

HIGH VOLTAGE CERAMIC CHIP CAPACITOR

- CHV SERIES -

SCOPE

- Cal-Chip's unique construction process ensures excellent volumetric efficiency and stability of capacitance with temperature.
- Our high voltage capacitors have extended values to those previously offered.



FEATURES

- Special internal electrode design offers the highest voltage rating.
- Surface mount suitable for wave and reflow soldering
- High reliability
- RoHS compliant

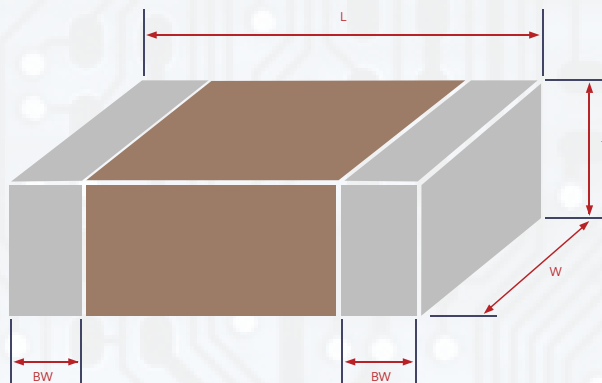
APPLICATIONS

- Suitable for LAN/WLAN interface
- Back-lighting inverter, DC-DC converters
- Ballast, Modems and Power Supplies

ELECTRICAL SPECIFICATIONS

Operating Temperature	-55°C to 125°C
Rating Voltage	100Vdc to 5000Vdc
Temperature Coefficient	NPO: $\leq \pm 30 \text{ppm}/^\circ\text{C}$, -55°C ~ +125°C (EIA Class I) X7R: $\leq \pm 15 \text{ppm}/^\circ\text{C}$, -55°C ~ +125°C (EIA Class II)
Dissipation Factor	NPO: $Q > 1000$, X7R: D.F. $\leq 2.5\%$
Insulation Resistance	10GΩ or 500/CΩ whichever is smaller
Aging	NPO: 0%, X&R: Typically 1.0% per decade of time
Dielectric Strength	100 ≤ V < 500V, 200% Rated Voltage
	500 ≤ V < 1000V, 150% Rated Voltage
	1000 ≤ V, 120% Rated Voltage

DIMENSIONS



TYPE (MM)	L (MM)	W (MM)	T (MAX) (MM)	BW (MIN) (MM)
0402	1.00+/-0.05	0.5+/-0.05	*	0.13
0603	1.60±0.10	0.80±0.10	*	0.15
0805	2.00±0.20	1.25±0.20	*	0.20
1206	3.20±0.30	1.60±0.20	*	0.30
1210	3.20±0.30	2.50±0.20	*	0.30
1808	4.60±0.30	2.00±0.20	*	0.30
1812	4.60±0.30	3.20±0.30	*	0.30
1825	4.60±0.30	6.35±0.40	*	0.30
2220	5.70±0.40	5.00±0.40	*	0.30
2225	5.70±0.40	6.35±0.40	*	0.30

PART NUMBER

CHV	0805	N	250	103	K	X	T	D
PRODUCT TYPE	SIZE	TERMINATION OPTIONS	RATED VOLTAGE	CAPACITANCE	TOLERANCE	DIELECTRIC	PACKAGING	PACKAGING
	0402 : 0402 0603 : 0603 0805 : 0805 1206 : 1206 1210 : 1210 1808 : 1808 1812 : 1812 1825 : 1825 2220 : 2220 2225 : 2225	N: Nickel Barrier A: Nickel Barrier/ Arc Protection P: Pd/Ag	250 : 250V 450 : 450V 500 : 500V 630 : 630V 1K0 : 1KV 1K5 : 1.5KV 2K0 : 2KV 2K5 : 2.5KV 3K0 : 3KV 4K0 : 4KV 5K0 : 5KV 6K0 : 6KV	Two significant digits followed by no. of zeros. And R in place of decimal point.	B: $\pm 0.1 \text{pF}$ C: $\pm 0.25 \text{pF}$ D: $\pm 0.50 \text{pF}$ F: $\pm 1\%$ G: $\pm 2\%$ J: $\pm 5\%$ K: $\pm 10\%$ M: $\pm 20\%$	C: COG X: X7R	T: 7" REEL	D Optional 10K reel (from 0603-1210 size)



