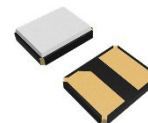


## Automotive Grade Ceramic Base SMD 2-pad Crystal

## Description

The ABM10AAIG series is an Automotive Grade AEC-Q200 qualified AT-Cut fundamental mode MHz quartz crystal offered in a 2.5mm x 2.0mm x 0.53mm two-pad SMD package. Tight frequency accuracy of  $\pm 15\text{ppm}$  at room temperature ( $+25^{\circ}\text{C}$ ) with frequency stability as low as  $\pm 50\text{ppm}$  over operating temperature range of  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$  is achieved in industry-standard carrier frequencies common for Infotainment Systems, Keyless Entry and Startup, GPS and Navigation, ADAS (Advanced Driver Assistance Systems), Vehicle to Vehicle Communication, LiDAR (Light Detection and Ranging), and In-vehicle Networking end applications.



## Features

- AEC-Q200 Qualified
- Automotive Grade 1:  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$
- TS16949 Production Line Certified
- PPAP Available Upon Request
- [REACH/RoHS II Compliant](#) | MSL Level = 1

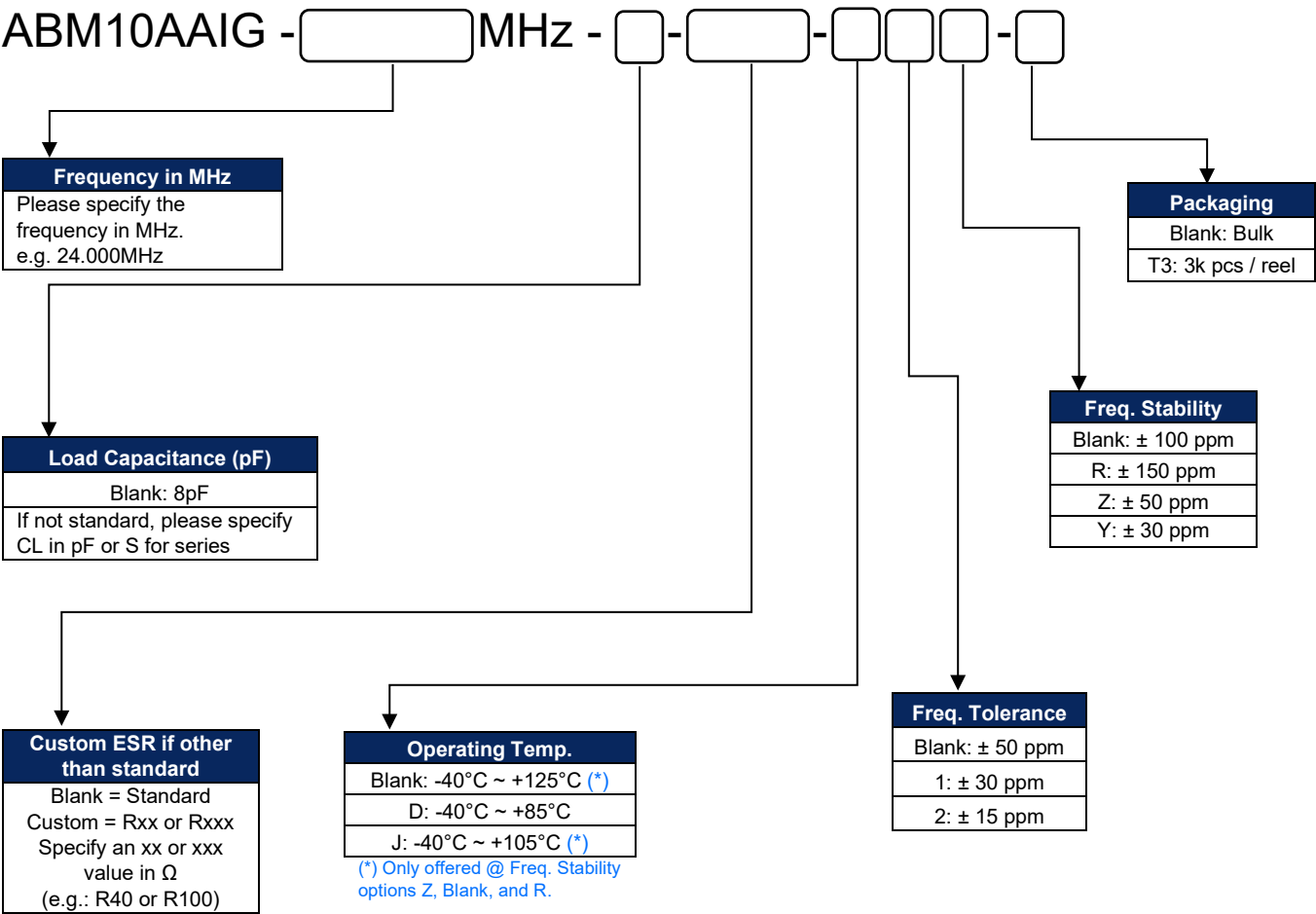
## Typical Applications

- Infotainment Systems
- Keyless Entry & Startup
- GPS & Navigation
- Comfort control
- ADAS (Advanced Driver Assistance Systems)
- Vehicle to Vehicle Communication
- LiDAR (Light Detection and Ranging)
- In-vehicle Networking
- Powertrain & Drive Control
- Power Control & Conversion
- Industrial Control & Automation

