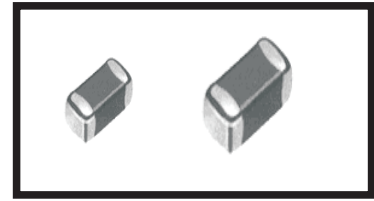


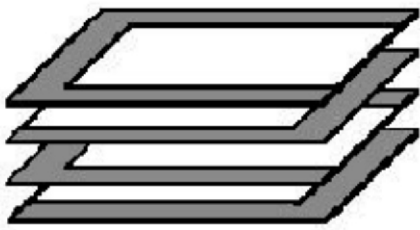
## 多層片式壓敏電阻器 (MLV) MULTILAYER CHIP VARISTORS

### ■ 多層片式壓敏電阻器 (MLV) MULTILAYER CHIP VARISTORS

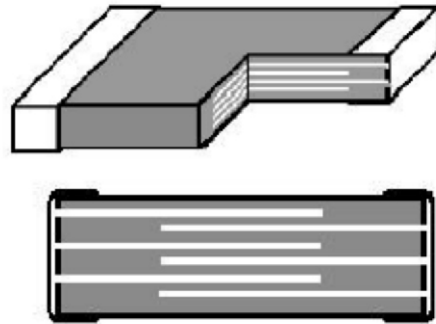


多層片式壓敏電阻器 (MLV) 是一種浪涌電壓抑制器。它是採用先進的疊層片式化技術制造的半導體陶瓷元件，它能夠為被保護元件（電路）提供強有力的保護，同時具有優良的浪涌能量吸收能力及內部散熱能力。該元件是一種無引線的片式結構，其寄生電感非常小、響應速度非常快（響應時間 $<0.5\text{ns}$ ），因此它具有優良的ESD及各種浪涌噪聲的抑制能力。與傳統的齊納二極管和圓片壓敏電阻器相似，具有體積小、重量輕、響應速度快的特點。

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  $0.5\text{ns}$ , 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.



Multilayer Formation Technologies



Section of the chip

#### ● 特征 FEATURES

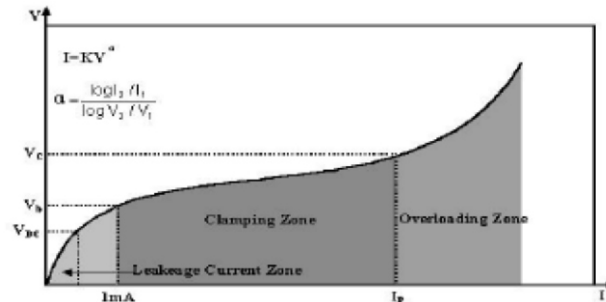
- \* 疊層片式陶瓷結構
- \* 無引線，產品尺寸1005[0402]、1608[0603]、2012[0805]、3216[1206]、3225[1210]、4532[1812]、8063[3225] 和 1080[4032]  
Leadless 1005[0402], 1608[0603], 2012[0805], 3216[1206], 3225[1210], 4532[1812], 8063[3225] and 1080[4032] Chip Size
- \* 溫度範圍： $-55^{\circ}\text{C} \sim +125^{\circ}\text{C}$   
 $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$  Operating Temperature Range
- \* 工作電壓範圍 $V_{w(dc)} = 3.3 \sim 615\text{V}$   
Operating Voltage Range  $V_w(\text{DC}) = 3.3\text{V}$  to  $615\text{V}$
- \* 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 $<0.5\text{ns}$ ）  
Low Inductance, Fast Response (Response time $<0.5\text{ns}$ )
- \* 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）  
Good Solderability (The electrode termination is selectable in plated )

## • 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 (Vw(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 (Vw(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 IP)

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Es) Maximum Surge Energy (Es)

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 (IL) 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10<sup>9</sup> 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 10<sup>9</sup>ohms) 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 (VB(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 (Vc)

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 (Cp)

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

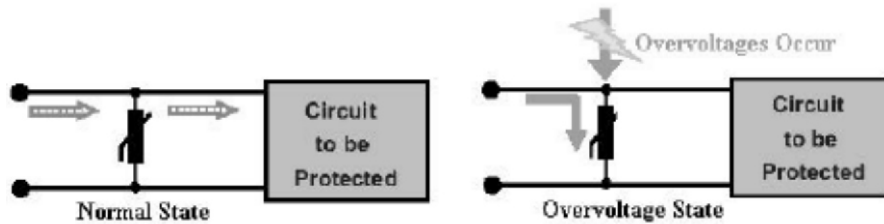
## 多層片式壓敏電阻器 (MLV) MULTILAYER CHIP VARISTORS

### • 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、控制和信號線產生的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

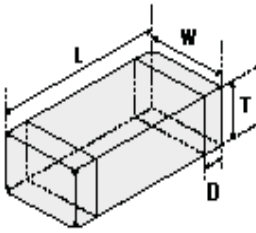
### • 產品規格型號的表示方法 PART NUMBER IDENTIFICATION

\* Multilayer Chip Varistor 片式壓敏電阻器

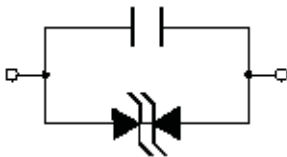
FPV	160808	G	3R3	P	M	T	
①	②	③	④	⑤	⑥	⑦	
①	②	③	④	⑤	⑥	⑦	
產品代號 Product Code		規格尺寸(L×W×T) (mm) Dimensions	產品系列 Product Series	直流工作電壓 Working DC Voltage	端頭 Termination	誤差 Tolerance	包裝方式 Packaging Style
FPV	疊層片式 壓敏電阻器 Multilayer Chip Varistor	100505 1.0×0.5×0.5 160808 1.6×0.8×0.8 201209 2.0×1.2×0.9 321611 3.2×1.6×1.1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

## • 外形尺寸及等效电路 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 (0.047±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)
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)
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 8/20 μs 1A	Energy Absorb 10/1000 μs	Peak Current 8/20 μs	Typical Capacitance @1MHz
	DC	AC						
	Volts	Volts	VB	ΔVB	Volts	Joules	Amps	pF
FPV100505G3R3PMT	3.3	2.5	5	±20%	14	0.05	20	300
FPV100505G5R6PLT	5.6	4	8	±15%	19	0.05	20	250
FPV100505G8R0PLT	8	5.7	12	±15%	27	0.05	20	230
FPV100505G9R0PLT	9	6.4	13	±15%	30	0.05	20	200
FPV100505G110PLT	11	7.8	16	±15%	33	0.05	20	180
FPV100505G120PLT	12	8.5	18	±15%	34	0.05	20	150
FPV100505G140PKT	14	10	20	±10%	35	0.05	20	120
FPV100505G160PKT	16	11.3	22	±10%	39	0.05	20	100
FPV100505G180PKT	18	12.7	25	±10%	44	0.05	20	90

