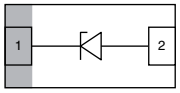
# Single-Line Unidirectional ESD-Protection Diode in DFN1006-2A




## FEATURES

- Compact DFN1006-2A package
- Low package height < 0.5 mm
- 1-line unidirectional ESD-protection
- AEC-Q101 qualified available
- Working range 24 V
- ESD immunity acc. IEC 61000-4-2
  ± 30 kV contact discharge
  ± 30 kV air 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

AUTOMOTIVE GRADE Available

Pb-free Available

e3

RoHS* Available

HALOGEN FREE Available

GREEN (5-2008) Available

## MARKING (example only)


Bar = pin 1 marking
X = date code
YY = type code (see table below)

## LINKS TO ADDITIONAL RESOURCES

3D Models | SPICE Models | Application Notes

**Soldering Recommendations for DFN Packages:**
please see Application Note: www.vishay.com/doc?86198

## ORDERING INFORMATION

| PART NUMBER (EXAMPLE) | AEC-Q101 QUALIFIED | ENVIRONMENTAL AND QUALITY CODE | | | ORDERING CODE (EXAMPLE) |
|---|---|---|---|---|---|
| | | RoHS COMPLIANT + LEAD (Pb)-FREE TERMINATIONS | TIN PLATED | 10K PER 7" REEL (8 mm TAPE) | |
| | | GREEN | | MOQ = 10K/BOX | |
| VESD24E1-HD1 | - | G | 3 | -08 | VESD24E1-HD1-G3-08 |
| VESD24E1-HD1 | H | G | 3 | -08 | VESD24E1-HD1HG3-08 |

## PACKAGE DATA

| DEVICE NAME | PACKAGE NAME | TYPE CODE | WEIGHT | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL | SOLDERING CONDITIONS |
|---|---|---|---|---|---|---|
| VESD24E1-HD1 | DFN1006-2A | 5D | 0.83 mg | UL 94 V-0 | MSL level 1 (according J-STD-020) | Peak temperature max. 260 °C |

## ABSOLUTE MAXIMUM RATINGS ($T_{amb}$ = 25 °C, unless otherwise specified)

| PARAMETER | TEST CONDITIONS | SYMBOL | VALUE | UNIT |
|---|---|---|---|---|
| Peak pulse current | Acc. IEC 61000-4-5, 8/20 µs/single shot | $I_{PPM}$ | 4 | A |
| Peak pulse power | Acc. IEC 61000-4-5, 8/20 µs/single shot (1) | $P_{PP}$ | 175 | W |
| Peak pulse current | $t_p$ = 10/1000 µs (1) | $I_{PPM}$ | 0.42 | A |
| Peak pulse power | $t_p$ = 10/1000 µs (1) | $P_{PP}$ | 17 | W |
| ESD immunity | Contact discharge acc. IEC 61000-4-2; 10 pulses (1) | $V_{ESD}$ | 30 | kV |
| | Air discharge acc. IEC 61000-4-2; 10 pulses (1) | | 30 | kV |
| | Contact discharge acc. ISO10605; 330 pF/330 Ω; 10 pulses (1) | | 30 | kV |
| Operating temperature | Junction temperature | $T_J$ | -55 to +150 | °C |
| Storage temperature | | $T_{stg}$ | -55 to +150 | °C |

**Note**

(1) Guaranteed by design; tested during device characterization

| ELECTRICAL CHARACTERISTICS ($T_{amb}$ = 25 °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 | $V_{RWM}$ | - | - | 24 | V |
| Reverse voltage | At $I_R$ = 50 nA | $V_R$ | 24 | - | - | V |
| Reverse current | At $V_R$ = 24 V | $I_R$ | - | < 1 | 0.05 | µA |
| Reverse breakdown voltage | At $I_R$ = 1 mA | $V_{BR}$ | 26.5 | 27.9 | 29.3 | V |
| | At $I_R$ = 1 mA; $T_J$ = -40 °C to +150 °C (1) | | 24.5 | - | 33 | V |
| Reverse clamping voltage | At $I_{PP}$ = $I_{PPM}$ = 4 A, $t_p$ = 8/20 µs | $V_C$ | - | 35 | 41 | V |
| | $t_p$ = 100 ns (TLP); $I_{\_TLP}$ = 16 A (1) | $V_{C\_TLP}$ | - | 35 | - | V |
| Dynamic resistance | $t_p$ = 100 ns (TLP); $I_{\_TLP}$ = 20 A - 50 A (1) | $r_{dyn}$ | - | 0.33 | - | Ω |
| Capacitance | At $V_R$ = 0 V; f = 1 MHz | $C_D$ | - | 28 | 31 | pF |