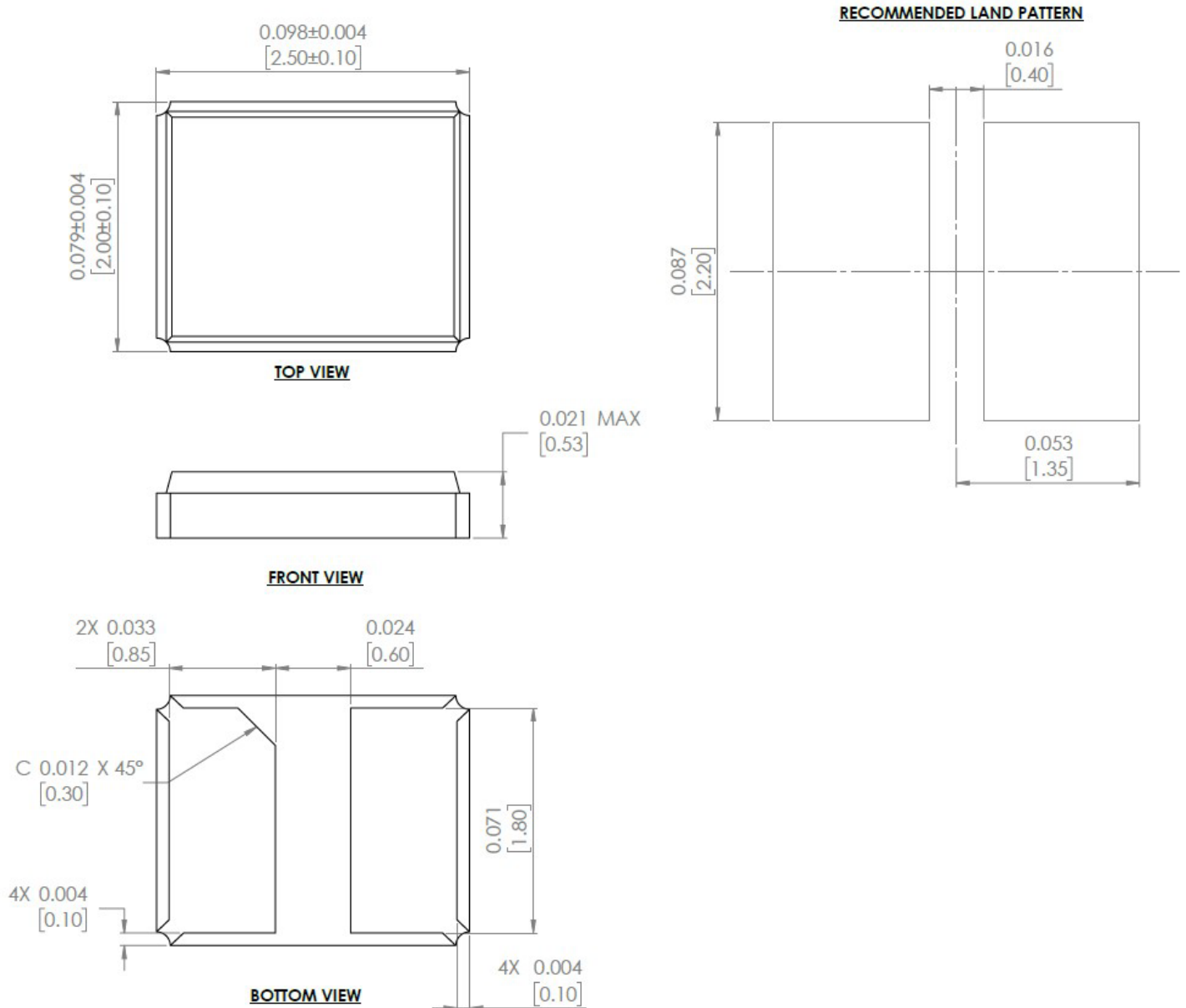
## Electrical Specifications

| Parameters                                                                          | Min.                 | Typ. | Max.   | Units              | Notes                                                   |
|-------------------------------------------------------------------------------------|----------------------|------|--------|--------------------|---------------------------------------------------------|
| Frequency Range                                                                     | 12.000               |      | 60.000 | MHz                |                                                         |
| Operation Mode                                                                      | Fundamental (AT-cut) |      |        |                    |                                                         |
| Operating Temperature                                                               | -40                  |      | +125   | $^{\circ}\text{C}$ | Option "blank"; See options                             |
| Storage Temperature                                                                 | -55                  |      | +125   | $^{\circ}\text{C}$ |                                                         |
| Frequency Tolerance @ $+25^{\circ}\text{C}$                                         | -50                  |      | +50    | ppm                | Option "blank"; See options                             |
| Frequency Stability over the Operating Temperature (ref. to $+25^{\circ}\text{C}$ ) | -100                 |      | +100   | ppm                | Option "blank"; See options                             |
| Equivalent series resistance (R1)                                                   |                      |      | 250    | $\Omega$           | 12.000 – 15.999MHz                                      |
|                                                                                     |                      |      | 80     |                    | 16.000 – 18.999MHz                                      |
|                                                                                     |                      |      | 50     |                    | 19.000 – 60.000MHz                                      |
| Shunt capacitance (C0)                                                              |                      |      | 3.0    | pF                 |                                                         |
| Load capacitance (CL)                                                               |                      | 8    |        | pF                 | Option "blank"; See options                             |
| Drive Level                                                                         |                      | 100  | 300    | $\mu\text{W}$      |                                                         |
| Aging                                                                               | -3                   |      | +3     | ppm                | @ $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ First year |
| Insulation Resistance                                                               | 500                  |      |        | M $\Omega$         | @ 100Vdc $\pm 15\text{V}$                               |

Part Identification (left blank if standard)



**Mechanical Dimensions**



**Dimensions: inches [mm]**

Reflow Profile [JEDEC J-STD-020]

