

## Transient Voltage Suppressor

Version: A1 2024-4-25

### Features

- IEC 61000-4-2 (ESD)  $\pm 30\text{KV}$ (air),  $\pm 30\text{KV}$  (contact)
- IEC 61000-4-4(EFT): 40A (5/50ns)
- IEC 61000-4-5(surge): 8A (8/20us)
- 152Watts peak pulse power (tp=8/20μs)
- Low capacitance: 8pF (Typical)
- Small package: DFN0603-2L
- Moisture sensitivity level: Level 3

### Exterior



DFN0603-2L

### Application Information

- Computers and peripherals
- Communication systems
- Portable electronics
- Cellular phones audio

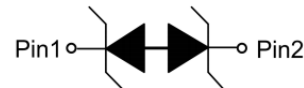
### Package (top view)



### 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<br>TLP <sup>③</sup> |    | Co <sup>④</sup> |     |
|---------------|-----------|----|----------------------|-----|----|---------------------|---|---------------------|---|------------------------|----------------------------|----|-----------------|-----|
|               | μA        | V  | V                    | V   | mA | V                   | A | V                   | A |                        | V                          | A  | pF              |     |
|               | MAX       |    | MIN                  | TYP |    | MAX                 |   | MAX                 |   | TYP                    | TYP                        |    | TYP             | MAX |
| BV-F612ZCB-AK | 0.1       | 12 | 13                   | 14  | 1  | 16                  | 1 | 19                  | 8 | 0.25                   | 15.8                       | 16 | 8               | 12  |

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

- ① IDRM is measured at VDRM=12V; VBR is measured at Ir=1mA;
- ② Surge Waveform: 8/20μs, pin 1 to pin2 and pin2 to pin1
- ③ TLP parameter: Z0 = 50Ω, tp = 100ns, tr = 1ns, RDYN is calculated from 4A to 16A
- ④ Off-state capacitance is measured in VDC=0V, f=1MHz

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### Part Numbering System

### Mark

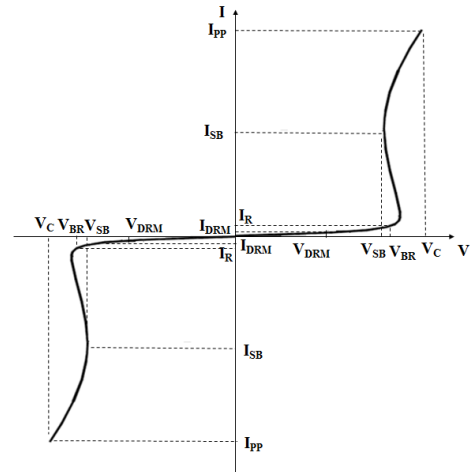
BV F6 12 Z C B-AK  
(1) (2) (3) (4) (5) (6)

- (1) Bencent Transient Voltage Suppressor
- (2) Package:DFN0603-2L
- (3) Off-state Voltage: 12V
- (4) Normal Capacitance
- (5) Bi-directional
- (6) Bencent internal code

