APPLICATION NOTE

Nema GFX Extensions TSVG Supported Elements List

A-SOCAPG-ANGA02EN v1.0

Legal Information and Disclaimers

AMBIQ MICRO INTENDS FOR THE CONTENT CONTAINED IN THE DOCUMENT TO BE ACCURATE AND RELIABLE. THIS CONTENT MAY, HOWEVER, CONTAIN TECHNICAL INACCURACIES, TYPOGRAPHICAL ERRORS OR OTHER MISTAKES. AMBIQ MICRO MAY MAKE CORRECTIONS OR OTHER CHANGES TO THIS CONTENT AT ANY TIME. AMBIQ MICRO AND ITS SUPPLIERS RESERVE THE RIGHT TO MAKE CORRECTIONS, MODIFICATIONS, ENHANCEMENTS, IMPROVEMENTS AND OTHER CHANGES TO ITS PRODUCTS, PROGRAMS AND SERVICES AT ANY TIME OR TO DISCONTINUE ANY PRODUCTS, PROGRAMS, OR SERVICES WITHOUT NOTICE.

THE CONTENT IN THIS DOCUMENT IS PROVIDED "AS IS". AMBIQ MICRO AND ITS RESPECTIVE SUPPLIERS MAKE NO REPRESENTATIONS ABOUT THE SUITABILITY OF THIS CONTENT FOR ANY PURPOSE AND DISCLAIM ALL WARRANTIES AND CONDITIONS WITH REGARD TO THIS CONTENT, INCLUDING BUT NOT LIMITED TO, ALL IMPLIED WARRANTIES AND CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE AND NON-INFRINGEMENT OF ANY THIRD PARTY INTELLECTUAL PROPERTY RIGHT.

AMBIQ MICRO DOES NOT WARRANT OR REPRESENT THAT ANY LICENSE, EITHER EXPRESS OR IMPLIED, IS GRANTED UNDER ANY PATENT RIGHT, COPYRIGHT, MASK WORK RIGHT, OR OTHER INTELLECTUAL PROPERTY RIGHT OF AMBIQ MICRO COVERING OR RELATING TO THIS CONTENT OR ANY COMBINATION, MACHINE, OR PROCESS TO WHICH THIS CONTENT RELATE OR WITH WHICH THIS CONTENT MAY BE USED.

USE OF THE INFORMATION IN THIS DOCUMENT MAY REQUIRE A LICENSE FROM A THIRD PARTY UNDER THE PATENTS OR OTHER INTELLECTUAL PROPERTY OF THAT THIRD PARTY, OR A LICENSE FROM AMBIQ MICRO UNDER THE PATENTS OR OTHER INTELLECTUAL PROPERTY OF AMBIQ MICRO.

