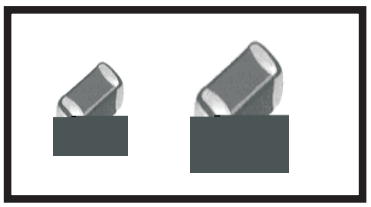
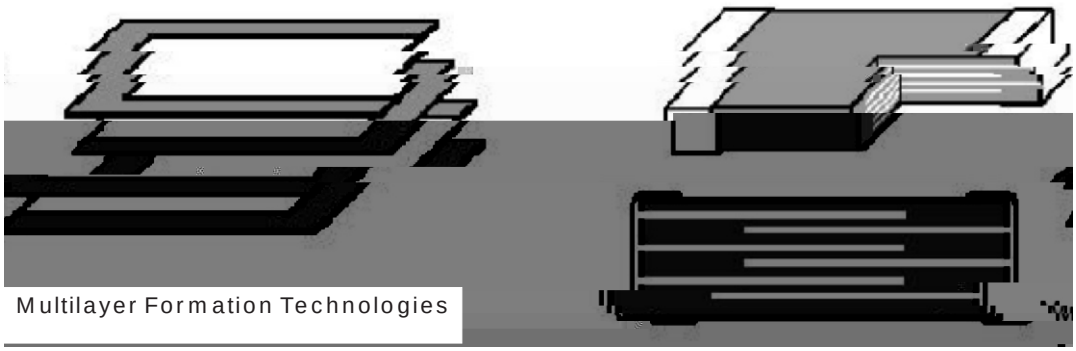
■ (MLV)
MULTILAYER CHIP VARISTORS



MLV

<0.5ns ESD

Multilayer Chip Varistors (MLV) are Transient Voltage Suppressors (TVS) which manufactured from semicon ductingceramics 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.



Multilayer Formation Technologies

Section of the chip

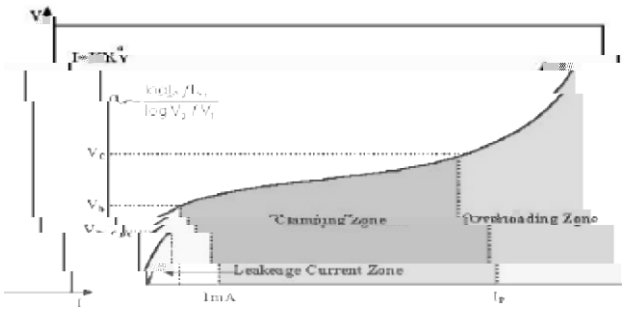
- FEATURES

*
* 1005[0402] 1608[0603] 2012[0805] 3216[1206] 3225[1210] 4532[1812] 8063[3225] 1080[4032]
Leadless 1005[0402], 1608[0603], 2012[0805], 3216[1206], 3225[1210], 4532[1812], 8063[3225] and 1080[4032] Chip Size
* 55 125
-55 to +125 Operating Temperature Range
* $V_{w(dc)}$ 3.3 615V
Operating Voltage Range Vw(DC) =3.3V to 615V
*
ESD
Inherent Bi-directional Clamping
*
Very Low Leakage Current
* <0.5ns
Low Inductance, Fast Response (Response time<0.5ns)
*
Excellent Temperature Coefficient
*
Good Solderability (The electrode termination is selectable in plated)

- ## INFORMATION FOR DESIGNER

Voltage Dependent Characteristic

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.



- ## TERMS AND DESCRIPTIONS

Working DC Voltage (Vw(DC))

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.

Working AC Voltage (Vw(AC))

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

Maximum Surge Current (Peak Current IP)
(8/20 µs)

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.

(E_S) Maximum Surge Energy (Es)
10/1000 µs

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.

I_L leakage (IL) at Rated DC Voltage

10^9 Ω (<50 µA)
500 µA

In the no conducting mode, the device is at a very high impedance (approaching 10^9ohms) andappears 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.

Varistor Voltage (VB(DC))

1mA

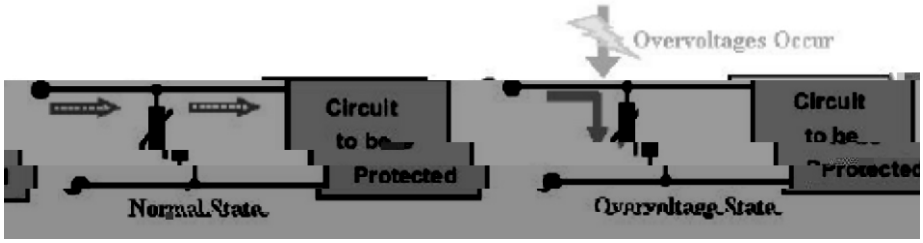
This is the voltage at which the device changes from the off state to the on state and enters its conduction mode of operation. The voltage is usually characterized at the 1mA point.

