

1. 適用範圍 / SCOPE

此份規格書涵蓋 MSTC0402/0603/0805/1206-series 金屬箔電流感測電阻元件相關規格。

This specification covers MSTC0402/0603/0805/1206-series devices, which are Metal Foil Current Sensing Resistor.

2. 產品型號/TYPE NUMBER

MSTC	0402/0603/0805/1206	M	×W×	Rxxx	*	LV
	(1)	(2)	(3)	(4)	(5)	(6)

- (1) 產品系列號 / SERIES NUMBER : Ex.MSTC1206 = 短電極/ Short electrode ; 兩端子 / two terminal ; 無側導 / without side electrode / size “0.12×0.06”
- (2) 產品材質 / Material : M = 錳銅合金 / MnCu alloy
- (3) 產品瓦特數 / Power Rating : Ex. W50=0.50 Watt ; 1W0=1.0Watt
- (4) 產品阻值 / Nominal Resistance Value : Ex. 2.5mΩ →2M50 ; 10mΩ →R010
- (5) 元件電阻偏差值 / Resistance Tolerance : Ex. D=±0.5% ; F=±1%
- (6) 產品碼/Product code:Ex. LV→Green protective coating design

3. 產品尺寸 / PRODUCT DIMENSIONS

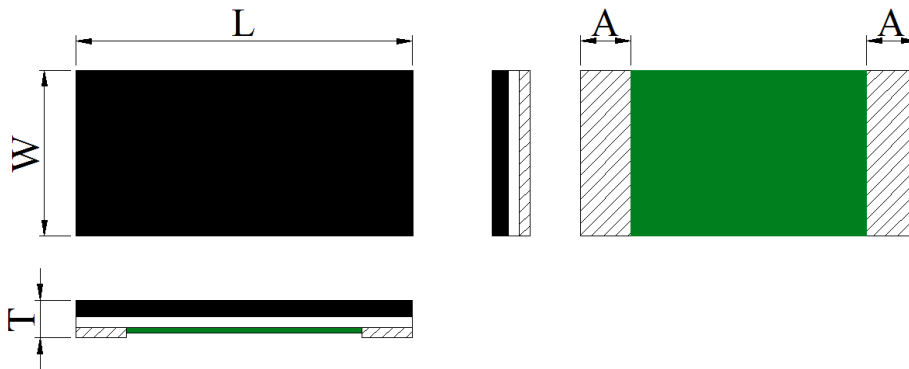


圖 1 / Fig.1

Unit(mm)

Part Number	W	L	T	A
MSTC0402MW33-series 2M50~R003	0.55±0.10	1.00±0.10	0.30±0.05	0.30±0.10
MSTC0402MW33-series R005~R025	0.55±0.10	1.00±0.10	0.30±0.05	0.23±0.10
MSTC0402MW25-series R040~R050	0.55±0.10	1.00±0.10	0.30±0.05	0.23±0.10

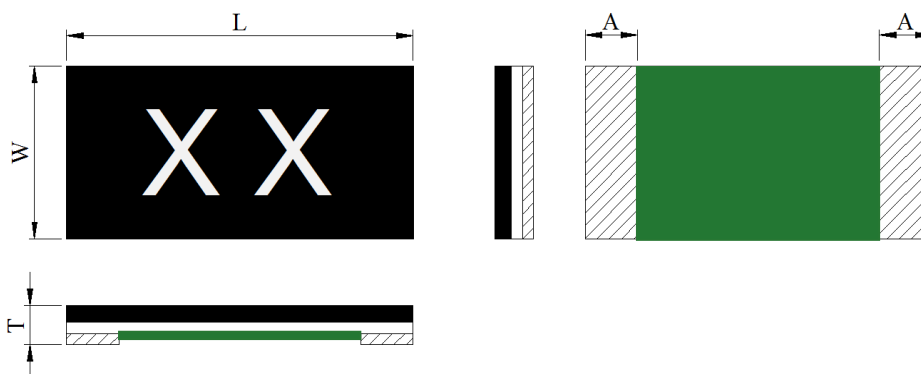


圖 2 / Fig.2

Unit(mm)

