

# **MST** series **Metal Strip Type** **Lead Free Current Sensing Resistors**

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# MST series Metal Strip Type Lead Free Current Sensing Resistors

## 1. 特性 Features

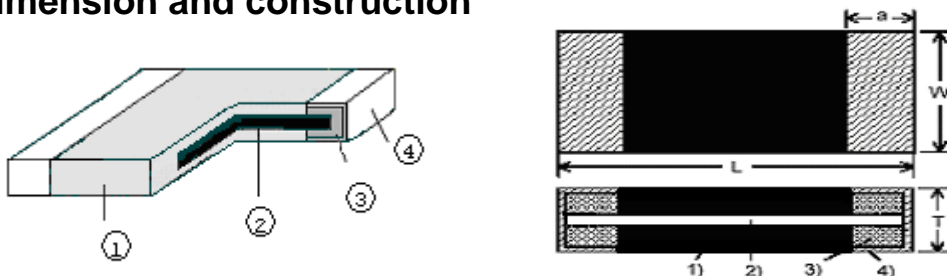
- 高功率及低溫度係數 High power rating and low TCR.
- 低阻值及高精度 (1%). Low resistance and high precision (1%).
- 電感係數小於 1.0nH. Inductance less than 1.0nH.
- 優異之可靠度及合理成本 Excellent reliability and suitable cost.
- 可用於無鉛焊接 Suitable for lead free soldering.

## 2. 應用 Applications

- 電路模組之電源供應器 Switching model power supply.
- 電池包 Battery pack.
- 筆記型及個人電腦 Notebook, personal computer.
- 測試儀器 Test Instrument.
- 功率放大器 Power Amplifier.

## 3. 尺寸結構

### Dimension and construction

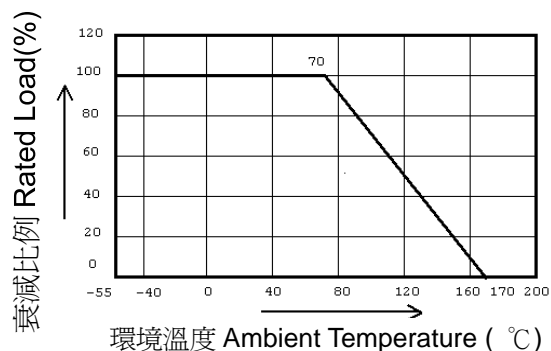


類型 TYPE	1.保護層 Protective Coating	2.電阻層 Resistive Element	3.端極 Terminal	4.外部電極 Outer Terminal
MST2512	樹脂 Resin	合金 Alloy Metal	銅 Copper	錫鍍層 Tin Plating

類型 Type	長 L	寬 W	厚度 T	電極 a
MST2512 1mΩ, 2mΩ	6.20+/-0.25	3.20+/-0.25	0.70+/-0.20	2.0+/-0.30
MST2512 3mΩ~25mΩ	6.20+/-0.20	3.20+/-0.20	0.60+/-0.20	0.80+/-0.20
MST2010 5mΩ~20mΩ	5.00+/-0.20	2.50+/-0.20	0.60+/-0.20	0.65+/-0.20
MST1206 5mΩ~25mΩ	3.10+/-0.15	1.60+/-0.15	0.55+/-0.20	0.50+/-0.15
MST5931 5mΩ	15.0+/-0.20	7.80+/-0.20	0.70+/-0.20	3.50+/-0.20

## 4. 功率衰減曲線 Power Derating Curve

操作溫度範圍 Operating Temperature Range: -55 to +170 °C



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## 5. 功率 Rating

Item 项目 Type 类型	阻值 Resistance Range (mΩ)	阻值精度 Resistance Tolerance (%)	功率 Power Rating at 70°C(W)	温度系数 Temperature coefficient of Resistance (ppm/°C)	最大工作 电压 Max Working Voltage	最大过负载 电压 Max Overload Voltage
MST2512	1,2,3,4,5	±1%(F) ±3%(H)	1	±50	71mV	142mV
MST2512	6,7,8,9,10	±1%(F) ±3%(H)	1	±30	100mV	200mV
MST2512	15	±1%(F) ±3%(H)	1	±30	122mV	244mV
MST2512	20	±1%(F) ±3%(H)	1	±30	141 mV	282 mV
MST2512	25	±1%(F) ±3%(H)	1	±30	158mV	316mV
MST2512	30,40,50	±1%(F) ±3%(H)	1	±30	224mV	448mV
MST2512	1,2,3,4,5	±1%(F) ±3%(H)	2	±50	100mV	200mV
MST2512	6,7,8,9,10	±1%(F) ±3%(H)	2	±30	141mV	282mV
MST2512	15	±1%(F) ±3%(H)	2	±30	173mV	346mV
MST2512	20	±1%(F) ±3%(H)	2	±30	200 mV	400 mV
MST2512	25	±1%(F) ±3%(H)	2	±30	224mV	448mV
MST2010	5	±1%(F) ±3%(H)	1	±30	71mV	142mV
MST2010	10	±1%(F) ±3%(H)	1	±30	100mV	200mV
MST2010	15	±1%(F) ±3%(H)	1	±30	122mV	244mV
MST2010	20	±1%(F) ±3%(H)	1	±30	141mV	282mV
MST1206	5	±1%(F) ±3%(H)	1	±30	71mV	142mV

