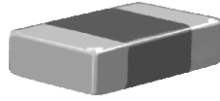


Multilayer Ceramic Chip Capacitors



GENERAL SPECIFICATIONS

NOTE: Electrical characteristics at + 25 °C unless otherwise specified

Capacitance Range: 100 pF to 1.8 μ F

Temperature Coefficient of Capacitance (TCC):
X7R: $\pm 15\%$ from - 55 °C to + 125 °C, with 0 Vdc applied

Dissipation Factor (DF):
 ≤ 25 V ratings: 3.5 % maximum at 1.0 Vrms and 1 kHz
 > 25 V ratings: 2.5 % maximum at 1.0 Vrms and 1 kHz

Aging Rate: 1 % maximum per decade

FEATURES

- General purpose dielectric
- Excellent aging characteristics
- Ideal for decoupling and filtering
- Ideal for surge suppression and high voltage applications
- Wide range of case sizes, voltage ratings and capacitance values



RoHS
COMPLIANT

Insulation Resistance (IR):

At + 25 °C and rated voltage 100 000 M Ω minimum or 1000 Ω F, whichever is less

At + 125 °C and rated voltage 10 000 M Ω minimum or 100 Ω F, whichever is less

Dielectric Withstanding Voltage (DWV):

This is the maximum voltage the capacitors are tested for a 1 to 5 second period and the charge/discharge current does not exceed 50 mA.

≤ 200 Vdc : DWV at 250 % of rated voltage
500 Vdc: DWV at 200 % of rated voltage
630/1000 Vdc: DWV at 150 % of rated voltage

