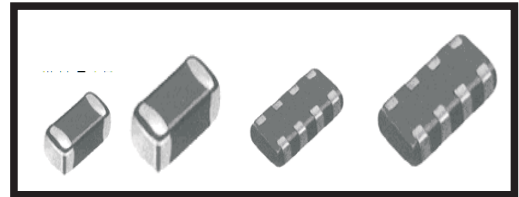
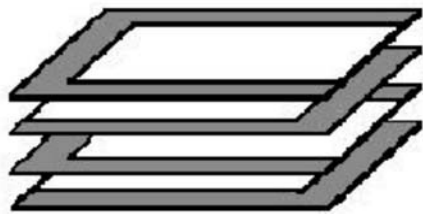


■ 片式壓敏電阻器 (MLV) MULTILAYER CHIP VARISTOR

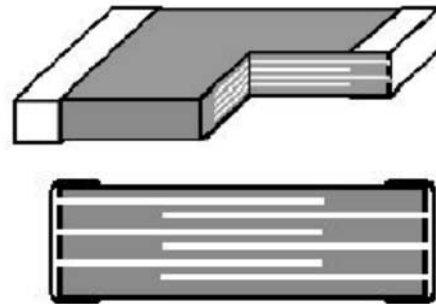


多層片式壓敏電阻器 (MLV) 是一種浪涌電壓抑制器。它是採用先進的疊層片式化技術製造的半導體陶瓷元件，它能夠為被保護元件 (電路) 提供強有力的保護，同時具有優良的浪涌能量吸收能力及內部散熱能力。該元件是一種無引線的片式結構，其寄生電感非常小、響應速度非常快 (響應時間 < 0.5ns) ，因此它具有優良的ESD及各種浪涌噪聲的抑制能力。與傳統的齊納二極管和圓片壓敏電阻器相似，具有體積小、重量輕、響應速度快的特點。

Multilayer Chip Varistors (MLV) are Transient Voltage Suppressors (TVS) which manufactured from semiconducting ceramics by the highly advanced multilayer formation technologies, which can offer rugged protection, excellent transient energy absorption and internal heat dissipation. The devices are leadless chip form, eliminating lead inductance and guaranteeing a faster speed of response time of less than 0.5ns, which makes them fast enough to ensure reliable protection against ESD pulse and other specific transient events. These transient suppression devices are significantly smaller footprints and lower profiles than traditional zener diodes or radial MOVs.



多层成型技术
Multilayer Formation Technologies



芯片部分
Section of the chip

● 特征 FEATURES

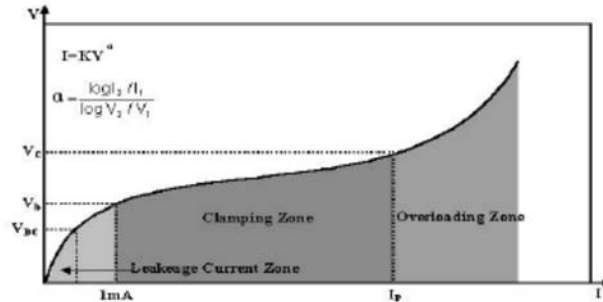
- * 疊層片式陶瓷結構
- * 無引線，產品尺寸1005[0402]、1608[0603]、2012[0805]、3216[1206]、3225[1210]、4532[1812]、5750[2220]、8063[3225] 和 1080[4032]
Leadless 1005[0402], 1608[0603], 2012[0805], 3216[1206], 3225[1210], 4532[1812], 8063[3225] and 1080[4032] Chip Size
- * 溫度範圍：-55℃ ~ +125℃
-55℃ to +125℃ Operating Temperature Range
- * 工作電壓範圍 $V_{w(dc)} = 3.3 \sim 615V$
Operating Voltage Range $V_w(DC) = 3.3V$ to 615V
- * 具有雙向限制特性
適合ESD保護
Inherent Bi-directional Clamping
- * 漏電流非常小
Very Low Leakage Current
- * 寄生電感小、響應速度快 (響應時間 < 0.5ns)
Low Inductance, Fast Response (Response time < 0.5ns)
- * 優良的溫度系數
Excellent Temperature Coefficient
- * 良好的焊接性能 (端電極為三層電鍍或銀/鈀/鉑合金)
Good Solderability (The electrode termination is selectable in plated and silver /palladium/platinum.)

• 設計信息 INFORMATION FOR DESIGNER

壓敏特性 Voltage Dependent Characteristic

疊層片式壓敏電阻器是一種對電壓敏感的電阻器，具有對稱的伏安特性，其阻值隨着電壓上升呈非線性下降，當電壓在一定範圍內進一步上升時，這種短路現象更加劇烈。

Transient Voltage Suppressors (Varistors) are voltage-dependent electrical resistors with symmetrical V/I characteristic. Their resistance value decrease with increasing voltage, thus "short-circuiting" further rises in overvoltage.



• 術語解釋 TERMS AND DESCRIPTIONS

直流工作電壓 Working DC Voltage (V_w(DC))

在規定的環境條件下，保證壓敏電阻器正常工作所允許連續施加的最大直流電壓值，它也作為測量漏電流的參考點，在此電壓通常小於元件的壓敏電壓。

This is the maximum continuous DC voltage, which may be applied up to the maximum operating temperature of the device. The rated DC operating voltage (working voltage) is also used as the reference point for leakage current. This voltage is always less than the breakdown voltage of the device.

交流工作電壓 Working AC Voltage (V_w(AC))

在規定的環境條件下，保證壓敏電阻器正常工作所允許連續施加的最大交流電壓值。

This is the maximum continuous sinusoidal rms voltage, which maybe applied at any temperature up to the maximum operating temperature of the device.

最大浪涌電流 Maximum Surge Current (Peak Current I_P)

在規定的脈衝波形(8/20 μs)和相應的電壓下，保證壓敏電阻器正常工作所允許施加最大電流。這個脈衝可以施加在元件任意一端。

This is the maximum peak current, which may be applied for an 8/20 μs impulse, with rated line voltage also applied, without causing device failure. The pulse can be applied to the device in either polarity with the same confidence factor.

最大的浪涌能量(能量耐量E_s) Maximum Surge Energy (E_s)

在單個規定的脈衝波形(10/1000 μs)下，保證壓敏電阻器正常工作時，其所能承受的最大的脈衝能量。

This is the maximum rated transient energy which may be dissipated for a single current pulse at a specified impulse duration (10/1000 μs), with the rated DC or RMS voltage applied, without causing device failure.

漏電流 (I_L) leakage (IL) at Rated DC Voltage

在非傳導模式下，該元件具有非常高的阻抗(接近10⁹ Ω)在系統中呈開路狀態，此時漏電流非常低(室溫下<50 μA)。與齊納二極管不同，疊層片式壓敏電阻器具有低漏電流特性，在最高工作溫度下，漏電流不超過500 μA。

In the no conducting mode, the device is at a very high impedance (approaching 10⁹ohms) and appears as an almost open circuit in the system. The leakage current drawn at this level is very low(<50 μA at ambient temperature) and, unlike the zener diode, the multilayer varistors have the added advantage that, when operated up to its maximum temperature, its leakage current will not increase above 500 μA.

壓敏電壓 Varistor Voltage (V_B(DC))

該電壓是壓敏電阻器從開路狀態進入導通狀態的電壓值，標稱壓敏電壓通常為1mA直流電流所對應的電壓。

This is the voltage at which the device changes from the off state to the on state and enters its conduction mode of operation. The voltage is usually characterized at the 1mA point.

限制電壓 Clamping Voltage (V_C)

在規定脈衝波形(8/20 μs)和電流下，元件兩端產生的峰值電壓，需要指出的是峰值電壓和峰值電流的產生在時間上不一定要一致。

This is the peak voltage appearing across the suppressor when measured at conditions of specified pulse current and specified waveform (8/20 μs). It is important to note that the peak current and peak voltage may not necessarily be coincidental in time.

電容量 Capacitance (C_p)

這是元件在規定頻率(1MHz)和偏置電壓(0.5V)下的電容量。

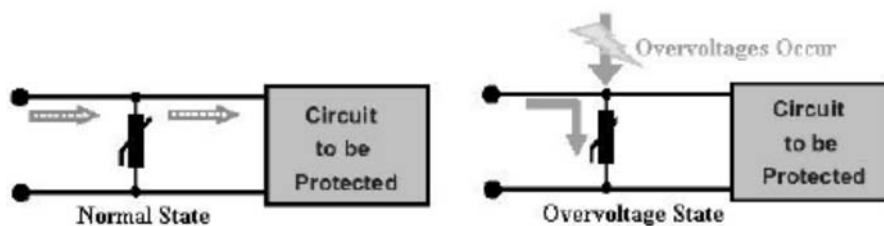
This is the capacitance of the device at a specified frequency 1MHz and bias 0.5V

• 應用 APPLICATION

防止過電壓 The Prevention of Overvoltage

當施加的電壓升高到壓敏電壓時，壓敏電阻器的電流急劇上升，被保護設備的浪涌電壓迅速減小，從而使裝有壓敏電阻器的設備抗浪涌噪聲能力達到相應要求。壓敏電阻器可以抑制各種各樣的浪涌電壓，使電子設備免受干擾和破壞

When the voltage increases above the threshold of MLV, the suppressor will draw a rapidly increasing current, and then the overvoltage is considerably attenuated away from the protection of the equipments should be supplemented by including specific components that will raise the withstand capabilities to the required level. Varistors provide protection against all kind of overvoltage and prevent electronic equipment from being damaged by transient events.