CAPACITANCE RANGE

DIMENSION (MM)		0402		0603		0805							
L (L1)		1.0 ± 0.05		1.6 ± 0.1		2.00 ± 0.2							
W		0.5 ± 0.05		0.8 ± 0.1		1.25 ± 0.2							
DIELECTRIC		COG		COG		X7R				COG			
T (MAX)		0.55		0.95		1.45				1.45			
RATED VOLTAGE		250		250	500	250	500	630	1KV	250	500	630	1KV
CAP. RANGE	0.5pF	0R5											
	0.75	R75											
	0.8	0R8											
	1.0pF	1R0											
	1.1	1R1											
	1.2	1R2											
	1.3	1R3											
	1.5	1R5											
	1.6	1R6											
	1.8	1R8											
	2.0	2R0											
	2.2	2R2											
	2.4	2R4											
	2.5	2R5											
	2.7	2R7											
	3.0	3R0											
	3.3	3R3											
	3.6	3R6											
	3.9	3R9											
	4.0	4R0											
	4.3	4R3											
	4.7	4R7											
	5.0	5R0											
	5.1	5R1											
	5.6	5R6											
	6.0	6R0											
	6.2	6R2											
	6.8	6R8											
	7.0	7R0											
	7.5	7R5											
	8.0	8R0											
	8.2	8R2											
	9	9R0											
	9.1	9R1											
	10	100											
	11	110											
	12	120											
	13	130											
	15	150											
	16	160											
	18	180											
	20	200											
	22	220											
	24	240											
	27	270											
	30	300											
	33	330											
	36	360											
	39	390											
	43	430											
	47	470											
	51	510											
	56	560											
	62	620											
	68	680											
	75	750											
	82	820											
	91	910											
	100	101											
	120	121											
	150	151											
	180	181											
	200	201											
	220	221											





CAPACITANCE RANGE

DIMENSION (MM)			0603					0805								
L (L1)			1.6 ± 0.1					2.00 ± 0.2								
W			0.8 ± 0.1					1.25 ± 0.2								
DIELECTRIC			COG		X7R			COG				X7R				
T (MAX)			0.95					1.45				1.45				
RATED VOLTAGE			250	500	250	500	1KV	250	500	630	1KV	250	500	630	1KV	
CAP. RANGE	240	241														
	270	271														
	300	301														
	330	331														
	360	361														
	390	391														
	430	431														
	470	471														
	510	511														
	560	561														
	620	621														
	680	681														
	750	751														
	820	821														
	910	911														
	1.0nF	102														
	1.2	122														
	1.3	132														
	1.5	152														
	1.6	162														
	1.8	182														
	1.9	192														
	2.0	202														
	2.2	222														
	2.7	272														
	3.3	332														
	3.9	392														
	4.7	472														
	5.6	562														
	6.8	682														
	8.2	822														
	10	103														
	12	123														
	15	153														
	18	183														
	22	223														
	27	273														
	33	333														
	39	393														
	47	473														
56	563															
68	683															
82	823															
100	104															

