

# Maida 多層式突波吸收器

0402 至 2220 間各種尺寸之 ESD 及暫態電壓抑制

Maida 多層式突波吸收器 (MLV) 為無導線表面黏著晶片，有各種不同的尺寸、電壓及電容值，適用於各種不同的應用。

## 瞭解多層式突波吸收器 (MLV)

### 何謂 MLV？

熟悉 Maida 發展公司的圓片突波吸收器的人，大部分都知道突波吸收器，但不一定熟悉多層式突波吸收器 (MLV)。MLV 為極小的陶瓷晶片接在各端頭上，可用於保護電路並避免靜電放電及其他高壓突波。如同圓片突波吸收器一樣，MLV 的目的在於帶走不需要的峰值電壓，以保護電子電路。在正常操作情況下，突波吸收器實質上並未抽取電流而保留在待命狀態，消耗極小的功率。但若電路上發生大的電壓峰值時，突波吸收器將迅速開始通電。突波吸收器將電流從保護電路上帶走並流至地面；當大的峰值一通過時，突波吸收器隨即停止通電，並恢復待命狀態。有些人認為這類功能如同一個可重設的保險絲，在各個電壓峰值之後，突波吸收器本身即進行重設。

有導線的圓片突波吸收器一般用於保護裝置，以避免插入家用電氣插座內。它們可以保護所有電壓上不尋常的脈衝，而這些脈衝通常可存在於 AC 電力供應線上。MLV 在較低的電壓下操作，一般用於可攜式電池操作的直流電壓裝置，如行動電話。

### MLV 與有導線的突波吸收器圓片比較的優點

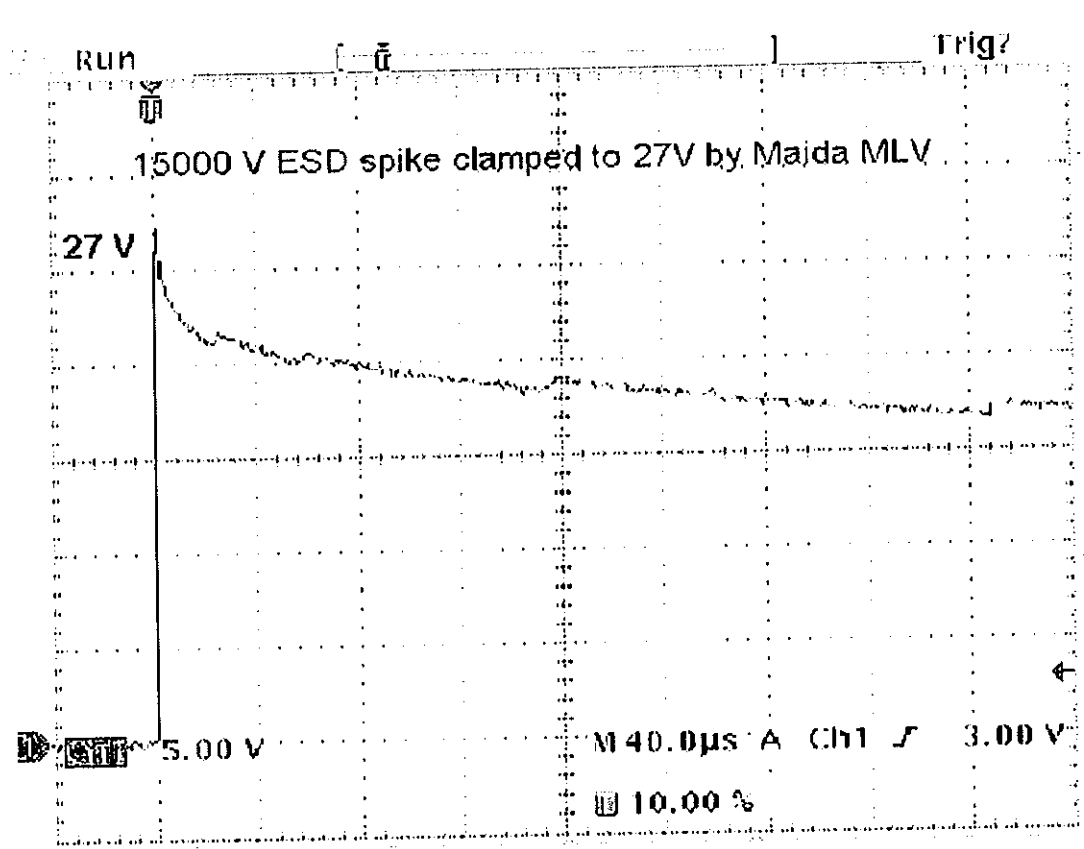
MLV 為表面黏著晶片，以無導線銷售；它們由電路板製造商直接焊接在印刷電路板上。消除導線使 MLV 比有導線圓片更具優勢；可消除導線內的電容與電感，而極小的尺寸也使 MLV 比有導線的圓片對脈衝有更快速的反應。