## 多層片式壓敏電阻器 (MLV) MULTILAYER CHIP VARISTORS

### 1608 (0603) TYPE

1608 PART Number	Working voltage		Varistor voltage @1mA DC		Maximum Clamping Voltage 8/20 $\mu$ s 1A	Energy Absorb 10/1000 $\mu$ s	Peak Current 8/20 $\mu$ s	Typical Capacitance @1MHz
	DC	AC						
	Volts	Volts	VB	$\Delta$ VB	Volts	Joules	Amps	pF
FPV160808G3R3PMT	3.3	2.5	5	$\pm 20\%$	14	0.1	30	300
FPV160808G5R6PLT	5.6	4	8	$\pm 15\%$	19	0.1	30	280
FPV160808G8R0PLT	8	5.7	12	$\pm 15\%$	27	0.1	30	250
FPV160808G9R0PLT	9	6.4	13	$\pm 15\%$	30	0.1	30	240
FPV160808G110PLT	11	7.8	16	$\pm 15\%$	33	0.1	30	220
FPV160808G120PLT	12	8.5	18	$\pm 15\%$	34	0.1	30	210
FPV160808G140PKT	14	10	20	$\pm 10\%$	35	0.1	30	190
FPV160808G160PKT	16	11.3	22	$\pm 10\%$	39	0.1	30	180
FPV160808G180PKT	18	12.7	25	$\pm 10\%$	44	0.1	30	170
FPV160808G220PKT	22	15.6	30	$\pm 10\%$	53	0.1	30	150
FPV160808G240PKT	24	17	33	$\pm 10\%$	58	0.1	30	140
FPV160808G260PKT	26	18.4	36	$\pm 10\%$	63	0.1	30	120
FPV160808G300PKT	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 $\mu$ s 1A	Energy Absorb 10/1000 $\mu$ s	Peak Current 8/20 $\mu$ s	Typical Capacitance @1MHz
	DC	AC						
	Volts	Volts	VB	$\Delta$ VB	Volts	Joules	Amps	pF
FPV201209G3R3PMT	3.3	2.5	5	$\pm 20\%$	14	0.1	40	380
FPV201209G5R6PLT	5.6	4	8	$\pm 15\%$	19	0.1	40	350
FPV201209G8R0PLT	8	5.7	12	$\pm 15\%$	27	0.1	40	300
FPV201209G9R0PLT	9	6.4	13	$\pm 15\%$	30	0.1	40	280
FPV201209G110PLT	11	7.8	16	$\pm 15\%$	33	0.1	35	250
FPV201209G120PLT	12	8.5	18	$\pm 15\%$	34	0.1	35	220
FPV201209G140PKT	14	10	20	$\pm 10\%$	35	0.1	35	200
FPV201209G160PKT	16	11.3	22	$\pm 10\%$	39	0.1	35	190
FPV201209G180PKT	18	12.7	25	$\pm 10\%$	44	0.1	35	180
FPV201209G220PKT	22	15.6	30	$\pm 10\%$	53	0.1	35	175
FPV201209G240PKT	24	17	33	$\pm 10\%$	58	0.1	35	170
FPV201209G260PKT	26	18.4	36	$\pm 10\%$	63	0.1	35	165
FPV201209G300PKT	30	21.2	42	$\pm 10\%$	74	0.1	35	150

### 3216(1206) TYPE

3216 PART Number	Working voltage		Varistor voltage @1mA DC		Maximum Clamping Voltage 8/20 $\mu$ s 1A	Energy Absorb 10/1000 $\mu$ s	Peak Current 8/20 $\mu$ s	Typical Capacitance @1MHz
	DC	AC						
	Volts	Volts	VB	$\Delta$ VB	Volts	Joules	Amps	pF
FPV321611G3R3PMT	3.3	2.5	5	$\pm 20\%$	14	0.1	40	750
FPV321611G5R6PLT	5.6	4	8	$\pm 15\%$	19	0.1	40	700
FPV321611G8R0PLT	8	5.7	12	$\pm 15\%$	27	0.1	40	650
FPV321611G9R0PLT	9	6.4	13	$\pm 15\%$	30	0.1	40	600
FPV321611G110PLT	11	7.8	16	$\pm 15\%$	33	0.1	35	500
FPV321611G120PLT	12	8.5	18	$\pm 15\%$	34	0.1	35	450
FPV321611G140PKT	14	10	20	$\pm 10\%$	35	0.1	35	350
FPV321611G160PKT	16	11.3	22	$\pm 10\%$	39	0.1	35	300
FPV321611G180PKT	18	12.7	25	$\pm 10\%$	44	0.1	35	270
FPV321611G220PKT	22	15.6	30	$\pm 10\%$	53	0.1	35	250
FPV321611G240PKT	24	17	33	$\pm 10\%$	58	0.1	35	230
FPV321611G260PKT	26	18.4	36	$\pm 10\%$	63	0.1	35	220
FPV321611G300PKT	30	21.2	42	$\pm 10\%$	74	0.1	35	200
FPV321611G330PKT	33	23.3	45	$\pm 10\%$	79	0.1	35	180
FPV321611G380PKT	38	27	51	$\pm 10\%$	90	0.1	35	160
FPV321611G420PKT	42	30	56	$\pm 10\%$	99	0.1	35	150
FPV321611G480PKT	48	34	62	$\pm 10\%$	110	0.1	35	120
FPV321611G560PKT	56	40	72	$\pm 10\%$	127	0.1	35	110
FPV321611G600PKT	60	45	76	$\pm 10\%$	134	0.1	35	100
FPV321611G680PKT	68	48	86	$\pm 10\%$	151	0.1	35	90

- 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

## 多層片式壓敏電阻器 (MLV) MULTILAYER CHIP VARISTORS

### 2012 (0805) TYPE

2012 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						
	Volts	Volts	VB	ΔV <sub>B</sub>	Volts	Joules	Amps	pF
FPV201209E3R3PMT	3.3	2.5	5	±20%	14	0.3	120	650
FPV201209E5R6PLT	5.6	4	8	±15%	19	0.3	120	600
FPV201209E8R0PLT	8	5.7	12	±15%	27	0.3	120	500
FPV201209E9R0PLT	9	6.4	13	±15%	30	0.3	120	450
FPV201209E110PLT	11	7.8	16	±15%	33	0.3	120	440
FPV201209E120PLT	12	8.5	18	±15%	34	0.3	120	420
FPV201209E140PKT	14	10	20	±10%	35	0.3	120	400
FPV201209E160PKT	16	11.3	22	±10%	39	0.3	120	380
FPV201209E180PKT	18	12.7	25	±10%	44	0.3	100	360
FPV201209E220PKT	22	15.6	30	±10%	53	0.3	100	320
FPV201209E240PKT	24	17	33	±10%	58	0.3	100	300
FPV201209E260PKT	26	18.4	36	±10%	63	0.3	100	280
FPV201209E300PKT	30	21.2	42	±10%	74	0.3	100	260

### 3216(1206) TYPE

3216 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						
	Volts	Volts	VB	ΔVB	Volts	Joules	Amps	pF
FPV321611E3R3PMT	3.3	2.5	5	±20%	14	0.4	150	1500
FPV321611E5R6PLT	5.6	4	8	±15%	19	0.4	150	1300
FPV321611E8R0PLT	8	5.7	12	±15%	27	0.4	150	1100
FPV321611E9R0PLT	9	6.4	13	±15%	30	0.4	150	1000
FPV321611E110PLT	11	7.8	16	±15%	33	0.4	150	900
FPV321611E120PLT	12	8.5	18	±15%	34	0.4	150	850
FPV321611E140PKT	14	10	20	±10%	35	0.4	150	800
FPV321611E160PKT	16	11.3	22	±10%	39	0.4	150	750
FPV321611E180PKT	18	12.7	25	±10%	44	0.4	150	700
FPV321611E220PKT	22	15.6	30	±10%	53	0.4	150	600
FPV321611E240PKT	24	17	33	±10%	58	0.4	150	550
FPV321611E260PKT	26	18.4	36	±10%	63	0.4	120	500
FPV321611E300PKT	30	21.2	42	±10%	74	0.4	120	450
FPV321611E330PKT	33	23.3	45	±10%	79	0.4	120	400
FPV321611E380PKT	38	27	51	±10%	90	0.4	120	310
FPV321611E420PKT	42	30	56	±10%	99	0.4	120	260
FPV321611E480PKT	48	34	62	±10%	110	0.4	120	240
FPV321611E560PKT	56	40	72	±10%	127	0.4	120	200
FPV321611E600PKT	60	45	76	±10%	134	0.4	120	180
FPV321611E680PKT	68	48	86	±10%	151	0.4	120	150