CAP. RANGE



CAPACITANCE RANGE

DIMENSION (MM)		1206													
L (L1)		3.2 ± 0.30													
W		1.6 ± 0.2													
DIELECTRIC		COG						X7R							
T (MAX)		1.9						1.45						1.8	
RATED VOLTAGE		250	500	630	1K	2K	3K	250	500	630	1KV	1.5KV	2KV	2.5KV	3KV
CAP. RANGE	1.0pF 1R0														
	1.2 1R2														
	1.5 1R5														
	1.8 1R8														
	2.0 2R0														
	2.2 2R2														
	2.7 2R7														
	3.0 3R0														
	3.3 3R3														
	3.9 3R9														
	4.0 4R0														
	4.7 4R7														
	5.0 5R0														
	5.1 5R1														
	5.6 5R6														
	6.0 6R0														
	6.2 6R2														
	6.8 6R8														
	7.0 7R0														
	7.5 7R5														
	8.0 8R0														
	8.2 8R2														
	9.1 9R1														
	10 100														
	12 120														
	15 150														
	18 180														
	20 200														
	22 220														
	27 270														
	33 330														
	39 390														
	43 430														
	47 470														
	51 510														
	56 560														
	62 620														
	68 680														
	75 750														
	82 820														
	91 910														
	100 101														
	120 121														
	130 131														
	150 151														
	180 181														
	200 201														
	220 221														
	270 271														
	300 301														
	330 331														
	360 361														
	390 391														
	430 431														





CAPACITANCE RANGE

DIMENSION (MM)		1206													
L (L1)		3.2 ± 0.30													
W		1.6 ± 0.2													
DIELECTRIC		COG						X7R							
T (MAX)		1.9						1.45						1.8	
RATED VOLTAGE		250	500	630	1K	2K	3K	250	500	630	1KV	1.5KV	2KV	2.5KV	3KV
CAP. RANGE	470	471													
	510	511													
	560	561													
	620	621													
	680	681													
	750	751													
	820	821													
	910	911													
	1.0nF	102													
	1.2	122													
	1.5	152													
	1.8	182													
	2.2	222													
	2.7	272													
	3.3	332													
	3.9	392													
	4.7	472													
	5.6	562													
	6.8	682													
	8.2	822													
	10	103													
	12	123													
	15	153													
	18	183													
	22	223													
	27	273													
	33	333													
	39	393													
	47	473													
	56	563													
	68	683													
	82	823													
	100	104													
	120	124													
	150	154													
	180	184													
	220	224													



CAPACITANCE RANGE

DIMENSION (MM)		1210											
L (L1)		3.2 ± 0.30											
W		2.50 ± 0.20											
DIELECTRIC		COG						X7R					
T (MAX)		2.2						2.2	2.6				
RATED VOLTAGE		250	500	630	1K	1.5K	2KV	250	500	630	1KV	1.5KV	2KV
CAP. RANGE	3.9	3R9											
	5.0	5R0											
	8.2	8R2											
	10	100											
	12	120											
	15	150											
	18	180											
	22	220											
	27	270											
	33	330											
	39	390											
	47	470											
	56	560											
	68	680											
	82	820											
	100	101											
	120	121											
	150	151											
	180	181											
	220	221											
	270	271											
	330	331											
	390	391											
	470	471											
	560	561											
	680	681											
	820	821											
	1.0nF	102											
	1.2	122											
	1.5	152											
	1.8	182											
	2.2	222											
	2.7	272											
	3.3	332											
	3.9	392											
	4.7	472											
	5.6	562											
	6.8	682											
	8.2	822											
	10	103											
	12	123											
	15	153											
	18	183											
	22	223											
	27	273											
	33	333											
	39	393											
	47	473											
	56	563											
	68	683											
	82	823											
	100	104											
	120	124											
	150	154											
	180	184											
	220	224											
	270	274											
	330	334											
	390	394											
	470	474											
	560	564											
	680	684											