Part Number	W	L	T	A
MSTC0603MW50-series R002	0.80±0.25	1.60±0.25	0.35±0.20	0.45±0.20
MSTC0603MW50-series 2M50~R003	0.80±0.25	1.60±0.25	0.35±0.20	0.35±0.20
MSTC0603MW50-series R004~R015	0.80±0.25	1.60±0.25	0.35±0.20	0.30±0.20
MSTC0603MW33-series R016~R020	0.80±0.25	1.60±0.25	0.35±0.20	0.30±0.20

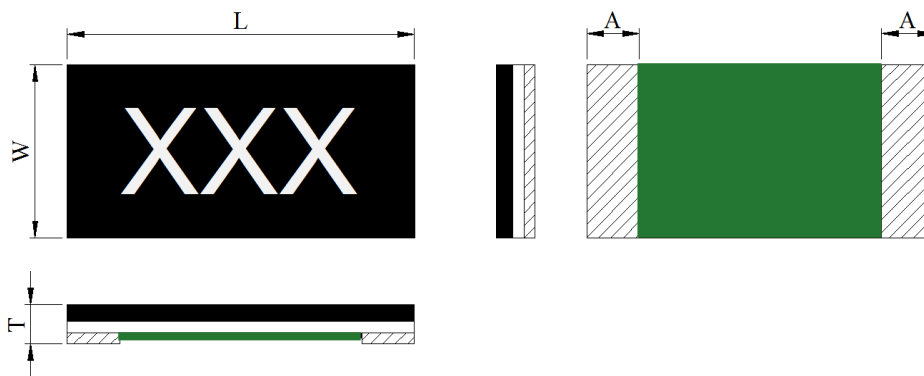


圖 3 / Fig.3

Unit(mm)

Part Number	W	L	T	A
MSTC0805MW50-series R001~1M50*LV	1.25±0.25	2.00±0.25	0.40±0.20	0.70±0.20
MSTC0805MW50-series R002~2M50*LV	1.25±0.25	2.00±0.25	0.40±0.20	0.60±0.20
MSTC0805MW50-series R003~R020*LV	1.25±0.25	2.00±0.25	0.40±0.20	0.40±0.20

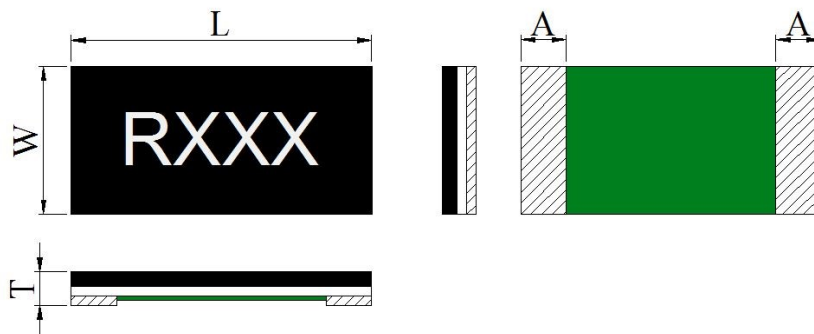


圖 4 / Fig.4

Unit(mm)

Part Number	W	L	T	A
MSTC1206M1W0-series R001~1M50*LV	1.60±0.25	3.20±0.25	0.40±0.20	1.25±0.30
MSTC1206M1W0-series R002*LV	1.60±0.25	3.20±0.25	0.40±0.20	1.05±0.30
MSTC1206M1W0-series R003*LV	1.60±0.25	3.20±0.25	0.40±0.20	0.80±0.30
MSTC1206M1W0-series R004~R020*LV	1.60±0.25	3.20±0.25	0.40±0.20	0.60±0.30

4. 產品結構及使用材料說明(參考圖 5) / STRUCTURE & MATERIAL (Ref to Fig.5)

