

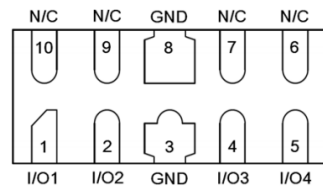
Transient Voltage Suppressor

Version: A1 2022-10-26

Features

- IEC61000-4-2(ESD) $\pm 21\text{KV}$ (air), $\pm 16\text{KV}$ (Contact)
- IEC61000-4-4(EFT) 40A (5/50nS)
- IEC61000-4-5(Lightning) 6A (8/20uS)
- Working Voltage: 3.3V
- VSB : 4.0V min
- 4 Lines Protection
- Low leakage current
- Moisture sensitivity level: Level 3

Exterior



DFN2510

Application Information

- High Definition Multi-Media Interface (HDMI1.3/1.4/2.0)
- Digital Visual Interface (DVI)
- Display Port Interface
- Serial ATA
- PCI Express
- USB 1.1/2.0/3.0/3.1/OTG


Package (top view)



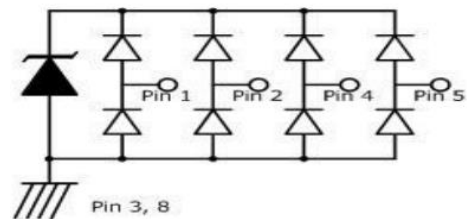
T6:Product Code

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Agency Approvals

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

Schematic



Part Number and Electrical Parameter

| Part Number | $I_{\text{DRM}}@ V_{\text{DRM}}$ | | $V_{\text{BR}}^{\text{①}}@ I_{\text{R}}$ | | $V_{\text{c}}@I_{\text{pp}}^{\text{②}}$ 8/20 μs | | R_{DYN} @TLP $^{\text{③}}$ | $V_{\text{c}}@I_{\text{pp}}$ TLP $^{\text{③}}$ | | $C_{\text{o}}^{\text{④}}$ | $C_{\text{o}}^{\text{⑤}}$ |
|-------------|----------------------------------|-----|--|----|---|---|--|--|----|---------------------------|---------------------------|
| | μA | V | V | mA | V | A | Ω | V | A | pF | pF |
| | MAX | | MIN | | MAX | | TYP | TYP | | MAX | MAX |
| BV-FK03U4CB | 1 | 3.3 | 4.0 | 1 | 10 | 5 | 0.25 | 9 | 16 | 0.45 | 0.65 |

Absolute maximum ratings measured at $T_{\text{A}} = 25^{\circ}\text{C}$ RH = 45%-75% (unless otherwise noted).

- ① VBR is measured at $I_{\text{R}} = 1\text{mA}$, pin1, 2, 4, 5 to pin 3, 8
- ② Surge Waveform: 8/20 μs , pin1,2,4,5 to pin 3,8
- ③ TLP parameter: $Z_0 = 50\Omega$, $t_{\text{p}} = 100\text{ns}$, $t_{\text{r}} = 2\text{ns}$, averaging window from 60ns to 80ns. RDYN is calculated from 4A to 16A.
- ④ Off-state capacitance is measured in $V_{\text{DC}} = 0\text{V}$, $V_{\text{RMS}} = 1\text{V}$, $f = 1\text{MHz}$, IO to IO
- ⑤ Off-state capacitance is measured in $V_{\text{DC}} = 0\text{V}$, $V_{\text{RMS}} = 1\text{V}$, $f = 1\text{MHz}$, IO to GND.

Transient Voltage Suppressor

Part Numbering System

BV FK 03 U 4 C B
(1) (2) (3) (4) (5) (6) (7)

- (1) Bencent Transient Voltage Suppressor
- (2) Package: DFN2510
- (3) Working Voltage:3.3V
- (4) Low Capacitance
- (5) 4 Lines Protection
- (6) Bi-directional,IO to IO
- (7) Bencent intenal code