MLV 讓電路板製造商更容易組裝。在多種情況下，有導線的圓片必須以手將圓片插入電路板的孔內，然後再以波焊爐焊接。MLV 可使用機械方式放置於電路板上，且可輕易使用回流焊爐沿著其他表面黏著的晶片焊接。MLV 可用於取代低壓突波吸收器圓片的情況下，時間及製程的節省相當可觀。

MLV 最大的優點在於小尺寸。表面黏著的晶片平鋪於電路板上。其小巧的特性為目前行動裝置的精簡設計所必須的。

## 使用 MLV 保護 ESD

靜電放電僅為充電物體上跳出並流至地面的快速電流火花。冬天走在地板上接觸導體表面時，都會經歷靜電放電的威力；在手指尖端感受的火花可高達數千伏特。通過的電流極小，當儲存的電荷放出後，電流隨即停止。但電壓峰值卻足夠摧毀或鎖住半導體如 MOSFETs 及 CMOS 中纖細的開關門。任何具有矽「腦」的手持式裝備都是 ESD 脈衝的潛在受害者。行動電話、PDA、呼叫器、遙控器及電子遊戲等都需保護，以免受到 ESD 破壞。任何可能讓電荷進入裝置的部件都需加以保護，包括小型鍵盤、天線、電池充電接口及通過塑膠外殼的任何孔上。MLV 正適合該項任務。



此示波圖顯示通過 MaidaSV18P0603 多層式突波吸收器後，15KV 空氣放電峰值的結果。電壓在若干微秒之後，消耗至僅為 27V 的位準。

## Maida Development Co Multilayer Varistors

### EV Series for ESD protection

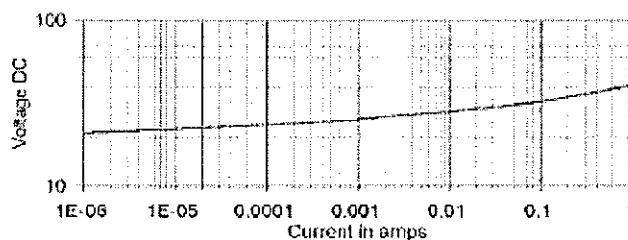
This is our lowest capacitance MLV series. All parts in this series are designed to protect sensitive components from high voltage Electrostatic Discharge (IEC 1000-4-2 8KV contact). Tests show that Maida MLVs will continue to provide circuit protection even after 100,000 8KV discharges. With capacitance values starting at less than 10pf for the EV18P0402L, these MLVs are ideal to protect high-speed circuits in portable hand held devices.

| 0402 (1005) |                                            |      |                                |                                                     |     |     |         |
|-------------|--------------------------------------------|------|--------------------------------|-----------------------------------------------------|-----|-----|---------|
| Maida       | Minimum Ratings Electrical Characteristics |      |                                |                                                     |     |     |         |
|             | Continuous                                 |      | Typical<br>Varistor<br>Voltage | Minimum<br>Number<br>of direct<br>8KV ESD<br>pulses | Max |     | Typical |
|             | Applied                                    |      |                                |                                                     |     |     |         |
|             |                                            |      |                                |                                                     |     |     |         |
|             | (AC)                                       | (DC) | 1mA                            | tolerated                                           | (V) | (A) | (pF)    |
| EV18P0402L  | 14                                         | <18  | 26                             | 10000                                               | 55  | 1   | 9       |
| EV18P0402   | 14                                         | <18  | 26                             | 10000                                               | 50  | 1   | 27      |

| 0603 (1608) |                                            |      |                          |                                         |     |     |         |
|-------------|--------------------------------------------|------|--------------------------|-----------------------------------------|-----|-----|---------|
| Maida       | Minimum Ratings Electrical Characteristics |      |                          |                                         |     |     |         |
|             | Continuous Applied                         |      | Typical Varistor Voltage | Minimum Number of direct 8KV ESD pulses | Max |     | Typical |
|             |                                            |      |                          |                                         |     |     |         |
|             |                                            |      |                          |                                         |     |     |         |
|             | (AC)                                       | (DC) | at 1mA                   | tolerated                               | (V) | (A) | (pF)    |
| EV18P0603L  | 14                                         | <18  | 26                       | 10000                                   | 48  | 1   | 40      |
| EV18P0603   | 14                                         | <18  | 26                       | 10000                                   | 45  | 1   | 120     |