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MST1206	10	±1%(F) ±3%(H)	1	±30	100mV	200mV
MST1206	15	±1%(F) ±3%(H)	1	±30	122mV	244mV
MST1206	20	±1%(F) ±3%(H)	1	±30	141mV	282mV
MST1206	25	±1%(F) ±3%(H)	1	±30	158mV	316mV
MST5931	5	±1%(F) ±3%(H)	5	±30	158mV	316mV

$$E = \sqrt{P * R}$$

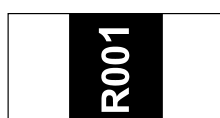
E : Working Voltage(V) , P : Rated Power (W) , R : Resistance Value(Ω)

E : 工作電壓(伏特) , P : 功率 (瓦特) , R : 阻值(歐姆)

## 6. 料號 Part Number

□□□□	□	□□□	□□□□	□□	□□	□□□□
<b>Type</b>	<b>TCR</b>	<b>Customer</b>	<b>Size</b>	<b>Watt</b>	<b>Tolerance</b>	<b>R Value</b>
MST	-:Normal P : 50ppm		2512 2010	H:1W J:2W	F: ±1% H: ±3%	4 digit

## 7. 阻值與文字對應 Resistance Marking



For 1~2 mΩ



For 3~25 mΩ

R001 = 1 mΩ

R020 = 20mΩ

## 8. 可靠度測試 Reliability Performance

測試項目 Test Item	規範 Specification	測試方法 Test Method
阻值 DC Resistance	F: ±1% . H: ±3%. J: ±5%	IEC 115-1 4.5/ JIS C 5202 5.1 阻值量測 Measure the resistance Value.
短時間過負載 Short Time Overload	$\Delta R \leq \pm(1\% \pm 0.5m\Omega)$	5 倍功率測試 5 秒 5 × Rated power for 5 seconds
銲錫性 Solderability	端極之上錫面積需 95% 以上 Over 95% of termination must be covered with (Sn+Ag+Cu)	IEC 115-1 4.17 / JIS C 5202 6.5 樣品經助銲劑潤濡後於 245±2°C 錫爐 測試 3±0.5 sec After immersing flux, dip in the 245±2°C molten solder bath for 3±0.5 sec.

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耐熱性 Resistance to solder Heat	$\Delta R \leq \pm(1\% \pm 0.5m\Omega)$ 無機構損傷 No mechanical damage	IEC 115-1 4.18 / JIS C 5202 5.2 With $260 \pm 5^\circ\text{C}$ for $10 \pm 1\text{sec.}$
長時間溼度 Load Life Humidity	$\Delta R \leq \pm(1\% \pm 0.5m\Omega)$	$40 \pm 2^\circ\text{C}$ with relative humidity 90% ~ 95% D.C. rated voltage for 1.5 hours ON 30 minutes OFF. Cycle repeated 1000 hours.
溫度係數 Temperature Coefficient of Resistance (TCR)	$\pm 50\text{ppm}/^\circ\text{C}$ $\pm 30\text{ppm}/^\circ\text{C}$	IEC 115-1 4.8.4.2 / JIS C 5202 5.2 $T_1$ $T_2$ Test temperature : $25^\circ\text{C} \sim -55^\circ\text{C}$ $25^\circ\text{C} \sim 125^\circ\text{C}$ $\text{TCR}(\text{ppm}/^\circ\text{C}) = (\text{R}_2 - \text{R}_1) / \text{R}_1 \times 1 / (\text{T}_2 - \text{T}_1) \times 10^6$
長時間負載 Load Life	$\Delta R \leq \pm(1\% \pm 0.5m\Omega)$	IEC 115-1 4.25.1 / JIS C 5202 7.10 Rated voltage for 1.5 hours for followed by a pause 0.5 hour at $70 \pm 3^\circ\text{C}$ . Cycle repeated 1000 hours
溫度循環 Temperature Cycle	$\Delta R \leq \pm(1\% \pm 0.5m\Omega)$ No mechanical damage	IEC 115-1 4.19 / JIS C 5202 7.4 Repeat 5 cycles as follows $-55^\circ\text{C}$ (30min.) + $25^\circ\text{C}$ (2~3min.) + $125^\circ\text{C}$ (30min.) + $25^\circ\text{C}$ (2~3min.)
絕緣電阻 Insulation Resistance	端極與保護層間超過 $1000M\Omega$ Between termination and coating must be over $1000M\Omega$	IEC 115-1 4.6.1.1 / JIS C 5202 5.6 Test voltage : $100 \pm 15\text{V}$
彎曲強度 Bending strength	$\Delta R \leq \pm(1\% \pm 0.5m\Omega)$ 無機構損傷 No mechanical damage	IEC 115-1 4.33 Resistance change after bended on the 90mm PCB. Bending : 2mm