INFORMATION IN THIS DOCUMENT IS PROVIDED SOLELY TO ENABLE SYSTEM AND SOFTWARE IMPLEMENTERS TO USE AMBIQ MICRO PRODUCTS. THERE ARE NO EXPRESS OR IMPLIED COPYRIGHT LICENSES GRANTED HEREUNDER TO DESIGN OR FABRICATE ANY INTEGRATED CIRCUITS OR INTEGRATED CIRCUITS BASED ON THE INFORMATION IN THIS DOCUMENT. AMBIQ MICRO RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN. AMBIQ MICRO MAKES NO WARRANTY, REPRESENTATION OR GUARANTEE REGARDING THE SUITABILITY OF ITS PRODUCTS FOR ANY PARTICULAR PURPOSE, NOR DOES AMBIQ MICRO ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT, AND SPECIFICALLY DISCLAIMS ANY AND ALL LIABILITY, INCLUDING WITHOUT LIMITATION CONSEQUENTIAL OR INCIDENTAL DAMAGES. “TYPICAL” PARAMETERS WHICH MAY BE PROVIDED IN AMBIQ MICRO DATA SHEETS AND/OR SPECIFICATIONS CAN AND DO VARY IN DIFFERENT APPLICATIONS AND ACTUAL PERFORMANCE MAY VARY OVER TIME. ALL OPERATING PARAMETERS, INCLUDING “TYPICALS” MUST BE VALIDATED FOR EACH CUSTOMER APPLICATION BY CUSTOMER’S TECHNICAL EXPERTS. AMBIQ MICRO DOES NOT CONVEY ANY LICENSE UNDER NEITHER ITS PATENT RIGHTS NOR THE RIGHTS OF OTHERS. AMBIQ MICRO PRODUCTS ARE NOT DESIGNED, INTENDED, OR AUTHORIZED FOR USE AS COMPONENTS IN SYSTEMS INTENDED FOR SURGICAL IMPLANT INTO THE BODY, OR OTHER APPLICATIONS INTENDED TO SUPPORT OR SUSTAIN LIFE, OR FOR ANY OTHER APPLICATION IN WHICH THE FAILURE OF THE AMBIQ MICRO PRODUCT COULD CREATE A SITUATION WHERE PERSONAL INJURY OR DEATH MAY OCCUR. SHOULD BUYER PURCHASE OR USE AMBIQ MICRO PRODUCTS FOR ANY SUCH UNINTENDED OR UNAUTHORIZED APPLICATION, BUYER SHALL INDEMNIFY AND HOLD AMBIQ MICRO AND ITS OFFICERS, EMPLOYEES, SUBSIDIARIES, AFFILIATES, AND DISTRIBUTORS HARMLESS AGAINST ALL CLAIMS, COSTS, DAMAGES, AND EXPENSES, AND REASONABLE ATTORNEY FEES ARISING OUT OF, DIRECTLY OR INDIRECTLY, ANY CLAIM OF PERSONAL INJURY OR DEATH ASSOCIATED WITH SUCH UNINTENDED OR UNAUTHORIZED USE, EVEN IF SUCH CLAIM ALLEGES THAT AMBIQ MICRO WAS NEGLIGENT REGARDING THE DESIGN OR MANUFACTURE OF THE PART.

Revision History

Revision	Date	Description
1.0	December 2025	Initial Release.

Reference Documents

Document ID	Description
A-SOCAPG-UMGA01EN	Nema DC API Library User's Manual
A-SOCAPG-UMGA02EN	Nema GFX API Library User's Manual
A-SOCAPG-UMGA03EN	Nema GFX Extension Vector Graphics User's Manual
A-SOCAPG-ANGA01EN	Nema DC MiP Panels Configuration Application Note
A-SOCAPG-SGGA01EN	Nema Pixpresso Starting Guide
A-SOCAPG-ANGA03EN	Nema GFX API Debugging Application Note
A-SOCAPG-UMGA04EN	Nema GUI-builder User's Manual
A-SOCAPG-UMGA05EN	Nema GFX Benchmark Suite User's Manual
A-SOCAPG-UMGA06EN	Nema Pico Graphics Processing Unit User's Manual
A-SOCAPG-UMGA07EN	Nema Pico Platform Drivers User's Manual

Table of Contents

List of Tables

List of Figures

SECTION

1

Overview

This document contains the supported elements from Tiny SVG 1.2 profile, as well as descriptions of the elements and the their respective attributes. These elements are used in files converted from SVG to TSVG format, for use with the Nema GFX library.

SECTION

2

Supported Elements

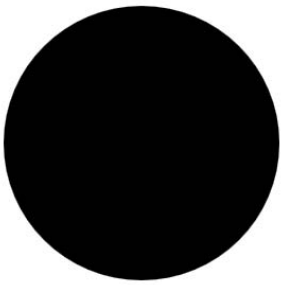
2.1 Supported Elements

The circle SVG element is a basic shape, used to draw circles on a center point and a radius.

Example

```
<svg viewBox="0 0 100 100" xmlns="http://www.w3.org/2000/svg">
  <circle cx="50" cy="50" r="50"/>
</svg>
```

Figure 2-1: Circle Element



Supported attributes:

- cx
- cy
- r
- id
- fill
- fill-opacity
- fill-rule

- stroke
- stroke-opacity
- stroke-width
- stroke-dasharray
- stroke-dashoffset
- style
- transform

