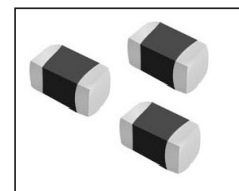


### FEATURES

- HIGH CURRENT RATINGS (UP TO 1,200A 8/20 $\mu$ S)
- WORK VOLTAGE 5.5VDC ~ 100VDC
- EIA SIZES 1206, 1210, 1812 AND 2220
- TEMPERATURE RANGE -55°C ~ +125°C (1206 ~ 1812)  
-55°C ~ +85°C (2220)
- REFLOW SOLDERING COMPATIBLE

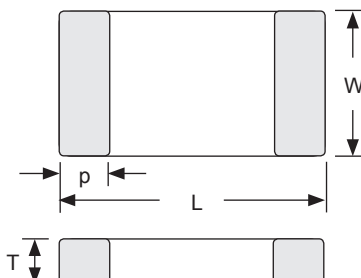
**RoHS**  
**Compliant**  
includes all homogeneous materials

\*See Part Number System for Details



### STANDARD CASE DIMENSIONS (mm)

| Type    | L          | W          | T        | p           |
|---------|------------|------------|----------|-------------|
| NVH1206 | 3.2 ± 0.20 | 1.6 ± 0.20 | 1.6 max  | 0.20 ~ 0.80 |
| NVH1210 | 3.2 ± 0.30 | 2.5 ± 0.25 | 1.7 max. | 0.25 ~ 0.75 |
| NVH1812 | 4.5 ± 0.40 | 3.2 ± 0.30 | 2.5 max. | 0.25 ~ 1.00 |
| NVH2220 | 5.7 ± 0.40 | 5.0 ± 0.40 | 2.5 max. | 0.25 ~ 1.00 |



### NVH1206 SPECIFICATIONS (STANDARD PACKAGE)

| Part Number        | Max. Working Voltage <20mA |         | Varistor Voltage @1mA DC Volts | Max. Clamping Voltage           |                        | Rated Single Pulse Transient    |                                  | Typical Capacitance* @1.0Vrms, 1KHz (pF) |
|--------------------|----------------------------|---------|--------------------------------|---------------------------------|------------------------|---------------------------------|----------------------------------|------------------------------------------|
|                    | VDC                        | VAC RMS |                                | 8/20 $\mu$ s Volts <sub>1</sub> | ESD Volts <sub>2</sub> | Energy 10/1000 $\mu$ s (Joules) | Peak Current 8/20 $\mu$ s (Amps) |                                          |
| NVH1206D5R5C242TRF | 5.5                        | 4.0     | 10.0 ~ 14.0                    | 18                              | 5.0                    | 0.5                             | 250                              | 2400                                     |
| NVH1206D090C220TRF | 9.0                        | 6.4     | 12.0 ~ 16.0                    | 20                              | 5.0                    | 0.5                             | 250                              | 2000                                     |
| NVH1206D120C162TRF | 12.0                       | 8.5     | 13.0 ~ 19.0                    | 25                              | 5.0                    | 0.5                             | 250                              | 1600                                     |
| NVH1206D140C112TRF | 14.0                       | 10.0    | 16.0 ~ 22.0                    | 30                              | 5.0                    | 0.5                             | 250                              | 1100                                     |
| NVH1206D180C801TRF | 18.0                       | 12.7    | 22.0 ~ 28.0                    | 40                              | 5.0                    | 0.5                             | 250                              | 800                                      |
| NVH1206D220C751TRF | 22.0                       | 15.6    | 26.0 ~ 34.0                    | 45                              | 5.0                    | 0.6                             | 250                              | 750                                      |
| NVH1206D260C681TRF | 26.0                       | 18.4    | 31.0 ~ 38.0                    | 58                              | 5.0                    | 0.7                             | 200                              | 680                                      |
| NVH1206D300C551TRF | 30.0                       | 21.3    | 37.0 ~ 46.0                    | 65                              | 5.0                    | 0.7                             | 200                              | 550                                      |
| NVH1206D330C501TRF | 33.0                       | 23.4    | 39.0 ~ 49.0                    | 72                              | 5.0                    | 0.7                             | 200                              | 500                                      |
| NVH1206D380C401TRF | 38.0                       | 30.0    | 46.0 ~ 54.0                    | 75                              | 5.0                    | 0.7                             | 200                              | 400                                      |
| NVH1206D420C351TRF | 42.0                       | 32.0    | 48.0 ~ 58.0                    | 86                              | 5.0                    | 0.5                             | 150                              | 350                                      |
| NVH1206D480C281TRF | 48.0                       | 34.1    | 54.0 ~ 67.0                    | 100                             | 5.0                    | 0.5                             | 150                              | 280                                      |
| NVH1206D560C201TRF | 56.0                       | 40.0    | 61.0 ~ 75.0                    | 120                             | 5.0                    | 0.5                             | 150                              | 200                                      |
| NVH1206D600C161TRF | 60.0                       | 46.0    | 69.0 ~ 83.0                    | 130                             | 5.0                    | 0.5                             | 150                              | 160                                      |
| NVH1206D650C141TRF | 65.0                       | 50.0    | 73.0 ~ 91.0                    | 140                             | 5.0                    | 0.6                             | 150                              | 140                                      |
| NVH1206D750C131TRF | 75.0                       | 55.0    | 85.0 ~ 103.0                   | 160                             | 5.0                    | 0.6                             | 150                              | 130                                      |
| NVH1206D850C121TRF | 85.0                       | 60.0    | 90.0 ~ 110.0                   | 170                             | 5.0                    | 0.7                             | 150                              | 120                                      |
| NVH1206D101C101TRF | 100                        | 75.0    | 108.0 ~ 132.0                  | 200                             | 5.0                    | 0.7                             | 150                              | 100                                      |

