

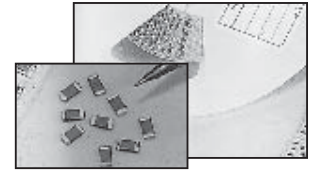
## FEATURES

- X7R, X5R AND Y5V DIELECTRICS
- HIGH CAPACITANCE DENSITY
- ULTRA LOW ESR & ESL
- EXCELLENT MECHANICAL STRENGTH
- NICKEL BARRIER TERMINATIONS
- RoHS COMPLIANT
- SAC SOLDER COMPATIBLE\*

## RoHS Compliant

Includes all homogeneous materials

\*See Part Number System for Details



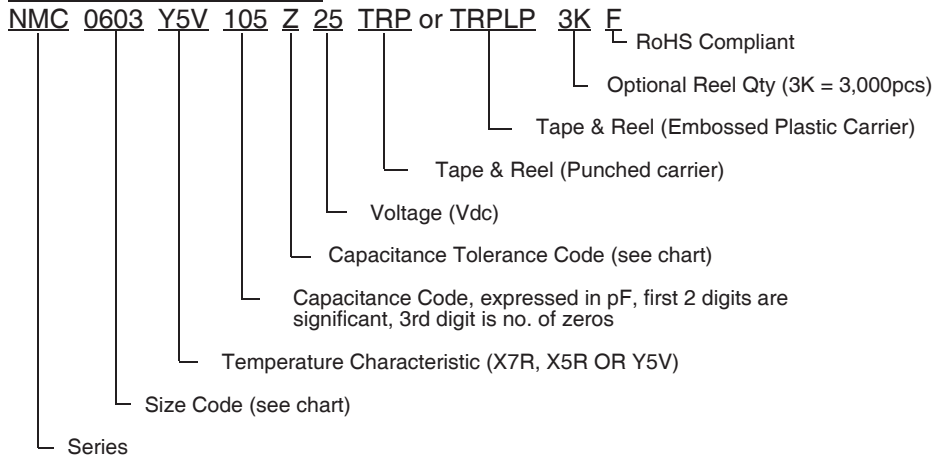
| Temperature Coefficient         | X7R  | X5R                       | Y5V   |
|---------------------------------|--|---------------------------|---|
| Capacitance Range               | 1.0 $\mu$ F ~ 10 $\mu$ F   | 1.0 $\mu$ F ~ 100 $\mu$ F | 1.0 $\mu$ F ~ 100 $\mu$ F                           |
| Capacitance Tolerance           | 10% (K) & 20% (M)  | 10% (K) & 20% (M)         | +80%/-20% (Z)                                       |
| Operating Temperature Range     | -55°C ~ +125°C   | -55°C ~ +85°C             | -30°C ~ +85°C                                       |
| Temperature Characteristics     | $\pm 15\%$ $\Delta$ Cap.   | $\pm 15\%$ $\Delta$ Cap.  | +22%, -82% $\Delta$ Cap.                            |
| Rated Voltages                  | 4Vdc, 6.3Vdc, 16Vdc, 25Vdc, 50Vdc & 100Vdc   |                           |   |
| Dissipation Factor              | See Sizes & Values Tables  |                           |   |
| Insulation Resistance           | 100Megohm/ $\mu$ F minimum @ +25°C   |                           |   |
| Dielectric Withstanding Voltage | 250% of Rated Voltage for 5 $\pm$ 1 sec., 50mA max.  |                           | 150% of Rated Voltage for 5 $\pm$ 1 sec., 50mA max. |
| Test Conditions (EIA-198-2E)    | C $\leq$ 10 $\mu$ F 1KHz, 1.0V $\pm$ 0.2Vrms (ALC on)<br>C > 10 $\mu$ F 120Hz, 0.5V $\pm$ 0.2Vrms (ALC on) |                           | 1KHz, 1.0V $\pm$ 0.1Vrms (ALC on)                   |

\*Reflow soldering is recommended. Contact NIC regarding the use of other soldering methods.

