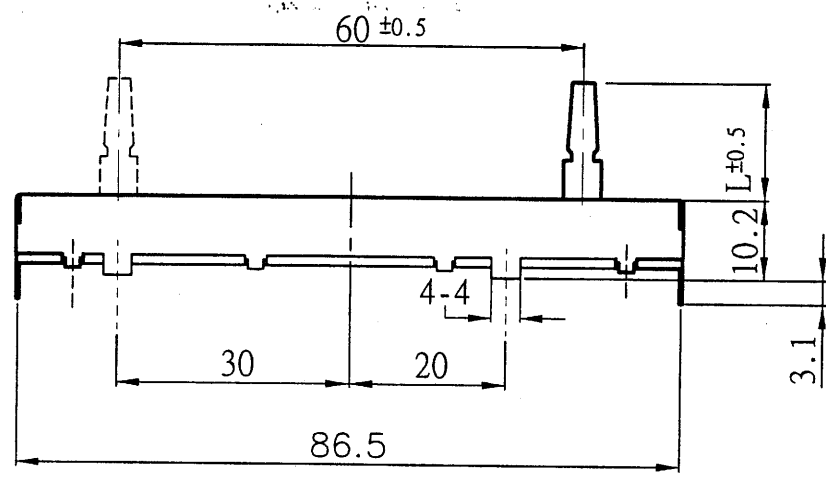
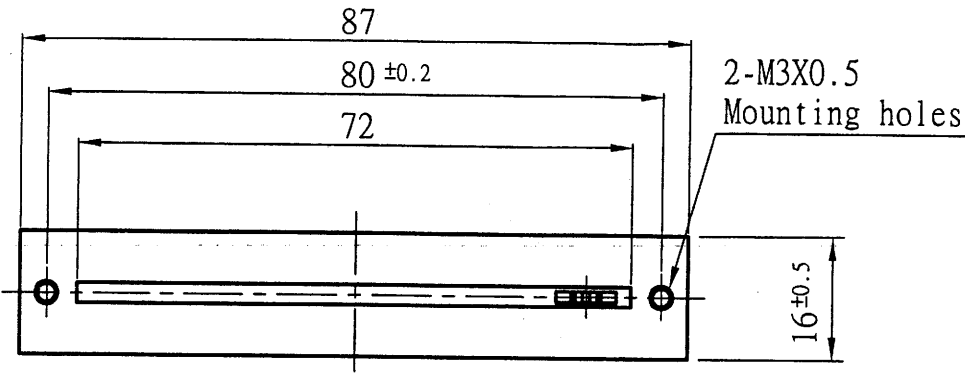
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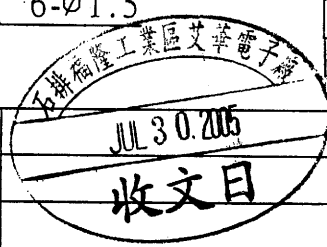
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P.C.B. Mounting hole detail

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	12.5
	15
	20
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✓	13



RA60D2F-210- D1-

No.	DATE	DESCRIPTION	NAME			
TOL. UNLESS OTHERWISE STATED	DIMENSION	SCALE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING No.
less than 10 ±0.3	mm	1/1	呂芳誠	王茂林	吳碧鋒	
above 10~30 ±0.5			94.7.13	84.7.20	94.7.22	
above 30~100 ±1.0						
above ±5'						

## SPECIFICATIONS OF SLIDE POTENTIOMETER

## 一、 Environment

1.1 Operating temperature range:-10~+70°C

使用溫度範圍: -10~+70°C

1.2 Test conditions

試驗條件

Standard atmospheric conditions

標準狀態

Unless otherwise specified, the standard range of atmospheric

無特別規定之實驗及測定時以溫度

Conditions for making measurements and tests is as follows:

5~35°C, 相對溼度 45~85%, 氣

Ambient temperature:5~35°C Relative humidity : 45~85%

壓 860~1060mbar 之標準狀態測定

Air pressure: 860 mbar to 1060 mbar

If there is any doubt about the results, measurements shall be made within the following limit

