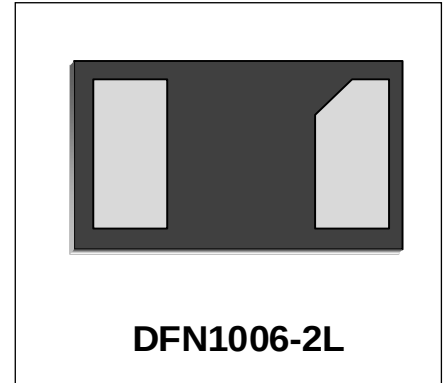


### Features

- 950 Watts Peak Pulse Power per Line ( $t_p=8/20\mu s$ )
- Small Body Outline Dimensions
- Protects one I/O or power line
- Working Voltage: 4.85V
- Low Leakage Current

### IEC COMPATIBILITY (EN61000-4)

- IEC 61000-4-2 (ESD)  $\pm 30kV$  (air),  $\pm 30kV$  (contact)
- IEC 61000-4-4 (EFT) 40A (5/50ns)
- IEC 61000-4-5 (Lightning) 95A (8/20 $\mu s$ )



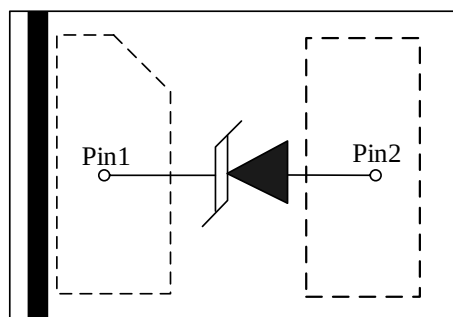
### Mechanical Characteristics

- DFN1006-2L package
- Marking : Marking Code
- Packaging : Tape and Reel per EIA 481
- RoHS Compliant

### Applications

- Cellular Handsets & Accessories
- Personal Digital Assistants (PDAs)
- Notebooks & Handhelds
- Portable Instrumentation
- Digital Cameras

### Schematic & PIN Configuration

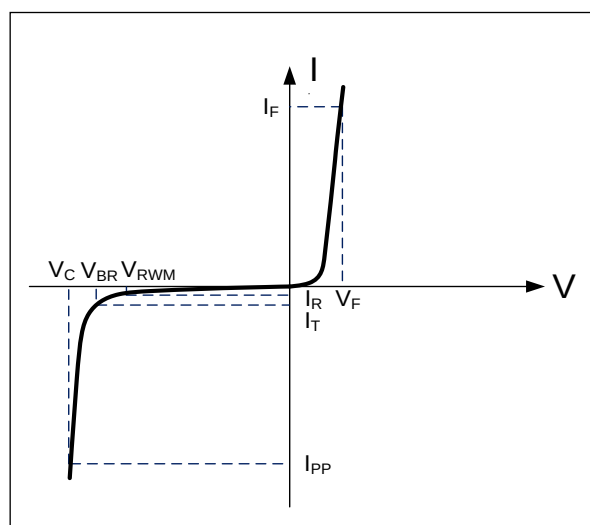


(TOP VIEW)

| Absolute Maximum Rating                  |           |             |       |
|------------------------------------------|-----------|-------------|-------|
| Rating                                   | Symbol    | Value       | Units |
| Peak Pulse Power ( $t_p = 8/20\mu s$ )   | $P_{PP}$  | 950         | Watts |
| Peak Pulse Current ( $t_p = 8/20\mu s$ ) | $I_{PP}$  | 95          | A     |
| Operating Temperature                    | $T_J$     | -55 to +125 | °C    |
| Storage Temperature                      | $T_{STG}$ | -55 to +150 | °C    |

## Electrical Parameters (T=25°C)

| Symbol    | Parameter                           |
|-----------|-------------------------------------|
| $I_{PP}$  | Reverse Peak Pulse Current          |
| $V_C$     | Clamping Voltage @ $I_{PP}$         |
| $V_{RWM}$ | Reverse Stand-Off Voltage           |
| $I_R$     | Reverse Leakage Current @ $V_{RWM}$ |
| $V_{BR}$  | Breakdown Voltage @ $I_T$           |
| $I_T$     | Test Current                        |
| $I_F$     | Forward Current                     |
| $V_F$     | Forward Voltage @ $I_F$             |



