

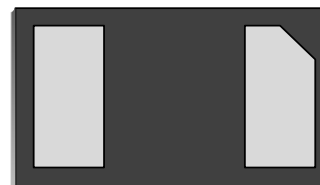


## WS05DTUF-BL

### Transient Voltage Suppressor

#### Features

- Small Body Outline Dimensions
- Protect one data line
- Low Clamping Voltage
- Low Capacitance
- Working Voltage:5V
- Low Leakage Current



DFN1006-2L

#### IEC COMPATIBILITY (EN61000-4)

- IEC 61000-4-2 (ESD)  $\pm 20\text{kV}$  (air),  $\pm 15\text{kV}$  (contact)
- IEC 61000-4-4 (EFT) 40A (5/50ns)
- IEC 61000-4-5 (Lightning) 4.5A (8/20 $\mu\text{s}$ )

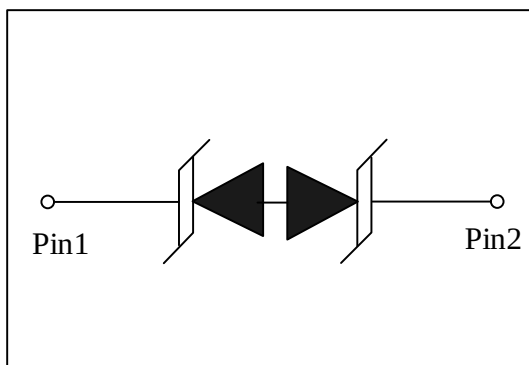
#### Mechanical Characteristics

- DFN1006-2L package
- Marking: Marking Code
- Packaging: Tape and Reel
- RoHS Compliant & HF
- Device meets MSL1 requirement

#### Applications

- USB 2.0 and USB 3.0
- HDMI 1.3 and HDMI 1.4
- SATA and ESATA
- DVI
- IEEE 1394
- PCI Express
- Portable Electronics
- Notebooks

#### Schematic & PIN Configuration

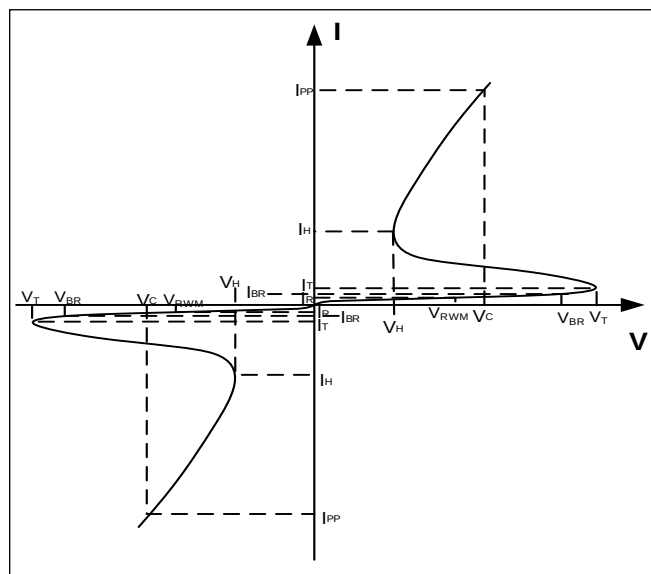


## Absolute Maximum Rating

| Rating                                   | Symbol    | Value        | Units |
|------------------------------------------|-----------|--------------|-------|
| Peak Pulse Power ( $t_p = 8/20\mu s$ )   | $P_{PP}$  | 36           | W     |
| Peak Pulse Current ( $t_p = 8/20\mu s$ ) | $I_{PP}$  | 4.5          | A     |
| Operating Temperature                    | $T_J$     | -55 to + 125 | °C    |
| Storage Temperature                      | $T_{STG}$ | -55 to +150  | °C    |

