Packaging / Marking Information

SMD Chips (ZV, ZVX, ZVE, AV) Series

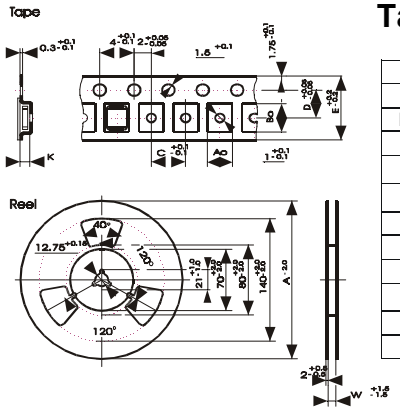
- Tape & Reel Specifications
- Case Size Dimensions
- Recommended Soldering Pad Dimensions

Leaded Devices (ZV, AV, MV, OV) Series

- Tape & Reel Specifications
- Ammo Pack Dimensions
- Lead Style Information
- Marking Information

Tape & Reel Specification

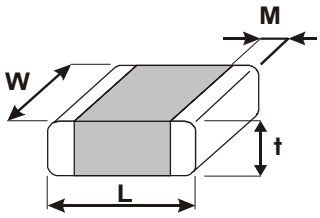
Conforms to IEC Publication 286-2



Tape / Reel Dimensions

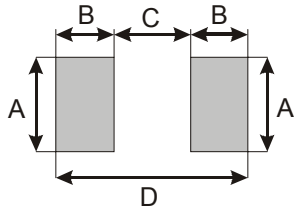
	CASE SIZE						
PARAMETERS	0603	0805	1206	1210	1812	2220	3225
	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)
A_0	1.2 (0.047)	1.6 (0.063)	1.9 (0.075)	2.9 (0.114)	3.75 (0.148)	5.6 (0.220)	7.0 (0.276)
B_0	1.9 (0.075)	2.4 (0.094)	3.75 (0.148)	3.7 (0.146)	5.0 (0.197)	6.25 (0.246)	8.7 (0.343)
C	4.0 (0.157)	4.0 (0.157)	4.0 (0.157)	4.0 (0.157)	8.0 (0.315)	8.0 (0.315)	12.0 (0.472)
D	3.5 (0.138)	3.5 (0.138)	3.5 (0.138)	3.5 (0.138)	5.5 (0.217)	5.5 (0.217)	7.5 (0.295)
E	8.4 (0.331)	8.4 (0.331)	8.4 (0.331)	8.4 (0.331)	12.4 (0.488)	12.4 (0.488)	16.4 (0.646)
K_{MAX}	1.1(0.043)	1.1(0.043)	1.8 (0.071)	2.0 (0.079)	2.0 (0.079)	2.0 (0.079)	3.7 (0.146)
W	8.4 (0.331)	8.4 (0.331)	8.4 (0.331)	8.4 (0.331)	12.4 (0.488)	12.4 (0.488)	16.4 (0.646)
A	180/330 (7/13)	180/330 (7/13)	180/330 (7/13)	180/330 (7/13)	180/330 (7/13)	180/330 (7/13)	330 (13)

