

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

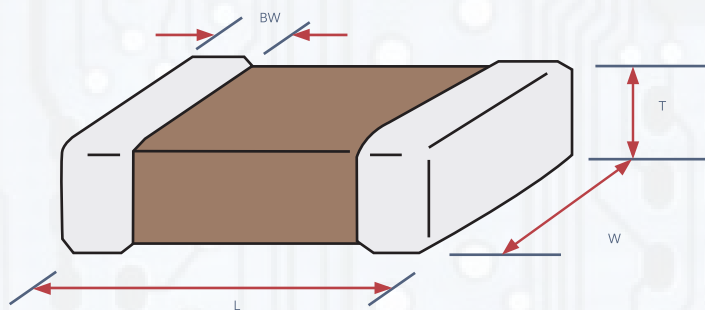
- Suitable for LAN/WLAN interface
- Back-lighting inverter, DC-DC converters,
- Ballast, Modems and Power Supplies



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

CONSTRUCTION & DIMENSIONS



TYPE (MM)	L (MM)	W (MM)	T (MAX) (MM)	B (MIN) (MM)	BW (MIN) (MM)
0603	1.60±1:0.10	0.80±1:0.10	0.95	0.4	0.15
0805	2.00±1:0.20	1.25±1:0.20	1.45	0.7	0.20
1206	3.20±1:0.30	1.60±1:0.20	1.80	1.5	0.30
1210	3.20±1:0.30	2.50±1:0.20	2.60	1.6	0.30
1808	4.60±1:0.30	2.00±1:0.20	2.20	2.5	0.30
1812	4.60±1:0.30	3.20±1:0.30	3.00	2.5	0.30
1825	4.60±1:0.30	6.35±1:0.40	3.00	2.5	0.30
2220	5.70±1:0.40	5.00±1:0.40	3.00	3.5	0.30
2225	5.70±1:0.40	6.35±1:0.40	3.00	3.5	0.30

ORDERING INFORMATION

CHV	0805	N	250	103	K	X	T	D
PRODUCT TYPE	SIZE	TERMINATION OPTIONS	RATED VOLTAGE	CAPACITANCE	TOLERANCE	DIELECTRIC	PACKAGING	PACKAGING
	0603 : 0603 0805 : 0805 1206 : 1206 1210 : 1210 1808 : 1808 1812 : 1812 1825 : 1825 2220 : 2220 2225 : 2225	N: Nickel Barrier X: Nickel Barrier/ Flex Term. 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: ± 1pF C: ± 0.25pF D: ± 0.50pF F: ± 1% G: ± 2% J: ± 5% K: ± 10% M: ± 20%	C: COG X: X7R	T: 7" REEL	D Optional 10K reel (from 0603-1210 size)



CAPACITANCE RANGE

DIMENSION (MM)		CHV0603			CHV0805					
L(L1)		1.6±0.1			2.00 ± 0.2					
W		0.8±0.1			1.25 ± 0.2					
BW(L2/L3)		0.40 ± 0.05			0.7 ± 0.2					
DIELECTRIC		COG		X7R		COG		X7R		
H (max)		0.95	0.95	0.95	1.45	1.1	1.1	1.1	1.1	1.1
RATED VOLTAGE		250	250	500	250	500	250	500	1KV	
CAP. RANGE										
1.0pF	1R0									
1.3	1R3									
1.5	1R5									
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									
6.8	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									



DIMENSION (MM)		CHV0603			CHV0805			
L(L1)		1.6±0.1			2.00 ± 0.2			
W		0.8±0.1			1.25 ± 0.2			
BW(L2/L3)		0.40 ± 0.05			0.7 ± 0.2			
DIELECTRIC		COG			COG		X7R	
H (max)		0.95	0.95	0.95	1.45	1.1	1.1	1.1
RATED VOLTAGE		250	250	500	250	500	250	500
CAP. RANGE								
47	470							
51	510							
56	560							
62	620							
68	680							
75	750							
82	820							
91	910							
100	101							
120	121							
130	131							
150	151							
160	161							
180	181							
200	201							
220	221							
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							
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							

DIMENSION (MM)		CHV1206													
L(L1)		3.2±0.30													
W		1.6±0.2													
BW(L2/L3)		1.50±0.3													
DIELECTRIC		COG							X7R						
H (max)		1.8							1.8						
RATED VOLTAGE		250	500	630	1KV	2KV	3KV	250	500	630	1KV	1.5KV	2KV	2.5KV	3KV
CAP. RANGE															
1.0pF	1R0														
2.0	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														
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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														
124	124														
154	154														
184	184														
224	224														
274	274														
334	334														
393	394														
564	564														
684	684														
824	824														
1.0uF	105														
!#!	!#!														