## Electrical Parameters

| Symbol    | Parameter                           |
|-----------|-------------------------------------|
| $I_{PP}$  | Reverse Peak Pulse Current          |
| $V_C$     | Clamping Voltage @ $I_{PP}$         |
| $V_{RWM}$ | Reverse Stand-Off Voltage           |
| $I_{BR}$  | Reverse Stand-Off Current           |
| $I_R$     | Reverse Leakage Current @ $V_{RWM}$ |
| $V_{BR}$  | Breakdown Voltage @ $I_T$           |
| $V_C$     | Test Voltage                        |
| $I_T$     | Test Current                        |
| $V_H$     | Holding Voltage                     |
| $I_H$     | Holding current                     |



## Electrical Characteristics(T=25°C unless otherwise noted)

| WS05DTUF-BL                       |           |                                     |         |         |         |          |
|-----------------------------------|-----------|-------------------------------------|---------|---------|---------|----------|
| Parameter                         | Symbol    | Conditions                          | Minimum | Typical | Maximum | Units    |
| Reverse Stand-Off Voltage         | $V_{RWM}$ |                                     |         |         | 5       | V        |
| Reverse Breakdown Voltage         | $V_{BR}$  | $I_T = 1mA$                         | 6       |         |         | V        |
| Reverse Leakage Current           | $I_R$     | $V_{RWM} = 5V$ ,                    |         |         | 200     | nA       |
| Holding current                   | $I_H$     | $T = 25^\circ C$                    |         | 50      |         | mA       |
| Clamping Voltage                  | $V_C$     | $I_{PP} = 4.5A$ , $t_p = 8/20\mu s$ |         | 5.5     | 8       | V        |
| ESD Clamping Voltage <sup>1</sup> | $V_C$     | $I_{PP} = 4A$<br>$t_p = 0.2/100ns$  |         | 4.2     |         | V        |
| ESD Clamping Voltage <sup>1</sup> | $V_C$     | $I_{PP} = 16A$<br>$t_p = 0.2/100ns$ |         | 8.3     |         | V        |
| Dynamic Resistance <sup>1,2</sup> | $R_{DYN}$ | $TLP = 0.2/100ns$                   |         | 0.34    |         | $\Omega$ |
| Junction Capacitance              | $C_j$     | $V_R = 0V$ , $f = 1MHz$             |         | 0.55    | 0.65    | pF       |

Notes : 1、TLP Setting :  $t_p = 100ns$ ,  $t_r = 0.2ns$ ,  $I_{TLP}$  and  $V_{TLP}$  sample window:  $t_1 = 70ns$  to  $t_2 = 90ns$ .

2、Dynamic resistance calculated from  $I_{PP} = 4A$  to  $I_{PP} = 16A$  using "Best Fit".