發生判定疑問或另有特別要求則以基準狀態(溫度 20±2°C, 相對溼度

Ambient temperature:20±2°C Relative humidity : 60~70%

60~70%氣壓 860~1060mbar)為準

Air pressure: 860 mbar to 1060 mbar

測定

## 二、 Mechanical characteristics 機械的性能

Item 項目	Conditions 條件		Specifications 規格
1 Lever travel 把柄移動距離			60±1mm
2 Operating force 作動力	Traveling speed 移動速度 20mm/sec 秒	Standard atmospheric conditions 常溫 5°C TO 35°C	5gf~50gf
		Starting force (standard atmospheric conditions) 始動力(常溫 )	Operating force 100gf max 作動力 100gf 以下
3 Lever travel stop strength 把柄止動強度	5kgf at a position 5mm from mounting surface 5kgf 以上 (固定面起 5mm 處測定)		Without excessive play or poor contact 無顯著鬆動接觸不良
4 Side thrust of the lever 把柄橫擠壓強 度	A static load of 5kgf shall be applied at the point 5mm from the mounted plate in a direction perpendicular to the axial direction for 10 sec, with the potentiometer mounted in assembly conditions 本體以螺絲固定於底板上, 固定面起 5mm 位置, 在於 把柄移動方向垂直之方向加 5kgf 靜負荷 10 秒以上		Without deformation or breaks in the sliding part and contact part 操作部位及關聯部品不可 有顯著變形及破損
5 Thrust and tensile lever 把柄擠壓引張 強度	Thrust and tensile static load of 5kgf shall be applied to the potentiometer in the lever directions for 10 sec 於把柄垂直之端面方向, 擠壓或引張方向加 5kgf 靜荷 重 10sec 以上		Without damage such as bad sliding and breaking or play in the lever. Electrical characteristics shall be satisfied 柄不能有破損, 滑動異常 電氣性能需滿足規格

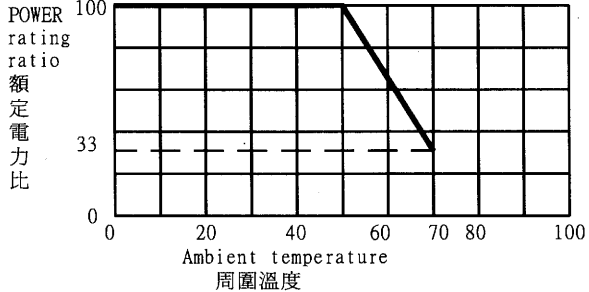
## SPECIFICATIONS OF SLIDE POTENTIOMETER

	Item 項目	Conditions 條件	Specifications 規格
6	Lever wobble 把柄橫振	A torsion moment of 250gf-cm shall be applied at the lever in a direction perpendicular to the axial direction and then the displacement shall be measured 於把柄頭端加 250gf 之力矩，與把柄移動方向相對應之垂直方向作彎曲測定	2 ( 2 x L / 20 ) mm p - p or less L=length of lever L=把柄之長度
7	Distance from the center of the lever 把柄之偏心	After sliding lever as far as it will go in each direction, the distance from the center of the lever to the middle of the mounting screw hole shall be measure at the both ends 把柄對固定孔中心作單側測定	0.5mm or less on each end 單側 0.5mm 以下
8	Resistance to soldering heat 銲錫耐熱性	After soldering without excessive looseness of terminals and failure contact 銲錫後，端子不能有顯著的接觸不良發生	Change in total resistance is relative to the value before test: 15% without excessive looseness of terminals and failure contact 全阻值初期值±15%以內 端子不能有顯著的接觸不良發生
9	Side lifetest without load 無負載壽命	The moving contact, without electrical load, shall be slide from one end stop to the other and returned to its original position extended over 90% or more effective angle. This procedure constitutes 1 cycle. And the moving contact shall be subjected to 2000 cycles per hour. A total of 100,000±1000 cycles 無負載測試，移動速度 2000 回/時(往復 1 次 1 回)在有效移動距離 90%以上，合計 100,000±1000 次的滑動	Change in total resistance is relative to the value before test: ±15% Noise: less than 200mv Operating force:3~60gf 全阻值變化初期值±15% 滑動雜音: 200mv 以下 滑動力:3~60gf 以內

## 三、 Electrical characteristics 電氣的性能

1	Nominal total resistance 全阻抗值許容差		10 K $\Omega$ ±20%
2	Resistance law (Taper) 電阻變化特性	Measurement shall be made by the resistance law method 電壓法測定	Refer to Taper shown 參照 Taper 表