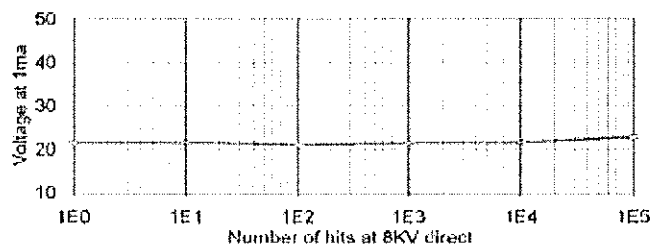
### Current - Voltage Curve

Maida EV18P0402L



### ESD Repetitive 8KV Strikes

Maida EV18P0402L



## TV Series Low Capacitance Multilayer Varistor

The TV series is designed to suppress destructive transients that may damage circuits. This series has the lowest capacitance value possible while still providing some surge protection. These parts handle less energy than the standard SV series MLV, but their lower capacitance makes them a better choice in some high speed circuits.

| 0603 (1608)              |                    |      |                 |              |                               |      |                                            |     |                                         |
|--------------------------|--------------------|------|-----------------|--------------|-------------------------------|------|--------------------------------------------|-----|-----------------------------------------|
| Maida<br>Style<br>Number | Maximum Ratings    |      |                 |              | Electrical Characteristics    |      |                                            |     |                                         |
|                          | Continuous         |      | Transient       |              | Varistor Voltage<br>(@1mA DC) |      | Max Clamping<br>Voltage<br>(@Test Current) |     | Typical<br>Cap.<br><br>1 V rms<br>@1MHz |
|                          | Applied<br>Voltage |      | Energy          | Peak Current |                               |      |                                            |     |                                         |
|                          |                    |      | 10x1000 $\mu$ s | 8x20 $\mu$ s | Vmin                          | Vmax | 8x20 $\mu$ s                               |     |                                         |
|                          | (AC)               | (DC) | (J)             | (A)          | (V)                           | (V)  | (V)                                        | (A) | (pF)                                    |
| TV5R5P0603               | 4                  | 5.5  | 0.05            | 20           | 6.9                           | 9.3  | 20                                         | 1   | 210                                     |
| TV9P0603                 | 6.5                | 9    | 0.05            | 20           | 11                            | 15   | 25                                         | 1   | 180                                     |
| TV11P0603                | 8                  | 11   | 0.05            | 20           | 13                            | 17   | 30                                         | 1   | 170                                     |
| TV14P0603                | 10                 | 14   | 0.05            | 25           | 16.5                          | 20.5 | 35                                         | 1   | 150                                     |
| TV18P0603                | 14                 | 18   | 0.05            | 25           | 22                            | 27   | 45                                         | 1   | 120                                     |
| TV22P0603                | 17                 | 22   | 0.05            | 30           | 26                            | 32   | 50                                         | 1   | 90                                      |
| TV26P0603                | 20                 | 26   | 0.05            | 30           | 32                            | 38   | 60                                         | 1   | 60                                      |

| 0805 (2012)              |                    |      |                 |              |                                |      |                                            |     |                                         |
|--------------------------|--------------------|------|-----------------|--------------|--------------------------------|------|--------------------------------------------|-----|-----------------------------------------|
| Maida<br>Style<br>Number | Maximum Ratings    |      |                 |              | Electrical Characteristics     |      |                                            |     |                                         |
|                          | Continuous         |      | Transient       |              | Varistor Voltage<br>(@ 1mA DC) |      | Max Clamping<br>Voltage<br>(@Test Current) |     | Typical<br>Cap.<br><br>1 V rms<br>@1MHz |
|                          | Applied<br>Voltage |      | Energy          | Peak Current |                                |      |                                            |     |                                         |
|                          |                    |      | 10x1000 $\mu$ s | 8x20 $\mu$ s | Vmin                           | Vmax | 8x20 $\mu$ s                               |     |                                         |
|                          | (AC)               | (DC) | (J)             | (A)          | (V)                            | (V)  | (V)                                        | (A) | (pF)                                    |
| TV5R5P0805               | 4                  | 5.5  | 0.1             | 40           | 6.9                            | 9.3  | 15                                         | 2   | 510                                     |
| TV9P0805                 | 6.5                | 9    | 0.15            | 40           | 11.3                           | 15.2 | 20                                         | 2   | 320                                     |
| TV11P0805                | 8                  | 11   | 0.15            | 40           | 13                             | 17   | 25                                         | 2   | 290                                     |
| TV14P0805                | 10                 | 14   | 0.15            | 40           | 17.5                           | 23.7 | 30                                         | 2   | 250                                     |
| TV18P0805                | 14                 | 18   | 0.15            | 40           | 23                             | 30   | 40                                         | 2   | 200                                     |
| TV22P0805                | 17                 | 22   | 0.15            | 40           | 28                             | 34   | 50                                         | 2   | 180                                     |
| TV26P0805                | 20                 | 26   | 0.15            | 40           | 33                             | 40   | 60                                         | 2   | 100                                     |

## SV Series Standard Multilayer Varistor

The SV series is our standard MLV line. They have good surge suppression and moderate capacitance.