### 3225(1210) TYPE

3225 PART Number	Working voltage		Varistor voltage @1mA DC		Maximum Clamping Voltage 8/20 $\mu$ s 1A	Energy Absorb 10/1000 $\mu$ s	Peak Current 8/20 $\mu$ s	Typical Capacitance @1MHz
	DC	AC						
	Volts	Volts	VB	$\Delta$ VB	Volts	Joules	Amps	pF
FPV322513E180PKT	18	12.7	25	$\pm 10\%$	44	1.5	300	1200
FPV322513E220PKT	22	15.6	30	$\pm 10\%$	53	1.5	300	1100
FPV322513E240PKT	24	17	33	$\pm 10\%$	58	1.5	300	1050
FPV322513E260PKT	26	18.4	36	$\pm 10\%$	63	1.5	280	1000
FPV322513E300PKT	30	21.2	42	$\pm 10\%$	74	1.5	280	800
FPV322513E330PKT	33	23.3	45	$\pm 10\%$	79	1.5	280	700
FPV322513E380PKT	38	27	51	$\pm 10\%$	90	1.5	280	650
FPV322513E420PKT	42	30	56	$\pm 10\%$	99	1.5	280	580
FPV322513E480PKT	48	34	62	$\pm 10\%$	110	1.5	280	510
FPV322513E560PKT	56	40	72	$\pm 10\%$	127	1.5	250	450
FPV322513E600PKT	60	45	76	$\pm 10\%$	134	1.5	250	420
FPV322513E680PKT	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 $\mu$ s 1A	Energy Absorb 10/1000 $\mu$ s	Peak Current 8/20 $\mu$ s	Typical Capacitance @1MHz
	DC	AC						
	Volts	Volts	VB	$\Delta$ VB	Volts	Joules	Amps	pF
FPV453215E180PKT	18	12.7	25	$\pm 10\%$	44	2.5	500	1800
FPV453215E220PKT	22	15.6	30	$\pm 10\%$	53	2.5	500	1600
FPV453215E240PKT	24	17	33	$\pm 10\%$	58	2.5	500	1500
FPV453215E260PKT	26	18.4	36	$\pm 10\%$	63	2.5	500	1300
FPV453215E300PKT	30	21.2	42	$\pm 10\%$	74	2.5	500	1200
FPV453215E330PKT	33	23.3	45	$\pm 10\%$	79	2.5	500	1100
FPV453215E380PKT	38	27	51	$\pm 10\%$	90	2.5	500	1050
FPV453215E420PKT	42	30	56	$\pm 10\%$	99	2.5	500	1000
FPV453215E480PKT	48	34	62	$\pm 10\%$	110	2.5	500	900
FPV453215E560PKT	56	40	72	$\pm 10\%$	127	2.5	500	800
FPV453215E600PKT	60	45	76	$\pm 10\%$	134	2.5	500	650
FPV453215E680PKT	68	48	86	$\pm 10\%$	151	2.5	500	550

### 5750 (2220) TYPE

5750 PART Number	Working voltage		Varistor voltage @1mA DC		Maximum Clamping Voltage 8/20 $\mu$ s 1A	Energy Absorb 10/1000 $\mu$ s	Peak Current 8/20 $\mu$ s	Typical Capacitance @1MHz
	DC	AC						
	Volts	Volts	VB	$\Delta$ VB	Volts	Joules	Amps	pF
FPV5750E180PKT	18	12.7	25	$\pm 10\%$	44	2.5	600	4000
FPV5750E220PKT	22	15.6	30	$\pm 10\%$	53	2.5	600	3500
FPV5750E240PKT	24	17	33	$\pm 10\%$	58	2.5	600	3000
FPV5750E260PKT	26	18.4	36	$\pm 10\%$	63	2.5	600	2500
FPV5750E300PKT	30	21.2	42	$\pm 10\%$	74	2.5	600	2200
FPV5750E330PKT	33	23.3	45	$\pm 10\%$	79	2.5	600	2000
FPV5750E380PKT	38	27	51	$\pm 10\%$	90	2.5	600	1800
FPV5750E420PKT	42	30	56	$\pm 10\%$	99	2.5	600	1600
FPV5750E480PKT	48	34	62	$\pm 10\%$	110	2.5	600	1400
FPV5750E560PKT	56	40	72	$\pm 10\%$	127	2.5	600	1000
FPV5750E600PKT	60	45	76	$\pm 10\%$	134	2.5	600	800
FPV5750E680PKT	68	48	86	$\pm 10\%$	151	2.5	600	700

## 多層片式壓敏電阻器 (MLV) MULTILAYER CHIP VARISTORS

### 8063(3225) TYPE

8063 PART Number	Working voltage		Varistor voltage @1mA DC		Maximum Clamping Voltage 8/20 $\mu$ s 1A	Energy Absorb 10/1000 $\mu$ s	Peak Current 8/20 $\mu$ s	Typical Capacitance @1MHz
	DC	AC						
	Volts	Volts	VB	$\Delta$ VB	Volts	Joules	Amps	pF
FPV8063E14SKT	14	11	18	$\pm 10\%$	35@1A	0.3	100	4000
FPV8063E18SKT	18	14	22	$\pm 10\%$	44@1A	0.4	100	3500
FPV8063E22SKT	22	17	27	$\pm 10\%$	53@1A	0.5	100	3000
FPV8063E26SKT	26	20	33	$\pm 10\%$	63@1A	0.6	100	2600
FPV8063E31SKT	31	25	39	$\pm 10\%$	69@1A	0.7	100	2200
FPV8063E38SKT	38	30	47	$\pm 10\%$	90@1A	0.9	100	1800
FPV8063E45SKT	45	35	56	$\pm 10\%$	99@1A	1.1	100	1500
FPV8063E56SKT	56	40	68	$\pm 10\%$	127@1A	1.3	100	1200
FPV8063E65SKT	65	50	82	$\pm 10\%$	144@5A	1.8	400	1100
FPV8063E85SKT	85	60	100	$\pm 10\%$	176@5A	2.2	400	950
FPV8063E100SKT	100	75	120	$\pm 10\%$	211@5A	2.5	400	800
FPV8063E125SKT	125	95	150	$\pm 10\%$	264@5A	3.4	400	650
FPV8063E150SKT	150	115	180	$\pm 10\%$	317@5A	3.6	400	550
FPV8063E170SKT	170	130	205	$\pm 10\%$	361@5A	4.2	400	400
FPV8063E180SKT	180	140	220	$\pm 10\%$	387@5A	4.5	400	350
FPV8063E200SKT	200	150	240	$\pm 10\%$	422@5A	4.9	400	250
FPV8063E225SKT	225	175	270	$\pm 10\%$	475@5A	5.6	400	200
FPV8063E300SKT	300	230	360	$\pm 10\%$	634@5A	7.2	400	90
FPV8063E320SKT	320	250	390	$\pm 10\%$	686@5A	8.2	400	80
FPV8063E350SKT	350	275	430	$\pm 10\%$	757@5A	8.6	400	75
FPV8063E385SKT	385	300	470	$\pm 10\%$	827@5A	9.6	400	60

### 1080(4032) TYPE

1080 PART Number	Working voltage		Varistor voltage @1mA DC		Maximum Clamping Voltage 8/20 $\mu$ s 1A	Energy Absorb 10/1000 $\mu$ s	Peak Current 8/20 $\mu$ s	Typical Capacitance @1MHz
	DC	AC						
	Volts	Volts	VB	$\Delta$ VB	Volts	Joules	Amps	pF
FPV1080E14SKT	14	11	18	$\pm 10\%$	35@2.5	0.8	250	5000
FPV1080E18SKT	18	14	22	$\pm 10\%$	44@2.5	0.9	250	4500
FPV1080E22SKT	22	17	27	$\pm 10\%$	53@2.5	1.1	250	4000
FPV1080E26SKT	26	20	33	$\pm 10\%$	63@2.5	1.3	250	3500
FPV1080E31SKT	31	25	39	$\pm 10\%$	69@2.5	1.6	250	3000
FPV1080E38SKT	38	30	47	$\pm 10\%$	90@2.5	2.0	250	2800
FPV1080E45SKT	45	35	56	$\pm 10\%$	99@2.5	2.5	250	2500
FPV1080E56SKT	56	40	68	$\pm 10\%$	127@2.5	3.0	250	2000
FPV1080E65SKT	65	50	82	$\pm 10\%$	144@10A	4.2	1200	1900
FPV1080E85SKT	85	60	100	$\pm 10\%$	176@10A	4.8	1200	1700
FPV1080E100SKT	100	75	120	$\pm 10\%$	211@10A	5.9	1200	1500
FPV1080E125SKT	125	95	150	$\pm 10\%$	264@10A	7.6	1200	1350
FPV1080E150SKT	150	115	180	$\pm 10\%$	317@10A	8.4	1200	1000
FPV1080E170SKT	170	130	205	$\pm 10\%$	361@10A	9.5	1200	900
FPV1080E180SKT	180	140	220	$\pm 10\%$	387@10A	10.0	1200	800
FPV1080E200SKT	200	150	240	$\pm 10\%$	422@10A	11.0	1200	700
FPV1080E225SKT	225	175	270	$\pm 10\%$	475@10A	13.0	1200	500
FPV1080E300SKT	300	230	360	$\pm 10\%$	634@10A	17.0	1200	220
FPV1080E320SKT	320	250	390	$\pm 10\%$	686@10A	19.0	1200	200
FPV1080E350SKT	350	275	430	$\pm 10\%$	757@10A	21.0	1200	140
FPV1080E385SKT	385	300	470	$\pm 10\%$	827@10A	23.0	1200	110
FPV1080E615SKT	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