Case Size Dimensions



Size	Length (L)	Width (W)	Thickness (t)	Land Length (M)
	mm (inches)	mm (inches)	mm (inches)	mm (inches)
0603	1.6 ± 0.15 (0.063 ± 0.006)	0.80 ± 0.10 (0.031 ± 0.004)	1.0 max. (0.040 max.)	0.5 ± 0.25 (.020 ± 0.01)
0805	2.0 ± 0.20 (0.079 ± 0.008)	1.25 ± 0.15 (0.049 ± 0.006)	1.1 max. (0.043 max.)	0.5 ± 0.25 (.020 ± 0.01)
1206	3.2 ± 0.30 (0.126 ± 0.012)	1.60 ± 0.20 (0.063 ± 0.008)	1.6 max. (0.063 max.)	0.5 ± 0.25 (.020 ± 0.01)
1210	3.2 ± 0.30 (0.126 ± 0.012)	2.50 ± 0.25 (0.100 ± 0.010)	1.8 max. (0.070 max.)	0.5 ± 0.25 (.020 ± 0.01)
1812	4.5 ± 0.35 (0.177 ± 0.014)	3.20 ± 0.30 (0.126 ± 0.012)	1.9 max. (0.075 max.)	0.5 ± 0.25 (.020 ± 0.01)
2220	5.7 ± 0.40 (0.224 ± 0.016)	5.00 ± 0.40 (0.197 ± 0.016)	1.9 max. (0.075 max.)	0.5 ± 0.25 (.020 ± 0.01)
3225	8.0 ± 0.50 (0.315 ± 0.020)	6.30 ± 0.40 (0.248 ± 0.016)	2.0 max. (0.079 max.)	0.5 ± 0.25 (.020 ± 0.01)

Recommended Soldering Pad Dimensions



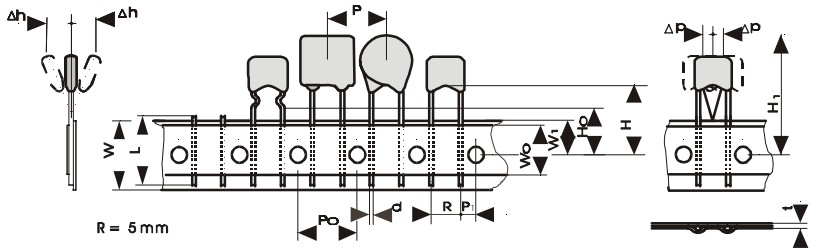
Size	RECOMMENDED PAD DIMENSION			
	A	B	C	D
	mm (in.)	mm (in.)	mm (in.)	mm (in.)
0603	1.0 (0.039)	1.0 (0.039)	1.0 (0.039)	3.0 (0.118)
0805	1.4 (0.055)	1.2 (0.047)	1.0 (0.039)	3.4 (0.134)
1206	1.8 (0.071)	1.2 (0.047)	2.1 (0.083)	4.5 (0.177)
1210	2.8 (0.110)	1.2 (0.047)	2.1 (0.083)	4.5 (0.177)
1812	3.6 (0.142)	1.5 (0.059)	3.0 (0.118)	6.0 (0.236)
2220	5.5 (0.217)	1.5 (0.059)	4.2 (0.165)	7.2 (0.283)
3225	6.8 (.268)	1.5 (0.059)	6.5 (.256)	9.5 (0.374)

