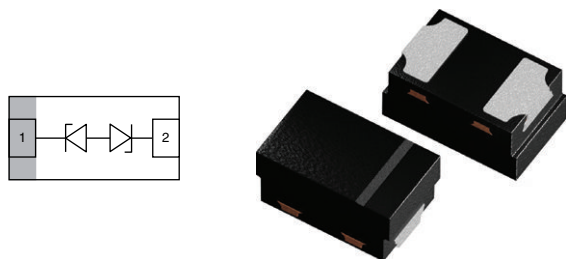


# Single-Line Bidirectional ESD-Protection Diode in DFN1006-2B



## MARKING (example only)



Bar = pin 1 marking

X = date code

YY = type code (see table below)

## LINKS TO ADDITIONAL RESOURCES



3D Models



Models



Application Notes

## FEATURES

- Compact DFN1006-2B package
- Low package height < 0.5 mm
- 1-line bidirectional ESD-protection
- AEC-Q101 qualified available
- Working range 16 V and 26 V
- ESD immunity acc. IEC 61000-4-2  
± 30 kV contact and air discharge
- ESD immunity acc. ISO10605 (330 pF / 330 Ω)  
± 30 kV contact discharge
- Lead plating: Sn (e3)  
Tin plated exposed side wall of lead frame
  - Soldering can be checked by standard vision inspection
  - AOI = Automated Optical Inspection
  - No X-ray necessary
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



## Soldering Recommendations for DFN Packages:

please see Application Note: [www.vishay.com/doc?86198](http://www.vishay.com/doc?86198)

## APPLICATIONS

For automotive network such as LIN-BUS

## ORDERING INFORMATION

| PART NUMBER<br>(EXAMPLE) | AEC-Q101<br>QUALIFIED | ENVIRONMENTAL AND QUALITY CODE                     |               |                                | ORDERING CODE (EXAMPLE) |
|--------------------------|-----------------------|--|---------------|--------------------------------|-------------------------|
|                          |                       | RoHS COMPLIANT +<br>LEAD (Pb)-FREE<br>TERMINATIONS | TIN<br>PLATED | 10K PER 7" REEL<br>(8 mm TAPE) |                         |
|                          |                       | GREEN  |               | MOQ = 10K/BOX                  |                         |
| VLIN1626-DD1             | -                     | G  | 3             | -08                            | VLIN1626-DD1-G3-08      |
| VLIN1626-DD1             | H                     | G  | 3             | -08                            | VLIN1626-DD1HG3-08      |

## PACKAGE DATA

| DEVICE NAME  | PACKAGE NAME | TYPE CODE | WEIGHT  | MOLDING COMPOUND<br>FLAMMABILITY RATING | MOISTURE<br>SENSITIVITY LEVEL        | SOLDERING<br>CONDITIONS         |
|--------------|--------------|-----------|---------|---|--------------------------------------|---------------------------------|
| VLIN1626-DD1 | DFN1006-2B   | 5E        | 0.83 mg | UL 94 V-0                               | MSL level 1<br>(according J-STD-020) | Peak temperature<br>max. 260 °C |

**ABSOLUTE MAXIMUM RATINGS - PIN 1 TO PIN 2 (16 V)** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

| PARAMETER             | TEST CONDITIONS  | SYMBOL    | VALUE       | UNIT               |
|-----------------------|--|-----------|-------------|--------------------|
| Peak pulse current    | Acc. IEC 61000-4-5, 8/20 $\mu\text{s}$ /single shot <sup>(1)</sup>                 | $I_{PPM}$ | 5           | A                  |
| Peak pulse power      | Acc. IEC 61000-4-5, 8/20 $\mu\text{s}$ /single shot <sup>(1)</sup>                 | $P_{PP}$  | 160         | W                  |
| Peak pulse current    | $t_p = 10/1000\text{ }\mu\text{s}$ <sup>(1)</sup>                                  | $I_{PPM}$ | 0.6         | A                  |
| Peak pulse power      | $t_p = 10/1000\text{ }\mu\text{s}$ <sup>(1)</sup>                                  | $P_{PP}$  | 18          | W                  |
| ESD immunity          | Contact discharge acc. IEC 61000-4-2; 10 pulses <sup>(1)</sup>                     | $V_{ESD}$ | 30          | kV                 |
|                       | Air discharge acc. IEC 61000-4-2; 10 pulses <sup>(1)</sup>                         |           | 30          | kV                 |
|                       | Contact discharge acc. ISO10605 (330 pF / 330 $\Omega$ ); 10 pulses <sup>(1)</sup> |           | 30          | kV                 |
| Operating temperature | Junction temperature   | $T_J$     | -55 to +150 | $^{\circ}\text{C}$ |
| Storage temperature   |  | $T_{stg}$ | -55 to +150 | $^{\circ}\text{C}$ |