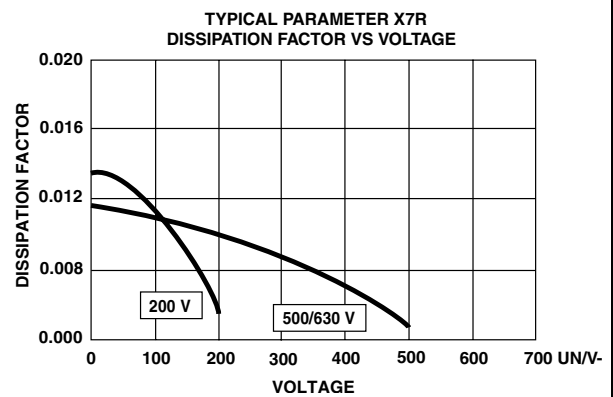
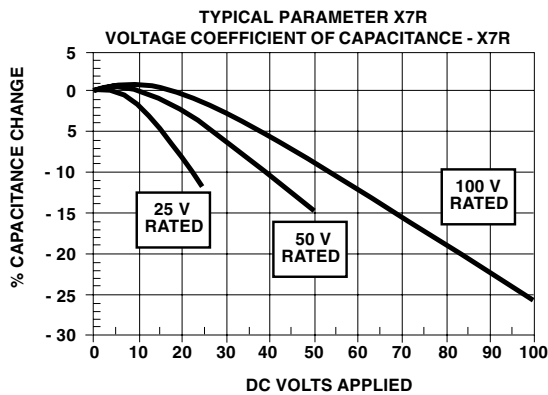
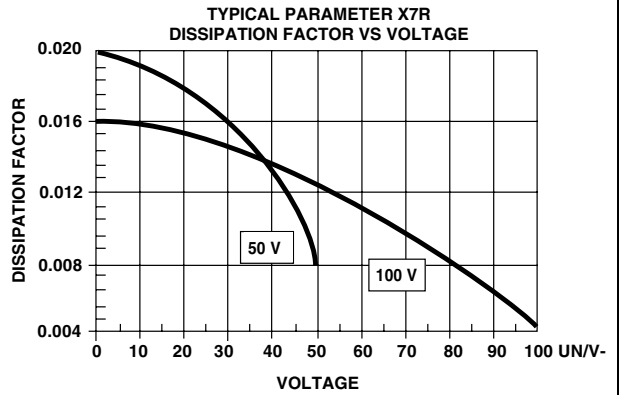
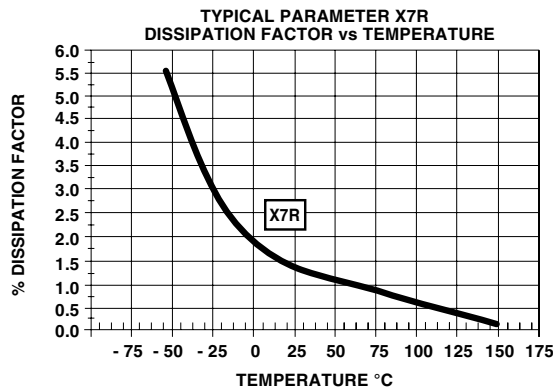
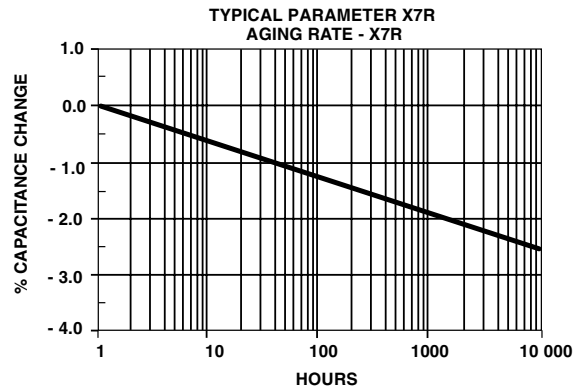
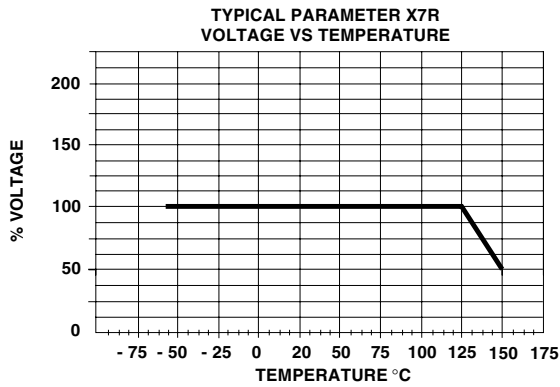
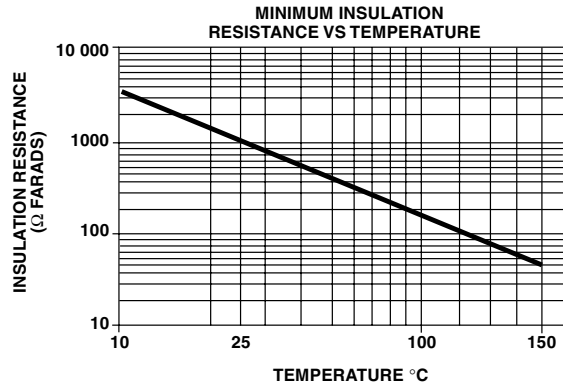
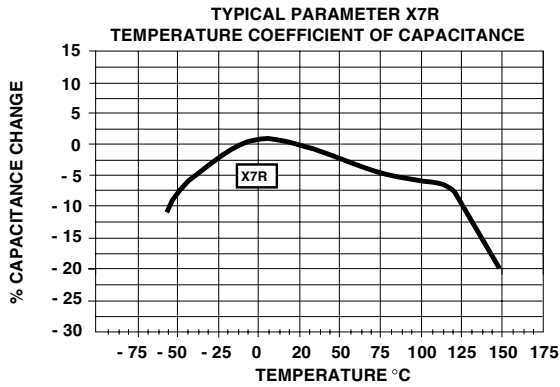
ORDERING INFORMATION

VJ0805 ³⁾	Y	102	K	X	A	A	T	### ²⁾
CASE CODE	DIELECTRIC	CAPACITANCE NOMINAL CODE	CAPACITANCE TOLERANCE	TERMINATION	DC VOLTAGE RATING ¹⁾	MARKING	PACKAGING	PROCESS CODE
0402 0603 0805 1206 1210 1808 1812 1825 2220 2225 3640	Y = X7R	Expressed in picofarads (pF). The first two digits are significant, the third is a multiplier. Examples: 102 = 1000 pF	J = $\pm 5\%$ K = $\pm 10\%$ M = $\pm 20\%$	X = Ni barrier 100 % tin plated F = AgPd	J = 16 V X = 25 V A = 50 V B = 100 V C = 200 V E = 500 V L = 630 V G = 1000 V	A = Unmarked M = Marked NOTE: Marking is only available for 0805 and 1206	T = 7" reel/plastic tape C = 7" reel/paper tape R = 11 1/4" reel/plastic tape P = 11 1/4" reel/paper tape O = 7" reel/flamed paper tape I = 11 1/4"/13" reel/flamed paper tape NOTE: "I" and "O" is used for "F" termination paper taped	