具體應用 Specific Application

- 抑制各種感性負載切換或各種瞬間噪聲在電路板中產生的EFT和浪涌電壓。
Suppression of Inductive Switching or Other Transient Events Such as EFT and Surge Voltage at the Circuit Board Level.
- 保護元件和電路，防止在電源供應、控制和信號綫產生的ESD。
Protection of Components and Circuits Sensitive to ESD Transients Occurring on Power supplies, Control and Signal Lines.
- 為IC、CMOS和MOSFET提供在綫過壓保護。
Provides On-Board Transient Voltage Protection for ICs, CMOS and MOSFET.
- 在許多領域中可替換較大的表面貼裝TVS齊納二極管。
Replace Larger Surface Mount TVS Zeners in Many Applications
- 用于協助各種終端產品實現電磁兼容性。
Used to Help Achieve Electromagnetic Compliance of End Products

• 產品規格型號的表示方法 PART NUMBER IDENTIFICATION

* Multilayer Chip Varistor 片式壓敏電阻器

FPV 160808 G 3R3 P M T

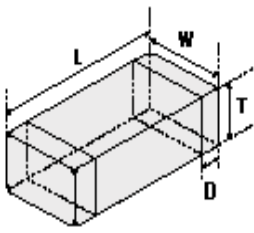
① ② ③ ④ ⑤ ⑥ ⑦

| ① 產品代號 Product Code | | ② 規格尺寸(L×W×T) (mm) Dimensions | | ③ 產品系列 Product Series | | ④ 直流工作電壓 Working DC Voltage | | ⑤ 端頭 Termination | | ⑥ 誤差 Tolerance | | ⑦ 包裝方式 Packaging Style | |
|------------------------|---|-------------------------------------|-------------|--------------------------|---------------------------------|--------------------------------|------|---------------------|------------------------------|-------------------|------|---------------------------|---------------------|
| FPV | 風華疊層片式壓敏電阻器 Multilayer Chip Varistor | 100505 | 1.0×0.5×0.5 | E | 高耐能型 High energy absorb type | 3R3 | 3.3V | P | 電鍍 Plated | K | ±10% | T | 編帶包裝 Tape & Reel |
| | | 160808 | 1.6×0.8×0.8 | | | 240 | 24V | | | L | ±15% | | |
| | | 201209 | 2.0×1.2×0.9 | S | 高速型 High speed type | | | S | 鉑/鈀/銀 Non-plated Pt/Pd/Ag | M | ±20% | B | 散裝 Bulk |
| | | 321611 | 3.2×1.6×1.1 | | | | | | | | | | |
| | | 322513 | 3.2×2.5×1.3 | G | 通用型 General type | | | | | | | | |
| | | 451616 | 4.5×1.6×1.6 | | | | | | | | | | |
| | | 453215 | 4.5×3.2×1.5 | | | | | | | | | | |
| | | 5750 | 5.7×5.0 | | | | | | | | | | |
| 8063 | 8.0×6.3 | | | | | | | | | | | | |
| 1080 | 10.2×8.0 | | | | | | | | | | | | |

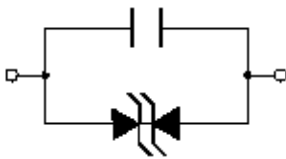
多層片式壓敏電阻器 (MLV) INTRODUCTION FO FPV SERIES MULTILAYER

• 外形尺寸及等效電路 SHAPE AND DIMENSIONS & EQUIVALENT CIRCUIT

單位(Unit): mm/inch



Equivalent circuit



| Part Number | L | W | T | D |
|------------------|---------------------------|---------------------------|---------------------------|----------------------------|
| 100505 (0402) | 1.0±0.15 (0.040±0.006) | 0.5±0.15 (0.020±0.006) | 0.5±0.15 (0.020±0.006) | 0.25±0.10 (0.010±0.004) |
| 160808 (0603) | 1.6±0.2 (0.063±0.008) | 0.8±0.2 (0.031±0.008) | 0.8±0.2 (0.031±0.008) | 0.3±0.2 (0.01±0.008) |
| 201209 (0805) | 2.0±0.2 (0.079±0.008) | 1.2±0.2 (0.047±0.008) | 0.9±0.2 (0.035±0.008) | 0.5±0.3 (0.020±0.012) |
| 201212 (0805) | 2.0±0.2 (0.079±0.008) | 1.2±0.2 (0.047±0.008) | 1.2±0.2 (0.047±0.008) | 0.5±0.3 (0.020±0.012) |
| 321611 (1206) | 3.2±0.2 (0.126±0.008) | 1.6±0.2 (0.063±0.008) | 1.1±0.2 (0.043±0.008) | 0.5±0.3 (0.020±0.012) |
| 321609 (1206) | 3.2±0.2 (0.126±0.008) | 1.6±0.2 (0.063±0.008) | 0.9±0.2 (0.035±0.008) | 0.5±0.3 (0.020±0.012) |
| 322513 (1210) | 3.2±0.2 (0.126±0.008) | 2.5±0.2 (0.098±0.008) | 1.3±0.2 (0.051±0.008) | 0.5±0.3 (0.020±0.012) |
| 451616 (1806) | 4.5±0.2 (0.186±0.008) | 1.6±0.2 (0.063±0.008) | 1.6±0.2 (0.063±0.008) | 0.5±0.3 (0.020±0.012) |
| 453215 (1812) | 4.5±0.2 (0.180±0.008) | 3.2±0.2 (0.126±0.008) | 1.5±0.2 (0.060±0.008) | 0.5±0.3 (0.020±0.012) |
| 5750 (2220) | 5.7±0.3 (0.22±0.012) | 5.0±0.3 (0.20±0.012) | 1.0~2.5 (0.050~0.100) | 0.7±0.3 (0.028±0.012) |
| 8063 (3225) | 8.0±0.3 (0.32±0.012) | 6.3±0.3 (0.250±0.012) | 1.0~2.5 (0.050~0.100) | 0.7±0.3 (0.028±0.012) |
| 1080 (4032) | 10.2±0.3 (0.400±0.012) | 8.0±0.3 (0.320±0.012) | 1.0~2.5 (0.050~0.100) | 0.7±0.3 (0.028±0.012) |

• 性能參數 SPECIFICATION

• 片式壓敏電阻器通用系列 Multilayer Chip Varistor General Series

• 通用系列是FPV片式壓敏電阻器中主要的一種，其工作電壓寬、可靠性高，應用非常廣泛：

General Series is a major series of FPV Multilayer Chip Varistors (MLV), which can provide widely working voltage, high reliability and suppress varies transient event

• 為各種IC提供浪涌電壓保護

I Protection from transient voltage noise in all kinds of IC

• 為電源I/O接口提供ESD、EFT及浪涌保護

I Protection from ESD, EFT and surge in power I/O port

• 替代齊納二極管 I Replacement of zener diode

1005 (0402) TYPE

| 1005 PART Number | Working voltage | | Varistor voltage @1mA DC | | Maximum Clamping Voltage 8/20µs 1A | Energy Absorb 10/1000µs | Peak Current 8/20µs | Typical Capacitance @1MHz |
|---------------------|-----------------|-------|-----------------------------|------|---|-------------------------------|---------------------------|---------------------------------|
| | DC | AC | VB | ΔVB | | | | |
| | Volts | Volts | | | Volts | Joules | Amps | pF |
| FPV100505G3R3□M□ | 3.3 | 2.5 | 5 | ±20% | 14 | 0.05 | 20 | 300 |
| FPV100505G5R6□L□ | 5.6 | 4 | 8 | ±15% | 19 | 0.05 | 20 | 250 |
| FPV100505G8R0□L□ | 8 | 5.7 | 12 | ±15% | 27 | 0.05 | 20 | 230 |
| FPV100505G9R0□L□ | 9 | 6.4 | 13 | ±15% | 30 | 0.05 | 20 | 200 |
| FPV100505G110□L□ | 11 | 7.8 | 16 | ±15% | 33 | 0.05 | 20 | 180 |
| FPV100505G120□L□ | 12 | 8.5 | 18 | ±15% | 34 | 0.05 | 20 | 150 |
| FPV100505G140□K□ | 14 | 10 | 20 | ±10% | 35 | 0.05 | 20 | 120 |
| FPV100505G160□K□ | 16 | 11.3 | 22 | ±10% | 39 | 0.05 | 20 | 100 |
| FPV100505G180□K□ | 18 | 12.7 | 25 | ±10% | 44 | 0.05 | 20 | 90 |

1608 (0603) TYPE

| 1608 PART Number | Working voltage | | Varistor voltage @1mA DC | | Maximum Clamping Voltage 8/20 μ s 1A | Energy Absorb 10/1000 μ s | Peak Current 8/20 μ s | Typical Capacitance @1MHz |
|---------------------|-----------------|-------|--------------------------------|-------------|---|-------------------------------------|---------------------------------|---------------------------------|
| | DC | AC | VB | Δ VB | | | | |
| | Volts | Volts | | | Volts | Joules | Amps | pF |
| FPV160808G3R3□M□ | 3.3 | 2.5 | 5 | \pm 20% | 14 | 0.1 | 30 | 300 |
| FPV160808G5R6□L□ | 5.6 | 4 | 8 | \pm 15% | 19 | 0.1 | 30 | 280 |
| FPV160808G8R0□L□ | 8 | 5.7 | 12 | \pm 15% | 27 | 0.1 | 30 | 250 |
| FPV160808G9R0□L□ | 9 | 6.4 | 13 | \pm 15% | 30 | 0.1 | 30 | 240 |
| FPV160808G110□L□ | 11 | 7.8 | 16 | \pm 15% | 33 | 0.1 | 30 | 220 |
| FPV160808G120□L□ | 12 | 8.5 | 18 | \pm 15% | 34 | 0.1 | 30 | 210 |
| FPV160808G140□K□ | 14 | 10 | 20 | \pm 10% | 35 | 0.1 | 30 | 190 |
| FPV160808G160□K□ | 16 | 11.3 | 22 | \pm 10% | 39 | 0.1 | 30 | 180 |
| FPV160808G180□K□ | 18 | 12.7 | 25 | \pm 10% | 44 | 0.1 | 30 | 170 |
| FPV160808G220□K□ | 22 | 15.6 | 30 | \pm 10% | 53 | 0.1 | 30 | 150 |
| FPV160808G240□K□ | 24 | 17 | 33 | \pm 10% | 58 | 0.1 | 30 | 140 |
| FPV160808G260□K□ | 26 | 18.4 | 36 | \pm 10% | 63 | 0.1 | 30 | 120 |
| FPV160808G300□K□ | 30 | 21.2 | 42 | \pm 10% | 74 | 0.1 | 30 | 100 |

2012 (0805) TYPE

| 2012 PART Number | Working voltage | | Varistor voltage @1mA DC | | Maximum Clamping Voltage 8/20 μ s 1A | Energy Absorb 10/1000 μ s | Peak Current 8/20 μ s | Typical Capacitance @1MHz |
|---------------------|-----------------|-------|--------------------------------|-------------|---|-------------------------------------|---------------------------------|---------------------------------|
| | DC | AC | VB | Δ VB | | | | |
| | Volts | Volts | | | Volts | Joules | Amps | pF |
| FPV2012□G3R3□M□ | 3.3 | 2.5 | 5 | \pm 20% | 14 | 0.1 | 40 | 350 |
| FPV2012□G5R6□L□ | 5.6 | 4 | 8 | \pm 15% | 19 | 0.1 | 40 | 300 |
| FPV2012□G8R0□L□ | 8 | 5.7 | 12 | \pm 15% | 27 | 0.1 | 40 | 270 |
| FPV2012□G9R0□L□ | 9 | 6.4 | 13 | \pm 15% | 30 | 0.1 | 40 | 260 |
| FPV2012□G110□L□ | 11 | 7.8 | 16 | \pm 15% | 33 | 0.1 | 35 | 240 |
| FPV2012□G120□L□ | 12 | 8.5 | 18 | \pm 15% | 34 | 0.1 | 35 | 220 |
| FPV2012□G140□K□ | 14 | 10 | 20 | \pm 10% | 35 | 0.1 | 35 | 200 |
| FPV2012□G160□K□ | 16 | 11.3 | 22 | \pm 10% | 39 | 0.1 | 35 | 190 |
| FPV2012□G180□K□ | 18 | 12.7 | 25 | \pm 10% | 44 | 0.1 | 35 | 180 |
| FPV2012□G220□K□ | 22 | 15.6 | 30 | \pm 10% | 53 | 0.1 | 35 | 160 |
| FPV2012□G240□K□ | 24 | 17 | 33 | \pm 10% | 58 | 0.1 | 35 | 150 |
| FPV2012□G260□K□ | 26 | 18.4 | 36 | \pm 10% | 63 | 0.1 | 35 | 140 |
| FPV2012□G300□K□ | 30 | 21.2 | 42 | \pm 10% | 74 | 0.1 | 35 | 110 |