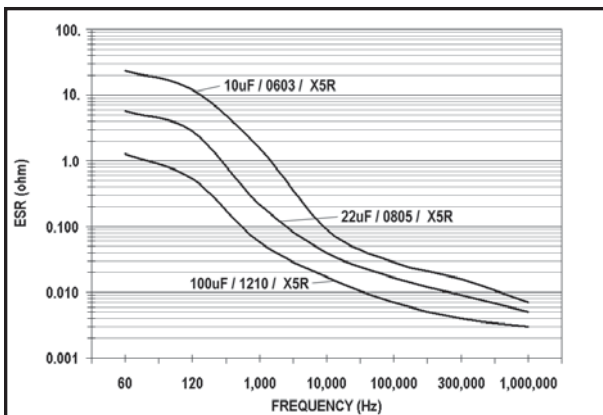
Capacitance value stability over applied VDC is not assured for class II MLCC (X7R, X5R & Y5V) and it is suggested to consider to use NPO MLCCs Ceramic Capacitors, Film Capacitors or Electrolytic Capacitors for applications where stability in capacitance value, over applied VDC, is performance requirement.

For additional information go to: <http://www.niccomp.com/help/VoltageCoefficientofCapacitors-032012-R1.pdf>.

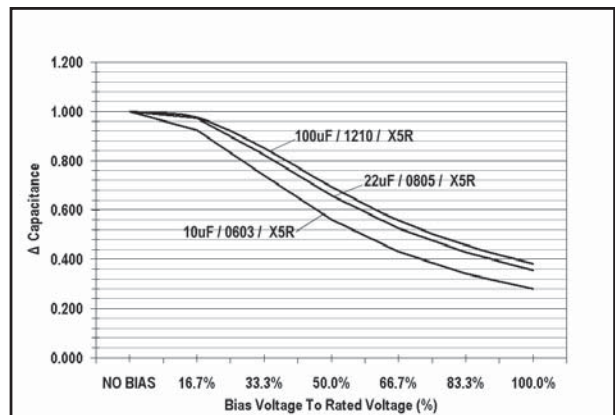
## PART NUMBER SYSTEM



Typical ESR versus Frequency



Typical Capacitance versus Bias Voltage



## X7R HIGH CV CAPACITOR VALUES AND SIZES (mm)

| EIA Case Size         | 0603                  |    |    | 0805        |     |      |     | 1206        |    |        |      |    |    |
|-----------------------|-----------------------|----|----|-------------|-----|------|-----|-------------|----|--------|------|----|----|
| Length (L)            | 1.6 ± 0.15            |    |    | 2.0 ± 0.2   |     |      |     | 3.2±0.2     |    |        |      |    |    |
| Width (W)             | 0.8 ± 0.15            |    |    | 1.25 ± 0.2  |     |      |     | 1.6±0.2     |    |        |      |    |    |
| Thickness max. (T)    | 1.0                   |    |    | 1.35        |     |      |     | 1.90        |    |        |      |    |    |
| Termination Width (P) | 0.1 ~ 0.65            |    |    | 0.25 ~ 0.75 |     |      |     | 0.25 ~ 0.85 |    |        |      |    |    |
| Capacitance           | Working Voltage (Vdc) |    |    |             |     |      |     |             |    |        |      |    |    |
|                       | 6.3V                  | 10 | 16 | 6.3         | 10  | 16   | 25  | 6.3         | 10 | 16     | 25   | 35 | 50 |
| 1.0µF                 |                       | 5% | 5% |             | 5%  | 3.5% | 5%  |             | 5% | 5%     | 3.5% |    | 3% |
| 1.5µF                 |                       |    |    |             |     |      |     |             |    |        |      |    |    |
| 2.2µF                 | 10%                   |    |    | 10%*        | 5%* | 5%*  | 5%* |             | 5% | 5%     | 3.5% |    |    |
| 3.3µF                 |                       |    |    | 10%*        |     |      |     |             | 5% | 5%     | 3.5% |    |    |
| 4.7µF                 |                       |    |    | 10%*        |     |      |     |             | 5% | 5%     | 3.5% |    |    |
| 10µF                  |                       |    |    | 15%*        |     |      |     | 10%         | 5% | 3.5%** |      |    |    |