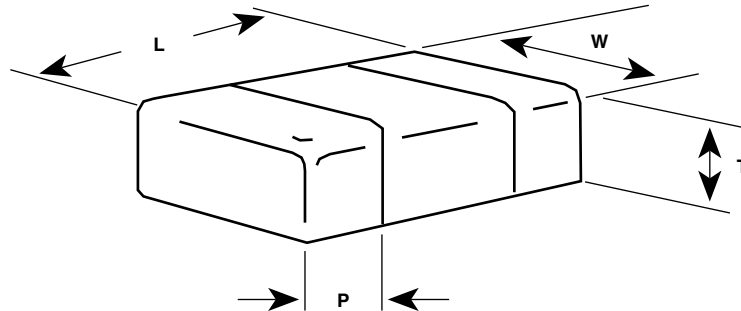
Note

1. DC voltage rating should not be exceeded in application.
2. Process Code may be added with up to three digits, used to control non-standard products and/or special requirements.
3. Case size designator may be replaced by four digit drawing number used to control non-standard products and/or special requirements

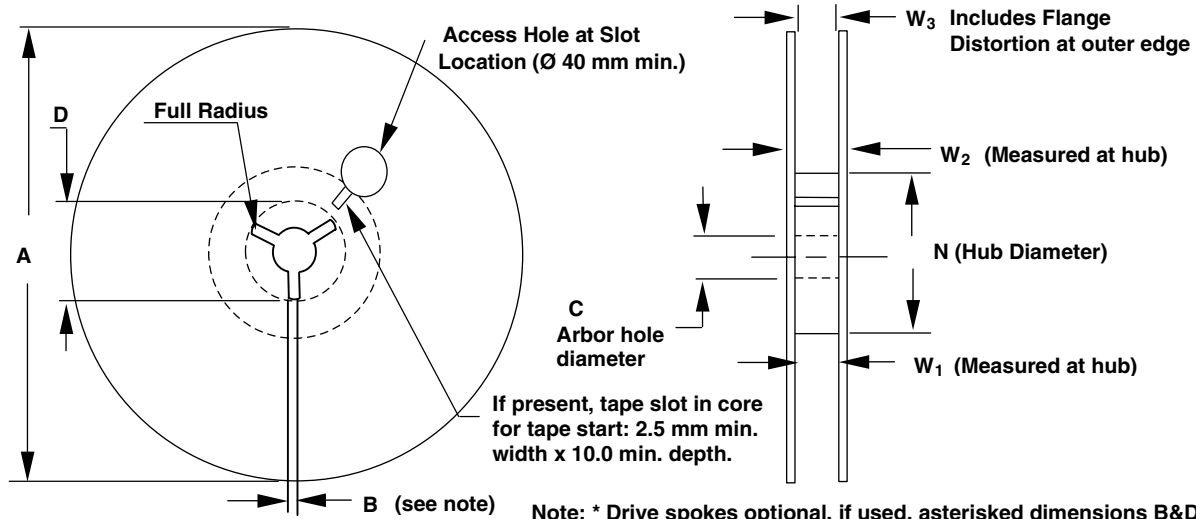
X7R DIELECTRIC - TYPICAL PARAMETERS



DIMENSIONS in inches [millimeters]



