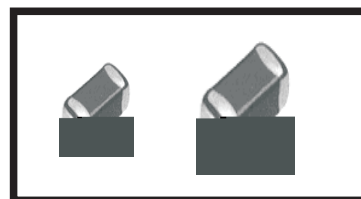


## Automotive Grade Multilayer chip Varistor

### FEATURES



Multilayer monolithic construction suitable for high density mounting

Excellent clamping ratio and strong capability of voltage surge suppression

AEC-Q200 Rev-D

Qualification based on AEC-Q200 Rev-D

Recommended Applications

Automotive multimedia, wireless connection system and body comfort system.

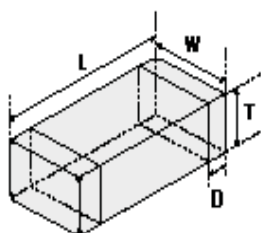
### PART NUMBER IDENTIFICATION

APV    321611    E    240    P    K    T

Product Code		(L x W x T) (mm) Dimensions		Product Series		Working DC Voltage		Termination		Tolerance		Packaging Style	
APV	Automotive Grade Multilayer chip Varistor	160808	1.6 x 0.8 x 0.8	E	High energy absorb type	240	24V	P	Plated	K	± 10%	T	Tape & Reel
		201209	2.0 x 1.2 x 0.9							L	± 15%		
		321611	3.2 x 1.6 x 1.1	S	High speed type	M	± 20%						
		322513	3.2 x 2.5 x 1.3										
		453215	4.5 x 3.2 x 1.5	G	General type								

### SHAPE AND DIMENSIONS

(Unit): mm /Inch



Part Number	L	W	T	D
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)

## General Series

IC

I Protection from transient voltage noise in all kinds of IC

I/O ESD EFT

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

	Working voltage		Varistor voltage @					
	Volts	Volts						
		14	10					
	16	11.3						
	18	12.7						
	22	15.6						
	24	17						
	26	18.4						
	30	21.2						



## Automotive Grade Multilayer chip Varistors

### HIGH ENERGY ABSORB SERIES

#### EFT

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

#### 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	Typical Capacitance @ 1MHz
	DC	AC	V <sub>B</sub>	V <sub>B</sub>				
	Volts	Volts			Volts	Joules	Amps	pF
APV201209E160PKT	16	11.3	22	± 10%	39	0.3	120	380
APV201209E180PKT	18	12.7	25	± 10%	44	0.3	100	360
APV201209E220PKT	22	15.6	30	± 10%	53	0.3	100	320
APV201209E240PKT	24	17	33	± 10%	58	0.3	100	300
APV201209E260PKT	26	18.4	36	± 10%	63	0.3	100	280
APV201209E300PKT	30	21.2	42	± 10%	74	0.3	100	260
APV201209E330PKT	33	23.3	45	± 10%	79	0.3	100	230

#### 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	V <sub>B</sub>	V <sub>B</sub>				
	Volts	Volts			Volts	Joules	Amps	pF
APV321611E160PKT	16	11.3	22	± 10%	39	0.4	150	750
APV321611E180PKT	18	12.7	25	± 10%	44	0.4	150	700
APV321611E220PKT	22	15.6	30	± 10%	53	0.4	150	600
APV321611E240PKT	24	17	33	± 10%	58	0.4	150	550
APV321611E260PKT	26	18.4	36	± 10%	63	0.4	120	500
APV321611E300PKT	30	21.2	42	± 10%	74	0.4	120	450
APV321611E330PKT	33	23.3	45	± 10%	79	0.4	120	400
APV321611E380PKT	38	27	51	± 10%	90	0.4	120	310
APV321611E420PKT	42	30	56	± 10%	99	0.4	120	260
APV321611E480PKT	48	34	62	± 10%	110	0.4	120	240


#### 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	V <sub>B</sub>	V <sub>B</sub>				
	Volts	Volts			Volts	Joules	Amps	pF
APV322513E180PKT	18	12.7	25	± 10%	44	1.5	300	1200
APV322513E220PKT	22	15.6	30	± 10%	53	1.5	300	1100
APV322513E240PKT	24	17	33	± 10%	58	1.5	300	1050
APV322513E260PKT	26	18.4	36	± 10%	63	1.5	280	1000
APV322513E300PKT	30	21.2	42	± 10%	74	1.5	280	800
APV322513E330PKT	33	23.3	45	± 10%	79	1.5	280	700
APV322513E380PKT	38	27	51	± 10%	90	1.5	280	650
APV322513E420PKT	42	30	56	± 10%	99	1.5	280	580
APV322513E480PKT	48	34	62	± 10%	110	1.5	280	510