\*Capacitance Tolerance  $\pm 30\%$

### PART NUMBERING SYSTEM

NVH 1206 D 600 TR C161 E

- RoHS Compliant
- Typical Capacitance (pF): 1st & 2nd characters are significant figures, 3rd character is multiplier
- Tape & Reel
- Working Voltage: VDC rating for standard type, VAC rating for molded type, 1st & 2nd characters are significant figures, 3rd character is multiplier, R = decimal point, 5R5 = 5.5, 600 = 60, 131 = 130
- Construction: D = Multilayer
- Case Size: 1206, 1210, 1812 & 2220
- Series



## NVH1210 SPECIFICATIONS (STANDARD PACKAGE)

| Part Number        | Max. Working Voltage <20mA |         | Varistor Voltage @1mA DC Volts | Max. Clamping Voltage            |                         | Rated Single Pulse Transient    |                                  | Typical Capacitance* @1.0Vrms, 1KHz (pF) |
|--------------------|----------------------------|---------|--------------------------------|----------------------------------|-------------------------|---------------------------------|----------------------------------|------------------------------------------|
|                    | VDC                        | VAC RMS |                                | 8/20 $\mu$ s Volts <sub>-1</sub> | ESD Volts <sub>-2</sub> | Energy 10/1000 $\mu$ s (Joules) | Peak Current 8/20 $\mu$ s (Amps) |                                          |
| NVH1210D5R5C402TRF | 5.5                        | 4.0     | 10.0 ~ 14.0                    | 18                               | 5.0                     | 0.7                             | 400                              | 4000                                     |
| NVH1210D090C382TRF | 9.0                        | 6.4     | 12.0 ~ 16.0                    | 20                               | 5.0                     | 0.9                             | 400                              | 3800                                     |
| NVH1210D120C322TRF | 12.0                       | 8.5     | 13.0 ~ 19.0                    | 25                               | 5.0                     | 1.0                             | 400                              | 3200                                     |
| NVH1210D140C272TRF | 14.0                       | 10.0    | 16.0 ~ 22.0                    | 30                               | 5.0                     | 1.2                             | 400                              | 2700                                     |
| NVH1210D180C202TRF | 18.0                       | 12.7    | 22.0 ~ 28.0                    | 40                               | 5.0                     | 1.5                             | 400                              | 2000                                     |
| NVH1210D220C162TRF | 22.0                       | 15.6    | 26.0 ~ 34.0                    | 45                               | 5.0                     | 1.7                             | 400                              | 1600                                     |
| NVH1210D260C142TRF | 26.0                       | 18.4    | 31.0 ~ 38.0                    | 58                               | 5.0                     | 1.9                             | 400                              | 1400                                     |
| NVH1210D300C122TRF | 30.0                       | 21.3    | 37.0 ~ 46.0                    | 65                               | 5.0                     | 1.7                             | 300                              | 1200                                     |
| NVH1210D330C112TRF | 33.0                       | 23.4    | 39.0 ~ 49.0                    | 72                               | 5.0                     | 1.7                             | 300                              | 1100                                     |
| NVH1210D380C102TRF | 38.0                       | 30.0    | 46.0 ~ 54.0                    | 75                               | 5.0                     | 2.0                             | 300                              | 1000                                     |
| NVH1210D420C801TRF | 42.0                       | 32.0    | 48.0 ~ 58.0                    | 86                               | 5.0                     | 2.0                             | 300                              | 800                                      |
| NVH1210D480C701TRF | 48.0                       | 34.1    | 54.0 ~ 67.0                    | 100                              | 5.0                     | 2.0                             | 300                              | 700                                      |
| NVH1210D560C601TRF | 56.0                       | 40.0    | 61.0 ~ 75.0                    | 120                              | 5.0                     | 2.3                             | 300                              | 600                                      |
| NVH1210D600C451TRF | 60.0                       | 46.0    | 69.0 ~ 83.0                    | 130                              | 5.0                     | 2.0                             | 300                              | 450                                      |
| NVH1210D650C251TRF | 65.0                       | 50.0    | 73.0 ~ 91.0                    | 140                              | 5.0                     | 1.6                             | 300                              | 250                                      |
| NVH1210D750C301TRF | 75.0                       | 55.0    | 85.0 ~ 103.0                   | 160                              | 5.0                     | 1.6                             | 200                              | 300                                      |
| NVH1210D850C201TRF | 85.0                       | 60.0    | 90.0 ~ 110.0                   | 170                              | 5.0                     | 2.0                             | 200                              | 200                                      |
| NVH1210D101C181TRF | 100                        | 75.0    | 108.0 ~ 132.0                  | 200                              | 5.0                     | 1.6                             | 200                              | 180                                      |