## ● 片式壓敏電阻器高速系列

### Multilayer Chip Varistor High Speed Series

高速系列片式壓敏電阻器是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

通用串行總線(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 $\mu$ s 1A	Energy Absorb 10/1000 $\mu$ s	Peak Current 8/20 $\mu$ s	Typical Capacitance @1MHz
	DC	AC						
	Volts	Volts	VB	$\Delta$ VB	Volts	Joules	Amps	pF
FPV100505S3R3PMT	3.3	2.5	7	$\pm 20\%$	15	0.05	20	70
FPV100505S5R6PLT	5.6	4	11	$\pm 15\%$	24	0.05	20	45
FPV100505S8R0PLT	8	5.7	14	$\pm 15\%$	31	0.05	20	30
FPV100505S9R0PLT	9	6.4	15	$\pm 15\%$	33	0.05	20	26
FPV100505S110PLT	11	7.8	18	$\pm 15\%$	40	0.05	20	24
FPV100505S120PLT	12	8.5	20	$\pm 15\%$	44	0.05	20	20
FPV100505S140PKT	14	10	22	$\pm 10\%$	49	0.05	20	18
FPV100505S160PKT	16	11.3	24	$\pm 10\%$	53	0.05	20	15
FPV100505S180PKT	18	12.7	27	$\pm 10\%$	60	0.05	20	15

#### 1608(0603) TYPE

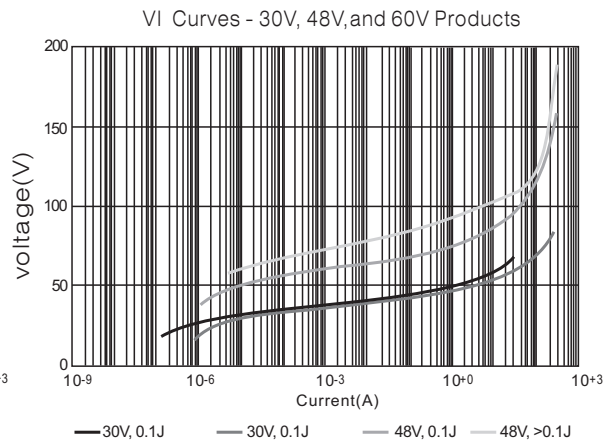
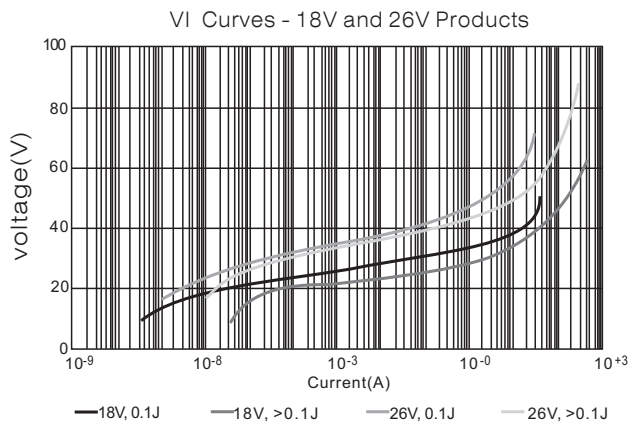
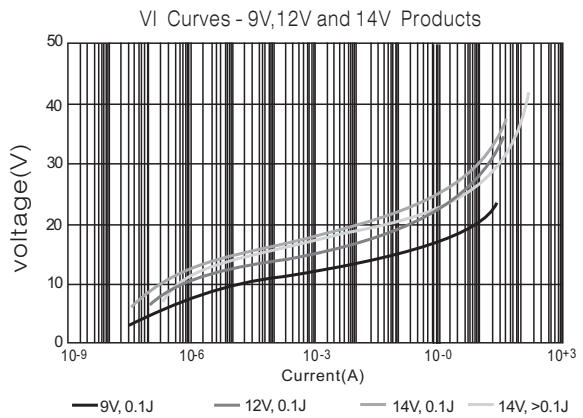
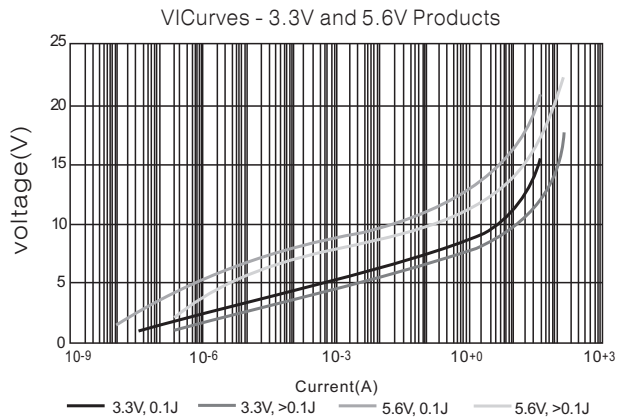
1608 PART Number	Working voltage		Varistor voltage @1mA DC		Maximum Clamping Voltage 8/20 $\mu$ s 1A	Energy Absorb 10/1000 $\mu$ s	Peak Current 8/20 $\mu$ s	Typical Capacitance @1MHz
	DC	AC						
	Volts	Volts	VB	$\Delta$ VB	Volts	Joules	Amps	pF
FPV160808S3R3PMT	3.3	2.5	7	$\pm 20\%$	15	0.05	20	180
FPV160808S5R6PLT	5.6	4	11	$\pm 15\%$	24	0.05	20	110
FPV160808S8R0PLT	8	5.7	14	$\pm 15\%$	31	0.05	20	80
FPV160808S9R0PLT	9	6.4	15	$\pm 15\%$	33	0.05	20	70
FPV160808S110PLT	11	7.8	18	$\pm 15\%$	40	0.05	20	60
FPV160808S120PLT	12	8.5	20	$\pm 15\%$	44	0.05	20	55
FPV160808S140PKT	14	10	22	$\pm 10\%$	49	0.05	20	50
FPV160808S160PKT	16	11.3	24	$\pm 10\%$	53	0.05	20	45
FPV160808S180PKT	18	12.7	27	$\pm 10\%$	60	0.05	20	40
FPV160808S220PKT	22	15.6	32	$\pm 10\%$	71	0.05	20	30
FPV160808S240PKT	24	17	35	$\pm 10\%$	77	0.05	20	25
FPV160808S260PKT	26	18.4	38	$\pm 10\%$	84	0.05	20	25
FPV160808S300PKT	30	21.2	44	$\pm 10\%$	97	0.05	20	20
FPV160808S680PKT	68	48	88	$\pm 10\%$	194	0.05	20	17