DIMENSION (MM)		CHV1210									
L(L1)		3.20±0.30									
W		2.50±0.20									
BW(L2/L3)		1.60±0.30									
DIELECTRIC		COG					X7R				
H (max)		2.2					2.6	2.2	2.6		
RATED VOLTAGE		250	500	630	1KV	1.5KV	250	500	1KV	1.5KV	2KV
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										
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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										
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3.9	392										
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154	154										
184	184										
224	224										
274	274										
334	334										
393	394										
474	474										
564	564										
684	684										
824	824										
1.0uF	105										
2.2	225										
3.3	335										
6.8	685										

DIMENSION (MM)		CHV1808													
L(L1)		4.60±0.30													
W		2.00±0.20													
BW(L2/L3)		2.50±0.30													
DIELECTRIC		COG								X7R					
H (max)		1.8			2.2					2.2		2.2	2.2	2.2	2.2
RATED VOLTAGE		250	500	630	1KV	2KV	3KV	4KV	5KV	250	500	1KV	2KV	3KV	4KV
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														
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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														
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33	333														
39	393														
47	473														
56	563														
68	683														
82	823														
100nF	104														



DIMENSION (MM)		CHV1812																
L(L1)		4.60±0.30																
W		3.20±0.30																
BW(L2/L3)		2.50±0.30																
DIELECTRIC		COG								X7R								
H (max)		1.8	1.8	2.6	2.2	2.6	2.6	2.6	2.7	2.6	3	1.8	2.2	2.7	2.7	2.7		
RATED VOLTAGE		250	500	630	1KV	2KV	3KV	4KV	5KV	6KV	250	500	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																	
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393	394																	
474	474																	
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684	684																	
824	824																	
1.0uF	105																	
2.2	225																	
3.3	335																	
4.7	475																	
6.8	685																	

DIMENSION (MM)		CHV1825														
L(L1)		4.60±0.30														
W		6.35±0.40														
BW(L2/L3)		2.50±0.30														
DIELECTRIC		COG							X7R							
H (max)		1.8	2.6	2.6	2.6	2.6	2.6	2.6	2.6	3.0	1.8	2.2	2.6	2.6	2.7	
RATED VOLTAGE		250	500	630	1KV	1.5KV	2KV	2.5KV	3KV	250	500	1KV	2KV	3KV	4KV	5KV
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															
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390	391															
470	471															
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680	681															
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393	394															
474	474															
564	564															
684	684															
824	824															
1.0uF	105															
2.2	225															
3.3	335															
4.7	475															
6.8	685															
8.2	825															
100	106															



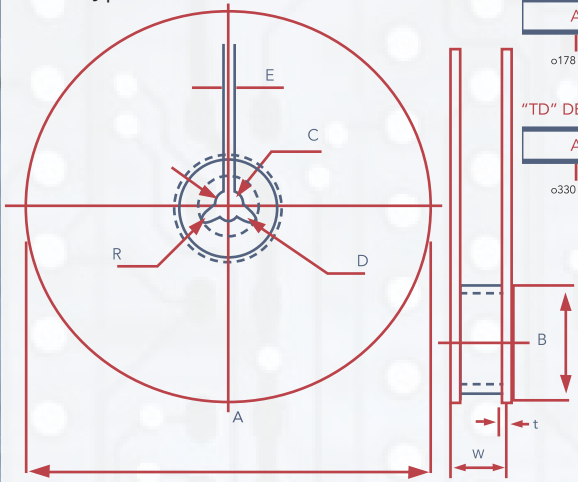
DIMENSION (MM)		CHV2220																
L(L1)		5.70±0.40																
W		5.00±0.40																
BW(L2/L3)		3.50±0.30																
DIELECTRIC		COG							X7R									
H (MAX)		1.8		2.2	2.2	1.8	2.5	3	2.2	2.6	1.8	1.8	2.2	2.7				
RATED VOLTAGE		250	500	630	1KV	2KV	3KV	4KV	5KV	6KV	250	500	1KV	2KV	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																	
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390	391																	
470	471																	
560	561																	
600	601																	
680	681																	
820	821																	
1.0nF	102																	
1.2	122																	
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393	394																	
474	474																	
564	564																	
684	684																	
824	824																	
1.0uF	105																	
2.2	225																	
3.3	335																	
4.7	475																	
6.8	685																	
8.2	825																	
100	106																	