## 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	VB	VB				
	Volts	Volts			Volts	Joules	Amps	pF
APV453215E180PKT	18	12.7	25	$\pm 10\%$	44	2.5	500	1800
APV453215E220PKT	22	15.6	30	$\pm 10\%$	53	2.5	500	1600
APV453215E240PKT	24	17	33	$\pm 10\%$	58	2.5	500	1500
APV453215E260PKT	26	18.4	36	$\pm 10\%$	63	2.5	500	1300
APV453215E300PKT	30	21.2	42	$\pm 10\%$	74	2.5	500	1200
APV453215E330PKT	33	23.3	45	$\pm 10\%$	79	2.5	500	1100
APV453215E380PKT	38	27	51	$\pm 10\%$	90	2.5	500	1050
APV453215E420PKT	42	30	56	$\pm 10\%$	99	2.5	500	1000
APV453215E480PKT	48	34	62	$\pm 10\%$	110	2.5	500	900

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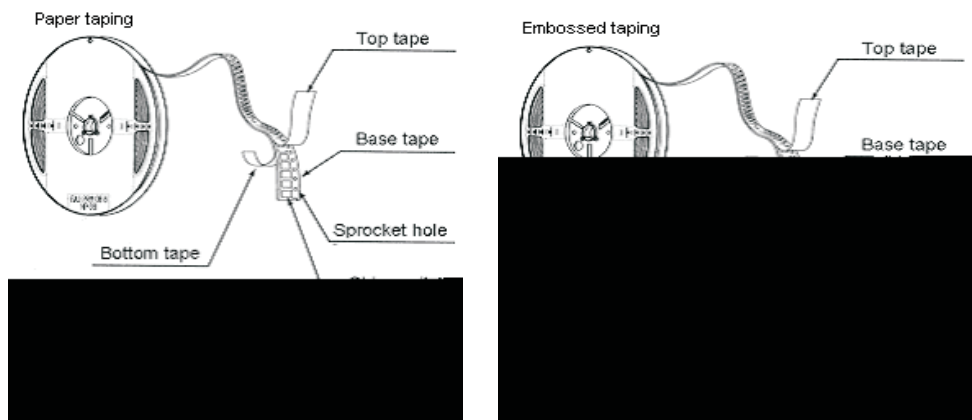
NO.	Item	Specified value	Test methods
8	Vibration	$\Delta V1mA/V1mA \leq \pm 10\%$ . No Visible damage; varistor voltage: $\Delta V1mA/V1mA \leq \pm 10\%$ .	10Hz ~ 2000Hz 5 20 X Y Z 12, 36 The entire frequency range of 10 to 2000 Hz and return to 10 Hz shall be traversed in 20 minutes. This cycle shall be performed 12 times in each of three mutually perpendicular directions (total of 36 times), so that the motion shall be applied for a total period of approximately 12 hours. Peak value 5g
9	Resistance to Soldering Heat	$\Delta V1mA/V1mA \leq \pm 10\%$ . No Visible damage; varistor voltage: $\Delta V1mA/V1mA \leq \pm 10\%$ .	(260±5) 10±1) s Solder bath Temperature (260±5) Immersion timer (10±1) seconds
10	ESD	$\Delta V1mA/V1mA \leq \pm 10\%$ . No Visible damage; varistor voltage: $\Delta V1mA/V1mA \leq \pm 10\%$ .	8000V; 1 Direct contact discharge; Indicated voltage: 8000V; Two discharges shall be applied to each PUT within a sample group and at each stress voltage level, one with a positive polarity and one with a negative polarity.
11	Solderability	95% 95% or more of electrode area shall be coated by new solder.	(245±5) 3±0.3) s. Solder bath Temperature (245±5) Immersion timer (3±0.3) seconds.
12	Board flex	$\Delta V1mA/V1mA \leq \pm 10\%$ . No Visible damage; varistor voltage: $\Delta V1mA/V1mA \leq \pm 10\%$ .	1.6mm 1mm/s 2mm 60s±5s The testing samples shall be mounted on a 100mm × 40mm FR4 PCB board, which is 1.6mm ± 0.2mm thick; Bending shall be applied to the 2.0mm with 1.0mm/sec; Duration: 60±5s.
13	Terminal Strength (SMD)	$\Delta V1mA/V1mA \leq \pm 10\%$ . No Visible damage; varistor voltage: $\Delta V1mA/V1mA \leq \pm 10\%$ .	17.7N 60s±1s The testing samples shall be mounted on the testing boards apply a 17.7N (1.8kg) force to the side of a device being tested. Duration: 60s±1s 