## SPECIFICATIONS OF SLIDE POTENTIOMETER

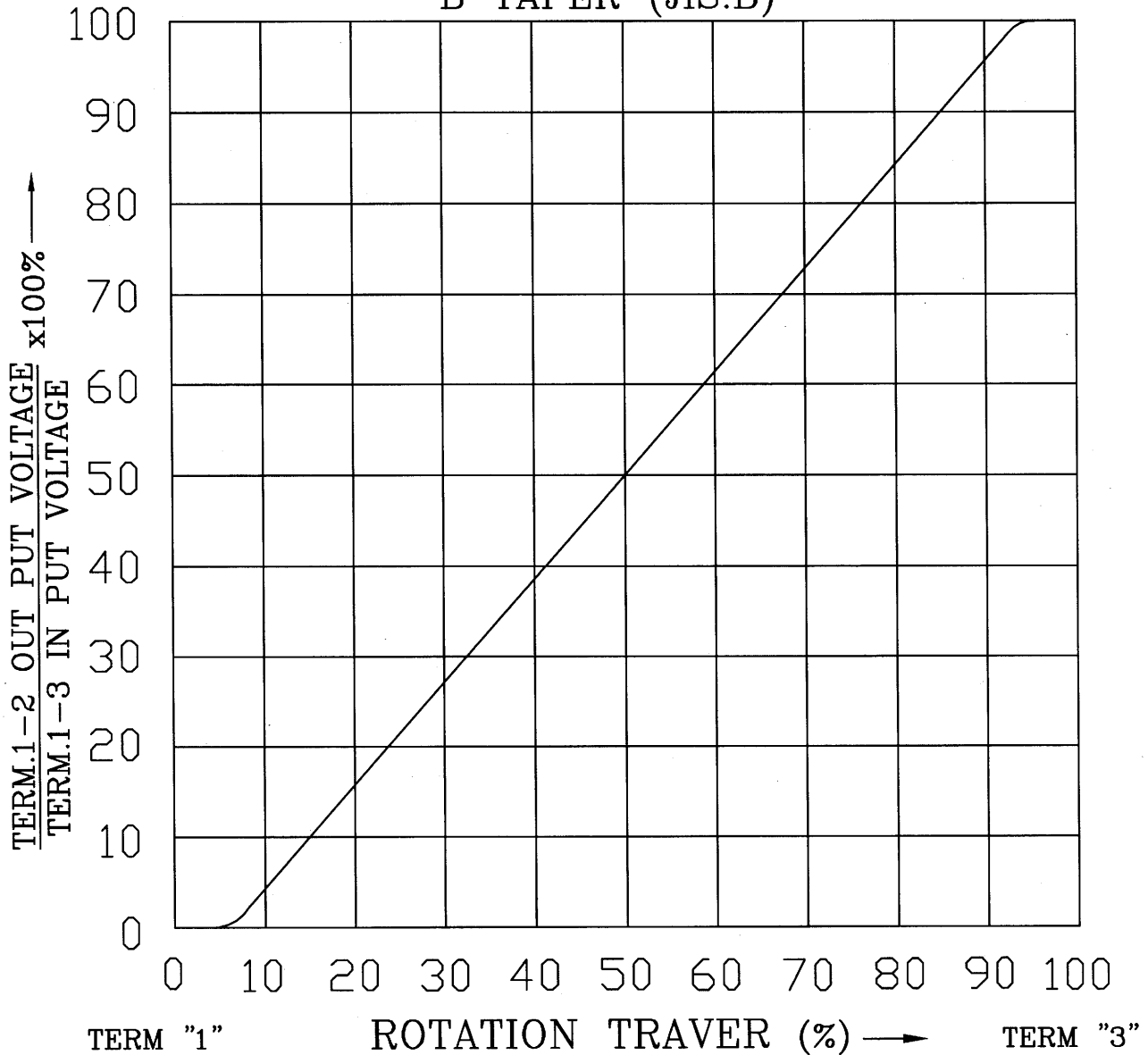
	Item 項目	Conditions 條件	Specifications 規格		
3	Power rating 額定功率	<p>Power rating is based on continuous full load operation at the maximum voltage between terminal 1 and 3 power rating vs. ambient temperature shall be denoted on the following graph.</p> <p>端子 1 ~ 3 間連續負載後之功率最大功率周圍溫度對功率影響之曲線如下圖表示</p> 	B TAPER : 0.25W EXCEPT B:0.125W		
4	Rated voltage 額定電壓	<p>Rated voltage(額定電壓) <math>E=\sqrt{PR}</math> Where P: power rating 額定功率 R: nominal total resistance 全阻抗值</p> <p>when the rated voltage exceeds the maximum operating voltage, the maximum operating voltage shall rated voltage 額定電壓超過最高使用電壓時，最高使用電壓為額定電壓</p>	Maximum operating voltage 最高使用電壓	D.C 20 V	
5	Residual resistance 殘留阻值	<p>Resistance at each end of the between terminals 1 and 2, and 2 and 3 shall be measured 摺動子在終端位置，在此時端子 1-2 間，端子 2-3 間測定之電阻值</p>	Between1-2 1-2 間	Between2-3 2-3 間	
			Less 1Ω 1Ω 以下	Less1Ω 1Ω 以下	
6	Noise 摺動雜音	Refers to JIS C6443 依 JIS C6443 測定法		Less than 47mV 47 mV 以下	
7	Insulation resistance 絕緣阻抗	<p>A voltage of 100 V DC shall be applied for 1 min, after which measurement shall be made. DC 100 V 1 分鐘</p>	<p>Between individual terminals and frame/shaft/lever. 在端子，固定架，把柄間</p>	100MΩ or more 100MΩ 以上	
8	Dielectric strength 耐電壓	<p>Trip current: 10mA Measuring frequency: 50/60 Hz 100AC for 1min 電流 10mA 頻率 50/60 HZ AC 100 V 1 分鐘</p>	<p>Between individual terminals and frame/shaft/lever 在端子，固定架，把柄間</p>	Without damage to parts, arcing or breakdown etc. 沒有損傷，變形，絕緣破壞等情形。	