| 0603 (1608)              |                    |      |                 |              |                               |      |                                            |                  |                 |
|--------------------------|--------------------|------|-----------------|--------------|-------------------------------|------|--------------------------------------------|------------------|-----------------|
| Maida<br>Style<br>Number | Maximum Ratings    |      |                 |              | Electrical Characteristics    |      |                                            |                  |                 |
|                          | Continuous         |      | Transient       |              | Varistor Voltage<br>(@1mA DC) |      | Max Clamping<br>Voltage<br>(@Test Current) |                  | Typical<br>Cap. |
|                          | Applied<br>Voltage |      | Energy          | Peak Current |                               |      |                                            |                  |                 |
|                          |                    |      | 10x1000 $\mu$ s | 8x20 $\mu$ s | Vmin                          | Vmax | 8x20 $\mu$ s                               | 1 V rms<br>@1KHz |                 |
|                          | (AC)               | (DC) | (J)             | (A)          | (V)                           | (V)  | (V)                                        | (A)              | (pF)            |
| SV5R5P0603               | 4                  | 5.5  | 0.1             | 30           | 6.9                           | 9.3  | 16                                         | 2                | 440             |
| SV9P0603                 | 6.5                | 9    | 0.1             | 30           | 11.3                          | 15.2 | 23                                         | 2                | 380             |
| SV11P0603                | 8                  | 11   | 0.1             | 30           | 13                            | 18   | 27                                         | 2                | 350             |
| SV14P0603                | 10                 | 14   | 0.1             | 30           | 17.5                          | 23.7 | 30                                         | 2                | 290             |
| SV18P0603                | 14                 | 18   | 0.1             | 30           | 23                            | 30   | 40                                         | 2                | 220             |
| SV22P0603                | 17                 | 22   | 0.1             | 30           | 28                            | 34   | 50                                         | 2                | 170             |
| SV26P0603                | 20                 | 26   | 0.1             | 30           | 33                            | 40   | 60                                         | 2                | 100             |
| SV30P0603                | 25                 | 30   | 0.1             | 30           | 38                            | 46   | 65                                         | 2                | 40              |

| 0805 (2012)              |                    |      |                 |              |                               |      |                                            |     |                                         |
|--------------------------|--------------------|------|-----------------|--------------|-------------------------------|------|--------------------------------------------|-----|-----------------------------------------|
| Maida<br>Style<br>Number | Maximum Ratings    |      |                 |              | Electrical Characteristics    |      |                                            |     |                                         |
|                          | Continuous         |      | Transient       |              | Varistor Voltage<br>(@1mA DC) |      | Max Clamping<br>Voltage<br>(@Test Current) |     | Typical<br>Cap.<br><br>1 V rms<br>@1KHz |
|                          | Applied<br>Voltage |      | Energy          | Peak Current |                               |      |                                            |     |                                         |
|                          |                    |      | 10x1000 $\mu$ s | 8x20 $\mu$ s | Vmin                          | Vmax | 8x20 $\mu$ s                               |     |                                         |
|                          | (AC)               | (DC) | (J)             | (A)          | (V)                           | (V)  | (V)                                        | (A) | (pF)                                    |
| SV5R5P0805               | 4                  | 5.5  | 0.3             | 120          | 6.9                           | 9.3  | 15                                         | 2   | 1020                                    |
| SV9P0805                 | 6.5                | 9    | 0.3             | 120          | 11.3                          | 15.2 | 24                                         | 2   | 640                                     |
| SV11P0805                | 8                  | 11   | 0.3             | 120          | 13                            | 18   | 27                                         | 2   | 580                                     |
| SV14P0805                | 10                 | 14   | 0.3             | 120          | 17.5                          | 23.7 | 30                                         | 2   | 500                                     |
| SV18P0805                | 14                 | 18   | 0.3             | 120          | 23                            | 30   | 40                                         | 2   | 400                                     |
| SV22P0805                | 17                 | 22   | 0.3             | 120          | 28                            | 34   | 50                                         | 2   | 360                                     |
| SV26P0805                | 20                 | 26   | 0.3             | 120          | 33                            | 40   | 58                                         | 2   | 280                                     |
| SV30P0805                | 25                 | 30   | 0.3             | 120          | 38                            | 46   | 65                                         | 2   | 200                                     |
| SV39P0805                | 30                 | 39   | 0.3             | 120          | 42                            | 52   | 80                                         | 2   | 150                                     |