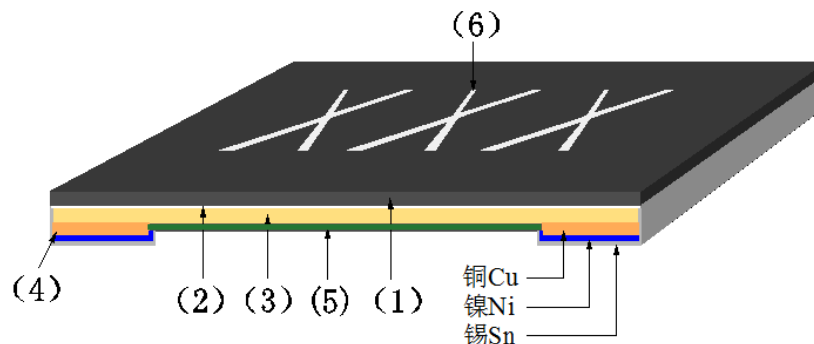


圖 5 / Fig.5

- 4.1 基板 / Substrate(1) : 環氧樹脂 / epoxy
- 4.2 粘著膠層/Adhesive(2): 環氧樹脂 / epoxy
- 4.3 電阻本體 / Resistive element(3) : 銅合金 / Cu - alloy
- 4.4 端電極 / Terminal electrode(4) : 錫、鎳、銅 / Sn、Ni、Cu
- 4.5 保護防焊層 / Protective coating(5) : 防火級環氧樹脂,符合 UL- 94-V0 要求(绿色) /
Flame-retardant epoxy, meets UL- 94-V0 requirements (green)
- 4.6 文印防焊層 / Marking coating(6) : 防火級環氧樹脂,符合 UL- 94-V0 要求(白色) /
Flame-retardant epoxy, meets UL- 94-V0 requirements (white)

5. 電氣特性 / ELECTRICAL CHARACTERISTICS

Part Number	Resistance Value (mΩ)	Power Rating (Watt)	Resistance Tolerance (%)	TCR (ppm/°C)
MSTC0402MW33-series 2M50~R025	2.5~3	0.33	±1%(F)	±150
	5~25		R020 ±0.5%(D)	±100
MSTC0402MW25-series R040~R050	40~50	0.25	±1%(F)	±100

Part Number	Resistance Value (mΩ)	Power Rating (Watt)	Resistance Tolerance (%)	TCR (ppm/°C)
MSTC0603MW50-series R002~R015	2	0.50	±1%(F) R005 ±0.5%(D)	±150
	2.5~5			±100
	6~15			±75
MSTC0603MW33-series R016~R020	16~20	0.33	±1%(F)	±75

Part Number	Resistance Value (mΩ)	Power Rating (Watt)	Resistance Tolerance (%)	TCR (ppm/°C)
MSTC0805MW50-series R001~R020*LV	1	0.5	±1%(F)	±150
	1.5			±100
	2~5			±75
	6~20			±50

Part Number	Resistance Value (mΩ)	Power Rating (Watt)	Resistance Tolerance (%)	TCR (ppm/°C)
MSTC1206M1W0-series R001~R020*LV	1~4	1.0	±1%(F)	±75
	5~20			±50

6. 產品特性及信賴性測試規範 / PRODUCT CHARACTERISTICS AND RELIABILITY TEST STANDARD

測試方法 Parameter	條件 Conditions	允收標準 Requirements
瞬間過載測試 / Short Time Over Load	P= 2.5Pr ; T=25±2°C , t = 5sec.	±(1.0%+0.5mΩ) IEC60115-1 4.13
高溫測試 / High Temp. Exposure	T = +155±2°C ; t = 1000h	±(1.0%+0.5mΩ) IEC60115-1 4.25