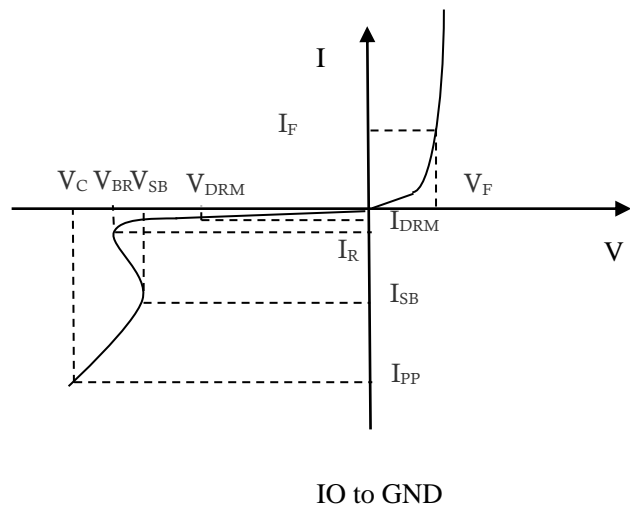
Mark



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XXXX:Date Code

V-I Curve

| Parameters | Definition |
|------------|------------------------------|
| VC | Clamping voltage |
| Ipp | Peak pulse current |
| VDRM | Stand-off Voltage |
| VBR | Breakdown Voltage |
| VSB | Snapback Voltage |
| IDRM | Reverse Leakage Current |
| IR | Test current |
| ISB | Test current |
| VF | Forward on-state voltage |
| IF | Forward current |
| Ppp | Peak Pulse Power Dissipation |



Thermal Consideration

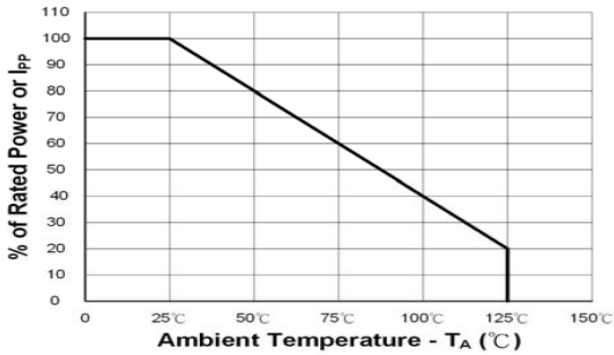
| symbol | Parameter | Value | Unit |
|--------|--------------------------------------|-------------|------|
| TJ | Operating Junction Temperature Range | -40 to +125 | °C |
| TS | Storage Temperature Range | -55 to +150 | °C |

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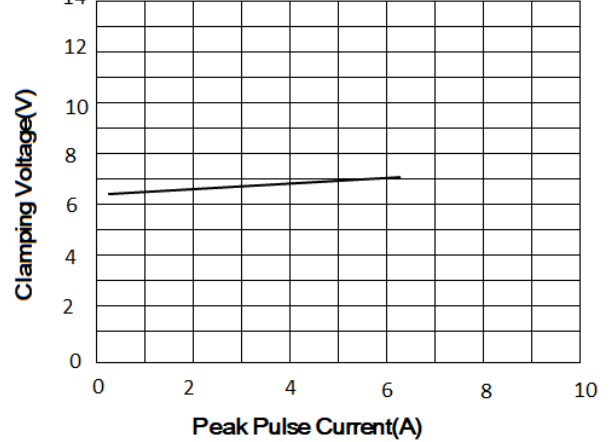
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Typical Characteristics