Clamping Voltage (Vc) its
8/20 µs µ

• APPLICATION

The Prevention of Overvoltage

When the voltage increases above the threshold of MLV, the suppressor will draws 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 overv oltage and prevent electronic equipment from being damaged by transient events.



Specific Application

· EFT

Suppression of Inductive Switching or Other Transient Events Such as EFT and Surge Voltage at the Circuit Board Level.

· ESD

Protection of Components and Circuits Sensitive to ESD Transients Occurring on Power supplies, Control and Signal Lines.

· IC CMOS MOSFET

Provides On-Board Transient Voltage Protection for ICs, CMOS and MOSFET.

· TVS

Replace Larger Surface Mount TVS Zeners in Many Applications

·

Used to Help Achieve Electromagnetic Compliance of End Products

• PART NUMBER IDENTIFICATION

＊ Multilayer Chip Varistor

FPV	160808	G	3R3	P	M	T

Product Code	
FPV	Multilayer Chip Varistor

(L×W×T) (mm) Dimensions	
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

Product Series	
E	High energy absorb type
S	High speed type
G	General type

Working DC Voltage	
3R3	3.3V
240	24V

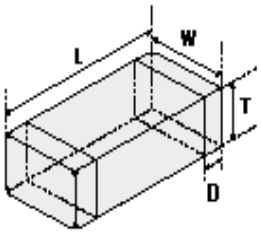
Termination	
P	Plated

Tolerance	
K	±10%
L	±15%
M	±20%

Packaging Style	
T	Tape & Reel
B	Bulk

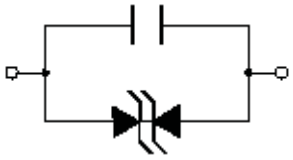
SHAPE AND DIMENSIONS & EQUIVALENT CIRCUIT

(Unit): mm/inch



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)

Equivalent circuit



SPECIFICATION

Multilayer Chip Varistor General Series

FPV

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

IC

l Protection from transient voltage noise in all kinds of IC

I/O ESD EFT

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

l 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						
	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

3216(1206) TYPE

3216 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
FPV321611G3R3PMT	3.3	2.5	5	±20%	14	0.1	40	750
FPV321611G5R6PLT	5.6	4	8	±15%	19	0.1	40	700
FPV321611G8R0PLT	8	5.7	12	±15%	27	0.1	40	650
FPV321611G9R0PLT	9	6.4	13	±15%	30	0.1	40	600
FPV321611G110PLT	11	7.8	16	±15%	33	0.1	35	500
FPV321611G120PLT	12	8.5	18	±15%	34	0.1	35	450
FPV321611G140PKT	14	10	20	±10%	35	0.1	35	350
FPV321611G160PKT	16	11.3	22	±10%	39	0.11	35	300
FPV321611G180PKT	18	12.7	25	±10%	44	0.1	35	270
FPV321611G220PKT	22	15.6	30	±10%	53	0.1	35	250
FPV321611G240PKT	24	17	33	±10%	58	0.1	35	230
FPV321611G260PKT	26	18.4	36	±10%	63	0.1	35	220
FPV321611G300PKT	30	21.2	42	±10%	74	0.1	35	200
FPV321611G330PKT	33	23.3	45	±10%	79	0.1	35	180
FPV321611G380PKT	38	27	51	±10%	90	0.1	35	160
FPV321611G420PKT	42	30	56	±10%	99	0.1	35	150
FPV321611G480PKT	48	34	62	±10%	110	0.1	35	120
FPV321611G560PKT	56	40	72	±10%	127	0.1	35	110
FPV321611G600PKT	60	45	76	±10%	134	0.1	35	100
FPV321611G680PKT	68	48	86	±10%	151	0.1	35	90

- MULTLAYER CHIP VARISTOR HIGH ENERGY ABSORB SERIES

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

Application

· EFT

Suppression of Inductive Switching or Other Transient Events Such as EFT and Surge Voltage at the Circuit Board Level.