\* 1.45mm maximum thickness, \*\*2.20mm maximum thickness

Percentages in the table represent the dissipation factor for that value.

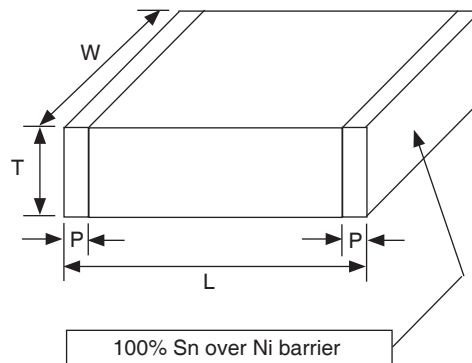
## X7R HIGH CV CAPACITOR VALUES AND SIZES (mm)

| EIA Case Size         | 1210                  |      |      |        |      | 1812       |    |      |      |       | 2225        |      |      |      |
|-----------------------|-----------------------|------|------|--------|------|------------|----|------|------|-------|-------------|------|------|------|
| Length (L)            | 3.2±0.2               |      |      |        |      | 4.5±0.4    |    |      |      |       | 5.7±0.4     |      |      |      |
| Width (W)             | 2.5±0.2               |      |      |        |      | 3.2±0.3    |    |      |      |       | 6.35±0.25   |      |      |      |
| Thickness max. (T)    | 2.20                  |      |      |        |      | 1.8        |    |      |      |       | 2.20        |      |      |      |
| Termination Width (P) | 0.25 ~ 1.00           |      |      |        |      | 0.25 ~ 1.5 |    |      |      |       | 0.25 ~ 1.02 |      |      |      |
| Capacitance           | Working Voltage (Vdc) |      |      |        |      |            |    |      |      |       |             |      |      |      |
|                       | 10                    | 16   | 25   | 35     | 50   | 100        | 10 | 16   | 25   | 50    | 100         | 25   | 50   | 100  |
| 1.0µF                 | 5%                    | 3.5% | 3.5% |        | 3.5% | 2.5%**     | 5% | 3.5% | 3.5% | 2.5%* | 2.5%*       | 2.5% | 2.5% | 2.5% |
| 1.5µF                 |                       |      |      |        |      |            |    |      |      |       |             | 2.5% |      |      |
| 2.2µF                 |                       |      | 3.5% |        |      |            |    |      |      |       |             | 2.5% |      |      |
| 3.3µF                 |                       |      | 3.5% |        |      |            |    |      |      |       |             |      |      |      |
| 4.7µF                 |                       | 3.5% | 5%   | 2.5%** |      |            |    |      |      |       |             |      |      |      |
| 10µF                  | 5%                    | 3.5% | 5%** |        |      |            |    |      |      |       |             |      |      |      |

\*2.20mm maximum thickness, \*\*2.80mm maximum thickness

Percentages in the table represent the dissipation factor for that value.