# 多層片式壓敏電阻器 (MLV) MULTILAYER CHIP VARISTORS

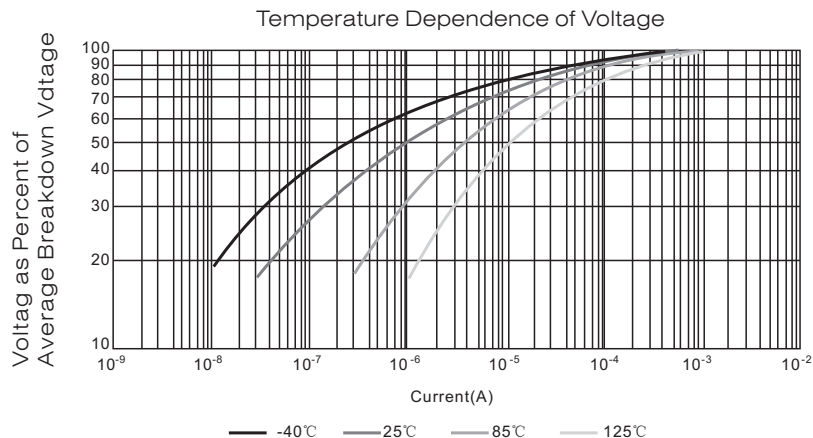
2012(0805) TYPE

2012 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						
	Volts	Volts	VB	ΔVB	Volts	Joules	Amps	pF
FPV201209S3R3PMT	3.3	2.5	7	±20%	15	0.05	20	220
FPV201209S5R6PLT	5.6	4	11	±15%	24	0.05	20	140
FPV201209S8R0PLT	8	5.7	14	±15%	31	0.05	20	100
FPV201209S9R0PLT	9	6.4	15	±15%	33	0.05	20	90
FPV201209S110PLT	11	7.8	18	±15%	40	0.05	20	70
FPV201209S120PLT	12	8.5	20	±15%	44	0.05	20	60
FPV201209S140PKT	14	10	22	±10%	49	0.05	20	55
FPV201209S160PKT	16	11.3	24	±10%	53	0.05	20	50
FPV201209S180PKT	18	12.7	27	±10%	60	0.05	20	45
FPV201209S220PKT	22	15.6	32	±10%	71	0.05	20	40
FPV201209S240PKT	24	17	35	±10%	77	0.05	20	35
FPV201209S260PKT	26	18.4	38	±10%	84	0.05	20	30
FPV201209S300PKT	30	21.2	44	±10%	97	0.05	20	25

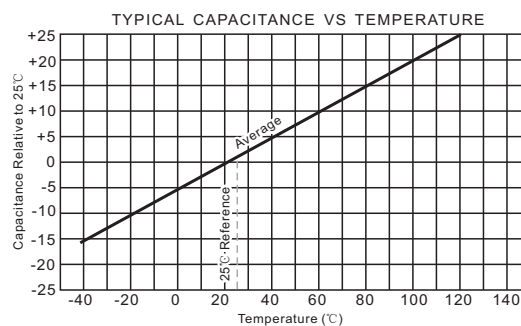
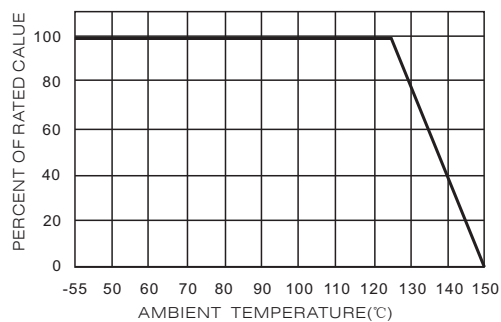
## • I-V CURVES



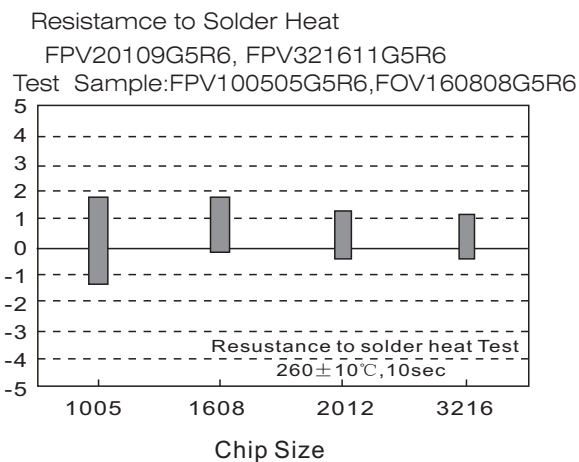
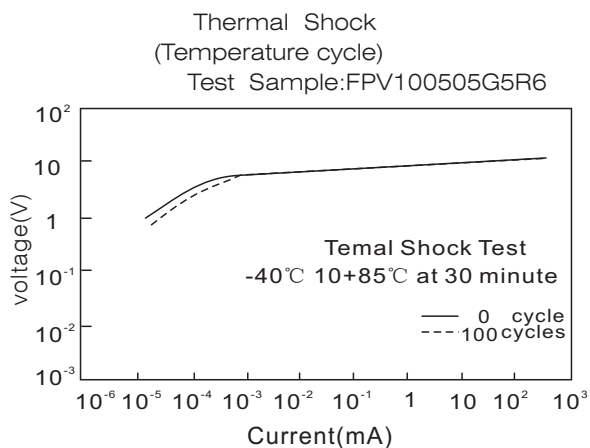
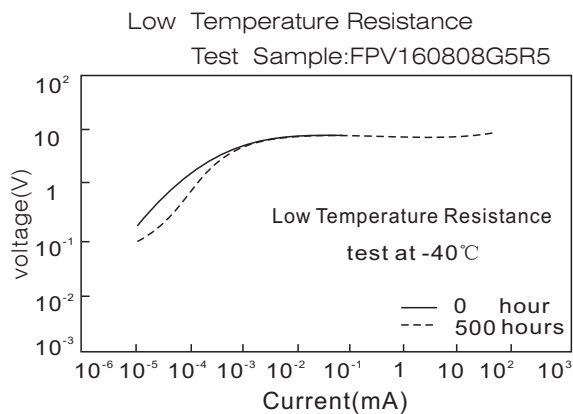
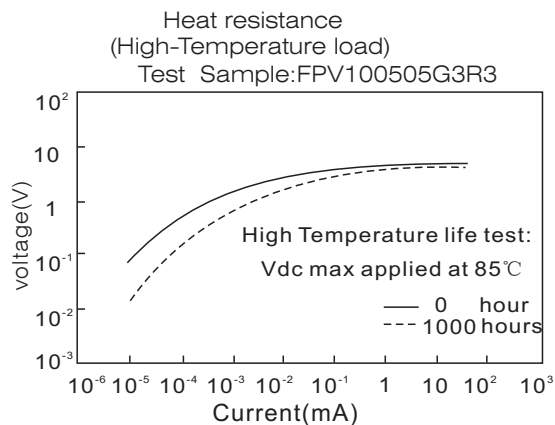
# • VB VS. TEMPERATURE



# • ENERGY AND CAPACITANCE VS. TEMPERATURE



# • RELIABILITY TEST DATA



## 多層片式壓敏電阻器 (MLV) MULTILAYER CHIP VARISTORS

### ● 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

通用串行總線(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.峰窩電話 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	疊層片式壓敏電阻器 Multilayer Chip Varistor	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
		160808	1.6×0.8×0.8			180	18V					B	散裝 Bulk

⑧ 電容量 Capacitance	
070	7PF
150	15PF

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						
	Volts	Volts	VB	ΔVB	Volts	Joules	Amps	pF
FPV100505S3R3PMT150	3.3	2.5	7	±20%	20	0.01	6	10.5~19.5
FPV100505S5R6PMT150	5.6	4	11	±20%	24	0.01	6	10.5~19.5
FPV100505S180PMT030	18	12.7	120	±20%	250	0.01	6	2.3~4.3
FPV100505S180PMT070	18	12.7	27	±20%	60	0.01	6	4.8~8.8
FPV160808S3R3PMT150	3.3	2.5	7	±20%	20	0.01	6	10.5~19.5
FPV160808S5R6PMT150	5.6	4	11	±20%	24	0.01	6	10.5~19.5
FPV160808S180PMT030	18	12.7	120	±20%	250	0.01	6	2.3~4.3
FPV160808S180PMT070	18	12.7	27	±20%	60	0.01	6	4.8~8.8

