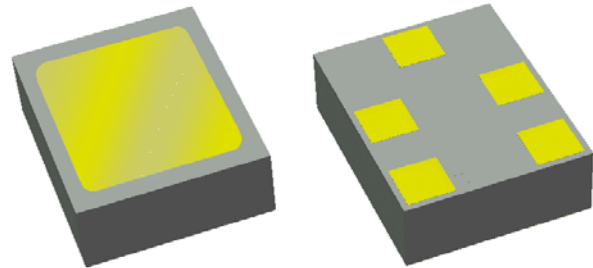


# Data Sheet

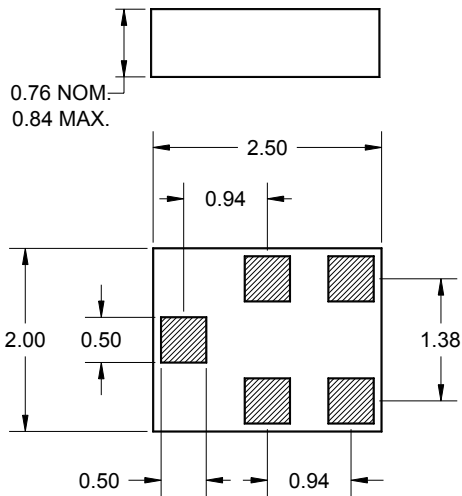
## Features

- For EGSM applications
- Usable bandwidth 35 MHz
- High attenuation
- Superior amplitude and phase balance
- Single-ended input
- Balanced output
- Ceramic Surface Mount Package (SMP)
- Small size



## Package

Surface Mount 2.50 x 2.00 x 0.76 mm

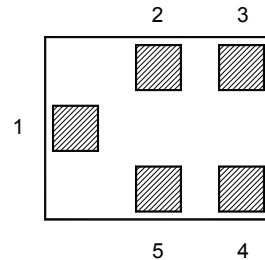


Dimensions shown are nominal in millimeters  
 All tolerances are  $\pm 0.10\text{mm}$

Body:  $\text{Al}_2\text{O}_3$  ceramic  
 Lid: Kovar or Alloy 42, Au over Ni plated  
 Terminations: Au plating 0.5 - 1.0 $\mu\text{m}$ ,  
 over a 2 - 6 $\mu\text{m}$  Ni plating

## Pin Configuration

Bottom View



| Pin No. | Description        |
|---------|--------------------|
| 1       | Input, Unbalanced  |
| 2,5     | Input, Case ground |
| 3,4     | Output, Balanced   |

# Data Sheet

## Electrical Specifications <sup>(1)</sup>

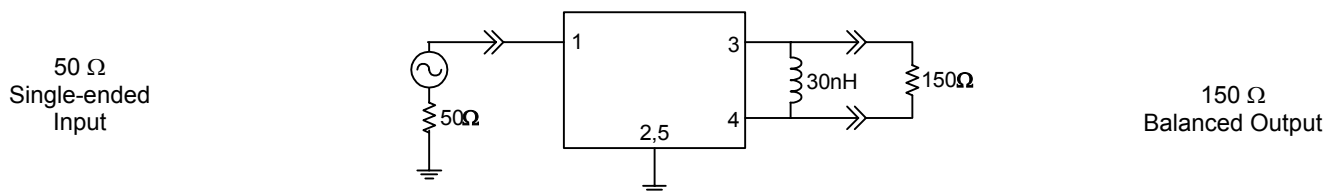
Operating Temperature Range: <sup>(2)</sup> +25 °C