(CONSULT FACTORY  
FOR CAPACITANCE  
VALUES NOT LISTED)



## X5R HIGH CV CAPACITOR VALUES AND SIZES (mm)

| EIA Case Size         | 0402                  |        |     |     | 0603       |     |     |      |    | 0805        |     |      |     |     |
|-----------------------|-----------------------|--------|-----|-----|------------|-----|-----|------|----|-------------|-----|------|-----|-----|
| Length (L)            | 1.0 ± 0.05            |        |     |     | 1.6 ± 0.15 |     |     |      |    | 2.0 ± 0.2   |     |      |     |     |
| Width (W)             | 0.5 ± 0.05            |        |     |     | 0.8 ± 0.15 |     |     |      |    | 1.25 ± 0.2  |     |      |     |     |
| Thickness max. (T)    | 0.6                   |        |     |     | 1.0        |     |     |      |    | 1.45        |     |      |     |     |
| Termination Width (P) | 0.1 ~ 0.3             |        |     |     | 0.1 ~ 0.65 |     |     |      |    | 0.20 ~ 0.75 |     |      |     |     |
| Capacitance           | Working Voltage (Vdc) |        |     |     |            |     |     |      |    |             |     |      |     |     |
|                       | 4                     | 6.3    | 10  | 16  | 4          | 6.3 | 10  | 16   | 25 | 4           | 6.3 | 10   | 16  | 25  |
| 1.0µF                 |                       | 10%    | 15% | 10% |            | 10% | 10% | 5%   | 5% |             | 10% | 7.5% | 5%  | 5%  |
| 1.5µF                 |                       |        |     |     |            | 10% | 10% | 3.5% |    |             | 10% | 10%  | 5%  | 5%  |
| 2.2µF                 | 10%                   | 10%    |     |     |            | 10% |     |      |    |             | 10% | 10%  |     |     |
| 3.3µF                 |                       |        |     |     |            | 10% |     |      |    |             | 10% | 10%  |     |     |
| 4.7µF                 | 10%                   | 12.5%* |     |     |            | 10% | 5%  |      |    |             | 10% | 10%  | 10% | 10% |
| 6.8µF                 |                       |        |     |     |            |     |     |      |    |             |     |      |     |     |
| 10µF                  |                       |        |     |     | 10%        | 10% |     |      |    |             | 10% | 10%  | 10% |     |
| 22µF                  |                       |        |     |     | 12.5%      |     |     |      |    |             | 15% |      |     |     |
| 47µF                  |                       |        |     |     |            |     |     |      |    | 10%         |     |      |     |     |

\*T max. 0.65mm, L & W tolerance -0/+0.15mm

Percentages in the table represent the dissipation factor for that value.

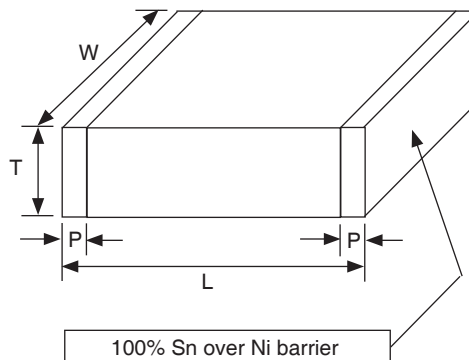
## X5R HIGH CV CAPACITOR VALUES AND SIZES (mm)