**ABSOLUTE MAXIMUM RATINGS - PIN 2 TO PIN 1 (26 V)** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

| PARAMETER             | TEST CONDITIONS  | SYMBOL    | VALUE       | UNIT               |
|-----------------------|--|-----------|-------------|--------------------|
| Peak pulse current    | Acc. IEC 61000-4-5, 8/20 $\mu\text{s}$ /single shot <sup>(1)</sup>                 | $I_{PPM}$ | 3.9         | A                  |
| Peak pulse power      | Acc. IEC 61000-4-5, 8/20 $\mu\text{s}$ /single shot <sup>(1)</sup>                 | $P_{PP}$  | 175         | W                  |
| Peak pulse current    | $t_p = 10/1000\text{ }\mu\text{s}$ <sup>(1)</sup>                                  | $I_{PPM}$ | 0.4         | A                  |
| Peak pulse power      | $t_p = 10/1000\text{ }\mu\text{s}$ <sup>(1)</sup>                                  | $P_{PP}$  | 17          | W                  |
| ESD immunity          | Contact discharge acc. IEC 61000-4-2; 10 pulses <sup>(1)</sup>                     | $V_{ESD}$ | 30          | kV                 |
|                       | Air discharge acc. IEC 61000-4-2; 10 pulses <sup>(1)</sup>                         |           | 30          | kV                 |
|                       | Contact discharge acc. ISO10605 (330 pF / 330 $\Omega$ ); 10 pulses <sup>(1)</sup> |           | 30          | kV                 |
| Operating temperature | Junction temperature   | $T_J$     | -55 to +150 | $^{\circ}\text{C}$ |
| Storage temperature   |  | $T_{stg}$ | -55 to +150 | $^{\circ}\text{C}$ |

**ELECTRICAL CHARACTERISTICS - PIN 1 TO PIN 2 (16 V)** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

| PARAMETER                 | TEST CONDITIONS / REMARKS   | SYMBOL        | MIN. | TYP. | MAX. | UNIT          |
|---------------------------|---|---------------|------|------|------|---------------|
| Protection paths          | Number of lines which can be protected  | $N_{channel}$ | -    | -    | 1    | lines         |
| Reverse stand off voltage | Max. reverse working voltage  | $V_{RWM}$     | -    | -    | 16   | V             |
| Reverse voltage           | At $I_R = 50\text{ nA}$   | $V_R$         | 16   | -    | -    | V             |
| Reverse current           | At $V_R = 16\text{ V}$  | $I_R$         | -    | < 1  | 0.05 | $\mu\text{A}$ |
| Reverse breakdown voltage | At $I_R = 1\text{ mA}$  | $V_{BR}$      | 17.4 | 18.5 | 20.0 | V             |
|                           | At $I_R = 1\text{ mA}$ ; $T_J = -40\text{ }^{\circ}\text{C}$ to $+150\text{ }^{\circ}\text{C}$ <sup>(1)</sup> |               | 16   | -    | 22.5 | V             |
| Reverse clamping voltage  | At $I_{PP} = I_{PPM} = 5\text{ A}$ , $t_p = 8/20\text{ }\mu\text{s}$ <sup>(1)</sup>                           | $V_C$         | -    | 26   | 32   | V             |
|                           | At $I_{PP} = I_{PPM} = 0.6\text{ A}$ , $t_p = 10/1000\text{ }\mu\text{s}$ <sup>(1)</sup>                      |               | -    | 25   | 30   | V             |
|                           | $t_p = 100\text{ ns}$ (TLP); $I_{TLP} = 16\text{ A}$ <sup>(1)</sup>   | $V_{C\_TLP}$  | -    | 26   | -    | V             |
| Dynamic resistance        | $t_p = 100\text{ ns}$ (TLP); $I_{TLP} = 0\text{ A}$ to $50\text{ A}$ <sup>(1)</sup>                           | $r_{dyn}$     | -    | 0.28 | -    | $\Omega$      |
| Capacitance               | At $V_R = 0\text{ V}$ ; $f = 1\text{ MHz}$  | $C_D$         | -    | 16   | 20   | pF            |