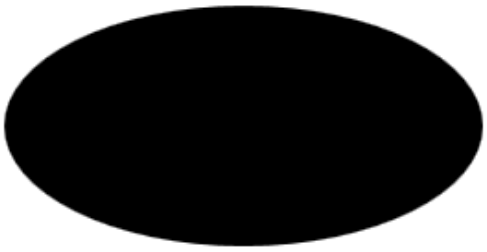
2.2 Ellipse Element

The ellipse SVG element is a basic shape, used to draw ellipses on a center coordinate, and both their x and y radius

Example

```
<svg viewBox="0 0 200 100" xmlns="http://www.w3.org/2000/svg">
  <ellipse cx="100" cy="50" rx="100" ry="50"/>
</svg>
```

Figure 2-2: Ellipse Element



Supported attributes:

- cx
- cy
- rx
- ry
- id
- fill
- fill-opacity
- fill-rule
- stroke
- stroke-opacity
- stroke-width
- stroke-dasharray

- stroke-dashoffset
- style
- transform

2.3 g Element

The g SVG element is a container used to group other SVG elements.

Transformations applied to the g element are performed on its child elements, and its attributes are inherited by its children.

Supported attributes:

- id
- fill
- fill-opacity
- fill-rule
- stroke
- stroke-opacity
- stroke-width
- stroke-linecap
- stroke-linejoin
- stroke-miterlimit
- stroke-dasharray
- stroke-dashoffset
- style
- transform

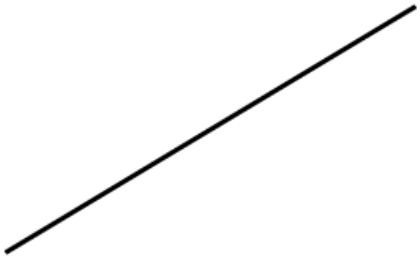
2.4 Line Element

The line element is an SVG basic shape used to create a line connecting two points.

Example

```
<svg viewBox="0 0 100 100" xmlns="http://www.w3.org/2000/svg">
  <line x1="0" y1="80" x2="100" y2="20" stroke="black"/>
</svg>
```

Figure 2-3: Line Element



Supported attributes:

- x1
- y1
- x2
- y2
- id
- fill
- fill-opacity
- fill-rule
- stroke
- stroke-opacity
- stroke-width
- stroke-linecap
- stroke-linejoin
- stroke-miterlimit
- stroke-dasharray
- stroke-dashoffset
- style
- transform

2.5 Linear Gradient Element

The linearGradient element lets authors define linear gradients to apply to other SVG elements.

Supported attributes:

- x1
- y1
- x2
- y2
- gradientUnits
- id

2.6 Path Element

The path SVG element is the generic element to define a shape. All the basic shapes can be created with a path element.

Example

```
<svg viewBox="0 0 100 100" xmlns="http://www.w3.org/2000/svg">
  <path d="M 10,30
           A 20,20 0,0,1 50,30
           A 20,20 0,0,1 90,30
           Q 90,60 50,90
           Q 10,60 10,30 z"/>
</svg>
```

Figure 2-4: Path Element

Supported attributes:

- d
- class
- id
- fill
- fill-opacity

- fill-rule
- stroke
- stroke-opacity
- stroke-width
- stroke-linecap
- stroke-linejoin
- stroke-miterlimit
- stroke-dasharray
- stroke-dashoffset
- style
- transform

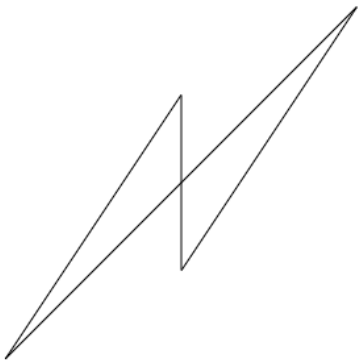
2.7 Polygon Element

The polygon element defines a closed shape consisting of a set of connected straight line segments. The last point is connected to the first point.