| EIA Case Size         | 1206                  |     |      |      |      | 1210       |      |      |       |      | 1812     |     |
|-----------------------|-----------------------|-----|------|------|------|------------|------|------|-------|------|----------|-----|
| Length (L)            | 3.2±0.2               |     |      |      |      | 3.2±0.3    |      |      |       |      | 4.5±0.4  |     |
| Width (W)             | 1.6±0.2               |     |      |      |      | 2.5±0.2    |      |      |       |      | 3.2±0.4  |     |
| Thickness max. (T)    | 1.90                  |     |      |      |      | 2.2        |      |      |       |      | 3.1      |     |
| Termination Width (P) | 0.25 ~ 0.85           |     |      |      |      | 0.25 ~ 1.0 |      |      |       |      | 0.2 min. |     |
| Capacitance           | Working Voltage (Vdc) |     |      |      |      |            |      |      |       |      |          |     |
|                       | 4                     | 6.3 | 10   | 16   | 25   | 6.3        | 10   | 16   | 25    | 35   | 6.3      | 10  |
| 1.0µF                 |                       |     |      |      |      |            |      |      |       |      |          |     |
| 1.5µF                 |                       |     |      | 5%   |      |            |      |      |       |      |          |     |
| 2.2µF                 |                       | 10% | 7.5% | 5%   | 3.5% |            |      |      |       | 3.5% |          |     |
| 3.3µF                 |                       | 10% | 7.5% | 5%   | 3.5% |            |      |      |       |      |          |     |
| 4.7µF                 |                       | 10% | 7.5% | 5%   | 5%   | 10%        | 5%   | 3.5% | 3.5%* |      |          |     |
| 6.8µF                 |                       | 10% |      |      |      |            |      |      |       |      |          |     |
| 10µF                  |                       | 10% | 10%  | 5%   | 5%   | 10%        | 5%   | 5%   | 5%*   | 10%  |          |     |
| 22µF                  |                       | 10% | 10%  | 3.5% |      | 10%*       | 10%* | 5%*  | 5%*   |      |          |     |
| 47µF                  | 10%                   | 10% | 10%  |      |      | 10%*       | 10%* |      |       |      |          |     |
| 100µF                 |                       |     |      |      |      | 15%*       |      |      |       |      | 10%      | 10% |

\*Length 3.2mm ± 0.4mm, 2.8mm maximum thickness

Percentages in the table represent the dissipation factor for that value.

(CONSULT FACTORY FOR CAPACITANCE VALUES NOT LISTED)



## Y5V HIGH CV CAPACITOR VALUES AND SIZES (mm)

| EIA Case Size         | 0402                  |       | 0603       |       |     |    | 0805        |       |       |    |    |
|-----------------------|-----------------------|-------|------------|-------|-----|----|-------------|-------|-------|----|----|
| Length (L)            | 1.0 ± 0.05            |       | 1.6 ± 0.15 |       |     |    | 2.0 ± 0.2   |       |       |    |    |
| Width (W)             | 0.5 ± 0.05            |       | 0.8 ± 0.15 |       |     |    | 1.25 ± 0.2  |       |       |    |    |
| Thickness max. (T)    | 0.6                   |       | 1.0        |       |     |    | 1.45        |       |       |    |    |
| Termination Width (P) | 0.1 ~ 0.3             |       | 0.1 ~ 0.65 |       |     |    | 0.25 ~ 0.75 |       |       |    |    |
| Capacitance           | Working Voltage (Vdc) |       |            |       |     |    |             |       |       |    |    |
|                       | 6.3                   | 10    | 6.3        | 10    | 16  | 25 | 6.3         | 10    | 16    | 25 | 50 |
| 1.0µF                 | 20%                   | 12.5% |            | 16%   | 16% | 9% | 16%         | 12.5% | 9%    | 9% | 9% |
| 1.5µF                 |                       |       |            |       |     |    | 16%         | 12.5% | 9%    |    |    |
| 2.2µF                 |                       |       | 20%        | 16%   | 16% |    | 16%         | 12.5% | 9%    | 9% |    |
| 3.3µF                 |                       |       |            |       |     |    | 16%         | 12.5% | 9%    |    |    |
| 4.7µF                 |                       |       | 20%        | 12.5% |     |    | 16%         | 12.5% | 12.5% |    |    |
| 6.8µF                 |                       |       |            |       |     |    |             | 16%   |       |    |    |
| 10µF                  |                       |       |            |       |     |    | 20%         | 30%   |       |    |    |
| 22µF                  |                       |       |            |       |     |    | 20%         |       |       |    |    |

\*2.5mm maximum thickness

Percentages in the table represent the dissipation factor for that value.