| 1206 (3216)              |                    |      |            |              |                               |      |                                             |     |                  |
|--------------------------|--------------------|------|------------|--------------|-------------------------------|------|---------------------------------------------|-----|------------------|
| Maida<br>Style<br>Number | Maximum Ratings    |      |            |              | Electrical Characteristics    |      |                                             |     |                  |
|                          | Continuous         |      | Transient  |              | Varistor Voltage<br>(@1mA DC) |      | Max Clamping<br>Voltage<br>(@ Test Current) |     | Typical<br>Cap.  |
|                          | Applied<br>Voltage |      | Energy     | Peak Current |                               |      |                                             |     |                  |
|                          |                    |      | 10x1000 μs | 8x20 μs      | Vmin                          | Vmax | 8x20 μs                                     |     | 1 V rms<br>@1KHz |
|                          | (AC)               | (DC) | (J)        | (A)          | (V)                           | (V)  | (V)                                         | (A) | (pF)             |
| SV5R5P1206               | 4                  | 5.5  | 0.4        | 120          | 6.9                           | 9.3  | 15                                          | 10  | 3700             |
| SV9P1206                 | 6.5                | 9    | 0.4        | 150          | 11.3                          | 15.2 | 25                                          | 10  | 2170             |
| SV14P1206                | 10                 | 14   | 0.4        | 150          | 17.5                          | 23.7 | 30                                          | 10  | 1670             |
| SV18P1206                | 14                 | 18   | 0.4        | 150          | 23                            | 30   | 40                                          | 10  | 1030             |
| SV26P1206                | 20                 | 26   | 0.4        | 150          | 33                            | 40   | 58                                          | 10  | 940              |
| SV30P1206                | 25                 | 30   | 0.4        | 150          | 38                            | 46   | 66                                          | 10  | 890              |
| SV48P1206                | 40                 | 48   | 0.4        | 150          | 55                            | 66   | 100                                         | 10  | 680              |

| 1210 (3225)              |                    |      |            |              |                               |      |                                            |     |                  |
|--------------------------|--------------------|------|------------|--------------|-------------------------------|------|--------------------------------------------|-----|------------------|
| Maida<br>Style<br>Number | Maximum Ratings    |      |            |              | Electrical Characteristics    |      |                                            |     |                  |
|                          | Continuous         |      | Transient  |              | Varistor Voltage<br>(@1mA DC) |      | Max Clamping<br>Voltage<br>(@Test Current) |     | Typical<br>Cap.  |
|                          | Applied<br>Voltage |      | Energy     | Peak Current |                               |      |                                            |     |                  |
|                          |                    |      | 10x1000 μs | 8x20 μs      | Vmin                          | Vmax | 8x20 μs                                    |     | 1 V rms<br>@1KHz |
|                          | (AC)               | (DC) | (J)        | (A)          | (V)                           | (V)  | (V)                                        | (A) | (pF)             |
| SV18P1210                | 14                 | 18   | 0.9        | 220          | 23                            | 30   | 40                                         | 10  | 1350             |
| SV26P1210                | 20                 | 26   | 0.9        | 220          | 33                            | 40   | 58                                         | 10  | 1200             |
| SV30P1210                | 25                 | 30   | 0.9        | 220          | 38                            | 46   | 66                                         | 10  | 900              |
| SV48P1210                | 40                 | 48   | 0.9        | 250          | 55                            | 66   | 100                                        | 10  | 780              |
| SV60P1210                | 50                 | 60   | 0.9        | 250          | 69                            | 83   | 120                                        | 10  | 600              |

## PV Series Power Multilayer Varistor

The PV series has higher energy handling capabilities than our standard series. These MLVs should be chosen where the application requires outstanding surge protection and high reliability.

| 0603 (1603)              |                    |      |                 |              |                               |      |                                            |     |                                         |
|--------------------------|--------------------|------|-----------------|--------------|-------------------------------|------|--------------------------------------------|-----|-----------------------------------------|
| Maida<br>Style<br>Number | Maximum Ratings    |      |                 |              | Electrical Characteristics    |      |                                            |     |                                         |
|                          | Continuous         |      | Transient       |              | Varistor Voltage<br>(@1mA DC) |      | Max Clamping<br>Voltage<br>(@Test Current) |     | Typical<br>Cap.<br><br>1 V rms<br>@1KHz |
|                          | Applied<br>Voltage |      | Energy          | Peak Current |                               |      |                                            |     |                                         |
|                          |                    |      | 10x1000 $\mu$ s | 8x20 $\mu$ s | Vmin                          | Vmax | 8x20 $\mu$ s                               |     |                                         |
|                          | (AC)               | (DC) | (J)             | (A)          | (V)                           | (V)  | (V)                                        | (A) | (pF)                                    |
| PV5R5P0603               | 4                  | 5.5  | 0.15            | 40           | 6.9                           | 9.3  | 15.5                                       | 2   | 960                                     |
| PV14P0603                | 10                 | 14   | 0.15            | 40           | 17.5                          | 23.7 | 30                                         | 2   | 450                                     |
| PV18P0603                | 14                 | 18   | 0.15            | 40           | 23                            | 30   | 40                                         | 2   | 380                                     |
| PV22P0603                | 17                 | 22   | 0.15            | 40           | 28                            | 34   | 58                                         | 2   | 290                                     |