| Parameter <sup>(3)</sup>  | Minimum | Typical     | Maximum | Unit     |
|---|---------|-------------|---------|----------|
| <b>Center Frequency</b>   | -       | 942.5       | -       | MHz      |
| <b>Maximum Insertion Loss</b><br>925 - 960 MHz<br>Excluding losses due to matching    | -       | 2.3         | -       | dB       |
| Including losses in matching test circuit shown below                                 | -       | 2.5         | 3.2     | dB       |
| <b>Amplitude Ripple</b><br>925 - 960 MHz  | -       | 0.2         | 1.6     | dB p-p   |
| <b>Absolute Attenuation</b><br>0 - 880 MHz  | 50      | 65          | -       | dB       |
| 880 - 905 MHz   | 30      | 38          | -       | dB       |
| 905 - 915 MHz   | 20      | 22          | -       | dB       |
| 980 - 1050 MHz  | 23      | 28          | -       | dB       |
| 1050 - 6000 MHz   | 50      | 65          | -       | dB       |
| <b>Input VSWR</b><br>925 - 960 MHz  | -       | 1.8         | 2.4     | dB       |
| <b>Output VSWR</b><br>925 - 960 MHz   | -       | 1.7         | 2.3     | dB       |
| <b>Output Phase Balance <math>\phi(S_{31}) - \phi(S_{21})</math></b><br>925 - 960 MHz | 175     | 180         | 185     | degree   |
| <b>Output Amplitude Balance <math>( S_{31}/S_{21} )</math></b><br>925 - 960 MHz       | -0.5    | 0           | 0.5     | dB       |
| <b>Optimal Source Impedance <sup>(4)</sup></b>  | -       | 50          | -       | $\Omega$ |
| <b>Optimal Load Impedance <sup>(4)</sup></b>  | -       | 225    48nH | -       | $\Omega$ |

### Notes:

1. All specifications are based on the test circuit shown below
2. This specification is valid for room temperature only. The specification over the full temperature range(s) is available on the next page(s)
3. Electrical margin has been built into the design to account for the variations due to manufacturing tolerances
4. This is the complex conjugate of the unmatched filter's impedance resulting in maximum power transfer

### Test Circuit:



# Data Sheet

## Electrical Specifications <sup>(1)</sup>

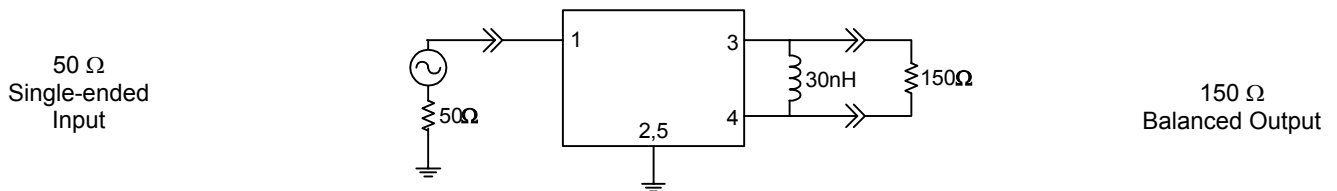
Operating Temperature Range: <sup>(2)</sup> -10 to +80 °C

| Parameter <sup>(3)</sup>  | Minimum                    | Typical                    | Maximum               | Unit                       |
|---|----------------------------|----------------------------|-----------------------|----------------------------|
| <b>Center Frequency</b>   | -                          | 942.5                      | -                     | MHz                        |
| <b>Maximum Insertion Loss</b><br>925 - 960 MHz<br>Excluding losses due to matching<br>Including losses in matching test circuit shown below | -<br>-                     | 2.5<br>2.7                 | -<br>3.5              | dB<br>dB                   |
| <b>Amplitude Ripple</b><br>925 - 960 MHz  | -                          | 0.9                        | 1.9                   | dB p-p                     |
| <b>Absolute Attenuation</b><br>0 - 880 MHz<br>880 - 905 MHz<br>905 - 915 MHz<br>980 - 1050 MHz<br>1050 - 6000 MHz                           | 50<br>30<br>18<br>23<br>50 | 65<br>38<br>22<br>27<br>65 | -<br>-<br>-<br>-<br>- | dB<br>dB<br>dB<br>dB<br>dB |
| <b>Input VSWR</b><br>925 - 960 MHz  | -                          | 2.1                        | 2.4                   | dB                         |
| <b>Output VSWR</b><br>925 - 960 MHz   | -                          | 2.1                        | 2.3                   | dB                         |
| <b>Output Phase Balance <math>\phi(S_{31}) - \phi(S_{21})</math></b><br>925 - 960 MHz   | 175                        | 180                        | 185                   | degree                     |
| <b>Output Amplitude Balance <math>( S_{31}/S_{21} )</math></b><br>925 - 960 MHz   | -0.5                       | 0                          | 0.5                   | dB                         |
| <b>Optimal Source Impedance <sup>(4)</sup></b>  | -                          | 50                         | -                     | $\Omega$                   |
| <b>Optimal Load Impedance <sup>(4)</sup></b>  | -                          | 225    48nH                | -                     | $\Omega$                   |