CAPACITANCE RANGE

DIMENSION (MM)			1812																		
L (L1)			4.60 ± 0.30																		
W			3.20 ± 0.30																		
DIELECTRIC			COG								X7R										
T (MAX)			1.8			2.6	2.2	2.6			2.7	2.6	3				2.2	2.7			
RATED VOLTAGE			250	500	630	1KV	2KV	3KV	4KV	5KV	6KV	250	500	630	1KV	1.5KV	2KV	3KV	4KV	5KV	6KV
CAP. RANGE	10	100																			
	12	120																			
	15	150																			
	18	180																			
	22	220																			
	27	270																			
	33	330																			
	39	390																			
	47	470																			
	56	560																			
	62	620																			
	68	680																			
	82	820																			
	100	101																			
	120	121																			
	150	151																			
	180	181																			
	220	221																			
	270	271																			
	330	331																			
	390	391																			
	470	471																			
	560	561																			
	680	681																			
	820	821																			
	1.0nF	102																			
	1.2	122																			
	1.5	152																			
	1.8	182																			
	2.2	222																			
	2.4	242																			
	2.7	272																			
	3.3	332																			
	3.9	392																			
	4.7	472																			
	5.6	562																			
	6.8	682																			
	8.2	822																			
	10	103																			
	12	123																			
	15	153																			
	18	183																			
	22	223																			
	27	273																			
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	39	393																			
	47	473																			
	56	563																			
	68	683																			
	82	823																			
100	104																				
120	124																				
150	154																				
180	184																				
220	224																				
270	274																				
330	334																				
390	394																				
470	474																				
560	564																				
680	684																				
820	824																				
1.0uF	105																				
2.2	225																				





CAPACITANCE RANGE

DIMENSION (MM)			1825															
L (L1)			4.60 ± 0.30															
W			6.35 ± 0.40															
DIELECTRIC			COG							X7R								
T (MAX)			1.8	2.6						3.0	1.8	2.2		2.6		2.7		
RATED VOLTAGE			250	500	630	1KV	1.5KV	2KV	2.5KV	3KV	250	500	630	1KV	2KV	3KV	4KV	5KV
CAP. RANGE	10	100																
	12	120																
	15	150																
	18	180																
	22	220																
	27	270																
	33	330																
	39	390																
	47	470																
	56	560																
	68	680																
	82	820																
	100	101																
	120	121																
	150	151																
	180	181																
	220	221																
	270	271																
	330	331																
	390	391																
	470	471																
	560	561																
	680	681																
	820	821																
	1.0nF	102																
	1.2	122																
	1.5	152																
	1.8	182																
	2.2	222																
	2.7	272																
	3.3	332																
	3.9	392																
	4.7	472																
	5.6	562																
	6.8	682																
	8.2	822																
	10	103																
	12	123																
	15	153																
	18	183																
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	33	333																
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	68	683																
	82	823																
	100	104																
	120	124																
150	154																	
180	184																	
220	224																	
270	274																	
330	334																	
390	394																	
470	474																	
560	564																	
680	684																	
820	824																	
1.0uF	105																	
2.2	225																	



CAPACITANCE RANGE

DIMENSION (MM)		2220																	
L (L1)		5.70 ± 0.40																	
W		5.00 ± 0.40																	
DIELECTRIC		COG									X7R								
T (MAX)		1.8						2.2	3.2	2.5	3.0	3.1			2.6	1.8		2.2	2.7
RATED VOLTAGE		250	500	630	1KV	1.5KV	2KV	3KV	4KV	5KV	250	500	630	1KV	2KV	3KV	4KV	5KV	6KV
CAP. RANGE	2.0pF 2R0																		
	3.3 3R3																		
	3.9 3R9																		
	5.0 5R0																		
	8.2 8R2																		
	10 100																		
	12 120																		
	15 150																		
	18 180																		
	22 220																		
	27 270																		
	33 330																		
	39 390																		
	47 470																		
	56 560																		
	68 680																		
	82 820																		
	100 101																		
	120 121																		
	150 151																		
	180 181																		
	220 221																		
	270 271																		
	330 331																		
	390 391																		
	470 471																		
	560 561																		
	600 601																		
	680 681																		
	820 821																		
	1.0nF 102																		
	1.2 122																		
	1.5 152																		
	1.8 182																		
	2.2 222																		
	2.7 272																		
	3.3 332																		
	3.9 392																		
	4.7 472																		
	5.6 562																		
	6.8 682																		
	8.2 822																		
	10 103																		
	12 123																		
	15 153																		
	18 183																		
	22 223																		
	27 273																		
	33 333																		
	39 393																		
	47 473																		
	56 563																		
	68 683																		
	82 823																		
	100 104																		
	120 124																		
	150 154																		
	180 184																		
	220 224																		
	270 274																		
	330 334																		
	390 394																		
	470 474																		
	560 564																		
	680 684																		
	820 824																		
	1.0uF 105																		
	2.2 225																		
	3.3 335																		