DIMENSION (MM)		CHV2225														
L(L1)		5.70±0.40														
W		6.35±0.40														
BW(L2/L3)		3.50±0.30														
DIELECTRIC		COG							X7R							
H (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	1KV	2KV	3KV	4KV	5KV
CAP. RANGE																
2.0pF	2R0															
3.3	3R3															
3.9	3R9															
5.0	5R0															
8.2	8R2															
10	100															
12	120															
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274	274															
334	334															
393	394															
474	474															
564	564															
684	684															
824	824															
1.0uF	105															
2.2	225															
3.3	335															
4.7	475															
6.8	685															
8.2	825															
100	106															



PACKAGING (TAPING)

Reel Type Size



STANDARD REEL

A	B	C	D	E	W	t	R
$\phi 178 \pm 2.0$	$\phi 50 \text{ min}$	$\phi 13.0 \pm 0.5$	$\phi 21.0 \pm 0.8$	2.0 ± 0.5	$10.2-8\text{mm}$ $14.0-12\text{mm}$ ± 1.5	0.8 ± 0.2	1.0

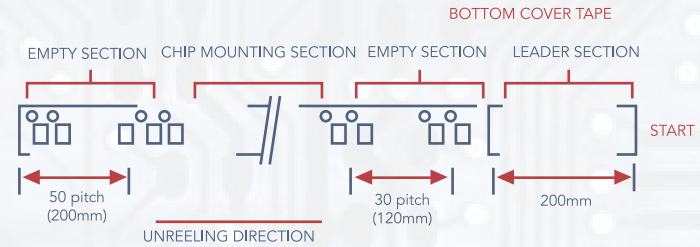
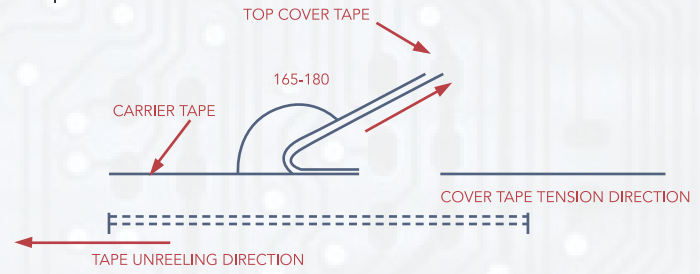
UNIT: mm

"TD" DESIGNATOR FOR OPTIONAL 10/13 INCH REELS

A	B	C	D	E	W	t	R
$\phi 330 \pm 2.0$	$\phi 50 \text{ min}$	$\phi 13.0 \pm 0.5$	$\phi 21.0 \pm 0.8$	2.0 ± 0.5	10.0 ± 1.5	0.8 ± 0.2	1.0

UNIT: mm

CarrierTape (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)