**Notes:**

1. All specifications are based on the test circuit shown below
2. In production, devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temperature
3. Electrical margin has been built into the design to account for the variations due to temperature drift and manufacturing tolerances
4. This is the complex conjugate of the unmatched filter's impedance resulting in maximum power transfer

**Test Circuit:**



# Data Sheet

## Electrical Specifications <sup>(1)</sup>

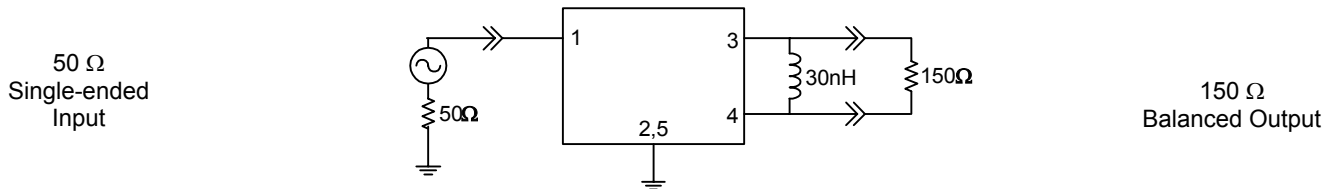
Operating Temperature Range: <sup>(2)</sup> -20 to +80 °C

| Parameter <sup>(3)</sup>  | Minimum                    | Typical                    | Maximum               | Unit                       |
|---|----------------------------|----------------------------|-----------------------|----------------------------|
| <b>Center Frequency</b>   | -                          | 942.5                      | -                     | MHz                        |
| <b>Maximum Insertion Loss</b><br>925 - 960 MHz<br>Excluding losses due to matching<br>Including losses in matching test circuit shown below | -<br>-                     | 2.6<br>2.7                 | -<br>3.7              | dB<br>dB                   |
| <b>Amplitude Ripple</b><br>925 - 960 MHz  | -                          | 0.7                        | 2.1                   | dB p-p                     |
| <b>Absolute Attenuation</b><br>0 - 880 MHz<br>880 - 905 MHz<br>905 - 915 MHz<br>980 - 1050 MHz<br>1050 - 6000 MHz                           | 50<br>30<br>18<br>22<br>50 | 65<br>38<br>22<br>27<br>65 | -<br>-<br>-<br>-<br>- | dB<br>dB<br>dB<br>dB<br>dB |
| <b>Input VSWR</b><br>925 - 960 MHz  | -                          | 1.8                        | 2.4                   | dB                         |
| <b>Output VSWR</b><br>925 - 960 MHz   | -                          | 1.8                        | 2.3                   | dB                         |
| <b>Output Phase Balance <math>\phi(S_{31}) - \phi(S_{21})</math></b><br>925 - 960 MHz   | 175                        | 180                        | 185                   | degree                     |
| <b>Output Amplitude Balance <math>( S_{31}/S_{21} )</math></b><br>925 - 960 MHz   | -0.5                       | 0                          | 0.5                   | dB                         |
| <b>Optimal Source Impedance <sup>(4)</sup></b>  | -                          | 50                         | -                     | $\Omega$                   |
| <b>Optimal Load Impedance <sup>(4)</sup></b>  | -                          | 225    48nH                | -                     | $\Omega$                   |