· ESD

Protection of Components and Circuits Sensitive to ESD Transients Occurring on Power supplies, Control and Signal Lines.

· IC CMOS MOSFET

Provides On-Board Transient Voltage Protection for ICs, CMOS and MOSFET.

· TVS

Replace Larger Surface Mount TVS Zeners in Many Applications

2012 (080

FPV201209E3R3PMT								
FPV201209E5R6PLT								
FPV201209E8R0PLT								
FPV201209E9R0PLT								
FPV201209E110PLT								
FPV201209E120PLT								
FPV201209E140PKT								
FPV201209E160PKT								
FPV201209E180PKT								
FPV201209E220PKT								
FPV201209E240PKT								
FPV201209E260PKT								
FPV201209E300PKT								

P/								
FPV453215E								
FPV453215E220								
FPV453215E240PKT								
FPV453215E260PKT								
FPV453215E300PKT								
FPV453215E330PKT	33							
FPV453215E380PKT	38							
FPV453215E420PKT	42	30						
FPV453215E480PKT	48	34						
FPV453215E560PKT	56	40	7					
FPV453215E600PKT	60	45	76					
FPV453215E680PKT	68	48	86	±				

5750 2220 TYPE

5750 PART Number	Working voltage		Varistor voltage @1mA DC		Max Clamp Voltage 8/20µs 1A			
	DC	AC						
	Volts	Volts	VB	ΔVB	Volts			
	18	12.7	25	±10%				
	22	15.6	30	±10%	53			
	24	17	33	±10%	58			
	26	18.4	36	±10%	63			
	30	21.2	42	±10%	74			
	33	23.3	45	±10%	79			
	38	27	51	±10%	90			
	42	30	56	±10%	99			
	48	34	62	±10%	110			
	56	40	72	±10%	127			
	60	45	76	±10%	134			
	68	48	86	±10%	151			

8063(3225) TYPE

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

1080(4032) TYPE

1080 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
FPV1080E14SKT	14	11	18	±10%	35@2.5	0.8	250	5000
FPV1080E18SKT	18	14	22	±10%	44@2.5	0.9	250	4500
FPV1080E22SKT	22	17	27	±10%	53@2.5	1.1	250	4000
FPV1080E26SKT	26	20	33	±10%	63@2.5	1.3	250	3500
FPV1080E31SKT	31	25	39	±10%	69@2.5	1.6	250	3000
FPV1080E38SKT	38	30	47	±10%	90@2.5	2.0	250	2800
FPV1080E45SKT	45	35	56	±10%	99@2.5	2.5	250	2500
FPV1080E56SKT	56	40	68	±10%	127@2.5	3.0	250	2000
FPV1080E65SKT	65	50	82	±10%	144@10A	4.2	1200	1900
FPV1080E85SKT	85	60	100	±10%	176@10A	4.8	1200	1700
FPV1080E100SKT	100	75	120	±10%	211@10A	5.9	1200	1500
FPV1080E125SKT	125	95	150	±10%	264@10A	7.6	1200	1350
FPV1080E150SKT	150	115	180	±10%	317@10A	8.4	1200	1000
FPV1080E170SKT	170	130	205	±10%	361@10A	9.5	1200	900
FPV1080E180SKT	180	140	220	±10%	387@10A	10.0	1200	800
FPV1080E200SKT	200	150	240	±10%	422@10A	11.0	1200	700
FPV1080E225SKT	225	175	270	±10%	475@10A	13.0	1200	500
FPV1080E300SKT	300	230	360	±10%	634@10A	17.0	1200	220
FPV1080E320SKT	320	250	390	±10%	686@10A	19.0	1200	200
FPV1080E350SKT	350	275	430	±10%	757@10A	21.0	1200	140
FPV1080E385SKT	385	300	470	±10%	827@10A	23.0	1200	110
FPV1080E615SKT	615	460	750	±10%	1320@10A	36.0	600	55

8063 1080 18------18V 225-----225V

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

Multilayer Chip Varistor High Speed Series

FPV

ESD EFT

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.