\*Capacitance Tolerance  $\pm 30\%$ 

## NVH1812 SPECIFICATIONS (STANDARD PACKAGE)

| Part Number        | Max. Working Voltage <20mA |         | Varistor Voltage @1mA DC Volts | Max. Clamping Voltage            |                         | Rated Single Pulse Transient    |                                  | Typical Capacitance* @1.0Vrms, 1KHz (pF) |
|--------------------|----------------------------|---------|--------------------------------|----------------------------------|-------------------------|---------------------------------|----------------------------------|------------------------------------------|
|                    | VDC                        | VAC RMS |                                | 8/20 $\mu$ s Volts <sub>-1</sub> | ESD Volts <sub>-2</sub> | Energy 10/1000 $\mu$ s (Joules) | Peak Current 8/20 $\mu$ s (Amps) |                                          |
| NVH1812D5R5C712TRF | 5.5                        | 4.0     | 10.0 ~ 14.0                    | 18                               | 5.0                     | 1.0                             | 800                              | 7100                                     |
| NVH1812D090C602TRF | 9.0                        | 6.4     | 12.0 ~ 16.0                    | 20                               | 5.0                     | 1.2                             | 800                              | 6000                                     |
| NVH1812D120C512TRF | 12.0                       | 8.5     | 13.0 ~ 19.0                    | 25                               | 5.0                     | 1.5                             | 800                              | 5100                                     |
| NVH1812D140C432TRF | 14.0                       | 10.0    | 16.0 ~ 22.0                    | 30                               | 5.0                     | 1.9                             | 800                              | 4300                                     |
| NVH1812D180C362TRF | 18.0                       | 12.7    | 22.0 ~ 28.0                    | 40                               | 5.0                     | 2.3                             | 800                              | 3600                                     |
| NVH1812D220C262TRF | 22.0                       | 15.6    | 26.0 ~ 34.0                    | 45                               | 5.0                     | 2.5                             | 800                              | 2600                                     |
| NVH1812D260C242TRF | 26.0                       | 18.4    | 31.0 ~ 38.0                    | 58                               | 5.0                     | 3.0                             | 800                              | 2400                                     |
| NVH1812D300C202TRF | 30.0                       | 21.3    | 37.0 ~ 46.0                    | 65                               | 5.0                     | 3.7                             | 800                              | 2000                                     |