**ELECTRICAL CHARACTERISTICS - PIN 2 TO PIN 1 (26 V)** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

| PARAMETER                 | TEST CONDITIONS / REMARKS   | SYMBOL        | MIN. | TYP. | MAX. | UNIT          |
|---------------------------|---|---------------|------|------|------|---------------|
| Protection paths          | Number of lines which can be protected  | $N_{channel}$ | -    | -    | 1    | lines         |
| Reverse stand off voltage | Max. reverse working voltage  | $V_{RWM}$     | -    | -    | 26   | V             |
| Reverse voltage           | At $I_R = 50\text{ nA}$   | $V_R$         | 26   | -    | -    | V             |
| Reverse current           | At $V_R = 26\text{ V}$  | $I_R$         | -    | < 1  | 0.05 | $\mu\text{A}$ |
| Reverse breakdown voltage | At $I_R = 1\text{ mA}$  | $V_{BR}$      | 28   | 30   | 32   | V             |
|                           | At $I_R = 1\text{ mA}$ ; $T_J = -40\text{ }^{\circ}\text{C}$ to $+150\text{ }^{\circ}\text{C}$ <sup>(1)</sup> |               | 26   | -    | 36   | V             |
| Reverse clamping voltage  | At $I_{PP} = I_{PPM} = 3.9\text{ A}$ , $t_p = 8/20\text{ }\mu\text{s}$ <sup>(1)</sup>                         | $V_C$         | -    | 39   | 45   | V             |
|                           | At $I_{PP} = I_{PPM} = 0.4\text{ A}$ , $t_p = 10/1000\text{ }\mu\text{s}$ <sup>(1)</sup>                      |               | -    | 37   | 43   | V             |
|                           | $t_p = 100\text{ ns}$ (TLP); $I_{TLP} = 16\text{ A}$ <sup>(1)</sup>   | $V_{C\_TLP}$  | -    | 37   | -    | V             |
| Dynamic resistance        | $t_p = 100\text{ ns}$ (TLP); $I_{TLP} = 20\text{ A}$ to $50\text{ A}$ <sup>(1)</sup>                          | $r_{dyn}$     | -    | 0.36 | -    | $\Omega$      |
| Capacitance               | At $V_R = 0\text{ V}$ ; $f = 1\text{ MHz}$  | $C_D$         | -    | 16   | 20   | pF            |

**Note**

<sup>(1)</sup> Guaranteed by design; tested during device characterization

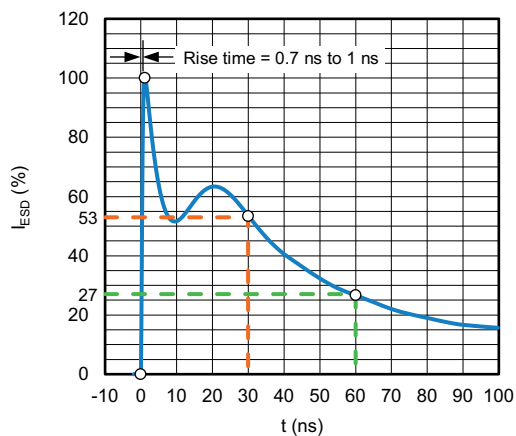


Fig. 1 - ESD Discharge Current Wave Form Acc. IEC 61000-4-2 (330  $\Omega$  / 150 pF)