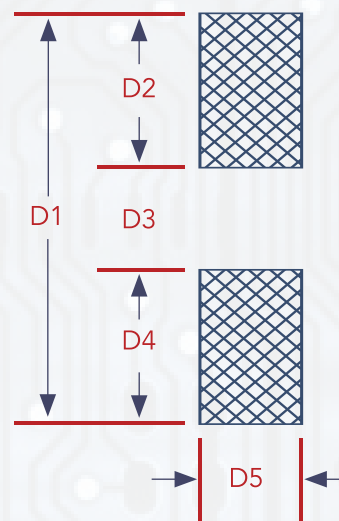
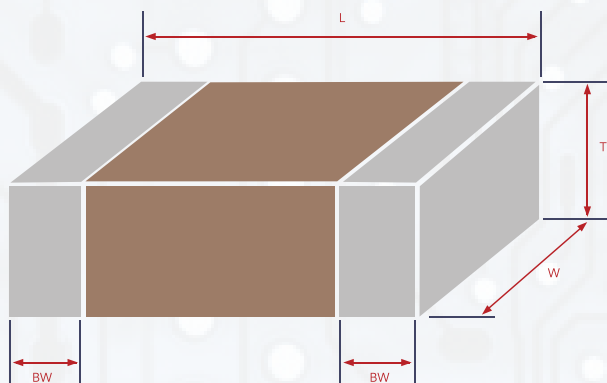


CAPACITANCE RANGE

DIMENSION (MM)			2225															
L (L1)			5.70 ± 0.40															
W			6.35 ± 0.40															
DIELECTRIC			COG							X7R								
T (MAX)			3.0							3.0	2.2			2.6	1.8	2.2	2.7	
RATED VOLTAGE			250	500	630	1KV	2KV	3KV	4KV	5KV	250	500	630	1KV	2KV	3KV	4KV	5KV
CAP. RANGE	10	100																
	12	120																
	15	150																
	18	180																
	22	220																
	27	270																
	33	330																
	39	390																
	47	470																
	56	560																
	68	680																
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	470	471																
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	680	681																
	820	821																
	1.0nF	102																
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	1.5	152																
	1.8	182																
	2.2	222																
	2.7	272																
	3.3	332																
	3.9	392																
	4.7	472																
	5.6	562																
	6.8	682																
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	47	473																
	56	563																
	68	683																
	82	823																
	100	104																
	120	124																
150	154																	
180	184																	
220	224																	
270	274																	
330	334																	
390	394																	
470	474																	
560	564																	
680	684																	
820	824																	
1.0uF	105																	
1.2	125																	
2.2	225																	
3.3	335																	
4.7	475																	
6.8	685																	
8.2	825																	
100	106																	