Multilayer Technology **Varistor Plus**

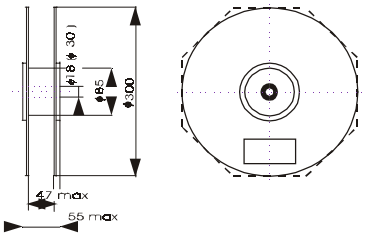
Tape & Reel Specification

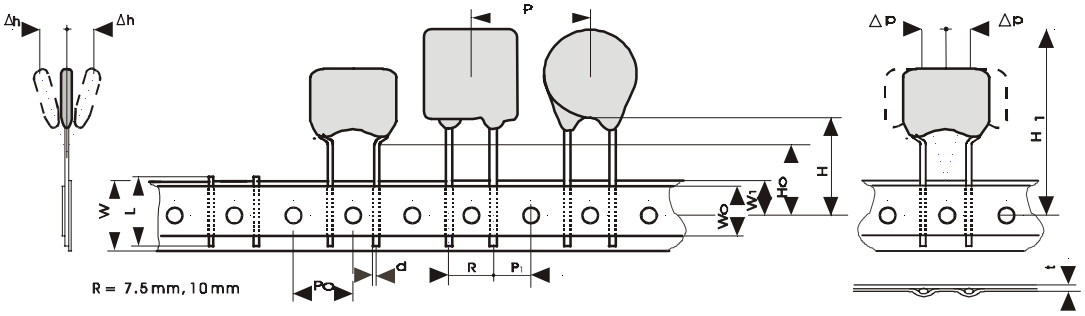
Ammo Pack Dimensions

Conforms to IEC Publication 286-2

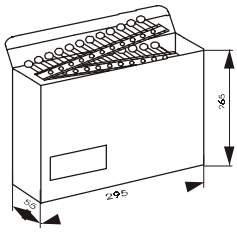


Reel





Ammo Pack



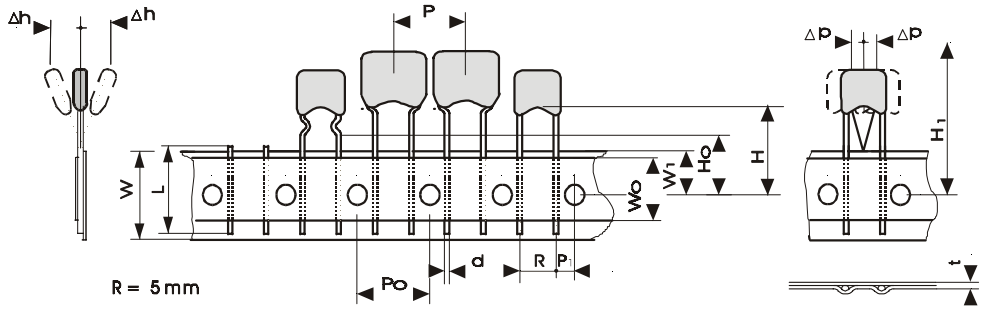
Symbol	Parameters	Series	Model Size				
		ZV	05	07	10	14	20
		AV	602 / 802 / 902		903 / 1103		
W	Tape Width		18 +1.0/-0.5 (0.71 +0.04/-0.02)	18 +1.0/-0.5 (0.71 +0.04/-0.02)	18 +1.0/-0.5 (0.71 +0.04/-0.02)	18 +1.0/-0.5 (0.71 +0.04/-0.02)	18 +1.0/-0.5 (0.71 +0.04/-0.02)
W_0	Hold Down Tape Width		12 Min. (0.47 Min.)	12 Min. (0.47 Min.)	12 Min. (0.47 Min.)	12 Min. (0.47 Min.)	12 Min. (0.47 Min.)
W_1	Hold position		9 +0.75/0.5 (0.35 +0.03/0.02)	9 +0.75/0.5 (0.35 +0.03/0.02)	9 +0.75/0.5 (0.35 +0.03/0.02)	9 +0.75/0.5 (0.35 +0.03/0.02)	9 +0.75/0.5 (0.35 +0.03/0.02)
t	Total Tape Thickness		0.9 Max. (0.04 Max.)	0.9 Max. (0.04 Max.)	0.9 Max. (0.04 Max.)	0.9 Max. (0.04 Max.)	0.9 Max. (0.04 Max.)
P	Pitch of Component		12.7 +/- 1.0 (0.5 +/- 0.04)	12.7 +/- 1.0 (0.5 +/- 0.04)	12.7 +/- 1.0 (0.5 +/- 0.04)	12.7 +/- 1.0 (0.5 +/- 0.04)	12.7 +/- 1.0 (0.5 +/- 0.04)
P_0	Feed Hold Pitch		12.7 +/- 0.2 (0.5 +/- 0.01)	12.7 +/- 0.2 (0.5 +/- 0.01)	12.7 +/- 0.2 (0.5 +/- 0.01)	12.7 +/- 0.2 (0.5 +/- 0.01)	12.7 +/- 0.2 (0.5 +/- 0.01)
P_1	Feed Hold Center to Pitch		3.81 +/- 0.7 (0.15 +/- 0.03)	3.81 +/- 0.7 (0.15 +/- 0.03)	8.89 +/- 0.8 (0.35 +/- 0.03)	8.89 +/- 0.8 (0.35 +/- 0.03)	7.62 +/- 0.8 (0.30 +/- 0.03)