**Notes:**

1. All specifications are based on the test circuit shown below
2. In production, devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temperature
3. Electrical margin has been built into the design to account for the variations due to temperature drift and manufacturing tolerances
4. This is the complex conjugate of the unmatched filter's impedance resulting in maximum power transfer

**Test Circuit:**



# Data Sheet

## Electrical Specifications <sup>(1)</sup>

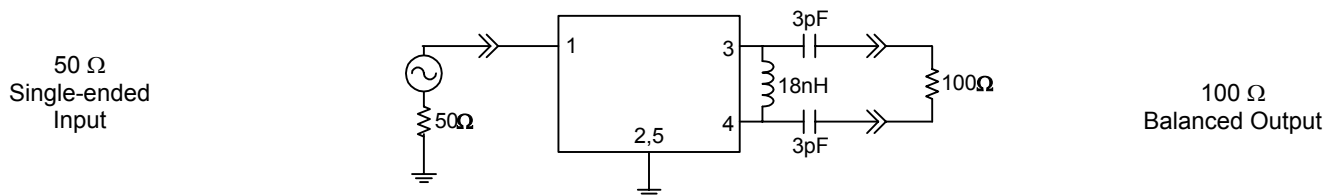
Operating Temperature Range: <sup>(2)</sup>      -20 to +80 °C

| Parameter <sup>(3)</sup>  | Minimum                    | Typical                    | Maximum               | Unit                       |
|---|----------------------------|----------------------------|-----------------------|----------------------------|
| <b>Center Frequency</b>   | -                          | 942.5                      | -                     | MHz                        |
| <b>Maximum Insertion Loss</b><br>925 - 960 MHz<br>Excluding losses due to matching<br>Including losses in matching test circuit shown below | -<br>-                     | 2.6<br>2.9                 | -<br>3.9              | dB<br>dB                   |
| <b>Amplitude Ripple</b><br>925 - 960 MHz  | -                          | 0.7                        | 2.1                   | dB p-p                     |
| <b>Absolute Attenuation</b><br>0 - 880 MHz<br>880 - 905 MHz<br>905 - 915 MHz<br>980 - 1050 MHz<br>1050 - 6000 MHz                           | 50<br>30<br>18<br>22<br>50 | 65<br>38<br>22<br>27<br>65 | -<br>-<br>-<br>-<br>- | dB<br>dB<br>dB<br>dB<br>dB |
| <b>Input VSWR</b><br>925 - 960 MHz  | -                          | 1.8                        | 2.4                   | dB                         |
| <b>Output VSWR</b><br>925 - 960 MHz   | -                          | 1.8                        | 2.3                   | dB                         |
| <b>Output Phase Balance <math>\phi(S_{31}) - \phi(S_{21})</math></b><br>925 - 960 MHz   | 175                        | 180                        | 185                   | degree                     |
| <b>Output Amplitude Balance <math>( S_{31}/S_{21} )</math></b><br>925 - 960 MHz   | -0.5                       | 0                          | 0.5                   | dB                         |
| <b>Optimal Source Impedance <sup>(4)</sup></b>  | -                          | 50                         | -                     | $\Omega$                   |
| <b>Optimal Load Impedance <sup>(4)</sup></b>  | -                          | 225    48nH                | -                     | $\Omega$                   |

### Notes:

1. All specifications are based on the test circuit shown below
2. In production, devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temperature
3. Electrical margin has been built into the design to account for the variations due to temperature drift and manufacturing tolerances
4. This is the complex conjugate of the unmatched filter's impedance resulting in maximum power transfer