Example

```
<svg viewBox="0 0 200 100" xmlns="http://www.w3.org/2000/svg">
  <polygon points="100,100 150,25 150,75 200,0"
fill="none" stroke="black" />
</svg>
```

Figure 2-5: Polygon Element



Supported attributes:

- points
- id
- fill
- fill-opacity
- fill-rule
- stroke

- stroke-opacity
- stroke-width
- stroke-linecap
- stroke-linejoin
- stroke-miterlimit
- stroke-dasharray
- stroke-dashoffset
- style
- transform

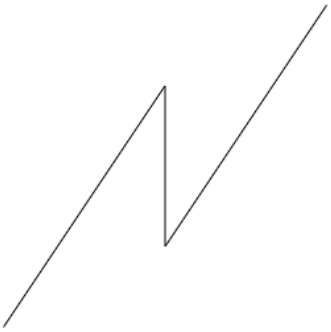
2.8 Polyline Element

The polyline element is an SVG basic shape that creates straight lines connecting several points. Typically a polyline is used to create open shapes as the last point doesn't have to be connected to the first point.

Example

```
<svg viewBox="0 0 200 100" xmlns="http://www.w3.org/2000/svg">
  <polyline points="100,100 150,25 150,75 200,0"
fill="none" stroke="black" />
</svg>
```

Figure 2-6: Polyline Element



Supported attributes:

- points
- id
- fill
- fill-opacity
- fill-rule
- stroke
- stroke-opacity

- stroke-width
- stroke-linecap
- stroke-linejoin
- stroke-miterlimit
- stroke-dasharray
- stroke-dashoffset
- style
- transform

2.9 radialGradient Element

The radialGradient element lets authors define radial gradients to apply to other SVG elements.

Supported attributes:

- cx
- cy
- r
- gradientUnits
- id

2.10 Stop Element

The stop element defines a color and its position to use on a gradient. This element is always a child of a linearGradient or radialGradient element.

Supported attributes:

- stop-color
- stop-opacity
- id

2.11 rect Element

The rect element is a basic SVG shape that draws rectangles, defined by their position, width, and height. The rectangles may have their corners rounded.

Example

```
<svg viewBox="0 0 220 100" xmlns="http://www.w3.org/2000/svg">
  <!-- Simple rectangle -->
  <rect width="100" height="100" />
  <!-- Rounded corner rectangle -->
```

```
  <rect x="120" width="100" height="100" rx="15" />
</svg>
```

Figure 2-7: rect Element

Supported attributes:

- x
- y
- rx
- ry
- height
- width
- id
- fill
- fill-opacity
- fill-rule
- stroke
- stroke-opacity
- stroke-width
- stroke-dasharray
- stroke-dashoffset
- style
- transform

2.12 Text Element

The text element draws a graphics element consisting of text.

Supported attributes:

- x
- y
- id

- fill
- fill-opacity
- stroke
- stroke-opacity
- stroke-width
- transform

2.13 Use Element

The use element takes nodes from within the SVG document, and duplicates them somewhere else.

Supported attributes

- x
- y
- id
- xlink:href
- href
- fill
- fill-opacity
- fill-rule
- stroke
- stroke-opacity
- stroke-width
- stroke-linecap
- stroke-linejoin
- stroke-miterlimit
- stroke-dasharray
- stroke-dashoffset
- transform

SECTION

3

Supported Attributes

3.1 cx

Table 3-1: cx for Circle/Ellipse Elements

Description	The x-axis coordinate of a circle or ellipse
Value Type	length
Default Value	0

Table 3-2: cx for radialGradient Elements

Description	The x coordinate of the end circle of the radial gradient
Value Type	length-percent
Default Value	50%

3.2 cy

Table 3-3: cy to Circle/Ellipse Elements

Description	The y-axis coordinate of a circle or ellipse
Value Type	length
Default Value	0

Table 3-4: cy to radialGradient Elements

Description	The y coordinate of the end circle of the radial gradient
Value Type	length-percentage
Default Value	50%

3.3 xl

Table 3-5: xl for line element

Description	Defines the x-axis coordinate of the line starting point
Value Type	length | number
Default Value	0

Table 3-6: xl for linearGradient element

Description	Defines the x coordinate of the starting point of the vector gradient along which the linear gradient is drawn.
Value Type	length-percentage | number
Default Value	0%

3.4 yl

Table 3-7: yl for line element

Description	Defines the y-axis coordinate of the line starting point
Value Type	length | number
Default Value	0

Table 3-8: yl for linearGradient element

Description	Defines the y coordinate of the starting point of the vector gradient along which the linear gradient is drawn.
Value Type	length-percentage | number
Default Value	0%