EIA STYLE	VISHAY VITRAMON STYLE DESIGNATION	LENGTH (L)	WIDTH (W)	MAXIMUM THICKNESS (T)	TERMINATION (P)	
					(Min.)	(Max.)
0402	VJ0402	0.040 + 0.004/ - 0.002 [1.00 + 0.10/ - 0.05]	0.020 + 0.004/ - 0.002 [0.50 + 0.10/ - 0.05]	0.024 [0.60]	0.004 [0.10]	0.016 [0.41]
0603	VJ0603	0.063 ± 0.005 [1.60 ± 0.12]	0.031 ± 0.005 [0.80 ± 0.12]	0.036 [0.92]	0.012 [0.30]	0.018 [0.46]
-	VJ0612	0.063 ± 0.008 [1.60 ± 0.20]	0.126 ± 0.008 [3.20 ± 0.20]	0.067 [1.68]	0.010 [0.25]	0.018 [0.46]
-	VJ0508	0.049 ± 0.008 [1.25 ± 0.20]	0.079 ± 0.008 [2.00 ± 0.20]	0.042 [1.07]	0.005 [0.13]	0.018 [0.46]
0805	VJ0805	0.079 ± 0.008 [2.00 ± 0.20]	0.049 ± 0.008 [1.25 ± 0.20]	0.057 [1.45]	0.010 [0.25]	0.028 [0.71]
1206	VJ1206	0.126 ± 0.008 [3.20 ± 0.20]	0.063 ± 0.008 [1.60 ± 0.20]	0.067 [1.68]	0.010 [0.25]	0.028 [0.71]
1210	VJ1210	0.126 ± 0.008 [3.20 ± 0.20]	0.098 ± 0.008 [2.50 ± 0.20]	0.067 [1.68]	0.010 [0.25]	0.028 [0.71]
-	VJ1808	0.177 ± 0.010 [4.50 ± 0.25]	0.080 ± 0.010 [2.03 ± 0.25]	0.067 [1.68]	0.010 [0.25]	0.030 [0.76]
1812	VJ1812	0.177 ± 0.010 [4.50 ± 0.25]	0.126 ± 0.008 [3.20 ± 0.20]	0.086 [2.18]	0.010 [0.25]	0.030 [0.76]
1825	VJ1825	0.177 ± 0.010 [4.50 ± 0.25]	0.252 ± 0.010 [6.40 ± 0.25]	0.086 [2.18]	0.010 [0.25]	0.030 [0.76]
-	VJ2220	0.220 ± 0.008 [5.59 ± 0.20]	0.200 ± 0.010 [5.08 ± 0.25]	0.086 [2.18]	0.010 [0.25]	0.030 [0.76]
-	VJ2225	0.220 ± 0.010 [5.59 ± 0.25]	0.250 ± 0.010 [6.35 ± 0.25]	0.086 [2.18]	0.010 [0.25]	0.030 [0.76]
-	VJ3640	0.360 ± 0.015 [9.14 ± 0.38]	0.400 ± 0.015 [10.20 ± 0.38]	0.086 [2.18]	0.010 [0.25]	0.030 [0.76]



REEL DIMENSIONS in inches (millimeters)								
TAPE SIZE	A MAX.	B MIN.	C	D MIN.	N MIN.	W ₁	W ₂ MAX.	W ₃
8 mm	12.992 (330)	0.059 (1.5)	0.512 + 0.50 - 0.20 (13.0 + 0.50 - 0.20)	0.795 (20.2)	1.969 (50.0)	0.331 + 0.059/- 0.0 (8.4 + 1.5/- 0.0)	0.567 (14.4)	Shall accommodate tape width without interference
12 mm						0.488 + 0.079/- 0.0 (12.4 + 2.0/- 0.0)	0.724 (18.4)	
16 mm					2.401 (61.0)	0.646 + 0.0789/- 0.0 (16.4 + 2.0/- 0.0)	0.882 (22.4)	

- Note**
- For reels less than 360 mm diameter (A), the most widely used reel diameters are 178 mm ± 2 mm and 330 mm ± 2 mm. Reel diameters ranging from 254 mm to 292 mm also exist. Commonly used hub diameters are 80, 100, 150 and 178 mm.
 - Tape with components must wrap around hub without damage.