- PACKAGING

- STANDAE QUANTITY

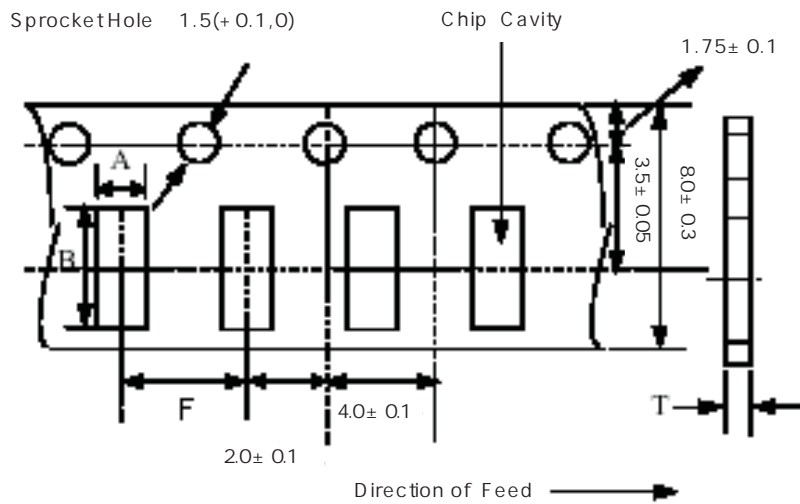
TYPE	160808	201209	321611	322513	453215
Quantity (PCS)	4000	4000	3000	3000	3000

- TAPING DRAWINGS



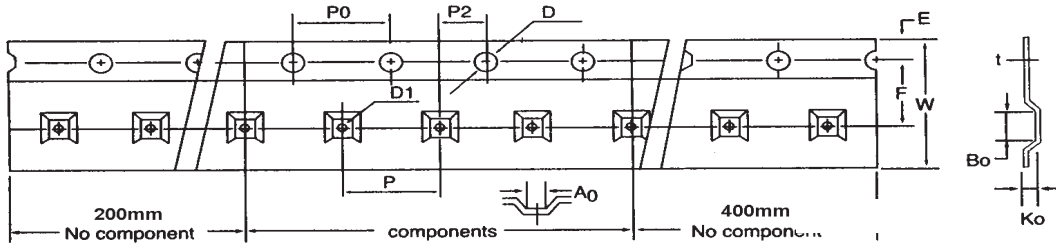
- TAPING DIMENSIONS (UNIT: m m )

- Paper carrier



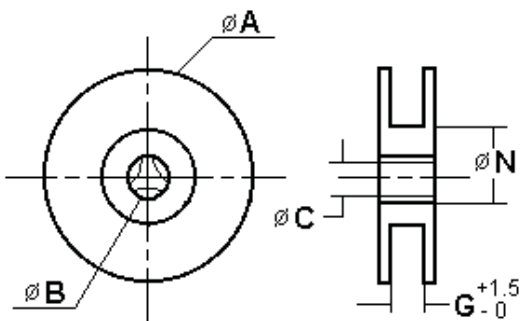
PartNO.	A	B	F	T
160808	1.0±0.2	1.8±0.2	4.0±0.2	1.1 max

• Embossed Carrier



	4532	3225	3216	2012
W	12.0+/-0.2	8.1+/-0.2	8.1+/-0.2	8.1+/-0.2
P	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
F	5.50+/-0.10	3.50+/-0.10	3.50+/-0.10	3.50+/-0.10
D	1.55+/-0.05	1.55+/-0.05	1.55+/-0.05	1.55+/-0.05
D1	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
P <sub>0</sub> 10	40.0+/-0.20	40.0+/-0.20	40.0+/-0.20	40.0+/-0.20
P2	2.0+/-0.05	2.0+/-0.05	2.0+/-0.05	2.0+/-0.05
A <sub>0</sub>	3.66+/-0.10	2.80+/-0.10	1.90+/-0.10	1.52+/-0.10
B <sub>0</sub>	4.95+/-0.10	3.50+/-0.10	3.51+/-0.10	2.41+/-0.10
t	0.23+/-0.10	0.23+/-0.10	0.23+/-0.10	0.23+/-0.10
Ko	1.74+/-0.10	1.55+/-0.10	1.27+/-0.10	1.35+/-0.10

• REEL DIMENSIONS (UNIT mm)



TYPE	REEL	A	B	C	N	G
1608-3225	CF-8	178± 2.0	22.0± 2.0	12.5± 1.5	57± 2.0	8
4532	CF-12	330± 2.0	22.0± 2.0	12.5± 1.5	98± 2.0	12



LEADER AN

- Cautions for using the automotive products:
  
- 2018 6
  
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- The catalog is updated on June, 2018, Some contents are changed as the products are updated or optimized, so please evaluate and confirm the details before using them .
  
- The products listed in the catalog are recommended for automotive multimedia, wireless connection system and vehicle body system , without special instructions, the products can't used for automotive power system , safety management system or other equipment systems with high requirements for safety and reliability.
  
- Please note we shall not take any responsibility for any loss caused by the failure to use the products according to our requirements.