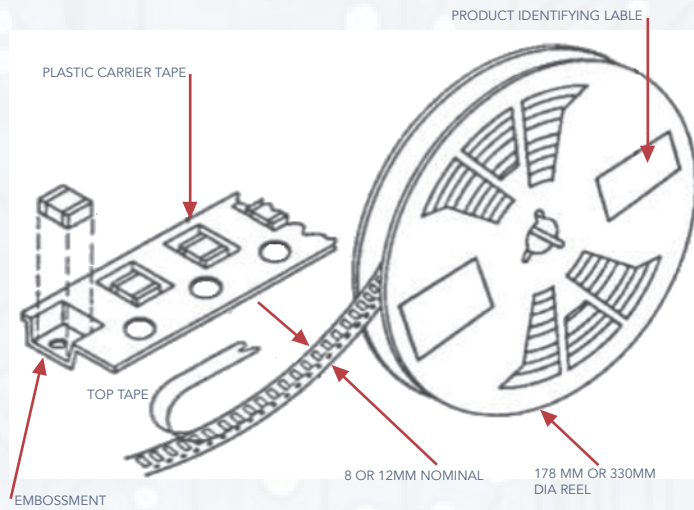
EMBOSSED PLASTIC CARRIER TAPE FOR 0805/1206 TYPE AND 1210 TYPE

UNIT=mm

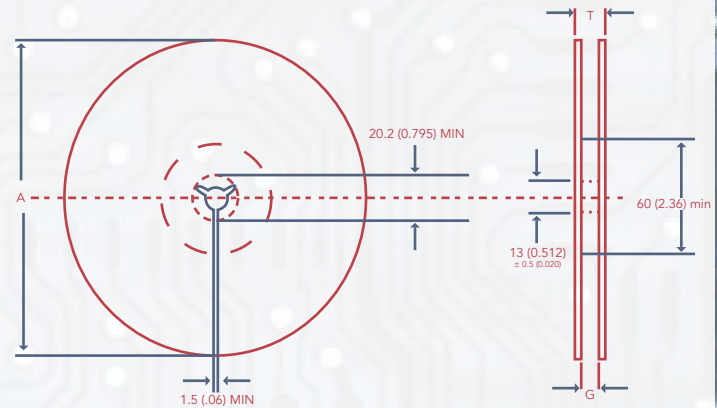
TYPE	A	B	W	F	E	P1	P2	P0	D0	t1	t2	MOUNTING HOLE	STD. REEL QTY 7"	OPTIONAL REEL QTY (10/13')	
0805	1.45 ± 0.2	2.3 ± 0.2	8.0 ± 0.3	3.5 ± 0.05	1.75 ± 0.1	4.0 ± 0.1	2.0 ± 0.5	4.0 ± 0.1	1.5 ± 0.1	0.6 max	2.5 max	Angular Embossed Hole	2,000 3,000	10,000	
1206	2.0 ± 0.2	3.6 ± 0.2											2,000 3,000		
1210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

PACKAGING

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



Reel dimensions mm (inches)

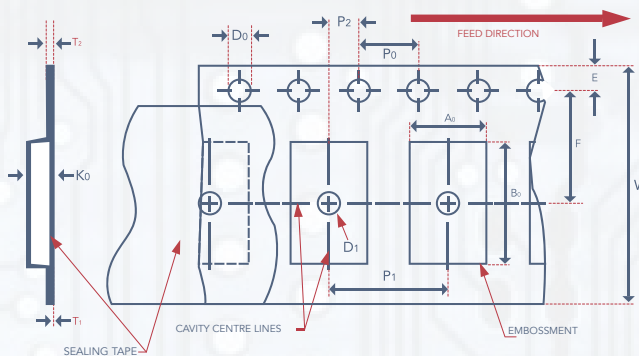


SYMBOL	DESCRIPTION	178MM REEL	330MM REEL
A	Reel Diameter	178 (7) ±2 (0.079)	330 (13) max
G	Reel Inside with	8.4 (0.33) ± 1.5 (0.059) - 0	12.4 (0.49) ± 1.5 (0.059) - 0
T	Reel Outside with	14.4 (0.56) max	18.4 (0.72) max

Peel Force

The peel force of the top sealing tape is between 0.2 and 1.0 Newton at 180°. The breaking force of the carrier and sealing tape in the direction of unreeling is greater than 10 Newtons.

Tape dimensions mm (inches)



SYMBOL	DESCRIPTION	8MM TAPE	12MM TAPE
A ₀	Width of cavity	Dependent of chip size to minimize rotation	
B ₀	Length of cavity		
K ₀	Depth of cavity		
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	