| NVH1812D330C182TRF | 33.0                       | 23.4    | 39.0 ~ 49.0                    | 72                               | 5.0                     | 3.7                             | 800                              | 1800                                     |
| NVH1812D380C162TRF | 38.0                       | 30.0    | 46.0 ~ 54.0                    | 75                               | 5.0                     | 4.2                             | 800                              | 1600                                     |
| NVH1812D420C142TRF | 42.0                       | 32.0    | 48.0 ~ 58.0                    | 86                               | 5.0                     | 4.0                             | 600                              | 1400                                     |
| NVH1812D480C122TRF | 48.0                       | 34.1    | 54.0 ~ 67.0                    | 100                              | 5.0                     | 4.0                             | 600                              | 1200                                     |
| NVH1812D560C102TRF | 56.0                       | 40.0    | 61.0 ~ 75.0                    | 120                              | 5.0                     | 4.3                             | 600                              | 1000                                     |
| NVH1812D600C901TRF | 60.0                       | 46.0    | 69.0 ~ 83.0                    | 130                              | 5.0                     | 4.3                             | 600                              | 900                                      |
| NVH1812D650C781TRF | 65.0                       | 50.0    | 73.0 ~ 91.0                    | 140                              | 5.0                     | 4.0                             | 600                              | 780                                      |
| NVH1812D750C601TRF | 75.0                       | 55.0    | 85.0 ~ 103.0                   | 160                              | 5.0                     | 4.0                             | 500                              | 600                                      |
| NVH1812D850C451TRF | 85.0                       | 60.0    | 90.0 ~ 110.0                   | 170                              | 5.0                     | 4.0                             | 500                              | 450                                      |
| NVH1812D101C401TRF | 100                        | 75.0    | 108.0 ~ 132.0                  | 200                              | 5.0                     | 4.0                             | 500                              | 400                                      |

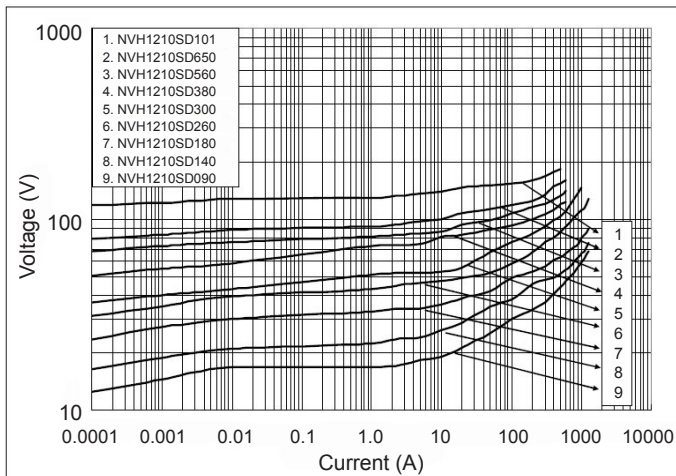
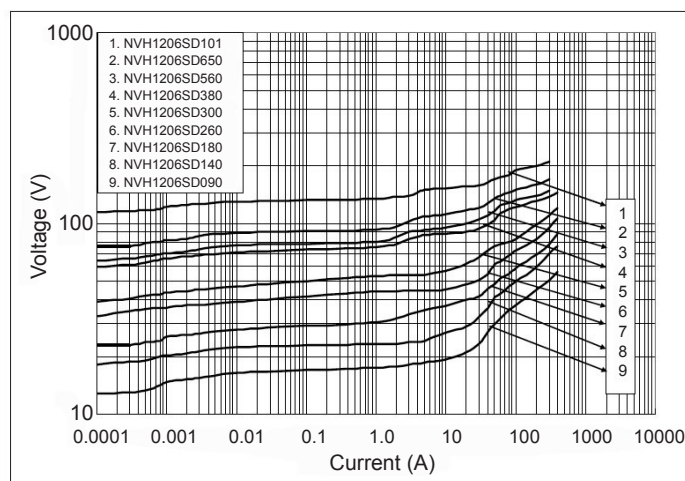
\*Capacitance Tolerance  $\pm 30\%$ 