## SPECIFICATIONS OF SLIDE POTENTIOMETER

	Item 項目	Conditions 條件	Specifications 規格
9	Tracking error 連動誤差	Tracking is measured by applying 1kHz, 2V to terminals 1 & 3 of each control and getting out voltage of terminals 1 & 2 of each control. 在前後端的 1~3 端子間加 1KHz 2V 電壓，以前段為準，1~2 端子間的輸出。(2~3 端間測定)	-40db~0db $\leq$ 3db

# STANDARD RESISTANCE TAPER

## B TAPER (JIS:B)



NO.	DATE	DESCRIPTION		MODEL NAME			
		TOL. UNLESS OTHERWISE STATED	DIMENSION	SCALE	DRAWN BY	CHECKED BY	APPROVED BY
		less than 10 ±0.3	mm		何	王	王
		above 10 ~ 30 ±0.5		90.8.21	90.8.21	90.8.21	
		above 30 ~ 100 ±1.0		建志	茂松	茂松	
		above ±5°					
TAIWAN ALPHA ELECTRONIC CO., LTD.							

## 可變電阻無鉛焊錫與保管條件共通規格書

### Common Specification of Lead-Free Soldering and Storage conditions for Potentiometers

以下焊錫條件以可變電阻置於單層 1.6mm 厚度之印刷電路板上測試為基準。

The specification below is based on testing results of 1.6mm thickness single layer printed circuit board.

#### 1. 手工焊錫條件：

For Manual Soldering：

1-1 操作溫度最高 350°C，操作時間 3 秒以內。

To be performed within 3 seconds at 350°C or below.

#### 2. 自動或半自動機台焊錫條件：

For Automated or Semi-Automated Soldering Equipments:

2-1 使用發泡式且比重 0.82 以上的助焊劑，發泡高度以印刷電路板厚度一半為標準，且助劑不能流入可變電阻基板表面及印刷電路板表面。

Flux of 0.82 specific gravity, applied by foam fluxer, shall be used. Foam head shall be limited to the height which is half thickness of printed circuit board to be soldered. No flux should be allowed to run up onto resistive element board of potentiometer and the surface of printed circuit board.

2-2 預熱時間不超過兩分鐘，焊錫介面（即印刷電路板底）最高預熱溫度不超過 100°C。

Regarding preheating, the entire flow duration should not exceed 2 minutes, and soldering surface temperature (undersurface of PCB) shall be settled within 100°C.

2-3 焊錫過程機台設定溫度在 260°C 以下、4 秒以內。

Solder Dipping is to be performed within 4 seconds at 260°C or below.

3. 若回轉型電位器是塑膠軸且帶有檔位，請將主軸先調整至其中一個檔位或中心檔位上才可以進行焊錫作業。

For rotary potentiometer with plastic shaft which have centre detent or multiple detents, the shaft should be settled in relevant detent position prior to soldering process.

4. 手工焊錫、自動或半自動機台焊錫不得超過一回。

Regardless of soldering facility and method, solder dipping or solder smearing must not be carried out more than 1 time.

註：本項焊錫溫度條件不適用於回流焊接作業設備。

Remarks: This specification is not recommended for and applicable in reflow soldering.

焊錫注意事項：

Caution for soldering:

如圖所示，請避免 PCB 上層表面有焊錫

Please avoid soldering on upper surface of

P.C.B. as shown.

#### 5. 保管條件(Storage conditions):

產品需儲存在原始的包裝,以及保持常溫

常濕、避免陽光直射、遠離任何腐蝕性氣體。

產品需盡快完全地使用完,建議最慢不要超過

交貨後 6 個月。產品經拆封後，全部的數量都需迅速地使用完。

The products shall be stored in the original packaging and kept at room temperature and humidity, out of direct sunlight, and away from any and all corrosive gas. The products shall be completely used as soon as possible, but no longer than 6 months from the date of delivery. Once product packaging is opened, the complete quantity of such products shall be promptly used.