## Typical Characteristics

Figure 1: Peak Pulse Power Vs Pulse Time

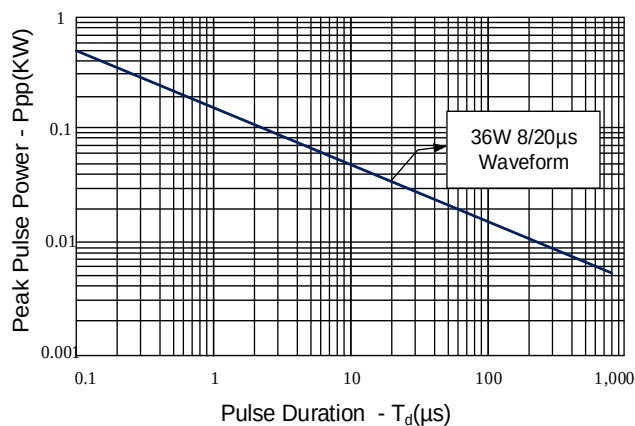


Figure 2: Power Derating Curve

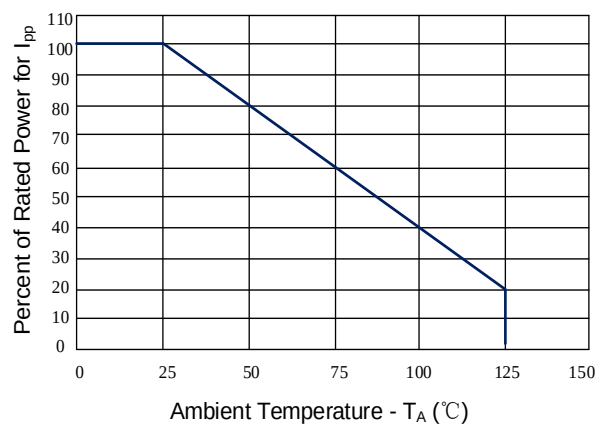


Figure 3: Clamping Voltage vs. Peak Pulse Current

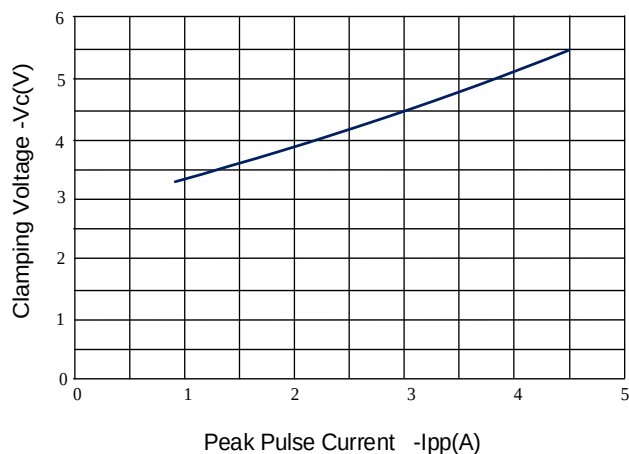