**Note**

(1) Guaranteed by design; tested during device characterization

## TYPICAL CHARACTERISTICS ($T_{amb}$ = 25 °C, unless otherwise specified)

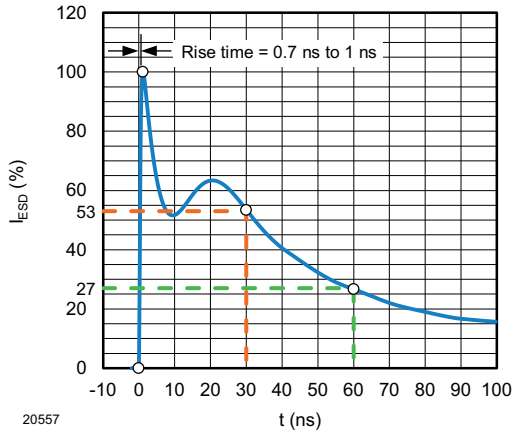



Fig. 1 - ESD Discharge Current Wave Form
According to IEC 61000-4-2 (330 Ω / 150 pF)

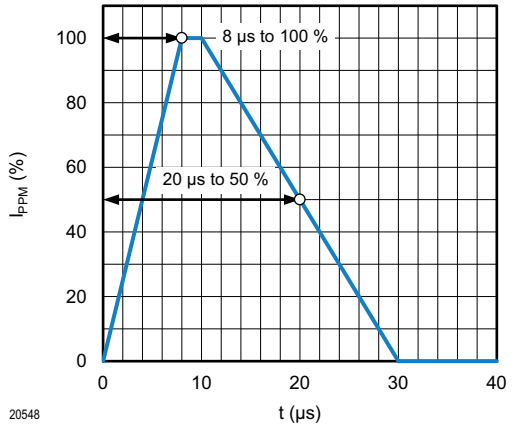



Fig. 2 - 8/20 µs Peak Pulse Current Wave Form
