

## Transient Voltage Suppressor

Version: A5 2023-08-04

### Features

- IEC 61000-4-2(ESD)±20KV(air), ±20KV(contact)
- IEC61000-4-5(Lightning) 4A (8/20uS)
- IEC61000-4-4(EFT) 40A (5/50nS)
- 96 Watts peak pulse power (tp=8/20μS)
- Low capacitance: 0.25pF (Typical)
- Low clamping voltage
- Weight approx. 1.0 mg
- Moisture sensitivity level: Level 1
- Small package: DFN1006-2L

### Exterior



DFN1006-2L

### Application information

- Serial ATA
- Desktops, Servers and Notebooks
- Cellular Phones
- MDDI Ports
- USB2.0 Data Line Protection
- Display Ports
- HDMI

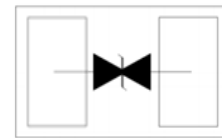
### Package (top view)



### Agency Approvals

| Icon                                                                                | Description                        |
|-------------------------------------------------------------------------------------|------------------------------------|
| <b>RoHS</b>                                                                         | Compliance with 2011/65/EU         |
| <b>HF</b>                                                                           | Compliance with IEC61249-2-21:2003 |
|  | Mean lead free                     |

### Schematic



### Part Number and Electrical Parameter

| Part Number | IDRM@VDRM |   | VBR <sup>①</sup> @IR |    | Vc@Ipp <sup>②</sup> |   | Vc@Ipp <sup>②</sup> |   | RDYN@ TLP <sup>③</sup> |     | Vc@Ipp TLP <sup>③</sup> |  | Co <sup>④</sup> |     |
|-------------|-----------|---|----------------------|----|---------------------|---|---------------------|---|------------------------|-----|-------------------------|--|-----------------|-----|
|             | μA        | V | V                    | mA | V                   | A | V                   | A | Ω                      | V   | A                       |  | pF              |     |
|             | MAX       |   | MIN                  |    | MAX                 |   | MAX                 |   | TYP                    | TYP |                         |  | TYP             | MAX |
| BV-FA05UCA  | 0.1       | 5 | 6                    | 1  | 16                  | 2 | 24                  | 4 | 1.64                   | 38  | 16                      |  | 0.25            | 0.4 |

Absolute maximum ratings measured at T= 25°C RH = 45%-75% (unless otherwise noted).

① VBR is measured at IR=1mA

② Surge Waveform: 8/20μS.

③ TLP parameter: Z0 = 50Ω, tp = 100ns, tr = 1ns, RDYN is calculated from 4A to16A

④ Off-state capacitance is measured in VDC=0V,VRMS=0.3V,f=1MHz

## Transient Voltage Suppressor

### Part Numbering System

BV FA 05 U C A  
(1) (2) (3) (4) (5) (6)

- (1) Bencent Transient Voltage Suppressor
- (2) Package:DFN1006-2L
- (3) Off-state Voltage: 5V
- (4) Low Capacitance
- (5) Bidirectional
- (6) Bencent internal code