## ● 小尺寸超高電壓多層片式壓敏電阻器

### Small size Super High Voltage Multilayer Chip Varistor

#### ● 特性FEATURES

- 多層獨石結構適合高密度安裝  
Multilayer monolithic construction suitable for high density mounting
- 良好的殘壓比和電壓浪涌抑制能力强  
Excellent clamping ratio and strong capability of voltage surge suppression
- 高壓壓敏電阻，適用於交流電路  
High voltage varistor, suitable for AC circuit

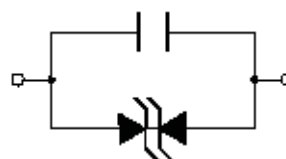
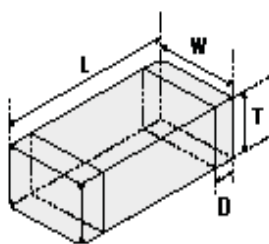
#### 應用APPLICATIONS

- 用于電源、網絡接口、LED照明等防雷和電壓浪涌抑制  
Lightning protection and voltage surge suppression for Power supply, Network Interface, LED lighting.
- 可以代替小直徑的插件類壓敏電阻器  
Can instead of the small diameter plug-in class varistor

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

FPV	3225	H	385	P	K	T
①	②	③	④	⑤	⑥	⑦
①	②	③	④	⑤	⑥	⑦
產品代號 Product Code	規格尺寸(L×W) (mm) Dimensions	產品系列 Product Series	直流工作電壓 Working DC Voltage	端頭 Termination	誤差 Tolerance	包裝方式 Packaging Style
FPV 疊層片式壓敏電阻器 Multilayer Chip Varistor	2016 2.2×1.7 3216 3.2×1.6 3225 3.2×2.5 4532 4.5×3.2 5750 5.7×5.0	H 超高壓型 Super High Voltage Type	150 150V 385 385V	P 電鍍 Plated	K ±10%	T 編帶包裝 Tape & Reel

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



Equivalent circuit

單位(Unit): mm/inch

Part Number	L	W	T	D
2016 (0806)	2.2±0.2 (0.087±0.008)	1.7±0.2 (0.077±0.008)	1.8 Max (0.071)	0.25~0.75 (0.010~0.029)
3216 (1206)	3.2+0.6/-0.2 (0.126+0.024/-0.008)	1.6+0.4/-0.2 (0.063+0.016/-0.008)	1.9 Max (0.075)	0.25~0.75 (0.010~0.029)
3225 (1210)	3.2+0.6/-0.2 (0.126+0.024/-0.008)	2.5+0.4/-0.2 (0.098+0.016/-0.008)	2.6 Max (0.102)	0.25~0.75 (0.010~0.029)
4532 (1812)	4.5+0.6/-0.2 (0.177+0.024/-0.008)	3.2+0.5/-0.2 (0.126+0.02/-0.008)	2.8 Max (0.110)	0.30~0.80 (0.012~0.031)
5750 (2220)	5.7+0.6/-0.2 (0.224+0.024/-0.008)	5.0+0.5/-0.2 (0.197+0.02/-0.008)	2.8 Max (0.110)	0.40~0.90 (0.016~0.034)

## 多層片式壓敏電阻器 (MLV) MULTILAYER CHIP VARISTORS

### 2016(0806) TYPE

2016 PART Number	Working voltage		Varistor voltage @1mA DC		Maximum Clamping Voltage 8/20 $\mu$ s 1A	Energy Absorb 10/1000 $\mu$ s	Peak Current 8/20 $\mu$ s	Typical Capacitance @1MHz
	DC	AC						
	Volts	Volts	VB	$\Delta$ VB	Volts	Joules	Amps	pF
FPV2016H200PKT	200	150	240	$\pm 10\%$	360	0.36	100	40
FPV2016H225PKT	225	175	270	$\pm 10\%$	410	0.36	100	35
FPV2016H250PKT	250	195	300	$\pm 10\%$	450	0.36	80	32
FPV2016H300PKT	300	230	360	$\pm 10\%$	540	0.36	50	30
FPV2016H320PKT	320	250	390	$\pm 10\%$	590	0.36	50	25
FPV2016H350PKT	350	275	430	$\pm 10\%$	650	0.36	50	20

### 3216(1206) TYPE

3216 PART Number	Working voltage		Varistor voltage @1mA DC		Maximum Clamping Voltage 8/20 $\mu$ s 1A	Energy Absorb 10/1000 $\mu$ s	Peak Current 8/20 $\mu$ s	Typical Capacitance @1MHz
	DC	AC						
	Volts	Volts	VB	$\Delta$ VB	Volts	Joules	Amps	pF
FPV3216H200PKT	200	150	240	$\pm 10\%$	360	0.9	150	50
FPV3216H225PKT	225	175	270	$\pm 10\%$	410	0.9	150	45
FPV3216H250PKT	250	195	300	$\pm 10\%$	450	0.9	150	40
FPV3216H300PKT	300	230	360	$\pm 10\%$	540	0.9	80	35
FPV3216H320PKT	320	250	390	$\pm 10\%$	590	0.9	80	30
FPV3216H350PKT	350	275	430	$\pm 10\%$	650	0.9	80	30
FPV3216H385PKT	385	300	470	$\pm 10\%$	710	0.9	80	25

### 3225(1210) TYPE

3225 PART Number	Working voltage		Varistor voltage @1mA DC		Maximum Clamping Voltage 8/20 $\mu$ s 1A	Energy Absorb 10/1000 $\mu$ s	Peak Current 8/20 $\mu$ s	Typical Capacitance @1MHz
	DC	AC						
	Volts	Volts	VB	$\Delta$ VB	Volts	Joules	Amps	pF
FPV3225H200PKT	200	150	240	$\pm 10\%$	360	1.5	200	55
FPV3225H225PKT	225	175	270	$\pm 10\%$	410	1.5	200	50
FPV3225H250PKT	250	195	300	$\pm 10\%$	450	1.5	200	45
FPV3225H300PKT	300	230	360	$\pm 10\%$	540	1.5	150	40
FPV3225H320PKT	320	250	390	$\pm 10\%$	590	1.5	150	40
FPV3225H350PKT	350	275	430	$\pm 10\%$	650	1.5	150	35
FPV3225H385PKT	385	300	470	$\pm 10\%$	710	1.5	150	30

### 4532(1812) TYPE

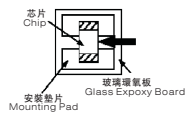
4532 PART Number	Working voltage		Varistor voltage @1mA DC		Maximum Clamping Voltage 8/20 $\mu$ s 1A	Energy Absorb 10/1000 $\mu$ s	Peak Current 8/20 $\mu$ s	Typical Capacitance @1MHz
	DC	AC						
	Volts	Volts	VB	$\Delta$ VB	Volts	Joules	Amps	pF
FPV4532H200PKT	200	150	240	$\pm 10\%$	360	4.5	200	70
FPV4532H225PKT	225	175	270	$\pm 10\%$	410	4.5	200	65
FPV4532H250PKT	250	195	300	$\pm 10\%$	450	5.0	200	60
FPV4532H300PKT	300	230	360	$\pm 10\%$	540	5.5	150	55
FPV4532H320PKT	320	250	390	$\pm 10\%$	590	6.0	150	50
FPV4532H350PKT	350	275	430	$\pm 10\%$	650	6.0	150	45
FPV4532H385PKT	385	300	470	$\pm 10\%$	710	6.5	150	40

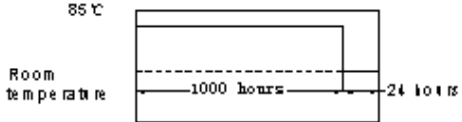
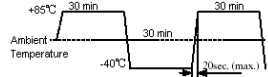
## 5750(2220) TYPE