## Electrical Characteristics

| ES45DFVH                          |           |                                             |         |         |         |          |
|-----------------------------------|-----------|---------------------------------------------|---------|---------|---------|----------|
| Parameter                         | Symbol    | Conditions                                  | Minimum | Typical | Maximum | Units    |
| Reverse Stand-Off Voltage         | $V_{RWM}$ |                                             |         |         | 4.85    | V        |
| Reverse Breakdown Voltage         | $V_{BR}$  | $I_T = 1mA$                                 | 5       |         |         | V        |
| Reverse Leakage Current           | $I_R$     | $V_{RWM} = 4.85V$ , $T = 25^\circ C$        |         |         | 500     | nA       |
| Forward Voltage                   | $V_F$     | $I_F = 10mA$                                | 0.5     |         | 1.2     | V        |
| Clamping Voltage                  | $V_C$     | $I_{PP} = 95A$ , $t_p = 8/20\mu s$          |         | 8.8     | 10      | V        |
| Dynamic Resistance <sup>1,2</sup> | $R_{DYN}$ | $TLP = 0.2/100ns$                           |         | 0.03    |         | $\Omega$ |
| ESD Clamping Voltage <sup>1</sup> | $V_C$     | $I_{PP} = 4A$ ,<br>$t_p = 0.2/100ns$ (TLP)  |         | 5.8     |         | V        |
| ESD Clamping Voltage <sup>1</sup> | $V_C$     | $I_{PP} = 16A$ ,<br>$t_p = 0.2/100ns$ (TLP) |         | 6.1     |         | V        |
| Junction Capacitance              | $C_j$     | $V_R = 0V$ , $f = 1MHz$                     |         | 245     | 300     | pF       |