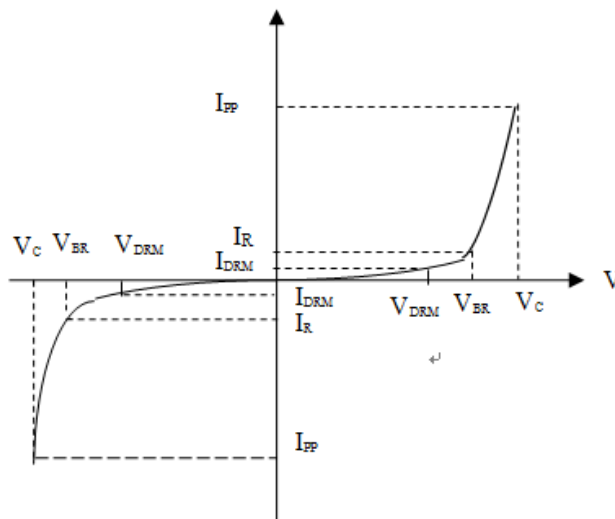
### Mark



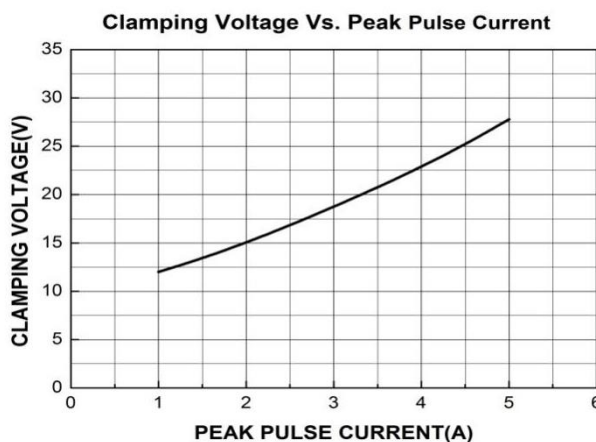
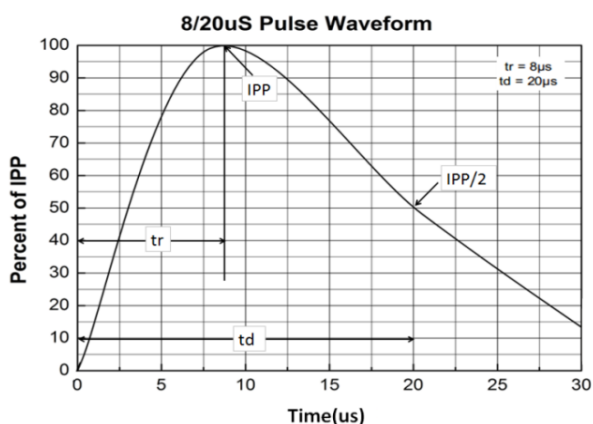
5BU: Part Number

### V-I Curve

| Parameters | Definition                   |
|------------|------------------------------|
| $V_C$      | Clamping voltage             |
| $I_{PP}$   | Surge waveform 8/20 $\mu$ s  |
| $V_{DRM}$  | Stand-off Voltage            |
| $V_{BR}$   | Breakdown Voltage            |
| $I_{DRM}$  | Reverse Leakage Current      |
| $I_R$      | Test current                 |
| $P_{PP}$   | Peak Pulse Power Dissipation |



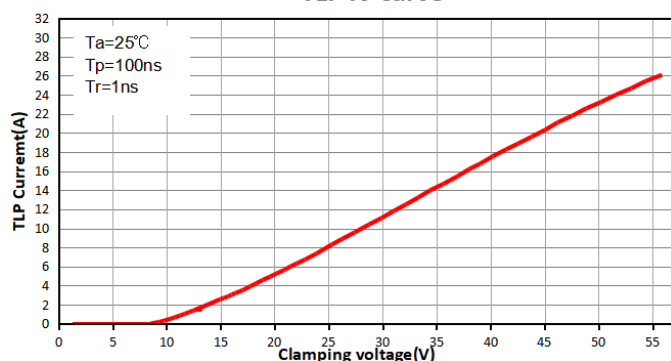
### Typical Characteristics



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Version: A5 2023-08-04

TLP IV curve



## Thermal Considerations

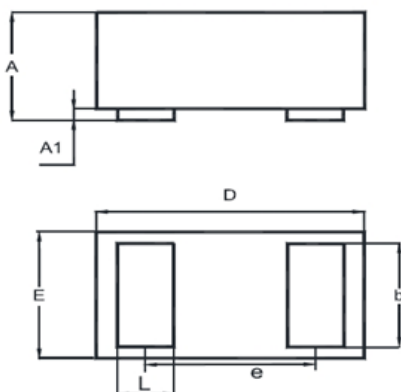
| symbol | Parameter                            | Value       | Unit               |
|--------|--------------------------------------|-------------|--------------------|
| $T_J$  | Operating Junction Temperature Range | -40 to +125 | $^{\circ}\text{C}$ |
| $T_s$  | Storage Temperature Range            | -55 to +150 | $^{\circ}\text{C}$ |