低溫測試 / Low Temp. Storage	$T = -55 \pm 2^{\circ}\text{C}$; $t = 1000\text{h}$	$\pm(1.0\%+0.5\text{m}\Omega)$ IEC60115-1 4.25
濕度負載壽命測試 / Moisture Load Life (60°C 、 $95\%\text{RH}$)	$V_{\text{test}} = V_{\text{max}}$; $T=60 \pm 2^{\circ}\text{C}$; $\text{RH}=95\%$; $t = 90\text{min ON}$, 30min OFF , 1000h	$\pm(2.0\%+0.5\text{m}\Omega)$ IEC60115-1 4.25
冷熱衝擊測試 / Thermal Shock	$[-55^{\circ}\text{C } 30\text{min.} \rightarrow \text{R.T. } 3\text{min.} \rightarrow +155^{\circ}\text{C } 30\text{min.}$ $\rightarrow \text{R.T. } 3\text{min.}]$, 100 個連續循環 / 100Cycles	$\pm(1.0\%+0.5\text{m}\Omega)$ IEC60115-1 4.19
在 70°C 下負載壽命測試 / Load Life at 70°C	$V_{\text{test}} = V_{\text{max}}$; $T=70 \pm 2^{\circ}\text{C}$; $t = 90\text{min ON}$, 30min OFF , 1000h	$\pm(2.0\%+0.5\text{m}\Omega)$ IEC60115-1 4.25
可焊性測試 / Solderability	浸入錫爐 / Dip into solder at $T = 245 \pm 5^{\circ}\text{C}$, $t = 3 \pm 0.5\text{sec.}$	錫涵蓋面積/The covered area $>95\%$ IEC60115-1 4.17
抗焊熱性測試 / Resistance to Solder Heat	經熱風式迴焊爐 / Through Reflow Parts are subjected to 3 reflow cycles.	$\pm(1.0\%+0.5\text{m}\Omega)$ IEC60115-1 4.18
機械衝擊測試 / Mechanical Shock	加速度 $a = 100\text{G}$, 振幅時間 $t = 6\text{ms}$ $a = 100\text{G}$, $t = 6\text{ms}$	$\pm(1.0\%+0.5\text{m}\Omega)$ IEC60115-1 4.21
基板彎曲測試 / Substrate Bending	兩支撐點間距 / Span between fulcrums : 90mm ; 振幅 / Bend Width: 2mm ; 測試板/Test board: 玻璃纖維板/ Glass-Epoxy Board ; 厚度 / Thickness $= 1.6\text{mm}$	$\pm 1.0\%$ IEC60115-1 4.33

7. 環境特性 / ENVIRONMENTAL CHARACTERISTIC

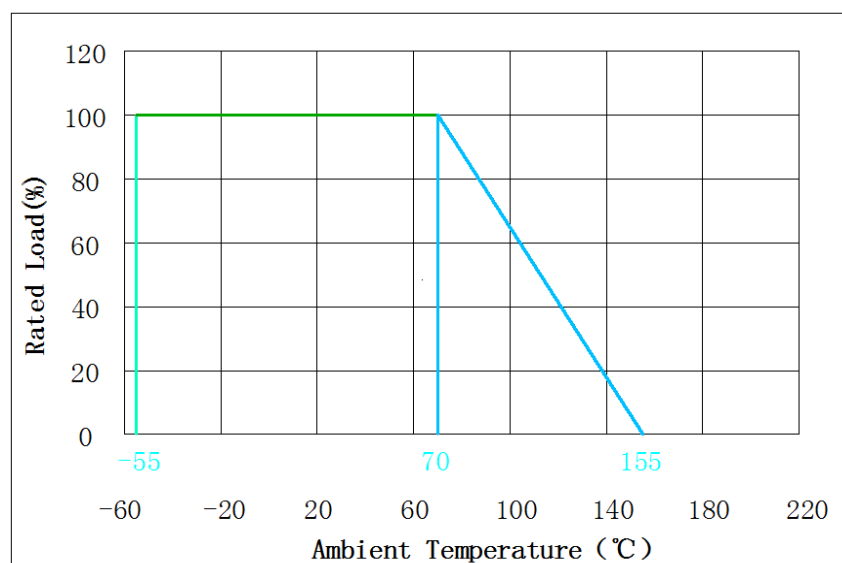
7.1 操作溫度範圍: $-55^{\circ}\text{C} \sim 155^{\circ}\text{C}$ / Operating Temperature: $-55^{\circ}\text{C} \sim 155^{\circ}\text{C}$

額定功率溫度衰變曲線 / Typical Thermal Derating Curve

額定功率乃指於 70°C 以內可連續滿額功率使用的術語。

下圖為當操作溫度高於 70°C 時的可使用功率衰減曲線。

Power rating is based on continuous full load operation at rated ambient temperature of 70°C . For resistors operated at ambient temp. in excess of 70°C , the max. load shall be derated in accordance with the following curve.