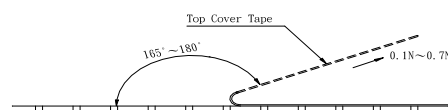
## 9. PACKAGING

### 9.1 上膠帶拉力強度 Peel Strength of Top Cover Tape

拉起速度約為 300 mm/min; The peel speed shall be about 300 mm/min

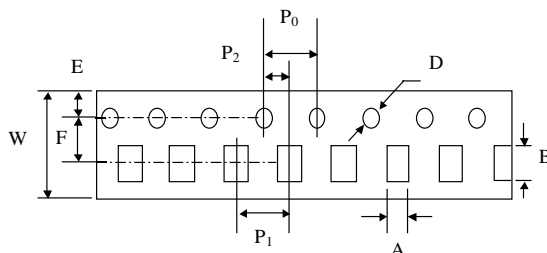
上膠拉力在之間 0.1 to 0.7N

The peel force of top cover tape shall between 0.1 to 0.7N



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## 9.2 包裝材料尺寸 Tape Packaging Dimensions

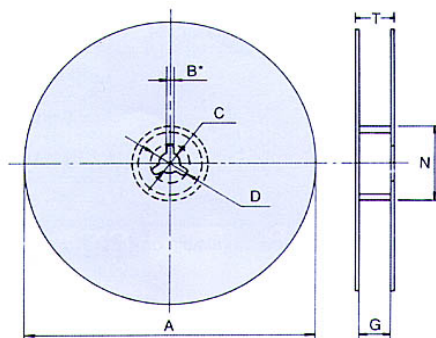


Accumulated dimensional tolerance  $40\pm 0.2\text{mm}$

Size	A	B	W	F	E	P1	P2	P0	D
2512	$3.70\pm 0.20$	$6.75\pm 0.20$	$12.00\pm 0.30$	$5.50\pm 0.05$	$1.75\pm 0.10$	$4.00\pm 0.10$	$2.00\pm 0.05$	$4.00\pm 0.10$	$1.50+0.10/-0$
2010	$2.80\pm 0.20$	$5.55\pm 0.20$	$12.00\pm 0.30$	$5.50\pm 0.05$	$1.75\pm 0.10$	$4.00\pm 0.10$	$2.00\pm 0.05$	$4.00\pm 0.10$	$1.50+0.10/-0$
1206	$2.00\pm 0.20$	$3.70\pm 0.20$	$8.15\pm 0.15$	$3.50\pm 0.05$	$1.75\pm 0.10$	$4.00\pm 0.10$	$2.00\pm 0.05$	$4.00\pm 0.10$	$1.50+0.10/-0$
5931	$8.20\pm 0.10$	$15.4\pm 0.10$	$24.0\pm 0.30$	$11.5\pm 0.10$	$1.75\pm 0.10$	$12.0\pm 0.10$	$2.00\pm 0.10$	$4.00\pm 0.10$	$1.50+0.10/-0$

unit : mm

## 9.3 捲軸尺寸 Reel Dimensions



unit : mm

Size	Packaging Q'ty	A	N	C	D	B	G	T
2512	4kpcs/Reel	$178.0\pm 2.0$	$60.0\pm 0.5$	$13.0\pm 0.5$	20(Min.)	$2.0\pm 0.5$	$13.8\pm 1.5$	16.7max.
2010	4kpcs/Reel	$178.0\pm 2.0$	$60.0\pm 0.5$	$13.0\pm 0.5$	20(Min.)	$2.0\pm 0.5$	$13.8\pm 1.5$	16.7max.
1206	4kpcs/Reel	$178.0\pm 2.0$	$60.0\pm 0.5$	$13.0\pm 0.5$	20(Min.)	$2.0\pm 0.5$	$10.0\pm 1.5$	14.9max.
5931	3kpcs/Reel	$330.0\pm 2.0$	$99.5\pm 0.5$	$13.5\pm 0.5$	$20\pm 0.5$	$2.5\pm 0.5$	$24.0\pm 1.0$	$28.6\pm 1.0$

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