**Note:** 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

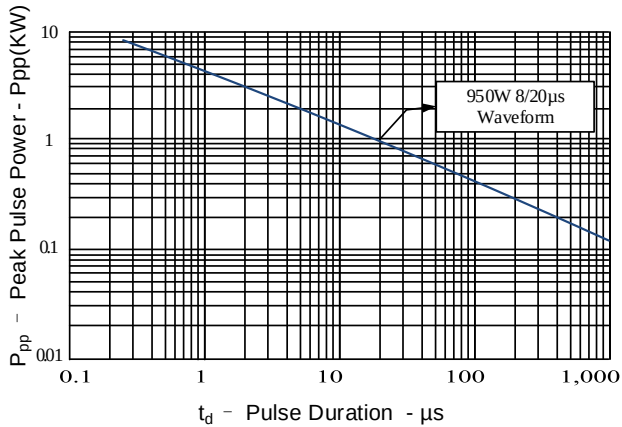


Figure 2: Power Derating Curve

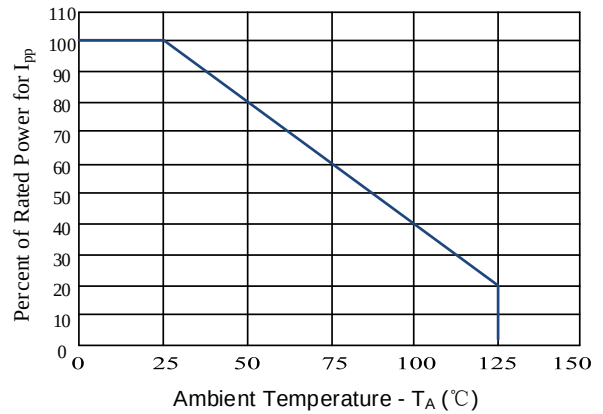


Figure 3: Clamping Voltage vs. Peak Pulse Current

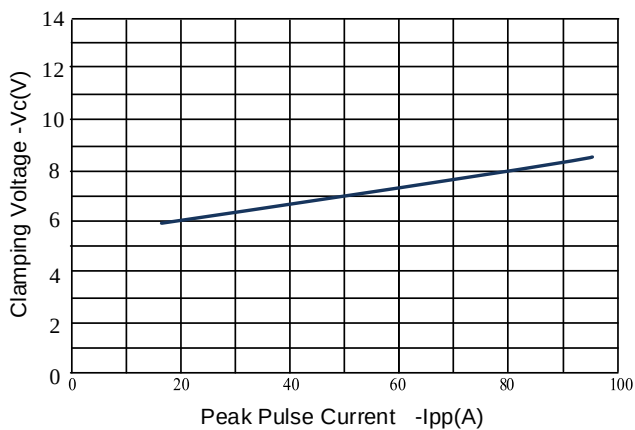


Figure 4: Normalized Junction Capacitance vs. Reverse Voltage

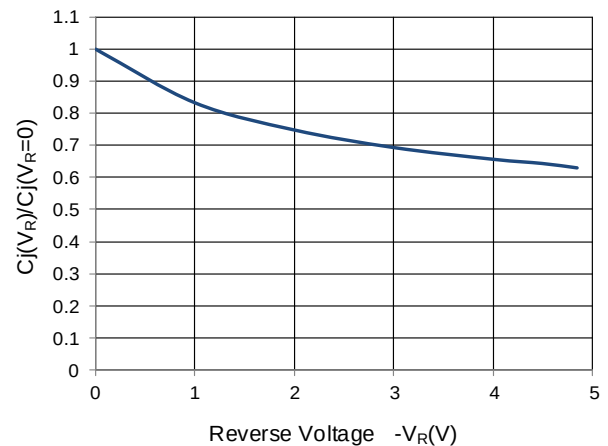


Figure 5: 8/20 $\mu s$  Pulse Waveform

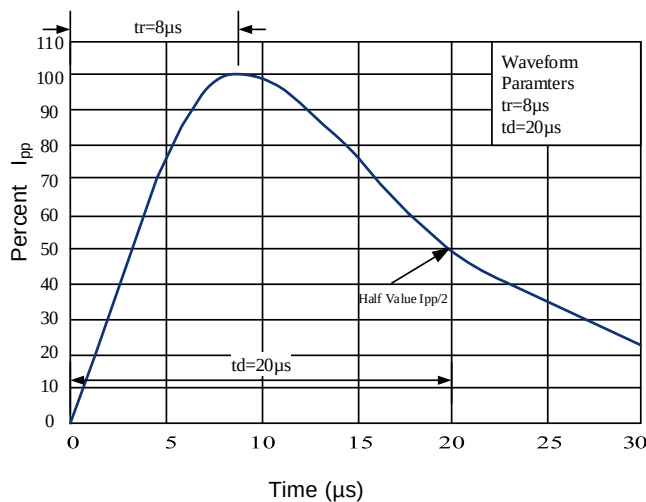
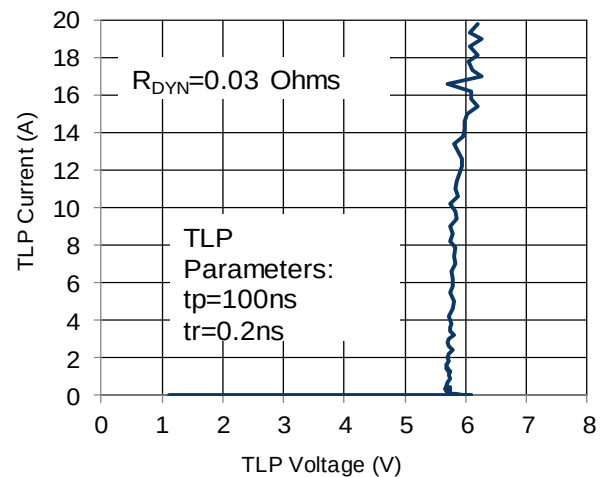
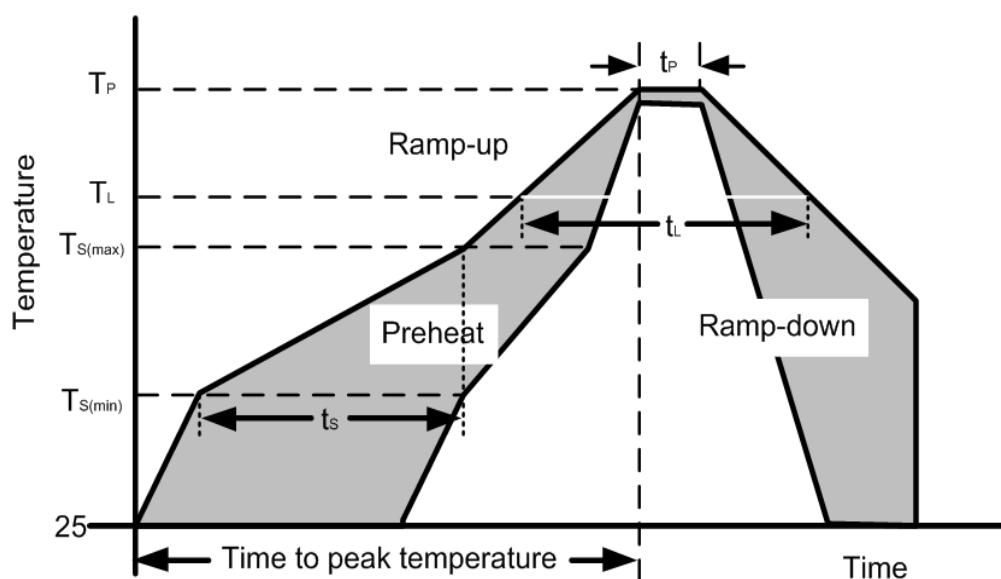