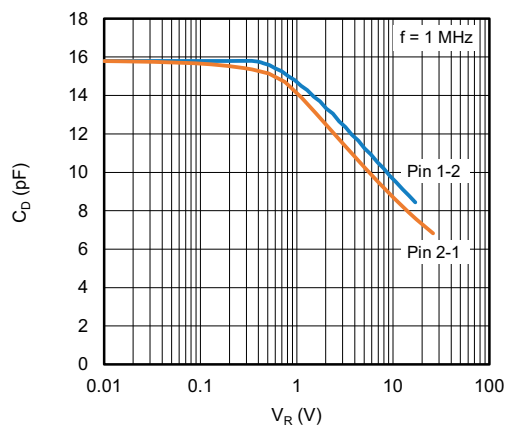


Fig. 4 - Typical Capacitance vs. Reverse Voltage

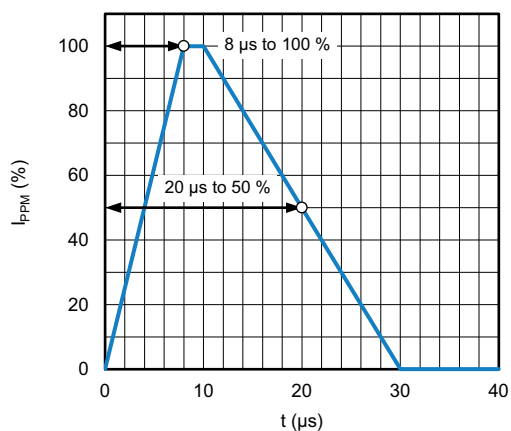


Fig. 2 - 8/20  $\mu$ s Peak Pulse Current Wave Form Acc. IEC 61000-4-5

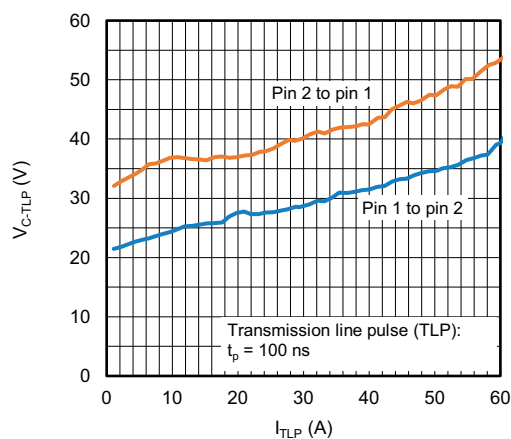


Fig. 5 - Typical Clamping Voltage vs. Peak Pulse Current

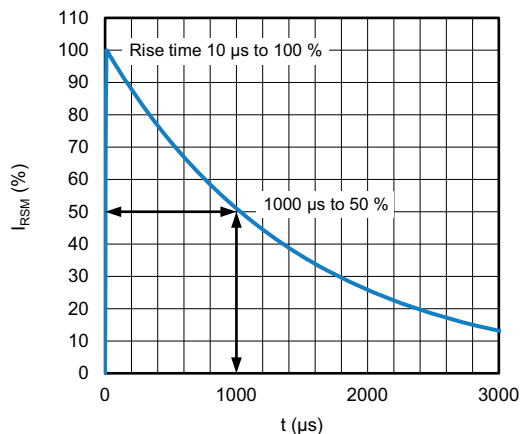