STANDARD PACKAGING QUANTITIES ^{1/2)}					
BODY SIZE	TAPE SIZE	7" REEL QUANTITIES		11 1/4" AND 13" REEL QUANTITIES	
		PAPER TAPE PACKAGING CODE "C"/"O" ⁴⁾	PLASTIC TAPE PACKAGING CODE "T"	PAPER TAPE PACKAGING CODE "P"/"I" ⁴⁾	PLASTIC TAPE PACKAGING CODE "R"
0402 ³⁾	8 mm	5000/10 000	N/A	10 000/30 000	N/A
0603	8 mm	4000	4000	10 000	N/A
0805 ⁴⁾	8 mm	3000	3000	10 000	10 000
1206 ⁵⁾	8 mm	N/A	3000	N/A	10 000
1210 ⁵⁾	8 mm	N/A	3000	N/A	10 000
1808	12 mm	N/A	3000	N/A	10 000
1812	12 mm	N/A	1000	N/A	5000
1825	12 mm	N/A	1000	N/A	4000
2220	12 mm	N/A	1000	N/A	4000
2225	12 mm	N/A	1000	N/A	4000
3640	16 mm	N/A	500	N/A	2000

- Note**
- REFERENCE: EIA Standard RS 481 – "Taping of Surface Mount Components for Automatic Placement"
 - N/A = Not Available, not supported anymore
 - Quantity can vary with customer request
 - Flamed paper tape code "O" (7" reel) and "I" (11 1/4"/13" reel) for AgPd terminated parts (termination code F)
 - Packaging "C/P" or "T/R" and quantity can depend from product thickness