3.5 x2

Table 3-9: x2 for line element

Description	Defines the x-axis coordinate of the line ending point
Value Type	length | number
Default Value	0

Table 3-10: x2 for linearGradient element

Description	Defines the x coordinate of the ending point of the vector gradient along which the linear gradient is drawn.
Value Type	length-percentage | number
Default Value	100%

3.6 y2

Table 3-11: y2 for line element

Description	Defines the y-axis coordinate of the line ending point
Value Type	length | number
Default Value	0

Table 3-12: y2 for linearGradient element

Description	Defines the y coordinate of the ending point of the vector gradient along which the linear gradient is drawn.
Value Type	length-percentage | number
Default Value	100%

3.7 x

Table 3-13: x for rect of use element

Description	Defines the x coordinate of a rect of a use element or the starting point of a text baseline.

Table 3-13: x for rect of use element *(Continued)*

Value Type	length | coordinate
Default Value	0

3.8 y

Table 3-14: y for rect of a use element

Description	Defines the y coordinate of a rect of a use element or the starting point of a text baseline.
Value Type	length | coordinate
Default Value	0

3.9 r

Table 3-15: r for circle element

Description	The radius of the circle. A value lower or equal to zero disables rendering of the circle.
Value Type	length
Default Value	0

Table 3-16: r for radialGradient element

Description	The radius of the end circle of the radial gradient. The gradient will be drawn such that the 100% stop is mapped to the perimeter of the end circle.
Value Type	length
Default Value	50%

3.10 rx

Table 3-17: rx for ellipse element

Description	The radius of the ellipse on the x axis.

Table 3-17: rx for ellipse element *(Continued)*

Value Type	auto | length
Default Value	auto

Table 3-18: rx for rect element

Description	The horizontal corner radius of the rect. Defaults to ry if it is specified.
Value Type	auto | length
Default Value	auto

3.11 ry

Table 3-19: ry for ellipse element

Description	The radius of the ellipse on the y axis.
Value Type	auto | length
Default Value	auto

Table 3-20: ry for rect element

Description	The vertical corner radius of the rect. Defaults to rx if it is specified.
Value Type	auto | length
Default Value	auto

3.12 height

Table 3-21: height

Description	The height of the rect.
Value Type	auto | length | percentage
Default Value	auto

3.13 width

Table 3-22: height

Description	The width of the rect.
Value Type	auto | length | percentage
Default Value	auto

3.14 d

Table 3-23: d

Description	This attribute defines the shape of the path.
Value Type	string
Default Value	‘ ‘

3.15 points

Table 3-24: points

Description	This attribute defines the list of points (pairs of x, y absolute coordinates) required to draw a polygon or a polyline.
Value Type	number+
Default Value	“ “

3.16 class

Table 3-25: class

Description	Assigns a class name or set of class names to an element. You may assign the same class name or names to any number of elements, however, multiple class names must be separated by whitespace characters.
Value Type	list-of-class-names
Default Value	‘ ‘

3.17 id

Table 3-26: id

Description	This attributes assigns a unique name to an element.
Value Type	id
Default Value	None

3.18 href

Table 3-27: href

Description	This attribute defines a link to a resource as reference URL. The exact meaning of that link depends on the context of each element using it.
Value Type	url
Default Value	None

3.19 xlink:href

Table 3-28: xlink:href

Description	This attributes defines a reference to a resource as a reference IRI. The exact meaning of that link depends on the context of each element using it.
Value Type	iri
Default Value	None

3.20 fill

Table 3-29: fill

Description	For shapes and text, fill is a presentation attribute that defines the color used to paint the element.

Table 3-29: fill

Value Type	Available color formats are: ▪ rgb/rgba format ▪ #RGB, #RRGGBB, #RGBA, #RRGGBBAA format ▪ predefined color tags included at https://johndecember.com/html/spec/colorsvghex.html
Default Value	black

3.21 fill-opacity

Table 3-30: fill-opacity

Description	This attribute is a presentation attribute defining the opacity of the paint server (color, gradient, pattern, etc.) applied to a shape.
Value Type	[0-1]
Default Value	1

3.22 fill-rule

Table 3-31: fill-rule

Description	This attribute is a presentation attribute defining the algorithm to use to determine the inside part of a shape.
Value Type	nonzero | evenodd
Default Value	nonzero

3.23 gradientUnits

The gradientUnits attribute defines the coordinate system used for attributes specified on the gradient elements.