7.2 存儲條件 / STORAGE CONDITIONS

在溫度+10℃~40℃、相對濕度 $\leq 75\%$ 的密閉條件下可存放2年。 /

Under airtight in temperature+10℃~40℃、relative humidity $\leq 75\%$ can store 2 years.

在溫度+10℃~60℃、相對濕度為95%的非露天下最多可存放30天。 /

Without dew in temperature+10℃~60℃、relative humidity be 95% maximum value for 30days.

8. 焊錫墊尺寸及焊接條件 / SOLDER PAD SIZE AND WELDING CONDITIONS

8.1 建議如下圖焊接方式焊接，並滿足所要求的尺寸。 / Propose that the following picture installation way is installed, and satisfied the required size.

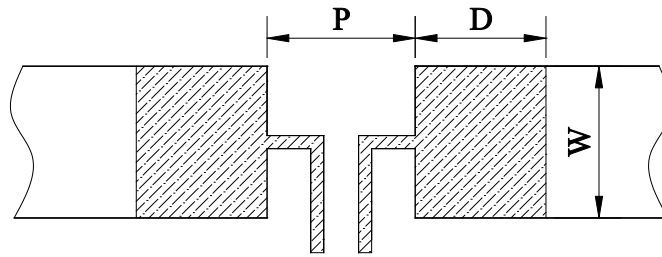
Part Number	P	W	D	Loading
MSTC0402MW33-series 2M50~R003	0.35mm	0.60mm	0.60mm	0.33w
MSTC0402MW33-series R005~R025	0.40mm	0.60mm	0.60mm	0.33w
MSTC0402MW25-series R040~R050	0.40mm	0.60mm	0.60mm	0.25w

Part Number	P	W	D	Loading
MSTC0603MW50-series R002	0.38mm	0.92mm	1.41mm	0.50w
MSTC0603MW50-series 2M50~R003	0.50mm	0.92mm	1.35mm	0.50w
MSTC0603MWxx-series R004~R020	0.60mm	0.92mm	1.30mm	0.50w/0.33w

Part Number	P	W	D	Loading
MSTC0805MW50-series R001*LV	0.40mm	1.44mm	1.60mm	0.5w
MSTC0805MW50-series 1M50~2M50*LV	0.50mm	1.44mm	1.55mm	0.5w
MSTC0805MW50-series R003~R020*LV	0.80mm	1.44mm	1.40mm	0.5w

Part Number	P	W	D	Loading
MSTC1206M1W0-series R001~1M50*LV	0.50mm	1.84mm	2.15mm	1.0w
MSTC1206M1W0-series R002*LV	0.60mm	1.84mm	2.10mm	1.0w
MSTC1206M1W0-series R003~R020*LV	1.20mm	1.84mm	1.80mm	1.0w

loading : 適用於本司建議焊墊設計並使用於限定穩定電流下 /
suit for specific pad layout and specific steady current



8.2 建議客戶焊接參數 / Recommended Customer Soldering Parameters

8.2.1 回流焊溫度曲線 / Solder reflow Temperature condition (圖 6 / Fig.6)