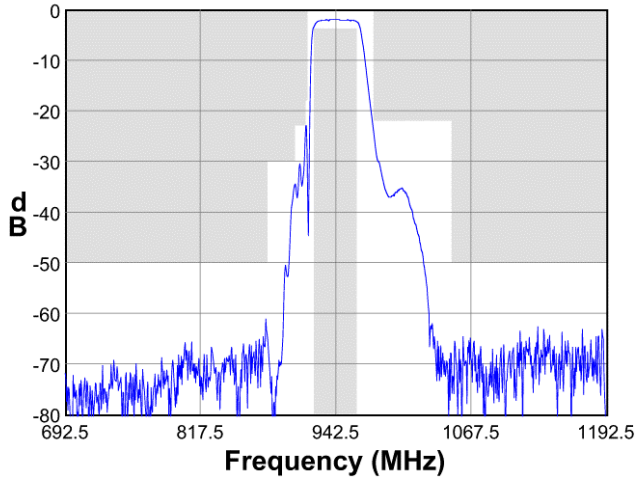
### Test Circuit:



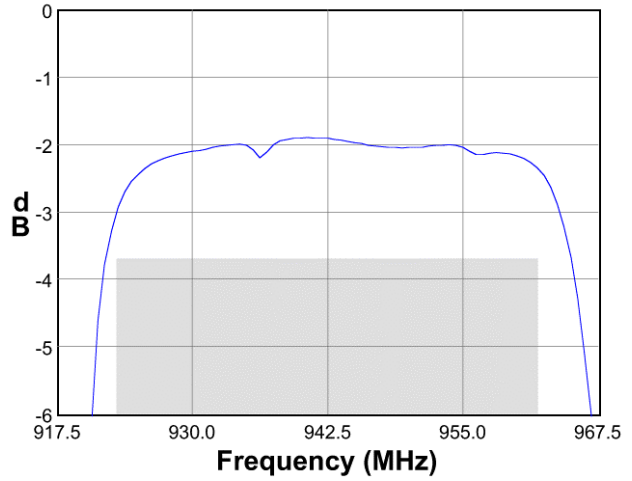
**Data Sheet**

**Typical Performance (at +25°C)**

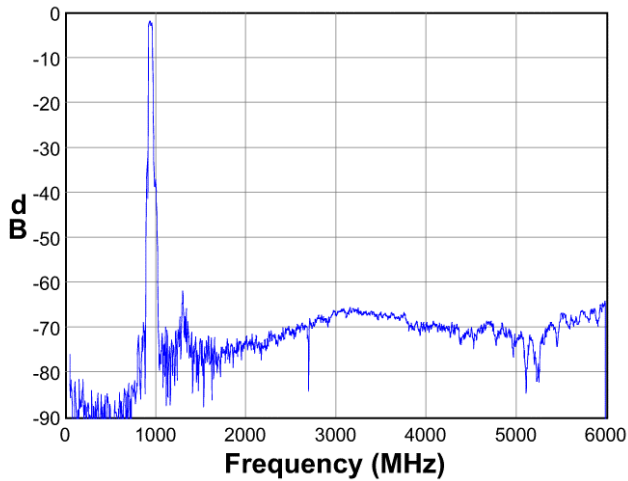
**Frequency Response**



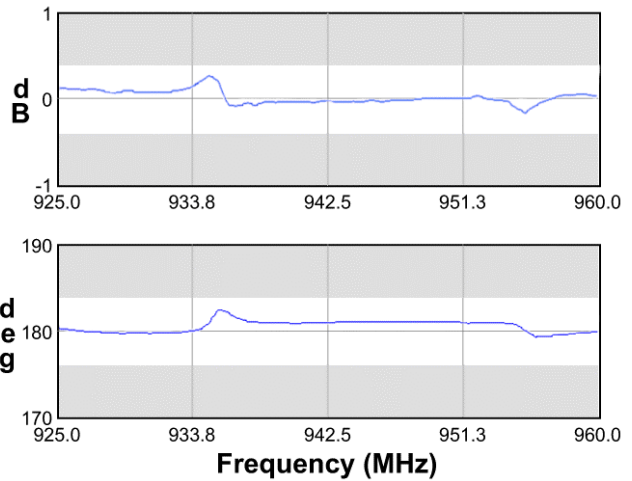
**Passband Response**



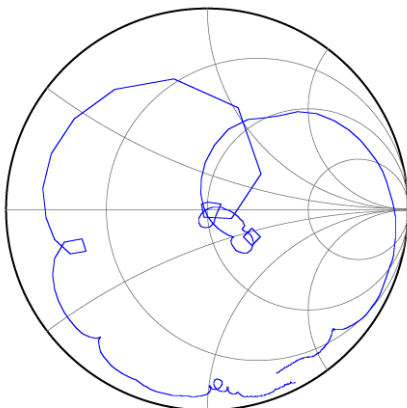
**Wideband Response**



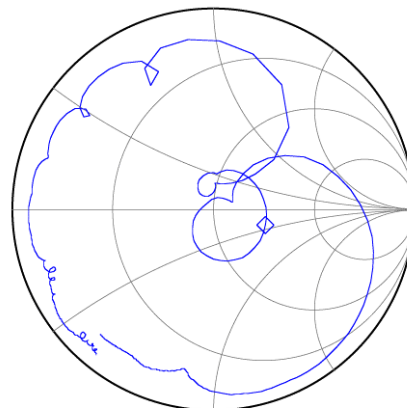
**Amplitude/Phase Balance**



**Input Smith Chart**



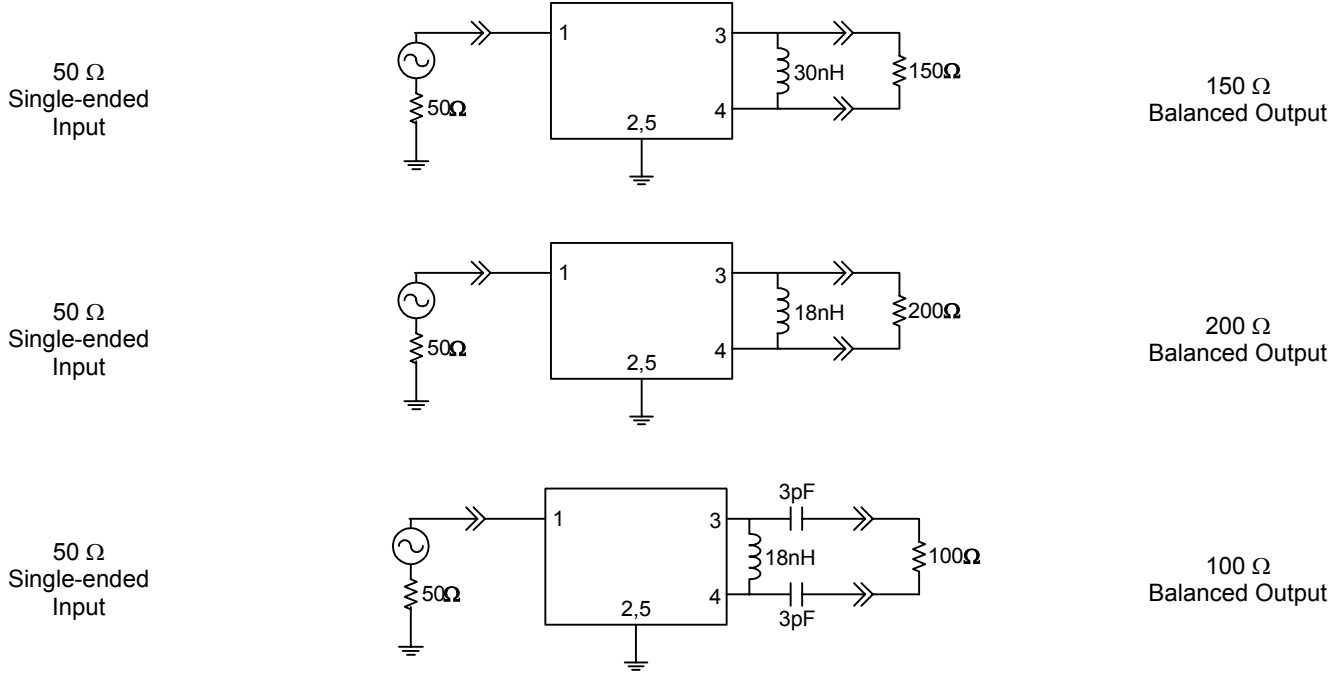
**Output Smith Chart**



**Data Sheet**

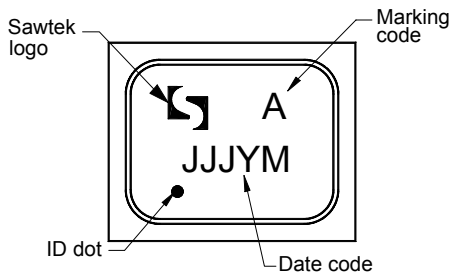