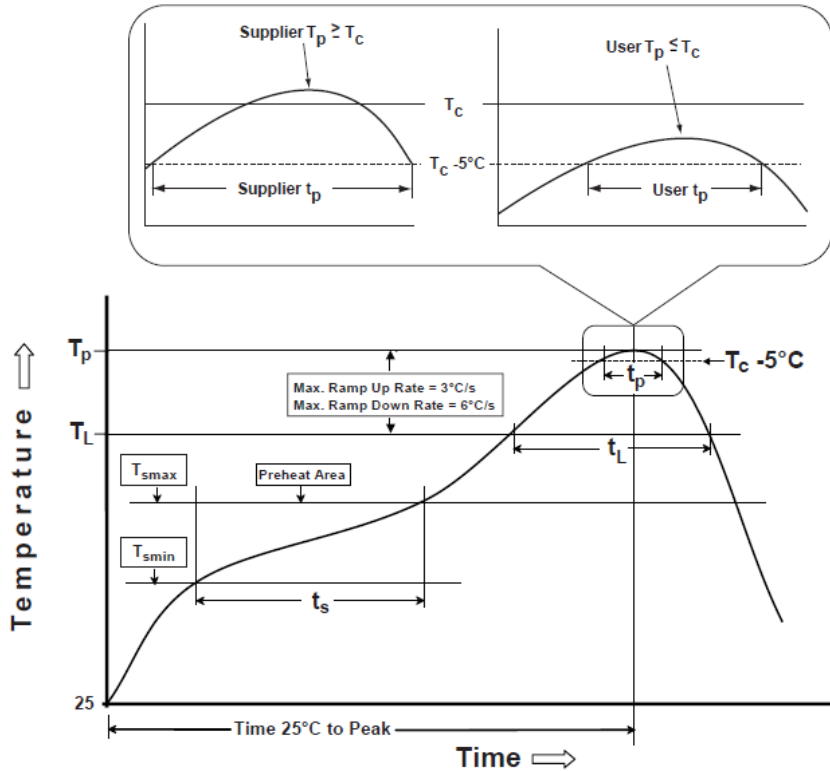


Table 1

| SnPb Eutectic Process<br>Classification Temperatures ( $T_C$ ) |                           |                                 |
|----------------------------------------------------------------|---------------------------|---------------------------------|
| Package Thickness                                              | Volume $\text{mm}^3$ <350 | Volume $\text{mm}^3$ $\geq 350$ |
| <2.5 mm                                                        | 235 °C                    | 220 °C                          |
| $\geq 2.5$ mm                                                  | 220 °C                    | 220 °C                          |