EMBOSSED 8, 12 AND 16 MM CARRIER TAPE

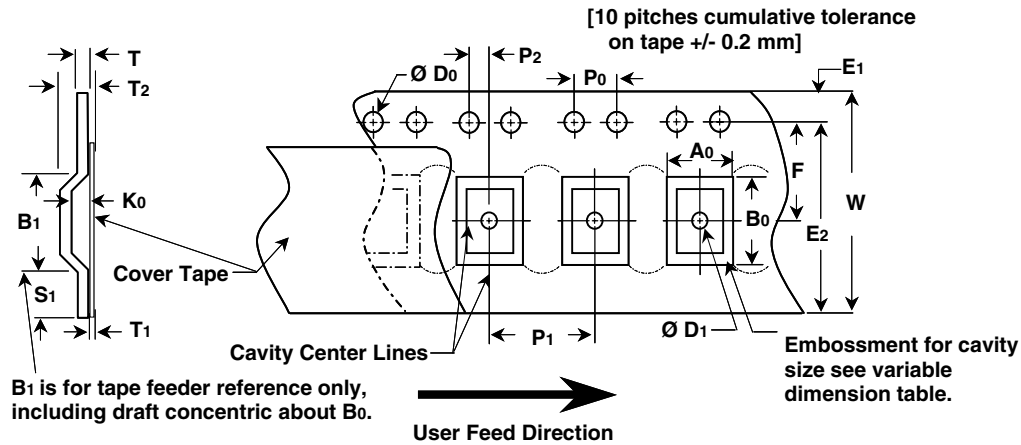


Figure 1

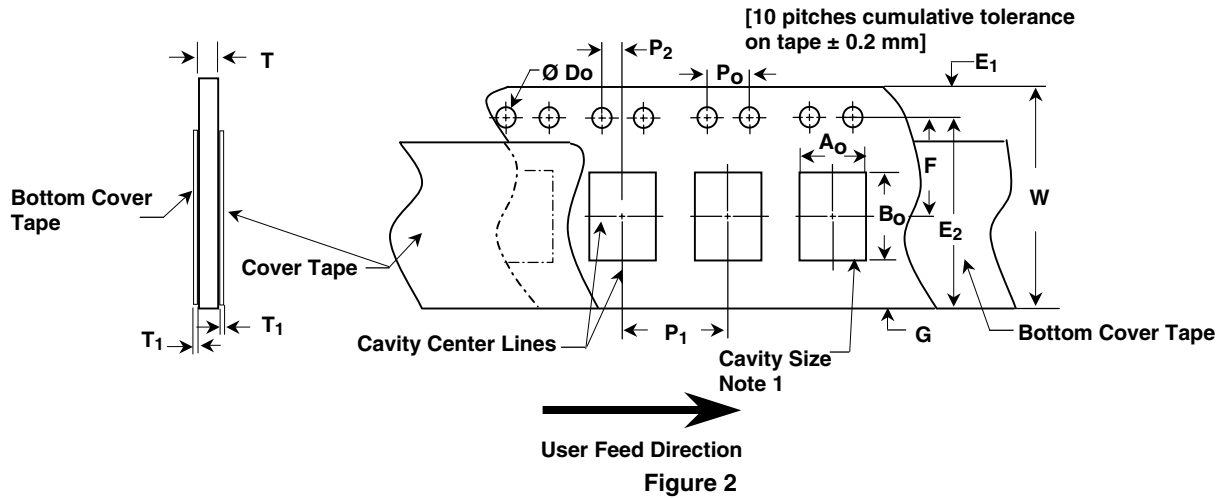
CONSTANT CARRIER TAPE METRIC DIMENSIONS in inches (millimeters)							
TAPE SIZE	D ₀	E ₁	P ₀	P ₂	S ₁ MIN.	T MAX.	T ₁
8 mm and 12 mm	0.059 + 0.004/- 0.0 (1.50 + 0.10/- 0.0)	0.069 + 0.004 (1.75 ± 0.10)	0.175 + 0.004 (4.0 ± 0.10)	0.079 + 0.002 (2.0 ± 0.05)	0.024 (0.60)	0.024 (0.60)	0.004 (0.10) Max.

VARIABLE CARRIER TAPE METRIC DIMENSIONS in inches (millimeters)									
TAPE SIZE	B ₁ MAX.	D ₁ MIN.	E ₂ MIN.	F	P ₁	R MIN.	T ₂	W MAX.	A ₀ , B ₀ AND K ₀
8 mm 2 mm Pitch	0.171 (4.35)	0.177 (0.450)	0.246 (6.25)	0.138 ± 0.002 (3.50 ± 0.05)	0.79 ± 0.004 (2.00 ± 0.10)	0.984 (25.0)	0.098 (2.50) Max.	0.327 (8.30)	see note 1
8 mm 4 mm Pitch	0.171 (4.35)	0.177 (0.450)	0.246 (6.25)	0.138 ± 0.002 (3.50 ± 0.05)	0.157 ± 0.004 (4.00 ± 0.10)	0.984 (25.0)	0.098 (2.50) Max.	0.327 (8.30)	see note 1
12 mm 2 mm Pitch	0.323 (8.20)	0.059 (0.150)	0.404 (10.25)	0.217 ± 0.002 (5.50 ± 0.05)	0.157 ± 0.004 (4.00 ± 0.10)	1.181 (30.0)	0.256 (6.50) Max.	0.484 (12.30)	see note 1
16 mm 4 mm Pitch	0.476 (12.1)	0.059 (0.150)	0.561 (14.25)	0.295 ± 0.004 (7.50 ± 0.1)	0.157 ± 0.004 (4.00 ± 0.10)	1.181 (30.0)	0.341 (8.0) Max.	0.641 (16.3)	see note 1

Note

1. The cavity defined by A₀, B₀ and K₀ shall surround the component with sufficient clearance that:
 - a) The component does not protrude above the top surface of the carrier tape.
 - b) The component can be removed from the cavity in a vertical direction without mechanical restriction, after the cover tape has been removed.
 - c) Rotation of the component is limited to 20° maximum for 8 and 12 mm tapes and 10° maximum for 16 mm figure 3 & 4.
 - d) Lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12mm wide tape and to 1.0 mm maximum for 16 mm wide tape figure 5.

PAPER 8 MM CARRIER TAPE



CONSTANT CARRIER TAPE METRIC DIMENSIONS in inches (millimeters)							
TAPE SIZE	D ₀	E ₁	P ₀	P ₂	T ₁ MAX.	G MIN.	R REF.
8 mm	0.059 + 0.004/- 0.0 (1.50 + 0.10/- 0.0)	0.069 + 0.004 (1.75 ± 0.10)	0.175 + 0.004 (4.0 ± 0.10)	0.079 + 0.002 (2.0 ± 0.05)	0.024 (0.60)	0.029 (0.75)	0.010 (0.25)