| 0805 (2012)              |                    |      |                 |              |                               |      |                                            |     |                                         |
|--------------------------|--------------------|------|-----------------|--------------|-------------------------------|------|--------------------------------------------|-----|-----------------------------------------|
| Maida<br>Style<br>Number | Maximum Ratings    |      |                 |              | Electrical Characteristics    |      |                                            |     |                                         |
|                          | Continuous         |      | Transient       |              | Varistor Voltage<br>(@1mA DC) |      | Max Clamping<br>Voltage<br>(@Test Current) |     | Typical<br>Cap.<br><br>1 V rms<br>@1KHz |
|                          | Applied<br>Voltage |      | Energy          | Peak Current |                               |      |                                            |     |                                         |
|                          |                    |      | 10x1000 $\mu$ s | 8x20 $\mu$ s | Vmin                          | Vmax | 8x20 $\mu$ s                               |     |                                         |
|                          | (AC)               | (DC) | (J)             | (A)          | (V)                           | (V)  | (V)                                        | (A) | (pF)                                    |
| PV5R5P0805               | 4                  | 5.5  | 0.4             | 120          | 6.9                           | 9.3  | 15.5                                       | 5   | 1530                                    |
| PV14P0805                | 10                 | 14   | 0.4             | 150          | 16.5                          | 20.5 | 30                                         | 5   | 750                                     |
| PV18P0805                | 14                 | 18   | 0.4             | 150          | 23                            | 30   | 40                                         | 5   | 640                                     |
| PV22P0805                | 17                 | 22   | 0.4             | 150          | 28                            | 34   | 50                                         | 5   | 540                                     |
| PV26P0805                | 20                 | 26   | 0.4             | 150          | 33                            | 40   | 58                                         | 5   | 480                                     |
| PV30P0805                | 25                 | 30   | 0.4             | 150          | 38                            | 46   | 65                                         | 5   | 250                                     |

| 1206 (3216)              |                    |      |                 |              |                               |      |                                            |     |                                         |
|--------------------------|--------------------|------|-----------------|--------------|-------------------------------|------|--------------------------------------------|-----|-----------------------------------------|
| Maida<br>Style<br>Number | Maximum Ratings    |      |                 |              | Electrical Characteristics    |      |                                            |     |                                         |
|                          | Continuous         |      | Transient       |              | Varistor Voltage<br>(@1mA DC) |      | Max Clamping<br>Voltage<br>(@Test Current) |     | Typical<br>Cap.<br><br>1 V rms<br>@1KHz |
|                          | Applied<br>Voltage |      | Energy          | Peak Current |                               |      |                                            |     |                                         |
|                          |                    |      | 10x1000 $\mu$ s | 8x20 $\mu$ s | Vmin                          | Vmax | 8x20 $\mu$ s                               |     |                                         |
|                          | (AC)               | (DC) | (J)             | (A)          | (V)                           | (V)  | (V)                                        | (A) | (pF)                                    |
| PV5R5P1206               | 4                  | 5.5  | 0.7             | 150          | 6.9                           | 9.3  | 15.5                                       | 10  | 4800                                    |
| PV14P1206                | 10                 | 14   | 0.7             | 200          | 17.5                          | 23.7 | 30                                         | 10  | 2200                                    |
| PV18P1206                | 14                 | 18   | 0.7             | 200          | 23                            | 30   | 40                                         | 10  | 1700                                    |
| PV26P1206                | 20                 | 26   | 0.7             | 200          | 33                            | 40   | 58                                         | 10  | 1550                                    |
| PV30P1206                | 25                 | 30   | 0.7             | 200          | 38                            | 46   | 66                                         | 10  | 1430                                    |
| PV48P1206                | 40                 | 48   | 0.7             | 200          | 55                            | 66   | 100                                        | 10  | 1070                                    |

| 1210 (3225)              |                    |      |                 |              |                               |      |                                            |     |                                         |
|--------------------------|--------------------|------|-----------------|--------------|-------------------------------|------|--------------------------------------------|-----|-----------------------------------------|
| Maida<br>Style<br>Number | Maximum Ratings    |      |                 |              | Electrical Characteristics    |      |                                            |     |                                         |
|                          | Continuous         |      | Transient       |              | Varistor Voltage<br>(@1mA DC) |      | Max Clamping<br>Voltage<br>(@Test Current) |     | Typical<br>Cap.<br><br>1 V rms<br>@1KHz |
|                          | Applied<br>Voltage |      | Energy          | Peak Current |                               |      |                                            |     |                                         |
|                          |                    |      | 10x1000 $\mu$ s | 8x20 $\mu$ s | Vmin                          | Vmax | 8x20 $\mu$ s                               |     |                                         |
|                          | (AC)               | (DC) | (J)             | (A)          | (V)                           | (V)  | (V)                                        | (A) | (pF)                                    |
| PV18P1210                | 14                 | 18   | 1.5             | 500          | 23                            | 30   | 40                                         | 10  | 2680                                    |
| PV26P1210                | 20                 | 26   | 1.5             | 300          | 33                            | 40   | 58                                         | 10  | 2100                                    |
| PV30P1210                | 25                 | 30   | 1.5             | 250          | 38                            | 46   | 66                                         | 10  | 1900                                    |
| PV48P1210                | 40                 | 48   | 1.5             | 250          | 55                            | 66   | 100                                        | 10  | 1600                                    |
| PV60P1210                | 50                 | 60   | 1.5             | 250          | 69                            | 83   | 140                                        | 10  | 1230                                    |
| PV85P1210                | 67                 | 85   | 1.5             | 250          | 98                            | 118  | 160                                        | 10  | 590                                     |