## NVH2220 SPECIFICATIONS (STANDARD PACKAGE)

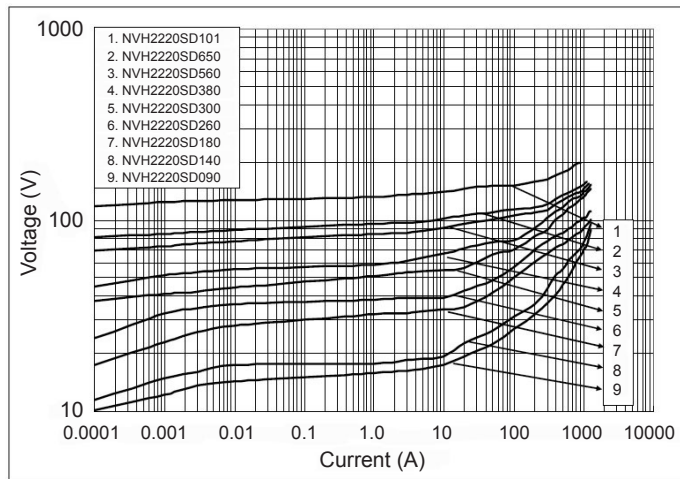
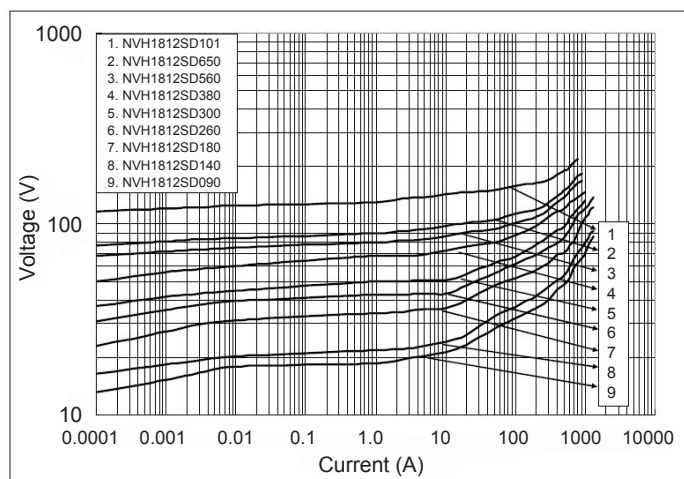
| Part Number        | Max. Working Voltage <20mA |         | Varistor Voltage @1mA DC Volts | Max. Clamping Voltage           |                        | Rated Single Pulse Transient    |                                  | Typical Capacitance* @1.0Vrms, 1KHz (pF) |
|--------------------|----------------------------|---------|--------------------------------|---------------------------------|------------------------|---------------------------------|----------------------------------|------------------------------------------|
|                    | VDC                        | VAC RMS |                                | 8/20 $\mu$ s Volts <sub>1</sub> | ESD Volts <sub>2</sub> | Energy 10/1000 $\mu$ s (Joules) | Peak Current 8/20 $\mu$ s (Amps) |                                          |
| NVH2220D5R5C153TRF | 5.5                        | 4.0     | 10.0 ~ 14.0                    | 18                              | 10                     | 1.4                             | 1200                             | 15000                                    |
| NVH2220D090C123TRF | 9.0                        | 6.4     | 12.0 ~ 16.0                    | 20                              | 10                     | 2.7                             | 1200                             | 12000                                    |
| NVH2220D120C103TRF | 12.0                       | 8.5     | 13.0 ~ 19.0                    | 25                              | 10                     | 3.2                             | 1200                             | 10000                                    |
| NVH2220D140C802TRF | 14.0                       | 10.0    | 16.0 ~ 22.0                    | 30                              | 10                     | 5.4                             | 1200                             | 8000                                     |
| NVH2220D180C722TRF | 18.0                       | 12.7    | 22.0 ~ 28.0                    | 40                              | 10                     | 5.8                             | 1200                             | 7200                                     |
| NVH2220D220C532TRF | 22.0                       | 15.6    | 26.0 ~ 34.0                    | 45                              | 10                     | 6.5                             | 1200                             | 5300                                     |
| NVH2220D260C402TRF | 26.0                       | 18.4    | 31.0 ~ 38.0                    | 58                              | 10                     | 7.8                             | 1200                             | 4000                                     |