多層片式壓敏電阻器 (MLV) INTRODUCTION FO FPV SERIES MULTILAYER

3216(2016) TYPE

| 3216 PART Number | Working voltage | | Varistor voltage @1mA DC | | Maximum Clamping Voltage 8/20 μ s 1A | Energy Absorb 10/1000 μ s | Peak Current 8/20 μ s | Typical Capacitance @1MHz |
|---------------------|-----------------|-------|-----------------------------|-------------|---|-------------------------------------|---------------------------------|---------------------------------|
| | DC | AC | VB | Δ VB | | | | |
| | Volts | Volts | | | Volts | Joules | Amps | pF |
| FPV3216□G3R3□M□ | 3.3 | 2.5 | 5 | \pm 20% | 14 | 0.1 | 40 | 600 |
| FPV3216□G5R6□L□ | 5.6 | 4 | 8 | \pm 15% | 19 | 0.1 | 40 | 560 |
| FPV3216□G8R0□L□ | 8 | 5.7 | 12 | \pm 15% | 27 | 0.1 | 40 | 500 |
| FPV3216□G9R0□L□ | 9 | 6.4 | 13 | \pm 15% | 30 | 0.1 | 40 | 450 |
| FPV3216□G110□L□ | 11 | 7.8 | 16 | \pm 15% | 33 | 0.1 | 35 | 400 |
| FPV3216□G120□L□ | 12 | 8.5 | 18 | \pm 15% | 34 | 0.1 | 35 | 300 |
| FPV3216□G140□K□ | 14 | 10 | 20 | \pm 10% | 35 | 0.1 | 35 | 270 |
| FPV3216□G160□K□ | 16 | 11.3 | 22 | \pm 10% | 39 | 0.1 | 35 | 250 |
| FPV3216□G180□K□ | 18 | 12.7 | 25 | \pm 10% | 44 | 0.1 | 35 | 240 |
| FPV3216□G220□K□ | 22 | 15.6 | 30 | \pm 10% | 53 | 0.1 | 35 | 220 |
| FPV3216□G240□K□ | 24 | 17 | 33 | \pm 10% | 58 | 0.1 | 35 | 210 |
| FPV3216□G260□K□ | 26 | 18.4 | 36 | \pm 10% | 63 | 0.1 | 35 | 200 |
| FPV3216□G300□K□ | 30 | 21.2 | 42 | \pm 10% | 74 | 0.1 | 35 | 180 |
| FPV3216□G330□K□ | 33 | 23.3 | 45 | \pm 10% | 79 | 0.1 | 35 | 150 |
| FPV3216□G380□K□ | 38 | 27 | 51 | \pm 10% | 90 | 0.1 | 35 | 130 |
| FPV3216□G420□K□ | 42 | 30 | 56 | \pm 10% | 99 | 0.1 | 35 | 110 |
| FPV3216□G480□K□ | 48 | 34 | 62 | \pm 10% | 110 | 0.1 | 35 | 90 |
| FPV3216□G560□K□ | 56 | 40 | 72 | \pm 10% | 127 | 0.1 | 35 | 80 |
| FPV3216□G600□K□ | 60 | 45 | 76 | \pm 10% | 134 | 0.1 | 35 | 70 |
| FPV3216□G680□K□ | 68 | 48 | 86 | \pm 10% | 151 | 0.1 | 35 | 60 |

- 片式壓敏電阻器高耐能系列
MULTILAYER CHIP VARISTOR HIGH ENERGY ABSORB SERIES

高耐能系列專為吸收電路中存在的能量較大的瞬態電壓噪聲而設計的，其通流量大，吸收功率大、響應速度快。
High Energy Absorb Series is design to absorb the high energy transient voltage in circuit, which provide high rate current, highly energy absorb ability and fast response speed

應用 Application

- 抑制各種感性負載切換或各種瞬間噪聲在電路板中產生的EFT和浪涌電壓。
Suppression of Inductive Switching or Other Transient Events Such as EFT and Surge Voltage at the Circuit Board Level.
- 保護元件和電路，防止在電源供應、控制和信號綫產生的ESD。
Protection of Components and Circuits Sensitive to ESD Transients Occurring on Power supplies, Control and Signal Lines.
- 為IC、CMOS和MOSFET提供在綫過壓保護。
Provides On-Board Transient Voltage Protection for ICs, CMOS and MOSFET.
- 在許多領域中可替換較大的表面貼裝TVS齊納二極管。
Replace Larger Surface Mount TVS Zeners in Many Applications

2012 (0805) TYPE

| 2012 PART Number | Working voltage | | Varistor voltage @1mA DC | | Maximum Clamping Voltage 8/20 μ s 1A | Energy Absorb 10/1000 μ s | Peak Current 8/20 μ s | Typical Capacitance @1MHz |
|---------------------|-----------------|-------|--------------------------------|--------------|---|-------------------------------------|---------------------------------|---------------------------------|
| | DC | AC | VB | ΔV_B | | | | |
| | Volts | Volts | | | Volts | Joules | Amps | pF |
| FPV2012□E3R3□M□ | 3.3 | 2.5 | 5 | $\pm 20\%$ | 14 | 0.3 | 120 | 600 |
| FPV2012□E5R6□L□ | 5.6 | 4 | 8 | $\pm 15\%$ | 19 | 0.3 | 120 | 550 |
| FPV2012□E8R0□L□ | 8 | 5.7 | 12 | $\pm 15\%$ | 27 | 0.3 | 120 | 500 |
| FPV2012□E9R0□L□ | 9 | 6.4 | 13 | $\pm 15\%$ | 30 | 0.3 | 120 | 450 |
| FPV2012□E110□L□ | 11 | 7.8 | 16 | $\pm 15\%$ | 33 | 0.3 | 120 | 440 |
| FPV2012□E120□L□ | 12 | 8.5 | 18 | $\pm 15\%$ | 34 | 0.3 | 120 | 420 |
| FPV2012□E140□K□ | 14 | 10 | 20 | $\pm 10\%$ | 35 | 0.3 | 120 | 400 |
| FPV2012□E160□K□ | 16 | 11.3 | 22 | $\pm 10\%$ | 39 | 0.3 | 120 | 380 |
| FPV2012□E180□K□ | 18 | 12.7 | 25 | $\pm 10\%$ | 44 | 0.3 | 100 | 360 |
| FPV2012□E220□K□ | 22 | 15.6 | 30 | $\pm 10\%$ | 53 | 0.3 | 100 | 320 |
| FPV2012□E240□K□ | 24 | 17 | 33 | $\pm 10\%$ | 58 | 0.3 | 100 | 300 |
| FPV2012□E260□K□ | 26 | 18.4 | 36 | $\pm 10\%$ | 63 | 0.3 | 100 | 280 |
| FPV2012□E300□K□ | 30 | 21.2 | 42 | $\pm 10\%$ | 74 | 0.3 | 100 | 220 |

3216(1206) TYPE

| 3216 PART Number | Working voltage | | Varistor voltage @1mA DC | | Maximum Clamping Voltage 8/20 μ s 1A | Energy Absorb 10/1000 μ s | Peak Current 8/20 μ s | Typical Capacitance @1MHz |
|---------------------|-----------------|-------|--------------------------------|-------------|---|-------------------------------------|---------------------------------|---------------------------------|
| | DC | AC | VB | ΔVB | | | | |
| | Volts | Volts | | | Volts | Joules | Amps | pF |
| FPV3216□E3R3□M□ | 3.3 | 2.5 | 5 | $\pm 20\%$ | 14 | 0.4 | 150 | 1200 |
| FPV3216□E5R6□L□ | 5.6 | 4 | 8 | $\pm 15\%$ | 19 | 0.4 | 150 | 1100 |
| FPV3216□E8R0□L□ | 8 | 5.7 | 12 | $\pm 15\%$ | 27 | 0.4 | 150 | 1000 |
| FPV3216□E9R0□L□ | 9 | 6.4 | 13 | $\pm 15\%$ | 30 | 0.4 | 150 | 950 |
| FPV3216□E110□L□ | 11 | 7.8 | 16 | $\pm 15\%$ | 33 | 0.4 | 150 | 800 |
| FPV3216□E120□L□ | 12 | 8.5 | 18 | $\pm 15\%$ | 34 | 0.4 | 150 | 600 |
| FPV3216□E140□K□ | 14 | 10 | 20 | $\pm 10\%$ | 35 | 0.4 | 150 | 540 |
| FPV3216□E160□K□ | 16 | 11.3 | 22 | $\pm 10\%$ | 39 | 0.4 | 150 | 520 |
| FPV3216□E180□K□ | 18 | 12.7 | 25 | $\pm 10\%$ | 44 | 0.4 | 150 | 500 |
| FPV3216□E220□K□ | 22 | 15.6 | 30 | $\pm 10\%$ | 53 | 0.4 | 150 | 460 |
| FPV3216□E240□K□ | 24 | 17 | 33 | $\pm 10\%$ | 58 | 0.4 | 150 | 420 |
| FPV3216□E260□K□ | 26 | 18.4 | 36 | $\pm 10\%$ | 63 | 0.4 | 120 | 400 |
| FPV3216□E300□K□ | 30 | 21.2 | 42 | $\pm 10\%$ | 74 | 0.4 | 120 | 360 |
| FPV3216□E330□K□ | 33 | 23.3 | 45 | $\pm 10\%$ | 79 | 0.4 | 120 | 300 |
| FPV3216□E380□K□ | 38 | 27 | 51 | $\pm 10\%$ | 90 | 0.4 | 120 | 250 |
| FPV3216□E420□K□ | 42 | 30 | 56 | $\pm 10\%$ | 99 | 0.4 | 120 | 220 |
| FPV3216□E480□K□ | 48 | 34 | 62 | $\pm 10\%$ | 110 | 0.4 | 120 | 180 |
| FPV3216□E560□K□ | 56 | 40 | 72 | $\pm 10\%$ | 127 | 0.4 | 120 | 165 |
| FPV3216□E600□K□ | 60 | 45 | 76 | $\pm 10\%$ | 134 | 0.4 | 120 | 150 |
| FPV3216□E680□K□ | 68 | 48 | 86 | $\pm 10\%$ | 151 | 0.4 | 120 | 135 |