| 1812 (4532)              |                    |      |                 |              |                               |      |                                            |     |                  |
|--------------------------|--------------------|------|-----------------|--------------|-------------------------------|------|--------------------------------------------|-----|------------------|
| Maida<br>Style<br>Number | Maximum Ratings    |      |                 |              | Electrical Characteristics    |      |                                            |     |                  |
|                          | Continuous         |      | Transient       |              | Varistor Voltage<br>(@1mA DC) |      | Max Clamping<br>Voltage<br>(@Test Current) |     | Typical<br>Cap.  |
|                          | Applied<br>Voltage |      | Energy          | Peak Current |                               |      |                                            |     | 1 V rms<br>@1KHz |
|                          |                    |      | 10x1000 $\mu$ s | 8x20 $\mu$ s | Vmin                          | Vmax | 8x20 $\mu$ s                               |     | (pF)             |
|                          | (AC)               | (DC) | (J)             | (A)          | (V)                           | (V)  | (V)                                        | (A) | (pF)             |
| PV18P1812                | 14                 | 18   | 2.5             | 500          | 23                            | 30   | 40                                         | 10  | 3800             |
| PV26P1812                | 20                 | 26   | 3.0             | 500          | 33                            | 40   | 58                                         | 10  | 2950             |
| PV30P1812                | 25                 | 30   | 3.7             | 500          | 38                            | 46   | 66                                         | 10  | 2820             |
| PV48P1812                | 40                 | 48   | 4.0             | 400          | 55                            | 66   | 100                                        | 10  | 2740             |
| PV60P1812                | 50                 | 60   | 4.5             | 400          | 69                            | 83   | 140                                        | 10  | 2220             |
| PV85P1812                | 67                 | 85   | 5.8             | 400          | 98                            | 118  | 160                                        | 10  | 1400             |

| 2220 (5750)              |                    |      |                 |              |                               |      |                                            |     |                  |
|--------------------------|--------------------|------|-----------------|--------------|-------------------------------|------|--------------------------------------------|-----|------------------|
| Maida<br>Style<br>Number | Maximum Ratings    |      |                 |              | Electrical Characteristics    |      |                                            |     |                  |
|                          | Continuous         |      | Transient       |              | Varistor Voltage<br>(@1mA DC) |      | Max Clamping<br>Voltage<br>(@Test Current) |     | Typical<br>Cap.  |
|                          | Applied<br>Voltage |      | Energy          | Peak Current |                               |      |                                            |     | 1 V rms<br>@1KHz |
|                          |                    |      | 10x1000 $\mu$ s | 8x20 $\mu$ s | Vmin                          | Vmax | 8x20 $\mu$ s                               |     | (pF)             |
|                          | (AC)               | (DC) | (J)             | (A)          | (V)                           | (V)  | (V)                                        | (A) | (pF)             |
| PV5R5P2220               | 4                  | 5.5  | 2               | 1000         | 6.9                           | 9.3  | 15.5                                       | 10  | 15000            |
| PV14P2220                | 10                 | 14   | 2.5             | 1200         | 17.5                          | 23.7 | 30                                         | 10  | 9600             |
| PV18P2220                | 14                 | 18   | 3               | 1200         | 23                            | 30   | 40                                         | 10  | 6400             |
| PV26P2220                | 20                 | 26   | 5               | 1200         | 33                            | 40   | 58                                         | 10  | 6200             |
| PV30P2220                | 25                 | 30   | 6               | 1200         | 38                            | 46   | 66                                         | 10  | 5700             |
| PV48P2220                | 40                 | 48   | 8               | 1200         | 55                            | 66   | 100                                        | 10  | 5200             |

### AV Series Automotive Multilayer Varistor

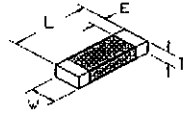
The AV series is designed for ultimate reliability in automotive applications. Parts in this series are designed to withstand the 24.5V jump start condition that occurs when two 12V batteries are connected together in series. These parts are our most reliable surge suppressors, but also our most expensive.