| NVH2220D300C362TRF | 30.0                       | 21.3    | 37.0 ~ 46.0                    | 65                              | 10                     | 9.6                             | 1200                             | 3600                                     |
| NVH2220D330C342TRF | 33.0                       | 23.4    | 39.0 ~ 49.0                    | 72                              | 10                     | 9.6                             | 1200                             | 3400                                     |
| NVH2220D380C322TRF | 38.0                       | 30.0    | 46.0 ~ 54.0                    | 75                              | 10                     | 12.0                            | 1200                             | 3200                                     |
| NVH2220D420C312TRF | 42.0                       | 32.0    | 48.0 ~ 58.0                    | 86                              | 10                     | 9.0                             | 900                              | 3100                                     |
| NVH2220D480C302TRF | 48.0                       | 34.1    | 54.0 ~ 67.0                    | 100                             | 10                     | 7.7                             | 900                              | 3000                                     |
| NVH2220D560C182TRF | 56.0                       | 40.0    | 61.0 ~ 75.0                    | 120                             | 10                     | 9.0                             | 900                              | 1800                                     |
| NVH2220D600C152TRF | 60.0                       | 46.0    | 69.0 ~ 83.0                    | 130                             | 10                     | 6.5                             | 900                              | 1500                                     |
| NVH2220D650C142TRF | 65.0                       | 50.0    | 73.0 ~ 91.0                    | 140                             | 10                     | 5.6                             | 900                              | 1400                                     |
| NVH2220D750C102TRF | 75.0                       | 55.0    | 85.0 ~ 103.0                   | 160                             | 10                     | 6.0                             | 800                              | 1000                                     |
| NVH2220D850C801TRF | 85.0                       | 60.0    | 90.0 ~ 110.0                   | 170                             | 10                     | 6.8                             | 800                              | 800                                      |
| NVH2220D101C651TRF | 100                        | 75.0    | 108.0 ~ 132.0                  | 200                             | 10                     | 6.0                             | 800                              | 650                                      |