I/O Data, Diagnostic I/O Ports

USB Universal Serial Bus (USB)

Video & Audio Ports

Portable/Hand-Held Products

/ Mobile Communications/Cellular Phones

/DSP Computer/DSP Products

Industrial Instruments Including Medical

1005(0402) TYPE

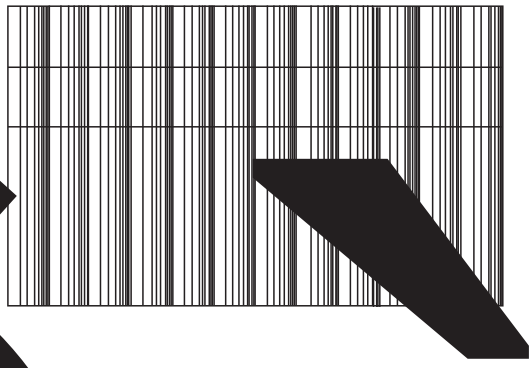
1005 PART Number	Working voltage		Varistor voltage @1mA DC		Maximum Clamping Voltage 8/20μs 1A	Energy Absorb 10/1000μs	Peak Current 8/20μs	Typical Capacitance @1MHz
	DC	AC						
	Volts	Volts	VB	ΔVB	Volts	Joules	Amps	pF
FPV100505S3R3PMT	3.3	2.5	7	±20%	15	0.05	20	70
FPV100505S5R6PLT	5.6	4	11	±15%	24	0.05	20	45
FPV100505S8R0PLT	8	5.7	14	±15%	31	0.05	20	30
FPV100505S9R0PLT	9	6.4	15	±15%	33	0.05	20	26
FPV100505S110PLT	11	7.8	18	±15%	40	0.05	20	24
FPV100505S120PLT	12	8.5	20	±15%	44	0.05	20	20
FPV100505S140PKT	14	10	22	±10%	49	0.05	20	18
FPV100505S160PKT	16	11.3	24	±10%	53	0.05	20	15
FPV100505S180PKT	18	12.7	27	±10%	60	0.05	20	15

1608(0603) TYPE

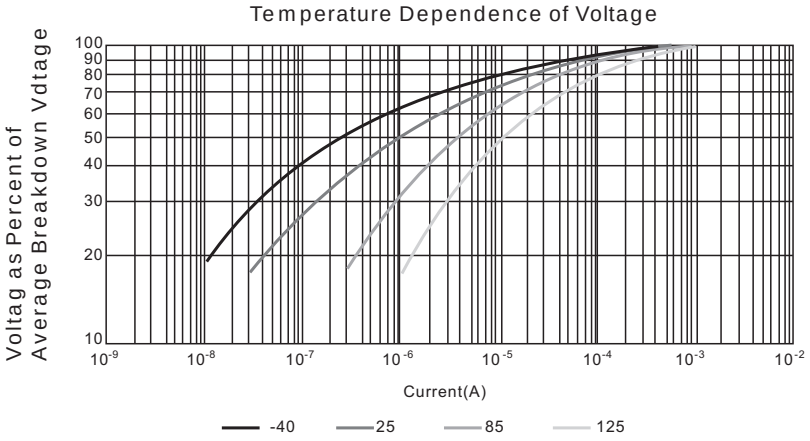
1608 PART Number	Working voltage		Varistor voltage @1mA DC		Maximum Clamping Voltage 8/20μs 1A	Energy Absorb 10/1000μs	Peak Current 8/20μs	Typical Capacitance @1MHz
	DC	AC						
	Volts	Volts	VB	ΔVB	Volts	Joules	Amps	pF
FPV160808S3R3PMT	3.3	2.5	7	±20%	15	0.05	20	180
FPV160808S5R6PLT	5.6	4	11	±15%	24	0.05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

2012(0805) TYPE

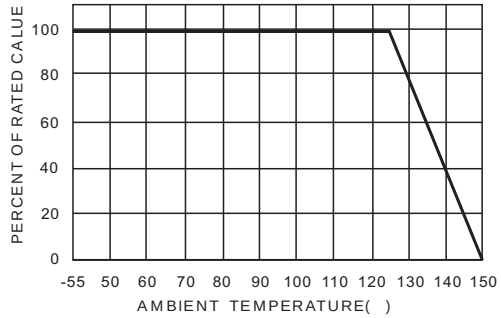
2012 PART Number	Working voltage		Varistor voltage @1mA DC		Maximum Clamping Voltage 8/20μs 1A	Energy Absorb 10/1000μs	Peak Current 8/20μs	Cap @
	DC	AC						
	Volts	Volts	VB	ΔVB	Volts	Joules	Amps	pF
FPV201209S3R3PMT	3.3	2.5	7	±20%	15	0.05	20	220
FPV201209S5R6PLT	5.6	4	11	±15%	24	0.05	20	140
FPV201209S8R0PLT	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