多層片式壓敏電阻器 (MLV) INTRODUCTION FO FPV SERIES MULTILAYER

3225(1210) TYPE

| 3225 PART Number | Working voltage | | Varistor voltage @1mA DC | | Maximum Clamping Voltage 8/20 μ s 1A | Energy Absorb 10/1000 μ s | Peak Current 8/20 μ s | Typical Capacitance @1MHz |
|---------------------|-----------------|-------|-----------------------------|-------------|---|-------------------------------------|---------------------------------|---------------------------------|
| | DC | AC | VB | Δ VB | | | | |
| | Volts | Volts | | | Volts | Joules | Amps | pF |
| FPV3225E180K | 18 | 12.7 | 25 | $\pm 10\%$ | 44 | 1.5 | 300 | 1000 |
| FPV3225E220K | 22 | 15.6 | 30 | $\pm 10\%$ | 53 | 1.5 | 300 | 900 |
| FPV3225E240K | 24 | 17 | 33 | $\pm 10\%$ | 58 | 1.5 | 300 | 850 |
| FPV3225E260K | 26 | 18.4 | 36 | $\pm 10\%$ | 63 | 1.5 | 280 | 800 |
| FPV3225E300K | 30 | 21.2 | 42 | $\pm 10\%$ | 74 | 1.5 | 280 | 760 |
| FPV3225E330K | 33 | 23.3 | 45 | $\pm 10\%$ | 79 | 1.5 | 280 | 700 |
| FPV3225E380K | 38 | 27 | 51 | $\pm 10\%$ | 90 | 1.5 | 280 | 650 |
| FPV3225E420K | 42 | 30 | 56 | $\pm 10\%$ | 99 | 1.5 | 280 | 580 |
| FPV3225E480K | 48 | 34 | 62 | $\pm 10\%$ | 110 | 1.5 | 280 | 510 |
| FPV3225E560K | 56 | 40 | 72 | $\pm 10\%$ | 127 | 1.5 | 250 | 450 |
| FPV3225E600K | 60 | 45 | 76 | $\pm 10\%$ | 134 | 1.5 | 250 | 420 |
| FPV3225E680K | 68 | 48 | 86 | $\pm 10\%$ | 151 | 1.5 | 250 | 360 |

4532(1812) TYPE

| 4532 PART Number | Working voltage | | Varistor voltage @1mA DC | | Maximum Clamping Voltage 8/20 μ s 1A | Energy Absorb 10/1000 μ s | Peak Current 8/20 μ s | Typical Capacitance @1MHz |
|---------------------|-----------------|-------|-----------------------------|-------------|---|-------------------------------------|---------------------------------|---------------------------------|
| | DC | AC | VB | Δ VB | | | | |
| | Volts | Volts | | | Volts | Joules | Amps | pF |
| FPV453215E180K | 18 | 12.7 | 25 | $\pm 10\%$ | 44 | 2.5 | 500 | 1500 |
| FPV453215E220K | 22 | 15.6 | 30 | $\pm 10\%$ | 53 | 2.5 | 500 | 1200 |
| FPV453215E240K | 24 | 17 | 33 | $\pm 10\%$ | 58 | 2.5 | 500 | 900 |
| FPV453215E260K | 26 | 18.4 | 36 | $\pm 10\%$ | 63 | 2.5 | 500 | 800 |
| FPV453215E300K | 30 | 21.2 | 42 | $\pm 10\%$ | 74 | 2.5 | 500 | 750 |
| FPV453215E330K | 33 | 23.3 | 45 | $\pm 10\%$ | 79 | 2.5 | 500 | 700 |
| FPV453215E380K | 38 | 27 | 51 | $\pm 10\%$ | 90 | 2.5 | 500 | 650 |
| FPV453215E420K | 42 | 30 | 56 | $\pm 10\%$ | 99 | 2.5 | 500 | 600 |
| FPV453215E480K | 48 | 34 | 62 | $\pm 10\%$ | 110 | 2.5 | 500 | 550 |
| FPV453215E560K | 56 | 40 | 72 | $\pm 10\%$ | 127 | 2.5 | 500 | 500 |
| FPV453215E600K | 60 | 45 | 76 | $\pm 10\%$ | 134 | 2.5 | 500 | 450 |
| FPV453215E680K | 68 | 48 | 86 | $\pm 10\%$ | 151 | 2.5 | 500 | 400 |

5750 (2220) TYPE

| 5750 PART Number | Working voltage | | Varistor voltage @1mA DC | | Maximum Clamping Voltage 8/20 μ s 1A | Energy Absorb 10/1000 μ s | Peak Current 8/20 μ s | Typical Capacitance @1MHz |
|---------------------|-----------------|-------|-----------------------------|-------------|---|-------------------------------------|---------------------------------|---------------------------------|
| | DC | AC | VB | Δ VB | | | | |
| | Volts | Volts | | | Volts | Joules | Amps | pF |
| FPV5750E180K | 18 | 12.7 | 25 | $\pm 10\%$ | 44 | 2.5 | 600 | 4000 |
| FPV5750E220K | 22 | 15.6 | 30 | $\pm 10\%$ | 53 | 2.5 | 600 | 3500 |
| FPV5750E240K | 24 | 17 | 33 | $\pm 10\%$ | 58 | 2.5 | 600 | 3000 |
| FPV5750E260K | 26 | 18.4 | 36 | $\pm 10\%$ | 63 | 2.5 | 600 | 2500 |
| FPV5750E300K | 30 | 21.2 | 42 | $\pm 10\%$ | 74 | 2.5 | 600 | 2200 |
| FPV5750E330K | 33 | 23.3 | 45 | $\pm 10\%$ | 79 | 2.5 | 600 | 2000 |
| FPV5750E380K | 38 | 27 | 51 | $\pm 10\%$ | 90 | 2.5 | 600 | 1800 |
| FPV5750E420K | 42 | 30 | 56 | $\pm 10\%$ | 99 | 2.5 | 600 | 1600 |
| FPV5750E480K | 48 | 34 | 62 | $\pm 10\%$ | 110 | 2.5 | 600 | 1400 |
| FPV5750E560K | 56 | 40 | 72 | $\pm 10\%$ | 127 | 2.5 | 600 | 1000 |
| FPV5750E600K | 60 | 45 | 76 | $\pm 10\%$ | 134 | 2.5 | 600 | 800 |
| FPV5750E680K | 68 | 48 | 86 | $\pm 10\%$ | 151 | 2.5 | 600 | 700 |

8063(3225) TYPE

| 8063 PART Number | Working voltage | | Varistor voltage @1mA DC | | Maximum Clamping Voltage 8/20 μ s 1A | Energy Absorb 10/1000 μ s | Peak Current 8/20 μ s | Typical Capacitance @1MHz |
|---------------------|-----------------|-------|--------------------------------|-------------|---|-------------------------------------|---------------------------------|---------------------------------|
| | DC | AC | VB | Δ VB | | | | |
| | Volts | Volts | | | Volts | Joules | Amps | pF |
| FPV8063E14□K□ | 14 | 11 | 18 | $\pm 10\%$ | 35@1A | 0.3 | 100 | 1750 |
| FPV8063E18□K□ | 18 | 14 | 22 | $\pm 10\%$ | 44@1A | 0.4 | 100 | 1450 |
| FPV8063E22□K□ | 22 | 17 | 27 | $\pm 10\%$ | 53@1A | 0.5 | 100 | 1200 |
| FPV8063E26□K□ | 26 | 20 | 33 | $\pm 10\%$ | 63@1A | 0.6 | 100 | 980 |
| FPV8063E31□K□ | 31 | 25 | 39 | $\pm 10\%$ | 69@1A | 0.7 | 100 | 850 |
| FPV8063E38□K□ | 38 | 30 | 47 | $\pm 10\%$ | 90@1A | 0.9 | 100 | 720 |
| FPV8063E45□K□ | 45 | 35 | 56 | $\pm 10\%$ | 99@1A | 1.1 | 100 | 620 |
| FPV8063E56□K□ | 56 | 40 | 68 | $\pm 10\%$ | 127@1A | 1.3 | 100 | 520 |
| FPV8063E65□K□ | 65 | 50 | 82 | $\pm 10\%$ | 144@5A | 1.8 | 400 | 300 |
| FPV8063E85□K□ | 85 | 60 | 100 | $\pm 10\%$ | 176@5A | 2.2 | 400 | 250 |
| FPV8063E100□K□ | 100 | 75 | 120 | $\pm 10\%$ | 211@5A | 2.5 | 400 | 210 |
| FPV8063E125□K□ | 125 | 95 | 150 | $\pm 10\%$ | 264@5A | 3.4 | 400 | 135 |
| FPV8063E150□K□ | 150 | 115 | 180 | $\pm 10\%$ | 317@5A | 3.6 | 400 | 110 |
| FPV8063E170□K□ | 170 | 130 | 205 | $\pm 10\%$ | 361@5A | 4.2 | 400 | 100 |
| FPV8063E180□K□ | 180 | 140 | 220 | $\pm 10\%$ | 387@5A | 4.5 | 400 | 95 |
| FPV8063E200□K□ | 200 | 150 | 240 | $\pm 10\%$ | 422@5A | 4.9 | 400 | 90 |
| FPV8063E225□K□ | 225 | 175 | 270 | $\pm 10\%$ | 475@5A | 5.6 | 400 | 75 |
| FPV8063E300□K□ | 300 | 230 | 360 | $\pm 10\%$ | 634@5A | 7.2 | 400 | 60 |
| FPV8063E320□K□ | 320 | 250 | 390 | $\pm 10\%$ | 686@5A | 8.2 | 400 | 55 |
| FPV8063E350□K□ | 350 | 275 | 430 | $\pm 10\%$ | 757@5A | 8.6 | 400 | 50 |
| FPV8063E385□K□ | 385 | 300 | 470 | $\pm 10\%$ | 827@5A | 9.6 | 400 | 45 |