Fig. 3 - 10/1000  $\mu$ s Peak Pulse Current Wave Form

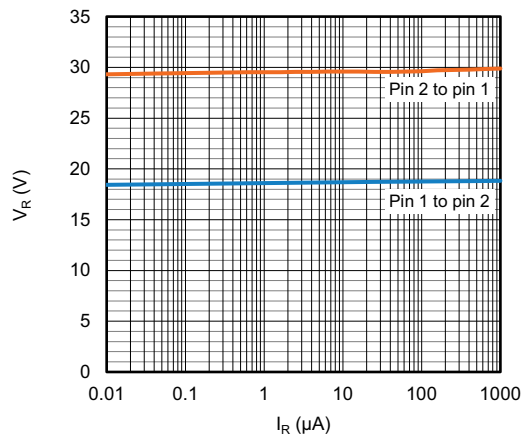


Fig. 6 - Typical Reverse Voltage vs. Reverse Current

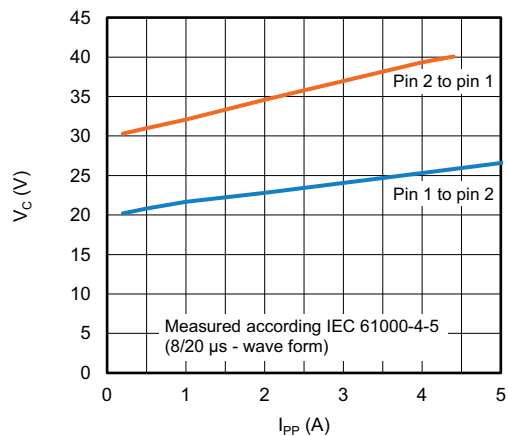


Fig. 7 - Typical Peak Clamping Voltage vs. Peak Pulse Current

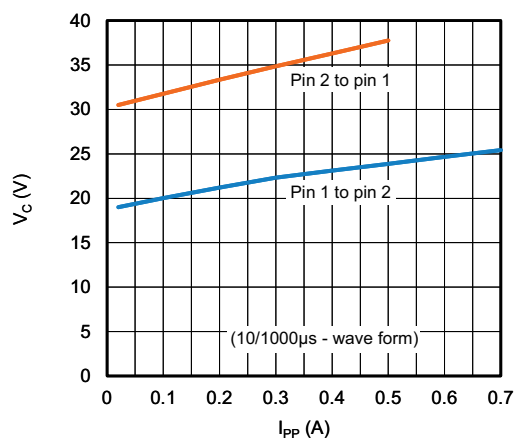
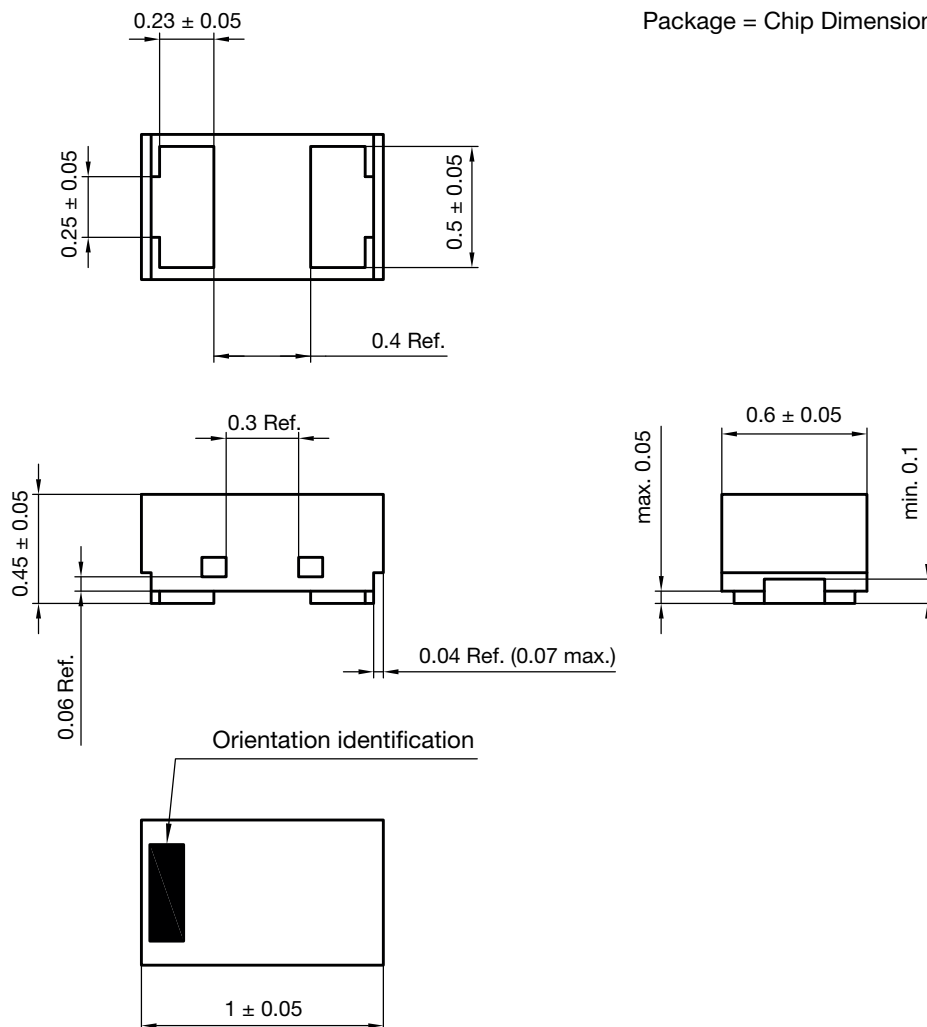
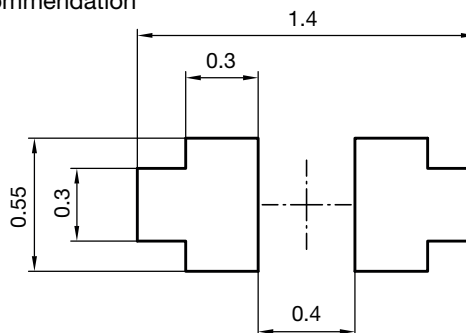