## Environmental Characteristics

| Testing items                        | Technical standards                                                                                 |
|--------------------------------------|-----------------------------------------------------------------------------------------------------|
| High temperature Reverse Bias Test   | Temperature: $125\pm 3^{\circ}\text{C}$ Bias= $80\%V_{\text{DRM}}$<br>Time:168H                     |
| High Temperature Life Test           | Temperature: $150^{\circ}\text{C}$<br>Time:168H                                                     |
| High-low Temperature Cycle test      | Temperature: From $-40^{\circ}\text{C}$ to $125^{\circ}\text{C}$<br>Dwell time : 30min,10~100cycles |
| High Temperature &High Humidity Test | Temperature: $85^{\circ}\text{C}$ Humidity:85%<br>Time:168H                                         |
| Pressure cooker Test                 | Temperature: $121^{\circ}\text{C}$ , 2atm. Humidity:100%<br>Time:24H                                |
| Resistance of soldering heat         | Temperature: $260\pm 5^{\circ}\text{C}$<br>Time of dip soldering: 10s, 3times                       |

Note: The above testing items can be specified by customer's special request

## Product Dimensions

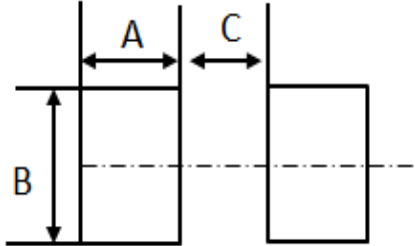


| REF | mm        | inch        |
|-----|-----------|-------------|
| A   | 0.45~0.55 | 0.018~0.022 |
| A1  | 0.00~0.05 | 0.000~0.002 |
| D   | 0.95~1.05 | 0.037~0.041 |
| E   | 0.55~0.65 | 0.022~0.026 |
| b   | 0.40~0.60 | 0.016~0.024 |
| e   | 0.64BSC   | 0.025BSC    |
| L   | 0.15~0.35 | 0.006~0.014 |

## Transient Voltage Suppressor

Version: A5 2023-08-04

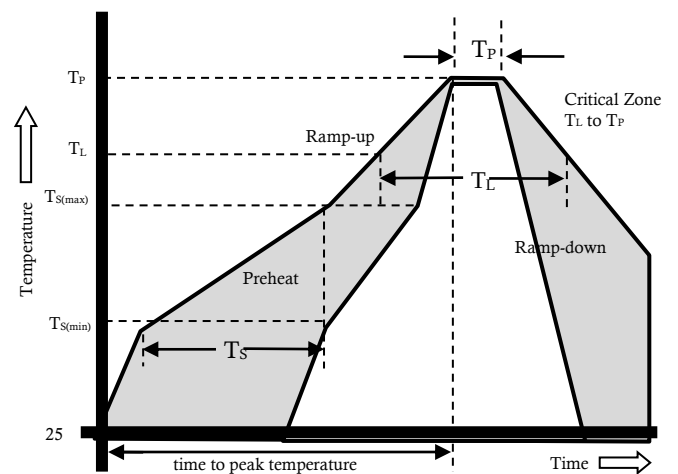
### Recommended Soldering Pad



| REF | mm   | inch  |
|-----|------|-------|
| A   | 0.35 | 0.014 |
| B   | 0.60 | 0.024 |
| C   | 0.35 | 0.014 |