1080(4032) TYPE

| 1080 PART Number | Working voltage | | Varistor voltage @1mA DC | | Maximum Clamping Voltage 8/20 μ s 1A | Energy Absorb 10/1000 μ s | Peak Current 8/20 μ s | Typical Capacitance @1MHz |
|---------------------|-----------------|-------|--------------------------------|-------------|---|-------------------------------------|---------------------------------|---------------------------------|
| | DC | AC | VB | Δ VB | | | | |
| | Volts | Volts | | | Volts | Joules | Amps | pF |
| FPV1080E14□K□ | 14 | 11 | 18 | $\pm 10\%$ | 35@2.5 | 0.8 | 250 | 5000 |
| FPV1080E18□K□ | 18 | 14 | 22 | $\pm 10\%$ | 44@2.5 | 0.9 | 250 | 4500 |
| FPV1080E22□K□ | 22 | 17 | 27 | $\pm 10\%$ | 53@2.5 | 1.1 | 250 | 4000 |
| FPV1080E26□K□ | 26 | 20 | 33 | $\pm 10\%$ | 63@2.5 | 1.3 | 250 | 3500 |
| FPV1080E31□K□ | 31 | 25 | 39 | $\pm 10\%$ | 69@2.5 | 1.6 | 250 | 3000 |
| FPV1080E38□K□ | 38 | 30 | 47 | $\pm 10\%$ | 90@2.5 | 2.0 | 250 | 2800 |
| FPV1080E45□K□ | 45 | 35 | 56 | $\pm 10\%$ | 99@2.5 | 2.5 | 250 | 2500 |
| FPV1080E56□K□ | 56 | 40 | 68 | $\pm 10\%$ | 127@2.5 | 3.0 | 250 | 2000 |
| FPV1080E65□K□ | 65 | 50 | 82 | $\pm 10\%$ | 144@10A | 4.2 | 1200 | 1900 |
| FPV1080E85□K□ | 85 | 60 | 100 | $\pm 10\%$ | 176@10A | 4.8 | 1200 | 1700 |
| FPV1080E100□K□ | 100 | 75 | 120 | $\pm 10\%$ | 211@10A | 5.9 | 1200 | 1500 |
| FPV1080E125□K□ | 125 | 95 | 150 | $\pm 10\%$ | 264@10A | 7.6 | 1200 | 1350 |
| FPV1080E150□K□ | 150 | 115 | 180 | $\pm 10\%$ | 317@10A | 8.4 | 1200 | 900 |
| FPV1080E170□K□ | 170 | 130 | 205 | $\pm 10\%$ | 361@10A | 9.5 | 1200 | 700 |
| FPV1080E180□K□ | 180 | 140 | 220 | $\pm 10\%$ | 387@10A | 10.0 | 1200 | 500 |
| FPV1080E200□K□ | 200 | 150 | 240 | $\pm 10\%$ | 422@10A | 11.0 | 1200 | 400 |
| FPV1080E225□K□ | 225 | 175 | 270 | $\pm 10\%$ | 475@10A | 13.0 | 1200 | 300 |
| FPV1080E300□K□ | 300 | 230 | 360 | $\pm 10\%$ | 634@10A | 17.0 | 1200 | 200 |
| FPV1080E320□K□ | 320 | 250 | 390 | $\pm 10\%$ | 686@10A | 19.0 | 1200 | 180 |
| FPV1080E350□K□ | 350 | 275 | 430 | $\pm 10\%$ | 757@10A | 21.0 | 1200 | 105 |
| FPV1080E385□K□ | 385 | 300 | 470 | $\pm 10\%$ | 827@10A | 23.0 | 1200 | 90 |
| FPV1080E615□K□ | 615 | 460 | 750 | $\pm 10\%$ | 1320@10A | 36.0 | 600 | 55 |

備注：8063與1080直流工作電壓表示方法：18-----18V 225-----225V。

Remark: The working DC voltage of 8063 and 1080 part number are identified as: 18-----18V 225-----225V

多層片式壓敏電阻器 (MLV) INTRODUCTION FO FPV SERIES MULTILAYER

- 片式壓敏電阻器高速系列

Multilayer Chip Varistor High Speed Series

高速系列方式壓敏電阻器是FPV電壓保護元件中的一族，其容量非常低反應速度非常快。

高速系列產品為高速數據線和其它高頻領域提供ESD和EFT保護

The Multilayer High-Speed Series is a very low capacitance extension to the FPV family of Transient Voltage Suppressor available in 1005,1608 and 2012 surface mount chip.

The High Speed series provides protection from ESD and EFT in high speed data-line and other high frequency applications.

數據、診斷/I/O接口 Data, Diagnostic I/O Ports

通用串行總綫 (USB) Universal Serial Bus (USB)

視頻和音頻接口 Video & Audio Ports

便携式手提設備 Portable/Hand-Held Products

移動通信/蜂窩電話 Mobile Communications/Cellular Phones

計算機/DSP產品 Computer/DSP Products

工業及醫學儀器 Industrial Instruments Including Medical

1005(0402) TYPE

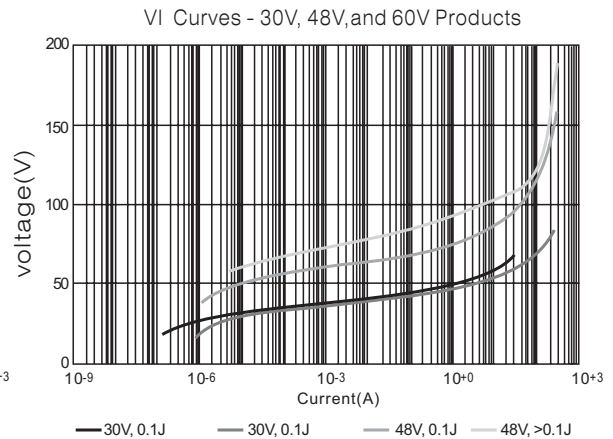
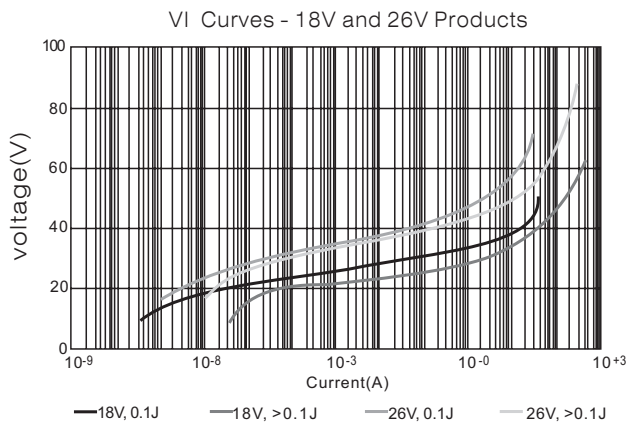
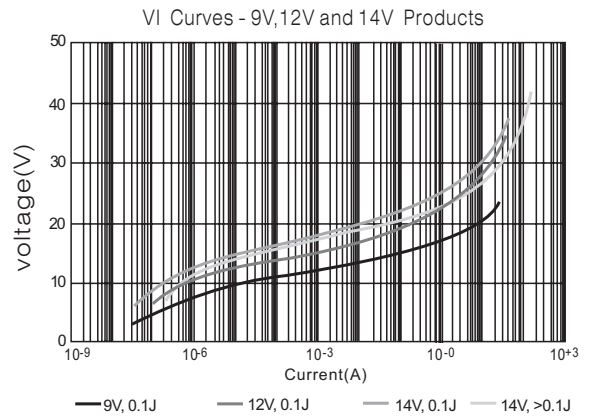
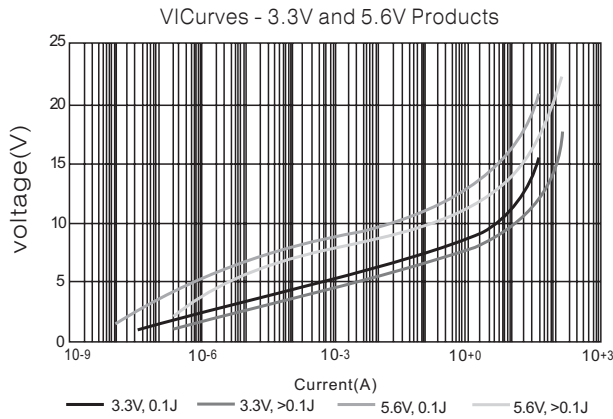
| 1005 PART Number | Working voltage | | Varistor voltage @1mA DC | | Maximum Clamping Voltage 8/20 μ s 1A | Energy Absorb 10/1000 μ s | Peak Current 8/20 μ s | Typical Capacitance @1MHz |
|---------------------|-----------------|-------|-----------------------------|-------------|---|----------------------------------|------------------------------|------------------------------|
| | DC | AC | VB | Δ VB | | | | |
| | Volts | Volts | | | Volts | Joules | Amps | pF |
| FPV100505S3R3□M□ | 3.3 | 2.5 | 7 | \pm 20% | 15 | 0.05 | 10 | 70 |
| FPV100505S5R6□L□ | 5.6 | 4 | 11 | \pm 15% | 24 | 0.05 | 10 | 45 |
| FPV100505S8R0□L□ | 8 | 5.7 | 14 | \pm 15% | 31 | 0.05 | 10 | 30 |
| FPV100505S9R0□L□ | 9 | 6.4 | 15 | \pm 15% | 33 | 0.05 | 10 | 26 |
| FPV100505S110□L□ | 11 | 7.8 | 18 | \pm 15% | 40 | 0.05 | 10 | 24 |
| FPV100505S120□L□ | 12 | 8.5 | 20 | \pm 15% | 44 | 0.05 | 10 | 20 |
| FPV100505S140□K□ | 14 | 10 | 22 | \pm 10% | 49 | 0.05 | 10 | 18 |
| FPV100505S160□K□ | 16 | 11.3 | 24 | \pm 10% | 53 | 0.05 | 10 | 15 |
| FPV100505S180□K□ | 18 | 12.7 | 27 | \pm 10% | 60 | 0.05 | 10 | 15 |

1608(0603) TYPE

| 1608 PART Number | Working voltage | | Varistor voltage @1mA DC | | Maximum Clamping Voltage 8/20 μ s 1A | Energy Absorb 10/1000 μ s | Peak Current 8/20 μ s | Typical Capacitance @1MHz |
|---------------------|-----------------|-------|-----------------------------|-------------|---|----------------------------------|------------------------------|------------------------------|
| | DC | AC | VB | Δ VB | | | | |
| | Volts | Volts | | | Volts | Joules | Amps | pF |
| FPV160808S3R3□M□ | 3.3 | 2.5 | 7 | \pm 20% | 15 | 0.05 | 10 | 180 |
| FPV160808S5R6□L□ | 5.6 | 4 | 11 | \pm 15% | 24 | 0.05 | 10 | 110 |
| FPV160808S8R0□L□ | 8 | 5.7 | 14 | \pm 15% | 31 | 0.05 | 10 | 80 |
| FPV160808S9R0□L□ | 9 | 6.4 | 15 | \pm 15% | 33 | 0.05 | 10 | 70 |
| FPV160808S110□L□ | 11 | 7.8 | 18 | \pm 15% | 40 | 0.05 | 10 | 60 |
| FPV160808S120□L□ | 12 | 8.5 | 20 | \pm 15% | 44 | 0.05 | 10 | 55 |
| FPV160808S140□K□ | 14 | 10 | 22 | \pm 10% | 49 | 0.05 | 10 | 50 |
| FPV160808S160□K□ | 16 | 11.3 | 24 | \pm 10% | 53 | 0.05 | 10 | 45 |
| FPV160808S180□K□ | 18 | 12.7 | 27 | \pm 10% | 60 | 0.05 | 10 | 40 |
| FPV160808S220□K□ | 22 | 15.6 | 32 | \pm 10% | 71 | 0.05 | 10 | 30 |
| FPV160808S240□K□ | 24 | 17 | 35 | \pm 10% | 77 | 0.05 | 10 | 25 |
| FPV160808S260□K□ | 26 | 18.4 | 38 | \pm 10% | 84 | 0.05 | 10 | 25 |
| FPV160808S300□K□ | 30 | 21.2 | 44 | \pm 10% | 97 | 0.05 | 10 | 20 |
| FPV160808S680□K□ | 68 | 48 | 88 | \pm 10% | 194 | 0.05 | 10 | 17 |
| FPV160808S171□K□ | 171 | 130 | 205 | \pm 10% | 340 | 0.05 | 10 | 4 |