According to IEC 61000-4-5

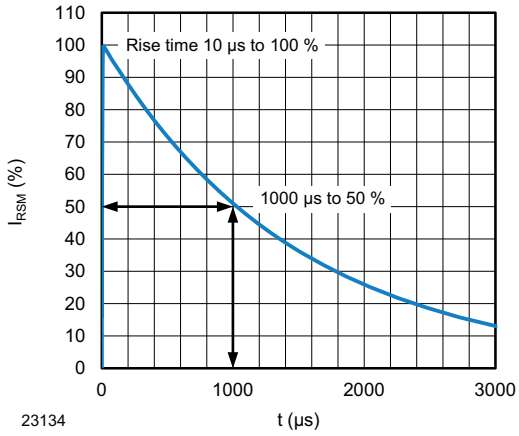



Fig. 3 - 10/1000 µs Peak Pulse Current Wave Form

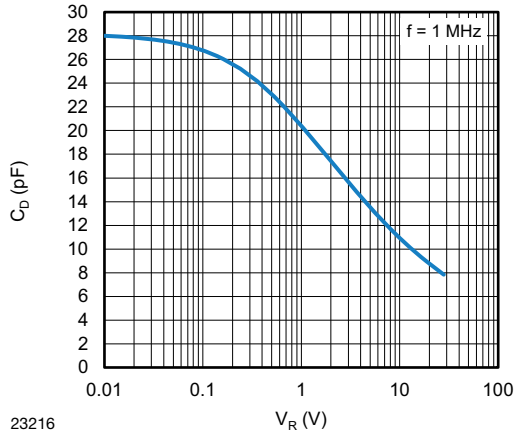



Fig. 4 - Typical Capacitance vs. Reverse Voltage

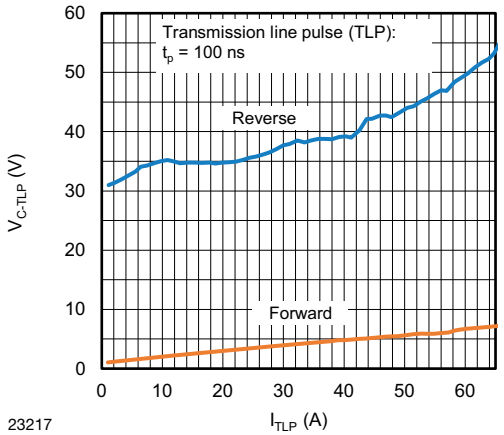



Fig. 5 - Typical Peak Clamping Voltage vs. Peak Pulse Current

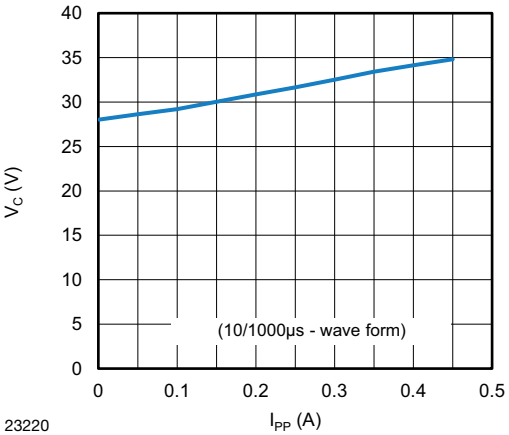