| Protects 12V supply systems |                                        |                                    |                 |              |                               |      |                                            |     |                                         |
|-----------------------------|----------------------------------------|------------------------------------|-----------------|--------------|-------------------------------|------|--------------------------------------------|-----|-----------------------------------------|
| Maida<br>Style<br>Number    | Maximum Ratings                        |                                    |                 |              | Electrical Characteristics    |      |                                            |     |                                         |
|                             | Maximum<br>Continuous<br>DC<br>Voltage | Jump<br>Start<br>Voltage<br>5 mins | Transient       |              | Varistor Voltage<br>(@1mA DC) |      | Max Clamping<br>Voltage<br>(@Test Current) |     | Typical<br>Cap.<br><br>1 V rms<br>@1KHz |
|                             |                                        |                                    | Energy          | Peak Current |                               |      |                                            |     |                                         |
|                             |                                        |                                    | 10x1000 $\mu$ s | 8x20 $\mu$ s | Vmin                          | Vmax | 8x20 $\mu$ s                               |     |                                         |
|                             | (DC)                                   | (V)                                | (J)             | (A)          | (V)                           | (V)  | (V)                                        | (A) | (pF)                                    |
| AV18P0805                   | 18                                     | 24.5                               | 0.4             | 150          | 22                            | 29   | 42                                         | 5   | 480                                     |
| AV18P1206                   | 18                                     | 24.5                               | 0.7             | 200          | 22                            | 29   | 40                                         | 10  | 1090                                    |
| AV18P1210                   | 18                                     | 24.5                               | 1.5             | 500          | 22                            | 29   | 40                                         | 10  | 1670                                    |
| AV18P1812                   | 18                                     | 24.5                               | 3.0             | 800          | 22                            | 29   | 40                                         | 10  | 9600                                    |
| AV18P2220                   | 18                                     | 24.5                               | 6.0             | 1500         | 22                            | 29   | 40                                         | 10  | 15000                                   |



Standard dimensions: inches (mm)

|      | CHIP SIZE                  |                            |                            |                            |                            |                            |                           |
|------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|---------------------------|
|      | 0402 (1005)                | 0603 (1608)                | 0805 (2012)                | 1206 (3216)                | 1210 (3225)                | 1812 (4532)                | 2220 (5750)               |
| L    | 0.040±0.004<br>(1.0±0.10)  | 0.063±0.008<br>(1.60±0.15) | 0.079±0.008<br>(2.00±0.20) | 0.126±0.012<br>(3.2±0.30)  | 0.126±0.012<br>(3.20±0.30) | 0.177±0.014<br>(4.5±0.35)  | 0.225±0.018<br>(5.7±0.40) |
| W    | 0.020±0.004<br>(0.5±0.10)  | 0.032±0.008<br>(0.80±0.15) | 0.048±0.008<br>(1.25±0.20) | 0.083±0.012<br>(1.60±0.30) | 0.088±0.012<br>(2.50±0.30) | 0.126±0.012<br>(3.20±0.30) | 0.187±0.018<br>(5.0±0.40) |
| Tmax | 0.024<br>(0.60)            | 0.035<br>(0.90)            | 0.043<br>(1.10)            | 0.067<br>(1.70)            | 0.071<br>(1.80)            | 0.079<br>(2.00)            | 0.079<br>(2.00)           |
| E    | 0.010±0.008<br>(0.25±0.15) | 0.014±0.008<br>(0.35±0.15) | 0.018±0.010<br>(0.45±0.25) | 0.032±0.010<br>(0.55±0.25) | 0.034±0.012<br>(0.60±0.30) | 0.038±0.018<br>(0.70±0.40) | 0.038±0.018<br>(0.7±0.40) |



Maida MLV 提供散裝包裝或捲帶式包裝。

| 提供捲帶式包裝 |       |
|---------|-------|
| 尺寸      | 件／捲軸  |
| 0402    | 10000 |
| 0603    | 4000  |
| 0805    | 4000  |
| 1206    | 3000  |
| 1210    | 3000  |

## 回流焊接建議

電路板上安裝 MLV（或其他類似的晶片）最常見的使用方式為回流焊接。在電路板表面黏著晶片即將放置的接觸點上（稱為焊墊）使用焊接膏；將電路板上焊接的所有晶片均放置於焊墊上，然後將整個電路板置於高溫爐內，爐內的高溫足以使焊劑熔化，而導致「回流」。

焊劑熔化後形成一個包含晶片端點的圓滑輪廓，然後以溶劑清洗電路板清除任何殘餘物。

一般而言，建議 Maida MLV 晶片在 215 至 245°C 的溫度下使用回流焊接，且在峰值溫度下保持約 1 分鐘。此為焊接最廣泛的常用範圍，應可與其他表面黏著的晶片相容。