Table 3-32: gradientUnits for linearGradient element

Description	The linearGradient element, gradientUnits define the coordinate system used for the attributes x1, y1, x2, and y2.
Value Type	userSpaceOnUse | objectBoundingBox
Default Value	objectBoundingBox

Table 3-33: gradientUnits for radialGradient element

Description	For radialGradient element, gradientUnits defines the coordinate system used for the attribute cx, cy, and r.
Value Type	userSpaceOnUse | object BoundingBox
Default Value	objectBoundingBox

3.24 stop-color

Table 3-34: stop-color

Description	This attribute defines the color of the gradient stop.
Value Type	currentcolor | color
Default Value	black

3.25 stop-opacity

Table 3-35: stop-opacity

Description	This attribute defines the opacity of the gradient stop.
Value Type	opacity
Default Value	1

3.26 stroke

Table 3-36: stroke

Description	This attribute is a presentation attribute defining the color (or any SVG paint server like gradients or patterns) used to paint the outline of the shape.
Value Type	Available color formats are: ▪ rgb/rgba format ▪ #RGB, #RRGGBB, #RGBA, #RRGGBBAA format ▪ predefined color tags included at https://johndecember.com/html/spec/colorsvghex.html
Default Value	none

3.27 stroke-opacity

Table 3-37: stroke-opacity

Description	This attribute is a presentation attribute defining the opacity of the paint server (color, gradient, pattern, etc.) applied to the stroke of a shape.
Value Type	[0 - 1]
Default Value	1

3.28 stroke-width

Table 3-38: stroke-width

Description	This attribute is a presentation attribute defining the width of the stroke to be applied to the shape.
Value Type	length
Default Value	1px

3.29 stroke-linecap

Table 3-39: stroke-linecap

Description	This attribute is a presentation attribute defining the shape to be used at the end of open subpaths when they are stroked.
Value Type	butt | round | square
Default Value	butt

3.30 stroke-linejoin

Table 3-40: stroke-linejoin

Description	This attribute is a presentation attribute defining the shape to be used at the join of two segment of a stroked path.
Value Type	bevel | miter | round
Default Value	miter

3.31 stroke-miterlimit

Table 3-41: stroke-miterlimit

Description	This attribute is a presentation attribute defining a limit in the ratio of the miter length to the stroke-width used to draw a miter join. When the miter is exceeded the join is substituted with a bevel join.
Value Type	number
Default Value	4

3.32 stroke-dasharray

Table 3-42: stroke-dasharray

Description	This attribute is a presentation attribute defining the on off patterns used at the shape outline.
Value Type	none | dasharray
Default Value	none

3.33 style

Table 3-43: style

Description	This attribute allows to style an element using CSS declarations.
Value Type	CSS declarations
Available delarations	All supported SVG presentation attributes included in this document can be used as CSS declaration inside the style attribute.

3.34 transform

Table 3-44: transform

Description	This attribute defines a list of transform definitions
Value Type	id
Default Value	none

3.34.1 Transform functions

- **matrix** - The matrix(a,b,c,d,e,f) transform function specifies a transformation in the form of a transformation matrix of six values.
- **translate** - The translate(x,[y]) transform function moves the object by x and y. If y is not provided, it is assumed to be 0.
- **scale** - The scale(x,[y]) transform function specifies a scale operation by x and y. If y is not provided, it is assumed to be equal to x.
- **rotate** - The rotate(a,[x,y]) transform function specifies a rotation by a degrees about a given point. If optional parameters x and y are not supplied, the rotation is about the origin of the current user coordinate system. If the optional parameters are supplied, the rotation is about the point (x,y).
- **skewX** - The skewX(a) transform function specifies a skew transformation along the x axis by a degrees.
- **skewY** - The skewY(a) function specifies a skew transformation along the y axis by a degrees.

6500 River Place Boulevard, Building 7, Suite 200, Austin, TX 78730
www.ambiq.com
sales@ambiq.com
+1 512.879.2850

A-SOCAPG-ANGA02EN v1.0
December 2025