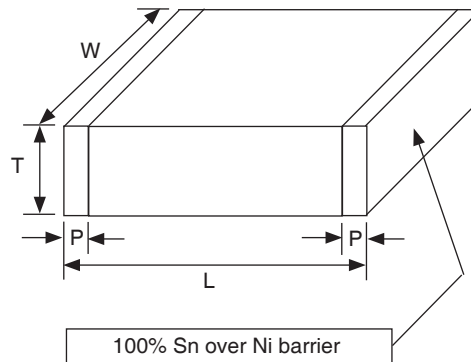
## Y5V HIGH CV CAPACITOR VALUES AND SIZES (mm)

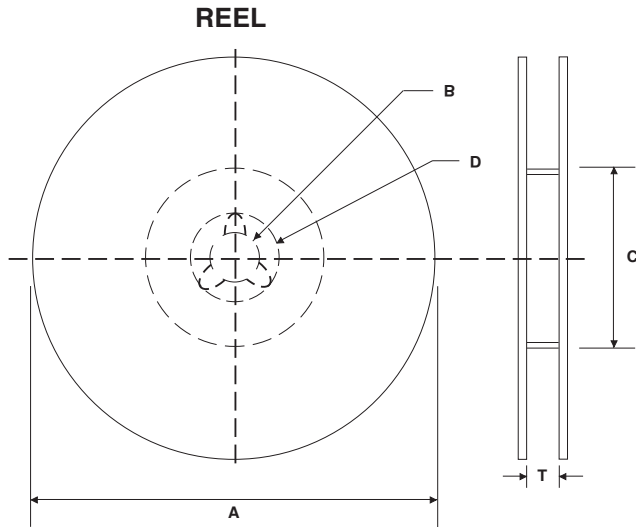
| EIA Case Size         | 1206                  |       |       |    |    | 1210       |      |       |       |    | 1812       |    |       |    |    |    |
|-----------------------|-----------------------|-------|-------|----|----|------------|------|-------|-------|----|------------|----|-------|----|----|----|
| Length (L)            | 3.2±0.2               |       |       |    |    | 3.2±0.2    |      |       |       |    | 4.5±0.4    |    |       |    |    |    |
| Width (W)             | 1.6±0.2               |       |       |    |    | 2.5±0.2    |      |       |       |    | 3.2±0.3    |    |       |    |    |    |
| Thickness max. (T)    | 1.90                  |       |       |    |    | 2.2        |      |       |       |    | 2.8        |    |       |    |    |    |
| Termination Width (P) | 0.25 ~ 0.85           |       |       |    |    | 0.25 ~ 1.0 |      |       |       |    | 0.25 ~ 1.5 |    |       |    |    |    |
| Capacitance           | Working Voltage (Vdc) |       |       |    |    |            |      |       |       |    |            |    |       |    |    |    |
|                       | 6.3                   | 10    | 16    | 25 | 35 | 50         | 6.3  | 10    | 16    | 25 | 35         | 50 | 10    | 16 | 25 | 50 |
| 1.0µF                 |                       | 12.5% | 12.5% | 7% |    | 7%         |      | 12.5% | 12.5% | 9% |            | 7% | 12.5% | 9% | 5% | 5% |
| 1.5µF                 |                       | 12.5% | 12.5% | 9% |    |            |      | 12.5% | 12.5% | 9% |            |    | 12.5% | 9% | 5% | 5% |
| 2.2µF                 |                       | 12.5% | 12.5% | 9% |    | 9%         |      | 12.5% | 12.5% | 9% |            | 7% | 12.5% | 9% | 5% | 5% |
| 3.3µF                 |                       | 12.5% | 12.5% | 9% |    |            |      | 12.5% | 12.5% | 9% |            |    | 12.5% | 9% | 5% | 5% |
| 4.7µF                 |                       | 12.5% | 12.5% | 9% | 7% |            | 20%  | 12.5% | 12.5% | 9% |            | 7% | 12.5% | 9% | 5% | 5% |
| 6.8µF                 |                       | 16%   | 12.5% |    |    |            |      | 12.5% | 12.5% | 9% |            |    | 12.5% | 9% | 5% | 5% |
| 10µF                  | 20%                   | 16%   | 12.5% | 9% | 9% |            |      | 16%   | 12.5% | 9% | 7%         |    | 12.5% | 9% | 5% |    |
| 22µF                  | 20%                   | 16%   |       |    |    |            | 20%  | 16%   | 16%   |    |            |    |       |    |    |    |
| 33µF                  |                       |       |       |    |    |            |      |       |       |    |            |    |       |    |    |    |
| 47µF                  |                       |       |       |    |    |            | 20%  | 16%   |       |    |            |    | 16%   | 9% |    |    |
| 100µF                 |                       |       |       |    |    |            | 20%* |       |       |    |            |    |       |    |    |    |