Figure 4: Normalized Junction Capacitance vs. Reverse Voltage

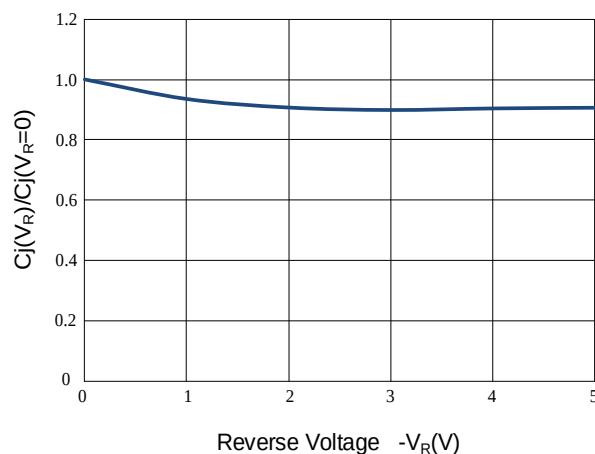


Figure 5: TLP Positive I-V Curve

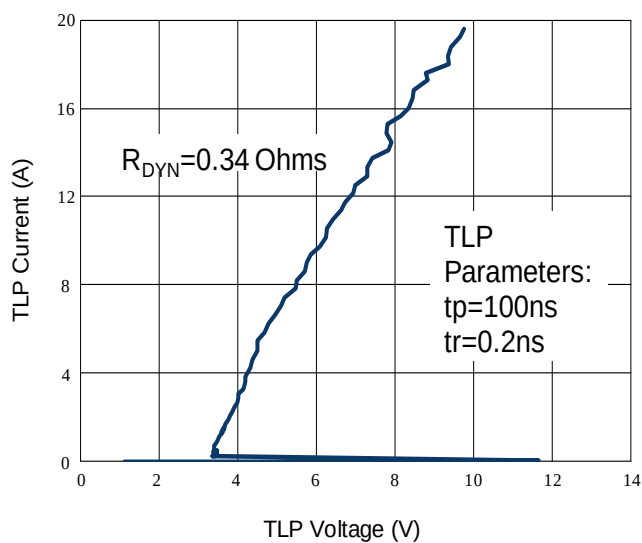
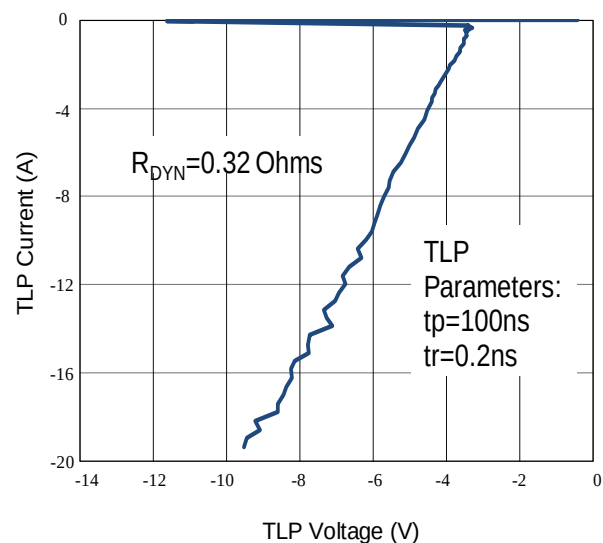
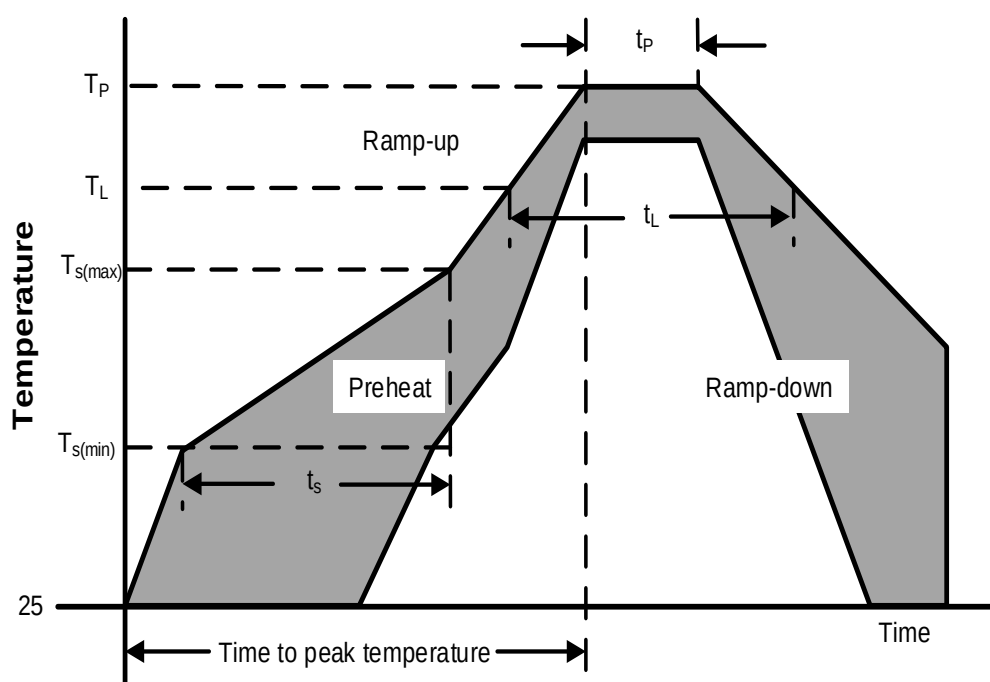