Fig. 8 - Typical Peak Clamping Voltage vs. Peak Pulse Current

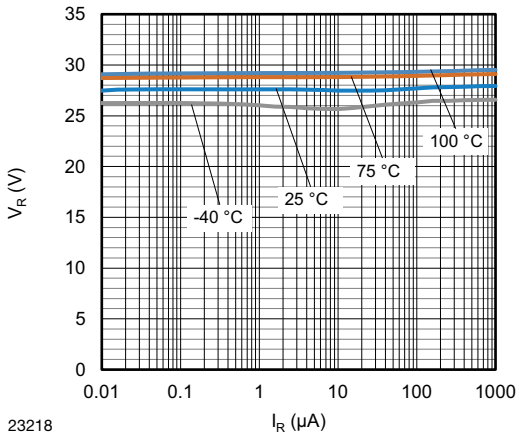



Fig. 6 - Typical Reverse Voltage vs. Reverse Current

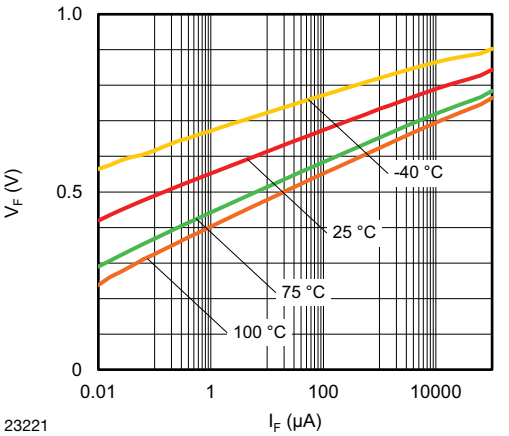



Fig. 9 - Typical Forward Voltage vs. Forward Current

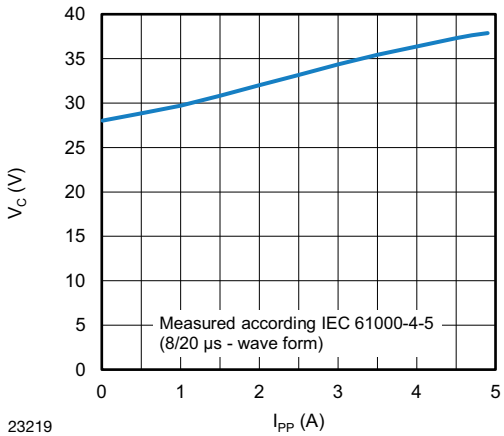
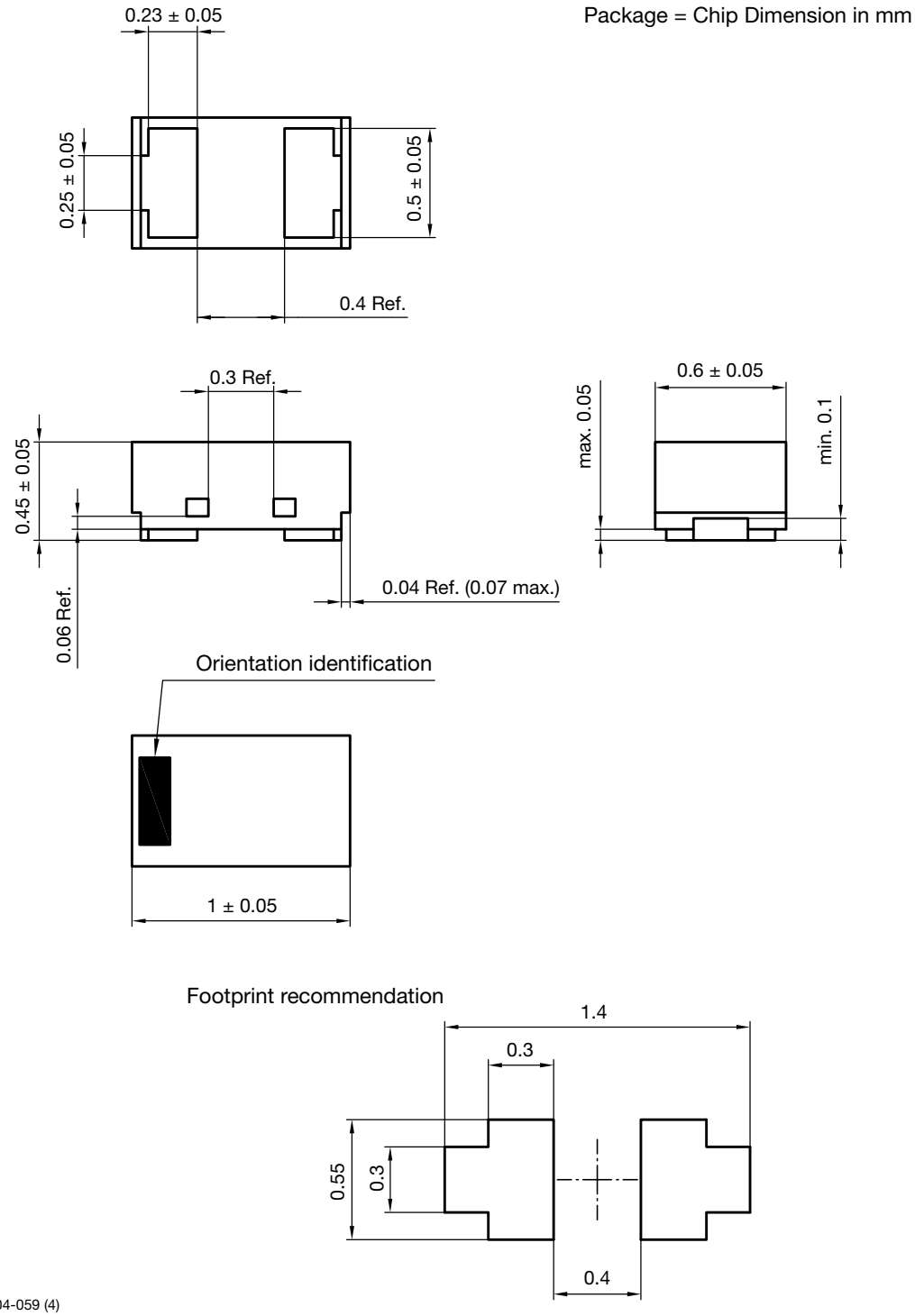