LAND DIMENSION



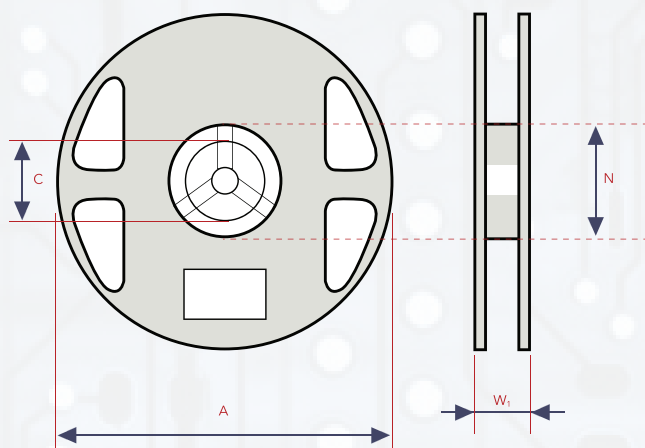
CASE SIZE	D1	D2	D3	D4	D5
0201 (0603)	0.85 (0.033)	0.30 (0.012)	0.25 (0.010)	0.30 (0.012)	0.35 (0.014)
0402 (1005)	1.70 (0.067)	0.60 (0.024)	0.50 (0.020)	0.60 (0.024)	0.50 (0.020)
0603 (1608)	2.30 (0.091)	0.80 (0.031)	0.70 (0.028)	0.80 (0.031)	0.75 (0.030)
0805 (2012)	3.00 (0.118)	1.00 (0.039)	1.00 (0.039)	1.00 (0.039)	1.25 (0.049)
1206 (3216)	4.00 (0.157)	1.00 (0.039)	2.00 (0.079)	1.00 (0.039)	1.60 (0.063)
1210 (3225)	4.00 (0.157)	1.00 (0.039)	2.00 (0.079)	1.00 (0.039)	2.50 (0.098)
1808 (1808)	5.60 (0.220)	1.00 (0.039)	3.60 (0.142)	1.00 (0.039)	2.00 (0.079)
1812 (4532)	5.60 (0.220)	1.00 (0.039)	3.60 (0.142)	1.00 (0.039)	3.00 (0.118)
1825 (4564)	5.60 (0.220)	1.00 (0.039)	3.60 (0.142)	1.00 (0.039)	6.35 (0.250)
2220 (5750)	6.60 (0.260)	1.00 (0.039)	4.60 (0.181)	1.00 (0.039)	5.00 (0.197)
2225 (5763)	6.60 (0.260)	1.00 (0.039)	4.60 (0.181)	1.00 (0.039)	6.35 (0.250)





PACKAGING (TAPING)

REEL TYPE SIZE



- To peel off the cover tape by the method shown in the right figure apply a peel-off force of 20GF - 60GF (card board); 10GF - 75GF (plastic tape).

- The cover tape should not touch the top or bottom of the chip.

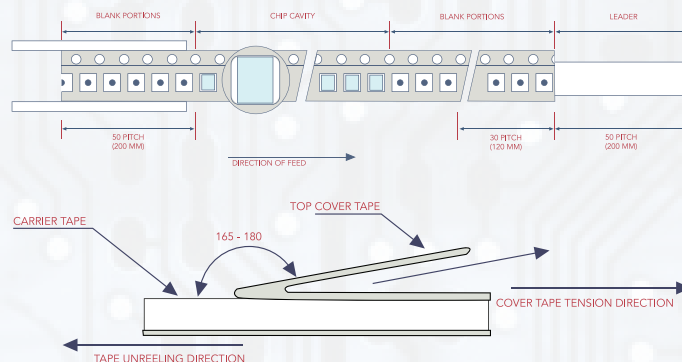
- If the cover tape has been peeled off it may be difficult to remove the chip due to punch-hole clearance, dirt, and debris. Make sure therefore that no paper waste will adhere to and block the absorption nozzle.

- If the cover tape has been peeled off from the top, stick it back on with a suitable adhesive.

- Follow the illustration for the start and end of the winding operation.

SIZE	0402, 0603, 0805, 1206, 1210			1808, 1812, 1825, 2220, 2225
REEL SIZE	7"	10"	13"	7"
C	13.0 ± 0.5	13.0 ± 0.5	13.0 ± 0.5	13.0 ± 0.5
W1	10.0 ± 1.5	10.0 ± 1.5	10.0 ± 1.5	12.4 + 2.0/-0
A	178.0 ± 2.0	250.0 ± 2.0	330.0 ± 2.0	178.0 ± 2.0
N	60.0 + 1.0/-0	50 MIN	50 MIN	60.0 + 1.0/-0