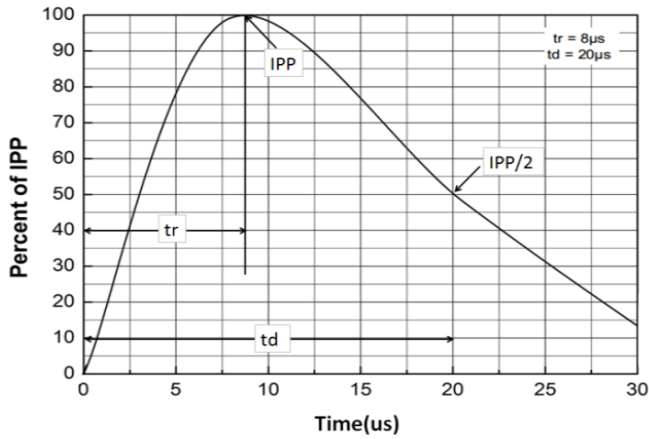
Power Derating Curve



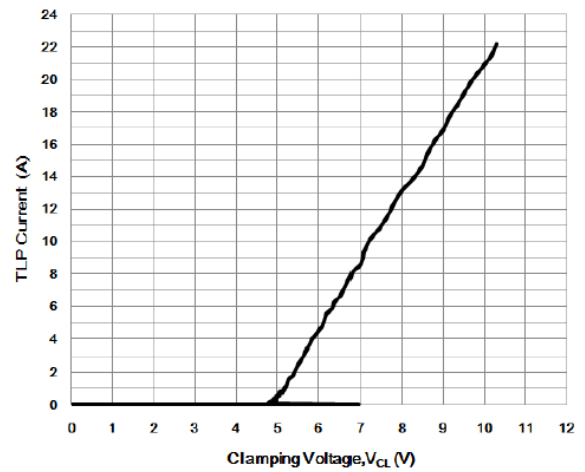
Clamping Voltage Vs. Peak Pulse Current



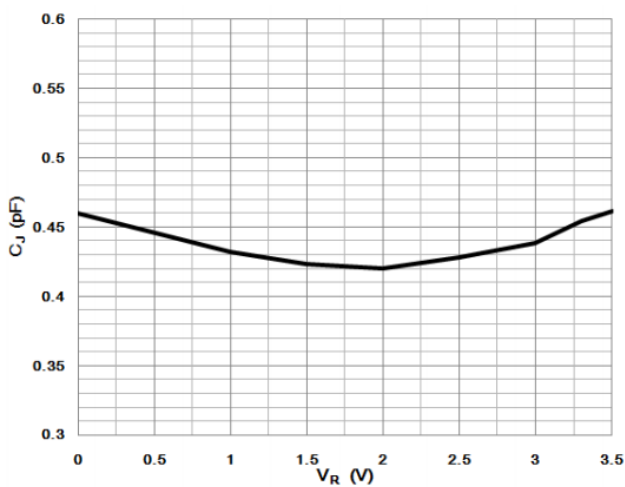
8/20uS Pulse Waveform



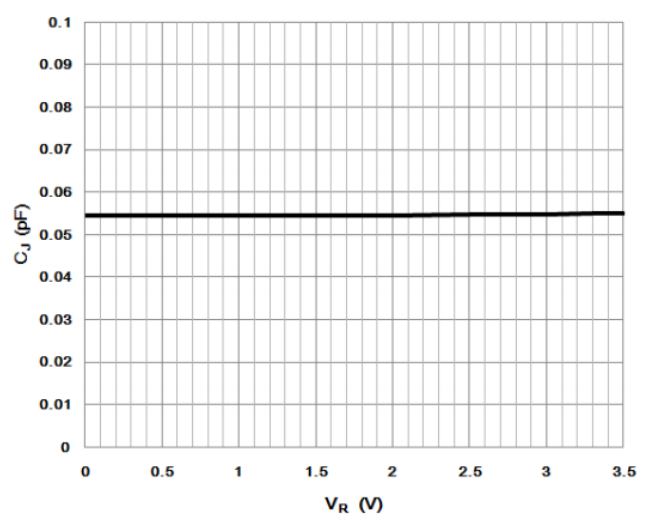
Positive TLP Clamping Voltage (tperiod=100ns, tr=1ns)



Junction Capacitance (I/O Pin to GND)



Junction Capacitance (I/O Pin to I/O Pin)



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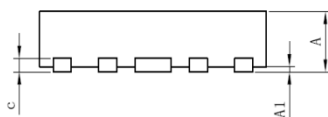
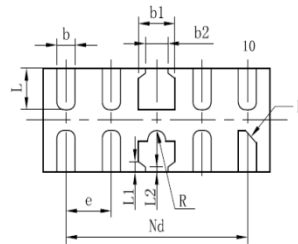
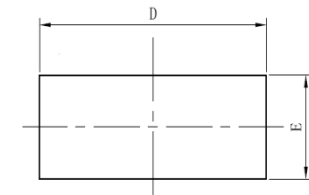
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Environmental Characteristics