\*2.8mm maximum thickness

Percentages in the table represent the dissipation factor for that value.

(CONSULT FACTORY  
FOR CAPACITANCE  
VALUES NOT LISTED)





### REEL DIMENSIONS (mm)

| Reel Diameter (A) | B        | C         | D        | T max.  |
|-------------------|----------|-----------|----------|---|
| 7" (178 ± 2.0)    | 13 ± 0.5 | 50 min.   | 21 ± 1.0 | 8.4 +1.0/-0<br>(1812 case size<br>12.4 +2.0/-0) |
| 10" (250 ± 2.0)   |          | 100 ± 1.0 |          |   |
| 13" (330 ± 2.0)   |          | 100 ± 1.0 |          |   |

### 7 INCH REEL QUANTITIES\*

| Size              | 01005  | 0201   | 0402   | 0603  | 0805  | 1206  | 1210  | 1812  |
|-------------------|--------|--------|--------|-------|-------|-------|-------|-------|
| Tape Size         | 8mm    | 8mm    | 8mm    | 8mm   | 8mm   | 8mm   | 8mm   | 12mm  |
| Min. Qty Per Reel | 20,000 | 20,000 | 10,000 | 4,000 | 4,000 | 4,000 | 1,000 | 1,000 |
| Max. Qty Per Reel | 20,000 | 20,000 | 10,000 | 4,000 | 5,000 | 5,000 | 5,000 | 2,000 |

\*Quantity dependent on chip thickness. Contact NIC for reel quantities on larger diameter reels.

### CARRIER TAPE MATERIAL

Parts with a thickness of ≥1mm will be taped on embossed plastic carrier. Parts with a thickness of less than 1mm will be taped on paper carrier

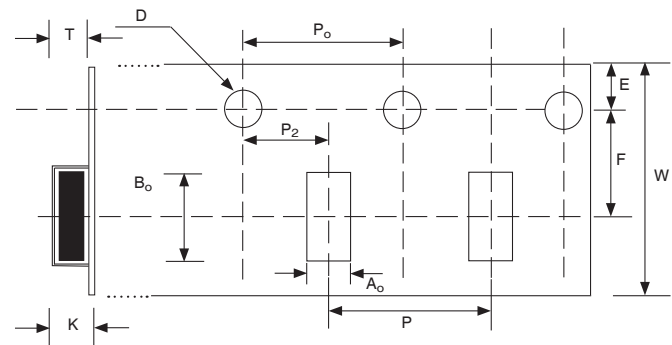
### EMBOSSED PLASTIC CARRIER TAPE DIMENSIONS (mm)

| Tape Size | W         | F          | E           | P <sub>0</sub> | P <sub>2</sub> | D                                   | K max. | T max. | P         |
|-----------|-----------|------------|-------------|----------------|----------------|-------------------------------------|--------|--------|-----------|
| 8mm       | 8.0 ± 0.2 | 3.5 ± 0.05 | 1.75 ± 0.10 | 4.0 ± 0.1      | 2.0 ± 0.5      | 1.5 <sup>+0.1</sup> <sub>-0.0</sub> | 3.0    | 2.0    | 4.0 ± 0.1 |
| 12mm      | 12 ± 0.2  | 5.5 ± 0.05 |             |                |                |                                     |        | 4.5    | 8.0 ± 0.1 |