CARRIER TAPE STANDARD



CARDBOARD CARRIER TAPE FOR 0402, 0603, 0805/1206 TYPE

UNIT - MM

TYPE	A	B	W	F	E	P1	P2	P0	D0	t1	t2	MOUNTING HOLE	STD. REEL QTY 7"
0402	0.7±0.2	1.3±0.2	8.0±0.3	3.5±0.05	1.75±0.1	4.0±0.1	2.0±0.5	4.0±0.1	1.5±0.1	1.1 max	1.4 max	Angular Punch Hole	10,000 (20,000)
0603	1.1±0.2	1.9±0.2											4,000 (10,000)
0805	1.65±0.2	2.4±0.2											4,000 (10,000)
1206	2.0±0.2	3.6±0.2											4,000 (10,000)

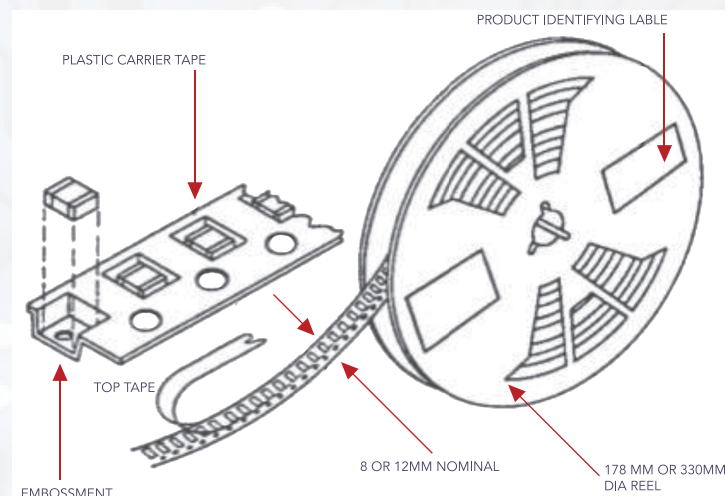
EMBOSSED PLASTIC CARRIER TAPE FOR 0805/1206 TYPE AND 1210 TYPE

UNIT - MM

TYPE	A	B	W	F	E	P1	P2	P0	D0	t1	t2	MOUNTING HOLE	STD. REEL QTY 7"	OPTIONAL REEL QTY (10"/13")
0805	1.45±0.2	2.3±0.2	8.0±0.3	3.5±0.05	1.75±0.1	4.0±0.1	2.0±0.5	4.0±0.1	1.5±0.1	0.6 max	2.5 max	Angular Embossed Hole	2,000 / 3,000	10,000
1206	2.0±0.2	3.6±0.2											2,000 / 3,000	10,000
1210	2.9±0.2	3.6±0.2											1,000 / 2,000 3,000	4,000
1808	3.6±0.2	4.9±0.2	12.0±0.3	5.5±0.05	1.75±0.1	8.0±0.1	2.0±0.5	4.0±0.1	1.5±0.1	0.6 max	6.5 max	Angular Embossed Hole	500 / 1,000	2,000
1812	3.6±0.2	4.9±0.2											500 / 1,000	2,000
1825	6.8±0.3	4.9±0.2											500 / 1,000	1,500
2220	5.5±0.3	6.2±0.3											500 / 700 1,000	1,500
2225	6.8±0.3	6.2±0.3											500 / 700	1,000

PACKAGING

- Tape and reel packing of surface mounting chip capacitors for automatic placement are in accordance with IEC286 part 3 and RS481