VARIABLE CARRIER TAPE METRIC DIMENSIONS in inches (millimeters)						
TAPE SIZE	E ₂ MIN.	F	P ₁	W MAX.	A ₀ , B ₀ AND K ₀	T
8 mm 2 mm Pitch	0.246 (6.25)	0.138 ± 0.002 (3.50 ± 0.05)	0.79 ± 0.004 (2.00 ± 0.10)	0.327 (8.30)	see note 1	1.1 mm maximum for paper base tape
8 mm 4 mm Pitch	0.246 (6.25)	0.138 ± 0.002 (3.50 ± 0.05)	0.157 ± 0.004 (4.00 ± 0.10)	0.327 (8.30)	see note 1	1.1 mm maximum for paper base tape

Note

1. The cavity defined by A₀, B₀ and K₀ shall surround the component with sufficient clearance that:
 - a) The component does not protrude above the top surface of the carrier tape.
 - b) The component can be removed from the cavity in a vertical direction without mechanical restriction, after the cover tape has been removed.
 - c) Rotation of the component is limited to 20° maximum for 8 and 12 mm tapes and 10° maximum for 16 mm figure 3 & 4.
 - d) Lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12mm wide tape and to 1.0 mm maximum for 16 mm wide tape figure 5.

MAXIMUM COMPONENT ROTATION FOR PUNCHED AND EMBOSSED CARRIER

Figure 3 Maximum Lateral Movement Carrier Top View

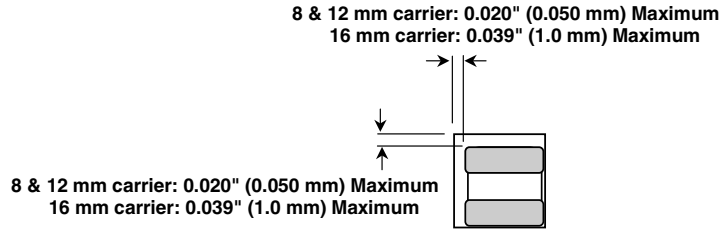
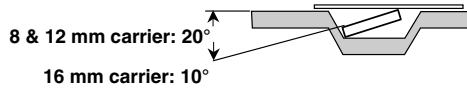
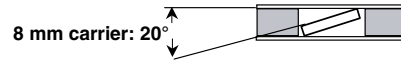


Figure 4

Maximum Component Rotation Embossed Carrier Side View

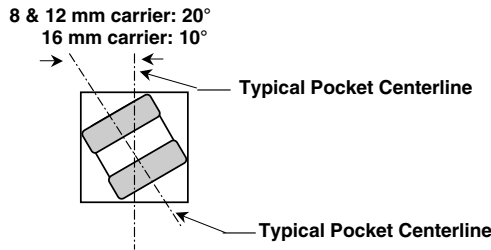


Maximum Component Rotation Paper Carrier Side View



MAXIMUM LATERAL MOVEMENT FOR PUNCHED AND EMBOSSED CARRIER

Figure 5 Maximum Component Rotation Top View



BENDING RADIUS FOR PUNCHED EMBOSSED CARRIER

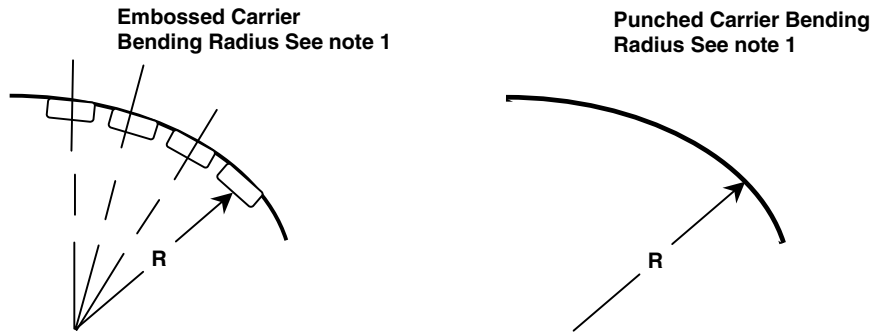


Figure 6

Note 1: The tape with or without components shall pass without damage round "R", see dimensions table



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