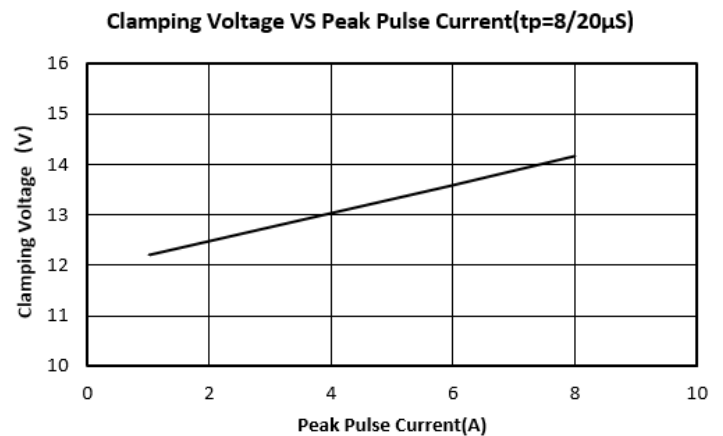
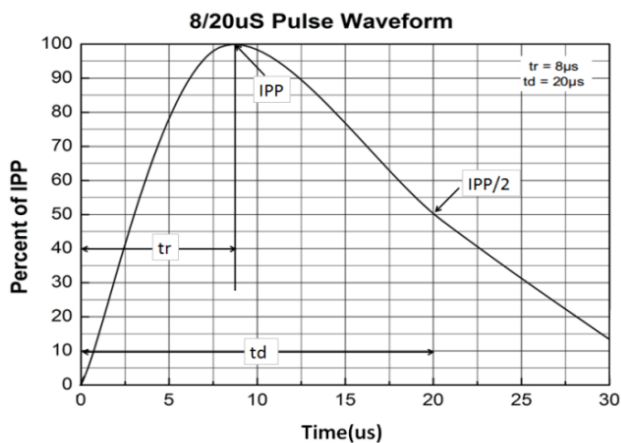


### V-I Curve

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

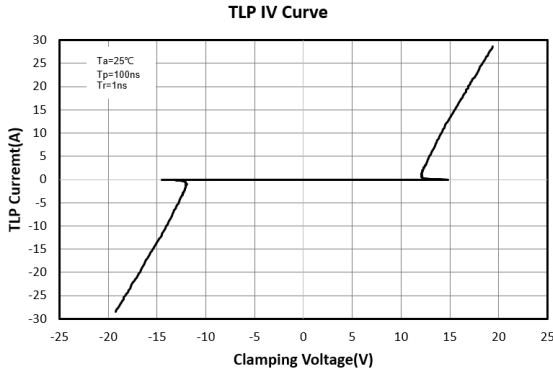


### Typical Characteristics



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### Thermal Considerations

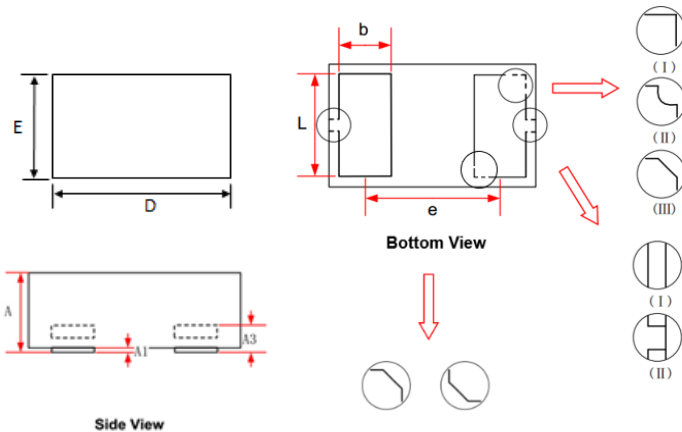
| symbol | Parameter                            | Value       | Unit               |
|--------|--------------------------------------|-------------|--------------------|
| $T_J$  | Operating Junction Temperature Range | -55 to +125 | $^{\circ}\text{C}$ |
| $T_S$  | Storage Temperature Range         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

### Environmental Characteristics

| Testing items                         | Technical standards                                                                              |
|---------------------------------------|--------------------------------------------------------------------------------------------------|
| High temperature Reverse Bias Test    | Temperature: $150\pm 3^{\circ}\text{C}$ 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 $-55^{\circ}\text{C}$ to $150^{\circ}\text{C}$<br>Dwell time: 30min, 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