Fig. 8 - Typical Peak Clamping Voltage vs. Peak Pulse Current

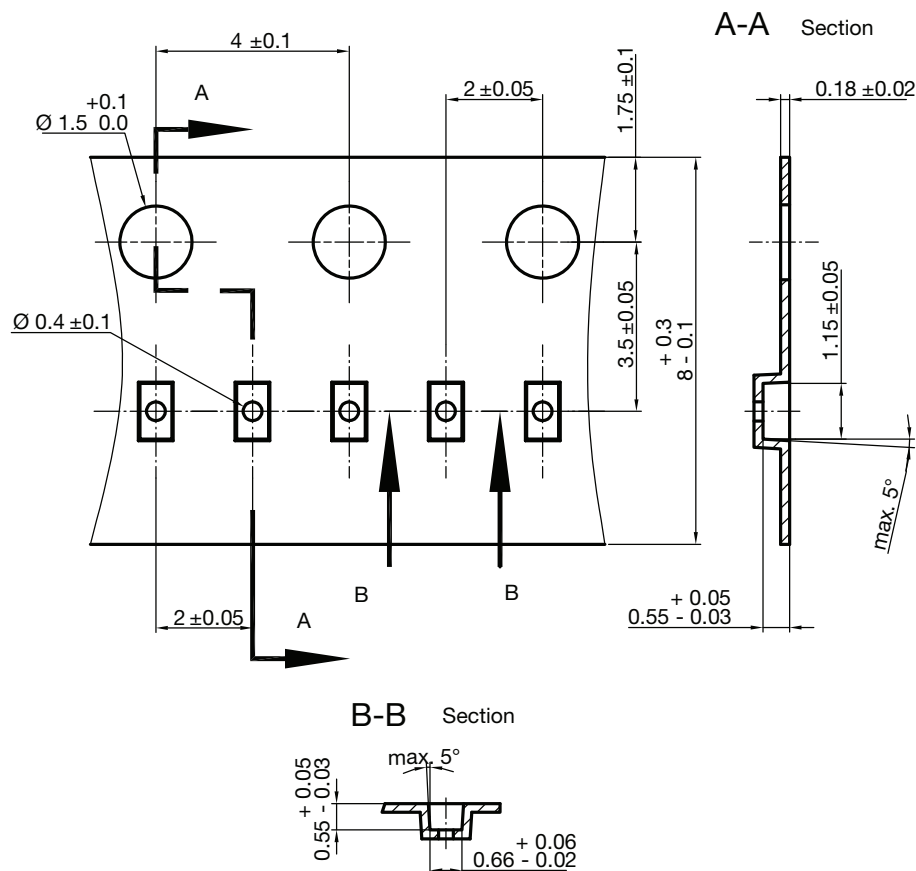
**PACKAGE DIMENSIONS** in millimeters (inches): **DFN1006-2B**

Package = Chip Dimension in mm


**Footprint recommendation**


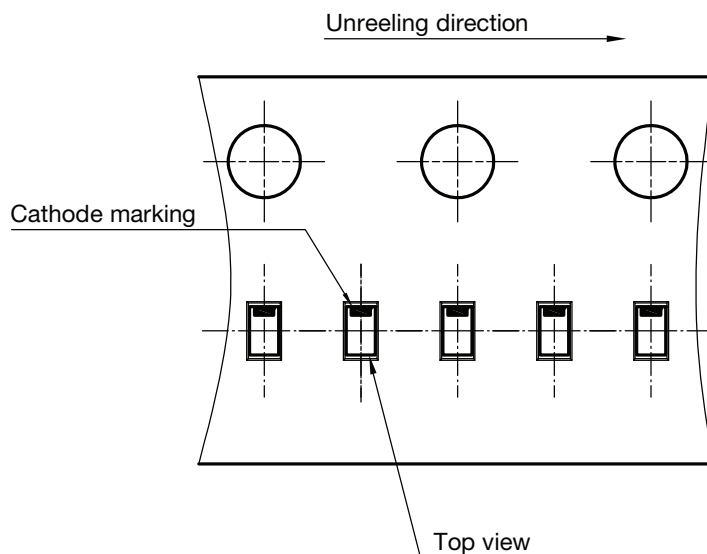
Document no.: S8-V-3906.04-059 (4)  
Created - Date: 11-Jul-2018  
Rev.5 - Date: 17-Sep-2021

23191

**CARRIER TAPE DFN1006-2B**


S8-V-3906.04-063 (4)  
created 28.10.2019

surface resistance:  $10^5 - 10^{11} \frac{\text{OHMS}}{\text{SQ}}$   
Cumulative tolerances of 10 sprocket holes is  $\pm 0.2 \text{ mm}$

**ORIENTATION IN CARRIER TAPE DFN1006-2B**


S8-V-3906.04-064 (4)  
created 28.10.2019



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