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

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

Product Dimensions

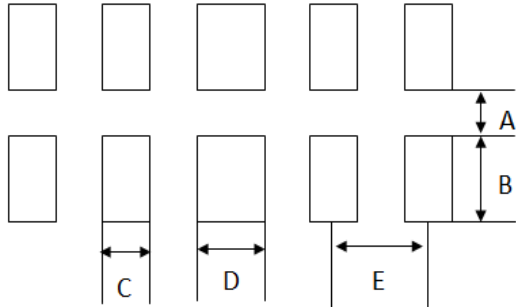


| REF | mm | inch |
|-----|-----------|-------------|
| A | 0.45~0.55 | 0.018~0.022 |
| A1 | 0.00~0.05 | 0.000~0.002 |
| b | 0.15~0.25 | 0.006~0.01 |
| b1 | 0.35~0.45 | 0.014~0.018 |
| b2 | 0.13~0.3 | 0.005~0.012 |
| c | 0.1~0.2 | 0.004~0.008 |
| D | 2.40~2.60 | 0.094~0.102 |
| e | 0.50BSC | 0.020BSC |
| Nd | 2.00BSC | 0.079BSC |
| E | 0.90~1.10 | 0.035~0.043 |
| L | 0.30~0.50 | 0.012~0.020 |
| L1 | 0.075REF | 0.003REF |
| L2 | 0.05REF | 0.002REF |
| h | 0.08~0.15 | 0.003~0.006 |
| R | 0.05~0.15 | 0.002~0.006 |

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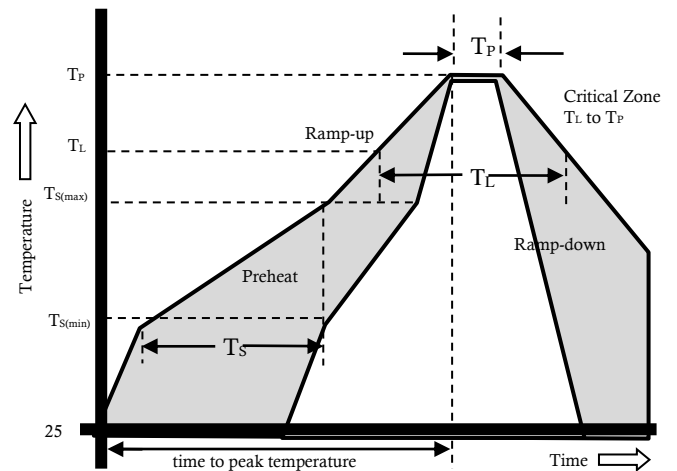
Recommended Soldering Pad



| REF | mm | inch |
|-----|------|-------|
| A | 0.2 | 0.008 |
| B | 0.6 | 0.024 |
| C | 0.3 | 0.012 |
| D | 0.45 | 0.018 |
| E | 0.5 | 0.020 |

Reflow Profile

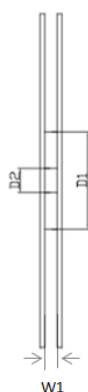
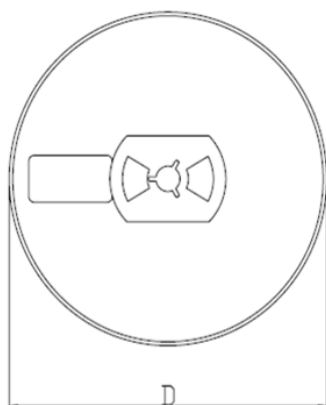
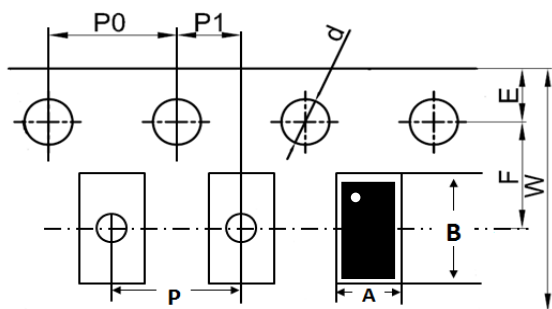
| Reflow Condition | | Pb-Free assembly |
|---|--|------------------|
| Pre Heat | Temperature Min | 150°C |
| | Temperature Max | 200°C |
| | Time (min to max) | 60 – 180 secs |
| Average ramp up rate (Liquid) Tamp (T _L) to peak | | 3°C/s max |
| T _{S(max)} to T _L - Ramp-up Rate | | 3°C/s max |
|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



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Package Reel Information



| REF | mm | inch |
|-----|---------------|----------------|
| A | 1.2+/-0.10 | 0.047+/-0.004 |
| B | 2.7+/-0.10 | 0.106+/-0.004 |
| 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 | 4.00+/-0.20 | 0.157+/-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 (pcs) | Per Carton (pcs) | Reel Diameters (mm) | Carton Size(mm) | | |
|---------|------------|------------------|---------------------|-----------------|-----|-----|
| | | | | L | W | H |
| Taping | 3,000 | 90,000 | 178 | 390 | 370 | 220 |