R	Lead Spacing		5.08 +0.6/-0.1 (0.2 +0.02/-.004)	5.08 +0.6/-0.1 (0.2 +0.02/-.004)	7.62 +0.6/-0.1 (0.3 +0.02/-.004)	7.62 +0.6/-0.1 (0.3 +0.02/-.004)	10.16 +0.6/-0.1 (0.4 +0.02/-.004)
ΔP	Component Alignment		+/- 1.3 Max. (+/- 0.05 Max.)	+/- 1.3 Max. (+/- 0.05 Max.)	+/- 2.0 Max. (+/- 0.08 Max.)	+/- 2.0 Max. (+/- 0.08 Max.)	+/- 2.0 Max. (+/- 0.08 Max.)
Δh	Component Alignment		+/- 2.0 Max. (+/- 0.08 Max.)	+/- 2.0 Max. (+/- 0.08 Max.)	Depends on t_{max}	Depends on t_{max}	Depends on t_{max}
d	Wire Diameter		0.6 +/- 0.05 (0.024 +/-0.002)	0.6 +/- 0.05 (0.024 +/-0.002)	0.8 +/- 0.05 (0.031 +/-0.002)	0.8 +/- 0.05 (0.031 +/-0.002)	0.8 +/- 0.05 (0.031 +/-0.002)
D_0	Feed Hold Diameter		4 +/- 0.2 (0.16 +/-0.01)	4 +/- 0.2 (0.16 +/-0.01)	4 +/- 0.2 (0.16 +/-0.01)	4 +/- 0.2 (0.16 +/-0.01)	4 +/- 0.2 (0.16 +/-0.01)
H	Height from Tape Center		18 +2.0/-0.0 (0.71 +/-0.0)	18 +2.0/-0.0 (0.71 +/-0.0)	18 +2.0/-0.0 (0.71 +/-0.0)	18 +2.0/-0.0 (0.71 +/-0.0)	18 +2.0/-0.0 (0.71 +/-0.0)
	to Component Base						
H_0	Seating Plane Height		16 +/- 0.5 (0.63 +/- 0.02)	16 +/- 0.5 (0.63 +/- 0.02)	16 +/- 0.5 (0.63 +/- 0.02)	16 +/- 0.5 (0.63 +/- 0.02)	16 +/- 0.5 (0.63 +/- 0.02)
H_1	Component Height		32.2 Max. (1.27 Max.)	32.2 Max. (1.27 Max.)	38.5 Max. (1.52 Max.)	40.0 Max. (1.57 Max.)	46.5 Max. (1.83 Max.)
L	Length of Clipped Lead		11 Max. (0.43 Max.)	11 Max. (0.43 Max.)	11 Max. (0.43 Max.)	11 Max. (0.43 Max.)	11 Max. (0.43 Max.)