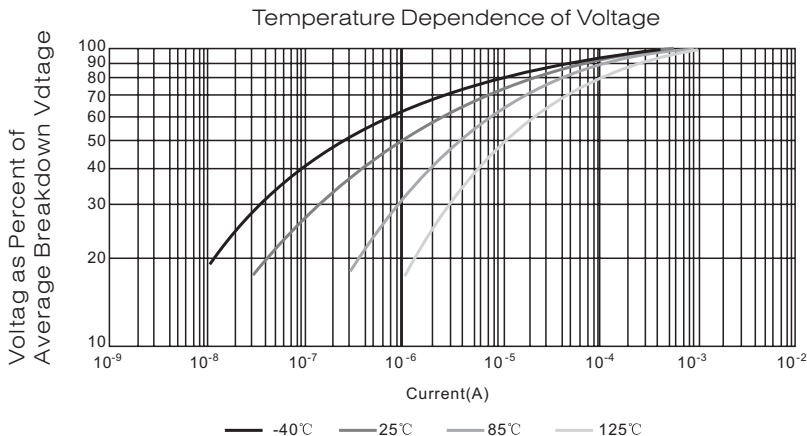
2012(0805) TYPE

| 2012 PART Number | Working voltage | | Varistor voltage @1mA DC | | Maximum Clamping Voltage 8/20 μ s 1A | Energy Absorb 10/1000 μ s Joules | Peak Current 8/20 μ s Amps | Typical Capacitance @1MHz pF |
|---------------------|-----------------|-------|-----------------------------|-------------|---|---|---|---------------------------------------|
| | DC | AC | VB | Δ VB | | | | |
| | Volts | Volts | | | Volts | | | |
| FPV201209S3R3□M□ | 3.3 | 2.5 | 7 | $\pm 20\%$ | 15 | 0.05 | 10 | 220 |
| FPV201209S5R6□L□ | 5.6 | 4 | 11 | $\pm 15\%$ | 24 | 0.05 | 10 | 140 |
| FPV201209S8R0□L□ | 8 | 5.7 | 14 | $\pm 15\%$ | 31 | 0.05 | 10 | 100 |
| FPV201209S9R0□L□ | 9 | 6.4 | 15 | $\pm 15\%$ | 33 | 0.05 | 10 | 90 |
| FPV201209S110□L□ | 11 | 7.8 | 18 | $\pm 15\%$ | 40 | 0.05 | 10 | 70 |
| FPV201209S120□L□ | 12 | 8.5 | 20 | $\pm 15\%$ | 44 | 0.05 | 10 | 60 |
| FPV201209S140□K□ | 14 | 10 | 22 | $\pm 10\%$ | 49 | 0.05 | 10 | 55 |
| FPV201209S160□K□ | 16 | 11.3 | 24 | $\pm 10\%$ | 53 | 0.05 | 10 | 50 |
| FPV201209S180□K□ | 18 | 12.7 | 27 | $\pm 10\%$ | 60 | 0.05 | 10 | 45 |
| FPV201209S220□K□ | 22 | 15.6 | 32 | $\pm 10\%$ | 71 | 0.05 | 10 | 40 |
| FPV201209S240□K□ | 24 | 17 | 35 | $\pm 10\%$ | 77 | 0.05 | 10 | 35 |
| FPV201209S260□K□ | 26 | 18.4 | 38 | $\pm 10\%$ | 84 | 0.05 | 10 | 30 |
| FPV201209S300□K□ | 30 | 21.2 | 44 | $\pm 10\%$ | 97 | 0.05 | 10 | 25 |

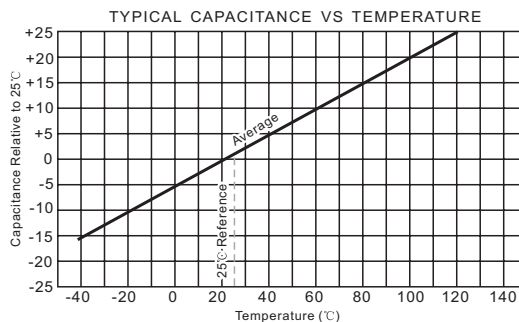
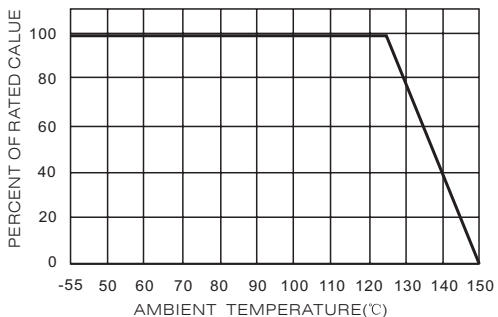
• I-V CURVES


多層片式壓敏電阻器 (MLV) INTRODUCTION FO FPV SERIES MULTILAYER

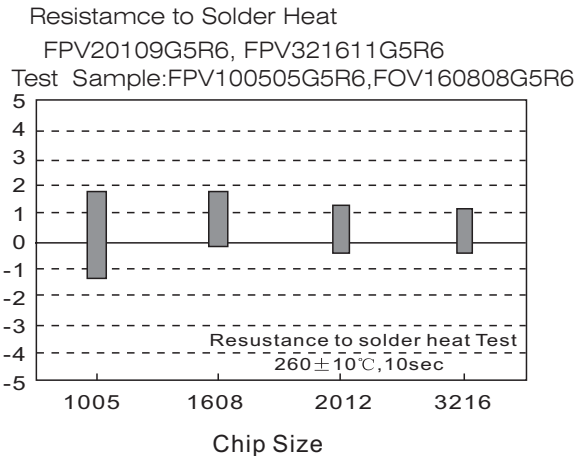
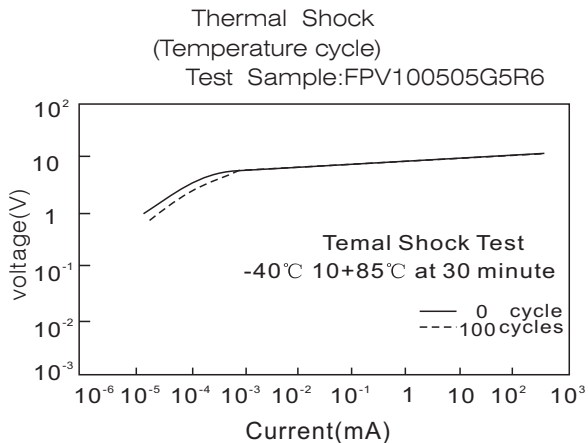
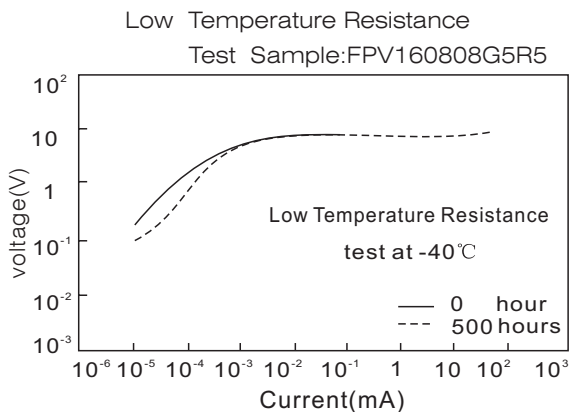
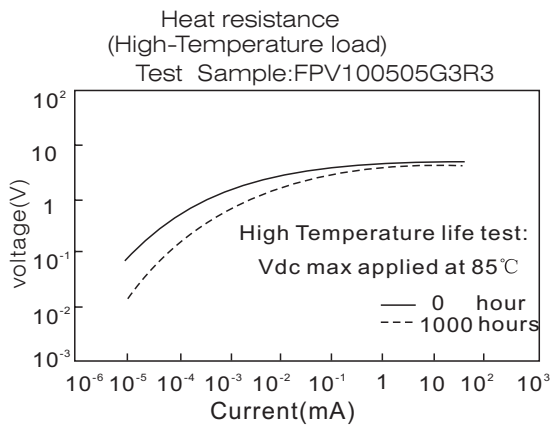
• VB VS. TEMPERATURE



• ENERGY AND CAPACITANCE VS. TEMPERATURE



• RELIABILITY TEST DATA



• 片式壓敏電阻排 MULTILAYER CHIP VARISTOR ARRAY

CVA 3216 - 4 G 3R3 P M T

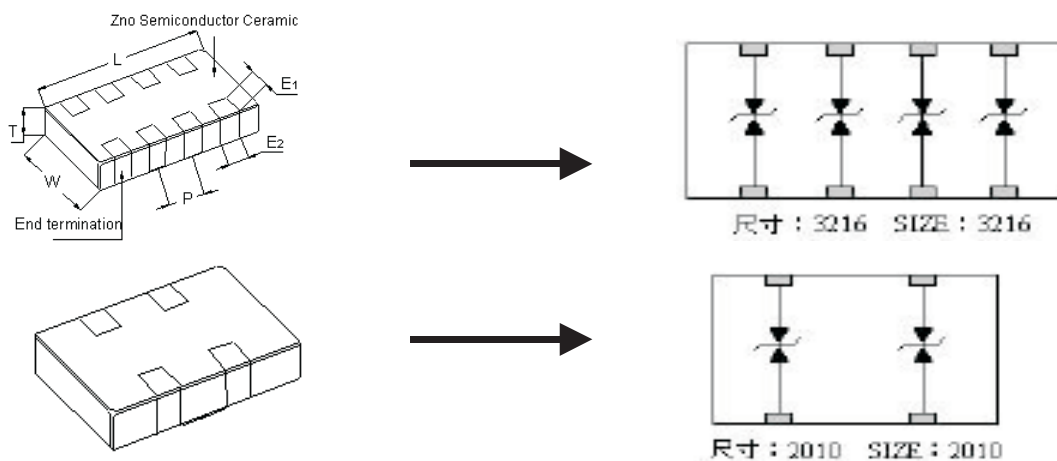
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

| ① 產品代號 Product Code | | ② 規格尺寸(L×W×T) (mm) Dimensions | | ③ 結構 Configuration | | ④ 產品系列 Product Series | | ⑤ 直流工作電壓 Working DC Voltage | | ⑥ 端頭 Termination | | ⑦ 誤差 Tolerance | |
|------------------------|---|-------------------------------------|-------------|-----------------------|---------------|--------------------------|------------------------|--------------------------------|------|---------------------|---------------------|-------------------|------|
| CVA | 風華疊層片式 壓敏電阻排 Multilayer Chip Varistor Array | | | 2 | 2聯 2 Array | S | 高速型 High speed type | 3R3 | 3.3V | P | 電鍍 Plated | K | ±10% |
| | | 3216 | 3.2×1.6×0.9 | 4 | 4聯 4 Array | G | 通用型 General type | 180 | 18V | S | 鉛/鈹/銀 Non-plated | L | ±15% |
| | | 2010 | 2.0×1.0×0.5 | | | | | | | | | M | ±20% |

⑧

| 包裝方式 Packaging Style | |
|-------------------------|---------------------|
| T | 編帶包裝 Tape & Reel |
| B | 散裝 Bulk |

• 外形尺寸及等效電路 SHAPE AND DIMENSIONS & EQUIVALENT CIRCUIT



unit: mm(inch)

| Part No. | L | W | T | E ₁ | E ₂ | D |
|----------------|---------------------------|---------------------------|--------------------------|--|---------------------------|---------------------------|
| 2010 (0804) | 2.0±0.15 (0.079±0.008) | 1.0±0.15 (0.039±0.006) | 0.5±0.1 (0.035±0.008) | 0.20+0.15/-0.1 (0.010+0.006/-0.004) | 2.0±0.15 (0.079±0.006) | 2.0±0.15 (0.079±0.006) |
| 3216 (1206) | 3.2±0.2 (0.126±0.008) | 1.6±0.2 (0.063±0.008) | 0.9±0.1 (0.035±0.008) | 0.35±0.2 (0.014±0.008) | 0.3±0.2 (0.012±0.008) | 0.8±0.1 (0.031±0.004) |

多層片式壓敏電阻器 (MLV) INTRODUCTION FO FPV SERIES MULTILAYER

- 片式壓敏電阻排單片電性能

Multilayer Chip Varistor Array Electrical Characteristics Per Element

所占空間更小

Reduced component placement costs.