5750 PART Number	Working voltage		Varistor voltage @1mA DC		Maximum Clamping Voltage 8/20 $\mu$ s 1A	Energy Absorb 10/1000 $\mu$ s	Peak Current 8/20 $\mu$ s	Typical Capacitance @1MHz
	DC	AC						
	Volts	Volts	VB	$\Delta$ VB	Volts	Joules	Amps	pF
FPV5750H200PKT	200	150	240	$\pm 10\%$	360	4.5	500	80
FPV5750H225PKT	225	175	270	$\pm 10\%$	410	4.5	500	70
FPV5750H250PKT	250	195	300	$\pm 10\%$	450	5.0	500	60
FPV5750H300PKT	300	230	360	$\pm 10\%$	540	5.5	400	55
FPV5750H320PKT	320	250	390	$\pm 10\%$	590	6.0	400	50
FPV5750H350PKT	350	275	430	$\pm 10\%$	650	6.0	400	45
FPV5750H385PKT	385	300	470	$\pm 10\%$	710	6.5	400	40

# 多層片式壓敏電阻器 (MLV) MULTILAYER CHIP VARISTORS

## • 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
1	工作溫度範圍 Operating temperature range	-55 to +125℃	
2	貯存溫度範圍 Storage temperature range	-10 to +40℃	
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: 120℃~150℃ preheating temperature:100℃~150℃ 預熱時間: 1分鐘 Preheating time:60S 焊接溫度: : 245℃ ±5℃ Solder temperature: 245℃ ±5℃ 浸入時間: 5秒±1秒 Duration:5S±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	耐焊接熱 Resistance to soldering	1、瓷體沒有破裂之類的損傷 No damage such as cracks should be caused in chip element 2、至少75%端電極表面被焊錫覆蓋。 At least 75% of terminal electrode is covered by new solder. 3、壓敏電壓變化在 ±10%之內。 Varistor voltage change within ±10%.	預熱溫度: 120℃~150℃ preheating temperature:100℃~150℃ 預熱時間: 1分鐘 Preheating time:60S 焊接溫度: : 260℃ ±5℃ Solder temperature: 260℃ ±5℃ 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 Terminal Strength	1、端電極沒有破裂，也不會脫離瓷體 The terminal electrode shall not be broken off nor the chip element.	速度Speed:1.0mm/S 保持時間 Keep time:10S±1S 施加力 Applied force: 1005, 1608:5N; 2012:6N; 3216,3225,4532:10N; 5750,8063,1080:15N 
6	抗彎強度 Flextrue strength	1、沒有機械損傷 No mechanical damage. 2、壓敏電壓變化率小於 ±10% Varistor voltage change within ±10%.	 1、彎曲: 2mm 2、施加速度: 0.5mm/S Curve:2mm Speed:0.5mm/S 3、時間: 10S Duration:10S
7	耐高溫 High temperature resistance	1、沒有機械損傷 No mechanical damage. 2、壓敏電壓變化率小於 ±10% Varistor voltage change within ±10%.	測試溫度: 125±2℃ Temperature: 125±2℃ 測試時間: 1000 <sup>+24</sup> <sub>-0</sub> 小時 Duration: 1000 <sup>+24</sup> <sub>-0</sub> hrs

序號 NO.	項目 Item	詳細說明Specified value	試驗方法Test methods
8	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 $\pm 10\%$ Varistor voltage change within $\pm 10\%$ .	溫度: $-55^{\circ}\text{C} \pm 2^{\circ}\text{C}$ Temperature: $-40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 周期: $1000_{-0}^{+24}$ 小時 Duration: $1000_{-0}^{+24}$ hrs
9	高溫負載 High temperature load	1、無可見機械損傷 No mechanical damage. 2、壓敏電壓變化率小於 $\pm 10\%$ Varistor voltage change within $\pm 10\%$ .	測試溫度: $85 \pm 2^{\circ}\text{C}$ Temperature: $85 \pm 2^{\circ}\text{C}$ 測試時間: $1000_{-0}^{+24}$ 小時 Duration: $1000_{-0}^{+24}$ hrs 施加直流工作電壓 Bias at Working Voltage Vdc.  
10	恒定濕熱 Static Humidity	1、無可見機械損傷 No mechanical damage. 2、壓敏電壓變化率小於 $\pm 10\%$ Varistor voltage change within $\pm 10\%$ .	濕度: 90~95% RH Humidity: 90 to 95% RH 溫度: $60 \pm 2^{\circ}\text{C}$ Temperature: $40 \pm 2^{\circ}\text{C}$ 測試時間: $1000_{-0}^{+24}$ 小時 Duration: $1000_{-0}^{+24}$ hrs
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 $\pm 5\%$ Varistor voltage change within $\pm 5\%$ .	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 $\pm 5\%$ Varistor voltage change within $\pm 5\%$ .	溫度: $-55^{\circ}\text{C}$ , $30 \pm 3$ 分鐘 $+125^{\circ}\text{C}$ , $30 \pm 3$ 分鐘 Temperature: $-55^{\circ}\text{C}$ for $30 \pm 3$ min $+125^{\circ}\text{C}$ for $30 \pm 3$ min 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。

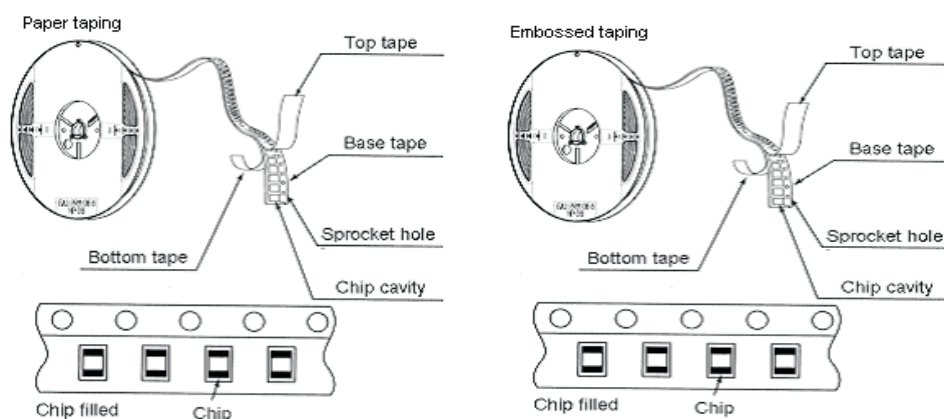
Note: When there are questions concerning, measurement shall be made after  $24 \pm 2$ hrs of recovery under the standard condition.

- 包裝 PACKAGING
- 標準包裝數量STANDAE QUANTITY

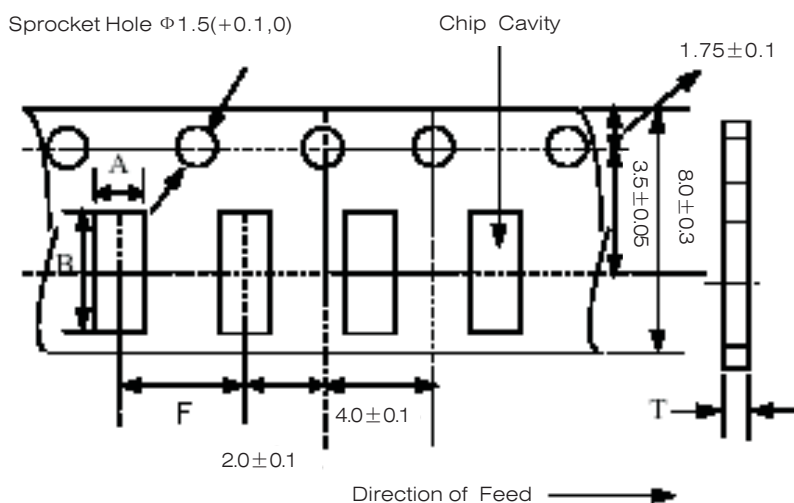
TYPE	100505	160808	201209	321611	322513	453215	5750	8063	1080
Quantity (PCS)	10000	4000	4000	3000	3000	3000	3000	2500	2500