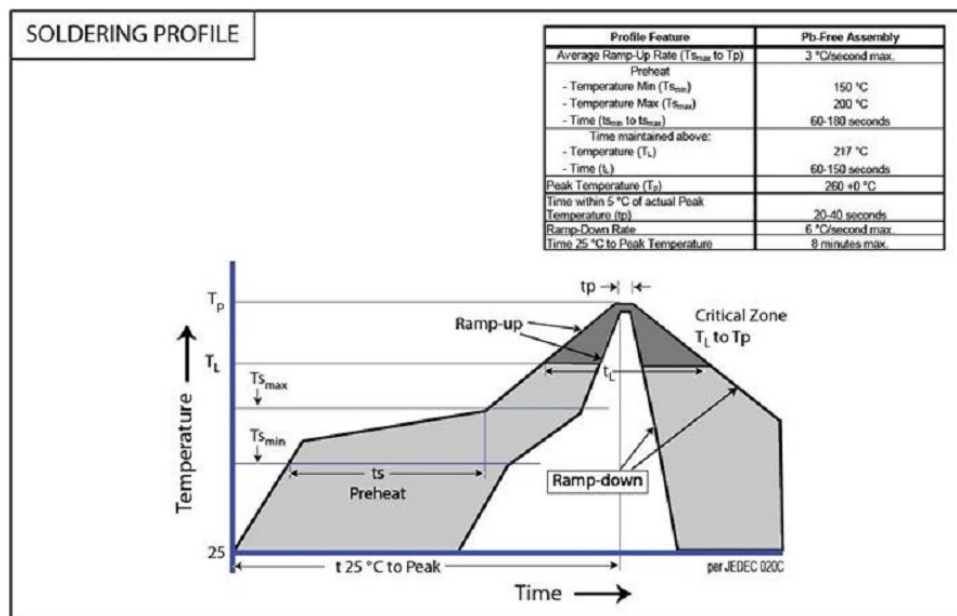


圖 6 / Fig.6

8.2.2 允許烙鐵焊接條件(熱風設備) / Rework temperature (hot air equipment) : 350°C, 3~5seconds

8.2.3 焊接方法建議 / Recommended reflow methods

焊接熱源方式可用紅外線, 熱蒸氣, 熱風. / IR, vapor phase oven, hot air oven

如果焊錫溫度超過允許最高溫度, 則產品本身會有功能損壞的疑慮. / If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

9. 批量生產後出貨測試項目 / Lot ACCEPTANCE TEST REQUIREMENTS

每一批生產均須作入庫檢驗, 每一批生產單量不可超過500Kpcs. /

Qualification shall consist of passing a program of following tests. Parts shall be pulled from each lot and maximum lot quantity shall be within 500Kpcs.

9.1 外觀 / Visual

方法 / Procedure : 利用放大鏡進行檢查 / Visual

標準 / Acceptance Criteria : 不能有髒污、不潔、文印錯誤、破損等 / No parts are outstandingly stained

9.2 尺寸 / Dimensions

方法 / Procedure : 使用合適且經校正的尺規 / As appropriate, calipers, micrometers, optical comparator, or approved gages

標準 / Acceptance Criteria : 尺寸均在規定標準範圍內 / No parts outside specific dimensions

9.3 單體元件電阻(Ro) / Resistance (Ro)

方法 / Procedure : 在 25℃ 下利用四線量測技術量測之 / Resistance shall be measured with 25℃ in the 4-wire resistance test

標準 / Acceptance Criteria : 電阻值均在規定標準範圍內 / The resistance of the test device shall be within the limits specified

9.4 電阻溫度係數 / TCR

方法 / Procedure : 利用四線法量測出元件分別在 25℃ 及 125℃ 下的電阻值, 並將其帶入下面公式中即可得出 TCR 值 / Getting the sampling device resistance values measured in 25℃ and 125℃ and put them in to the following equation to calculate the TCR

標準 / Acceptance Criteria : 溫度係數值均在規定標準範圍內 / All parts must within the specific $TCR = (R_b - R_a) / R_a \times 1 / (T_b - T_a) \times 10^{-6}$

9.5 絕緣電阻 / Insulation resistance (Ri)

方法 / Procedure : 利用絕緣測試儀量測 / Resistance between protective layer and resistive shall be measured by high ohm meter

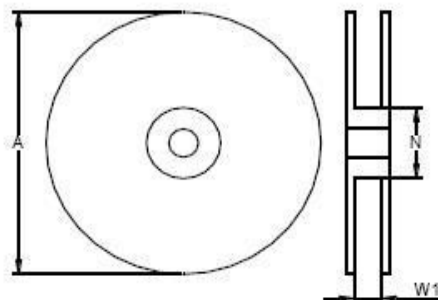
標準 / Acceptance Criteria : 防焊層與電阻本體絕緣電阻至少高於 100MΩ / The resistance of the test device shall over 100MΩ