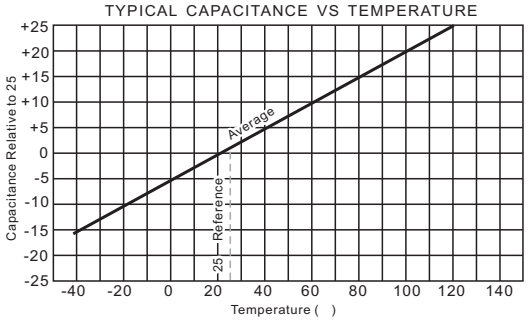


• VB VS. TEMPERATURE



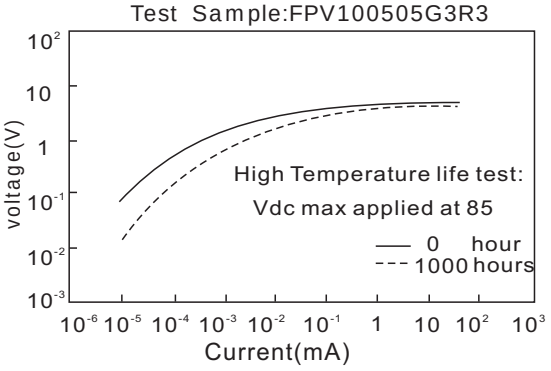
• ENERGY AND CAPACITANCE VS. TEMPERATURE



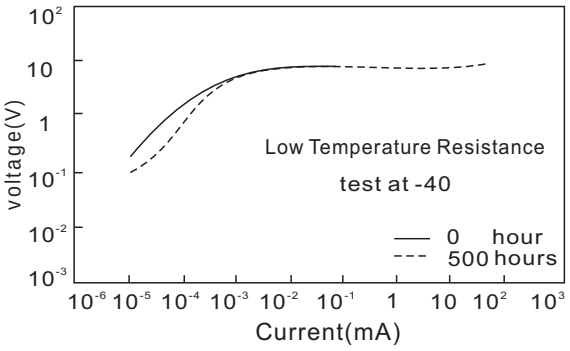


• RELIABILITY TEST DATA

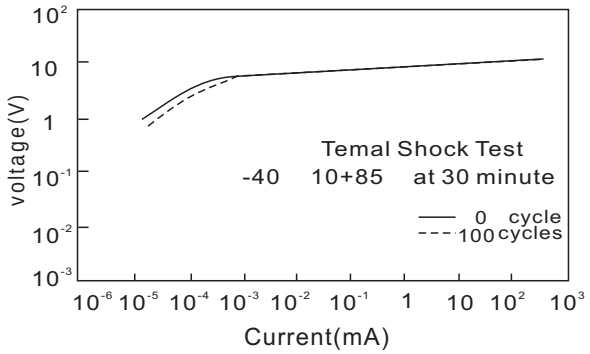
Heat resistance
(High-Temperature load)
Test Sample:FPV100505G3R3



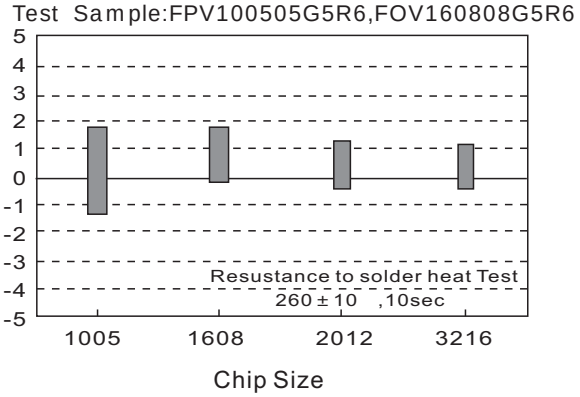
Low Temperature Resistance
Test Sample:FPV160808G5R5



Thermal Shock
(Temperature cycle)
Test Sample:FPV100505G5R6



Resistamce to Solder Heat
FPV20109G5R6, FPV321611G5R6
Test Sample:FPV100505G5R6,FOV160808G5R6



Ultra-low capacitance Chip Varistor

FPV

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

I/0 Data, Diagnostic I/O Ports

USB Universal Serial Bus (USB)