Legend: mm (inch)

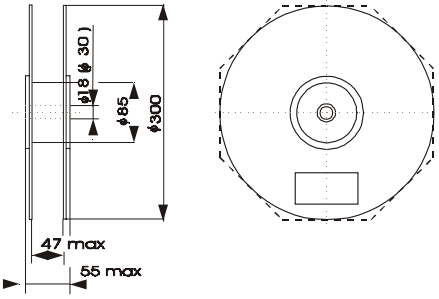
Tape & Reel Specification

Ammo Pack Dimensions

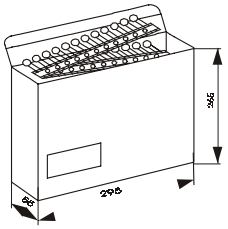
Conforms to IEC Publication 286-2



Reel

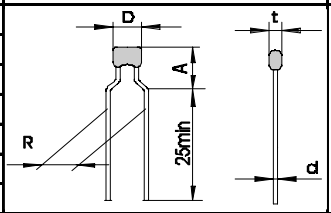
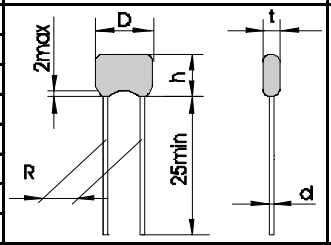
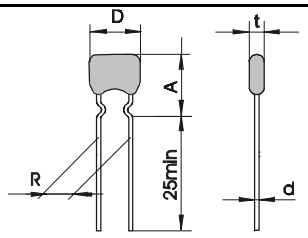
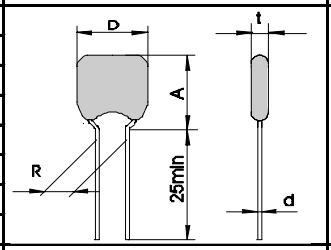
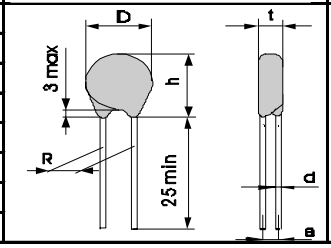


Ammo Pack



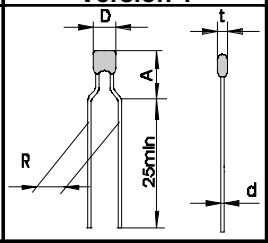
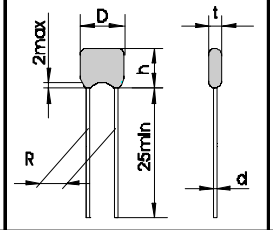
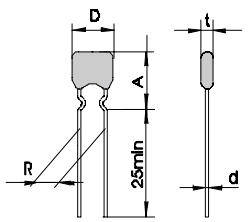
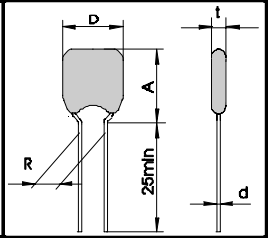
Symbol	Parameters	Model Sizes	
		MV	OV
		6 x 9 mm	7.3 x 9.0 / 7.8 x 12 mm
W	Tape Width	18 +1.0/-0.5 (0.71 +0.04/-0.02)	18 +1.0/-0.5 (0.71 +0.04/-0.02)
W_0	Hold Down Tape Width	12 Min. (0.47 Min.)	12 Min. (0.47 Min.)
W_1	Hold position	9 +0.75/0.5 (0.35 +0.03/0.02)	9 +0.75/0.5 (0.35 +0.03/0.02)
t	Total Tape Thickness	0.9 Max. (0.04 Max.)	0.9 Max. (0.04 Max.)
P	Pitch of Component	12.7 +/- 1.0 (0.5 +/- 0.04)	12.7 +/- 1.0 (0.5 +/- 0.04)
P_0	Feed Hold Pitch	12.7 +/- 0.2 (0.5 +/- 0.01)	12.7 +/- 0.2 (0.5 +/- 0.01)
P_1	Feed Hold Center to Pitch	3.81 +/- 0.7 (0.15 +/- 0.03)	3.81 +/- 0.7 (0.15 +/- 0.03)
R	Lead Spacing	5.08 +0.6/-0.1 (0.2 +0.02/-.004)	5.08 +0.6/-0.1 (0.2 +0.02/-.004)
ΔP	Component Alignment	+/- 1.3 Max. (+/- 0.05 Max.)	+/- 1.3 Max. (+/- 0.05 Max.)
Δh	Component Alignment	+/- 2.0 Max. (+/- 0.08 Max.)	+/- 2.0 Max. (+/- 0.08 Max.)
d	Wire Diameter	0.6 +/- 0.05 (0.024 +/-0.002)	0.6 +/- 0.05 (0.024 +/-0.002)
D_0	Feed Hold Diameter	4 +/- 0.2 (0.16 +/-0.01)	4 +/- 0.2 (0.16 +/-0.01)
H	Height from Tape Center to Component Base	18 +2.0/-0.0 (0.71 +/-0.0)	18 +2.0/-0.0 (0.71 +/-0.0)
H_0	Seating Plane Height	16 +/- 0.5 (0.63 +/- 0.02)	16 +/- 0.5 (0.63 +/- 0.02)
H_1	Component Height	32.2 Max. (1.27 Max.)	32.2 Max. (1.27 Max.)
L	Length of Clipped Lead	11 Max. (0.43 Max.)	11 Max. (0.43 Max.)