減少PCB板面積

Downsize PCB.

用于多綫浪涌電壓抑制

Use in multiple lines for transient voltage suppression.

| PART Number | Working voltage | | Varistor voltage @1mA DC | | Maximum Clamping Voltage 8/20 μ s 1A | Energy Absorb 10/1000 μ s | Peak Current 8/20 μ s | Typical Capacitance @1MHz |
|------------------|-----------------|-------------|--------------------------|-------------|--|-------------------------------|---------------------------|---------------------------|
| | DC | AC | VB | Δ VB | | | | |
| | Volts | Volts | | | Volts | Joules | Amps | pF |
| CVA2010-2G5R6□M□ | 5.6 | 4 | 8 | \pm 20% | 19 | 0.1 | 30 | 225 |
| CVA2010-2G9R0□L□ | 9 | 6.4 | 12 | \pm 15% | 30 | 0.1 | 30 | 150 |
| CVA2010-2G140□L□ | 14 | 10 | 18 | \pm 15% | 35 | 0.1 | 30 | 125 |
| CVA2010-2G180□L□ | 18 | 12.7 | 24 | \pm 15% | 44 | 0.1 | 30 | 125 |
| CVA2010-2S180□L□ | \leq 18 | \leq 12.7 | N/A | | 60 | 0.05 | 20 | <75 |
| CVA3216-4G5R6□M□ | 5.6 | 4 | 8 | \pm 20% | 19 | 0.1 | 30 | 225 |
| CVA3216-4G9R0□L□ | 9 | 6.4 | 12 | \pm 15% | 30 | 0.1 | 30 | 150 |
| CVA3216-4G140□L□ | 14 | 10 | 18 | \pm 15% | 35 | 0.1 | 30 | 125 |
| CVA3216-4G180□L□ | 18 | 12.7 | 24 | \pm 15% | 44 | 0.1 | 30 | 125 |
| CVA3216-4S180□L□ | \leq 18 | \leq 12.7 | N/A | | 60 | 0.05 | 20 | <75 |

• 超低電容量片式壓敏電阻器

Ultra-low capacitance Chip Varistor

超低電容壓敏電阻器屬於FPV高速系列，其容量更低反應速度更快。

Ultra-low capacitance varistors are FPV high-speed series, its lower capacity and faster response.

數據、診斷I/O接口Data, Diagnostic I/O Ports

通用串行總綫 (USB) Universal Serial Bus (USB)

視頻和音頻接口Video & Audio Ports

便携式手提設備 Portable/Hand-held products

移動通信. 蜂窩電話 Mobile communications/Cellular Phones

計算機/DSP產品 computer/DSP Products

工業及醫學儀器 Industrial Instruments Including Medical

液晶顯示器LCD Monitor

• 產品規格型號的表示方法 PART NUMBER IDENTIFICATION

FPV 160808 S 3R3 P M T 070
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

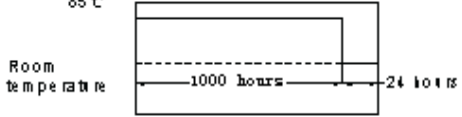
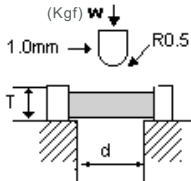
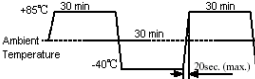
| | | | | | | | | | | | | | |
|---------------------------|--------------------------|--|-------------|-----------------------------|--------------------|-----------------------------------|------|------------------------|--------------|----------------------|------|------------------------------|---------------------|
| ① 產品代號 Product Code | | ② 規格尺寸(L×W×T) (mm) Dimensions | | ③ 產品系列 Product Series | | ④ 直流工作電壓 Working DC Voltage | | ⑤ 端頭 Termination | | ⑥ 誤差 Tolerance | | ⑦ 包裝方式 Packaging Style | |
| FPV | 風華疊層片式壓敏電阻器 | 100505 | 1.0×0.5×0.5 | S | 高速型High speed type | 3R3 | 3.3V | P | 電鍍 Plated | M | ±20% | T | 編帶包裝 Tape & Reel |
| | Multilayer Chip Varistor | 160808 | 1.6×0.8×0.8 | | | 180 | 18V | | | | | S | 鉑/鈀/銀 Pt/Pd/Ag |
| ⑧ 電容量 Capacitance | | 070 | 7PF | | | | | | | | | | |
| | | 150 | 15PF | | | | | | | | | | |

| PART Number | Working voltage | | Varistor voltage @1mA DC | | Maximum Clamping Voltage 8/20 μs 1A | Energy Absorb 10/1000 μs | Peak Current 8/20 μs | Typical Capacitance @1MHz |
|---------------------|-----------------|-------|--------------------------|------|-------------------------------------|--------------------------|----------------------|---------------------------|
| | DC | AC | VB | ΔVB | | | | |
| | Volts | Volts | | | Volts | Joules | Amps | pF |
| FPV100505S3R3□M□150 | 3.3 | 2.5 | 7 | ±20% | 15 | 0.01 | 6 | 10.5~19.5 |
| FPV100505S5R6□M□150 | 5.6 | 4 | 11 | ±20% | 24 | 0.01 | 6 | 10.5~19.5 |
| FPV100505S180□M□030 | 18 | 12.7 | 120 | ±20% | 250 | 0.01 | 6 | 2.3~4.3 |
| FPV100505S180□M□070 | 18 | 12.7 | 27 | ±20% | 60 | 0.01 | 6 | 4.8~8.8 |
| FPV160808S3R3□M□150 | 3.3 | 2.5 | 7 | ±20% | 10 | 0.01 | 6 | 10.5~19.5 |
| FPV160808S5R6□M□150 | 5.6 | 4 | 11 | ±20% | 35 | 0.01 | 6 | 10.5~19.5 |
| FPV160808S180□M□030 | 18 | 12.7 | 120 | ±20% | 250 | 0.01 | 6 | 2.3~4.3 |
| FPV160808S180□M□070 | 18 | 12.7 | 27 | ±20% | 60 | 0.01 | 6 | 4.8~8.8 |

多層片式壓敏電阻器 (MLV) INTRODUCTION FO FPV SERIES MULTILAYER

• 可靠性測試 RELIABILITY TESTING

| 序號 NO. | 項目 Item | 詳細說明Specified value | | | | 試驗方法Test methods |
|-----------|---------------------------------------|---|------|------|------|---|
| | | 1005 | 1608 | 2012 | 3216 | |
| 1 | 工作溫度範圍 Operating temperature range | -55 to +125°C | | | | |
| 2 | 貯存溫度範圍 Storage temperature range | -10 to +40°C | | | | |
| 3 | 可焊性 Solderability | 至少90%端電極表面被焊錫覆蓋 At least 90% of terminal electrode is covered by new solder | | | | 預熱溫度: 100°C~150°C preheating temperature:100°C~150°C 預熱時間: 1分鐘 Preheating time:60S 焊接溫度: : 230°C ±10°C Solder temperature: 230°C ±10°C 浸入時間: 3秒±1秒 Duration:3S±1S 浸入松香助焊劑約3~5秒 Flux: immersion into methanol solution with colophony for 3 to 5 secretary. |
| 4 | 耐焊性 Resistance to soldering | 瓷體沒有破裂之類的損傷 No damage such as cracks should be caused in chip element 至少75%端電極表面被焊錫覆蓋。 At least 75% of terminal electrode is covered by new solder. 壓敏電壓變化在 ±10%之內。 Varistor voltage change within ±10%. | | | | 預熱溫度: 100°C~150°C preheating temperature:100°C~150°C 預熱時間: 1分鐘 Preheating time:60S 焊接溫度: : 260°C ±10°C Solder temperature: 260°C ±10°C 浸入時間: 10秒±1秒 Duration:10S±1S 浸入松香助焊劑約3~5秒 Flux: immersion into methanol solution with colophony for 3 to 5 secretary. |
| 5 | 端電極強度 Adhesion of electrode | 端電極沒有破裂，也不會脫離瓷體 The termination and body should be no damage | | | | 施加力: 1005、1608為5N; 2012、3216、3225、4532為10N Applied force: 5N force for 1005 and 1608 series. 10N force for 2012、3216、3225、4516、4532series. 保持時間: 10±1S Keep time : 10 ±1S  |
| 6 | 躍落 Drop | 1、無可見機械損傷 No mechanical damage. 2、壓敏電壓變化率小於 ±5% Varistor voltage change within ±5%. | | | | 從高度為1米的空中自由落到混凝土地板重復10次 Dropped 10 times on a concrete floor from a height of 1 m. |
| 7 | 耐低溫 Loading at low temperature | 1、無可見機械損傷 No mechanical damage. 2、壓敏電壓變化率小於 ±5% Varistor voltage change within ±5%. | | | | 溫度: -40°C ±2°C Temperature:-40°C ±2°C 周期: 500±24小時 Duration:500±24hrs |

| 序號 NO. | 項目 Item | 詳細說明Specified value | | | | 試驗方法Test methods | | | | | | | | | | |
|-----------|---|---|------|------|------|--|-----|-----|-----|-----|---|-----|-----|-----|-----|--|
| | | 1005 | 1608 | 2012 | 3216 | | | | | | | | | | | |
| 8 | 耐高溫 Loading at high temperature | 1、無可見機械損傷 No mechanical damage. 2、壓敏電壓變化率小於±5% Varistor voltage change within ±5%. | | | | 測試溫度：85±2℃ Temperature: 85±2℃ 測試時間：1000±24小時 Duration: 1000±24hrs 施加電壓：工作電壓 Applied voltage: Working voltage 85℃  | | | | | | | | | | |
| 9 | 耐潮濕 Loading under Damp Heat | 1、無可見機械損傷 No mechanical damage. 2、壓敏電壓變化率小於±5% Varistor voltage change within ±5%. | | | | 濕度：90~95% RH Humidity:90 to 95% RH 溫度：40±2℃ Temperature:40±2℃ 測試時間：500±12小時 Duration: 500±12hrs 施加電壓：工作電壓 Applied voltage: Working voltage | | | | | | | | | | |
| 10 | 抗壓強度 Resistance to pressure of substrate | 按右圖方式施加力，瓷體沒有損傷 The body shall not be damaged by forces applied on the right. <table border="1" data-bbox="478 1048 849 1131"> <tr> <td>d</td> <td>0.8</td> <td>1.3</td> <td>1.3</td> <td>2.0</td> </tr> <tr> <td>w</td> <td>1.0</td> <td>1.0</td> <td>1.0</td> <td>4.0</td> </tr> </table> | | | | d | 0.8 | 1.3 | 1.3 | 2.0 | w | 1.0 | 1.0 | 1.0 | 4.0 |  |
| d | 0.8 | 1.3 | 1.3 | 2.0 | | | | | | | | | | | | |
| w | 1.0 | 1.0 | 1.0 | 4.0 | | | | | | | | | | | | |
| 11 | 振動 Vibration | 1、無可見機械損傷 No mechanical damage. 2、壓敏電壓變化率小於±5% Varistor voltage change within ±5%. | | | | 頻率：10~55~10Hz Frequency 10 to 55 to 10Hz 振幅：1.5mm Amplitude:1.5mm X、Y、Z方向的時間：每方向2小時 Directions:2hrs each in X,Y,Z direction | | | | | | | | | | |
| 12 | 溫度循環 Thermal shock | 1、無可見機械損傷 No mechanical damage. 2、壓敏電壓變化率小於±5% Varistor voltage change within ±5%. | | | | 溫度：-40℃，30±3分鐘 +80℃，30±3分鐘 Temperature:-40℃ for 30±3min +80℃ for 30±3min 轉換時間：20秒(最大) Transforming interval:max 20 sec 循環次數：32 Number of cycles:32  | | | | | | | | | | |