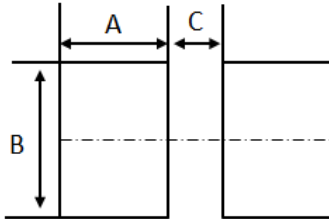


| REF | mm        | inch        |
|-----|-----------|-------------|
| A   | 0.23~0.35 | 0.009~0.014 |
| A1  | 0.00~0.05 | 0.000~0.002 |
| A3  | 0.102REF  | 0.004REF    |
| D   | 0.55~0.67 | 0.022~0.026 |
| E   | 0.25~0.37 | 0.010~0.015 |
| b   | 0.10~0.21 | 0.004~0.008 |
| e   | 0.36BSC   | 0.014BSC    |
| L   | 0.20~0.30 | 0.008~0.012 |

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### Recommended Soldering Pad



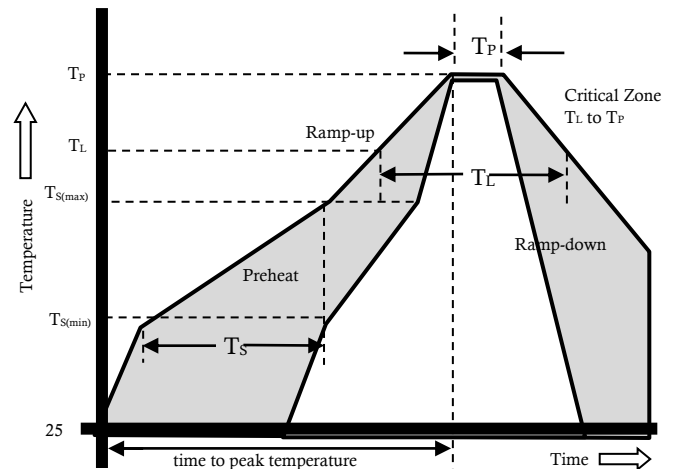
| REF | mm   | inch  |
|-----|------|-------|
| A   | 0.25 | 0.010 |
| B   | 0.30 | 0.012 |
| C   | 0.15 | 0.006 |

#### Notes:

This recommended land pattern is for reference purposes only. Please consult your manufacturing group to ensure your PCB design guidelines are met

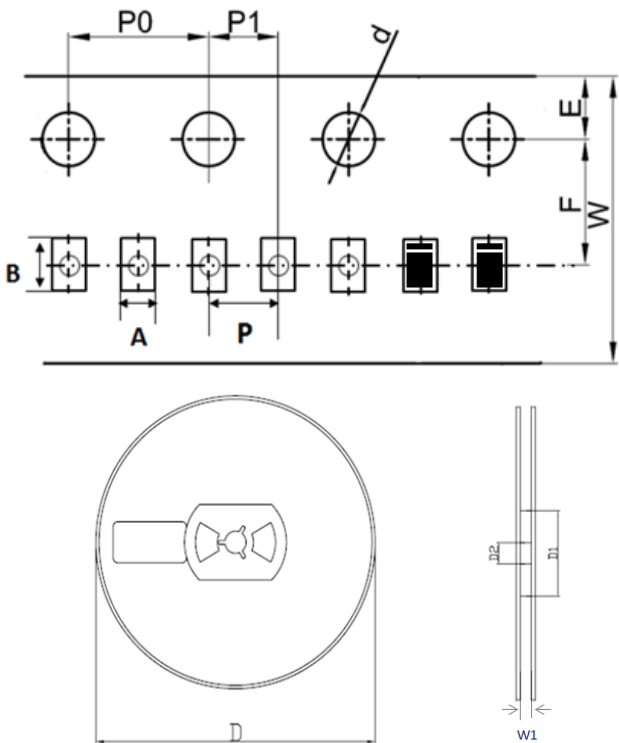
### Reflow Profile

| 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)<br>Tamp (T <sub>L</sub> ) to peal |                                          | 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            |



**Transient Voltage Suppressor**  
Package Reel Information

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| REF | mm            | inch           |
|-----|---------------|----------------|
| A   | 0.40+/-0.05   | 0.016+/-0.002  |
| B   | 0.70+/-0.05   | 0.028+/-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 |