#### Notes:

- Specifications are in compliance with EIA RS481-1-A "Taping of surface Mount Components for Automatic Placement"
- Dimensions A<sub>0</sub> (max.) equals component width dimension plus 0.5mm
- Dimension B<sub>0</sub> (max.) equals component length dimension plus 0.5mm

### EMBOSSED PLASTIC CARRIER TAPE

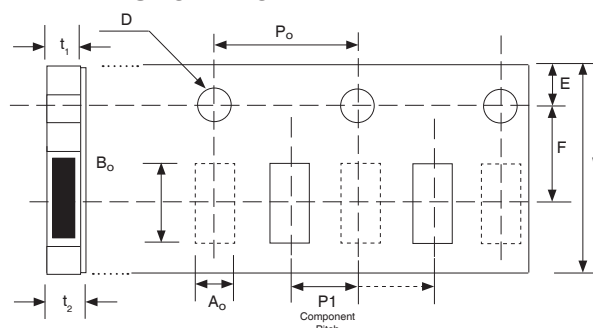


See notes 2 & 3 regarding dimensions A<sub>0</sub> and B<sub>0</sub>

### PUNCHED CARRIER TAPE DIMENSIONS (mm)

| Type  | A <sub>0</sub> | B <sub>0</sub> | W         | F          | E          | P1         | P0        | D0                                  | T1 max. | T2 max. | Mounting Hole      |
|-------|----------------|----------------|-----------|------------|------------|------------|-----------|-------------------------------------|---------|---------|--------------------|
| 01005 | 0.25 ± 0.04    | 0.45 ± 0.04    | 8.0 ± 0.3 | 3.5 ± 0.05 | 1.75 ± 0.1 | 2.0 ± 0.05 | 4.0 ± 0.1 | 1.5 <sup>+0.1</sup> <sub>-0.0</sub> | 0.27    | 0.36    | Angular Punch Hole |
| 0201  | 0.37 ± 0.03    | 0.67 ± 0.05    |           |            |            |            |           |                                     | 0.45    | 0.80    |                    |
| 0402  | 0.65 ± 0.05    | 1.15 ± 0.05    |           |            |            |            |           |                                     | 1.1     | 1.4     |                    |
| 0603  | 1.1 ± 0.2      | 1.9 ± 0.2      |           |            |            | 4.0 ± 0.10 |           |                                     | 1.1     | 1.4     |                    |
| 0805  | 1.65 ± 0.2     | 2.4 ± 0.2      |           |            |            |            |           |                                     |         |         |                    |
| 1206  | 2.0 ± 0.2      | 3.6 ± 0.2      |           |            |            |            |           |                                     |         |         |                    |

### PUNCHED CARRIER TAPE



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[SL155C222MAB](#) [FK26X7R2E104KN006](#) [CCR06CG183GRV](#) [CFB1/2C101J](#) [CFB1/2C102J](#) [CN20C102K](#) [M39014/01-1317](#) [M39014/01-](#)  
[1572V](#) [M39014/01-1594V](#) [M39014/02-1236](#) [M39014/02-1321V](#) [M39014/02-1345V](#) [M39014/22-0351](#) [M39014/22-0695](#) [M39014/220767](#)  
[M39014/220788](#) [M39014/22-1005](#) [MA405E334MAA](#) [MD015A103KAB](#) [SL301E105MAB](#) [CCR05CG242FRV](#) [KTD101B684M32A0B00](#)  
[CCR07CG473KR](#) [CCR05CG820JP](#) [TKC-TMC1206-05-1501-J??](#) [TKC-TMC1206-05-1801-J](#) [TKC-TMC1206-05-20R0-F](#) [TKC-](#)  
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