TYPE	2016H	3216H	3225H	4532H	5750H
Quantity (PCS)	2000	2000	1500	2000	2000

- 編帶圖紙 TAPING DRAWINGS

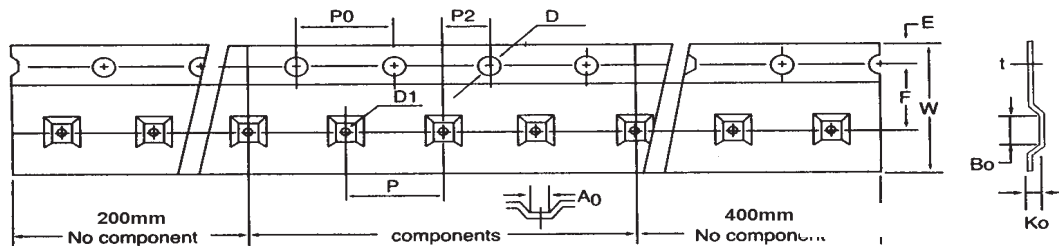


- 編帶尺寸 TAPING DIMENSIONS (UNIT: mm)
- 紙載帶 Paper carrier



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

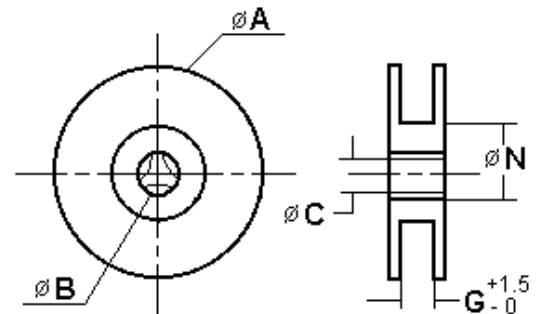


	1080	8063	5750	4532	3225	3216	2012
W	24.0+/-0.3	16.0+/-0.3	12.0+/-0.2	12.0+/-0.2	8.1+/-0.2	8.1+/-0.2	8.1+/-0.2
P	12+/-0.10	12+/-0.10	8.0+/-0.10	8.0+/-0.10	4.0+/-0.10	4.0+/-0.10	4.0+/-0.10
E	1.75+/-0.10	1.75+/-0.10	1.75+/-0.10	1.75+/-0.10	1.75+/-0.10	1.75+/-0.10	1.75+/-0.10
F	11.5+/-0.10	7.50+/-0.10	5.50+/-0.10	5.50+/-0.10	3.50+/-0.10	3.50+/-0.10	3.50+/-0.10
D	1.50 <sup>+0.1</sup> <sub>-0</sub>	1.50 <sup>+0.1</sup> <sub>-0</sub>	1.50 <sup>+0.1</sup> <sub>-0</sub>	1.55+/-0.05	1.55+/-0.05	1.55+/-0.05	1.55+/-0.05
D1	1.50 <sup>+0.1</sup> <sub>-0</sub>	1.50 <sup>+0.1</sup> <sub>-0</sub>	1.50 <sup>+0.1</sup> <sub>-0</sub>	1.50 <sup>+0.25</sup> <sub>-0</sub>	1.50 <sup>+0.25</sup> <sub>-0</sub>	1.50 <sup>+0.25</sup> <sub>-0</sub>	1.50 <sup>+0.25</sup> <sub>-0</sub>
P <sub>0</sub>	4.0+/-0.10	4.0+/-0.10	4.0+/-0.10	4.0+/-0.10	4.0+/-0.10	4.0+/-0.10	4.0+/-0.10
P <sub>0</sub> 10	40.0+/-0.20	40.0+/-0.20	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+/-0.1	2.0+/-0.1	2.0+/-0.05	2.0+/-0.05	2.0+/-0.05	2.0+/-0.05
A <sub>0</sub>	8.4+/-0.10	7.0+/-0.20	5.1+/-0.20	3.66+/-0.10	2.80+/-0.10	1.90+/-0.10	1.52+/-0.10
B <sub>0</sub>	10.5+/-0.10	8.7+/-0.20	6.0+/-0.20	4.95+/-0.10	3.50+/-0.10	3.51+/-0.10	2.41+/-0.10
t	0.3+/-0.05	0.3+/-0.05	0.3+/-0.05	0.23+/-0.10	0.23+/-0.10	0.23+/-0.10	0.23+/-0.10
K <sub>0</sub>	1.9+/-0.10	2.0+/-0.10	2.0+/-0.10	1.74+/-0.10	1.55+/-0.10	1.27+/-0.10	1.35+/-0.10

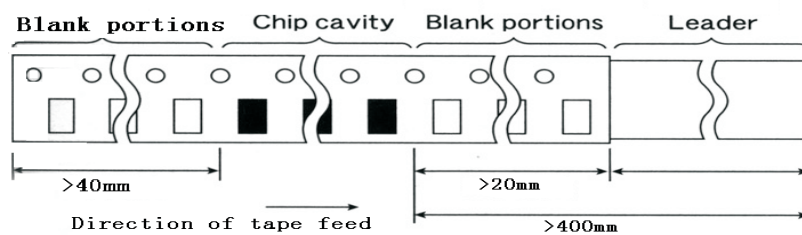
	5750H	4532H	3225H	3216H	2016H
W	12.0+/-0.2	12.0+/-0.2	8.0+/-0.2	8.0+/-0.2	8.0+/-0.2
P	8.0+/-0.10	8.0+/-0.10	4.0+/-0.10	4.0+/-0.10	4.0+/-0.10
E	1.75+/-0.10	1.75+/-0.10	1.75+/-0.10	1.75+/-0.10	1.75+/-0.10
F	5.50+/-0.10	5.50+/-0.10	3.50+/-0.10	3.50+/-0.10	3.50+/-0.10
D	1.50 <sup>+0.1</sup> <sub>-0</sub>	1.55+/-0.05	1.50 <sup>+1.0</sup> <sub>-0</sub>	1.50 <sup>+1.0</sup> <sub>-0</sub>	1.50 <sup>+1.0</sup> <sub>-0</sub>
D1	1.50 <sup>+0.1</sup> <sub>-0</sub>	1.50 <sup>+0.25</sup> <sub>-0</sub>	1.00+/-0.05	1.00+/-0.05	1.00+/-0.05
P <sub>0</sub>	4.0+/-0.10	4.0+/-0.10	4.0+/-0.10	4.0+/-0.10	4.0+/-0.10
P <sub>0</sub> 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 <sub>0</sub>	5.1+/-0.20	3.66+/-0.10	3.00+/-0.10	2.10+/-0.10	2.0+/-0.10
B <sub>0</sub>	6.0+/-0.20	4.95+/-0.10	3.90+/-0.10	3.90+/-0.10	2.5+/-0.10
t	0.3+/-0.05	0.23+/-0.10	0.23+/-0.10	0.23+/-0.10	0.23+/-0.10
K <sub>0</sub>	3.0+/-0.10	3.0+/-0.10	2.50+/-0.10	2.00+/-0.10	1.90+/-0.10

• 卷盤尺寸 REEL DIMENSIONS (UNIT: mm)

TYPE	REEL	A	B	C	N	G
1005-3225	CF-8	178 $\pm 2.0$	22.0 $\pm 2.0$	12.5 $\pm 1.5$	57 $\pm 2.0$	8
4532-5750	CF-12	330 $\pm 2.0$	22.0 $\pm 2.0$	12.5 $\pm 1.5$	98 $\pm 2.0$	12
8063	CF-16	330 $\pm 2.0$	22.0 $\pm 2.0$	12.5 $\pm 1.5$	110 $\pm 2.0$	16
1080	CF-24	330 $\pm 2.0$	22.0 $\pm 2.0$	12.5 $\pm 1.5$	98 $\pm 2.0$	24



• 導帶與空長度 LEADER AND BLANK PORTION



• 剝離力：沿箭頭方向要求0.1~0.7N

PEELING OFF FORCE : 0.05 to 0.7N in the direction show below.