Figure 6: TLP Negative I-V Curve



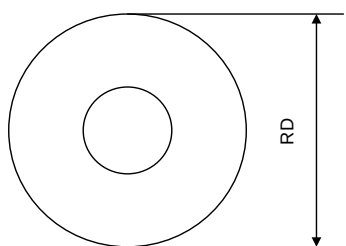
## Soldering Parameters

| Reflow Condition                                       |                                  | Pb – Free assembly |
|--------------------------------------------------------|----------------------------------|--------------------|
| Pre Heat                                               | Temperature Min ( $T_{s(min)}$ ) | 150°C              |
|                                                        | Temperature Max ( $T_{s(max)}$ ) | 200°C              |
|                                                        | Time (min to max) ( $t_s$ )      | 60 – 190 secs      |
| Average ramp up rate (Liquidus Temp) ( $T_L$ ) to peak |                                  | 5°C/second max     |
| $T_{s(max)}$ to $T_L$ —Ramp-up Rate                    |                                  | 5°C/second max     |
| Reflow                                                 | Temperature ( $T_L$ ) (Liquidus) | 217°C              |
|                                                        | Temperature ( $t_L$ )            | 60 – 150 seconds   |
| Peak Temperature ( $T_P$ )                             |                                  | 260+0/-5 °C        |
| Time within actual peak Temperature ( $t_p$ )          |                                  | 20 – 40 seconds    |
| Ramp-down Rate                                         |                                  | 5°C/second max     |
| Time 25°C to peak Temperature ( $T_P$ )                |                                  | 8 minutes Max.     |
| Do not exceed                                          |                                  | 280°C              |