10. 包裝訊息 / PACKAGING INFORMATION

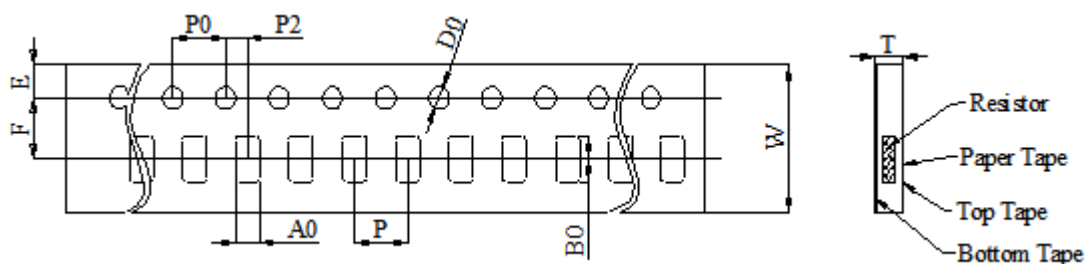
10.1 包裝數量、重量 / QUANTITY & WEIGHT

型號 / Type Number	數量 / Quantity (pcs)	重量 / Weight (g)
MSTC0402MWxx-series	10,000	100±30
MSTC0603MWxx-series	5,000	110±30
MSTC0805MW50-series*LV	5,000	120±30
MSTC1206M1W0-series*LV	5,000	140±30

10.2 捲輪規格 / Reel & Tape specifications



型號 / Type Number	A±5 (mm)	N±2 (mm)	W1±1 (mm)
MSTC0402MWxx-series	178	60	9.0
MSTC0603MWxx-series	178	60	9.0
MSTC0805MW50-series*LV	178	60	9.0
MSTC1206M1W0-series*LV	178	60	9.0



Unit(mm)

MSTC0402MWxx-series							
W	8.00 ± 0.30	P0	4.00 ± 0.10	P	2.00 ± 0.10	P2	2.00 ± 0.10
A0	0.65 ± 0.10	B0	1.10 ± 0.10	D0	1.50 ± 0.10	F	3.50 ± 0.10
E	1.75 ± 0.10	T	0.42 ± 0.05	/	/	/	/

MSTC0603MWxx-series							
W	8.00 ± 0.30	P0	4.00 ± 0.10	P	4.00 ± 0.10	P2	2.00 ± 0.10
A0	0.98 ± 0.10	B0	1.85 ± 0.10	D0	1.50 ± 0.10	F	3.50 ± 0.10
E	1.75 ± 0.10	T	0.60 ± 0.05	/	/	/	/

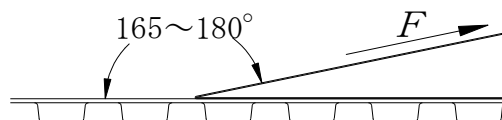
MSTC0805MW50-series*LV							
W	8.00 ± 0.30	P0	4.00 ± 0.10	P	4.00 ± 0.10	P2	2.00 ± 0.10
A0	1.55 ± 0.10	B0	2.30 ± 0.10	D0	1.50 ± 0.10	F	3.50 ± 0.10
E	1.75 ± 0.10	T	0.75 ± 0.10	/	/	/	/

MSTC1206M1W0-series*LV							
W	8.00 ± 0.30	P0	4.00 ± 0.10	P	4.00 ± 0.10	P2	2.00 ± 0.10
A0	2.05 ± 0.20	B0	3.65 ± 0.20	D0	1.50 ± 0.10	F	3.50 ± 0.10
E	1.75 ± 0.10	T	0.75 ± 0.10	/	/	/	/

10.3 密封膠膜剝離強度要求 / Peeling Strength of Seal Tape

F = 剝離強度 : 0.1 – 1.0N (10 - 100gf)

F = Peeling Strength: 0.1 – 1.0N (10 - 100gf)



11. 其他 / OTHERS

11.1 如果在使用中有超出本規格書的要求，必須經由雙方協商確認。 / In the event that an impropriety is found beyond this specification , it shall be fixed by mutual agreement between the parties.

11.2 如果本規格書有不適當的情況，必須通過雙方協商並由本公司修改。 / In the event that an impropriety is found in this specification , Juneway Electronic Technology Co., Ltd. shall amend it by mutual agreement between the parties.