**Matching Schematics**

Actual matching values may vary due to PCB layout and parasitics

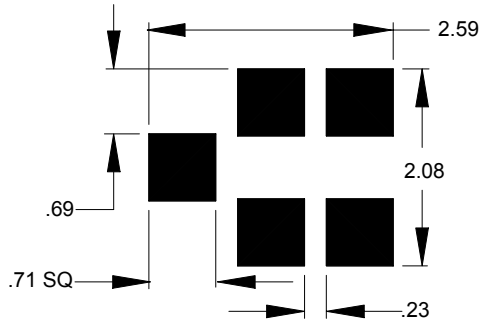


**Marking**

**PCB Footprint**



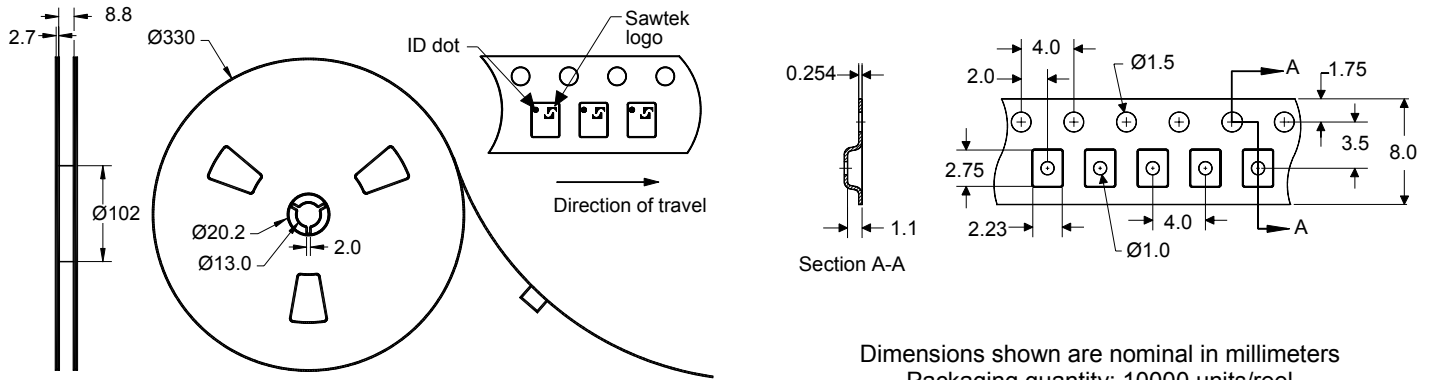
The date code consists of: JJJ = Julian day, Y = last digit of year, M = manufacturing site code



This footprint represents a recommendation only  
Dimensions shown are nominal in millimeters

**Data Sheet**

**Tape and Reel**




Dimensions shown are nominal in millimeters  
 Packaging quantity: 10000 units/reel

**Maximum Ratings**

| Parameter                   | Symbol           | Minimum | Maximum | Unit |
|-----------------------------|------------------|---------|---------|------|
| Operating Temperature Range | T                | -20     | +80     | °C   |
| Storage Temperature Range   | T <sub>stg</sub> | -40     | +85     | °C   |

**Warnings**

- Electrostatic Sensitive Device (ESD) 
- Avoid ultrasonic exposure

**Links to Additional Technical Information**

[PCB Layout Tips](#)

[Qualification Flowchart](#)

[Soldering Profile](#)

[S-Parameters](#)

[Other Technical Information](#)

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