Figure 6: TLP Curve



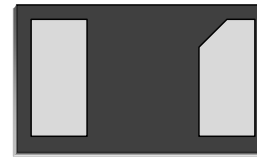
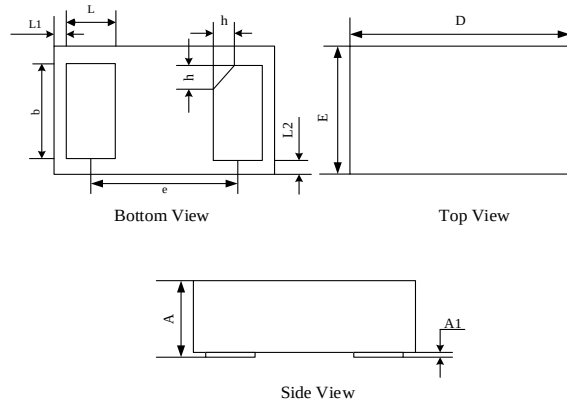
## Soldering Parameters

| 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              |



## Outline Drawing –DFN1006-2L

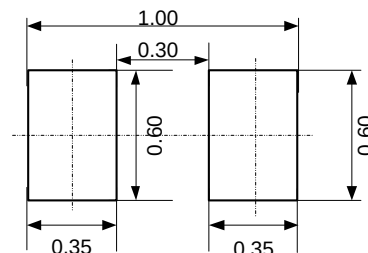
## PACKAGE OUTLINE



DFN1006-2L

| SYMBOL | MILLIMETERS |       |       | Dimension In Inches |       |       |
|--------|-------------|-------|-------|---------------------|-------|-------|
|        | NOM         | MIN   | MAX   | NOM                 | MIN   | MAX   |
| A      | --          | 0.35  | 0.400 | --                  | 0.014 | 0.016 |
| A1     | --          | --    | 0.050 | --                  | --    | 0.002 |
| D      | 1.020       | 0.990 | 1.050 | 0.040               | 0.039 | 0.041 |
| E      | 0.620       | 0.590 | 0.650 | 0.024               | 0.023 | 0.026 |
| b      | 0.480       | 0.430 | 0.530 | 0.019               | 0.017 | 0.021 |
| L      | 0.220       | 0.170 | 0.270 | 0.009               | 0.007 | 0.011 |
| h      | 0.125       | 0.075 | 0.175 | 0.005               | 0.003 | 0.007 |
| L1     | 0.075REF    |       |       | 0.003REF            |       |       |
| L2     | 0.070REF    |       |       | 0.003REF            |       |       |
| e      | 0.650BSC    |       |       | 0.026BSC            |       |       |

## Land Pattern



## Marking Codes

| Part Number | Marking Code                                                                                                                   |
|-------------|--------------------------------------------------------------------------------------------------------------------------------|
| ES45DFVH    | <div> <div>1</div> <div> <div></div> <div>KVX</div> </div> <div>2</div> </div> <p>KV=Specific Device Code<br/>X=Month Code</p> |

## Package Information

Qty: 10k/Reel