Table 2

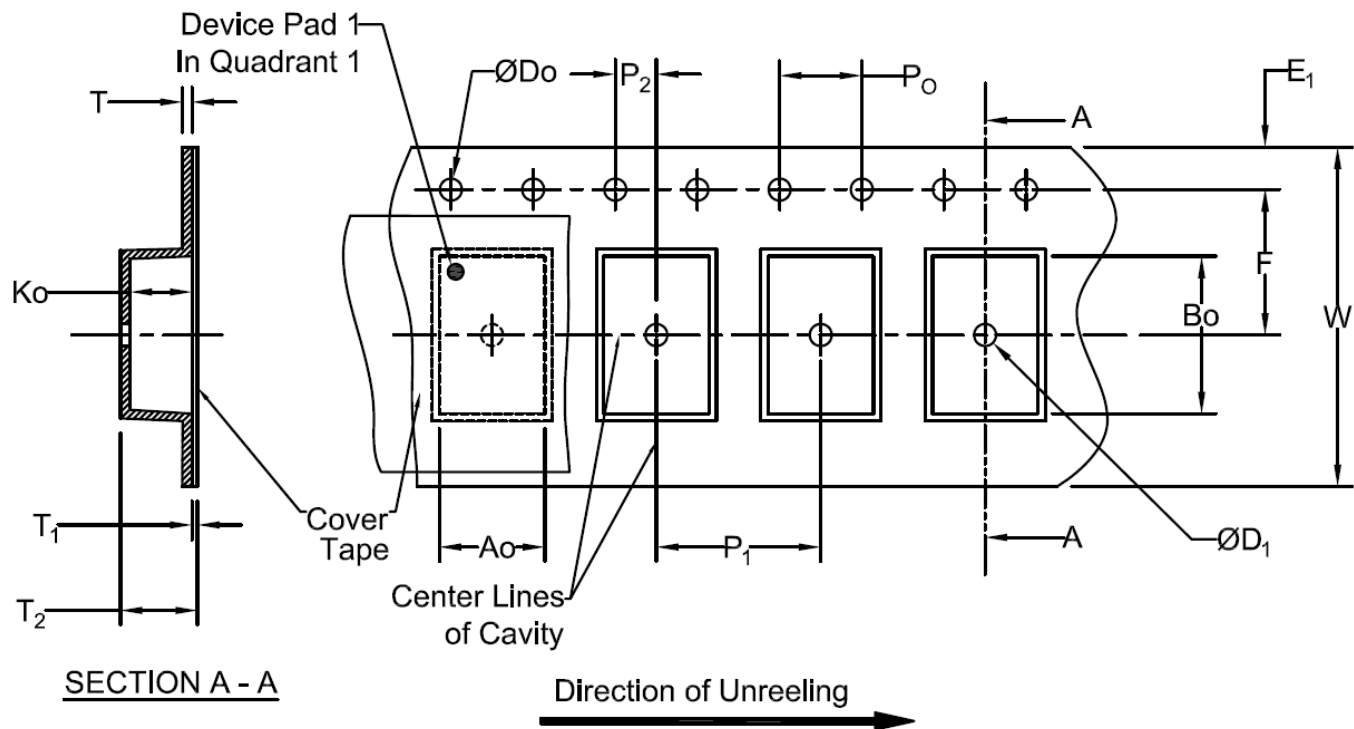
| Pb-Free Process<br>Classification Temperatures ( $T_C$ ) |                           |                               |                            |
|----------------------------------------------------------|---------------------------|-------------------------------|----------------------------|
| Package Thickness                                        | Volume $\text{mm}^3$ <350 | Volume $\text{mm}^3$ 350-2000 | Volume $\text{mm}^3$ >2000 |
| <1.6 mm                                                  | 260 °C                    | 260 °C                        | 260 °C                     |
| 1.6 mm - 2.5 mm                                          | 260 °C                    | 250 °C                        | 245 °C                     |
| >2.5 mm                                                  | 250 °C                    | 245 °C                        | 245 °C                     |

| Profile Feature                                                                   | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|-----------------------------------------------------------------------------------|-------------------------|------------------|
| Preheat / soak                                                                    |                         |                  |
| Temperature minimum ( $T_{smin}$ )                                                | 100°C                   | 150°C            |
| Temperature maximum ( $T_{smax}$ )                                                | 150°C                   | 200°C            |
| Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )                                       | 60 - 120 sec.           | 60 - 120 sec.    |
| Average ramp-up rate ( $T_{smax}$ to $T_P$ )                                      | 3°C/sec. max            | 3°C/sec. max     |
| Liquidous temperature ( $T_L$ )                                                   | 183°C                   | 217°C            |
| Time at liquidous ( $t_L$ )                                                       | 60 - 150 sec.           | 60 - 150 sec.    |
| Peak package body temperature ( $T_P$ )*                                          | see Table 1             | see Table 2      |
| Time ( $t_p$ )** within 5°C of the specified classification temperature ( $T_C$ ) | 20 sec.                 | 30 sec.          |
| Ramp-down rate ( $T_P$ to $T_{smax}$ )                                            | 6°C/sec. max            | 6°C/sec. max     |
| Time 25°C to peak temperature                                                     | 6 min. max              | 8 min. max       |
| Reflow cycles                                                                     | 2 max                   | 2 max            |

\*Tolerance for peak profile temperature ( $T_P$ ) is defined as a supplier minimum and a user maximum.