Fig. 7 - Typical Peak Clamping Voltage vs. Peak Pulse Current

**PACKAGE DIMENSIONS** in millimeters (Inches): **DFN1006-2A**

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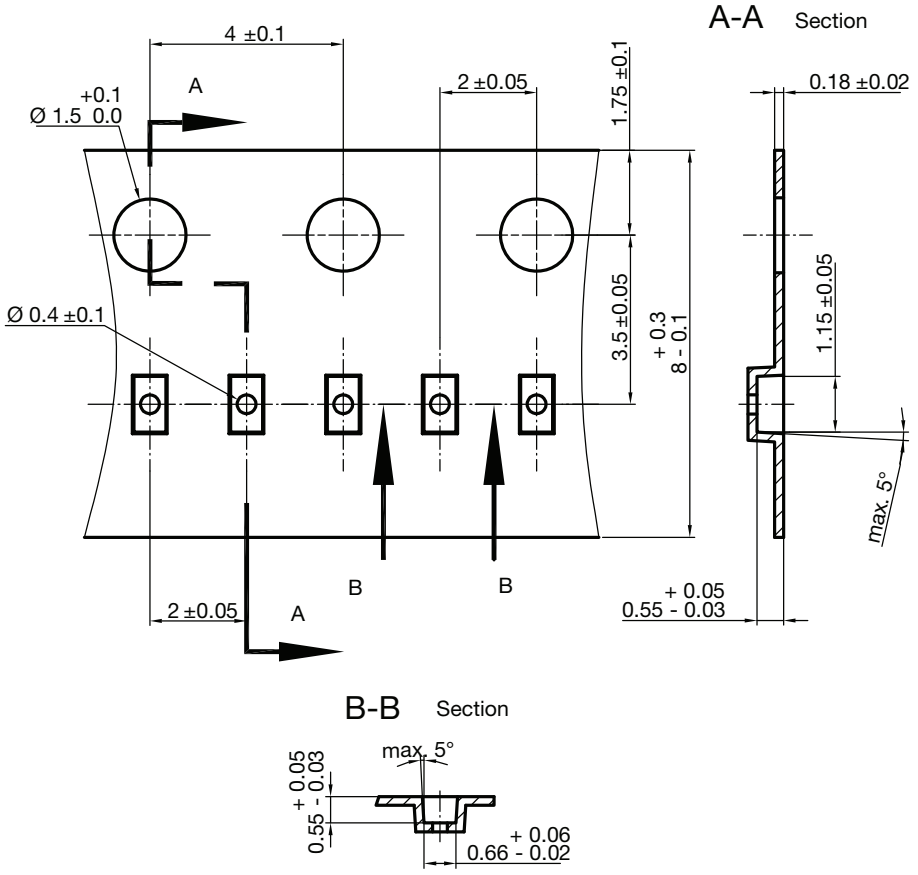
## CARRIER TAPE DFN1006-2A

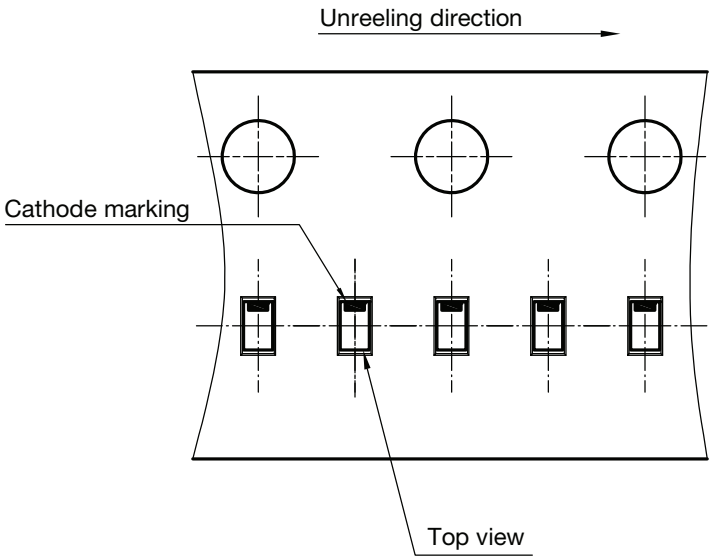



S8-V-3906.04-063 (4)
created 28.10.2019

surface resistance: $10^5$ - $10^{11}$ $\frac{\text{OHMS}}{\text{SQ}}$

Cummulative tolerances of 10 sprocket holes is ± 0.2 mm

## ORIENTATION IN CARRIER TAPE DFN1006-2A




S8-V-3906.04-064 (4)
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