Video & Audio Ports

Portable/Hand-held products

. Mobile commuications/Cellular Phones

/DSP computer/DSP Products

Industrial Instruments Induding Medical

LCD Monitor

PART NUMBER IDENTIFICATION

FPV 160808 S 3R3 P M T 070

Product Code	
FPV	Multilayer Chip Varistor

(L×W×T) (mm) Dimensions	
100505	1.0×0.5×0.5
160808	1.6×0.8×0.8

Product Series	
S	High speed type

Working DC Voltage	
3R3	3.3V
180	18V

Termination	
P	Plated

Tolerance	
M	±20%

Packaging Style	
T	Tape & Reel
B	Bulk

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

Small size Super High Voltage Multilayer Chip Varistor

FEATURES

- Multilayer monolithic construction suitable for high density mounting
- Excellent clamping ratio and strong capability of voltage surge suppression
- High voltage varistor, suitable for AC circuit

APPLICATIONS

LED

- Lightning protection and voltage surge suppression for Power supply, Network Interface, LED lighting.
- Can instead of the small diameter plug-in class varistor

PART NUMBER IDENTIFICATION

FPV	3225	H	385	P	K	T

Product Code	
FPV	Multilayer Chip Varistor

(L×W) (mm) Dimensions	
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

Product Series	
H	Super High Voltage Type

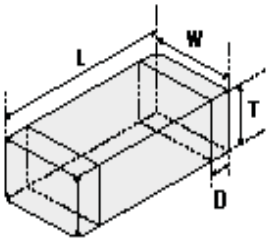
Working DC Voltage	
150	150V
385	385V

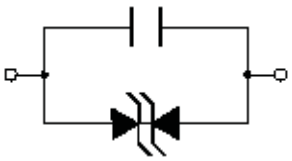
Termination	
P	Plated

Tolerance	
K	±10%

Packaging Style	
T	Tape & Reel

SHAPE AND DIMENSIONS & EQUIVALENT CIRCUIT





Equivalent circuit

(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)

2016(0806) TYPE

2016 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
FPV2016H200PKT	200	150	240	±10%	360	0.36	100	40
FPV2016H225PKT	225	175	270	±10%	410	0.36	100	35
FPV2016H250PKT	250	195	300	±10%	450	0.36	80	32
FPV2016H300PKT	300	230	360	±10%	540	0.36	50	30
FPV2016H320PKT	320	250	390	±10%	590	0.36	50	25
FPV2016H350PKT	350	275	430	±10%	650	0.36	50	20

3216(1206) TYPE

3216 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
FPV3216H200PKT	200	150	240	±10%	360	0.9	150	50
FPV3216H225PKT	225	175	270	±10%	410	0.9	150	45
FPV3216H250PKT	250	195	300	±10%	450	0.9	150	40
FPV3216H300PKT	300	230	360	±10%	540	0.9	80	35
FPV3216H320PKT	320	250	390	±10%	590	0.9	80	30
FPV3216H350PKT	350	275	430	±10%	650	0.9	80	30
FPV3216H385PKT	385	300	470	±10%	710	0.9	80	25

3225(1210) TYPE

3225 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
FPV3225H200PKT	200	150	240	±10%	360	1.5	200	55
FPV3225H225PKT	225	175	270	±10%	410	1.5	200	50
FPV3225H250PKT	250	195	300	±10%	450	1.5	200	45
FPV3225H300PKT	300	230	360	±10%	540	1.5	150	40
FPV3225H320PKT	320	250	390	±10%	590	1.5	150	40
FPV3225H350PKT	350	275	430	±10%	650	1.5	150	35
FPV3225H385PKT	385	300	470	±10%	710	1.5	150	30

4532(1812) TYPE

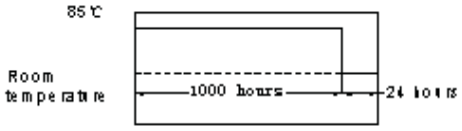
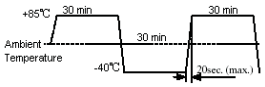
4532 PART Number	Working voltage		Varistor voltage @1mA DC		Maximum Clamping Voltage 8/20μs 1A	Energy Absorb 10/1000μs	Peak Current 8/20μs	Typical Capacitance @1MHz
	DC	AC						
	Volts	Volts	VB	ΔVB	Volts	Joules	Amps	pF
FPV4532H200PKT	200	150	240	±10%	360	4.5	200	70
FPV4532H225PKT	225	175	270	±10%	410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