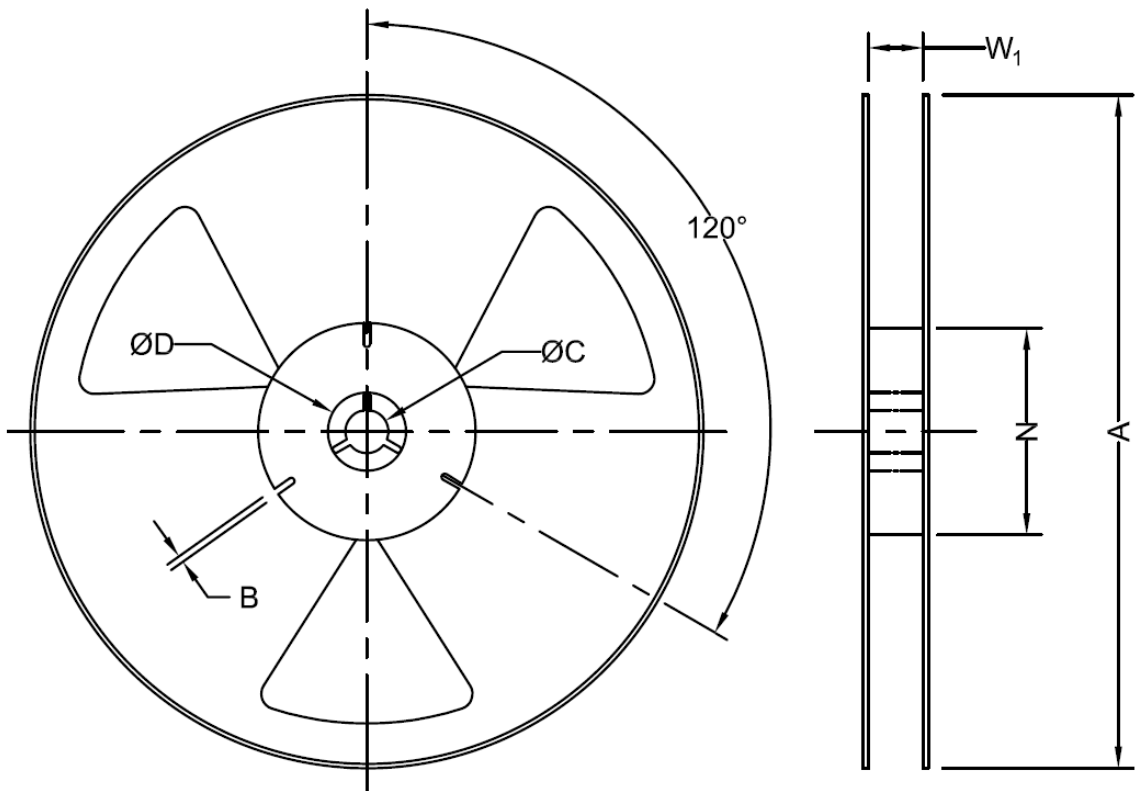
\*\*Tolerance for time at peak profile temperature ( $t_p$ ) is defined as a supplier minimum and a user maximum.

Packaging



| Tape Specifications (mm) |                |                |                |                      |                      |                      |         |
|--------------------------|----------------|----------------|----------------|----------------------|----------------------|----------------------|---------|
| Width                    | Ao             | Bo             | Do             | D <sub>1</sub> (Min) | E <sub>1</sub>       | F                    | Ko      |
| 8mm                      | *              | *              | 1.5+0.1/-0.0   | 1.0                  | 1.75±0.1             | 3.5±0.05             | *       |
| Width                    | P <sub>1</sub> | P <sub>2</sub> | P <sub>0</sub> | T (Max)              | T <sub>1</sub> (Max) | T <sub>2</sub> (Max) | W (Max) |
| 8mm                      | 4.0±0.1        | 2.0±0.05       | 4.0±0.1        | 0.6                  | 0.1                  | 2.5                  | 8.3     |

\*Note: Compliant to EIA-481



| Reel Specifications (mm) |          |         |         |               |         |         |                 |
|--------------------------|----------|---------|---------|---------------|---------|---------|-----------------|
| Width                    | Qty/Reel | A (Nom) | B (Min) | C (Min)       | D (Min) | N (Min) | *W <sub>1</sub> |
| 8mm                      | 3000     | 178     | 1.5     | 13.0+0.5/-0.2 | 20.2    | 50      | 8.4+1.5/-0.0    |

**\*Note: Measured at Hub**