\*Capacitance Tolerance  $\pm 30\%$ 

## TYPICAL PERFORMANCE CHARACTERISTICS

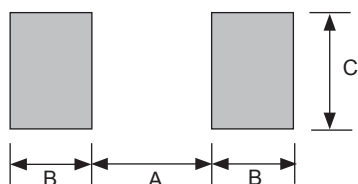


### TYPICAL PERFORMANCE CHARACTERISTICS

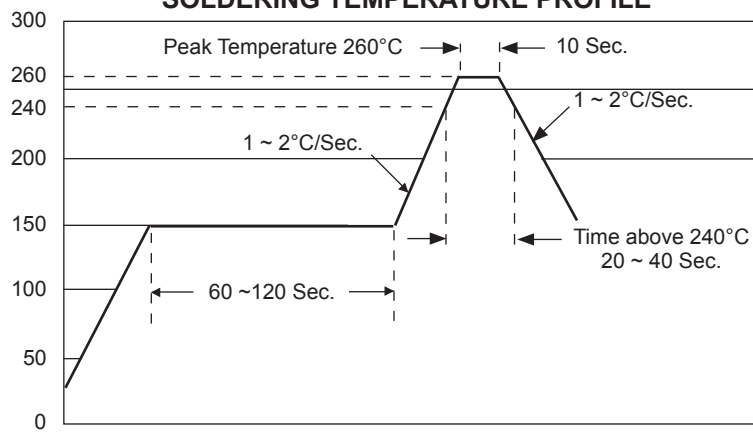


### RECOMMENDED LAND PATTERN DIMENSIONS (mm)

| Type    | A         | B         | C         |
|---------|-----------|-----------|-----------|
| NVH1206 | 1.8 ~ 2.5 | 1.0 ~ 1.5 | 1.2 ~ 2.0 |
| NVH1210 | 1.9 ~ 2.1 | 1.2 ~ 1.5 | 2.6 ~ 2.8 |
| NVH1812 | 2.8 ~ 3.0 | 1.5 ~ 1.8 | 3.3 ~ 3.6 |
| NVH2220 | 4.0 ~ 4.2 | 1.8 ~ 2.0 | 5.2 ~ 5.5 |



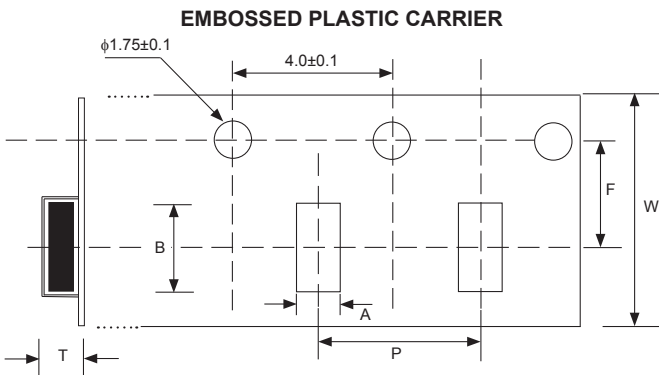
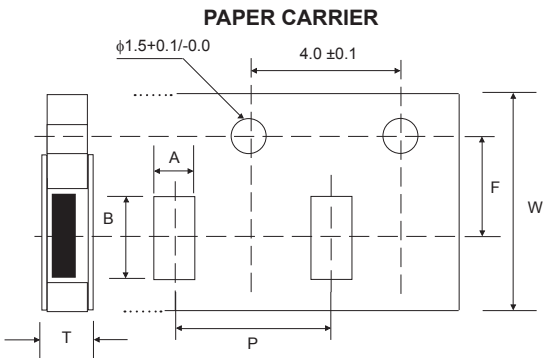
### RECOMMENDED REFLOW SOLDERING TEMPERATURE PROFILE



Note: 2 times maximum reflow

CARRIER DIMENSIONS (mm) AND REEL QUANTITY

| Type    | Carrier Material | A nom. | B nom. | P ± 0.1 | T max. | F ± 0.05 | W ± 0.3 | Reel Quantity |
|---------|------------------|--------|--------|---------|--------|----------|---------|---------------|
| NVH1206 | Paper            | 1.90   | 3.50   | 4.0     | 1.10   | 3.50     | 8.0     | 3,000         |
| NVH1210 | Plastic          | 2.75   | 3.45   | 4.0     | 1.80   | 3.50     | 8.0     | 2,000         |
| NVH1812 |                  | 3.50   | 4.80   | 8.0     | 2.70   | 5.50     | 12.0    | 2,000         |
| NVH2220 |                  | 5.10   | 6.00   | 8.0     | 2.7    | 5.50     | 12.0    | 2,000         |



REEL DIMENSIONS (mm)

| A         | B        | W    |
|-----------|----------|------|
| 178 ± 2.0 | 58 ± 2.0 | 12.5 |