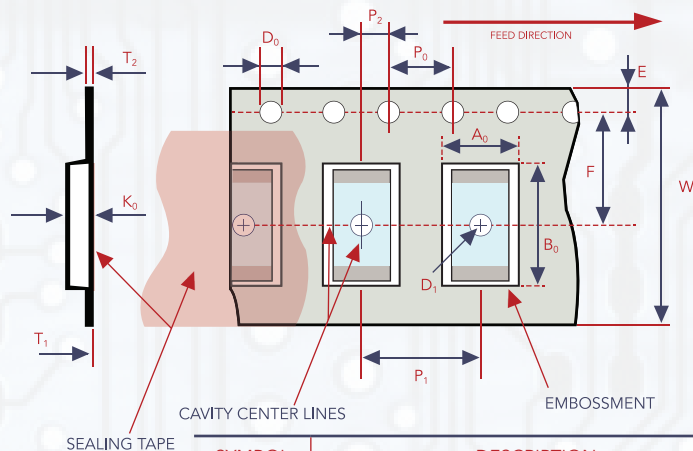


PEEL FORCE

The peel force of the top sealing tape is between 0.2 and 1.0 Newton at 1800. The breaking force of the carrier and sealing tape in the direction of unreeling is greater than 10 Newtons.

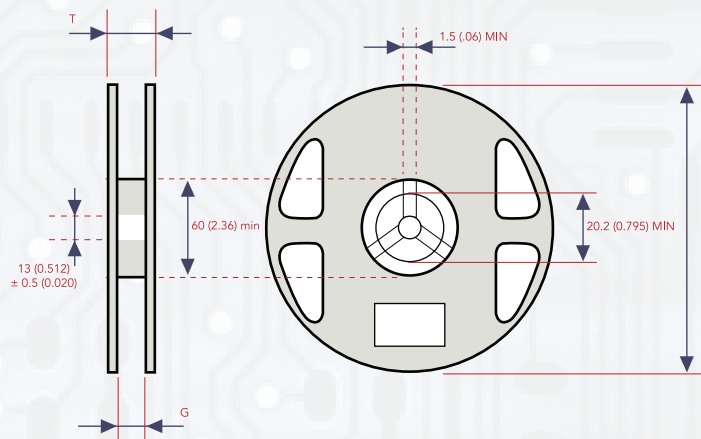
TAPE DIMENSIONS MM (INCHES)

The peel force of the top sealing tape is between 0.2 and 1.0 Newton at 1800. The breaking force of the carrier and sealing tape in the direction of unreeling is greater than 10 Newtons.



SYMBOL	DESCRIPTION	8 MM TAPE	12 MM TAPE
A ₀ B ₀ K ₀	Width of cavity Length of cavity Depth of cavity	Dependent of chip size to minimize rotation	
W	Width of tape	8 (0.315) ± 0.2 (0.008)	12 (0.472) ± 0.2 (0.008)
F	Distance between drive hole centres and cavity centres	3.5 (0.138) ± 0.5 (0.002)	5.5 (0.213) ± 0.05 (0.002)
E	Distance between drive hole centres and tape edge	1.75 (0.069) ± 0.1 (0.004)	
P ₁	Distance between cavity centres	4 (0.156) ± 0.1 (0.004)	8 (0.315) ± 0.1 (0.004)
P ₂	Axial distance between drive hole centres and cavity centres	2 (0.079) ± 0.5 (0.002)	
P ₀	Axial distance between drive hole centres	4 (0.156) ± 0.1 (0.004)	
D ₀	Drive to hole diameter	1.5 (0.059) ± 0.1 (0.004) - 0	
D ₁	Diameter of cavity piercing	1 (0.039) ± 0.1 (0.004) - 0	1.5 (0.059) ± 0.1 (0.004) - 0
t ₁	Embossed tape thickness	0.3 (0.012) ± 0.1 (0.004)	0.4 (0.016) ± 0.1 (0.004)
t ₂	Top tape thickness	0.1 (0.004) max	

REEL DIMENSIONS MM (INCHES)



SYMBOL	DESCRIPTION	178 MM REEL	330 MM REEL
A	Reel Diameter	178 (7) ± 2 (0.079)	330 (13) max
G	Reel Inside with	8.4 (0.33) ± 1.5 (0.059) - 0	12.4 (0.49) ± 1.5 (0.059) - 0
T	Reel Outside with	14.4 (0.56) max	18.4 (0.72) max



Cal-Chip
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