5750(2220) TYPE

5750 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
FPV5750H200PKT	200	150	240	±10%	360	4.5	500	80
FPV5750H225PKT	225	175	270	±10%	410	4.5	500	70
FPV5750H250PKT	250	195	300	±10%	450	5.0	500	60
FPV5750H300PKT	300	230	360	±10%	540	5.5	400	55
FPV5750H320PKT	320	250	390	±10%	590	6.0	400	50
FPV5750H350PKT	350	275	430	±10%	650	6.0	400	45
FPV5750H385PKT	385	300	470	±10%	710	6.5	400	40

- RELIABILITY TESTING

	Item	Specified value	Test methods
1	Operating temperature range	-55 to +125	
2	Storage temperature range	-10 to +40	
3	Solderability	90% At least 90% of terminal electrode is covered by new solder	120 ~150 preheating temperature:100 ~150 1 Preheating time:60S : 245 ±5 Solder temperature: 245 ±5 5 ±1 Duration:5S±1S 3~5 Flux: immersion into methanol solution with colophony for 3 to 5 secretary.
4	Resistance to soldering	1 No damage such as crucks should be caused in chip element 2 3 ±10% Varistor voltage change within±10%.	
5	Terminal Strength	1 The terminal electrode shall not be broken off nor the chip element.	
6	Flextrue strength	No mechanical damage.	
7			

N0.	Item	Specified value	Test methods
8	Loading at low temperature	1 No mechanical damage. 2 ±10% Varistor voltage change within ±10%.	-55 ±2 Temperature:-40 ±2 1000 $^{+24}_{-0}$ Duration:1000 $^{+24}_{-0}$ hrs
9	High temperature load	1 No mechanical damage. 2 ±10% Varistor voltage change within ±10%.	85±2 Temperature: 85±2 1000 $^{+24}_{-0}$ Duration: 1000 $^{+24}_{-0}$ hrs Bias at Working Voltage Vdc. 
10	Static Humidity	1 No mechanical damage. 2 ±10% Varistor voltage change within ±10%.	90~95% RH Humidity:90 to 95% RH 60±2 Temperature:40±2 1000 $^{+24}_{-0}$ Duration: 1000 $^{+24}_{-0}$ hrs
11	Vibration	1 No mechanical damage. 2 ±5% Varistor voltage change within ±5%.	10~55~10Hz Frequency 10 to 55 to 10Hz 1.5mm Amplitude:1.5mm X Y Z 2 Directions:2hrs each in X,Y,Z direction
12	Thermal shock	1 No mechanical damage. 2 ±5% Varistor voltage change within ±5%.	-55 30±3 +125 30±3 Temperature:-55 for 30±3min +125 for 30±3min 20 Transforming interval:max 20 sec 32 Number of cycles:32 

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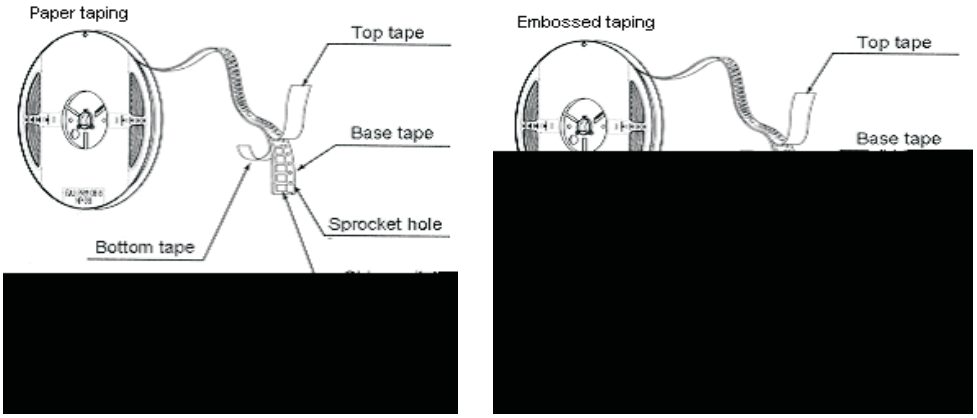
Note: When there are questions concerning, measurement shall be made after 24±2hrs of recovery under the standard condition.

