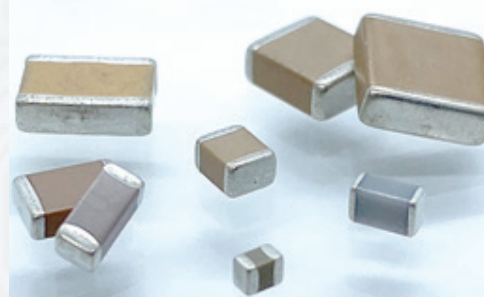


# HIGH VOLTAGE CERAMIC CHIP CAPACITOR

## - 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

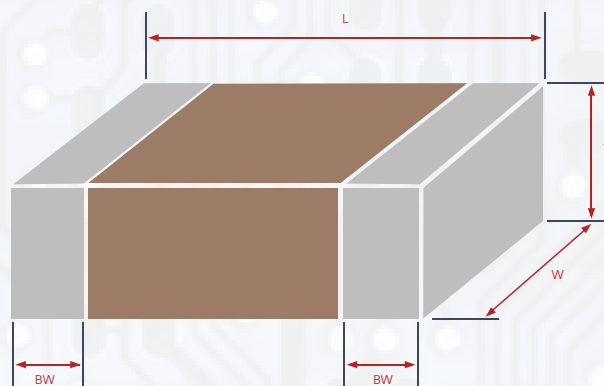
### APPLICATIONS

- 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: $\leq \pm 30 \text{ppmi}/^\circ\text{C}$ , -55°C ~ +125°C (EIA Class I)
	X7R: $\leq \pm 15 \text{ppmi}/^\circ\text{C}$ , -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	$100 \leq V < 500\text{V}$ , 200% Rated Voltage
	$500 \leq V < 1000\text{V}$ , 150% Rated Voltage
	$1000 \leq V$ , 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

### ORDER INFORMATION

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)



\*REFERENCE CHARTS BELOW





# 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				X7R			
T (MAX)	0.55		0.95				1.45				1.45			
RATED VOLTAGE	250		250	500	250	500	250	500	630	1KV	250	500	630	1KV
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													

CAP. RANGE





# 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
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
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														

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	470	471														
	510	511														
	560	561														
	620	621														
	680	681														
	750	751														
	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															

**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
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												

CAP. RANGE





# CAPACITANCE RANGE

DIMENSION (MM)		1808														
L (L1)		4.60 ± 0.30														
W		2.00 ± 0.20														
DIELECTRIC		COG							X7R							
T (MAX)		1.8			2.2				2.2							
RATED VOLTAGE		250	500	630	1KV	2KV	3KV	4KV	5KV	250	500	630	1KV	2KV	3KV	4KV
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															
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															
100nF	104															
120	124															
150	154															
180	184															
220	224															
270	274															

CAP. RANGE

**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
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																			
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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																			
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																			

CAP. RANGE







# 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
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																
820	824																
1.0uF	105																
2.2	225																

CAP. RANGE



# CAPACITANCE RANGE

DIMENSION (MM)		2220																													
L (L1)		5.70 ± 0.30																													
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												
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																														
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33	333																														
39	393																														
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56	563																														
68	683																														
82	823																														
100	104																														
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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																														

CAP. RANGE





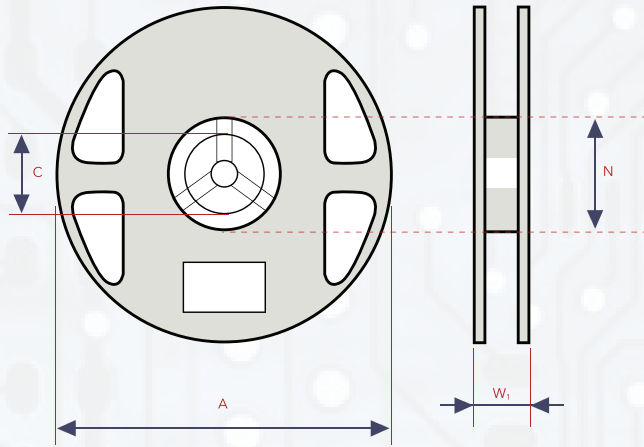
# CAPACITANCE RANGE

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
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																
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																

CAP. RANGE

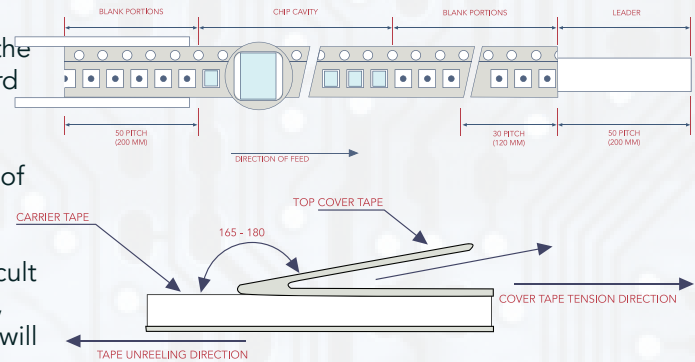
# PACKAGING (TAPING)

## REEL TYPE SIZE



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



- 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.