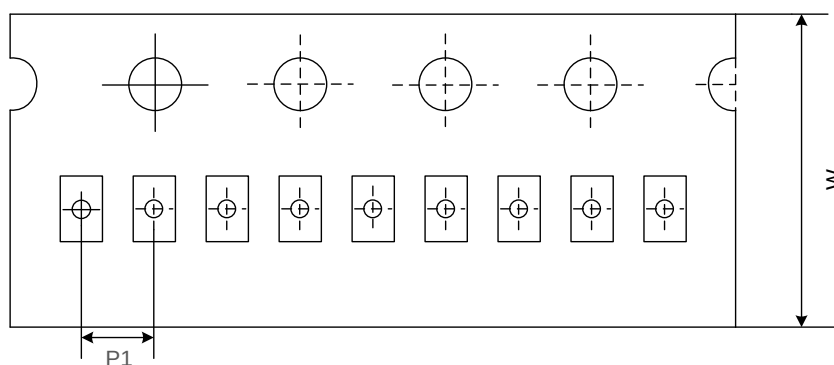


## Tape And Reel Information

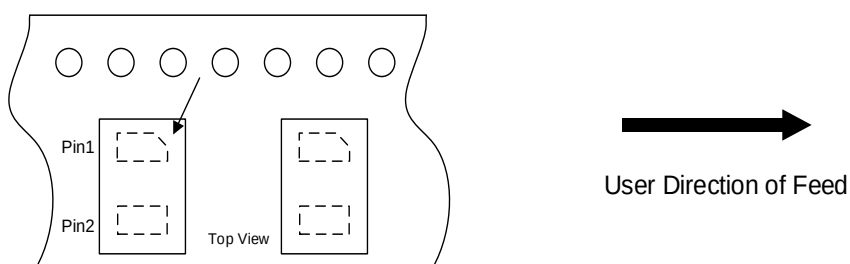
Reel Dimensions



Tape Dimensions

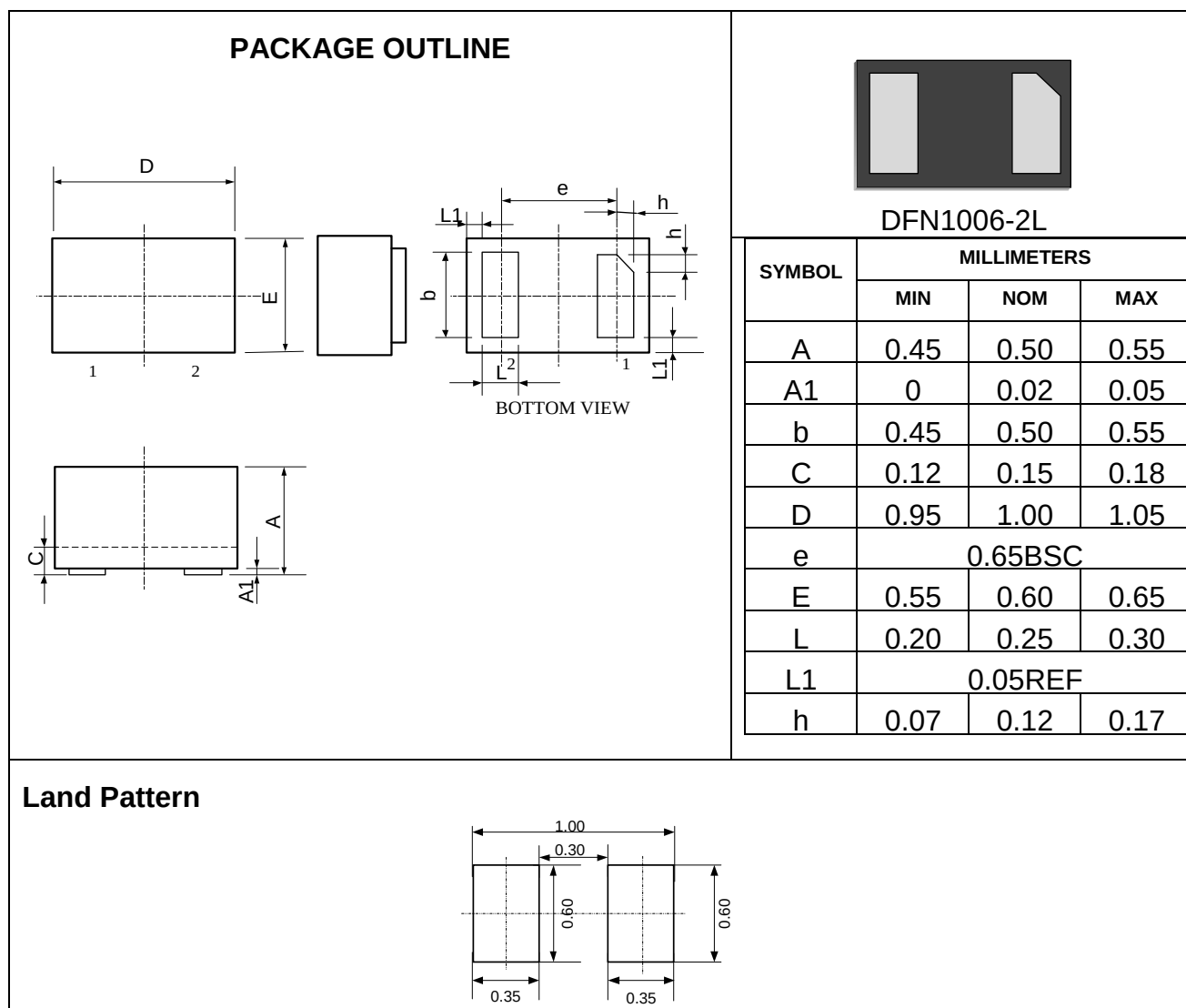


Quadrant Assignments For PIN1 Orientation In Tape



|    |                                         |        |
|----|-----------------------------------------|--------|
| RD | Reel Dimensions                         | 7 inch |
| W  | Overall width of the carrier tape       | 8 mm   |
| P1 | Pitch between successive cavity centers | 2mm    |

## Outline Drawing –DFN1006-2L



## Marking Codes

| Part Number | Marking Code                                                                                                                                                                                                                                                                                                |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WS05DTUF-BL | <div style="border: 1px solid black; padding: 5px; text-align: center;"> <div style="display: flex; justify-content: space-between;"> <span>1</span> <span><b>KSX</b></span> <span>2</span> </div> <div style="font-size: 0.8em; margin-top: 5px;"> KS=Specific Device Code<br/> X=Month Code </div> </div> |

## Package Information

Qty: 10k/Reel

## CONTACT INFORMATION

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For additional information, please contact your local Sales Representative.

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Specifications are subject to change without notice.  
The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time.  
Users should verify actual device performance in their specific applications.