### Reflow Profile

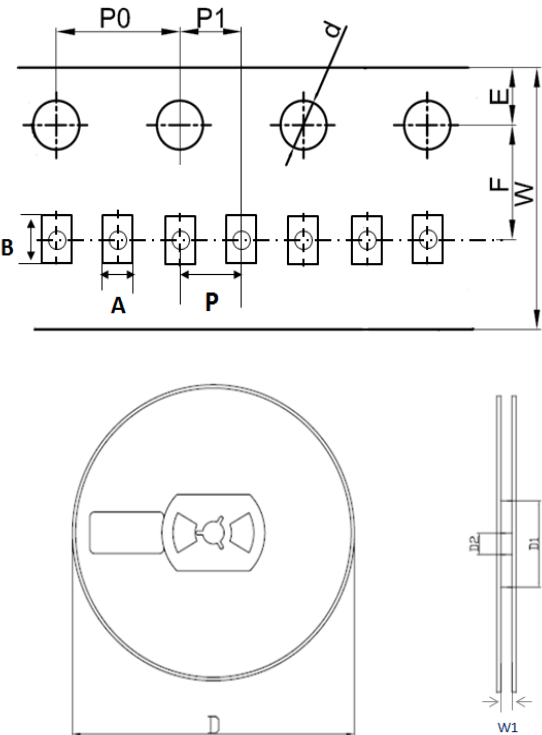
| Reflow Condition                                                         |                                          | Pb-Free assembly |
|--------------------------------------------------------------------------|------------------------------------------|------------------|
| Pre Heat                                                                 | Temperature Min                          | 150°C            |
|                                                                          | Temperature Max                          | 200°C            |
|                                                                          | Time (min to max)                        | 60 – 180 secs    |
| Average ramp up rate (Liquid) T <sub>amp</sub> (T <sub>L</sub> ) to peak |                                          | 3°C/s max        |
| T <sub>S</sub> (max) to T <sub>L</sub> - Ramp-up Rate                    |                                          | 3°C/s max        |
| Reflow                                                                   | - Temperature (T <sub>L</sub> ) (Liquid) | 217°C            |
|                                                                          | - Temperature (T <sub>L</sub> )          | 60 – 150 secs    |
| Peak Temperature (T <sub>P</sub> )                                       |                                          | 260±0/-5 °C      |
| Time within 5°C of actual peak Temperature (T <sub>P</sub> )             |                                          | 30secs           |
| Ramp-down Rate                                                           |                                          | 6°C/s max        |
| Time 25°C to peak Temperature (T <sub>P</sub> )                          |                                          | 8 mins max.      |
| Do not exceed                                                            |                                          | 260°C            |



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Version: A5 2023-08-04

**Package Reel Information**



| REF | mm            | inch           |
|-----|---------------|----------------|
| A   | 0.70+/-0.05   | 0.028+/-0.002  |
| B   | 1.15+/-0.05   | 0.045+/-0.002  |
| d   | 1.50+0.1/-0   | 0.059+0.004/-0 |
| D   | 178.00+/-2.00 | 7.008+/-0.079  |
| D1  | 55.00+/-3.00  | 2.165+/-0.118  |
| D2  | 13.00+/-0.50  | 0.512+/-0.020  |
| E   | 1.75+/-0.10   | 0.069+/-0.004  |
| F   | 3.50+/-0.20   | 0.138+/-0.008  |
| P   | 2.00+/-0.20   | 0.079+/-0.008  |
| P0  | 4.00+/-0.20   | 0.157+/-0.008  |
| P1  | 2.00+/-0.20   | 0.079+/-0.008  |
| W   | 8.00+/-0.20   | 0.315+/-0.008  |
| W1  | 9.50+/-1.00   | 0.374+/-0.039  |

| OUTLINE | REEL<br>(PCS) | PER CARTON<br>(PCS) | REEL<br>DIAMETERS<br>(mm) | CARTON SIZE(mm) |     |     |
|---------|---------------|---------------------|---------------------------|-----------------|-----|-----|
|         |               |                     |                           | L               | W   | H   |
| TAPING  | 10,000        | 300,000             | 178                       | 390             | 370 | 220 |