注：以上要求測試電性能的項目，應試驗后在標準條件下放置24小時后測試。

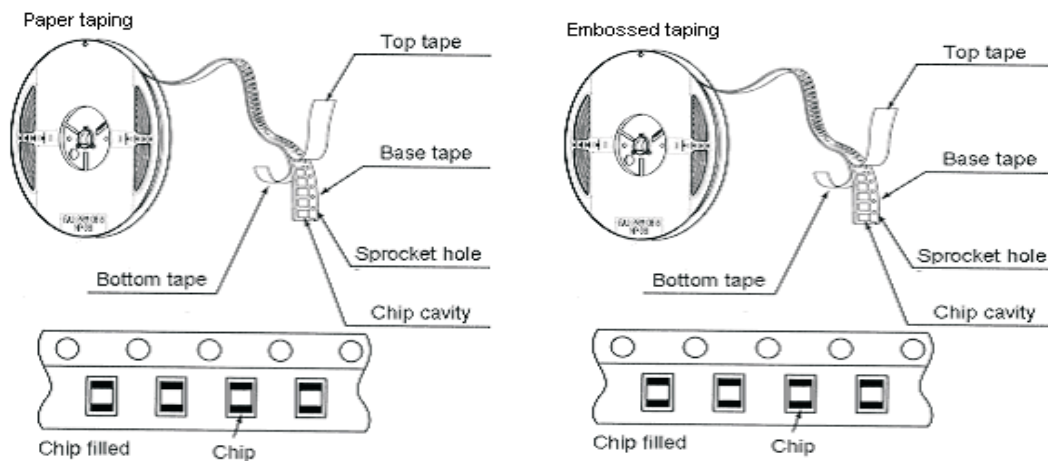
Note: When there are questions concerning, measurement shall be made after 24±2hrs of recovery under the standard condition.

多層片式壓敏電阻器 (MLV) INTRODUCTION FO FPV SERIES MULTILAYER

• STANDAEE QUANTITY

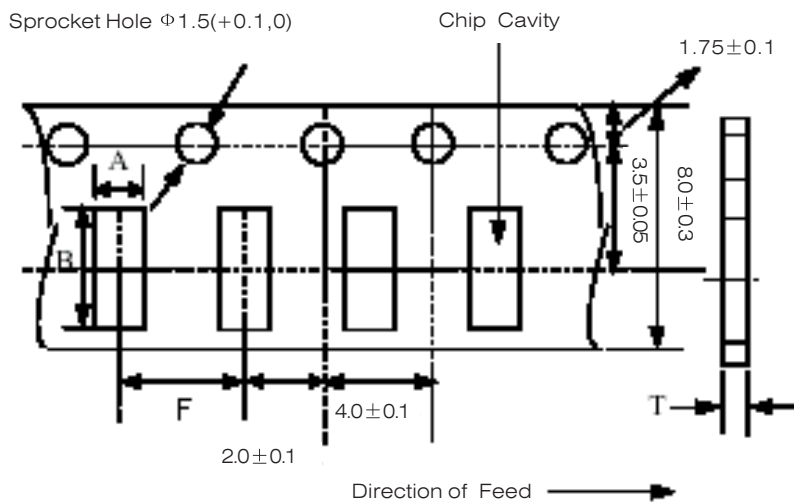
| TYPE | 100505 | 160808 | 201209 | 321611 | 322513 | 453215 | 1080 |
|----------------|--------|--------|--------|--------|--------|--------|------|
| Quantity (PCS) | 10000 | 4000 | 4000 | 3000 | 3000 | 3000 | 2500 |

• 編帶圖紙 TAPING DRAWINGS



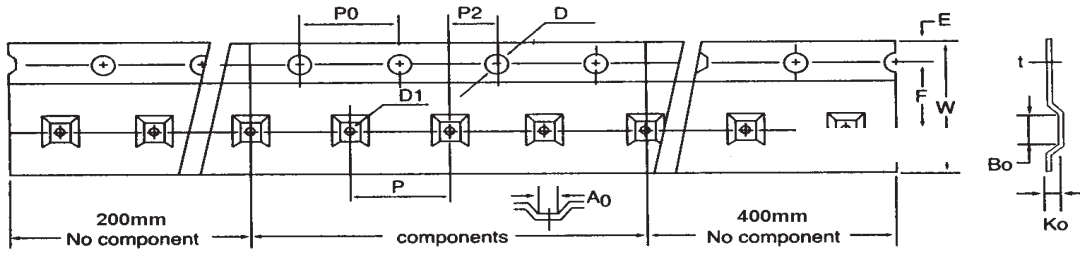
• 編帶尺寸 TAPING DIMENSIONS (UNIT: mm)

· 紙載帶 Paper carrier



| Part NO. | A | B | F | T |
|----------|----------------|----------------|----------------|--------|
| 100505 | 0.65 ± 0.1 | 1.15 ± 0.1 | 2.0 ± 0.05 | 0.8max |
| 160808 | 1.0 ± 0.2 | 1.8 ± 0.2 | 4.0 ± 0.2 | 1.1max |
| 201209 | 1.5 ± 0.2 | 2.3 ± 0.2 | 4.0 ± 0.2 | 1.1max |

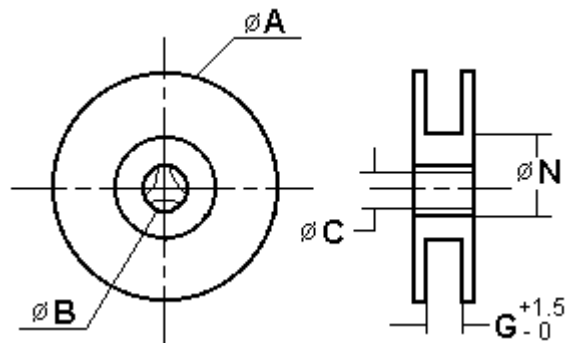
· 塑料膠帶 Embossed Carrier



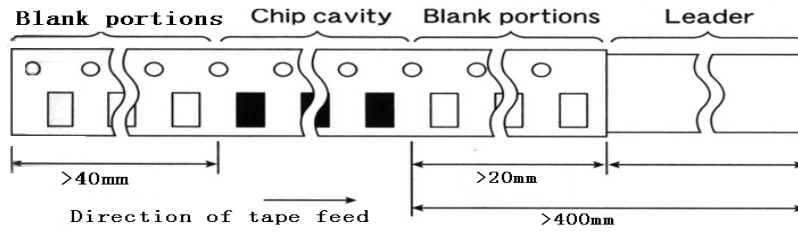
| | 1080 | 4532 | 3225 | 3216 | 2012 |
|-------------------|------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| W | 16.0+/-0.3 | 12.0+/-0.2 | 8.1+/-0.2 | 8.1+/-0.2 | 8.1+/-0.2 |
| P | 12+/-0.10 | 8.0+/-0.10 | 4.0+/-0.10 | 4.0+/-0.10 | 4.0+/-0.10 |
| E | 1.75+/-0.10 | 1.75+/-0.10 | 1.75+/-0.10 | 1.75+/-0.10 | 1.75+/-0.10 |
| F | 7.50+/-0.10 | 5.50+/-0.10 | 3.50+/-0.10 | 3.50+/-0.10 | 3.50+/-0.10 |
| D | 1.50 ^{+0.1} ₋₀ | 1.55+/-0.05 | 1.55+/-0.05 | 1.55+/-0.05 | 1.55+/-0.05 |
| D1 | 1.50 ^{+0.1} ₋₀ | 1.50 ^{+0.25} ₋₀ | 1.50 ^{+0.25} ₋₀ | 1.50 ^{+0.25} ₋₀ | 1.50 ^{+0.25} ₋₀ |
| P ₀ | 4.0+/-0.10 | 4.0+/-0.10 | 4.0+/-0.10 | 4.0+/-0.10 | 4.0+/-0.10 |
| P ₀ 10 | 40.0+/-0.20 | 40.0+/-0.20 | 40.0+/-0.20 | 40.0+/-0.20 | 40.0+/-0.20 |
| P2 | 2.0+/-0.1 | 2.0+/-0.05 | 2.0+/-0.05 | 2.0+/-0.05 | 2.0+/-0.05 |
| A ₀ | 8.4+/-0.10 | 3.66+/-0.10 | 2.80+/-0.10 | 1.90+/-0.10 | 1.52+/-0.10 |
| B ₀ | 10.5+/-0.10 | 4.95+/-0.10 | 3.50+/-0.10 | 3.51+/-0.10 | 2.41+/-0.10 |
| t | 0.3+/-0.05 | 0.23+/-0.10 | 0.23+/-0.10 | 0.23+/-0.10 | 0.23+/-0.10 |
| Ko | 1.9+/-0.10 | 1.74+/-0.10 | 1.55+/-0.10 | 1.27+/-0.10 | 1.35+/-0.10 |

• 卷盤尺寸 REEL DIMENSIONS (UNIT: mm)

| | A | B | C | N | G |
|-------|-------------|--------------|--------------|-------------|----|
| CF-8 | 178 ±2.0 | 22.0 ±2.0 | 12.5 ±1.5 | 57 ±2.0 | 8 |
| CF-12 | 330 ±2.0 | 22.0 ±2.0 | 12.5 ±1.5 | 98 ±2.0 | 12 |
| CF-16 | 330 ±2.0 | 22.0 ±2.0 | 12.5 ±1.5 | 110 ±2.0 | 16 |



- 導帶與空長度 LEADER AND BLANK PORTION



- 剝離力：沿箭頭方向要求 $0.1 \sim 0.7\text{N}$
PEELING OFF FORCE : 0.05 to 0.7N in the direction show below.