Lead Style (Version) / Lead Spacing

Product Series / Range	Dimensions R mm (inch)	h mm (inch)	A mm (inch)	Version 1	Version 5
ZV 2M…40K 05	5 (0.197)		7 (0.276)		
ZV 2M…40K 07	5 (0.197)		8 (0.315)		
ZV 4M…40K 10	5 (0.197)		9 (0.354)		
AV 14K…30K 602 003	5 (0.197)		8 (0.315)		
ZV 4M…40K 14	5 (0.197)	9 (0.354)	12 (0.472)		
AV 14K…30K 802 006	5 (0.197)	9 (0.354)	12 (0.472)		
ZV 4M…40K 20	5 (0.197)		12 (0.472)		
AV 14K…30K 902 012…025	5 (0.197)		12 (0.472)		
AV 14K…30K 1103 50	7.5 (0.295)		12 (0.472)		
AV25…35K 20…40 050…100	10 (0.394)	24 (0.945)			

For additional lead styles (i.e., clipped leads, crimped leads), contact factory.

Lead Style (Version) / Lead Spacing

Type	R (mm)	h (mm)	A (mm)	Version 1	Version 5
95K 103 MV 2M…95K 104 MZ 95K 105	5 (0.197)		9 (0.354)		
474 MZ OV 14K…40K 105 MZ 801 155 MZ	5 (0.197)	9 (0.354)	12 (0.472)		
474 MZ OV 14K…40K 105 MZ 122 155 MZ	5 (0.197)		12 (0.472)		

For additional lead styles (i.e., clipped leads, crimped leads), contact factory.

Leaded Varistor Marking

ZV Series:

For Model Sizes 05, 07

14 Z 5

14 = V_{RMS}
Z = First Letter of Series
5 = Model Size

For Model Size 10

ZV 40
K 10

ZV = Series Name
40 = V_{RMS}
K = V_N Tolerance
10 = Model Size

For Model Sizes 14, 20

KEKO
ZV 11
K 20

KEKO = Tradename
ZV = Series Name
11 = V_{RMS}
K = V_N Tolerance
20 = Model Size

AV Series:

For Model Size 602

20 A 003

20 = V_{RMS}
A = First Letter of Series
003 = W_{LD} Code: 3 Joules

For Model Size 802

AV 17 K
802 006

AV = Series Name
17 = V_{RMS}
K = V_N Tolerance
802 = Model Size
006 = W_{LD} Code: 6 Joules

For Model Sizes 902, 1103

KEKO
AV 30 K
1103 050

KEKO = Tradename
AV = Series Name
30 = V_{RMS}
K = V_N Tolerance
1103 = Model Size
050 = W_{LD} Code: 50 Joules

For Model Sizes 20, 40

KEKO
AV 25 K
20 050

KEKO = Tradename
AV = Series Name
25 = V_{RMS}
K = V_N Tolerance
20 = Model Size
050 = W_{LD} Code: 50 Joules

Leaded Varistor Marking

MV Series:

For Model Size 6 x 9mm

MV 14 K
103 Z

MV = Series Name
14 = V_{RMS}
K = V_N Tolerance
103 = Capacitance Code
Z = Dielectric Code: Z for Z5U/Y5V

OV Series:

For Model Sizes 7.3 x 9 & 7.8 x 9mm

KEKO
OV 20 K
474 MZ
122

KEKO = Tradename
OV = Series Name
20 = V_{RMS}
K = V_N Tolerance
474 = Capacitance Code
M = Capacitance Tolerance
Z = Dielectric Code: Z for Z5U/Y5V
122 = Current Code: 801 for 800A
122 for 1200A