### 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

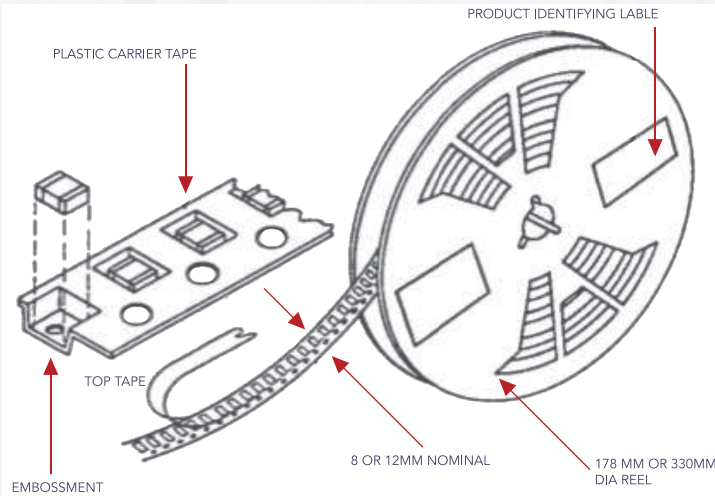
UNIT - MM

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

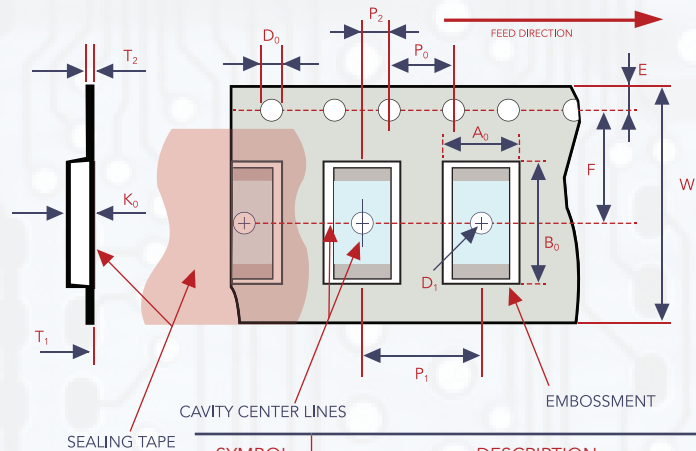


## PEEL FORCE

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.

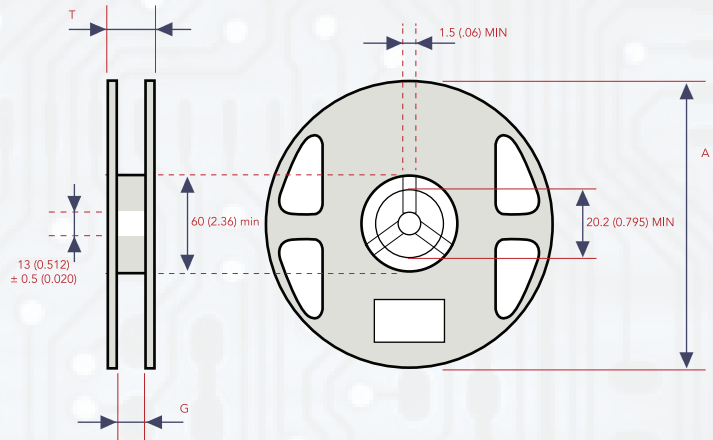
## TAPE DIMENSIONS MM (INCHES)

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 <sub>0</sub>	Width of cavity	Dependent of chip size to minimize rotation	
B <sub>0</sub>	Length of cavity	Dependent of chip size to minimize rotation	
K <sub>0</sub>	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 <sub>1</sub>	Distance between cavity centres	4 (0.156) ± 0.1 (0.004)	8 (0.315) ± 0.1 (0.004)
P <sub>2</sub>	Axial distance between drive hole centres and cavity centres	2 (0.079) ± 0.5 (0.002)	
P <sub>0</sub>	Axial distance between drive hole centres	4 (0.156) ± 0.1 (0.004)	
D <sub>0</sub>	Drive to hole diameter	1.5 (0.059) ± 0.1 (0.004) - 0	
D <sub>1</sub>	Diameter of cavity piercing	1 (0.039) ± 0.1 (0.004) - 0	1.5 (0.059) ± 0.1 (0.004) - 0
t <sub>1</sub>	Embossed tape thickness	0.3 (0.012) ± 0.1 (0.004)	0.4 (0.016) ± 0.1 (0.004)
t <sub>2</sub>	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