- PACKAGING
- STANDAE QUANTITY

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

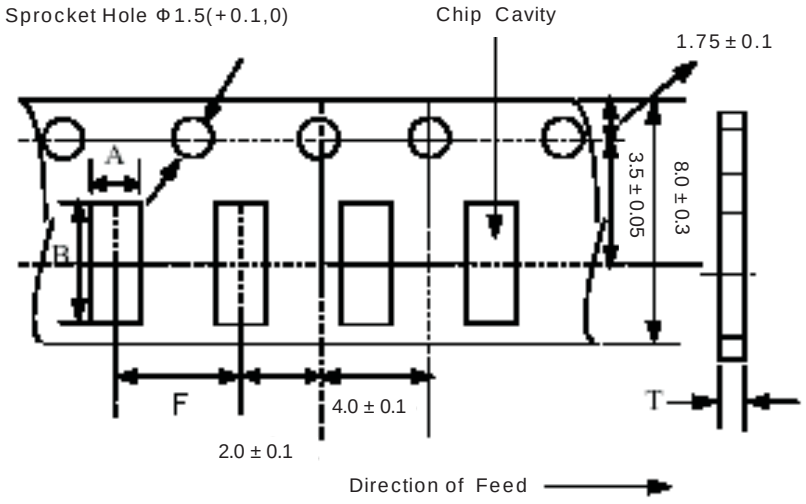
TYPE	2016H	3216H	3225H	4532H	5750H
Quantity (PCS)	2000	2000	1500	2000	2000

- TAPING DRAWINGS



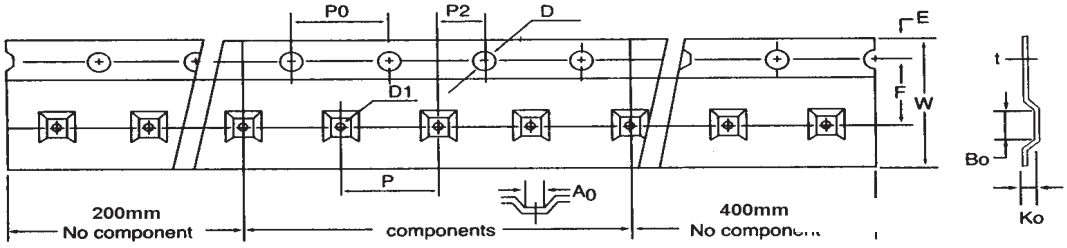
- TAPING DIMENSIONS (UNIT: mm)

· 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

Embossed Carrier



	1080	8063	1104+	4532.00	3225.00	3216	2012
W	24.0+/-0.3	16.0+/-0.3		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	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
F	11.5+/-0.10	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	$1.50^{+0.1}_{-0}$	0.23+/-0.10	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	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			3.65+/-0.10	2.80+/-0.10	1.90+/-0.10	1.52+/-0.10
B_0	10.5+/-0.10	8.7+/-020		4.95+/-0.10	3.50+/-0.10	3.51+/-0.10	2.41+/-0.10
t	0.3+/-0.05			0.26+/-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	1.55+/-0.05

3+2 /-0.2020 /-0.00

c0412+32

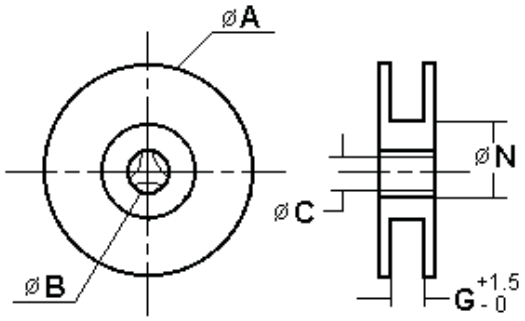
c0 42004 ”

c04

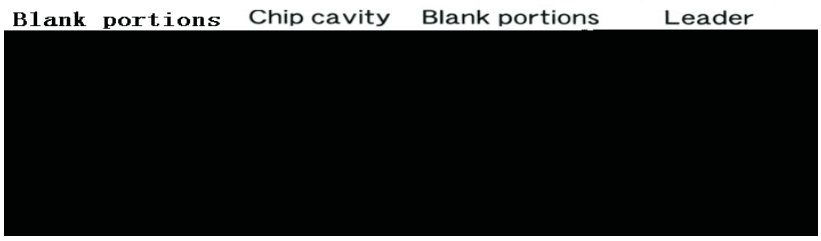
[illegible] -0.3

- REEL DIMENSIONS (UNIT mm)

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



- LEADER AND BLANK PORTION



- 0.1~0.7N

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